SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

GREENLEAF LAKE

2024

SURVEY REPORT

State: Oklahoma

Project Title: Greenleaf Lake Fish Management Survey Report

Period Covered: 2024-2025

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Greenleaf Lake

ABSTRACT

Greenleaf Lake was surveyed in 2024 by fall trap netting for White and Black Crappie to monitor age and growth of crappie populations. Catch rates for crappie (C/f = 3.41) have remained consistent with recent samples and White Crappie dominated the sample. Growth rates are difficult to calculate accurately as most fish collected were two-year olds of various sizes, and very few fish of other ages were sampled.

Greenleaf Lake was surveyed in 2024 by fall gill netting to monitor pelagic sportfish populations within the lake. Too few Crappie were caught in gill nets (N = 7) to make any reliable population estimates. Channel catfish caught by fall experimental gill netting were consistent with recent samples, but still too few (N = 6) to make any reliable population estimates. Gizzard shad were the only shad species collected in the gill nets and remain the dominant forage base for sportfish in Greenleaf Lake. Fall gill netting should no longer be considered a reliable method for sampling sportfish in Greenleaf Lake for the foreseeable future.

A one-year creel survey will be conducted from December 2024 to November 2025 to determine angling pressure and angler attitudes and opinions on sportfish management and fishing opportunities in Greenleaf Lake. Results from that survey will be considered along with recent fish sampling results to determine future management decisions for the lake.

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 Table 6. 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 Table 7.

RESULTS

White and Black Crappie

1. White and Black Crappie were sampled by fall trap netting in 2024 to determine catch rates (CPUE or C/f), and otoliths were pulled from a subsample of fish and analyzed to determine age and growth rates for the population.
2. Total Crappie CPUE from trap nets was 3.41 and consistent with most recent surveys. White Crappie dominate the population with a CPUE of 2.33 (N = 55), and Black Crappie were much less abundant with a CPUE of 1.09 (N = 26).
3. Relative weights for all size classes were poor (Table 1) and seem to indicate a potential forage availability problem.
4. Two-year old fish dominated the sample (N = 46) and had a mean length of 230 mm (9 inches; Table 2). The oldest fish in the sample were five-years old (N = 3) with a mean length of 369 mm (14.5 inches).
5. Growth rates for Crappie is difficult to determine due to lack of fish sampled at different ages, but growth is assumed to be slow overall (Figure 3).
6. The most recent shad sample had zero Threadfin Shad caught in the sample, and Gizzard shad were the predominant forage for sportfish in Greenleaf Lake (Tables 4 and 5). This could indicate a limited forage of small enough size for Crappie to utilize and achieve proper growth.

Channel Catfish

1. Channel Catfish were samples by fall experimental gill netting in 2024 to determine catch rates (CPUE or C/f) and body condition (W_r).
2. Total CPUE for Channel Catfish was 1.43 (N=6) with the smallest fish being 17 inches and the largest being 20 inches. Catch rates are consistent with recent samples (2018 and 2021; Table 2, Figure 4).
3. Even with the most recent stocking of 45,000 3-inch Channel Catfish in 2021 (Table 6), there seems to be poor recruitment with very few fish surviving to a catchable size and contributing to the fishery.
4. With the history of Channel Catfish stockings and consistent low catch rates, Greenleaf Lake should not be considered a successful Channel Catfish fishery.

Shad

1. Gizzard and Threadfin Shad were sampled by suspended, floating gill nets in 2022. Ten stations were randomly sampled for a period of 24 hours during each survey.
2. Gizzard shad catch in the 2022 survey was significantly higher than the 2010 survey while Threadfin shad catch dropped to zero (Tables 5&6).
3. Threadfin Shad 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.

RECOMMENDATIONS

Fish Attractor Structures

1. Habitat structures should be refurbished every three to four years and buoys checked annually. Shelbyville Cubes will be constructed and placed in 2025, or as soon as materials are made available.

Fish Stockings

1. Threadfin Shad should be stocked in spring of 2025 to supplement the forage base for sportfish. Threadfin populations should be monitored and restocked as needed to try to improve Crappie and other sportfish relative weights.

