

Segment Completion Report

by

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FILE

TITLE

Inventory of species present in Buchanan Lake.

OBJECTIVES

To determine the species present and their relative abundance.

METHODS

Specimens were collected by using 8 x 125 foot experimental gill nets with one to three inch square mesh sizes, which are graduated in one half inch intervals, every 25 feet. Gill nets, 8 x 100 feet, of square mesh sizes $1\frac{1}{2}$, 2, and 3 inch were also used. Seine collections were made with 30 x 6 foot bag seines, $\frac{1}{4}$ inch square mesh, and seines of bobbinet, $1/8$ inch square mesh.

Both net and seine collections were made at random in all areas of the lake. Seine collections were also made in the San Saba River, and Falls Creek, which are major tributaries of the lake. Seined specimens were preserved in ten per cent formalin and brought to the laboratory for identification and tabulation.

Data recorded for individuals taken in nets included length, weight, sex and stage of sexual development. Stomachs of game specimens were preserved in ten per cent formalin, and later the contents were analyzed and recorded in the laboratory.

Chemical and thermal conditions, including water and air temperatures, pH, dissolved oxygen, and carbon dioxide were recorded for three water sampling stations on the lake. Each station was visited twice during the segment period. Ecological data was recorded for each fish collection.

PHYSICAL CHARACTERISTICS

Lake Buchanan is located in the Burnet-Llano Country, or Central Basin of Texas. The area is characterized by rugged granitic intrusions, and numerous cedar covered mountain ranges reaching six to seven hundred feet above the mesquite and post oak flats. Shallow soils vary from coarse grey to moderately heavy chocolate loams, which are seldom adapted to agriculture, except in a few valleys. The area supports a large cattle industry, and many sheep and goats are raised.

Completed in 1938, Buchanan Dam has a length of 11,000 feet, and a height of 150 feet. The lake is 33 miles long, reaches a maximum width of 8 miles, has a maximum depth of 132 feet, and impounds approximately 1,000,000 acre feet at spillway level.

The mountain range to the north, chiseled deep by the Colorado, forms steep rugged banks often towering several hundred feet above the lake. This area is

characterized by silt and clay mud bottoms. The lower portion of the lake is spread out over a large area with granite-gravel shoals extending up out of the water to form much of the shore line. Granite gravel and sand bottoms especially in the shallows of this area provide excellent spawning grounds for a number of fish species.

The Lower Colorado River Authority reports a water fluctuation of little more than one foot for the months of December, 1954 through April, 1955. In May, 1955, the water level rose from 1008 feet, to its maximum capacity of 1020 feet above sea level.

AQUATIC VEGETATION AND COVER

Aquatic vegetation in Buchanan Lake is relatively sparse, except for a few areas. Filamentous algae, Spirogyra sp., are found in a few shallow portions of the lake where silt has settled over the bottom. Muskgrass, Chara sp. and coontail, Ceratophyllum demersum were also found in a few scattered localities in similar association. Willows, Salix nigra, are very abundant in the lower part of the lake and provide considerable cover for fish. Numerous outcroppings of rock, stumps, brush and driftwood also provide excellent cover in all areas of the lake.

CHEMICAL CHARACTERISTICS

Water analyses, as recorded in Table I include data collected from three stations as shown on the accompanying map. Water temperatures in Lake Buchanan ranged from 52° Fahrenheit in December, 1954, to 81° Fahrenheit in May, 1955. The pH of Lake Buchanan ranged from 7.6 to 8.8, with an average of 8.1. Dissolved oxygen varied from a maximum of 13.0 parts per million near the surface, to a minimum of 5.2 parts per million near the bottom of the lake. The average dissolved oxygen content was 10.3 parts per million. Dissolved carbon dioxide averaged 1.6 parts per million, with a variation of 0.0 to 4.0 parts per million.

These data, as recorded herein, are not believed to indicate any unusual or adverse chemical or thermal conditions. Sufficient dissolved oxygen was present and no harmful substances were found in appreciable amounts.

Buchanan Lake, early in the segment period, was normally clear. Secchi disk readings of 10 to 20 feet, in depth, were common in many areas of the lake. However, during April and May, 1955, with turbid flood waters from the tributaries filling the lake, secchi disk readings were recorded as low as 6 inches.

