

## JOB COMPLETION REPORT

State of TEXAS

Project No. F7R4 Name: Fisheries Investigations and Surveys of the Waters of Region 1-B.

Job No. B-10 Title: Basic Survey and Inventory of Species Present, as well as Their Distribution in the Pease River, its Tributaries and Watershed within Wilbarger, Foard, Cottle, Motley, Floyd, and Brisco Counties, Texas.

Period Covered: June 1, 1956 through May 31, 1957

### ABSTRACT

Fifty-two seine collections produced a total of 20,005 specimens for study. Twenty-four species, representing 7 families of freshwater fish were found to occur. Except in a few isolated holes near the river mouth, the Pease River is valueless for game fish at the present time. For the most part, the water is excessively salty, and the river bed is often dry and too shallow to maintain a game fish population. The fish population is comprised mostly of salt tolerant cyprinids and game wardens report extensive seining for these species by commercial bait dealers. Since the water is not suitable for municipal or irrigation purposes, the construction of an impoundment on the Pease River in the foreseeable future, for any purpose other than flood control, is unlikely.

### ACKNOWLEDGMENTS

Dr. Walter Dalquest, whose employment with the Texas Game and Fish Commission terminated in October 1956, set up the original stations, conducted all of the laboratory work and most of the field work on this job for the first five months. Since that time, Dr. Dalquest has helped with some phases of work conducted in Region 1-B and has checked the manuscript of this report. Grateful acknowledgment is also expressed to Dr. Carl Gray, Soils Scientist of Midwestern University and Wichita County Water Improvement Districts, for making the numerous water analyses during this study. Data on water volume were obtained from Mr. John Joernes, United States Geological Survey, Water Resources Branch, Wichita Falls.

### TECHNIQUES

Sample stations were established at six points along the length of the Pease River. Eleven collections, approximately one month apart, were made at each sample station during the study. At each station, chemical and physical data concerning the water were taken, and seine samples of the fishes present were preserved in formalin for laboratory examination and identifications. Since an adequate picture of the fish population at all points along the river could be determined by seining, no gill nets or fish toxicants were used. There are no important permanent-flowing tributaries of the Pease. Water was present at only one tributary during the study, and basic survey collections were taken from this station in addition to those on the river. On several occasions, data could not be obtained from some of the station either because

the river was dry, or because the river was flooded and could not be seined.

### PHYSICAL CHARACTERISTICS

North Pease River originates in northwestern Motley County and flows northeastwardly to just above the Motley-Hall County line, then continues south-eastwardly across northern Cottle County to its confluence with South and Middle Pease Rivers. Both the South and Middle Pease Rivers originate in western Motley County, flow northeastwardly to their convergence in east-central Cottle County, and continue to their confluence with North Pease River in northeastern Cottle County. After leaving Cottle County, the Pease River flows southeastwardly across the southwestern corner of Hardeman County, serves as a boundary line between south-eastern Hardeman and northeastern Foard Counties, and continues across the northern section of Wilbarger County to its confluence with Red River.

Headwater streams of the Pease River lie in Permian clays and sandstones, with abundant veins and stringers of crystalline gypsum. The sediments of Permian age outcropping along the Pease River form the Pease River Group and are considered to have been deposited in early-middle Permian time. On the north bank of the river at Lazare Station, and at an elevation nearly 100 feet above the present river level, are found extensive Pleistocene gravel deposits that are now being worked commercially. To the south of the river and only a few yards above the present river level occurs a well-consolidated conglomerate of unknown age. It seems to differ lithologically from Pleistocene gravels of the valley of the Pease and other northern Texas rivers, and no fossils of vertebrate animals were found in spite of rather intensive search.

Downstream from Lazare Station, wind blown sands from numerous dunes and there are bluffs along the river that consist of reddish, sandy soil and contain remains of modern buffalos and other Recent animals. The Permian rocks form the river valley but Recent deposits cover the floodplain of the river itself. There are local deposits of late Pleistocene age, as at Vernon Station, containing remains of elephants and other mammals. Other deposits of apparently similar age are found near the river mouth.

The U. S. Geological Survey discontinued its station on the Pease River in July 1947. Therefore, stream flow and run-off data are not available for the period of this survey. Data is available for the monthly and annual mean discharge and the monthly and annual run-off at Quanah Station from January 1924 to July 1947. (See Tables 1 and 2).

### DESCRIPTION OF SAMPLE STATIONS

NORTH FORK STATION. Located on Highway 83 approximately 18 miles south of Childress, in Cottle County. The river here has cut a relatively narrow valley in Permian rocks. There is much shale, gypsum and silt. The river bed is braided sand and quite firm (not quicksand). The river was dry here most of the year, and collections were taken from isolated pools below cliffs on the north bank.

MATADOR STATION. Located on Highway 70, approximately 12 miles west of Paducah, at the Motley-Cottle County line. The valley here is narrow and deeply-cut into Permian rocks. The river bed is braided sand and apparently dry most of the

time because grass grows well out on the river bed. Many trees grow along the river's edge, mostly elms and a few cottonwoods. Collections were made from a deep hole near the bridge, that apparently holds water for long periods of time. This station is the point farthest up the river that is worthy of maintaining as a station. Since this station was dry for the first 6 months of the study, it was discontinued in November 1956, and replaced by South Fork Station approximately 25 miles downstream.

SOUTH FORK STATION. Located on Highway 83 about 6 miles south of North Fork Station and 15 miles north of Paducah. This station is approximately 10 miles below the confluence of the Middle and South Forks of the Pease River. The river bed is similar to that of the North Fork, but the valley is narrower. Except during a period of heavy rain, in May 1957, this station was dry. A tree at least 10 feet high, in the middle of the river bed, indicates a normally dry condition.

LAZARE STATION. Located about 12 miles south of Kirkland and near the very small town of Lazare. The confluence of the North and South Forks of the Pease occurs about 3 miles upstream. Approaching this station from the north, one descends through a series of cut terraces in Permian sediments. Deposits on the north bank are sandstone, shale, gypsum and dolomite. To the south the rise is more gradual, and much of it is through a gravel and conglomerate series of many yards thickness. This material appears entirely non-fossiliferous. The river bed is broad and of braided sand. Running water was present each time this station was worked.

QUANAH STATION. Located on Highway 283, approximately 15 miles south of Quanah. This station is in a valley cut into Permian silt, sandstone and dolomitic limestone. To the north, in the direction of Quanah, the land rises greatly in level after level of terraces cut into Permian sediments. No Pleistocene and little Recent, even on highest level. The river bed is quite broad, of braided sand, and rather muddy. Running water was not always present, but there were several large pools from which a collection could always be obtained.

