SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

ELK CITY LAKE

1992

Job Performance Report

Oklahoma Fisheries Management Program

Federal Aid Project No. F 44-D-5

Fish Management Survey and Recommendations

for

Elk City Lake

Prepared by Larry Cofer

INTRODUCTION

Elk City Lake impounds Elk Creek, 2 km south of Elk City in Beckham County, Oklahoma (Fig. 1). Elk Lake covers 97 surface hectares and was re-constructed in 1970 by the USDA Soil Conservation Service. Elk Lake has a mean depth of 3 m and a maximum of 7 m, a shoreline development ratio of 2.3, and a secchi disc visibility of around 50 cm in the main pool in August; turbidity is primarily from suspended clay. Fish habitat consists of flooded timber in the upper end and rip-rap on the dam. Principle fisheries are for largemouth bass, crappie and channel catfish.

Elk Lake's turbidity is the primary limiting factor for fishing improvement. Water level reductions were common in the 1980's, but the pool has been stable recently making conditions more conducive to fish production. Prior surveys at the lake have only been partial standardized samples.

Florida largemouth bass have been stocked recently to improve the trophy bass potential at Elk Lake. Saugeye have also been introduced since 1988 to utilize the abundant shad forage base (Table 1). Brush piles have been constructed to improve catch rates, primarily for crappie. New parking lots, docks and access roads have been built around Elk Lake since 1990 with the cooperation of the City of Elk City. A 356 mm (14 inch) minimum length limit on bass has been in effect since 1988.

Elk City Lake was sampled in 1992 by spring electrofishing as a baseline survey to evaluate the largemouth bass and forage populations.

White bass

1. Two white bass were captured (150 and 330 mm), representing two year classes.

Saugeye

1. Four saugeye were sampled, representing at least two year classes from the 1988-1990 stockings. The largest weighed 2025 g (4.5 lb). All four saugeye were in excellent condition.

Bluegill

1. Bluegill abundance from 1992 spring electrofishing (C/f=53- Table 3) was comparable to the minimum acceptable value for a quality forage supply.
2. The abundance of bluegill 75-149 mm was satisfactory, while those < 75 mm and >150 mm were far below acceptable values.
3. Body condition values (W_r) were satisfactory (>90) for all bluegill size groups.
4. Intermediate bluegill were moderately abundant in Elk Lake, but reproduction has been poor recently and few large bluegill are present.

Gizzard Shad

1. Shad abundance from 1992 spring electrofishing (C/f=203) was well above the minimum acceptable value for a quality forage supply (C/f= 40- Table 4).
2. In spring electrofishing, the abundance of shad <200 mm was well above satisfactory.
3. Body condition values (W_r) were unsatisfactory for all shad size groups.

2. Fall-night electrofishing should be conducted in years when saugeye are stocked to evaluate survival and growth rates.

3. A sample of small bass should be collected in 1993 for genetic analysis. Future Florida bass stockings should be dependent on positive results of this survey.

Fishing Regulations

1. The 356 mm (14 inch) minimum length limit on bass should be retained at Elk Lake to protect small bass (Appendix- Figure 7). The population can benefit from further protection (e.g. to 18 or 20 inches) if local anglers are willing to release more fish.

Angler Access Improvements

1. Shoreline access roads, docks and parking lots developed cooperatively by ODWC and Elk City should be maintained.

2. If funds are available, the oil well site on the south shoreline should be developed as a nursery pond.

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Table 1. Species, number and size of fish stocked in Elk City Lake, 1984-1992.

DATE	SPECIES	NUMBER	SIZE
1984	Florida Intergrade Largemouth Bass	2,400	Fingerlings
1986	Florida Intergrade Largemouth Bass	12,000	Fingerlings
1987	Florida Intergrade Largemouth Bass	8,400	Fingerlings
1987	Hybrid Striped Bass	21,600	Fry
1988	Saugeye	9,600	Fingerlings
1988	Largemouth Bass	7,200	Fingerlings
1989	Saugeye	9,600	Fingerlings
1989	Inland Silversides	5,000	Adults
1989	Blue Catfish	50	Adults
1990	Saugeye	7,200	Fingerlings
1990	Certified Florida Bass	12,000	Fingerlings
1992	Certified Florida Bass	5,230	Fingerlings

Table 2. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of largemouth bass collected by spring electrofishing from Elk City Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total (≥40)		<200 mm (15-45)		200-299 mm (15-30)		≥300 mm (≥15)		≥356 mm (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1992	101	40.4	5.6	95	2.8	103	32	111	28.4	112

Table 3. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of bluegill collected by spring electrofishing from Elk City Lake. Numbers in parentheses represent acceptable C/f values for a quality forage supply. Acceptable W_r values are $\geq$90.

