33.4 43.7
Hicks, D.

SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

Hominy Lake

1988

Job Performance Report

Oklahoma Fisheries Management Program

Federal Aid Project No. F-44-D-3

Fish Management Survey and Recommendations

for

Hominy Lake

Prepared by Don Hicks

Job Performance Report

State: Oklahoma Project No. F-44-D-3

Project Title: Oklahoma Fisheries Management Program

Survey Title: Survey and Recommendations - Hominy Lake

Period Covered: January 1, 1988 - December 31, 1988

ABSTRACT

Spring electrofishing was conducted on Hominy Lake to monitor the population status of largemouth bass and forage fish species since the initiation of a 14 inch length limit on largemouth bass in 1986.

Largemouth bass were very abundant with a substantial percentage of the population comprised of quality size fish between 12 and 14 inches in length. Legal or harvestable size (>14 in.) fish appeared to be proportionally less abundant than in 1979 which may be a result of the minimum length limit.

White and black crappie were above or equal to the regional average in abundance, respectively. Almost 100 percent of the crappie collected were harvestable (>9 in.) size.

Bluegill were very abundant and they appeared to be providing the primary forage for the largemouth bass population. Increased predation on bluegill has shifted the population structure and produced larger numbers of quality size (>6 in.) fish.

Gizzard shad continued to be low in abundance with highly variable annual recruitment. They appeared to be providing limited prey for the largemouth bass population.

Recommendations include the continuation of the 14 inch minimum length limit, the stocking of channel catfish in alternate years and the elimination of highly selective fishing methods for channel catfish.

INTRODUCTION

Hominy City Lake is a 200 surface acre impoundment located on Claremore Creek 2.3 miles southwest of Hominy in Osage County. The Lake was initially impounded in 1956 primarily for a water supply and recreation. Physical parameters include a shoreline development ratio of 3.6, an average depth of 25 feet, a low water exchange rate and clear water (secchi = 8.6 inches). Shorelines are primarily steep with a substrate of large to small rocks and clay soils. Submerged vascular aquatic plants are numerous on shallow flats during the growing season.

Spring electrofishing was conducted in April, 1988 to primarily evaluate the status of largemouth bass and forage species populations since the initiation of a city imposed 14 inch minimum length limit on largemouth bass in 1986.

A survey conducted in 1979 showed abundant but balanced largemouth bass and bluegill populations. Less than desirable length-weight conditions for smaller size bass indicated intense competition for prey. Gizzard shad were comprised primarily of large size fish and annual recruitment appeared to be low or intermittent.

Recent fish stockings are included in Table 1.

SURVEY RESULTS

Largemouth bass

1. Spring electrofishing catch rates (C/f = 86.03) indicate largemouth bass were very abundant; the catch rate was twice the regional average (Table 2) and more than four times the 1979 rate (C/f = 5.3). However, length frequency data from both years showed well balanced populations with only relatively small differences in length group modes (Figure 2), but improved electrofishing efficiency in 1988 may have biased comparative analysis with past catch rates. Spring 1988 catch rates of sub-legal (12-14 in.) quality and legal or harvestable (>14 in.) size bass were 25.0 and 15.4, respectively. Smaller bass < 8 and 8-12 inches, were caught at rates of 19.1 and 26.5, respectively. An Age I or a yearling (<6 in.) to adult ratio of 0.3:1, indicates excessive bass recruitment and the subsequent stockpiling of sub-quality (<12 in.) fish is not a potential problem at the present time.

2. PSD and RSD_{15} values in 1988 were 63 and 16, respectively, compared to 64 and 33 in 1979. These values are within the recommended range (PSD 50-70) for lakes having both bluegill and gizzard shad as prey species. Comparative RSD values and length frequency data show proportionally more bass between 12 and 15 inches and less fish 18 inches or longer in 1988 compared to 1979, suggesting a population structure shift influenced by the 14 inch minimum length limit. The median length range of

fish collected was 9.5 to 12.6 inches. The largest bass caught was 23.5 inches in length and weighed 6.0 pounds.