WEST VERNON STATION. Located on Highway 287, about 3 miles northwest of Vernon. The valley is broad and shallow with bluffs of bedded materials, mostly floodplain sand, on the north side. The river bed is very wide and braided, with the flood level approaching one-half mile in width. Bed is sand and quicksand. Very little streamside vegetation except salt cedar. When the stream was not flowing, there were deep holes (up to 6 feet in depth) under the bridge from which collections were taken.

VERNON STATION. Quite similar to West Vernon Station and within sight of it. Located on Highway 283, immediately north of Vernon. This station was discontinued in January 1957, because it was not different enough from the West Vernon Station. It was set up as a station originally because it was thought to be below the sewage plant, it was discontinued and a new station (East Vernon) was set up below the effluent ditch.

EAST VERNON STATION. Located about 2 miles east of the city of Vernon and about one-half mile below the sewage effluent ditch. The river is quite often dry, except for the water provided by the sewage plant effluent. When the river is flowing, fish species similar to those of the stations further upstream may be found here. When the river is not flowing, fish are trapped in stagnant pools of sewage water and usually die. There are signs of bank fishing farther downstream (probably for carp). Tracks and other indications of commercial bait seining are evident between this station and the mouth of the river.

SHORES CREEK. Located 3 miles north of North Fork Station on Highway 83. This creek is in a narrow canyon with steep walls. The creek consists of standing holes of water 50 to 200 feet long connected by seeping stream flow. Bottom is sandy and rocky with thin covering of silt. There is no vegetation in the canyon, and the walls have jutting rocks heavily laced with stringers of gypsum. Rocks and snags in the creek bed made seining very difficult. Only Hybognathus and Pimephales promelas were taken at this station.

Physical data: Air - 72; Water - 57; Turbidity - 500 plus

Chemical data:	ca.	na.	cl.	so4	co3	hco3	Total	pH
	1054	34	28	2467	6	149	110	8.4

#### CHEMICAL CHARACTERISTICS OF WATER

The chemical nature of water at the sample stations is given in Table 3. Except during periods of rainfall and where it is diluted by sewage effluent from the city of Vernon, the water in the Pease River is too salty and "gypsy" to support most species of freshwater fishes. The source of these natural polluting salts is probably springs whose waters have percolated through gypsum and halite beds of Permian age.

#### POLLUTION

No industrial waste was found to enter the Pease River. The only sewage effluent entering the river is from the city of Vernon. Water from this effluent was checked on several occasions and was always found to be well treated, free of all solids, and clear. Treated water is carried from the treating plant in an enclosed pipe directly to the effluent ditch, where it falls onto large concrete blocks and flows approximately 400 feet to the river. Frogs, turtles and algae were observed in the ditch. When water is flowing in the river at this point, it is actually improved by the treated sewage water. When the river is not flowing and diluting the sewage effluent, it is quite common to find sick and dead fish (mostly carp, carpsucker, bullhead catfish and native minnows) in the river and along the banks.

#### PHYSICAL CHARACTERISTICS

Physical conditions at sample stations are shown in Table 4. For the purpose of this survey, turbidity was measured with a secchi disk. Measurements were made in deepest water found at the station. Frequently, the disk was clearly visible on the bottom, in which case the turbidity was recorded as the depth of the water "plus".

#### FISH COLLECTIONS

A total of 24 species, representing 7 families of freshwater fishes was taken from the Pease River during the segment period. Monthly variations in species and numbers of fishes taken at each of the sample stations are given in Tables 5 through 11. The total numbers of fishes taken at all of the permanent sample stations along the river are given in Table 12.

There were 20,005 specimens collected from the seven permanent sampling stations.

Family Clupeidae

## Herrings

Dorosoma cepedianum: gizzard shad. We took 66 specimens during the study, comprising 0.3% of the total.

Family Catostomidae

## Suckers

Carpionotus carpio: river carpsucker. Only 117 specimens were taken, all but one of which were captured near the river mouth, close to Vernon.

Family Cyprinidae

## Shiners and Minnows

Cyprinus carpio: carp. Twelve carp were collected, all at West Vernon Station.

Hybopsis aestivalis: speckled chub. A total of 94 specimens was taken at 4 stations.

Notropis percobromus: plains shiner. Sixteen specimens were taken at West Vernon and Quanah Stations.

Notropis brazosensis: Brazos River shiner. Only 4 specimens were taken, all at West Vernon station, in December 1956.

Notropis potteri: chub shiner. Although not numerous (0.39% of the total) this species was represented at all but 2 stations during the study. It was not taken at South Fork Station (dry except during floods) or at East Vernon Station where adequate water was not present to dilute the sewage effluent.

Notropis bairdi: Red River shiner. This, one of the most abundant species in the Pease River, was represented at every station and comprised 23.8% of the total.

Notropis lutrensis: redhorse shiner. This is also one of the more numerous and widely distributed species in the Pease River. It was taken from every station and comprised 17.06% of the total.

Notropis buchmanii: ghost shiner. Occurred only at two stations, near the river mouth. It was taken at West Vernon station in August and September 1956, and at Vernon Station in August 1956.

Hybognathus placita: plains minnow. Comprising 25.28% of the total, this widely distributed species was the most abundant of all fishes in the Pease River. It was not taken at East Vernon Station, but was found at all the other stations.

Pimephales vigilax: parrot minnow. Eleven specimens were taken during the study, at Vernon and West Vernon Station.

Pimephales promelas: fathead minnow. Although not numerous, this species is widely distributed in the Pease, from the headwaters to its mouth.

Family Ameiuridae

Freshwater catfishes

Ictalurus punctatus: channel catfish. A total of ten specimens was taken, all at West Vernon Station.

Ictalurus melas: black bullhead. This species is not numerous, but well distributed in the Pease - especially in isolated holes.

Family Cyprinodontidae

Killifishes and topminnows

Fundulus kansae: plains killifish. The killifish is abundant in the Pease River and widely distributed.

Cyprinodon rubrofluviatilis: Red River pupfish. Comprising 14.27% of the total, this salt tolerant species was taken at every sampling station. It was most abundant at Lazare Station, where the salinity was consistently high.

Family Poeciliidae

Mosquitofishes

Gambusia affinis: common mosquitofish. A total of 59 specimens was taken from three stations. Noteworthy is the collection of one Gambusia at Lazare Station in March 1957 when the chloride measurement was next-to-the highest recorded during the entire segment period (13,764 p.p.m.). All of the other specimens of Gambusia were obtained at Vernon and West Vernon Stations.

