STATE Texas
PROJECT NO. F6R3 - Job B-6
PERIOD July 1, 1955 - June 30, 1956

Job Completion Report

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Project Leader

TITLE

Basic Survey and Inventory of Fish Species Present in the Aransas River.

OBJECTIVES

a. To gather fundamental data on the chemical and physical characters of the Aransas River.

b. To determine the species present and their relative numbers in the Aransas River.

PROCEDURE

a. Twenty trips were made to the Aransas River to gather basic and fisheries data from September 30, 1955 through June 21, 1956. Water sample analyses were run on three occasions and special salinity samples were taken over the twenty-six mile course of the lower part of the river. General ecological conditions of the river and surrounding area were noted and width and depth measurements were taken. Maps 1 and 2 were made up in the laboratory from county maps of the Texas Highway Department and from aerial photos of the Production Marketing Administration. Much general information about the stream, fishing success, flood periods, etc., was obtained from Mr. Frank Rooke, owner of a ranch covering much of the north shore of the lower river and from Game and Fish Warden W. T. Harris. Dr. Clarence Cottam and Mr. Caleb Glazener, Director and Assistant Director of the Welder Wildlife Foundation on the south side of the river, were also contacted about their views on fisheries improvements on the stream.

b. Experimental gill nets 125 by 8 feet with square mesh sections from 1 to 3 inches were set twice at thirteen stations. These stations were located at each even numbered river mile above the dirt dam near the mouth of the river. The first series of collections were made from September 30, 1955 through March 20, 1956; the second series from May 14 to 18, 1956. Nets were set across the river channel at 2 to 4 stations from 3 to 5 P.M. and picked up the following morning from 8 to 10 A. M. The fish taken were weighed, measured, sexed and stomach contents and parasites noted. Seining collections were made with a $\frac{1}{4}$ inch square mesh 30 by 6 foot bag seine at Mile 1 on April 6, 1956 and at Miles 5, 16 and 26 on June 21, 1956.

PHYSICAL CHARACTERISTICS

The Aransas River watershed, as shown in Map 1, covers about 780 square miles in Bee, Refugio, and San Patricio counties in Southcentral Texas. The greater part of the watershed is in Bee County and the various creeks are typically dry with a few

scattered, more or less permanent, water holes. The lower twenty-six miles of the river, from just above the U. S. Highway 77 bridge to the mouth, contains permanent standing water, subject to the rise and fall of the tide in Copano Bay. Map 2 shows this lower portion of the river in more detail than Map 1. Chiltipin Creek is the major tributary of the Aransas River, entering the river just above the mouth, between Copano Bay and the dirt dam which is one and a half miles above the mouth. This dam was built by the Welder Ranch to exclude salt water from the river so the fresh water there would be used by range cattle. A flood washed out a new channel from about a mile above the dam to Chiltipin Creek so that rising tides now push bay water as well as oil field brine from the creek into the river. Moody Creek contains standing water for about a mile above its mouth and was the only tributary of the lower section that was not dry. No flowing water was found in the Aransas River except as a result of tidal changes or run-off water from rains. Chiltipin Creek is likewise typically dry except below Sinton where a constant flow of salt brine occurs from the Sinton oil field.

The area is in the Northeastern part of the South Texas brush land, the Tamaulipan Biotic Province of Dice. The land is gently rolling with many deeply eroded, dry gullies. The soil type is principally sandy loam with some clays and outcrops of caliche. The flat coastal prairie is present only at the mouth of the river. The uplands are covered by mesquite and thick growths of thorny scrub, usually with little grass. Along the gullies and streams the principal trees are hackberry, huisache and live oak with a thick ground cover of grasses and various forbs. The principal land use is for pasturing of cattle but in recent years there has been considerable clearing done, especially on blackland areas, for the planting of row crops. Numerous oil fields have been developed in the area. According to the Texas Almanac, 1956-1957, published by the Dallas Morning News, the altitudes of the various towns in the area are: Beeville 214 feet above sea level, Skidmore 159, Sinton 55 and Woodsboro 47. Normal January temperature at Beeville is 55, July is 88. The average annual rainfall is listed as 30 inches in Bee and San Patricio counties and 33 inches in Refugio County, but during the recent drouth, since 1949, the rainfall has been about 1/2 to 2/3 of that amount. Heaviest rainfall is normally in May and September and rain usually comes in thunder storms following long dry spells.

