

SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

PURCELL LAKE

2023

SURVEY REPORT

State: Oklahoma

Project Title: Purcell Lake Fish Management Survey Report

Period Covered: 2023

Prepared by: OFRL Research Biologists

Date Prepared: January 2024

Purcell Lake

ABSTRACT

Surveys of Purcell Lake were conducted in 2019 and 2023 for Largemouth Bass using standardized electrofishing, 2021 for Channel Catfish using hoop nets, and 2023 for crappie using modified fyke nets. Purcell Lake was surveyed by fall fyke netting in 2023 to monitor trends in fish populations. The fishery consists of Largemouth Bass, White Bass, various sunfish species, White Crappie, Channel Catfish and Flathead Catfish.

INTRODUCTION

Purcell Lake is located three miles southwest of Purcell on Chandler Rd. in McClain County, Oklahoma. The lake is a 157-acre impoundment with a maximum depth of 24 feet and a total water storage capacity of 2,600 acre-ft. It is classified as eutrophic with an average secchi disc visibility of around 57 cm. Fish habitat consists primarily of rip rap and submerged trees. Attempts were made to establish aquatic vegetation such as water willow at various sites around the lake with moderate success.

Primary management concerns are a severely stunted crappie population, as well as poor Channel Catfish recruitment. Largemouth Bass fry or fingerlings were stocked annually from 2012-2017. Channel Catfish were last stocked in 2014 (Appendix 1). Fish attractor sites have been constructed from brush piles to improve angler success and are periodically refurbished. Sites were most recently refurbished in December 2022. To see locations of fish attractor sites please visit: [Fish Attractors Map \(arcgis.com\)](https://arcgis.com). Purcell lake currently has city mandated 16-inch minimum length limit for Black (Largemouth) Bass and a 10-inch minimum length limit for Crappie (White or Black). Please see the statewide regulations for more information ([2023-24Regulations.pdf \(wildlifedepartment.com\)](#)).

Surveys of Purcell Lake were conducted in 2019 and 2023 for Largemouth Bass using standardized electrofishing, 2021 for Channel Catfish using hoop nets, and 2023 for crappie using modified fyke nets.

Aquatic Nuisance Species

There are no known ANS in Purcell.

RESULTS

Spring Bass Electrofishing

Largemouth Bass (LMB) were surveyed in spring of 2023 by means of boat electrofishing. Sampling occurred in accordance with the Oklahoma Department of Wildlife's Standard Sampling Procedures (SSP). During sampling the water temperature was 20° C (68° F), and the lake was approximately three feet below normal. The entirety of the shoreline was sampled for a total of twelve units of effort, and a total of 82 Largemouth Bass were sampled.

Median total length of all LMB sampled was 369 mm with a minimum length of 168 mm and a maximum length of 578 mm (Figure 1). Mean CPUE of LMB was 41.0 (26.9-55.1 95% CI), a standard error (SE) of 7.19 and a relative standard error (RSE) of 17.54 (Table 1). The mean CPUE of 41.0 is comparable to that of the CPUE obtained during the 2019 bass sampling period (40.5).

A total of 82 LMB were aged; ages ranged from 2 to 8 years. von Bertalanffy growth shows a theoretical maximum length (L_{∞}) of 539 mm TL, a growth coefficient (K) of 0.32, and a t_0 of 0.07 (Figure 2). A catch-curve regression calculated an annual mortality (A) of 26.7 % and an instantaneous mortality (Z) of 0.31 (Figure 3).

Table 1: Catch per unit effort of Largemouth Bass in Purcell City Lake by size category.

Species	Size Category	Mean	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
LMB	sub stock	0.5	100	.5	-0.48	1.48	768	300
LMB	stock	8.0	21.32	1.71	4.66	11.34	35	14
LMB	quality	13.5	34.22	4.62	4.45	22.55	90	35
LMB	preferred	17.0	19.83	3.37	10.39	23.61	30	12
LMB	memorable	2.0	56.41	1.13	-0.21	4.21	244	95