Fish Surveys

1. Spring boat electrofishing surveys should be conducted in 2025 or 2026 as conditions allow to continue monitoring changes in the overall black bass populations and to monitor impact of new statewide bass regulations that were passed in 2022.
2. Age data from Largemouth Bass should be taken to monitor growth rates within the lake.

Fishing Regulations

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.
2. All other fish species fall under statewide regulations.
3. No new regulation changes are recommended at this time.

Table 1. Catch rats (C/f) and relative weights (W_r) for Crappie caught by fall trap netting in Greenleaf Lake.

	Total (≥25)		**≥5 in.** (10-40)		**≥8 in.** (≥10)		**≥10 in.** (≥4)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr
1986	88	32.4	26.4	92	11.04	88	0.48	78
1990	281	21.6	18.48	89	4.32	90	1.2	92
1991	426	30.48	27.36	90	4.56	93	1.44	97
1992	89	7.44	7.44	83	0.84	84	0	---
1993	436	20.16	16.08	91	2.64	90	0.72	94
1994	392	28.8	26.4	87	7.44	88	1.92	94
1998	389	12.96	12.96	95	10.56	96	4.56	96
1999	143	4.32	3.36	92	2.64	91	1.2	93
2009	26	1.2	1.2	88	0.96	89	0.48	88
2010	28	1.92	1.2	83	0.96	81	0.576	82
2016	52	2.61	2.61	86	1.8	88	0.74	86
2019	92	3.32	2.25	89	1.14	88	0.69	87
2024	81	3.41	3.41	87	2.16	86	0.8	86

