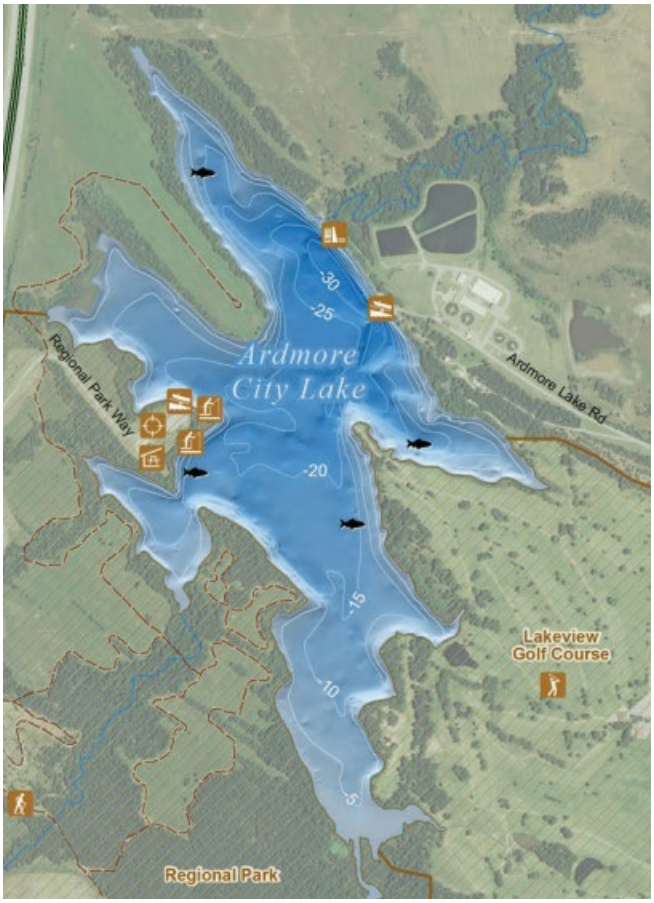
SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

ARDMORE CITY LAKE

2022

INTRODUCTION

Ardmore City Lake is located in Carter County on the north side of the city limits of Ardmore, Oklahoma (Figure 1.). Ardmore City Lake has a surface area of 142 acres and was constructed in 1910 by the City of Ardmore. The lake has a maximum depth of 30 ft and a secchi disc visibility of around 7.4 ft. in the main pool in August.

A boat dock was constructed and installed in 1991, and a parking lot, boat ramp, boat dock, fishing dock and restroom in 1999 as a cooperative Boating Access project with the City of Ardmore and the Oklahoma Department of Wildlife Conservation (ODWC).

HABITAT

Natural fish habitat consists of aquatic vegetation, rock and limited amounts of flooded timber. The Oklahoma Department of Wildlife Conservation (ODWC) currently maintains 4 buoyed fish attractors to increase angler opportunities (Figure 2). Maps and GPS coordinates for these structures are available on the department's website at http://www.wildlifedepartment.com/fishing/wheretofish.htm. In 2008, a statewide grant through the National Fish and Wildlife Foundation (NFWF) allowed for the purchase of materials to construct artificial habitat structures consisting of polyethylene pipe and concrete blocks. These artificial habitat structures, known as spider blocks, were placed around the fishing dock in the summer of 2009. Buoyed fish attractors throughout the lake were refurbished during 2022. These trees should provide improved fishing opportunities for several years.

WATER QUALITY

Water quality data for Ardmore City Lake is collected through the Oklahoma Water Resources Board as part of their Beneficial Use Monitoring Program (BUMP). The most current BUMP

report for Ardmore City Lake can be viewed at http://www.owrb.ok.gov. A brief overview of several water quality parameters is included in Table 1.

FISHERY

The major sportfish in Ardmore City Lake include largemouth bass, white and black crappie, and channel catfish. Historical stocking data is included in Table 2.

Regulations include a 14 inch minimum length limit for bass with only one bass greater than 16 inches, a five fish creel limit for black bass and channel catfish, and a 15 fish creel and no size limit on crappie. City of Ardmore agreed to adopt statewide bass regulations but currently have signage in place which results in the rather arduous regulation above. Additional planning and discussions are needed with Parks and Recreation Department to remediate.

Ardmore City Lake was surveyed by fall trap netting in 2019 and spring electrofishing in 2022 (Figure 3) to evaluate the status of the crappie and black bass populations.

Black Bass

Both largemouth and spotted bass can be found at Ardmore City Lake. Largemouth bass are the dominant species, accounting for 96% of the black bass collected during the 2022 survey. Catch rates for largemouth bass greater than 14 inches have remained consistently higher over the past three samples compared to data collected from 1986 – 2008. Relative weights for all size categories were above acceptable levels. Five individuals measured over 22 inches with the heaviest weighing 9.8 pounds. Age and growth data collected in 2022 indicated age-3 largemouth averaged 13.2 inches. Fish as old as age-12 were collected during this sample. Catch, size distribution, and age data for largemouth bass are included in Tables 3 and Figures 4 – 6.

Only five spotted bass were collected in 2022. All of these fish were 11 or 12 inches and had acceptable relative weights. Historical data for spotted bass are included in Table 4 and Figures 7 - 8.

Crappie

The expansion of hydrilla prevented fall trap netting in 2022. Efforts to reduce hydrilla will need to be successful before fall trap netting can be completed. Spring netting may be an alternative in future years if hydrilla cannot be controlled.

Crappie were sampled by fall trap netting in 2019 to determine the size structure and growth rates of the population. The crappie population appears to be relatively low in abundance with catch rates of all size classes below the acceptable limit for a quality fishery. However, quality size crappie are consistently collected. Growth rates are very good with crappie often exceeding 10 inches during their second year of growth. Age-3 crappie were not collected in the 2019 sample indicating poor recruitment in 2016. This missing year class explains the lack of 11 and 12 inch crappie in the population. Catch rate, size structure, and growth rate data are included in Tables 5 – 6 and Figures 9 – 11.

