SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

PRAGUE LAKE

2023

SURVEY REPORT

State: Oklahoma

Project Title: Prague Lake Fish Management Survey Report

Period Covered: Changes in ODWC standard reporting occurred since the 2006 Survey Report. This report discusses survey results from 2008-2023.

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Prague Lake

ABSTRACT

Prague Lake was surveyed by spring electrofishing (2018, 2023), and fall gill netting (2008, 2014, 2022), techniques to monitor trends in fish populations. Largemouth Bass abundance decreased significantly but remained high enough to still be considered a high-quality fishery. Channel Catfish abundance was low, poor recruitment noted and natural reproduction verified. Gizzard Shad abundance was considered high with acceptable abundance of optimal forage size.

INTRODUCTION

Prague Lake impounds Sand Creek 5 miles northwest of Prague in Lincoln County, Oklahoma. Prague Lake covers 225 surface acres and was constructed in 1984 by the City of Prague. The lake has a mean depth of 11 ft, and a secchi disc visibility of around 58 inches in the main pool in August. However, turbid water conditions often occur for extended periods of time following heavy rains. Fish habitat consists primarily of flooded timber and aquatic vegetation.

The main fisheries management problem was a decline in Channel Catfish abundance. Past stockings of fingerlings increased their abundance. However, stocking frequency has been reduced. The Channel Catfish stocking program is meant to establish a self-sustaining population. Natural reproduction occurs but recruitment appears poor. Florida largemouth bass fingerlings are stocked frequently to enhance trophy bass potential (Appendix 1).

Two large brush rows were constructed prior to impoundment from trees cleared during dam construction to provide fish attractor habitat. 14 other fish attractor locations have been added since impoundment, 12 of which were created in 2015 with the deployment of artificial starfish structures. A boating access project consisting of the installation of a boat ramp, boat dock, and a gravel parking lot was completed in 1990. Restrooms were installed in 1991. A fishing access project consisting of the installation of a walkway and covered fishing dock was completed in 1992. The boat dock and fishing dock were heavily damaged by high winds in 1994 and were repaired. The gravel parking lot was asphalted in 1998.

Species found in recent surveys, but not specifically mentioned in this report include: Bluegill Sunfish, Brown Bullhead, Golden Shiner, Green Sunfish, Redear Sunfish, and Rock Bass.

Current Prague Lake Fishing Regulations
- No Bass under 14'' in length.
- No more than 5 bass per day
- No catfish under 10 '' in length
- 15 fish limit per day

Prague Lake was surveyed by spring electrofishing (2018, 2023) and fall gill netting (2008, 2014, 2022), techniques to monitor trends in fish populations.

RESULTS

Largemouth Bass

Largemouth Bass (LMB) were surveyed in spring of 2018 and 2023 by means of boat electrofishing. Randomly selected shoreline units were sampled. Overall LMB abundance, catch per unit of effort (CPUE) increased from 2005 (CPUE= 114.0) to 2018 (CPUE = 128.0), then showed a significant decrease in 2023 (CPUE = 64.0) (Table 1). While CPUE decreased for the 2023 survey, the abundance for fish 15 inches or greater was still above the minimum CPUE of 15 for a high quality fishery. CPUE decreased for all size classes from 2018 to 2023. It is important to note that the standard sampling procedures (SSP) for Largemouth Bass electrofishing surveys changed from 15 minute to 10 minute units in 2015. While this change decreased the amount of time sampled per unit, it is unknown how that would have affected catch rates. CPUE's can vary based on habitat types sampled. It is also important to note that electrofishing systems switched from Smith-Roots to an ETS System in 2022. The two systems differ in design and possibly efficiency. The 2023 results should be viewed as an estimate and not directly comparable to the 2005 or 2018 survey. Future surveys will be comparable with the 2023 survey.

Length frequency histograms showed a more even distribution in overall size structure in 2023 compared to 2018 (Figure 1) but shows a reduction in fish over 18 inches. Proportional size distribution (PSD) values have decreased in all size classes from 2018 to 2023 also indicating a decrease in proportion of larger size fish (Table 2). Body condition or relative weights (Wr) for all size classes surveyed were above acceptable values of 90 and had only slightly decreased in the quality, preferred and memorable size classes (Table 1). The largest fish sampled was from the 2023 survey and measured 23.8 (in) in total length and 9.3 (lbs) in weight.

Age data was collected on a subset of LMB from the 2023 survey. LMB growth was slow but steady, taking approximately four years to reach legal harvest length of 14 inches with a mean length of 15.3 inches at age four (Table 3). Growth steadily increases to a mean length of 18.2 inches by age six and 21.6 inches by age nine. The Von Bertalanffy growth curve (Figure2) gives a visual representation of the predicted growth of LMB for Prague Lake and estimates the mean maximum length at 23.3 inches. The 2023 age frequency indicates strong 2020 (age three) and 2021 (age two) year classes with more than 40% of the LMB surveyed to be two and three years of age (Figure3). Recruitment of age one fish was present but decreased since 2018.   The most recent stocking of FLMB occurred in 2023 with 16,965 fingerlings. A total of 126,792 FLMB have been stocked since 2016.

