

Frio River

SEGMENT COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-9-R-11

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

Job No. B-22 Fisheries Reconnaissance

Project Leader: Elgin M. C. Dietz

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

Marion Toole
D-J Coordinator

Eugene A. Walker
Assistant Director for Wildlife

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ABSTRACT

With certain exceptions, fisheries reconnaissance work on the Nueces River and its channel impoundments in 1963 indicated that the channel catfish is present in relative abundance. Fishing pressure on these waters is comparatively light and heavier pressure could be supported. Where channel catfish are not abundant, restocking would be beneficial.

On Pinto and Las Moras Creeks, tributaries to the Rio Grande River, public access is restricted, and as a result the streams are of little importance as a sport fishery.

Although the Leona River previously contained a good game fish population and supported a much needed fishery for this area, the stream was very low and of little consequence during 1963.

Medina Lake net collections show a continuing increase in gizzard shad which comprised 62 per cent of the netted fish in 1963. Channel and flathead catfish accounted for 42 per cent of the total weight of all netted specimens. This lake supports a good population of these catfish and sport fishermen have been taking them in good numbers.

Gill netting data for Diversion Lake fails to indicate appreciable benefits from the selective removal of gizzard shad in February 1962 and subsequent planting of young game fish.

Survey data for the Medina River and the small impoundment at Castroville show gizzard shad as the dominant single species. Fair numbers of channel and flathead catfish, largemouth bass and white crappie were present in Castroville City Lake. However, few fish of any species were taken in the river and this is attributed to periodic die-offs of fish due to agricultural insecticides and other pollutants.

The three lakes in the San Antonio area, namely Woodlawn, Elmendorf and Davis (Esquivel) Lakes, support a heavy fishing pressure and supply a much needed fishery. Insecticide pollution removed most of the game fish population from Davis Lake during 1963.

Gill netting data for Falcon Lake indicates that this lake has the most dense fish population of any of the waters covered by this reconnaissance. An average of over 50 fish were taken by each gill net set. White crappie, averaging more than $\frac{1}{2}$ -pound each, were the most numerous game fish taken. Other game fish present in relative abundance were channel catfish, white bass, blue catfish, and largemouth bass. Gizzard shad were the most abundant of the rough fish species.

SEGMENT COMPLETION REPORT

State of Texas Name: Fisheries Investigations and Surveys
of the Waters of Region 5-A
Project No. F-9-R-11 Title: Fisheries Reconnaissance
Job No. B-22
Period Covered: December 1, 1962 through November 30, 1963

Objectives:

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

Introduction:

During the project segment, reconnaissance surveys were conducted on the Nueces River and its lakes in Uvalde, Zavala, Dimmit, and La Salle Counties; Las Moras and Pinto Creeks in Kinney County; Leona River in Uvalde and Zavala Counties; Medina Lake in Bandera and Medina Counties; Diversion Lake in Medina County; Castroville City Lake in Medina County; Medina River in Medina and Bexar Counties; the San Antonio River as well as Woodlawn, Elmendorf, and Esquivel Lakes in Bexar County. A checklist of all fish species collected is presented in Table 1.

Techniques Used:

Specimens in netting samples were collected with standard gill nets composed of 25-foot sections of varying mesh sizes from 1- to 3-inch square mesh. Lengths, weights, and numbers of netted fish were recorded in the field. Fish collected by seining were taken in 12- by 4-foot common-sense minnow seines or with 20- by 6-foot, $\frac{1}{4}$ -inch mesh, straight seines, and were preserved in 10 per cent formalin solution for later identification and tabulation in the laboratory.

Since fish populations in more than one body of water were sampled, techniques used and/or findings will be taken up separately for these waters in subsequent segments of this report.

NUECES RIVER

Techniques Used and Findings:

One gill net and six seine samples of fish were taken from the Nueces River and its major tributary, the West Nueces River (Figures 1, 2, and 3 and Tables 2 and 3). Fish samples were also taken from six channel impoundments

Table 1. Checklist of fish species used in report.

Common Names	Scientific Names
1. Alligator gar	<u>Lepisosteus spatula</u>
2. Spotted gar	<u>L. oculatus</u>
3. Longnose gar	<u>L. osseus</u>
4. Threadfin shad	<u>Dorosoma petenense</u>
5. Gizzard shad	<u>D. cepedianum</u>
6. Mexican tetra	<u>Astyanax mexicanus</u>
7. Smallmouth buffalo	<u>Ictiobus bubalus</u>
8. River carpsucker	<u>Carpionodes carpio</u>
9. Gray redhorse	<u>Moxostoma congestum</u>
10. Carp	<u>Cyprinus carpio</u>
11. Goldfish	<u>Carassius auratus</u>
12. Golden shiner	<u>Notemigonus crysoleucas</u>
13. Speckled chub	<u>Hybopsis aestivalis</u>
14. Rio Grande shiner	<u>Notropis jemezanus</u>
15. Texas shiner	<u>N. amabilis</u>
16. Weed shiner	<u>N. texanus</u>
17. Blacktail shiner	<u>N. venustus</u>
18. Red shiner	<u>N. lutrensis</u>
19. Hybrid shiner	<u>N. venustus x N. lutrensis</u>
20. Sand shiner	<u>N. stramineus</u>
21. Ghost shiner	<u>N. buchanani</u>
22. Roundnose minnow	<u>Dionda episcopa</u>
23. Bullhead minnow	<u>Pimephales vigilax</u>
24. Stoneroller	<u>Campostoma anomalum</u>
25. Channel catfish	<u>Ictalurus punctatus</u>
26. Blue catfish	<u>I. furcatus</u>
27. Black bullhead	<u>I. melas</u>
28. Yellow bullhead	<u>I. natalis</u>
29. Flathead catfish	<u>Pylodictis olivaris</u>
30. Blackstripe topminnow	<u>Fundulus notatus</u>
31. Sheepshead minnow	<u>Cyprinodon variegatus</u>
32. Mosquitofish	<u>Gambusia affinis</u>
33. Sailfin molly	<u>Mollienesia latipinna</u>
34. Tidewater silverside	<u>Menidia beryllina</u>
35. White bass	<u>Roccus chrysops</u>
36. Largemouth bass	<u>Micropterus salmoides</u>
37. Warmouth	<u>Chaenobryttus gulosus</u>
38. Green sunfish	<u>Lepomis cyanellus</u>
39. Spotted sunfish	<u>L. punctatus</u>
40. Redear sunfish	<u>L. microlophus</u>
41. Bluegill	<u>L. macrochirus</u>
42. Redbreast sunfish	<u>L. auritus</u>
43. Longear sunfish	<u>L. megalotis</u>
44. White crappie	<u>Pomoxis annularis</u>
45. Logperch	<u>Percina caprodes</u>
46. Orangethroat darter	<u>Etheostoma spectabile</u>
47. Greenthroat darter	<u>E. lepidum</u>
48. Freshwater drum	<u>Aplodinotus grunniens</u>
49. Rio Grande perch	<u>Cichlasoma cyanoguttatum</u>

