33.4
47.3- Bristow
City Lake

SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

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OKLAHOMA

DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

BRISTOW CITY LAKE

1985

Job Performance Report

Oklahoma Fisheries Management Program

Federal Aid Project No. F-38-R-8

Fish Management Surveys and Recommendations

for

Bristow City Lake

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Job Performance Report

State: Oklahoma Project No.: F-38-R-8

Project Title: Oklahoma Fisheries Management Program

Study Title: Surveys and Recommendations - Bristow City Lake

Period Covered: January 1,1985 - December 31, 1985

ABSTRACT

Bristow City Lake was surveyed in 1985 using spring and fall electrofishing and fall gill netting. Largemouth bass population density was moderate with an abundance of stock size and smaller; and trophy sized fish with fish in the quality size range being of lowest abundance. Largemouth bass recruitment appeared adequate and small fish (less than 280 mm) were in poor condition (W_r). The white crappie were moderately high in abundance and were mostly stock sized individuals. Channel catfish population density was low; made up of good condition individuals that are experiencing some reproduction problems. Black bullhead were the most abundant fish captured during fall gill netting. Bluegill were found in high abundance, mostly of stock size and larger, and larger fish were in good condition. Redear sunfish were found in relatively high densities, most fish were quality sized, and in good condition. The gizzard shad appeared abundant in the spring electrofishing sample and scarse in the fall gill netting, they were generally of a size to be too large to serve as forage for stock size predators. Recommendations included constructing brush fish attractors and installing catfish spawning containers to provide spawning habitat and protection of the nests. Stocking of grow out channel catfish to augment low natural reproduction is also recommended. The enforcement of a 13-16" slot length limit is recommended to help improve the quality of largemouth bass angling on Bristow City Lake.

INTRODUCTION

Bristow City Lake, also known as Lake Massena, is a municipal impoundment on Catfish Creek, a tributary of Little Deep Fork Creek, within the city limits of Bristow, Oklahoma in Creek County. The lake was impounded in 1935-36 by the W.P.A. and has a surface area of 14 ha. The lake was originally named for the wife of the Governor at that time, Alfalfa Bill Murray. The shoreline of the reservoir is largely covered in waterwillow and smartweed.

The lake was poisoned out with rotenone in 1975 and restocked with 700 hybrid sunfish, 1,500 bluegill sunfish, 2,200 channel catfish, and 2,200 largemouth bass. Recent fish stockings include 1,750 grow-out channel catfish in 1983, 320 grass carp for vegetation control in 1984, and 400 channel catfish in 1985.

There was a partial survey completed in 1984. Tulsa Region personnel collected fish population data on Bristow City Lake from May through November 1985. Survey methods include spring electrofishing, fall electrofishing, and fall gill netting.

Largemouth Bass

1. The population density of largemouth bass in the spring electrofishing sample apparently increased (1985 C/f = 9.50, 1984 C/f = 5.50, Table 1). The 1985 survey indicates that the population density has increased, but the limited sample size of the 1984 survey (1985 N = 114, 1984 N = 44, Table 1) may not have presented a truely accurate sample of the population for comparison. The density of largemouth bass from the 1985 spring electrofishing was well above the regional average (C/f = 4.67, Table 5). The density of largemouth

bass in the fall electrofishing sample also appeared high (C/f = 15.42, Table 3).

2. The largemouth bass population structure from the spring electrofishing sample showed an increase in the numbers of stock size fish (1984 PSD = 63%, 1985 PSD = 32%, Table 2). The largemouth bass sampled during spring electrofishing ranged in length from 113-525 mm with a M.L.R. = 180-216 (Figure 1). The size structure still indicates an abundance of trophy size fish from within the stock size fish numbers (1984 PSD = 63%, RSD = 63%; 1985 PSD = 32%, RSD = 28%, Table 2). The spring electrofishing sample indicated that 87% of the largemouth bass sampled were less than 300 mm in length, 11% were greater than 380 mm in length, and only 13% were quality size (greater than 300mm - - Figure 1). According to the size group distribution of largemouth bass Bristow City Lake appears to be a candidate for a slot length limit (Table 6). The fall electrofishing sample continued a trend of the stock sized and smaller fish being most abundant (Figure 1). There continued to be an abundance of trophy sized fish from within the stock size fish numbers (PSD = 20%, RSD = 18%).

