Lake of the Arbuckles
Fisheries Management Plan

Southcentral Region
Oklahoma Department of Wildlife Conservation

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Background

The Lake of the Arbuckles, known locally as Lake Arbuckle, is a 2,350 acre reservoir formed by the impoundment of Guy Sandy, Buckhorn, and Rock Creeks, approximately 8 miles southwest of Sulphur in Murray County, Oklahoma (Figure 1). It was constructed by the Bureau of Reclamation in 1967 and has a watershed of 126 square miles in south central Oklahoma. Lake Arbuckle sits within the boundaries of the Chickasaw National Recreation Area. The watershed is indicative of the cross timber ecosystem and has one major urban development, the town of Sulphur. Agricultural operations including hay production and livestock grazing make up a small portion of the watershed. The lake serves multiple operation purposes including flood control, water supply, fish and wildlife habitat, and recreation. The normal conservation pool is 872 feet msl with the top of the flood control pool at 885.3 feet msl. The Oklahoma Department of Wildlife Conservation (ODWC) has a working Memorandum of Understanding with the National Park Service regarding the management and regulation of wildlife resources within the Chickasaw National Recreation Area.

Habitat

Natural fish habitat consists of rock points and islands, aquatic vegetation, areas of limited standing timber, rock, coarse gravel, and mud or sand flats. Water willow (*Justicia americana*) is common along the shorelines in many areas of the lake, growing at or above Conservation Pool elevation. This species provides good spawning and nursery habitat when inundated. Submerged vegetation includes naiad (*Najas* spp.), coontail (*Ceratophyllum demersum*), Chara (*Chara* spp.) and hydrilla (*Hydrilla verticillata*).

Additional habitat includes man-made structures such as rip-rap, natural and artificial brush piles. The ODWC currently maintains 18 marked brushpiles to increase angler opportunities. Maps and geo-references for these structures are available at https://www.wildlifedepartment.com/fishing/wheretofish.

Water Quality

Lake Arbuckle is classified as a eutrophic reservoir with high primary productivity. Water quality data collected through the Oklahoma Water Resources Board (OWRB) as part of their Beneficial Use Monitoring Program (BUMP) classifies Lake Arbuckle as supporting all but the dissolved oxygen criteria outlined for the Fish and Wildlife Propagation (FWP) beneficial uses. The complete BUMP report for Lake Arbuckle can be viewed at http://www.owrb.ok.gov/quality/monitoring/bump.php. An overview of several water quality parameters is included below and in Table 1.

Thermal and Chemical Stratification

Lake Arbuckle exhibits moderate thermal and strong chemical stratification during summer months (July – mid-September). Depth of the thermocline varies between years, but typically occurs at a depth of 18 – 24 feet. Dissolved oxygen levels below this depth are generally below 1.0 mg/L. Lake Arbuckle does not support the FWP beneficial use based on low dissolved oxygen levels recorded during the summer.

Turbidity
Lake Arbuckle has an average turbidity of 7 NTU and an average secchi disk depth of 47 inches. The fish and wildlife beneficial use based on turbidity is supported.

Productivity
A trophic state index (TSI), using Carlson's TSI (chlorophyll-a), was calculated to measure the lake's productivity. TSI values ranged from 50 in 2008 to 59 in 2009. This classifies the lake as eutrophic.

Conductivity
Specific conductivity ranged from 332.9 µS/cm to 407 µS/cm. These values are similar to other lakes in the region.

Salinity
Salinity values ranged from 0.16 to 0.20 ppt.

pH
The pH values ranged from 6.74 to 8.71, representing a neutral to slightly alkaline system. The fish and wildlife beneficial use based on pH is supported.

Tailrace
Lake Arbuckle does not have a year-round tailrace or an established tailrace fishery. During most of the year there are minimal or zero water releases through the dam. Floodwater releases are intermittent and short lived.

Fishery

The major sportfish in Lake Arbuckle include largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), spotted bass (*M. punctulatus*), white bass (*Morone chrysops*), white crappie (*Pomoxis annularis*), black crappie (*P. nigromaculatus*), and channel catfish (*Ictalurus punctatus*). The primary forage species include threadfin shad (*Dorosoma petenense*), gizzard shad (*D. cepedianum*), and several species of sunfish (*Lepomis* spp.).

Regulations for bass were changed in 2022 to remove the 13 – 16 inch protective slot. Largemouth and smallmouth now fall under the statewide length limit of only 1/day over 16 inches. Crappie have a 15/day creel limit with a 10 inch minimum length limit. All other regulations are the same as statewide. The fish stocking history for Lake Arbuckle is included in Table 2.

Black Bass
Lake Arbuckle contains three species of black bass: largemouth bass, spotted bass, and smallmouth bass and is one of the best black bass lakes in the region. In 2009, Lake Arbuckle ranked as the #1 bass tournament lake in Oklahoma according to results reported to ODWC (Table 3).

Due to high exploitation rates in the late 1970s, a 14 inch minimum length limit was placed on all black bass species in Lake Arbuckle in 1979. Soon after this regulation was implemented, slower growth and stockpiling of bass < 14 inches was reported. In an effort to correct this problem and encourage the harvest of small bass, a 12 – 15 inch protective slot limit was implemented in 1982. An increase in the density of bass > 15 inches was noted during the three years following the implementation of the slot limit (Summers 1988). Spotted bass density was also noted to increase during this period because they seldom reach a size greater than 15 inches. This resulted in a large portion of the spotted bass population protected from harvest by the slot limit. In 1987, the protective slot limit was adjusted to a 13 – 16 inch slot to encourage anglers to harvest bass < 13 inches. Creel and size limits for spotted bass were removed in 2009 to encourage spotted bass harvest. The slot limit was replaced in September of 2022 by a new statewide length limit on black bass. This new regulation does not change the bag limit of 6 but restricts harvest to only 1 largemouth or smallmouth combined per day over 16 inches. This regulation aims to increase harvest of smaller bass to avoid historic stockpiling and to increase growth. A companion regulation allows for bass tournaments to apply for an exemption to the length limit if they agree to the terms of the exemption.

Largemouth Bass

The largemouth bass is the dominant black bass species in Lake Arbuckle. Florida-strain largemouth bass have been stocked consistently throughout the 1990s and 2000s to increase abundance of trophy-sized bass. Lake Arbuckle has produced numerous trophy largemouth bass over the past decade. The current lake record largemouth bass was caught in 2008 and weighed 14.5 lbs. DNA samples collected during 2017 indicated that 7% were pure Florida strain, 12% were F_1, 76% were F_x, and 5% were native northern strain bass. Historical DNA results are included in Table 5.

Catch rates and relative weights for legal-sized fish are consistently within the range of acceptable values for a quality fishery. Recruitment of young bass is occasionally below acceptable values. Spring electrofishing was conducted in April 2020. During this sample, a new electrofishing control box was suspected to not be performing properly. A wiring problem was later discovered, explaining the poor catch efficiencies noted during the sampling. Reduced catch rates for black bass in 2020 are likely the result of this issue and should not be viewed as a reduction in the overall population. Catch rates and size structure of largemouth bass are included in Table 4 and Figures 2 – 3. Growth rates for largemouth bass were evaluated in 2020 and were within acceptable levels when compared to other major reservoirs within the region (Figure 4).

Largemouth bass from Lake Arbuckle were tested for Largemouth Bass Virus (LMBV) in 2002. These results indicated that approximately 22% of the population carried LMBV. Fish kills resulting from LMBV were never confirmed at Lake Arbuckle.

Spotted Bass

Spotted bass made up approximately 13% of the black bass population in the 2017 electrofishing survey. Catch rates and size structure of the spotted bass population are listed in Table 6 and Figures 5 – 6.

Smallmouth Bass

Smallmouth bass were first stocked in 1986. The population is self-sustaining but has remained at relatively low numbers when compared to other smallmouth bass populations throughout Oklahoma. Sampling data is limited for smallmouth bass given their preference for deeper, rock and bolder type habitat. These habitats are not effectively sampled by daytime electrofishing. Spring electrofishing samples conducted during 2017 resulted in an overall catch rate of 5.3 fish/hr with only 4 individuals exceeding 14 inches. Catch rates and size structure of the smallmouth bass population are listed in Table 7 and Figure 7.

White Bass

White Bass are native to the Lake Arbuckle watershed and contribute to the recreational fishery. Abundance estimates for white bass have varied over the past ten years but are comparable to other white bass fisheries in the region. Total catch and catch rate of fish > 12 inches was the highest ever recorded during the last sample during 2007. Catch rates and size structure of the Lake Arbuckle white bass fishery are included in Table 8 and Figures 8 – 9.

Channel Catfish

Channel Catfish are omnivorous, feeding on a wide variety of organic matter, dead and alive. Some of the more common foods are fish, mussels, snails, insects and crayfish. Catch rates for channel catfish have remained inconsistent over the last decade (Table 9; Figure 10). This is likely due to sampling bias rather than population fluctuations. Relative weights have consistently varied over time. During the most recent sample in 2007, relative weights were below acceptable values for all size groups.

Crappie

Lake Arbuckle contains both white and black crappie, with white crappie comprising approximately 80% of the population in some years. Angling for crappie is popular during the spring spawn and throughout the year around man-made brush piles. Creel surveys were conducted at Lake Arbuckle from 1985 – 1995. Results from this creel indicated that angler exploitation was shaping the crappie population structure (Boxrucker 1998). Restrictive harvest regulations (10 inch minimum length limit; 15 fish/day) were implemented in 1993 to improve the size structure of the population and increase the percentage of age-4 and older crappie. Both size structure and percentage of crappie older than age-4 increased following the regulation change (Boxrucker 1999). The creel survey also determined angler acceptance of the regulation to be high.