FIGURE 1 NUECES RIVER

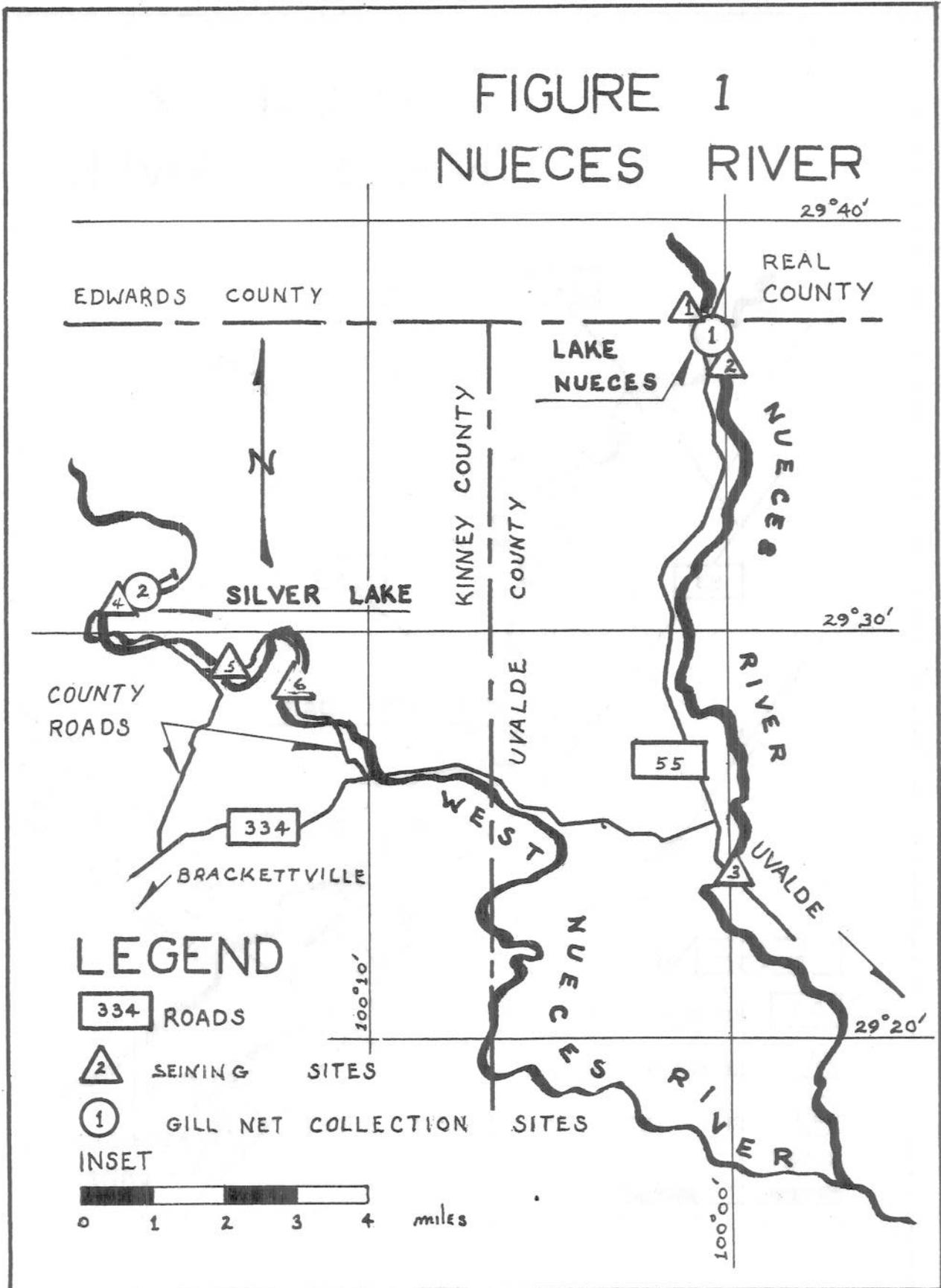


FIGURE 2 NUECES RIVER

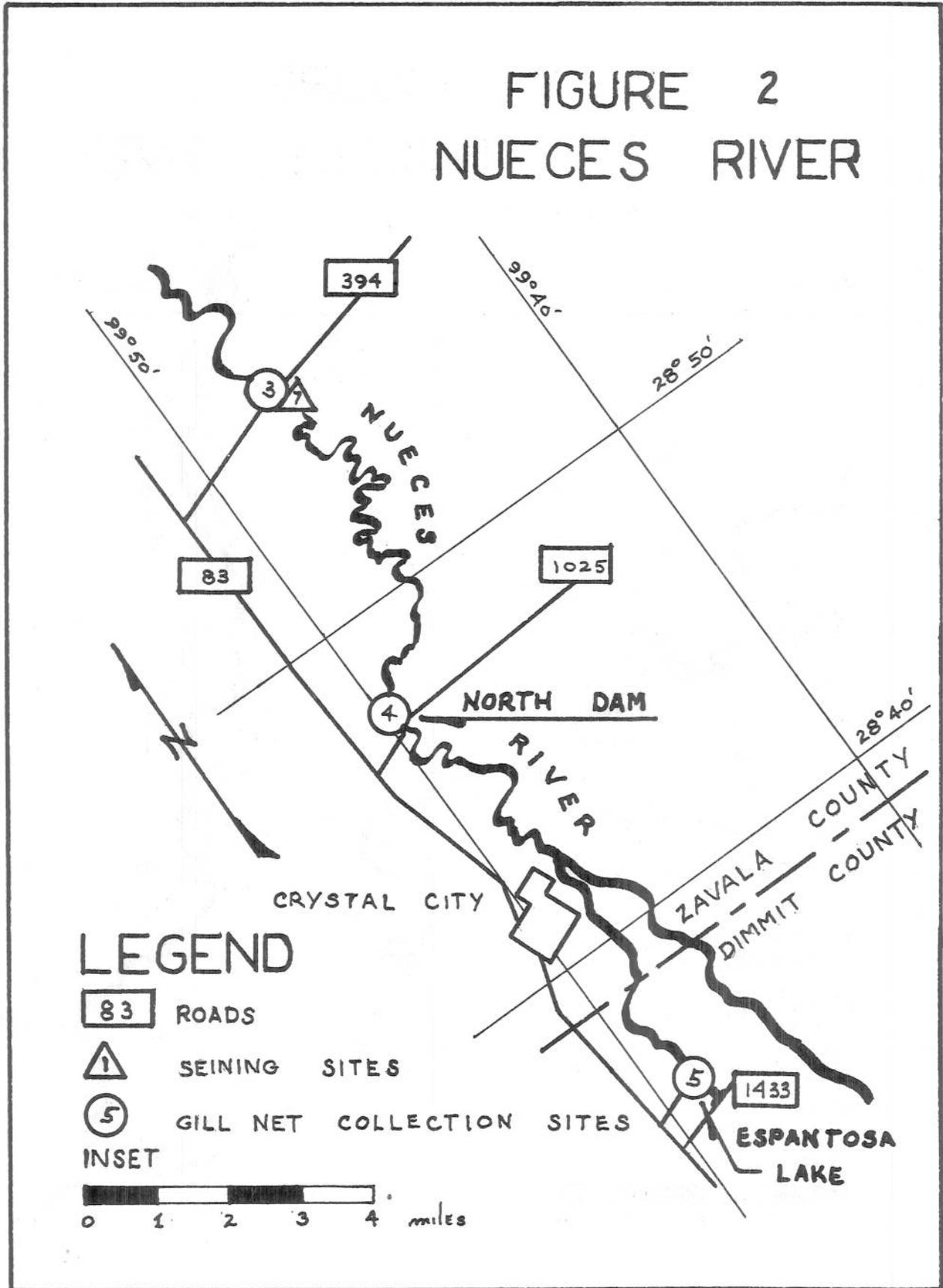
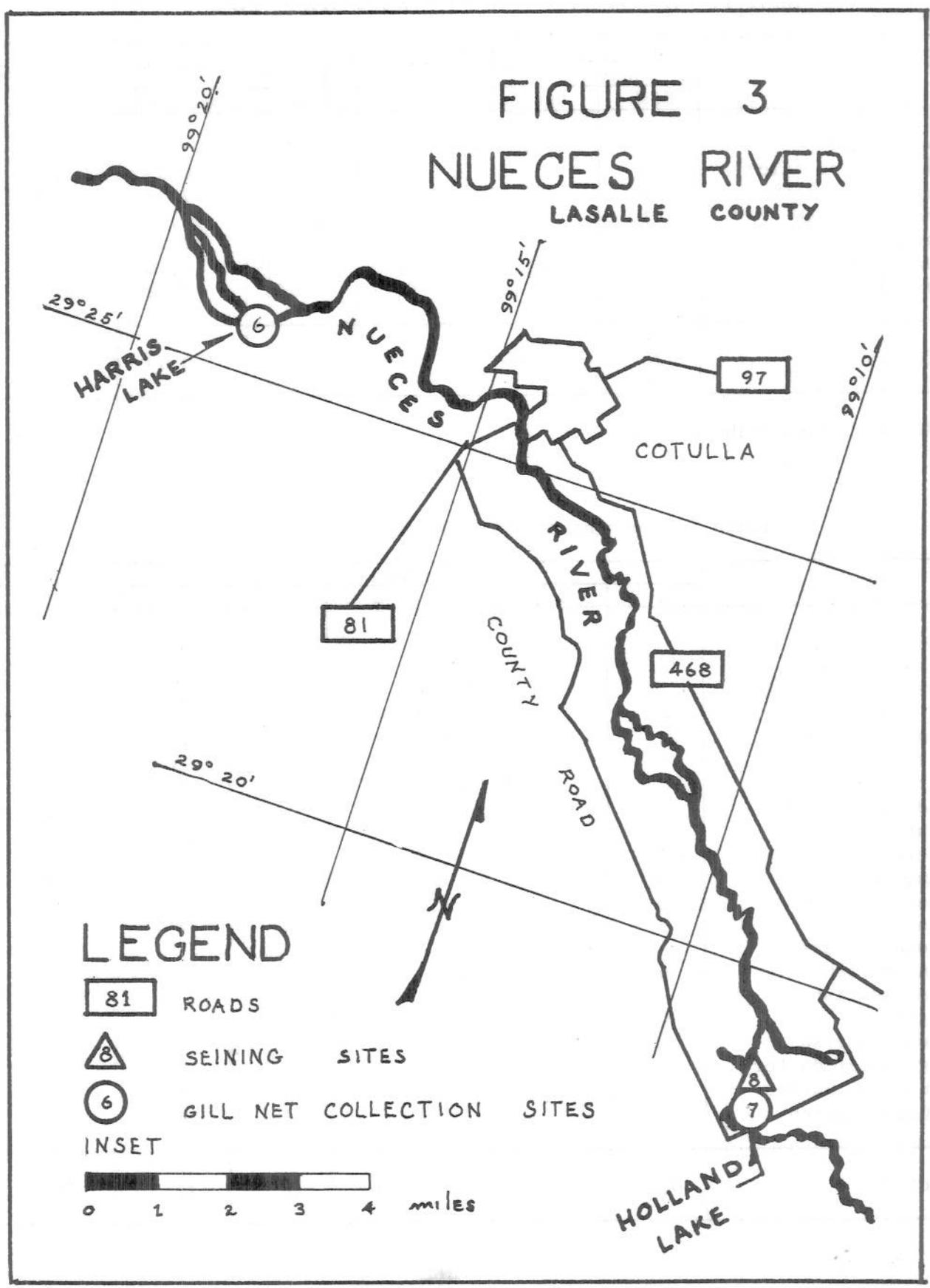


FIGURE 3

NUECES RIVER

LASALLE COUNTY



LEGEND

- 81 ROADS
- 8 SEINING SITES
- 6 GILL NET COLLECTION SITES

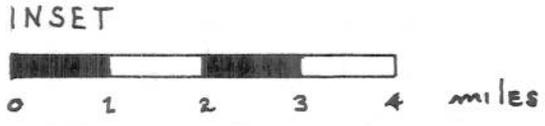


Table 2. Gill netting results, Nueces River, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Gizzard shad*	13	40.63	12.14	5,505	23.81	1.84
Smallmouth buffalo*	5	15.63	29.87	13,551	58.63	3.29
River carpsucker*	4	12.50	4.07	1,844	7.98	1.96
Channel catfish	1	3.12	0.75	338	1.46	1.71
Largemouth bass	7	21.88	3.94	1,785	7.72	2.09
Redear sunfish	1	3.12	0.09	41	0.18	4.10
Bluegill	1	3.12	0.11	50	0.22	3.86
Totals	32	100.00	50.97	23,114	100.00	

*Indicates rough fish species.