Florida Largemouth Bass (FLMB) have been stocked frequently in Prague Lake from 1996 to present (Appendix 1) in an effort to introduce FLMB genetics into the bass population. FLMB will grow quicker and larger than native Northern Largemouth Bass, given enough forage and the right conditions within the system. Largemouth Bass genetics were sampled in 2015 and 2023 to determine the extent of Florida largemouth bass genetics within the population. The 2015 survey showed 28.2% of fish sampled contained pure FLMB or F1, a first generation cross (Table 4). No pure Northern Largemouth Bass were

sampled in the 2015 sample. However, 20% had unreadable results. FLMB genetic samples during the 2023 survey are still being process.

Overall LMB abundance decreased significantly, relative weights decreased slightly, and growth rates were slow but steady up to a mean maximum length of 23.3 inches. While abundance decreased, Prague Lake, is still classified as a high-quality bass fishery.   Prague Lake will continue to receive periodic Florida largemouth bass stockings. It is worth noting that many factors changed with our electrofishing set up between 2018 and 2023. While overall catch rates had decreased its difficult to say how the changes affected the catch rates. The 2023 Electrofishing set up had a new ETS system, new boat, new dipper, and water clarity decreased from 35 inches in 2018 to only 22 inches in 2023. Another survey will be planned for the spring of 2024 to further compare and assess population dynamics. No changes are recommended for Largemouth Bass regulations at this time.

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 Prague Lake. Acceptable Wr values are ≥90.

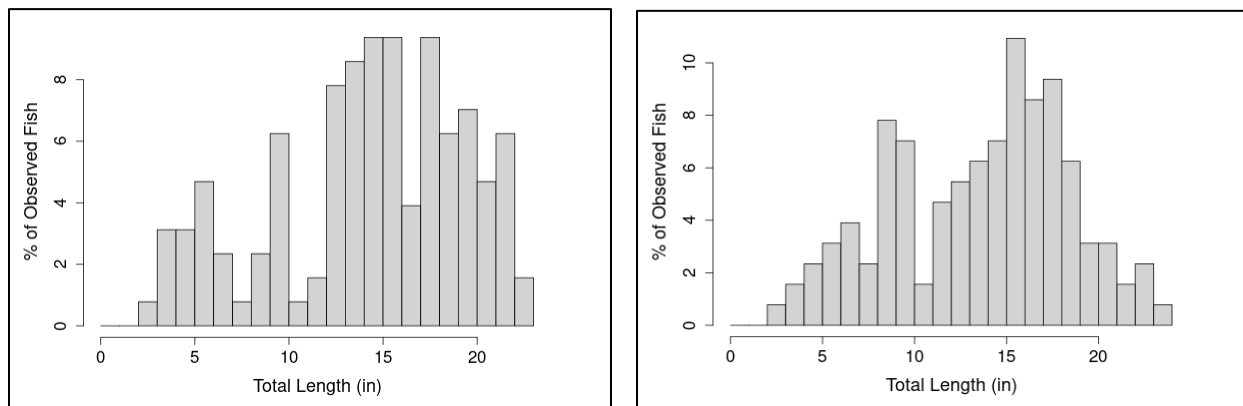|		Total CPUE	Substock 0-7.8 in	Stock 7.9 in		Quality 11.8 in		Preferred 15 in		Memorable 20.1 in		Trophy 24.8 in	
Year	No.	CPUE	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2005	171	114.0	30.0	19.3	92	37.3	95	26.7	95	0.7	101	.	.
2018	128	128.0	18.0	15.0	91	32.0	97	47.0	100	16.0	104	.	.
2023	128	64.0	9.0	13.5	91	11.5	95	25.0	97	5.0	100	.	.

Figure 1. Largemouth Bass Length Frequencies for Prague Lake 2018 (left) and 2023 (right).

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)
2005	77	33	1
2018	86	57	15
2023	75	55	9