Table 1 shows the average widths and depths at each of the two miles stations in the lower 26 miles of the river. The upper portion is narrow and rather shallow with sharply cut banks of sandy loam rising at about a 45 degree angle for fifteen or twenty feet above the stream. The middle part of this section is wider and deeper with banks of sandy loam, sharply cut, bluffs of caliche or a mixture of the two soils. The height of the banks is generally about ten to fifteen feet above the stream. The lower portion is the widest and shallowest and the banks are sharply cut of clay, sandy loam and some caliche but are only about five feet above water level. At Mile 6 there is a caliche hill forming the south shore of the river which is about 75 feet high. Figures 1, 2, and 3 demonstrate the general characteristics of the three sections of the river. On both sides of the center section several oxbow lakes have been formed and cut off from the river when new channels were cut. Silt deposits at each end of the lakes have practically isolated them from the stream except at the very highest flood stages. Indication of terrace deposits were seen in the upper and middle sections.

CHEMICAL ANALYSIS

Table 2 gives the results of chemical analyses run at several stations on the river. The suitability of the fresh water in the river for fresh water fish was best shown by the presence of bass and sunfish in the seining collection made at Mile 26 and the almost complete absence of fresh water fish in collections further down stream.

The most important item in chemical analysis was salinity. Table 1 shows the results of salinity tests made at the State Marine Laboratory by Mr. Rudy Marek on samples taken at each two mile station from the dirt dam to the head of the standing water in the Aransas River. One series of samples was taken on March 26 and 29, another series on May 18, 1956. Fresh water enters the head of the river from run-off rains on the watershed and also at the river's mouth through the lower cut when floods on Chiltipin Creek are forced up stream by tidal action. The latter source of fresh water explains the low salinity readings in the lower part of the river in May as the creek had received heavy rains a week previously. Fresh water from the main river drainage is usually very turbid and for several weeks after a small rise, the muddy fresh water block occupies the upper part of the river while there is clear salt water in the lower part. During dry spells the water in the upper part of the stream becomes increasingly salty until run-off water replaces it. Salt water enters the river through the lower cut on rising tides. It may be bay water (normally 30 to 35 ppt), brine from Chiltipin Creek or a mixture of the two. Tests showed the oil field brine in Chiltipin Creek to be 80.4 ppt two miles above its mouth and 47.8 ppt at its mouth on May 18, 1956. A sample from Sinton at the U. S. Highway 77 bridge on May 29, 1956 contained 73 ppt. This highly concentrated brine, being denser than bay water, is forced into the mouth of the river and settles in the deeper waters of the lower and middle parts of the river. In both series of samples, salinity at the surface decreased regularly upstream. Although there are many days with strong winds, the tortuous course of the river prevents any great amount of wave action and consequent mixing of the surface and bottom waters. Action is now being taken by the State Railroad and Game and Fish Commissions to prevent the pollution of Chiltipin Creek from the Sinton oil field.

AQUATIC VEGETATION

Very little aquatic vegetation was found in the Aransas River, apparently due to the salt water. In shallow areas of the middle part of the standing water there were occasional growths of pondweed (Potomogeton pectinatus). Mostly above Mile 20 there were some beds of muskgrass (Chara), pondweed (Potomogeton nodosus) and spatterdock (Nuphar). Above Mile 26, in some small ponds not accessible to the salt walter, there were very thick growths of muskgrass and pondweed. Emergent water plants were also found mostly in the upper section, none below Mile 16. They included a cane, saw grass (Zizaniopsis), cattail (Typha latifolia), club rush (Scirpus olneyi), willow (Salix) and others. No bulrush (Scirpus validus) was found on the river although it was common in Rooke Lake. Seining collections made at Miles 16 and 26 showed that the underwater plants that were present furnished important fish cover.

RESULTS OF FISH COLLECTIONS

Table 3 shows the list of 29 species of fish recorded from the Aransas River in this job. Two other species, the yellow bullhead (Ameiurus melas) and the warmouth bass (Chaenobryttus coronarius), were taken from Rooke Lake in April, 1955. Surprisingly, no freshwater drum (Aplodionotus grunniens), white crappie (Pomoxis annularis) or channel catfish (Ictalurus punctatus) were taken; they are very common fresh water fish in the area and may be expected to occur in some of the pools of the watershed. Table 4 shows the numbers of each species taken in experimental gill nets at each two mile station. A total of 239 fish of 18 species was taken. Of these, only seven species and 39 individuals (12.31%) were game fish and only one each of blue catfish and largemouth black bass were fresh water game fish. Only five species (longnose gar, spotted

gar, smallmouth buffalo, blue catfish and largemouth bass) were definitely restricted to fresh water and none of them were taken below Mile 16. Except for the gizzard shad, the seven most common fish taken in Lake Corpus Christi were either absent or present in reduced number in the Aransas River. The gizzard shad and striped mullet were taken in approximately equal numbers almost throughout the 26 miles of the stream. Table 5 shows the weights, percentages and rank by weight of the fish taken in the experimental nets.

