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Smith, J.

SURVEY REPORT
OKLAHOMA FISHERIES MANAGEMENT PROGRAM



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS
FOR
NEWT GRAHAM LOCK & DAM 18
1987

Job Performance Report

Oklahoma Fisheries Management Program

Federal Aid Project No. F-44-D-2

Fish Management Survey and Recommendations

for

Newt Graham Lock & Dam 18

Prepared by Jim Smith

Top Management Report

Business Activities Management Program

Project No. 1-44-0-2

Business Management Survey and Business Activities

for

West Virginia State Bank

Prepared by the Staff

Job Performance Report

State: Oklahoma Project No.: F-44-D-2
Project Title: Oklahoma Fisheries Management Program
Study Title: Surveys and Recommendations-Newt Graham Lock & Dam 18
Contract Period: January 1, 1987 - December 31, 1987

ABSTRACT

Newt Graham Lock & Dam 18 was surveyed in 1987 by spring and fall electrofishing, fall gill netting and fall fyke netting to evaluate population status of sport fish and forage species; only backwaters were sampled.

Largemouth bass abundance remained relatively low. PSD and RSD₁₅ values were satisfactory; however, length group catch rates remained unsatisfactory. The fall electrofishing catch rate for ≤ 200 mm size largemouth showed improvement and may reflect Florida largemouth bass stocking success in 1987. Approximately 55% of the fall electrofishing catch by number was comprised of ≤ 200 mm size bass; over 40% were 101-160 mm in length. Many of the less than stock size bass came from a relatively few sites where a majority of the Florida bass fingerlings had been stocked. Spotted bass represented 7% of the black bass catch by number.

Gillnetting numbers of crappie and channel catfish continued to be low. Crappie electrofishing catch rates surpassed regional averages and indicated moderate abundance of white crappie. Anglers may catch more black crappie in 1988 than usually encountered. Blue catfish abundance was down, but size structure showed balance. The bluegill population was dominated by less than quality size (< 150 mm) fish; PSD was only 3%. The forage base appears to be more than adequate; gizzard and threadfin shad were collected. The flathead catfish gillnetting catch rate was double the regional average.

Recommendations included the construction of several brush piles, making some visible while marking others with standard buoys, shoreline tree cutting as time permits, continued stocking of Florida largemouth bass fingerlings, finding a way to eliminate siltation problems at the mouths of cutoffs and another standardized survey in 1990.

INTRODUCTION

Newt Graham Lock & Dam (a U.S. Army Corps of Engineers project) is the 18th lock and dam along the McClellan-Kerr Arkansas River Navigation System. The structure is located in Wagoner County at Navigation km 679, in an excavated channel portion of the Verdigris River 11.3 km south of Inola. The Newt Graham section of the navigation system is approximately 40 km in length and culminates at the Port of Catoosa turning basin in Rogers County near the mouth of Bird Creek. The Lock & Dam was started in 1967 and was essentially completed in 1970. It encompasses 603 ha of water, including 229 ha in the navigation channel itself, and 374 ha of backwater.

Recent stockings (1980-87) have included 69,816 northern largemouth bass fingerlings and 22,834 Florida largemouth bass fingerlings. Approximately 8,000 largemouth bass fry were released in 1986. The stocking record is presented in Table 1. Bass have generally been transported by boat in order to stock fish into each cutoff (weather and water conditions permitting). Shoreline tree cutting was conducted within 18-1, 18-4 and 18-6 cutoffs in August of 1987 to improve shoreline bass habitat.

Spring and fall electrofishing, fall gill netting and fall fyke netting were conducted in 1987 to evaluate population status of sport fish and forage species. Sampling has taken place within cutoffs and creeks off the artificial channel; no sampling has been attempted in the artificial channel itself.

RESULTS AND DISCUSSION

Largemouth Bass

1. Turbid water and late sampling appeared to affect spring electrofishing adversely; relatively few fish were observed and the spring electrofishing catch rate was the lowest yet reported for Newt Graham (spring C/f = 1.25; Table 3).
2. The fall sample was much more productive (fall C/f = 4.41; Table 6), although still well below the regional average for lakes of this size (Cf/NE = 0.33; Table 2).
3. Spring and fall PSD's (57% and 60%, respectively; Tables 3 and 6) were satisfactory, as were RSD₁₅ values.
4. Size group catch rates (Table 4) show recruitment problems; C/f's for all size groups are consistently low and below preferred ranges.
5. While percentages of quality (>300 mm) and preferred (>380 mm) sizes may be acceptable from year to year, overall abundance remains unsatisfactory.
6. The fall electrofishing C/f for the ≤200 mm size group (2.41; Table 4) was an improvement and may reflect Florida largemouth bass stocking success in 1987.
7. Body condition was good for Newt Graham largemouth (most mean W_r values were in the 90's and 100's; Figures 1 and 2).
8. A length-weight comparison (Table 5) shows that Newt Graham largemouth match up well in this capacity with the better largemouth bass populations, especially for less than preferred size bass.
9. Anglers should harvest quality size largemouth in 1988, but the numbers won't be there; there is no surplus within any size group.

White Crappie

1. Gill netting continues to be unproductive (fall gillnetting C/f = 0.039; Tables 2 and 7); whereas, electrofishing has proven effective (spring C/f = 1.83, fall C/f = 2.45; Tables 3 and 6, respectively).
2. Fyke netting yielded only a few white crappie (C/f = 0.319; Table 2).
3. Electrofishing catch rates surpassed regional averages (spring and fall Cf/NE's = 1.76; Table 2).
4. Median length ranges (MLR's; Table 2) were 144-184 mm and 120-237 mm for spring and fall samples, respectively.
5. Only 13% of fall electrofished white crappie were preferred (>260 mm in length; Figure 3).
6. Body condition was very good (all but one W_r value above 100; Figure 3).
7. Recruitment appears to be satisfactory; anglers will find a moderate abundance of white crappie in 1988.
8. Anglers should catch more black crappie in 1988 than they usually encounter.

Channel Catfish

1. Little is known about channel catfish abundance at Newt Graham; few have been collected by sampling methods that are usually effective for this species.
2. The species appears to be widely distributed, since channel catfish are observed at most stations while electrofishing in spring and fall.
3. The species may be more abundant within the artificial channel.

