FINAL REPORT

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FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project F-6-R-22

Region 2-C Fisheries Studies

Objective III: Reservoir Categorization

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Abstract

Predictability of large reservoir management practices affecting standing crop has been speculative, due to physical, chemical, and biological variables. Many of these variables are controllable, but cause and effect relationships, involving these variables and standing crop, change in different reservoir types.

The purpose of this study is to collect standardized data on major reservoirs in central Texas and to categorize these reservoirs based on the resulting data. Descriptive data were up-dated on 14 major reservoirs, and physical, chemical, and biological sampling was conducted on Lakes Belton and Whitney.

Since this study is being terminated prematurely, and data from only two reservoirs have been acquired, no attempt at categorization was made. Data similar to those collected here will be obtained under a new State-Wide management project, and when sufficient amounts have been accumulated, categorization should be carried out.

FINAL REPORT

State: Texas Project Number: F-6-R-22

Project Title: Region 2-C Fisheries Studies

Study Title: Reservoir Categorization

Period Covered: From January 1, 1973 To December 31, 1974

Objective Number: III Job Number: 10

Objective:

To categorize the major reservoirs of Fisheries Region 2-C.

Background:

Better predictability in reservoir fisheries management practices is badly needed. Physical, chemical, and biological variables of reservoirs have profound effects on fish populations and in many instances these variables can be manipulated by man. Knowledge of vital cause and effect relationships can provide fishery managers with insight for making recommendations based on fact rather than speculation.

The relationship of certain enviornmental factors to standing crop has been lemonstrated by Carlander (1955), Hayes and Anthony (1964), Jenkins (1968; 1970) Ryder (1965) and others. Using regression analyses between independent and dependent variables, these investigators have identified significant factors that influence standing crops of fishes in certain reservoir types. Due to the large number of environmental variables and their interactions, data analysis has become very complex.

Past survey and inventory records maintained by the Texas Parks and Wildlife Department contain primarily fish population information, but lack much of the additional environmental data needed for categorization. The purpose of this study is to obtain standardized physical, chemical, and biological data from 14 major reservoirs (over 500 acres) and their tailwaters, and to correlate these data by automatic data processing. This report covers two segments of a proposed five year study.

Procedures:

The first segment of the study was used primarily for familiarizing personnel with reservoirs in the study area, selecting sampling techniques and sampling sites, and acquiring descriptive data. Descriptive data forms were compiled on each of the 14 major reservoirs in Region 2-C. Data were recorded for the following parameters: age of reservoir, year sampled, drainage area, location, surface elevation, surface area, volume, mean depth, maximum depth, outlet depth, shoreline length, growing season, storage ratio, thermocline depth, mean annual water level fluctation, total alkalinity, total dissolved solids, depth of visibility, shore development, basin geology, riprapping, controlling authority, and reservoir use. Descriptive data were obtained from "Engineering Data on Dams and Reservoirs in Texas" and "Dams and Reservoirs in Texas, Historical and Descriptive Information", publications of the Texas Water Development Board; "Water Resources Data for Texas- Part 2 Water Quality Records", 1969-73, publications of the U.S. Geological Survey; water level reports prepared by the U.S. Army Corps of Engineers; correspondence with controlling agencies; and actual field sampling.

Due to the extent of sampling required, only two reservoirs were selected for study during the second segment. Lake Belton, a 12,300 acre lake in Bell County, and Lake Whitney, 23,500 acre lake in Hill and Bosque counties, were chosen so that sampling would coincide with other field activities.

Monthly water analyses were run from January through September, 1974, with the exception of the August sample at Lake Whitney. Sampling stations were located at middle and lower lake sites in the lakes proper, and tailwater stations were located 200 meters below the dam and 2 miles downstream (Figs. 1 and 2). Lake parameters tested were: dissolved oxygen, temperature, pH, turbidity, conductivity, total alkalinity, total dissolved solids, sulfates, nitrates, phosphates, settleable solids, and secchi disc transparency. Tailwater parameters were the same, but also included hydrogen sulfide readings. Samples were taken between 10:00 AM and 4:00 PM. Dissolved oxygen and temperature profiles were read at 1 meter intervals from surface to bottom and the remaining parameters, other than secchi, were read from surface, middle, and bottom samples each month. Sulfates, nitrates, and phosphates were recorded only during April and July. Dissolved oxygen and temperature were determined with a Model 51A YSI oxygen meter and specific conductance was read from a Model 33 YSI conductivity meter. Turbidity, total alkalinity, hydrogen sulfide, and sulfates were determined with a Hach DR-EL portable laboratory. Total dissolved solids, nitrates, and phosphates were determined by the Regional Parks and Wildlife Department Chemist using standard methods. Settleable solids were measured with 1200 milliliter Imhoff cones after settling approximately 24 hours.

Standing crop estimates were made from cove rotenone samples. Three coves totalling 5.0 acres were sampled between September 9th and 25th at Lake Belton (Fig. 1), and three coves totalling 10.7 acres were sampled between August 13th and 28th at Lake Whitney (Fig. 2). Coves were measured using plane table methods and were sounded to determined volume. Block nets made of 3/4 inch bar mesh webbing were used to isolate sampling areas. Nets were dropped at approximately 10:00 PM and treatment began at approximately 8:00 AM the following morning. Approximately 100 fishes of various sizes and species were captured from elsewhere in the lake, measured, tagged with Floy anchor tags, and released into the cove. The mean recovery rates from tagged fishes were used to project recovery rates for all fishes recovered from each cove. Liquid rotenone (5%) was applied at a rate sufficient to insure a total kill and was mixed thoroughly.

The day of application and the day following were considered as two recovery days. All fishes were separated by species and inch classes, beginning at 1.49 inches and progressing in 1 inch increments (i.e., 0-1.49= inch class 1, 1.50- 2.49= inch class 2, 2.50-3.49= inch class 3, etc). Total numbers of each inch class were counted both days, but total weights of each species inch class were measured from only the first day's recovery. Average weights for both recovery days were calculated from the first day's recovery. The average number and total pounds of each species inch class for each cove were estimated by dividing the number and weight recovered y the area of the cove. The observed standing crop of each species inch class was determined by weighting the area of each cove and calculating the simple averages of the individual cove results. The total observed standing crop for each species was obtained by adding the simple averages of the individual inch classes. The adjusted standing crop estimate in numbers and weight was obtained by projecting the mean recovery percentage from all tagged specimens to the total observed standing crop.

Structures for determining age and growth were obtained from select species in both lakes during 1974. Scales, otoliths, and pectoral spines were removed for use in back calculating growth. This procedure was intended for acquiring comparative growth data from representative sport fishes and was not intended for detailed population dynamics work. Samples of channel catfish, white bass, striped bass (from Lake Whitney), largemouth bass, white crappie, and walleye (from Lake Belton) were collected during April and May. Fishes were collected by experimental gill nets (8 ft. deep and 150 ft. long, having graduated bar mesh ranging from 1-3½ inches), frame nets (4 ft. deep and 6 ft. wide, having 1 inch bar mesh) and electro shocking (220 volt D.C. current, max. 3,000 watts). Scales were removed from the left side, below the lateral line, at the tip of the pectoral fin. The two saggittal otoliths were removed from scaled fishes and the left pectoral spine was removed from channel catfish. Specimens were air dried and stored in envelopes. Reading and measurement of annual marks was not accomplished, due to the shortened work schedule.

Vegetative surveys scheduled for August or September were deleted due to extreme drops in water elevation at both lakes. The percent of each lake covered by vegetation was to have been visually estimated, but virtually all marginal vegetation was liminated due to drought conditions.

Findings:

Reservoir descriptive data from major reservoirs in Region 2-C were combined with like data from other regions by the Austin office in unpublished form. Descriptive data on Lakes Belton and Whitney were updated to include 1974 information (Tables 1 and 2).

Middle and lower lake profiles at Lake Belton revealed an August thermocline depth of approximately 9 to 12 meters with a drop in September to about 18 meters (Tables 3 and 4). Although no August readings were taken at Lake Whitney, the July mid lake profiles showed the thermocline depth to be about 7 meters (Table 5), while the lower lake profile indicated a weak thermocline at approximately 12 to 16 meters (Table 6). September profiles at Lake Whitney showed gradual oxygen and temperature gradients. Lake Whitney (Table 9 and 10) exhibited higher conductivity, total dissolved solids, and sulfate values than Lake Belton (Tables 7 and 8), but other physicochemical parameters were comparable. These similarities were also shown in the lakes' tailwaters (Tables 11 and 12).

The observed standing crop estimate (both number and weight per acre) was higher for Lake Whitney than for Lake Belton, although the species of fish present were nearly identical (Tables 13 and 14). Broad size ranges were shown for most species (Tables 15 and 16), although some species and inch classes known to occur, were totally lacking. Tagged fish recoveries of 62 percent for Lake Belton and 59 ercent for Lake Whitney were recorded. When these percentages were projected to the observed standing crop data the adjusted standing crop figures became substantially higher (Tables 13 and 14).

