SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

HENRYETTA (JIM HALL) LAKE

2024

SURVEY REPORT

State: Oklahoma

Project Title: Henryetta (Jim Hall) Lake Fish Management Survey Report

Period Covered: Changes in ODWC standard reporting occurred since the 2007 Survey Report. This report discusses survey results from 2007-2024.

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Date Prepared: January 28, 2025

Henryetta (Jim Hall) Lake

ABSTRACT

Henryetta (Jim Hall) Lake was surveyed by spring electrofishing (2020), fall gill netting (2011, 2015), fall trap netting (2024), and summer catfish electrofishing (2019) techniques to monitor trends in fish populations. Largemouth Bass abundance was low with acceptable body conditions. Channel Catfish abundance remained low, but body condition increased. Blue Catfish abundances and body condition increased. Crappie abundance and size structure increased with a high abundance of fish below five inches in length.

INTRODUCTION

Henryetta Lake, also known as Jim Hall Lake, is located in Okmulgee County approximately 3 miles southeast of Henryetta, Oklahoma. This 450 surface acre lake is owned by the City of Henryetta and was impounded in 1928. The lake has a max depth of 33.5ft and approximately 11 miles of shoreline. Primary uses of the lake are for municipal water supply and recreation.

Henryetta Lake is a relatively shallow and turbid lake. Turbid water conditions have been prevalent for many years, likely due to colloidal clay suspension. In 1980, it was recommended that water level drawdown combined with vegetation seeding be conducted to reduce water turbidity. This was not accomplished, but a natural drawdown and subsequent lake bed revegetation did occur in the early 1980s. However, water clarity failed to increase to any noticeable extent after this event. Secchi disk readings in 1990 ranged from 8-11 inches. Secchi disk readings in more recent years did not appear to show any significant changes in water clarity. Secchi readings from 2011 to 2020 ranged from 5-11 inches. Aquatic vegetation (water willow) has become established in several areas around the lake.

Blue Catfish fingerlings were stocked in 1979, and Channel Catfish fingerlings were stocked annually from 1978 to 1989. No stockings have occurred since this time. Four fish attractor sites have been constructed by the Oklahoma Department of Wildlife Conservation. They consist of Cedar trees made into brush piles to improve angler success and are periodically refurbished (Appendix 1). Fish attractor sites were most recently refurbished in December of 2019. Currently, fishing regulations for Henryetta Lake follow statewide regulations.

Henryetta Lake was surveyed by spring electrofishing (2020), fall gill netting (2011, 2015), fall trap netting (2024), and summer catfish electrofishing (2019) techniques to monitor trends in fish populations.

RESULTS

Largemouth Bass

Largemouth Bass (LMB) were surveyed in spring of 2020 by means of boat electrofishing. Six randomly selected shoreline units were sampled. Overall LMB abundance, catch per unit of effort (CPUE) was considered below average for that of a quality fishery (CPUE=23) (Table 1). This is well below the minimum CPUE of 40 for a quality LMB fishery. 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.

The 2020 Length frequency histogram indicated nearly 45% of the fish sampled were in the 13 and 14 inch length groups, as well as, few fish were present below eight inches in length, indicating poor recruitment from the 2019 year class (Figure 1). Proportional size distribution (PSD) for quality size fish (PSD-Q=82) was slightly higher than desired for a balanced bass population. High PSD-Q indicates a higher proportion of quality and larger size fish. However, if its too high it can indicate poor recruitment with few fish in the smaller size classes (Table 2). Body condition or relative weights (Wr) for all size classes surveyed were above acceptable values of 90 with an overall relative weight of (Wr=98.07) indicating a healthy population (Table 1). The largest fish sampled from the 2020 survey was 18.9 (in) in length and 4.25 (lbs).

