SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

STILWELL CITY LAKE

2023

SURVEY REPORT

State: Oklahoma

Project Title: Stilwell City Lake Fish Management Survey Report

Period Covered: 2022-2023.

Prepared by: Jon West

Date Prepared: December 2023

Stilwell City Lake

ABSTRACT

Stilwell City lake was surveyed by fall trap netting (2022) and spring boat electrofishing (2023) techniques to monitor trends in fish populations. Survey results indicate a low abundance of crappie, which declined precipitously from the 2019 survey. Largemouth Bass (LMB) abundance was similar to the 2020 survey with moderate to high overall catch rates with a somewhat bimodal distribution in the size classes. A subset of bass sampled were taken for age and growth analysis which showed growth to be slow to moderate.

Recommendations include to continue monitoring the bass and crappie populations through surveys planned for 2025 (trap netting) and 2026 (spring electrofishing). Habitat enhancement should occur on an as needed basis.

INTRODUCTION

Stilwell City Lake (C.J. Carson Lake) is located southwest of Stilwell in Adair County, Oklahoma, approximately 5 miles west on state highway 100 and 1 mile south. The lake covers 188 surface acres, has an average depth of 16.8 ft. and drains a watershed of 7.34 square miles (4,697 acres). The dam was constructed in 1965 on an unnamed tributary to Sallisaw Creek and is located in Section 24, Township 15 North, Range 24 East of the Indian Meridian. The lake was built for water supply, flood control, and recreation and is owned by the city of Stilwell. Water quality measurements show some stratification occurs in the summertime and is usually around 4 meters. The OWRB BUMP report classifies the lake as eutrophic with a TSI of 54 and is phosphorus limited. It has a stable water level and is encircled with water willow. Other aquatic vegetation includes Potamegeton spp., cattail, primrose, and filamentous algae. Annually, in the spring, Stilwell utilities treat the lake with copper sulfate to control algae growth. The lake does receive pressure from locals and is known for its healthy bluegill and red ear populations.

Fish habitat consists of a ring of water willow around the lake and numerous submerged aquatic macrophytes, rip-rap at the dam and multiple ODWC habitat enhancement sites (Appendix I). In June of 2019, 500 triploid grass carp were stocked to help control submerged vegetation and were purchased by the city of Stilwell. Stilwell's recent stockings can be seen on Appendix II.

Public facilities include two boat ramps and multiple areas with shoreline access. Anglers are limited to pole and line fishing only and internal combustion engines are prohibited except for Stilwell High School team anglers during practice fishing (personal communication Adair warden).

Results

Crappie

Stilwell Crappie were sampled using fall trap netting in 2022. Ten shoreline sites were randomly selected and were fished for 18-24 hours. Crappie abundance, measured as catch per unit effort (CPUE) was very low at 0.9 which was significantly lower than the 2019 trap netting survey (Table 1). Body condition, measured as relative weight (Wr) was above satisfactory levels at 99 (Table 1). Crappie length frequencies show the 2022 sample was dominated by the 10 inch group that comprised 67% of the sample (Figure 1). Age and growth shows that the 10 inch group are fast growing 1 and 2 yr old fish (Table 2). Age frequencies show that the entire catch was made up of fish $\leq$ 2 years old. (Figure 2). The 2019 sample was dominated by 2 year old fish and the catch rates of that sample were much higher. The large 2 year old class from the 2019 sample must have had a large die-off before the 2022 sample resulting in the low catch rates and only younger fish being caught. The low abundance of crappie has

led to good growth rates and body condition. Stilwell crappie should be monitored via fall trap netting in 2025 to determine if the population has rebounded .

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall trap net from Stilwell City Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 5.1 in		Quality 7.9 in		Preferred 9.8 in		Memorable 11.8 in		Trophy 15	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2019	145	10	0.5	85	6.1	87	3.9	88	0.2	86	.	.
2022	15	0.9	.	.	.	.	0.9	99	.	.	.	.