Structures for age and growth determination were taken from 228 fishes, 119 from Lake Belton and 109 from Lake Whitney. Walleye (4), striped bass (10), and white crappie were not captured in adequate numbers for back calculation. Approximately 30 specimens of various age classes are needed for this work.

A checklist of fish species encountered during all sampling efforts is provided in Table 17.

Analysis:

No attempt was made to analyze these data for the purpose of categorization. This procedure was scheduled for the fifth year of the study, when comparative data from all 14 reservoirs were to have been acquired. Analysis of the accumulated data would require complex computer programming, which would necessitate making provisions for computer time.

Recommendations:

This study is being terminated prematurely, due to overlap with procedures to be carried out under a State-Wide management project effective January 1, 1974. Data to be acquired under this new project will parallel those gathered for categorization. When sufficient data have been acquired state-wide, models should be developed by Parks and Wildlife Department data processing personnel that will group similar reservoirs and identify environmental parameters that significantly affect standing crops in those particular types of reservoirs.

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Date: November 18, 1974

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Literature Cited

Carlander, Kenneth D. 1955. The standing crop of fish in lakes. J. Fish. Res. Bd. Canada 12(4): 543-570.

Hayes, F.R., and E.H. Anthony. 1964. Productive capacity of North American lakes as related to the quantity and trophic level of fish, the lake dimensions, and the water chemistry. Trans. Amer. Fish Soc. 93(1): 53-57.

Jenkins, Robert M. 1968. The influence of some environmental factors on standing crop and harvest of fishes in U.S. reservoirs. Reservoir Fishery Resources Symposium, Athens, Ga., April 1967. Publ. by So. Div., Amer. Fish. Soc., pp. 298-321.

________________. 1970 The influence of engineering design and operation and other environmental factors on reservoir fishery resources. Water Res. Bul. 6(1): 110-119.

Ryder, R. A. 1965. A method for estimating the potential fish production of north temperate lakes. Trans. Amer. Fish. Soc. 94(3): 214-218.

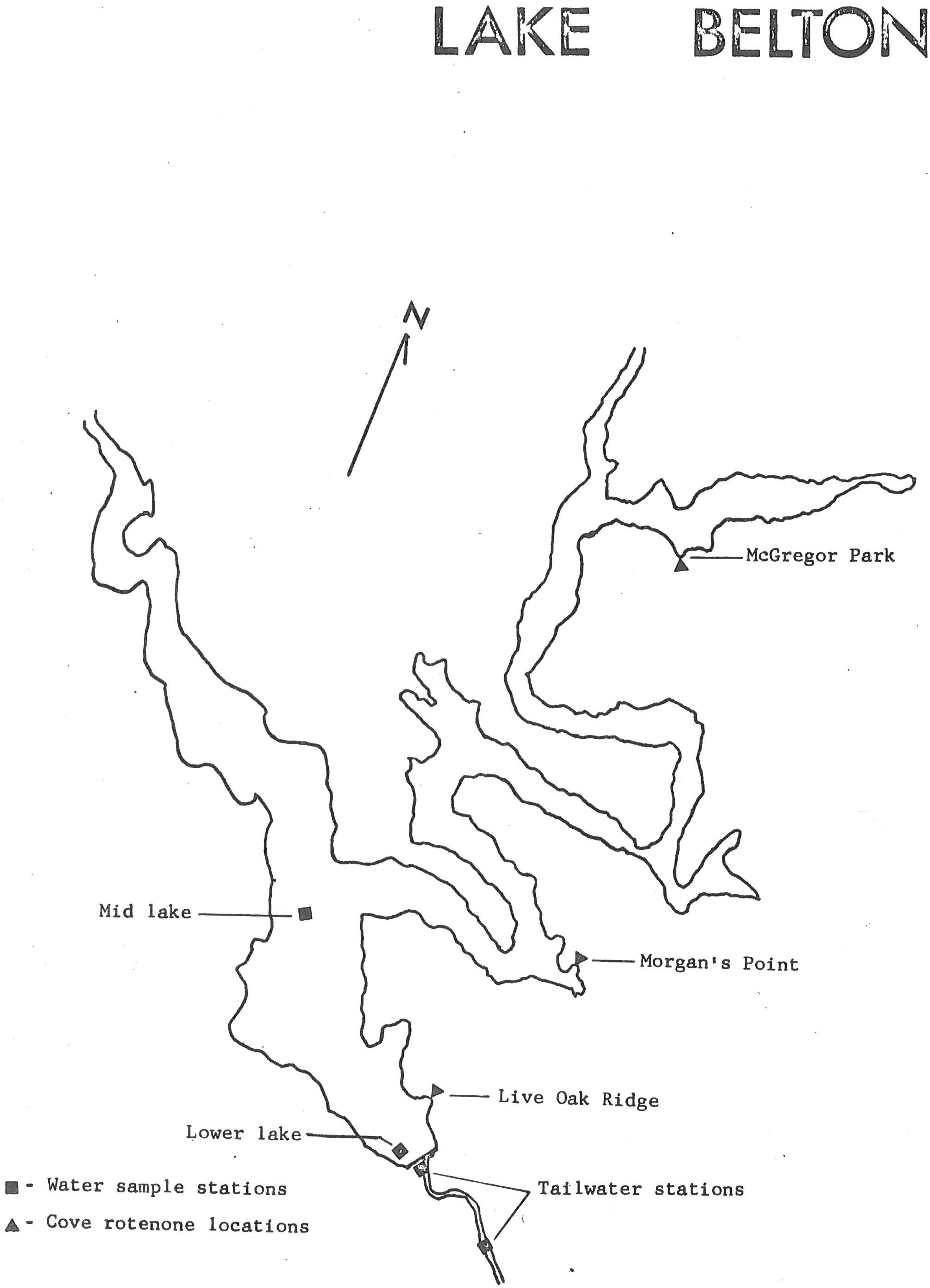

Fig. 1. Map of Lake Belton showing water sample stations and cove rotenone locations.

