

Report of Fisheries Investigations
Basic Survey and Inventory of Fish Species Present
in the Escondido Creek Watershed

by

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Dingell-Johnson Project F-6-R-6, Job B-14
July 1, 1958 - June 30, 1959

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Job Completion Report

State of TEXAS

Project No. F-6-R-6

Name: Fisheries Investigations and Surveys
of the Waters of Region 8-B.

Job No. B-14

Title: Basic Survey and Inventory of Fish
Species in the Escondido Creek Water-
shed.

Period Covered:

July 1, 1958 - June 30, 1959

Abstract:

The Escondido Creek Watershed Pilot Project was built by the Federal Government and the Karnes County Soil Conservation District in 1954 through 1958. Eleven dams were built as flood control structures and extensive soil conservation measures were carried out on the entire 117 square miles of the watershed. Each dam forms a sediment pool of permanent water of 200 acre-feet. Drains and flood draw down structures prevent rough fish access from downstream.

Water sampling, netting and seining were carried out to determine the fisheries conditions of nine of the lakes. In general water conditions were found to be suitable for good production of warm water fish and 408 fish of 12 species were taken by netting and seining.

Although all nine lakes seem to offer fair to good fishing at present, five of them contain bullhead catfish which are expected to ruin them within a short time. At such time as undesirable fish become overabundant, recommendations are made for the complete removal of fish from these lakes and restocking with desirable fish.

Objectives:

To determine the chemical and physical characteristics of the Escondido Creek Watershed and the fish species present and their relative numbers.

Procedure:

Mr. Roy G. Freeman, Jr., Work Unit Conservationist, Soil Conservation Service, Kenedy, Texas, was contacted regarding the Escondido Creek Pilot Watershed Project. Information about the location and size of the lakes, land owners involved, and purpose and operation of the project were largely obtained through Mr. Freeman. The project leader and two field assistants visited nine of the eleven lakes in the watershed at least once during the investigation. One water sample and two netting collections were taken from each of these lakes and, in some cases, seining collections, stocking records and ecological notes were also obtained.

Findings:

Physical Description

In 1953, the Karnes County Soil Conservation District entered an agreement with the Federal Government to develop the Escondido Creek Watershed as a Pilot Project. This was one of four such projects in Texas and one of 62 in the United States. Funds to build the dams were furnished by the Federal Government while the planning, engineering, and land treatment were paid for by the District. Once constructed, the dams became the property of the District for maintenance but the other land involved and the right of access to the lakes remained with the individual property owners. The dams located on branches of Escondido Creek were primarily intended to retain flood waters and drain them off slowly into the creek through drawdown tubes. A sediment pool of 200 acre feet was to be the only "permanent" water behind each dam between heavy rains. A spillway at the end of each dam was designed to carry off exceptionally heavy runoffs, expected only once in 25 years. Small, light rains were to be caught and held in the soil above the dams by contouring, cover crops, brush control, and seeding in pastures, controlled grazing and other soil conservation measures.

The watershed controlled by this project covers 117 square miles, and sediment pools, water manageable for fisheries, totaled 467 surface acre-feet.

Escondido Creek drains into the San Antonio River almost 100 miles above its mouth. The average annual rainfall in Karnes County is 29.84 inches. Topography is gently rolling, with waxy clay soil in the west, and sandy loams in the north and east. Brush and small timber are the dominant upland vegetation but increasing amounts of pasture are being cleared for improved pastures and row crops. Map I shows the locations of the lakes in Karnes County. Figure I shows a schematic drawing of a dam and Table 1 gives basic statistics of the eleven lakes. All are from a mimeographed pamphlet prepared by Mr. Freeman.

Water Analysis

Water analysis samples were taken from just in front of the drawdown structure in the deepest part of each lake checked. Samples were taken from the surface and, where possible, from 10 and 20 feet deep. Temperatures, dissolved oxygen and carbon dioxide amounts reflected the time of year and prevailing air temperatures and were normal for this area. Two lakes, at sites No. 2 and No. 8, showed Ph-th alkalinity which is not usually found in the area. The methylorange alkalinities ranged from 25 to 146 parts per million, averaging 90.9, which is rather low for South Texas. Tests for pH showed a range of 8.2 to 8.8, averaging 8.6, which is normal for the area. Except for Sites No. 1 and No. 8, all lakes investigated were clear with secchi disk readings of 11.5 to 25 inches. Both of these lakes were low at the time they were checked and it was obvious that the small amount of water remaining in the sediment pools had been stirred up by wind and fish action on the soft mud bottoms. The water in these lakes is perfectly suited to warm fish species. All lakes have deep enough water to prevent overheating or complete coverage by submerged vegetation in the summer.

