SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

LAKE KEYSTONE

2024

SURVEY REPORT

State: Oklahoma

Project Title: Oklahoma Fisheries Management Program

Study Title: Surveys and Recommendations-Keystone Reservoir

Period Covered: 1 January 2024 - 31 December 2024

Prepared by: Colby Gainer

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LAKE KEYSTONE

ABSTRACT

Lake Keystone was sampled by spring electrofishing in 2022 and fall gillnetting in 2024 to determine fish population trends for Largemouth Bass, Crappie, Channel Catfish, Blue Catfish, White Bass, and Striped Bass. Shad populations were also sampled by fall gill netting to assess the forage base for the sportfish in Keystone Lake. Largemouth Bass populations remain just above the threshold of a quality fishery. Crappie populations dipped below the threshold for a quality fishery. White Bass, Striped Bass, Channel Catfish, and Blue Catfish populations were all well above the threshold for quality fisheries. No major Striped Bass fish kills were observed in 2022, 2023 or 2024. Water quality profiles were conducted throughout the months of June through September to monitor conditions that can affect Striped Bass health. No Striped Bass kills occurred during the summer of 2024. Current statewide regulations for all sportfish should remain in effect for Lake Keystone.

INTRODUCTION

Lake Keystone impounds the Arkansas and Cimarron Rivers, 25 km west of Tulsa in Osage, Pawnee and Creek Counties, Oklahoma (Figure 1). Keystone Lake covers 10,530 surface hectares and was constructed in 1964 by the U.S. Army Corps of Engineers. Keystone Lake has a mean depth of 7.7 m and a maximum depth of 23.3 m, a shoreline development ratio of 14.5, and a secchi disc visibility of around 24 inches in the main pool in April; turbidity is primarily from both suspended clay and plankton. Fish habitat consists primarily of extensive lengths of shoreline of either sand or rock. Major fisheries include Channel Catfish, Blue Catfish, White Bass, Striped Bass, Crappie, and Largemouth Bass. Angling pressure appears to be high due to the proximity to the Tulsa metropolitan area. A high water exchange rate (8.4:1), widely fluctuating water levels and high seasonal turbidities have had negative impacts especially on Largemouth Bass and Striped Bass fisheries resulting in low natural recruitment and/or emigration losses. However, Crappie, White Bass, catfish species, and forage fish (primarily gizzard shad) have generally had a trend of high abundance with some cyclic variations.

Since 2014, the Wildlife Department has placed over 80 brush pile habitat structures throughout the lake consisting primarily of cedar trees. Locations for these structures can be found on the ODWC Interactive Fish Attractor Map that can be accessed through the ODWC website, wildlifedepartment.com. Due to the dramatic water fluctuations that can happen at Keystone Lake, no buoys are used for marking habitat locations on the water.

In 2022, the 14-inch minimum rule for Largemouth and Smallmouth Bass was removed and replaced by allowing anglers to keep 6 bass total, but only one fish over 16 inches. This is to allow anglers to harvest the more abundant, smaller fish while preventing the over harvest of larger fish.

A research project completed in 1992 was designed to assess the suitability of Keystone Reservoir for habitat ion by adult striped bass. This project was precipitated by the late summer die-off's of adult striped bass. Based on the findings of this research, the U.S. Army Corps of Engineers has modified procedures for floodwater releases beginning in March 1989, in an attempt to improve water quality, and hence, reduce the frequency of these mortality events. However, the USACE no longer operates the dam in that manner as it caused corrosion and damage to federal property and equipment downstream of the dam. Summer Striped Bass fish kills are still an annual concern. Regional managers regularly monitor water quality within the lake during the summer months to try to predict when a die-off might occur. The Last documented Striped Bass die-off was in August of 2021.

Keystone Reservoir was sampled in 2022 by spring electrofishing to evaluate the status of black bass populations. It was also sampled by fall gill netting to evaluate the status of Striped Bass, White Bass, Channel Catfish, Blue Catfish, and White Crappie fisheries. Water quality surveys were performed in the summer months of 2022 and 2023 to monitor conditions that may affect Striped Bass health and potential die-offs.

RESULTS

Largemouth Bass

1. Largemouth Bass abundance from spring boat electrofishing in 2022 (C/f = 45.63) was down slightly from the previous survey in 2018 but still above the threshold for a quality fishery (Table 1).
2. Relative weights (W_r) were very good for all length groups larger than eight inches and consistent with previous surveys.
3. Recruitment of largemouth Bass is known to fluctuate dramatically between samples, most likely because of the dramatic water fluctuations that occur in Lake Keystone for flood control during the spring spawning season. Bass populations have fluctuated significantly since the earliest sample recorded in 1989.
4. Since favorable habitat for bass is sparse within the reservoir, spring sampling is conducted at fixed sites where bass are most likely to be encountered.
5. Spring electrofishing for Largemouth Bass should continue every two to three years to continue monitoring population trends.

Crappie

1. Crappie abundance from 2024 fall gillnetting (C/f = 4.37) was below the minimum acceptable value for a quality fishery (C/f = 4.8). The total crappie C/f is significantly higher than last sample but following a similar historical trend (Figure 6).
2. Relative weight overall was 107 and is classified as very good. Body condition values (W_r) were average for stock sized crappie (W_r = 86) and excellent for fish greater than stock sized (Table 6). Condition values for all size groups have been generally stable in recent samples.
3. Recruitment of crappie is known to fluctuate dramatically between samples, most likely because of the dramatic water fluctuations that occur in Lake Keystone for flood control during the spring spawning season.
4. Fall gill netting should continue every other year to continue monitoring population trends for White Crappie. Trap netting for White Crappie should be done in 2025 to determine age and growth rates.

White Bass

1. White Bass abundance from 2024 fall gill netting (C/f = 11.58) was well above the minimum acceptable value for a quality fishery (C/f ≥ 4.8). The total White Bass C/f has been cyclic but has generally remained above the acceptable value for a quality fishery in recent sample years (Table 9).
2. Body condition values (W_r) were satisfactory for all size groups. Condition values have been stable in recent samples.
3. Many individuals are reaching preferred and larger sizes, with good relative weights.

4. Abundance, size structure and condition values indicated the presence of a good White Bass fishery in the fall of 2024.
5. Fall gill netting should continue every other year to continue monitoring population trends for White Bass.

Striped Bass

1. The total Striped Bass abundance has remained stable in recent sample years (C/f = 2.86; Table 10).
2. The abundance of Striped Bass at stock size was consistent in recent samples showing stable recruitment. Fish greater than stock size was relatively unchanged when compared with recent catch rates while no individuals were collected over quality size.
3. Body condition values (W_r) were below average for all sizes in 2024.
4. Although abundance and size structure has improved over the past few years, striped bass numbers continued to be too low to represent a quality fishery. Emigration of fish downstream during high water outflows and occasional thermal related die-offs in the lake proper are probably the controlling factors regulating striped bass abundance in Keystone Lake.
5. Striped bass young-of-year are sampled annually as lake levels allow to assess spawning success. Catch rates in 2022 and 2023 (C/f = 55.37 and C/f = 2.3, respectively) were dramatically lower than the previous samples in 2020 and 2021 showing that spawning success seems to be sporadic and dependent on proper environmental conditions and stream flow (Table 11).
6. In 2024 a total of 2609 YOY Striped Bass were collected. Lengths ranged from 51mm to 132mm. Average length of all individuals collected was 68.72mm
7. Fall gill netting should continue every other year to continue monitoring population trends for Striped Bass.

Channel Catfish

1. Channel Catfish abundance from 2024 gill netting (C/f = 9.60) was well above the minimum acceptable value for a quality fishery (C/f = 4.8). The total Channel Catfish C/f has fluctuated but generally remained above the value for a quality fishery during most sample years (Table 12).
2. The abundance of all Channel Catfish was good for stock and quality sized, but few individuals are reaching preferred or larger sizes.
3. Body condition values (Wr) were unsatisfactory for all size groups. Body condition has decreased over the last several samples.
4. Channel Catfish abundance and size structure data indicated the presence of a sub-quality fishery in 2022.
5. Fall gill netting should continue every other year to continue monitoring population trends for Channel Catfish.