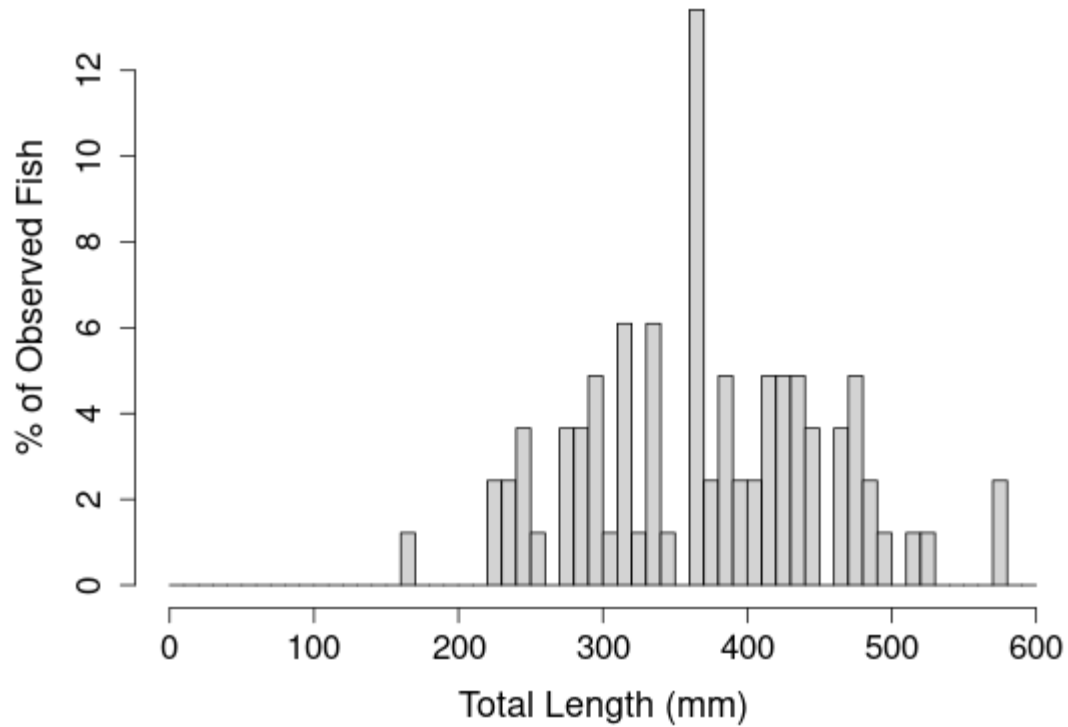


Figure 1: Length-frequency distribution of Largemouth Bass in Purcell City Lake.