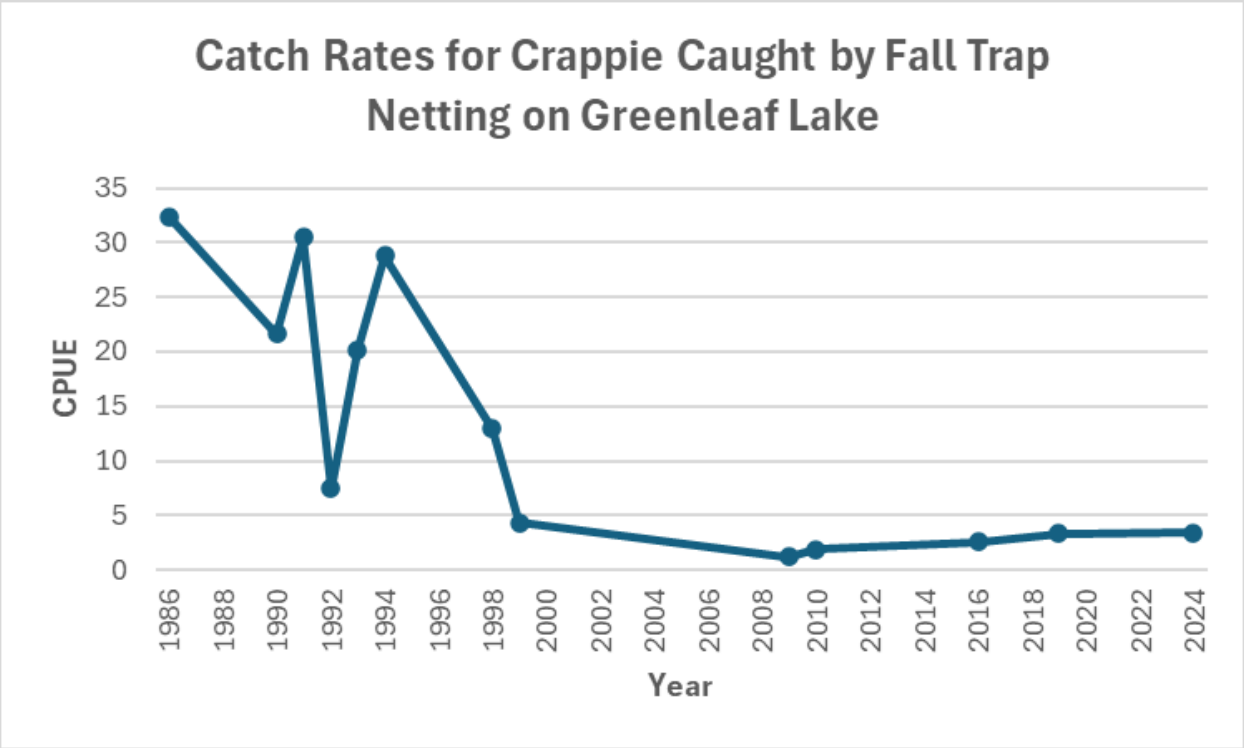

Figure 1. Total crappie catch rates from fall trap netting on Greenleaf Lake, 1986-2024.

Table 2. Mean length at age for White Crappie caught by trap netting from Greenleaf Lake in fall of 2024 (OFAT analysis).

Age	Mean TL	Count	CV	SE	L 95% CI	U 95% CI
2	229.9	46	16.3	5.5	219.0	240.7
3	344.0	1	NA	NA	NA	NA
4	332.8	5	7.2	10.7	311.9	353.7
5	368.7	3	4.4	9.4	350.3	387.1