Blue Catfish

1. Blue Catfish abundance from 2024 gillnetting (C/f = 4.59) was well above the minimum acceptable value for a quality fishery (C/f ≥ 2.4).
2. The total Blue Catfish C/f has been increasing in recent sample years but fell back to average in 2024 (Table 13). The abundance of all Blue Catfish size groups was satisfactory.
3. Body condition values (Wr) of substock sized blue catfish was good, but all fish stock sized and greater were average or below average condition.
4. Abundance, size structure and condition values continued to indicate that Blue Catfish is the dominant catfish species in Keystone Lake.
5. Fall gill netting should continue every other year to continue monitoring population trends for Blue Catfish.

Gizzard Shad

1. Shad abundance from 2024 fall gill netting (C/f = 5.39) was above the minimum acceptable value for a quality forage supply (C/f ≥ 4.8). The total shad C/f has fluctuated in recent years but has always well exceeded the C/f for a quality forage base (Table 14). This year's shad catch rate was the lowest in several years, and should be monitored going forward.
2. Gizzard Shad populations are known to fluctuate dramatically within reservoirs and are usually not a concern unless there are multiple consecutive samples with below acceptable catch rates.
3. Shad abundance and size structure indicates they were providing an abundant source of prey in 2024.
4. Fall gill netting should continue every other year to continue monitoring population trends for shad.

White Perch

1. White Perch abundance from 2024 fall gill netting (C/f = 4.66) was higher than the 2022 sample, but near the historical trend.
2. White Perch populations could have negative effects on sportfish and should be monitored to ensure populations are not reaching very high catch rates.
3. Fall gill netting should continue every other year to continue monitoring population trends for shad.

Water Quality

1. Multiple water quality measurements were recorded at two locations within Keystone Lake from June to September in 2024 as needed based on weather and lake conditions.

2. No major Striped Bass kills were observed during the summer months of 2022, 2023 and 2024.
3. Water quality measurements should be conducted multiple times annually as needed during the months of June through September to track environmental conditions that could lead to a Striped Bass die-off.

RECOMMENDATIONS

Fish Attractor Structures

1. Brush pile structures will be added or refurbished with cedar trees in 2025.

Fish Stockings

1. No additional fish stockings are currently recommended.

Fish Surveys

1. A spring electrofishing survey should be conducted in 2025 and every other year after that to continue evaluating black bass populations as part of a long-term monitoring program and to evaluate impacts of 2020 regulation changes.
2. A fall gill netting survey should be conducted in 2026 and every other year after, to evaluate the status of pelagic fish as part of a long-term monitoring program.

Fishing Regulations

1. Current regulations are statewide regulations for all species as defined in Title 800 and the Oklahoma Fishing and Hunting Regulations book.
2. No change in the Striped Bass fishing regulation is recommended since natural losses and not angler harvest is the primary factor regulating abundance.
3. No change in the Largemouth Bass regulation is recommended since the changes that were made in 2020. Electrofishing surveys will be conducted every two to three years, as lake conditions allow, to evaluate the impacts of the 2020 regulation changes.
4. Statewide regulations should remain in place for all other fish species.

Table 1. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **Largemouth Bass** collected by spring electrofishing from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r are ≥ 90.

	Total (≥ 40)		< 8 inches (15-45)		8-12 inches (15-30)		≥ 12 inches (≥ 15)		≥ 14 inches (≥ 10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1989	252	22.57	2.74	94	3.99	101	15.8	102	8.9	103
1990	86	49.14	4.67	103	26.24	109	18.23	105	9.65	108
1991	28	18.66	10.00	99	8.00	93	0.67	84		
1996	116	29.12	6.25	101	5.72	102	17.43	98	11.95	97
1998	282	81.69	23.36	106	18.65	109	40.28	103	26.00	103
2003	234	39.00	3.333	96	7.5	103	28.33	103	23.167	103
2011	100	25.00	1.75	81	10.0	94	18.00	101	11.25	102
2015	96	24.00	2.5	97	9.75	104	14.0	102	10.5	101
2018	254	63.5	10.5	90	9.5	103	45.75	101	39.25	101
2022	179	45.63	5.37	88	11.05	99	34.42	109	22.74	110

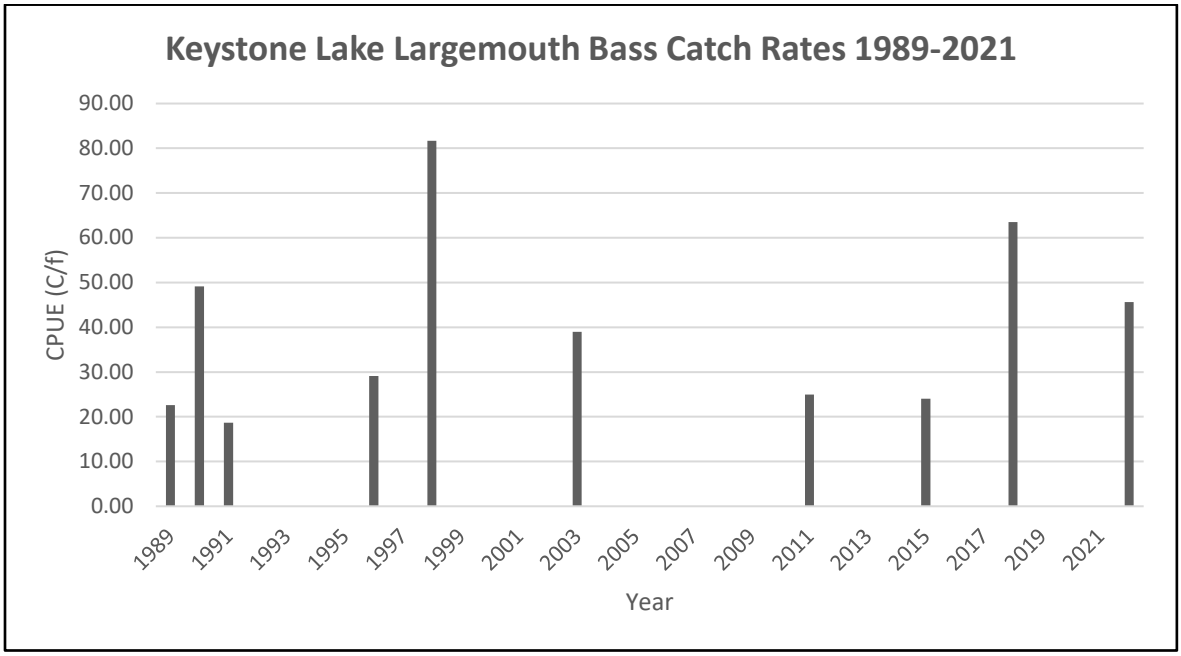

Figure 1. Total catch per unit effort (CPUE; C/f) for **Largemouth Bass** in Keystone Lake from electrofishing surveys from 1989-2021.

Table 2. Total CPUE of **Largemouth Bass** by spring electrofishing 2018 (OFAT analysis).

Species	Mean	Count	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Largemouth Bass	63.5	24	12.89	8.19	47.45	79.55	26	10

Table 3. CPUE by size for **Largemouth Bass** by spring electrofishing 2018 (OFAT analysis).

Species	Size Category	Mean	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Largemouth Bass	substock	9.5	17.39	1.65	6.26	12.74	46	18
Largemouth Bass	stock	7.25	20.53	1.49	4.33	10.17	65	25
Largemouth Bass	quality	14.25	14.74	2.10	10.13	18.37	33	13
Largemouth Bass	preferred	32	19.60	6.27	19.71	44.29	59	23
Largemouth Bass	memorable	0.5	69.16	0.35	-0.18	1.18	735	287
Largemouth Bass	trophy	0	NA	NA	NA	NA	NA	NA

