SURVEY REPORT
OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS FOR FOSS LAKE 2024

SURVEY REPORT

State: Oklahoma

Project Title: Foss Reservoir Fish Management Survey Report

Period Covered: 2013-2024

Prepared by: Dalton Norris

Date Prepared: December 2024

FOSS RESERVOIR

ABSTRACT

Foss Reservoir was sampled in 2013, 2015, 2016, 2018, 2017, 2019, 2020, 2021, 2022, and 2024 by fall gill netting to evaluate the status of the walleye, white bass, and hybrid striped bass populations. Walleye catch rates are slightly above the statewide average, and stocking efforts are being used to try and increase these catch rates. The walleye data shows that fish body condition is average compared to the rest of Oklahoma. Hybrid striped bass had a high relative abundance and proportional size distribution indicating that individuals were of favorable size for anglers.

INTRO

Foss Lake, located in Custer County, was constructed in 1961 by the Bureau of Reclamation to serve as a flood control, irrigation, municipal water supply, and fish and wildlife recreation reservoir. The reservoir is also a major waterfowl stop with the Washita National Wildlife Refuge providing a wintering resting area. Foss covers 8,800 acres at normal pool and has a storage capacity of 256,220 acre feet. The drainage area is 1,496 square miles. Foss Lake impounds the Washita River with an annual exchange rate of 0.29. The secchi disk reading in the main pool is around 38 inches. Foss has a mean depth of 23 feet and a maximum depth of 89 feet. There is 63 miles of shoreline with a shoreline development ratio of 4.79. Prevailing winds are from a southerly direction at 12 mph. Typical annual fluctuation is 2 feet.

Fish habitat consists primarily of rip-rap along the dam, Cutberth, north side, and marina camping areas. Beds of American pondweed and water willow are present near Little Panther boat ramp and the marina. These weed beds appear to be expanding. Habitat is lacking and numerous man-made fish attractors have been added consisting mainly of cedar brush piles (Appendix 1).

Popular sport fish found in Foss include walleye, white bass, hybrid striped bass, crappie, channel catfish, largemouth bass, and smallmouth bass. A history of the largemouth bass population shows a booming population in the early years as the lake slowly stage filled. Upon reaching normal pool elevation with lack of new shoreline cover, bass densities dropped, and recruitment was low. Currently, the bass population is rebounding with habitat improvements and expanding natural weed beds. Walleye and hybrid striped bass are stocked regularly to maintain populations (Appendix 2). Foss primary productivity is poor. This lack of nutrients from the watershed along with a phosphorus deficiency can be seen in the lower abundance of gizzard shad forage and unsatisfactory relative weights of predatory species.

A creel survey has been started on Foss Lake that is examining harvest, catch rate, usage, and angler satisfaction of the fishery.

RESULTS

WALLEYE

Walleye gillnet sampling on Foss Reservoir took place in the fall of 2013 through 2024. These fall gillnet samples were conducted following Standard Sampling Procedures for Fisheries Management. The experimental gillnets that were used were made up from monofilament with mesh sizes of 1.9-6.4 cm. The gill nets were 24 meters long and 1.8 meters deep with a float line and a lead line to ensure the net is deployed properly. Sampling locations for the nets were selected randomly by 300m^2 grids and an ideal water depth of less than 4.5 meters.

Catch per unit effort (CPUE) values for walleye samples were slightly above the statewide average. The highest CPUE value was recorded in 2019 with a value of 7.62. The lowest CPUE value recorded was in 2024 with a value of 1.20. The statewide CPUE value for walleye gill net surveys is CPUE=1.39. Two surveys (2020, 2024) was below the statewide average. This indicates that the catch rate and population of walleye in Foss Lake is higher than the average of Oklahoma (Table 1).

Relative weight (Wr) values for walleye gill net surveys were over the favorable value of Wr=80 except for the preferred size class and the survey from 2013. This shows that most of the individuals caught had a good body condition. The statewide average Wr value for walleye gill net surveys is Wr=90. Most of the size classes for Foss Reservoir were above or very close to Wr=90 indicating that the body condition is average compared to the state of Oklahoma average (Table 1).