Table 3. Seining results, Nueces River, 1963.

Species	Stations						Total
	2	3	4	5	6	7	
Gizzard shad						2	2
Mexican tetra	1						1
Texas shiner	1		106		12	21	140
Weed shiner		4					4
Blacktail shiner	21	1	24	13	17	31	107
Red shiner	8				10	63	81
Ghost shiner			1		11		12
Roundnose minnow						7	7
Bullhead minnow						16	16
Stoneroller	1						1
Channel catfish	4						4
Yellow bullhead	3						3
Mosquitofish	5	6	1	33	14	18	77
Largemouth bass	4	19			1		24
Green sunfish	6	2	3	1			12
Redear sunfish			3				3
Bluegill	6	29	2	24	3	12	76
Longear sunfish				1			1
Orangethroat darter					1		1
Greenthroat darter						2	2
Rio Grande perch	1	3		2	1		7
Totals	61	64	140	74	70	172	581

on the river including Lakes Nueces, Silver, North Dam, Espantosa, Harris and Holland. Results of these surveys are discussed separately in the text below.

The fish samples from the Nueces River were, with exception of the gill net sample, collected up-stream from the Balcones Escarpment. Below the escarpment the river is intermittent and, except for some deep pools, the river dries up during the summer.

The results of the single gill net collection are shown in Table 2 and seining results are shown in Table 3.

In seining, the Texas shiner (Notropis amabilis) was the single most numerous species collected, with the blacktail shiner (Notropis venustus) a close second. Bluegills (Lepomis macrochirus) were collected at all seine stations. Largemouth bass (Micropterus salmoides) were observed though not collected at all stations.

LAKE NUECES

Techniques Used and Findings:

Completed in 1963, Lake Nueces is a constant-level, 19 surface acre, clearwater impoundment. It is located in Uvalde County on the upper reaches of the Nueces River (Figure 1) immediately downstream from Camp Wood. At the time of the reconnaissance survey, the fish in the lake represented only those fish that were in the impoundment area prior to inundation. No fish were stocked before the netting and seining collections were made.

Channel catfish (Ictalurus punctatus) followed by river carpsuckers (Carpionotus carpio) were the most abundant species taken in nets (Table 4). It is probable that the river carpsucker will become a problem species in the future after they have had an opportunity to spawn and establish themselves in this new reservoir.

In seining, it was apparent that a good minnow population dominated by the Texas shiner is present (Table 5).

SILVER LAKE

Findings:

Silver Lake, approximately 10 acres in area, is a large, deep pool with an almost constant water level, located on the West Nueces River (Figure 1). The river in this area is intermittent and normally flows for only a relatively short period after a rain on the watershed.

Considering the total number of fish collected (Table 6), netting samples from this lake produced an unusually large number of channel catfish. Spotted gars (Lepisosteus oculatus) were the next most abundant rough fish species taken in nets.

Table 4. Gill netting results, Lake Nueces, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Spotted gar*	5	10.41	4.32	1,962	11.44	.57
Gizzard shad*	1	2.09	0.27	123	0.72	1.85
River carpsucker*	9	18.75	15.09	6,849	39.93	2.04
Channel catfish	27	56.25	9.95	4,516	26.33	1.56
Flathead catfish	2	4.16	7.62	3,458	20.16	1.73
Spotted sunfish	1	2.09	0.10	48	0.28	5.42
Redbreast sunfish	1	2.09	0.22	100	0.58	3.57
Longear sunfish	2	4.16	0.21	97	0.56	4.93
Totals	48	100.00	37.78	17,153	100.00	

*Indicates rough fish species.

Table 5. Seining results, Lake Nueces, 1963.

Species	Total
Texas shiner	61
Blacktail shiner	9
Red shiner	1
Ghost shiner	1
Mosquitofish	4
Bluegill	2
Total	78

Table 6. Gill netting results, Silver Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Spotted gar*	6	10.34	11.25	5,102	8.43	.59
Longnose gar*	2	3.45	7.44	3,374	5.57	.66
Smallmouth buffalo*	2	3.45	29.25	13,267	21.93	4.32
River carpsucker*	1	1.72	3.62	1,644	2.72	1.93
Channel catfish	34	58.64	75.14	34,083	56.33	1.60
Black bullhead*	1	1.72	.61	278	.46	2.03
Yellow bullhead*	5	8.62	3.20	1,453	2.40	2.12
Largemouth bass	2	3.45	1.61	729	1.20	2.17
Warmouth	1	1.72	.17	79	.14	3.28
Bluegill	2	3.45	.93	424	.70	3.96
Longear sunfish	1	1.72	.06	27	.04	2.96
Rio Grande perch*	1	1.72	.10	45	.08	4.12
Totals	58	100.00	133.38	60,505	100.00	

*Indicates rough fish species.

Table 7. Gill netting results, North Dam Lake, 1962.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Spotted gar*	17	11.72	15.11	6,852	9.89	.53
Longnose gar*	33	22.76	58.72	26,635	38.44	.38
Threadfin shad*	2	1.38	.26	120	.18	1.88
Gizzard shad*	55	37.92	24.89	11,289	16.29	1.86
Smallmouth buffalo*	8	5.52	34.00	15,422	22.26	3.35
Channel catfish	1	.69	1.81	822	1.19	1.78
Black bullhead*	1	.69	.66	300	.43	2.20
Largemouth bass	3	2.07	3.84	1,744	2.52	2.31
Redear sunfish	1	.69	.11	52	.08	3.51
Bluegill	6	4.14	1.25	567	.81	4.81
White crappie	14	9.66	5.94	2,694	3.89	3.02
Freshwater drum*	4	2.76	6.13	2,779	4.02	2.77
Totals	145	100.00	152.72	69,276	100.00	

*Indicates rough fish species.

NORTH DAM LAKE

Findings:

This 310-acre channel impoundment was constructed to store and to divert Nueces River waters for irrigation in the Crystal City area (Figure 2). Therefore, the lake's water level fluctuates a great deal.

When net samples were taken, the lake was at a low point and the fish population was concentrated. Of the specimens collected, rough fish species including gizzard shad (Dorosoma cepedianum), longnose gar (Lepisosteus osseus), spotted gar and smallmouth buffalo (Ictiobus bubalus) dominated the fish population (Table 7). Small white crappie (Pomoxis annularis) and largemouth bass are the dominant game fish species. Channel catfish should be restocked in this area of the Nueces River.

ESPANTOSA LAKE

Findings:

Espantosa Lake, located in Dimmit County south of Crystal City, is 600 acres in area and is also a channel impoundment on the Nueces River (Figure 2). Like North Dam Lake, it too fluctuates a great deal and was low at the time of sampling.

Gill netting results varied somewhat from North Dam Lake in that freshwater drum (Aplodinotus grunniens) was the second most abundant species taken (Table 8). Small white crappie were the most abundant game fish taken in netting.

Because of extreme fluctuation in water levels, maintenance of a sport fish population is next to impossible, but stocking of additional channel catfish would be beneficial.

HARRIS LAKE

Findings:

Like the other channel impoundments in this section of the Nueces River (Figure 3), Harris Lake, measuring 125 acres in area, was built for irrigation purposes and is subject to fluctuation. However, not too much irrigated land is located in this area of La Salle County and therefore the fluctuations in water level are not too severe.

Netting results (Table 9) indicate an abundance of gars in the lake, including the longnose, spotted, and alligator gars (Lepisosteus spatula). Game fish apparently are poorly represented in Harris Lake.

HOLLAND LAKE

Findings:

Holland Lake is the farthest downstream of the channel impoundments on

Table 8. Gill netting results, Espantosa Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Spotted gar*	9	5.29	10.62	4,816	6.09	.71
Longnose gar*	3	1.76	9.30	4,218	5.33	.44
Gizzard shad*	52	30.59	23.18	10,516	13.30	1.99
Smallmouth buffalo*	28	16.47	64.50	29,256	37.01	3.54
Channel catfish	6	3.53	3.32	1,505	1.90	1.73
Redear sunfish	1	.59	.24	111	.15	4.83
White crappie	25	14.71	14.88	6,748	8.53	3.31
Freshwater drum*	45	26.47	48.01	21,776	27.55	3.05
Rio Grande perch*	1	.59	.24	110	.14	4.78
Totals	170	100.00	174.29	79,056	100.00	

*Indicates rough fish species.