Sampling for crappie has been intermittent over the last decade due to extreme water level fluctuations. In 2018 catch rates for crappie were below average. Of the 47 fish collected, 64% were age-3 (2015 high water year). Because this 2015 age group spanned from 8.9 – 12.5 inches in length, it tended to mask other poor year classes. Based on age data, 2013, 2014, and 2016 all appear to be very low recruitment years. The low catch of age-1 fish indicated that 2017 was below average for recruitment.

Average growth rates for crappie remained above acceptable values in 2018. However, there appeared to be some slow growing age-3 individuals from the large 2015 year class. These slower growing individuals were likely the result of increased competition among their cohort

and not the result of stunting. Some fish from this cohort achieved exceptional growth reaching 12.5 inches in 3 years.

Sampling conducted in 2021 and 2024 showed a considerable increase in catch rates from 2018. Catch rates for all crappie combined and crappie ≥ 10 inches exceeded the long-term averages for Arbuckle and relative weights were above acceptable levels in all size categories. In 2024 41% of the population was comprised of legal sized crappie (≥10 inches). Crappie growth is historically good up to age-2 and then levels off quickly. While this pattern remained the same, the overall growth increased by one or more inches for ages 2 - 4. This may be partially due to lower sample sizes for 3 and 4 year olds. The reduced bag limit and 10 inch minimum length limit continues to be supported. Crappie catch rates, size structure, and growth rates from past trap-netting surveys are presented in Tables 10 – 11 and Figures 11 – 13.

Forage Fish

Bluegill

Bluegill sunfish provide recreational angling opportunities and are an important forage fish for littoral predators at Lake Arbuckle. Catch rates for bluegill are included in Table 12.

Shad

Lake Arbuckle contains both gizzard and threadfin shad. Adult gizzard shad are able to reach large sizes and can outgrow gape limits of many predators. Threadfin shad adults are considerably smaller, rarely exceeding 6 inches in length. Threadfin are temperature sensitive and stress at temperatures below 45°F. The winter of 2009/2010 was exceptionally cold and likely resulted in the loss of threadfin shad. In an effort to be proactive and ensure sufficient numbers of threadfin shad broodstock, the ODWC stocked approximately 5,000 adult threadfin in 2010. Catch rates for gizzard and threadfin shad are included in Tables 13 and 14, respectively.

Threats to the Fishery

Aquatic Nuisance Species (ANS)

Zebra mussels

Zebra mussels (*Dreissena polymorpha*) were first detected in nearby Lake Texoma in 2008. Since that time, adult zebra mussels have become widespread throughout Lake Texoma. Due to the popularity of both Arbuckle and Texoma lakes and their close proximity to each other, numerous vectors exist for the transfer of water and zebra mussel veligers to Lake Arbuckle and surrounding reservoirs.

Hydrilla

Hydrilla is an invasive and potentially damaging aquatic weed popular in the aquarium trade. It has the ability to form dense mats displacing native species, restricting water flow, and impairing recreational activities. Its many modes of reproduction, including fragmentation, allows for rapid spread and dispersal within and among water bodies. Hydrilla has been observed within Lake Arbuckle and is suspected to have been transplanted intentionally. Hydrilla coverage

within the lake has varied greatly. Large mats of hydrilla were documented during the summer of 2006. The winter of 2006/2007 saw a drop in lake elevation four feet below conservation pool and was followed by unusually high water levels during the summer growing season of 2007. The combination of low winter water followed by high summer levels eliminated the large hydrilla mats in Lake Arbuckle. Hydrilla eventually returned and large mats were seen from 2012 – 2014. Record flood stages for extended periods in 2015 appear to have eliminated hydrilla in Arbuckle and it has not been documented as of 2024.

Lake Arbuckle Fisheries Management Goal

To provide a diversified, high quality sport fishery commensurate with resource capabilities and public desires.

Objectives and Strategies

Objective 1.0 Maintain the largemouth bass population at the following levels.

A. Total catch rates - $\geq$ 100 fish per hour.
B. Catch rates for LMB $\geq$ 16 inches - $\geq$ 15 fish per hour.
C. Length at age – 14 inches at age 3.
D. Maintain Florida bass genetics – FLMB + $F_1 \geq 40\%$.

Strategies

1. Conduct standardized sampling procedure (SSP) electrofishing every three years to evaluate catch rates.
2. Collect age and growth data as needed.
3. Evaluate the 1 over 16 inch limit based on biological and social factors.
4. Stock certified FLMB according to recommended stocking rates.

Objective 2.0 Maintain crappie trap netting catch rates at the following levels.

A. Total catch rates - > 8 fish per net-night.
B. Catch rates for crappie $\geq$ 10 inches - > 3 fish per net-night.
C. Length at age – 10 inches at age 3.

Strategies

1. Conduct SSP trap netting every three years to evaluate catch rates by size groups and relative weights.
2. Collect age and growth data during each survey year.
3. Maintain current harvest regulations.

Objective 3.0 Address aquatic nuisance species through monitoring efforts and public outreach.

Strategies

1. Participate in Hydrilla Task Force and provide technical assistance towards applicable plans, monitoring efforts, and public outreach.
2. Conduct at least one media contact per year highlighting ANS issues and measures the public can use to prevent further spread.
3. Provide area managers and/or constituency groups with information that will educate the public regarding aquatic nuisance species.

Objective 4.0 Protect and enhance aquatic habitat to benefit important sportfish and their associated prey species.

Strategies

1. Maintain a minimum of fifteen (15) fishing attractors and visually mark their position with buoys. Brush piles made of natural materials will be refurbished once during the duration of this plan.
2. Provide GPS coordinates of all newly established habitat structures for public viewing on the ODWC website.

Objective 5.0 Conduct public outreach

Strategies

1. Conduct at least one media contact per year highlighting ODWC management efforts on Lake Arbuckle and fishing opportunities available to the public.
2. Coordinate fisheries management activities and results with the Chickasaw National Recreation Area staff.
3. Collect fish and/or tissue samples as requested to monitor contaminant levels in selected fishes.
4. Educate anglers and tournament directors about proper fish handling and associated fishing mortality.

Citations

Boxrucker, J. 1998. Effects of a minimum length limit and daily creel reduction on the white crappie population structure and angler creel on Arbuckle Reservoir. Final Report Federal Aid Grant F-50-R, Project 3. Oklahoma Department of Wildlife Conservation, Oklahoma City. 25pp.

Boxrucker, J. 1999. Changes in crappie population structure following restrictive harvest regulations. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies. 53:80-90.

Summers, G. L. 1988. Largemouth bass population changes following implementation of a slot length limit. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies. 42:209-217.

Table 1. Physical and chemical characteristics of Lake Arbuckle

Operating Agencies: Flood Control, water supply and fish and wildlife recreation	Bureau of Reclamation
Impoundment Date	1967
Watershed	126 square miles
Surface Area	2,350 acres
Capacity	72,400 acre-feet
Shoreline	36 miles
Shoreline Development Ratio	5.4
Mean Depth	30.8 ft.
Maximum Depth	79.7 ft.
Water Exchange Rate	0.468
Secchi Disk	47 in
pH Range	6.74 – 8.71
Conductivity Range	332.9 – 407 µS/cm
Salinity Range	0.16 – 0.20 ppt
Average Turbidity Value	7 NTU
Trophic State Index (chlorophyll a)	59
Trophic Class	Eutrophic

Table 2. Species, number and size of fish stocked in Lake Arbuckle from 1967 to 2024.

DATE	SPECIES	NUMBER	SIZE
1967	Northern pike	300,000	Fry
1967	Readear sunfish	6,800	Fingerlings
1967	Largemouth bass	184,000	Fingerlings
1967	Channel catfish	340,525	Fingerlings
1968	Northern pike	1,000,000	Fry
1968	Blue catfish	100	Adults
1968	Flathead catfish	13,000	Fingerlings
1969	Blue catfish	50	Adults
1970	Northern pike	448,000	Fry
1970	Blue catfish	50	Adults
1971	Walleye	876,469	Fry
1972	Walleye	1,028,557	Fry
1972	Northern pike	63,851	Fry
1973	Walleye	553,253	Fry
1974	Florida bass	4,000	Fry
1975	Channel catfish	30,000	Fingerlings
1975	Threadfin shad	12,000	Adults
1975	Hybrid bass	15,000	Fry
1976	Threadfin shad	21,200	Adults
1976	Mississippi Silverside	7,000	Adults
1976	Florida bass	6,000	Fingerlings
1979	Channel catfish	23,500	Fingerlings
1980	Threadfin shad	9,500	Adults
1981	Channel catfish	58,900	Adults
1984	Walleye	235,000	Fry
1984	Threadfin shad	6,000	Adults
1985	Threadfin shad	4,750	Adults
1985	Walleye	245,000	Fry
1985	Blue catfish	24,150	Fingerlings
1986	Smallmouth bass	41,500	Fingerlings
1987	Smallmouth bass	30,080	Fingerlings
1987	Channel catfish	20,320	Fingerlings
1991	Smallmouth bass	13,200	Fingerlings
1991	Blue catfish	25,302	Fingerlings
1992	Channel catfish	44,625	Fingerlings
1996	Florida bass	50,098	Fingerlings
1997	Florida bass	47,028	Fingerlings
1998	Florida bass	47,096	Fingerlings
1999	Florida bass	48,125	Fingerlings
1999	Smallmouth bass	23,931	Fingerlings
2000	Florida bass	47,607	Fingerlings
2000	Smallmouth bass	47,420	Fingerlings
2001	Smallmouth bass	23,500	Fingerlings

Table 2. Continued.