Family Centrarchidae

Black basses and sunfishes

Micropterus salmoides: largemouth bass. Only 7 specimens were taken - one at Quanah Station and 6 at West Vernon Station.

Lepomis cyanellus: green sunfish. Although not abundant, this salt tolerant sunfish was taken at all but one station. It was absent from only the polluted waters of East Vernon Station.

Lepomis macrochirus: bluegill. Not numerous, but widely distributed.

Lepomis humilis: orangespotted sunfish. A total of 99 specimens was taken at 3 stations.

Lepomis megalotis: longear sunfish. Eleven specimens were taken at Vernon and West Vernon Stations.

Pomoxis annularis: white crappie. Nine specimens taken, one from Quanah Station and 8 at West Vernon.

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Table 1. Monthly and Annual Mean Discharge at Quansh Station.  
(Drainage area, 3,037 square miles, of which 559 square miles is probably noncontributing).

Year	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Annual
1924	-	-	-	10.9	4.97	46.8	99.2	11.4	330	1182	435	579	-
1925	19.4	0.35	1.63	19.4	4.99	.62	389	1127	51.4	85.3	1160	1063	329
1926	167	40.4	.23	.71	1.19	35.8	615	105	95.4	266	24.8	451	150
1927	-	-	-	60.7	18.7	6.25	47.8	117	161	18.9	7.16	74.2	-
1928	34.4	0.5	1.0	1.0	5.0	0	2.2	171	160	197	164	5.6	62.4
1929	-	-	-	-	-	-	-	-	-	-	-	-	152
1930	94.6	28.9	3.10	11.3	18.3	47.3	120	69.4	.58	3.19	.88	39.7	33.5
1931	1172	20.6	271	16.1	90.3	32.9	81.5	55.0	377	12.8	64.3	0	184
1932	182	93.0	63.6	74.3	12.1	.53	220	155	2367	845	331	184	372
1933	3.86	.04	331	11.8	8.19	13.1	.02	288	5.10	588	524	379	182
1934	.81	13.6	9.07	5.87	1.36	20.9	12.3	76.5	128	17.3	311	375	81.0
1935	.09	29.5	.81	.44	1.22	495	911	4116	634	90.2	481	173	584
1936	159	26.8	20.3	11.5	9.51	7.79	9.17	195	86.2	60.9	.99	3563	341
1937	42.5	17.3	16.3	14.0	3.01	3.43	35.4	438	640	85.0	1081	281	223
1938	317	14.1	7.39	3.51	23.8	64.7	31.9	563	1616	112	128	6.09	240
1939	40.8	33.3	1.64	211	3.14	88.6	.95	185	1530	296	273	.02	222
1940	65.3	.03	2.56	2.54	11.2	.16	136	213	28.1	13.0	830	108	119
1941	39.1	115	1.25	5.33	19.4	31.8	745	4094	5531	137	867	572	1013
1942	2018	111	84.2	38.2	20.0	19.5	1150	60.0	15.5	21.2	36.6	556	346
1943	324	26.2	28.8	23.4	9.38	8.55	69.4	359	464	12.0	0	6.20	111
1944	8.77	4.37	18.2	16.7	14.9	11.1	6.33	91.3	564	43.4	55.7	68.4	74.7
1945	33.9	10.1	27.9	19.4	13.5	16.4	26.8	3.61	76.4	1030	258	52.9	133
1946	34.0	6.52	5.08	12.9	7.15	1.68	0.63	58.4	331	44.0	32.3	871	116
1947	867	34.4	28.5	15.1	4.38	8.18	69.1	2430	57.9	-	-	-	-

Note: All discharge is measured in cubic feet per second.

Table 2. Monthly and Annual Run-off at Quansah Station.  
 (Drainage area, 3037 square miles of which 559 square miles is probably noncontributing).

Year	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Annual
924	-	-	-	668	286	2,880	5,900	702	19,600	72,650	26,700	345	-
925	1,190	20.8	100	1,190	277	38.1	23,120	69,270	3,060	5,250	71,340	63,270	238,100
926	10,300	2,410	14.1	43.6	66	2,200	36,600	6,440	5,680	16,380	1,520	26,860	108,500
927	-	-	-	3,730	1,040	384	2,840	7,170	9,570	1,160	440	4,420	-
928	2,120	29.8	61.5	61.5	288	0	131	10,520	9,520	12,140	10,100	333	45,300
929	-	-	-	-	-	-	-	-	-	-	-	-	110,000
930	5,820	1,720	191	695	1,020	2,910	7,140	4,270	35	196	54	236	24,300
931	72,070	1,230	16,640	990	5,020	2,020	4,850	3,380	22,430	787	3,950	0	133,400
932	11,180	5,530	3,910	4,570	696	33	13,090	7,070	140,800	51,970	20,370	10,900	270,100
933	237	2.4	20,330	726	455	806	1.2	17,700	303	36,130	32,240	22,570	131,500
934	50	806	558	361	76	1,290	734	4,700	7,590	1,060	19,130	22,290	58,640
935	5.4	1,750	50	27	68	30,410	54,220	253,100	37,750	5,540	29,590	10,320	422,800
936	9,790	1,590	1,250	705	547	479	545	11,970	5,130	3,740	61	212,000	247,800
937	2,610	1,030	1,000	860	167	211	2,110	26,950	58,090	5,220	66,480	16,730	161,500
938	19,510	840	455	216	1,320	3,980	1,900	34,600	96,150	6,860	7,880	362	174,100
939	2,510	1,980	101	13,000	175	5,450	57	11,400	91,040	18,170	16,810	1.0	160,700
940	4,020	2.0	157	156	644	9.7	8,090	13,090	1,670	800	51,010	6,400	86,050
941	2,410	6,820	77	328	1,080	1,950	44,310	251,700	329,100	8,440	53,320	34,010	733,500
942	124,100	6,630	5,180	2,350	1,110	1,200	68,430	3,690	920	1,300	2,250	33,080	250,200
943	19,920	1,560	1,770	1,440	521	526	4,130	22,070	27,640	735	0	369	80,680
944	539	260	1,120	1,030	858	680	377	5,610	33,560	2,670	3,420	4,070	54,190
945	2,090	603	1,710	1,190	752	1,010	1,600	222	4,550	63,320	15,860	3,150	96,060
946	2,090	388	313	793	397	104	37	222	19,670	2,710	1,980	51,850	-
947	53,330	2,050	1,750	928	243	503	4,110	3,590	3,440	-	-	-	83,920

Note: ALL run-off is measured in acre feet.