In the survey from 2022, the L infinity value was much larger than previous years with age data available. This value is unreasonable and likely reflects the limited and highly variable growth data from 2022 (Table 2).

The proportional size distribution (PSD) and proportional size distribution of preferred (PSD-P) values were highest in 2018 with a PSD value of 81 and a PSD-P value of 12. The lowest PSD value was recorded in 2013 with a value of 5. The statewide average PSD value for walleye gill net surveys is PSD=66. That number was met in 2018, 2019, and 2024. This indicates that there are less individuals that are of favorable size for angler to catch than the average of individuals caught in Oklahoma (Table 3).

It is recommended that Foss Reservoir is surveyed annually for walleye to evaluate the status of the fishery. It is also recommended that Foss is stocked at the same rate of 125 fish per acre annually.

Table 1: Total number (No), catch per unit effort (CPUE), and relative weights (Wr) by size group of Walleye collected in gill net surveys from Foss Reservoir.

		Total CPUE	Substock <250mm		Stock 250mm		Quality 380mm		Preferred 510mm	
Year	**No**	**CPUE**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**
2024	17	1.20	-	-	0.28	91.78	0.91	85.27	-	-
2022	32	2.66	0.08	137.57	1.57	89.07	0.92	88.99	0.08	57.93
2021	39	3.30	0.80	88.62	0.90	89.41	1.50	88.40	0.10	77.15
2020	24	1.28	-	-	0.48	93.59	0.64	92.93	0.16	84.47

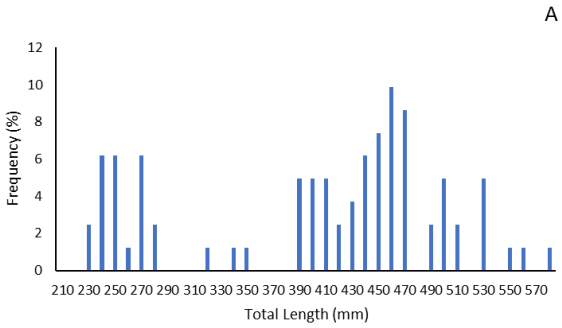
2019	81	7.62	0.5	97.03	1.41	97.47	4.07	98.6	0.75	95.11
2018	38	3.58	0.19	92.47	0.66	96.24	2.54	92.88	0.19	93.80
2017	15	1.44	-	-	0.77	98.04	0.67	84.03	-	-
2016	19	1.69	0.27	94.58	1.33	80.74	0.09	98.59	-	-
2015	32	3.15	0.59	92.23	2.36	95.47	0.2	94.16	-	-
2013	24	1.83	0.38	78.01	1.37	78.51	0.08	79.65	-	-

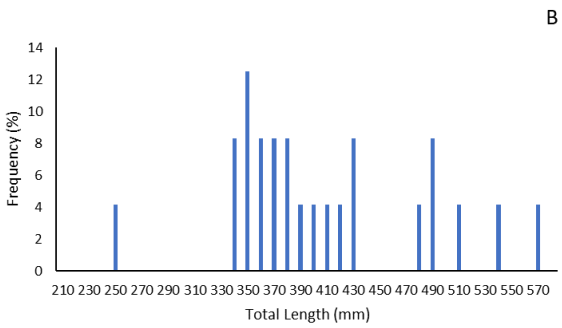
Table 2: Mean total length at age (mm) and L infinity (estimated mean maximum length) for Walleye collected from Foss Reservoir gillnet surveys.

Year	Age 0	Age 1	Age 2	Age 3	Age 4	L inf
2024	265.00	363.67	406.14	452.75	474	526.445
2022	271.38	352.35	449.2	514	-	1376.914
2021	277.37	408.08	447	-	-	
2020	257	387.82	485	558.5	-	774.314
2019	259.85	398.67	457	499.9	532	540.825
2018	259.22	-	430	461.44	-	497.035

Table 3: Proportional Size Distribution (PSD) and Proportional Size Distribution of Preferred (PSD-P) for Walleye collected from Foss Reservoir gillnet surveys.

