

SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

OKMULGEE LAKE

2025

SURVEY REPORT

State: Oklahoma

Project Title: Okmulgee Lake Fish Management Survey Report

Period Covered: 2025

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Okmulgee Lake

ABSTRACT

Okmulgee Lake was surveyed by spring electrofishing (2025) techniques to monitor trends in fish populations. Largemouth Bass abundance increased, body conditions and recruitment decreased, recruitment of LMB from the 2024-year class was lower than desired. Spotted Bass showed a significant decrease in relative abundance but a slight increase in size structure, however, variability within the data was high and should be reevaluated in future surveys. Continued monitoring of the Black Bass population dynamics is recommended.

Introduction

Okmulgee Lake impounds Salt Creek 5 miles west of Okmulgee in Okmulgee County, Oklahoma. Okmulgee Lake covers 668 surface acres and was constructed in 1928 by the City of Okmulgee. Okmulgee Lake has a mean depth of 17.5 feet and a maximum of 70 foot, a shoreline development ratio of 5.4, and a secchi disc visibility of around 60 inches in the main pool in August; turbidity is primarily from plankton. Fish habitat types range from steep rocky shoreline to gently sloping mud flats with abundant aquatic vegetation.

Previous surveys have indicated an increasing abundance of Largemouth Bass with an improvement in the population size structure. More recent studies continue to show improvement in Largemouth Bass size structure, however, abundance has decreased but remained as a quality fishery. These surveys generally indicated fairly abundant populations of Spotted Bass, and sunfish; while Channel Catfish, Crappie and White Bass were present in low numbers.

Recent fish stocking activities have included stocking of Channel Catfish fingerlings and Florida largemouth bass (Appendix 1). A boating access project consisting of a fishing dock was constructed in 2000, and 3 boat docks with ADA parking was constructed in 2017 and are currently under a cooperative agreement. Fish attractor habitat (cedar trees) was installed in three sites in 1984. These sites have been refurbished periodically to increase angler fishing success. In 2006, these fish attractor sites were refurbished with spider blocks. Over the years additional sites have been added and some dropped. Currently a total of seven fish attractor sites are maintained and were refurbished in 2022 and 2024 with a combination of spider blocks, cedar trees, and Shelbyville cubes (Appendix 2). Other fish management activities have included the installation of catfish spawning structures, and the use of length limits to improve bass population size structure. In 2001 a slot limit of 13-16 inches was enacted. In 2022 the black bass regulations changed for simplicity to follow new statewide regulations, harvest limit of six Largemouth Bass of which only one may be larger than 16 inches. There is no longer a minimum length limit.

Okmulgee Lake was surveyed by spring electrofishing (2025) techniques to monitor trends in fish populations.

RESULTS

Largemouth Bass

Largemouth Bass (LMB) were surveyed in spring of 2025 by means of boat electrofishing. A total of 12 randomly selected shoreline units were sampled. Overall LMB, catch per unit of effort (CPUE) total relative abundance increased in 2025 (CPUE = 68.5) compared to the previous survey in 2019 (CPUE = 60.0) (Table 1). CPUE increased for stock, quality and preferred size classes, while it decreased slightly for sub stock, memorable and trophy size classes. No fish were collected from the trophy size class. Okmulgee Lake is considered a high quality fishery with high relative abundance. Recruitment from the 2024 year class appeared lower than desired with the low relative abundance of Substock size fish. While total abundance increased, body condition or relative weights (W_r) decreased for all size classes and were below acceptable values of 90 (Table 1). The largest fish sampled from the 2025 survey measured 22.1 (in) in total length and weighed 6.2 (lbs).

Length frequency histograms also indicated low recruitment with a decrease in LMB below eight inches in length (Figure 1). A slight increase in LMB over 16 inches was observed in 2025 (21%) compared to 2019 (20%). However, proportional size distribution (PSD) values during the 2025 survey decreased slightly for all size classes, PSD-Q = 64, PSD-P=32, PSD-M=7 compared to 2019 PSD-Q = 66, PSD-P=33, PSD-M=11 indicating a decrease in proportion of larger size fish (Table 2).