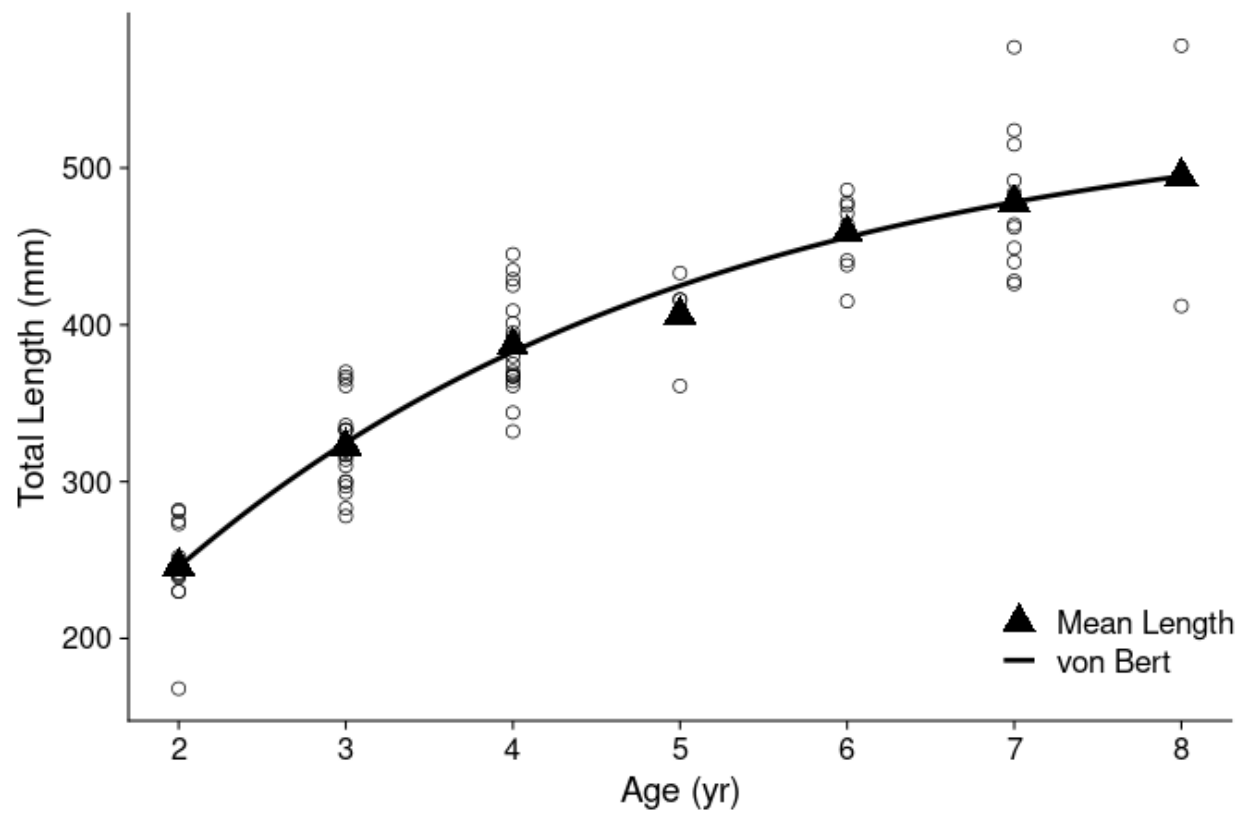


Figure 2: von Bertalanffy growth curve for Largemouth Bass in Purcell City Lake.

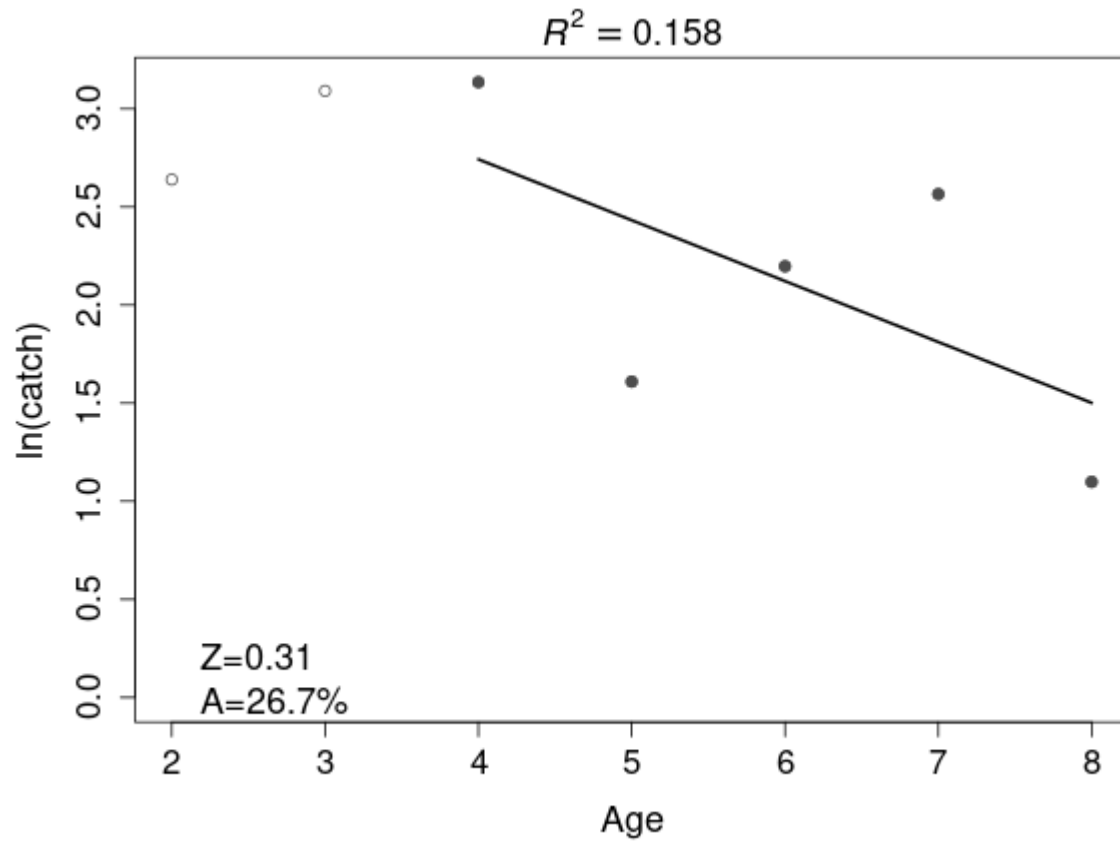


Figure 3: Catch curve for Largemouth Bass in Purcell City Lake.

Crappie

Crappie were surveyed in 2023 using modified fyke nets between the dates of October 17th and 19th, 2023. The average water temperature was 16.7 C and water levels were normal. Sites were randomly chosen as specified by SSP for a total of 354 hours of effort resulting in the capture of 1083 White Crappie. No Black Crappie were observed during sampling.