Blue Catfish

1. Blue catfish abundance appeared to be down in 1987 (fall gill-netting C/f = 0.094; Table 7).
2. The middle 50% of the gillnetting catch was comprised of 212-532 mm size fish (Table 2); 25% were quality size (>520 mm; Figure 4) and 0% were preferred (>760 mm).
3. Body condition was good for most length groups; most W_r 's were in the 90's and 100's (Figure 4).
4. Natural reproduction and recruitment appear to be satisfactory.
5. Anglers will see a balanced blue catfish size structure in 1988; abundance may be down from previous years.

Bluegill

1. Bluegill abundance appeared to be up (spring and fall electro-fishing C/f's = 10.25 and 7.70, respectively; Tables 3 and 4), over that observed in 1984.
2. PSD (3%; Table 3) was very low, indicating an unsatisfactory percentage of stock size bluegill (≥ 75 mm) were quality size (≥ 150 mm).
3. There were no preferred size bluegill (>200 mm) collected in 1987 (Figures 5 and 6).
4. Body condition was good for all length groups except less than stock size bluegill collected in the spring (Figures 5 and 6).
5. Reproduction and recruitment remained satisfactory.
6. Few quality size bluegill will be available to anglers in 1988.

Other Species

1. Gizzard shad catch rates (spring electrofishing C/f = 15.92,

fall electrofishing C/f = 16.40 and gillnetting C/f = 0.514; Table 2) were near corresponding regional averages for lakes of this size.

- 2. Threadfin shad were collected for the third time in the past four surveys (Table 7).
- 3. Median length ranges (MLR's; Table 2) were 125-170 mm, 106-190 mm and 173-190 mm for spring and fall electrofished and fall gillnetted gizzard shad, respectively.
- 4. The fall gillnetting sample was dominated by 161-200 mm size gizzard shad (78%; Figure 9).
- 5. Body condition was quite good for electrofished gizzard shad (no W_r 's under 90; Figures 7 and 8), but not quite as good for gillnetted fish (Figure 9).
- 6. Gizzard shad reproduction and recruitment appear to be satisfactory.
- 7. The flathead catfish gillnetting C/f (0.024; Table 2) was double the regional average; maximum weight was 6237 g and mean weight 4612 g (Table 2).

RECOMMENDATIONS

Fish Habitat Improvements

Approximately seven brush piles should be constructed in 1988. A few of these should be visible, shallow water brush piles; the remainder should be marked with standard fishing area buoys.

Brush piles should be recharged in 1991, continuing a three-year rotation program for N.E. Region lakes. Additional sites should be evaluated at that time; it may be adviseable to eliminate some existing sites and to add some new ones.

The U. S. Army Corps of Engineers has given permission to the Oklahoma Department of Wildlife Conservation (ODWC) to cut shoreline trees periodically to improve shoreline fish habitat. ODWC personnel must coordinate with Corps personnel on project plans and sites. Shoreline tree cutting should be carried out in August and September, as time allows.

Fish attractor buoys need to be checked in late winter and late summer annually and replaced as necessary.

Stockings

Florida largemouth bass stockings should continue annually; 14,900 38 mm fingerlings are recommended for Newt Graham backwaters in 1988. Fish should be stocked by boat to permit stocking into each cutoff and some incoming creeks. Each of the cutoffs represents essentially a small lake, separated from the others by the artificial channel used for barge navigation.

Newt Graham continues to experience poor natural reproduction and recruitment. By continuing the Florida largemouth bass stockings, we should have a good opportunity to infiltrate the gene pool with Florida bass genes. Intergradation should be potentially high. Fall electrofishing in 1988 indicated an improvement in the catch rate of ≤ 200 mm size largemouth, which may reflect a successful stocking of Florida largemouth in the spring of 1988. Almost 55% of the fall catch by number was comprised of ≤ 200 mm size bass; over 40% were 101-160 mm size bass. Many of the less than stock size bass came from a relatively few sites where a majority of the Florida bass fingerlings were stocked.

Fishermen Access and Utilization

Downstream entrances to cutoffs need to be kept open to allow boat access from and to the main channel and to prevent stagnation and dissolved oxygen depletion. An investigation in the spring of 1987 revealed that the mouths of a number of Chouteau and Newt Graham cutoffs continued to have siltation problems. Some were impassable. Motors have to be tilted to get into some cutoffs; paddling is required for others. Cutoffs 18-8, 18-9, 18-10 and 18-11 were in particularly bad shape. The Corps and ODWC need to find a way to keep the cutoffs open to boating and fishing.

Other

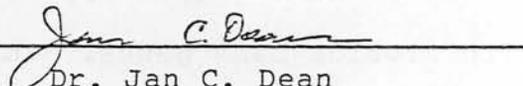
Newt Graham Lock & Dam 18 (the backwaters) should be surveyed again in 1990 in accordance with the guidelines outlined in "Standardized Sampling Procedures for Lake and Reservoir Management Recommendations".

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Table 1. Newt Graham Lock & Dam 18 stocking record.

Date	Species	Number	Size
1980	Largemouth Bass	10,500	51 mm
1980	Florida Largemouth Bass	10,995	51 mm
1981	Largemouth Bass	41,916	51 mm
1982	Largemouth Bass	7,400	76 mm
1983	Largemouth Bass	10,000	76 mm
1986	Largemouth Bass	8,000	Fry
1986	Florida Largemouth Bass	4,600	38 mm
1987	Florida Largemouth Bass	7,239	44 mm

FALL YEAR STOCKING

* Values greater than 1.00 indicate above regional average C/D ratio
 values below 1.00 are below average.

Table 2. Total number captured (N), catch per unit effort (C/f), North-east Regional mean C/f ($NE \bar{x}$) for lakes 405-4,047 ha in size, 1987 C/f relative to $NE \bar{x}$ (Cf/NE)*, mean and maximum weights, and median length range (MLR) of select species collected by various gear types from Newt Graham Lock & Dam 18 in 1987.