Table 6 gives the comparative success of experimental gill netting in the Aransas River. When the average catch of 9.19 fish and 34.60 pounds of fish per net is compared to the average catch from Lake Corpus Christi (2275 fish and 24.98 pounds of fish per net), it will be seen that fewer fish with a larger average size were taken in the Aransas River. It must be remembered that most of the fish in the river were salt water forms and that the salt water conditions reduced the populations of the fresh water forms. Table 7 gives the maximum, minimum and average standard length, weight and "K" factor for the fish taken in experimental nets. Considering the relatively small sample taken from the Aransas River, the average "K" factors of the fresh water fish agree roughly with those from Lake Corpus Christi, as follows: alligator gar .82: .80; spotted gar .74 : .72; longnose gar .50 : .47; gizzard shad 1.70 : 1.91; smallmouth buffalo 2.97 : 3.77; blue catfish 1.65 : 1.60 and largemouth bass 2.30 : 2.66. The relatively lower "K" factor of the gizzard shad, smallmouth buffalo and largemouth bass in the Aransas River may be due to sampling error but is more likely due to the salinity having reduced the amount of food available to these species.

Table 8 shows the results of the seining collections made at four stations in the Aransas River. The presence of the sunfish, largemouth bass, Rio Grande perch and Red Shiner minnows at the upper end of the standing water demonstrates that where the salinity is reduced the water is suitable for fresh water game fish. The invasion of salt water from the bay apparently prevents their distribution in fishable numbers further downstream. Fresh water shrimp (Paleomonetes), an important fish food in Lake Corpus Christi and other waters of the area, were taken at Mile 26 and Brown Shrimp (Penaeus aztecus) were seined at Mile 5. The beds of Pondweed at Mile 16 and Mile 26 were apparently directly connected with the larger numbers of fish seined at those stations.

Three alligator gar were the only fish recorded with stomach contents. One contained a smallmouth buffalo (which was included in the netting results) and two gizzard shad. Another contained a striped mullet and the third contained a striped mullet and several black feathers (probably from a coot). Parasites noted were tapeworms in the stomach and intestine of three alligator gar and visceral round worms in two spotted gar and one sleeper. Large parasitic isopods were found in the mouths of several of the black drum and fish lice (Argulus) were found on two alligator gar. Fish eating shore birds were fairly numerous along the stream, mostly Little Green Herons with some Great Blue Herons and American and Snowy Egrets. A Bald Eagle nest was seen near Mr. Rooke's house but the pair of birds was only seen once. No ducks or coots were seen on the river but they are common on Rooke Lake.

RECOMMENDATIONS

Under the present conditions, with the bay water polluting the lower part of the Aransas River, there is no point in attempting any fresh water fisheries improvements. However, the Welder Ranch has been considering the possibility of damming the tidal cuts to exclude the salt water from the river, thereby making the river a source of fresh water

r their cattle. If such dams are built and they are successful, it would be advantageous to rotenone the lower twenty-six miles of the river to remove all fish and then restock with fresh water game and desirable forage fish. It is assumed that if the dams were built, rain water would flush the salt water out of the river and leave a very long but narrow lake of fresh water containing about 1800 acre-feet or more. Such a lake should provide some important fresh water fishing for the area and public access would be available at U. S. Highway 77 at Mile 25 and at the Refugio County road at Mile 7. There is very little fresh water fishing available to the public in the area and, according to reports, the production of blue catfish in the river has been very good prior to the invasion of the salt water.

SUMMARY

1. The Aransas River is located in Southcentral Texas, the first independent drainage northeast of the Nueces River. About 780 square miles of brush lands in Bee, Refugio and San Patricio counties make up the drainage.

2. The creeks in the drainage are mostly dry except for isolated water holes and during times of heavy run-off rains. Chiltipin Creek carries a strong flow of oil field brine in its lower portion.

3. Salt water, both brine and bay water, enters the lower part of the river through a tidal cut around a dirt dam near its mouth. The lower 26 miles of the river contains standing water (about 1800 acre-feet) subject to tidal fluctuations.

4. Very little aquatic vegetation occurs in the river due to the salt water. the upper half of the standing water section muskgrass and pondweed were found in scattered locations.

5. Seining and gill netting collections showed 29 species of fish present, mostly salt water forms. Only two fresh water game fish, a blue catfish and a black bass, were taken in 26 experimental gill net sets.

6. The presence of bass, sunfish and red shiner minnows at the upper end of the 26 mile section showed that where the salt water is not too strong, the water is suitable for fresh water fish. Local reports indicated that catfishing has been good in the river in previous years, presumably before the tidal cuts bypassed the dam.

7. If the tidal cuts were dammed to exclude the salt water, the Aransas River should furnish good fresh water fishing with free access to the public. Rotenoning and restocking with desirable fish would probably be necessary for maximum development.

