SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS FOR **Eucha Lake** 2024

SURVEY REPORT

State: Oklahoma
Project Title: Oklahoma Fisheries Management Program
Study Title: Surveys and Recommendations – Eucha Lake
Period Covered: 1 January 2024 – 31 December 2024
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ABSTRACT

Eucha Lake fish populations are regularly monitored via spring electrofishing, trap netting, and gillnetting. In 2024 only spring electrofishing for Largemouth Bass was conducted.

INTRODUCTION

Eucha Lake was established in 1952 when the City of Tulsa impounded Spavinaw Creek in Delaware County, Oklahoma. Eucha Lake has a surface area of 2,812 acres (1,138 hectares), 48 miles of shoreline, and a capacity of 74,456 acre-feet. The normal pool elevation is 778 feet above sea level, and it has a maximum depth of 83 feet. Secchi disk depth varies throughout the year but is generally around 66 inches. The primary purpose of Eucha Lake is to store municipal water for the City of Tulsa. There are five public boat ramps throughout the lake, and the City of Tulsa does require fishing and boating permits that can be purchased at the Lake Office. Primary fish species sought by rod and reel anglers include Largemouth Bass, Crappie, Channel Catfish, Flathead Catfish, White Bass, and various sunfish species. Lake Eucha also has a large gigging angler base, and these anglers mainly target sucker species such as Spotted Suckers.
In May of 2015, ODWC biologists supplementally stocked 1,500 adult Threadfin Shad into Eucha Lake after several drought years, coupled with extremely low temperatures for several consecutive years wiped out the existing Threadfin population. The Threadfin Shad have been plentiful every year since this supplemental stocking occurred.
From 2016 through 2019 ODWC started an experimental stocking of Florida Largemouth Bass (FLMB) in Eucha Lake. The FLMB that were stocked into Eucha Lake are one-year-old growouts from the State Fish Hatchery in Durant, Oklahoma. The purpose of this project is to determine if stocking age-1 FLMB is more successful than stocking fingerling or fry. Also to determine if FLMB and F1 FLMB (hybrid between FLMB and native Northern Largemouth Bass (NLMB)) show

increased growth in Northeastern Oklahoma like they do in more southern climates. The stocking numbers of FLMB were: 1,046 in 2016, 639 in 2017, 823 in 2018, and 1,300 in 2019 for a total of 3,808 age-1 grow-out bass. Genetic testing and analysis began in 2018 with fish ranging in size from three to ten inches (Ages 0 to 2), and in 2019 with fish ranging in size from three to twelve inches (Ages 0 to 3). Results from those two genetic samples resulted in 3% of fish sampled in 2018 had FLMB alleles present, and in 2019 it resulted in 15% of fish sampled having FLMB alleles. Genetic samples were again collected in 2021 and 2024, but a different protocol was used for these samples. One-hundred fifty fish were collected from throughout the lake in 2021 and sizes ranged from twelve to twenty-three inches (Ages 2 to 11). This resulted in 1% of fish having FLMB alleles. In 2024, the protocol was again slightly changed to collecting fish from the upper half of the lake. All fish collected that have had FLMB alleles were collected in the upper end through the first three genetic samples (age-1 grow-outs were stocked in the upper end of the lake). 4% of all fish sampled in 2024 had greater than 20% FLMB genetics, 4 of which were identified as F1 FLMB. No pure FLMB were detected and 22% of the sample were identified as pure NLMB (98.5% of snips are required for a fish to be designated as pure).