FISH COLLECTIONS

Table II contains a checklist of 33 species found to occur in Lake Buchanan and its tributaries. A total of 5952 specimens were provided for study by 85 netting and 60 seining collections. The enclosed map shows the location of the fish collections.

The results of seining are presented in Table III and are broken down by species and by month. In all, a total of 3576 specimens were collected by this method from the lake and its tributaries.

Of the 27 species seined, the blackspot shiner, N. venustus, was the most abundant, making up 52.43% of the total number of specimens. The redhorse shiner, N. lutrensis, was the next most abundant, comprising 15.72%. The combined total of all species of sunfish follows third with 14.24%. Gizzard shad, D. cepedianum, was found to be fourth in abundance with 6.29%, while all other seined fish species totaled only 11.32% of the total number of specimens. Several seining collections were made in the same localities, therefore seining areas rather than seining stations were located on

the enclosed map.

Table IV shows that a total of 14 species, excluding all species of sunfish, were collected by gill nets. Included are the number of each species netted per month, the totals and the per cent of number. Of 2376 netted specimens, 16.96% were game fish including channel catfish, yellow catfish, white crappie, all species of sunfish, white bass, spotted and largemouth bass. All other species comprised 83.04% of which shad and river carpsucker formed a major portion, 51.59% and 23.86% respectively.

The number of pounds of fish netted per month, total weight and per cent of weight for each species, is recorded in Table V. Game species including all sunfish, catfish, bass and crappie comprised 18.91% of the collections by weight. Rough fish species including gar, shad, buffalo, carp, suckers, mullet and drum totaled 81.09% of netted specimens, by weight. River carpsuckers and shad dominated the rough fish catch again with respective percentages of 35.35% and 21.06% of the total catch.

Table VI records the success of gill netting in Lake Buchanan in terms of number and pounds of fish from December, 1954 through May, 1955.

Table VII contains the length, weight and coefficient of condition ("K") of fish species caught by gill nets in Buchanan Lake, during the segment. A number of rough fish specimens were not weighed and measured individually, and are not included in these data.

DISCUSSION

Fishing in Buchanan Lake appears to be better, on the average, than in the other lakes of the Colorado River chain, with the possible exception of Lake Granite Shoals, which was built in 1951. White bass fishing has been consistently good during the spawning season over a period of years. It is believed that a larger population of white bass exist in Lake Buchanan than the data on hand indicates, because of the large numbers of white bass taken by anglers near the head of the lake during the spawning migration in January and February, 1955. Great numbers of white bass were taken by anglers on spoons and live minnows, as the bass became active in moving toward the tributaries, during the early part of the segment period.

Catfish catches have been good, especially in the more turbid waters of the upper portions of Lake Buchanan. After the rise of approximately 12 feet in May, 1955, even larger strings of catfish, channel catfish in particular, were taken in the more turbid waters that filled the lake. The collection data to date indicates that blue catfish (*I. furcatus*) may be absent from the waters of Buchanan Lake. Also, there have been no catches of blue catfish observed by this writer.

Good catches of white crappie, taken on minnows, were observed on all portions of the lake before the rise in May 1955. Crappie provide considerable sport for anglers on Buchanan Lake throughout the year.

Largemouth black bass are fished for extensively in all portions of Lake Buchanan, and many good catches are reported the year round. Shoreline fishing generally is very productive, but many bass are taken in shallow areas where partly submerged willow trees grow, and in the shallows around numerous islands in the lake.

Good fishing in Buchanan Lake might be explained by the fact that the granite-ravel shoals provide exceptional spawning grounds for black bass, crappie and sunfish. Data on hand indicates that the spawning success for these species is relatively high, and with the ample cover that the lake provides, many fish grow to desirable size.

Buchanan Lake maintains a high level of fertility, due to the fact that the Colorado River, flowing into the lake from the north, brings in large quantities of decaying organic material from the water shed. This, in part, may account for the tremendous shad population of the lake. Shad are the most abundant species in the lake, and are second only to river carpsucker in total weight of netted specimens as recorded in these data.

Large quantities of brush and driftwood offer excellent spawning cover for shad, carp, suckers and buffalo. Commercial fishing is believed to have kept the carp and buffalo populations in check to some degree but the river carpsucker which is of less market value is extremely abundant. Large numbers of river carpsuckers averaging approximately two pounds were taken in $1\frac{1}{2}$ and 2 inch gill nets and in the respective sections of experimental gill nets.