3. Mean relative weight values for bass length groups of < 8 in., 8-12 in., 12-14 in. and >14 in. were 75, 80, 89 and 100, respectively, showing quality size bass in good condition and smaller fish in poor to fair condition (Figure 2). Similar W_r values for smaller bass in 1979 indicate excessive competition for prey is a continuing problem at this trophic level (Figure 2).

4. In general, largemouth bass appear to have an abundant and well structured population with adequate recruitment and good condition factors for quality size fish. Although low mean relative weights of smaller size bass indicate intense competition for prey, stockpiling does not appear to be a current problem. Anglers should experience good catch rates on both sub-legal (12-14 in.) and legal or harvestable (>14 in.) size bass in 1988 and 1989. However, bass 14 inches or longer appear to be sustaining increased angling mortality since the implementation of the minimum length limit.

White crappie

1. White crappie were 33 percent above the regional average in abundance (Table 2) and about six times more numerous than in 1979.

2. All white crappie collected (Figure 3) were harvestable size

(>9 in.). The median length range was 9.8 to 11.0 inches. The largest crappie caught was 15.3 inches in length and weighed 1.9 pounds.

3. W_r values ranged from 87 to 110 indicating quality size crappie were in good to excellent condition (Figure 3).

4. Anglers should find quality size crappie moderately abundant in 1988 and 1989 but the population density does not compare favorably with those in larger reservoirs.

Black crappie

1. Catch rates indicated black crappie were about equal to the regional average in abundance and 87 percent more numerous than in 1979 (Table 2).

2. Ninety seven percent (Figure 4) of the crappie were harvestable size (>9 in.). The median length range was 8.7 to 10.2 inches and the largest crappie collected was 10.9 inches long and weighed 0.7 pounds.

3. W_r values indicated all quality size crappie were in excellent condition (Figure 4).

4. Angling for quality size black crappie in 1989 and 1990 should be much improved over 1979 but their population density continues to limit the fishery.

Bluegill

1. The catch rate (86.03) for bluegill in 1988 was equal to the regional average (Table 2). They have increased approximately 78 percent in abundance since 1979 which again may be an artifact of sampling bias.

2. Length frequency data (Figure 5) showed a decline in the number of intermediate size (3-6 in.) bluegill from 1979 (80 percent) to 1988 (50 percent), but quality size fish (>6 in.) almost doubled in abundance during the same period. PSD values for bluegill were 26 and 52 in 1979 and 1988, respectively. Smaller (< 3 in.) bluegill were also more abundant in 1988 (18 percent) than in 1979 (7 percent). These changes in the bluegill population structure suggest a substantial increase in predation on intermediate size fish by the more abundant 12 inch or longer bass population. The median length of bluegill collected was 2.4 to 5.5 inches.

3. Bluegill body condition declined slightly since 1979 which may be indicative to a population increase and subsequent competition for prey. Mean relative weight values for length groups 3 to 6 inch and 6 to 8 inch were 96 and 97, respectively, in 1979 compared to 92 and 85 in 1988 (Figure 5).

4. Bluegill appear to be providing abundant prey for most sizes of bass at the present time. Sunfish anglers will find an excellent fishery for quality size bluegill.

Gizzard shad

1. Gizzard shad continued to have a low density population (C/f = 28.68) well below the regional mean (Table 2). The relative abundance of preferred size (3-6 in.) shad by largemouth bass suggests that shad are not providing a significant amount of prey. The abundance and structure of the shad population in Hominy Lake is typical of similar size impoundments where annual recruitment is limited.

2. Low relative weight values for shad in 1988 (Figure 6) suggest shad were present in higher numbers, with increased competition for food, than in 1979, when W_r values were near 100 percent.

3. Over-all, gizzard shad appear to be a distant second to bluegill as an important prey species for predators in Hominy Lake.