3. Condition (W_r) of largemouth bass from the 1985 spring electrofishing sample ranged from poor to excellent (73 to 103%, Figure 1). Generally the largemouth bass greater than 280 mm in length were in good to excellent condition and those fish less than 280 mm in length were in poor condition. The condition (W_r) of largemouth bass sampled during fall electrofishing showed an improvement in most size classes (Figure 1).

The only size groups that exhibited poor condition during the fall electrofishing were the fish from 221-260 mm (Figure 1). There maybe a forage problem for stock sized individuals in Bristow City Lake.

4. Reproduction was documented during fall electrofishing. There was a young-to-adult ratio of 3.3 observed from the 1985 fall electrofishing ($N \leq 152$ mm = 33, $N \geq 305$ mm = 10). Largemouth bass seem to be effectively recruiting into the population at this time.

White Crappie

1. The population density of white crappie in the spring electrofishing sample was high (1985 C/f = 7.92, 1984 C/f = 1.50, Table 1) well above the regional average (C/f = 1.39, Table 5). The density observed during the gillnetting sample was low (C/f = 0.11, Table 4) and not even half the regional average (C/f = 0.28, Table 5). Shoreline electrofishing may have overestimated the abundance of white crappie along shoreline and the fall gillnetting sample may have underestimated their abundance. Only one white crappie was captured during fall electrofishing (C/f = 0.14, Table 3).
2. The white crappie sampled during spring electrofishing ranged from 154 to 262 mm in length and had a M.L.R. = 177-188 mm (Figure 3). The white crappie sampled during fall gill netting ranged from 124-186 mm with a M.L.R. = 160-182 mm. The white crappie population in Bristow City Lake appears to be dominated by stock size individuals.
3. Condition (W_r) of white crappie from the spring electrofishing ranged from 79 to 108% indicating overall they are in good

condition (Figure 3). The white crappie collected during fall gill netting, conditions ranged from 100 to 113% indicating they were overall in excellent condition.

4. Reproduction of white crappie was not documented during 1985.

Channel Catfish

1. The density of channel catfish from the gillnetting sample was low (C/f= 0.05, Table 4) and well below the regional average (C/f = 0.16, Table 5).
2. Channel catfish gillnetted during 1985 ranged from 378 to 527 mm in length with a M.L.R. = 393-524 mm. The range of lengths sampled indicates that channel catfish maybe experiencing some recruitment problems.
3. Condition (W_r) of channel catfish in the gillnetting sample ranged from 87 to 154% indicating good to excellent condition typical of low density population.
4. Reproduction of channel catfish during 1985 was not documented.

Black Bullhead

1. The density of black bullhead from the gillnetting sample was the highest of any fish sampled by that gear (C/f = 0.13, Table 4).
2. The black bullheads sampled during gillnetting ranged in length from 220 to 262 mm in length with a M.L.R. = 236-261 mm.
3. All size groups of black bullheads exhibited good to excellent condition with K values over 1.0.
4. Recruitment of black bullhead catfish was not documented during 1985.

Bluegill

1. The population density of bluegill in the 1985 spring electrofishing sample (C/f = 31.50,Table 1) was extremely high when compared to the 1984 spring electrofishing sample (C/f = 13.25, Table 1) and the regional average (C/f = 13.65, Table 5).
2. The population structure of bluegill from spring electrofishing showed a predominance of stock-sized individuals (M.L.R. = 125-143 mm, Figure 2; PSD = 18%, Table 2). This is a continuation of parameters observed during 1984 (M.L.R. 121-140 mm and PSD = 19%, Table 2).
3. Condition (W_r) of bluegill from the spring electrofishing indicated that fish above 80 mm were in excellent condition while those below 80 mm were in poor condition (Figure 2).
4. Although the 1985 spring electrofishing produced only 1.9% of the sample less than 80 mm in length (Figure 2) bluegill appeared to be recruiting into the population effectively.

Redear Sunfish

1. The density of redear sunfish in the 1985 spring electrofishing sample decreased from 1984 (1985 C/f = 12.88, 1984 C/f = 18.13, Table 1) but remained almost twice as the regional average (C/f = 6.66, Table 5).
2. The population structure of redear sunfish continued to show a high concentration of quality size fish (M.L.R. = 149-166 mm, Figure 2; PSD = 75%, Table 2).
3. The condition (W_r) of redear sunfish from spring electrofishing indicated that overall they are in good condition (W_r's from 87 to 96, Figure 2).
4. Reproduction of redear sunfish was not confirmed during 1985.

