Report of Fisheries Investigations

Basic Survey and Inventory of Species, as Well as Their Distribution in the Clear Fork of the Brazos River in Region 3-B, Texas

by

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ABSTRACT

A total of 152 gill nets were set and 39 seining collections were made to collect 9,023 specimens of fish representing 31 species from the Clear Fork of the Brazos River and its watershed. Desirable game fish populations were found to be exceedingly scarce in the river but more abundant in lakes on the watershed. Redhorse shiners (Notropis lutrensis) and stunted sunfish were found to be the most numerous species in the river while gizzard shad (Dorosoma cepedianum), channel catfish (Ictalurus punctatus), and small white crappie (Pomoxis annularis) were found to be very prevalent in the lakes on the watershed. The principal fisheries problems were, in general, found to be excessive populations of gizzard shad, river carpsucker (Carpiodes carpio) and stunted crappie and sunfish and widespread salt water pollution emitting from oil wells, which has apparently reduced considerably, or completely eliminated game fish populations in several localities.

Job Completion Report

FILE

State of TEXAS

Project No. F-5-R-7 Name: Fisheries Investigations and Surveys of the Waters of Region 3-B.

Job No. B-16 Title: Basic Survey and Inventory of Species, as Well as Their Distribution in the Clear Fork of the Brazos River in Region 3-B, Texas

Period Covered: April 16, 1958 - March 31, 1960

OBJECTIVES

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

PROCEDURE

The Clear Fork of the Brazos River and its watershed was divided into upper and lower regions on the basis of its physical and botanical aspects. All physical, chemical and biological data were organized and analyzed in relation to the location from which they were collected. A total of 152 nets were set and 39 seining collections were made on the complete watershed. Of this total 134 netting collections and 32 seining collections were made in the region designated as the upper watershed and 18 netting collections and 7 seining collections were made in the region designated as the lower watershed. A greater number of netting and seining collections were made in the upper region than in the lower region because in the upper region there were more lakes to set nets in and more water suitable for seining. Altogether there were 29 seining collections taken from the river, 5 seining collections taken from tributaries to the river and 5 seining collections taken from lakes on the watershed. There were 12 netting collections taken from the river and 140 nets were set in lakes on the watershed. Netting was impossible in the river's tributaries due to shallow water and narrow creek beds. Some of the netting collections from lakes were obtained in conjunction with other Dingell-Johnson work.

The nets used were experimental type gill nets, 125 feet long and 8 feet deep with five 25-foot sections of webbing ranging from 1-inch to 3-inch square mesh.

Five types of seines were employed in making seine collections. They included a 12' X 4' commonsense seine, a 20' X 6' commonsense seine, a 30' X 6' bag seine with $\frac{1}{4}$-inch mesh, a nylon straight seine measuring 50' X 6' with $\frac{1}{4}$-inch mesh, and a nylon straight seine measuring 100' X 6' with $\frac{1}{2}$-inch mesh.

Specimens collected by seining were taken to the laboratory for identification and study. Samples of each species were preserved in a 10 percent formalin solution. Specimens collected by netting were examined in the field for stomach contents and sexual development and were weighed and measured in order to obtain growth and condition information. All data collected was recorded on fish collections forms in the field and later combined and tabulated in the office.

Temperature, pH, and turbidity was recorded at every third station. Water samples were also collected but it was found that reasonably extensive water analyses data were available by combining records obtained from the Texas Board of Water Engineers, the Texas Health Department and the United States Geological Survey. Physical and botanical observations were also made at various netting and seining localities during the course of the survey.

No rotenone treatment of pools was attempted on the river or tributaries because of flowing water or the danger of flowing water in case of rain. It was feared that this flowing water would cause fish eradication on private property where permission had not been obtained to conduct such work.

FINDINGS

Although the division of the Clear Fork of the Brazos River into upper and lower regions was done on the basis of the physical and botanical characteristics found in each region, the exact line that was selected to divide the two areas had to be chosen in a more or less arbitrary manner. No sharp line of topographical change exists, although there is a definite change in the topography and ecological aspects of the upper and lower regions. The most logical place to divide the watershed was found to be at the Leuders Dam which is located almost on the county line between Jones and Shackelford Counties. This line extends upward between Haskell and Throckmorton Counties and downward between Taylor and Callahan Counties. Using these county lines as a division point between the upper and lower watershed of the Clear Fork of the Brazos River, Haskell, Jones, Taylor, Fisher, Nolan, and Scurry Counties are in the upper region. Throckmorton, Shackelford, Callahan, Young, Stephens, and Eastland Counties are in the lower region.

Physical Characteristics

Upper watershed - The Clear Fork of the Brazos River arises in the southeastern part of Scurry County from a series of small springs which flow sporadically and only in periods of heavy moisture. The river in this area is actually more like a creek, dry much of the time with shallow banks and a narrow bed. Permian red soils prevail in this area and much of the land is in cultivation. When the river flows in this area, it usually contains much red and brown colloidal suspension. As the stream progresses through Fisher and Jones Counties a multitude of creeks, many of which arise in Nolan and Taylor Counties, are added to the watershed. This additional drainage area tends to create a more permanent stream, with wider banks and greater flow in the eastern part of the upper Clear Fork of the Brazos River watershed. This terrain is also for the most part flat cultivated land but contains more rolling pasture in the eastern areas. At Nugent, which is the eastern extremity of the upper region, average annual runoff figures for a period of 30.6 years equalled 91,770 acre feet. The minimum flow recorded during this period was 7,830 acre feet and the maximum flow recorded was 518,000 acre feet.

Lower watershed - The Clear Fork of the Brazos River below the Leuders Dam is a wider, deeper stream bed that often contains flowing water. The stream bed is primarily packed sand with limestone projections and there are many large trees along the banks. The water in this region is usually very clear and the stream is more deserving of its name as it continues further east. The vegetative cover on the black and gray soils of this region, the permanence of water, and the presence of many farm tanks and ponds are probably the main reasons for the less turbid waters of the area. The terrain in the lower watershed consists mainly of undulating pasture, and ranching is the chief land use. At Fort Griffin, near the eastern extremity of the lower region, the average annual runoff figures for a period of 30.8 years equalled 173,300 acre-feet. The minimum flow recorded during this period was 6,370 acre feet and the maximum flow recorded was 711,000 acre-feet.

Aquatic and Shoreline Vegetation

Upper watershed - Aquatic vegetation in the upper region is limited to various forms of algae and a few patches of bulrushes (Scirpus), which are located near the eastern extremity, above the Leuders Dam. Shoreline vegetation is likewise limited. Mesquite is common and willows, hackberries, chinaberries and pecans are widely scattered at various locations along the upper watershed. Sunflowers, and various weeds and grasses are the principal shoreline vegetative types.

Lower watershed - Besides various types of algae, the principal types of aquatic vegetation in the lower region appear to be muskgrass (Chara) and coontail (Ceratophyllum). The shoreline supports a profuse vegetation with larger mesquites, pecans, hackberries, chinaberries, post oaks, and willows being the more common trees. Various grasses, vines, and brambles are also abundant.

Pollution and Water Quality

Because pollution and bad water quality occur in scattered areas in the watershed, according to where sources of pollution exist, no attempt will be made to give the results of this investigation according to upper or lower regions. The primary sources of pollution were found to be oil wells. Salt water escaping from these wells and invading the sub-surface water supply or flowing directly out of the ground appears to be the pollutant most seriously affecting the aquatic environment. Chlorides were found to be present up to 43,800 p.p.m. in one artesian spring on the banks of California Creek. California Creek, which is the main tributary of the Clear Fork of the Brazos River, and the river itself were the only places where water quality and pollution data was obtained. This water quality data was obtained from the Texas Board of Water Engineers, the Texas Health Department, and the United States Geological Survey. Other areas where salt-water pollution was found to exist included the Clear Fork near Roby and near Eliasville, and the Old Hamlin City Lake.

Old Hamlin City Lake is apparently devoid of all fish except for some very salt tolerant species. It has been stocked several times with bass and catfish from the state hatcheries, but evidently these fish have not survived.

Effluents going into the river near Leuders have been found to be primarily the washings from a limestone quarry and may even be beneficial to certain species. The largest shad found in any locality along the river were collected near the point where the effluent was being discharged.

Figures 44 through 50 give a more complete account of the water quality of the Clear Fork of the Brazos River. Insufficient dissolved oxygen was not common and appeared to be a minor fishery problem. The pH values ranged from 7.1 to 8.4, while 7.7 was the average reading. For more specific and complete water quality information, the reader is referred to the above named figures.

Fish Populations

The results of the netting and seining collections can best be given in the following annotated species list and the fishery charts included in this report. An index to all charts, maps, and pictures is included in this report immediately preceeding the fishery charts. Figure 10 gives a complete summation of seining results, while Figure 39 gives a complete summation of netting results. Fishery information pertaining to more specific areas of the Clear Fork of the Brazos River watershed can be located by referring to the included index. A total of 9,023 specimens of 31 species were collected. These 31 species represented 11 families and 20 genera.

Annotated Species List: -

Lepisosteidae (gars)

Lepisosteus osseus (longnose gar). This species is very dominant in some sections of the lower part of the Clear Fork of the Brazos River. Some stretches of stream in the lower area have apparently been practically denuded of small fish by this species. The gars in those sections were observed to be rather poor and on the average, weighed only one pound. In one particular netting location in the lower river, gars were so active and perhaps so ravenous that there were approximately 20 of them in the gill net before the survey crew had it completely set out. There were no gar taken in the upper reaches of the watershed and none collected from lakes in either regions. Thus, considering the whole river, its tributaries, and the lakes on the watershed, gar accounted for only 2.45 percent of the total fish netted.

Clupeidae (herrings)

Dorosoma cepedianum (gizzard shad). This species was aboundant in both netting and seining collections composing 9.42 percent of the total seining sample and 23.95 percent of the total netting sample. This was the highest percentage, by number, of any species taken by netting. The river, itself, was particularly heavily infested with this species, with over 35 percent of the fish taken from the river being shad. They were large averaging over 10 ounces, while the shad taken from the lakes averaged only 2.5 ounces.