Neither the results of stomach analyses nor management recommendations for Lake Buchanan have been included in this report. However these will be included in the Job Completion Report at the end of the next segment period.

SUMMARY

1. Lake Buchanan, an impoundment of approximately 1,000,000 acres at spillway level, is located on the Colorado River in the rugged hill country near Burnet.

2. Submerged aquatic vegetation provides only meager cover except in a few shallow silted areas but willows (Salix nigra) and large quantities of brush, driftwood and rocks offer an abundance of hiding places.

3. There were no unusual or adverse chemical or thermal conditions recorded during this segment period.

4. Buchanan Lake was normally clear but became turbid during the latter part of the segment period as flood waters flowed in from the tributaries.

5. A total of 145 fish collections provided 5952 specimens, which may be divided into 12 families and 33 species.

6. Blackspot and redhorse shiners were the most abundant of 3576 seined specimens, totaling 52.43%.

7. Gizzard shad and river carpsucker dominated the rough fish catch, totaling 75.45% of 2376 netted specimens. All species of game fish totaled only 16.96%.

8. White bass, largemouth black bass, channel catfish and crappie provide excellent fishing on the lake.

9. Good spawning grounds and adequate cover provide a good opportunity for game species to reproduce and reach a desirable size.

10. High lake fertility due to an influx of decaying organic materials from the Colorado River may explain why the shad population is so high.

11. Carp and buffalo are believed to have been kept in check by commercial fishermen but a large population of river carpsucker occur in the lake.

Table I

Buchanan Lake Water Analysis, December 1954 through May 1955.

Date	Depth in Feet	Air Temp. °F	Water Temp. °F	pH	O ₂ ppm	CO ₂ ppm
December 16, 1954	1	68	52	7.9	11.6	1.0
	10	68	52	8.0	11.6	1.5
	15	68	52	8.0	11.5	1.5
	20	68	52	8.0	11.0	2.0
	30	68	52	8.0	10.0	2.5
January 19, 1955	1	45	52	8.0	9.0	0.0
	10	45	52	8.0	8.6	1.0
	15	45	52	8.3	8.2	1.0
	20	45	52	8.1	8.4	1.5
	30	45	52	7.9	5.2	2.0
February 1, 1955	1	68	54	8.4	8.0	0.0
	10	68	54	8.4	8.8	1.0
	15	68	54	8.5	9.8	2.0
	20	68	54	8.5	8.6	2.0
	30	68	54	8.8	5.2	3.0
March 15, 1955	1	71	59	7.9	13.0	0.0
	10	71	58	7.9	13.0	0.5
	20	71	58	7.7	12.5	1.0
	30	71	57	7.9	12.0	2.0
	40	71	55	7.7	11.0	2.0
	50	71	55	7.7	11.0	3.0
April 19, 1955	1	80	72	8.2	13.2	0.0
	10	80	72	8.3	13.0	0.0
	20	80	72	8.3	13.0	1.0
	30	80	71	8.4	12.5	2.0
	40	80	71	8.4	12.0	2.5
	50	80	71	8.4	11.0	4.0
May 17, 1955	1	86	81	8.2	10.0	0.5
	5	86	80	8.0	10.5	1.0
	10	86	80	7.8	9.8	2.0
	15	86	79	7.6	9.5	2.5
	25	86	79	7.8	9.0	3.0
	30	86	79	7.8	8.8	4.0