DATE	SPECIES	NUMBER	SIZE
2003	Cert. Florida bass	47,290	Fingerlings
2005	Cert. Florida bass	47,110	Fingerlings
2010	Threadfin shad	4,890	Adults
2010	Cert. Florida bass	155,027	Fingerlings
2011	Cert. Florida bass	180,092	Fingerlings
2012	Cert. Florida bass	79,332	Fingerlings
2013	Cert. Florida bass	75,043	Fingerlings
2014	Cert. Florida bass	90,035	Fingerlings
2015	Cert. Florida bass	101,065	Fingerlings
2016	Cert. Florida bass	100,100	Fingerlings
2017	Cert. Florida bass	120,520	Fingerlings
2018	Cert. Florida bass	101,365	Fingerlings
2019	Cert. Florida bass	100,026	Fingerlings
2020	Cert. Florida bass	100,140	Fingerlings
2021	Cert. Florida bass	90,108	Fingerlings
2022	Cert. Florida bass	101,665	Fingerlings
2023	Cert. Florida bass	101,527	Fingerlings
2024	Cert. Florida bass	100,138	Fingerlings

Table 3. Lake Arbuckle Tournament Results. Ranking of lakes statewide from which 10 or more tournament reports were received. Ranked according to quality fishing indicators. Lake Arbuckle ranking listed in parentheses.

Year	Number of Reports	Total Number Of Anglers	Number of Bass Caught	Number of Bass Weighed In per 8-Hour Day		Bass/ Tourn	Bass Weighed In/Angler	Percent Successful Anglers		Average Weight per Bass (lbs.)		Number of Bass Weighing In Over 5 lbs.	Angler-Hours per Bass Weighing In Over 5 lbs.	Number of Bass Weighing In Over 8 lbs.	Avg. Big Bass	Avg. 1st Place Weight (lbs.)		Overall Rank
1994	21	770	788	2.26	(# 2)	36.7	1.02	57	(# 15)	1.11	(# NA)	0.19	(# 17)	0.04	8.2	8.4	(# 18)	18
1995	9	362	660	1.96	(# NA)	73.3	1.82	78	(# NA)	1.37	(# NA)	1.8	(NA)	0	7.2	12.0	(# NA)	NA
1996	12	510	512	2.38	(# 2)	42.7	1.00	53	(# 14)	1.17	(# 22)	0.9	(# 11)	0	7.4	8.9	(# 20)	14
1997	14	426	332	2.12	(# 1)	23.7	0.78	64	(# 9)	1.72	(# 23)	0.7	(# 7)	0.07	8.0	9.59	(# 14)	11
1998	18	599	493	1.95	(# 1)	27.4	0.82	52	(# 17)	1.25	(# 25)	0.9	(# 9)	0	5.94	7.78	(# 18)	17
1999	8	316	233	0.9	(# NA)	29.1	0.74	47	(# NA)	1.81	(# NA)	1.1	(# NA)	0	7.97	8.57	(# NA)	NA
2000	9	532	433	1.08	(# NA)	48.1	0.81	55	(# NA)	1.67	(# NA)	1.8	(# NA)	0	7.56	10.44	(# NA)	NA
2001	39	1,769	1,432	1.8	(# 3)	36.7	0.81	56	(# 13)	1.57	(# 16)	0.7	(# 3)	0.03	9.0	9.27	(# 14)	11
2002	33	1,437	1,006	1.34	(# 3)	30.5	0.70	50	(# 15)	1.26	(# 19)	0.2	(# 3)	0	7.79	7.27	(# 17)	18
2003	28	1,147	1,028	1.68	(# 5)	36.7	0.89	53	(# 15)	1.32	(# 20)	0.3	(# 8)	0	7.38	7.6	(# 18)	17
2004	13	606	671	1.14	(# 9)	51.6	1.11	70	(# 6)	1.33	(# 18)	0.7	(# 18)	0.15	10.25	9.0	(# 14)	18
2005	13	488	414	1.23	(# 12)	31.8	0.85	67	(# 8)	1.61	(# 17)	0.5	(# 8)	0	6.54	9.82	(# 13)	18
2006	17	350	595	1.7	(# 10)	35.0	1.7	78	(# 4)	1.70	(# 17)	1.2	(# 7)	0.1	5.36	11.9	(# 8)	6
2007	12	207	456	2.2	(# 8)	38.0	2.2	79	(# 6)	1.96	(# 17)	1.3	(# 12)	0.1	5.51	15.88	(# 3)	7
2008	30	536	1020	1.9	(# 4)	34.0	1.9	60	(# 13)	2.21	(# 10)	3.5	(# 7)	0.4	7.45	14.33	(# 9)	10
2009	14	417	789	NA	(# NA)	56.4	1.89	85.7	(# 3)	2.11	(# 15)	3.1	(# 20)	1.14	7.3	17.7	(# 8)	1
Avg	**18**	**655**	**679**	**1.7**	**5**	**39.5**	**1.19**	**63**	**10.6**	**1.57**	**18.3**	**1.18**	**10**	**0.13**	**7.4**	**10.5**	**13.4**	**12.8**

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

	Total (≥40)		<8 in. (15-45)		8–12 in. (15-30)		≥12 in. (≥15)		≥14 in. (≥10)		13-16 in.		≥ 16 in.	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1986	176	100.7	16.0	86	56.0	90	28.6	88	8.6	94	11.4	86	3.4	103
1988	186	106.3	15.4	89	24.0	89	66.9	94	35.4	98	46.3	93	8.6	109
1991	313	104.3	32.7	96	39.7	98	32.0	95	17.0	97	18.7	94	7.0	95
1994	174	139.2	24.0	88	48.8	91	66.4	90	31.2	92	37.6	88	12.8	96
1996#	263	175.3	18.0	93	70.0	91	87.3	91	48.7	93	52.7	90	18.0	96
1998	69	138.0	44.0	95	46.0	92	48.0	90	24.0	92	20.0	91	10.0	95
1998#	86	114.7	13.3	99	32.0	95	69.3	90	33.3	87	32.0	90	14.7	88
2001	146	116.8	27.2	88	19.2	90	70.4	88	45.6	89	38.4	88	21.6	89
2004*	394	87.6	5.7	105	27.6	96	54.2	89	25.3	90	29.8	88	10.4	94
2007	587	130.4	17.1	92	18.4	94	94.9	92	57.3	93	53.1	92	24.9	94
2009	555	123.6	10.7	94	35.1	92	82.7		52.7	90	39.3	89	24.0	92
2014[R]	143	47.7	0	-	-	-	46.0	88	32.3	89	27.7	87	15.7	91
2017	254	84.6	14.0	87	-	-	45.7	102	40.3	104	8.7	97	34.0	105
2020	128	41.3	1.33	74	-	-	37.7	93	29.0	96	16.0	87	19.7	99

* 2004 started a new minimum of 4.5 hours electrofishing on Lake Arbuckle.
# Night electrofishing
[R] Random site selection

Table 5. Results of largemouth bass DNA analyses from Lake Arbuckle. FLMB = pure strain Florida largemouth bass; F1 = first generation hybrid between FLMB and NLMB; Fx = second or later generation hybrid cross; NLMB = native northern largemouth bass.

Year	FLMB	F_1	FLMB + F_1	F_x	NLMB
1998*	34%	0%	34%	9%	53%
2001*	13%	17%	30%	17%	53%
2004*	29%	32%	61%	18%	21%
2009†	8%	33.3%	41.3%	52.9%	5.7%
2017†	7%	12%	19%	76%	5%

* Results derived from gel electrophoresis.
† Results derived from microsatellite DNA analysis.

Table 6. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of spotted bass collected by spring electrofishing from Lake Arbuckle. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total (≥ 40)		< 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
1982	56	6.1	0.9	87	3.1	85	0.5	99
1984	213	18.5	7.2	76	8.9	80	0.08	79
1986	32	0.6	0.01	-	0.5	91	0.06	33
1988	18	10.3	1.7	64	2.3	78	-	-
1991	23	7.7	3.3	-	3.3	80	-	-
1994	22	17.6	2.4	-	11.2	77	0.8	73
1996	18	12.0	4.7	79	4.0	80	-	-
1998#	32	42.7	14.7	-	16.0	89	-	-
2001	8	6.4	-	-	0.8	96	1.6	91
2004*	2	0.44	-	-	0.22	93	0.22	77
2007	7	1.6	-	-	0.22	91	0.89	97
2009	31	6.9	0.9	104	2.9	-	0.67	91
2014 [R]	18	6.0	1.3	-	-	-	1.0	90
2017	42	14.0	3.3	93	-	-	5.3	94
2020	8	2.7	-	-	2.0	107	0.3	100

* 2004 started a new minimum of 4.5 hours Electrofishing on Lake Arbuckle.
# Night electrofishing
[R] Random site selection

Table 7. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of smallmouth bass collected by spring electrofishing from Lake Arbuckle. 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
1996	2	1.3	1.3	-	-	-	-	-
1998#	14	18.7	18.7	-	-	-	-	-
2001	5	2.4	1.6	-	0.8	79	-	-
2001#	21	21.0	4.0	-	14.0	-	1.0	-
2004*	4	0.89	-	-	0.44	87	0.44	81
2007	7	1.60	0.22	-	0.44	77	0.67	85
2009	9	2.00	0.44	-	-	-	0.67	82
2014 R	10	3.3	1.0	-	-	-	1.33	83
2017	16	5.3	2.3	83	-	-	1.33	95
2020	9	0.3	0.3	75	-	-	-	-

* 2004 started a new minimum of 4.5 hours Electrofishing on Lake Arbuckle.
# Night electrofishing
R Random site selection

Table 8. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of white bass collected by combined by gill netting from Lake Arbuckle.