Table 1. Average Widths and Depths and Salinities from Thirteen Stations on the Lower Aransas River.

River Miles Above Dam	Average Width	Average Depth	Maximum Depth	3-26 & 29-56 Salinity (ppt) Top	3-26 & 29-56 Salinity (ppt) Bottom	5-18-56 Salinity (ppt) Top	5-18-56 Salinity (ppt) Bottom
2	230	3.37	4.0	40.0	40.0	18.0	18.0
4	183	4.92	7.1	34.0	42.5	17.6	20.0
6	188	5.87	9.5	32.0	52.9	16.8	43.2
8	182	6.24	10.5	31.8	51.0	16.7	18.0
10	187	8.71	15.5	29.2	48.6	16.8	41.0
12	188	5.49	7.4	20.7	31.2	16.5	17.0
14	152	5.33	9.3	15.2	25.0	16.5	17.6
16	181	7.07	11.0	11.2	20.0	17.0	17.0
18	103	5.07	8.5	9.2	13.8	14.6	16.7
20	90	5.84	9.7	4.3	6.0	12.8	14.1
22	91	3.17	4.7	1.0		6.5	12.5
24	84	3.41	4.8	.4		3.0	4.0
26	40	3.28	4.5	.3		.3	.4

Estimated Surface Acres: 347 Estimated Acre-feet: 1822

Table 2. Results of Chemical Analysis on the Aransas River.

River Miles Above Dam	Date	Depth	°F	O_2 ppm	CO_2 ppm	ph-th Alk.	M. O. Alk.	Jackson Turb.	Salinity (ppt)	pH
5	6-27-56	0	88	-	0	20.0	93	*	25.7	8.2
5	6-27-56	6	87	-	0	24.0	95	*	29.3	8.8
7	11-23-55	0	-	-	-	0	436	-	-	-
7	11-23-55	5	-	-	-	0	212	-	-	-
16	9-30-55	0	82	-	-	0	106	550	-	-
16	9-30-55	9	80	-	-	0	118	700	-	-
16	6-27-56	0	90	4.4	0	0	90	*	8.3	8.4
16	6-27-56	6	88	3.8	1.0	0	100	*	9.6	7.6
26	6-27-56	0	87	2.8	0	0	137	*	5.2	8.2
26	6-27-56	6	86	4.6	0	0	137	100	5.2	8.4

- indicates no test, due to lack of glassware or reagents.
* indicates less than 25 ppm silt, minimum reading on turbidimeter tube.

Table 3. A List of Fish Recorded from the Aransas River.

Scientific Name	Common Name	Symbol
Lepisosteus spatula	Alligator Gar	AG
Lepisosteus productus	Spotted Gar	SG
Lepisosteus osseus	Longnose Gar	LNG
Elops saurus	Bigeye Herring	BEH
Opisthonema oglinum	Thread Herring	THH
Bervoortia gunteri	Bay Menhaden	BMH
Dorosoma cepedianum	Gizzard Shad	GS
Anchoa hepsetus	Striped Anchovy	
Ictiobus bubalus	Smallmouth buffalo	SMB
Notropis lutrensis	Red Shiner	
Galeichthys felis	Sea Catfish	SCT
Ictalurus furcatus	Blue Catfish	BC
Syngnathus scovelli	Scovell's Pipefish	
Lucania parva	Rainwater Fish	
Cyprinodon variegatus	Sea Pupfish	
Mollienesia latipinna	Sailfin Molly	
Mugil cephalus	Striped Mullet	SML
Menidia beryllina	Tidewater Silversides	
Micropterus salmoides	Largemouth Black Bass	LMB
Lepomis macrochirus	Bluegill Sunfish	
Lepomis megalotis	Longear Sunfish	
Caranx hippos	Common Jack	
Sciaenops ocellata	Redfish	RED
Leiostomus xanthurus	Spot Croaker	SCR
Micropogon undulatus	Atlantic Croaker	ACR
Pogonias cromis	Black Drum	BDR
Cynoscion nebulosus	Speckled Trout	SPT
Cichlasoma cyanoguttata	Rio Grande Perch	
Gobiomorus dormitator	Sleeper	SLE

Table 4. The Numbers of Fish Taken in Experimental Gill Nets from the Aransas River.