RECOMMENDATIONS

Fish Harvest Regulations

Largemouth bass - The population structure is slightly atypical with a larger than normal percentage of quality size (>12 in.) fish combined with below average body conditions for smaller fish. However, these population indices do not appear to be adversely affecting the population. The abnormally large number of quality size bass may be preventing potentially excessive recruitment and stockpiling through cannibalism. Therefore, the 14 inch minimum length limit should be retained at the present time but the lake manager should

be aware the potential for stockpiling of sub-quality (< 12 in.) size bass still remains.

Stocking

Channel catfish - The stocking of grow-out or advanced sized (8-10 in.) channel catfish, at a rate of 20 fish per acre, should be continued in alternate years to supplement poor natural recruitment.

Fishing methods - Trotlines, limblines, jugs and yo-yo's should not be allowed. These gear types are highly selective for channel catfish and their continued use in a small lake could result in the depletion or over-harvest of the channel catfish population.

PREPARED BY: Don Hicks

Don Hicks
Regional Supervisor

APPROVED BY: BARRY BOLDON

Table 1. Total number (N) and size of fish stocked in Lake Hominy, from November, 1980 to April, 1988.

DATE	SPECIES	NUMBER	SIZE (mm)
November, 1980	Channel catfish	5,040	102
September, 1981	Channel catfish	10,000	76
August, 1983	Channel Catfish	8,000	203
August, 1985	Channel catfish	1,334	203
September, 1987	Channel catfish	5,000	127

Table 2 . Total number of fish captured (n), catch per unit effort (C/f), Northcentral Regional mean C/f (lakes less than 405 ha), 1988 C/f relative to regional mean (Cf/NC)*, mean and maximum weights, and MLR's by gear for Lake Hominy , in 1988.

Gear - Spring Electrofishing [Total units of effort = 3.1]

Species	n	C/f **	NC $\bar{x}$	Cf/NC	Mean Wt(g)	Max. Wt(g)	MLR (mm)
Largemouth bass	117	86.0	42.7	2.0	450	2,693	235-339
White crappie	26	19.1	12.5	1.5	253	850	236-293
Black crappie	14	10.3	9.7	1.1	193	368	224-249
Bluegill	117	86.0	53.4	1.6	52	145	93-165
Gizzard shad	39	28.7	51.0	0.6	88	204	182-241

* Values greater than 1.0 indicate above average C/f's; those below 1.0 are below average.

** Catch per hour (Electrofishing), or Catch per net hour (Gill Netting)

Figure 1.