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 were first detected at Ardmore City Lake in 2022. Issues with water intakes for the nearby golf course have already been noted by City of Ardmore staff. ODWC met with city representatives in 2023 and possible scenarios were discussed. Continued monitoring is needed to track this infestation and educate the public about possible vectors of spread. 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 Ardmore City Lake was first detected in fall 2019 while trap netting. Since that time, hydrilla has spread rapidly. A survey conducted in summer of 2023 indicated that topped out mats of hydrilla covered approximately 67% of the surface area of the lake. City of Ardmore plans to work with a private contractor to begin treatments in 2024 to control the hydrilla establishment. Continued monitoring should be conducted to evaluate these efforts.

RECOMMENDATIONS

1. Conduct black bass sampling in 2025.
2. Trap netting will be dependent on hydrilla control attempts.
3. Fish attractor buoys should be checked and brush shelters refurbished as needed.
4. Continue to monitor aquatic nuisance species threats through public outreach opportunities, literature, and signage.

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Table 1. Physical and chemical characteristics of Ardmore City from 2007 BUMP Report

Operating Agencies: Recreation	City of Ardmore
Impoundment Date	1910
Watershed	square miles 3.17
Surface Area	142 acres
Capacity	600 acre-feet
Shoreline	5 miles
Maximum Depth	30 ft.
Water Exchange Rate	1.42
Secchi Disk	42 in
pH Range	7.16 – 8.85
Conductivity Range	278.6 – 365 µS/cm
Salinity Range	0.13 – 0.18 ppt
Average Turbidity Value	10 NTU
Trophic State Index (chlorophyll a)	52
Trophic Class	eutrophic

Table 2. Species, number and size of fish stocked in Ardmore City Lake from 1981 to 2020.

DATE	SPECIES	NUMBER	SIZE
1981	Channel catfish	6,606	Fingerlings
1983	Largemouth bass	3,667	Fingerlings
1983	Channel catfish	10,000	Adults
1984	Threadfin shad	1,000	Adults
1987	Channel catfish	3,700	Fingerlings
1990	Channel catfish	2,900	Fingerlings
1992	Threadfin shad	2,000	Adults
1995	Threadfin shad	1,500	Adults
1996	Certified Florida LMB	4,100	Fingerlings
2003	Certified Florida LMB	16,872	Fingerlings
2005	Certified Florida LMB	3,753	Fingerlings
2011	Certified Florida LMB	4,440	Fingerlings
2013	Certified Florida LMB	78,910	Fry
2014	Certified Florida LMB	75,009	Fry
2015	Certified Florida LMB	72,400	Fry
2018	Certified Florida LMB	75,600	Fry
2019	Certified Florida LMB	24,444	Fingerlings
2020	Certified Florida LMB	30,834	Fingerlings

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

	Total (≥40)		<8 in. (15-45)		8–13 in. (15-30)		≥12 in. (≥15)		≥14 in. (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1986	106	53.0	25.5	74			11.0	92	7.5	95
1994	106	106.0	9.0	79			28.0	95	12.0	94
1996	125	100.0	10.4	83	57.6	91	66.4	88	19.2	90
*2004	149	99.3	23.0	98	50.0	89	30.0	95	16.7	96
2008	104	69.3	3.3	100	34.7	91	44.7	91	23.3	91
**2013	120	120.0	9.0	88	57.0	87	73.0	90	34.0	94
2018	72	72.0	7.0	90	32.0	86	40.0	90	30.0	90
2022	71	71.0	7.0	101			47.0	94	33.0	94

* Denotes changed electrofishing protocol – Minimum of 1.5 hours of effort required.
** Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.

Table 4. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of spotted bass collected by spring electrofishing from Ardmore City Lake. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total (≥ 40)		< 8 inches (15-45)		8-13 inches (15-30)		≥ 14 inches (≥ 10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1996	6	4.8	-	-	4.0	82	0.8	89
*2004	4	2.7	-	-	1.3	88	0.7	81
2008	8	5.3	-	-	4.0	85	1.3	89
**2013	2	2.0	-	-	2.0	94	-	-
2018	2	2.0	-	-	2.0	95	-	-
2022	5	5.0	-	-	5.0	91	-	-

*2004 Denotes changed electrofishing protocol – Minimum of 1.5 hrs of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.

Table 5. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of all crappie collected by trap netting from Ardmore City Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery.

	Total (≥25)		<5 in. (≥5)		≥5 in. (10-40)		≥8 in. (≥10)		≥10 in. (≥4)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1997	160	17.0	3.8	88	13.2	65	3.1	83	1.9	87
2000	144	15.7	1.3	89	14.4	85	3.6	83	0.55	85
2003	142	16.2	-	-	16.2	82	2.6	79	0.33	79
2008	32	3.4	-	-	3.4	88	2.2	87	1.5	85
2012	28	3.5	0.6	-	2.9	94	2.2	96	1.1	97
2015	81	8.2	1.4	-	6.8	99	6.3	99	2.6	96
2019	46	3.6	1.6	-	2.0	95	1.1	92	0.4	87

Table 6. Mean length at age of crappie collected by trap netting from Ardmore City Lake. Numbers in parentheses represent values for acceptable growth rates.

	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7
Year	(≥ 6.3 in.)	(≥ 7.9 in.)	(≥ 8.9 in.)	(≥ 9.8 in.)			
1997	5.5	8.5	11.0	9.8	10.9	11.9	11.4
2000	4.8	5.8	7.2	8.5	-	-	-
2003	5.8	7.0	7.5	8.1	8.3	9.1	8.1
2008	7.2	10.3	11.3	11.2	-	-	12.0
2012	8.2	10.8	10.1	-	-	-	-
2015	9.7	11.1	11.7	14.2	-	-	-
2019	7.9	9.8	-	13.3	14.3	-	-