Species	Mi.2	Mi.4	Mi.6	Mi.8	Mi.10	Mi.12	Mi.14	Mi.16	Mi.18	Mi.20	Mi.22	Mi.24	Mi.26	Total	Percent	Rank
AG	3	3	2	1	4	1	4	1	1	1	-	2	-	23	9.62	4
SG	-	-	-	-	-	-	-	-	1	1	3	1	-	6	2.51	7
LNG	-	-	-	-	-	-	-	-	1	-	2	4	1	8	3.34	6
BEH	-	1	-	-	-	-	-	-	-	-	-	-	-	1	0.41	10
THH	-	-	-	2	-	-	-	-	-	-	-	-	-	2	0.82	9
BMH	2	9	1	4	2	1	1	-	-	-	-	-	1	21	8.78	5
GS	6	6	2	7	17	-	1	3	3	1	2	1	12	61	25.56	1
SMB	-	-	-	-	-	-	-	1	1	-	-	3	-	5	2.09	8
SGT	7	9	6	4	4	1	4	-	2	-	-	-	-	37	15.48	2
BC	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0.41	10
SML	2	10	4	8	1	-	-	-	-	1	2	-	6	34	14.22	3
LMB	-	-	-	-	-	-	-	-	-	-	-	1	-	1	0.41	10
RED	1	-	-	-	-	-	-	-	-	-	-	-	-	1	0.41	10
SCR	-	1	2	1	-	-	-	-	1	1	-	-	-	6	2.51	6
ACR	1	-	-	-	-	-	1	-	-	-	-	-	-	2	0.82	9
BDR	1	6	1	3	1	-	2	-	1	2	5	1	-	23	9.62	4
SPT	2	2	1	-	-	-	-	-	-	-	-	-	-	5	2.09	8
SLE	-	-	-	-	-	-	-	1	-	1	-	-	-	2	0.82	9
Total	25	47	19	30	29	3	13	6	11	8	14	14	20	239	99.94	
Percent	10.46	19.66	7.94	12.55	12.13	1.25	5.43	2.51	4.61	3.34	5.85	5.85	8.36	99.99		

Table 5. Pounds of Fish Taken in Experimental Gill Nets From the Aransas River.

Species	Pounds	%	Rank
AG	694.42*	77.20	1
SG	17.43	1.94	5
LNG	63.75	7.09	2
BEH	0.15	0.02	18
THH	0.26	0.03	17
BMH	2.42	0.27	11
GS	18.82	2.09	4
SMB	16.31	1.81	6
SCT	7.70	0.86	8
BC	1.08	0.12	13
SML	10.57	1.17	7
LMB	0.34	0.04	16
RED	4.69	0.52	10
SCR	0.74	0.08	14
ACR	0.50	0.06	15
BDR	52.91	5.88	3
SPT	5.33	0.59	9
SLE	2.11	0.23	12
Total	899.53	100.00	

* One specimen estimated weight 100 pounds.

Table 6. Success of Experimental Gill Netting in the Aransas River in Terms of Numbers and Pounds of Fish Caught.

River Miles Above Dam	Number of Net Set	Number of Feet of Net Set	Number of Fish Caught	Average Number of Fish/Net	Average Number of Fish/foot of Net	Pounds of Fish Caught	Average Pounds of Fish/Net	Average Pounds of Fish/Foot of Net
2	2	250	25	12.50	.100	80.30	40.15	.32
4	2	250	47	23.50	.188	151.75	75.88	.61
6	2	250	19	9.50	.076	61.14	30.57	.24
8	2	250	30	15.00	.120	19.64	9.82	.08
10	2	250	29	14.50	.116	143.81	71.90	.58
12	2	250	3	1.50	.016	43.28	21.64	.17
14	2	250	13	6.50	.056	80.19	40.10	.32
16	2	250	6	3.00	.024	29.88	14.94	.12
18	2	250	11	5.50	.044	116.80*	58.40	.47
20	2	250	8	4.00	.032	18.79	9.39	.08
22	2	250	14	7.00	.059	44.88	22.44	.18
24	2	250	14	7.00	.059	89.31	44.66	.36
26	2	250	20	10.00	.080	19.76	9.88	.08
Total	26	3250	239			899.53		
Average	2	250		9.19	0.74		34.60	.28

Table 7. Minimum, Maximum and Average Standard Length, Weights and "K" Factors of Fish Taken in Experimental Nets from the Aransas River.