Species	N	C/f	$NE \bar{x}$	Cf/NE	Mean Wt.(g)	Max. Wt.(g)	MLR (mm)
<u>SPRING ELECTROFISHING</u>							
Largemouth Bass	15	1.25	6.97	0.18	519	1758	219-385
Spotted Bass	3	0.25	0.78	0.32	269	338	220-295
White Crappie	22	1.83	1.04	1.76	70	390	144-184
Black Crappie	7	0.58	0.42	1.38	124	408	167-223
Bluegill	123	10.25	14.10	0.73	21	74	80-115
Redear Sunfish	2	0.17	1.58	0.11	41	61	110-149
Gizzard Shad	191	15.92	17.05	0.93	36	118	125-170
<u>FALL ELECTROFISHING</u>							
Largemouth Bass	97	4.41	13.19	0.33	302	1502	129-255
Spotted Bass	7	0.32	0.42	0.76	54	140	125-210
White Crappie	54	2.45	1.39	1.76	121	510	120-237
Black Crappie	9	0.41	2.12	0.19	151	205	140-218
Bluegill	154	7.70	10.61	0.73	21	90	75-115
Gizzard Shad	164	16.40	19.02	0.86	46	190	106-190
<u>FALL GILL NETTING</u>							
White Crappie	10	0.039	0.058	0.67	107	250	152-249
Channel Catfish	2	0.008	0.042	0.19	729	1418	196-530
Blue Catfish	24	0.094	0.142	0.66	791	4990	212-532
Flathead Catfish	6	0.024	0.012	2.00	4612	6237	680-760
Gizzard Shad	131	0.514	0.555	0.93	62	180	173-190
Threadfin Shad	10	0.039	0.129	0.30	24	30	130-137
<u>FALL FYKE NETTING</u>							
White Crappie	15	0.319	---	---	81	140	172-202

* Values greater than 1.00 indicate above regional average C/f's; values below 1.00 are below average.

Table 3. Total number (N), mean weight, catch per unit effort by number and weight, proportional stock density (PSD) and relative stock density (RSD) measurements for select species collected by spring electrofishing from Newt Graham Lock & Dam 18.*

Species	N	Mean Wt.(g)	Catch per 15 min		PSD	RSD ₁₅	
			No.	Wt.(g)			
<u>Largemouth Bass</u>							
1979	(16)	30	364	1.88	682	65	18
1980	(12)	25	568	2.08	1183	65	35
1982	(22)	46	329	2.09	688	38	23
1984	(29)	103	433	3.55	1539	49	16
1987	(12)	15	519	1.25	649	57	36
<u>Spotted Bass</u>							
1979	(16)	2	34	0.13	4	--	--
1980	(12)	0	--	0.00	0	--	--
1982	(22)	4	350	0.18	64	--	--
1984	(29)	4	240	0.14	33	--	--
1987	(12)	3	269	0.25	67	--	--
<u>White Crappie</u>							
1979	(16)	15	170	0.94	160	--	--
1980	(12)	17	116	1.42	164	--	--
1982	(22)	18	162	0.82	133	--	--
1984	(29)	69	142	2.38	338	--	--
1987	(12)	22	70	1.83	128	--	--
<u>Black Crappie</u>							
1979	(16)	0	--	0.00	0	--	--
1980	(12)	1	30	0.08	3	--	--
1982	(22)	0	--	0.00	0	--	--
1984	(29)	2	129	0.07	9	--	--
1987	(12)	7	124	0.58	72	--	--
<u>Bluegill</u>							
1979	(16)	69	33	4.31	141	17	--
1980	(12)	29	23	2.42	55	0	--
1982	(13)	100	28	7.69	214	11	--
1984	(20)	158	27	7.90	211	6	--
1987	(12)	123	21	10.25	216	3	--
<u>Gizzard Shad</u>							
1980	(9)	130	38	14.44	544	--	--
1982	(13)	134	63	10.31	649	--	--
1984	(13)	313	13	24.08	321	--	--
1987	(12)	191	36	15.92	577	--	--

* Units of effort reported in parentheses by individual species and years.

Table 4. Catch per unit effort by size groups of largemouth bass collected by spring electrofishing from Newt Graham Lock & Dam 18, compared to the Newt Graham average and the N.E. Regional average for lakes 405-4,047 ha (1,000-10,000 acres) in size.

Year	N	Size Groups (mm)				All Sizes
		≤200	201-300	>300	>380	
1979	30	0.88	0.31	0.69	0.19	1.88
1980	25	0.41	0.58	1.08	0.58	2.08
1982	46	0.91	0.73	0.45	0.27	2.09
1984	103	0.69	1.59	1.27	0.42	3.55
1987	15	0.08	0.50	0.67	0.42	1.25
Newt Graham Ave.		0.59	0.75	0.83	0.29	2.17
N. E. Ave.		1.68	1.79	3.50	1.68	6.97
<u>Fall Electrofishing</u>						
1987	97	2.41	0.78	1.22	0.45	4.41

Table 5. Length-weight comparisons for largemouth bass collected by spring electrofishing (latest sample) from N.E. Region lakes.

Lakes*	<u>Total Lengths (mm)</u>						
	200	250	300	360	410	460	510
Grand	95**	201	373	692	1074	1585	2248
Ft. Gibson	97	204	373	684	1054	1545	2178
Tenkiller	101	200	347	605	898	1275	1745
Hudson	98	208	384	709	1098	1616	2286
Eucha	94	192	343	613	927	1337	1857
Chouteau	100	209	382	698	1073	1569	----
Spavinaw	96	196	351	630	956	1383	1925
Newt Graham	107	217	385	685	1033	1485	2056
Chimney Rock	104	213	383	688	1045	----	----
Frances	106	210	367	642	956	1359	----
Stilwell	86	176	317	571	867	1256	1751
Adair	82	173	320	589	912	1341	1896

* Listed by size, largest down to the smallest.

