

Report of Fisheries Investigations
Inventory of Species Present in Lake Daniel near Breckenridge, Texas

by

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Dingell-Johnson Project F-5-R-8, Job B-30
April 1, 1960 - March 31, 1961

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A B S T R A C T

Lake Daniel, a 11,400 acre feet lake near Breckenridge, Texas, was surveyed by taking gill net and seining samples of the fish populations. Of 626 individuals captured by gill nets, 57.18 percent were game species. Although there was some evidence of "stunting" in white crappie and sunfish, the high degree of over all condition and the relative abundance of usable game fish were regarded as far above average, and no management recommendations are made. It is recommended that the lake be resurveyed within the next five years.

Job Completion Report

State of Texas

Project No. F-5-R-8

Name: Fisheries Investigations and Surveys
of the Waters of Region 3-B.

Job No. B-30

Title: Inventory of Species Present in Lake
Daniel near Breckenridge, Texas

Period covered:

April 1, 1960 - March 31, 1961

OBJECTIVES

To determine the species present and their relative abundance as well as to determine the ecological factors influencing distribution.

PROCEDURE

A. Netting Collections

1. 20 gill nets were set at random locations in the lake to secure a sample of the fish population.
2. Ten sites were netted on two occasions.
3. Gill net collections were made with experimental gill nets composed of 25 foot sections of varying size mesh, including 3/4 inch, 1-inch, 1½-inch, 2-inch, and 3-inch mesh.
4. Data for a sample number of individuals taken in nets consisted of length, weight, sex, stage of sexual development.
5. Ecological data for each collection included:
 - a. Temperature - air and surface water
 - b. pH
 - c. Depth of water
 - d. Depth of net set
 - e. Direction and strength of wind
 - f. Dissolved oxygen and carbon dioxide content of water
 - g. Main cover types, if any, including dominant aquatic vegetation, brush, rock ledges, etc.
 - h. Bottom type at point of collection (mud, silt, rock, gravel, etc.)

B. Seining Collections

1. Collections were made with 25 foot, ½-inch seines and/or 12 foot, ½-inch common seines.
2. Collections were made at locations selected in such a manner as to provide data on the fish populations in more than one type of habitat.
3. Seine specimens were tallied in a sample number of collections and individuals were preserved for laboratory identification and measurement.
4. Ecological data for each collection of specimens included the same items listed under Item 5 above.

Certain details that were included in the original work procedure for this job were not completed because they were obviously unnecessary. Gill nets provided an adequate means of sampling of the fish populations and hoop nets were not used for that reason. To provide useful data, fyke or hoop nets must usually be set for several consecutive days. Gill nets usually provide a significant catch within the first 24 hours. Hoop type nets are also more selective in the species captured and sampling by that method is considerably more expensive than by gill nets. Age was not accurately determined for any of the fish since presently accepted methods are known to be fallible in fish of this area. The data that is required for computing K and that pertaining to sexual development were not taken for all fish netted. However, that information was taken for a sample number of fish for each species present. In all instances where the total number of fish captured of a particular species was less than twenty-five, K data was taken for all of the fish available. For other species of fish where the total number of fish caught exceeded 100 individuals, 25 percent of the total catch were weighed, measured, and sexed.

RESULTS

Lake Description

Lake Daniel is located approximately eight miles southeast of the City of Breckenridge in Stephens County, Texas. The reservoir is city-owned and is impounded by a compacted earth fill dam that was completed in 1947. The approximate capacity of the lake is 11,400 acres and the surface area covered at that elevation is about 583 acres. The reservoir impounds Gumsolus Creek, Big Creek, and East Gumsolus Creek and has a contributing watershed of about 20,000 acres. The shoreline of about 19 miles is irregular and the average depth of the lake is about 20 feet.

Recreational Usage

Although there is no factual information available on the amount of recreation the lake provides, the lake is obviously very popular with sportsmen and the fishing reputation of the lake is good.

Fish Populations

The distribution of the various species and information on some other aspects of the fish populations are included in the following annotated checklist of species. This data resulted from seining collections and from observations of workers while the work was being done at the lake.

Annotated Checklist of Species of Fish Taken from Lake Daniel

LEPISOSTEIDAE - Gars

Lepisosteus osseus - longnose gar. Not actually taken in either seining or netting in the lake but observed in stream areas of the region.

CLUPEIDAE - Herrings

Dorosoma cepedianum - gizzard shad. Abundant but not indicated as being exces-

sively numerous. Apparently concentrated to some extent during the winter in the upper lake areas.

CATASTOMIDAE - Suckers

Carpiodes carpio - river carpsucker. Common but not as yet overly abundant. A dormant threat to the game fish populations. Ripe in sexual development in mid-winter.

CYPRINIDAE - Minnows

Cyprinus carpio - carp. Common but not numerous in the sense of a concentrated population.

Notropis lutrensis - redhorse shiner. Common and numerous in specific localities.

Pimephales vigilax - parrot minnow. Common and abundant.

Note: Although extensive seining was attempted only the above species were actually captured. For a more detailed report on the species of fish present in this locality refer to completion reports for Jobs B-16 and B-29.

AMEIURIDAE - Catfishes

Ictalurus punctatus - channel catfish. Common and very abundant throughout the reservoir.

