

SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

Broken Bow LAKE

State: Oklahoma

Project Title: Broken Bow Fish Management Survey Report

Period Covered: 2025

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Date Prepared: January 2026

ABSTRACT

Catch rates for all basses were low compared to previous samples owing to high water levels. Only 2 smallmouth bass were sampled. Bass relative weights continue to be low for all species. Despite the lower catch rates no large size structure shifts were observed. Further sampling will need to be conducted to compare to previous years which would necessitate normal water levels during targeted sampling temperatures and conditions. Walleye were sampled in many areas using gillnets. While their catch rates were low, it is encouraging to sample them in many areas instead of a few very concentrated locations.

INTRODUCTION

Broken Bow Reservoir impounds the Mt. Fork River, 14.5 km north of Broken Bow in McCurtain County, Oklahoma. Broken Bow Reservoir covers 5,680 surface hectares and construction was completed in 1968 by the U.S. Army Corps of Engineers (USACE). The south end of the lake is leased by Beavers Bend State Park from the USACE.

Broken Bow Reservoir has a mean depth of 19.7 m and a maximum depth of 54.8 m. The depth of the lake results in an abundance of cold water being stored at deeper depths. The lake has a shoreline development ratio of 10.8, a water exchange rate of 1.0 and a Secchi disc visibility of around 304.8 cm in the main pool in August; turbidity is primarily from plankton. Fish habitat consists primarily of rock and some flooded timber.

There are five boat ramps within in the state park including the marina. There are two additional ramps, one at Holly Creek, and one in the McCurtain County Wilderness Area. Two boat ramps in the state park, Carson Creek and Stephens Gap, are boating fishing access project ramps made possible through the Oklahoma Department of Wildlife Conservation (ODWC) and maintained by the state park. Additionally, the boat ramp in the wilderness area was developed and maintained by ODWC.

Broken Bow has 5 bass species including Largemouth Bass, Smallmouth Bass, Spotted Bass, White Bass, and Hybrid Striped Bass. Broken Bow is stocked with Florida-strain Largemouth Bass every year and are known to grow over 14 lbs. Smallmouth Bass are present but in low numbers. Spotted Bass are commonly caught and routinely harvested by anglers. Broken Bow has a well established White Bass fishery with thousands of fish harvested during spawning runs with large individuals common. Hybrid Striped Bass were introduced to Broken Bow in 2016 with 85,000 fingerlings stocked.

The Walleye fishery in Broken Bow lake is growing in popularity but is far behind the Bass, Crappie, Catfish, and Hybrid fishery in popularity. However, a few anglers do target walleye when available with the majority of anglers targeting them in the Southeast region of the lake and a few select rocky islands in the southern third of the lake. Given the low population few walleye are encountered in gillnets and walleye are opportunistically collected when they are encountered. The largest individual encountered by sampling crews was a 4 Kilogram female sampled in the spring in the upper lake. The female had assumedly swum upstream to spawn. Her egg masses weighed over 450 grams.

RESULTS

Largemouth Bass

2025 Black Bass electrofishing results are somewhat atypical owing to high water levels during sampling. 2025 Catch Per Unit Effort (CPUE) were the lowest on record (table 1) with catch rates low for all size classes (table 2). Compared to many samples the length of Largemouth Bass in our Broken Bow sample does not follow the typical normal distribution, likely owing to difficulties sampling with high water levels (figure 1). Interestingly, Proportional Stock Density remained steady over the last 7 years despite low catch rates (table 3). This is encouraging as it indicates that the size structure is stable despite issues with fish collection. Relative Weight (Wr) continues to be low for Largemouth Bass (table 4). Despite Largemouth Bass relative weight being the highest since prior to 2012, it is still below standards. Average length at age was lower than most previous samples for all fish ages except age 3 (table 5). Overall, length at age metrics were decent but not great. Largemouth bass weight at age was very good for age 3 individuals but lower than preferred at all other ages (table 6). While length and weight were low, growth as measured by Von Bertalanffy metrics were average with a K coefficient of 0.54 and a L infinity of 479.32 (table 7). Mortality estimates for Largemouth bass are high compared to other regional water bodies but intermediate to low compared to previous

sampling in Broken Bow (table 8). It is likely that the high rates compared to other water bodies is due to missing year classes in sampling at broken bow over estimating the mortality rate which varies between 25% and 40% in other southeast Oklahoma reservoirs (figure 2).