** Weights in grams.

Table 6. Total number (N), mean weight, catch per unit effort by number and weight, proportional stock density (PSD) and relative stock density (RSD) measurements for select species collected by fall electrofishing from Newt Graham Lock & Dam 18.*

Species	N	Mean Wt.(g)	Catch per 15 min		PSD	RSD ₁₅
			No.	Wt.(g)		
<u>Largemouth Bass</u>						
1980 (16)	37	516	2.31	1194	71	33
1987 (22)	97	302	4.41	1332	60	24
<u>Spotted Bass</u>						
1980 (16)	6	280	0.38	105	--	--
1987 (22)	7	54	0.32	17	--	--
<u>White Crappie</u>						
1980 (16)	11	108	0.69	74	--	--
1987 (22)	54	121	2.45	296	--	--
<u>Black Crappie</u>						
1980 (16)	1	77	0.06	5	--	--
1987 (22)	9	151	0.41	62	--	--
<u>Bluegill</u>						
1980 (13)	98	13	7.54	97	2	--
1987 (20)	154	21	7.70	162	1	--
<u>Gizzard Shad</u>						
1987 (10)	164	46	16.40	757	--	--

* Units of effort reported in parentheses by individual species and years.

Table 7. Total number (N), mean weight and catch per unit effort by number and weight of select fishes collected by gill netting from Newt Graham Lock & Dam 18.*

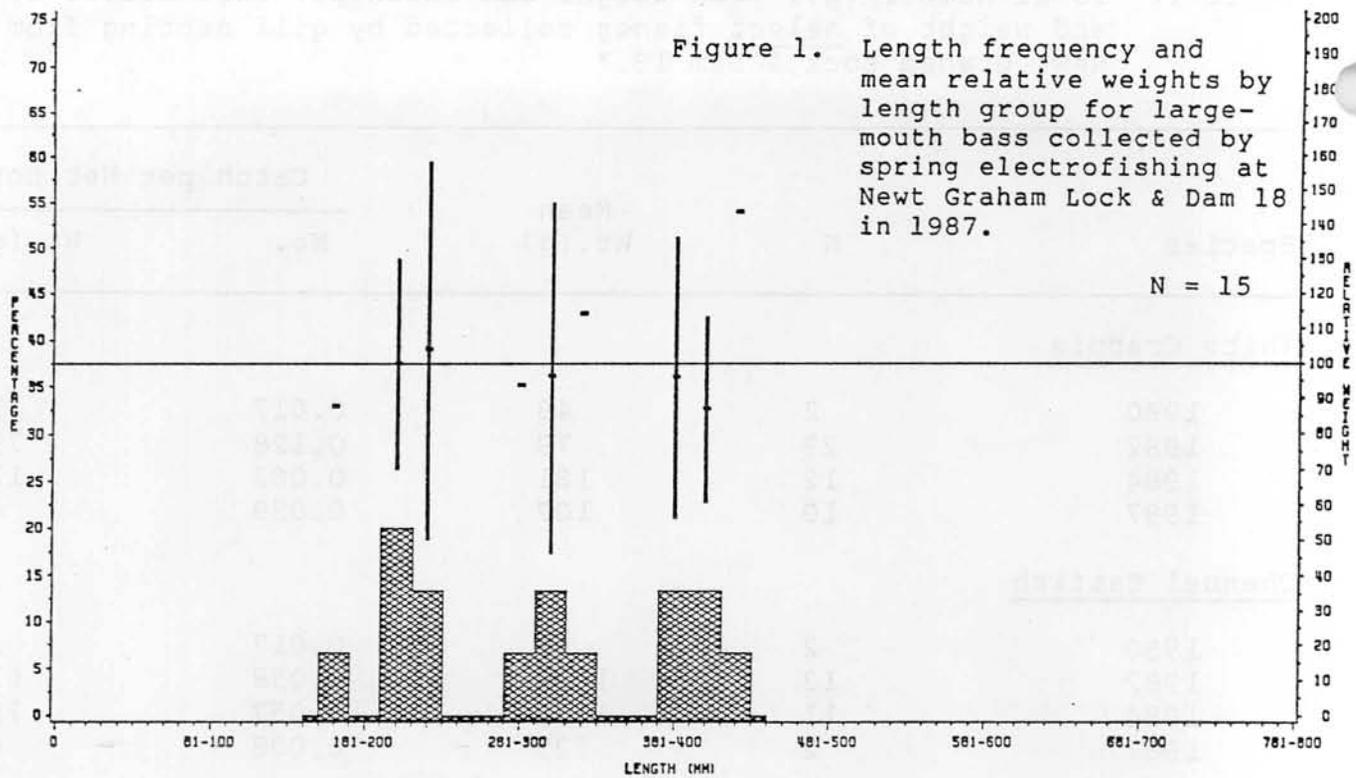
Species	N	Mean Wt.(g)	Catch per Net Hour	
			No.	Wt.(g)
<u>White Crappie</u>				
1980	2	48	0.017	1
1982	29	79	0.128	79
1984	12	181	0.062	11
1987	10	107	0.039	4
<u>Channel Catfish</u>				
1980	2	58	0.017	1
1982	13	1099	0.058	63
1984	11	1388	0.057	79
1987	2	729	0.008	6
<u>Blue Catfish</u>				
1980	5	954	0.042	40
1982	42	894	0.186	166
1984	65	665	0.337	224
1987	24	791	0.094	74
<u>Flathead Catfish</u>				
1980	2	3487	0.017	58
1982	3	3997	0.013	53
1984	3	3209	0.016	50
1987	6	4612	0.024	109
<u>Gizzard Shad</u>				
1980	34	80	0.283	23
1982	158	51	0.699	36
1984	51	49	0.264	13
1987	131	62	0.514	32
<u>Threadfin Shad</u>				
1980	6	25	0.050	1
1982	0	--	0.000	0
1984	1	20	0.005	T
1987	10	24	0.039	1

* Total units of effort = 120 (1980); 226 (1982); 193 (1984); 255 (1987).

