SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

GREENLEAF LAKE

2022

SURVEY REPORT

State: Oklahoma

Project Title: Greenleaf Lake Fish Management Survey Report

Period Covered: 2022

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Greenleaf Lake

ABSTRACT

Greenleaf Lake was surveyed by spring boat electrofishing and fall shad netting techniques to monitor trends in fish populations. Survey results indicate a moderate to high abundance of largemouth bass with a Catch per unit effort (CPUE) of 105.2 bass per hour, which is slightly lower than the 2019 survey results. Age data was collected on largemouth bass and showed relatively slow growth. Shad netting results showed good gizzard shad abundance while no threadfin shad were captured in the survey. Recommendations include surveying Greenleaf via boat electrofishing in 2025 and shad netting as needed. New largemouth bass regulations of 6 bass/day and no minimum size restrictions with only 1 fish greater than 16” were applied statewide in the fall of 2022.

Introduction

Greenleaf Lake is a 920 acre reservoir located three miles south of Braggs, in Muskogee County in eastern Oklahoma. The reservoir impounds Greenleaf Creek approximately 1.5 miles above its confluence with the Arkansas River. The reservoir was impounded in 1939 by the United States Army as a water supply lake for Camp Gruber. Since, Greenleaf Lake has been leased to the State of Oklahoma, and its classified purpose is recreation. Access includes 1 boat ramp, a marina, a year round heated fishing dock and an open air fishing dock. Several amenities are available through the state park such as camping sites, restrooms, hiking trails etc..

The major sport fish in Greenleaf Lake include largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), white bass (*Morone chrysops*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), and flathead catfish (*Pylodictis olivaris*). The primary forage species include bluegill (*Lepomis macrochirus*), threadfin shad (*Dorosoma petenense*), and gizzard shad (*Dorosoma cepedianum*). The fish stocking history for Greenleaf Lake is included in Appendix 1. Special fishing regulations which apply to Greenleaf Lake include: Channel and/or blue catfish have a combined limit of six per day, and only one blue catfish over 30 inches.

Shoreline habitat in Greenleaf Lake is primarily comprised of aquatic vegetation, rock, and woody debris. Water willow and coontail comprise the bulk of the aquatic vegetation; however, many other species are present. Additional habitat includes man-made structures such as brush piles, spider blocks, and boat docks. The north end of the lake offers some standing timber, but most of it has rotted since impoundment. The ODWC has established and maintained brush piles on Greenleaf Lake. These brush piles are refurbished with cedar trees and/or spider blocks when needed. Locations of brush piles are shown in Appendix 2.

RESULTS

Largemouth Bass

Largemouth Bass (LMB) were surveyed in the spring of 2022 via boat electrofishing. Randomly selected shoreline units were sampled. Overall LMB abundance, measured by CPUE, has varied over the years and the 2022 sample showed a slight decrease from the previous sample, though not significant (Table 1). The 2022 overall catch rate of 105 bass per hour shows moderate to high abundance. Bass size structure for 2022 sample shows good size structure with fish in the 13-16 inch range comprising 51% of the sample. This should translate into stable preferred and memorable size classes for the next few years. Relative weights were above acceptable ranges in all size classes inferring that intraspecific competition for resources does not appear to be occurring (Table 1). PSD values increased significantly in the PSD-Q range, reinforcing the possibility of quality bass fishing on Greenleaf for the next few years. A high PSD-Q indicates an increased proportion of quality size fish (Table 2).

Age data was collected on a subset of bass in the 2019 and 2022 surveys. LMB growth was moderate to slow taking around 4 years to reach 14" (Table 3). Even with the slow growth, bass did not stockpile in any given size class. With the new harvest oriented regulation, slower growth is less of an issue since there is no minimum size restriction. Age frequencies show strong 3 and 5 year old classes of bass, which are the fish in the quality and preferred size ranges.

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Largemouth bass collected by spring electrofishing from Bell Cow 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
2016	496	148.8	26.7	38.7	89.9	44.4	90.3	36.3	84.4	2.7	87.5	.	.
2019	375	112.5	20.7	33	93.5	18.3	92	38.4	93.8	2.1	94	.	.
2022	263	105.2	9.6	16.4	90	33.6	93	43.6	92.1	2	90.8	.	.