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

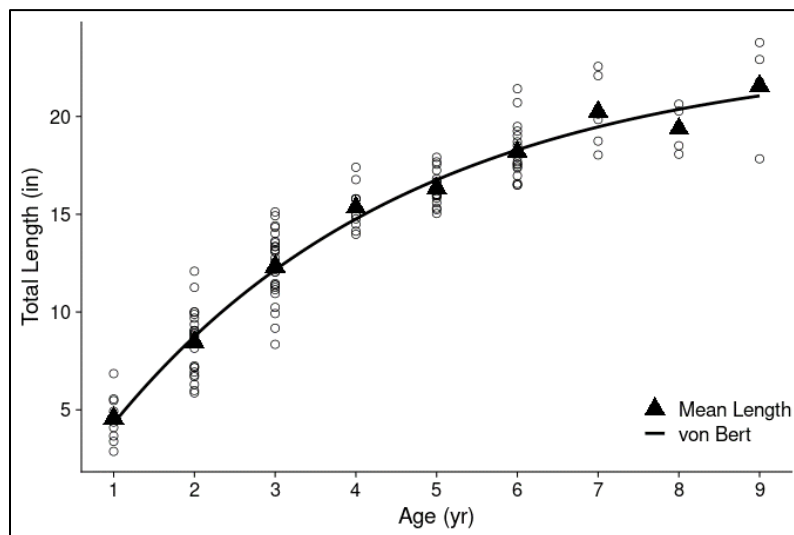| Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	L inf.
2023	4.6	8.5	12.3	15.3	16.3	18.2	20.2	19.4	21.6	.	.	.	23.3

Figure 2. 2023 Largemouth Bass Mean Length at Age: Von Bert Estimated Growth Curve. The Von Bert Growth Curve indicates the estimated growth rate of Largemouth Bass.
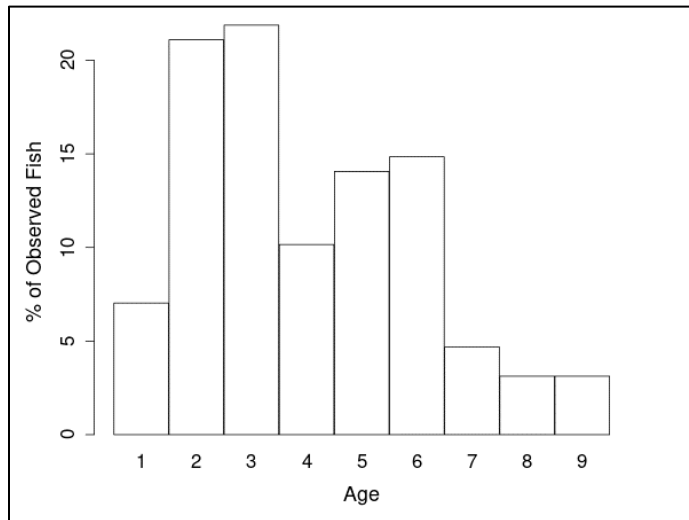
Figure 3. 2023 Age Frequencies of Largemouth bass.

Table 4. Largemouth Bass Genetic Samples 2015 and 2023.

Bass DNA Summary									
Year	%FLMB	%NLMB	% F1	% FX-F	% FX-N	% FX	% DNR	% F+F1	# Sampled
2015	6.3%	0.0%	15.6%	43.8%	18.8%	15.6%	20.0%	21.9%	40
2023	TBD	.	.	.	.	.	.	.	73

Genotype	Description
FLMB	Only Florida Strain Alleles
NLMB	Only Native Strain Alleles
F1	First Cross-Both Alleles present for all markers
FX-F	Hybrid Cross-mostly Florida Alleles
FX-N	Hybrid Cross-mostly Native Alleles
FX	Hybrid Cross-equal number of Alleles for 2 or 3 markers
DNR	Did not run or file unreadable.

Channel Catfish

Channel Catfish were surveyed in 2008, 2014 and 2022 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Five stations were randomly sampled for a period of 24 hours in the 2008 and 2023 surveys, only three stations were sampled in the 2014 survey. Moderate abundance was observed in the 2008 survey (CPUE = 5.9), then steadily decreased to low abundance in 2014 (CPUE = 4.2) and 2022 (CPUE = 1.9) (Table 5). Body condition was considered acceptable for all size classes and years surveyed except for quality size fish in 2008 (Wr = 87). Low abundance was also observed during the hoop net survey in 2021 (CPUE = 0.8) (Table 6). The most recent surveys in 2021 and 2022 showed poor recruitment with no Channel Catfish less than quality size collected. However, an increase in preferred size fish was observed in the 2022 (CPUE = 1.1) gill net survey compared to 2008 (CPUE = 0.0) and 2014 (CPUE = 0.6). The 2021 hoop net survey is the only survey to collect fish in the memorable size class (CPUE = 0.1).

Length frequency histograms from gill nets (Figure 4) and hoop net (Figure 5) indicate an increase in size structure and poor recruitment from each year surveyed. Proportional size distribution (PSD) values also increased for the 2021 and 2022 surveys, indicating an increase in the proportion of larger fish. However, values too high may indicate poor recruitment with few fish present in the smaller size classes (Table 7).