	Total		< 8 in.		8 – 12 in.		≥ 12 in.	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr
1982	76	5.76	2.16	94	0.72	95	3.12	88
1984	49	4.8	0.72	103	2.16	90	1.92	78
1986	61	6.9	-	-	2.64	84	4.32	85
1988	27	2.9	-	-	1.92	90	0.96	78
1991	124	13.68	1.92	76	10.56	87	1.44	84
1994	119	12.48	1.44	98	7.92	95	3.12	90
1996	115	12.00	1.2	83	8.64	93	2.16	81
1998	180	19.44	5.52	94	7.92	93	6.0	86
2001	64	7.44	0.48	100	1.92	101	5.28	84
2004	27	2.88	0.12	117	1.2	97	1.68	84
2007	200	23.76	2.74	93	8.64	94	12.48	88

Table 9. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of channel catfish collected by gill netting from Lake Arbuckle. Numbers in parentheses represent acceptable values for a quality fishery.

	Total (≥ 4.80)		< 12 in. (≥ 1.2)		≥ 12 in. (≥ 1.2)		≥ 16 in. (≥ 1.2)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr
1982	38	2.88	0.72	84	2.16	92	1.68	95
1984	31	3.12	0.48	82	2.64	99	1.68	110
1986	20	2.4	0.24	67	2.16	77	0.96	79
1988	31	3.36	0.72	71	2.64	88	1.92	93
1991	23	2.64	0.72	61	1.68	91	1.20	96
1994	41	4.32	2.4	82	1.92	88	0.96	98
1996	19	1.92	0.24	67	1.68	83	0.96	91
1998	35	3.84	1.44	71	2.40	80	1.20	78
2001	26	3.12	0.24	79	2.88	91	1.44	97
2004	23	2.64	0.72	105	1.68	91	0.96	95
2007	55	6.24	2.64	88	3.60	84	2.88	85

Table 10. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of all crappie collected by trap netting from Lake Arbuckle. 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
1985	285	8.88	0.10	89	8.88	89	6.0	90	1.9	93
1987	224	7.44	0.24	98	7.20	94	7.0	94	4.6	94
1989	71	1.20	-	-	1.20	95	1.2	95	0.5	95
1990	143	3.60	0.72	88	2.90	91	2.2	93	1.2	93
1992	161	4.08	-	-	4.00	97	4.0	97	1.9	97
1993	114	2.88	-	-	2.88	93	2.6	93	1.0	92
1994	171	4.54	-	-	4.54	95	4.2	96	1.6	96
1996	479	12.0	0.50	-	11.50	95	10.3	96	5.3	94
2004	174	9.12	0.96	-	8.16	104	6.9	96	6.0	93
2009	184	9.43	0.22	-	9.22	98	9.0	97	4.8	97
2016	67	3.34			3.34	94	2.3	92	0.6	90
2018	47	2.31	0.14	-	2.17	90	1.9	91	1.3	91
2021	178	9.02	0.61	-	8.42	96	6.8	95	3.6	93
2024	148	8.30	1.07	-	7.23	100	6.3	99	3.3	96

Table 11. Mean length at age of crappie collected by trap netting from Lake Arbuckle. Numbers in parentheses represent values for acceptable growth rates.

	Age 1	Age 2	Age 3	Age 4
Year	(≥ 6.3 in.)	(≥ 7.9 in.)	(≥ 8.9 in.)	(≥ 9.8 in.)
1984	7.9	10	-	-
1985	8.3	10.6	11.8	-
1986	7.0	11.0	-	14.0
1987	8.6	10.1	10.8	9.8
1988	8.0	10.8	10.8	14.6
1989	9.3	10.9	-	11.7
1990	9.3	11.4	12.2	9.1
1991	8.8	11.3	11.0	12.2
1992	9.3	10.9	13.0	-
1993	8.8	10.7	11.4	-
1994	8.9	10.9	11.4	12.0
1996	9.0	10.8	11.9	12.1
2004	8.8	10.4	10.9	11.4
2009	8.5	9.8	10.2	13.0
2016	7.0	9.6	13.5	10.9
2018	8.3	8.7	10.8	
2021	8.3	10.0	11.1	11.3
2024	8.8	11.2	12.1	13.2

Table 12. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of bluegill collected by spring electrofishing and seining from Lake Arbuckle. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total[1] (≥ 45)		< 3 inches[1] (≥ 10)		3-6 inches[1] (20-100)		≥6 inches[1] (≥ 15)		< 4 inches[2] (1.0)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	No.	C/f
1982	161	17.4	0.22	-	11.7	141	5.5	116	238	19.5
1984	372	32.3	6.78	-	19.9	112	5.7	115	174	4.3
1986	164	3.1	0.29	-	2.2	79	0.7	90	67	3.7
1988	341	194	20.5	-	137	83	37.1	88	58	2.9
1991	174	58	8.0	-	31.6	82	18.3	98	140	6.9
1994	214	171	8.0	-	90.4	73	72.8	92	48	2.4
1996	219	146	5.3	-	88.0	93	52.7	96	12	0.6
1998*	74	148	16.0	-	90.0	92	42.0	93	287	14.1
1998#	152	202.7	48.0	-	121.3	95	33.3	99	-	-
2001	99	79.2	18.4	-	36.8	78	30.3	97	83	4.1
2004	120	26.7	4.0	-	9.8	100	12.9	103	11	0.54
2007	128	28.4	6.4	-	14.9	99	7.8	103	-	-

2004 started a new minimum of 4.5 hours of Electrofishing on Arbuckle.
[1] Spring electrofishing
[2] Seining
* Day electrofishing
# Night electrofishing

Table 13. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of gizzard shad collected by spring electrofishing, gill netting, and seining from Lake Arbuckle. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total[1] (≥ 40)		< 8 inches[1] (≥ 20)		Total[2] (≥ 4.8)		<8 inches[2] (≥ 2.4)	
Year	No.	C/f	C/f	W_r	No.	C/f	C/f	W_r
1982	55	5.95	2.00	144	42	3.12	3.12	86
1984	60	5.22	0.08	121	60	6.00	1.68	133
1986	-	-	-	-	52	6.00	0.48	74
1988	54	30.8	0.57	48	69	7.44	-	-
1991	33	11.0	1.67	101	62	6.96	0.24	49
1994	8	6.4	-	-	73	7.68	0.09	105
1996	39	26.0	-	-	65	6.72	-	-
1998	-	-	-	-	75	8.16	0.72	98
2001	-	-	-	-	96	11.28	3.36	78
2004	-	-	-	-	92	9.60	0.12	-
2007	-	-	-	-	105	12.48	5.04	-
2016*	83	9.1	-	-	-	-	-	-

[1] Spring electrofishing
[2] Gill netting
*Random floating shad gillnets

Table 14. Total number (No.) and catch rates (C/f) of threadfin shad collected by spring electrofishing and gill netting from Lake Arbuckle.

	Threadfin shad			
	Total[1]		Total[2]	
Year	No.	C/f	No.	C/f
1982	-	-	1	0.07
1984	-	-	27	2.64
1986	206	117	5	0.72
1988	12	6.9	2	0.22
1991	34	11.3	17	1.92
1994	-	-	48	5.04
1996	1	0.67	17	1.68
1998	6	12.0	66	7.20
2001	-	-	8	0.96
2004	-	-	67	7.20
2007	-	-	413	48.24
2016*	-	-	200	21.8

[1] Spring electrofishing
[2] Gill netting
*Random floating shad gillnets

Figure 1. Map of Lake Arbuckle and vicinity.

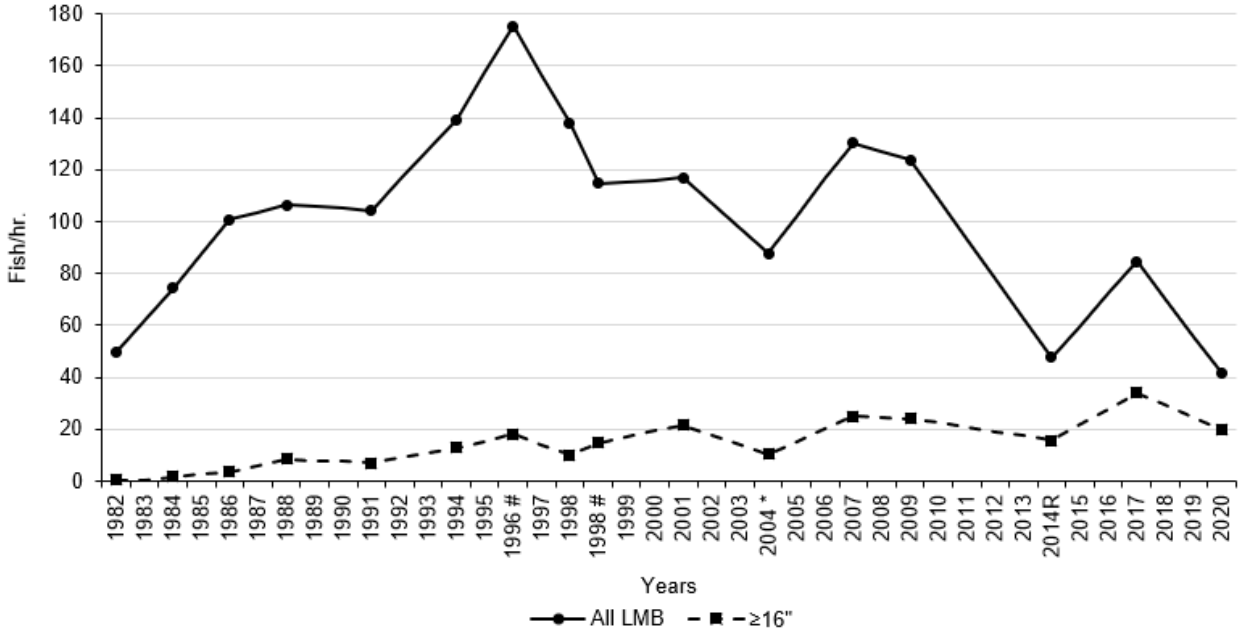

Figure 2. 1982-2020 total catch rates of largemouth bass and catch rates of largemouth bass > 16 inches collected by spring electrofishing.