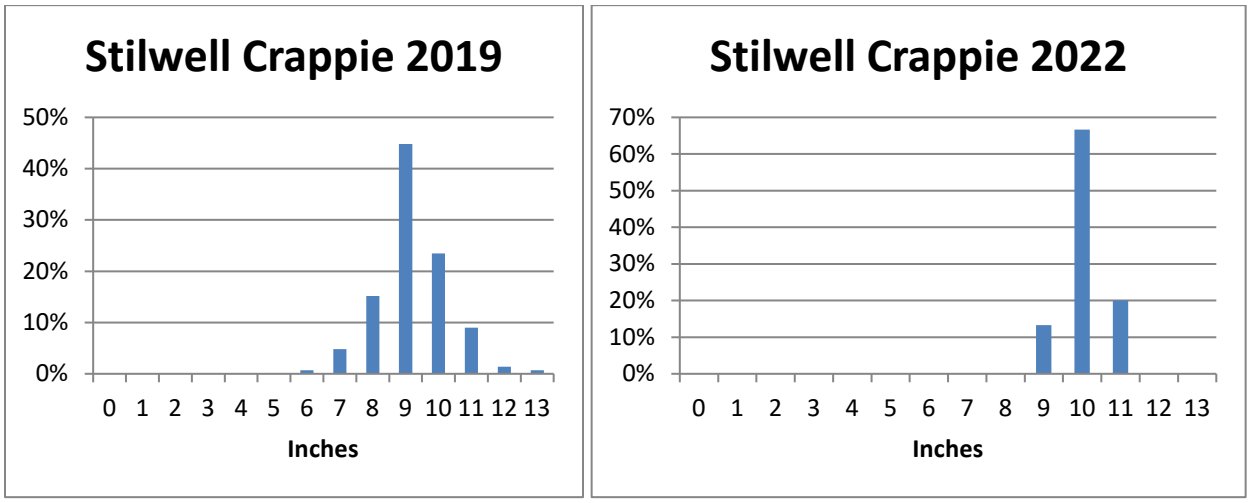


Figure 1. Crappie Trap Net Length Frequency Histogram for Stilwell City Lake.

Table 2. Crappie Mean length at age (inches) for Stilwell City Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5
2019	7.8	9.7	10.3	.	13.1
2022	10.1	11.1	.	.	.

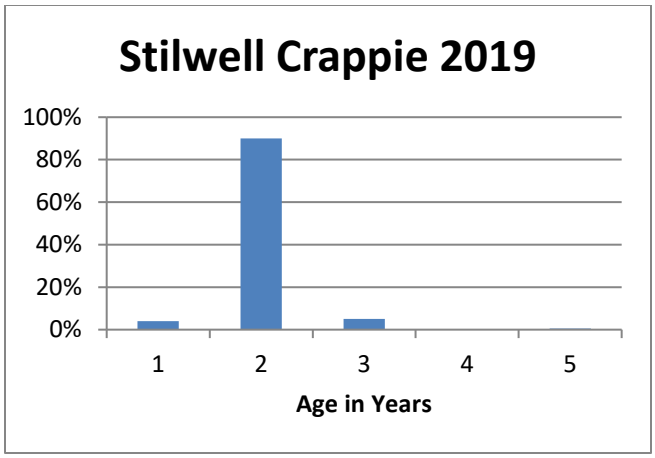


Figure 2. Crappie age frequencies from Stilwell City Lake

Largemouth Bass

Largemouth Bass (LMB) were surveyed in spring of 2022 by means of boat electrofishing. Randomly selected shoreline units were sampled in discrete 10 minute units of effort. Largemouth abundance measure as catch per unit effort (CPUE) was moderate to high with a catch rate of 129.6 bass/hr. This CPUE was similar to the 2020 spring sample but still well below the 2017 CPUE (Table 3). The highest catch rate fell into the preferred category, indicating a shift in the population to larger individuals. Body condition, measured as relative weight (Wr), show Stilwell bass to be above acceptable levels in all size categories (Table 3). Proportional Size Distribution (PSD) values were slightly above the balanced range for quality and preferred sized fish (Table 4). Length Frequencies also show the shift to larger individuals with 46% of the sampled bass measuring $\geq$14 inches (Figure 3). LMB growth was moderate with 4 year old fish averaging 16" in length, then growth rates slowing way down at 5 years of age and beyond (Table 5). Age frequencies show good age 1 and 2 year classes with distribution tapering off from there. The oldest fish aged was 12 years (Figure 4). The largest bass sampled was 19.9 inches long and weighed 4 lbs.

Table 3. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Largemouth bass collected by spring electrofishing from Stilwell City Lake. Acceptable Wr 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	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2017	451	270.6	98.4	100.8	93.7	67.2	87.4	3.6	95.4	0.6	86.4	.	.
2020	126	126	20	24	90.3	41	95	39	93.2	2	89.8	.	.
2023	108	129.6	40.8	10.8	93.8	28.8	100.3	49.2	94.2	.	.	.	.