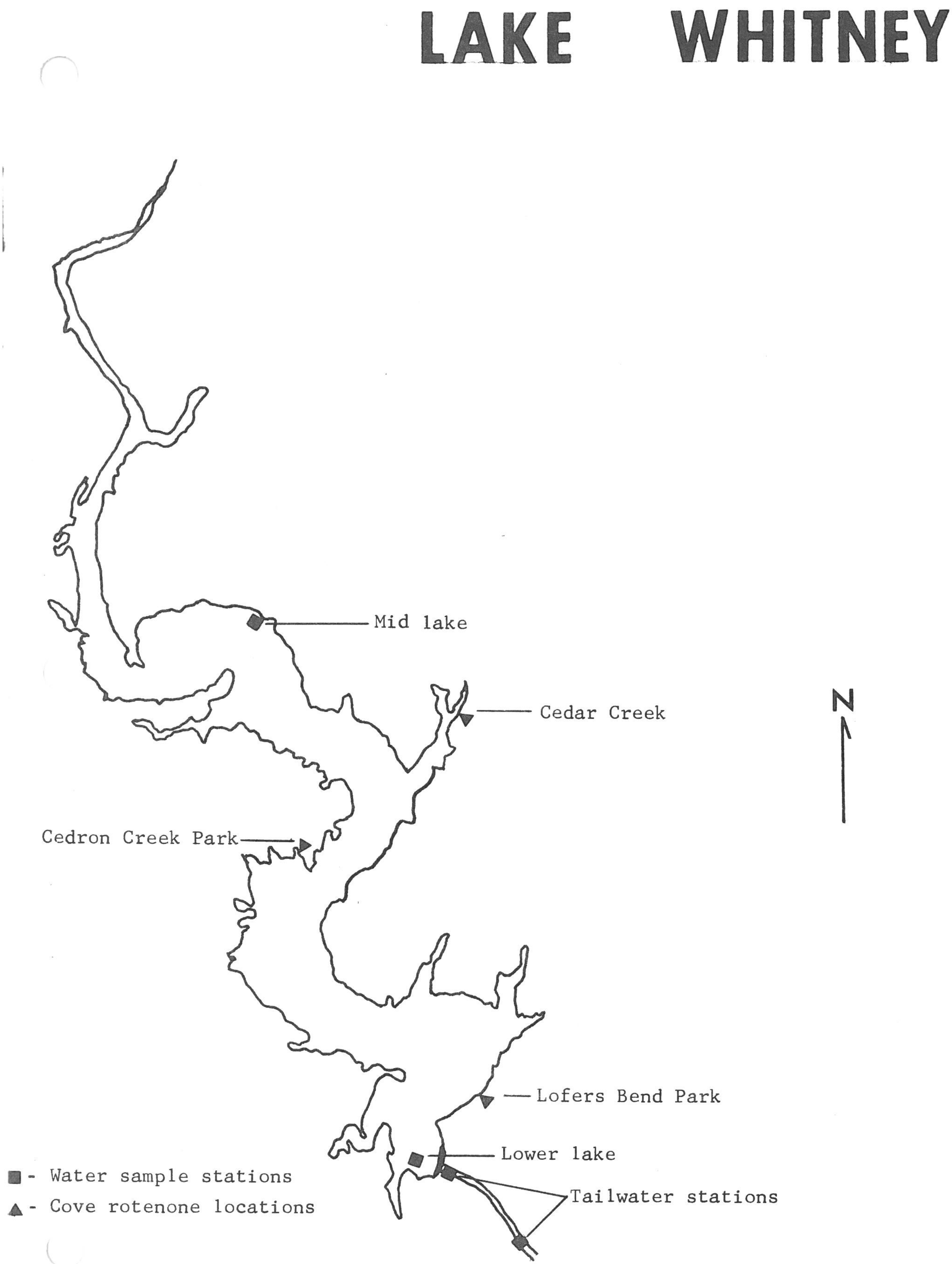

Fig. 2. Map of Lake Whitney showing water sample stations and cove rotenone locations.

Table 1. Lake Belton descriptive data.

Reporting biologist Roger L. McCabe

Reservoir name Belton

Year impounded 1954 Year sampled 1974

Drainage area (mi.^{2}) - 3,560

Location Bell County; Approx. lat 31°06', long 97°28'

	Mean annual values
Surface elevation (ft. msl)	594.0
Surface area (acres)	12,300
Volume (acre-ft.)	457,600
Mean depth (ft.)	37.2
Maximum depth (ft.)	111
Outlet depth (ft.)	111
Shoreline length (mi.)	136
Growing season (frost-free days)	260
Storage ratio	0.23
Thermocline depth (ft.)	35-40
Mean annual water level fluctuation (ft.)	10.33 over 5 yrs.
Total alkalinity (mg/l)	150
Total dissolved solids (mg/l)	256
Depth of visibility (ft.)	6
Shore development	8.75
Basin geology	Limestone
Rock riprap present (yes or no)	Yes
Controlling authority	U.S. Army Corps of Engineers
Reservoir use	Flood control, conservation, recreation

Table 2. Lake Whitney descriptive data.

Reporting biologist Roger L. McCabe

Reservoir name Whitney

Year impounded 1951 Year sampled 1974

Drainage area ($mi.^2$) - 17,656 contributing 8,950 noncontributing

Location Hill and Bosque Counties; Approx. Lat 31°51', long 97°22'

	Mean annual values
Surface elevation (ft. msl)	533.0 Power pool
Surface area (acres)	23,560
Volume (acre-ft.)	627,100
Mean depth (ft.)	26.62
Maximum depth (ft.)	108
Outlet depth (ft.)	84.2
Shoreline length (mi.)	250
Growing season (frost-free days)	247
Storage ratio	0.52
Thermocline depth (ft.)	35-45
Mean annual water level fluctuation (ft.)	10.92 over 5 yrs.
Total alkalinity (mg/l)	234
Total dissolved solids (mg/l)	777
Depth of visibility (ft.)	4-6
Shore development	11.6
Basin geology	Limestone and some shale
Rock riprap present (yes or no)	Yes
Controlling authority	U.S. Army Corps of Engineers
Reservoir use	Flood control, power, recreation

Table 3. Middle Lake Belton temperature and dissolved oxygen profiles, 1974.

Depth	JAN 22		FEB 19		MAR 21		APR 23		MAY 28		JUNE 19		JULY 23		AUG 22		SEPT 29	
(m)	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2
S	11.5	10.8	11.5	9.5	16.0	10.2	20.0	9.6	26.0	10.6	26.5	8.6	31.0	8.3	29.0	7.8	22.5	6.9
1	13.0	10.8	12.0	9.6	16.0	9.5	20.0	9.6	26.0	8.6	26.5	8.6	29.5	8.3	29.5	7.8	22.5	6.9
2	12.5	11.0	12.0	9.6	16.0	9.5	20.0	9.7	26.0	8.6	26.5	8.6	29.0	8.3	29.0	8.0	22.5	6.9
3	12.0	11.0	12.0	9.5	16.0	9.6	20.0	9.6	26.0	8.6	26.5	8.6	29.0	8.3	29.0	8.0	22.5	6.9
4	11.5	11.0	12.0	9.4	16.0	9.5	20.0	9.6	26.0	8.3	26.5	8.6	29.0	8.3	28.5	7.9	22.5	6.9
5	11.5	11.1	12.0	9.4	16.0	9.7	20.0	9.5	26.0	8.5	26.0	8.6	28.0	8.2	28.0	7.3	22.5	6.9
6	11.5	11.0	11.5	9.6	16.0	9.4	19.5	9.6	25.5	8.5	26.0	8.5	28.0	8.0	28.0	7.2	22.5	6.9
7	11.5	11.0	11.5	9.6	16.5	9.4	20.0	9.4	25.0	8.4	26.0	8.5	28.0	7.6	28.0	6.2	22.5	6.9
8	11.5	10.9	12.0	9.5	16.0	9.6	19.0	9.4	23.5	7.3	26.0	8.4	27.0	6.8	27.5	6.0	22.5	6.9
9	11.5	10.8	11.5	9.8	16.0	9.6	19.5	9.4	23.0	6.2	26.0	8.1	27.0	7.5	27.0	2.7	22.5	6.9
10	11.5	10.8	11.5	9.9	16.0	9.5	18.0	8.8	21.0	5.4	25.0	7.1	26.0	3.6	26.5	2.0	22.5	6.9
11	11.0	10.9	11.5	9.9	16.0	9.6	18.0	8.8	23.0	6.8	23.5	4.4	25.5	0.1	26.0	1.3	22.0	6.9
12	11.0	10.9	11.5	9.8	15.5	9.6	18.0	8.4	17.0	4.2	22.0	3.3	24.5	0.4	25.0	0.6	22.0	6.9
13	11.0	10.7	11.5	9.8	15.5	9.8	18.0	8.0	23.5	8.1	21.5	2.5	23.0	0.4	22.5	0.5	22.0	6.9
14	11.0	10.7	11.5	9.8	15.5	9.5	18.0	8.7	19.0	4.4	20.0	1.9	21.0	0.4	21.0	0.6	22.0	6.9
15	11.0	10.6	11.5	9.8	13.5	9.2	17.5	7.7	21.0	5.0	19.5	1.7	20.0	0.4	20.0	0.5	22.0	6.9
16	10.5	10.5	11.5	9.8	12.5	9.1	17.0	7.6	25.5	8.2	19.5	1.5	19.0	0.5	19.0	0.5	22.0	6.8
17	10.5	10.4	11.5	9.8	12.5	9.1	16.5	6.6	18.0	3.0	18.0	1.3	18.5	0.5	19.0	0.6	22.0	6.6
18	10.0	10.4	11.5	9.8	12.5	8.9	17.0	7.3	17.0	2.0	19.5	2.1	18.0	0.8	18.0	0.6	19.0	1.7
19	10.0	10.2	11.5	9.6	12.5	8.8	16.5	6.8	20.5	5.2	19.0	1.1	18.0	0.8	17.5	0.6	17.5	1.6
20	10.0	10.2	11.5	9.6	12.5	8.8	16.0	6.2	17.0	1.8	17.5	1.3	18.0	0.8	17.5	0.7	17.5	1.0
21	10.0	10.2	11.5	9.8	12.5	8.9	16.0	5.4	18.0	2.8	17.5	1.4	17.5	0.7	17.5	0.8	17.5	1.0
22	10.0	10.0	11.5	9.7	12.5	8.8	16.0	5.4	20.5	4.7	17.5	1.1	17.5	0.8	18.0	0.9	17.5	1.2
23	10.0	10.0	11.5	9.6	12.5	8.8	16.5	6.7	19.0	4.3	16.5	1.0	17.0	0.8	17.5	0.6	17.5	1.1
24	10.0	10.0	11.5	9.7	12.5	8.8	15.0	4.6	18.5	4.0	18.5	1.0	17.0	0.9	18.0	0.7	17.0	1.1
25	10.0	10.0	11.5	9.6	12.0	8.8	15.0	4.8	16.0	1.0			18.0	0.9	19.5	0.8	17.5	1.2
26	10.0	10.0	11.5	9.8	12.5	8.9	15.0	5.0	17.0	0.4			19.0	0.8			17.0	1.0

Table 4. Lower Lake Belton temperature and dissolved oxygen profiles, 1974.

