SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

MOUNTAIN LAKE

2023

INTRODUCTION

Mountain Lake impounds little Hickory Creek, 21 miles northwest of Ardmore in Carter County, Oklahoma (Figure 1). Mountain Lake covers 210 acres and was constructed in 1956 by the City of Ardmore. The lakes primary purposes are water storage, and recreation. The lake has a normal pool elevation of 1,048 feet msl, a mean depth of 8.2 feet, and a maximum depth of 50.5 feet (Table 1). Natural fish habitat consists primarily of aquatic vegetation, rock, and stump beds. The lake is relatively clear with a secchi depth of 8.5 feet in the summer.

FISHERY

The major sportfish in Mountain Lake include largemouth bass, smallmouth bass, white crappie, and channel catfish. A complete stocking history is included in Table 2.

In 2023, the 24 inch minimum length limit and a one fish/day creel limit for black bass was changed to align with the statewide limit of 6 fish/day of which only 1 can be greater than 16 inches. A 15 fish creel and no size limit on crappie, and a 5 fish creel with no size limit on catfish.

Mountain Lake was sampled by spring electrofishing in 2023 (Figure 2) to evaluate the status of the black bass population. Shad gillnetting was last conducted in 2017 to evaluate threadfin shad stocking efforts.

Black Bass

Largemouth Bass

Mountain Lake was drained down to the creek channel in 1984 for repair of the flood gates on the dam. Florida-strain largemouth bass were stocked in 1985 to increase abundance of trophy-sized bass. A state record largemouth bass (14lbs 10oz) was caught from the lake on March 25, 1993. DNA testing determined the fish was a first generation cross between a Florida bass and a

native, northern bass. It was eight years old. Mountain Lake has produced numerous trophy largemouth bass since the 1990s.

In recent years, Mountain Lake's bass population has been dominated by smaller individuals and slowed growth rates. Catch rates for largemouth bass > 12 inches consistently exceed the range of acceptable values for a quality fishery. However, the majority of these fish range from 12 – 16 inches. During the last 3 samples (2016, 2019, 2023), no largemouth bass exceeded the previous minimum length limit of 24 inches. Catch rates and size structure of largemouth bass are included in Table 3 and Figures 3-4. Age and growth data collected in 2013, 2019, and 2023 indicate that growth is slower than the statewide or regional average for largemouth bass (Table 4 and Figure 5). This slowed growth is likely the result of large numbers of smaller individuals competing for resources. Recent changes to the restrictive harvest limits may be helpful in reducing overall numbers and increasing growth rates.

Smallmouth Bass

Smallmouth bass were first stocked in 1991. The population is self-sustaining but has remained at relatively low numbers when compared to other smallmouth bass populations throughout Oklahoma. Only 3 smallmouth bass were collected in 2023 and ranged from 14 – 16 inches in length. Catch rates and size structure of the smallmouth bass population are listed in Table 5 and Figure 6.

THREATS TO FISHERY

Aquatic Nuisance Species (ANS)

Zebra mussels

Zebra mussels (*Dreissena polymorpha*) are small, thumbnail size mussels with a zebra-like pattern of stripes native to the Caspian Sea region of Asia. These invasive mussels reproduce rapidly and can spread from one waterbody to another through a free-floating, microscopic larval stage known as a veliger. Zebra mussels negatively impact the environment by altering the food

chain and water chemistry of a lake. Zebra mussels also affect manmade facilities by clogging water intake pipes and disrupting withdrawal operations.

Zebra mussels have not been detected at Mountain Lake. They were first detected in nearby Lake Texoma in 2008, Lake Murray in 2012, and Ardmore City Lake in 2022. Because Mountain Lake is located in close proximity (within 75 miles) of these lakes, there is a good likelihood that recreational users will utilize both reservoirs. This results in numerous vectors for the transfer of water and zebra mussel adults and veligers to Mountain Lake. The connectivity of the City of Ardmore's four lakes and their use as a municipal water source increases the threat level and the resulting negative impacts that a zebra mussel infestation would have. More information about invasive mussels can be found at http://www.100thmeridian.org.

Hydrilla

Hydrilla (*Hydrilla verticillata*) is an invasive and potentially damaging aquatic weed popular in the aquarium trade. It has the ability to establish at depths greater than 15 feet and form dense surface mats. Hydrilla is known to displace native species, negatively affect water quality, restrict water flow, and impair recreational activities. Its many modes of reproduction, including fragmentation, allows for rapid spread and dispersal within and among water bodies. Hydrilla infestation at Mountain Lake could be severe due to the relatively shallow nature of the lake (average depth 8.2 feet) and the ability of hydrilla to establish in deep water and outcompete native plants. Hydrilla has been observed at nearby Ardmore City lakes, Arbuckle, and Murray. The proximity of these lakes to Mountain Lake increases the risk of infestation.