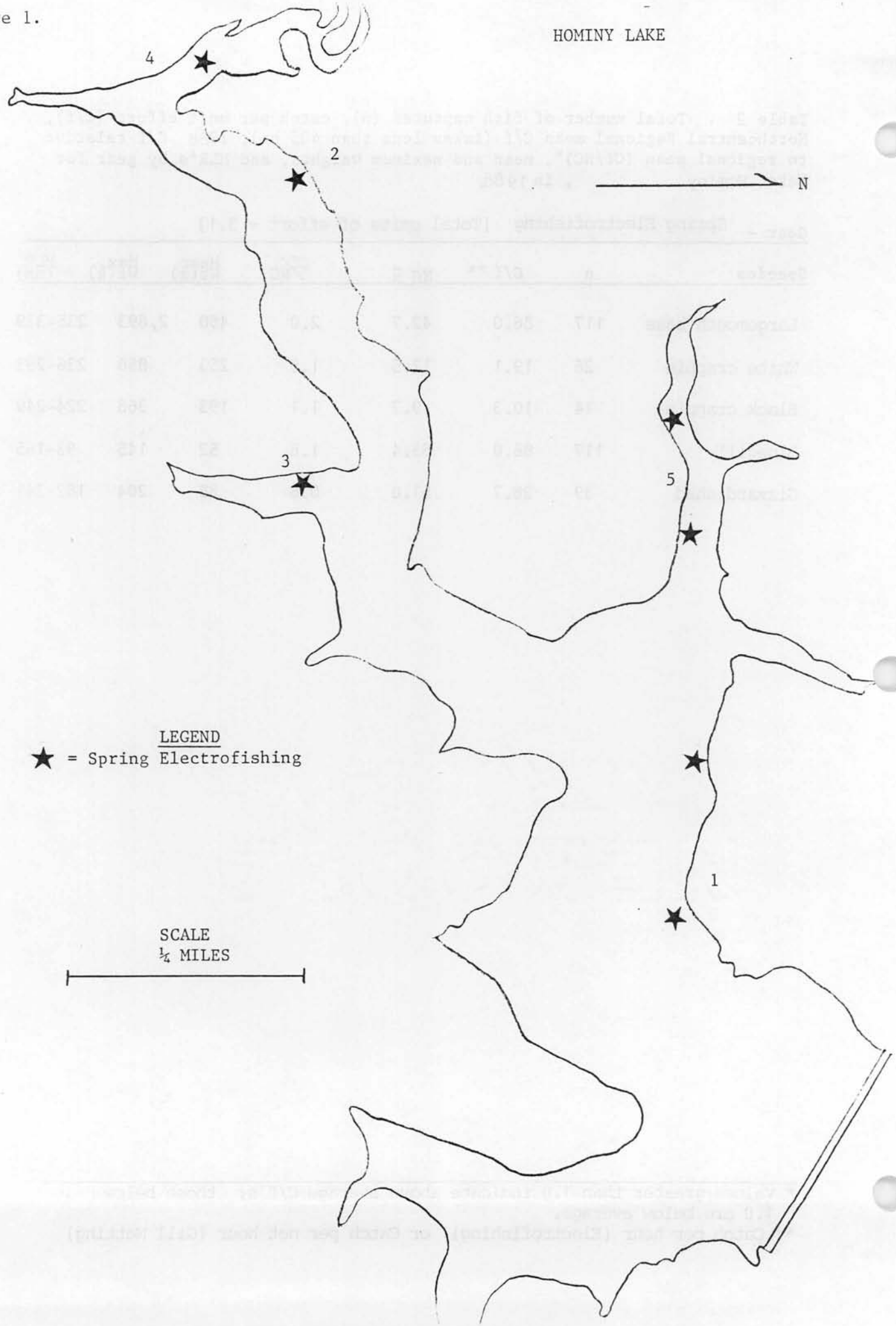
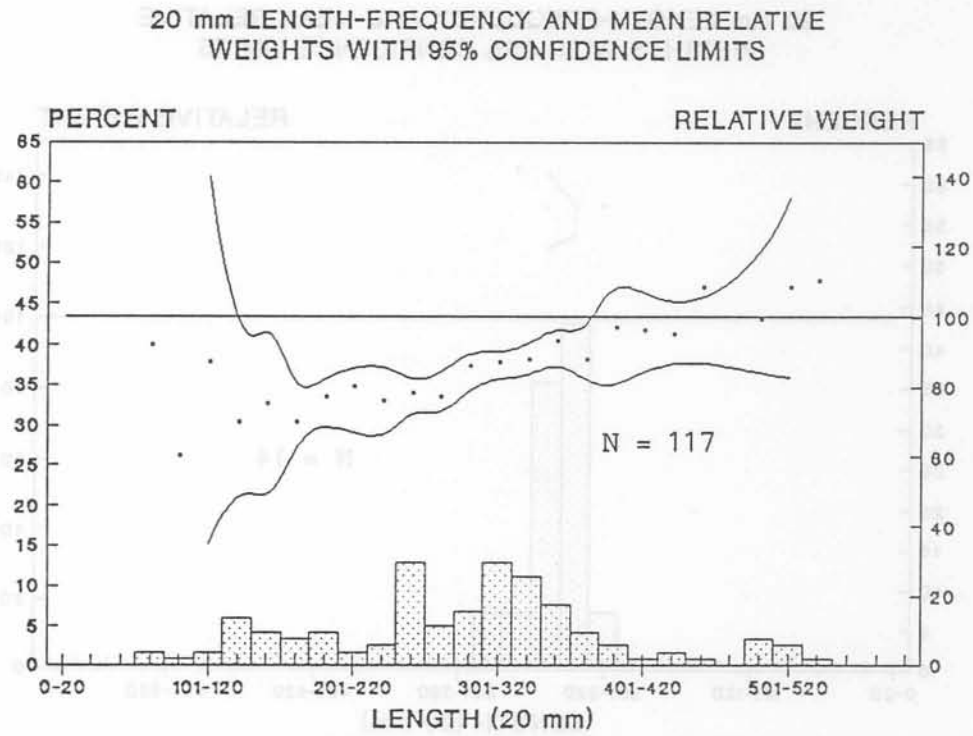