Table II

Checklist of Species Found to Occur in Buchanan Lake

Scientific Name	Common Name
<u>Lepisosteus platostomus</u>	shortnose gar
<u>Dorosoma cepedianum</u>	gizzard shad
<u>Astyanax fasciatus</u>	tetra
<u>Ictiobus bubalus</u>	smallmouth buffalo
<u>Carpionodes carpio</u>	river carpsucker
<u>Moxostoma congestum</u>	gray redbreast
<u>Cyprinus carpio</u>	carp
<u>Opsopoeodus emiliae</u>	pugnose minnow
<u>Notropis oxyrhynchus</u>	sharpnose shiner
<u>Notropis brazosensis</u>	Brazos River shiner
<u>Notropis venustus</u>	spottail
<u>Notropis lutrensis</u>	redbreast shiner
<u>Notropis deliciosus</u>	sand shiner
<u>Notropis volucellus</u>	mimic shiner
<u>Hybognathus nuchalis</u>	silvery minnow
<u>Pimephales vigilax</u>	parrot minnow
<u>Campostoma anomalum</u>	stoneroller
<u>Ictalurus punctatus</u>	channel catfish
<u>Pseudorasbora parva</u>	yellow catfish
<u>Gambusia affinis</u>	common mosquitofish
<u>Mugil cephalus</u>	striped mullet
<u>Morone chrysops</u>	white bass
<u>Micropterus punctulatus</u>	spotted black bass
<u>Micropterus salmoides</u>	largemouth black bass
<u>Chaenobryttus coronarius</u>	warmouth
<u>Lepomis cyanellus</u>	green sunfish
<u>Lepomis microlophus</u>	redbreast sunfish
<u>Lepomis macrochirus</u>	bluegill
<u>Lepomis humilis</u>	orangespotted sunfish
<u>Lepomis megalotis</u>	longear sunfish
<u>Pomoxis annularis</u>	white crappie
<u>Percina caprodes</u>	logperch
<u>Aplodinotus grunniens</u>	drum

Table III

Number of Specimens Taken in Seines From Buchanan Lake, December 1954 through May 1955.

Fish Species	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total	% of Number
D. cepedianum	0	2	1	12	32	178	225	6.29
A. fasciatus	0	0	0	0	13	0	13	0.36
I. bubalus	0	1	0	0	0	3	4	0.11
Carpionodes carpio	0	34	0	1	0	6	41	1.15
Cyprinus carpio	0	0	2	0	0	0	2	0.06
O. emilliae	0	3	0	0	0	0	3	0.08
N. oxyrhynchus	0	2	0	0	0	0	2	0.06
N. brazosensis	0	18	0	0	8	0	26	0.08
N. venustus	184	106	4	773	405	403	1875	0.73
N. lutrensis	2	410	0	75	47	28	562	52.43
N. deliciosus	0	4	0	0	0	0	4	15.72
N. volucellus	0	17	0	0	8	0	25	0.11
H. nuchalis	0	6	0	0	0	0	6	0.70
P. vigilax	0	8	0	1	0	0	9	0.16
C. anowalum	0	67	0	0	13	3	83	0.70
G. affinis	1	56	0	11	6	4	78	1.87
M. chrysops	0	0	0	0	0	9	9	2.18
M. punctulatus	0	1	0	0	0	0	1	0.25
M. salmoides	0	2	7	3	4	0	14	0.03
C. coronarius	0	0	0	1	0	62	63	2.18
L. cyanellus	1	6	0	2	0	0	9	0.03
L. microlophus	0	0	0	8	3	3	14	0.34
L. macrochirus	1	43	0	194	49	68	392	10.96
L. humilis	0	7	37	3	0	0	47	0.45
L. megalotis	0	32	2	6	22	17	79	0.28
P. annularis	0	0	0	0	0	10	10	2.21
P. caprodes	0	0	0	0	8	2	10	0.28
Totals	189	825	53	1090	618	801	3576	100.00

Table IV

Number of Specimens Taken by Gill nets from Buchanan Lake, December 1954 through May 1955.

Fish Species	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total	% of Number
<i>L. platostomus</i>	3	8	8	6	18	17	60	2.53
<i>D. cepedianum</i>	44	149	261	197	422	153	1226	51.59
<i>I. bubalus</i>	13	9	5	10	10	13	60	2.53
<i>Carpiodes carpio</i>	15	67	158	274	36	17	567	23.86
<i>M. Congestum</i>	1	1	4	6	6	1	19	0.80
<i>Cyprinus carpio</i>	0	1	6	5	14	2	28	1.18
<i>I. punctatus</i>	24	29	48	27	25	27	180	7.57
<i>P. olivaris</i>	0	1	0	0	0	7	8	0.34
<i>M. cephalus</i>	0	0	1	0	0	0	1	0.04
<i>M. chrysops</i>	26	9	8	13	11	5	72	3.03
<i>M. punctulatus</i>	0	5	3	7	2	0	17	0.72
<i>M. salmoides</i>	0	6	7	17	1	3	34	1.43
<i>Lepomis</i> (all sunfish)	0	2	0	6	3	8	19	0.80
<i>P. annularis</i>	17	11	2	6	7	30	73	3.07
<i>A. grunniens</i>	3	0	0	0	1	8	12	0.51
Totals	146	298	511	574	556	291	2376	100.00

Table V
 Pounds of Each Fish Species Taken by Gill Nets From Buchanan Lake
 December 1954 through May 1955.