Age data was collected on a subset of Largemouth Bass from the 2020 survey. Largemouth Bass growth was moderate, taking approximately three years to reach a mean length of 13.3 inches (Table 3). Growth slows but steadily increases to age six or 16.8 inches. Von Bertalanffy growth curve (Figure 2) gives a visual representation of the predicted growth of Largemouth Bass for Henryetta Lake and estimates the mean maximum length at 18.1 inches. Age frequencies indicate nearly 60% of the observed fish being three years old and 20% being two years old (Figure 3). No fish were observed less than two years old. The black bass harvest size regulation change from a 14 inch minimum to one fish over 16 inches in 2022 with the state wide regulation change. It is also important to note that with the high turbidity of Henryetta Lake, sampling inefficiencies due to lack of visibility could have occurred, leading to the absence of observed recruitment. Future sampling is needed to determine the viability of this assumption and the impact of the regulation change.

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 Henryetta Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 7.9 in		Quality 11.8 in		Preferred 15 in		Memorable 20.1 in		Trophy 24.8	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2020	23	23.0	4.0	90.1	13.0	98.6	5.0	101.2	.	.	.	.

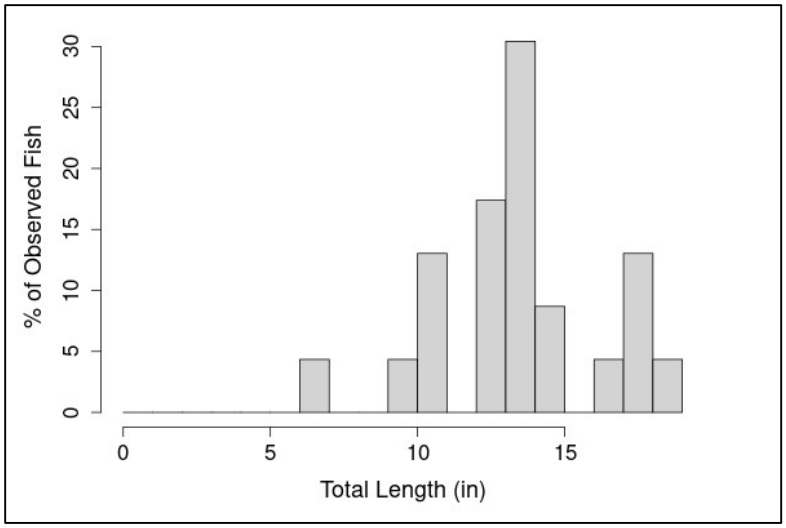


Figure 1. Largemouth Bass Length Frequencies for Henryetta Lake 2020.

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)
2020	82	23	.

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

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	L inf.
2020	.	9.8	13.3	.	.	16.8	17.7	18.1

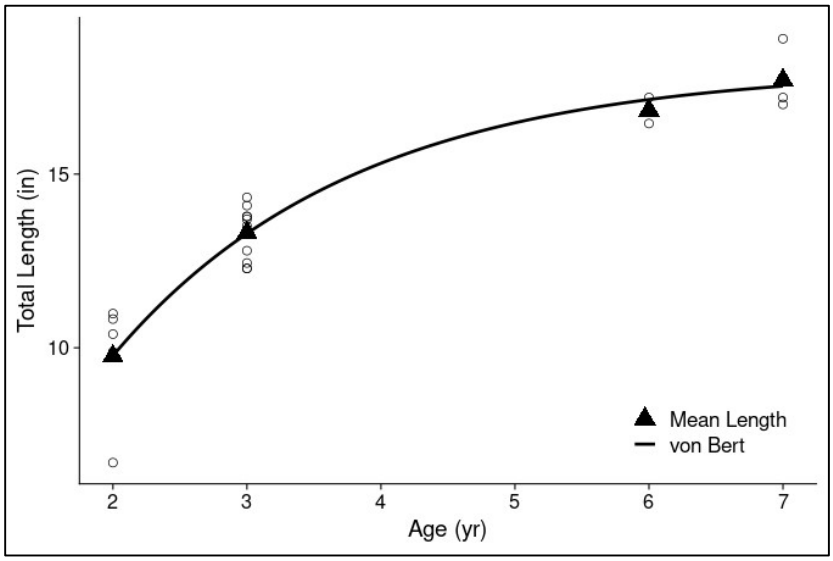


Figure 2. 2020 Largemouth Bass Mean Length at Age: Von Bert Estimated Growth Curve. The Von Bert Growth Curve indicates the estimated growth rate of Largemouth Bass.