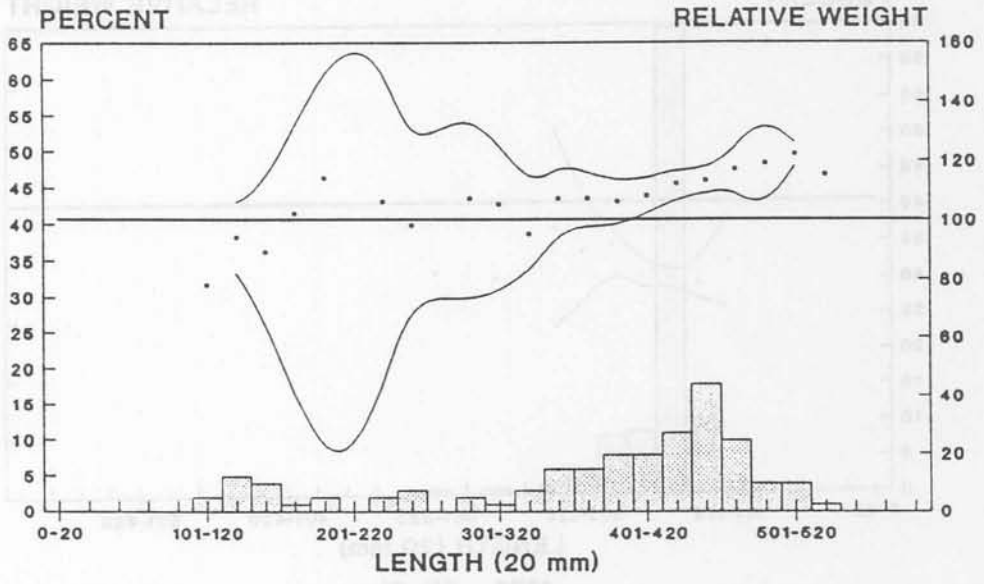
	Total (≥45)		<75 mm (≥10)		75-149 mm (20-100)		≥150 mm (≥15)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1992	79	52.7	1	90	44	90	8	97

APPENDIX

Length Frequency Histograms,
Relative Weight Plots, and
Length Limit Evaluation Graph for Bass
at Elk City Lake, 1992

FIGURE 4.

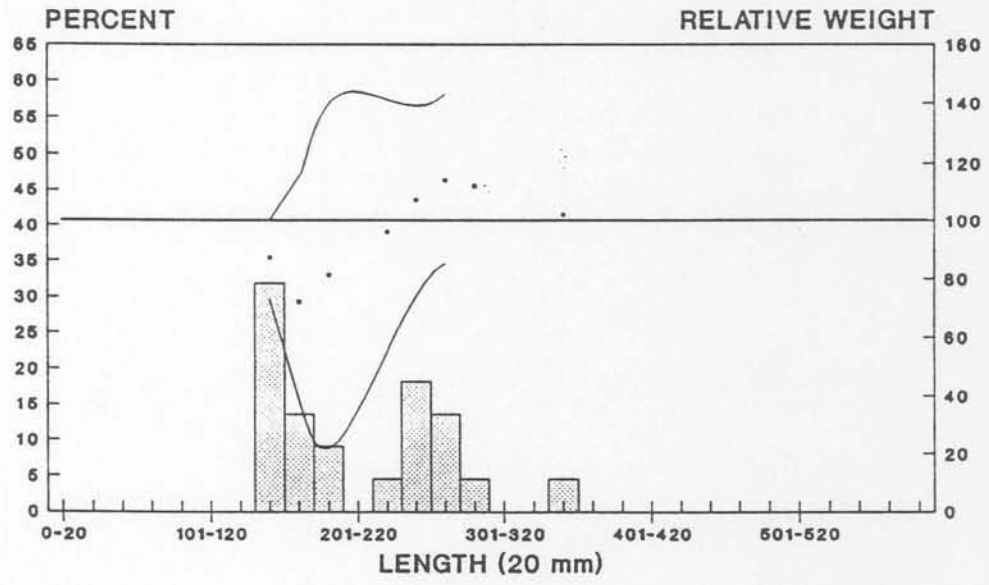
Length Frequency and Mean Relative Weights with 95% Confidence Limits



1992 - Elk City
Largemouth Bass - N=101
Spring Electrofishing

FIGURE 5.

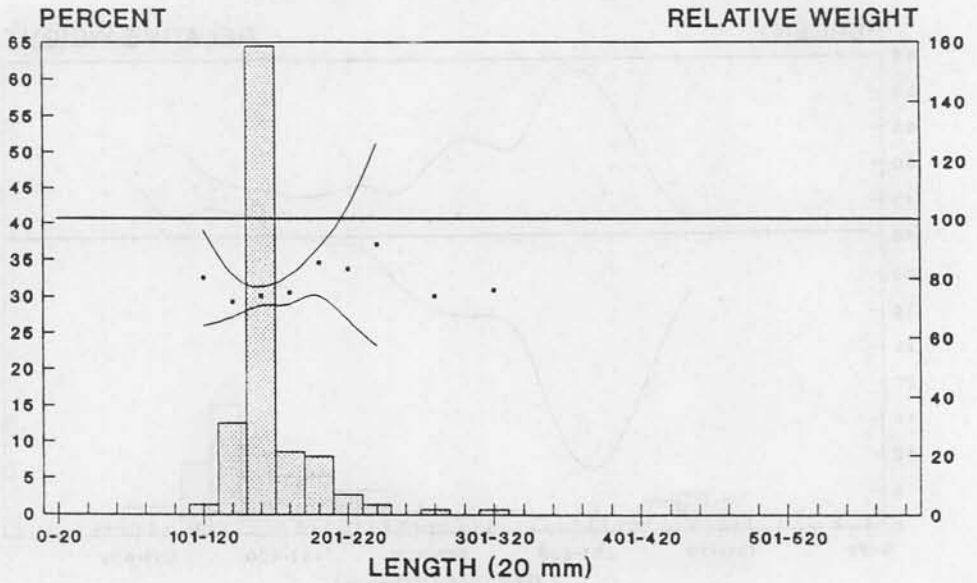
Length Frequency and Mean Relative Weights with 95% Confidence Limits



1992 - Elk City
White Crappie - N=22
Spring Electrofishing

FIGURE 8.

Length Frequency and Mean Relative Weights with 95% Confidence Limits



1992 - Elk City
Gizzard Shad - N=152
Spring Electrofishing