Age data was collected on a subset of Channel Catfish in 2022. Only nine Channel Catfish were collected, therefore, sample size was considered too small to make accurate conclusions. Of the nine fish collected, they grew to a mean length of 23.6 inches by age five and 25.3 inches by age eight (Table 8). The largest fish sampled measured 28.9 (in) and weighed 10.3 (lbs.) collected in the 2021 survey. The oldest Channel Catfish was aged to be eight years old. Natural reproduction has been verified, since the most recent stocking occurred in 2001 (Appendix 1). The historically high abundance of Largemouth Bass is likely a factor in poor recruitment of Channel Catfish.

Overall, relative abundance of Channel Catfish in Prague Lake is considered low, body conditions good and natural reproduction present, however recruitment is low. Historically high abundance of Largemouth Bass is likely a factor in poor recruitment. Harvest is recommended to reduce abundance and increase body conditions and growth rates. No changes are recommended for the Channel Catfish regulations at this time. The purpose of the Oklahoma Department of Wildlife Conservation Channel Catfish stocking program is to establish a self-sustaining population. No stockings are recommended at this time.

Table 5. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Channel Catfish collected by Gill netting from Prague Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 11 in		Quality 16.1 in		Preferred 24 in		Memorable 28 in		Trophy 35.8 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2008	26	5.9	.	.	5.9	87	.	.	.	.	.	.
2014	14	4.2	0.6	95	2.4	93	0.6	96	.	.	.	.
2022	9	1.9	.	.	0.9	94	1.1	90	.	.	.	.

Table 6. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Channel Catfish collected by Hoop netting from Prague Lake. Acceptable Wr values are ≥90.

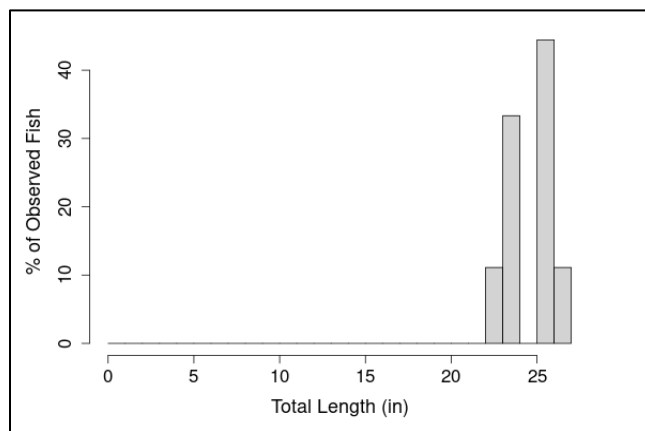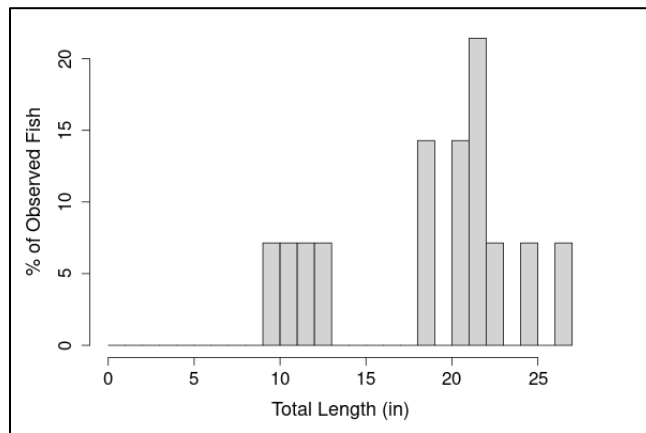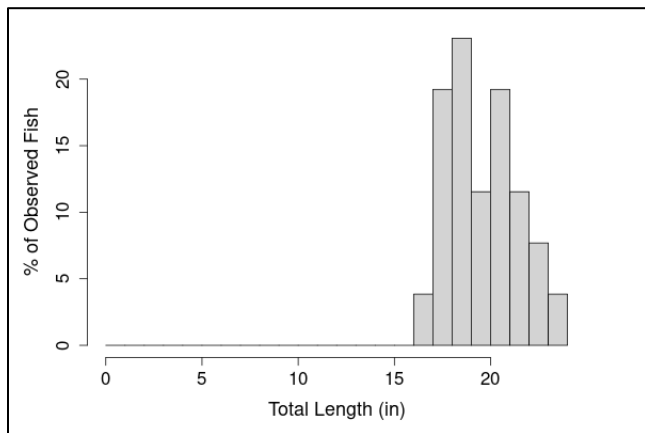|		Total CPUE	Stock 11 in		Quality 16.1 in		Preferred 24 in		Memorable 28 in		Trophy 35.8 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2021	18	0.8	.	.	0.3	94	0.3	93	0.1	100	.	.

