SURVEY REPORT
OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS
FOR
AMERICAN HORSE LAKE
2023

SURVEY REPORT

State: Oklahoma

Project Title: American Horse Lake Fish Management Survey Report

Period Covered: 2015-2023

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Date Prepared: November 2023

AMERICAN HORSE LAKE

ABSTRACT

American Horse lake was surveyed in 2015, 2016, 2017, 2019, 2020, 2021, and 2023. These surveys included spring electrofishing and summer hoop net surveys. Results of the electrofishing surveys show slightly a decreasing size structure of largemouth bass since 2015. Channel catfish hoop net surveys show that there has been low to moderate relative abundance with good size structure over the last seven years. This was likely influenced by the lack of grow-out (9') sized fish being stocked in the lake from 2014 through 2023.

INTRO

American Horse Lake impounds the American Horse Creek, 16 km west of Geary in Blaine County, Oklahoma. American Horse covers 40 surface hectares and was constructed in 1966 by the ODWC (Figure 1). American Horse has a mean depth of 6.2M and a maximum of 22.9M, a shoreline development ratio of 5.4, a water exchange rate of less than one, and a secchi disc visibility of around 40cm in the main pool in August; turbidity is primarily from plankton. Fish habitat consists of flooded standing timber and weed beds. Major fisheries include largemouth bass, bluegill, red-ear sunfish and channel catfish.

American Horse Lake has a history of success and failure from fertilization programs and associated aquatic vegetation problems. Fertilization greatly adds to the growth of sunfishes but has caused major macrophyte problems. Grass carp is the main control agent for these macrophytes. Macrophytes were under control in 1996 until grass carp were lost in 2007 when the dam was overtopped from tropical storm Erin.

In 2007 the lake was lowered approximately 30 feet due to damage to the dam caused by tropical storm Erin. The area was closed to the public due to safety concerns. Reconstruction efforts continued through 2014 when repairs to the dam were completed. After being lowered in 2007 the lake reached full pool again in 2019.

Fish stockings have been limited to channel catfish and grass carp over the years. Channel catfish have been stocked regularly since 2016 (Appendix 1) with sizes ranging from fingerling to growout (9in). Grass carp were also restocked in 2020 as macrophytes began to once again be problematic.

American Horse Lake was sampled by spring electrofishing in 2015, 2017, 2019, 2020, and 2023 to evaluate the status of the largemouth bass. American Horse was also sampled with tandem hoop nets surveys in the summer of 2016, 2019, 2021, and 2023 to evaluate channel catfish.

LMB EF

Largemouth Bass (LMB) were surveyed in the spring of 2015, 2017, 2019, 2020, and 2023 by boat electrofishing. Whole shoreline samples were conducted by using ten-minute stations. Total Catch Per Unit Effort (CPUE) ranged from 76.67 in 2020 to 48 in 2023 which is above the minimum value of 40 indicating a quality fishery (Table 1). CPUE for fish less than 200mm increased from 1.33 in 2015 to 7.06 in 2023 while preferred size fish (greater than 380mm) decreased from 24.67 in 2015 to 5.29 in 2023. Relative Weights (Wr) demonstrated a slight inverse relationship with catch rates in these size categories. Relative weight appears to be decreasing in fish less than 200mm and increasing in fish greater than 380mm (Table 1).

Length frequency histograms also show an increase in frequency of fish around 200mm in 2020 and 2023 as compared to 2017 and 2019 (Figure 1). The size range of fish collected each year remained fairly steady among years which ranged from approximately 150mm to 530mm.

The proportional size distribution (PSD) values for largemouth range from 48 (2020) to 77 (2019). The proportional size distribution of preferred (PSD-P) values decreased each year from 55 in 2015 to 14 in 2023.. The proportional size distribution of memorable (PSD-M) values were all 1 except for 2015 with a value of 4 (Table 2).

The largemouth bass population in American Horse has historically been a stunted bass fishery. After the dam renovation in 2014 the population was balanced. Since that time, it has been reverting to more of a stunted fishery as seen in the past. Aquatic vegetation management is needed to keep this population balanced. Biennial surveys should be conducted to monitor this population.

Table 1: Total number (No), catch per unit effort (CPUE), and relative weights (Wr) by size group of Largemouth Bass collected in electro-fishing surveys from American Horse Lake.