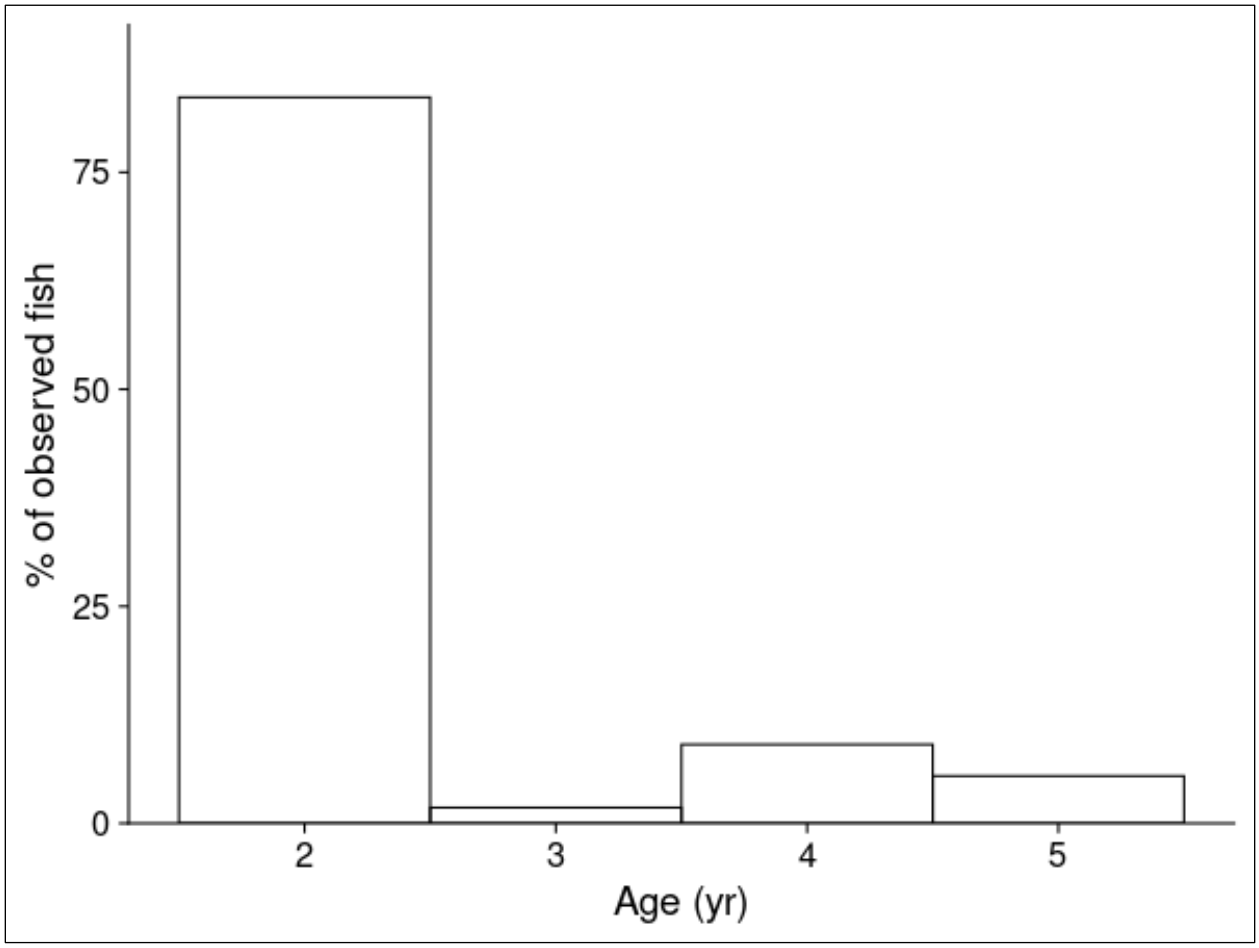

Figure 2. Ages of observed and aged White Crappie caught by trap netting Greenleaf Lake in fall of 2024.

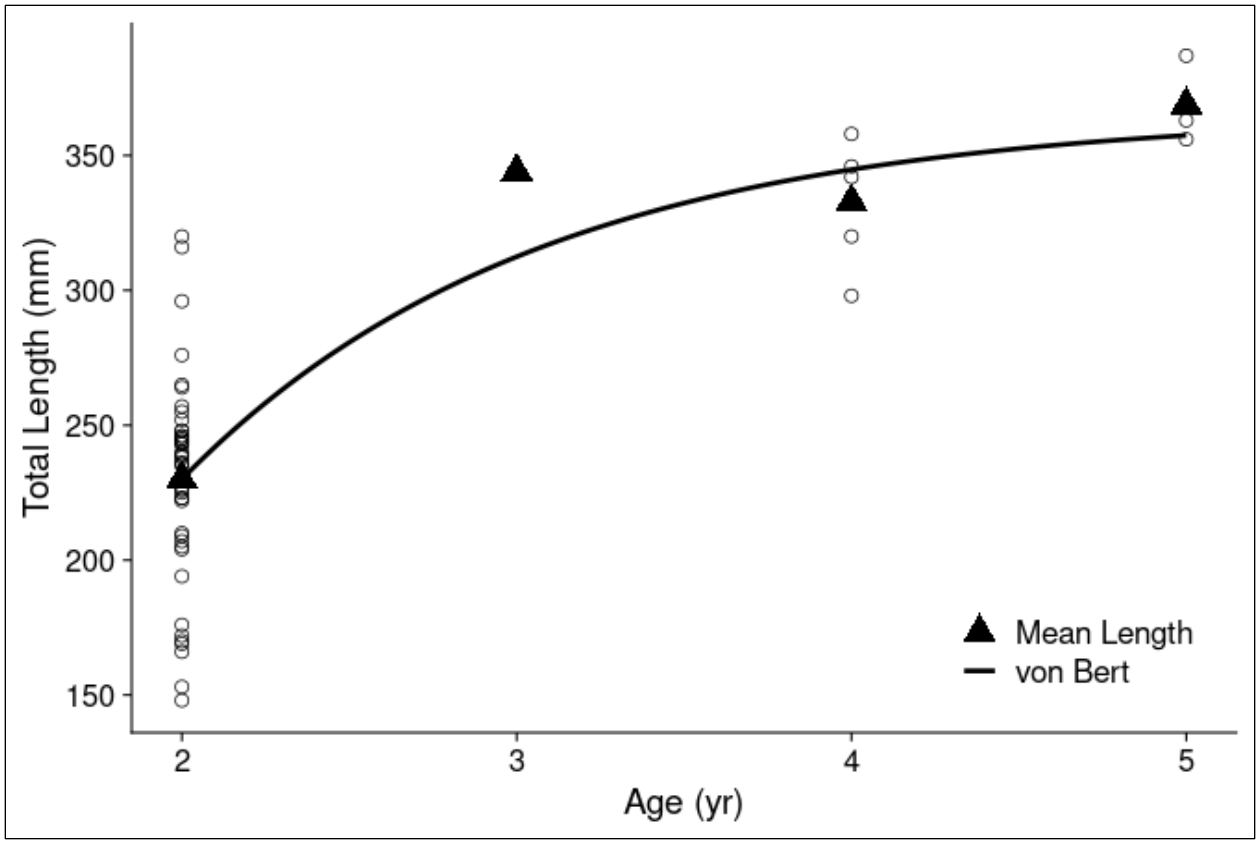

Figure 3. Von Bertanlanfy Growth Curve for Crappie caught by trap netting from Greenleaf Lake fall of 2024 (OFAT analysis).