Figure 4. Channel Catfish Gill net Length Frequency Histogram for 2008 (top left), 2014 (top right), and 2022 (bottom).
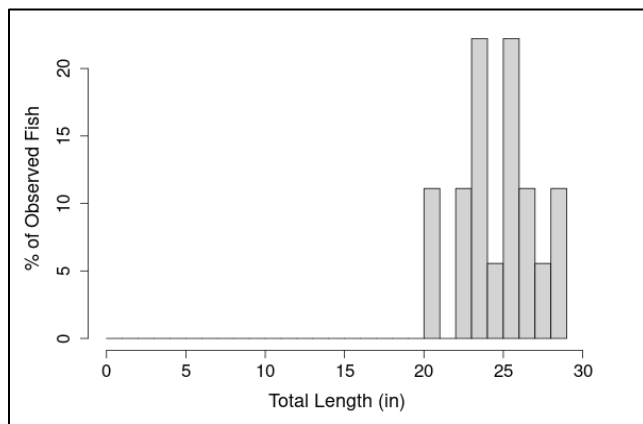

Figure 5. Channel Catfish Hoop Net Length Frequency Histogram for 2021.

Table 7. Proportional Size Distribution (PSD) of Channel Catfish. 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 (16.1 in)	PSD-P (24 in)	PSD-M (28 in)
2008	100	.	.
2014	83	17	.
2021	100	56	17
2022	100	56	.

Table 8. Mean Total Length at age (inches), and L infinity (estimated mean maximum length) for Channel Catfish from Prague 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.
2022	.	.	.	.	23.6	22.7	24.8	25.3	.	.	.	.	.

Crappie

Crappie were surveyed in 2008, 2014 and 2022 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Five stations were randomly sampled for a period of 24 hours during the 2008, 2014, and 2022 surveys. Overall Crappie abundance decreased from 2008 (CPUE=12.1) to 2014 (CPUE=5.1) then slightly increased and was considered moderate in the 2022 (CPUE=6.4) survey (Table 9). Abundance for quality and preferred size fish increased in 2022 compared to 2014 while both stock and memorable size classes decreased. Body conditions in the most recent 2022 survey were above acceptable values for all size classes except for preferred size fish (Wr=81). The 2022 length frequency histogram shows that nearly 47% of the Crappie sampled were eight inches or larger, the minimum size most anglers are willing to keep (Figure 6). The largest fished sampled from the three gill net surveys was from the 2008 survey and measured 15.7 (in) in total length and weighed 2.4 (lbs.) in weight.

Age data was collected on a subset of Crappie from the 2008, 2014, and 2022 surveys. Growth was considered slow but steady for all ages and years surveyed. Mean length at ages varied slightly but increased from 2008-2022 (Table 10). The most recent survey indicated Crappie grew to a mean length of eight inches by age two, 8.9 inches by age three and 13.6 inches by age five. The age frequency histogram for the most recent survey in 2022 indicates a strong 2020 (age two) and 2021 (age one) year classes (Figure 7). Decent recruitment can be observed with nearly 30% of the Crappie sampled were one year of age.

Overall Crappie at Prague Lake had moderate relative abundance, acceptable body conditions for most size classes, slow but steady growth and decent recruitment. No regulation changes are recommended at this time.

Table 9. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of White Crappie collected by Gill netting from Prague Lake. Acceptable Wr values are ≥90.

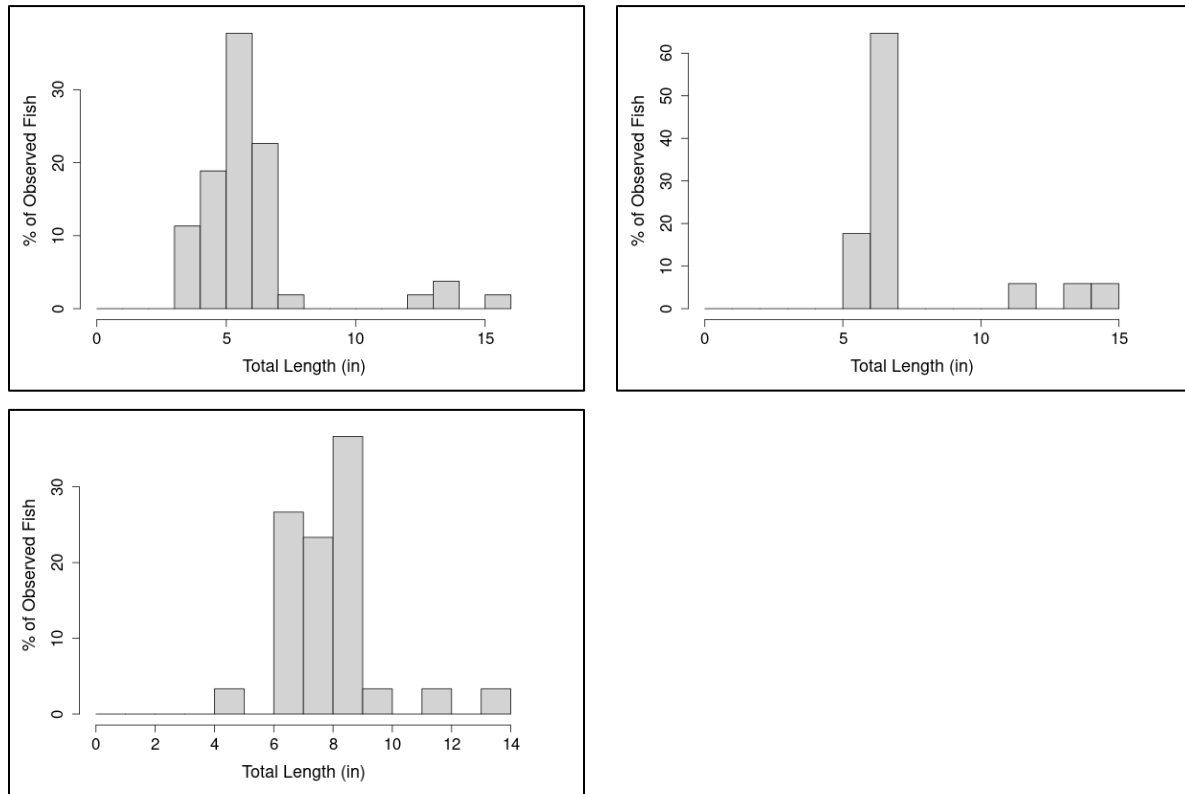|		Total CPUE	Stock 5.1 in		Quality 7.9 in		Preferred 9.8 in		Memorable 11.8 in		Trophy 15.0	
Year	**No.**	**CPUE**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**
2008	53	12.1	6.9	81	.	.	.	.	0.7	103	0.2	102
2014	17	5.1	4.2	93	.	.	.	.	0.9	99	.	.
2022	30	6.4	2.3	91	3.4	94	0.2	81	0.2	109	.	.