T = Trace

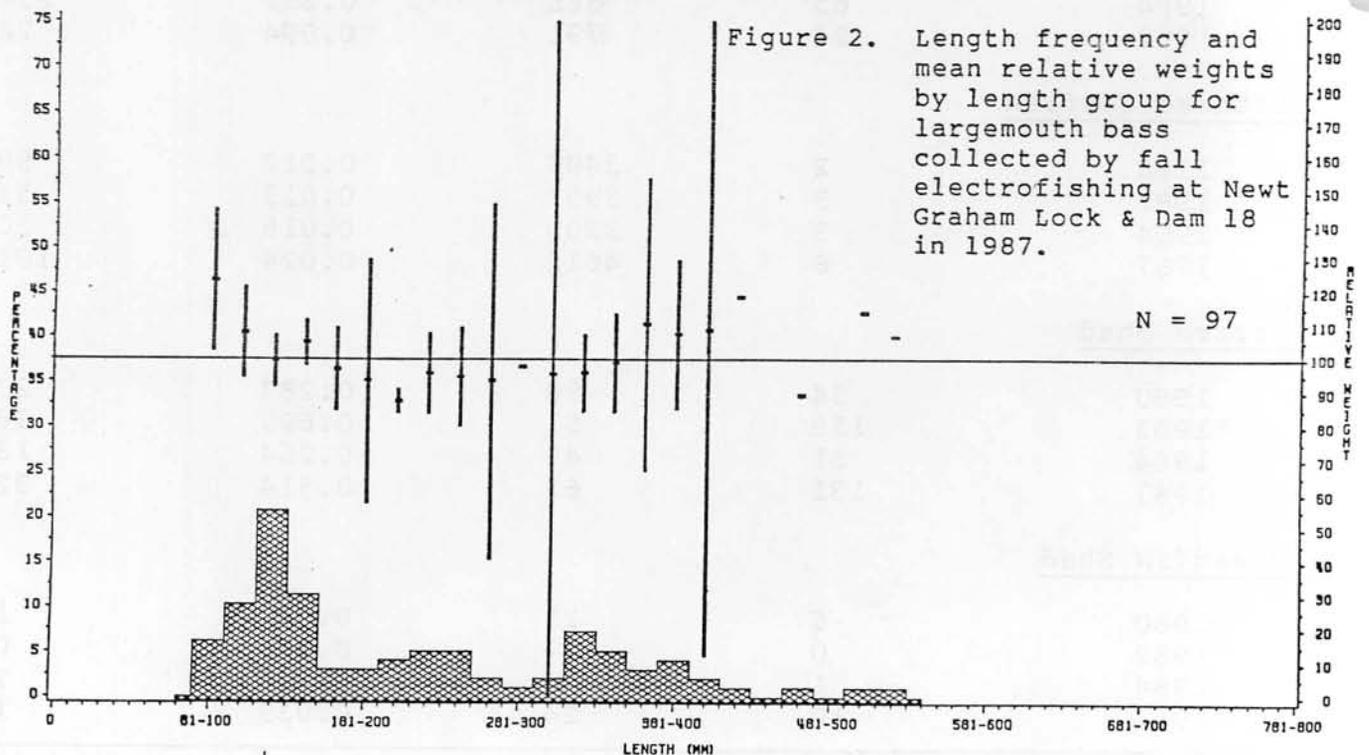
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=SPRING ELECTROFISHING SPECIES=LARGEMOUTH BASS



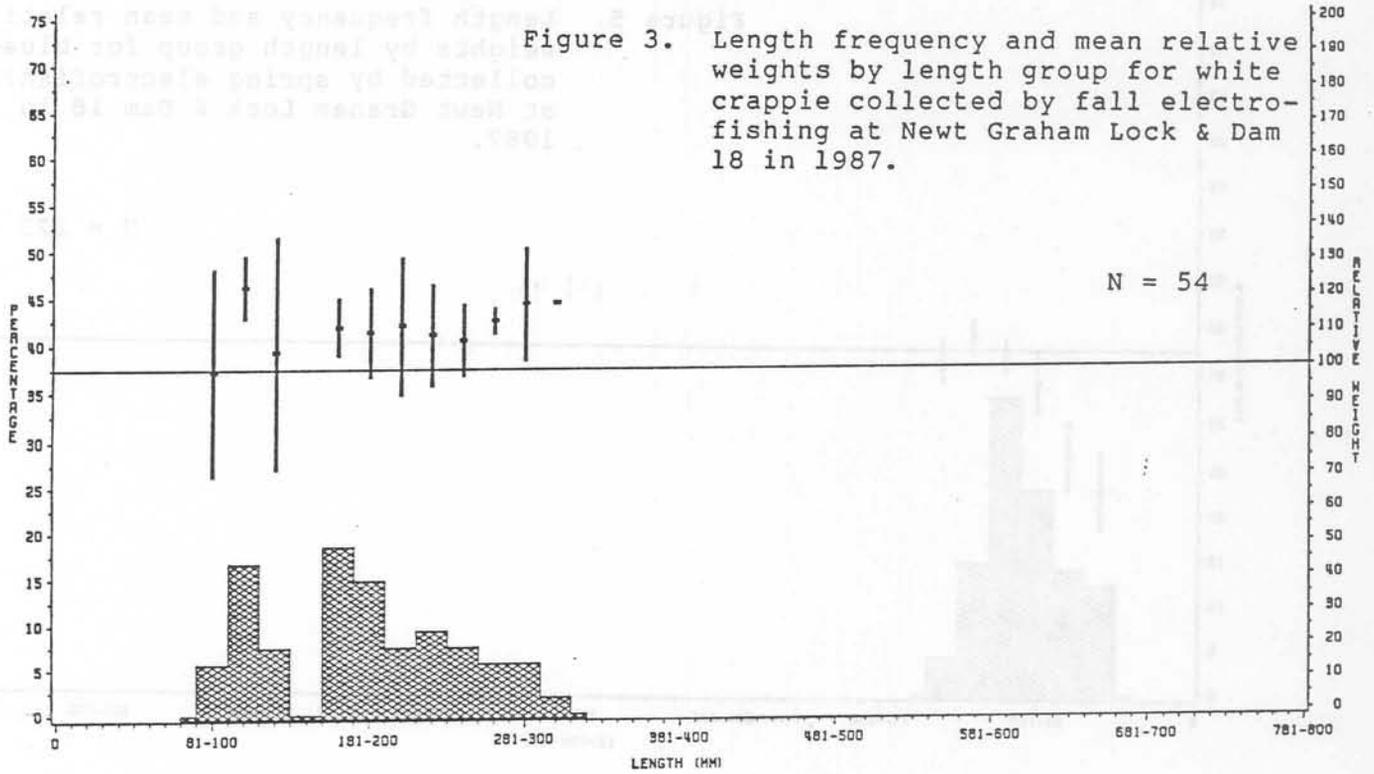
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=FALL ELECTROFISHING SPECIES=LARGEMOUTH BASS