Table 9. Gill netting results, Harris Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Alligator gar*	4	4.81	4.86	2,204	2.77	.70
Spotted gar*	2	2.41	1.01	458	0.57	.47
Longnose gar*	43	51.81	124.95	56,674	71.13	.38
Gizzard shad*	19	22.89	19.36	8,780	11.02	2.11
Smallmouth buffalo*	4	4.81	20.19	9,157	11.49	3.73
Channel catfish	1	1.21	1.25	567	0.71	1.78
Largemouth bass	2	2.41	1.62	737	0.92	2.10
Warmouth	1	1.21	0.21	97	0.12	3.86
Bluegill	2	2.41	0.19	84	0.11	4.99
White crappie	1	1.21	0.15	69	0.09	3.07
Freshwater drum*	2	2.41	1.63	738	0.93	2.70
Rio Grande perch*	2	2.41	0.25	115	0.14	6.80
Totals	83	100.00	175.67	79,680	100.00	

*Indicates rough fish species.

the Nueces River in Region 5-A (Figure 3). It is located near the southern county line of La Salle County and is 250 acres in area.

Netting indicated a fairly abundant white crappie population (Table 10) and seining indicated some spawning success for largemouth bass in this lake (Table 11). The relative abundance of game fish is borne out by the fairly high fishing pressure observed.

PINTO CREEK

Findings:

Pinto Creek, a small tributary of the Rio Grande, is located in the southwest corner of Kinney County (Figure 4). Except for the lower three miles, the creek flows only after rains on the watershed. Permanent water in the lower portion of the creek is affected by large numbers of rough fish which enter the area during rises on the Rio Grande River.

From netting results, it is apparent that the longnose gar is the dominant fish species present and that river carpsuckers are present in abundance (Table 12). Channel catfish are also present in limited numbers.

Of the fish collected in seines, the mosquitofish (Gambusia affinis), the bluegill, and the red shiner (Notropis lutrensis) were the most numerous species taken (Table 13).

LAS MORAS CREEK

Findings:

Las Moras Creek (Figure 4) begins at Las Moras Springs at Brackettville, in Kinney County, and flows in a southwesterly direction, entering the Rio Grande River near the northwestern corner of Maverick County. The springs arise at the Balcones Fault, have an average flow of 50 cubic feet per second, and have never been known to cease flowing.

The fish population, sampled only by seining, is typical of this type of habitat (Table 14). The most common fish collected was the round nose minnow (Dionda episcopa). Other commonly collected fish species were the Texas shiner (Notropis amabilis), the mosquitofish and the blacktail shiner.

Though not present in the seining collections, it is known that Las Moras Creek supports a good fishery for sunfishes and largemouth bass.

LEONA RIVER

Findings:

Arising from springs within and immediately below Uvalde, in Uvalde County, the Leona River (Figure 5) flows in a southerly and then southeasterly direction to its confluence with the Frio River near Derby in Frio County. Formerly this stream provided a locally important fishery, during the study period,

Table 10. Gill netting results, Holland Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Alligator gar*	8	5.55	67.45	30,595	39.91	.86
Spotted gar*	6	4.17	6.45	2,924	3.81	.61
Longnose gar*	6	4.17	17.94	8,137	10.62	.45
Gizzard shad*	44	30.55	10.58	4,801	6.26	2.01
Smallmouth buffalo*	12	8.33	35.50	16,101	21.00	4.42
Channel catfish	7	4.86	8.73	3,959	5.17	1.84
Warmouth	1	.70	.12	54	.07	4.06
Redear sunfish	1	.70	.08	36	.04	3.50
White crappie	49	34.02	10.10	4,579	5.98	2.98
Freshwater drum*	10	6.95	12.06	5,471	7.14	3.32
Totals	144	100.00	169.01	76,657	100.00	

*Indicates rough fish species.

Table 11. Seining results, Holland Lake, 1963.

Species	Total
Blacktail shiner	1
Red shiner	1
Mosquitofish	21
Tidewater silverside	1
Largemouth bass	14
Redear sunfish	1
Bluegill	7
Total	46

FIGURE 4 PINTO AND LAS MORAS CREEKS

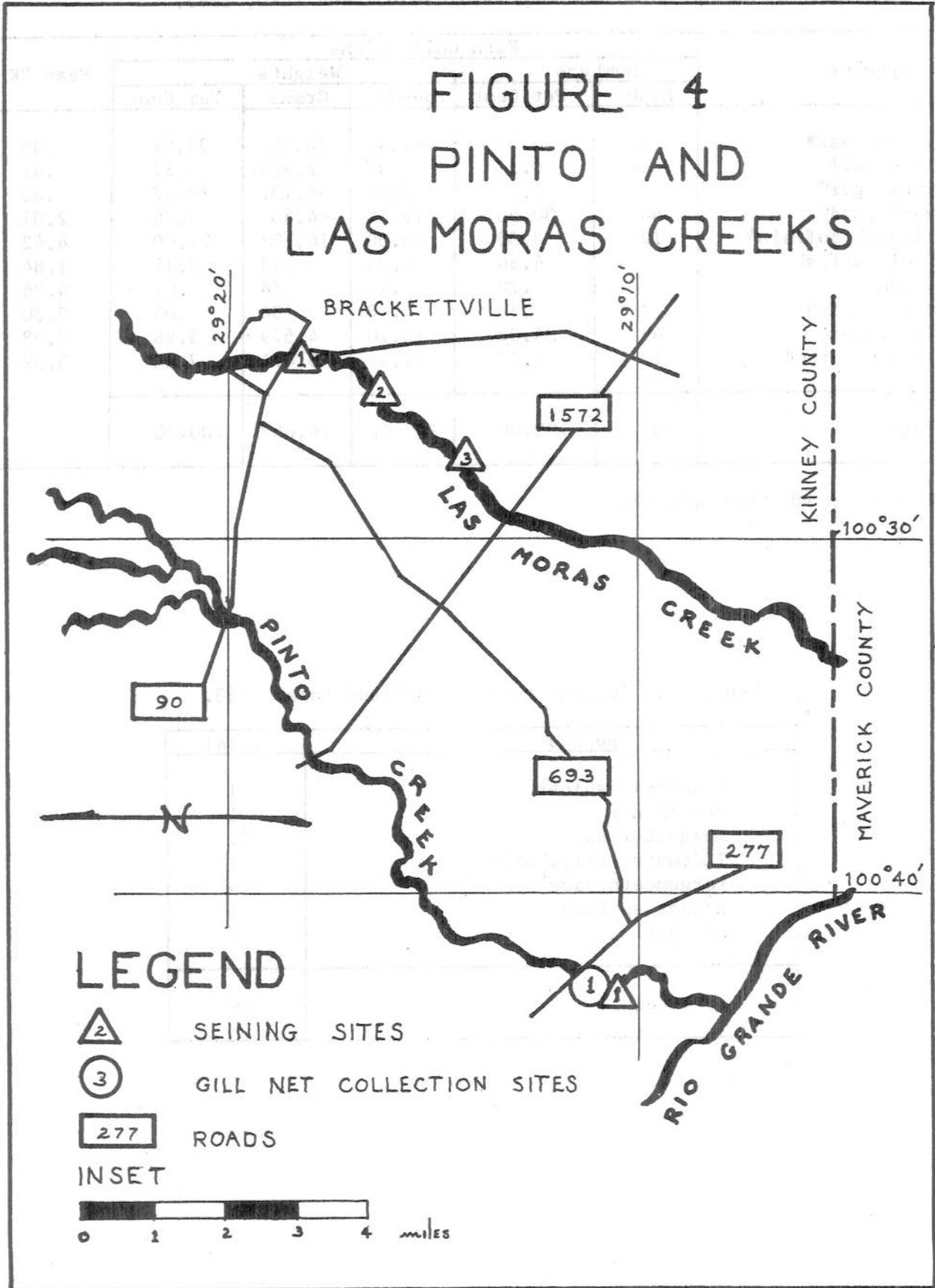


Table 12. Gill netting results, Pinto Creek, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Longnose gar*	56	50.00	61.21	27,762	48.95	.36
Gizzard shad*	5	4.46	2.17	984	1.73	2.37
Smallmouth buffalo*	9	8.04	17.44	7,911	13.95	3.06
River carpsucker*	35	31.25	33.92	15,388	27.13	2.65
Gray redhorse*	1	.89	0.65	293	.52	2.12
Carp*	1	.89	3.75	1,701	3.00	2.87
Channel catfish	3	2.68	4.09	1,857	3.27	1.71
Freshwater drum*	2	1.79	1.82	824	1.45	2.34
Totals	112	100.00	125.05	56,720	100.00	

*Indicates rough fish species.

Table 13. Seining results, Pinto Creek, 1963.

Species	Total
Gizzard shad	1
Texas shiner	5
Red shiner	29
Bullhead minnow	4
Mosquitofish	101
Largemouth bass	1
Warmouth	1
Green sunfish	3
Bluegill	82
White crappie	1
Rio Grande perch	1
Total	229

Table 14. Seining results, Las Moras Creek, 1963.