Year	PSD	PSD-P
2024	76	-
2022	39	3
2021	64	4
2020	62	12
2019	77	12
2018	81	6
2017	47	-
2016	6	-
2015	8	-
2013	5	-





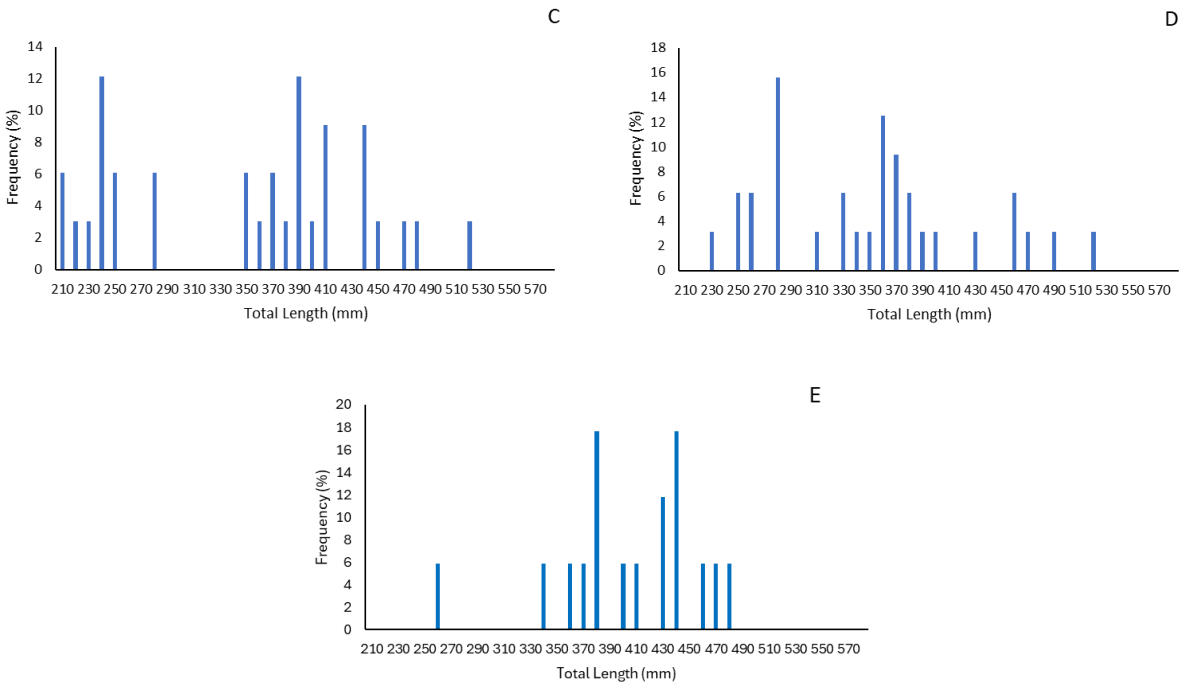


Figure 1: Walleye Length Frequencies for Foss Reservoir 2019(A), 2020(B), 2021(C), 2022(D), and 2024(E).

WHITE BASS

White bass sampling on Foss Reservoir took place in the fall of 2013 through 2024. Standard Sampling Procedures for Fisheries Management were followed for the gillnet surveys conducted at Foss. Gillnets that were used were made up from monofilament line with mesh sizes of 1.9-6.4 cm. Gillnets were 24 meters long and 1.8 meters deep with a float line and a lead line to ensure the net is deployed properly and proper buoyancy was achieved. Sampling locations for the nets were selected randomly by 300m^2 grids and an ideal water depth of less than 4.5 meters.

White bass catch per unit effort (CPUE) values varied from zero in 2021 and 2020 (CPUE=0) to very low in 2022 (CPUE=0.08) to very high in 2015 (CPUE=41.28). The CPUE value is much lower than other years sampled due to only one individual being collected. The statewide average CPUE value for white bass gill net surveys is CPUE=5.03. This average CPUE value was not met in 2024, 2022, 2021, 2020, and 2018. All other years of sampling, it was met or exceeded (Table 4).