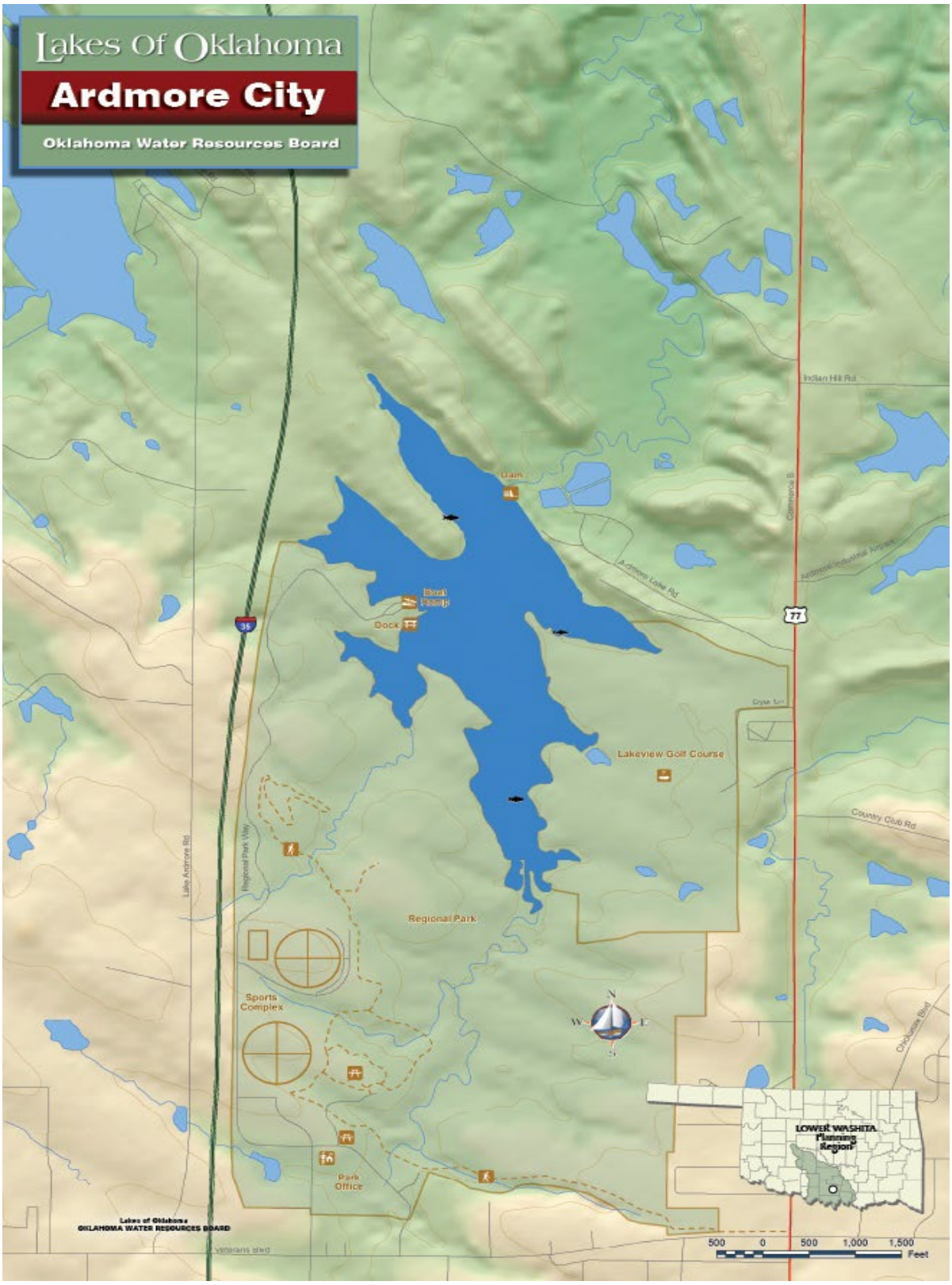
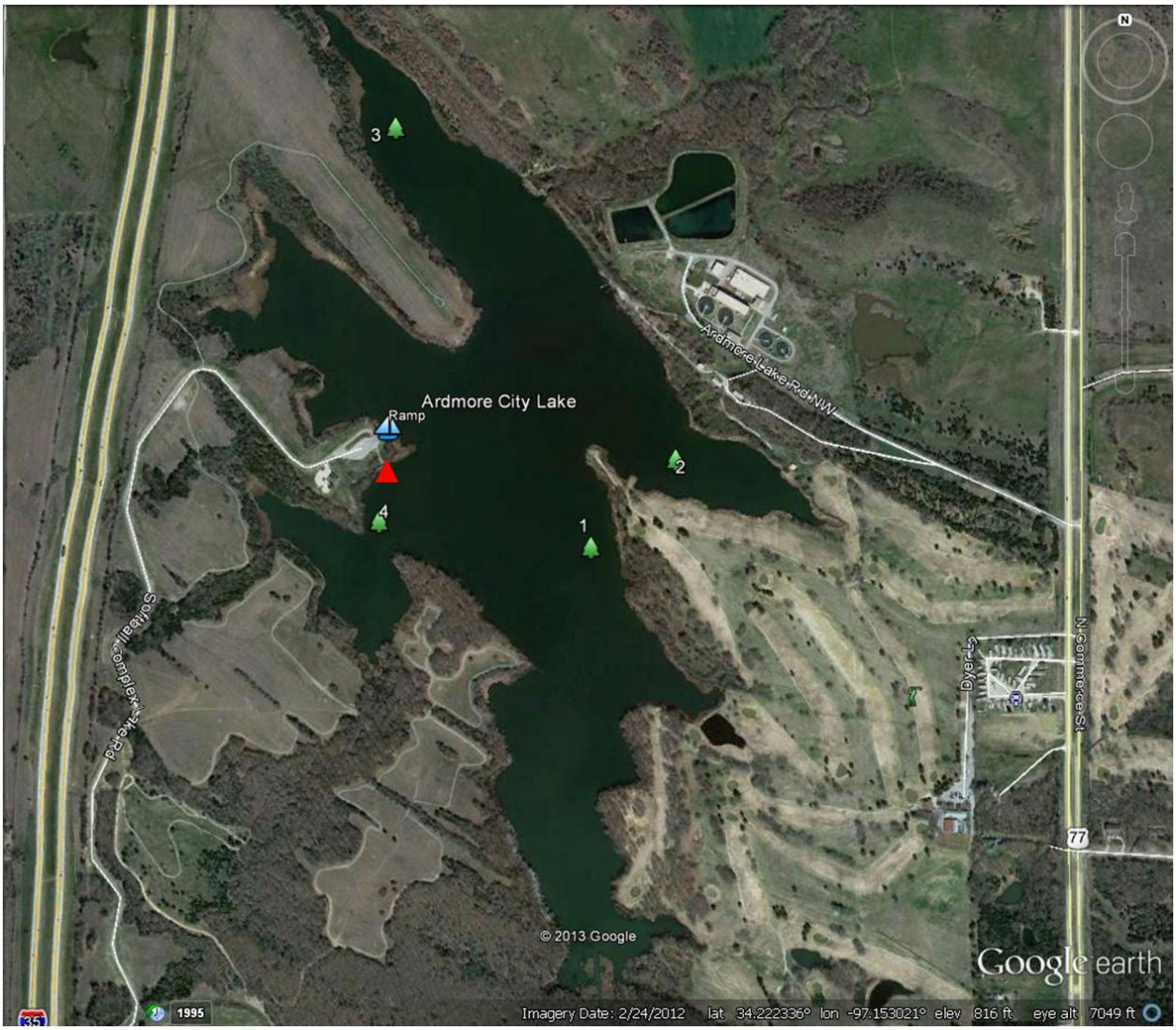