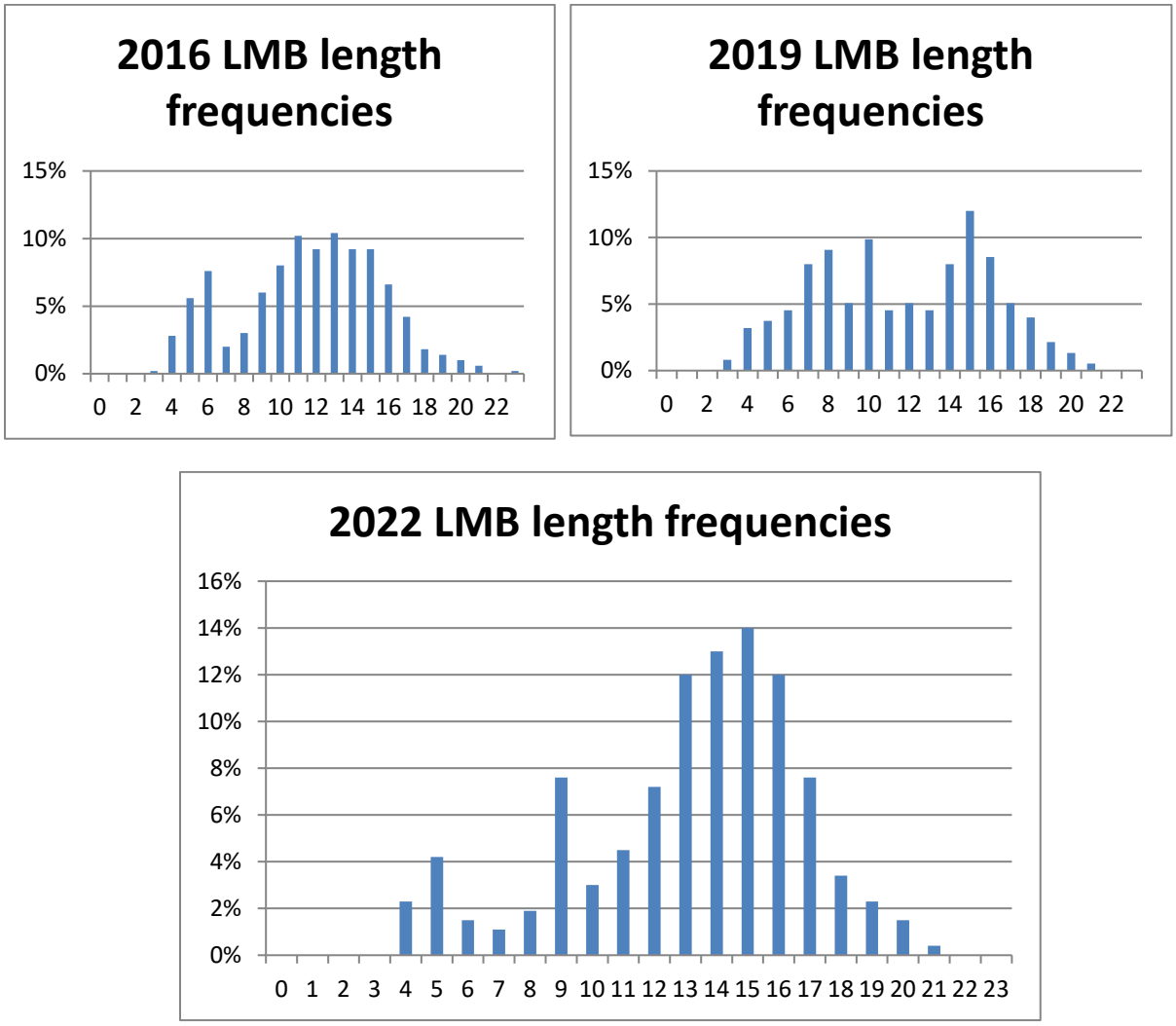

Figure 1. 2016, 2019 and 2022 Length frequency Largemouth bass

Table 2. Proportional Size Distribution (PSD) of Largemouth bass. Quality (PSD-Q), preferred (PSD-P) and memorable (PSD-M) lengths. PSD values indicate the proportion of fish in or above the quality, preferred or memorable size classes.