Year	No	Total CPUE	Substock <200mm		Stock 200mm		Quality 300mm		Preferred 380mm		Memorable 510mm	
		CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2023	136	48	7.06	87.13	16.49	85.66	18.71	94.14	5.29	95.19	0.35	108
2020	230	76.67	5.67	82.45	36.67	82.24	21.33	89.89	12	94.56	1	109.52
2019	189	56.7	1.5	86.24	12.6	86.48	30.6	82.53	11.7	86.68	0.3	90.44
2017	178	53.4	1.2	104.33	16.2	97.17	23.7	90.04	11.7	86.2	0.6	81.73
2015	75	50	1.33	94.83	17.33	90.75	4.67	96.75	24.67	89	2	90.62

Table 2: Proportional Size Distribution (PSD), Proportional Size Distribution of Preferred (PSD-P) and Memorable (PSD-M) for Largemouth Bass collected from American Horse Lake trap net surveys.

Year	PSD	PSD-P	PSD-M
2023	59	14	1
2020	48	18	1
2019	77	22	1
2017	65	24	1
2015	64	55	4
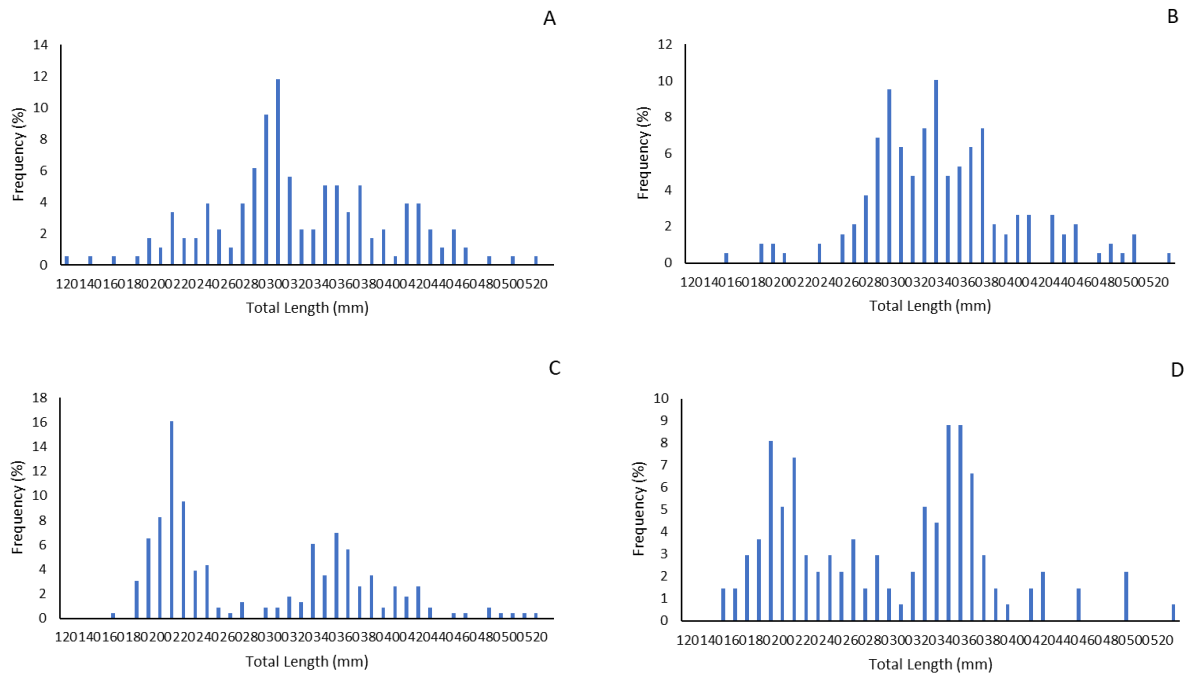
Figure 1: Largemouth Bass Length Frequencies for American Horse Lake 2017(A), 2019(B), 2020(C), and 2023(D).

CHANNEL CATFISH

Channel catfish were surveyed in the summer of 2016, 2019, and 2021 at American Horse Lake. The surveys were conducted following Standard Sampling Procedures for Fisheries Management. Tandem hoop net surveys were conducted by setting six stations of three net nights each totaling 18 net nights. Each station was three hoop nets set in tandem with the bridle end tied to the cod end. Before 2023, each of these three nets was baited with a whole bar of Zoat soap (400g). During the 2023 survey, cheese logs were used. These cheese logs were cut into thirds of about 0.9kg. This bait was first placed in a 0.9 kg plastic sample jar with 25-30 6 mm holes in it. The largest hoop on these nets was 0.8 meters and the net itself was approximately 3.4 meters long.

The highest Catch Per Unit Effort (CPUE) for the four years surveyed was in 2023 (CPUE=21.83). The Lowest CPUE was in 2019 (CPUE=0.33) with only 6 individuals collected (Table 3). The largest range of sizes of individuals collected was in 2023 (Figure 2).