Site No. 11 was not checked because the dam was only completed in July 1958, and the lake had not yet caught any appreciable amount of water. Neither had it been stocked with fish by the end of the investigation period. Site No. 9 was not in-

investigated because the land owner contacted refused to give his permission for project personnel to work the lake.

Fish Collections

Two experimental gill nets were set over one night in each of nine lakes. These nets were made of nylon with a floating top line and a weighted bottom line. They were eight feet deep and 125 feet long made up of 25-foot sections of 1", 1½", 2", 2½" and 3" square mesh. Such nets are designed to catch a small, representative sample of the various sizes of fish present. As shown in Table 3, a total of 186 fish, of 10 species, was taken in the nets. Lengths, weights and condition of fish were normal for this area except that most channel catfish were very fat.

One seine collection was made from each of the lakes investigated except at Site No. 6. A total of 222 fish of six species was taken. Because of the small samples of fish taken, the lists for each lake are certainly incomplete. It is known that flat-head catfish are present at Site No. 4 from stocking records and catch reports. However, the lists do give a good indication of needed management practices. Of the fish taken by seine, all were normal except that bass fingerlings and bluegill sunfish from Site No. 4 were "flat bellied", apparently near starvation. No insect larvae or other aquatic invertebrates were found in the weeds at this lake. Red shiners, apparently stocked by seining local waters, have done well in two lakes. They are probably a better forage fish for all of these lakes than the sunfish.

Stocking Records

Partial stocking records were available from some of the lake owners. Some of the lakes were apparently overstocked by requesting additional fish each year, by requesting fish from both State and Federal fish hatcheries, and by stocking wild, local fish that the owners had seined or caught from near by streams or tanks. Proper stocking does not consist of putting as many fish of as many kinds as possible in a lake. For best fishing results, lakes such as these when they are new or have just been treated with rotenone should be stocked with 100 to 200 largemouth bass fry, 50 to 100 channel catfish fingerlings and 100 redear sunfish fingerlings per surface acre. Bream (any kind of sunfish), white crappie and fish from local waters should never be stocked except by trained personnel under special conditions. These fish, which are not harvested by most fishermen, compete with bass and catfish for food and will, sooner or later, overstock a lake and ruin the fishing.

Recommendations:

Of the nine lakes sampled, only those at Sites No. 2, 5, 7 and 10 seem to be in good condition relative to the kinds of fish present. These contained only channel catfish, largemouth bass, sunfish and white crappie (the latter in No. 10 only). Site No. 7 might be improved by stocking some bass; however, they may already be present but were missed in the collections. Largemouth bass and channel catfish are the principal, most desirable game fish in lakes such as these and white crappie should not be stocked unless there is a heavy utilization expected. The sunfish may or may not be desirable as forage fish. It is doubtful that bass feed on them to any extent and, especially in smaller lakes, they are likely to become overabundant, stunted and will compete with young bass for aquatic invertebrates. This leads, within a few years, to a tremendous number of small sunfish and crappie and only a small number of large bass which are unable to reproduce because the sunfish either eat the young bass or starve them out.

The other lakes investigated, at Sites No. 1, 3, 4, 6 and 8, all have bullheads present. These fish are definitely undesirable. They overpopulate quickly, become stunted, feed on any young bass hatched, eliminate any aquatic invertebrates present and muddy the lake by stirring the bottom silt. This muddiness prevents the growth of any submerged aquatic vegetation which would furnish cover for young game fish and the aquatic invertebrates. All nine lakes seem to be offering fair to good bass and catfish fishing at present. As long as fair fishing success can be had in fall, winter and spring (summer is almost always a poor fishing season), and as long as the water remains reasonably clear, there is no need for renovation. When the bullheads, buffalo and sunfish become overabundant and stunted, or when the water becomes murky or muddy, it will be necessary to remove all the fish present and re-stock. This could be accomplished easily by draining a lake through the draw down tube as low as possible and treating the remaining water in the borrow pit with rotenone. Any small farm ponds or water holes above the lake would have to be completely rotenoned to kill all the fish there also. If the draining and rotenone treatment could be done just prior to the expected rainy season, the lake should fill soon after treatment and be ready to restock with desirable fish. Treatment of the lake and up-stream farm ponds could also be accomplished without draining the lake but a much large amount of rotenone would be needed and a complete, 100 percent fish kill would almost certainly not be obtained. Restocking should be with largemouth bass, channel catfish and redear sunfish only. Crappie, bream (sunfish, especially bluegills), and wild fish seined from local waters should not be stocked. Because these lakes are built with a draw down tube and it is very seldom that water flows over the spillways, undesirable fish from downstream should never be able to enter any of the lakes during floods. Thus, if the fish in the lakes and waters upstream of these lakes are completely controlled, good fishing should be obtained permanently if other sources of undesirable fish such as bait fish releases and seined, native fish are eliminated.