Table 3. Chemical Nature of the Water at the Sample Station.

Date	Calcium	Sodium	Chloride	Sulfate	Carbonates	Bicarbonates	Total Salts	pH
<u>NORTH FORK STATION</u>								
6/19/57	216	300	505	382	0	102	1505	-
7/11/56	732	1050	1597	1747	0	61	5187	-
8/22/56	878	1173	1864	1939	0	124	5978	7.4
9/15/56	904	1683	3461	874	0	162	7084	7.75
11/27/56	756	2423	3852	1548	0	157	8736	7.8
12/27/56	864	1709	3160	1228	0	180	7141	8.3
1/9/57	1120	1919	2973	2539	18	134	8703	8.4
2/7/57	1020	1664	2734	2093	12	144	7667	8.0
3/26/57	784	1617	2521	1743	9	108	6782	7.78
4/12/57	828	1632	2570	1824	6	108	6968	7.75
5/24/57	704	2457	3873	1459	12	132	8637	7.80
<u>MATADOR STATION</u>								
6/19/56	300	140	200	538	0	54	1232	-
7/11/56	624	498	809	1320	0	158	3409	-
8/22/56	dry							
9/15/56	dry							
11/27/56	dry							
<u>SOUTH FORK STATION</u>								
12/27/56	dry							
1/9/57	dry							
2/7/57	dry							
3/26/57	dry							
4/12/57	dry							
5/24/57	292	121	195	590	6	116	1320	7.97
<u>LAZARE STATION</u>								
6/19/56	300	560	950	516	0	108	2434	-
7/11/56	992	3250	5059	2328	0	122	11751	-
8/22/56	2195	9246	14697	4531	0	216	30884	7.25
9/15/56	1318	5829	10895	471	0	162	18675	7.65
11/27/56	1536	6565	10206	3446	0	183	21936	7.7
12/27/56	1672	7515	11804	3600	0	168	23759	8.4
1/9/57	2048	8150	12780	4522	18	122	27640	8.5
2/7/57	2082	8333	12958	4738	18	126	28255	8.1
3/26/57	1634	8232	13764	2367	12	132	26141	7.70
4/12/57	1592	8190	12567	3811	6	126	26292	7.55
5/24/57	426	891	1530	730	0	110	3687	7.87

Table 3. (Continued).

Date	Calcium	Sodium	Chloride	Sulfate	Carbonates	Bicarbonates	Total Salts	pH
<u>QUANAH STATION</u>								
6/19/56	928	1600	2911	1464	0	230	7133	-
7/11/56	640	1500	2547	1160	0	92	5939	-
8/22/56	278	150	195	634	0	104	1361	7.3
9/15/56	344	220	343	662	0	204	1773	7.80
11/27/56	756	1887	2787	1709	0	344	7483	7.6
12/27/56	1204	2887	5015	2035	0	126	11267	8.3
1/9/57	1428	2814	4438	3173	18	124	11995	8.2
2/7/57	1508	3341	5503	3015	12	150	13529	8.1
3/26/57	1128	3213	5240	2199	9	134	12923	7.60
4/12/57	936	1581	2734	1764	6	96	7117	7.81
5/24/57	224	182	327	384	6	102	1225	8.03
<u>WEST VERNON STATION</u>								
6/19/56	816	1250	2157	1497	0	198	5918	-
7/11/56	308	345	639	509	0	110	1911	-
8/22/56	248	180	231	590	0	90	1339	7.8
9/15/56	302	162	238	624	0	145	1471	7.65
11/27/56	588	936	1456	1205	0	244	4429	8.0
12/27/56	332	452	682	720	0	126	2312	8.3
1/9/57	696	896	1430	1373	30	244	4669	8.1
2/7/57	796	1089	1669	1714	18	240	5526	7.8
3/26/57	1046	3654	5630	2400	12	142	12884	7.80
4/12/57	500	603	1044	941	6	126	3220	7.92
5/24/57	230	143	277	413	6	72	1141	8.00
<u>VERNON STATION</u>								
6/19/56	952	1500	2574	1834	0	128	6988	-
7/11/56	192	156	355	240	0	85	1028	-
8/22/56	224	126	160	518	0	84	1112	7.5
9/15/56	456	816	1598	643	0	186	3699	7.75
11/27/56	620	975	1527	1344	0	157	4623	7.9
<u>EAST VERNON STATION</u>								
1/7/57	324	368	632	585	0	132	2041	8.3
1/23/57	180	180	204	96	30	494	1184	7.4
2/7/57	134	180	160	64	0	522	1060	7.4
3/26/57	930	2205	3841	1512	18	126	8632	8.0
4/12/57	298	309	487	1834	12	183	3123	8.0

Table 4. Physical Conditions at the Sample Stations.

Date	Air Temp.	Water Temp.	Turbidity (mm.)
<u>NORTH FORK STATION</u>			
6/19/56	95	86	15
7/11/56	95	82	100
8/22/56	95	72	100 - very low - not running
9/15/56	102	81	210 - much reduced
11/27/56	71	52	600
12/27/56	64	48	622 - not running, holes only
1/9/57	76	54	666
2/7/57	61	50	808
3/26/57	60	52	1000 plus
4/12/57	37	47	755
5/24/57	73	69	160
<u>MATADOR STATION</u>			
6/19/56	99	88	45
7/11/56	99	91	35
8/22/56	dry		
9/15/56	dry		
11/27/56	dry		
<u>SOUTH FORK STATION</u>			
12/27/56	dry		
1/9/57	dry		
2/7/57	dry		
3/26/57	dry		
4/12/57	dry		
5/24/57	76	70	40
<u>LAZARE STATION</u>			
6/19/56	95	86	35
7/11/56	90	77	120
8/22/56	97	79	185
9/15/56	104	86	500 - running, but very shallow
11/27/56	68	46	1000 plus
12/27/56	51	46	1000 plus
1/9/57	64	59	1000 plus
2/7/57	51	52	1000 plus
3/26/57	49	55	1000 plus
4/12/57	33	44	1000 plus
5/24/57	79	67	40 - (Water too high and swift to seine efficiently).

Table 4. Physical Conditions at the Sample Stations (Continued).