Year Surveyed	PSD-Q (11.8 in)	PSD-P (15 in)	PSD-M (20.1 in)
2016	68	32	2
2019	64	44	2
2022	83	48	2

Table 3. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for Largemouth bass from Greenleaf Lake.

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	L inf.
2019	6.7	10.1	13.6	15.1	16.7	16.5	17.1	20.3	.	.	.	.	21.1
2022	5.6	9.2	11.6	14.7	15.4	16.7	17.3	19.1	19	17.2	.	20.1	20.6

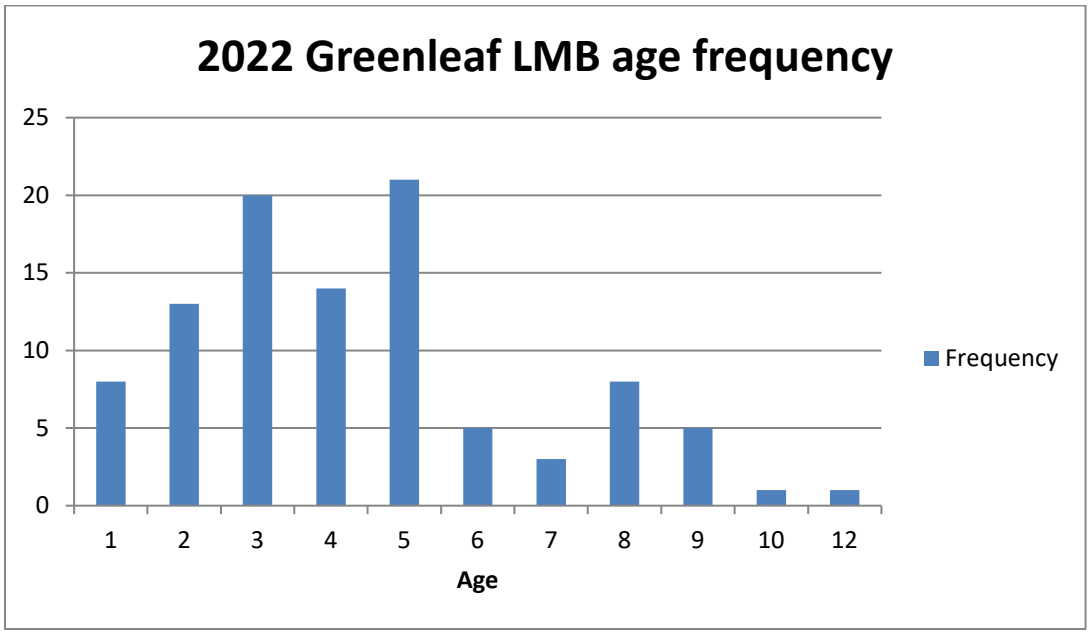

Figure 2. 2022 Age Frequency for LMB

Spotted Bass

Spotted bass were collected alongside LMB during the 2022 spring electrofishing survey of Greenleaf. Spotted bass abundance in Greenleaf is much lower than Largemouth. The 2022 survey had a total catch rate of 4.4 bass per hour (Table 4). Spotted bass are not protected under statewide rules by any creel or size restrictions. This open harvest management strategy is designed to facilitate low spotted bass numbers to increase largemouth prey availability and growth.

Table 4. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Spotted bass collected by spring electrofishing from Greenleaf Lake. Acceptable Wr values are ≥90.

		Total CPUE	Substock 0-7.1 in	Stock 7.1		Quality 11 in.		Preferred 13.8 in		Memorable 16.9 in	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2016	9	2.7	0.3	0.6	91.7	1.5	86.6	0.3	78.9		
2019	32	9.6	.	3.6	103.6	4.5	100	1.5	83	.	.
2022	11	4.4	0.4	2.4	92	1.2	91	0.4	77	.	.