Pylodictus olivaris - flathead catfish. These fish are almost never found in abundance; however, the population in this lake is greater than is normally found in other lakes of the area.

CYPRINODONTIDAE - Killifishes and topminnows

Fundulus kansaw - plains killifish. Rare.

Gambusia affinis - mosquitofish. Common but not abundant.

SERRANIDAE - Basses

Roccus chrysops - white bass. Not actually taken but so common in the adjacent waters that almost certain to occur in Lake Daniel.

CENTRARCHIDAE - Black basses and sunfish

Micropterus salmoides - largemouth bass. Common and fairly numerous. Successful reproduction and consecutive age groups obvious.

Lepomis cyanellus - green sunfish. The most common sunfish present in the reservoir.

Lepomis macrochirus - bluegill. About as common but possibly less numerous than green sunfish.

Pomoxis annularis - white crappie. Common and numerous in aggregations.

SCAENIDAE - Drum

Aplodinotus grunniens - freshwater drum. Common but not numerous, evenly distributed.

DISCUSSION

Total figures for netting collections indicated that channel catfish were the second most abundant game species (20.61 percent) and were the most important producers of a usable resource. Although white crappie (23.80 percent of the total catch), were abundant, only two of 149 individuals captured were large enough to provide sport. There is a fishery problem present in the rough fish populations that make up 42.82 percent of all fish in this lake. Although this problem is not regarded as being severe at this time, since 34.02 percent of the above figure are gizzard shad, the ability of suckers and carp to expand to dominating proportions is too well demonstrated in the past survey work of lakes of this region to permit a very optimistic appraisal of the lake's future recreational potentialities.

CONCLUSIONS AND RECOMMENDATIONS

There is no need for any management effort in Lake Daniel at this time. Game fishing in the lake is apparently satisfactory and all survey work indicates a favorable abundance of game fish. This reservoir should be resurveyed within the next five years.

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Date July 31, 1961

Figure 1. A comparison of rough and/or forage species to game fish species.

	Number	Percent by Number	Total weight		Percent by Weight
			lbs.	oz.	
Rough and/or forage species (Gizzard shad, river carpsucker, carp, freshwater drum, golden shiner)	268	42.82	201	12	56.31
Game species (Channel catfish, flathead cat- fish, largemouth bass, redeer sunfish, bluegill, white crappie.)	358	57.18	156	9	43.69
Totals	626	100.00	358	5	100.00

Figure 2. Results of gill net collections taken from Lake Daniels during the period of October 27, 1960 through February 24, 1961.

Species	Number	Percent by Number	Total weight		Average weight		Percent by Weight	Average "K"	
			lbs.	oz.	lbs.	oz.		Oct.	Feb.
Gizzard shad	213	34.02	64	13		4.86	18.08	1.70	1.75
River carpsucker	23	3.67	55	10	2	6.69	15.53	2.28	1.98
Carp	26	4.16	78	7	3	.26	21.89	2.39	----
Golden shiner	1	0.16		2		2.00	.03	1.58	----
Channel catfish	129	20.60	91	15		11.40	25.66	.89	1.16
Flathead catfish	3	0.48	13		4	5.00	3.62	----	----
Largemouth bass	28	4.48	34	12	1	3.85	9.70	2.31	1.89
Redear sunfish	3	0.48		4		1.50	.06	2.14	----
Bluegill sunfish	46	7.34	5	11		1.97	1.59	2.69	2.56
White crappie	149	23.81	10	15		1.17	3.06	1.20	1.73
Freshwater drum	5	.80	2	12		9.00	.78	1.91	----
Totals	626	100.00	358	5			100.00		

Figure 3. Results of gill net collections taken from Lake Daniels on October 27, 1960.

Species	Number	Percent by Number	Total weight		Average weight		Percent by Weight	Average "K"
			lbs.	oz.	lbs	oz.		
Gizzard shad	174	33.59	48	6		4	17.44	1.70
River carpsucker	18	3.47	42	9	2	5	15.35	2.28
Carp	26	5.02	78	7	3		28.28	2.39
Golden shiner	1	.19		2		2	.05	1.58
Channel catfish	91	17.57	51	10		9	18.62	.89
Flathead catfish	3	.59	13		4	5	4.69	----
Largemouth bass	23	4.44	26	3	1	3	9.44	2.31
Redear sunfish	3	.59		4		1.5	.09	2.14
Bluegill sunfish	41	7.90	5	5		2	1.92	2.69
White crappie	133	25.68	8	11		1	3.13	1.20
Freshwater drum	5	.96	2	12		9	.99	1.91
Totals	518	100.00	277	5			100.00	

Figure 4. Results of gill net collections taken from Lake Daniels on February 24, 1961.

Species	Number	Percent by Number	Total weight		Average weight		Percent by Weight	Average "K"
			lbs.	oz.	lbs.	oz.		
Gizzard shad	39	36.11	16	7		6.74	20.29	1.75
River carpsucker	5	4.63	13	1	2	9.80	16.12	1.98
Channel catfish	38	35.18	40	5	1	.97	49.77	1.16
Largemouth bass	5	4.63	8	9	1	1.40	10.57	1.89
Bluegill sunfish	5	4.63		6		1.20	.47	2.56
White crappie	16	14.82	2	4		2.25	2.78	1.73
Totals	108	100.00	81				100.00	