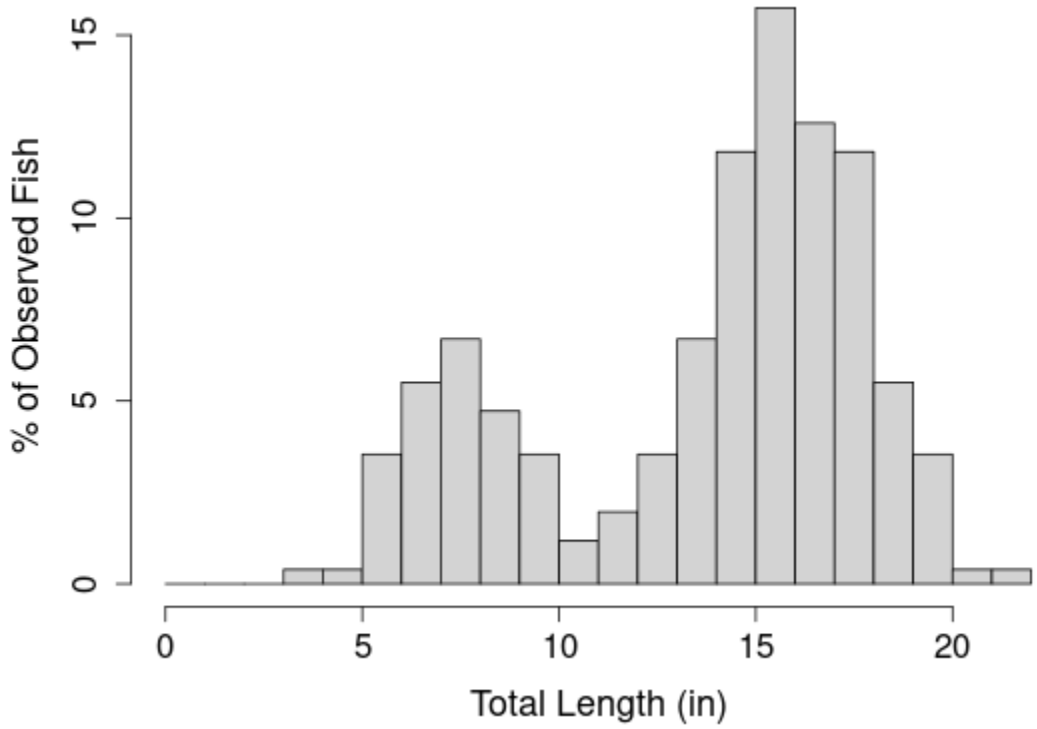

Figure 2. Length frequency plot for **Largemouth Bass** by spring electrofishing 2018 (OFAT analysis).

Table 4. Total CPUE of **Largemouth Bass** by spring electrofishing 2022 (OFAT analysis).

Species	Mean	Count	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
Largemouth Bass	56.53	19	11.63	6.57	43.64	69.41	16	6

Table 5. CPUE by size for **Largemouth Bass** by spring electrofishing 2022 (OFAT analysis).

Species	**Size Category**	**Mean**	**RSE**	**SE**	**L 95% CI**	**U 95% CI**	**N RSE = 12.5 (25% range)**	**N RSE = 20 (40% range)**
Largemouth Bass	substock	5.68	27.34	1.55	2.64	8.73	91	36
Largemouth Bass	stock	7.26	22.41	1.63	4.07	10.45	61	24
Largemouth Bass	quality	18.00	15.29	2.75	12.60	23.40	28	11
Largemouth Bass	preferred	24.63	20.98	5.17	14.50	34.76	54	21
Largemouth Bass	memorable	0.95	72.86	0.69	-0.41	2.30	646	252
Largemouth Bass	trophy	0.00	NA	NA	NA	NA	NA	NA

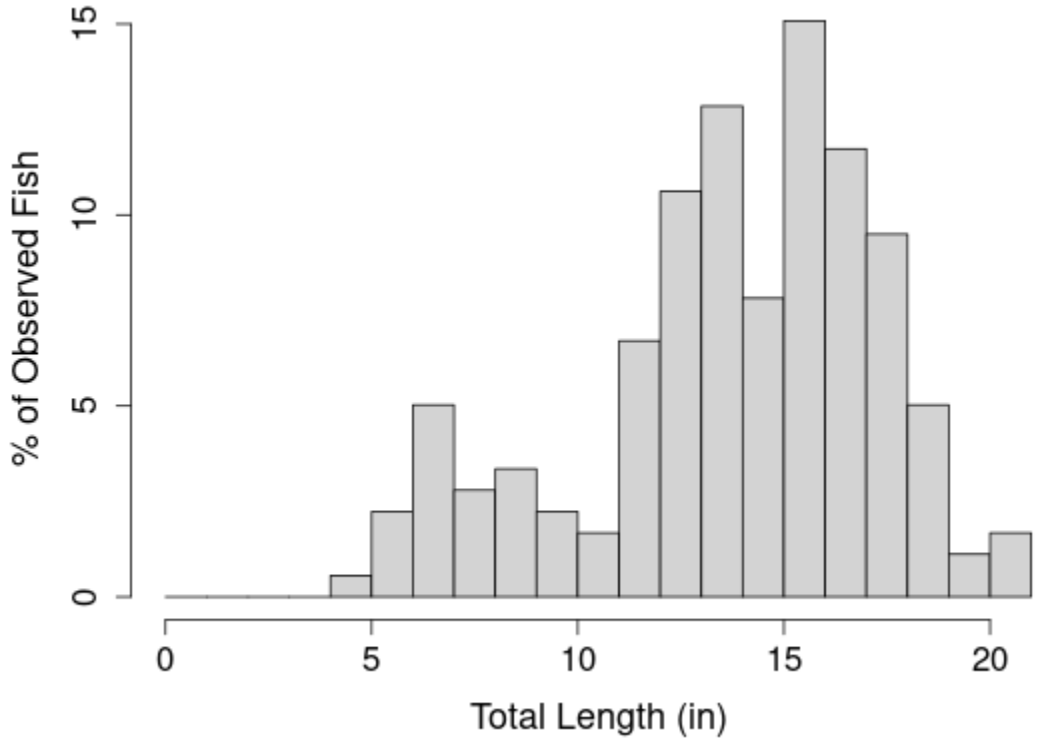

Figure 4. Length frequency plot for **Largemouth Bass** by spring electrofishing 2022 (OFAT analysis).

Table 6. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **White Crappie** collected by fall gill netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥4.8)			Stock		Quality		Preferred or larger	
Year	No.	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
2008	216	17.74	113	5.59	114	.51	93	.35	82
2010	74	5.92	103	4.00	103	.80	103	.48	98
2012	52	3.89	96	.83	91	.75	76	.96	94
2014	11	.75	98	.07	91	.27	96	.20	102
2016	59	4.52	84	1.53	75	1.44	84	.74	92
2018	35	2.48	104	-	-	.15	87	1.13	106
2020	97	6.12	108	.77	105	2.52	104	1.41	112
2022	26	1.96	93	.43	86	.83	89	.34	103
2024	97	4.37	107	.31	86	1.55	108	1.23	109

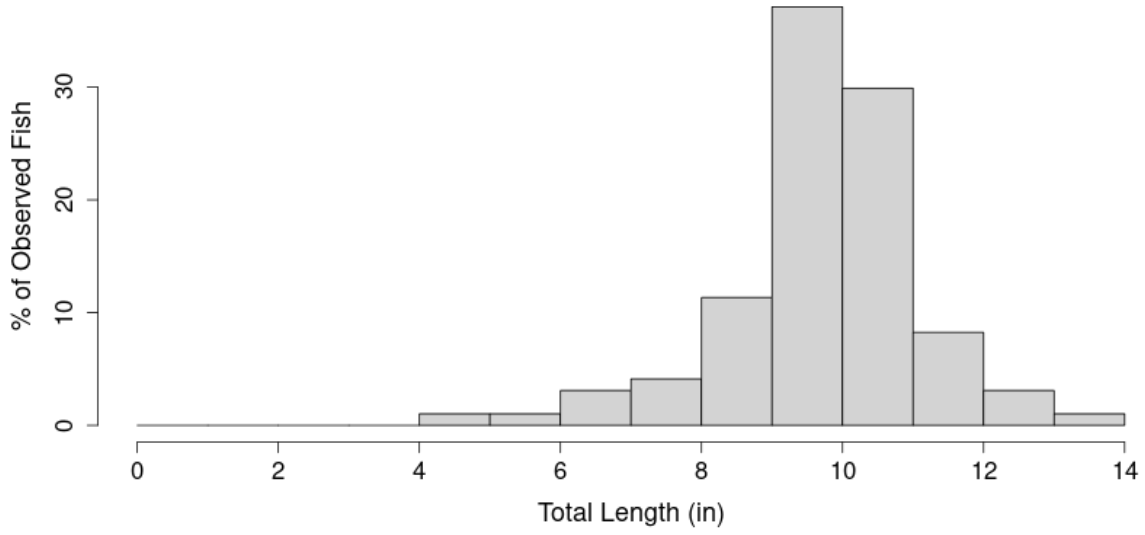

Figure 5. Length frequency plot for **White Crappie** by fall gill netting 2024 (OFAT analysis).