* Denotes changed electrofishing protocol – Minimum of 4.5 hrs of effort required.
# Denotes night electrofishing
R Denotes random site selection

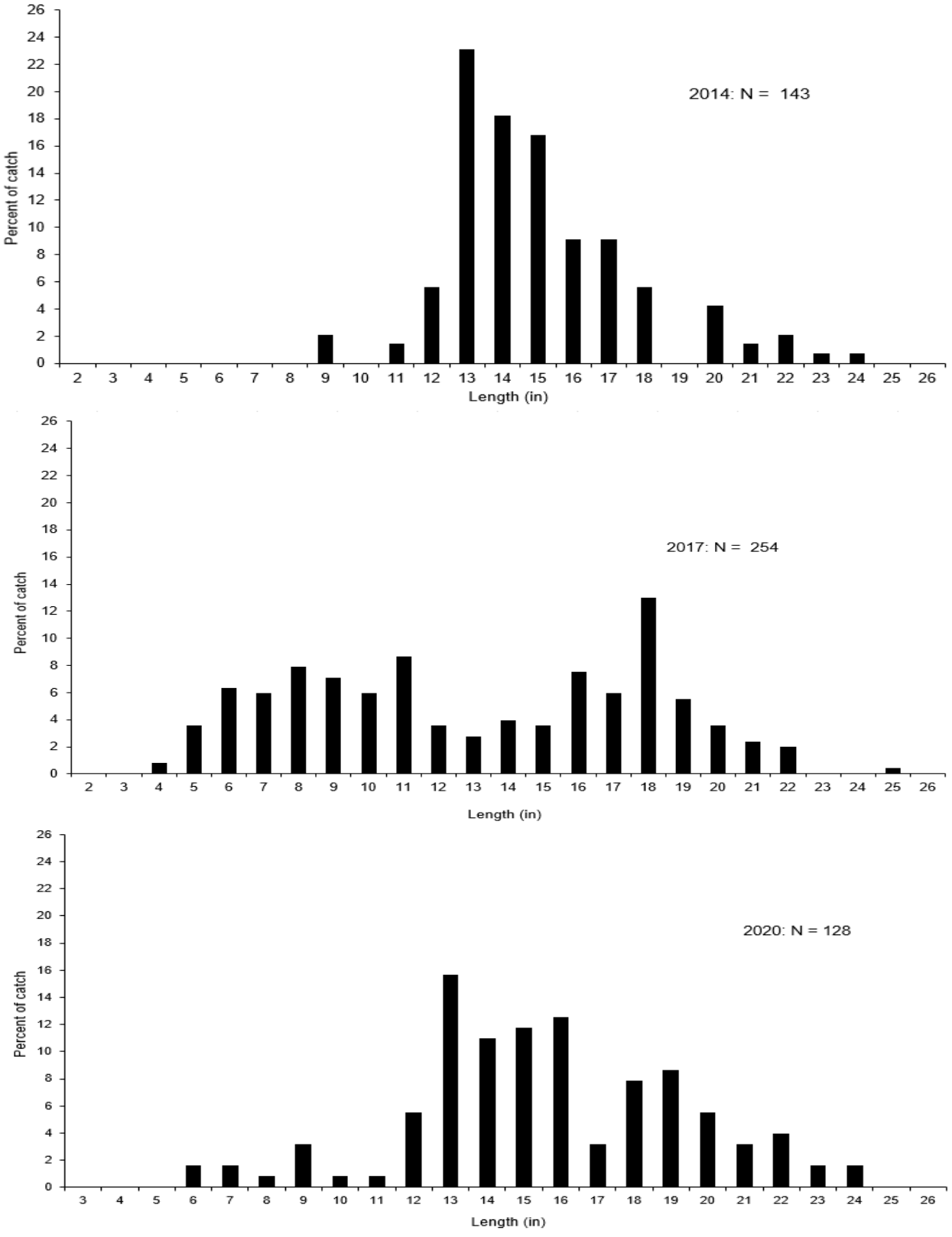

Figure 3. 2014, 2017, and 2020 length frequency distribution for largemouth bass collected by spring electrofishing at Lake Arbuckle.

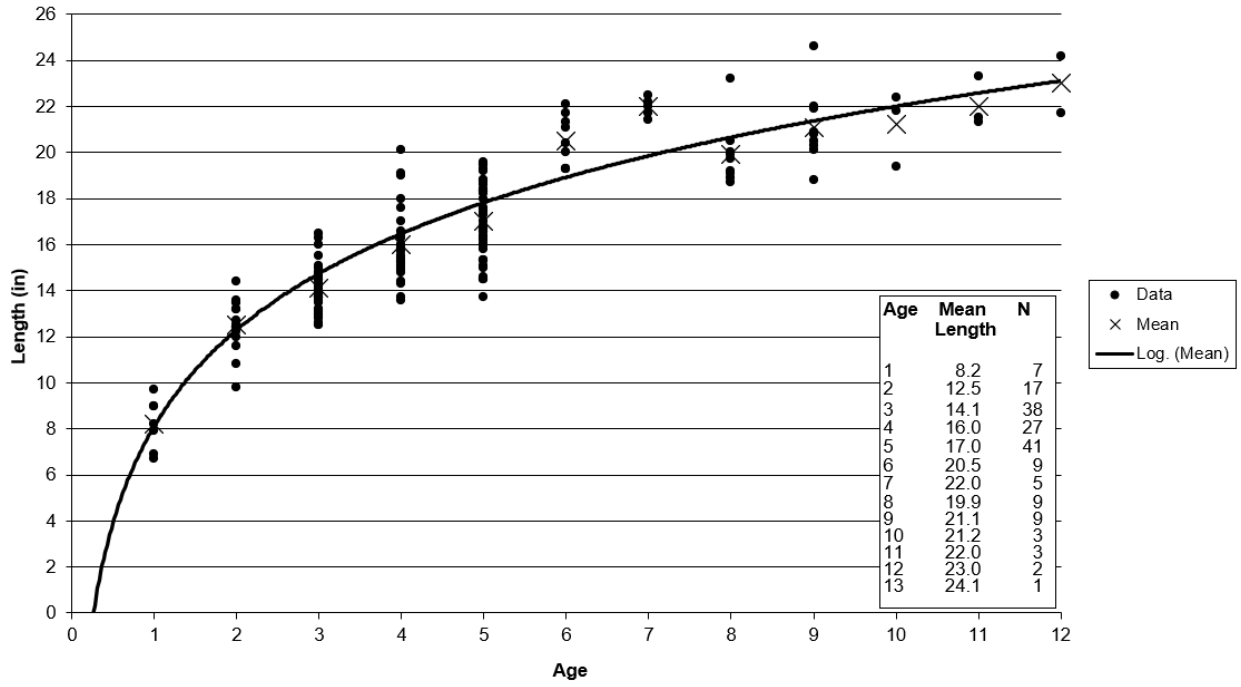

Figure 4. 2020 Length at age data for largemouth bass collected from Lake Arbuckle by spring electrofishing. N = 171

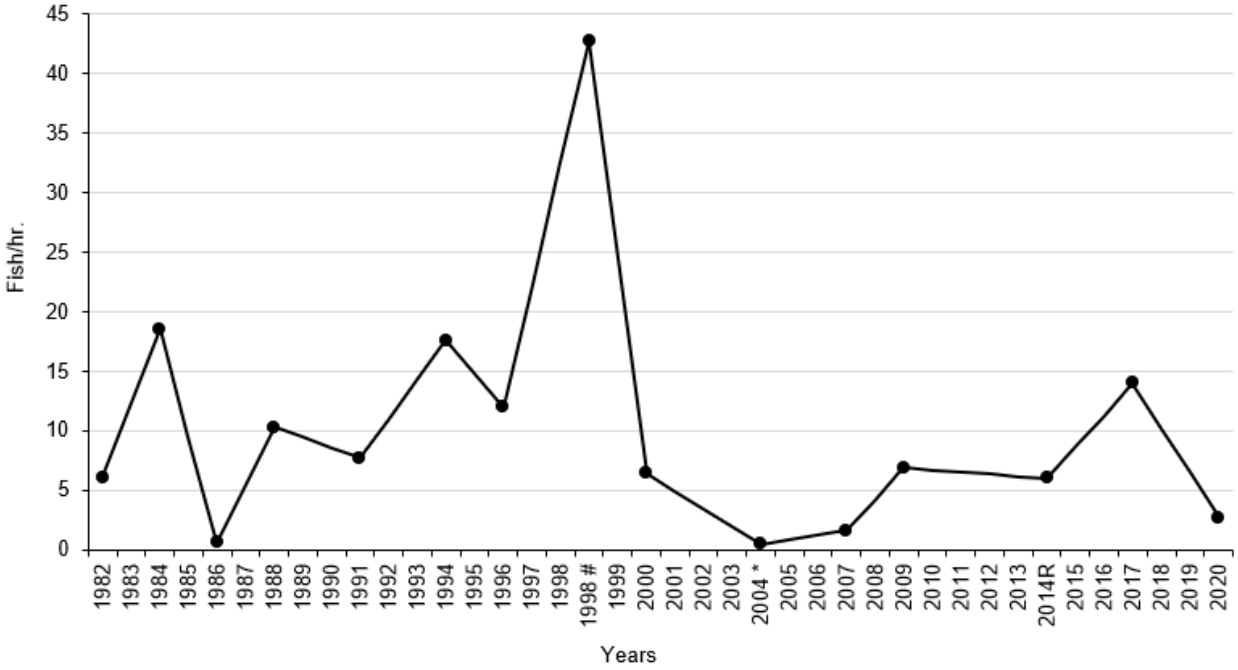

Figure 5. 1982-2020 Total catch rates of spotted bass collected by spring electrofishing.