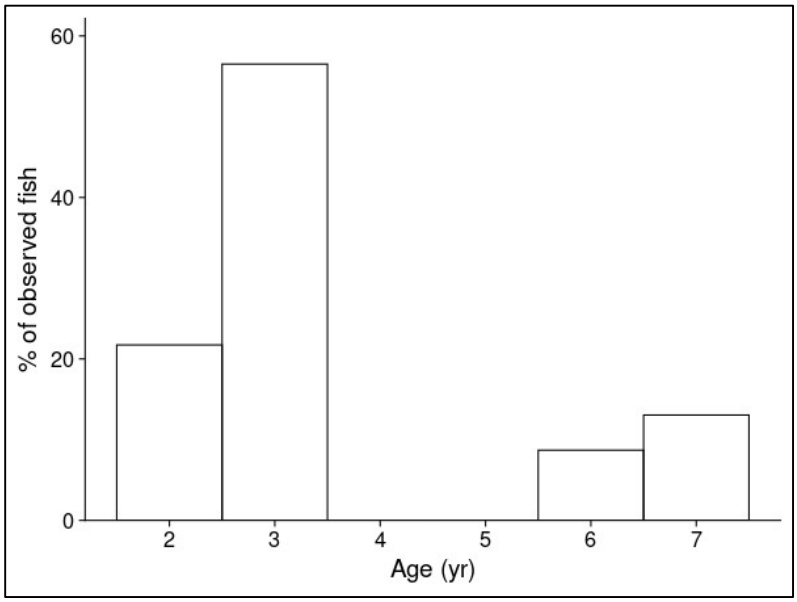


Figure 3. 2020 Age Frequency of Largemouth Bass.

Channel Catfish

Channel Catfish were surveyed in 2011 and 2015 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 2011 and 2015 surveys. Both surveys indicated a low abundance of Channel catfish with a (CPUE =0.3) in 2011, and (CPUE = 4.2) in 2015 (Table 4). Body condition was considered poor in 2011 (Wr=66). However, the only size class collected was substock (Table 4). Body condition increased significantly in 2015. Only quality and substock size fish were collected.

The abundance of Channel Catfish collected in the 2011 survey was too low to generate a viable Length-Frequency Histogram. The 2015 Length-Frequency Histogram showed approximately 70% of observed fish being 5-8 inches and within the substock size class (Figure 4). Proportional size distribution (PSD) values for 2015 (PSD=100) typically would signify a stunt in the population. The absence of fish in larger size classes would indicate fish are not growing past quality size or the potential of overharvest. With out age data, accurate assumptions can not be made. Body conditions for all fish observed were well above what is considered acceptable. Additional surveys are needed to confidently determine the status of the Channel Catfish fishery in Henryetta Lake.

Table 4. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Channel Catfish collected by fall gill netting from Henryetta Lake. Acceptable Wr values are ≥90.

		Total CPUE	Substock 0 in		Stock 11 in		Quality 16.1 in		Preferred 24 in		Memorable 28 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2011	2	0.3	0.3	66	.	.	.	.	.	.	.	.
2015	21	4.2	4.0	130	.	.	0.2	100	.	.	.	.