Relative weight (Wr) values for white bass gill net surveys on Foss Reservoir were lower on than the favorable Wr=80 value on three occasions. These occasions took place in 2019, 2017 and 2013. The statewide average Wr value for white bass gill net surveys is Wr=90. Excluding the tree outliers mentioned before, the Wr values for white bass were over or very near the statewide average. This indicates that the body condition of white bass in Foss Reservoir is similar to the statewide average body condition (Table 4).

The highest proportional size distribution (PSD) value for white bass ranged from 100 (2022, 2024) to 56 in 2015. The proportional size distribution of preferred (PSD-P) values ranged from 100 in 2022 to 28 in 2015. The statewide average PSD value for white bass gill net surveys is PSD=84. That average PSD value was met in 2022, 2018, 2017, and 2016 indicating that in those years there were more individuals of a favorable size to anglers (Table 5).

It is recommended that Foss Reservoir is annually gill net sampled for white bass to evaluate the status of the fishery. Restocking efforts will continue until a quality fishery is realized.

Table 4: Total number (No), catch per unit effort (CPUE), and relative weights (Wr) by size group of White Bass collected in gill net surveys from Foss Reservoir.

		Total CPUE	Substock <150mm		Stock 150mm		Quality 230mm		Preferred 300mm		Memorable 380mm		Trophy 460mm	
Year	**No**	**CPUE**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**
2024	10	0.72	-	-	-	-	0.14	97.38	0.07	83.06	0.50	97.31	-	-
2022	1	0.08	-	-	-	-	-	-	0.08	114.2	-	-	-	-
2021	0	0.00	-	-	-	-	-	-	-	-	-	-	-	-
2020	0	0.00	-	-	-	-	-	-	-	-	-	-	-	-
2019	197	18.54	0.33	79.56	4.48	89.94	3.24	95.39	1.83	103.76	6.48	99.62	-	-
2018	49	4.61	0.09	89.16	0.38	86.82	-	-	3.86	93.98	0.28	88.26	-	-
2017	95	9.33	0.85	97.91	1.26	87.21	0.88	87.12	5.84	88.87	0.5	77.81	-	-
2016	111	9.87	0.27	-	1.24	-	4.8	-	3.38	-	0.18	-	-	-
2015	422	41.28	0.49	-	17.96	-	11.43	-	5.39	-	5.9	-	0.1	-
2013	83	6.39	0.08	93.21	1.83	91.71	2.48	84.46	1.83	86.56	0.08	83.19	0.08	76.06

Table 5: Proportional Size Distribution (PSD), Proportional Size Distribution of Preferred (PSD-P), Memorable (PSD-M), and Trophy (PSD-T) for White Bass collected from Foss Reservoir gillnet surveys.

Year	PSD	PSD-P	PSD-M	PSD-T
2024	100	80	70	-
2022	100	100	-	-
2021	-	-	-	-
2020	-	-	-	-
2019	72	52	40	-
2018	92	92	6	-
2017	85	74	6	-
2016	87	37	2	-
2015	56	28	15	-
2013	71	32	2	1