* Denotes changed electrofishing protocol – Minimum of 4.5 hrs of effort required.
# Denotes night electrofishing.
R Denotes random site selection

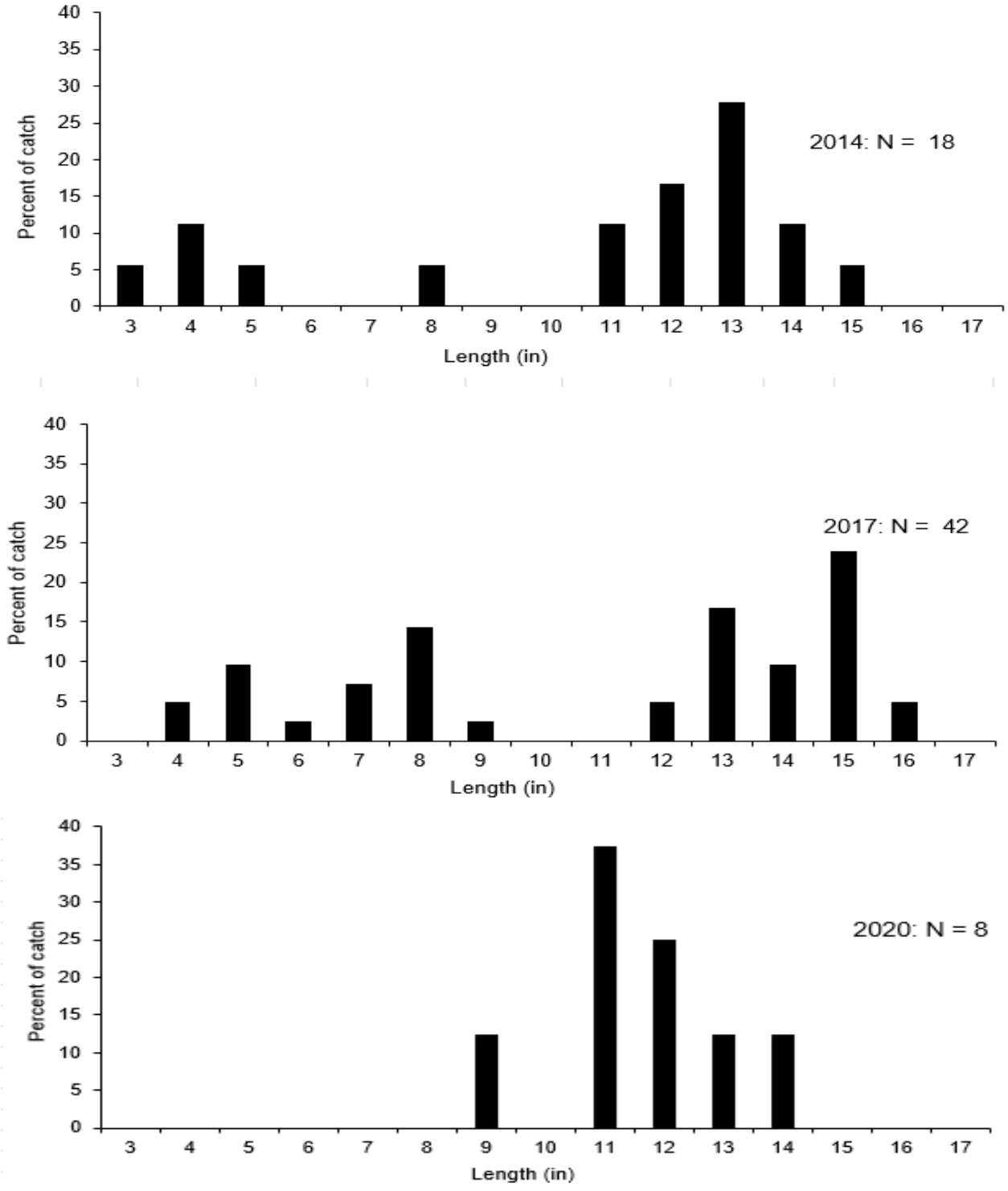

Figure 6. 2014, 2017, and 2020 length frequency distribution for spotted bass collected by electrofishing at Lake Arbuckle.

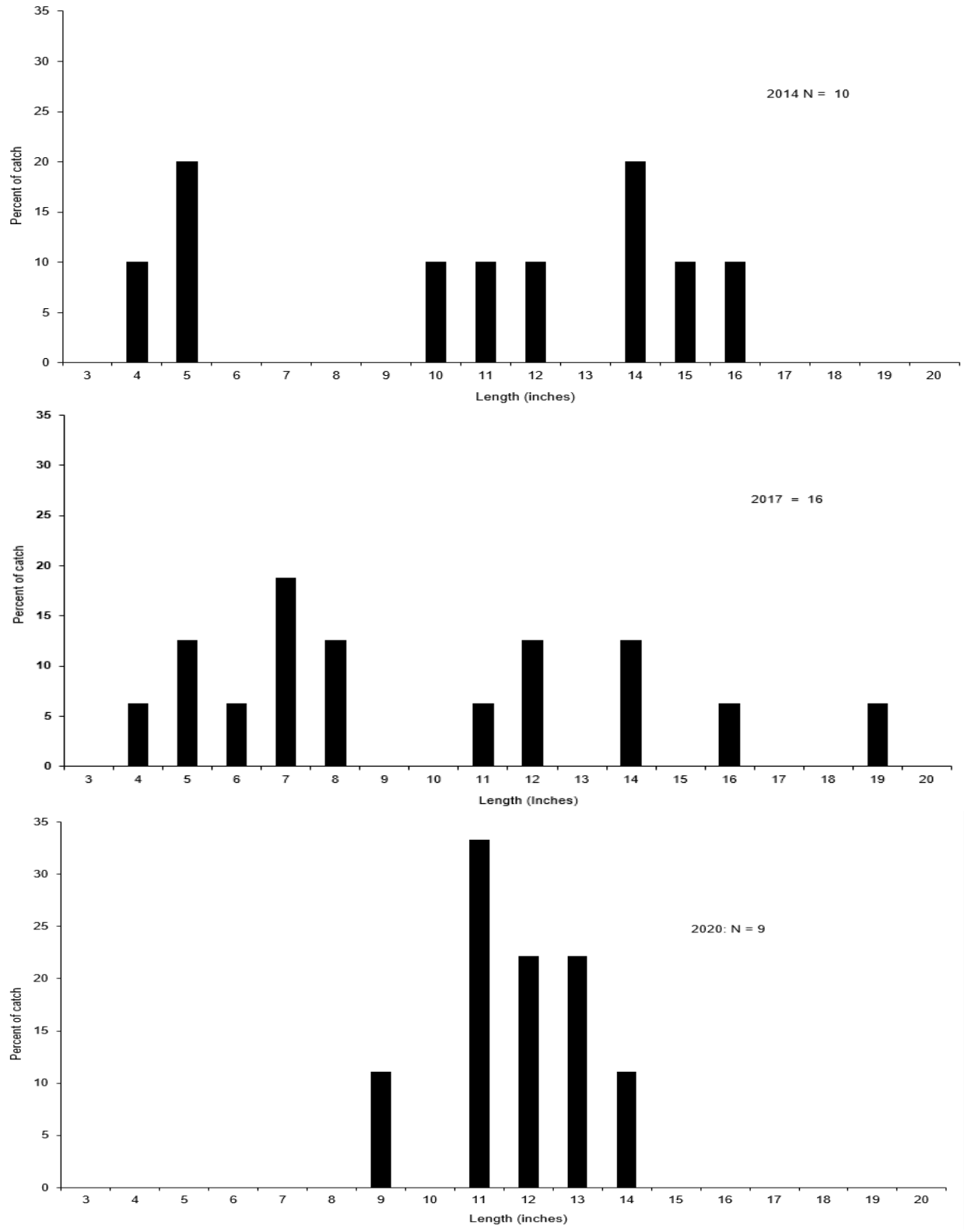

Figure 7. 2014, 2017 and 2020 length frequency distribution for smallmouth bass collected by spring electrofishing at Lake Arbuckle.