RECOMMENDATIONS

1. Conduct spring electrofishing in 2026 to evaluate the black bass fishery.
    a. Collect age and growth and DNA data on largemouth bass.
    b. Harvest of smaller bass should be encouraged to reduce the population and improve growth rates.
2. Enhance the forage abundance through the stocking of threadfin shad when feasible.

3. Address aquatic nuisance species threats through public outreach opportunities, literature, and signage.

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Table 1. Physical and chemical characteristics of Mountain Lake

Operating Agencies:	
Water storage and recreation	City of Ardmore
Impoundment Date	1956
Watershed	12.7 square miles
Surface Area	210 acres
Capacity	3,040 acre-feet
Shoreline	5 miles
Mean Depth	8.2 ft.
Maximum Depth	50.5 ft.
Water Exchange Rate	1.126
Secchi Disk	102 in

Table 2. Species, number and size of fish stocked in Mountain Lake from 1983 to 2021.

DATE	SPECIES	NUMBER	SIZE
1985	Florida bass	20,884	Fingerlings
1985	Bluegill	100,000	Fry
1985	Channel catfish	20,100	Fingerlings
1986	Inland silversides	2,100	Adults
1986	Threadfin shad	61	Adults
1988	Threadfin shad	1,500	Adults
1990	Channel catfish	5,060	Fingerlings
1991	Smallmouth bass	4,000	Fingerlings
1991	Threadfin shad	1,700	Adults
1992	Channel catfish	6,400	Growouts
1992	Threadfin shad	3,000	Adults
1995	Threadfin shad	2,000	Adults
1996	Cert. Florida bass	4,600	Fingerlings
1996	Smallmouth bass	2,300	Fingerlings
1997	Smallmouth bass	3,000	Fingerlings
2003	Cert. Florida bass	4,920	Fingerlings
2005	Cert. Florida bass	4,614	Fingerlings
2007	Cert. Florida bass	4,620	Fingerlings
2009	Cert. Florida bass	30,883	Fingerlings
2011	Cert. Florida bass	21,001	Fingerlings
2013	Cert. Florida bass	10,000	Fingerlings
2014	Cert. Florida bass	15,009	Fingerlings
2016	Cert. Florida bass	15,002	Fingerlings
2016	Threadfin shad	2,296	Adults
2017	Cert. Florida bass	15,075	Fingerlings
2018	Cert. Florida bass	15,064	Fingerlings
2021	Cert. Florida bass	30,388	Fingerlings

Table 3. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of largemouth bass collected by spring night electrofishing from Mountain Lake. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥40)		<8 in. (15-45)		≥12 in. (≥15)		≥14 in. (≥10)		≥ 16 in.	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1988	104	69.3	-	-	14.6	-	6.7	-		
1993	163	108.7	22.7	97	47.3	90	13.3	83		
1996	146	146.0	1.0	70	124.0	93	54.0	89	12.0	-
2000	137	182.7	16.0	104	148.0	92	137.3	92	92.0	90
2004	174	116.0	5.3	101	88.0	88	40.0	89	17.3	-
2010	95	95.0	8.0	85	78.0	-	35.0	88	13.0	94
2013	157	134.6	5.1	89	96.9	91	47.1	93	15.4	95
2016	78	78.0	3.0	100	62.0	88	47.0	88	26.0	89
2019	164	164.0	30.0	80	102.0	86	74.0	86	37.0	88
2023	68	68.0	9.0	82	55.0	84	52.0	87	35.0	86

Table 4. Mean length at age of largemouth bass collected by spring electrofishing from Mountain Lake.