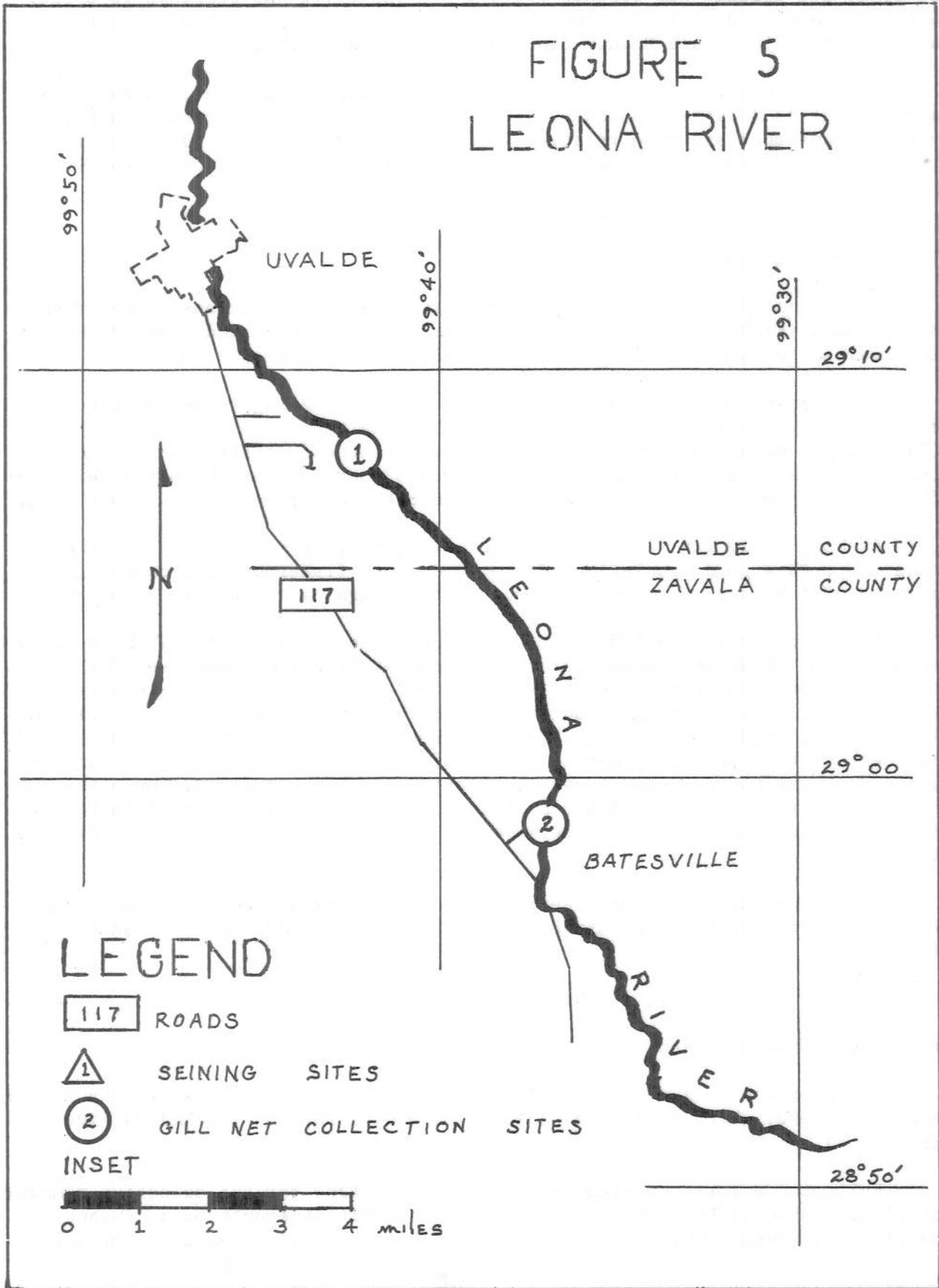
Species	Stations			Total
	1	2	3	
Gizzard shad			1	1
Mexican tetra		8	3	11
Texas shiner		91		91
Blacktail shiner		30	7	37
Hybrid shiner		1		1
Red shiner		1	3	4
Round nose minnow	326	1		327
Mosquitofish	35		15	50
Sailfin molly	2		5	7
Green sunfish	1			1
Redbreast sunfish	1			1
Totals	365	132	34	531

Table 15. Gill netting results, Leona River, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Gizzard shad*	27	50.92	20.03	9,086	52.78	1.95
Smallmouth buffalo*	1	1.89	3.44	1,559	9.06	3.34
River carpsucker*	1	1.89	4.63	2,098	12.19	2.30
Channel catfish	6	11.32	2.80	1,271	7.38	1.49
Black bullhead*	3	5.66	1.75	795	4.62	2.11
Yellow bullhead*	1	1.89	.19	87	.51	3.34
Largemouth bass	4	7.55	3.40	1,541	8.95	2.48
Green sunfish	1	1.89	.43	197	1.15	3.80
Redear sunfish	1	1.89	.12	56	.32	3.08
Bluegill	5	9.43	.85	385	2.24	3.51
Longear sunfish	2	3.78	.19	85	.49	3.49
Rio Grande perch*	1	1.89	.11	52	.31	4.62
Total	53	100.00	37.94	17,212	100.00	

*Indicates rough fish species.

FIGURE 5 LEONA RIVER



however, the springs had stopped flowing and the river was confined to pools. Gill net samples were taken from the two major pools, one in Uvalde County and the other in Zavala County near Batesville (Table 15).

Based on the limited fish collections from the Leona River, gizzard shad are present in relative abundance and channel catfish, largemouth bass and various sunfishes are also relatively common. If the present period of low rainfall continues, the stream will probably dry up as it did prior to 1957.

MEDINA LAKE

Techniques Used and Findings:

A total of 36 gill net collections were taken from stations established on Medina Lake (Figure 6) during previous years. During the study period, Medina Lake varied in lake area from 2,486 to 1,489 surface acres.

The gizzard shad population which has been increasing in Medina Lake for a number of years made up 62 per cent of the total number of fish netted (Table 16). Game fish, including channel and flathead catfish, white and largemouth bass, and white crappie comprised 57 per cent of the total weight of fish netted. Of this, channel and flathead catfish accounted for 42 per cent.

Although only six flathead catfish were collected in net samples, the lake supports a good population of them and sport fishermen have caught good numbers of this species with some individuals weighing as much as 87 pounds.

During the study period, a total of 366 longnose gars were taken in nets. Since 322 of these were taken during one netting trip and since over 200 were taken from only two nets, these fish would have unduly biased the results of gill netting from Medina Lake during 1963. There were therefore not included in Table 16. Had they been included, longnose gars would have comprised 31.69 per cent of the total fish netted and 69.57 per cent of their weight. In averaging the numbers of longnose gars collected in gill nets during the other two collection trips, this species comprised 7.72 per cent of the total number of fish netted; a figure which is believed to be much closer to the norm for this lake.

In collections from three seine stations on Medina Lake, blacktail and redfin shiners and bullhead minnows were the most numerous species taken (Table 17).

DIVERSION LAKE

Techniques Used and Findings:

Twenty-three gill net collections were taken from the 181 surface acres of Diversion Lake, which is located just below Medina Lake on the Medina River (Figure 6).

Following a rotenone treatment of Diversion Lake for the selective removal of gizzard shad in February 1962, large numbers of largemouth bass, channel catfish and redear sunfish were stocked in an effort to increase the overall