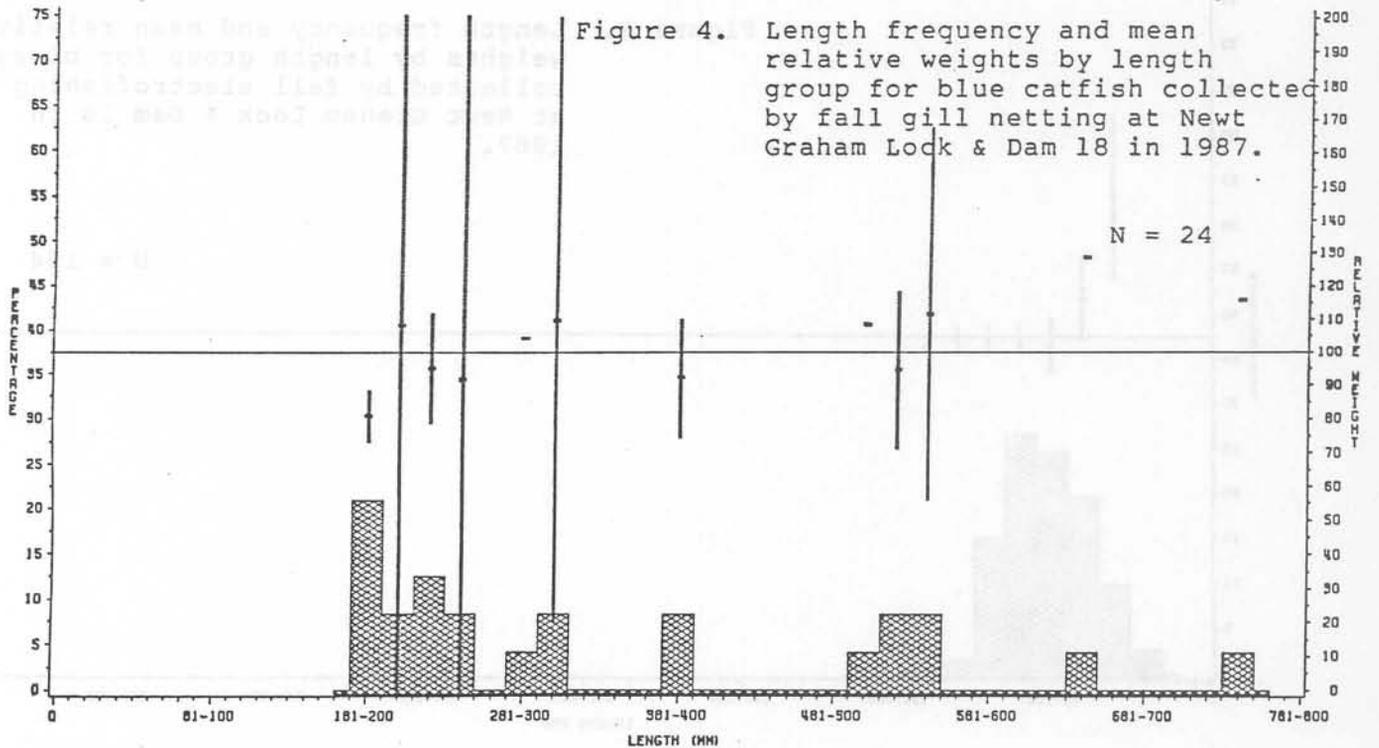
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=FALL ELECTROFISHING SPECIES=WHITE CRAPPIE



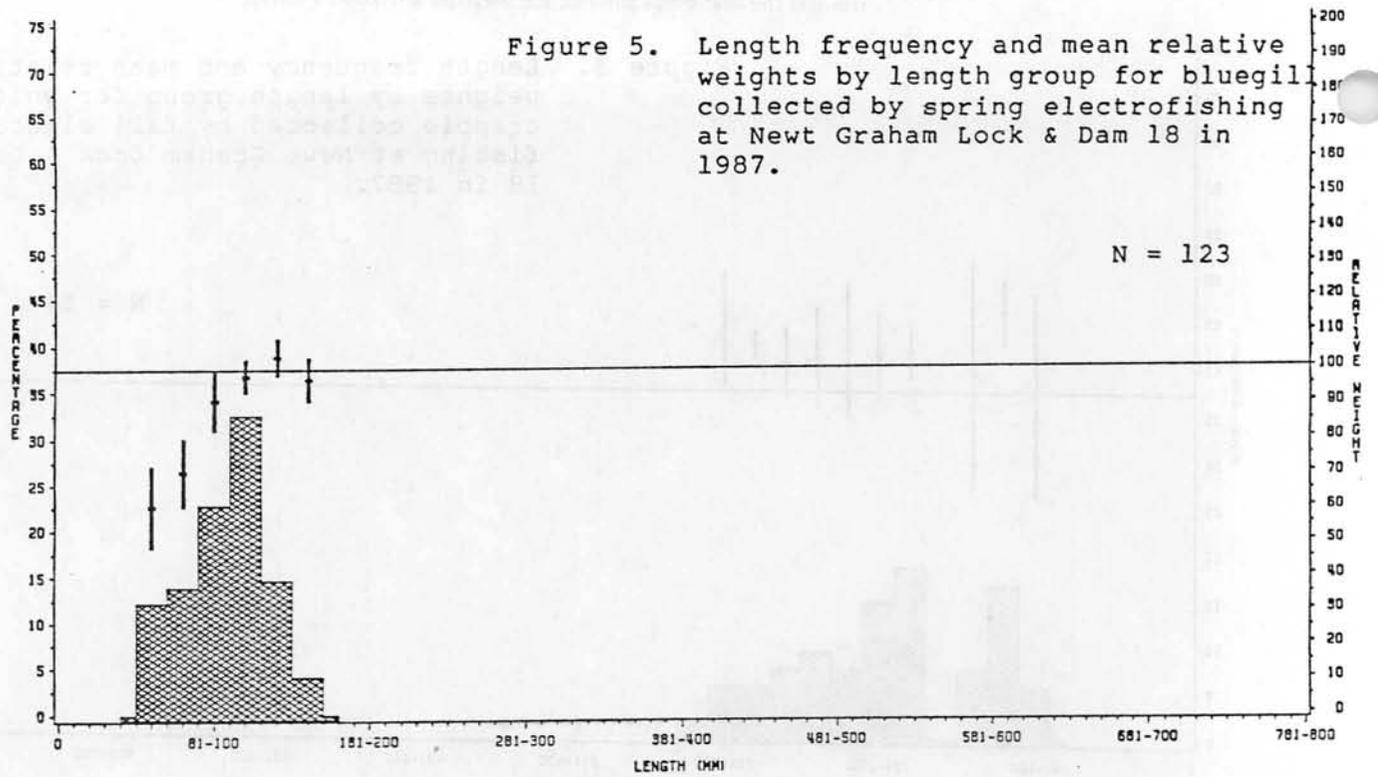
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=GILLNETTING SPECIES=BLUE CATFISH