The mean TL of White Crappie sampled was 128 mm with a minimum length of 32 mm and a maximum length of 363 mm (Figure 1). The mean CPUE of White Crappie was 74.5 (40.3-108.8 95% CI) with a standard error (SE) of 17.5 and a relative standard error (RSE) of 23.5 (Table 1). The mean CPUE by size category was highest for sub-stock (17.99) and stock (53.9) sized crappie (Table 1).

A total of 194 crappie were aged; age classes included fish of ages-0 to -7 with 95% of fish being between 1 and 4 years old. The mean TL was 108 mm at age-0, 133 mm at age-1, 144 mm at age-2, 149 mm at age-3, and 162 mm at age-4. The overall relative weight (Wr) was 85.5 with relative weights of all size categories above the 75th percentile (Table 2). von Bertalanffy predicted a theoretical maximum length (L_{∞}) of 408 mm TL, a growth coefficient (K) of 0.04, and a t_0 -8.35 (Figure 2). A catch-curve regression calculated an annual mortality (A) of 55.6% and an instantaneous mortality (Z) of 0.8 (Figure 3).

RECCOMENDATIONS

1. Recommend to the City of Purcell to remove the minimum length limit on Crappie spp., and to change Largemouth Bass regulations to match those put out by ODWC.
2. Continue to monitor population dynamics for sportfish species (Largemouth, Sunfish Spp., Catfish Spp.).

Table 1. Catch per unit effort (CPUE) of White Crappie in Purcell Lake.

	Mean	Count	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Purcell Lake								
Total	74.5	15	23.5	17.5	40.3	108.8	53	21
Substock	17.99	-	23.5	4.2	9.7	26.3	53	21
Stock	53.9	-	26.7	14.4	25.7	82.2	69	27
Quality	1.4	-	32	0.5	0.5	2.3	98	38
Preferred	0.8	-	27.5	0.2	0.4	1.4	72	28
Memorable	0.3	-	48.9	0.2	0.0	0.7	230	90

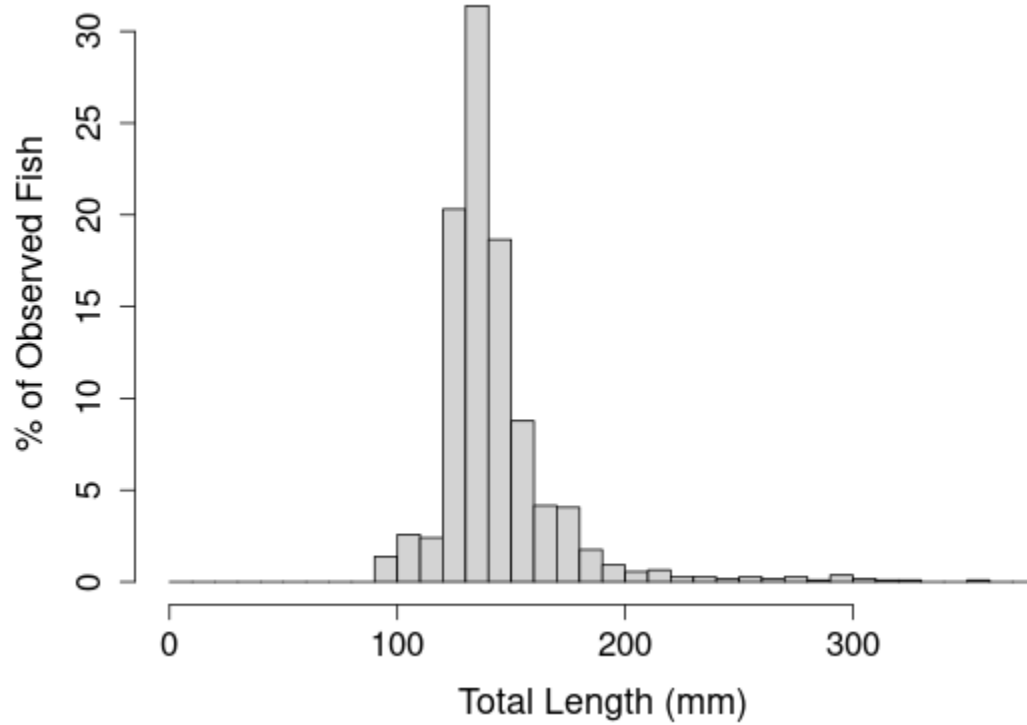


Figure 1. Length-frequency distributions of White Crappie from Purcell Lake.