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Table 1. Vital Statistics of the Lakes in the
Escondido Creek Watershed Project.

	#1	#2	#3	#4	#5	#6
Height of dam in feet	30	25	36	31.9	28	33
Length of dam in feet	2,310	1,900	1,765	2,120	2,709	2,733
Cubic yards in dam	127,383	102,256	162,637	136,609	81,470	157,114
Drainage acres above dam	1,819	1,772	2,984	3,992	861	1,731
Sediment pool surface acres	46	38	43	51	21	41
Sediment reserve pool surface acres	6	9	16	44	0	0
Total sediment pool surface acres	52	47	59	95	21	41
Sediment pool volume in acre feet	200	200	200	200	114	200
Sediment reserve pool volume	98	69	247	332	0	0
Total sediment pool volume	298	269	447	532	114	200
Flood detention pool surface acres	112	112	151	250	55	95
Flood detention pool volume	778	758	1,284	2,229	368	792
Drawdown structure size (inches)	12	15	17	28	17	12

Table 1. (Continued) Vital Statistics of the Lakes in the Escondido Creek Watershed Project.

	#7	#8	#9	#10	#11	Total
Height of dam in feet	27	30	33	30	28	
Length of dam in feet	2,642	1,729	1,950	2,174	2,554	
Cubic yards in dam	119,792	118,397	150,176	107,202	179,300	
Drainage acres above dam	6,256	2,528	4,680	1,765	5,396	28,784
Sediment pool surface acres	40	33	43	33	78	467
Sediment reserve pool surface acres	4	26	61	10	21	197
Total sediment pool surface acres	44	59	104	43	99	664
Sediment pool volume in acre feet	200	200	200	200	200	2,114
Sediment reserve pool volume	20	200	400	46	204	1,616
Total sediment pool volume	220	400	600	246	404	3,730
Flood detention pool surface acres	98	139	345	109	308	1,774
Flood detention pool volume	565	1,475	2,877	750	3,414	15,290
Drawdown structure size (inches)	17	13	19	14	28	

Table 2. Chemical Analysis of the Lakes on the Escondido Creek Watershed.

Site No.	Depth in Feet	Date	°F	O ₂ ppm	CO ₂ ppm	Ph-th Alk.	M.O. Alk.	pH	Secchi Disk
1	0	12/ 2/58	58	14.0	0.0	0	122	8.8	8.00"
2	0	7/29/58	88	-	0.0	20	50	8.8	25.00"
2	10	7/29/58	88	-	0.0	16	46	8.8	-
3	0	7/29/58	84	12.0	0.0	0	108	8.6	11.50"
3	10	7/29/58	84	10.8	1.0	0	108	8.4	-
3	20	7/29/58	84	9.8	5.0	0	108	-	-
4	0	7/21/58	86	10.0	3.0	0	132	8.2	11.50"
4	10	7/21/58	86	9.8	3.0	0	138	8.2	-
4	17	7/21/58	85	0.4	8.0	0	130	-	-
	0	11/20/58	64	8.6	5.0	0	74	8.6	18.00"
6	0	11/19/58	74	16.4	4.0	0	40	8.6	25.00"
7	0	11/21/58	63	10.0	11.0	0	25	8.5	18.00"
8	0	8/21/58	89	13.4	0.0	16	146	8.8	9.25"
8	10	8/21/58	87	10.4	0.0	16	146	8.8	-
10	0	12/ 3/58	58	13.6	0.0	0	124	8.8	16.00"
10	10	12/ 3/58	56	9.0	0.0	0	120	8.6	-