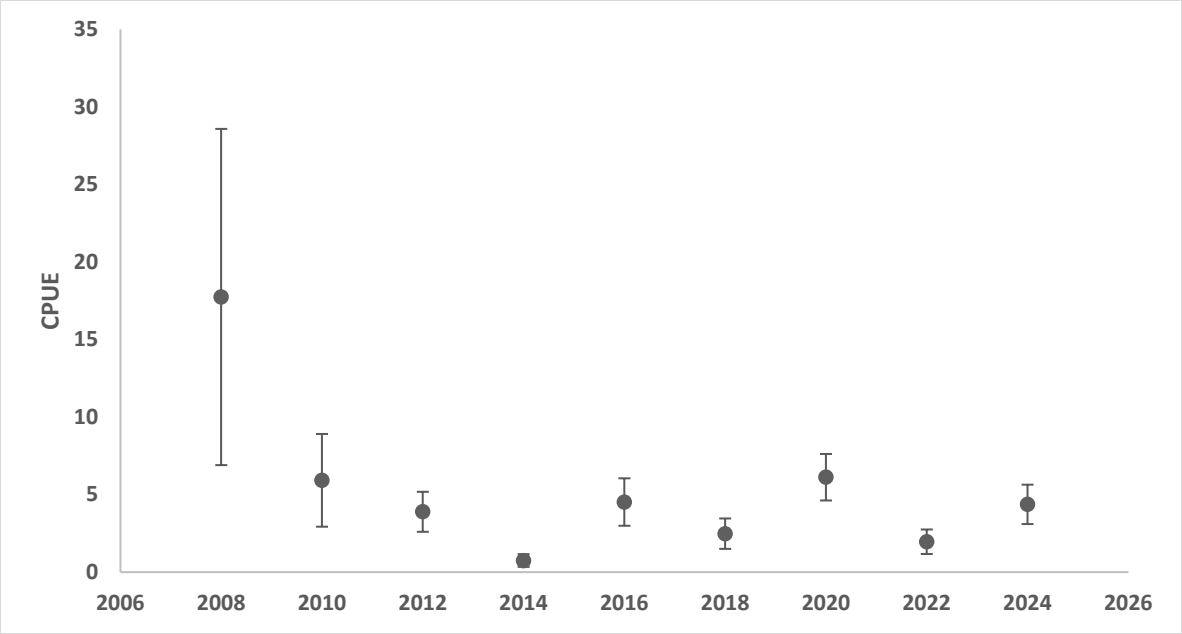

Figure 6. Total catch per unit effort (CPUE; C/f) for White Crappie in Keystone Lake from fall gill netting surveys from 2008-2024.

Table 7. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **White Crappie** collected by fall trap netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥4.8)		<8 inches (1.2-7.2)		≥8 inches (1.9)		≥ 10 inches (>1.0)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
2018	213	17.41	9.35	86	8.06	94	3.96	100

Table 8. Mean length at age of **White Crappie** collected from Keystone Lake. Numbers in parentheses represent values for acceptable growth rates.

Year	Age 1 (≥160mm) (6.3 inches)	Age 2 (≥200 mm) (8 inches)	Age 3 (≥225 mm) (9 inches)	Age 4 (≥250 mm) (10 inches)
1993	252	289	308	343
1995	178	255	362	359
1999	186	290	307	343
2018	166	262	257	313

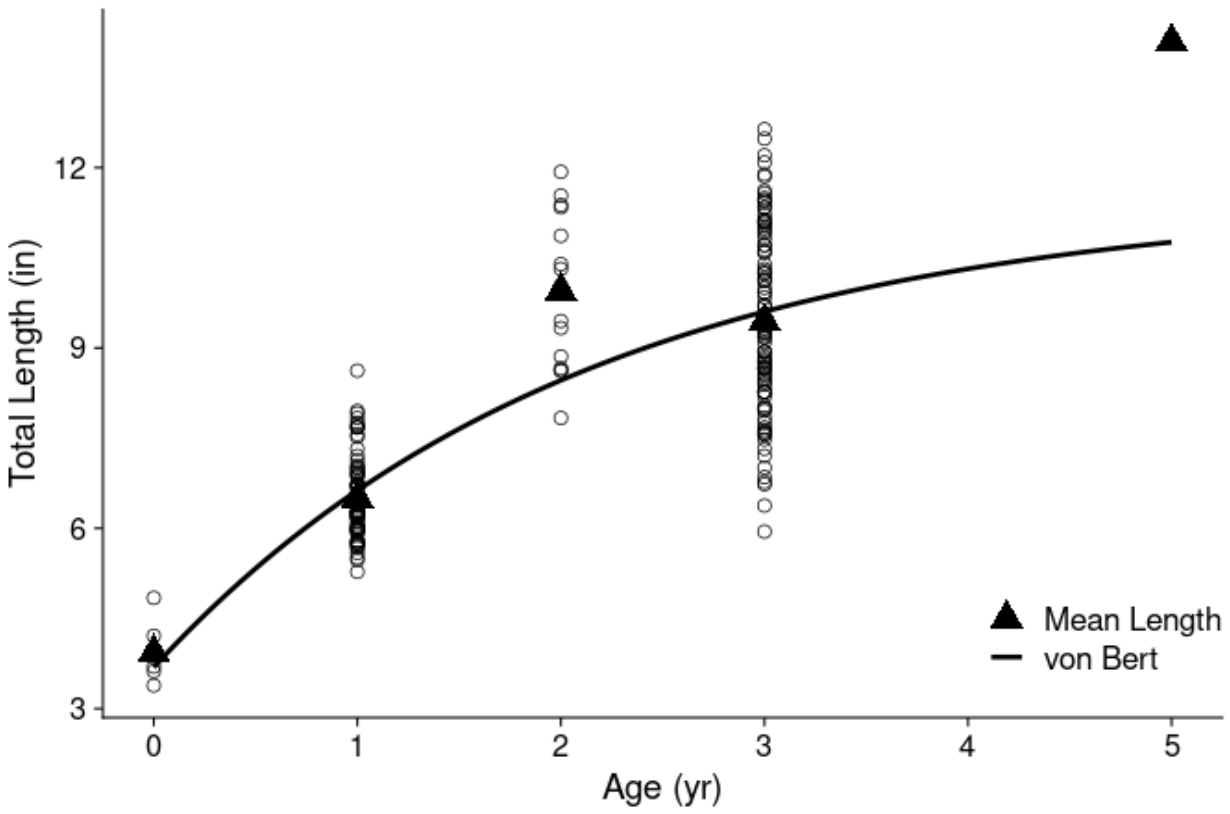

Figure 7. Von Bertalanffy plot for **White Crappie** from 2018 trap netting (OFAT analysis).

Table 9. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **White Bass** collected by fall gill netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥4.8)			Stock		Quality		Preferred or larger	
Year	No.	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
2008	28	2.36	91	.25	99	.67	89	.50	89
2010	58	4.64	94	.32	100	2.24	93	1.04	95
2012	64	4.79	86	.29	86	1.50	87	1.41	87
2014	138	9.67	91	2.44	88	2.54	90	2.25	95
2016	116	8.70	89	1.30	74	2.06	88	2.55	94
2018	78	5.42	90	.64	90	1.80	87	1.45	91
2020	131	8.39	101	3.02	100	1.35	100	1.85	103
2022	168	12.58	90	1.91	93	4.81	89	2.89	91
2024	255	11.58	93	2.63	95	3.10	94	2.92	91