Depth	JAN 22		FEB 19		MAR 21		APR 23		MAY 28		JUNE 19		JULY 23		AUG 22		SEPT 29	
(m)	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2
S	12.0	11.1	12.5	10.2	17.0	9.6	20.0	10.0	26.0	9.2	26.0	8.6	30.0	8.6	29.0	6.9	23.5	6.4
1	12.0	11.1	12.5	10.8	16.0	9.2	20.0	9.8	26.0	8.9	26.0	8.4	30.0	8.5	29.0	8.0	23.0	6.4
2	12.0	11.0	12.0	10.8	16.0	9.2	20.0	9.7	26.0	8.9	26.0	8.5	29.0	8.6	28.0	6.7	23.0	6.4
3	11.5	11.1	12.0	10.8	16.0	9.2	20.0	9.8	25.5	8.8	26.0	8.5	29.0	8.6	28.0	6.6	23.0	6.3
4	11.5	11.0	12.0	10.8	16.5	9.2	20.0	9.7	25.0	8.4	26.0	8.5	28.0	8.6	28.0	6.5	23.0	6.2
5	11.5	10.9	12.0	10.6	16.0	9.2	20.0	9.8	24.0	8.0	26.0	8.3	28.0	8.3	28.0	6.5	23.0	6.2
6	11.0	10.9	12.0	10.6	16.0	9.2	19.5	9.9	23.5	7.5	26.0	8.1	27.5	7.9	27.0	6.3	23.0	6.2
7	11.0	10.8	12.0	10.6	16.0	9.2	19.0	9.8	23.0	7.2	25.5	7.2	27.0	7.6	27.0	6.1	23.0	6.2
8	11.0	10.7	12.0	10.4	15.0	9.2	19.5	9.8	22.5	6.4	25.5	6.8	27.0	6.5	26.0	2.5	23.0	6.2
9	11.0	10.5	12.0	10.4	15.0	9.2	19.0	9.8	22.0	6.1	25.5	7.4	26.5	5.0	26.0	2.4	23.0	6.2
10	11.5	10.4	12.0	10.4	15.0	9.2	19.0	9.8	21.0	5.6	25.0	6.1	26.0	3.5	25.0	2.1	23.0	6.4
11	11.0	10.4	12.0	10.2	15.0	9.2	18.5	9.4	20.5	5.8	24.0	5.4	25.5	1.9	24.0	2.1	23.0	6.6
12	11.5	10.2	12.5	10.2	15.0	9.4	18.5	9.2	19.5	5.6	22.0	3.6	24.5	1.2	23.0	1.5	23.0	6.6
13	11.0	10.3	12.0	10.0	15.0	9.2	18.0	9.0	19.5	5.2	21.0	3.6	22.0	0.7	22.0	0.4	23.0	6.6
14	11.0	10.2	12.5	10.0	15.0	9.4	17.0	8.2	19.0	5.4	20.0	3.9	21.0	0.8	21.0	0.5	22.5	6.7
15	11.0	10.1	12.0	10.2	15.0	9.6	17.0	7.8	21.0	6.6	23.5	7.5	20.0	0.8	20.0	0.5	22.5	6.8
16	11.0	10.1	12.0	10.4	15.0	9.0	16.5	7.6	17.5	5.1	23.5	7.5	19.0	0.8	19.5	0.5	22.5	6.8
17	11.0	10.1	12.0	10.2	15.0	9.0	16.0	7.6	17.5	5.0	18.5	3.8	18.5	0.8	19.0	0.5	22.0	6.8
18	11.0	10.2	12.0	10.2	15.0	9.4	16.0	7.7	16.5	4.7	18.5	3.7	18.5	0.8	18.0	0.5	21.5	2.0
19	11.0	10.2	12.5	10.0	15.0	9.4	15.0	6.9	16.5	4.7	18.0	3.7	18.0	0.6	17.5	0.5	18.5	1.1
20	11.0	10.2	12.0	10.0	13.0	9.2	15.0	6.8	16.0	4.7	18.0	3.4	17.5	0.6	17.5	0.4	18.0	1.4
21	12.0	10.6	12.0	10.0	13.0	8.9	15.0	6.6	19.0	6.3	17.5	3.7	17.1	0.5	17.0	0.4	18.0	1.6
22	11.5	9.8	12.0	10.2	12.0	8.2	15.0	6.2	19.0	6.3	17.0	3.3	17.0	0.5	18.0	0.5	17.0	0.7
23	12.0	10.2	12.0	10.2	13.0	8.8	14.5	6.0	15.5	3.2	21.0	6.2	17.0	0.5	18.0	0.7	17.0	0.8
24	11.0	9.9	11.5	10.6	12.5	8.8	14.0	6.4	16.0	3.3	21.0	6.3	17.0	0.5	17.0	0.6	17.0	0.8
25	11.0	10.1	12.0	10.4	12.5	9.0	14.5	5.6	16.0	3.3	17.0	1.9	17.0	0.5	17.0	0.6	17.0	0.8
26			11.5	10.6	12.0	8.8	15.0	5.7	17.0	3.5			18.0	0.5			17.0	0.8

Table 5. Middle Lake Whitney temperature and dissolved oxygen profiles, 1974.

Depth	JAN 23		FEB 26		MAR 18		APR 16		MAY 21		JUNE 18		JULY 16		AUG		SEPT 20	
(m)	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2
S	8.5	11.5	11.5	11.4	18.5	10.5	18.5	9.6	27.0	8.3	28.0	8.1	30.0	8.5			29.0	9.6
1	8.5	11.3	11.5	11.4	19.0	10.4	18.0	9.6	26.5	8.4	28.0	8.0	30.0	8.4			26.0	10.2
2	8.5	11.2	11.5	11.0	19.0	10.4	18.0	9.4	26.0	8.1	28.0	8.1	30.0	8.4			25.5	9.2
3	8.5	11.2	11.0	10.8	19.0	10.4	18.0	9.0	26.0	7.8	28.0	8.0	29.5	8.2			25.0	8.4
4	8.5	11.2	11.0	11.0	19.0	10.3	17.5	8.0	26.0	7.7	28.0	8.0	29.0	7.4			25.0	7.6
5	8.0	11.4	11.0	11.0	19.0	10.3	17.5	7.8	26.0	7.6	28.0	8.0	29.0	6.9			25.0	6.8
6	8.0	11.3	11.0	10.8	19.0	10.2	17.5	7.6	26.0	7.2	28.0	7.9	28.5	6.0			24.5	6.3
7	8.0	10.8	11.0	10.8	19.0	10.3	17.5	7.4	26.0	7.0	28.0	7.8	28.0	3.8			24.0	4.9
8	8.0	10.9	11.0	11.0	19.0	10.3	17.0	7.6	25.5	6.3	28.0	7.5	28.0	2.5			24.0	4.2
9	7.5	10.9	11.0	10.8	19.0	10.4	17.0	7.4	25.0	5.8	28.0	7.3	28.0	1.9			24.0	4.3
10	7.5	10.9	11.0	10.8	19.0	10.3	17.0	7.6	25.0	5.1	28.0	6.5	28.0	1.6			24.0	4.0
11	7.5	10.9	11.0	11.0	19.0	10.2	17.5	8.2	25.0	4.5	27.0	3.9	28.0	1.6			24.0	3.9
12	7.5	10.9	11.0	10.8	19.0	10.2	17.5	7.6	25.0	4.5	27.0	1.9	28.0	1.2			24.5	3.9
13	7.5	10.9	11.0	10.8	19.0	10.2	17.5	7.8	25.0	3.5	26.5	1.0	28.0	1.0			24.0	3.6
14	7.5	10.5	11.0	10.9	18.5	9.7	17.5	7.7	24.0	2.5	27.0	0.6	27.5	1.0			24.0	2.9
15			11.0	11.0	17.0	7.4												
16			11.0	11.0														

Table 6. Lower Lake Whitney temperature and dissolved oxygen profiles, 1974.