HOMINY LAKE
N
4
2
3
5
1
LEGEND
★ = Spring Electrofishing
SCALE
¼ MILES

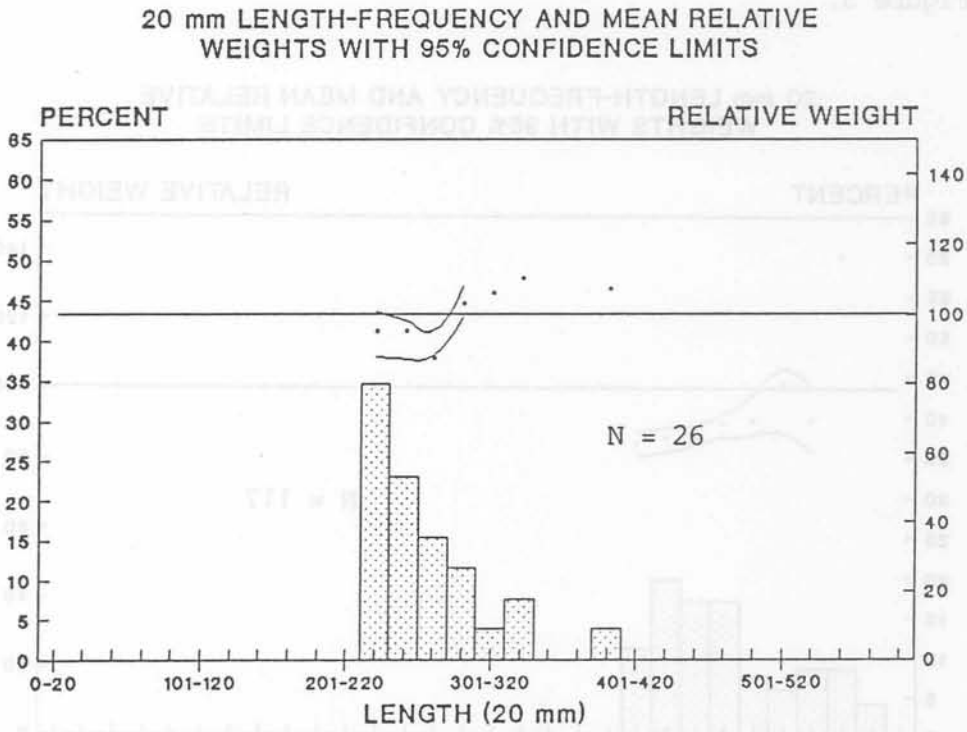
Figure 2.