- indicates no reading

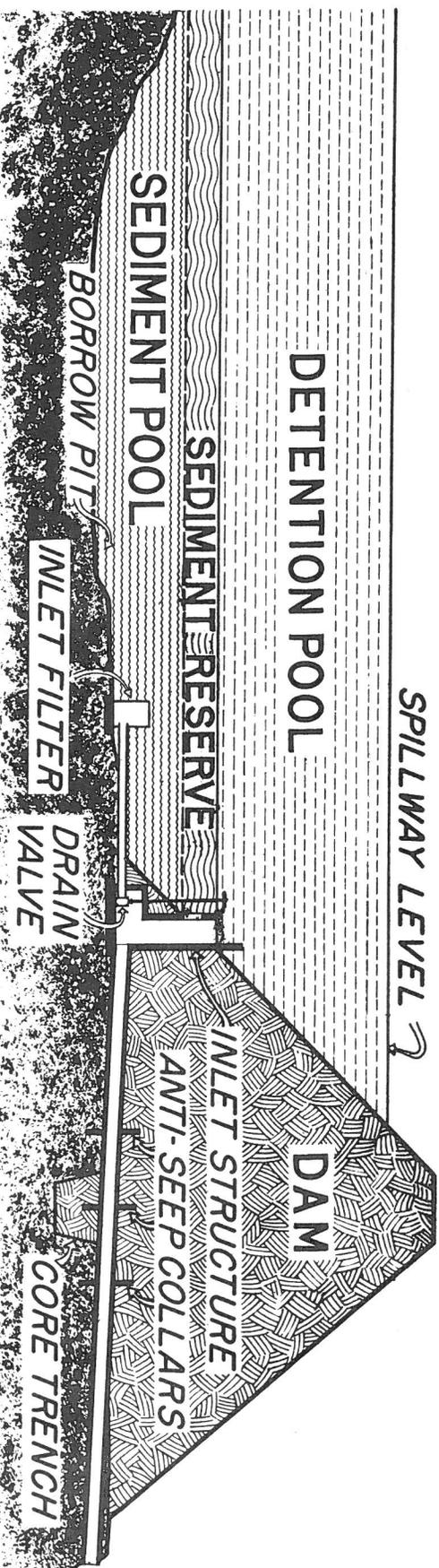
Table 3. Numbers and Kinds of Fish Taken in Experimental Gill Nets From Nine Lakes of the Esccondido Creek Watershed.

Species	#1	#2	#3	#4	#5	#6	#7	#8	#10	Total	Percent
<u>Ictiobus bubalus</u> (Smallmouth buffalo)	0	0	0	1	0	0	0	0	0	1	.53
<u>Ictalurus punctatus</u> (Channel catfish)	6	5	7	17	5	1	6	17	0	64	34.41
<u>Ictalurus melas</u> (Black bullhead)	0	0	4	25	0	3	0	2	0	34	18.28
<u>Ictalurus natalis</u> (Yellow bullhead)	22	0	0	0	0	0	0	0	0	22	11.83
<u>Pylodictus olivaris</u> (Flathead catfish)	0	0	2	0	0	0	0	0	0	2	1.07
<u>Micropterus salmoides</u> (Largemouth bass)	2	3	0	0	2	0	0	2	1	10	5.38
<u>Lepomis cyanellus</u> (Green sunfish)	0	1	0	5	0	0	0	0	0	6	3.23
<u>Lepomis microlophus</u> (Redear sunfish)	0	0	0	0	0	15	0	0	0	15	8.06
<u>Lepomis macrochirus</u> (Bluegill sunfish)	0	0	17	0	0	2	5	0	2	26	13.98
<u>Pomoxis annularis</u> (White crapple)	0	0	0	0	0	0	0	0	6	6	3.23
Total	30	9	30	48	7	21	11	21	9	186	
Percent	16.12	4.84	16.13	25.81	3.76	11.29	5.92	11.29	4.84		

Table 4. Numbers and Kinds of Fish Taken in Seining Collections
From Eight Lakes in the Escondido Watershed.

Species	#1	#2	#3	#4	#5	#7	#8	#10	Total	Percent
<u>Notropis lutrensis</u> (Red shiner)	0	0	27	45	2	0	0	0	74	33.33
<u>Gambusia affinis</u> (Mosquito fish)	0	0	11	16	0	6	20	1	54	24.32
<u>Micropterus salmoides</u> (Largemouth bass)	3	13	3	0	14	0	0	0	33	14.87
<u>Lepomis cyanellus</u> (Green sunfish)	1	11	1	1	0	0	0	0	14	6.30
<u>Lepomis microlophus</u> (Redear sunfish)	1	0	0	0	0	1	0	0	2	.90
<u>Lepomis macrochirus</u> (Bluegill sunfish)	0	4	4	1	0	10	0	26	45	20.28
Total	5	28	46	63	16	17	20	27	222	100.00
Percent	2.25	12.61	20.72	28.38	7.21	7.65	9.01	12.17	100.00	

Figure 1.



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