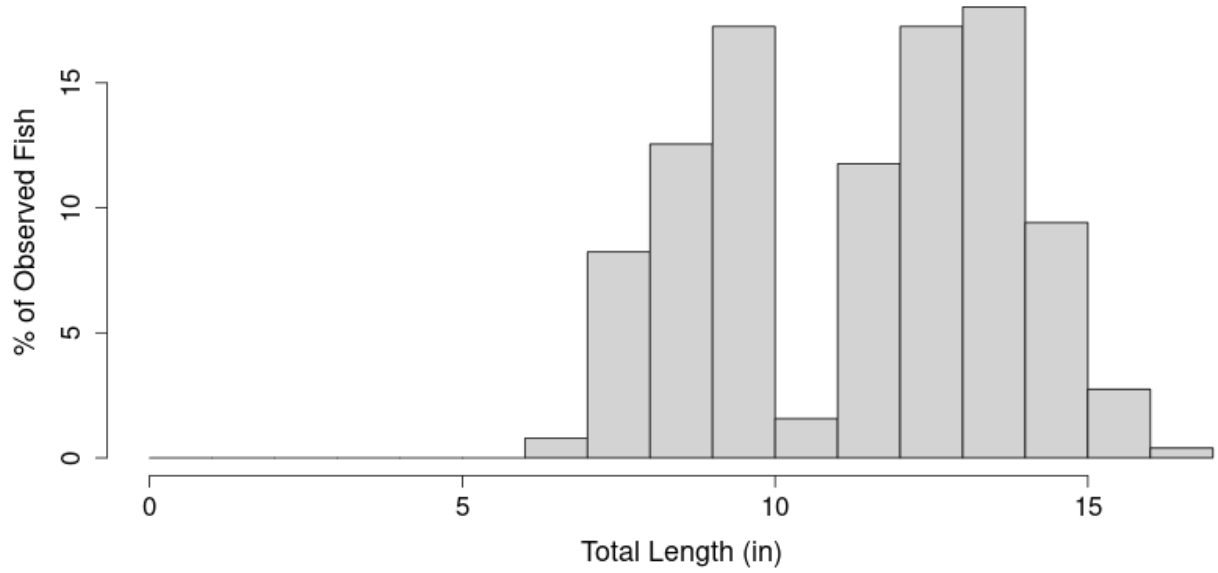

Figure 8. Length frequency plot for **White Bass** by fall gill netting 2024 (OFAT analysis).

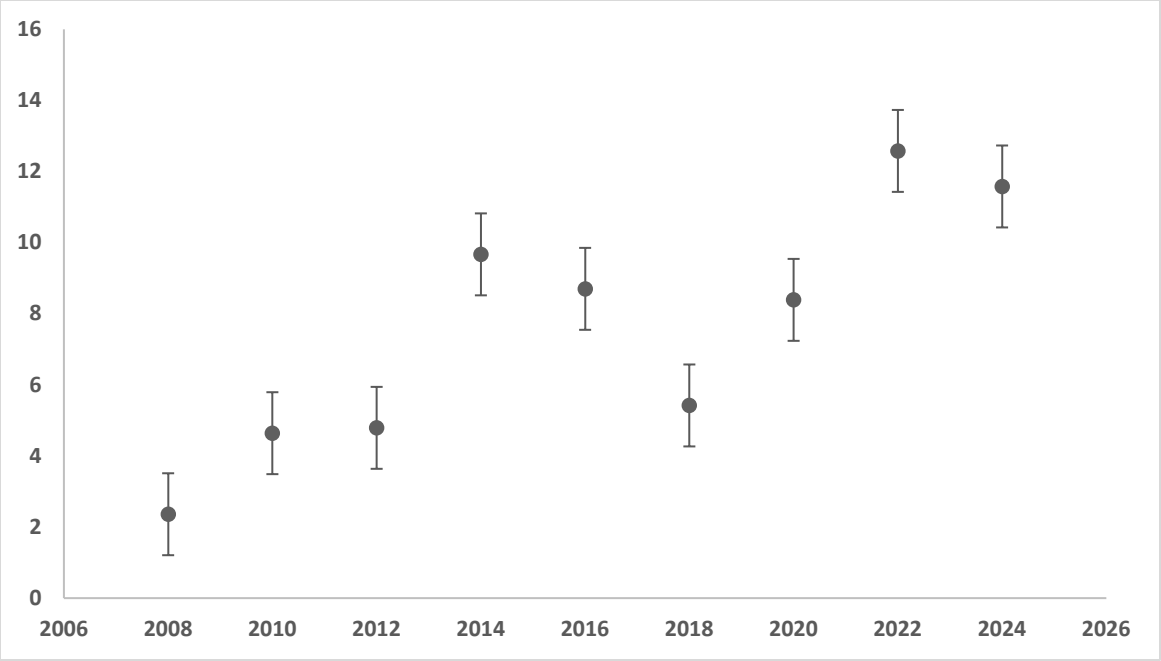

Figure 9. Total catch per unit effort (CPUE; C/f) for White Bass in Keystone Lake from fall gill netting surveys from 2008-2024.

Table 10. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **Striped Bass** collected by fall gill netting from Keystone Lake. Acceptable W_r values are ≥90.

	Total			Stock		Quality		Preferred or larger	
Year	No.	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
2008	17	1.31	85	.08	102	.67	82	-	-
2010	2	0.16	86	-	-	.08	90	-	-
2012	21	1.58	87	1.43	87	.07	96	-	-
2014	65	4.45	90	3.10	90	.85	95	-	-
2016	11	0.86	95	.32	98	.38	96	-	-
2018	20	1.38	89	1.10	90	.14	97	-	-
2020	45	2.81	94	1.11	97	.76	100	-	-
2022	46	3.48	89	2.13	92	-	-	-	-
2024	63	2.86	88	1.54	88	.96	87	-	-

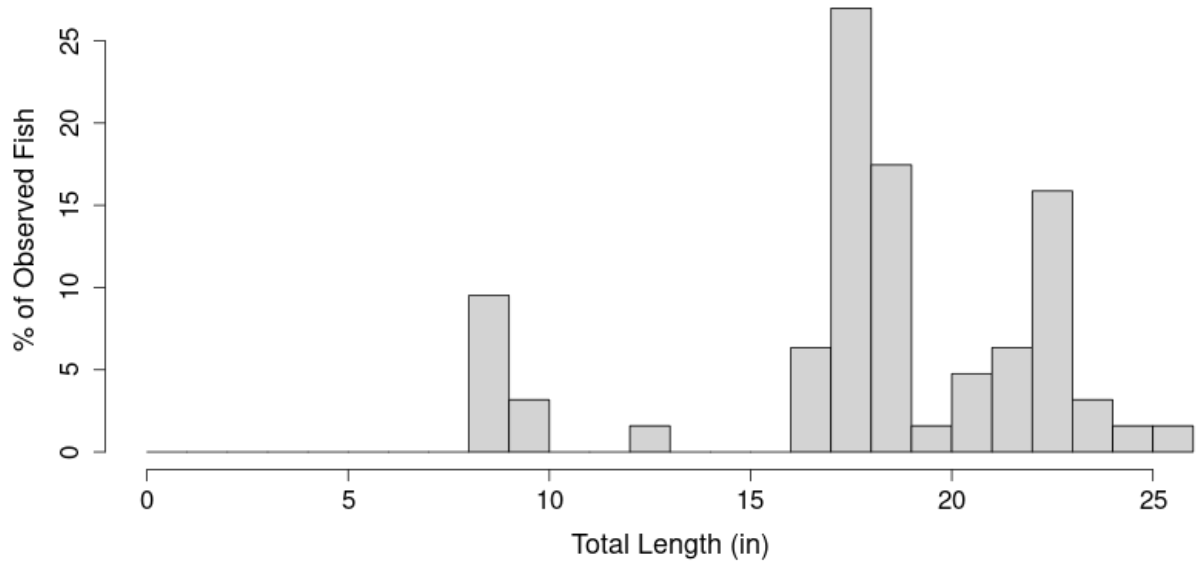

Figure 10. Length frequency plot for **Striped Bass** by fall gill netting 2024 (OFAT analysis).