Date	Air Temp.	Water Temp.	Turbidity (mm.)
<u>QUANAH STATION</u>			
6/19/56	95	81	135
7/11/56	81	73	20 - raining heavily
8/22/56	97	79	60 - muddy from recent rain
9/15/56	104	77	170 - much reduced in area
11/27/56	59	43	360
12/27/56	49	38	360
1/9/57	65	54	260
2/7/57	53	48	1000 plus
3/26/57	55	43	765
4/12/57	35	38	290
5/24/57	Water to high to seine.		
<u>WEST VERNON STATION</u>			
6/19/56	93	81	520
7/11/56	72	73	60 - raining heavily
8/22/56	90	75	120 - recently rained
9/15/56	90	77	95 - much reduced in area
11/27/56	45	39	380
12/27/56	42	37	665
1/9/57	64	54	240
2/7/57	49	47	320
3/26/57	54	39	330
4/12/57	34	44	240
5/24/57	71	71	60 - High water prevented seining. Still rising.
<u>VERNON STATION</u>			
6/19/56	88	81	390
7/11/56	79	73	40 - recently rained
8/22/56	90	72	75 - recently rained
9/15/56	90	77	210 - much reduced
11/27/56	50	42	370
12/27/56	42	37	455
<u>EAST VERNON STATION</u>			
1/9/57	56	53	380
2/7/57	dry		
3/26/57	51	39	310
4/12/57	dry		
5/24/57	Station inaccessible - roads washed out		



Table 5. Monthly Variation in Species and Numbers of Fishes at North Fork Station, Pease River.

Species	6/19	7/11	8/22	9/15	11/27	12/27	1/9	2/7	3/26	4/12	5/24	Total	% of Total
<u>N. potteri</u>		1										1	.07
<u>N. bairdi</u>		20	4		179	60	61	22	42			388	25.33
<u>N. lutrensis</u>	2	7	7	34	79	14	27	11	23	1		205	13.38
<u>Hybognathus</u>		71	209	224	24	10	12	16	7		8	581	37.92
<u>P. promelas</u>				9			3	4				16	1.04
<u>F. kansae</u>	1	2			12	21	33	8	10	4	7	98	6.40
<u>Cyprinodon</u>		46				17	61	9	24	3	63	223	14.56
<u>L. cyanellus</u>	1	1			1	2	1	3	7	2		18	1.17
<u>L. macrochirus</u>								2				2	0.13
<b>Total</b>	<b>4</b>	<b>148</b>	<b>220</b>	<b>267</b>	<b>295</b>	<b>124</b>	<b>198</b>	<b>75</b>	<b>113</b>	<b>10</b>	<b>78</b>	<b>1532</b>	<b>100.00</b>
<b>% of Total</b>	<b>0.3</b>	<b>9.7</b>	<b>14.4</b>	<b>17.3</b>	<b>19.3</b>	<b>8.1</b>	<b>12.9</b>	<b>4.9</b>	<b>7.4</b>	<b>.6</b>	<b>5.1</b>		<b>100.00</b>

Table 6. Monthly Variation in Species and Numbers of Fishes at Matador Station and South Fork Station, Pease River.

Species	6/19	7/11	*	*	**	**	**	**	**	**	5/24	Total	% of Total
			8/22	9/15	11/27	12/27	1/9	2/7	3/26	4/12			
<u>N. bairdi</u>		1								4		5	1.45
<u>N. lutrensis</u>	62	21										83	24.06
<u>Hybognathus</u>	30	9								49		88	25.51
<u>P. promelas</u>	9	16										25	7.25
<u>I. melas</u>	21	40								1		62	17.97
<u>F. kansae</u>	33											33	9.56
<u>L. cyanellus</u>	14	21										35	10.14
Total	169	108									68	345	100.00
% of Total	49.0	31.3									19.7		100.00

\* Matador station dry.

\*\* South Fork Station dry.

Note: Matador station discontinued in November - replaced by South Fork Station.

Table 7. Monthly Variation in Species and Numbers of Fishes at Lazare Station, Pease River.

Species	6/19	7/11	8/22	9/15	11/27	12/27	1/9	2/7	3/26	4/12	5/24	Total	% of Total
<u>Dorosoma</u>			1									1	.01
<u>Hybopsis</u>		5										5	.06
<u>N. potteri</u>											10	10	.12
<u>N. bairdi</u>	36	21	1	15	673	1066	121	21	193	350	8	2505	30.62
<u>N. lutrensis</u>	2	1										3	.04
<u>Hybognathus</u>	16	16	82	206	50	4	2				17	393	4.80
<u>F. kansae</u>	108	40	26	31	24	492	166	865	552	363	2	2669	32.63
<u>Cyprinodon</u>	182	37	105	55	265	370	454	135	481	499	8	2591	31.67
<u>Gambusia</u>									1			1	.01
<u>L. cyanellus</u>		1			1							2	.02
Total	344	121	215	307	1013	1932	743	1021	1227	1212	45	8180	99.98
% of Total	4.2	1.5	2.6	3.8	12.4	23.6	9.1	12.5	15.0	14.8	.5		100.00

Table 8. Monthly Variation in Species and Numbers of Fishes at Quanah Station, Pease River.

Species	6/19	7/11	8/22	9/15	11/27	12/27	1/9	2/7	3/26	4/12	* 5/24	Total	% of Total
<u>Dorosoma</u>	1			25			1					27	.69
<u>Carpionodes</u>				1								1	.03
<u>Hybopsis</u>	2				13		5			2		23	.59
<u>N. percobromus</u>							3	2				5	.13
<u>N. potteri</u>	1						15		1			17	.43
<u>N. bairdi</u>	11	4		23	461	17	41	41	53	257		908	23.20
<u>N. lutrensis</u>	27	16	18	8		9	71	102	62	7		320	8.18
<u>Hybognathus</u>	111	38	276	301	374	542	352	66	192	251		2503	63.91
<u>P. promelas</u>							2		1			3	.08
<u>I. melas</u>			5	1								6	.15
<u>F. kansae</u>	22	20	7		2		1		3			55	1.41
<u>Cyprinodon</u>					1		2			1		4	.10
<u>Micropterus</u>				1								1	.03
<u>L. cyanellus</u>		11	8	6	1							26	.66
<u>L. macrochirus</u>				2								2	.05
<u>L. humilis</u>			3	9								12	.31
<u>Pomoxis</u>				1								1	.03
<b>Total</b>	<b>176</b>	<b>89</b>	<b>317</b>	<b>378</b>	<b>852</b>	<b>568</b>	<b>493</b>	<b>211</b>	<b>312</b>	<b>518</b>		<b>3914</b>	<b>99.98</b>
<b>% of Total</b>	<b>4.5</b>	<b>2.3</b>	<b>8.1</b>	<b>9.7</b>	<b>21.8</b>	<b>14.5</b>	<b>12.6</b>	<b>5.4</b>	<b>8.0</b>	<b>12.2</b>			<b>99.9</b>

\* Seining attempted, but produced nothing. Water too high, swift and muddy.