Gizzard Shad

1. Gizzard shad density during 1985 spring electrofishing was high (1985 C/f = 35.88, 1984 C/f = 6.38, Table 1) and almost three times higher than the regional average (C/f = 12.22, Table 5). Gizzard shad density in the fall gillnetting sample was low (C/f= 0.06, Table 4) and well below the regional average (C/f = 0.64, Table 5). The variation in the densities of gizzard shad between the spring electrofishing and fall gill netting may be related to the effectiveness of the gear types seasonally used. The spring electrofishing may have overestimated and the fall gill netting may have underestimated the density of gizzard shad in Bristow City Lake.
2. The population structure of gizzard shad in the spring electrofishing sample indicated that most fish were too large a size to be available to stock size predators (M.L.R. 197-221 mm, Figure 3). Gizzard shad sampled in fall gill netting continued to be of a size to large to be preyed upon effectively by stock size predators (M.L.R. 149-217 mm).
3. The condition (W_r) of gizzard shad from the spring electrofishing ranged from poor to good (41-95%, Figure 3). The majority of the gizzard shad sampled during spring electrofishing were in poor condition with those greater than 180 mm (96%) experiencing the worst condition and highest densities. The condition (W_r) of the gizzard shad sampled in the fall gill netting indicated good to excellent condition (99-104%) which is usually a characteristic of a low density population.
4. Reproduction was not verified during 1985 by fall electrofishing or gill netting (Table 3 and 4 respectively).

Other Species

White Amur

White amur were stocked in 1984 for vegetation control. There were two White amur sampled during gill netting (C/f = 0.02, Table 4), they ranged from 435 to 537 mm in length and were in good condition with condition factors (K values) over 1.0.

RECOMMENDATIONS

Fish Habitat Improvements

The addition of brush fish attractors to concentrate fish for boat and bank anglers. Catfish spawning structures should continue to be added to provide spawning habitat for stocked channel catfish.

Stocking

Growout channel catfish should be stocked to augment low natural recruitment and to avoid predation by largemouth bass that fingerling stockings allow.

Fish Harvest Regulation

Bristow City Lake has a largemouth bass population that has a low abundance of quality size fish, moderate abundance of stock size and smaller fish in poor condition, and moderate recruitment. Bristow City Lake is a candidate for a slot length limit (13-16").

Other

Bristow City Lake should be surveyed again in 1987 according to the guidelines outlined in "Standardized Sampling Procedures for Lake and Reservoir Management Recommendations". An evaluation of the proposed slot length limit could be performed at this time.

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LITERATURE CITED

Ambler, M.E. 1984. Oklahoma fisheries management surveys and recommndations for Bristow City Lake. Oklahoma D-J Federal Aid Project No. F-38-R-7. Performance Report. 10 pp.

Table 1. Total number (N), weight and catch per unit effort (C/f)* for fishes collected by spring electrofishing, Bristow City Lake 1984, 1985.

Species	N	Weight (g)		C/f (15 min)	
		Total	Mean	No.	Wt.
Largemouth Bass					
1984a	44	25,155	571.70	5.50	3,144.38
1985	114	31,383	275.29	9.50	2,615.25
White Crappie					
1984	12	793	66.08	1.50	99.13
1985	95	6,451	67.91	7.92	537.58
Bluegill					
1984	106	5,244	49.47	13.25	655.50
1985	252	12,188	48.37	31.50	1,523.50
Redear Sunfish					
1984	145	9,887	68.19	18.13	1,235.88
1985	103	6,673	64.79	12.88	834.13
Gizzard Shad					
1984	51	4,518	88.59	6.38	564.75
1985	287	20,946	72.98	35.88	2,618.25

* C/f is based on 15 minutes (8 units in 1984 and 12 units in 1985).

[a] data from Ambler 1984.

Table 2. Proportional and relative stock density indices from selected species collected by spring electrofishing from Bristow City Lake 1984, 1985.

Species	N	Number			PSD	RSD
		Stock	Quality	Trophy		
Largemouth Bass						
1984	44	19	12	12	63	63
1985	114	47	15	13	32	28
Bluegill						
1984	106	104	20	0	19	0
1985	252	247	45	0	18	0
Redear Sunfish						
1984	145	145	88	0	61	0
1985	103	103	77	0	75	0
Gizzard Shad						
1984	51	49	1	0	2	0
1985	287	280	2	0	2	0

Table 3. Total number (N), weight and catch per unit effort (C/f)* for selected fishes collected by fall electrofishing, Bristow City Lake 1985.

Species	N	Weight(g)		C/f(15 min)	
		Total	Mean	No.	Wt.
Largemouth Bass	108	24,466	226.54	15.42	3,495.14
White Crappie	1	106	106	0.14	15.14

* C/f is based on 15 minutes (7 units in 1985).