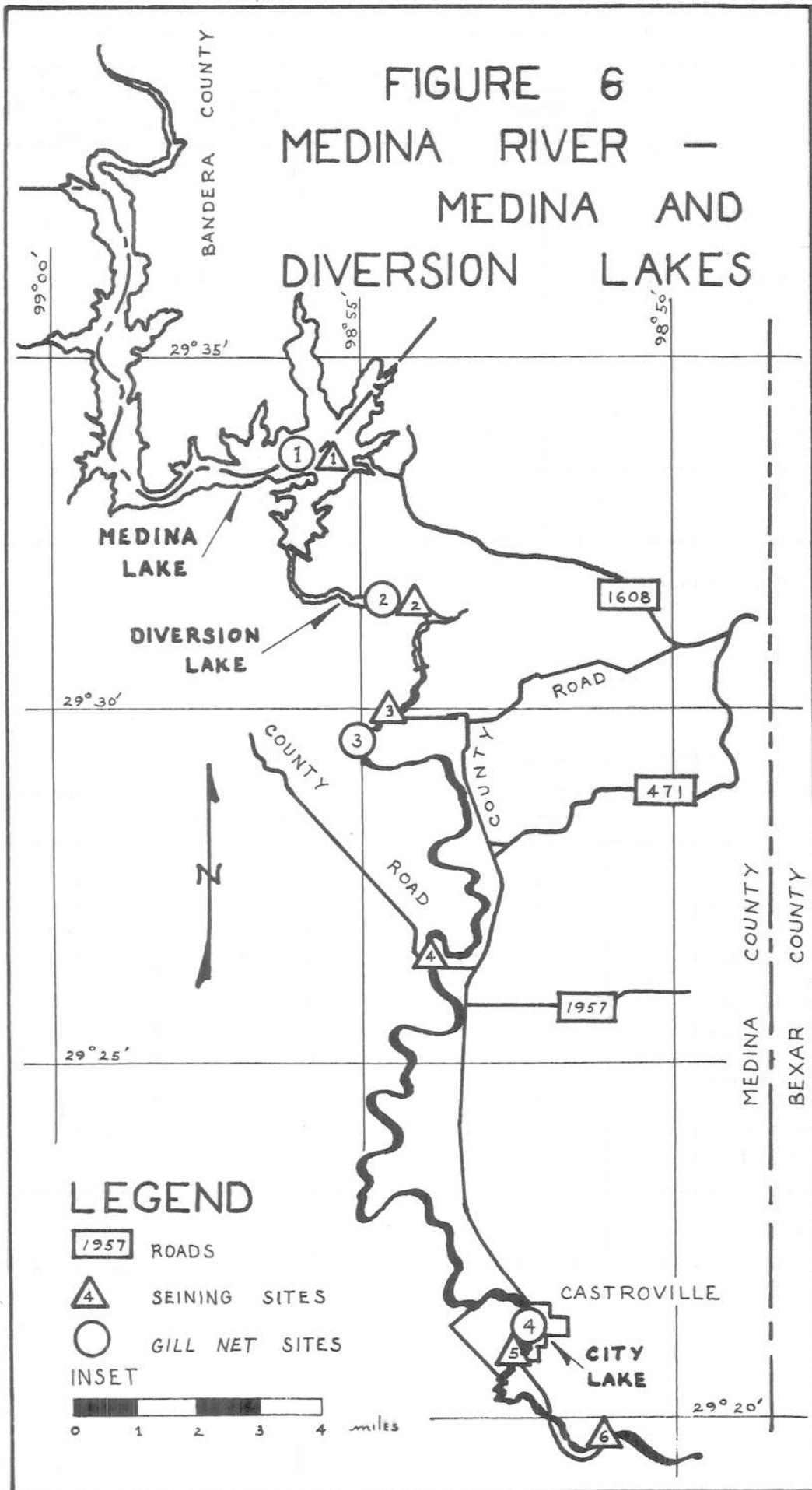


Table 16. Gill netting results, Medina Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Gizzard shad*	491	62.23	122.33	55,489	31.64	1.79
Smallmouth buffalo*	1	.12	4.75	2,155	1.23	3.63
Gray redhorse*	2	.26	1.36	618	.35	1.82
Carp*	16	2.02	25.21	11,434	6.52	2.48
Channel catfish	117	14.83	126.19	57,238	32.64	1.52
Flathead catfish	6	.76	37.31	16,925	9.65	2.19
White bass	54	6.85	41.09	18,640	10.63	2.45
Largemouth bass	5	.63	4.37	1,981	1.13	2.09
Redear sunfish	10	1.27	2.23	1,013	.58	3.44
Bluegill	39	4.94	8.16	3,703	2.11	3.64
White crappie	48	6.09	13.59	6,165	3.52	2.46
Totals	789	100.00	386.59	175,361	100.00	

*Indicates rough fish species.

Table 17. Seining results, Medina Lake, 1963.

Species	Stations			Total
	1	2	3	
Gizzard shad	18			18
Blacktail shiner	4	25	31	60
Red shiner	3	34	21	58
Bullhead minnow		32	6	38
Mosquitofish		1		1
Sailfin molly		6		6
Largemouth bass		2		2
Green sunfish			1	1
Redear sunfish		2	2	4
Bluegill	2	5	3	10
Longear sunfish		1		1
Rio Grande perch	1	2		3
Totals	28	110	64	202

game fish population. Current netting data fails to indicate that benefit resulted from the treatment and subsequent planting of young game fish. In fact, the percentage of game fish taken in netting samples decreased from 19.6 in 1962 to 11.0 in 1963 (see Table 5 in Job Completion Report for Job B-22, D-J Project F-9-R-10 and Table 18 in this report). Furthermore, gizzard shad which accounted for 64.5 per cent of the netted fish in 1962 increased to 66.8 per cent in 1963.

In seining collections from Diversion Lake, the most numerous species collected was the blacktail shiner (Table 19).

CASTROVILLE CITY LAKE

Findings:

Castroville City Lake is a small, 20-acre, channel impoundment on the Medina River within the city limits of Castroville (Figure 6). Netting results from fisheries reconnaissance work in 1963 indicated that gizzard shad and smallmouth buffalo were the most abundant species present. However, game fish species are represented in fair numbers by channel and flathead catfish, largemouth bass, and white crappie (Table 20).

MEDINA RIVER

Techniques Used and Findings:

Current reconnaissance work on the Medina River includes that portion of the stream from Diversion Lake Dam into its confluence with the San Antonio River (Figures 6 and 7). In all, two gill net and eight seine collections were taken from this portion of the river. The results of netting are inconclusive in that only 57 specimens were taken (Table 21). The river is known to suffer from die-offs of fish due to agricultural insecticides and other pollutants and this may account for the scarcity of fish in the netting collections.

In seining, the red shiner was the most abundant single species collected and accounted for 877 of the 1,356 specimens taken (Table 22). Sailfin mollies (Mollienesia latipinna) were the next most abundant species taken in seines.

WOODLAWN LAKE

Techniques Used and Findings:

Woodlawn Lake is a 40-acre lake located at the head of Alazan Creek, in a residential section of western San Antonio (Figure 8).

A total of 16 gill net collections were made at four stations on Woodlawn Lake during the study period. Game or panfish comprised 69.8 per cent of the total number and 75.6 per cent of the total weight of the fish collected (Table 23). These data compare favorably with data from the previous year when game and panfish comprised 58.5 per cent of the number and 42.6 per cent of the weight of the netted specimens (see Table 7 in the report for Job B-22, F-9-R-10).

Table 18. Gill netting results, Diversion Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Longnose gar*	96	19.20	118.27	53,648	31.67	.31
Gizzard shad*	334	66.80	201.82	91,542	54.04	1.86
Smallmouth buffalo*	1	.20	4.44	2,013	1.19	2.82
Carp*	13	2.60	17.49	7,933	4.68	2.35
Channel catfish	9	1.80	12.81	5,812	3.43	1.82
White bass	21	4.20	11.08	5,027	2.97	2.36
Largemouth bass	4	.80	2.64	1,200	.71	1.96
Warmouth	3	.60	.52	238	.14	3.44
Green sunfish	4	.80	.61	278	.16	3.04
Bluegill	10	2.00	1.86	845	.50	3.60
White crappie	4	.80	1.61	730	.43	2.60
Rio Grande perch*	1	.20	.28	126	.08	4.49
Totals	500	100.00	373.43	169,392	100.00	

*Indicates rough fish species.

Table 19. Seining results, Diversion Lake, 1963.

Species	Stations		Total
	1	2	
Blacktail shiner	80	235	315
Red shiner	24	12	36
Bullhead minnow	13	29	42
Largemouth bass	9		9
Bluegill	7		7
Redbreast sunfish		1	1
Totals	133	277	410

Table 20. Gill netting results, Castroville City Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Spotted gar*	2	2.17	6.69	3,034	9.06	.60
Gizzard shad*	41	44.57	13.12	5,952	17.80	1.96
Smallmouth buffalo*	15	16.31	31.76	14,406	43.04	3.38
Gray redhorse*	5	5.43	3.15	1,427	4.27	2.05
Channel catfish	5	5.43	7.01	3,179	9.50	1.57
Flathead catfish	3	3.26	5.93	2,688	8.04	1.70
Largemouth bass	4	4.35	2.08	945	2.82	2.04
Warmouth	1	1.08	.11	52	.16	4.62
Bluegill	6	6.53	1.04	473	1.41	3.81
White crappie	10	10.87	3.09	1,402	3.90	2.48
Totals	92	100.00	73.98	33,558	100.00	

*Indicates rough fish species.

Table 21. Gill netting results, Medina River, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Longnose gar*	3*	5.26	1.94	880	3.45	.33
Gizzard shad*	36	63.17	40.02	18,155	71.29	2.09
Smallmouth buffalo*	3	5.26	5.88	2,665	10.46	3.16
Gray redhorse*	6	10.53	3.81	1,729	6.79	2.10
Channel catfish	3	5.26	1.94	881	3.46	1.65
Yellow bullhead*	1	1.75	.33	150	.59	3.00
Flathead catfish	1	1.75	1.56	709	2.78	1.99
Largemouth bass	2	3.51	.44	200	.79	1.95
Bluegill	2	3.51	.22	99	.39	4.21
Totals	57	100.00	56.14	25,468	100.00	

*Indicates rough fish species.