Spotted Bass

Catch rates for Spotted Bass also declined significantly in 2025, again likely owing to difficulties with sampling during flooding (table 9). Catch rates by size class do model previous distributions which is encouraging that no large changes have occurred since the last sampling in 2021 (table 10). Most fish were observed to be sub 300mm (figure 3). PSD continued to decline from 2019 level which is concerning, however any real trend is difficult to discern given the high water scenario (table 11). Relative weights were also stable going back to 2019 with slight decreases across all categories except substock which declined significantly from 2021 (table 12). Spotted Bass mean length at age was relatively stable as was mean weight at age (table 13, 14). Only 3 age classes were sampled and of these Age-2 fish dominated the populations (figure 4). Given small sample size the Von Bertalanffy estimate for Spotted Bass cannot be trusted for 2025 (table 15). While enough data was collected to compute the various metrics, the L infinity is impossible. The annual mortality estimate for Spotted Bass was 47% and intermediate to samples in 2019 and 2021 (Table 16).

Smallmouth Bass

Very few Smallmouth Bass were sampled and not discussed further. Table 17-20 and figure 5 show related measurements and metrics. Interestingly, approximately 20 fish were collected during gillnet sampling which is very uncommon for black basses let alone Smallmouth Bass. Smallmouth Bass will continue to make a very small portion of the bass population at Broken Bow due to cessation of stockings many years ago.

Walleye

Walleye were sampled via gill nets and catch rates are still low. Additionally, walleye were sampled in many nets instead of concentrated in few nets in select spots in the lake. Size distribution of fish was concentrated in the 450-500mm range with some larger individuals sampled. Relative weights were low. No tables or figures are presented due to low catch rates.

Recommendations

1. Continue to monitor all fishes relative weights.
2. Consider large mesh gill net sampling for catfish.

Table 1: Largemouth Bass Catch Per Unit Effort (CPUE) by year.

Total CPUE	2012	2015	2019	2021	2025
Mean	49.25	15	42.82	52.5	10
Count	24	24	22	24	24
SE	6.11	2.7	5.78	6.08	1.72
L 95% CI	37.28	9.7	31.49	40.59	6.63
U 95% CI	61.22	20.3	54.14	64.41	13.37

Table 2: Largemouth Bass CPUE by size class across time.

CPUE Size	2012		2015		2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Sub-stock	8	1.9	0.5	0.35	6	1.63	6.5	1.14	1	0.78
Stock	18.25	2.99	3	1.08	10.09	2.75	13	2.3	2.5	0.8
Quality	14.75	2.17	7.75	2.06	15.82	2.66	22.75	3.52	3.75	1.07
Preferred	8.25	1.24	3.5	0.88	10.9	2	10.25	1.79	2.75	0.72
Memorable	.	.	.	.	.	.	.	.	.	.
Trophy	.	.	.	.	.	.	.	.	.	.

Table 3: Largemouth Bass proportional Stock Density by year.

PSD	2012	2015	2019	2021	2025
PSD	56	79	73	72	72
PSD-P	20	25	30	22	31
PSD-M	.	.	.	.	.
PSD-T	.	.	.	.	.
PSD S-Q	44	21	27	28	28
PSD Q-P	36	54	43	49	42
PSD P-M	20	25	30	22	31

Table 6: Largemouth Bass Mean weight at age with standard errors.

Mean Weight at Age	2012		2015		2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
1	136.94	4.94	130	27.12	83.67	7.07	78	6.29	66.5	7.5
2	446.74	15.75	392.7	16.35	377.57	16.88	349.98	13.32	373.91	40.92
3	620.54	29.63	759.57	59.11	795.46	48.01	576.73	22.7	810.2	45.7
4	808.8	20.45	990.8	51.21	794.86	26.18	731.53	35.45	.	.
5	911.17	50.58	.	.	959.22	51.28	1226	.	874	.
6	.	.	1170	.	1403.88	170.88	947.64	54.14	914	.
7	1349	.	.	.	641	.	1298	278	.	.
8	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	1726	.

Table 7: Largemouth Bass Von Bertalanffy metrics.

Von Bert	2012	2015	2019	2021	2025
L inf	427.1	501.21	430.76	445.465	479.317
K	0.67	0.44	0.67	0.54	0.54
t0	-0.11	-0.298	0.133	-0.001	0.134

Table 8: Largemouth Bass mortality estimates.