Depth	JAN 23		FEB 26		MAR 18		APR 16		MAY 21		JUNE 18		JULY 16		AUG		SEPT 20	
(m)	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2	C°	O_2
S	8.5	11.7	10.0	13.0	16.0	10.3	18.5	10.0	24.0	8.4	25.0	8.0	29.0	8.6			25.5	8.0
1	8.0	11.8	10.0	13.0	17.0	9.8	18.5	10.0	24.5	8.3	26.0	7.9	29.0	8.4			25.0	8.4
2	8.0	11.8	10.0	13.0	16.5	9.8	18.5	10.0	24.5	8.3	26.0	8.0	28.0	8.4			25.0	8.0
3	8.0	11.8	10.0	12.5	16.5	9.8	18.5	10.0	24.0	8.4	25.0	8.0	28.0	8.4			24.5	7.7
4	8.0	11.8	10.0	12.5	16.5	9.8	18.5	10.0	24.0	8.3	25.0	8.0	27.5	8.1			24.5	7.6
5	8.0	11.8	10.0	12.5	16.0	9.7	18.5	10.0	24.0	8.2	25.5	7.8	27.0	7.7			24.5	7.6
6	8.0	11.9	10.0	12.5	16.0	9.5	18.5	9.8	24.0	8.2	25.0	6.8	27.0	7.5			24.5	7.0
7	8.0	11.8	10.0	12.5	15.5	9.5	18.0	10.0	24.0	8.2	25.0	6.3	27.0	7.1			24.5	6.9
8	8.0	11.8	10.0	12.5	15.5	9.2	18.0	9.9	24.0	8.1	25.0	6.0	27.0	7.0			24.5	6.8
9	8.0	11.8	10.0	12.0	15.0	9.2	18.0	9.8	24.0	8.0	25.0	5.9	27.0	6.6			24.5	6.5
10	8.0	11.8	10.0	12.0	15.5	9.2	18.0	9.6	24.0	8.0	25.0	6.2	26.5	6.3			24.5	6.8
11	8.5	11.6	10.0	12.0	15.5	9.1	18.0	9.4	23.5	7.4	25.0	5.5	26.5	6.1			24.0	5.8
12	8.0	11.9	10.0	12.0	15.5	9.1	17.5	9.4	23.5	7.5	25.0	5.5	26.5	5.6			24.0	5.5
13	8.0	11.8	10.0	12.0	15.0	9.2	17.5	9.2	22.5	7.0	25.0	5.2	26.0	4.8			24.0	5.5
14	8.0	11.9	10.0	12.0	14.5	9.2	17.5	9.3	22.5	7.3	24.5	4.8	26.0	4.4			24.0	5.4
15	8.0	11.9	10.0	11.5	14.5	9.1	17.5	9.6	20.5	5.2	24.0	4.2	25.5	3.8			24.0	5.3
16	8.0	11.9	10.0	12.0	14.0	9.0	17.0	9.2	20.5	4.7	24.0	3.2	25.5	3.0			24.0	5.3
17	8.0	11.9	10.0	12.0	14.0	9.1	17.0	9.1	20.5	4.8	22.5	1.0	24.5	1.6			24.0	5.3
18	8.0	12.0	10.0	12.0	14.0	8.9	17.0	8.9	20.0	4.4	22.0	1.1	24.0	0.6			24.0	5.3
19	8.0	12.1	10.0	13.0	14.0	8.8	17.0	8.8	19.5	4.5	21.0	0.9	23.0	0.4			24.0	6.8
20	8.0	12.0	10.0	12.5	14.0	8.8	17.0	8.6	19.5	4.6	21.0	0.6	22.0	0.4			24.0	4.5
21	8.0	12.0	10.0	12.0	14.0	8.8	17.0	8.4	19.0	4.2	21.0	0.6	21.0	0.4			24.0	4.2
22	8.0	12.1	10.0	12.0	13.5	8.8	17.0	8.2	19.0	3.2	20.5	0.5	20.5	0.3			24.0	4.3
23	8.0	12.0	10.0	11.5	13.5	8.8	17.0	8.2	19.0	2.9	20.5	1.2	21.0	0.4			24.0	4.2
24	8.0	12.0	10.0	11.0	13.5	8.6	17.0	8.0	19.0	2.5	20.5	0.4	21.0	0.4			24.0	3.4
25	8.0	11.8	10.0	11.0	13.5	8.6	17.0	8.0	18.5	1.9	20.5	0.5	21.0	0.4			24.0	3.3
26					13.5	8.4	17.0	7.8	[illegible]	1.0	20.0	0.3						

Table 7. Middle Lake Belton physicochemical results, 1974.

Date		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/l)	Total dissolved solids (mg/l)	Sul-fates (mg/l)	Nit-rates (mg/l)	Phos-phates (mg/l)	Settle-able solids (mg/l)	Secchi (m)
	S*	8.3	20	285	160	258				<0.1	
JAN 22	M	8.1	10	280	140	245				<0.1	3.3
	B	8.2	10	225	140	239				<0.1	
	S	8.2	<10	320	165	238				<0.1	
FEB 19	M	8.1	<10	325	165	246				<0.1	2.7
	B	7.8	<10	340	165	272				<0.1	
	S	8.2	<10	280	140	180				<0.1	
MAR 21	M	8.0	<10	280	160	193				<0.1	3.8
	B	7.9	20	285	145	207				<0.1	
	S	7.2	<10	385	140	277	18	0.6210	0.00978	<0.1	
APR 23	M	7.1	<10	340	150	272	18	0.6650	0.00326	<0.1	3.5
	B	7.1	<10	330	150	315	18	1.1100	0.00228	<0.1	
	S	6.9	<10	392	130	268				<0.1	
MAY 28	M	6.7	<10	400	155	251				<0.1	2.2
	B	6.2	<10	456	165	292				<0.1	
	S	7.2	<10	374	130	229				<0.1	
JUN 19	M	6.2	<10	397	140	219				<0.1	2.6
	B	6.0	<10	390	150	262				<0.1	
	S	6.8	<10	370	130	353	15	0.0443	0.01300	<0.1	
JUL 23	M	6.2	<10	416	140	347	15	0.2220	0.01960	<0.1	3.0
	B	6.2	<10	422	150	449	13	0.2660	0.01300	<0.1	
	S	6.7	<10	360	125	218				<0.1	
AUG 22	M	6.2	<10	398	180	252				<0.1	1.8
	B	6.2	10	418	160	263				<0.1	
	S	6.7	<10	341	140	194	13			<0.1	
SEP 29	M	6.8	<10	333	140	172	12			<0.1	1.7
	B	6.2	<10	398	170	216	11			0.1	

* Symbols: S= Surface of profile
M= Middle of profile
B= Bottom of profile

Table 8. Lower Lake Belton physicochemical results, 1974

		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/1)	Total dissolved solids (mg/1)	Sul-fates (mg/1)	Nit-rates (mg/1)	Phos-phates (mg/1)	Settle-able solids (mg/1)	Secchi (m)
	S*	8.0	10	300	140	224				< 0.1	
JAN 22	M	8.2	10	310	160	216				< 0.1	2.9
	B	8.1	< 10	330	150	251				< 0.1	
	S	7.9	< 10	335	165	274				< 0.1	
FEB 19	M	7.8	< 10	320	165	290				< 0.1	2.7
	B	7.7	< 10	340	155	252				< 0.1	
	S	8.1	< 10	275	150	209				< 0.1	
MAR 21	M	8.3	< 10	275	150	217				< 0.1	3.7
	B	7.8	15	265	145	225				< 0.1	
	S	7.2	< 10	345	155	274	17	0.6650	0.00654	< 0.1	
APR 23	M	7.1	< 10	340	150	278	17	0.8650	0.01630	< 0.1	3.9
	B	7.1	10	340	140	342	19	1.6000	0.02280	< 0.1	
	S	7.1	< 10	392	150	191				< 0.1	
MAY 28	M	6.8	< 10	432	155	266				< 0.1	2.3
	B	6.2	10	456	135	252				< 0.1	
	S	7.1	< 10	392	135	212				< 0.1	
JUN 19	M	6.2	< 10	404	140	246				< 0.1	3.1
	B	6.1	25	403	150	232				0.6	
	S	6.9	< 10	370	130	381	15	0.0890	0.00650	< 0.1	
JUL 23	M	6.3	< 10	402	140	396	14	0.2220	0.00650	< 0.1	2.6
	B	6.3	< 10	402	145	398	15	0.4000	0.00650	< 0.1	
	S	6.7	< 10	373	120	225				< 0.1	
AUG 22	M	6.4	< 10	403	145	229				< 0.1	1.9
	B	6.2	< 10	402	145	217				< 0.1	
	S	6.4	< 10	352	130	170	12			< 0.1	
SEP 29	M	6.7	< 10	354	130	185	12			< 0.1	2.1
	B	6.2	< 10	399	160	224	13			< 0.1	

* Symbols: S= Surface of profile
M= Middle of profile
B= Bottom of profile

Table 9. Middle Lake Whitney physicochemical results, 1974.