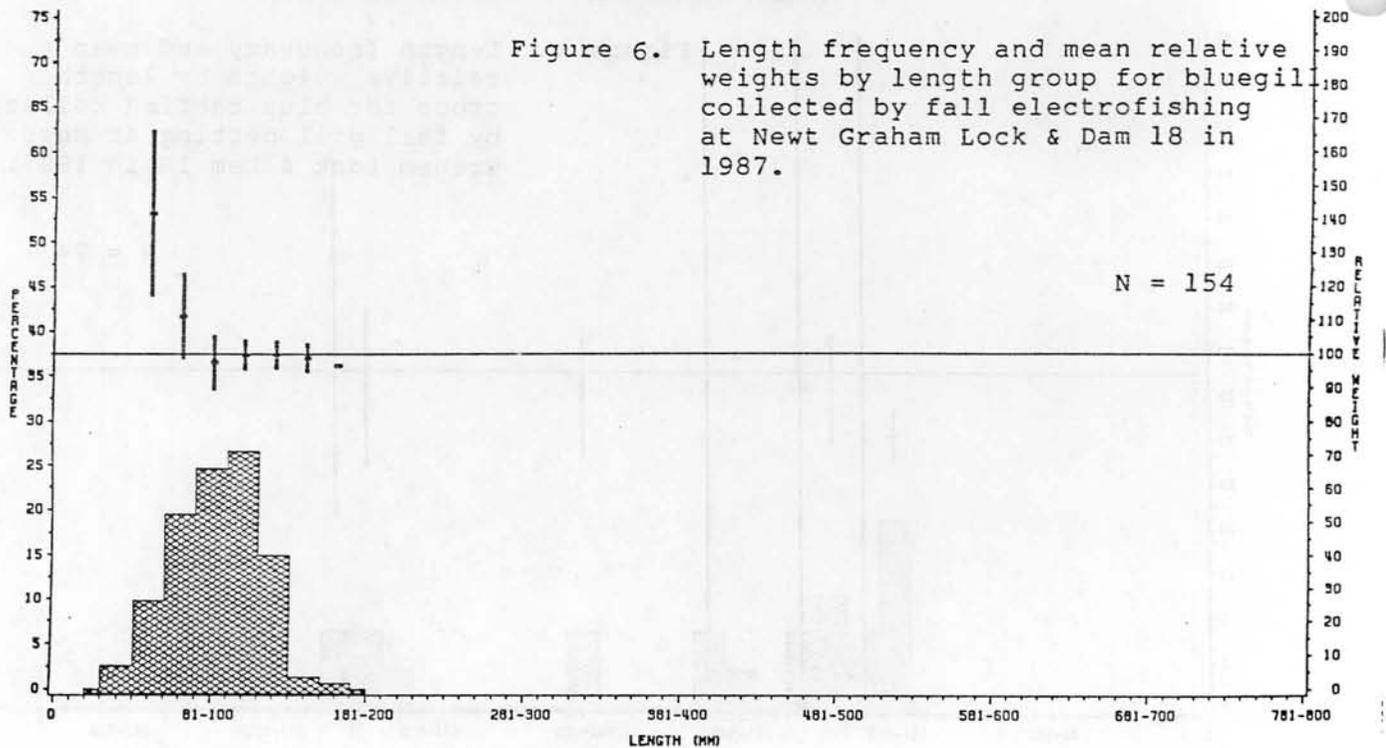
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=SPRING ELECTROFISHING SPECIES=BLUEGILL