Mortality Table	2012	2015	2019	2021	2025
Instantaneous	0.57	0.77	0.52	0.77	0.6
Annualized	43.19	53.92	40.34	53.57	44.85

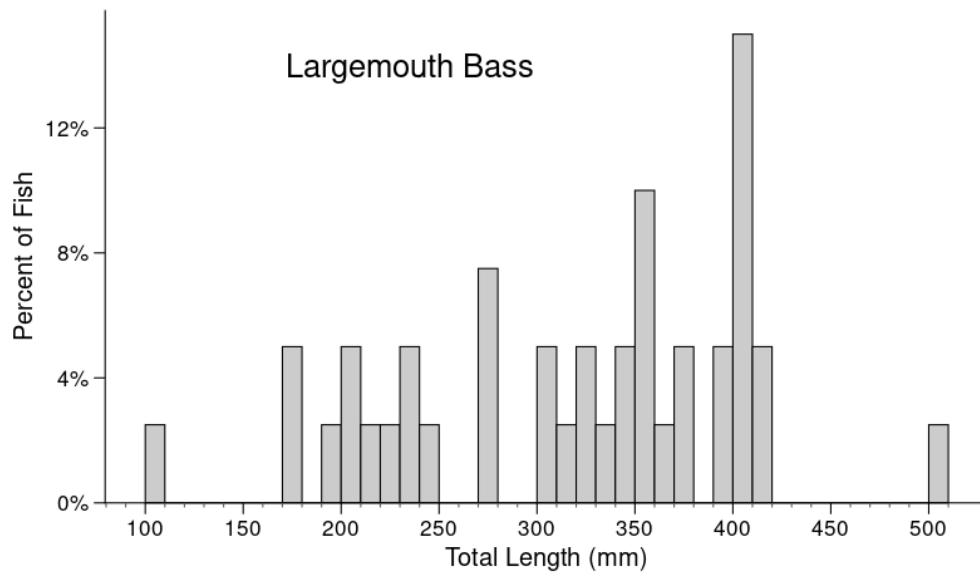


Figure 1: Largemouth Bass length frequency histogram.

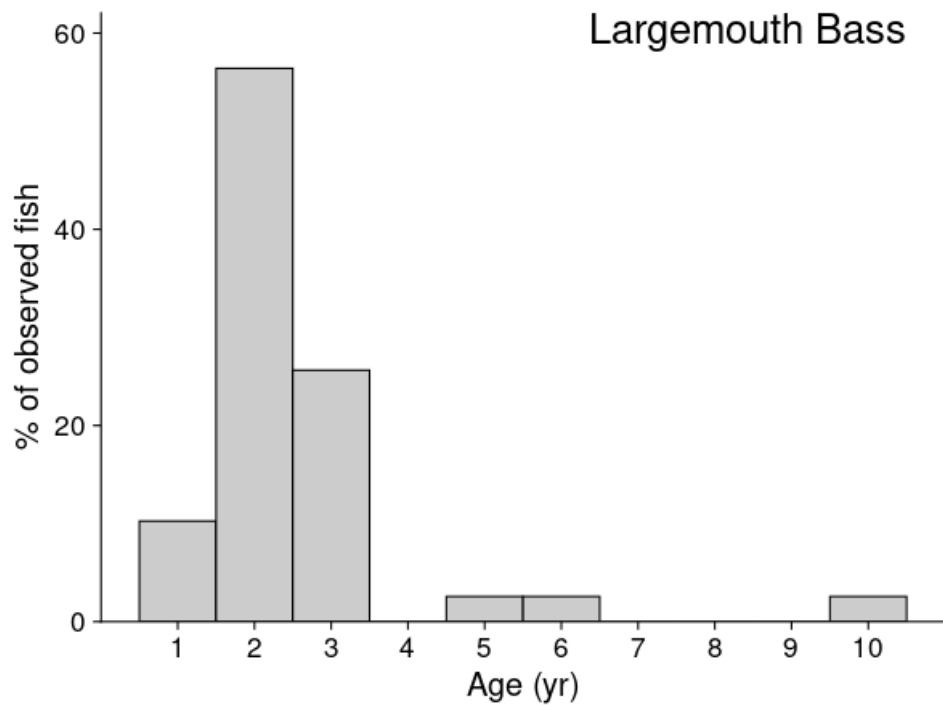


Figure 2: Largemouth Bass age frequency histogram.