Table 4. Total number (N), total and mean weight, and catch per unit effort (C/f)* for selected fishes collected by fall gill netting from Bristow City Lake during 1985.

Species	N	Weight (g)		C/f (h)	
		Total	Mean	No.	Wt.
White Crappie	10	614	61.40	0.11	6.98
Channel Catfish	4	4,152	1,038.00	0.05	47.18
Black Bullhead	11	2,702	245.64	0.13	30.70
White Amur	2	2,773	1,386.50	0.02	31.51
Gizzard Shad	5	361	72.20	0.06	4.10

* The effort for C/f calculations was 88 hours in 1985.

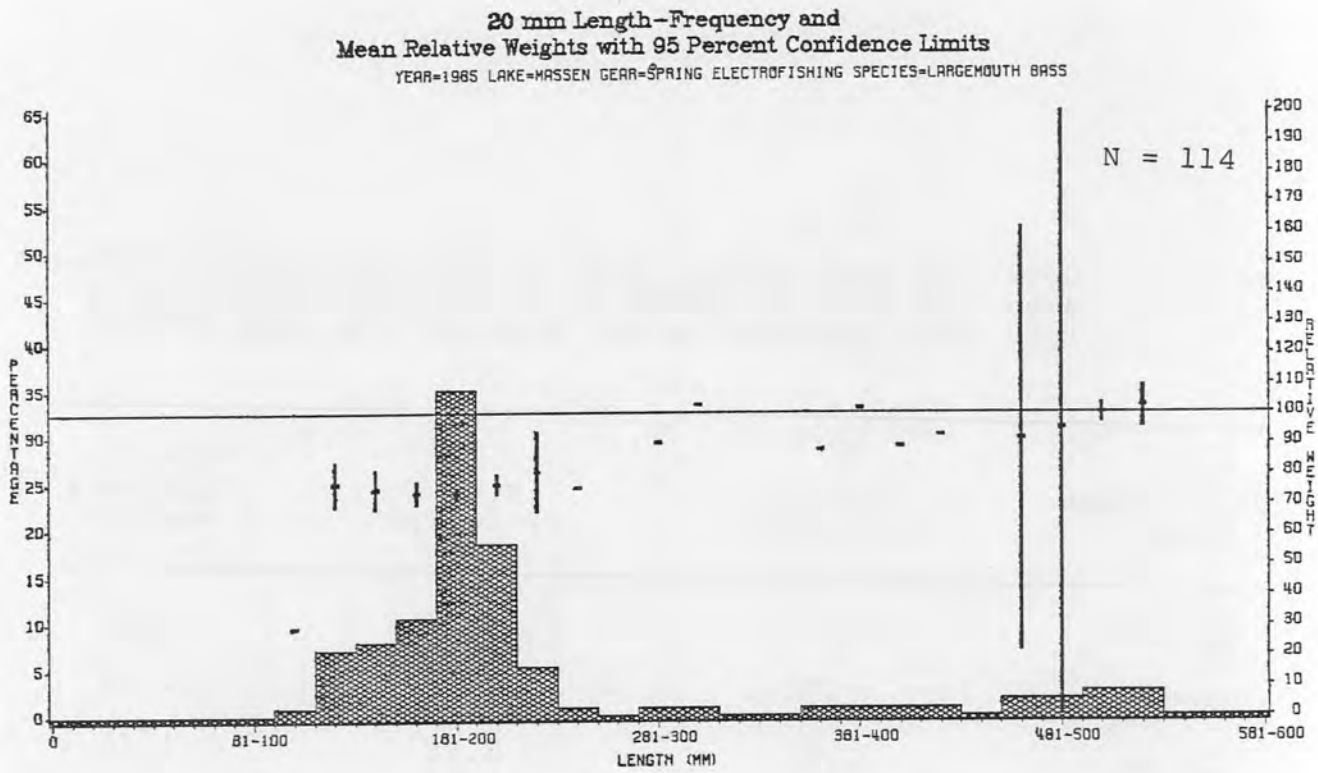
Table 5. Regional catch per unit effort (C/f) by number for selected species by gear type on reservoirs less than 405 hectares.