Catostomidae (suckers and buffalofishes)

Ictiobus bubalus (smallmouth buffalo). Most netting stations in the river yielded this species, but they were not as prevalent in the lakes. This species has a high commercial value and is netted commercially in Lake Fort Phantom Hill. The difficulty of access and netting in the holes in the river, where the majority of this species exist, prevents a more wide-scale commercial utilization of these fish

from the Clear Fork of the Brazos.

Carpiodes carpio (river carpsucker). This is the dominant sucker in nearly all West Texas waters. They were taken both by net and seine and were widely distributed throughout the watershed. The presence of this species constitutes a serious fishery problem in some lakes on the Clear Fork of the Brazos River drainage, especially since no utilization of the species by either man or fish has been observed.

Cyprinidae (shiners and minnows)

Cyprinus carpio (carp). This species is sub-dominant to the river carpsucker but does constitute a fishery problem in lakes where it occurs. Carp have more utility than river carpsuckers and they are becoming more and more fished for in many West Texas lakes because of their large size, tremendous strength, and willingness to fight when caught.

Notemigonus crysoleucas (golden shiner). Although this species was taken by net and seine, it was taken only from lakes. It is not believed to be native in the Clear Fork of the Brazos River, or its watershed, but is known to have been introduced as a forage fish by the state fish hatcheries.

Notropis lutrensis (redhorse shiner). This is the dominant shiner in the Clear Fork of the Brazos River and its tributaries. They constituted over 44 percent of the fish taken by seining for the whole watershed. These minnows are particularly abundant in the sporadic, intermittent streams of the upper part of the Clear Fork.

Notropis volucellus (mimic shiner). Only nine specimans of this species were collected from the complete watershed. They were collected from a number of different types of habitats, but were always in very much of a minority. Five were collected from lakes and four were collected from the river and they were taken from both the upper and lower watersheds.

Notropis buchanani (ghost shiner). Only two specimens of this species were collected. These collections indicated that the fish prefers running, muddy waters.

Pimephales vigilax (parrot minnow). Nearly all of the 149 individuals of this species collected were taken in the bigger waters of the middle and lower reaches of the river. Some localities in the lower river were saturated with these minnows. While taking a collection from the Pitt Taylor Ranch, in the lower river, thousands of these minnows were observed trying to swim up stream into the water pouring over a small dam.

Pimephales promelas (fathead minnow). This species was found in abundance in the upper reaches of the river and appears to be dominant over the parrot minnow in this area while the trend is apparently reversed in the lower river.

Ameiuridae (freshwater catfishes)

Ictalurus punctatus (channel catfish). Only occasional specimens of this fish were obtained by seining and netting in the river and its tributaries. The species was very abundant in netting collections taken from the lakes and composed almost 23 percent of the number and almost 44 percent of the weight of the total netting

sample. This fish is very much sought after by West Texas anglers and is frequently stocked from the state fish hatcheries.

Ictalurus melas (black bullhead). This species was taken by net and seine from both the river and the lakes. It appears to be more abundant in some of the smaller lakes, which apparently have no flathead catfish, than in any other waters.

Ictalurus natalis (yellow bullhead). This species appears to be more prevalent in the river than in the lakes and was very much outnumbered in the fish collections taken from the lakes by the black bullhead.

Pylodictus olivaris (flathead catfish). This very desirable food fish is much sought after by anglers and apparently serves as an effective bullhead control in lakes where it occurs. Only four specimens of this species were collected, but this is attributed to a fault in the means of sampling (ie. the small meshes of the nets used are not effective in capturing this species) and to the probability that these fish lie on the bottom in a lethargic state for long periods of time. These fish are known to be taken by anglers in several of the lakes on the Clear Fork of the Brazos River watershed where they were not taken in the fish collections.

Cyprinodontidae (killifishes and topminnows)

Fundulus notatus (blackstripe topminnow). The only locality in which this topminnow was seined was a tributary of the lower part of the river.

Fundulus kansae (plains killifish). This species was collected from the Old Hamlin City Lake which contains large amounts of chlorides which are believed to be the results of nearby oil wells. The killifish was not taken from any other locality.

Cyprinodon rubrofluviatilis (Red River pupfish). This species appears to be the dominant fish in the Old Hamlin City Lake where the water is too salty for most other species and was collected only from this locality.

Poecilliidae (mosquitofishes)

Gambusia affinis (mosquitofish). The mosquitofish is common in backwater sloughs and quiet pools throughout the watershed. They were the second most common fish in the seining collections, and are considered to be very desirable to man because of their practice of eating mosquitos.

Serranidae (basses)

Roccus chrysops (white bass). This species is not indigenous to the Clear Fork, but has been introduced in some of the lakes on the watershed. Although not many of these fish were collected, Fort Phantom Hill Lake is known to have a large population.

Centrarchidae (black basses and sunfishes)

Micropterus salmoides (largemouth bass). The evasive nature of these fish makes them difficult to capture in nets and seines. It is therefore difficult to arrive at an accurate estimate of their occurrence. The data collected would

indicate, however, that they are much more common in some of the lakes than they are in the river.

Chaenobryttus gulosus (warmouth bass). One fish of this species was taken from Lake Daniels on the lower Clear Fork watershed. These fish are often stocked by the state fish hatcheries.

Lepomis cyanellus (green sunfish). This sunfish is common throughout the watershed and is a desirable species to the angler when it attains a reasonable size. However, very few of these sunfish collected were large enough to be fished for and some individuals, only 2-inches long, were full grown, sexually ripe, fish.

Lepomis microlophus (redear sunfish). This is one sunfish that generally attains a desirable size in West Texas waters. Only a few individuals of this species were collected. These were probably present because of hatchery stocking and very likely not native to the stream.

Lepomis macrochirus (bluegill). This is the dominant sunfish in the Clear Fork of the Brazos drainage and was abundant both in lakes and in the river. None of these fish were of a desirable size, probably due to overpopulation. Some individuals were sexually mature at a length of two inches.

Lepomis humilis (orangespotted sunfish). Even under ideal conditions these sunfish do not attain a very desirable size, and all of the individuals collected from the Clear Fork were extremely small. This species is apparently subordinate to the other native sunfish.

Lepomis megalotis (longear sunfish). This is one of the more dominant sunfish species in the Clear Fork. They appear to prefer running stream areas, but were very abundant in the upper reaches of the river whether the water was running or was standing in pools. These fish, like the other species of sunfish, appeared to be stunted.

Pomoxis annularis (white crappie). Practically all the bigger waters of the Clear Fork and its watershed contained white crappie. They were particularly abundant in the lakes. However, not many were collected that were a desirable size.

Pomoxis nigromaculatus (black crappie). Two specimens of this species were taken from Lake Sweetwater. They were very large crappie and in very good condition. It is nearly certain, however, that these fish were stocked in that reservoir and are not indigenous to the watershed.

Percidae (perches and darters)

Percina caprodes (logperch). This apparently unimportant species was collected only from Lake Trammell on the Clear Fork of the Brazos River watershed. Since this fish is hard to collect by seining, it is possible that this was present in some of the other seining localities but missed.

Sciaenidae (croakers, drum, and weakfishes)

Aplodinotus grunniens (freshwater drum). This species was taken from only

two lakes on the watershed. These fish are apparently hard to sample by the use of seines and gill nets as very few have been collected in lakes that are thought to have relatively high populations.

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Date August 8, 1960

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Figure 1. - Master list of seining locations showing dates when seining was done at each station.

Seining locations on upper Clear Fork of the Brazos River *

1. Springs on A. R. Willingham Ranch in southeastern Scurry County
   July 18, 1958

2. Sterling Willingham Ranch in southwestern Fisher County
   July 18, 1958

3. Nettleton Ranch in western Fisher County
   July 18, 1958

4. Noles Ranch in northwestern Fisher County
   July 19, 1958

5. Dirt road crossing in north central Fisher County
   July 19, 1958

6. Highway 70 crossing north of Roby in Fisher County
   July 19, 1958 and June 22, 1959

7. Roy Eaton Ranch in northeastern Fisher County
   July 24, 1958

8. J. R. Murff Ranch in northeastern Fisher County
   July 24, 1958

9. Cecil Edward Ranch in eastern Fisher County
   July 24, 1958

10. Carriker Ranch in eastern Fisher County
    July 24, 1958

11. Highway 180 crossing east of Roby in Fisher County
    July 24, 1958 and June 22, 1959

12. Turner Ranch in eastern Fisher County
    July 24, 1958 and June 22, 1959

13. Highway 57 crossing in eastern Fisher County
    June 22, 1959

14. Dirt road crossing in southwestern Jones County
    July 24, 1958

15. Farm Road 126 crossing in southwestern Jones County
    July 24, 1958

16. Dirt road crossing in southwestern Jones County
    July 24, 1958

Figure 1. - Master list of seining locations showing dates when seining was done at each station - continued

Seining locations on upper Clear Fork of the Brazos River *

17. Farm Road 707 crossing at Truby, Texas, in Jones County
July 24, 1958

18. Highway 277, 83 crossing southeast of Anson in Jones County
July 23, 1958

19. Williams Ranch near Nugent, Texas, in Jones County
July 24, 1958 and June 23, 1959

20. Mack Doty Ranch near Nugent in Jones County
January 15, 1959 and June 23, 1959

Seining locations on tributaries of the upper Clear Fork of the Brazos River

21. Highway 277, 83 crossing on Mulberry Creek southeast of Anson in Jones County
July 23, 1958

22. Farm Road 1193 crossing of Elm Creek south of Nugent in Jones County
July 24, 1958 and June 23, 1959

Lakes on the upper Clear Fork of the Brazos River and its watershed where seining was done

23. New Hamlin Lake in Jones County
October 17, 1958

24. Old Hamlin Lake in Jones County
October 17, 1958

25. Lake Trammell in Nolan County
June 4, 1958 and August 19, 1959

26. Lake Kirby in Taylor County
July 15, 1959 and October 15, 1959

Seining locations on the lower Clear Fork of the Brazos River

27. Ed Davis Ranch below Leuders Dam in Jones County
March 10, 1959

28. J. C. Putnam Ranch in southwest Throckmorton County
March 11, 1959

29. Below Pitt Taylor Dam in Stephens County
August 26, 1959

Figure 1. - Master list of seining locations showing dates when seining was done at each station - continued

30. Below Crystal Falls Dam in Stephens County
August 25, 1959

Seining locations on tributaries of the lower Clear Fork of the Brazos River

31. Dirt road crossing on Salt Prong of Hubbard Creek in Shackelford County
October 29, 1958

32. Highway 283 crossing on Mills Creek in Shackelford County
August 25, 1959

Lakes on the lower Clear Fork of the Brazos River and its watershed where seining was done

33. Lake McCarthy near Albany in Shackelford County
October 29, 1958

* The Brazos River Watershed in arbitrarily divided into upper and lower regions by the Leuders Dam.