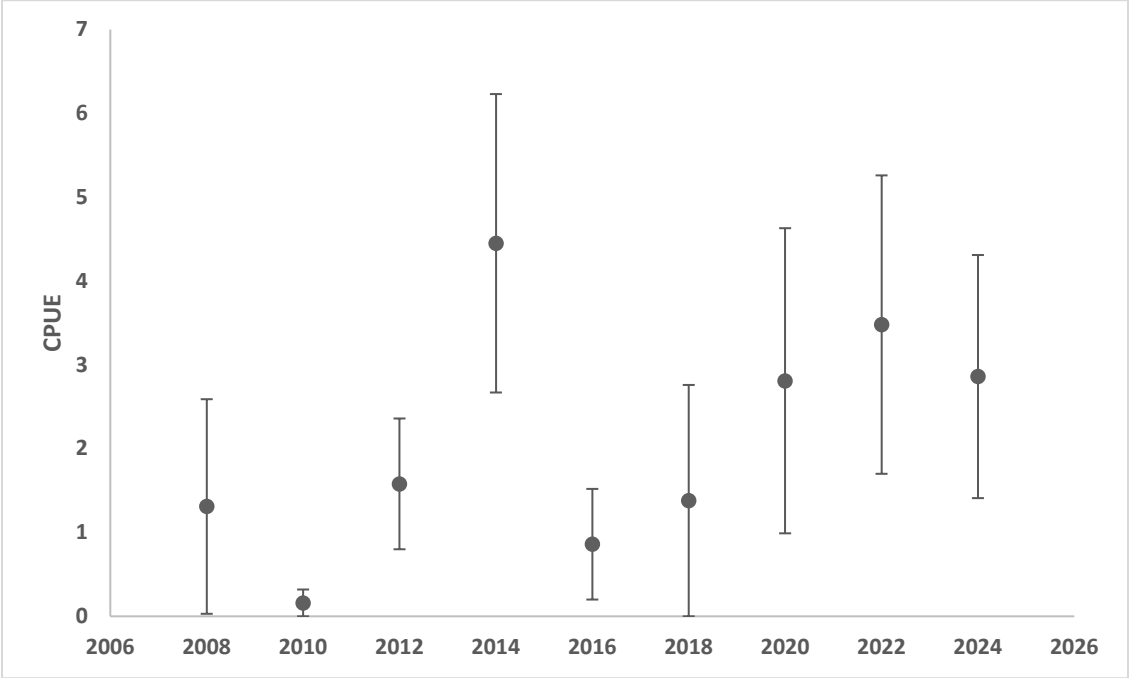

Figure 11. Total catch per unit effort (CPUE; C/f) for Striped Bass in Keystone Lake from fall gill netting surveys from 2008-2024.

Table 11. Total number (No.) and catch rates (C/f) of young-of-year **Striped Bass** collected by summer shoreline seining on Keystone Lake, 2010-2023.

Year	No.	C/f	RSE	SE	L 95% CI	U 95% CI	N RSE = 12.5 (25% range)	N RSE = 20 (40% range)
2010	404	77.4	28.85	22.33	33.64	121.17	64	25
2011	270	51.73	38.18	19.75	13.02	90.44	112	44
2012	272	52.11	32.93	17.16	18.48	85.75	83	33
2013	183	35.06	52.4	18.37	-0.95	71.07	211	82
2013	307	58.82	29.01	17.06	25.37	92.26	65	25
2016	1421	272.26	23.61	64.28	146.27	398.24	43	17
2017	648	124.15	30	37.24	51.16	197.15	69	27
2017	648	124.15	18.61	23.11	78.86	169.45	27	10
2018	3	0.57	100	0.57	-0.55	1.7	768	300
2020	2542	487.04	21.48	104.63	281.96	692.11	35	14
2021	2233	427.83	22.85	97.78	236.19	619.48	40	16
2022	289	55.37	26.93	14.91	26.15	84.59	56	22
2023	12	2.3	56.41	1.3	-0.24	4.84	244	95
2024								

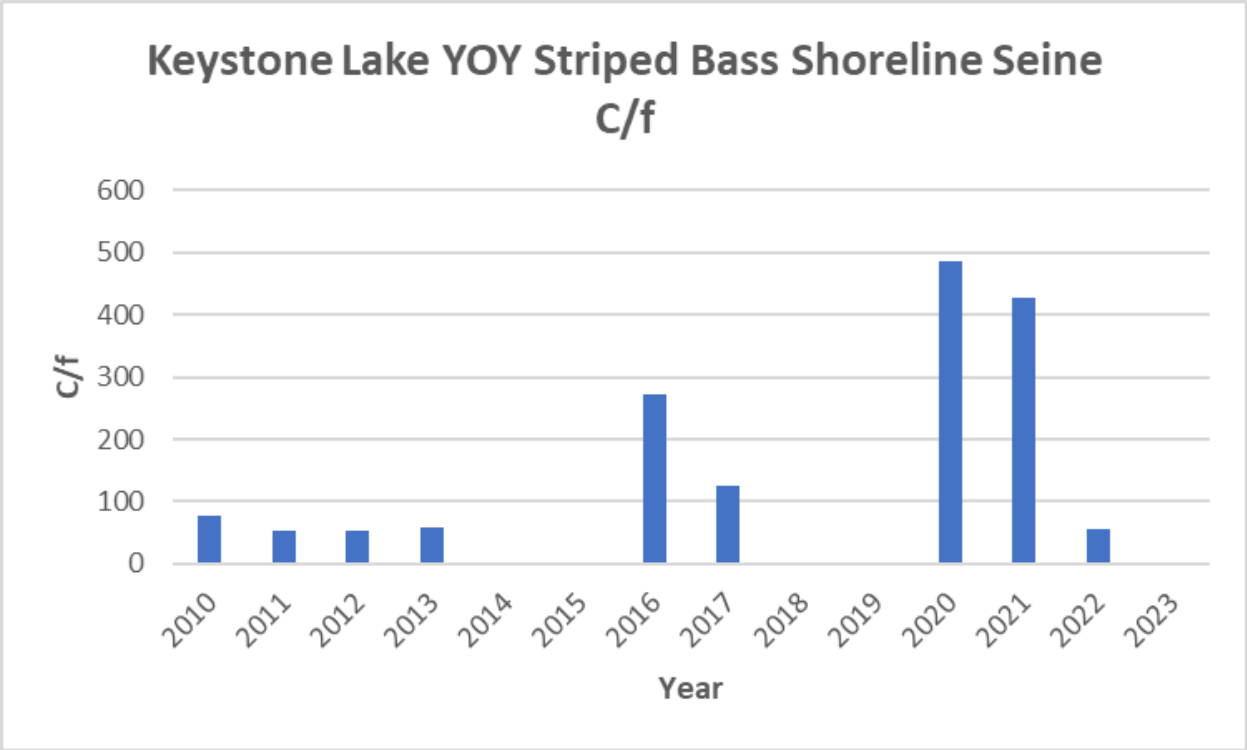

Figure 12. Cath rates (C/f) trends for Striped Bass YOY on Keystone Lake from summer shoreline seining, 2010-2023.

Table 12. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **Channel Catfish** collected by fall gill netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥4.8)			Stock		Quality		Preferred or larger	
Year	No.	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
2008	39	3.24	87	.67	77	.41	91	-	-
2010	47	3.76	95	.56	84	.72	88	-	-
2012	45	3.37	90	.83	79	.46	93	-	-
2014	76	5.37	89	.99	85	1.15	89	.07	84
2016	34	2.58	75	1.07	83	.22	90	-	-
2018	64	4.51	100	1.19	90	1.12	98	-	-
2020	99	6.23	96	1.88	88	2.22	92	-	-
2022	112	8.41	88	1.47	81	2.19	86	-	-
2024	214	9.60	83	2.48	83	2.32	87	.13	93

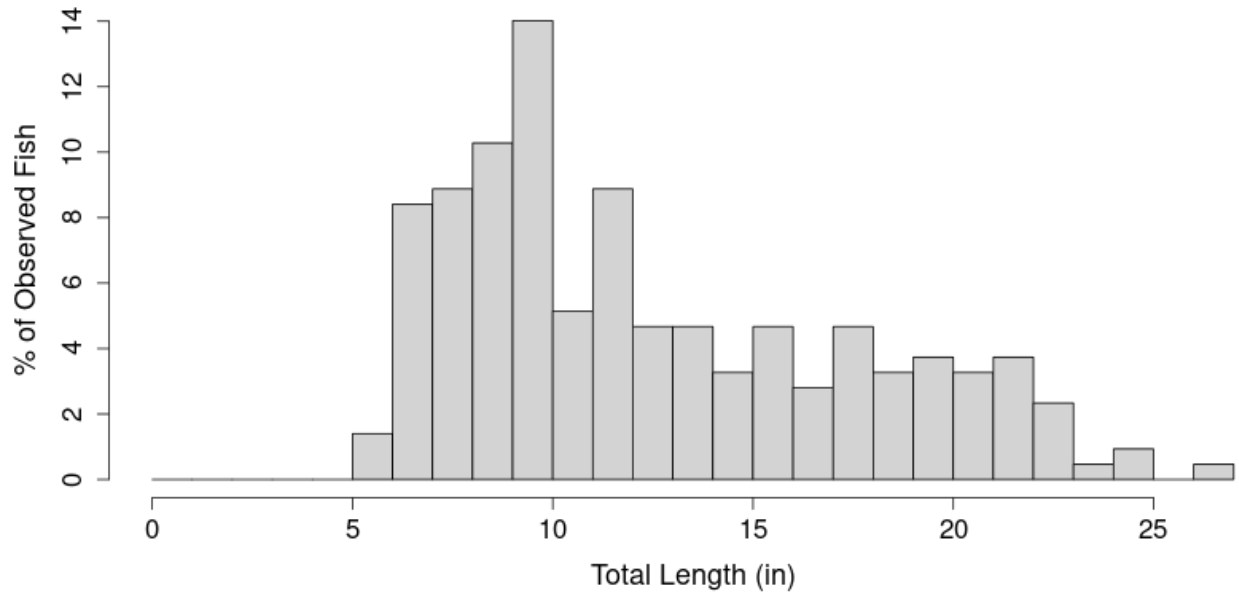

Figure 13. Length frequency plot for **Channel Catfish** by fall gill netting 2024 (OFAT analysis).