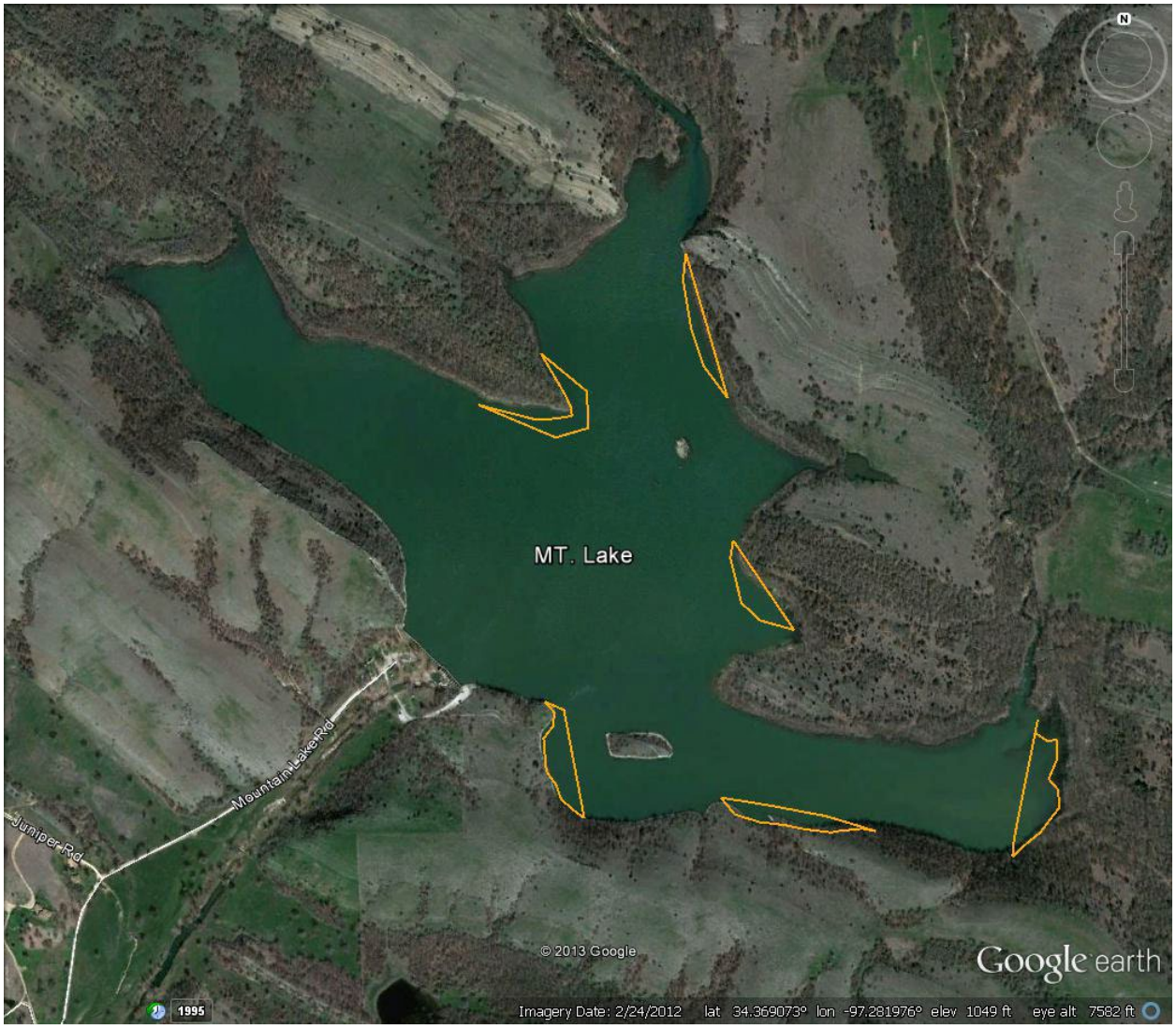
Year	Age 1 (Inches)	Age 2 (Inches)	Age 3 (Inches)	Age 4 (Inches)	Age 5 (Inches)	Age 6 (Inches)	Age 7 (Inches)	Age 8 (Inches)
2013	6.5	9.8	12.5	14.2	15.9	17.9	17.3	14.9
2019	7.3	11.2	13.9	15.5	16.2	17.0	16.6	17.7
2023	7.1	11.9	14.5	15.9	16.5	17.5	19.2	17.7

Table 5. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of smallmouth bass collected by spring night electrofishing from Mountain Lake. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total (≥ 15)		< 8 inches (15-45)		8-12 inches (15-30)		≥ 14 inches (≥ 10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
2004	18	12.0	2.0	87	4.7	91	1.3	85
2010	8	8.0			7.0	89		
2013	2	1.7			0.9	90		
2016	7	7.0	1.0	-	-	-	2.0	83
2019	12	12.0	4.0	85	5.0	92	3.0	83
2023	3	3.0	-	-	-	-	3.0	84

Figure 1. Map of Mountain Lake and vicinity.