Age data was collected on a subset of Largemouth Bass from the 2025 survey. Growth remained slow but steadily increased as the fish aged. Largemouth Bass growth rates varied slightly between 2019 to 2025 but ultimately decreased for most year classes. Largemouth Bass grew to a mean length of 16.6 inches by age five, a slight increase for the age five year class compared to 2019 (Table 3). The Von Bertalanffy growth curve (Figure 2) gives a visual representation of the predicted growth of Largemouth Bass for Okmulgee Lake and it shows steady growth up to age six or roughly 17 inches then slows greatly. The 2025 age frequency histogram indicated strong age 2 (2023), 3 (2022) and 4 (2021) year classes (Figure 3).

Florida Largemouth Bass (FLMB) were stocked twice since 2006, once in 2012 with 53,836 fingerlings and again in 2013 with 59,906 fingerlings (Appendix 1) in an effort to introduce FLMB genetics into the bass population. FLMB will grow quicker and larger than native Northern Largemouth Bass, given enough forage and the right conditions within the system. Since the LMB fishery is directly below the Dripping Springs Lake, which receives frequent FLMB stockings, FLMB genetics were collected in the 2025 spring sample. Results have yet to come in and will be updated in the next report.

Overall abundance increased, while size structure, and relative weights decreased. Recruitment remained lower than desired. The LMB population in Okmulgee Lake appears to be healthy with a high quality fishery present. It is important to note that the 13-16 inch slot limit changed in 2022 to align with the new statewide regulations. Since 2022 Okmulgee Lake follows the statewide regulations for LMB, a combined daily harvest limit of six fish, of which only one may be larger than 16 inches. There is no minimum length limit. No changes are recommended for Largemouth Bass regulations at this time.

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (W_r) by size groups of Largemouth Bass collected by spring electrofishing from Okmulgee Lake. Acceptable W_r values are ≥ 90 .

		Total CPUE	Substock 0-7.8 in	Stock 7.9 in		Quality 11.8 in		Preferred 15 in		Memorable 20.1 in		Trophy 24.8 in	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	448	149.3	48.3	55.0	87	30.7	87	12.3	98	3.0	101	.	.
2015	213	75.2	10.9	15.9	89	29.7	86	15.5	90	3.2	94	.	.
2019	110	60.0	13.6	15.8	92	15.3	93	10.4	95	4.4	96	0.6	92
2025	137	68.5	9.0	21.5	84	19.0	84	15.0	88	4.0	88	.	.

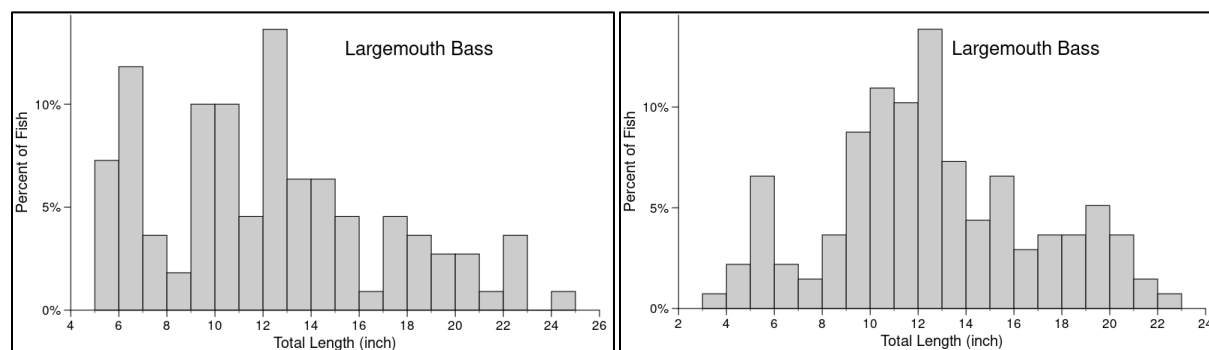


Figure 1. Largemouth Bass Length Frequency Histogram for Okmulgee Lake 2019 (Left), 2025 (Right).

Table 2. Proportional Size Distribution (PSD) of Largemouth Bass. Quality (PSD-Q), preferred (PSD-P) and memorable (PSD-M) lengths. PSD values indicate the proportion of fish in or above the quality, preferred or memorable size classes.

Year Surveyed	PSD-Q (11.8 in)	PSD-P (15 in)	PSD-M (20.1 in)
2006	46	15	3
2015	75	29	5
2019	66	33	11
2025	64	32	7

Table 3. Mean Total Length at age (inches) for **Largemouth Bass** from Okmulgee Lake.