Table 9. Monthly Variation in Species and Numbers of Fishes at West Vernon Station, Pease River.

Species	6/19	7/11	8/22	9/15	11/27	12/27	1/9	2/7	3/26	4/21	* 5/24	Total	% of Total
<u>Dorosoma</u>		5	3	20	1		4					33	.68
<u>Carpiodes</u>		1	21	63			9					94	1.95
<u>Cyprinus</u>			2	6			4					12	.25
<u>Hybopsis</u>		1			4	2	1	1				9	.18
<u>N. percobromus</u>						4	2		1	4		11	.23
<u>N. brazosensis</u>						4						4	.08
<u>N. potteri</u>			1			5	29		3	2		40	.83
<u>N. bairdi</u>	5				126	78	87	323	11	5		635	13.16
<u>N. lutrensis</u>	38	17	136	201	41	69	138	1262	188	195		2285	47.36
<u>N. buchanaui</u>			80	26								106	2.20
<u>Hybognathus</u>		27	7	11	482	19	158	26	548	57		1335	27.67
<u>P. vigilax</u>						6		2				8	.16
<u>P. promelas</u>		2		9								11	.23
<u>I. punctatus</u>			1	6			3					10	.21
<u>I. melas</u>	1		40	23								64	1.33
<u>F. kansae</u>				3				1				4	.08
<u>Cyprinodon</u>				2	10	2						14	.29
<u>Gambusia</u>	1	11		9	1							22	.46
<u>Micropterus</u>		1		2			3					6	.12
<u>L. cyanellus</u>	3	7	2	18								30	.62
<u>L. macrochirus</u>	6	1	2	2			3					14	.29
<u>L. humilis</u>	2	6	6	19			24	2		1		60	1.24
<u>L. megalotis</u>	2	5	1	2								10	.21
<u>Pomoxis</u>	1	1	2	4								8	.16
<b>Total</b>	<b>59</b>	<b>85</b>	<b>304</b>	<b>426</b>	<b>665</b>	<b>189</b>	<b>465</b>	<b>1617</b>	<b>751</b>	<b>264</b>		<b>4825</b>	<b>100.00</b>
<b>% of Total</b>	<b>1.2</b>	<b>1.8</b>	<b>6.3</b>	<b>8.8</b>	<b>13.8</b>	<b>3.9</b>	<b>9.6</b>	<b>33.5</b>	<b>15.6</b>	<b>5.5</b>			<b>100.00</b>

\* River at flood stage. Impossible to seine.

Table 10. Monthly Variation in Species and Numbers of Fishes at Vernon Station, Pease River.

Species	6/19	7/11	8/22	9/15	11/27	12/27	Total	% of Total
<u>Dorosoma</u>			3	1	1		5	.42
<u>Carpiodes</u>			13	8		1	22	1.83
<u>Hybopsis</u>			4		50	3	57	4.75
<u>N. potteri</u>					10		10	.83
<u>N. bairdi</u>	16	8			263	36	323	26.94
<u>N. lutrensis</u>	41	101	216	68	31	54	511	42.62
<u>N. buchanaani</u>			3				3	.25
<u>Hybognathus</u>	11	16	28	9	90	3	157	13.09
<u>P. vigilax</u>			3				3	.25
<u>P. promelas</u>				13			13	1.08
<u>I. melas</u>			5	3			8	.67
<u>Cyprinodon</u>						4	4	.33
<u>Gambusia</u>	16	11		7	2		36	3.00
<u>L. cyanellus</u>	1	1	3	7	6		18	1.50
<u>L. macrochirus</u>			1				1	.08
<u>L. humilis</u>	4		9	5		9	27	2.25
<u>L. megalotis</u>				1			1	.08
<b>Total</b>	<b>89</b>	<b>137</b>	<b>288</b>	<b>122</b>	<b>453</b>	<b>110</b>	<b>1199</b>	<b>99.8</b>
<b>% of Total</b>	<b>7.4</b>	<b>11.4</b>	<b>24.0</b>	<b>10.2</b>	<b>37.8</b>	<b>9.2</b>		<b>100.00</b>

Note: Station discontinued in January - replaced by East Vernon Station.

Table 11. Monthly Variation in Species and Number of Fishes at East Vernon Station, Pease River.

Species	*	**	3/26	***	***	Total	% of Total
	1/9	2/7		4/12	5/24		
<u>N. bairdi</u>			3			3	30.00
<u>N. lutrensis</u>			3			3	30.00
<u>Cyprinodon</u>			4			4	40.00
Total			10			10	100.00

\* Five drags produced only one live fish (Hybognathus - very sick). Present in the water and along the bank were dead carp, carpsucker, bullhead catfish and minnows. The minnows were either too dehydrated or decomposed to identify.