RESULTS

Largemouth Bass

Largemouth Bass (*Micropterus spp.*) were sampled via spring electrofishing in 2024. Fixed stations were sampled electrofishing to observe the age structure, growth rates, and population structure of Largemouth Bass; incidentally, Spotted Bass were sampled but no age and growth metrics were collected. Daytime boat electrofishing was conducted in concurrence with the current standardized sampling procedure (SSP) produced by the ODWC. This includes one aluminum boat containing a mounted electrofisher unit, the hull will act as the cathode, and booms with stainless steel droppers (4.8-6.4 mm diameter) acting as the anode. Samples were collected utilizing pulsed DC (60 pps) and optimum amp output (depending on conditions) with a single dipper at the bow. The boat driver and dipper electrofish along the shoreline for a total of 10 minutes (power on time) dipping all Black Bass spp. observed. The standard effort for Eucha Lake is 18 stations, 21 stations were utilized for 2024 to obtain more genetic samples. A total of 532 black bass were sampled in 2024, 529 of these were largemouth bass (LMB) exhibiting a high abundance with a mean catch rate (fish/hr) of 142.2 (Table1) which was similar to the 2021 sample. Catch rates by size class were above average statewide with preferred and above-size classes exceeding the 75th percentile (Table 2, Table 3). Length frequency analysis shows 14-16” size range dominated the sample totaling 35% of the sample (Figure 1). Relative weights for these size classes put the Eucha population above average (Table 1). Age and growth information was collected from 148 individuals and then length at age fit to the 529 total individuals (Table 5). Growth rate appears to be average with growth slowing about 7 years of age at 18” (Figure 2). Age classes 2 and 3 dominated (60%) our sample with sample sizes dwindling after age 5 (Figure 3) which is typical of an average population.

Evidence suggests that Lake Eucha's largemouth bass population is stable and average overall when compared to other lakes statewide. Catch rates are exceptional and there are a lot of individuals in the 14-16” size range, relative weights are slightly above average, and growth rates are average. The population should be monitored every 3 years to observe variations over time. Stocking rates of FLMB growouts should remain as available.

Year	N	Mean	Count	RSE	SE	L 95% CI	U 95% CI
2021	392	130.7	18	8.6	11.2	108.7	152.6
2024	529	142.2	21.0	8.5	12.0	118.6	165.7

Table 1. Total number (N), mean CPUE as fish/hr (Mean), number of stations (Count), relative standard error (RSE), standard error (SE), and upper and lower confidence intervals (L 95% CI, U 95% CI) of largemouth bass collected by spring electrofishing at Lake Eucha in 2023 and 2024.

Size Category	Mean	Wr	RSE	SE	L 95% CI	U 95% CI
substock	18.5	118.3	27.5	5.1	8.5	28.5
stock	18.1	93.5	18.6	3.4	11.5	24.7
quality	34.4	93.7	12.2	4.2	26.2	42.6
preferred	57.6	93.8	11.1	6.4	45.0	70.1
memorable	7.1	95.9	23.3	1.6	3.9	10.3
trophy	0.0	-	-	-	-	-

Table 2. Mean CPUE as fish/hr (Mean), relative weight (Wr), relative standard error (RSE), standard error (SE), and upper and lower confidence intervale (L 95% CI, U 95% CI), by size class for largemouth bass collected by spring electrofishing at Lake Eucha in 2024.

Species.Name	Size Class	5%	25%	50%	75%	95%
Largemouth Bass	PSD	37	57	71	79	92
Largemouth Bass	PSD-P	7	20	33	46	61
Largemouth Bass	PSD-M	0	1	2	4	12
Largemouth Bass	PSD-T	0	0	0	0	0

Table 3. Table of statewide percentiles for catch rate (CPUE) by PSD size class.

Species.Name	Wr Metric	5%	25%	50%	75%	95%
Largemouth Bass	Wr all sizes	82.4	88.1	93.2	97.8	106.4
Largemouth Bass	Wr < stock size	79.7	87.6	93.2	99.1	112.6
Largemouth Bass	Wr stock-quality size	80.7	86.0	91.5	96.6	105.4
Largemouth Bass	Wr quality-preferred size	80.0	86.4	91.7	96.9	106.1

Table 4. Represents statewide percentiles for relative weight (Wr) by PSD size class.