Species	Number of Specimens	Standard Length			Weight in Grams			"K" Factor		
		Minimum	Maximum	Average	Mimimum	Maximum	Average	Mimimum	Maximum	Average
AG	23	860	2045	1157	4536	45400*	13694	0.52	1.22	0.82
SG	6	512	610	544	280	2041	1317	0.54	0.90	0.74
LNG	8	620	1064	1301	1134	5698	3614	0.39	0.66	0.50
BEH	1	190	190	190	66	66	66	0.98	0.98	0.98
THH	2	145	155	150	56	60	58	1.55	1.90	1.72
BMH	21	120	170	132	30	110	47	1.60	2.55	2.21
GS	61	134	240	196	38	256	140	1.40	2.00	1.70
SMB	5	297	390	351	936	2041	1480	1.05	3.40	2.97
SCT	37	155	230	180	60	230	94	1.25	1.85	1.58
BC	1	310	310	310	488	488	488	1.65	1.65	1.65
SML	34	165	285	189	95	436	141	1.60	2.40	1.98
LMB	1	188	188	188	155	155	155	2.30	2.30	2.30
RED	1	500	500	500	2126	2126	2126	1.70	1.70	1.70
SCR	6	115	209	143	42	77	56	2.35	2.85	2.61
ACR	2	120	209	164	42	185	113	2.05	2.45	2.25
BDR	23	135	460	327	57	2977	1060	2.00	3.05	2.51
SPT	5	210	422	305	124	1134	484	1.25	1.50	1.39
SLE	2	303	335	319	475	482	478	1.30	1.70	1.50
Total	239									

* One AG estimated weight 100 lbs. Not included in "K" factor.

Table 8. Numbers of Fish Taken in Seining Collections From the Aransas River.

Species	Mile 1	Mile 5	Mile 16	Mile 26	Total	Percent	Rank
Elops saurus	-	2	3	-	5	0.91	11
Pomolobus aestivalis	4	-	-	-	4	0.73	12
Dorosoma cepedianum	-	6	-	-	6	1.09	10
Anchoa mitchellii	1	2	-	-	3	0.55	13
Notropis lutrensis	-	-	-	2	2	0.35	14
Syngnathus scovelli	-	-	30	3	33	6.01	5
Lucania parva	-	-	102	11	113	20.69	2
Cyprinodon variegatus	1	8	38	-	47	8.61	4
Mollienisia latipinna	-	-	27	-	27	4.94	6
Mugil cephalus	64	29	15	-	108	19.78	3
Menidia beryllina	15	2	10	130	157	28.75	1
Micropterus salmoides	-	-	-	12	12	2.18	8
Lepomis macrochirus	-	-	-	4	4	0.73	12
Lepomis megalotis	-	-	-	16	16	2.92	7
Caranx hippos	-	2	-	-	2	0.35	14
Cichlasoma cyanoguttata	-	-	-	10	10	1.82	9
Total	85	51	225	188	549		

Fig. 1. Aransas River at Mile seven.
Refugio County road landing at left.

