STATE Texas

PROJECT NO. F-5-R-2, Job B-2

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Job Completion Report

by

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TITLE

Creel Census of Lake Nasworthy.

OBJECTIVES

To estimate the total catch by species and to obtain data regarding the growth rate and relative abundance of each species in the catch.

METHODS

From October 1953 through February 1954 an actual count of all creels was attempted. Because of the difficulty involved in contacting each fisherman and because careful investigation revealed that a complete count was not being recorded in spite of diligence by workers; it was concluded that an estimate could be obtained that would be sufficiently reliable for practical purposes by making periodic counts of all persons fishing. The total number of persons fishing from the lake shore was usually determined by counting from an automobile, and persons fishing from boats were counted by a boat crew traveling the entire length of the lake at the same time the shore count was being taken. Two total counts were taken each morning and two counts were taken each afternoon. These counts were taken one hour apart and the average number of fishermen on the lake from morning counts was added to the average number of fishermen for the afternoon to produce the estimated total number of fishermen for the day. The sum of the averages described was used to estimate the total number of fishermen because actual creels indicated that virtually no fishermen spent more than half a day fishing on the lake without returning to camp, to the city of San Angelo, or to their homes. The time that counts were taken was determined by the total number of hours of daylight for the various seasons of the year, and may be loosely described as mid-morning and mid-afternoon. Night counts were made during the latter three months of work, and the number of night fishermen were added to the daily total. The average number of fishermen, hours fished, and their average creel for the seven day period was multiplied by the number of days in the month to produce each monthly total. Creel days were selected at random. Creel census stations were maintained at four sites on the lake during creel days, and samples of each day's fishing results were recorded. From this sample of fishing the total catch, hours fished, method employed, and bait used in catching the various species was determined.

A. Method of Determining Time of Morning Counts.

Number of Hours Sunrise to Noon minus 30 min. = a. Time for First Count

plus 30 min. = b. Time for 2nd Count

B. Method of Determining Time of Afternoon Counts.

$$\frac{\text{Number of Hours Noon to Sunset}}{2} \quad \begin{cases} \text{minus 30 min.} = \text{a. Time for First Count} \\ \text{plus 30 min.} = \text{b. Time for 2nd Count} \end{cases}$$

C. Method of Determining Daily Totals

$$\frac{\text{(a. plus b.)}}{2} \text{ plus } \frac{\text{(a. plus b.)}}{2} \text{ plus tot. night count} = \text{Total Fishermen for Day}$$

Total Fishermen X 1. Avg. catch from sample creels = Total catch

Total Fishermen X 2. Avg. hours fished from sample creels = Total hours fished

D. Method of Determining Monthly Totals

(Avg. of Seven Day Sample) X (Number of Days in Month) = Monthly Total

E. Annual Totals are the product of all Monthly Totals

FINDING

Lake Nasworthy is located approximately 6.5 miles southwest of the city of San Angelo in Tom Green County, Texas. The reservoir has about 1,300 surface acres and a volume of about 14,040 acre feet at emergency spillway. The dam creating the lake is located approximately one-fourth mile below the confluence of the South and Middle Concho ers.

Increasing water demands resulting from rapid growth of the city have resulted in extreme fluctuation of this lake, and during much of the census period the lake was reduced in volume to an extent that prevented many persons from attempting to fish. During May, June, and July of 1954 the tremendous increase in the number of fishermen using the lake is attributed not only to the vacation season, but also to the fact that many out-of-town fishing parties came to Lake Nasworthy who had originally intended camping at San Angelo Reservoir. These campers moved to the smaller lake because of adverse weather conditions and/or because of it's more accessible, convenvenient, and pleasant camping facilities. Although virtually all persons contacted were very willing to be interviewed, and attempted to co-operate in every way with personnel doing this work, difficulty was encountered in obtaining accurate information on many aspects of the catch. The size of fish released, the species or type of fish the person was attempting to catch, and the length of time actually fished were especially difficult to determine in many instances. There are other unaccounted-for factors influencing the included data; such as the skill, determination, and knowledge of the lake by fishermen. The data on night fishing is insufficient, and many persons maintain trotlines in the lake throughout the year. It was difficult to know when these lines were actually being used and when they were simply occupying desirable space in the lake.