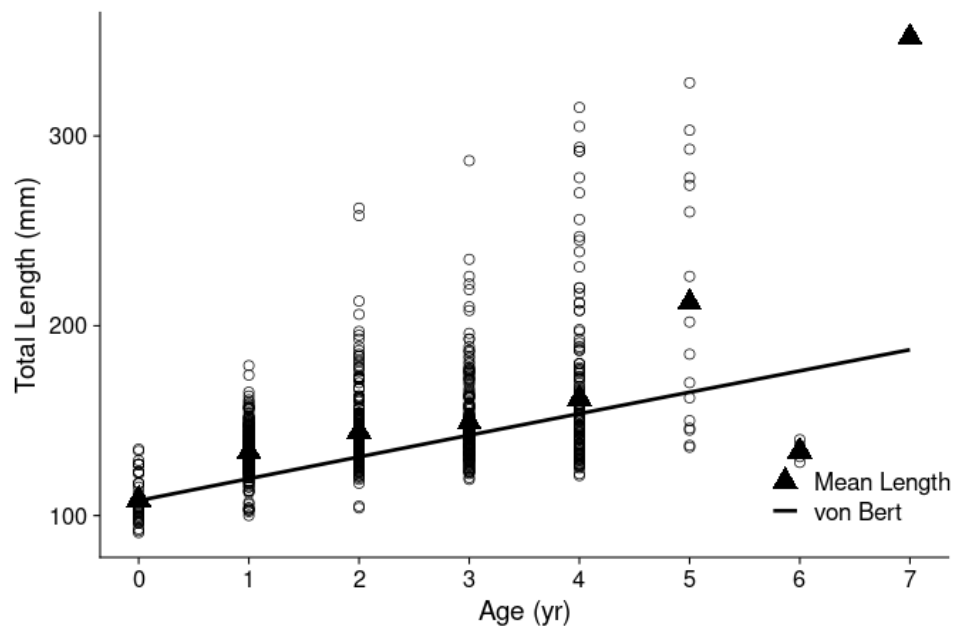


Figure 2. von Bertalanffy Growth Curve for White Crappie from Purcell Lake.

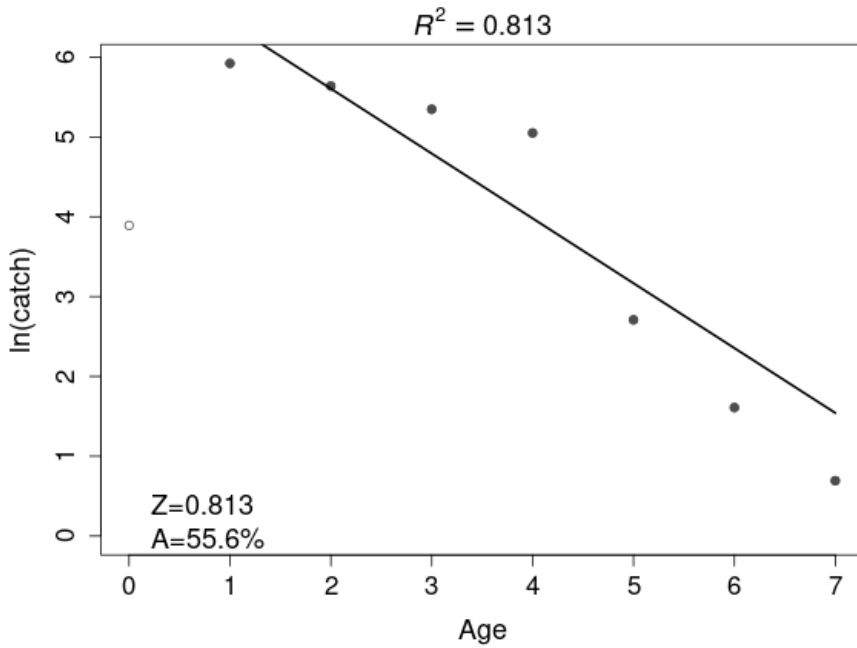


Figure 3. Catch curve for White Crappie from Purcell Lake.

Appendix 1: Species, number, and size of fish stocked in Purcell City Lake since 2012.

Date	Species	Number	Size (inches)
2012	Florida Largemouth Bass	15,000	1.5
2013	Florida Largemouth Bass	50,000	fry
2013	Florida Largemouth Bass	100,000	0.5
2014	Florida Largemouth Bass	50,000	0.5
2014	Channel Catfish	600	7
2015	Florida Largemouth Bass	75,000	fry
2016	Florida Largemouth Bass	75,000	fry
2017	Florida Largemouth Bass	75,000	1.5
2023	Florida Largemouth Bass	61,230	0.5