Table 9: Spotted Bass Catch Per Unit Effort (CPUE) by year.

Total CPUE	2019	2021	2025
Mean	24.92	36.75	6.25
Count	13	24	24
SE	6.11	4.4	0.35
L 95% CI	12.95	28.13	-0.18
U 95% CI	36.9	45.37	1.18

Table 10: Spotted Bass CPUE by size class across time.

CPUE Size	2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE
Substock	2.77	0.86	1.25	0.51	1	0.47
Stock	10.62	3.41	19	3.16	3	0.72
Quality	5.08	2.02	12.75	2.02	1.75	0.57
Preferred	6.46	2.84	3.75	0.94	0.5	0.35
Memorable	.	.	.	.	.	.
Trophy	.	.	.	.	.	.

Table 11: Spotted Bass Proportional Stock Density by year.

PSD	2019	2021	2025
PSD	52	46	43
PSD-P	29	11	10
PSD-M	.	.	.
PSD-T	.	.	.
PSD S-Q	48	54	57
PSD Q-P	23	36	33
PSD P-M	29	11	10
PSD M-T	.	.	.

Table 12: Spotted Bass Relative Weight with standard errors across PSD classes by year.

Wr	2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE
Substock	85.2	3.53	97.1	4.1	76.48	7.69
Stock	90.38	3.62	95.31	1.34	89.15	2.65
Quality	94.64	3.56	83.41	2.54	92.31	3.73
Preferred	87.25	1.63	82.48	2.18	85.65	1.04
Memorable	.	.	.	.	.	.
Trophy	.	.	.	.	.	.
Total	89.86	1.81	89.78	1.27	87.73	2.2

Table 13: Spotted Bass mean length at age with standard errors.

Mean Length at Age	2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE
1	176	10.15	.	.	128.75	7.16
2	216.93	7.45	239.67	3.26	242.07	7.65
3	349.2	9.23	315.58	3.8	341.57	13.02
4	351.38	7.5	358.6	3.8	.	.
5	396.17	3.22	395.67	1.2	.	.
6	.	.	.	.	.	.
7	.	.	408	.	.	.
8	.	.	.	.	.	.
9	.	.	.	.	.	.
10	.	.	.	.	.	.

Table 14: Spotted Bass mean weight at age with standard errors.

Mean Weight at Age	2019		2021		2025	
	Mean	SE	Mean	SE	Mean	SE
1	55	6.66	.	.	19.5	3.77
2	133.44	15.13	187.27	7.94	176.86	18.81
3	547.6	43.05	383	19.76	520.29	52.27
4	595.38	53.58	532	40.45	.	.
5	797.33	36.26	673	19	.	.

6	.	.	.	.	.	.
7	.	.	800	.	.	.
8	.	.	.	.	.	.
9	.	.	.	.	.	.
10	.	.	.	.	.	.

Table 15: Spotted Bass Von Bertalanffy metrics.

Von Bert	2019	2021	2025
L inf	538.11	429.12	1057.87*
K	0.27	0.51	0.13
t0	-0.04	0.39	0.002

Table16: Spotted Bass mortality estimates.

Mortality Table	2019	2021	2025
Instantaneous	0.46	0.95	0.63
Annualized	36.94	61.38	46.67