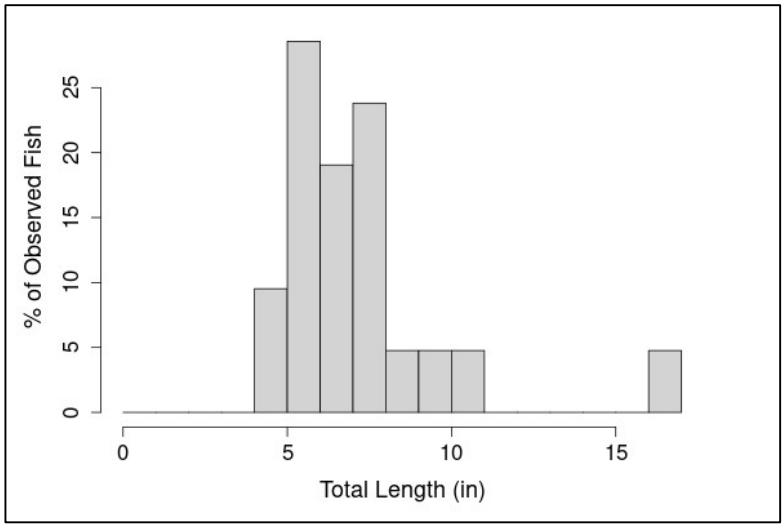


Figure 4. Channel Catfish Gill Net Length Frequency Histogram 2015.

Blue Catfish

Blue Catfish were surveyed in the fall of 2011 and 2015 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 both surveys. Abundance was low in the 2011 survey (CPUE=1.0) but increased in 2015 (CPUE=5.8) (Table 5). Overall body condition was considered acceptable for both surveys, but varied between size classes, dipping to levels slightly below what is considered acceptable for the stock and quality size classes in 2011 (Wr=86) (Wr=83) and for the stock size class in 2015 (Wr=89) (Table 5). The largest fish sampled from the gill net surveys measured 23.8 (in) in total length and weighed 4.5 (lbs.), collected from the 2011 survey.

Blue Catfish were also sampled in the summer of 2019 using low frequency electrofishing techniques. Six randomly selected sites were surveyed for a total of 30 minutes of effort. A total of one hundred and ninety eight Blue Catfish were sampled during the survey (CPUE = 396.0). Body condition for substock (Wr = 107) stock (Wr = 92) and quality (Wr= 99) size fish were considered acceptable (Table 6). No fish were collected in the preferred, memorable, or trophy size classes. Length frequency histograms show that 85% of fish observed were in the substock size class (Figure 5). The largest fish sampled measured 27.6 (in) in total length and 8.8 (lbs) in weight.

Age data was collected on a subset of Blue Catfish from the 2019 survey. Blue Catfish in Henryetta Lake had slow growth, they grew to a mean length of 12.6 inches by age six and 18.6 inches by age ten. Then eventually reaching a mean length of 26.2 inches by age 16 (Table 7). The 2019 age frequency indicated a strong 2018 (age 1) year class, containing nearly 50% of the fish sampled (Figure 6). The oldest Blue Catfish collected was aged to be 16 years old with a mean total length of 26.2 inches.

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

		Total CPUE	Stock 11.8 in		Quality 20.1 in		Preferred 29.9 in		Memorable 35 in		Trophy 44.9 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2011	7	1.0	0.3	86	0.1	83	.	.	.	.	.	.
2015	29	5.8	1.0	89	0.2	99	.	.	.	.	.	.

Table 6. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Blue Catfish collected by Summer Catfish Electrofishing from Henryetta Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 11.8 in		Quality 20.1 in		Preferred 29.9 in		Memorable 35 in		Trophy 44.9 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2019	198	396.0	34.0	92	26.0	99	.	.	.	.	.	.