Figure 2. Mountain Lake Sampling Sites



SSP Sampling Sites:

Spring Electrofishing -

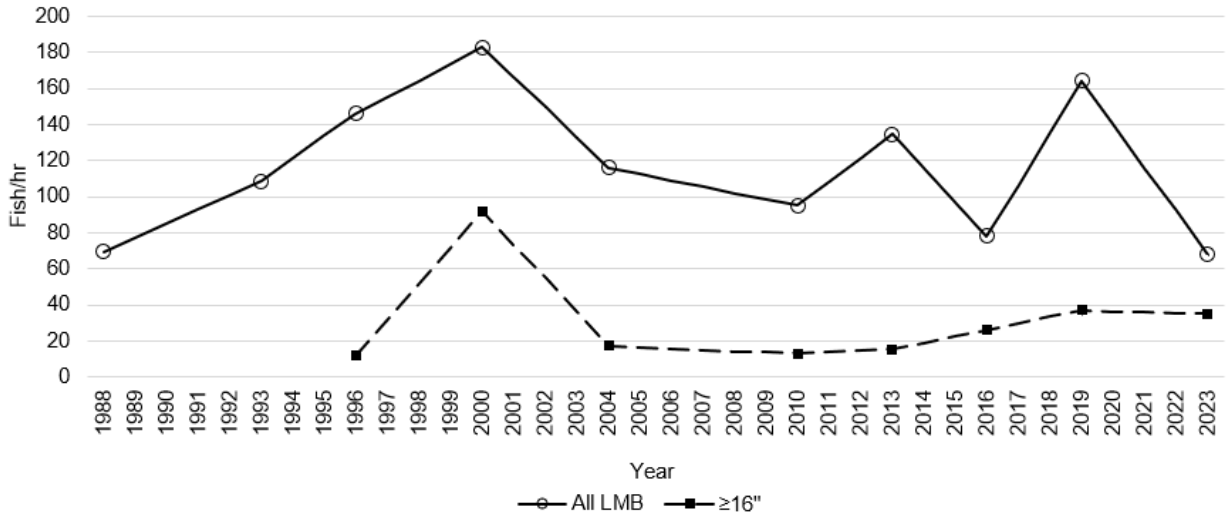


Figure 3. Total catch rates of largemouth bass and catch rates of largemouth bass ≥ 16 inches collected by spring electrofishing.