Table 4. Largemouth Bass Proportional Stock Densities Stilwell City Lake

Year	PSD-Q	PSD-P	PSD-M
2017	39	2	
2020	77	39	2
2023	88	55	0

Balanced PSD Values	
PSD-Q	40-70
PSD-P	10-40
PSD-M	0-10

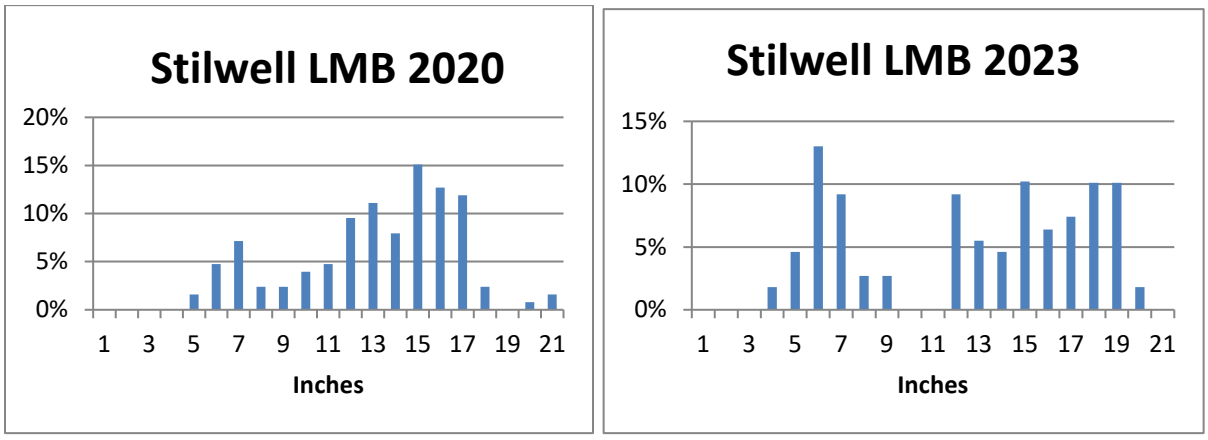
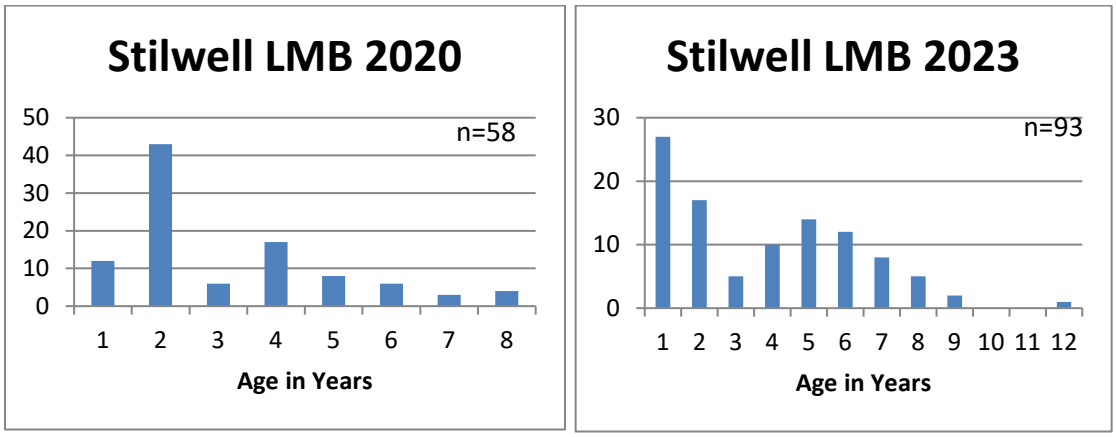


Figure 3. Largemouth Bass Length Frequency Histograms Stilwell City Lake

Table 5. Largemouth Bass Mean Length at Age Stilwell City Lake

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 12
2017	6.9	10.6	12.3	12.1	13.5					
2020	6.57	11.73	14.9	15.34	15.81	15.07	16.1	18.31		
2023	5.71	11.29	12.3	16.1	15.7	16.8	17.2	18.4	15.5	19.9

Figure 4. Largemouth Bass Age Frequencies Stilwell City Lake



Appendix I. ODWC Habitat Enhancement Sites Stilwell City Lake

Area Name	Latitude	Longitude	Habitat type	Marked	Bank Access	Date installed
Fireman's Cove	35.76502	-94.714122	2 large trees	Y	N	10/16/2019
Firemans cove	35.76502	-94.714122	1 large cedar	Y	N	10/9/2020
East side	35.76695	94.71011	11 cedars	Y	N	10/9/2020

Appendix II. Stilwell City Lake Recent Stockings

Year	Species	Number	Size
2001	Channel catfish	3762	7”
2016	Channel catfish	5000	7”
2019	Triploid Grass Carp	500	8-10”