Year	Age <u>1</u>	Age <u>2</u>	Age <u>3</u>	Age <u>4</u>	Age <u>5</u>	Age <u>6</u>	Age <u>7</u>	Age <u>8</u>	Age <u>9</u>	Age <u>10</u>	Age <u>11</u>	Age <u>12</u>	Age <u>13</u>
2019	6.4	10.1	12.3	14.2	15.5	18.9	18.5	18.1	20.6	22.3	22.1	.	.
2025	7.5	9.9	11.9	14.0	16.6	17.1	18.3	18.4	19.4	22.2	20.6	.	19.2

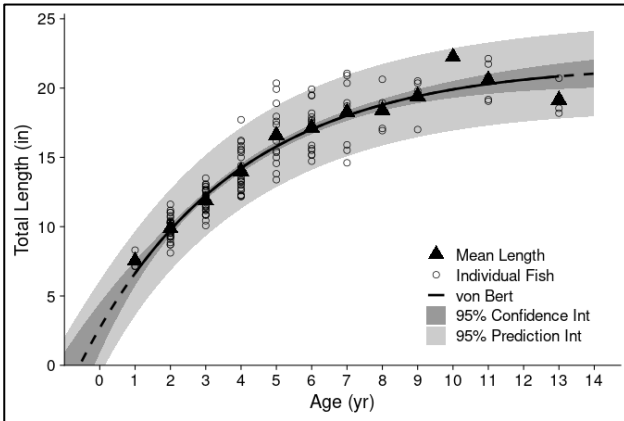


Figure 2. 2025 Largemouth Bass Mean Length at Age: Von Bert Estimated Growth Curve. The Von Bert Growth Curve indicates the estimated growth rate of Largemouth Bass.

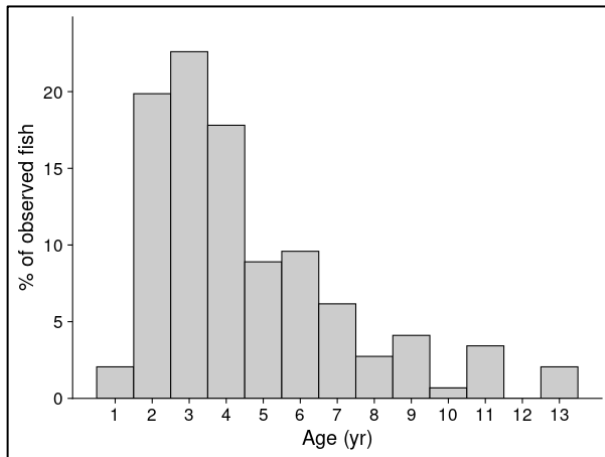


Figure 3. 2025 Age Frequency of Largemouth Bass.

Spotted Bass

Spotted Bass were surveyed in spring of 2025 by means of boat electrofishing. A total of 12 randomly selected shoreline units were sampled. Overall Spotted Bass relative abundance decreased significantly from 2019 (CPUE= 27.3) to 2025 (CPUE = 9.0) (Table 4). All size classes present showed a decrease in relative abundance. Body condition or relative weights (Wr) also decreased for all size classes except for quality (11 in), but remained below acceptable (values at or above 90) for all size classes (Table 4). The largest fish collected from the 2025 survey measured 14.6 (in) in total length and 1.4 (lbs.) in weight.

Proportional size distribution (PSD) values increased considerably from 2019 (PSD-Q = 14) to 2025 (PSD-Q = 29) indicating an increase in proportion of larger size fish in 2025 compared to 2019 (Table 5). Spotted Bass length frequency histograms (Figure 4) also demonstrate an increase in overall size structure during the 2025 survey compared to 2019. This is likely due to the fewer number of Spotted Bass collected in 2025 and the higher abundance of stock size fish surveyed in 2019. No age data was collected during these surveys.

Overall, relative abundance and body conditions for Spotted Bass decreased, size structure appeared to increase, however due to the low numbers of Spotted Bass surveyed and higher variability within the 2025 (CV = .39) survey, these results should be considered only observations until better data can be collected. Spotted Bass typically grow slower and obtain smaller sizes than Largemouth Bass but they compete for the same food source. For management reasons low abundance of Spotted Bass is preferred. Spotted Bass have no harvest or minimum length limit. No changes in regulations are recommended at this time.

Table 4. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Spotted Bass collected by spring electrofishing from Okmulgee Lake. Acceptable Wr values are ≥ 90 .