Figure 6. White Crappie, Gill Net Length Frequency Histogram 2008 (top right), 2014 (top left), 2022 (bottom).

Table 10. Mean Total Length at age (inches) for White Crappie from Prague Lake.

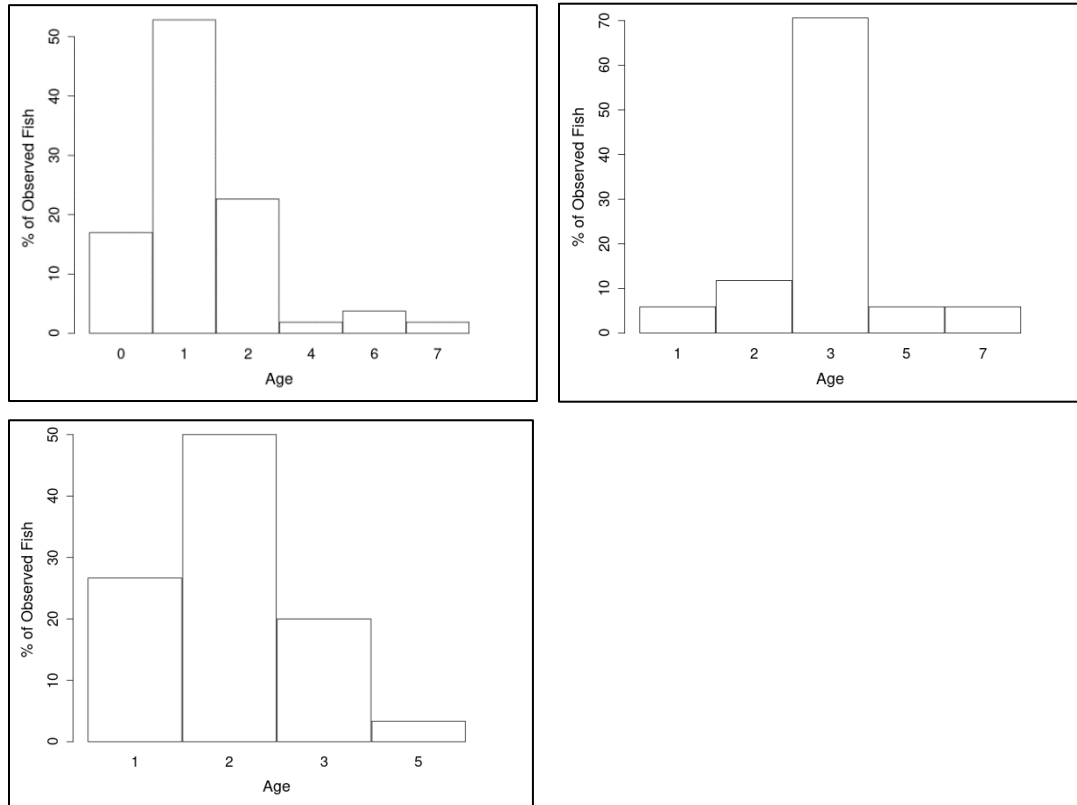| Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8
2008	5.2	6.7	.	12.8	.	13.6	15.7	.
2014	5.2	5.7	7.5	.	6.2	.	14.1	.
2022	6.5	8.0	8.9	.	13.6	.	.	.