Figure 1. Map of Ardmore City Lake and vicinity.

Figure 2: Ardmore City Lake Habitat Sites

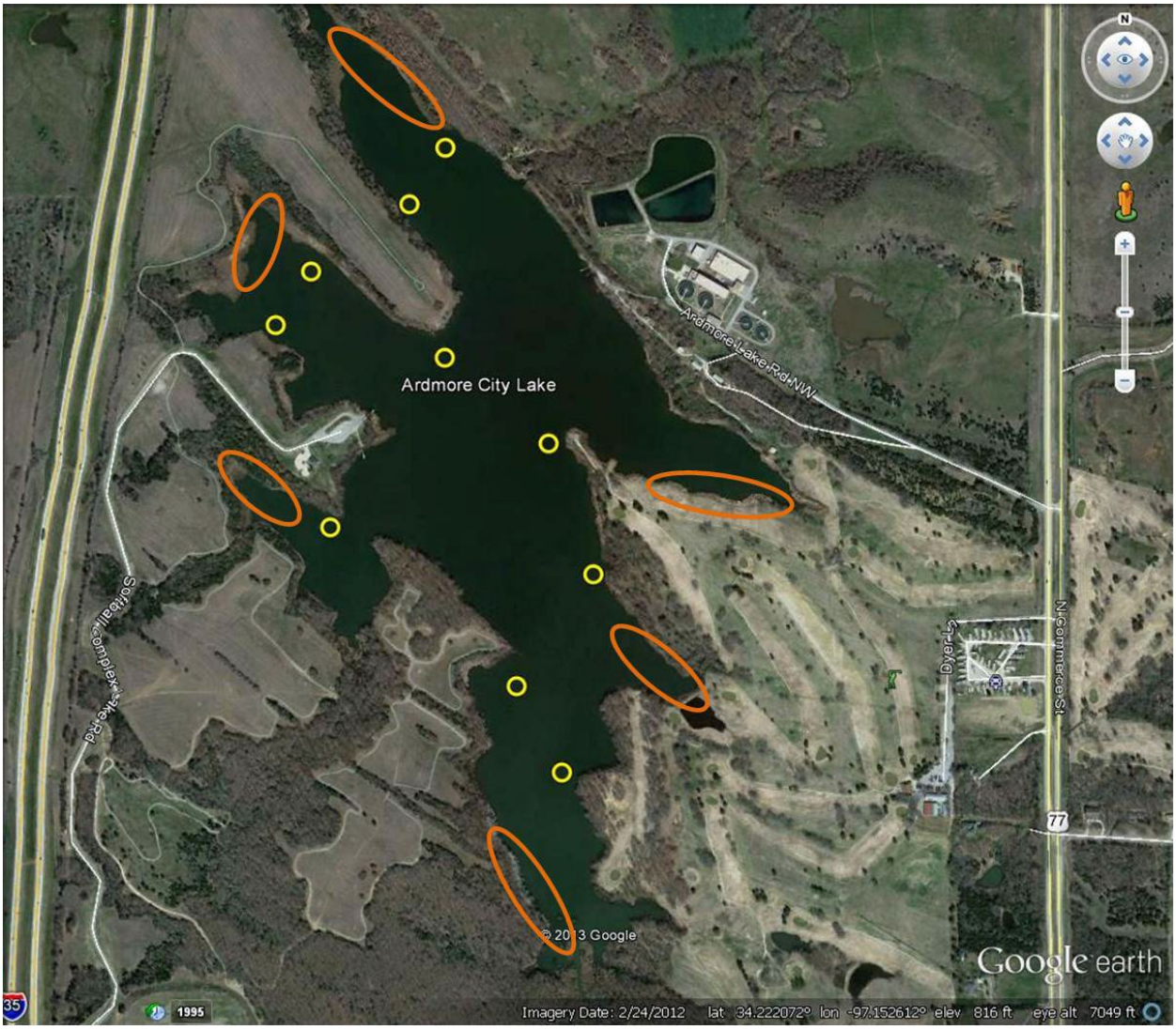


Habitat Sites:

Spider Blocks - ▲

Habitat - 

Figure 3: Ardmore City Lake Sampling Sites



SSP Sampling Sites:

Spring Electrofishing -

Fall Trap Netting -

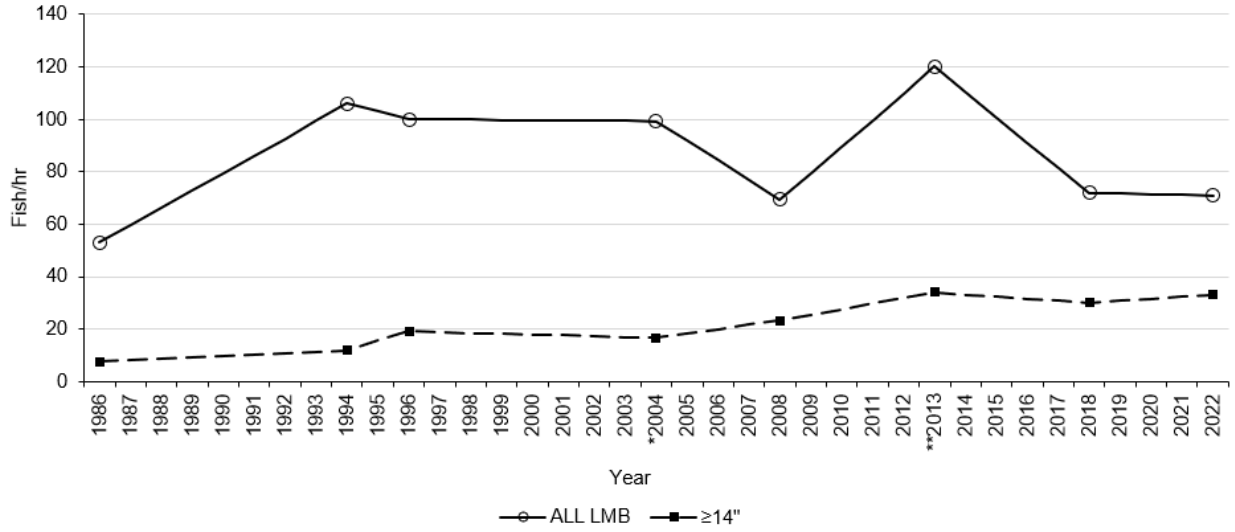


Figure 4. Total catch rates of largemouth bass and catch rates of largemouth bass ≥ 14 inches collected by spring electrofishing at Ardmore City Lake.

* 2004 Denotes changed electrofishing protocol – Minimum of 1.5 hrs of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.

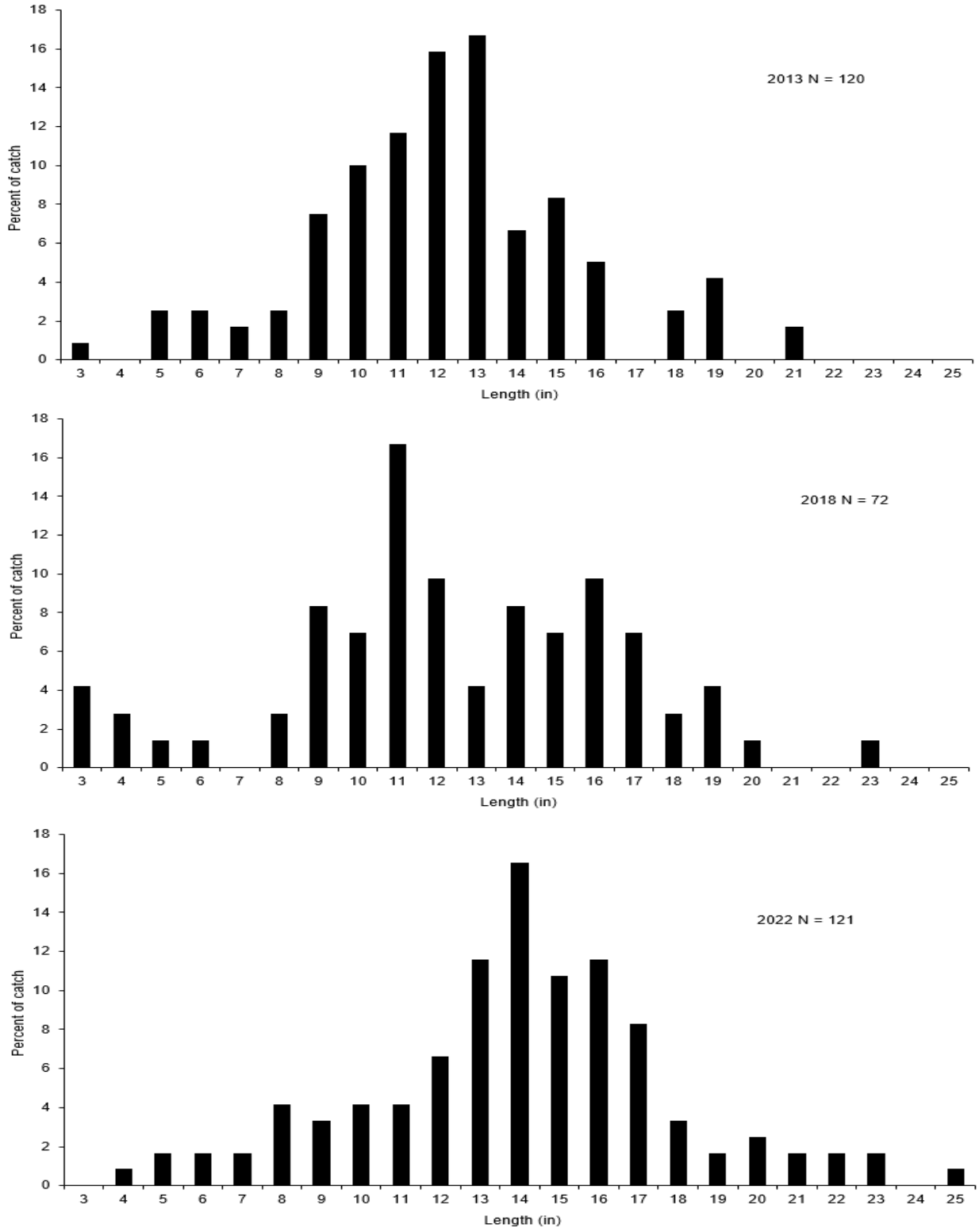


Figure 5. 2013, 2018, and 2022 length frequency distribution for largemouth bass collected by spring electrofishing at Ardmore City Lake.