Figure 2. - Results of seining collections from the upper Clear Fork of the Brazos River, its tributaries, and lakes on its watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	485	10.93
River carpsuckers	60	1.35
Carp	30	0.68
Golden shiner	9	0.20
Redhorse shiner	1,838	41.43
Mimic shiner	6	0.14
Ghost shiner	2	0.04
Parrot minnow	39	0.88
Fathead minnow	369	8.32
Channel catfish	37	0.84
Black bullhead	20	0.45
Yellow bullhead	42	0.94
Plains killifish	85	1.92
Red River pupfish	160	3.61
Mosquitofish	564	12.71
Largemouth bass	31	0.70
Green sunfish	132	2.97
Redear sunfish	6	0.14
Bluegill	269	6.06
Orangespotted sunfish	46	1.04
Longear sunfish	139	3.13
White crappie	61	1.38
Logperch	6	0.14
Totals	4,436	100.00

Figure 3. - Results of seining collections from the upper Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	3	0.10
River carpsucker	19	0.64
Redhorse shiners	1,699	57.59
Mimic shiner	1	0.04
Ghost shiner	1	0.04
Parrot minnow	18	0.61
Fathead minnow	369	12.50
Channel catfish	11	0.37
Black bullhead	12	0.41
Yellow bullhead	42	1.42
Mosquitofish	413	14.00
Largemouth bass	1	0.04
Green sunfish	111	3.76
Redear sunfish	3	0.10
Bluegill	102	3.46
Orangespotted sunfish	16	0.54
Longear sunfish	129	4.38
Totals	2,950	100.00

Figure 4. - Results of seining collections from tributaries of the upper Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	42	35.00
Carp	4	3.33
Redhorse shiner	28	23.34
Ghost shiner	1	0.83
Channel catfish	1	0.83
Black bullheads	4	3.33
Mosquitofish	26	21.67
Largemouth bass	1	0.83
Green sunfish	3	2.50
Longear sunfish	10	8.34
Totals	120	100.00

Figure 5. - Results of seining collections from the lakes on the upper Clear Fork of the Brazos River and its watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	440	32.21
River carpsucker	41	3.00
Carp	26	1.90
Golden shiner	9	0.66
Redhorse shiner	111	8.13
Mimic shiner	5	0.36
Parrot minnow	21	1.54
Channel catfish	25	1.83
Black bullhead	4	0.29
Plains killifish	85	6.22
Red River pupfish	160	11.72
Mosquitofish	125	9.15
Largemouth bass	29	2.12
Green sunfish	18	1.32
Redear sunfish	3	0.22
Bluegill	167	12.22
Orangespotted sunfish	30	2.20
White crappie	61	4.47
Logperch	6	0.44
Totals	1,366	100.00

Figure 6. - Results of seining collections from the lower Clear Fork of the Brazos River, its tributaries, and lakes on its watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Longnose gar	1	0.11
Gizzard shad	12	1.42
Redhorse shiner	491	58.11
Mimic shiner	3	0.36
Parrot minnow	110	13.01
Fathead minnow	17	2.01
Channel catfish	6	0.71
Blackstripe topminnow	15	1.78
Mosquitofish	76	8.99
Largemouth bass	9	1.07
Green sunfish	14	1.66
Bluegills	73	8.63
Orangespotted sunfish	10	1.19
Longear sunfish	8	0.95
Totals	845	100.00

Figure 7. - Results of seining collections from the lower Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Longnose gar	1	0.15
Gizzard shad	12	1.92
Redhorse shiner	441	70.45
Mimic shiner	3	0.47
Parrot minnow	110	17.57
Fathead minnow	2	0.32
Channel catfish	6	0.96
Mosquitofish	21	3.36
Green sunfish	3	0.48
Bluegill	21	3.36
Longear sunfish	6	0.96
Totals	626	100.00

Figure 8. - Results of seining collections from the tributaries of the lower Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Redhorse shiner	50	29.77
Fathead minnow	15	8.92
Blackstripe topminnow	15	8.92
Mosquitofish	50	29.77
Largemouth bass	4	2.38
Green sunfish	11	6.54
Longear sunfish	1	0.60
Bluegill	22	13.10
Totals	168	100.00

Figure 9. - Results of seining collections from lakes on the lower Clear Fork of the Brazos River, and its watershed, from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Mosquitofish	5	9.80
Largemouth bass	5	9.80
Bluegills	30	58.83
Orangespotted sunfish	10	19.60
Longear sunfish	1	1.97
Totals	51	100.00

Figure 10. - Results of seining collections from the Clear Fork of the Brazos River, its tributaries, and lakes on its watershed from April 16, 1958 — March 31, 1960

Species	Number	Percent of number
Longnose gar	1	0.01
Gizzard shad	497	9.42
River carpsucker	60	1.13
Carp	30	0.57
Golden shiner	9	0.17
Redhorse shiner	2,329	44.10
Mimic shiner	9	0.17
Ghost shiner	2	0.04
Parrot minnow	149	2.82
Fathead minnow	386	7.31
Channel catfish	43	0.81
Blackstripe topminnows	15	0.29
Black bullhead	20	0.38
Yellow bullhead	42	0.79
Plains killifish	85	1.61
Red River pupfish	160	3.03
Mosquitofish	640	12.12
Largemouth bass	40	0.76
Green sunfish	146	2.76
Redear sunfish	6	0.12
Bluegill	342	6.47
Orangespotted sunfish	56	1.06
Longear sunfish	147	2.79
White crappie	61	1.15
Logperch	6	0.12
Totals	5,281	100.00

Figure 11. - Results of seining collections from the Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Longnose gar	1	0.03
Gizzard shad	15	0.41
River carpsucker	19	0.53
Redhorse shiner	2,140	59.85
Mimic shiner	4	0.11
Ghost shiner	1	0.03
Parrot minnow	128	3.58
Fathead minnow	371	10.37
Channel catfish	17	0.48
Black bullhead	12	0.33
Yellow bullhead	42	1.18
Mosquitofish	434	12.13
Largemouth bass	1	0.03
Green sunfish	114	3.19
Redear sunfish	3	0.08
Bluegill	123	3.44
Orangespotted sunfish	16	0.45
Longear sunfish	135	3.78
Total	3,576	100.00

Figure 12. - Results of seining collections from the tributaries of the Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	42	14.58
Carp	4	1.39
Redhorse shiner	78	27.07
Ghost shiner	1	0.35
Fathead minnow	15	5.21
Blackstripe topminnow	15	5.21
Channel catfish	1	0.35
Black bullheads	4	1.39
Mosquitofish	76	26.39
Largemouth bass	5	1.74
Green sunfish	14	4.86
Bluegill	22	7.64
Longear sunfish	11	3.82
Totals	288.	100.00

Figure 13. - Results of seining collections from lakes on the Clear Fork of the Brazos River watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent of number
Gizzard shad	440	31.05
River carpsucker	41	2.89
Carp	26	1.83
Golden shiner	9	0.64
Redhorse shiner	111	7.83
Mimic shiner	5	0.36
Parrot minnow	21	1.48
Channel catfish	25	1.76
Black bullhead	4	0.28
Plains killifish	85	6.00
Red River pupfish	160	11.29
Mosquitofish	130	9.18
Largemouth bass	34	2.40
Green sunfish	18	1.27
Redear sunfish	3	0.21
Bluegills	197	13.90
Orangespotted sunfish	40	2.83
Longear sunfish	1	0.07
White crappie	61	4.30
Logperch	6	0.43
Totals	1,417	100.00

Figure 14. - A comparison of the relative abundance of the different species of fish in seining samples collected from the upper Clear Fork of the Brazos River watershed with the relative abundance of the different species of fish in seining samples collected from the lower Clear Fork of the Brazos River watershed during the period from April 16, 1959 through March 31, 1960 * **

R=rare; C=common; A=abundant

Species	Upper watershed	Lower watershed
Longnose gar	-	R
Gizzard shad	C	R
River carpsuckers	R	-
Carp	R	-
Golden shiner	R	-
Redhorse shiner	A	A
Mimic shiner	R	R
Ghost shiner	R	-
Parrot minnow	R	C
Fathead minnow	C	R
Channel catfish	C	C
Black bullhead	C	-
Yellow bullhead	C	-
Blackstripe topminnow	-	R
Plains killifish	R	-
Red River pupfish	R	-
Mosquitofish	A	A
Largemouth bass	R	R
Green sunfish	C	C
Redear sunfish	R	-
Bluegill	A	A
Orangespotted sunfish	C	C
Longear sunfish	A	C
White crappie	C	-
Logperch	R	-

* This chart was compiled on an arbitrary basis with the following factors taken into consideration.
(1) percent of each species represented in the total seining collections from the upper or lower watersheds
(2) the number of locations where the species was collected

** (1) consideration must be given to the fact that some species are more difficult to collect by seining than are others when analyzing the data herein given
(2) consideration must be given to the fact that the shallow waters of the upper watershed was more conducive to seining than were the deep waters of the lower watershed and for that reason some species may have not been collected in the lower watershed that were, in reality, present.
(3) consideration must be given to the fact that the Clear Fork of the Brazos River's watershed was divided into upper and lower regions on a sharp line selected on a more or less arbitrary basis and that, in reality, the physical, chemical, and biological characteristics of the upper and lower regions overlap.