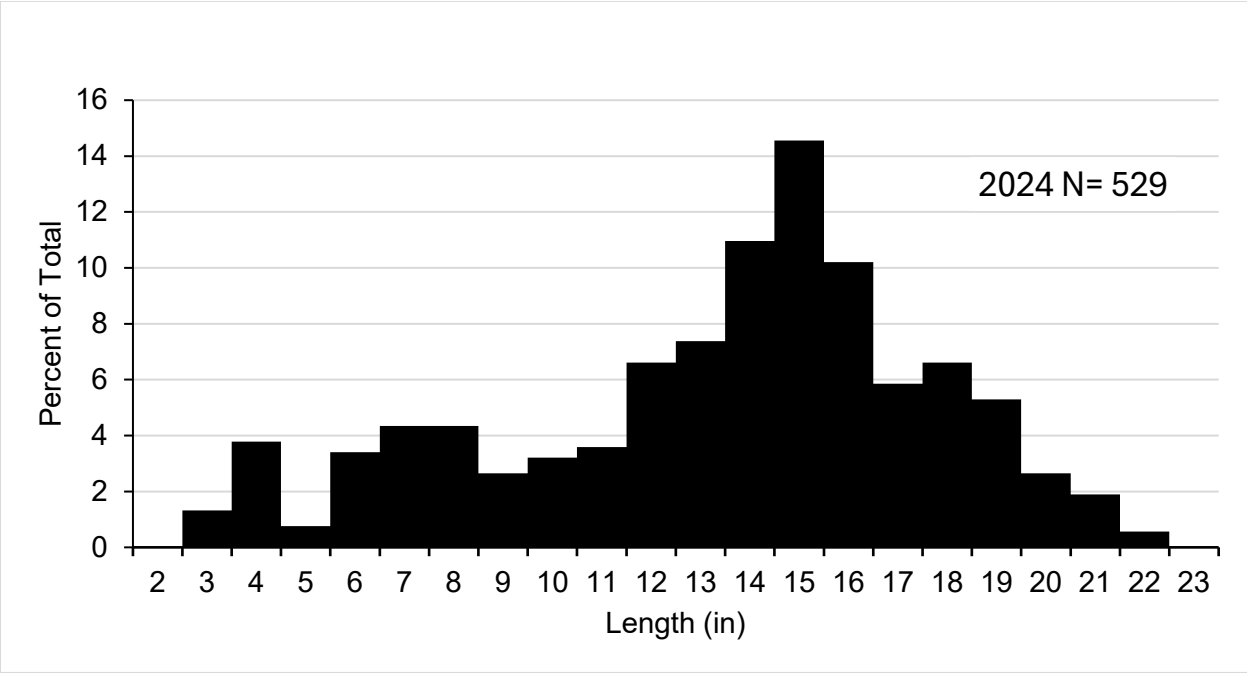

Figure 1. 2024 length frequency distribution for largemouth bass collected by spring electrofishing at Lake Eucha.

Age	Mean TL (in)	N	L 95% CI	U 95% CI
2	9.2	186.0	8.8	9.7
3	14.5	118.0	14.2	14.8
4	16.1	105.0	15.8	16.4
5	17.4	58.0	17.0	17.9
6	18.5	14.0	17.8	19.3
7	18.2	25.0	17.6	18.8
8	20.4	12.0	19.9	20.8
9	21.0	5.0	20.6	21.3
11	21.4	3.0	20.9	21.8

Table 5. Mean length (Mean TL) at age, total number in year class, and upper and lower confidence intervals (L 95% CI, U 95% CI) of largemouth bass collected by spring electrofishing at Lake Eucha in 2024.