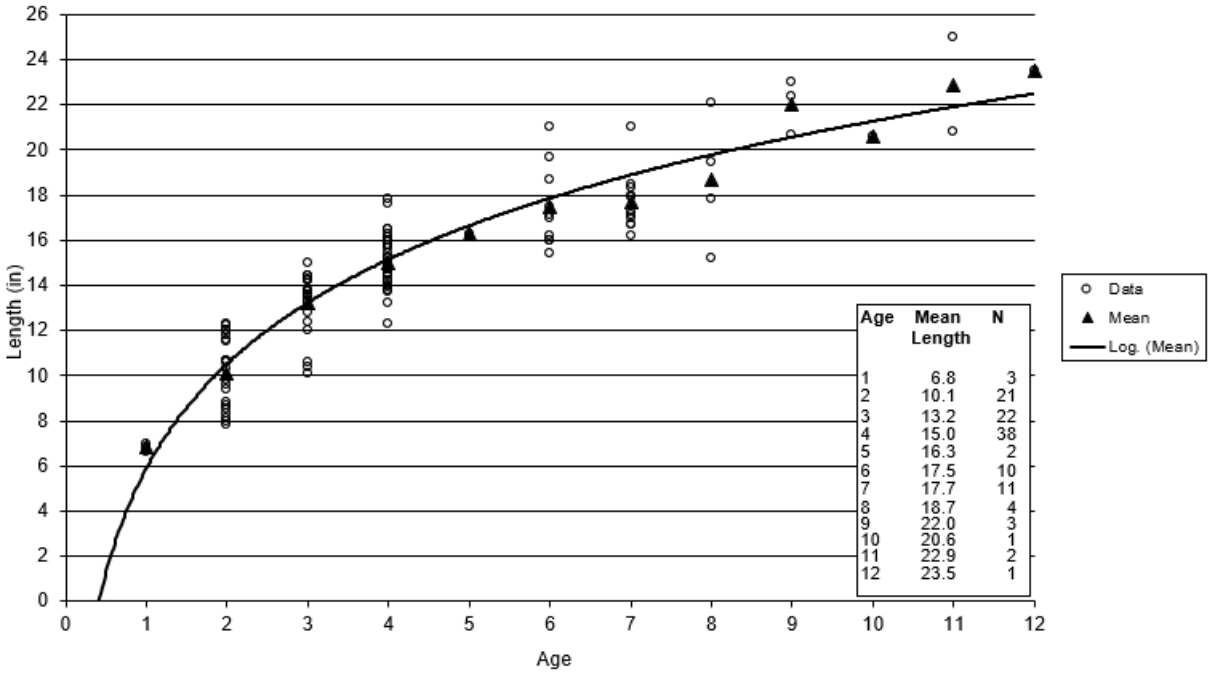


Figure 6. 2022 Length at age data for largemouth bass collected from Ardmore City Lake by spring electrofishing. N = 118

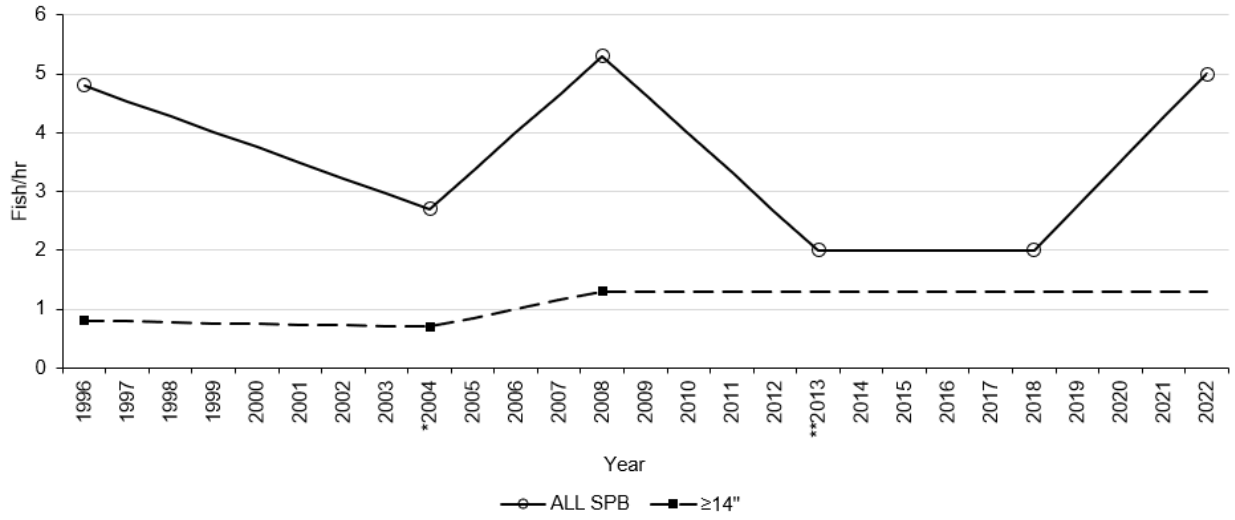


Figure 7. Total catch rates of spotted bass and catch rates of spotted bass ≥ 14 inches collected by spring electrofishing at Ardmore City Lake.

* 2004 Denotes changed electrofishing protocol – Minimum of 1.5 hrs of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.