HOMINY LAKE - 1988 LARGEMOUTH BASS
GEAR - SPRING ELECTROFISHING

2 confidence limits beyond axis

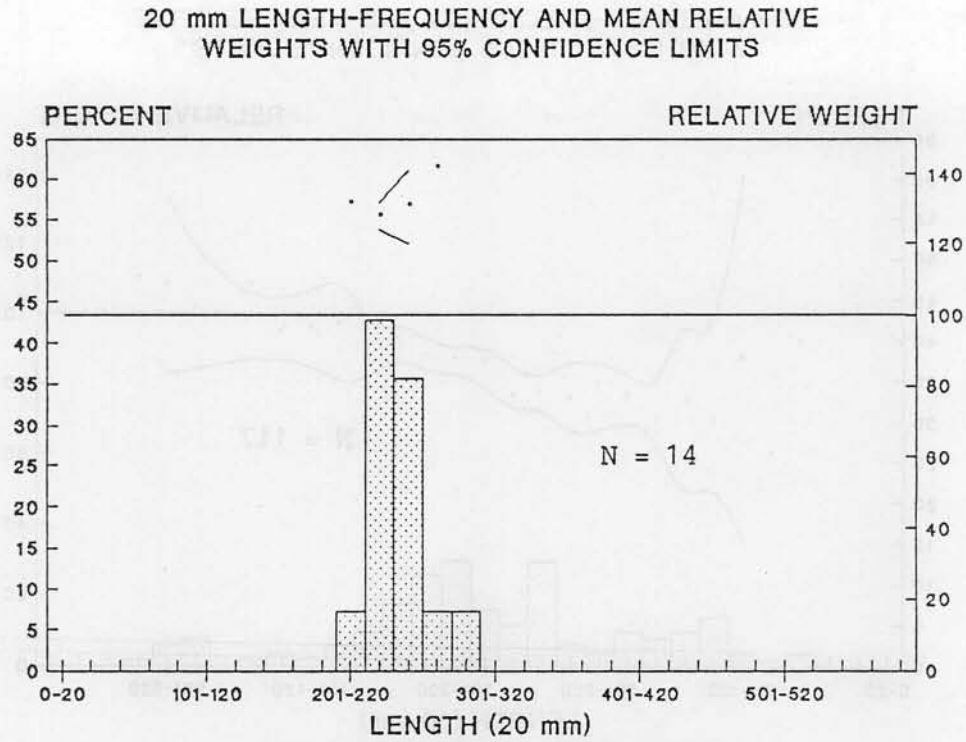
Figure 3.



HOMINY LAKE - 1988 WHITE CRAPPIE
GEAR - SPRING ELECTROFISHING

1 confidence limit beyond axis

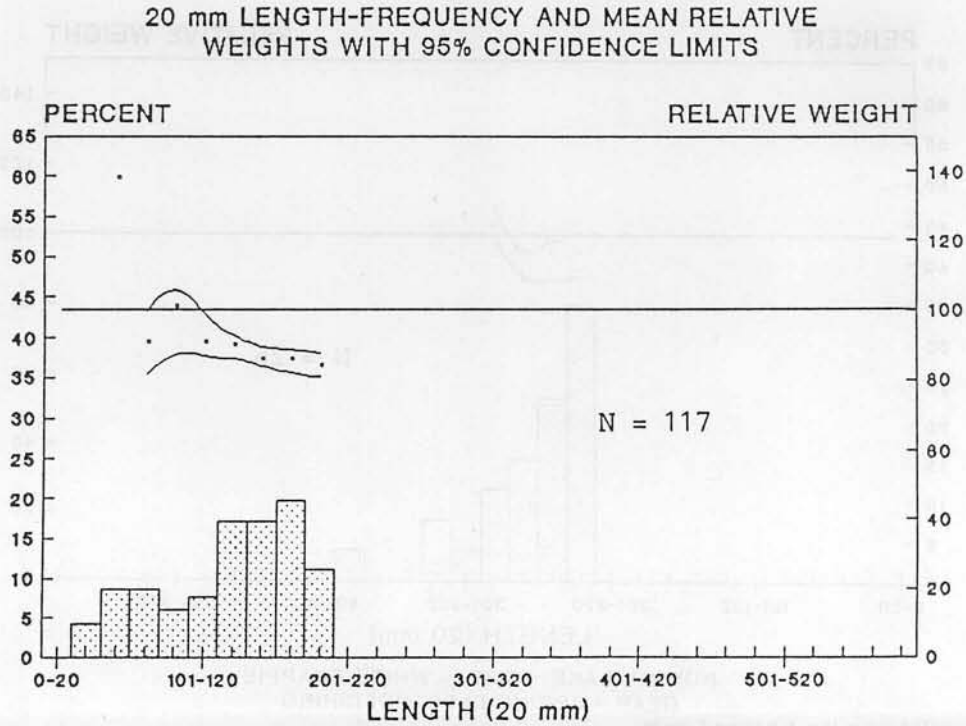
Figure 4.