		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/1)	Total dissolved solids (mg/1)	Sul-fates (mg/1)	Nit-rates (mg/1)	Phos-phates (mg/1)	Settle-able solids (mg/1)	Secchi (m)
	S*	8.4	<10	1150	140	1373				< 0.1	
JAN 23	M	8.0	15	1150	140	1363				< 0.1	1.5
	B	8.0	40	1150	140	1414				0.2	
	S	8.2	<10	1450	140	1252				< 0.1	
FEB 26	M	8.3	<10	1400	140	1220				< 0.1	1.1
	B	8.1	10	1350	140	1203				0.2	
	S	7.8	<10	1750	130	1089				< 0.1	
MAR 18	M	7.7	<10	1775	135	1092				< 0.1	1.3
	B	7.4	<10	1800	130	1114				0.1	
	S	7.5	<10	1000	135	1294	190	0.5320	0.02610	< 0.1	
APR 16	M	7.5	10	1000	140	1368	170	0.4430	0.03920	< 0.1	1.6
	B	7.3	<10	1050	120	1178	180	0.6650	0.09130	< 0.1	
	S	7.0	10	1824	140	1130				< 0.1	
MAY 21	M	6.8	10	1862	140	1118				< 0.1	1.5
	B	6.6	10	1700	160	1037				< 0.1	
	S	8.0	<10	1900	130	1123	125			< 0.1	
JUN 18	M	8.0	<10	1900	130	1178	125			< 0.1	1.7
	B	6.3	<10	1650	140	1019	125			< 0.1	
	S	6.8	0	1845	120	977	125	0.0890		< 0.1	
JUL 16	M	6.2	0	1947	130	1153	125	0.1330		< 0.1	1.1
	B	6.2	0	1978	130	1291	125	0.3560		< 0.1	
	S										
AUG	M										
	B										
	S		0	1593	105	0977				0.2	
SEP 20	M		0	1600	110	1953				0.1	0.9
	B		0	1850	115	1004				0.1	

* Symbols: S= Surface of profile
M= Middle of profile
B= Bottom of profile

Table 10. Lower Lake Whitney physicochemical results, 1974.

		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/1)	Total dissolved solids (mg/1)	Sul-fates (mg/1)	Nit-rates (mg/1)	Phos-phates (mg/1)	Settle-able solids (mg/1)	Secchi (m)
	S*	8.3	< 10	1000	130	1298				< 0.1	
JAN 23	M	8.4	10	1000	130	1249				< 0.1	2.3
	B	8.3	15	950	130	1201				0.4	
	S	8.2	<10	1500	130	1150				< 0.1	
FEB 26	M	8.1	<10	1500	140	1187				<0.1	2.3
	B	8.5	10	1450	135	1380				0.3	
	S	8.0	0	1550	135	1101				< 0.1	
MAR 18	M	7.8	0	1600	120	1128				< 0.1	2.7
	B	7.4	10	1650	130	1118				< 0.1	
	S	8.3	0	1000	125	1397	175	0.0889	0.04560	< 0.1	
APR 16	M	7.9	0	1000	130	1322	175	0.2220	0.02610	< 0.1	2.5
	B	7.5	10	1000	120	1146	200	0.4430	0.07840	0.1	
	S	7.1	<10	1818	130	1190				< 0.1	
MAY 21	M	7.0	<10	1820	130	1173				< 0.1	2.7
	B	6.3	<10	1192	150	1227				< 0.1	
	S	7.2	0	1850	130	1321				< 0.1	
JUN 18	M	6.7	0	1850	130	1269				< 0.1	2.3
	B	6.0	<10	1700	135	1207				< 0.1	
	S	6.5	0	1852	130	1158	125	0.1330		< 0.1	
JUL 16	M	6.4	0	1758	130	1241	125	0.1330		< 0.1	1.8
	B	6.2	0	1605	140	1038	126	0.1330		< 0.1	
	S										
AUG	M										
	B										
	S	6.6	0	1850	110	1171				<0.1	
SEP 20	M	6.4	0	1782	160	1215				<0.1	2.1
	B	6.6	0	900	110	1132				<0.1	

* Symbols: S= Surface of profile
M= Middle of profile
B= Bottom of profile

		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/1)	Total solved solids (mg/1)	Hydrogen sulfides (mg/1)	Sul-fates (mg/1)	Nit-rates (mg/1)	Phos-phates (mg/1)	Settle-able solids (ml/1)	Secchi (m)
JAN 22	U*	8.0	15	503.2	160	210	0.1				< 0.1	1.6
	L	7.8	15	496.0	180	289	0.1				0.1	1.1
FEB 19	U	8.1	0	399.0	165	281	< 0.1				< 0.1	1.8
	L	8.2	0	390.4	170	236	< 0.1				< 0.1	1.2
MAR 21	U	8.1	< 10	396.8	150	246	< 0.1				< 0.1	2.0
	L	7.8	20	414.8	160	230	< 0.1				< 0.1	6.0
APR 23	U	7.0	< 10	480.3	150	315	< 0.1		0.9780	0.0310	< 0.1	1.6
	L	7.0	< 10	446.3	145	327	< 0.1		0.7550	0.0620	< 0.1	1.2
MAY 28	U	6.9	10	437.0	155	270	< 0.1				< 0.1	1.5
	L	7.1	10	450.0	160	277	< 0.1				< 0.1	2.1
JUN 19	U	6.1	0	392.0	150	225	< 0.1				< 0.1	2.2
	L	6.5	0	404.0	150	238	< 0.1				< 0.1	1.5
JUL 23	U	6.8	0	396.0	145	321	< 0.1	15	0.4000	0.0130	< 0.1	1.4
	L	6.3	0	385.4	145	371	< 0.1	15	0.1070	0.0065	< 0.1	1.4
AUG 22	U	6.8	0		140	255					< 0.1	0.8
	L	6.3	0		145	259					< 0.1	0.8
SEP 29	U		0	401.2	160	215		10				2.3
	L		0	397.8	160	209		12				1.4

*Symbols: U= Upper station, 200 yards below the dam.
L= Lower station, 2 miles below the dam.

Table 12. Lake Whitney tailwater physicochemical results, 1974.

		pH	Turbidity (jtu)	Specific conductivity (micromhos 25C°)	Total alkalinity (mg/1)	Total dissolved solids (mg/1)	Hydrogen sulfides (mg/1)	Sul-fates (mg/1)	Nit-rates (mg/1)	Phos-phates (mg/1)	Settle-able solids (ml/1)	Secchi (m)
JAN 23	U*	8.2	10	1400	130	1372	0.1				<0.1	.91
	L	8.2	10	1728	130	1295	0.1				<0.1	1.6
FEB 23	U	8.2	<10	1781	130	1175	<0.1				<0.1	1.5
	L	8.1	<10	1781	135	1226	<0.1				0.05	1.5
MAR 18	U	8.0	10	2032	130	1056	<0.1				<0.1	1.0
	L	7.7	<10	2013	130	1194	<0.1				<0.1	1.9
APR 16	U	7.9	<10	1734	140	1112	<0.1	175	.1775	.01960	<0.1	1.6
	L	7.4	<10	1749	135	1257	<0.1	175	.1775	.01305	<0.1	1.6
MAY 21	U	7.3	<10	1782	130	1036	<0.1				<0.1	1.5
	L	6.7	<10	1800	140	1123	<0.1				<0.1	>1.5
JUN 18	U	6.7	0	1764	135	1140	<0.1				<0.1	>1.4
	L	7.0	0	1700	135	1188	<0.1				<0.1	1.4
JUL 16	U	7.0	0	1880	140	1214		125	0.1330		<0.1	1.3
	L	7.0	0	1848	120	1101		125	0.0890		<0.1	1.6
AUG	U											
	L											
SEP 20	U		0	940	110	1152					0.1	0.8
	L		0	810	180	436					0.1	1.0

*Symbols: U=Upper station, 200 yards below the dam.
L=Lower station, 2 miles below the dam.

Table 13. Total standing crop estimates from Lake Belton, 1974.

	Observed standing crop		Adjusted standing crop	
	No./acre	Lbs./acre	No./acre	Lbs./acre
Spotted gar	2.95	3.37	4.76	5.44
Longnose gar	0.34	2.38	0.55	3.84
Threadfin shad	76.25	0.35	122.99	0.56
Gizzard shad	59.29	16.52	95.63	26.64
Smallmouth buffalo	14.05	62.91	22.66	101.47
River carpsucker	3.23	6.74	5.21	10.87
Gray redhorse	3.14	5.10	5.07	8.23
Carp	2.00	16.43	3.23	26.50
Bullhead minnow	44.09	0.17	71.11	0.27
Channel catfish	40.79	10.79	65.79	17.40
Black bullhead	4.28	0.10	6.90	0.16
Yellow bullhead	2.24	0.24	3.61	0.39
Flathead catfish	1.26	0.08	2.03	0.13
Tadpole madtom	31.83	0.12	51.34	0.19
Blackstripe topminnow	0.67	0.01	1.08	0.02
White bass	1.27	0.51	2.05	0.82
Spotted bass	26.66	0.94	43.00	1.52
Largemouth bass	76.41	37.49	123.24	60.47
Warmouth	125.16	1.35	201.87	2.18
Green sunfish	594.55	5.13	958.95	8.27
Redear sunfish	177.34	3.58	286.03	5.77
Bluegill	1,185.67	64.77	1,912.37	104.47
Longear sunfish	289.70	4.26	467.26	6.87
White crappie	36.96	4.34	59.61	7.00
Black crappie	0.19	0.09	0.31	0.15
Logperch	36.88	0.38	59.48	0.61
Freshwater drum	3.30	2.54	5.32	4.10
Totals	2,840.50	250.69	4,581.45	404.34

Table 14. Total standing crop estimates from Lake Whitney, 1974.