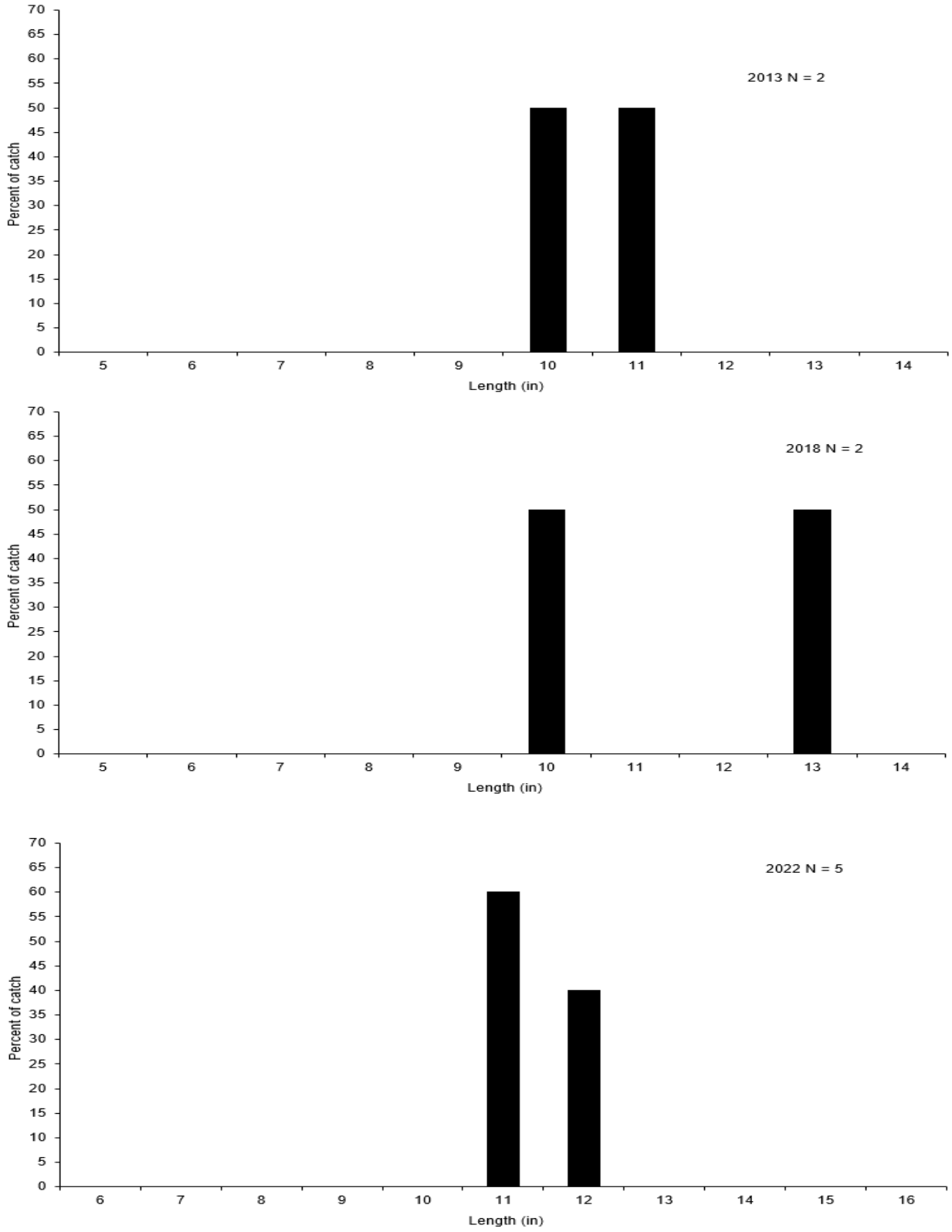


Figure 8. 2013, 2018, and 2022 length frequency distribution for spotted bass collected by spring electrofishing at Ardmore City Lake.

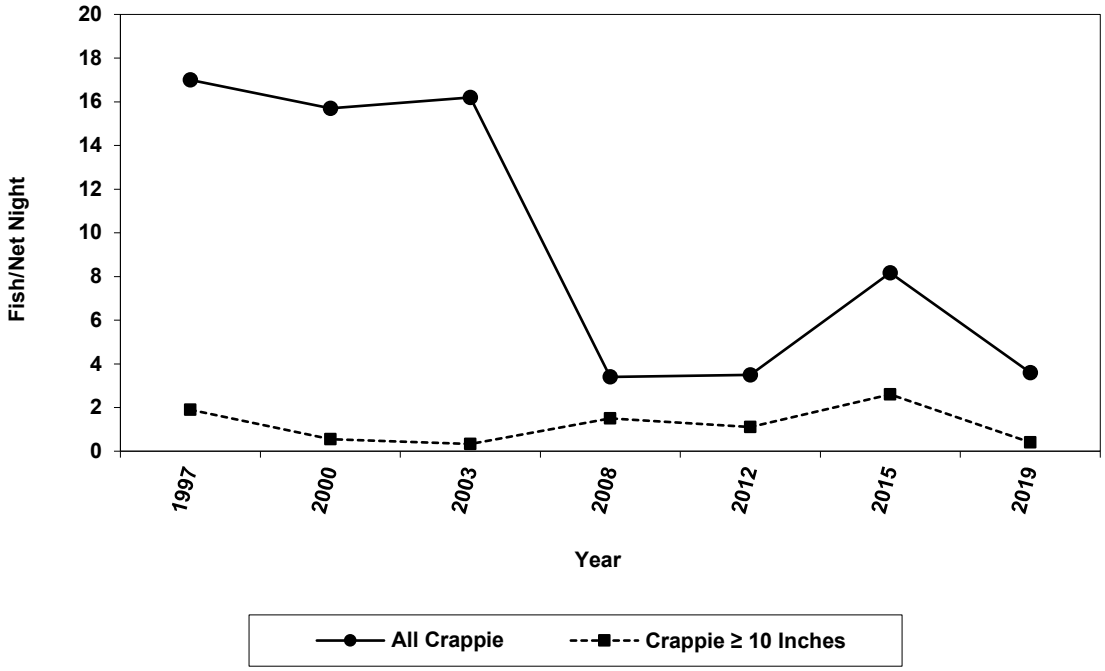


Figure 9. Total catch rates of all crappie and catch rates of all crappie ≥ 10 inches collected by trap netting at Ardmore City Lake.