		Total CPUE	<u>Stock</u> 7.1 in		<u>Quality</u> 11 in		<u>Preferred</u> 13.8 in		<u>Memorable</u> 16.9 in		<u>Trophy</u> 20.1	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	78	26.0	18.0	88	2.3	88	.	.	.	.	.	.
2015	52	18.4	9.5	90	7.4	83	.	.	.	.	.	.
2019	50	27.3	20.7	90	2.2	83	1.1	88	.	.	.	.
2025	18	9.0	5.0	86	1.5	84	0.5	83	.	.	.	.

Table 5. Proportional Size Distribution (PSD) of Spotted Bass. Quality (PSD-Q), preferred (PSD-P) and memorable (PSD-M) lengths. PSD values indicate the proportion of fish in or above the quality, preferred or memorable size classes.

<u>Year Surveyed</u>	<u>PSD-Q</u> <u>(11 in)</u>	<u>PSD-P</u> <u>(13.8 in)</u>	<u>PSD-M</u> <u>(16.9 in)</u>
2006	11	.	.
2015	44	.	.
2019	14	5	.
2025	29	7	.

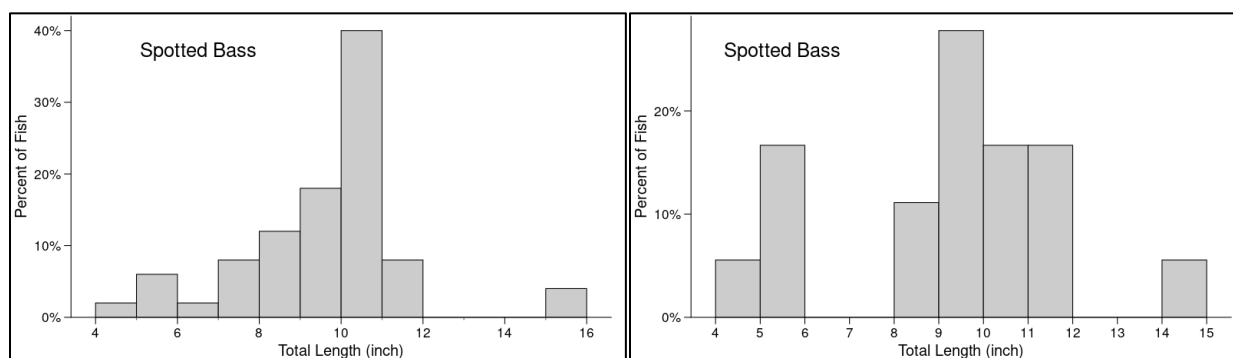


Figure 4. Spotted Bass Length Frequency Histogram for Okmulgee Lake 2019 (Left), 2025 (Right).

RECOMENDATIONS

1. Continued monitoring of black bass population dynamics and size structure.

Appendix 1. Species, number and size of fish stocked in Okmulgee Lake since 2000.

Date	Species	Number	Size (inches)
2000	Channel Catfish	14,404	7
2001	Channel Catfish	14,448	7
2002	Channel Catfish	14,448	6.5
2003	Channel Catfish	14,976	7
2004	Channel Catfish	14,575	7
2005	Channel Catfish	14,408	7
2006	Channel Catfish	14,400	7
2007	Channel Catfish	14,720	7
2008	Channel Catfish	18,125	5
2009	Channel Catfish	15,006	7
2012	Florida Largemouth Bass	53,836	1.5
2013	Florida Largemouth Bass	59,906	1.5
2014	Channel Catfish	26,740	7
2015	Channel Catfish	22,228	7
	Channel Catfish	4,830	6.75
2023	Channel Catfish	22,070	7
	Channel Catfish	18,255	2.5
2024	Channel Catfish	20,385	7

Appendix 2. Okmulgee Lake Fish Attractor Locations and Site Information

Area Name	Site #	Latitude	Longitude	Habitat Type	Marked	Bank Access	Date
Lions Club Point	1	35.6252	-96.0784	cedars	Y	N	April 2024
Salvation Army Point	2	35.6130	-96.0841	cedars	Y	N	April 2024
Fishing Dock	3	35.6212	-96.0645	cedars,spiders, Artificial Cubes	Y	Y	April 2024
East Bank N of Blackjack	4	35.6192	-96.0708	cedars	N	Y	Sept. 2022
WPA Pavillion Red Oak	5	35.6115	-96.0749	cedars	N	Y	Sept. 2022
Red Oak Area	6	35.6099	-96.0764	cedars	N	Y	April 2024
Hickory Point	7	35.6027	-96.0793	cedars	Y	Y	Sept. 2022