Proportional size distribution (PSD) values for channel catfish in American Horse were low except for 2019. The sample size for the 2019 survey was six individuals which likely influenced the 2019 PSD value of 100 (Table 4).

The channel catfish population in American Horse is dependent on maintenance stockings of grow-out catfish(9"). The lack of grow-out stocking from 2014 to 2023 negatively impacted the population. Biennial stockings should continue at the rate of 40 fish/acre.

Table 3: Total number (No), catch per unit effort (CPUE), and relative weights (Wr) by size group of Channel Catfish collected in hoop net surveys from American Horse Lake.

Year	No	Total CPUE	Substock <280mm		Stock 410mm		Quality 610mm		Preferred 710mm	
		CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2023	393	21.83	8.39	-	12.17	-	1.28	-	-	-
2021	232	12.89	6.61	93.03	4.72	85	1.56	89.9	-	-
2019	6	0.33	-	-	-	-	0.33	89.15	-	-
2016	304	12.67	-	-	10.33	-	2.29	-	0.04	-

Table 4: Proportional Size Distribution (PSD), Proportional Size Distribution of Preferred (PSD-P) and Memorable (PSD-M) for Channel Catfish collected from American Horse Lake trap net surveys.

Year	PSD
2023	10
2021	22
2019	100
2016	18
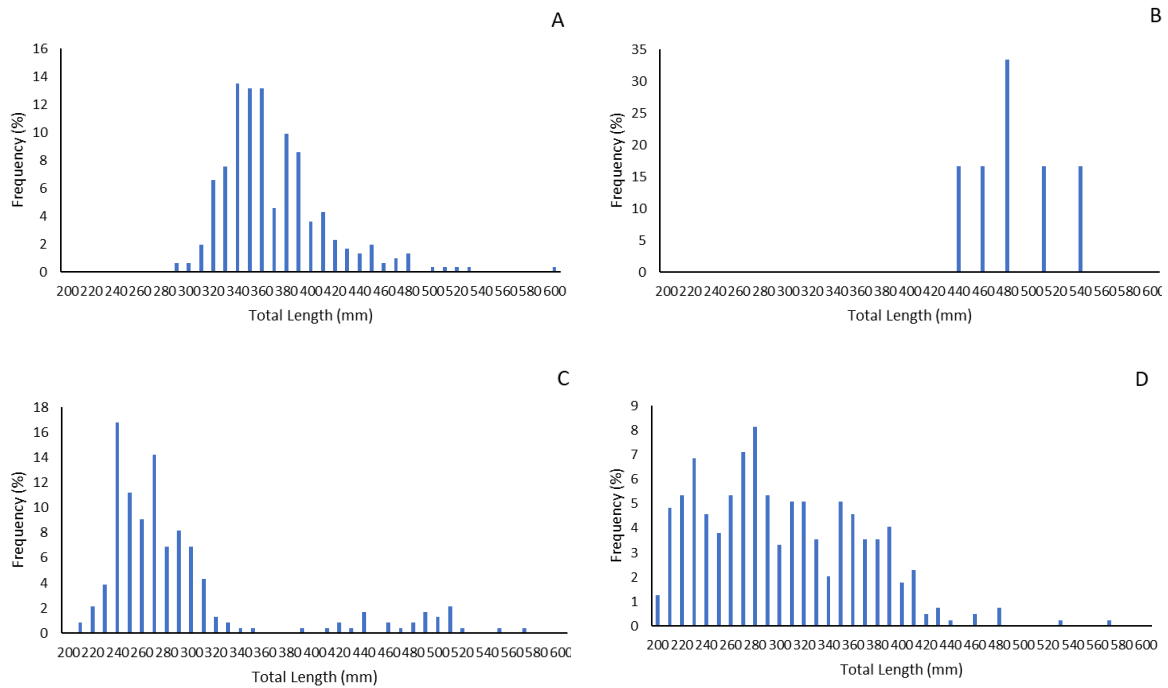
Figure 2: Channel Catfish Length Frequencies for American Horse Lake 2016(A), 2019(B), 2021(C) and 2023(D).

Stockings

Year	Species	Number	Size (mm)
2023	Channel Catfish	1,445	304.8
2020	Grass Carp	150	304.8
	Channel Catfish	4,000	228.6
2019	Channel Catfish	62,850	-
	Channel Catfish	4,020	215.9
2018	Channel Catfish	10,560	63.5
2016	Channel Catfish	14,319	76.2

APPENDIX 1