HOMINY LAKE - 1988 BLACK CRAPPIE
GEAR - SPRING ELECTROFISHING

1 observation beyond weight axis

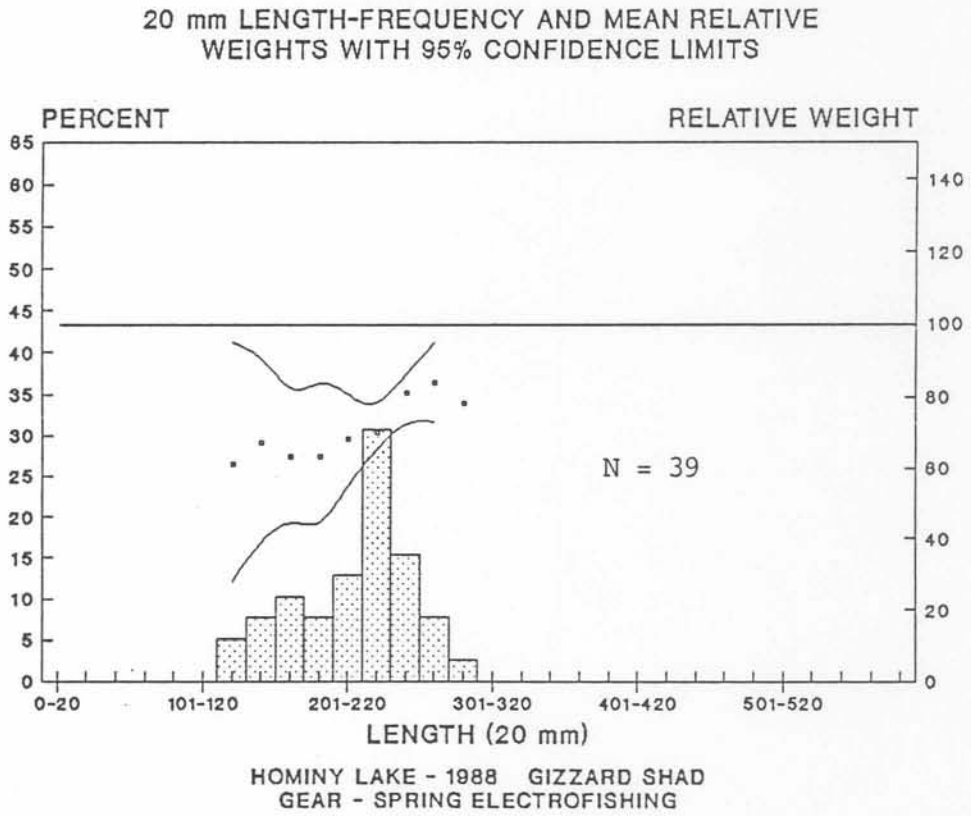
Figure 5.



HOMINY LAKE - 1988 BLUEGILL
GEAR - SPRING ELECTROFISHING

2 observations beyond weight axis

Figure 6.


20 mm LENGTH-FREQUENCY AND MEAN RELATIVE
WEIGHTS WITH 95% CONFIDENCE LIMITS
PERCENT
RELATIVE WEIGHT
65
60
55
50
45
40
35
30
25
20
15
10
5
0
140
120
100
80
60
40
20
0
N = 39
0-20
101-120
201-220
301-320
401-420
501-520
LENGTH (20 mm)
HOMINY LAKE - 1988 GIZZARD SHAD
GEAR - SPRING ELECTROFISHING