Figure 15. - Master list of netting locations showing dates when netting was done at each station

Netting locations on the upper Clear Fork of the Brazos River

1. Mack Doty Ranch near Nugent, Texas, in Jones County
   January 15, 1959
2. Ed Davis Ranch above Leuders Dam in Jones County
   March 10, 1959

Netting locations at lakes on the upper Clear Fork of the Brazos River watershed

3. Old Anson Lake in Jones County
   December 10, 1958
4. New Anson Lake in Jones County
   December 9, 1958
5. Old Hamlin Lake in Jones County
   October 17, 1958
6. New Hamlin Lake in Jones County
   October 17, 1958
7. Lake Trammell in Nolan County
   June 4, 1958; June 5, 1958; August 19, 1958; and November 23, 1959
8. Lake Sweetwater in Nolan County
   July 28, 29, 30, 1959 and November 24, 25, 1959
9. Lake Abilene in Taylor County
   June 24, 25, 1958
10. Lake Kirby in Taylor County
    July 15, 16, 1959; October 15, 1959; and December 3, 1959
11. Lake Fort Phantom Hill in Jones County
    April 23, 1959 and July 17, 1959

Netting locations on the lower Clear Fork of the Brazos River

12. J. C. Putnam Ranch in southwest Throckmorton County
    March 12, 1959
13. Morris Ledbetter Ranch in northeast Shackelford County
    March 12, 1959
14. Pitt Taylor Ranch in northern Stephens County
    August 27, 1959
15. N. G. Price Ranch near Eliasville, Texas, in Young County
    February 18, 1959

Netting locations at lakes on the lower Clear Fork of the Brazos River watershed

16. Lake McCarthy near Albany, Texas, in Shackelford County
    October 30, 1958

17. Lake Daniels in Stephens County
    February 19, 1959 and June 12, 1959

Figure 16. - Summary of netting collections in the upper Clear Fork of the Brazos River and lakes on its watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent by number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent by weight	Average "K"
Gizzard shad	848	25.41	167	11		3.16	7.80	2.06
Smallmouth buffalo	48	1.44	122	7	2	8.81	5.70	2.43
River carpsucker	223	6.68	273	10	1	3.63	12.74	2.57
Carp	76	2.28	82	3	1	1.30	3.82	2.40
Golden shiner	85	2.54	14	6		2.71	0.67	1.43
Channel catfish	751	22.51	1,021	10	1	5.77	47.56	1.85
Black bullheads	329	9.86	47	13		2.33	2.22	2.87
Yellow bullheads	20	0.60	12	8		10.00	0.59	2.42
Flathead catfish	3	0.09	8	12	2	14.67	0.40	1.49
White bass	19	0.57	17	6		14.63	0.81	2.16
Largemouth bass	58	1.73	125	6	2	2.59	5.84	3.22
Green sunfish	1	0.03		5		5.00	0.01	3.19
Redear sunfish	2	0.06		7		3.50	0.02	4.01
Bluegill sunfish	122	3.66	20	12		2.72	0.97	4.88
Longear sunfish	1	0.03		13		13.00	0.04	4.65
White crappie	748	22.42	230	3		4.92	10.71	3.29
Black crappie	2	0.06	1	8		12.00	0.07	2.95
Freshwater drum	1	0.03		9		9.00	0.03	2.49
Total	3,337	100.00	2,148	5			100.00	

Figure 17. - Netting collections from the upper Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	66	57.89	43	14		10.64	46.39	3.47
Smallmouth buffalo	10	8.77	22	3	2	3.50	23.47	3.29
River carpsucker	12	10.53	11	5		15.08	11.96	2.48
Channel catfish	1	0.88	4	13	4	13.00	5.09	2.26
Black bullheads	5	4.38	3	8		11.20	3.70	2.33
Largemouth bass	3	2.63	6	2	2	0.67	6.48	2.82
Green sunfish	1	0.88		5		5.00	0.33	3.19
Bluegill sunfish	5	4.39		13		2.60	0.86	4.88
White crappie	11	9.65	1	10		2.36	1.72	3.05
Totals	114	100.00	94	9			100.00	

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Figure 18. - Results of one net at netting station No. 1 on the Mack Doty Ranch in Jones County, in the upper Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Smallmouth buffalo	5	100.00	12	13	2	9	100.00	3.32
Totals	5	100.00	12	13	-	-	100.00	--

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Figure 19. - Results of three nets at netting station No. 2 on the Ed Davis Ranch in Jones County in the upper Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	66	60.55	43	14		10.64	53.79	3.47
Smallmouth buffalo	5	4.58	9	3	1	13.40	11.26	3.25
River carpsucker	12	11.01	11	5		15.08	13.87	2.48
Channel catfish	1	0.92	4	13	4	13.00	5.90	2.26
Black bullheads	5	4.58	3	8		11.20	4.29	2.33
Largemouth bass	3	2.76	6	2	2	0.67	7.51	2.82
Green sunfish	1	0.92		5		5.00	0.39	3.19
Bluegills	5	4.58		13		2.60	0.99	4.88
White crappie	11	10.10	1	10		2.36	2.00	3.05
Totals	109	100.00	81	9			100.00	

Figure 20. - Netting collections from the lakes of the upper Clear Fork of the Brazos River watershed from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	782	24.26	123	13		2.53	6.02	1.94
Smallmouth buffalo	38	1.18	100	4	2	10.21	4.88	2.20
River carpsucker	211	6.54	262	5	1	3.89	12.78	2.58
Carp	76	2.36	82	3	1	1.30	4.00	2.40
Golden shiners	85	2.63	14	6		2.71	0.70	1.43
Channel catfish	750	23.27	1,016	13	1	5.69	49.51	1.85
Black bullheads	324	10.05	44	5		2.19	2.16	2.88
Yellow bullheads	20	0.63	12	8		10.00	0.61	2.42
Flathead catfish	3	0.09	8	12	2	14.67	0.42	1.49
White bass	19	0.59	17	6		14.63	0.85	2.16
Largemouth bass	55	1.71	119	4	2	2.69	5.80	3.24
Redear sunfish	2	0.07		7		3.50	0.03	4.01
Bluegill sunfish	117	3.63	19	15		2.73	0.97	4.88
Longear sunfish	1	0.03		13		13.00	0.04	4.65
White crappie	737	22.86	228	9		4.96	11.12	3.29
Black crappie	2	0.07	1	8		12.00	0.08	2.95
Freshwater drum	1	0.03		9		9.00	0.03	2.49
Totals	3,223	100.00	2,053	12			100.00	

Figure 21. - Results of three nets at netting station No. 3, in Old Anson Lake, in Jones County in the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
River carpsuckers	2	8.00	4	5	2	2.50	21.16	2.87
Channel catfish	11	44.00	14	10	1	5.27	71.78	2.17
Black bullheads	1	4.00		3		3.00	0.92	2.71
Golden shiners	2	8.00		4		2.00	1.23	2.51
Bluegills	1	4.00		3		3.00	0.92	4.35
White crappie	8	32.00		13		1.63	3.99	3.64
Totals	25	100.00	20	6			100.00	

Figure 22. - Results of three nets at netting station No. 4, New Anson Lake, in Jones County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
River carpsucker	13	7.92	16	10	1	4.46	16.51	3.00
Channel catfish	91	55.49	75	3		13.22	74.67	2.28
Black bullheads	5	3.05	1	3		3.80	1.18	2.45
Largemouth bass	1	0.61	2	1	2	1.00	2.05	2.57
Longear sunfish	1	0.61		13		13.00	0.81	4.65
White crappie	53	32.32	4	13		1.45	4.78	3.71
Totals	164	100.00	100	11			100.00	

Figure 23. - Results of three nets at netting station No. 5, Old Hamlin Lake, in Fisher County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
No fish were obtained								

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Figure 24. - Results of three nets at netting station No. 6, New Hamlin Lake, in Jones County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Channel catfish	5	10.63		14			10.76	1.46
Black bullheads	3	6.39		6		2.00	4.62	1.87
Largemouth bass	2	4.25	3	6	1	11.00	41.54	2.55
Golden shiners	2	4.25		5		2.50	3.84	2.16
Bluegills	11	23.40		15		1.36	11.54	3.21
White crappie	24	51.08	2	4		1.50	27.70	2.75
Totals	47	100.00	8	2			100.00	

Figure 25. - Results of twenty-one nets at netting station No. 7 in Lake Trammell, in Nolan County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Golden shiner	69	12.47	12	3		2.82	4.93	2.13
Channel catfish	74	13.38	157	4	2	2.00	63.72	1.66
Black bullheads	251	45.39	25	3		1.61	10.20	2.48
Largemouth bass	11	1.99	29	10	2	11.09	12.00	2.76
Redear sunfish	1	0.18		2		2.00	0.05	3.67
Bluegill	62	11.21	11	9		2.98	4.69	3.62
White crappie	85	15.38	10	14		2.04	4.41	2.65
Totals	553	100.00	246	13			100.00	

Figure 26. - Results of forty-one nets at netting station No. 8 in Lake Sweetwater, in Nolan County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1957 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	598	54.11	90	14		2.43	15.35	1.14
River carpsuckers	102	9.23	141	2	1	6.13	23.85	2.16
Carp	54	4.89	47	12		14.15	8.07	2.52
Golden shiner	8	0.72	1			2.00	0.16	1.43
Channel catfish	189	17.11	214	9	1	2.16	36.26	1.53
Black bullheads	10	0.90	3	6		5.40	0.57	1.96
Yellow bullheads	20	1.81	12	8		10.00	2.11	2.42
Largemouth bass	28	2.54	50	5	1	12.75	8.51	2.92
Bluegill sunfish	8	0.72	1			2.00	0.16	3.87
White crappie	86	7.78	27	13		5.17	4.70	2.51
Black crappie	2	0.19	1	8		12.00	0.26	2.95
Totals	1,105	100.00	591	13			100.00	