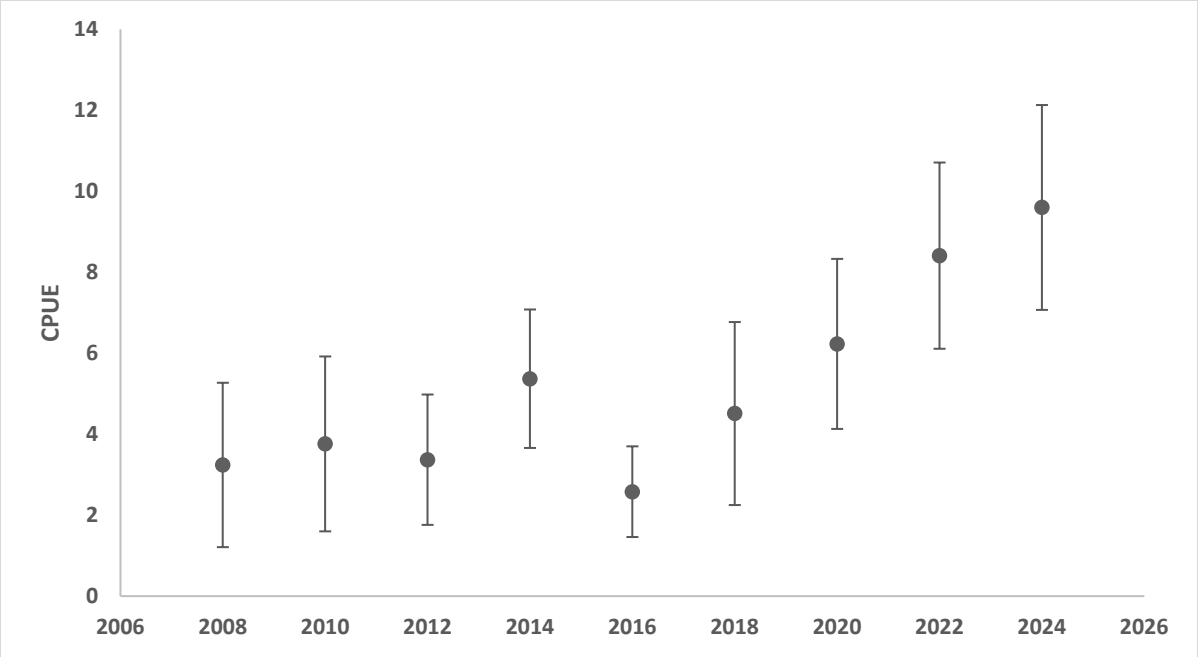

Figure 14. Total catch per unit effort (CPUE; C/f) for Channel Catfish in Keystone Lake from fall gill netting surveys from 2008-2024.

Table 13. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **Blue Catfish** collected by fall gill netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥90.

	Total (≥2.4)			Stock		Quality		Preferred or larger	
Year	No.	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
2008	126	10.19	89	1.51	84	.67	82	.15	97
2010	61	4.88	85	1.28	84	.64	81	-	-
2012	89	6.56	85	1.55	79	1.62	79	.12	94
2014	64	4.36	84	1.97	82	1.53	83	.07	100
2016	74	5.66	92	2.77	90	2.28	93	.08	99
2018	57	4.04	97	1.36	93	1.50	92	-	-
2020	50	3.18	100	.51	89	.72	95	.06	104
2022	106	7.86	87	2.75	82	2.27	84	.08	104
2024	100	4.59	86	1.87	84	.25	90	.05	90

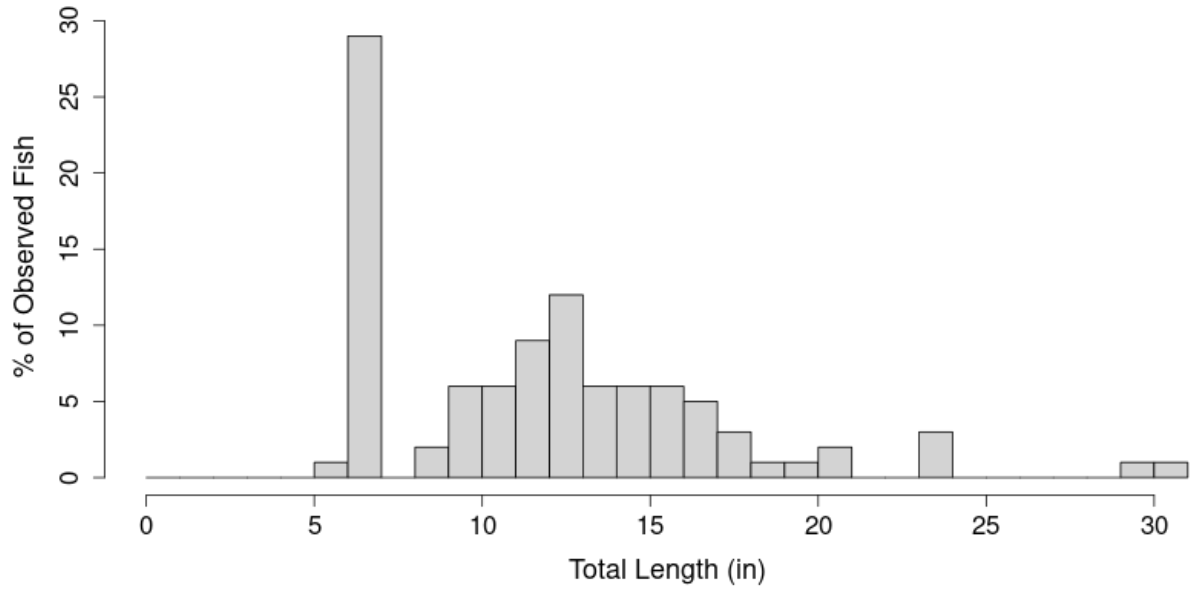

Figure 15. Length frequency plot for **Blue Catfish** by fall gill netting 2024 (OFAT analysis).