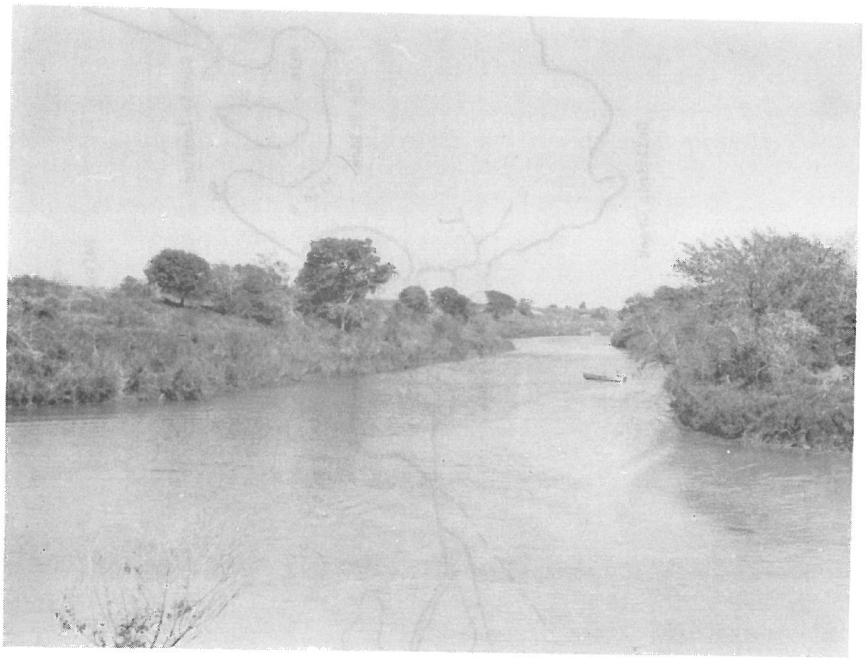
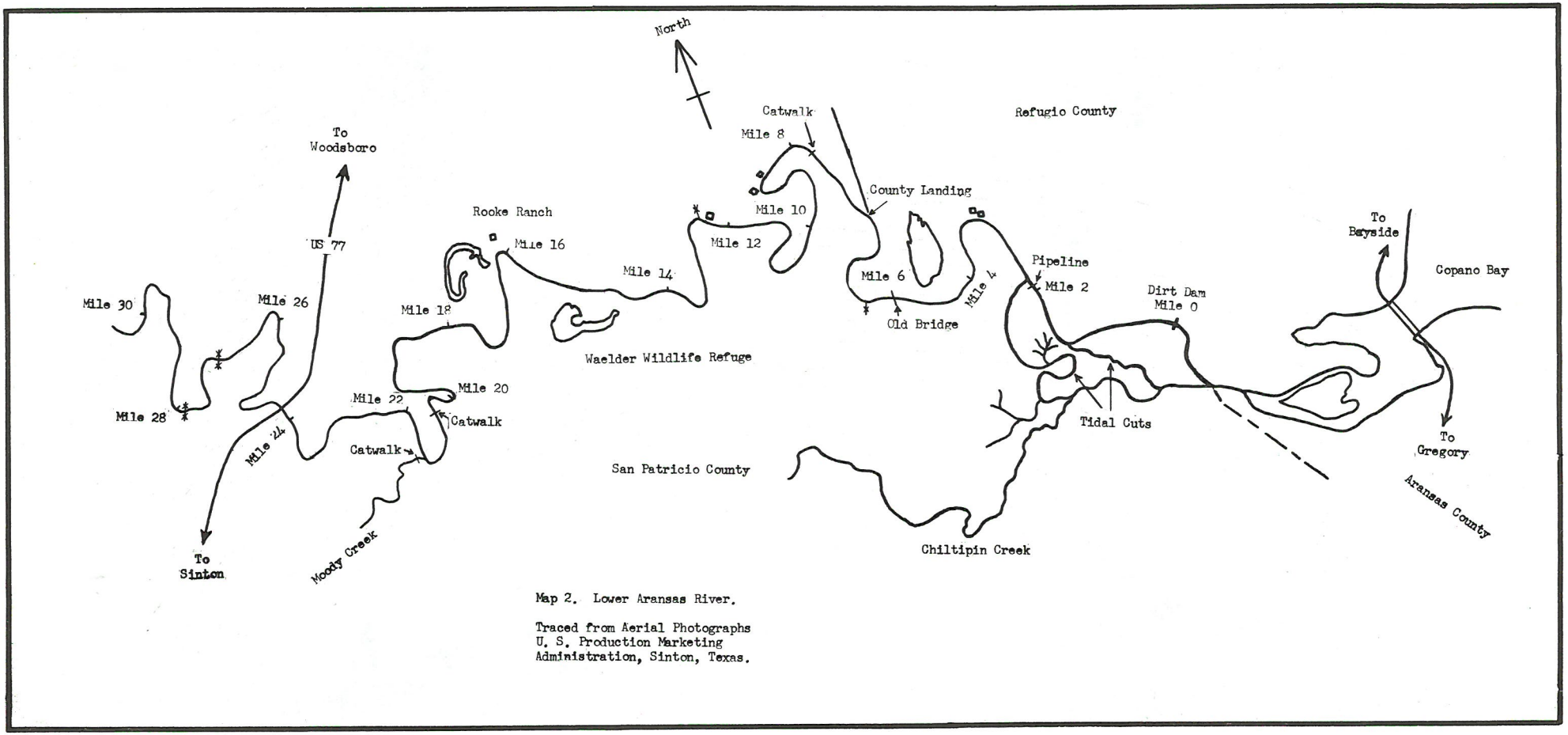


Fig. 2. Aransas River at Mile nineteen.



Map 2. Lower Aransas River.

Traced from Aerial Photographs
U. S. Production Marketing
Administration, Sinton, Texas.