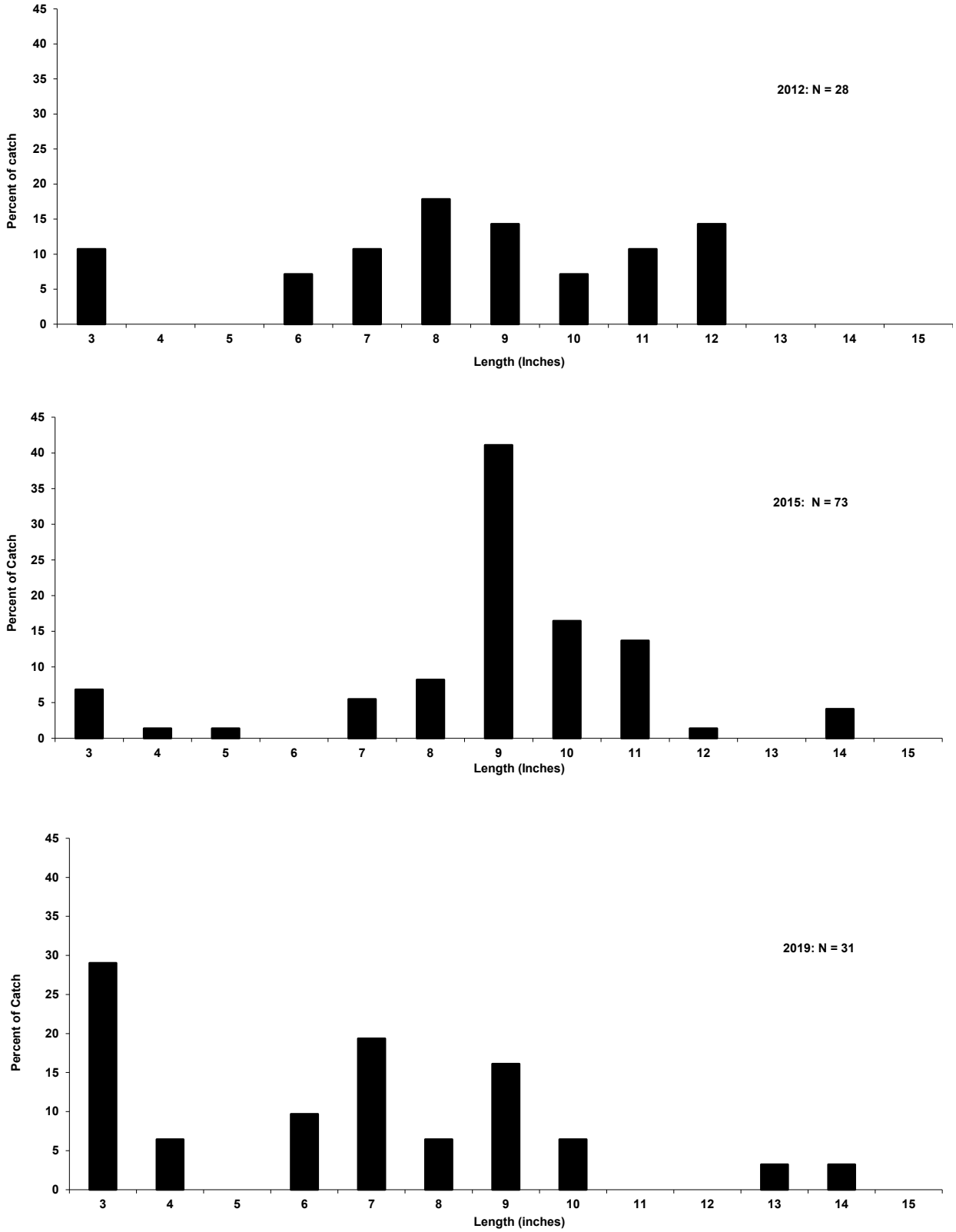


Figure 10. 2012, 2015 and 2019 length frequency distribution for all crappie collected by trap netting at Ardmore City Lake.

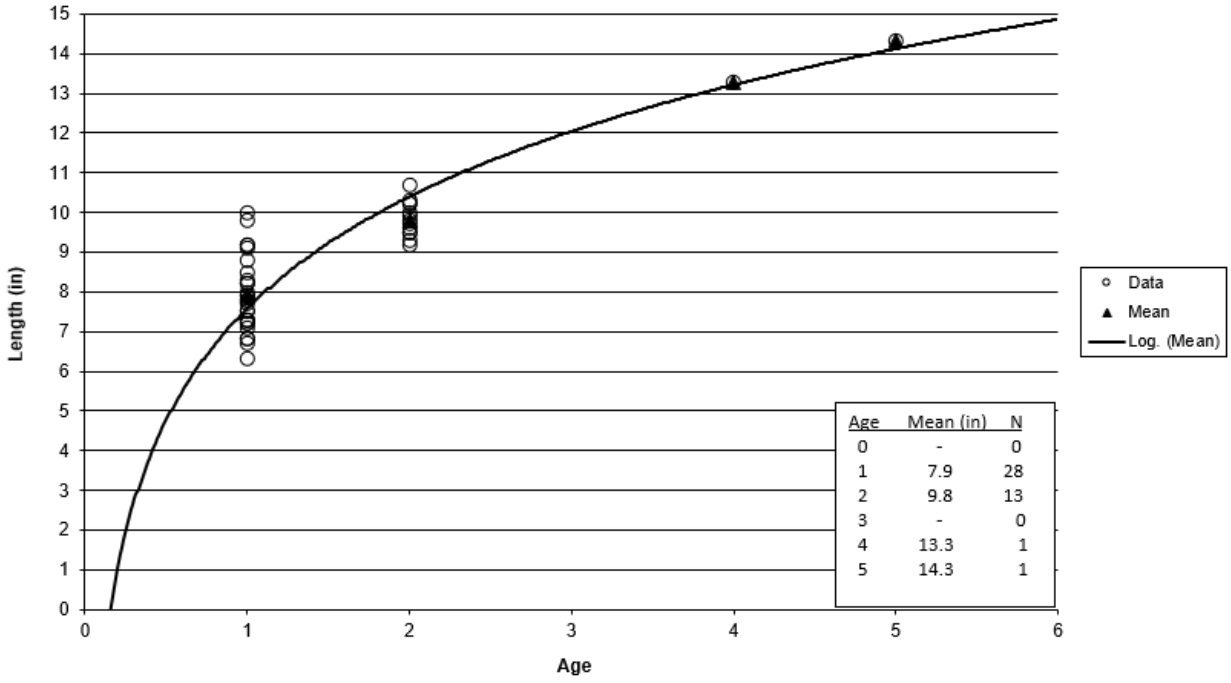


Figure 11. 2019 Length at age data for all crappie collected from Ardmore City Lake by trap netting. N = 43