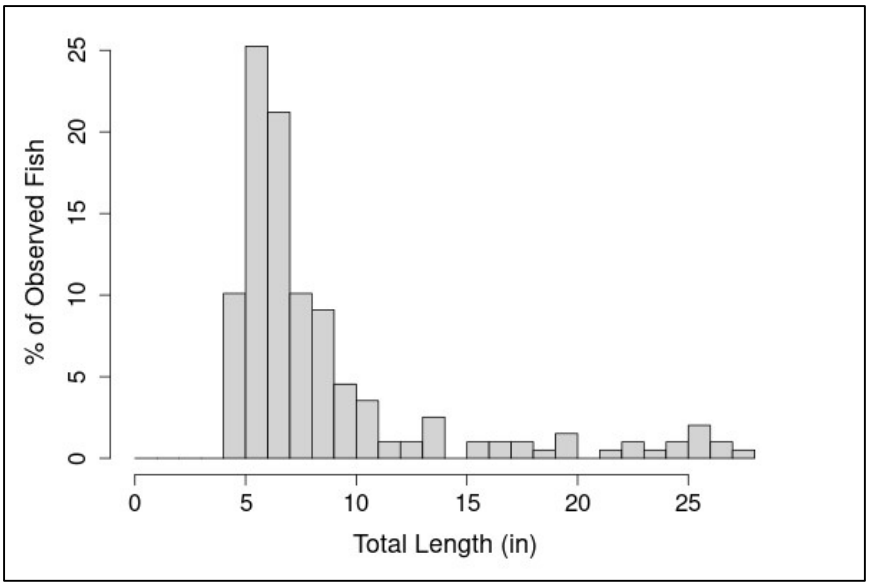


Figure 5. Blue Catfish, Electrofishing Length Frequency Histogram 2019.

Table 7. Mean Total Length at age (inches) for Blue Catfish from Henryetta Lake.

Age	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12	Age 13	Age 14	Age 15	Age 16
2019	5.7	7.1	10.8	8.8	.	12.6	14.0	17.3	19.8	18.6	24.6	21.8	25.0	24.6	26.4	26.2

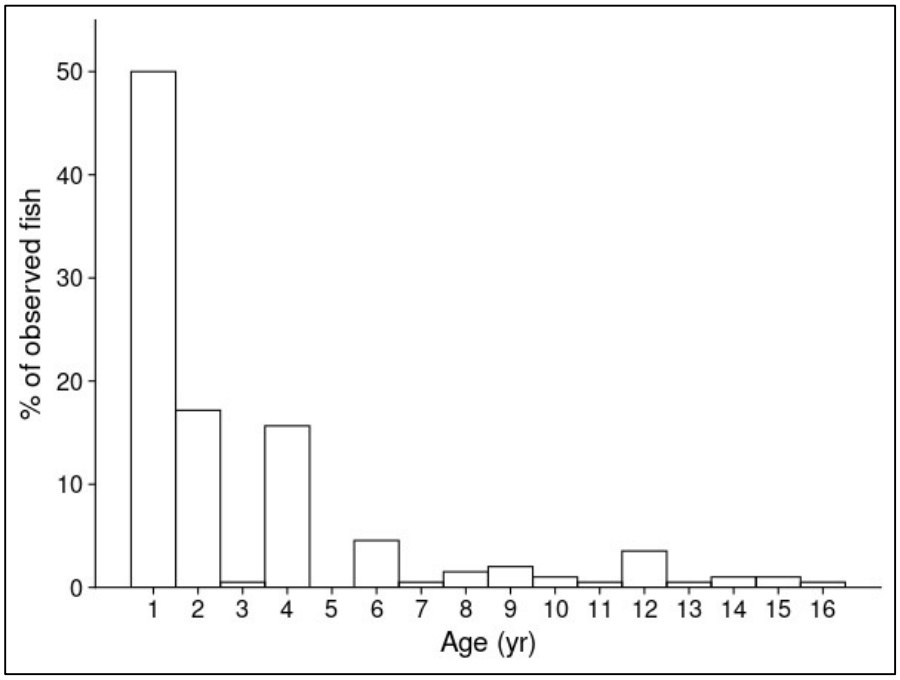


Figure 6. 2019 Blue Catfish, Age Frequency Histogram.

Flathead Catfish

Flathead Catfish were surveyed in 2011 and 2015 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 2011 and 2015 surveys. The 2015 survey indicated a low abundance of Flathead Catfish with a (CPUE = 0.2). No Flathead Catfish were sampled in the 2011 survey (Table 8). One Flathead Catfish was sampled in the 2015 survey and measured 19.8 (in) in total length and 3 (lbs) in weight. Body condition for the fish collected was slightly below what is considered acceptable (Wr=88) (Table 8).