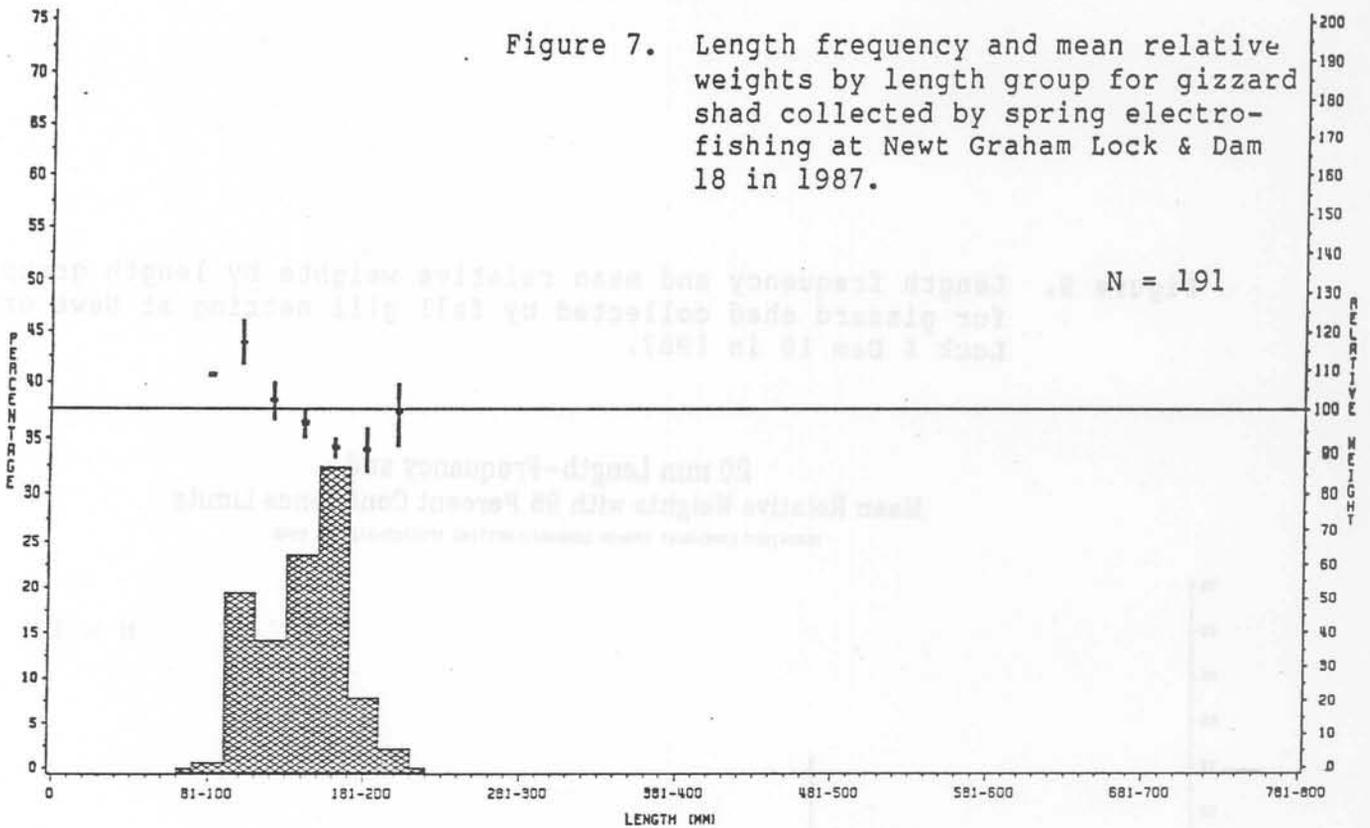
20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=FALL ELECTROFISHING SPECIES=BLUEGILL



20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=SPRING ELECTROFISHING SPECIES=GIZZARD SHAD



20 mm Length-Frequency and
Mean Relative Weights with 95 Percent Confidence Limits

YEAR=1987 LAKE=NEWT GRAHAM GEAR=FALL ELECTROFISHING SPECIES=GIZZARD SHAD

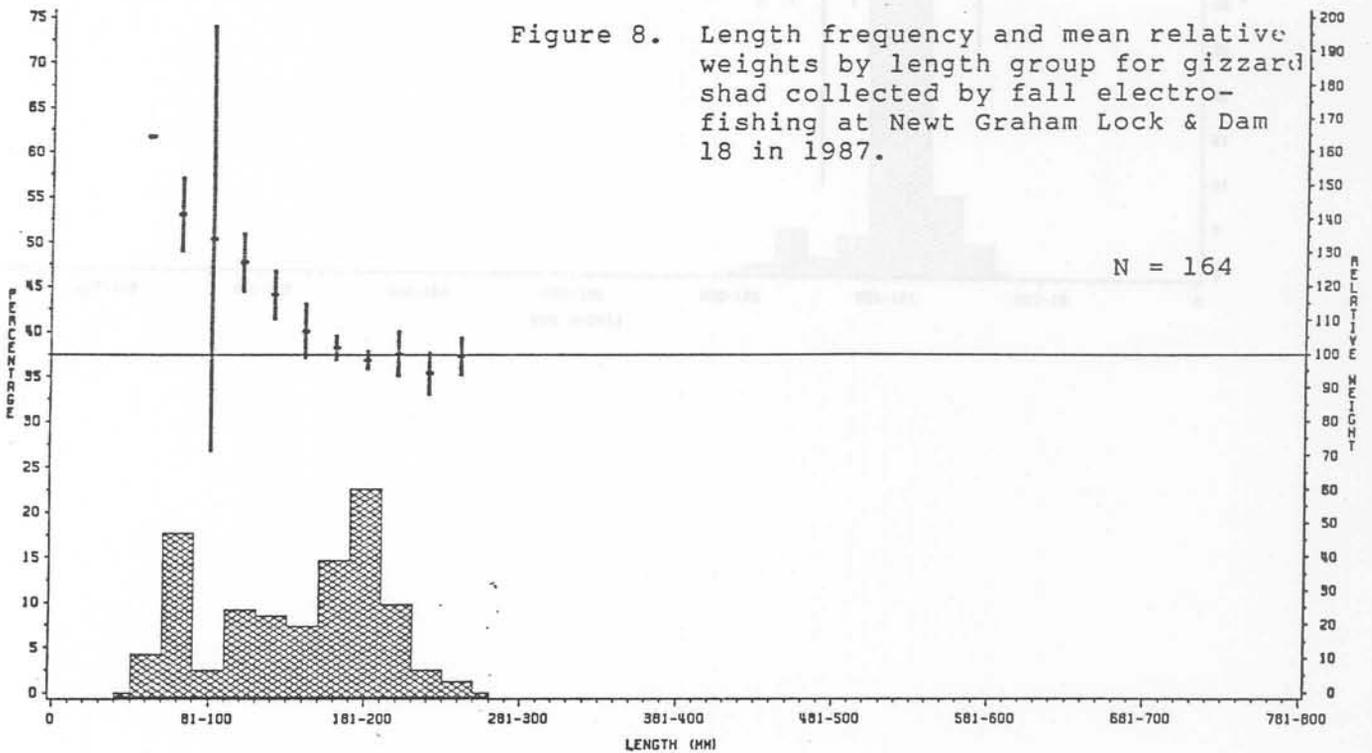


Figure 9. Length frequency and mean relative weights by length group for gizzard shad collected by fall gill netting at Newt Graham Lock & Dam 18 in 1987.