Table 3. Catch rats (C/f) and relative weights (W_r) for Channel Catfish caught by fall experimental gill netting in Greenleaf Lake.

	Total (≥25)		**<12 in.** (10-40)		**>12 in.** (≥10)		**≥16 in.** (≥4)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr
1988	31	5.04	1.44	120	3.6	90	1.2	84
1989	66	8.88	5.52	99	3.12	94	2.4	94
1992	11	2.4			2.4	87	2.4	87
1999	32	6.48	0.24	86	6.48	91	3.36	94
2014	11	2.64			2.64	91	2.64	91
2018	5	1.09	0.22	98	0.87	89	0.87	89
2021	8	0.96			0.96	-	0.96	-
2024	6	1.43			1.23	94	1.23	94

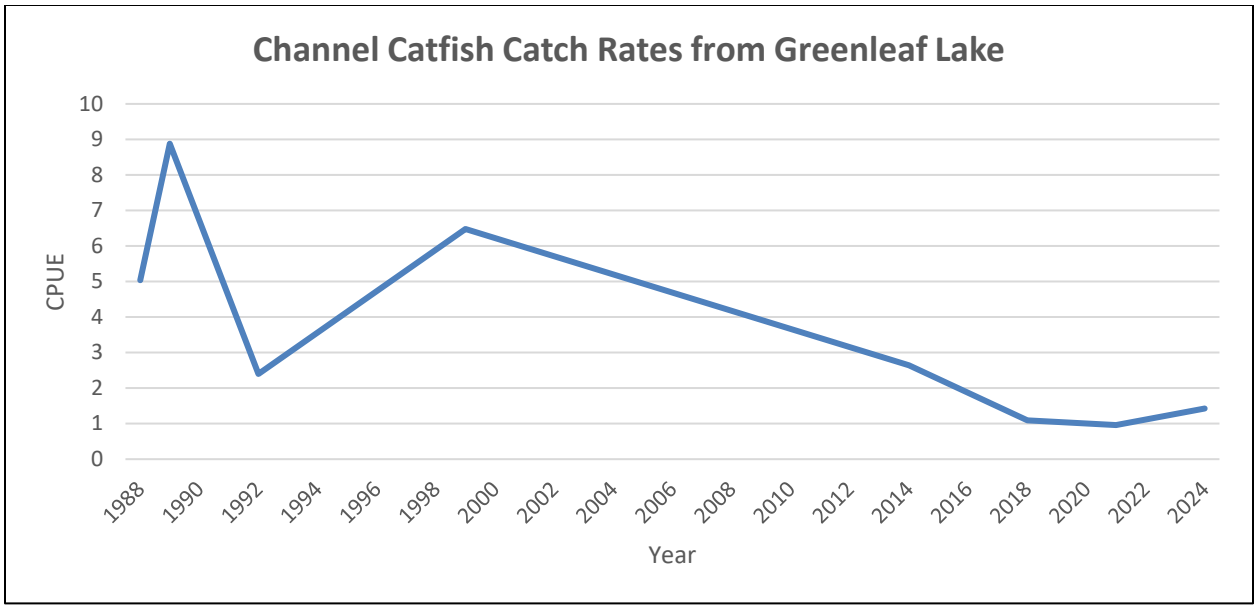

Figure 4. Total Channel Catfish catch rates (CPUE) caught from Greenleaf Lake by fall experimental gill netting, 1988-2024.

Table 4. Gizzard Shad catch rates Greenleaf using floating shad nets.

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 5. Threadfin Shad catch rates Greenleaf using floating shad nets.

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

Table 6. 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"

Table 7. 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