Fish Species	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total	% of Weight
<i>L. platostomus</i>	12.8	17.4	38.5	27.9	76.6	98.1	271.3	11.29
<i>D. cepedianum</i>	16.6	44.3	119.5	80.6	208.2	39.0	508.2	21.06
<i>I. bubalus</i>	28.6	26.2	14.3	36.6	40.0	44.8	190.5	7.89
<i>Carpiodes carpio</i>	20.2	100.4	248.1	404.6	49.7	30.6	853.6	35.35
<i>M. congestum</i>	0.7	1.5	8.9	17.5	8.1	0.9	37.6	1.56
<i>Cyprinus carpio</i>	0.0	2.0	13.3	15.6	45.0	4.4	80.3	3.33
<i>I. punctatus</i>	24.2	24.8	50.2	53.3	33.5	28.7	214.7	8.89
<i>P. olivaris</i>	0.0	0.5	6.3	0.0	0.0	19.2	26.0	1.08
<i>M. cephalus</i>	0.0	0.0	9.8	0.0	0.0	0.0	9.8	0.41
<i>M. chrysops</i>	28.4	6.8	7.4	21.8	9.7	5.2	79.3	3.29
<i>M. punctulatus</i>	0.0	10.0	15.4	12.4	1.4	0.0	39.2	1.62
<i>M. salmoides</i>	0.0	13.9	0.9	40.5	0.8	7.4	63.5	2.63
<i>P. annularis</i>	4.0	9.5	0.9	2.4	6.7	7.7	31.2	1.29
Lepomis (all sunfish)	0.0	0.1	0.0	1.2	0.4	0.8	2.5	0.10
<i>A. grunniens</i>	0.8	0.0	0.0	0.0	2.7	1.3	4.8	0.20
Totals	136.3	257.4	533.5	714.4	482.8	288.1	2412.5	99.99

Table VI

Success of Gill Netting in Terms of Number and Pounds of Fish, December 1954 through May 1955.