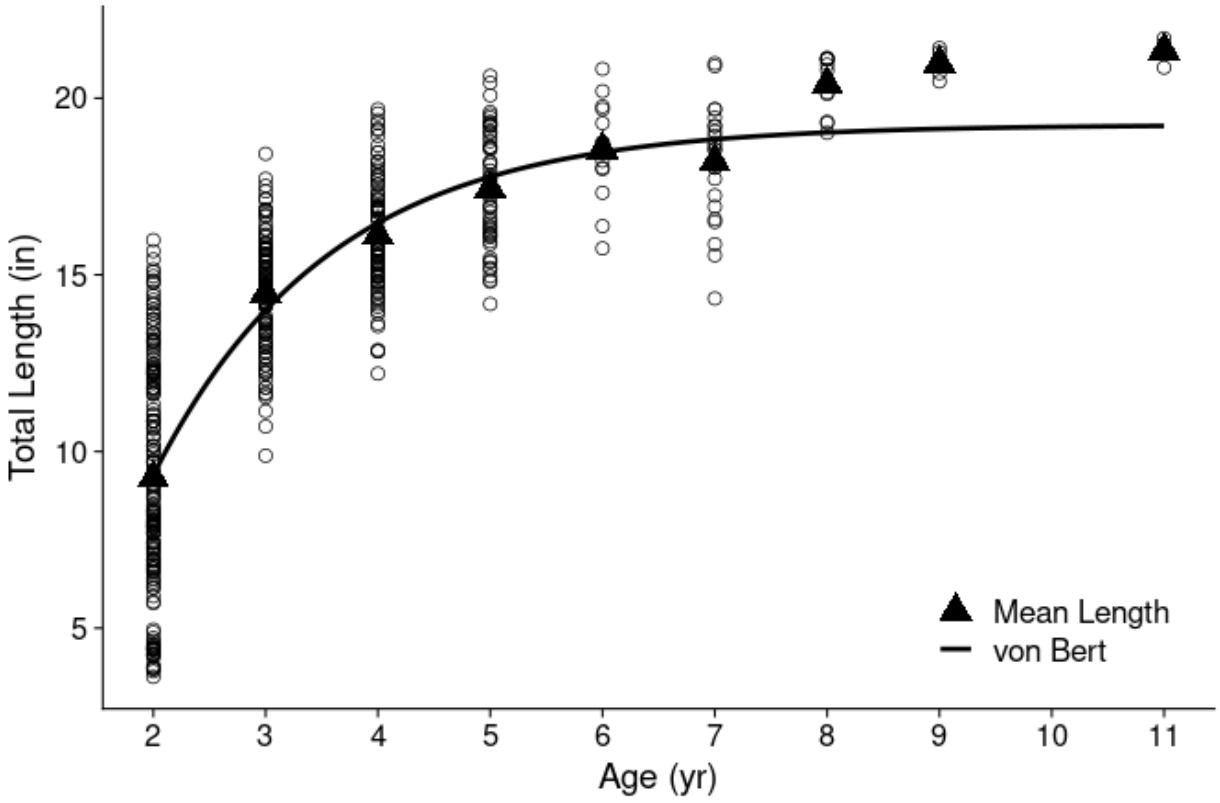

Figure 2. von Bert growth curve age data for largemouth bass collected from Lake Eucha by spring electrofishing in 2024. N = 148 (aged), N = 529 (fit)