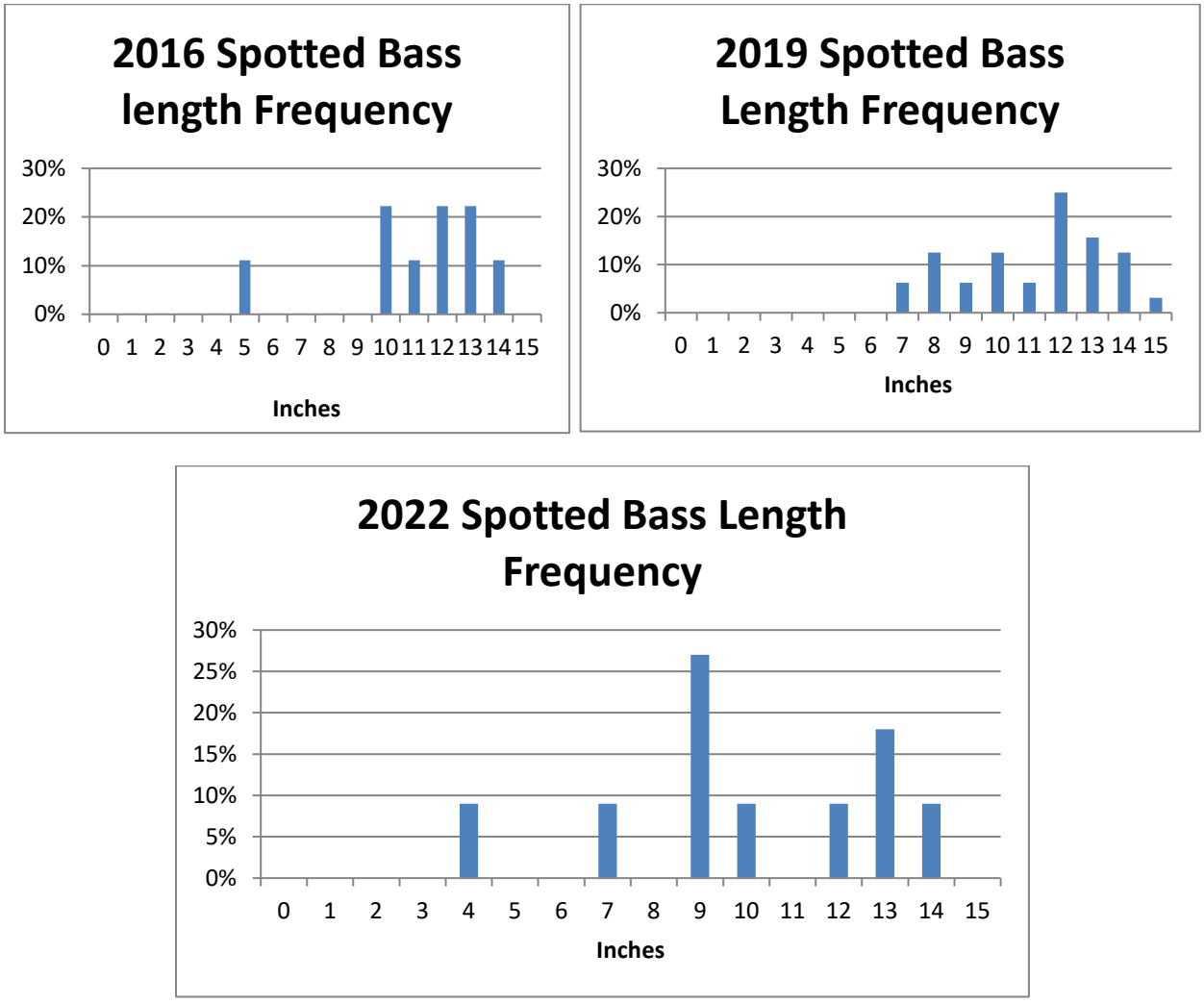

Figure 3. Spotted Bass Length Frequencies Greenleaf 2016,2019 and 2022 surveys

Shad

Gizzard and Threadfin shad were sampled by suspended gill nets in 2022. Ten stations were randomly sampled for a period of 24 hours during each surveys. Gizzard shad catch in the 2022 survey was significantly higher than the 2010 survey while Threadfin shad catch dropped to zero (Tables 5&6). Threadfin are occasionally stocked in Greenleaf but are prone to leaving the system or die-offs due to cold weather. Threadfin shad stocking should be considered if gizzard shad numbers decline or size structure changes at next survey. All gizzard shad caught in the 2022 survey fell below 6 inches. Optimal forage size for most species is six inches or less.

Table 5. Gizzard shad catch rates Greenleaf

Year	No.	Total CPUE	<6 inches	≥6 inches
2009	67	16.8	16.8	.
2010	4	1	1	.
2022	464	47.2	47.2	.