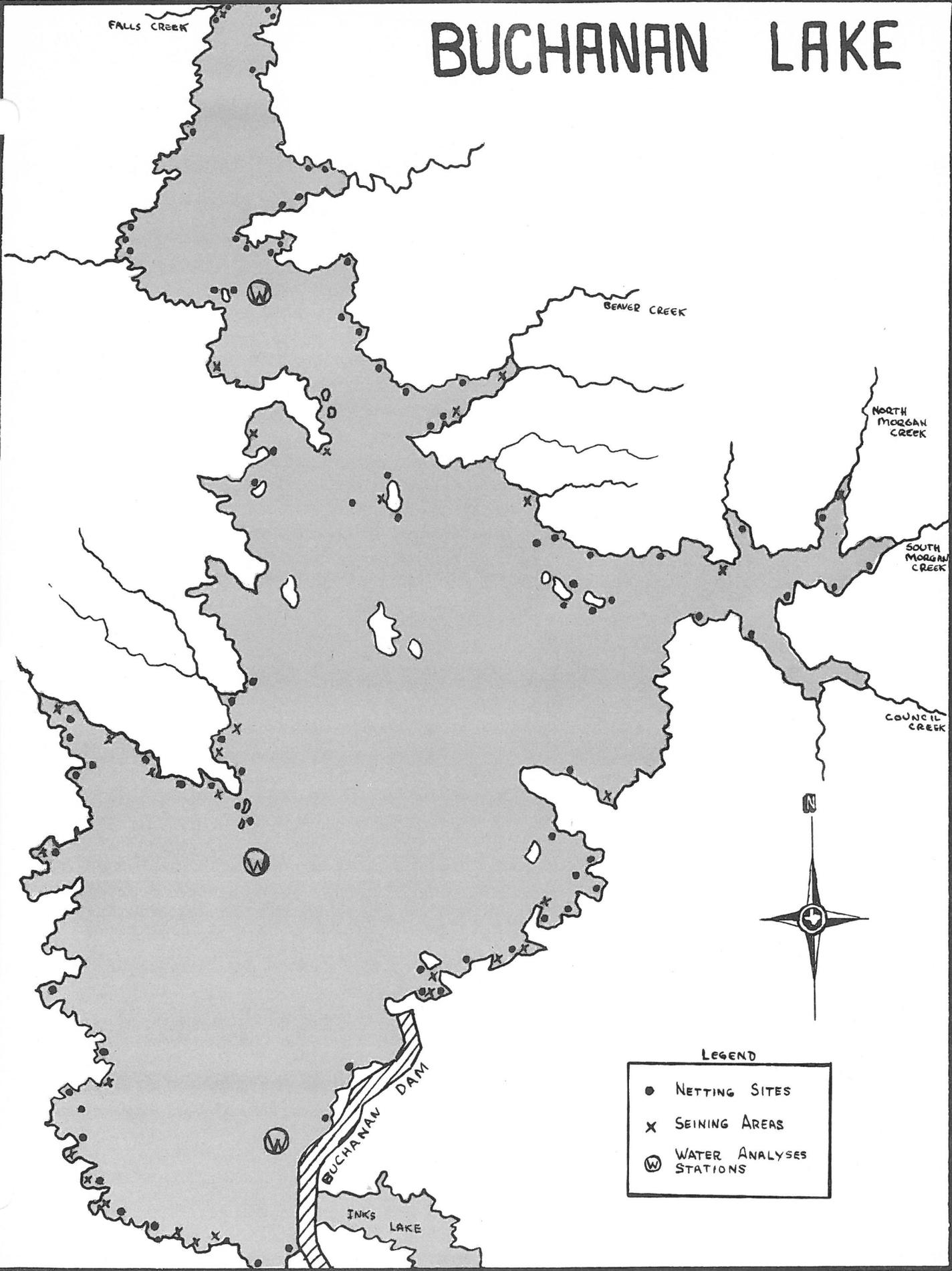
Month	Number of Nets Set	Number of Foot Net Set	Number of Fish Caught	Number lbs. Fish Caught	Average Number Fish/Net	Average No. Fish Ft. of Net	Average No. lbs. Fish/Net	Average No. lbs. Fish per Ft. of Net.
December	8	1000	146	136.3	18.25	0.136	17.03	0.136
January	12	1500	298	257.4	24.83	0.196	21.45	0.172
February	20	2200	511	533.5	25.55	0.232	26.68	0.243
March	24	2775	574	714.4	23.92	0.207	29.76	0.257
April	14	1550	556	482.8	39.71	0.359	34.49	0.311
May	7	800	291	288.1	41.57	0.364	41.16	0.360
Total	85	9825	2376	2412.5	27.95	0.242	28.38	0.246

Table VII

Length, Weight, and Coefficient of Condition of Fish Collected by Gill Nets
From Buchanan Lake, December 1954 through May 1955.

Fish Species	Number of Spec.	Standard Length Range	Standard Length Average	Weight Range (grams)	Weight Average (grams)	"K" Factor Range	"K" Factor Average
L. platostomus	60	440-1000	727.6	312-4876	1834.8	0.338-4.641	1.923
D. cepedianum	1226	117-397	207.3	38-652	197.9	1.036-2.595	1.854
I. tubalus	60	133-464	336.0	57-3742	1387.6	0.351-3.962	3.164
Carpoides Carpio	567	220-383	304.2	227-1474	701.4	1.090-3.277	2.436
M. Congestum	19	240-407	309.8	312-1701	806.6	2.186-3.028	2.420
Cyprinus carpio	28	296-450	361.5	680-2240	1306.5	1.967-3.048	2.667
I. punctatus	180	85-512	294.1	10-2722	518.8	0.645-3.359	1.645
P. Oliveris	8	235-489	366.5	215-2353	1157.5	1.658-2.110	1.822
M. cephalus	1	494	494.0	2863	2863.0	2.376	2.376
M. chrysops	72	162-323	260.3	113-922	529.8	1.196-3.782	2.764
M. punctulatus	17	228-372	322.1	284-1758	1010.5	2.203-4.066	2.866
M. salmoides	34	227-446	315.0	340-3033	1041.5	2.509-3.615	2.988
Lepomis (all sunfish)	19	95-159	116.5	28-142	70.5	2.800-5.449	4.004
P. annularis	73	85-298	169.6	7-1049	189.0	0.150-3.964	2.432
A. grunniens	12	95-369	171.3	57-1247	183.3	1.623-6.669	2.534

BUCHANAN LAKE



LEGEND

- NETTING SITES
- X SEINING AREAS
- Ⓜ WATER ANALYSES STATIONS