	Observed standing crop		Adjusted standing crop	
	No./acre	Lbs./acre	No./acre	Lbs./acre
Spotted gar	3.04	3.59	5.15	6.08
Longnose gar	0.29	0.90	0.49	1.53
Threadfin shad	322.37	5.05	546.39	8.56
Gizzard shad	776.60	146.49	1,316.27	248.29
Smallmouth buffalo	4.07	37.16	6.90	62.98
River carpsucker	2.53	2.34	4.29	3.97
Gray redhorse	3.17	3.21	5.37	5.44
Carp	10.45	33.27	17.71	56.39
Channel catfish	39.74	11.47	67.36	19.44
Yellow bullhead	0.07	0.01	0.12	0.02
Flathead catfish	5.15	6.00	8.73	10.17
Blackstripe topminnow	0.44	0.01	0.75	0.02
White bass	3.18	1.41	5.39	2.39
Spotted bass	29.09	2.83	49.31	4.80
Largemouth bass	43.69	13.20	74.05	22.37
Warmouth	75.62	14.80	128.17	25.09
Green sunfish	125.17	2.64	212.15	4.47
Redear sunfish	69.14	4.32	117.19	7.32
Bluegill	468.33	17.24	793.78	29.22
Redbreast sunfish	254.55	14.43	431.44	24.46
Longear sunfish	92.75	1.82	157.20	3.09
White crappie	30.58	16.28	51.83	27.59
Black crappie	9.01	1.46	15.27	2.47
Logperch	0.28	0.28	0.47	0.47
Freshwater drum	112.68	46.68	190.98	79.12
Totals	2,481.99	386.89	4,206.76	655.75

Table 15. Standing crop estimates for species inch classes from Lake Belton, 1974.

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Spotted gar	23	0.67	1.17
	21	0.67	0.87
	19	0.56	0.64
	18	0.19	0.20
	17	0.67	0.40
	14	0.19	0.09
Longnose gar	43	0.19	1.44
	37	0.15	0.59
Threadfin shad	6	1.30	0.08
	5	0.93	0.04
	4	1.85	0.02
	3	9.72	0.07
	2	60.13	0.13
	1	2.32	<0.01
Gizzard shad	13	0.37	0.11
	12	2.60	1.50
	11	8.15	4.24
	10	18.35	5.68
	9	14.98	3.64
	8	5.72	0.86
	7	2.00	0.18
	6	2.88	0.20
	5	0.15	0.01
	4	2.88	0.09
	3	1.21	<0.01
Smallmouth buffalo	28	0.15	2.47
	27	0.15	1.91
	26	0.64	7.95
	25	0.30	3.11
	24	0.94	9.28
	23	1.19	8.53
	22	1.45	10.72
	20	0.45	1.79
	19	0.76	2.69
	18	1.67	4.65
	17	2.12	4.50
	16	0.45	0.66
	15	0.45	0.50
	14	0.91	1.40
	13	2.12	2.42
	12	0.30	0.33

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
River carpsucker	20	0.15	0.53
	19	0.30	0.97
	18	0.30	0.89
	17	1.12	1.68
	16	1.21	2.42
	15	0.15	0.25
Gray redhorse	18	0.19	0.46
	17	0.86	1.77
	16	0.34	0.61
	15	1.22	1.78
	14	0.34	0.47
	6	0.19	0.01
Carp	29	0.19	2.33
	27	0.15	1.91
	25	0.15	1.42
	24	0.76	5.44
	23	0.45	3.41
	22	0.30	1.92
Bullhead minnow	3	9.24	0.07
	2	31.52	0.09
	1	3.33	<0.01
Channel catfish	24	0.15	0.67
	23	0.15	0.57
	22	0.15	0.48
	21	0.33	0.85
	20	1.04	2.49
	19	0.30	0.71
	18	0.34	0.66
	17	0.19	0.31
	16	0.82	1.32
	15	0.64	0.76
	14	0.30	0.24
	13	0.37	0.26
	12	0.56	0.33
	11	0.19	0.09
	10	0.97	0.25
	9	0.79	0.15
	8	1.21	0.18
	7	1.43	0.17
	6	0.52	0.05
(continued)	5	1.16	0.03

ble 15. (Continued)

Species	inch-class (TL)	No. of fish per acre	Pounds per acre	Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Channel catfish	4	5.38	0.11	Largemouth bass	16	0.15	0.38
	3	5.52	0.05		15	1.80	3.54
	2	10.15	0.04		14	1.19	1.28
	1	8.13	0.02		13	3.17	3.42
					12	7.90	5.69
Black bullhead	6	0.19	0.02		11	17.42	10.38
	5	0.93	0.05		10	12.01	5.42
	4	0.56	0.01		9	4.32	1.42
	3	2.04	<0.01		8	1.76	0.46
	2	0.56	<0.01		7	1.25	0.15
					6	2.97	0.50
Yellow bullhead	10	0.15	0.04		5	9.72	0.49
	9	0.30	0.12		4	9.26	0.23
	8	0.15	0.03		3	2.22	0.04
	7	0.15	0.02		1	0.33	<0.01
	5	0.15	<0.01				
	4	0.67	0.01	Warmouth	6	0.49	0.08
	2	0.67	<0.01		5	1.72	0.11
					4	14.10	0.45
thead catfish	9	0.33	0.06		3	29.61	0.45
	3	0.56	<0.01		2	76.24	0.24
	2	0.37	<0.01		1	3.00	0.02
Tadpole madtom	4	0.67	0.01	Green sunfish	8	0.33	0.08
	3	2.58	0.02		7	1.13	0.23
	2	25.65	0.08		6	3.13	0.42
	1	2.93	0.01		5	9.00	0.38
					4	33.51	1.01
Blackstripe topminnow	2	0.67	<0.01		3	174.26	1.78
					2	227.63	1.03
White bass	12	0.15	0.10		1	145.56	0.20
	11	0.45	0.28				
	8	0.67	0.13	Redear sunfish	8	1.19	0.29
					7	2.16	0.42
Spotted bass	10	0.15	0.08		6	8.27	0.94
	9	0.70	0.24		5	9.22	0.79
	8	0.33	0.05		4	8.64	0.29
	7	0.52	0.07		3	12.93	0.18
	6	0.37	0.03		2	131.45	0.66
	5	1.41	0.07		1	3.48	<0.01
	4	12.81	0.28				
	3	10.37	0.12	Bluegill	7	41.77	9.12
					6	187.04	28.06
Largemouth bass	23	0.15	1.05		5	180.62	15.72
	20	0.34	1.44		4	151.95	7.07
	19	0.15	0.62		3	239.98	3.16
	17	0.30	0.97	(continued)	2	333.16	1.59

Table 15. (Continued)

Species	inch-class (TL)	No. of fish per acre	Pounds per acre	Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Bluegill	1	51.15	0.05				
Longear sunfish	6	1.61	0.18				
	5	16.60	1.35				
	4	25.65	0.97				
	3	68.87	0.91				
	2	135.41	0.77				
	1	41.56	0.08				
White crappie	12	0.15	0.12				
	11	0.15	0.11				
	10	1.65	0.82				
	9	3.15	1.17				
	8	2.58	0.59				
	7	5.34	0.85				
	6	3.48	0.45				
	5	0.61	0.07				
	4	2.58	0.03				
	3	14.09	0.11				
	2	3.18	0.02				
Black crappie	8	0.19	0.09				
Log perch	6	0.19	<0.01				
	5	0.45	<0.01				
	4	21.14	0.21				
	3	14.17	0.14				
	2	0.93	<0.01				
Freshwater drum	17	0.15	0.15				
	16	0.33	0.47				
	15	0.34	0.47				
	13	0.70	0.49				
	12	1.26	0.77				
	11	0.37	0.16				
	8	0.15	0.03				

Table 16. Standing crop estimates for species inch classes from Lake Whitney, 1974.