Species	Gear Type		
	Electrofishing	Seining	Gill Netting
Largemouth Bass	4.67	2.06	--
Spotted Bass	2.88	0.02	--
White Crappie	1.39	1.66	0.28
Bluegill Sunfish	13.65	--	--
Redear Sunfish	6.66	--	--
Sunfish Spp.	--	116.92	--
Channel Catfish	--	--	0.16
Gizzard Shad	12.22	5.95	0.64
Notropis Spp.	--	5.66	--
Flathead Catfish	--	--	0.01

Table 6. Catch per unit effort (C/f) by size groups of largemouth bass collected by spring electrofishing from Bristow City Lake, compared to the Bristow City Lake average.

Size Groups (mm)	1984 N = 44 C/f = 5.50	1985 N = 114 C/f = 9.50	Bristow City Lake Average
≤ 200	3.13	5.83	4.48
201-300	0.88	2.42	1.65
≥ 301	1.50	1.25	1.38
≥ 381	1.50	1.08	1.29

Figure 1. Length frequencies and mean relative weights by length group for largemouth bass collected by spring electrofishing and fall electrofishing from Bristow City Lake, 1985.



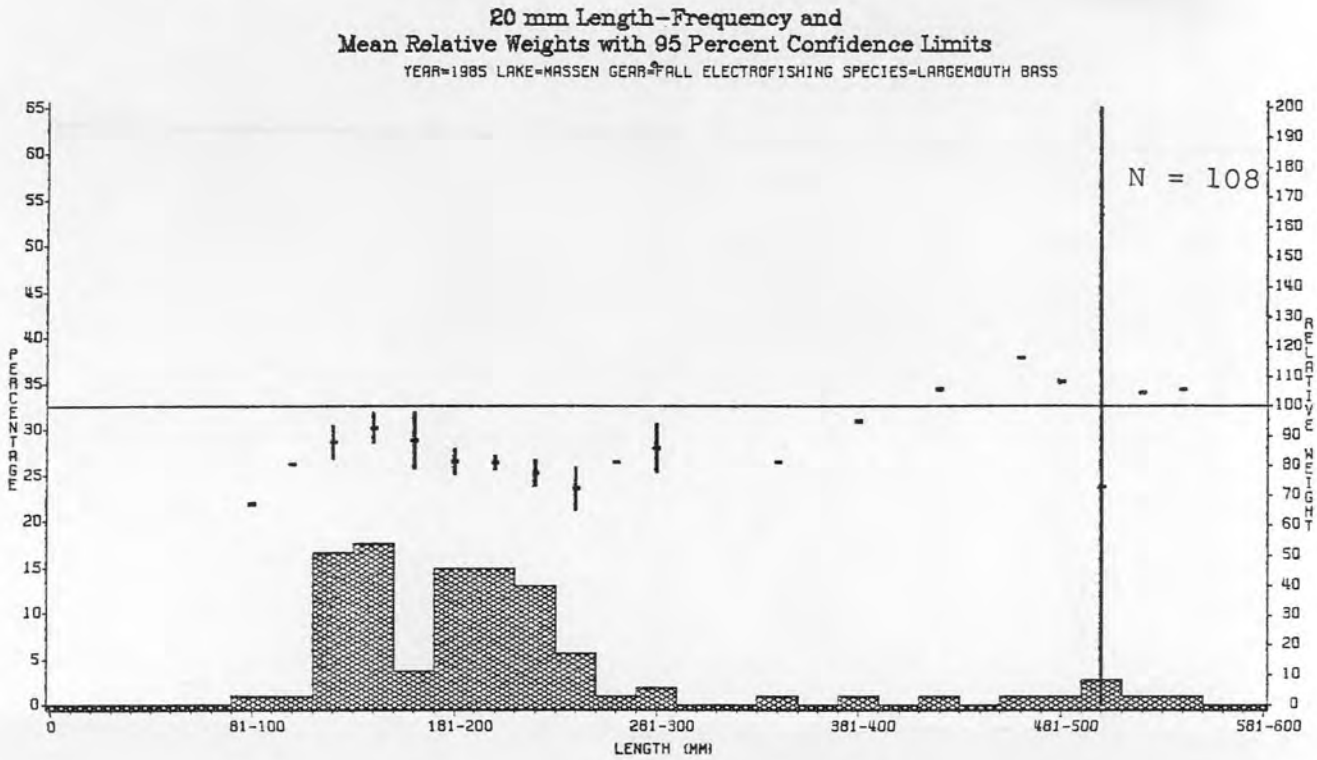
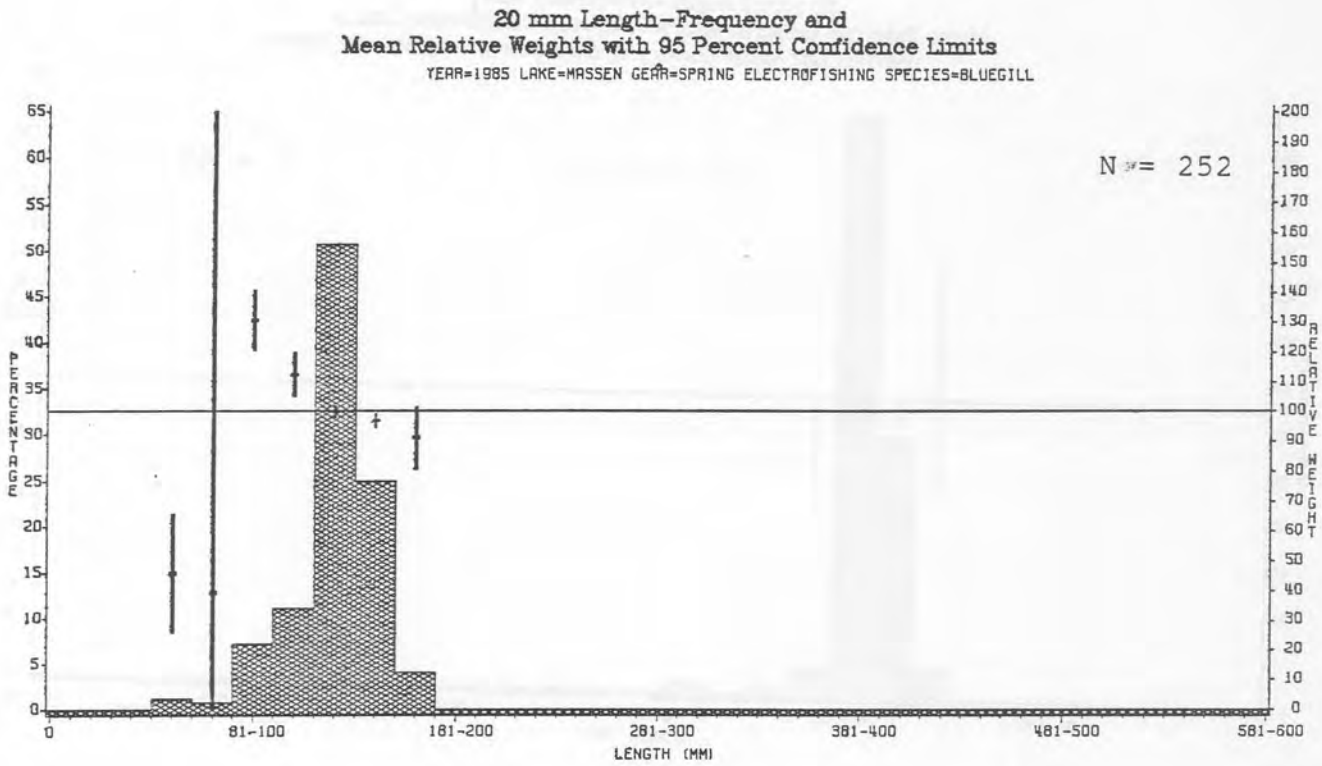