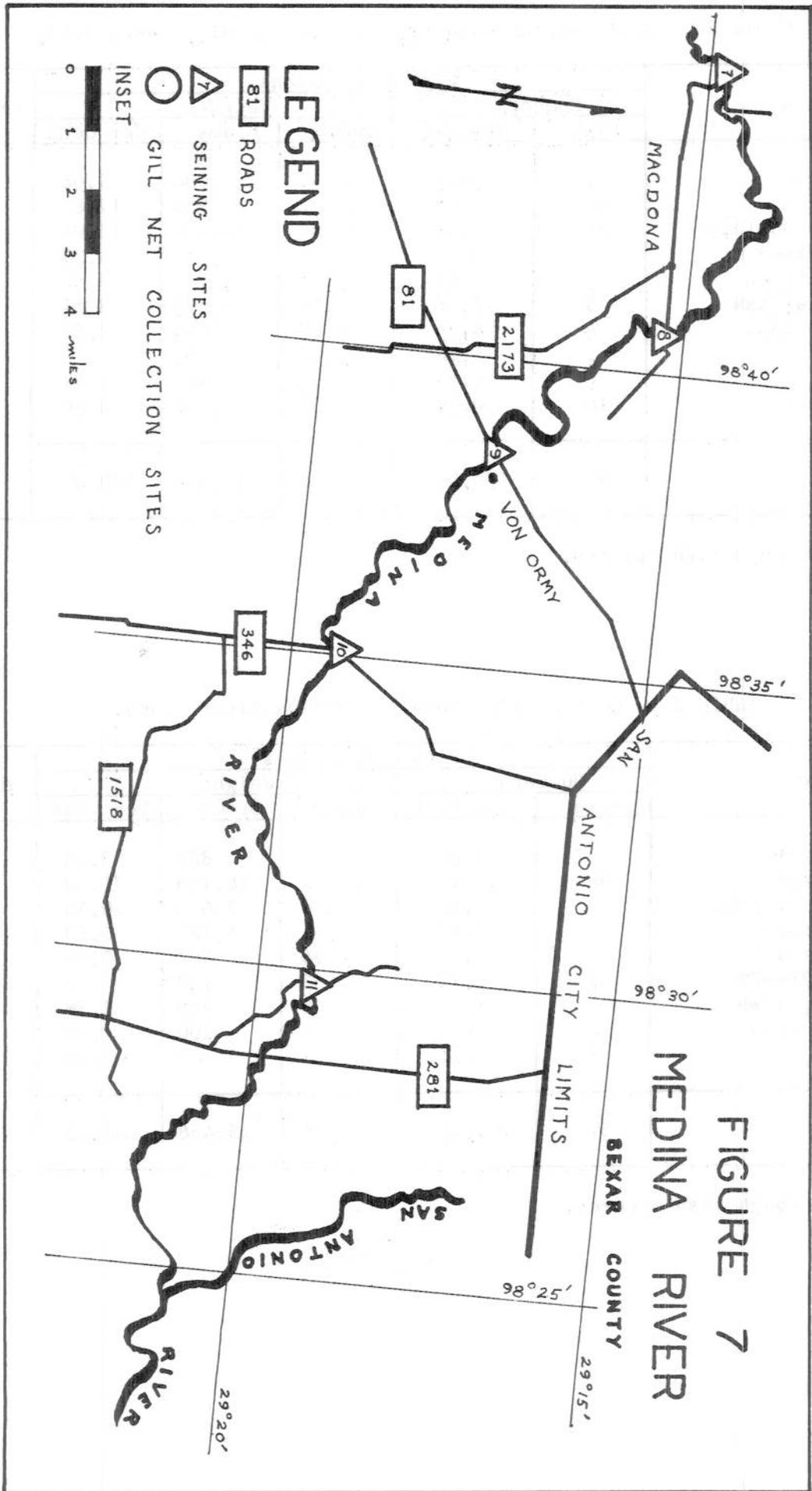


Table 22. Seining results, Medina River, 1963.

Species	Stations								Total
	1	2	3	4	5	6	7	8	
Gizzard shad				1					1
Mexican tetra			1			3	2	1	7
Gray redhorse	1				5				6
Speckled chub						1			1
Texas shiner		26			4		6		36
Blacktail shiner	22	8	3						33
Red shiner	9	2	35	83	54	632		62	877
Sand shiner			6						6
Channel catfish		1	1				1	2	5
Flathead catfish		1							1
Blackstripe minnow			1	1	1			3	6
Bullhead minnow	12	4	6	5		2	13	10	52
Sailfin molly	4	1		4		15	65	128	217
Spotted sunfish	3	9		12	4				28
Redear sunfish		6	1				2		9
Bluegill			6	2			11	3	22
Redbreast sunfish			1				10	8	19
Longear sunfish			1						1
Logperch	2			2	2				6
Rio Grande perch		4		3		2	3	11	23
Totals	53	62	62	113	70	655	113	228	1,356

Table 23. Gill netting results, Woodlawn Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Carp*	1	.17	.52	236	.32	3.28
Goldfish*	2	.32	1.92	872	1.19	5.82
Golden shiner*	2	.32	.28	128	.17	2.50
Channel catfish	46	7.55	47.00	21,320	29.11	1.57
Black bullhead*	101	16.58	24.65	11,179	15.27	2.35
Yellow bullhead*	71	11.66	10.56	4,791	6.54	2.10
Flathead catfish	5	.82	17.31	7,853	10.72	1.82
Largemouth bass	19	3.12	9.42	4,273	5.83	2.30
Warmouth	1	.17	.09	39	.06	4.02
Green sunfish	1	.17	.13	57	.08	3.65
Redear sunfish	11	1.81	.88	400	.54	4.01
Bluegill	151	24.79	12.43	5,636	7.70	4.08
Redbreast sunfish	18	2.96	1.61	729	.99	4.70
Longear sunfish	24	3.94	2.10	952	1.30	4.74
White crappie	149	24.47	30.11	14,113	19.27	2.89
Rio Grande perch*	7	1.15	1.46	662	.91	4.86
Totals	609	100.00	161.47	73,240	100.00	

*Indicates rough fish species.

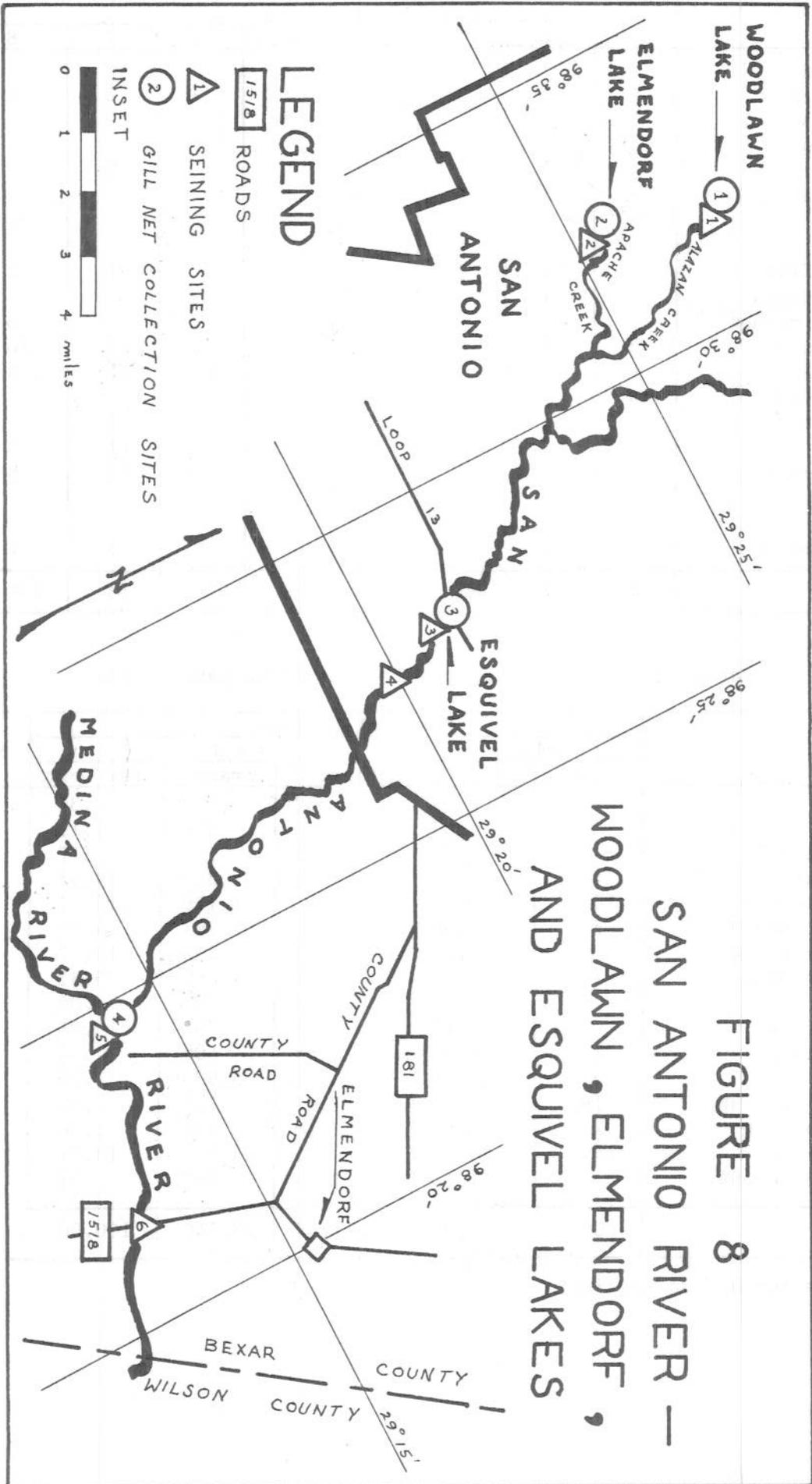


FIGURE 8
SAN ANTONIO RIVER —
WOODLAWN, ELMENDORF,
AND ESQUIVEL LAKES

Because of its location and good access, Woodlawn Lake supports very heavy fishing pressure and supplies much needed recreation for young anglers or other persons unable to fish outside of the City of San Antonio. Therefore, continuing efforts should be made to provide good fishing in this lake. Judging from the average weights of catfish, both channel and flathead, stocking of these species has been quite successful and should be continued. Spot creel census checks indicate the overall rate of catch to be 0.75 fish per man-hour of fishing.

In seining at two stations on Woodlawn Lake, bluegills accounted for more than half the collected specimens (Table 24).