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Spotted gar	29	0.11	0.26
	27	0.19	0.21
	26	0.07	0.15
	25	0.17	0.34
	24	0.22	0.40
	22	0.07	0.33
	21	0.18	0.24
	20	0.50	0.60
	19	0.81	0.65
	18	0.09	0.10
	17	0.09	0.05
	16	0.17	0.12
	15	0.26	0.12
	14	0.11	0.02
Longnose gar	37	0.15	0.46
	33	0.07	0.22
	31	0.07	0.21
	8	0.07	0.01
Threadfin shad	6	10.63	0.51
	5	41.70	1.69
	4	64.99	1.50
	3	88.02	1.04
	2	54.82	0.32
	1	62.18	0.09
Gizzard shad	15	0.18	0.21
	14	4.26	3.85
	13	25.31	17.17
	12	54.01	32.59
	11	72.09	28.79
	10	23.33	7.49
	9	43.04	8.60
	8	160.10	24.46
	7	116.78	11.59
	6	134.98	8.11
	5	19.92	0.81
	4	122.60	2.21
	3	46.55	0.61
nallmouth buffalo	30	0.15	4.80
	29	0.30	4.69
	28	0.24	3.69

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Smallmouth buffalo	27	0.22	3.28
	26	0.07	0.85
	25	0.22	2.21
	24	0.30	2.82
	23	0.63	4.49
	22	0.73	5.34
	21	0.44	2.53
	20	0.24	1.27
	19	0.09	0.45
	15	0.15	0.26
	14	0.22	0.40
	13	0.07	0.08
River Carpsucker	19	0.18	0.19
	18	1.66	1.20
	17	0.24	0.57
	16	0.09	0.14
	14	0.07	0.09
	13	0.15	0.10
	12	0.07	0.03
	10	0.07	0.02
Gray Redhorse	19	0.07	0.22
	18	0.22	0.53
	17	0.33	0.41
	16	0.11	0.22
	15	0.31	0.38
	14	0.11	0.15
	13	0.07	0.08
	12	0.30	0.24
	11	0.58	0.31
	10	1.50	0.60
	9	0.09	0.01
Carp	27	0.07	0.66
	26	0.09	0.72
	25	0.15	0.90
	24	0.15	0.70
	23	0.72	2.21
	22	1.77	7.78
	21	2.48	9.12
	20	1.39	4.96
	19	1.03	2.94
(continued)	18	0.37	0.97

Table 16. (Continued)

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Carp	17	0.42	0.92
	16	0.48	1.01
	15	0.11	0.18
	9	0.07	0.03
	8	0.07	0.02
	7	0.15	0.02
	5	0.24	0.01
	4	0.39	0.01
	3	0.29	0.01
	2	0.07	0.01
Channel catfish	23	0.07	0.41
	22	0.07	0.30
	21	0.07	0.25
	20	0.07	0.18
	19	0.17	0.56
	18	0.28	0.63
	17	0.44	0.81
	16	0.67	0.71
	15	0.71	0.89
	14	0.85	0.62
	13	1.06	0.66
	12	1.59	0.71
	11	1.47	0.77
	10	2.50	0.65
	9	4.16	0.79
	8	5.75	0.94
	7	5.61	0.53
	6	4.40	0.33
	5	3.95	0.50
	4	2.96	0.16
	3	1.16	0.03
	2	0.80	0.04
Yellow bullhead	5	0.07	0.01
Flathead catfish	34	0.07	1.24
	33	0.07	1.56
	27	0.07	0.49
	25	0.15	0.29
	22	0.17	1.30
	21	0.07	0.28
	16	0.07	0.27
	15	0.22	0.28
	11	0.07	0.11
	10	0.07	0.02
	9	0.20	0.05

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Flathead catfish	7	0.15	0.01
	6	0.24	0.02
	5	0.57	0.01
	4	1.61	0.04
	3	1.25	0.02
	2	0.69	0.01
Blackstripe minnow	3	0.11	0.01
	2	0.22	0.01
	1	0.11	0.01
White bass	15	0.11	0.12
	14	0.22	0.22
	13	0.20	0.17
	10	1.49	0.54
	9	1.05	0.32
	8	0.11	0.04
Spotted bass	14	0.07	0.06
	13	0.33	0.27
	12	0.44	0.31
	11	0.35	0.31
	10	1.29	0.44
	9	2.20	0.66
	8	1.43	0.27
	7	1.33	0.14
	6	1.95	0.15
	5	1.36	0.06
	4	3.14	0.05
	3	9.99	0.09
	2	2.35	0.02
Largemouth bass	20	0.11	0.46
	18	0.18	0.61
	17	0.07	0.20
	16	0.29	0.62
	15	0.58	0.93
	14	0.64	0.88
	13	0.95	0.86
	12	0.93	0.90
	11	1.04	0.90
	10	3.17	1.35
	9	7.10	2.12
	8	8.05	1.87
	7	2.80	0.99
	6	0.74	0.11
(continued)	5	2.01	0.07

Table 16. (Continued)

Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Largemouth bass	4	6.69	0.24
	3	7.15	0.09
	2	1.19	0.02
Warmouth	8	0.07	0.03
	6	0.35	0.03
	5	4.04	0.49
	4	13.55	0.49
	3	41.56	0.46
	2	14.45	0.09
	1	1.60	0.01
Green sunfish	8	0.22	0.06
	7	2.83	0.21
	6	5.66	0.50
	5	12.24	0.61
	4	19.59	0.50
	3	65.41	0.54
	2	17.35	0.11
	1	1.87	0.01
Redear sunfish	8	1.19	0.29
	7	4.26	0.57
	6	8.77	1.34
	5	15.14	0.93
	4	19.34	0.16
	3	19.65	0.32
	2	0.79	0.01
Bluegill	8	0.45	0.08
	7	7.99	1.49
	6	23.71	2.20
	5	74.70	5.07
	4	120.43	4.36
	3	152.98	2.60
	2	70.14	0.42
	1	17.93	0.02
Redbreast sunfish	9	0.33	0.05
	8	6.94	1.74
	7	17.98	2.78
	6	46.83	3.88
	5	82.23	5.19
	4	29.35	0.42
	3	26.65	0.17
Redbreast sunfish	2	30.21	0.11
	1	14.03	0.09
Longear sunfish	6	1.02	0.01
	5	8.72	0.49
	4	17.26	0.83
	3	35.74	0.36
	2	28.72	0.14
	1	1.29	0.01
White crappie	13	0.15	0.17
	12	0.07	0.03
	11	0.15	0.60
	10	0.55	0.22
	9	0.64	0.19
	8	1.01	0.22
	7	6.10	13.30
	6	13.84	1.16
	5	6.78	0.34
	4	0.53	0.05
	3	0.61	0.01
	2	0.15	0.01
Black crappie	12	0.07	0.07
	10	0.07	0.06
	9	0.07	0.04
	8	1.32	0.34
	7	3.10	0.51
	6	3.98	0.41
	5	0.40	0.03
Log perch	4	10.44	0.18
	3	10.40	0.10
	2	0.62	0.01
Freshwater drum	19	0.07	19.39
	18	0.11	0.26
	16	0.07	0.10
	15	0.07	0.13
	14	0.07	0.09
	13	0.38	0.27
	12	3.50	2.34
	11	12.02	5.32
	10	25.51	10.52
(continued)	9	10.58	2.77

Table 16. (Continued)

Species	inch-class (TL)	No. of fish per acre	Pounds per acre	Species	inch-class (TL)	No. of fish per acre	Pounds per acre
Freshwater drum	8	1.92	0.42				
	7	34.60	3.64				
	6	20.83	1.28				
	5	1.06	0.08				
	4	0.70	0.02				
	3	1.19	0.05				

Table 17. A checklist of fishes encountered from Lakes Belton and Whitney, 1974.

Scientific Name	Common Name	Belton	Whitney
Lepisosteus oculatus	Spotted gar	X	X
L. osseus	Longnose gar	X	X
Dorosoma petenense	Threadfin shad	X	X
D. cepedianum	Gizzard shad	X	X
Ictiobus bubalus	Smallmouth buffalo	X	X
Carpiodes carpio	River carpsucker	X	X
Moxostoma congestum	Gray redhorse	X	X
Cyprinus carpio	Carp	X	X
Pimephales vigilax	Bullhead minnow	X	
Ictalurus punctatus	Channel catfish	X	X
I. melas	Black bullhead	X	
I. natalis	Yellow bullhead	X	X
Pylodictis olivaris	Flathead catfish	X	X
Noturus gyrinus	Tadpole madtom	X	
Fundulus notatus	Blackstripe topminnow	X	X
Morone chrysops	White bass	X	X
M. saxatilis	Striped bass		X
Micropterus punctulatus	Spotted bass	X	X
M. salmoides	Largemouth bass	X	X
Lepomis gulosus	Warmouth	X	X
L. cyanellus	Green sunfish	X	X
L. microlophus	Redear sunfish	X	X
L. macrochirus	Bluegill	X	X
L. auritus	Redbreast sunfish		X
L. megalotis	Longear sunfish	X	X
Pomoxis annularis	White crappie	X	X
P. nigromaculatus	Black crappie	X	X
Stizostedion vitreum	Walleye	X	
Percina caprodes	Logperch	X	X
Aplodinotus grunniens	Freshwater drum	X	X