Figure 27. - Results of twenty-eight nets set at netting station No. 9 in Lake Abilene, in Taylor County, on the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	26	4.44	3	1		1.88	0.53	1.60
River carpsucker	46	7.86	42			14.61	7.27	2.15
Carp	1	0.17	2	13	2	13.00	0.48	2.47
Golden shiners	4	0.69		10		2.50	0.11	1.66
Channel catfish	208	35.56	372	3	1	12.62	64.43	1.74
Black bullheads	54	9.23	14			4.15	2.42	2.27
Largemouth bass	8	1.37	21		2	10.00	3.64	4.30
Redear sunfish	1	0.17		5		5.00	0.06	4.01
Bluegill	19	3.25	3	10		3.05	0.62	3.51
White crappie	218	37.26	118	1		8.67	20.44	3.69
Totals	585	100.00	577	11			100.00	

Figure 28. - Results of sixteen nets set at netting station No. 10 in Lake Kirby, in Taylor County, in the upper Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight obs.	Percent of weight	Average "K"
Gizzard shad	82	24.92	9	12		1.90	7.49	1.49
River carpsucker	11	3.35	3	10		5.27	2.79	2.18
Smallmouth buffalo	1	0.30	1	4	1	4.00	0.96	2.80
Carp	13	3.95	17	4	1	5.23	13.27	2.61
Channel catfish	42	12.77	39			14.86	29.98	1.78
Flathead catfish	3	0.91	8	12	2	14.67	6.73	2.50
Largemouth bass	1	0.31	3	2	3	2.00	2.40	2.12
Bluegill sunfish	1	0.31		1		1.00	0.05	2.78
White crappie	175	53.18	47	4		4.32	36.33	3.32
Totals	329	100.00	130	1			100.00	

Figure 29. - Results of twelve nets at netting station No. 11 in Fort Phantom Hill Lake, in Jones County, on the upper Clear Fork of the Brazos River watershed during the period from April 15, 1957 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	76	18.31	20	2		4.24	5.32	1.86
River carpsuckers	37	8.91	54	10	1	7.62	14.44	2.26
Smallmouth buffalo	37	8.91	99		2	10.81	26.18	2.26
Carp	8	1.93	14	6	1	12.75	3.80	2.52
Channel catfish	130	31.32	143	2	1	1.62	37.84	2.00
White bass	19	4.58	17	6		14.63	4.60	2.16
Largemouth bass	4	0.96	9	12	2	7.00	2.58	2.24
Bluegill sunfish	15	3.62	2	9		2.73	0.67	3.87
White crappie	88	21.21	16	11		3.03	4.42	3.26
Freshwater drum	1	0.25		9		9.00	0.15	2.49
Totals	415	100.00	378	3			100.00	

Figure 30. - Summary of netting collections in the lower Clear Fork of the Brazos River and lakes on its watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	92	22.71	100	14	1	1.54	25.91	0.40
Gizzard shad	48	11.85	20	13		6.94	5.35	1.87
Smallmouth buffalo	6	1.48	27	1	4	8.17	6.95	2.20
River carpsucker	42	10.37	83	10	1	15.86	21.48	2.45
Carp	11	2.72	35	11	3	3.91	9.17	2.66
Channel catfish	106	26.17	91	6		13.79	23.48	2.37
Black bullhead	4	0.99	2	8		10.00	0.64	2.53
Flathead catfish	1	0.25	3	2	3	2.00	0.80	1.49
Largemouth bass	6	1.48	12	6	2	1.00	3.18	3.24
Warmouth bass	1	0.25		7		7.00	0.11	3.91
Bluegill sunfish	23	5.68	2	14		2.00	0.74	2.44
White crappie	56	13.82	5	15		1.70	1.53	2.57
Freshwater drum	9	2.23	2	9		4.56	0.66	2.25
Totals	405	100.00	389	4			100.00	

Figure 31. - Netting collections from the lower Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	92	57.14	100	14	1	1.54	47.90	0.40
Gizzard shad	32	19.87	18	5		9.16	8.70	1.94
Smallmouth buffalo	6	3.73	27	1	4	8.17	12.85	2.20
River carpsucker	6	3.73	9	10	1	9.67	4.57	2.58
Carp	1	0.62	2	11	2	11.00	1.28	2.40
Channel catfish	14	8.69	34	14	2	7.86	16.56	1.85
Black bullheads	1	0.62	1		1	0.00	0.48	2.88
Flathead catfish	1	0.62	3	2	3	2.00	1.48	1.49
Largemouth bass	6	3.73	12	6	2	1.00	5.88	3.24
White crappie	2	1.25		10		5.00	0.30	3.29
Totals	161	100.00	210	9			100.00	

Figure 32. - Results of two nets at netting station No. 12 on the J. C. Putnam Ranch, in Throckmorton County, in the lower Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	5	45.45	5	13	1	2.60	21.09	2.58
Smallmouth buffalo	4	36.37	16	12	4	3.00	60.77	2.28
River carpsucker	1	9.09	2		2		7.26	2.51
Channel catfish	1	9.09	3		3		10.88	2.29
Totals	11	100.00	27	9			100.00	

* * * * *

Figure 33. - Results of two nets at netting station No. 13 on the Morris Ledbetter Ranch, in Shackelford County, in the lower Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	27	57.44	35	1	1	4.77	41.61	0.53
Gizzard shad	2	4.25	1	6		11.00	1.63	2.50
Smallmouth buffalo	2	4.25	10	5	5	2.50	12.24	2.20
River carpsucker	3	6.39	5	10	1	14.00	6.68	1.38
Channel catfish	9	19.15	22	7	2	7.88	26.63	2.38
Largemouth bass	4	8.52	9	6	2	5.50	11.21	2.65
Totals	47	100.00	84	3			100.00	

Figure 34. - Results of two nets at netting station No. 14 on the Pitt Taylor Ranch, in Stephens County, in the lower Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	2	28.58	1	9		12.50	15.92	0.34
Gizzard shad	1	14.28	-	6		6.00	3.82	1.54
Carp	1	14.28	2	11	2	11.00	27.39	2.40
Channel catfish	2	28.58	5	1	2	8.50	51.59	1.85
White crappie	1	14.28	-	2		2.00	1.28	2.29
Totals	7	100.00	9	13			100.00	

Figure 35. - Results of two nets at netting station No. 15 on the N. G. Price Ranch, in Young County, in the lower Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	63	65.61	64	4	1	0.31	72.19	0.40
Gizzard shad	24	25.00	10	12		7.16	12.07	1.94
River carpsucker	2	2.09	2		1		2.25	2.58
Channel catfish	2	2.09	4	6	2	3.00	4.92	1.79
Black bullheads	1	1.04	1		1		1.12	2.88
Flathead catfish	1	1.04	3	2	3	2.00	3.51	1.49
Largemouth bass	2	2.09	3		1	8.00	3.38	3.24
White crappie	1	1.04		8		8.00	0.56	3.29
Totals	96	100.00	89				100.00	

Figure 36. - Netting collections from the lakes of the lower Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	16	6.55	2	8		2.50	1.39	1.74
River carpsucker	36	14.76	74		2	0.89	41.42	2.43
Carp	10	4.09	33		3	4.80	18.47	2.69
Channel catfish	92	37.71	56	8		9.83	31.61	2.45
Black bullheads	3	1.23	1	8		8.00	0.84	2.41
Bluegill sunfish	23	9.43	2	14		2.00	1.61	2.44
White crappie	54	22.13	5	5		1.57	2.98	2.54
Freshwater drum	9	3.69	2	9		4.56	1.43	2.25
Warmouth bass	1	0.41		7		7.00	0.25	3.91
Total	244	100.00	178	11			100.00	

Figure 37. - Results of four nets at netting station No. 16 in Lake McCarthy, in Shackelford County, on the lower Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	16	21.05	2	8		2.50	6.82	1.74
River carpsucker	10	13.16	16	8	1	10.40	45.05	2.88
Carp	1	1.31	1		1		2.73	2.89
Channel catfish	5	6.58	10	2	2	0.40	27.65	2.05
Black bullheads	3	3.95	1	8		8.00	4.09	2.41
Bluegills	2	2.63		10		5.00	1.71	1.17
White crappie	39	51.32	4	6		1.79	11.95	2.40
Totals	76	100.00	36	10			100.00	

Figure 38. - Results of six nets at netting station No. 17 in Lake Daniels, in Stephens County, on the lower Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
River carpsucker	26	15.47	57	8	2	3.38	40.47	1.99
Carp	9	5.36	32		3	8.89	22.53	2.54
Channel catfish	87	51.78	46	6		8.53	32.64	2.85
Warmouth bass	1	0.60		7		7.00	0.31	3.91
Bluegills	21	12.50	2	4		1.71	1.58	3.71
White crappie	15	8.93		15		1.00	0.66	2.68
Freshwater drum	9	5.36	2	9		4.56	1.81	2.25
Total	168	100.00	142	1			100.00	

Figure 39. - Summary of fish taken in 152 nets set in the upper and lower regions of the Clear Fork of the Brazos River and lakes on its watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	92	2.45	100	14	1	1.54	3.97	0.40
Gizzard shad	896	23.95	188	8		3.37	7.43	2.05
Smallmouth buffalo	54	1.44	149	8	2	12.30	5.89	2.40
River carpsucker	265	7.08	357	4	1	5.57	14.08	2.55
Carp	87	2.33	117	14	1	5.68	4.64	2.43
Golden shiner	85	2.27	14	6		2.70	0.57	1.43
Channel catfish	857	22.90	1,113		1	4.78	43.86	1.91
Black bullhead	333	8.90	50	5		2.42	1.98	2.87
Yellow bullhead	20	0.53	12	8		10.00	0.50	2.42
Flathead catfish	4	0.11	11	14	2	15.50	0.46	1.49
White bass	19	0.51	17	6		14.63	0.69	2.16
Largemouth bass	64	1.70	137	12	2	2.44	5.43	3.22
Warmouth bass	1	0.03		7		7.00	0.01	3.91
Green sunfish	1	0.03		5		5.00	0.02	3.19
Redear sunfish	2	0.06		7		3.50	0.01	4.01
Bluegill sunfish	145	3.87	23	10		2.61	0.94	4.49
Longear sunfish	1	0.03		13		13.00	0.03	4.65
White crappie	804	21.48	236	2		4.70	9.30	3.24
Black crappie	2	0.06	1	8		12.00	0.06	2.95
Freshwater drum	10	0.27	3	2		5.00	0.13	2.27
Totals	3,742	100.00	2,537	9			100.00	