Flathead Catfish were sampled in the summer of 2019 using electrofishing techniques. Six randomly selected sites were surveyed for a total of 30 minutes of effort. A total of two Flathead Catfish were sampled during the survey. Abundance was considered low (CPUE = 4.0) (Table 9). Body conditions were considered excellent for the substock size class fish that was collected (Wr = 104). The largest fish sampled measured 42.6 (in) in total length. A concise weight was unable to be taken on this fish therefore, body condition is unable to be determined.

Table 8. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Flathead Catfish collected by fall gill netting from Henryetta Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 13.8 in		Quality 20.1 in		Preferred 28 in		Memorable 33.9 in		Trophy 40.2 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2011	0	.	.	.	.	.	.	.	.	.	.	.
2015	1	0.2	0.2	88	.	.	.	.	.	.	.	.

Table 9. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Flathead Catfish collected by Summer Catfish Electrofishing from Henryetta Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 11.8 in		Quality 20.1 in		Preferred 29.9 in		Memorable 35 in		Trophy 44.9 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2019	2	4	.	.	.	.	.	.	.	.	2	.

Crappie

Crappie were surveyed in 2011 and 2015 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 2011 and 2015 surveys. Overall Crappie abundance increased to a moderate level from 2011 (CPUE=1.0) to 2015 (CPUE=6.5) (Table 10). Relative abundance and relative weights increased for all size classes. In 2011 overall relative weight was below what is considered acceptable for healthy fish (Wr=79) and increased to an excellent level in 2015

(Wr=99) (Table 10). The 2011 survey lacked the observance of any fish in the quality, memorable, or trophy size classes. In 2015, the only size class not observed was trophy size fish. Although quality size fish were observed in the 2015 survey, body condition was considered poor (Wr=87) (Table 10). The largest fish sampled from both gill net surveys was from the 2015 survey and measured 13.9 (in) in length and 1.7 (lbs) in weight.

Trap nets were also used to sample the Crappie population in Henryetta Lake in 2024. Trap nets are more efficient and typically catch more fish, which gives a greater accuracy due to higher number being sampled. In 2024, fifteen random locations were selected for sampling and fished for a period of 24 hours. Overall abundance was considered high in 2024 (CPUE=53.7) with fish observed in all size classes (Table 11). The Length Frequency Histogram shows that 84% of the fish observed were in the substock size class. This indicates that excellent natural recruitment is occurring (Figure 7). However, body conditions for all fish smaller than those of memorable size (11.8 in) had below what is considered acceptable relative weights (Table 11). The observance of fish of all size classes indicates there is size distribution present, but the low relative weights of smaller fish indicate the carrying capacity or food availability for fish below 11.8 inches in length has been met. The largest fish sampled from the 2024 trap net survey was 15.6 (in) in length and 2.3 (lbs) in weight.

Age data was collected on a subset of Crappie from the 2015 gill net survey and the 2024 trap net survey. Growth appeared to be slow for both surveys, taking two years to reach approximately 5.5 inches. After age three growth rates increased slightly with an average of 13.8 inches being reached by age five (Table 12).

Table 10. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall gill netting from Henryetta 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
2011	7	1.0	0.3	74	.	.	0.1	95	.	.	.	.
2015	34	6.8	2.2	93	0.4	87	0.4	96	2.2	105	.	.