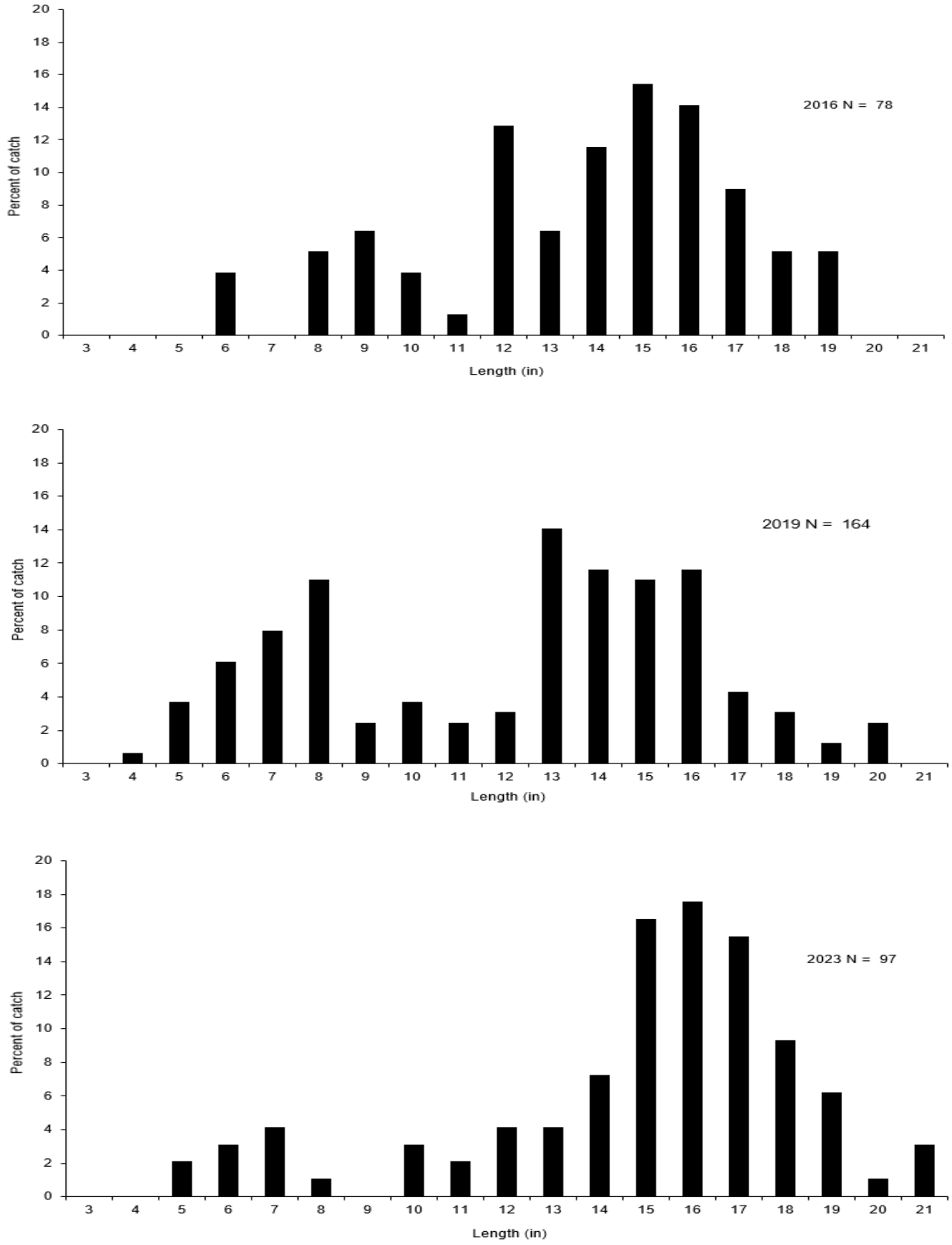


Figure 4. 2016, 2019, and 2023 length frequency distribution for largemouth bass collected by spring electrofishing at Mountain Lake.

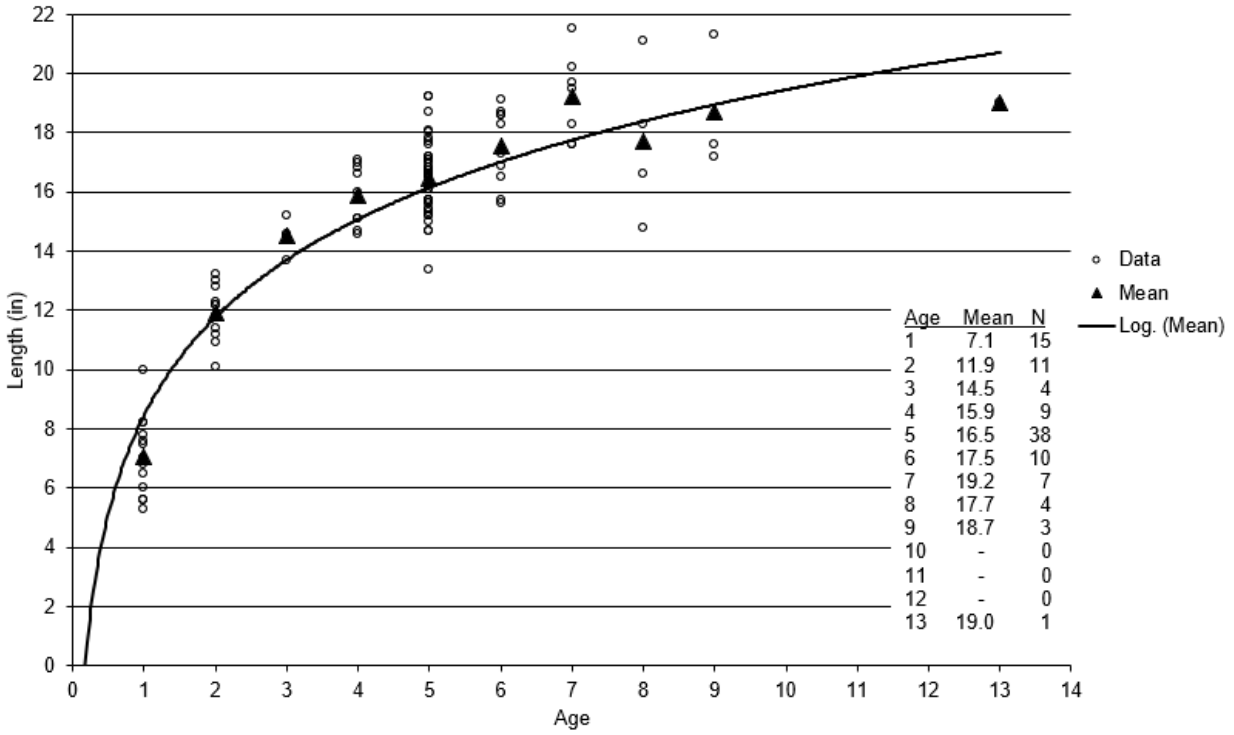


Figure 5. 2023 Length at age data for largemouth bass collected from Mountain Lake by spring electrofishing. N = 102