Figure 40. - Summary of fish taken in 12 nets set in the upper and lower regions of the Clear Fork of the Brazos River during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Longnose gar	92	33.45	100	14	1	1.54	33.06	0.40
Gizzard shad	98	35.64	62	3		10.15	20.38	2.97
Smallmouth buffalo	16	5.81	49	4	3	1.25	16.14	2.88
River carpsucker	18	6.55	20	15	1	2.61	6.86	2.51
Carp	1	0.36	2	11	2	11.00	0.88	2.40
Channel catfish	15	5.46	39	11	2	10.33	13.01	1.88
Black bullhead	6	2.18	4	8		12.00	1.47	2.42
Flathead catfish	1	0.36	3	2	3	2.00	1.03	1.49
Largemouth bass	9	3.28	18	8	2	0.89	6.06	3.10
Green sunfish	1	0.36		5		5.00	0.10	3.19
Bluegill sunfish	5	1.82		13		2.60	0.27	4.88
White crappie	13	4.73	2	4		2.77	0.74	3.09
Totals	275	100.00	305	2			100.00	

Figure 41. - Summary of fish taken in 140 nets set in the lakes on the Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960

Species	Number	Percent of number	Total weight lbs.	Total weight ozs.	Average weight lbs.	Average weight ozs.	Percent of weight	Average "K"
Gizzard shad	798	23.01	126	5		2.53	5.65	1.93
Smallmouth buffalo	38	1.10	100	4	2	10.21	4.49	2.20
River carpsucker	247	7.12	336	5	1	5.78	15.07	2.55
Carp	86	2.48	115	3	1	5.43	5.16	2.44
Golden shiner	85	2.45	14	6		2.70	0.65	1.43
Channel catfish	842	24.29	1,073	5	1	4.39	48.08	1.92
Black bullhead	327	9.43	45	13		2.24	2.05	2.87
Yellow bullhead	20	0.58	12	8		10.00	0.56	2.42
Flathead catfish	3	0.09	8	12	2	14.66	0.39	1.49
White bass	19	0.54	17	6		14.63	0.78	2.16
Largemouth bass	55	1.59	119	4	2	2.69	5.34	3.24
Warmouth bass	1	0.03		7		7.00	0.02	3.91
Redear sunfish	2	0.06		7		3.50	0.02	4.01
Bluegill sunfish	140	4.04	22	13		2.60	1.02	4.47
Longear sunfish	1	0.03		13		13.00	0.04	4.65
White crappie	791	22.81	233	14		4.73	10.47	3.21
Black crappie	2	0.06	1	8		12.00	0.07	2.95
Freshwater drum	10	0.29	3	2		5.00	0.14	2.27
Totals	3,467	100.00	2,232	7			100.00	

Figure 42. - A comparison of the relative abundance of different species of fish in netting samples collected from the upper Clear Fork of the Brazos River watershed with the relative abundance of different species of fish in netting samples collected from the lower Clear Fork of the Brazos River watershed during the period from April 16, 1958 through March 31, 1960 * **

R-rare; C-common; A-abundant

Species	Upper watershed	Lower watershed
Longnose gar	-	A
Gizzard shad	A	A
Smallmouth buffalo	C	C
River carpsucker	A	A
Carp	C	C
Golden shiner	C	-
Channel catfish	A	A
Black bullhead	A	C
Yellow bullhead	R	-
Flathead catfish	R	R
White bass	R	-
Largemouth bass	C	C
Warmouth bass	-	R
Green sunfish	R	-
Redear sunfish	R	-
Bluegill sunfish	A	A
Longear sunfish	R	-
White crappie	A	A
Black crappie	R	-
Freshwater drum	R	C

* This chart was compiled on an arbitrary basis with the following factors taken into consideration.
(1) percentage of each species represented in the total seining collections from the upper or lower watersheds.
(2) the number of locations where the species was collected.

** (1) Consideration must be given to the fact that some species (largemouth bass and sunfish) are more difficult to capture in gill nets than are others when analyzing the data given herein.
(2) Consideration must be given to the fact the deeper unobstructed water of the lakes was more conducive to setting gill nets than was the shallow obstructed water of the river, and for that reason the netting collections are weighted in favor of a lake type (or bigger, more open water type) enviornment.
(3) Consideration must be given to the fact that the Clear Fork of the Brazos River's watershed was divided into upper and lower regions on a sharp line selected on a more or less arbitrary basis and that, in reality, the physical, chemical, and biological attributes and characteristics of the upper and lower regions overlap.

Figure 43. - A checklist of fish species caught by netting and seining from the Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960 and prior to that period.

Scientific name	Common name
Lepisosteidae (gars)	
Lepisosteus osseus	longnose gar
Clupeidae (herrings)	
Dorosoma cepedianum	gizzard shad
Catostomidae (suckers and buffalofishes)	
Ictiobus bubalus	smallmouth buffalo
Carpiodes carpio	river carpsucker
Cyprinidae (shiners and minnows)	
Cyprinus carpio	carp
Notemigonus crysoleucas	golden shiner
Notropis lutrensis	redhorse shiner
Notropis volucellus	mimic shiner
Notropis buchanani	ghost shiner
Pimephales vigilax	parrot minnow
Pimephales promelas	fathead minnow
Ameiuridae (freshwater catfishes)	
Ictalurus punctatus	channel catfish
Ictalurus melas	black bullhead
Ictalurus natalis	yellow bullhead
Pylodictus olivaris	flathead catfish
Cyprinodontidae (killifishes and topminnows)	
Fundulus notatus	blackstripe topminnow
Fundulus kansae	plains killifish
Cyprinodon rubrofluviatilis	Red River pupfish

Figure 43. - A checklist of fish species caught by netting and seining from the Clear Fork of the Brazos River from April 16, 1958 through March 31, 1960, and prior to that period. (continued)

Scientific name	Common name
Poeciliidae (mosquitofish)	
Gambusia affinis	mosquitofish
Serranidae (basses)	
Roccus chrysops	white bass
Centrarchidae (black basses and sunfishes)	
Micropterus salmoides	largemouth bass
Chaenobryttus gulosus	warmouth bass
Lepomis cyanellus	green sunfish
Lepomis microlophus	redear sunfish
Lepomis macrochirus	bluegill
Lepomis humilis	orangespotted sunfish
Lepomis megalotis	longear sunfish
Pomoxis annularis	white crappie
Pomoxis nigromaculatus	black crappie
Percidae (perches and darters)	
Percina caprodes	logperch
Sciaenidae (croakers, drum, and weakfishes)	
Aplodinotus grunniens	freshwater drum

Figure 44. - Chemical analysis of water samples taken at various stations on the Clear Fork of the Brazos River from October 1, 1950 through September 30, 1956. (Analysis courtesy of Texas Board of Water Engineers.)

	c.f.s.	SiO_2	Ca	Mg	Na+K	HCO_3	SO_4	Cl	NO_3	Dissolved Solids p.p.m.	Ca Mg	Hardness $CaCO_3$ Non-carbonate	Percent Na	Micromhos at 25°C	pH range
Nugent 50-51	43.8	17.0	77	24.0	76	136	197.0	96	4.4	569	290	179	36	871	7.2-8.4
Fort Griffin 50-51	88.7	16.0	58	15.0	44	119	101.0	67	3.5	393	206	108	32	630	7.3-8.3
Nugent 51-52	10.8	12.0	65	28.0	81	165	165.0	106	2.8	558	277	142	39	895	7.6-8.4
Nugent 52-53	12.4	15.0	40	10.0	29	124	48.0	37	3.4	260	141	40	31	419	7.7-8.4
Hubbard Creek 54-55	249.0	11.0	37	3.7	25	109	9.5	41	3.4	192	108	18	34	331	7.4-8.2
Hubbard Creek 55-56	22.7	11.0	38	4.4	32	106	11.0	58	2.7	212	113	26	38	386	7.5-8.2
Hubbard Creek 56-57	633.0	8.4	36	4.1	24	98	10.0	46	2.9	180	107	26	33	331	7.3-8.1

Figure 45. - Chemical analysis of water samples taken from the Clear Fork of the Brazos River at state Highway 70, north of Roby, in Fisher County. (Courtesy of the Texas Health Department) *

1957	January	February	March	April	May	June	July	August	September	October	November	December
pH										7.9	7.9	8.0
Sp. Con.										11,912	5,232	12,536
Tot. Sol.										7,148	3,340	7,523
Chloride										1,942	852	2,203
Sulphate										2,202	1,117	2,133
Cl. Dem.										1.3	1.1	0.6
D. O.										9.4	8.0	8.6
B. O. D.										0.7	2.2	2.2
Flow										low	low	low

1958	January	February	March	April	May	June	July	August	September	October	November	December
pH	7.7	7.6	7.6	7.1	7.3	7.4	7.3	7.4		7.4	7.6	7.5
Sp. Con.	12,450	12,887	11,940	13,500	6,165	6,112	11,250	15,950		7,575	11,300	20,680
Tot. Sol.	7,470	7,732	7,164	7,080	3,699	3,667	6,750	9,588		4,545	6,780	12,408
Chloride	2,120	2,250	2,100	2,253	1,112	1,198	2,420	3,400		1,340	2,000	5,200
Sulphate	1,880	2,107	1,975	1,816	549	699	999	2,095		1,150	1,600	1,525
Cl. Dem.	0.7	1.1	2.6	0.6	3.9	4.4	2.6	3.9		1.8	4.9	12.4
D. O.	10.1	9.9	9.6	6.5	6.2	5.1	4.2	4.5		7.7	6.7	5.0
B. O. D.	1.5	2.4	0.9	1.3	1.6	0.5	0.5	0.5		4.3	2.4	0.5
Flow	low	low	low	norm	norm	low	low	low		norm	norm	norm

1959	January	February	March	April	May	June	July	August	September	October	November	December
pH	7.9	7.9	7.0	7.7	7.5	7.3	7.3	7.5	7.7	7.5	7.7	
Sp. Con.	13,325	13,362	13,550	20,950	6,150	10,710	2,443	6,775	11,950	5,850	11,783	
Tot. Sol.	7,965	8,017	8,010	12,570	3,714	6,426	1,466	4,065	7,170	3,510	7,070	
Chloride	2,400	2,100	2,700	2,120	1,000	2,550	408	1,360	2,250	957	1,963	
Sulphate	2,125	2,337	2,200	1,983	861	475	397	1,825	2,125	950	1,848	
Cl. Dem.	3.9	3.5	2.7	5.3	2.6	5.3	7.9	1.2	1.7	4.5	2.2	
D. O.	8.2	8.9	4.4	5.9	5.2	4.7	2.6	5.4	7.5	5.9	8.7	
B. O. D.	1.1	0.9	4.2	1.8	1.4	3.2	3.0	0.7	0.7	1.2	0.5	
Flow	low	low	low	norm	norm	norm	norm	norm	norm	high	norm	

*Monthly figures are averages of individual recordings.