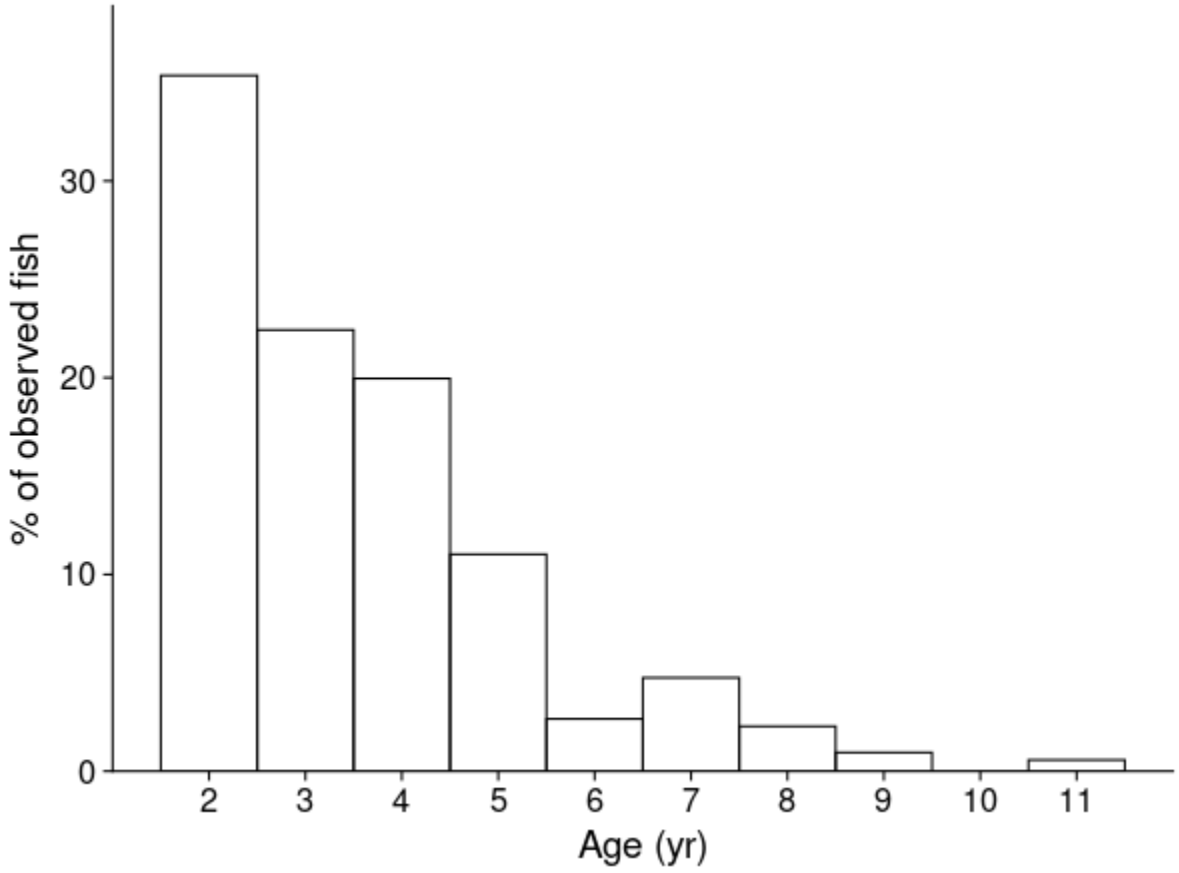

Figure 3. Percent of observed fish by age class for largemouth bass collected at Eucha Lake during spring electrofishing in 2024.

Spotted Bass

Spotted Bass (*Micropterus punctulatus*)were sampled via spring electrofishing in 2024. Fixed electrofishing stations were sampled to observe the age structure, growth rates, and population structure of Largemouth Bass; incidentally, Spotted Bass were sampled but no age and growth metrics were collected. Daytime boat electrofishing was conducted in concurrence with the current standardized sampling procedure (SSP) produced by the ODWC. This includes one aluminum boat containing a mounted electrofisher unit, the hull will act as the cathode, and booms with stainless steel droppers (4.8-6.4 mm diameter) acting as the anode. Samples were collected utilizing pulsed DC (60 pps) and optimum amp output (depending on conditions) with a single dipper at the bow. The boat driver and dipper electrofish along the shoreline for a total of 10 minutes (power on time) dipping all Black Bass spp. observed.

A total of 3 spotted bass were sampled in 2024, with a mean catch rate of 0.3 but a wide confidence interval of -0.4—2.1 fish/hr (Table 6). This is not a significant difference from that of 2021 as more effort was conducted, though very low abundance could result in sampling difficulty. Individuals sampled were

all greater than 11 inches indicating they were adult fish (Figure 4). Because spotted bass are not a sought-after species at Lake Eucha, no age and growth information was collected.