Table 6. Threadfin shad catch rates Greenleaf

Year	No.	Total CPUE
2009	85	21.3
2010	97	24.3
2022	.	.

Appendix I. Greenleaf Stocking history

Species	Year	Number	Description
Largemouth Bass	1942	10,000.00	Unknown
Largemouth Bass	1945	11,400.00	Unknown
Largemouth Bass	1945	50,000.00	Fry
Largemouth Bass	1947	900.00	Unknown
Largemouth Bass	1948	500.00	Unknown
Largemouth Bass	1958	1,500.00	Unknown
Largemouth Bass	1967	2,525.00	Unknown
Largemouth Bass	2017	54.00	Retired FLMB Brooders
Sunfish Sp.	1941	37,000.00	Unknown
Sunfish Sp.	1945	12,000.00	Unknown
Sunfish Sp.	1947	100.00	Unknown
Sunfish Sp.	1948	5,000.00	Unknown
Sunfish Sp.	1951	10,450.00	Unknown
Sunfish Sp.	1952	5,000.00	Unknown
Sunfish Sp.	1956	250.00	Unknown
Sunfish Sp.	1958	4,500.00	Unknown
Walleye	1953	100,000.00	Fry
Walleye	1984	50,000.00	Fry
Northern Pike	1966	500,000.00	Fry
Northern Pike	1976	24,735.00	Unknown
Hybrid Striped Bass	1980	100,000.00	Fry
White Bass	1941	6,000.00	Unknown
White Bass	1948	105.00	Unknown
White Bass	1951	62.00	Unknown
Crappie Sp.	1941	500.00	Unknown
Crappie Sp.	1947	50.00	Unknown
Threadfin Shad	1967	1,500.00	Brooders
Threadfin Shad	1975	10,500.00	Brooders
Threadfin Shad	1976	2,750.00	Brooders
Threadfin Shad	1995	200.00	Brooders
Threadfin Shad	1998	2,000.00	Brooders
Threadfin Shad	2005	2,450.00	Brooders
Threadfin Shad	2007	1,200.00	Brooders
Threadfin Shad	2009	1,000.00	Brooders
Threadfin Shad	2010	1,000.00	Brooders
Threadfin Shad	2011	1,500.00	Brooders
Threadfin Shad	2012	1,500.00	Brooders
Threadfin Shad	2015	1,500.00	Brooders
Channel Catfish	1941	3,000.00	Unknown
Channel Catfish	1942	15,000.00	Unknown
Channel Catfish	1945	15,000.00	Unknown
Channel Catfish	1947	10,000.00	Unknown

Channel Catfish	1952	2,000.00	Unknown
Channel Catfish	1956	17,000.00	Unknown
Channel Catfish	1958	1,500.00	Unknown
Channel Catfish	1967	30,021.00	8-10"
Channel Catfish	1970	163,240.00	Unknown
Channel Catfish	1976	10,000.00	6"
Channel Catfish	1977	18,400.00	9"
Channel Catfish	1978	46,000.00	3"
Channel Catfish	1981	23,001.00	4"
Channel Catfish	1982	92,000.00	4.5"
Channel Catfish	1983	66,020.00	5-6"
Channel Catfish	1984	100,310.00	3"
Channel Catfish	1988	96,330.00	4"
Channel Catfish	1989	100,000.00	3"
Channel Catfish	1997	26,481.00	6.5"
Channel Catfish	2010	20,513.00	7"
Channel Catfish	2021	45,000.00	3"

Appendix II. Greenleaf habitat types and locations

Habitat Type	Latitude	Longitude	Depth	Date
7 large cedar trees	35.621166	-95.157274	18	10/11/2016
7 large cedar trees	35.638127	-95.150862	12	10/11/2016
6 large cedar trees	35.622019	-95.163957	11	10/11/2016
2 cedar trees	35.621498	-95.165554	8	10/11/2016
2 cedar trees	35.619518	-95.166669	10	10/11/2016
8 large cedar trees	35.621166	-95.157274	18	10/7/2019
3 large cedar trees	35.638127	-95.150862	12	10/7/2019
4 large cedar trees	35.622019	-95.163957	11	10/7/2019
2 large cedar trees	35.62116	-95.157274	18	2/14/2022
3 huge cedars	35.62711	-95.1622	22	2/14/2022
7 large cedars	35.63792	-95.15156	15	2/14/2022