Figure 7. 2008 (top right), 2014 (top left) and 2022 (bottom) White Crappie Age Length Frequency.

Gizzard Shad

Gizzard Shad were surveyed in 2008, 2014, and 2022 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Five stations were randomly sampled for a period of 24 hours during the 2008, 2014, and 2022 surveys. Both 2008 (CPUE = 24.9) and 2022 (CPUE = 10.0) showed high abundance of Gizzard Shad, while the 2014 (CPUE = 0.6) survey had low abundance (Table 11). Overall, abundance decreased significantly from 2008 to 2014 then increased to acceptable levels for 2022. Abundance of Gizzard Shad less than six inches in total length for the 2022 (CPUE = 2.8) survey was just above the acceptable level (CPUE = 2.4). The length frequency histogram (Figure 8) for 2022 showed that roughly 35% of the fish surveyed were of optimal forage size for most species, six inches or less.

Table 11. Total number (No.) and catch per unit of effort (CPUE) by size groups of Gizzard Shad collected by gill nets from Prague Lake.

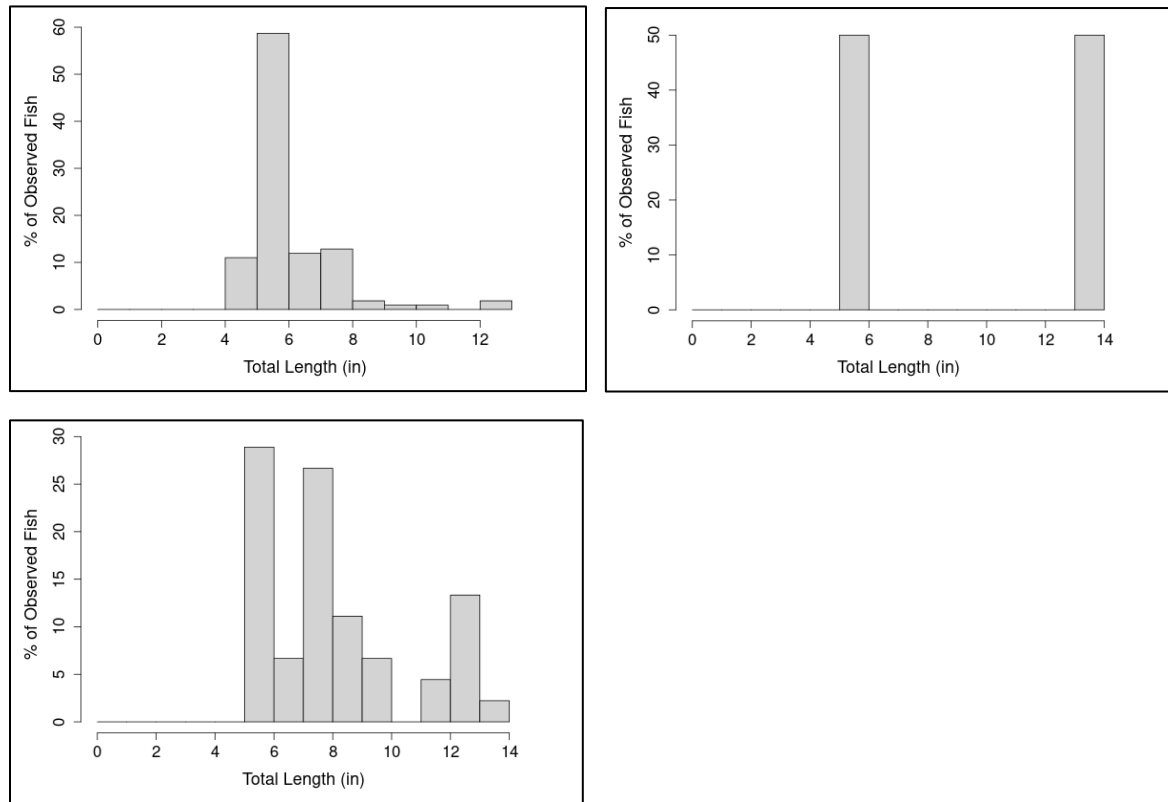| Gizzard Shad				
Year	No.	Total CPUE	<6 inches	>6 inches
2008	109	24.9	17.4	7.5
2014	2	0.6	0.3	0.3
2022	47	10.0	2.8	6.8

Figure 8. Gizzard Length Frequency Histogram from suspended gill nets 2008 (top left), 2014 (top right), and 2022 (bottom).

Appendix 1. Species, number, and size of fish stocked in Prague Lake since 2000.