Table 11. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of Crappie collected by fall trap netting from Henryetta 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
2024	824	53.7	5.0	82	0.5	85	1.2	85	1.4	91	0.1	103

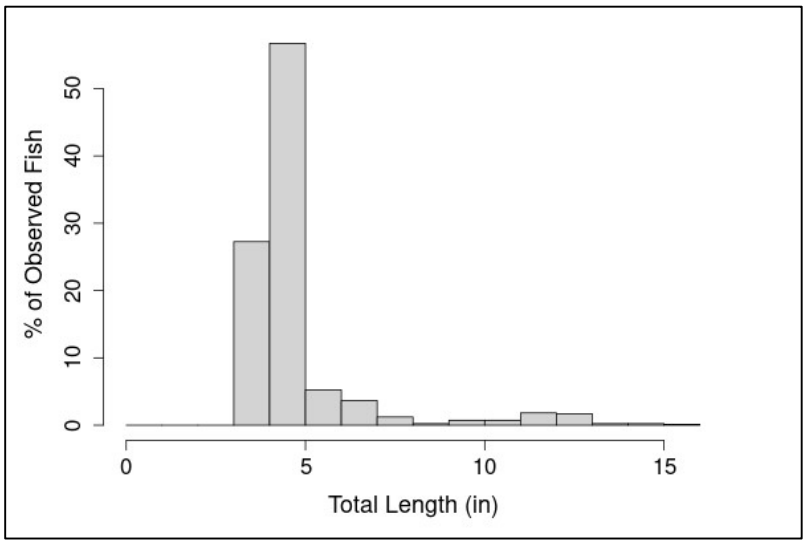


Figure 7. Crappie, Trap Net Length Frequency Histogram 2024.

Table 12. Mean Total Length at age (inches) for Crappie from Henryetta Lake.

Year	Age 1	Age 2	Age 3	Age4	Age 5	Age 6
2015	5.1	5.5	9.6	9.3	12.8	12.9
2024	4.2	5.8	8	10	15	13.6

Shad

Gizzard Shad were sampled by suspended gill nets in 2011 and 2015. 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 2011 and 2015 surveys. No Gizzard Shad were observed in the 2011 survey. Fifty two Gizzard Shad were collected in the 2015 survey (CPUE=10.4) (Table 13). Length frequency histograms (Figure 8) and CPUE's for the 2015 survey show the majority of shad are larger than six inches in length. Optimal forage size for most species is six inches or less.

Gizzard Shad are a major part of most sport fish species diets. While boom and bust years for most fish species are common, continued low abundance of Gizzard Shad will have negative effects on Henryetta Lake fish populations. It is important to note the possibility of suspended gill net gear inefficiencies on capturing fish under six inches in length.

Table 13. Total number (No.) and catch per unit of effort (CPUE) by size groups of Gizzard Shad collected by fall gill netting from Henryetta Lake.

Gizzard Shad				
Year	**No.**	**Total CPUE**	**<6 inches**	**≥6 inches**
2011	0	.	.	.
2015	52	10.4	0.8	9.6