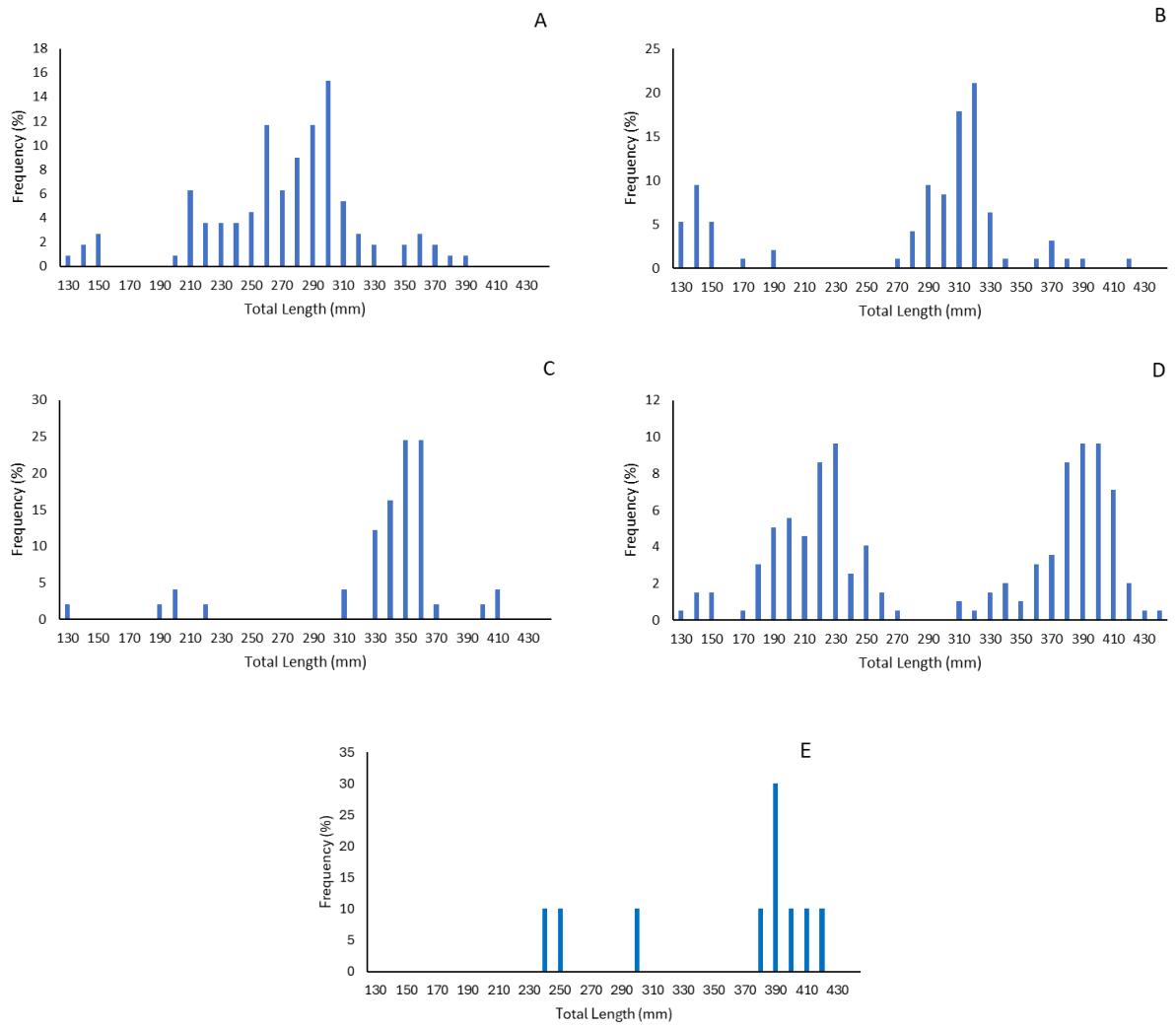


Figure 2: White Bass Length Frequencies for Foss Reservoir 2016(A), 2017(B), 2018(C), 2019(D), and 2024(E).

HYBRID STRIPED BASS

Hybrid striped bass sampling on Foss Reservoir took place in the fall of 2013 through 2024. All surveys conducted at Foss Reservoir followed Standard Sampling Procedures for Fisheries Management. Gillnets that were used were made up from monofilament line with mesh sizes of 1.9-6.4 cm. Gillnets were 24 meters long and 1.8 meters deep with a float line and a lead line to ensure the net is deployed properly and proper buoyancy was achieved. Sampling locations for the nets were selected randomly by 300m^2 grids and an ideal water depth of less than 4.5 meters.

Hybrid striped bass catch per unit effort (CPUE) values ranged from 2.85 in 2024 to 15.73 in 2016. The statewide CPUE value for hybrid striped bass gill net surveys is CPUE=5.34. This statewide average was exceeded every year that Foss Reservoir was surveyed except for the 2024 survey. The catch rate for Foss Reservoir is higher than the average catch rate in Oklahoma (Table 6).

Relative weight (Wr) values for Foss Reservoir hybrid striped bass were above the favorable value of Wr=80 in the last five years sampled, excluding the individuals collected in 2019 and 2024 in the memorable size class. This Wr≥80 indicates that the hybrid striped bass have a good body condition. The statewide average Wr value for hybrid striped bass gill net surveys is Wr=87. This average value was achieved in most size classes in each year sampled indicating that the Foss Reservoir hybrid striped bass fishery is close to average with Oklahoma when examining body condition (Table 6).