ELMENDORF LAKE

Techniques Used and Findings:

Elmendorf Lake is eight acres in surface area and is located at the head of Apache Creek, a tributary of the San Antonio River, in the western section of San Antonio (Figure 8). Because of its location and good access, heavy fishing pressure is exerted on its fish population.

In three gill net collections during the study period, only 22 specimens were taken (Table 25). Of these, eight were small bluegills and three were largemouth bass. The bass weighed a total of 7.6 pounds, or an average of 2½ pounds each, a good average weight considering the location of the lake and the amount of fishing pressure.

In seining, sailfin mollies accounted for 89 of the 113 specimens collected (Table 26). That no small largemouth bass were seined indicates a need for restocking.

DAVIS (ESQUIVEL) LAKE

Techniques Used and Findings:

Davis Lake is a 14-acre channel impoundment situated on the San Antonio River, in the south-central portion of San Antonio (Figure 8).

During 1963, two series of three gill net sets and one seining collection were made on the lake. The major portion of the specimens collected by gill nets were taken in the first netting series. In October 1963, a fish kill, caused by insecticide pollution, removed most of the game fish population. Large numbers of largemouth bass, weighing up to 5 pounds, and channel catfish, weighing up to 12 pounds, were destroyed. Because of this fish kill, the fish population represented by the data in Table 27 did not exist at the end of 1963.

Seining in Davis Lake is difficult at best, but seining results (Table 28) also reflect the effect of the insecticidal kill of fish in the lake. A recommendation to have the lake restocked has been made and efforts to control insecticidal kills need also to be made by the proper authorities.

Table 24. Seining results, Woodlawn Lake, 1963.

Species	Stations		Total
	1	2	
Golden shiner	12	5	17
Red shiner	1		1
Black bullhead		1	1
Mosquitofish	9	6	15
Largemouth bass	1		1
Redear sunfish	3	1	4
Bluegill	27	33	60
Longear sunfish	3		3
Redbreast sunfish		1	1
Rio Grande perch	3		3
Totals	50	47	106

Table 25. Gill netting results, Elmendorf Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Golden shiner*	4	18.18	.62	279	5.76	1.86
Black bullhead*	5	22.72	1.34	610	12.60	2.18
Largemouth bass	3	13.64	7.62	3,459	71.45	2.70
Bluegill	8	36.36	.69	312	6.45	3.69
Rio Grande perch*	2	9.10	.40	181	3.74	4.74
Totals	22	100.00	10.67	4,841	100.00	

*Indicates rough fish species.

Table 26. Seining results, Elemendorf Lake, 1963.

Species	Stations		Total
	1	2	
Mosquitofish	8	3	11
Sailfin molly	44	45	89
Green sunfish	1	1	2
Bluegill	4	6	10
Rio Grande perch	.	1	1
Totals	57	56	113

Table 27. Gill netting results, Davis Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Alligator gar*	1	.54	6.62	3,005	4.09	.74
Spotted gar*	1	.54	3.06	1,389	1.90	.87
Carp*	36	19.58	58.21	26,405	36.00	2.75
Goldfish*	3	1.63	3.75	1,701	2.32	4.49
Channel catfish	29	15.76	46.01	20,869	28.45	1.91
Black bullhead*	10	5.43	3.33	1,510	2.06	2.74
Yellow bullhead*	15	8.16	5.20	2,360	3.22	2.79
Largemouth bass	14	7.60	21.44	9,724	13.25	2.94
Warmouth	1	.54	.31	142	.20	4.66
Green sunfish	9	4.89	1.58	717	.97	3.96
Redear sunfish	2	1.08	.57	258	.36	4.55
Bluegill	26	14.13	3.02	1,371	1.87	4.98
Longear sunfish	1	.54	.09	43	.05	4.30
White crappie	11	5.97	3.96	1,795	2.45	3.70
Rio Grande perch*	25	13.58	4.53	2,056	2.81	5.33
Totals	184	100.00	161.68	73,345	100.00	

*Indicates rough fish species.

Table 28. Seining results, Esquivel Lake, 1963.

Species	Total
Red shiner	1
Mosquitofish	13
Sailfin molly	5
Rio Grande perch	1
Total	20

FALCON LAKE

Techniques Used and Findings:

Thirty-nine gill net collections were made on Falcon Lake during 1963. Netting stations established during the previous segment were used as sites of collections. In addition, 12 seining collections at 4 stations were made during this reconnaissance survey.

Collection data indicates a fairly dense fish population in Falcon Lake with an average of over 50 fish taken by each gill net set. Of the total fish collected, game fish composed 31.88 per cent by number (Table 29) as compared to 34.73 per cent for 1962. White crappie, averaging more than $\frac{1}{2}$ -pound each, were the most numerous game fish taken comprising 11.67 per cent of the total number and 9.45 per cent of the total weight collected. Other game fish taken in relative abundance were channel catfish, white bass, blue catfish, and largemouth bass.

Of the rough fish species collected by gill netting, the gizzard shad was the most frequent with 49.12 per cent by number and 21.95 per cent of the total weight. Other rough fish species taken in relative abundance were freshwater drum and longnose gar. The longnose gar accounted for the largest per cent of the total weight of all species collected with 26.30 per cent.

A total of 3,770 specimens were collected by seining on Falcon Lake (Table 30). The tidewater silverside was the most numerous single species taken with 1,074 specimens. The threadfin shad, red shiner, and gizzard shad were also present in substantial numbers.

Discussion

When analyzing collection data and field notes for this job, fisheries problems for this region (reported in Segment Completion Report Job D-1, Project F-9-R-11) become apparent.

An over abundance of rough fish is evident in most gill net collection tables of this report.

The lack of public access is recognized in the unharvested channel catfish and other game species in some of the waters covered by this report. Also, field notes show very few fishermen were present during the survey of any of the waters except Lakes Nueces, Holland, Medina, and Falcon. These waters, except Falcon Lake, have adequate public access, but lack in development of cabins and other public camping facilities.

The severe water fluctuation of most impoundments studied, the Leona River and the portion of the Nueces River below the Balcones Escarpment, are the direct result of excessive irrigation and normal low rainfall for this area.

The fish kills reported in the Medina River and Davis Lake result from insecticides and other polluting agents.

Table 29. Gill netting results, Falcon Lake, 1963.

Species	Fish Collections					Mean "K"
	Numbers		Weights			
	Fish	Per Cent	Pounds	Grams	Per Cent	
Alligator gar*	2	.10	115.10	52,210	8.67	.75
Spotted gar*	40	2.01	65.41	29,670	4.92	.63
Longnose gar*	107	5.38	349.03	158,318	26.30	.45
Threadfin shad*	30	1.50	3.49	1,583	.26	1.84
Gizzard shad*	977	49.12	291.35	132,154	21.95	1.84
Smallmouth buffalo*	15	.76	80.44	36,486	6.06	3.21
River carpsucker*	26	1.31	32.20	14,606	2.42	2.93
Carp*	19	.95	45.93	20,832	3.46	2.84
Channel catfish	131	6.59	40.93	18,567	3.09	1.43
Blue catfish	81	4.07	67.74	30,726	5.10	1.37
Black bullhead*	2	.10	.72	327	.05	2.01
Flathead catfish	2	.10	5.40	2,448	.41	1.72
White bass	96	4.83	43.59	19,771	3.28	2.26
Largemouth bass	28	1.41	19.94	9,047	1.51	2.16
Redear sunfish	12	.60	1.34	609	.10	3.19
Bluegill	52	2.61	5.48	2,486	.41	3.69
White crappie	232	11.67	125.42	56,890	9.45	2.59
Freshwater drum*	120	6.03	25.71	11,663	1.93	2.28
Rio Grande perch*	17	.86	8.23	3,735	.63	4.90
Totals	1,989	100.00	1,327.45	602,128	100.00	

*Indicates rough fish species.

Table 30. Seining results, Falcon Lake, 1963.

Species	Stations				Total
	1	2	3	4	
Threadfin shad	1	856			857
Gizzard shad	34	438	5	18	495
Mexican tetra		9	1		10
River carpsucker	2				2
Speckled chub			1		1
Rio Grande shiner	1				1
Blacktail shiner	5	53	35	23	116
Red shiner	85	446	136	169	836
Bullhead minnow	23	86	31		140
Sheepshead minnow	4	20	35	7	66
Mosquitofish	33	7	82	14	136
Sailfin molly	5		1		6
Tidewater silverside	145	557	318	54	1,074
Redear sunfish		1			1
Bluegill	4	10	5	3	22
White crappie	2				2
Rio Grande perch	3	1		1	5
Totals	347	2,484	650	289	3,770

The results of uncontrolled commercial netting on Falcon Lake can be found when analyzing Table 29. The 131 channel catfish collected by gill netting averaged a mere 0.3 pound, 81 blue catfish averaged 0.8 pound and 96 white bass averaged 0.4 pound each. In addition, the largemouth bass collected from Falcon Lake averaged 0.7 pound. It is believed that these small sizes are the direct result of unrestricted commercial netting on this impoundment. Contrarily, the greater than usual average size of crappie in Falcon Lake is probably due to extreme cropping of this species by netting.

Work is being done at present to alleviate some of the above problems. However, a concerted effort by all agencies concerned will be necessary before solutions to all these problems will be forthcoming.

Prepared by Elgin M. C. Dietz
Project Leader

Approved by Marion Toole
Coordinator

Date September 4, 1964

Kenneth C. Jurgens
Regional Supervisor