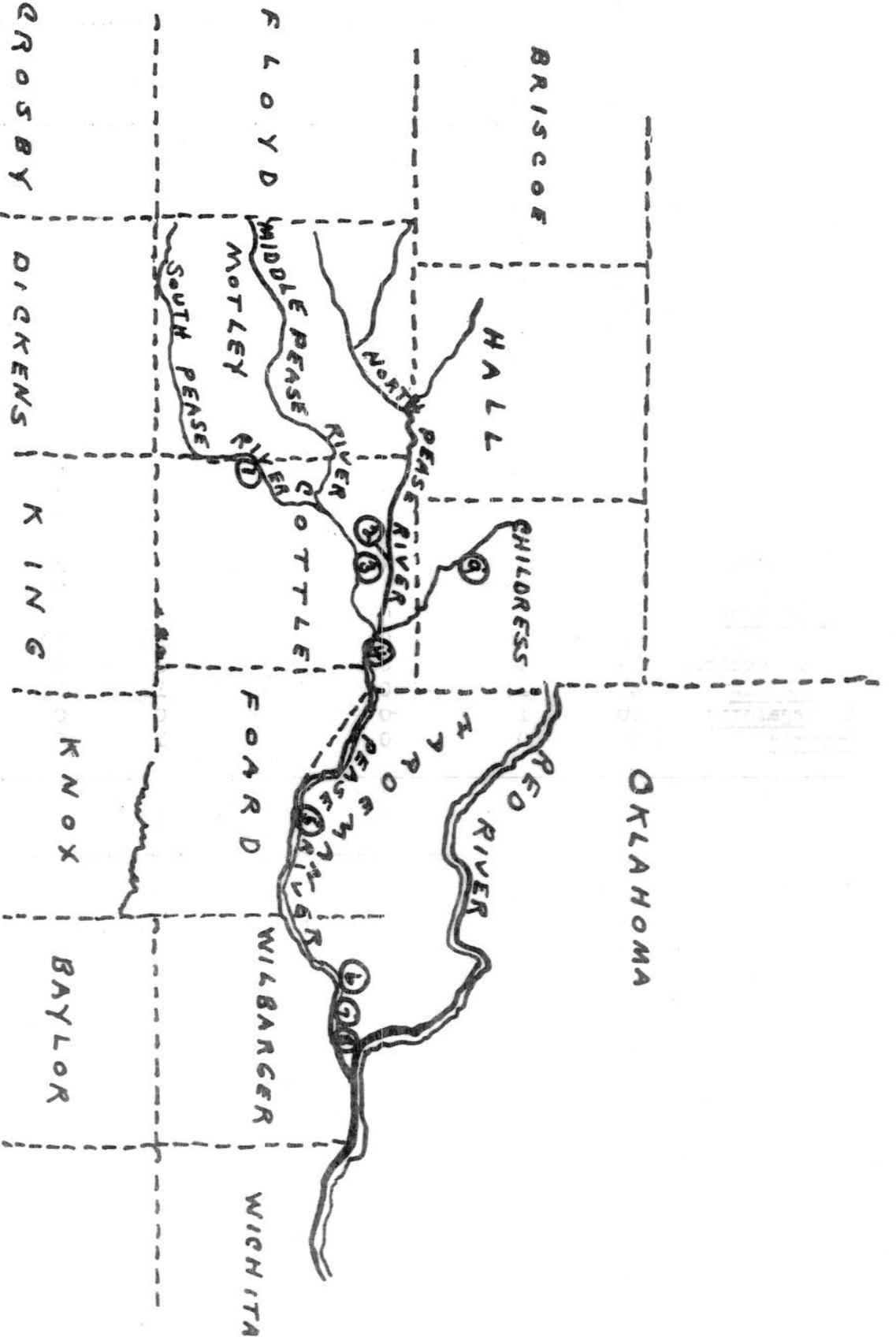
\*\* Sick carp and carpsucker observed. Water appeared too unsanitary to seine. Collected chemical and physical data only.

\*\*\* Considerable seining produced nothing.

\*\*\*\* River at flood stage - impossible to seine.

Table 12. Total Numbers of Fish Taken at the Pease River Stations.

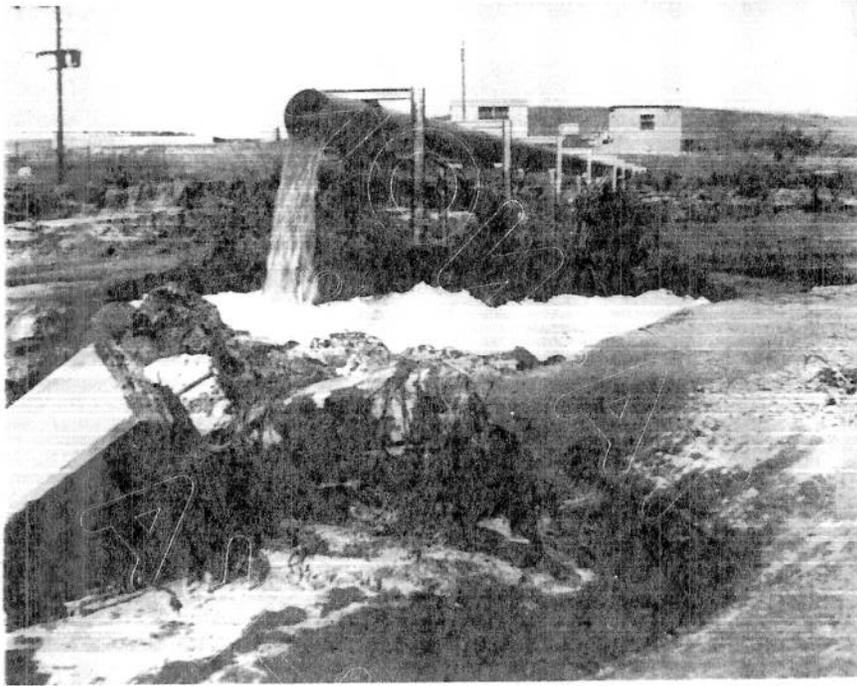
Species	North Fork	Matador and South Fork	Lazare	Quanah	West Vernon	Vernon	East Vernon	Total	% of Total
<u>Dorosoma</u>	33	5	0	1	27	0	0	66	.33
<u>Carploides</u>	94	22	0	0	1	0	0	117	.58
<u>Cyprinus</u>	12	0	0	0	0	0	0	12	.06
<u>Hybopsis</u>	9	57	0	5	23	0	0	94	.47
<u>N. percobromus</u>	11	0	0	0	5	0	0	16	.08
<u>N. brazosensis</u>	4	0	0	0	0	0	0	4	.02
<u>N. potteri</u>	40	10	0	10	17	1	0	78	.39
<u>N. bairdi</u>	635	323	3	2505	908	388	5	4767	23.83
<u>N. lutrensis</u>	2285	511	3	3	320	205	83	3410	17.06
<u>N. buchanaui</u>	106	3	0	0	0	0	0	109	.54
<u>Hybognathus</u>	1335	157	0	393	2503	581	88	5057	25.28
<u>P. vigilax</u>	8	3	0	0	0	0	0	11	.05
<u>P. promelas</u>	11	13	0	0	3	16	25	68	.34
<u>I. punctatus</u>	10	0	0	0	0	0	0	10	.05
<u>I. melas</u>	64	8	0	0	6	0	62	140	.70
<u>F. kansae</u>	4	0	0	2669	55	98	33	2859	14.29
<u>Cyprinodon</u>	14	4	4	2591	4	223	14	2,854	14.27
<u>Gambusia</u>	22	36	0	1	0	0	0	59	.29
<u>Micropterus</u>	6	0	0	0	1	0	0	7	.03
<u>L. cyanellus</u>	30	18	0	2	26	18	35	129	.64
<u>L. macrochirus</u>	14	1	0	0	2	2	0	19	.09
<u>L. humilis</u>	60	27	0	0	12	0	0	99	.49
<u>L. megalotis</u>	10	1	0	0	0	0	0	11	.05
<u>Pomoxis</u>	8	0	0	0	1	0	0	9	.04
Total	4825	1199	10	8180	3914	1532	345	20,005	99.97
% of Total	24.12	6.0	0 (+)	40.9	19.6	7.7	1.7		100.00