Figure 2. Length frequencies and mean relative weights by length group for bluegill and redear sunfish collected by spring electrofishing from Bristow City Lake, 1985.



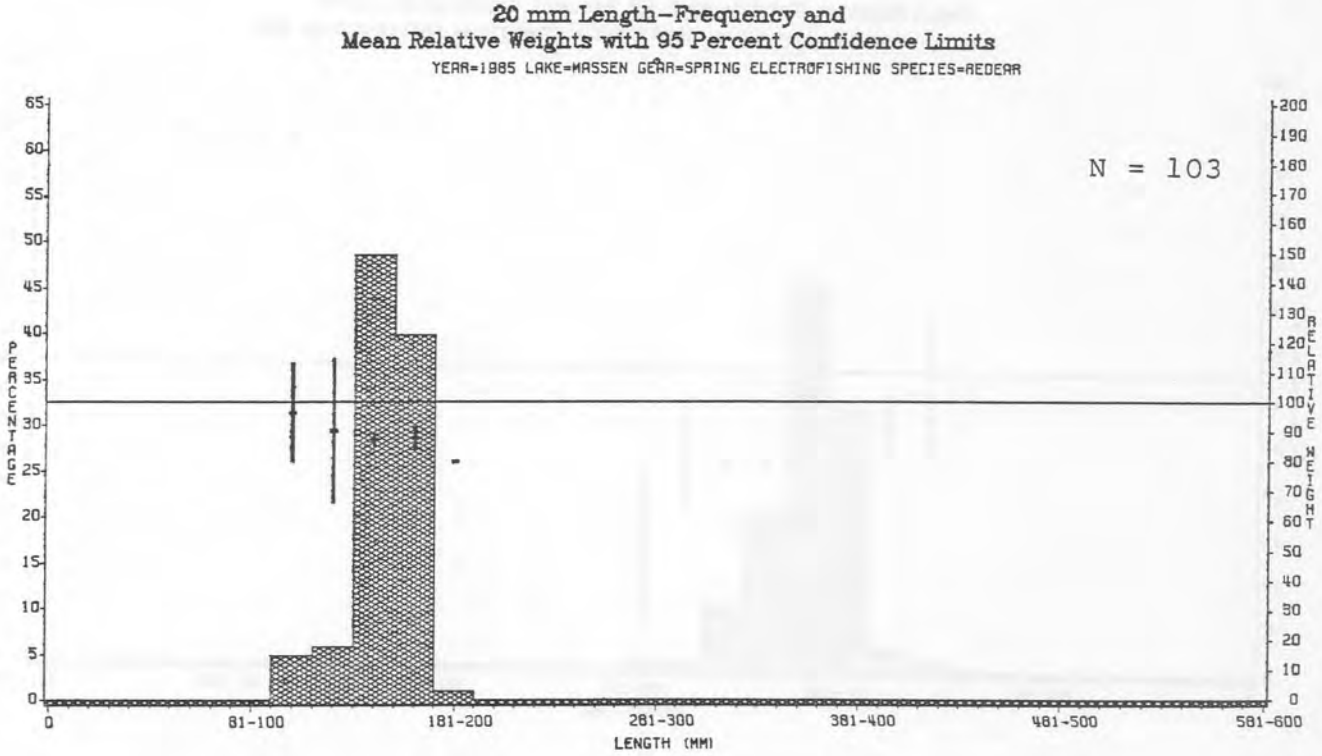
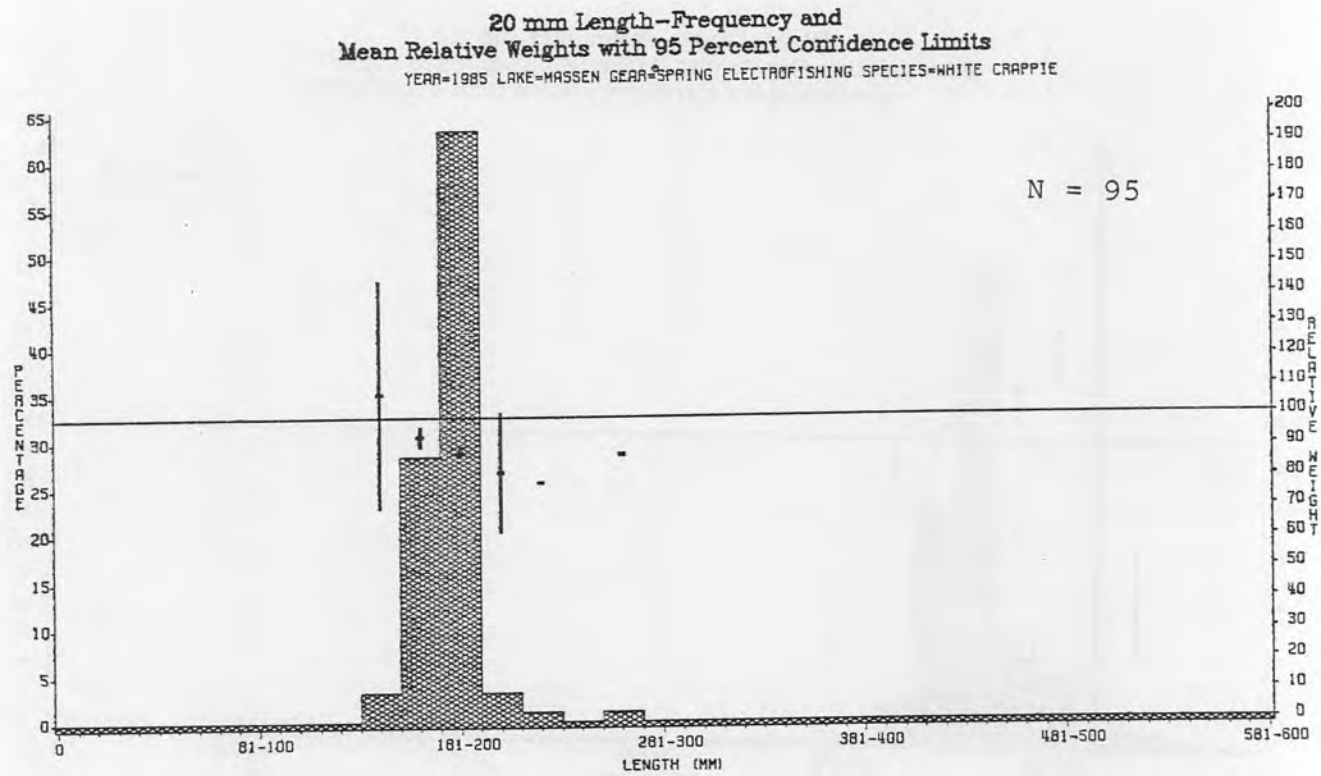