The L infinity value for 2022 was the highest at 629.579. This value is higher than other years with age data. The higher value indicates that individuals collected in that sample year have a higher estimated mean maximum length (Table 7).

Proportional size distribution (PSD) values ranged from 9 in 2016 to 98 in 2018, 2019, 2022, and 2024. The statewide average PSD value for hybrid striped bass gill net surveys is PSD=55. The only year that this average was not met was the very low year of 2016. The PSD values from Foss Reservoir were much higher than the statewide average PSD value. This indicates that Foss has a much higher proportion of individuals that are favorable to anglers to catch (Table 8).

It is recommended that Foss Reservoir is annually gill net surveyed to evaluate the status of the hybrid striped bass fishery. It is also recommended that Foss is stocked at the same rate of 5 fish per acre every other year.

Table 6: Total number (No), catch per unit effort (CPUE), and relative weights (Wr) by size group of Hybrid Striped Bass collected in gill net surveys from Foss Reservoir.

		Total CPUE	Substock <250mm		Stock 250mm		Quality 410mm		Preferred 510mm		Memorable 610mm	
Year	**No**	**CPUE**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**	**CPUE**	**Wr**
2024	40	2.85	-	-	0.07	82.99	1.43	90.50	1.29	83.09	0.07	77.37
2022	121	10.39	-	-	0.25	92.07	9.18	95.01	0.96	86.15	-	-
2021	123	12.30	-	-	5.20	90.33	4.80	90.10	2.30	81.41	-	-
2020	102	5.44	0.48	87.99	0.96	90.94	1.44	94.44	2.56	87.23	-	-
2019	124	11.67	0.5	83.05	0.17	95.24	0.66	84.13	8.89	91.33	0.08	71.21
2018	131	12.33	-	-	0.28	84.54	10.54	85.74	1.51	80.70	-	-
2017	111	10.86	0.1	83.76	2.14	82.92	7.15	83.92	1.47	73.7	-	-
2016	177	15.73	0.36	76.98	14.04	80.2	0.44	83.7	0.89	70.81	-	-
2015	62	6.05	0.2	92.6	0.89	93.01	1.65	89.43	3.32	85.32	-	-
2013	94	7.24	-	-	0.72	80.24	5.04	79.9	1.28	70.73	-	-

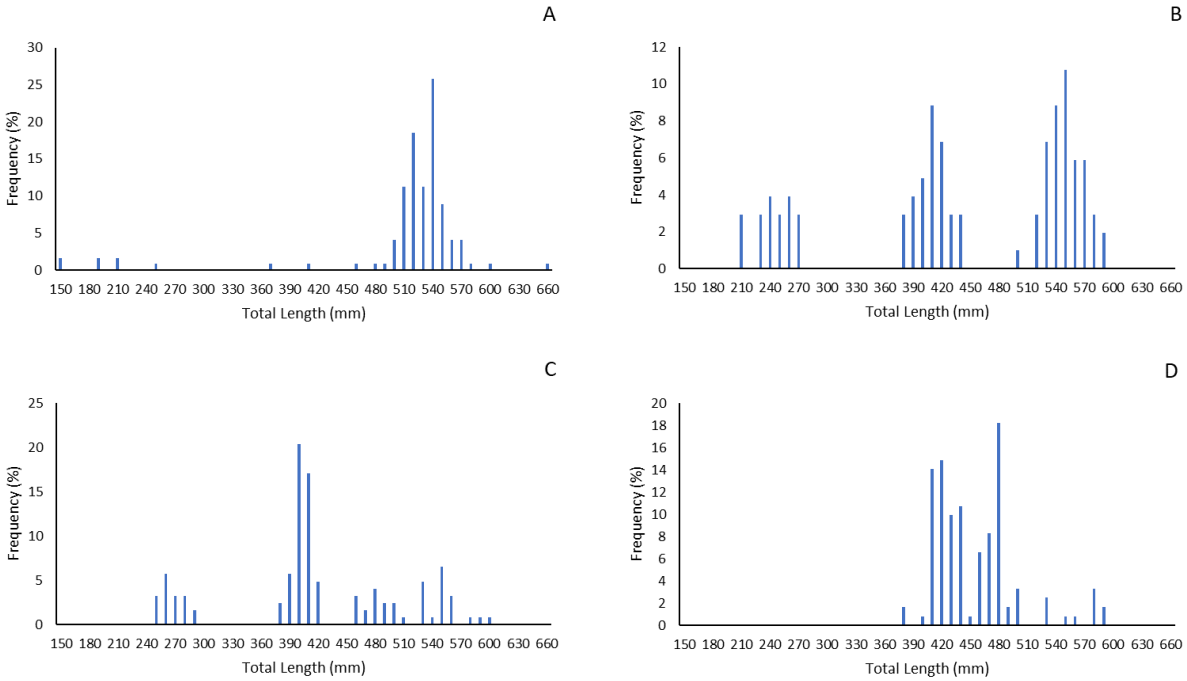
Table 7: Mean total length at age (mm) and L infinity (estimated mean maximum length) for Hybrid Striped Bass collected from Foss Reservoir gillnet surveys.