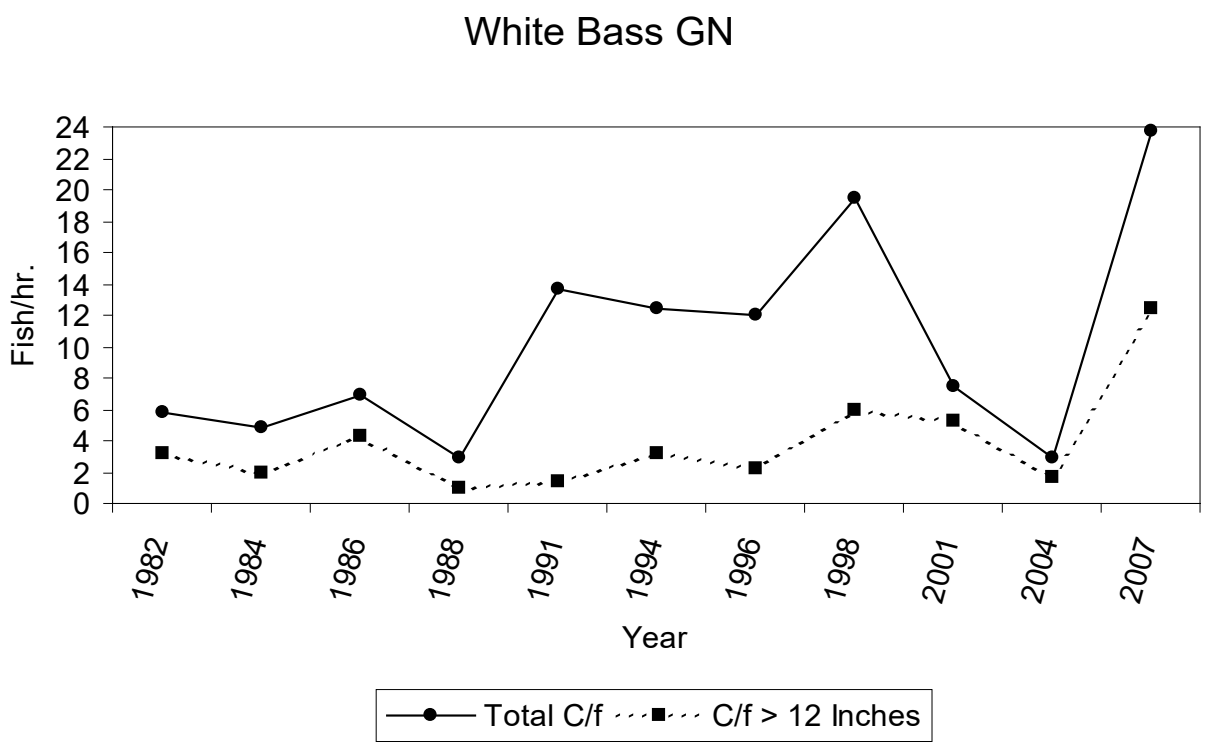

Figure 8. 1982 to 2007 catch rates for all white bass and white bass > 12 inches collected by gillnetting at Lake Arbuckle.

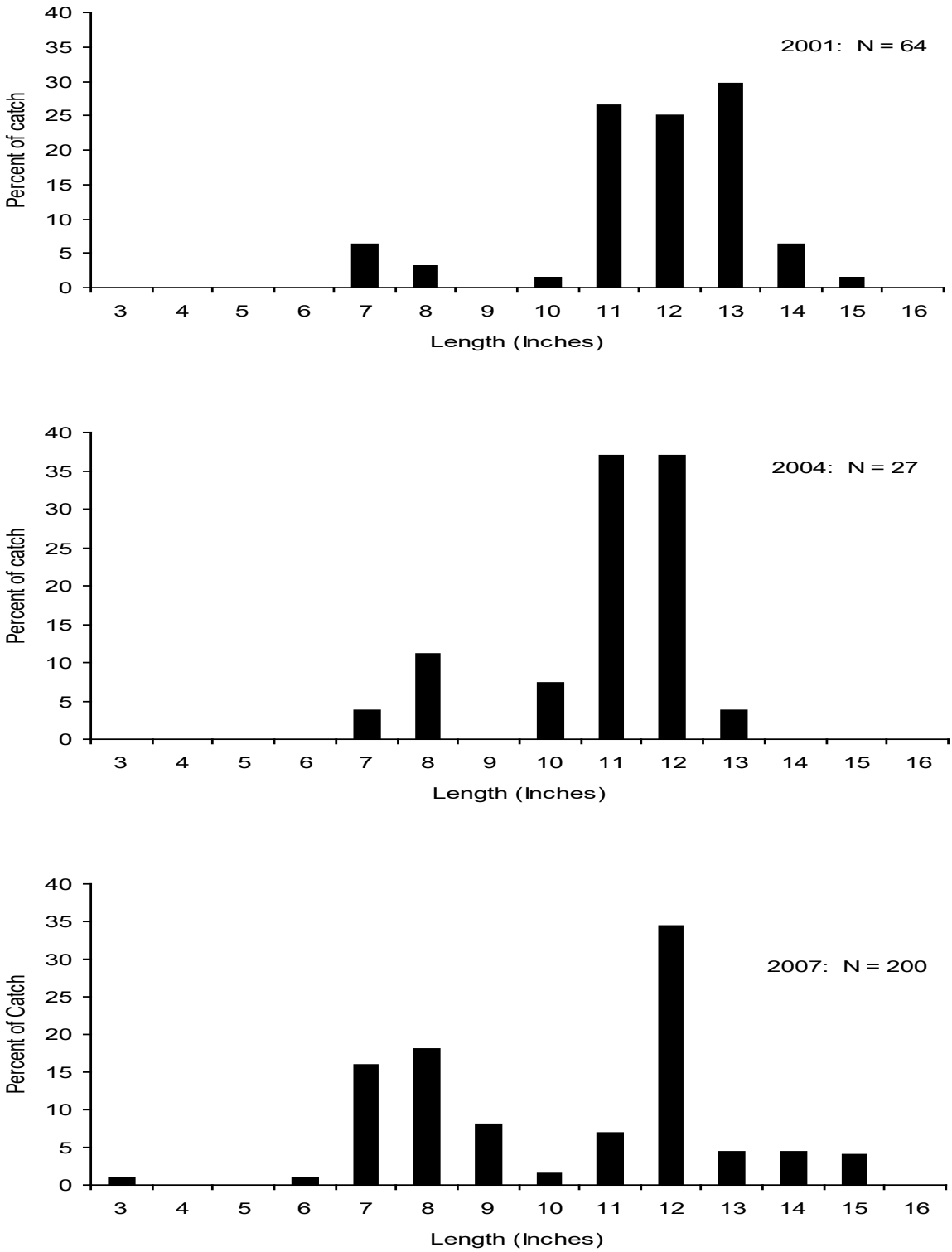

Figure 9. 2001, 2004 and 2007 length frequency distribution for white bass collected by gillnetting at Lake Arbuckle.

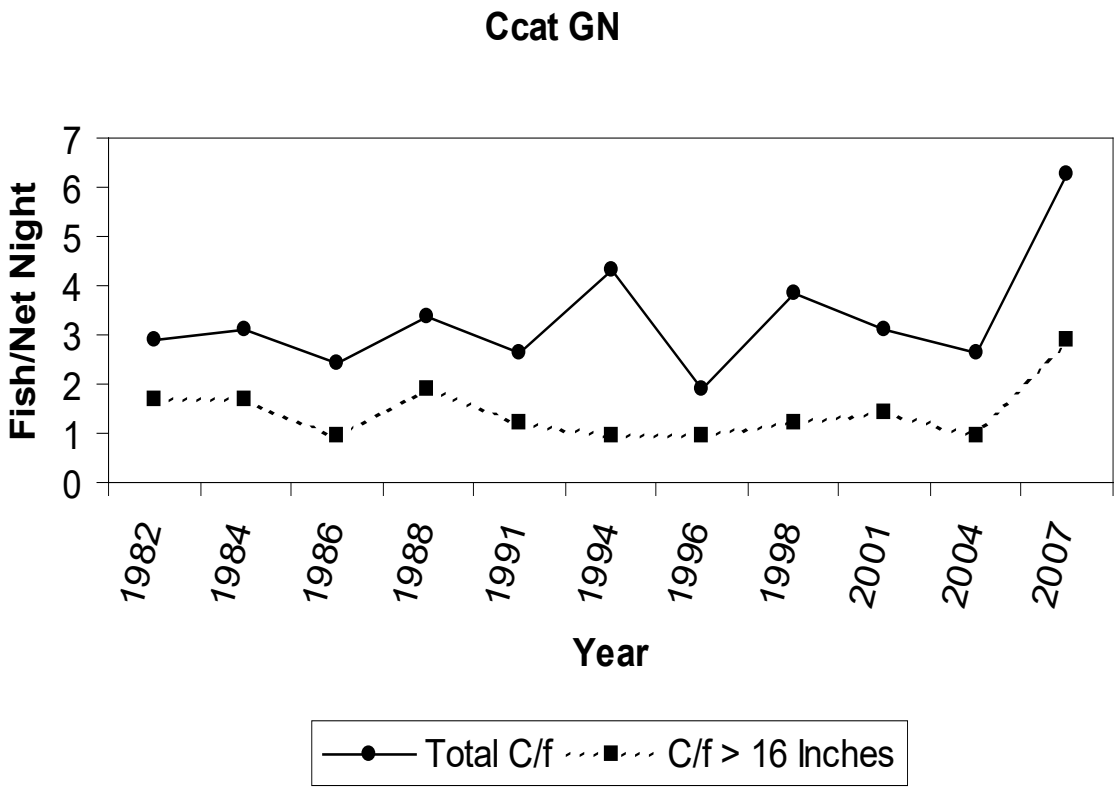

Figure 10. 1982 to 2007 catch rates for all channel catfish and channel catfish > 16 inches collected by gillnetting at Lake Arbuckle.