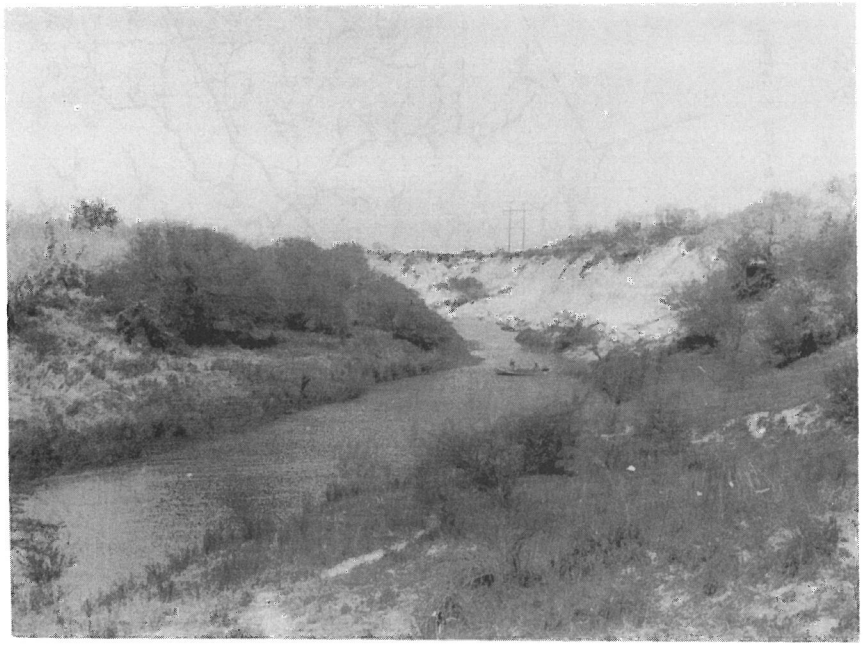
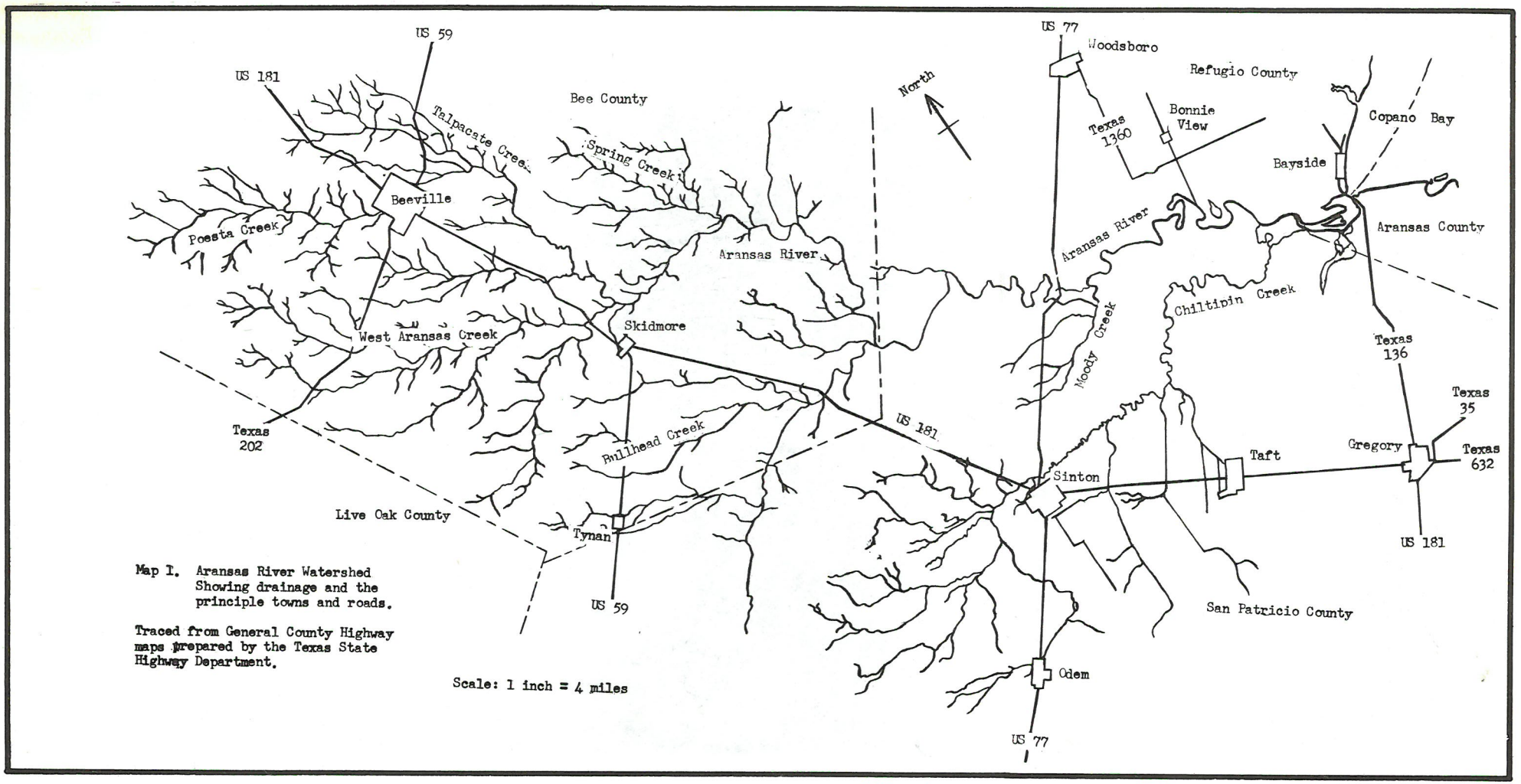


Fig. 3. Aransas River at Mile twenty-six.



Map I. Aransas River Watershed Showing drainage and the principle towns and roads.

Traced from General County Highway maps prepared by the Texas State Highway Department.

Scale: 1 inch = 4 miles