Overall Spotted Bass in Lake Eucha are of low abundance and their growth rate is unknown. Their low abundance makes it difficult to estimate their population dynamics. Spotted Bass are not considered a sought-after species in Lake Eucha. One of the lake's biggest draws is its Largemouth Bass population. Being in the same family spotted bass pose a threat to the largemouth in Lake Eucha through competition and hybridization. Spotted bass populations should continue to be monitored for any changes, being a native species that likely inhabits Spavinaw Creek eradication of the species is unlikely. It is possible that the lake lacks the habitat that the spotted bass are looking for and therefore they will naturally remain in the creek.

Year	N	Mean	Count	RSE	SE	L 95% CI	U 95% CI
2021	1	0.3	18	100.0	0.3	-0.32	0.99
2024	3	0.9	21.0	73.0	0.6	-0.4	2.1

Table 6. Total number (N), mean CPUE as fish/hr (Mean), number of stations (Count), relative standard error (RSE), standard error (SE), and upper and lower confidence intervals (L 95% CI, U 95% CI) of spotted bass collected by spring electrofishing at Lake Eucha in 2023 and 2024.

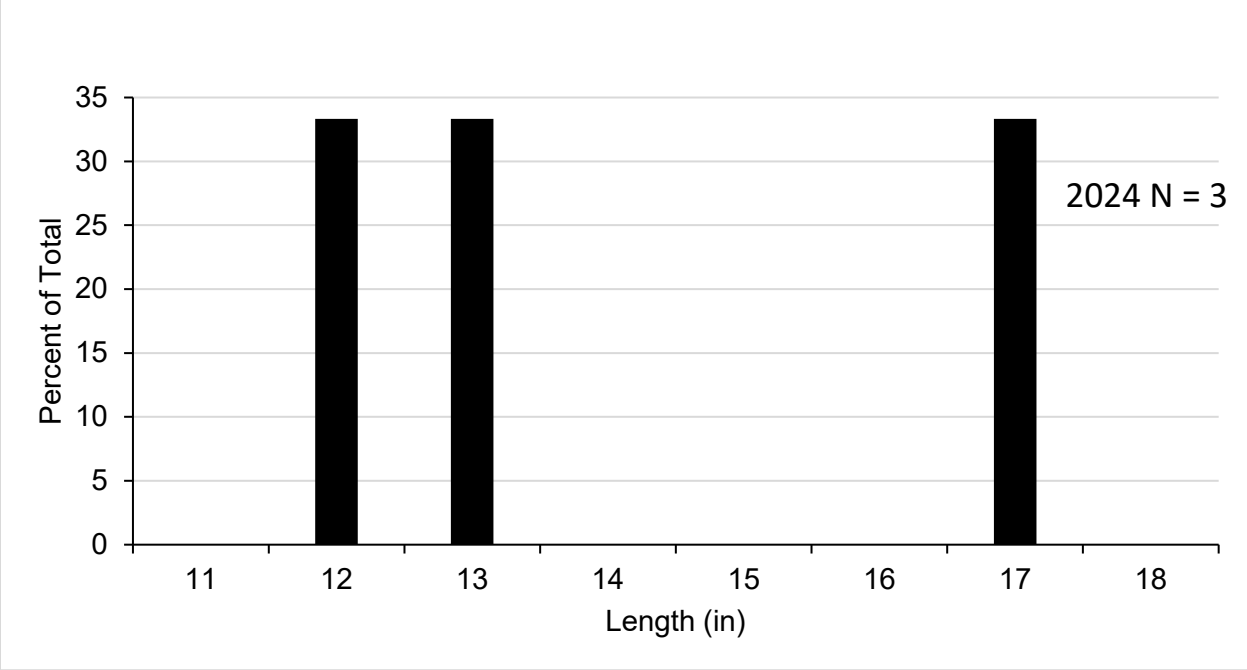

Figure 4. 2024 length frequency distribution for spotted bass collected by spring electrofishing at Lake Eucha.