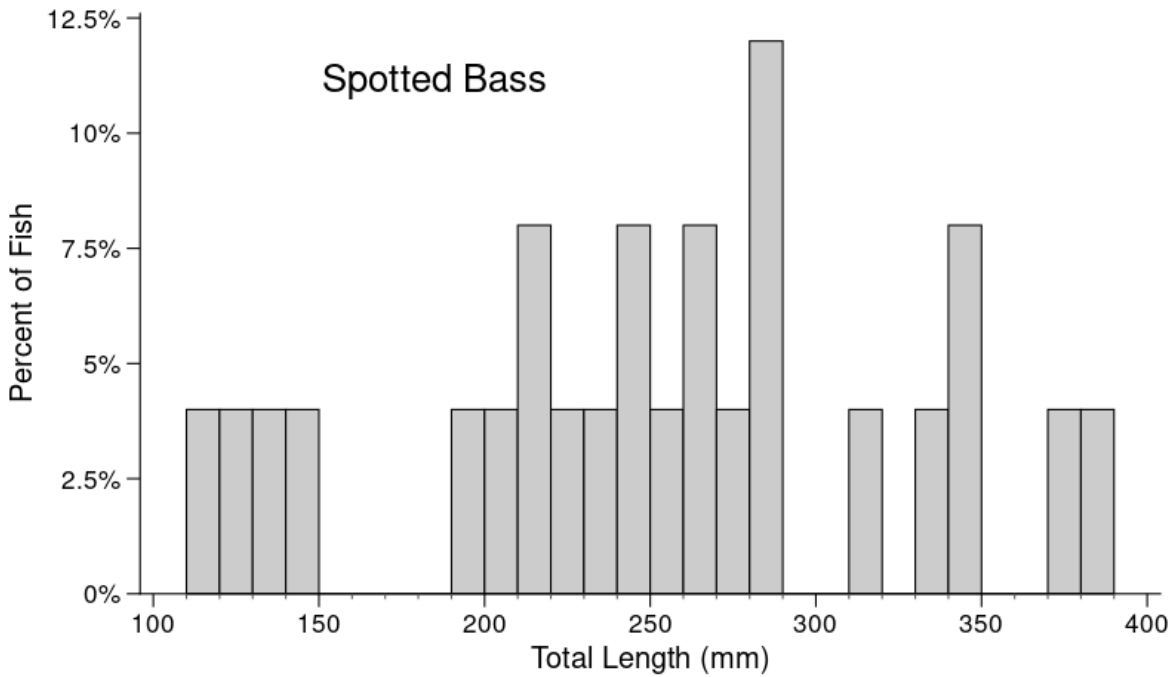


Figure 4: Spotted Bass length frequency histogram.

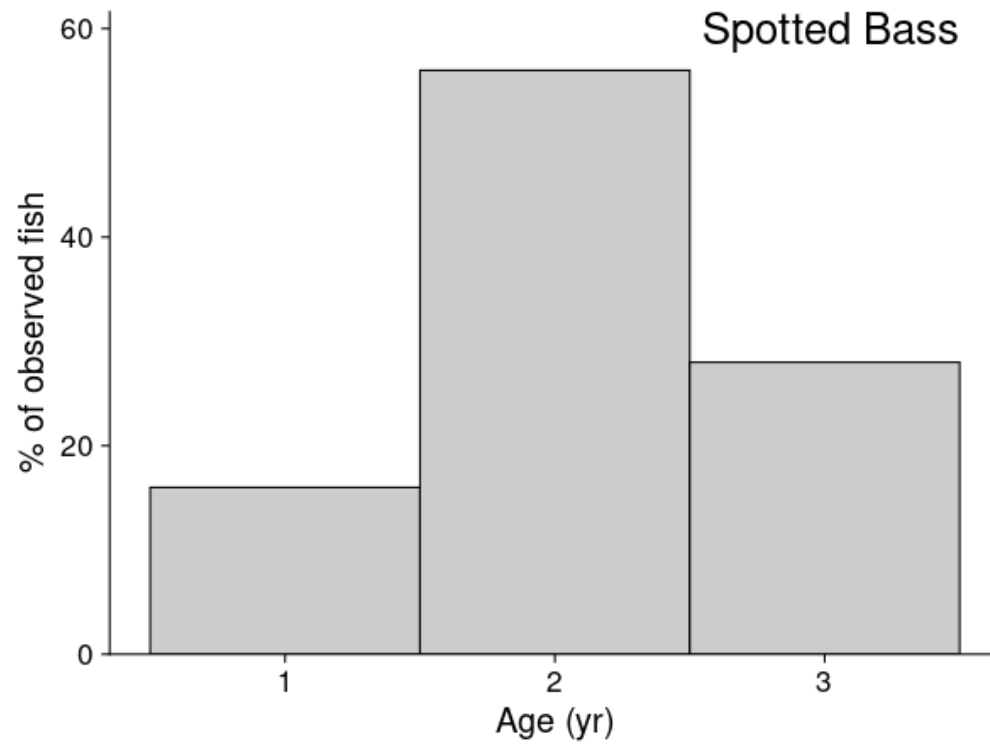


Figure 4: Spotted Bass age frequency histogram.