During the census period of twelve months, 116 days were actually spent taking creels on the lake. This includes both the five month period when an actual count was attempted and the following seven months when the described method of estimate was adapted. For that reason the percentage of the total time when creels were actually taken, 31.78 cent, may be misleading.

The following tables are intended to present most of the data obtained in such a manner as to reveal the more important aspects of the fishing effort and the resulting catch by sportsmen.

Table 1

The data contained in this chart are the monthly and annual total estimates. The number of persons who fished, the total effort expended, and the results in fish per man hour for the year are included. As shown, about six thousand fishermen had an average catch of slightly over one fish each during the twelve month period, and an average person fished about three and one-half hours to catch that fish. Because of inexperience by the personnel doing this work and because the method of estimation used during the first five month's work was found to be inadequate in estimating the number of persons fishing at night, the total estimates are known to be too conservative for the entire census period. However, the catch per unit effort is believed to be reasonably reliable for the year; and since night fishing was not a major factor, except in the summer months, it is hoped that the total number of fishermen and their total catch is not too far below the actual usage.

Table 2

The number and numerical percent for each of the various species caught each month is presented here. Because it was necessary to accept the statement of sportsmen concerning the identity of virtually all fish released, all sunfishes and warmouth bass are grouped under a single heading. As shown in the chart, sunfishes and white crappie made up over 60% of the total catch, and carp were third in numbers. These latter fish appear to be select with a group of local fishermen who make little attempt to fish for other species.

Table 3

The relative size of the various species of fish in the catch is shown. The included estimates are based on fish that were actually measured in taking creel results during the various months of the year. The number of individuals making up this sample exceeds twenty percent of the total estimated catch in all species except sunfishes, white crappie and carp. Although sunfishes averaged over 4 inches in length; a significant percent of the fish measured were in the three inch category, and less than seven percent were large enough to be regarded as desirable pan fish. One of the difficulties in obtaining data on the sunfish catch was in measuring these fish before they were released. About twenty percent of the white crappie taken were too small to be "Keepers" and in spite of the high percentage of these fish taken from the lake, few creels were deemed "good catches" by the sportsmen making the catch. Largemouth bass were less numerous than most species taken, but the average size of these fish was greater than other species except carp and channel catfish.

Table 4

This data permits a general comparison of the catch by species, showing the numerical percentage of each species as compared to it's percentage of the total weight of the catch. It is believed probable that this comparison of species by weight more accurately represents the extent to which each species of the catch was utilized as food, and may be more expressive in accounting for the amount of pleasure each species afforded the public. Carp contributed 36 percent of the total weight of the catch and white bass contributed 13 percent of that total. However catches of these species were usually desired and utilized as food by only a few individuals who actually sought these fish, and probably most of the pleasure derived from catches of carp, and to a lesser extent white bass, was confined to the sporting aspects of the catch. Largemouth bass and channel catfish were about 35 percent of the total weight of the catch and were the species most desired by sportsmen.

Table 5

The monthly and the total catch per unit effort for each species is shown in this data. Apparently sunfishes may be caught with relatively little effort during almost any month; however, fishing results for white crappie and largemouth bass appear to have declined during the summer and early fall months. The best months for largemouth bass were October, November and January; for white bass October, November, December and January; for white crappie November, December and April; and for southern channel catfish July and January. Carp were taken in abundance from April through November. Insufficient evidence was obtained to permit generalities for other species included in the catch.

Table 6

As shown in this table still fishing was the most popular and the most reliable of all methods employed in taking all species of fish except white bass. The highest yields per unit effort were obtained by fly fishing for sunfishes; however, the skill, determination, and other unaccounted-for aptitudes of the fishermen involved is believed to be superior to that of the average fisherman. Trolling for white bass was relatively successful; however, this method of fishing did not appear to be popular during the census period; and the above named aptitudes may well have been contributing factors in the results obtained with this method. Trotline fishing yielded the smallest number of fish per unit effort; however, the actual numbers of fish taken by this method was greater than those for casting and trolling. The relatively low fish per unit effort for trotlines is regarded as resulting from a lack of dilligence in baiting and maintaining lines, as well as possible ineffectiveness of that method. After several months experience at this work it was arbitrarily concluded that trotline data should be based on eight man hours fishing for each trotline set for a party setting more than one line, and at sixteen man hours fishing where only one line was employed.