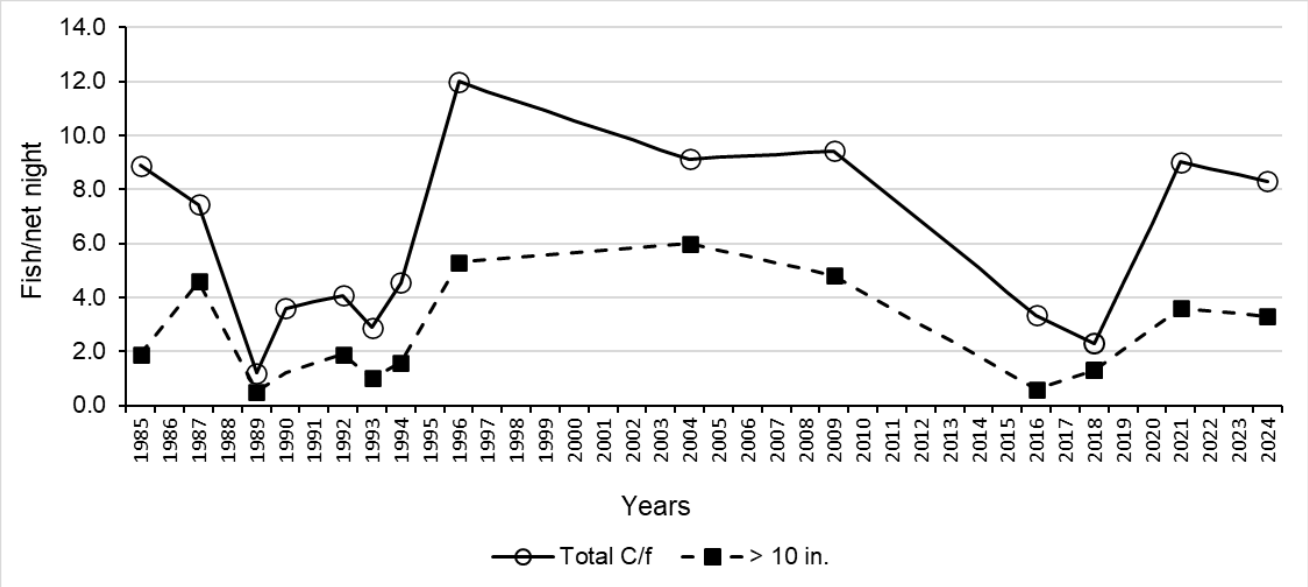

Figure 11. 1985 to 2024 catch rates for all crappie and crappie > 10 inches collected by trapnetting at Lake Arbuckle.

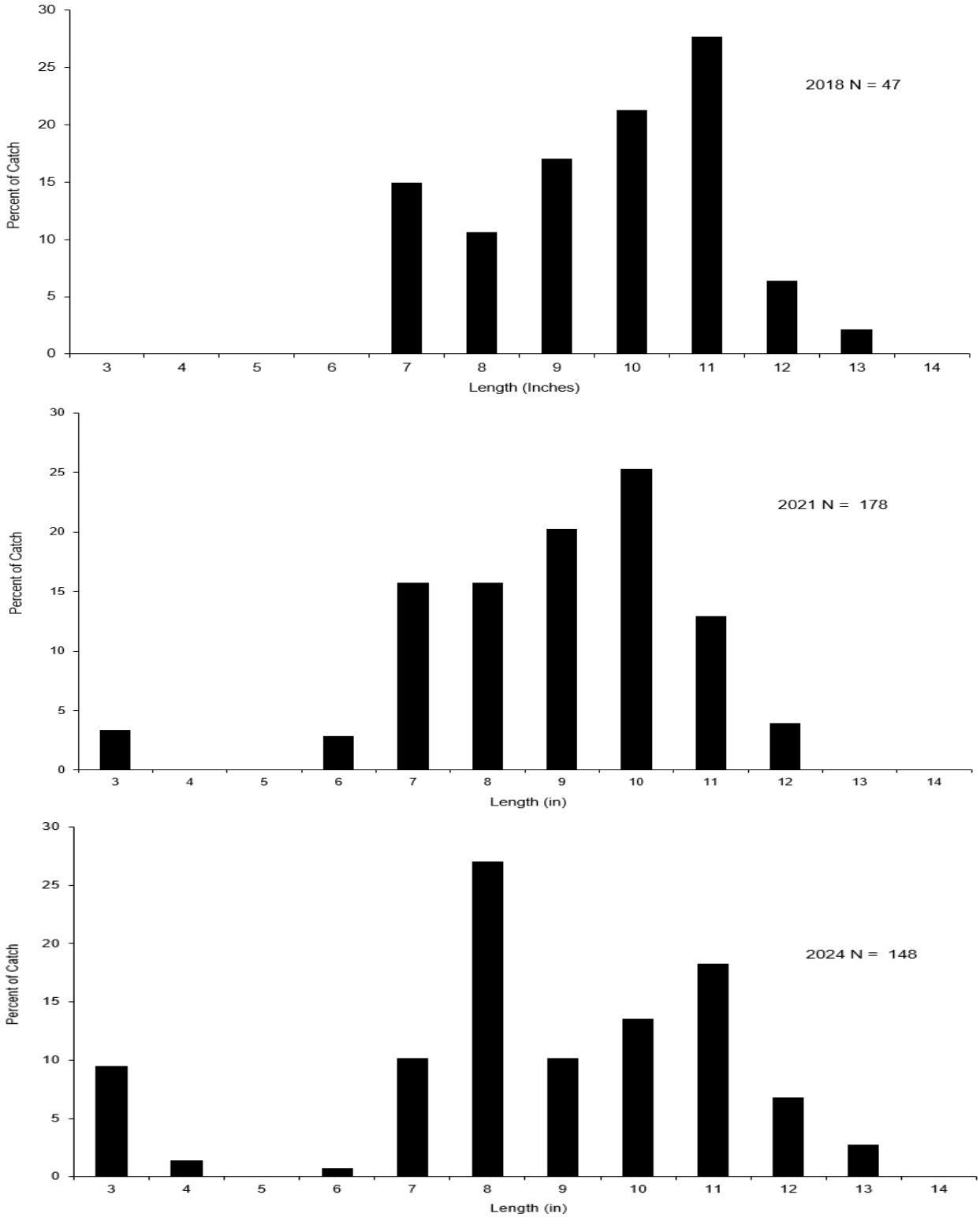

Figure 12. 2018, 2021, and 2024 length frequency distribution for all crappie collected by trap netting at Lake Arbuckle.

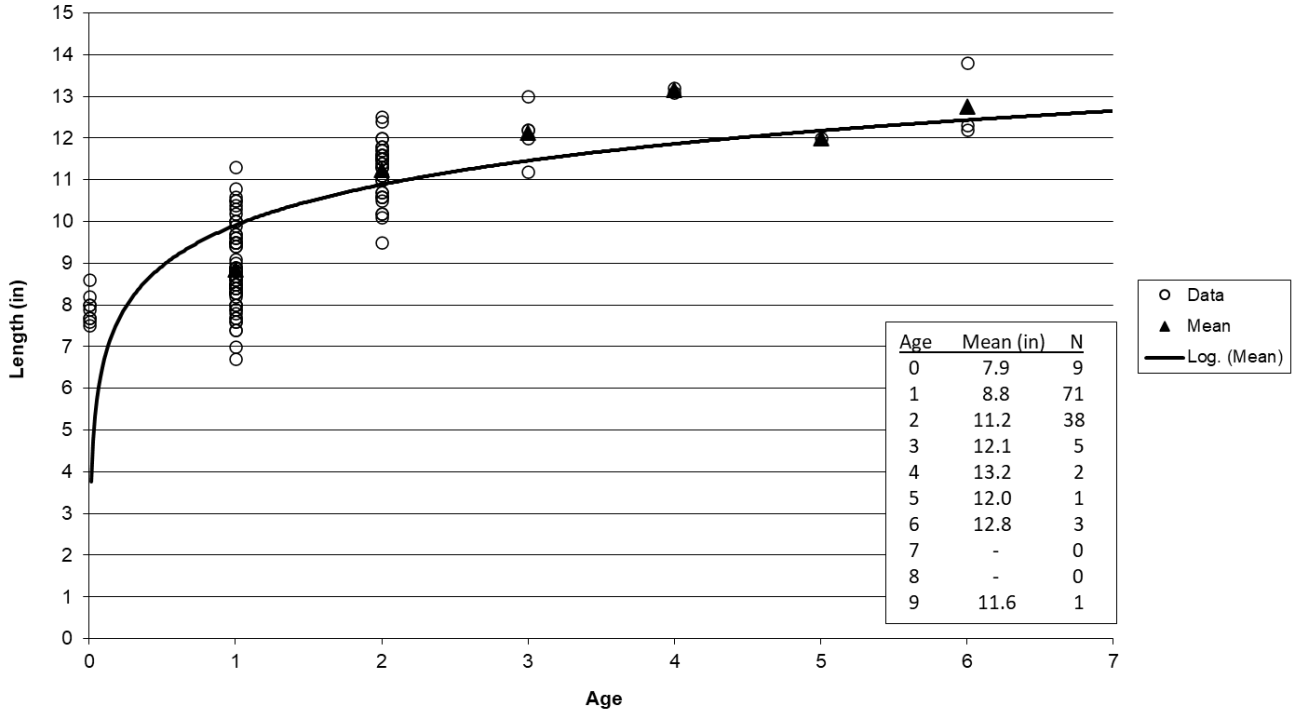

Figure 13. 2024 Length at age data for crappie combined collected from Lake Arbuckle by fall trap netting. N = 130