Figure 46. - Chemical analysis of water samples taken from the Clear Fork of the Brazos River at U. S. Highway 380 at Leuders (east of oil field) in Shakelford County. (Courtesy of the Texas Health Department) *

1957	January	February	March	April	May	June	July	August	September	October	November	December
pH									8.3	7.8	8.0	7.9
Sp. Con.									1,140	937	933	4,300
Tot. Sol.									684	562	560	5,160
Chloride									120	114	96	519
Sulphate									315	429	200	944
Cl. Dem.									2.7	0.7	1.8	0.7
D. O.									6.8	7.4	8.8	9.7
B. O. D.									2.0	1.9	5.6	1.3
Flow									norm	norm	high	norm

1958	January	February	March	April	May	June	July	August	September	October	November	December
pH	7.8	7.8	7.9	7.5	7.7	7.4	7.5	7.6	7.6	7.6	7.6	7.9
Sp. Con.	5,522	5,800	5,050	5,040	1,120	1,400	723	1,433	455	2,450	3,265	2,390
Tot. Sol.	3,315	1,980	3,030	3.024	672	840	434	859	273	1,470	1,959	1,435
Chloride	372	745	690	710	122	155	80	170	32	310	320	330
Sulphate	1,138	1,373	1,174	1,213	144	229	113	299	68	408	403	470
Cl. Dem.	0.5	0.9	1.8	1.2	1.3	3.5	4.7	0.9	1.2	2.7	4.0	3.1
D. O.	9.8	9.3	9.0	8.1	6.1	5.5	4.3	5.2	6.1	6.6	8.1	1.2
B. O. D.	3.2	2.3	9.2	2.4	1.6	0.9	0.5	0.9	0.7	1.8	1.5	1.2
Flow	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm

1959	January	February	March	April	May	June	July	August	September	October	November	December
pH	8.0	7.9	7.5		7.4	7.4	7.4	7.2	7.8	7.9	8.0	
Sp. Con.	3,750	3,550	5,985		4,613	537	342	762	4,625	707	1,495	
Tot. Sol.	2,250	2,130	3,591		2,768	322	205	458	1,575	424	897	
Chloride	560	460	880		565	44	22	84	340	73	177	
Sulphate	760	690	1,388		665	125	64	163	474	144	276	
Cl. Dem.	3.5	3.5	3.2		4.0	3.5	2.3	1.2	0.2	3.0	1.0	
D. O.	6.8	7.5	7.9		6.2	5.5	6.4	5.4	7.0	8.3	9.7	
B. O. D.	1.5	0.6	0.7		1.3	0.6	1.9	1.4	0.5	0.2	0.5	
Flow	norm	norm	norm		norm	norm	norm	norm	norm	norm	norm	

* Monthly figures are averages of individual recordings.

Figure 47. - Chemical analysis of water samples taken from the Clear Fork of the Brazos River at Farm Road crossing 701 east of Eliasville, Texas, in Young County. (Courtesy of the Texas Health Department) *

1957	January	February	March	April	May	June	July	August	September	October	November	December
pH									7.6	7.7	7.7	7.8
Sp. Con.									2,360	2,085	2,535	6,180
Tot. Sol.									1,416	1,251	1,521	3,708
Chloride									625	348	446	1,540
Sulphate									178	335	160	480
Cl. Dem.									3.5	1.8	1.8	0.7
D. O.									6.0	7.4	9.1	8.7
B. O. D.									0.9	0.5	3.7	2.5
Flow									norm	high	high	norm

1958	January	February	March	April	May	June	July	August	September	October	November	December
pH	7.8	7.7	7.5	7.4	7.3	7.4	7.5	7.7	7.7	7.7	7.6	7.9
Sp. Con.	3,250	3,775	4,259	4,000	1,675	1,850	1,040	3,007	2,270	1,642	2,350	3,280
Tot. Sol.	1,950	2,265	2,550	2,400	1,005	1,110	624	1,779	1,362	657	1,410	1,968
Chloride	770	860	1,030	1,050	315	320	221	760	560	263	470	840
Sulphate	127	161	220	126	135	164	37	88	66	35	56	74
Cl. Dem.	3.5	1.8	3.5	1.3	2.6	2.7	4.4	1.3	5.3	2.2	1.8	---
D. O.	9.8	9.0	8.0	7.6	5.7	5.8	4.2	6.0	4.5	7.1	8.4	---
B. O. D.	3.1	2.5	1.3	0.7	1.6	0.5	0.5	0.5	0.9	1.3	1.4	---
Flow	low	norm	norm	norm	high	high	flood	norm	high	norm	low	low

1959	January	February	March	April	May	June	July	August	September	October	November	December
pH	8.0	8.0	7.7	7.5	7.7	7.4	7.3	7.7				
Sp. Con.	3,100	3,600	4,300	5,500	1,057	895	1,967	1,370				
Tot. Sol.	1,860	2,160	2,580	3,300	634	537	1,180	833				
Chloride	800	1,340	1,106	1,380	150	102	380	230				
Sulphate	72	64	116	120	197	79	281	129				
Cl. Dem.	3.5	6.2	2.3	2.0	0.9	0.5	1.8	1.7				
D. O.	10.1	7.6	8.5	6.6	5.1	4.0	5.1	4.8				
B. O. D.	1.6	0.5	0.5	0.5	1.1	1.0	4.3	1.0				
Flow	low	low	norm	norm	norm	norm	norm	norm				

* Monthly figures are averages of individual recordings.

Figure 48. - Chemical analysis of water samples taken from the Brazos River at U. S. Highway 283 at Fort Griffin, Texas, in Shakelford County. (Courtesy of the Texas Health Department) *

1957	January	February	March	April	May	June	July	August	September	October	November	December
pH									7.9	7.9	7.7	8.0
Sp. Con.									1,850	2,850	492	1,415
Tot. Sol.									1,110	1,210	295	849
Chloride									290	340	64	167
Sulphate									480	783	55	234
Cl. Dem.									2.7	1.6	2.7	0.5
D. O.									6.6	6.8	8.6	9.8
B. O. D.									0.8	1.0	7.0	2.1
Flow									norm	norm	high	norm

1958	January	February	March	April	May	June	July	August	September	October	November	December
pH	7.9	7.9	7.8	7.5	7.7	7.5	7.9	7.8	8.0	7.6	7.8	7.9
Sp. Con.	2,715	2,475	4,150	4,320	1,600	1,400	572	720	437	690	1,000	987
Tot. Sol.	1,635	1,485	2,490	2,592	900	790	343	732	263	414	600	593
Chloride	174	300	550	610	235	235	77	216	46	104	160	175
Sulphate	495	495	845	1,067	218	145	59	1,005	57.5	53	92	95
Cl. Dem.	0.5	10.9	10.9	0.7	1.8	1.8	1.4	1.8	3.1	1.8	4.1	1.3
D. O.	9.8	9.6	9.2	8.3	6.3	6.4	5.6	5.7	5.9	6.15	9.8	10.1
B. O. D.	2.7	3.4	1.3	1.7	0.1	2.6	0.5	1.0	1.05	1.8	1.9	0.7
Flow	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm	norm

1959	January	February	March	April	May	June	July	August	September	October	November	December
pH	8.0	7.9	7.9	7.6	7.5	7.4	7.5	7.1	7.9	7.9	8.1	
Sp. Con.	1,420	3,070	1,565	1,900	1,177.5	441	1,385	1,118.5	1,235	478	1,127	
Tot. Sol.	852	1,842	938	1,140	724	265	831	671	231	286	676	
Chloride	240	480	260	280	150	52	170	255	231	55	153	
Sulphate	160	637	245	280	125	89	197	215	136	66.5	130.5	
Cl. Dem.	0.5	4.45	2.6	1.8	3.1	1.5	2.25	1.1	1.7	3.5	2.0	
D. O.	6.9	8.1	8.8	7.8	5.1	7.9	7.5	5.7	7.1	7.9	10.2	
B. O. D.	1.1	1.5	0.6	0.5	1.0	1.3	3.6	1.7	0.5	0.25	0.8	
Flow	low	low	norm	low	low	high	norm	norm	low	norm	norm	

* Monthly figures are averages of indiyidual recordings.

Figure 49. - Chemical analyses of water samples on California Creek in the Avoca Oil Fields of Jones County (Courtesy of Texas Board of Water Engineers)

Sampling Point	Location of point	Cl	Na	SiO_2	Mg	HCO_3	SO_4	Specific Conductance	Remarks
1. California Creek	On Eckenstam property below old washed-out rock dam approximately 0.7 miles upstream from F. A. S. Highway 600.	6,780	3,010	7	360	59	417	18,600	Sample taken from shallow, swift run below first pool downstream from old rock dam; flow estimated at 20-25 gpm; dying fish were seen in the pool.
2. California Creek	At bridge on F. A. S. Highway 600, 5 miles east of junction with Highway 142	1,830	Na/K 837	-	111	122	200	5,920	Sample from long pool on downstream side; width is approximately 20' at this point, averaging 2-3' deep; unable to estimate flow; slight evidence of aquatic life noted.
3. Artesian spring in bank of California Creek.	On Carlson property at intersection with Olson-Carlson property line running east & west; 0.3 miles above old dam described in item 1 above.	43,800	20,890	12	1,850	83	1,510	84,100	Sample taken from salty spring sporadically emitting gas bubbles; temperature of water 66° F, flow estimated at 3-5 gpm; small fish were dead below spring.