Year	Age 0	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 8	L inf
2024	-	429.25	-	508.87	546.33	585.00	-	-	-
2022	-	429.06	480.06	-	-	-	-	-	629.579
2021	271.85	406.41	487.27	-	-	-	550.8	-	-
2020	249.95	416.5	-	-	-	550.87	-	-	568.051
2019	198.57	-	-	-	538.95	552	-	668	595.022

2018	-	-	-	485.24	534.50	535.25	-	-	634.91

Table 8: Proportional Size Distribution (PSD), Proportional Size Distribution of Preferred (PSD-P), and Memorable (PSD-M)for Hybrid Striped Bass collected from Foss Reservoir gillnet surveys.

Year	PSD	PSD-P	PSD-M
2024	98	48	2
2022	98	9	-
2021	58	19	-
2020	81	52	-
2019	98	92	1
2018	98	12	-
2017	80	14	-
2016	9	6	-
2015	85	57	-
2013	90	20	-



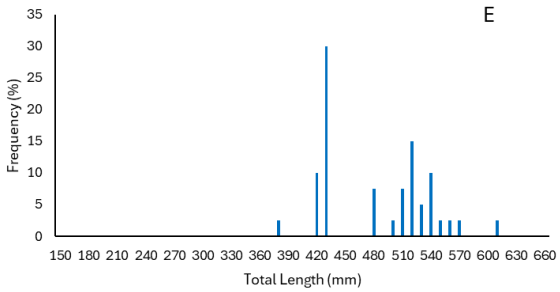


Figure 3: Hybrid Striped Bass Length Frequencies for Foss Reservoir 2019(A), 2020(B), 2021(C), 2022(D), and 2024(E).

Foss Lake Fish Attractors

12/28/2023, 11:05:10 AM

FishAttractors

- Brush Pile
- Gravel Pile
- Pallet
- PVC Structure
- Spider Blocks
- Sunken Boat
- Tire Reefs
- Combination
- Other
- Unknown

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

APPENDIX 1

Year	Species	Number	Size (mm)
2024	White Bass	350	Adult
	Walleye	1,100,000	6.35
2023	Walleye	1,100,000	6.35
	Hybrid S.B.	44,225	38.1
2022	Walleye	1,100,000	6.35
	White Bass	250,000	6.35
	White Bass	155	Adult
2021	White Bass	200	Adult
	Walleye	1,151,499	6.35
	Hybrid S.B.	31,622	38.1
	Hybrid S.B.	12,430	44.45
2020	Hybrid S.B.	44,632	43.18
2019	Walleye	1,266,693	6.35
	Hybrid S.B.	43,357	38.1
2018	Walleye	1,100,000	6.35
2017	Walleye	800,000	6.35
2016	Walleye	1,190,000	6.35
2015	Walleye	1,100,000	6.35
	Hybrid S.B.	700,000	6.35
2014	Walleye	2,200,000	6.35
	Hybrid S.B.	20,000	38.1
2013	Walleye	2,200,000	6.35

APPENDIX 2