- 1) MATADOR STATION
- 2) NORTH FORK STATION
- 3) SOUTH FORK STATION
- 4) LAZARUS STATION
- 5) QUANAH STATION

- 6) WEST VERNON STATION
- 7) VERNON STATION
- 8) EAST VERNON STATION
- 9) SHORES CREEK STATION

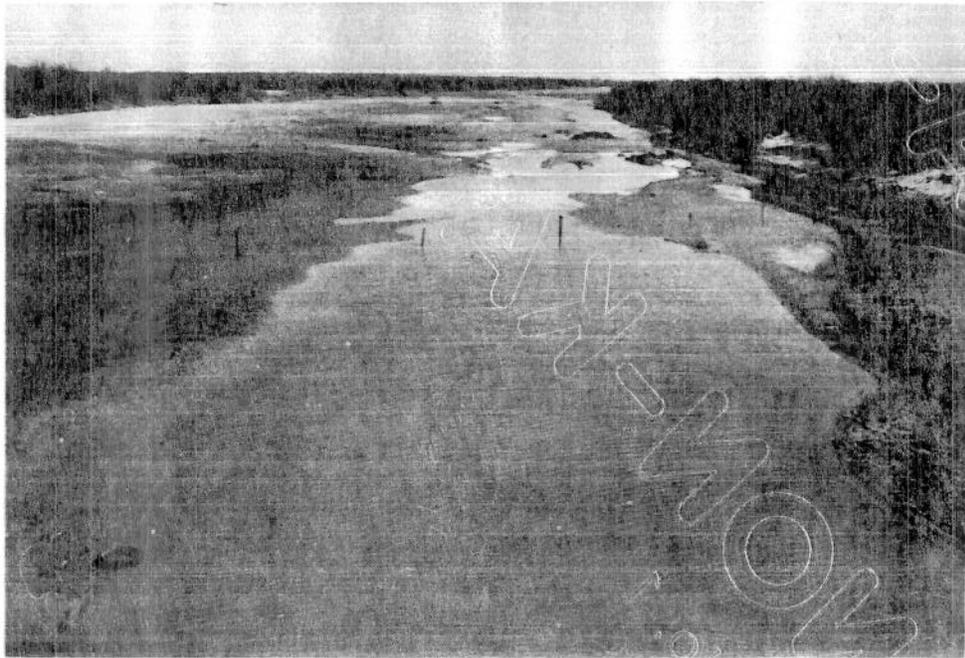




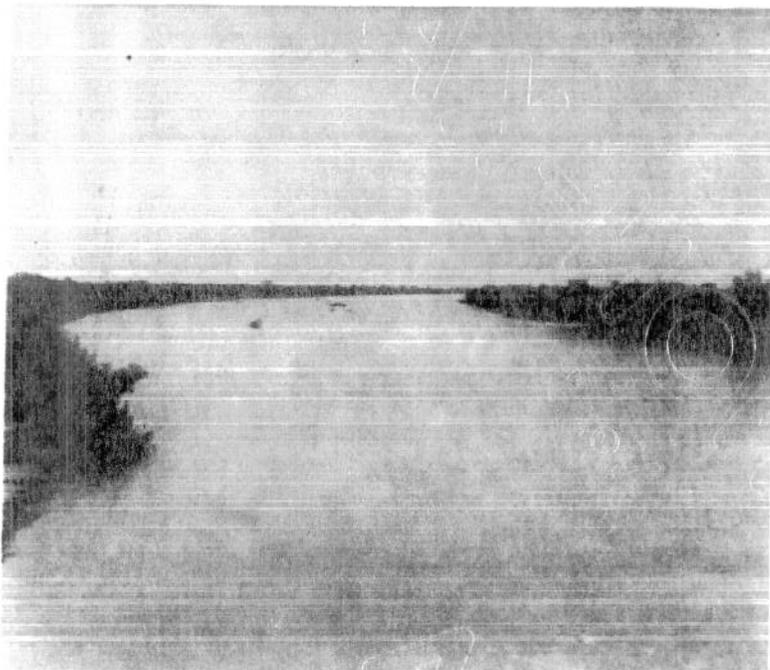
Treated sewage effluent from the city of Vernon. This water is well treated, free of all solids and clear.



Vernon's sewage effluent ditch just before entering river. Tadpoles, frogs and algae were observed in the ditch.



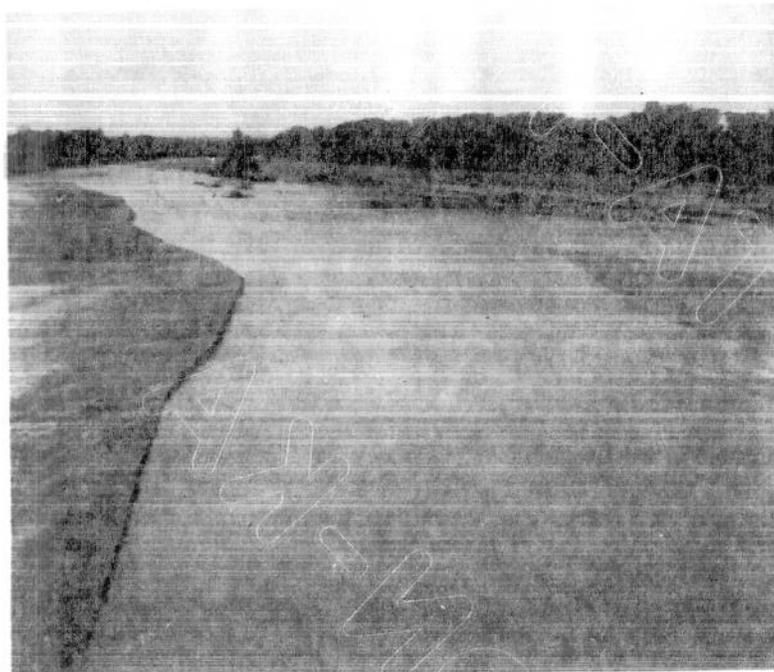
West Vernon Station under normal conditions.



West Vernon Station during rise.



North Fork Station. River is usually dry here, and collections were taken from isolated pools below cliffs on the left.



South Fork Station following recent rise. This is the only time during the segment that water was found to be present. Note tree growing in middle of river bed.