Table 17: Smallmouth Bass Catch Per Unit Effort (CPUE) by year.

Total CPUE	2021	2025
Mean	1	0.5
Count	24	24
SE	0.59	0.35
L 95% CI	-0.16	-0.18
U 95% CI	2.16	1.18

Table18: Smallmouth Bass CPUE by size class across time.

CPUE Size	2021		2025	
	Mean	SE	Mean	SE
Substock	.	.	.	.
Stock	0.5	0.35	0.25	0.25
Quality	0.25	0.25	0.25	0.25
Preferred	0.25	0.25	.	.
Memorable	.	.	.	.
Trophy	.	.	.	.

Table 19: Smallmouth Bass Proportional Stock Density by year.

PSD	2021	2025
PSD	50	50
PSD-P	25	.
PSD-M	.	.
PSD-T	.	.
PSD S-Q	50	50
PSD Q-P	25	50
PSD P-M	25	.
PSD M-T	.	.

Table 20: Smallmouth Bass Relative Weight with standard errors across PSD classes by year.

Wr	2021		2025	
	Mean	SE	Mean	SE
Substock	.	.	.	.
Stock	82.59	2.98	85.14	.
Quality	81.67	.	79.34	.
Preferred	81.61	.	.	.
Memorable	.	.	.	.
Trophy	.	.	.	.
Total	82	1.27	82.24	2.9

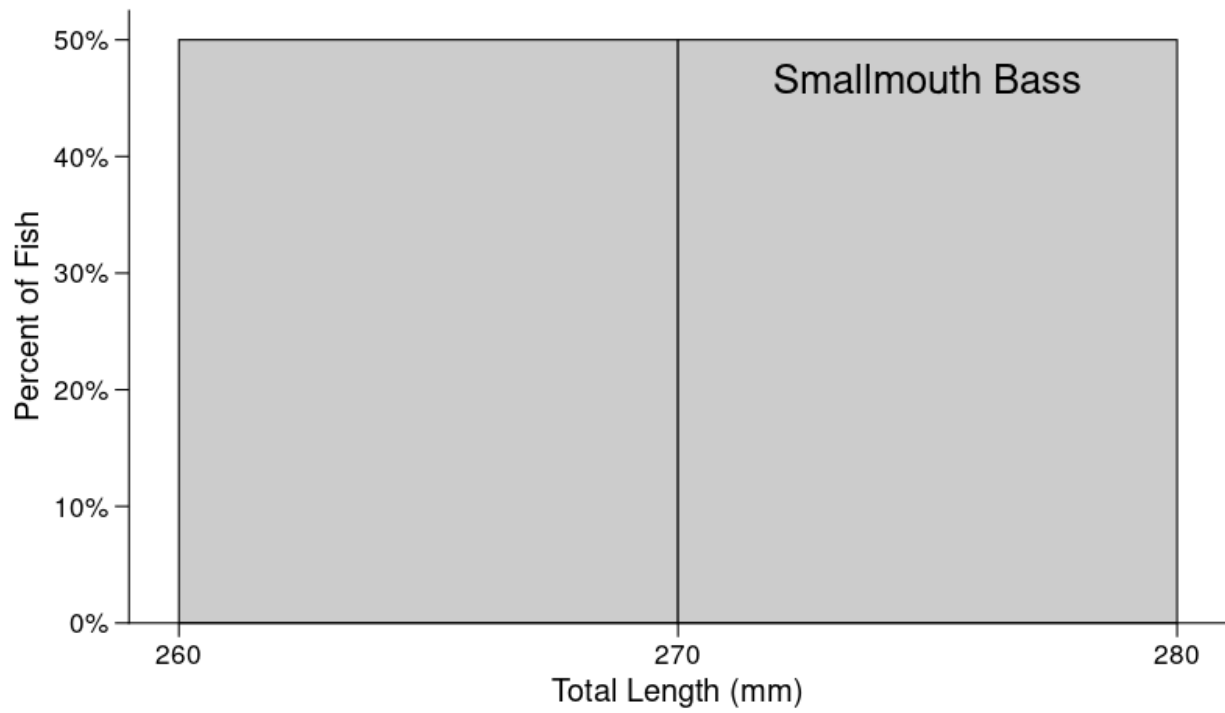


Figure 5: Smallmouth Bass length frequency histogram.