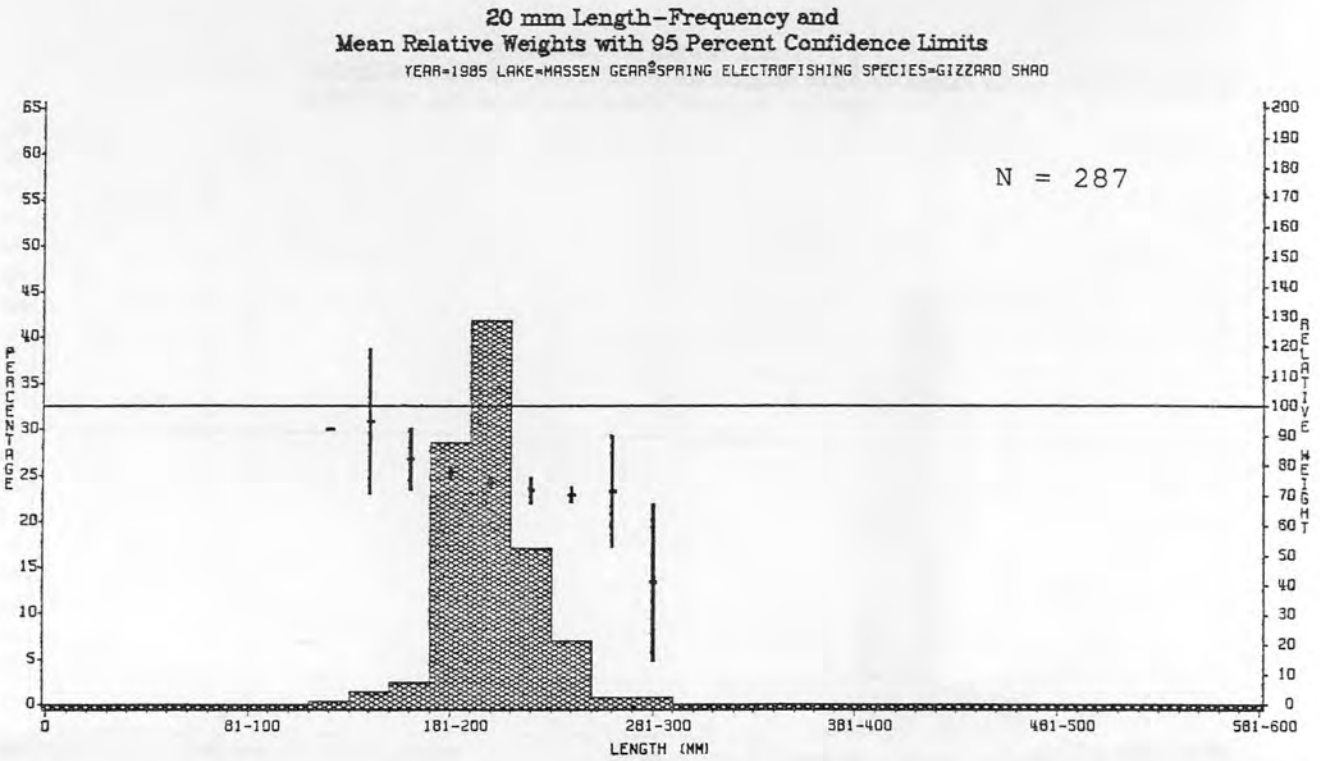



Figure 3. Length frequencies and mean relative weights by length group for white crappie and gizzard shad collected by spring electrofishing from Bristow City Lake, 1985.