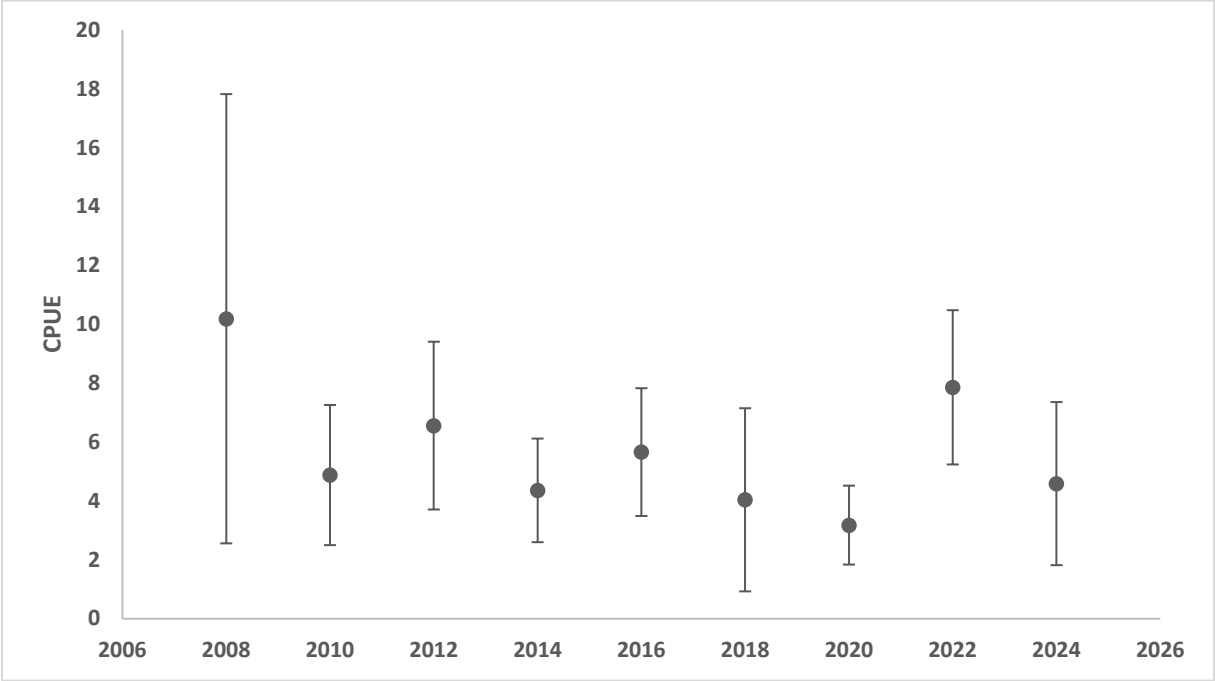

Figure 16. Total catch per unit effort (CPUE; C/f) for Blue Catfish in Keystone Lake from fall gill netting surveys from 2008-2024.

Table 14. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **Gizzard Shad** collected by fall gill netting from Keystone Lake. Numbers in parentheses represent acceptable C/f values for a quality fishery.

	Total (≥.20)	
Year	No.	C/f
2008	1106	86.11
2010	183	14.64
2012	147	10.97
2014	166	12.09
2016	86	6.56
2018	451	31.35
2020	270	16.86
2022	250	19.41
2024	121	5.39

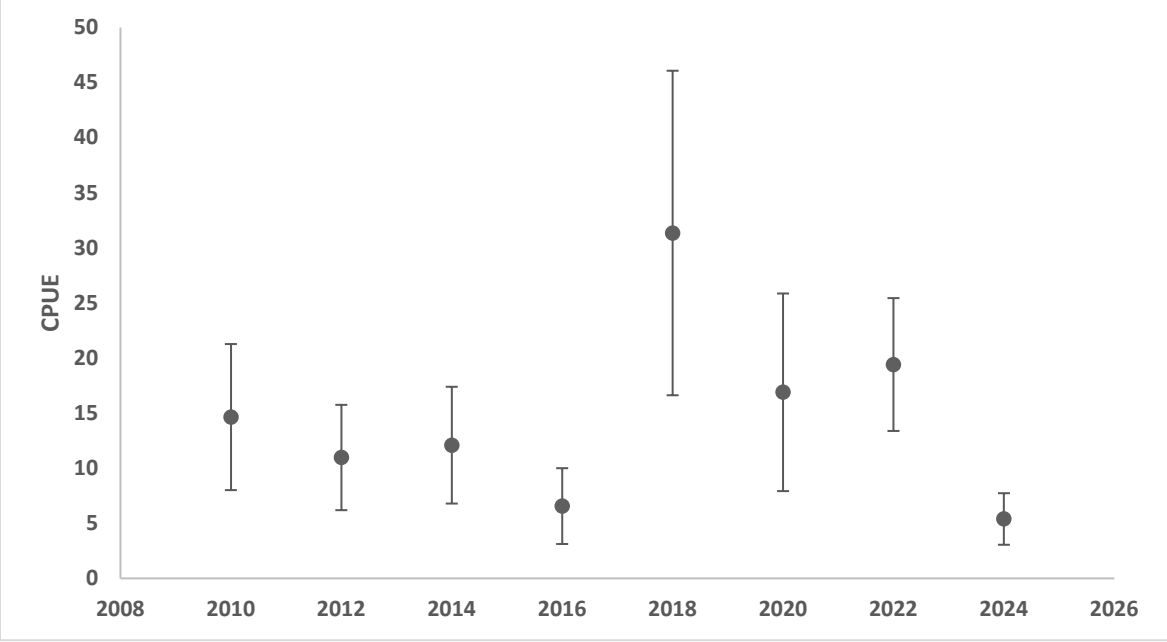

Figure 17. Total catch per unit effort (CPUE; C/f) for Gizzard Shad in Keystone Lake from fall gill netting surveys from 2010-2024.

Table 15. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of **White Perch** collected by fall gill netting from Keystone Lake.

	Total	
Year	No.	C/f
2002	-	-
2004	54	4.80
2008	-	-
2010	2	.16
2012	2	.15
2014	70	4.92
2016	11	.84
2018	66	4.59
2020	64	4.14
2022	36	2.58
2024	105	4.66

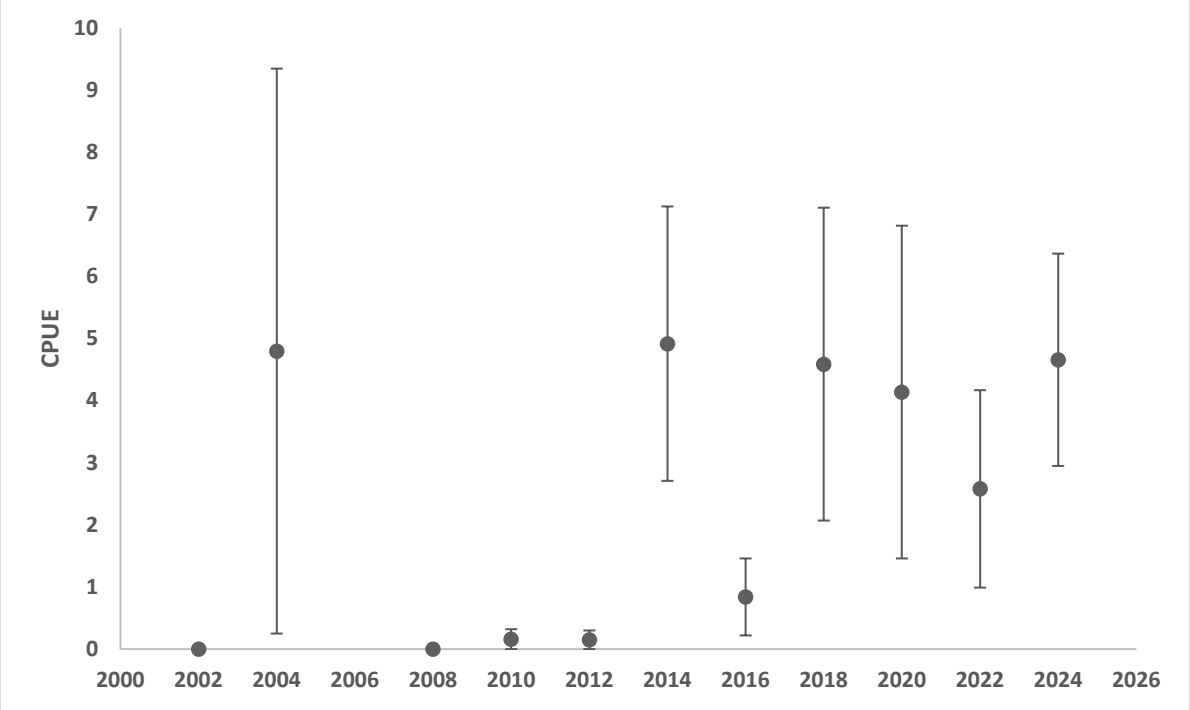

Figure 18. Total catch per unit effort (CPUE; C/f) for White Perch in Keystone Lake from fall gill netting surveys from 2000-2024.

Table 16. Species, number, and size of fish stocked in Keystone Lake since 1981.

Date	Species	Number	Size (mm)
1981	Largemouth Bass	35,055	90
1982	Largemouth Bass	8,000	102
1983	Largemouth Bass	15,000	147
1984	Largemouth Bass	2,500	140
1985	Largemouth Bass	20,000	89
1987	Largemouth Bass	6,000	114
1988	Largemouth Bass	10,000	64
1989	Largemouth Bass	5,500	102
1990	Smallmouth Bass	36,932	38-64
1991	Smallmouth Bass	118,780	19-52
1994	Walleye	500,000	Fry
1995	Walleye	500,000	Fry
1996	Walleye	2,600,000	Fry
1997	Walleye	1,000,000	41
1998	Walleye	1,000,000	Fry
1999	Walleye	1,000,000	Fry
1999	Smallmouth Bass	28,810	70-76