Table 7

Minnows and worms were the most successful baits used; however, a greater total number of largemouth bass and white bass were taken on lures than on natural baits. Dough bait captured more carp. A greater variety of baits were successful in capturing channel catfish than any other species. Although no factual records were obtained during days when the census was conducted a number of these fish were reported to have been taken by casting and trolling.

Table 8

This data presents the total and monthly fishing effort comparing successful fishing effort to unsuccessful effort. Since as discussed under Table 5, the winter months appear to produce a higher yield per unit effort than summer months; the high percentage of persons "skunked" in December and February may be a result of fishermen quitting because of adverse weather conditions rather than a lack of the quality of the fishing. According to the evidence obtained, approximately one out of every four fishing attempts by an average fisherman resulted in a complete failure to catch fish.

SUMMARY

1. From October 1953 through February 1954, an actual count of all creels was attempted and found to be virtually impossible. For the remaining seven months of the year, March 1954 through September 1954, a method of estimate was employed to obtain the required data and is believed to be more reliable and efficient than the data obtained when an attempt was made to contact all fishermen.

2. Because of inexperience in doing this type work, insufficient evidence was obtained for accurately estimating night fishing, and many aptitudes of individual fishermen, such as their skill, determination, and familarity with the lake are not adequately illustrated. No attempt is made to account for the influence of weather and accessibility on the fisherman effort or the fishing results.

3. About six thousand fishermen had an average catch of slightly over one fish each during the twelve month period, and an average person fished about three and one-half hours to catch that fish.

4. Sunfishes and white crappie made up over 60% of the total catch numerically and carp were third in numbers. Carp are select with a group of fishermen who make little attempt to catch other species.

5. Less than seven percent of the sunfish catch was large enough to be regarded as desirable pan fish, and there were few desirable catches of white crappie. Largemouth bass, channel catfish, and carp had the largest average sizes.

6. Largemouth bass and channel catfish were thirty-five percent of the estimated total weight of the catch, and it is believed this figure more accurately illustrates the pleasure that these species afforded the public.

7. The best months for largemouth bass were October, November and January; for white bass, October, November and December; for white crappie, November, December and April; and for channel catfish, July and January. Carp were taken in a greater abundance from April through November.

8. Still fishing was the most popular and the most reliable of all methods. Fly fishing for sunfishes had the highest yield per unit effort, and trolling for white bass was relatively successful. Trotlings yielded the smallest number of fish per unit effort; however, the actual number of fish taken by this method was greater than those for casting and trolling.

9. Minnows and worms were the most successful baits used. A greater number of largemouth bass and white bass were taken on lures than on natural baits. A greater variety of baits were successful in taking channel catfish than any other species.

10. According to the data obtained from the census, approximately one out of every four fishing attempts by an average fisherman resulted in a complete failure to catch fish.

Table 1. Monthly Creel Census Data for Lake Nasworthy From October 1953 through September 1954

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Total
Number of Fishermen	58	62	84	184	71	280	620	1,231	1,121	1,243	821	82	5,857
Hours Fished	401	228	297	606	256	1,090	2,300	5,924	4,484	3,829	1,648	2,585	23,648
Number of Fish Caught	129	137	110	62	94	301	1,330	1,481	1,494	765	557	251	6,711
Fish/ man hour	.322	.580	.316	.099	.367	.276	.578	.250	.333	.200	.341	.900	.284

Table 2. Number of Each Species of Fish Caught Per Month From Lake Nasworthy

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Total	Percent
Sunfish	23	17	5	3	19	118	448	397	601	131	84	149	1,995	29.730
White crappie	22	74	90	38	46	61	669	384	312	98	160	22	1,976	29.450
Largemouth bass	7	2	0	4	1	19	12	204	94	98	38	12	491	7.320
White bass	22	28	9	9	7	21	8	118	113	61	0	5	401	5.960
Channel catfish	29	7	0	1	14	43	28	115	58	211	101	23	630	9.300
Flathead catfish	0	0	1	0	1	0	0	0	0	0	0	0	2	.040
Freshwater drum	5	2	2	2	4	0	0	93	105	62	12	2	289	4.310
Yellow bullheads	0	0	0	0	0	2	0	0	0	0	0	7	9	.140
Carp	7	7	3	5	1	37	165	170	211	104	162	19	891	13.290
River carpsuckers	14	0	0	0	1	0	0	0	0	0	0	12	27	.460
Totals	129	137	110	62	94	301	1,330	1,481	1,494	765	557	251	6,711	100.00