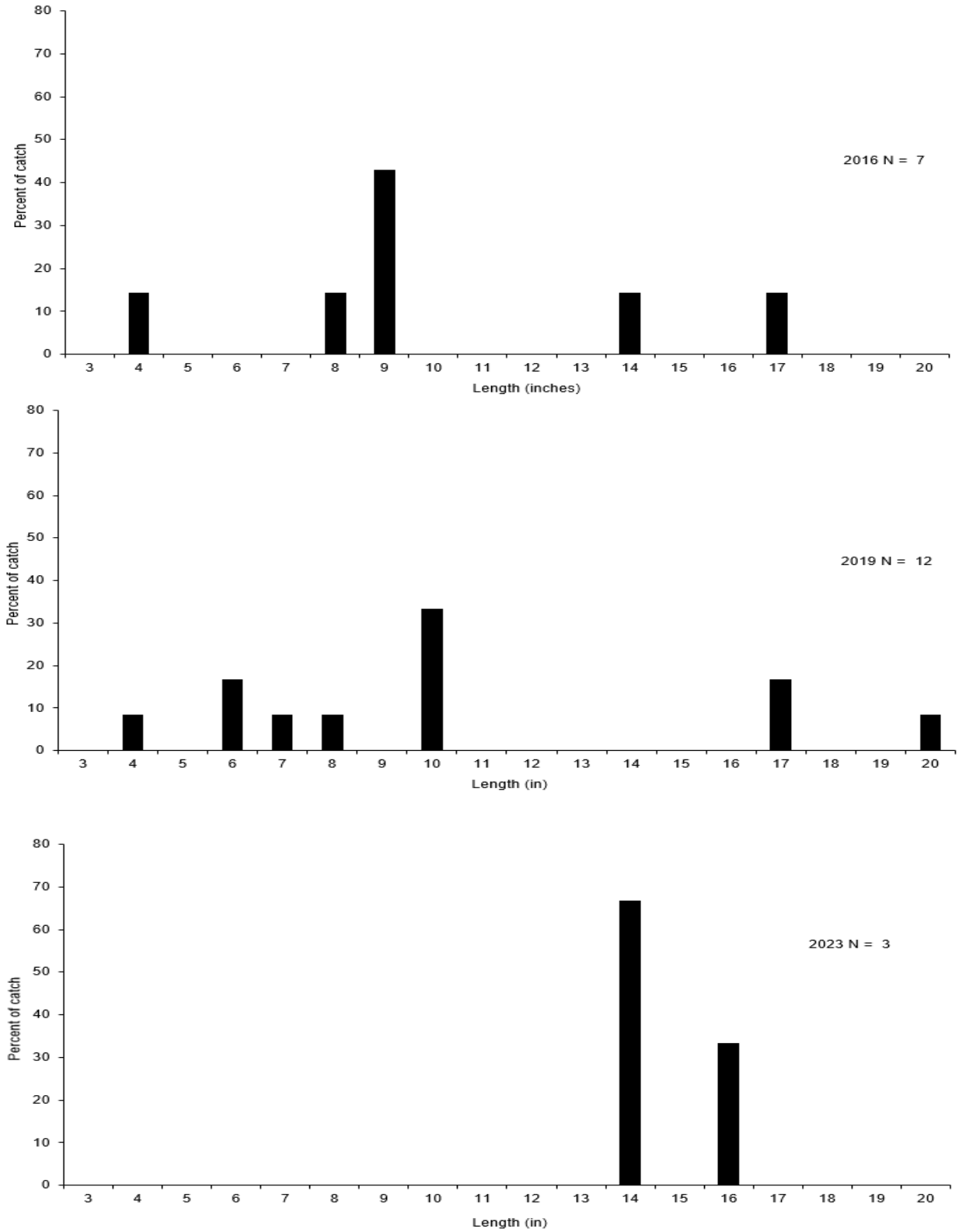


Figure 6. 2016, 2019, and 2023 length frequency distribution for smallmouth bass collected by spring electrofishing at Mountain Lake.