Date	Species	Number	Size (inches)
2000	Florida Largemouth Bass	6,796	3
	Channel Catfish	6,019	7
2001	Channel Catfish	6,000	7
2002	Florida Largemouth Bass	6,490	3
2004	Florida Largemouth Bass	6,100	3
2012	Florida Largemouth Bass	25,704	1.5
2013	Florida Largemouth Bass	30,700	1.5
2014	Florida Largemouth Bass	31,825	1.5
2016	Florida Largemouth Bass	30,005	1.5
2017	Florida Largemouth Bass	30,030	1.5
2018	Florida Largemouth Bass	30,122	1.5
2020	Florida Largemouth Bass	10,070	1.75
	Florida Largemouth Bass	9,600	1.5
2023	Florida Largemouth Bass	16,965	1.5

Appendix 2. Prague Lake Fish Attractor Locations
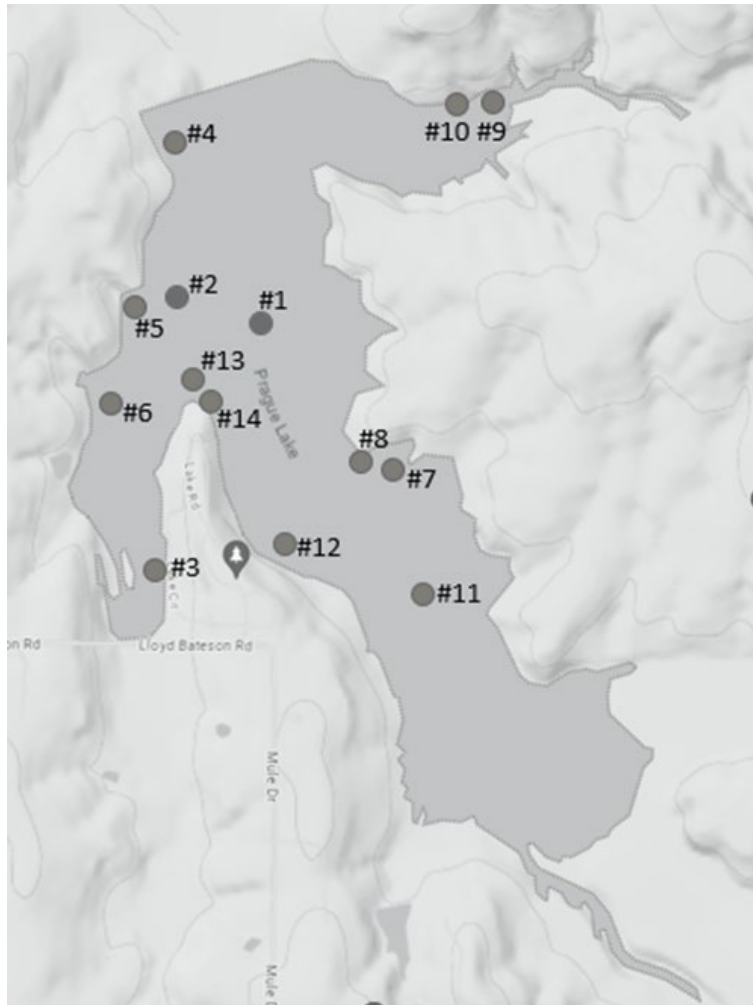
Fish Attractor Site Information for Prague Lake.

Area Name	Site #	Latitude	Longitude	Habitat Type	Marked	Bank Access	Date
Middle of lake	1	35.526944	-96.7225	Brush Pile	Y	N	7/21/2015
West bank	2	35.527222	-96.724722	Brush Pile	Y	N	7/21/2015
West Bank, North of brushpile buoy	3	35.5233	-96.725233	Starfish	Y	N	7/21/2015
West end of dam, tree grove	4	35.530233	-96.724883	Starfish	Y	N	7/21/2015
West Cove, west bank near big brushpile buoy	5	35.52735	-96.725516	Starfish	Y	N	7/21/2015
West Cove, even with north end of boat ramp point	6	35.525383	-96.726233	Starfish	Y	N	7/21/2015
East Cove East bank, west end of small rocky point	7	35.524166	-96.719466	Starfish	Y	N	7/21/2015
East Cove East bank, south side of rocky point	8	35.524283	-96.720183	Starfish	Y	N	7/21/2015
Northeast Cove	9	35.530833	-96.718116	Starfish	Y	N	7/21/2015
Northeast Cove	10	35.530466	-96.71875	Starfish	Y	N	7/21/2015
Old roadbed in East Arm	11	35.522116	-96.71955	Starfish	Y	N	7/21/2015
Pond dam in East Arm	12	35.52265	-96.722016	Starfish	Y	N	7/21/2015
North of boat ramp	13	35.525866	-96.72425	Starfish	Y	N	7/21/2015
North of boat ramp	14	35.52565	-96.7239	Starfish	Y	N	7/21/2015