Table 3. Size of Fish Caught From Lake Nasworthy During Year October 1953 through September 1954

Species		Size of Fish - Total Length in Inches									Avg. Length
		3.	4.	5.	6.	7.	8.				
Sunfish	No.	38	128	28	16	13	4				4.34
	%	16.89	56.39	12.34	7.05	5.73	1.76				100.00
		(Based on a Sample of 227 individuals of four species)									
		Size of Fish - Total Length in Inches									Avg. Length
		4.	5.	6.	7.	8.	9.	10.	12.	14.	
White crappie	No.	24	31	130	9	30	28	14	4	2	6.59
	%	8.83	11.39	47.80	3.31	11.03	10.29	5.15	1.47	.75	100.00
		(Based on a Sample of 272 individuals)									
		Size of Fish - Total length in Inches									Avg. Length
		11.	12.	13.	14.	15.	16.				
Largemouth bass	No.	14	48	38	26	11	11				12.95
	%	9.46	32.45	25.68	17.51	7.45	7.45				100.00
		(Based on a Sample of 148 individuals)									
		Size of Fish - Total Length in Inches									Avg. Length
		7.	10.	11.	12.	13.	14.				
White bass	No.	12	31	18	46	18	5				11.14
	%	9.23	23.84	13.85	35.38	13.85	3.85				100.00
		(Based on a Sample of 130 individuals)									
		Size of Fish - Total Length in Inches									Avg. Length
		10.	11.	12.	15.	21.	22.	23.			
Channel catfish	No.	8	14	21	13	1	2	2			12.98
	%	13.12	22.91	34.43	21.31	1.64	3.27	3.27			100.00
		(Based on a Sample of 61 individuals)									

(Continued)

Table 3. (Continued)

		Size of Fish - Total length in Inches							Avg. Length
		11.	12.	13.	15.	18.	20.	22.	
Carp	No.	23	11	54	18	12	11	10	14.71
	%	16.55	7.91	38.84	13.00	8.64	7.91	7.19	100.00
		(Based on a Sample of 139 individuals)							

		Size of Fish - Total Length in Inches								Avg. Length
		6.	7.	8.	9.	10.	14.	18.	22.	
Freshwater drum	No.	6	9	21	4	6	4	1	1	8.85
	%	11.54	17.30	40.39	7.69	11.54	7.69	1.93	1.93	100.00
		(Based on a Sample of 52 individuals)								

Table 4. Estimated Weight and Numerical Data for Sportsmen Catch From Lake Nasworthy from October 1953 through September 1954.

Species	Pop. Sample	Est. Tot. No. Caught	Avg. Weight (ounces)	Est. Tot. Weight (lbs.)	Numerical Percentage	Percent of Tot. Weight
Sunfish	227	1,995	1.66	207	29.73	5.84
White crappie	272	1,976	2.01	198	29.45	5.59
Largemouth bass	148	491	23.50	721	7.32	20.35
White bass	130	401	20.50	486	5.96	13.72
Southern channel catfish	61	630	12.85	530	9.30	14.98
Carp	139	891	23.00	1,280	13.290	36.16
Freshwater drum	52	289	6.55	118	4.31	3.34
	1,029	6,711		3,542	100.00	100.00

Table 5. Fishing Results Per Unit Effort by Species From Lake Nasworthy from Oct. 1953 through Sept. 1954.