Figure 50. - Chemical analysis of water samples taken from the Hamlin Lakes on the upper reaches of California Creek in Fisher and Jones Counties. (Courtesy of the Texas Health Department)

Location and date	Cl	Na	Mg	HCO_3	SO_4	Specific conductance
1. Old Hamlin City Lake west of Hamlin, Texas 4-28-1951	2,982	2,321	160	67	1,671	--
2. Old Hamlin City Lake west of Hamlin, Texas 5-15-1958	4,800	1,930	240	41	950	18,979
3. Moore's Lake directly below Old Hamlin City Lake 5-15-1958	1,550	450	98	26	800	7,920
4. New Hamlin City Lake south of Hamlin, Texas 5-15-58	11	1	12	129	25	290

Figure 51. Dry bed of the Clear Fork of the Brazos River near its extreme upper limit in far western Fisher County

Figure 52. Intermittent stream area of the Clear Fork of the Brazos River in western Fisher County

Figure 53. Pool on the intermittent stream area of the Clear Fork of the Brazos River in Fisher County

Figure 54. Semi-permanent water of the Clear Fork of the Brazos River in eastern Jones County

Figure 55. Confluence of Cottonwood Creek and the Clear Fork of the Brazos River above the Leuders Dam in eastern Jones County

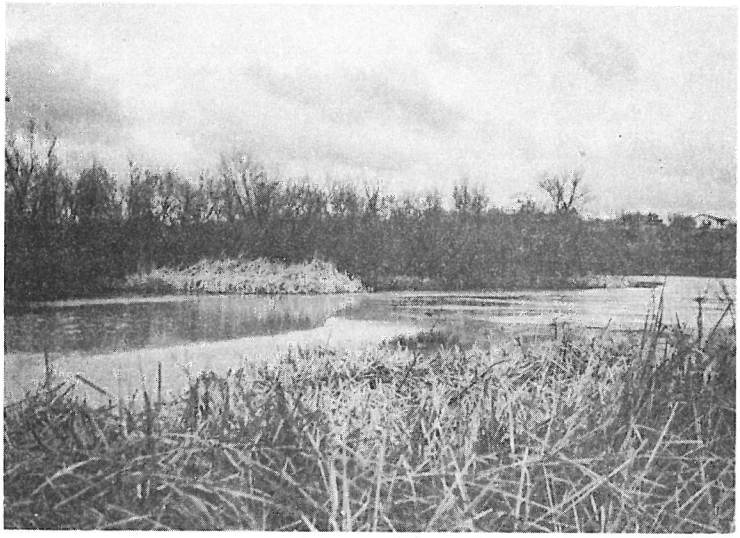


Figure 56. Patches of bullrushes above Leuders Dam in eastern Jones County

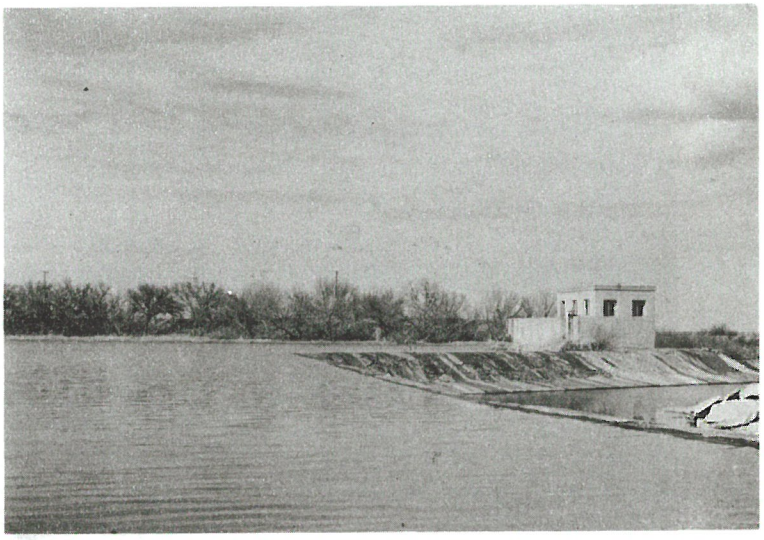
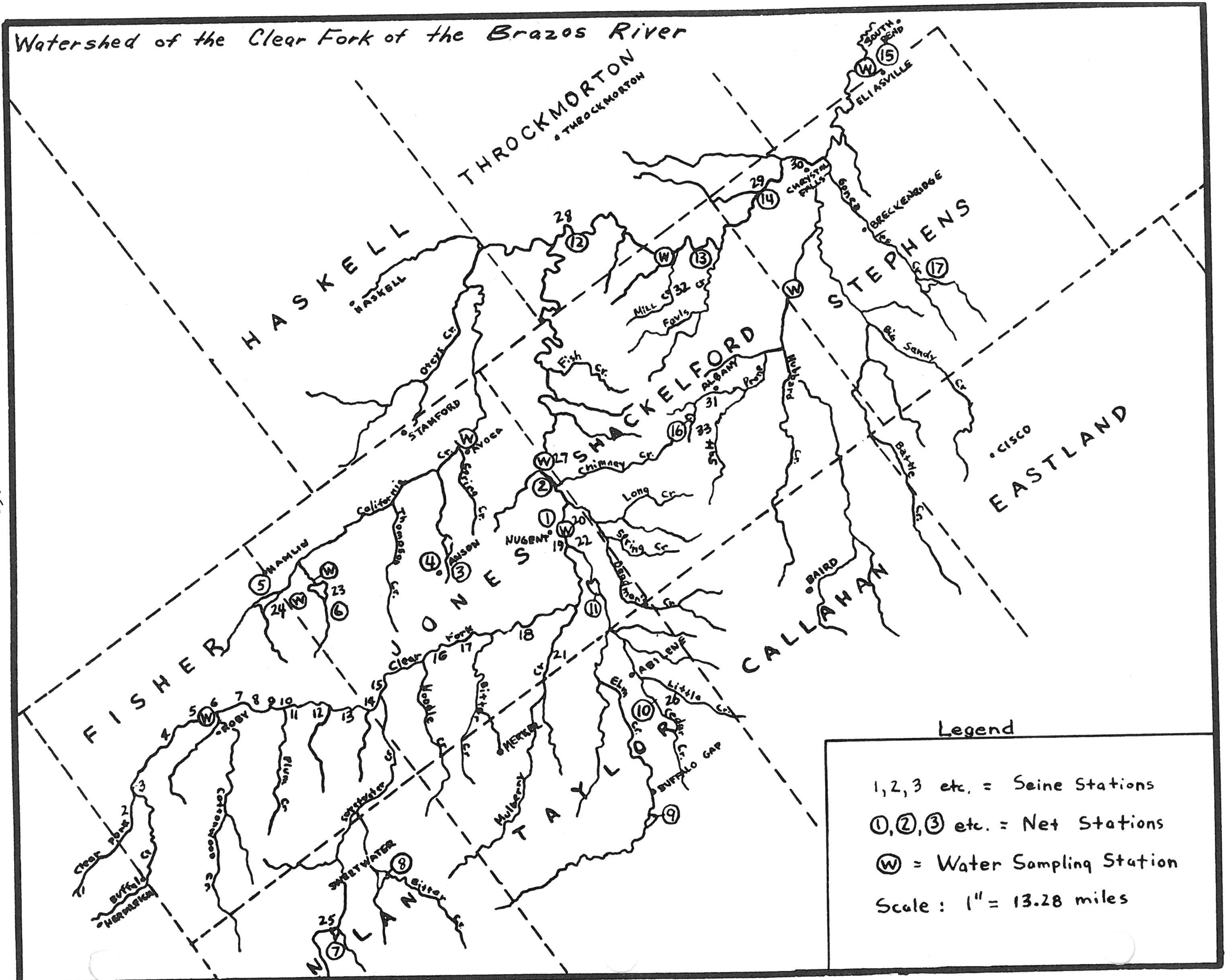


Figure 57. The Leuders Dam on the Clear Fork of the Brazos River near Leuders, Texas, in eastern Jones County

Figure 58. The Dam at Eliasville, Texas, on the lower reaches of the Clear Fork of the Brazos River in southern Young County


Watershed of the Clear Fork of the Brazos River
HASKELL
THROCKMORTON
FISHER
JONES
SHACKELFORD
STEPHENS
NOLAN
TAYLOR
CALLAHAN
EASTLAND
HASKELL
THROCKMORTON
STAMFORD
AVOCA
HAMLIN
ANSON
NUGENT
ROBY
MERKEL
ABILENE
BUFFALO GAP
SWEETWATER
HERMLEIGH
BAIRD
CISCO
ALBANY
CHRYSTAL FALLS
BRECKENRIDGE
ELIASVILLE
SOUTH BEND
Clear Fork
Buffalo Cr.
Cottonwood Cr.
Plum Cr.
Sweetwater Cr.
Bitter Cr.
Noodle Cr.
Bitter Cr.
Mulberry Cr.
Elm Cr.
Cedar Cr.
Little Cr.
Deadman Cr.
Spring Cr.
Long Cr.
Chimney Cr.
Salt Cr.
Thompson Cr.
California Cr.
Paint Cr.
Otey's Cr.
Fish Cr.
Mill Cr.
Foyls Cr.
Hubbard Cr.
Big Sandy Cr.
Battle Cr.
Gonzales Cr.
Legend
1, 2, 3 etc. = Seine Stations
①, ②, ③ etc. = Net Stations
Ⓦ = Water Sampling Station
Scale : 1" = 13.28 miles