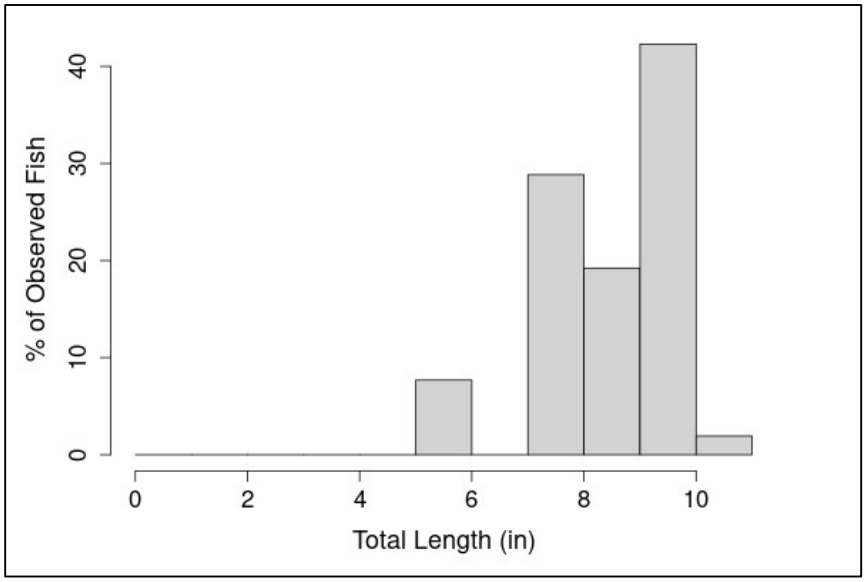
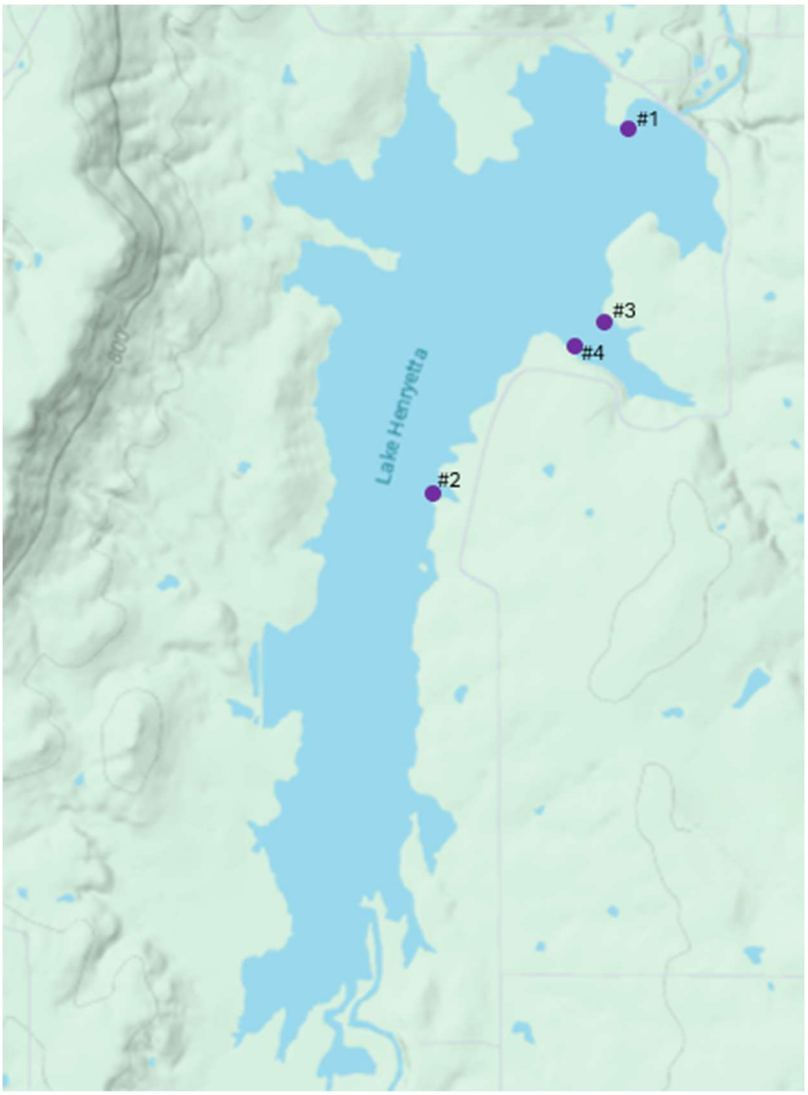


Figure 8. Gizzard Length Frequency Histogram from suspended gill nets 2015.



Appendix 1. Henryetta Lake Fish Attractor Locations

Fish Attractor Site Information for Henryetta Lake.

Area Name	Site #	Latitude	Longitude	Habitat Type	Marked	Bank Access	Date Installed	Date Refurbished
Dam ramp	1	N35.417518	W-95.923643	Cedar Trees	Y	Y	4/6/2016	12/4/2019
Legion Point #1	2	N35.40605	W-95.9308	Cedar Trees	Y	Y	4/6/2016	12/4/2019
Legion Point #2	3	N35.411416	W-95.9245	Cedar Trees	Y	Y	4/6/2016	12/4/2019
South Camping Area	4	N35.4108	W-95.925866	Cedar Trees	Y	Y	4/6/2016	12/4/2019