Species		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total	Fish/ man hr.
Sunfish	No.	23	17	5	3	19	118	448	397	601	131	84	149	1,995	1.0129
	Fish/man Hr.	.32	.92	.69	.39	1.02	1.55	1.07	.58	.26	.38	.28	1.78		
White crappie	No.	22	74	90	38	46	61	669	384	312	98	160	22	1,976	.2805
	Fish/man Hr.	.61	1.09	1.2	.39	.85	.18	1.00	.16	.25	.11	.16	.026		
Largemouth bass	No.	7	2	0	4	1	19	12	204	94	98	38	12	491	.2348
	Fish/man Hr.	.39	1.6	0	2.0	.25	.08	.13	.289	.25	.24	.13	.65		
White bass	No.	22	28	9	9	7	21	8	118	113	61	0	5	401	.677
	Fish/man Hr.	.81	1.16	.86	.64	.93	.24	.15	.69	.93	.89	0	.42		

Table 5. (Continued)

Species		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total	Fish/ man hr.
Southern channel catfish	No.	29	7	0	1	14	43	28	115	58	211	101	23	630	.1925
	Fish/man Hr.	.17	.35	0	.83	.57	.30	.06	.19	.15	.40	.16	.68		
Carp	No.	7	7	3	5	1	37	165	170	211	104	162	19	891	.4275
	Fish/man Hr.	1.4	.71	.64	.22	.33	.36	.81	1.10	.27	.24	1.144	.09		

Table 6. Fishing Results By Method From Lake Nasworthy from Oct. 1953 through Sept. 1954.

Species		Still Fishing	Trotlining	Casting	Fly Fishing	Trolling
Sunfish	number	1,342			605	
	percentage	68.93			31.07	
	Hrs. fished	1,497.70			391	
	Fish/man Hr.	.8960			1.55	
White crappie	number	1,386	143		207	16
	percentage	70.10	8.16		11.82	.92
	Hrs. fished	5,114	960		518	180
	Fish/man Hr.	.2711	.148		.399	.89
Largemouth bass	number	164	16	131	81	86
	percentage	34.30	3.35	27.40	16.95	18.00
	Hrs. fished	364	208	580	328	602
	Fish/man Hr.	.45	.077	.23	.25	.15

Table 6. (Continued)

Species		Still Fishing	Trotlining	Casting	Fly Fishing	Trolling
White bass	number	79			43	211
	percentage	23.73			12.91	63.36
	Hrs. fished	189			266	61
	Fish/man Hr.	.42			.79	.70
Channel catfish	number	182	411			
	percentage	30.69	69.31			
	Hrs. fished	728	2,357			
	Fish/man Hr.	.25	.17			
Flathead catfish	number		1			
	percentage		100			
	Hrs. fished		4.2			
	Fish/man Hr.		.230			
Carp	number	869				
	percentage	100				
	Hrs. fished	2,040				
	Fish/man Hr.	.43				
River carp suckers	number	13				
	percentage	100				
	Hrs. fished	7.8				
	Fish/man Hr.	1.66				

Table 7. Total Catch From Lake Nasworthy Oct. 1953 through Sept. 1954 by Type of Bait Used

Species		minnows	worms	shad	cray-fish	dough bait	blood bait	shrimp	cut bait	stink bait	flies	lures
Sunfish	No.	250	977					83			605	32
	%	12.85	50.17					4.27			31.07	1.64
White crappie	No.	1,053	663									16
	%	60.10	38.98									.92
Largemouth bass	No.	180									81	217
	%	37.65									16.95	45.40
White bass	No.	64	15								43	211
	%	19.22	4.50								12.91	63.36
Southern channel catfish	No.	212	8	103	19	54	0	13	104	80	0	0
	%	35.75	1.35	17.36	3.20	9.11	0	2.19	17.54	13.50	0	0
Flathead catfish	No.			1								
	%			100								
Carp	No.	16				853						
	%	.85				98.15						
River carp suckers	No.		13									
	%		100.0									
Freshwater Drum	No.		48					64				
	%		17.26					23.02				

Table 8. Comparison of Successful and Unsuccessful Fishing Effort. Lake Nasworthy, October 1953 through September 1954.

		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total
Successful Fishermen	Hrs. fished	326	150	133	529	117	878	1890	4914	3153	2625	1404	1674	17,793
	percent	81.3	65.8	44.8	87.3	45.3	80.6	82.17	82.9	70.3	68.6	85.0	64.8	75.25
Unsuccessful Fishermen	Hrs. fished	75	78	1643	77	139	212	410	1010	1331	1204	244	911	5,855
	percent	18.7	37.5	55.22	12.7	54.3	19.5	17.8	17.0	29.7	31.5	15.0	35.2	24.75