SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

Talawanda 1 and 2 LAKE

2022

SURVEY REPORT

State: Oklahoma

Project Title: Talawanda 1 and 2 Fish Management Survey Report

Period Covered: 2022

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Talawanda 1 and 2

ABSTRACT

Talawanda 1 and 2 were sampled in 2022 for Largemouth Bass. Reservoir 1 had higher catch rates of Largemouth Bass including larger individuals, but body condition has declined with increasing size. Growth rates represented by length and weight at age have improved since 2019. Talawanda 2 Largemouth Bass has had a decline in catch rates, but this is driven by lower catch rates of stock and sub-stock size fish. Indices indicate size structure has improved since 2012, peaking in 2019 from a large number of quality size fish but have since dropped to an intermediate value in 2022. Spotted Bass were also collected in 2022 in reservoir 2. While few Spotted Bass were collected catch rates improved slightly from 2019. Spotted Bass growth is similar between 2019 and 2022.

INTRODUCTION

Talawanda 1 is characterized as a clear, shallow reservoir with excessive aquatic vegetation. The reservoir was impounded in 1902. The Reservoir is an important bass fishery and receives Florida Bass every few years. The reservoir has produced numerous trophy bass and is very popular with bass anglers.

Talawanda 2 is a larger, deeper reservoir with increased turbidity and much less aquatic vegetation than Talawanda 1. Talawanda 2 was impounded much later than the first reservoir in 1924. While the second reservoir does not receive Florid Bass stockings, there is dam escapement from the first reservoir which has improved the bass genetics in Talawanda 2. The second reservoir has a more diverse fish community than the first with Channel Catfish, Crappie, Buffalo, and other fishes commonly encountered.

RESULTS

Largemouth Bass

Largemouth Bass were sampled in Talawanda 1 and 2 in 2022 using spring boat electrofishing with assistance from Choctaw Nation Environmental Protection Services.

In Talawanda 1, 73 Largemouth Bass were collected per hour (table 1). This is approximately a 50% increase in catch rate compared to 2012 and a 33% increase from 2019. Catch rates increased for stock, quality, and preferred size fish but decreased for sub-stock sized fish in 2022 compared to the previous two samples (table 2). The greatest concentration of fish were between 340-420 mm (figure 1). Proportional Stock Density (PSD), a measurement of size structure quality, was 81 in 2022 which is similar to estimates in 2012 and better than results in 2019 (table 3). PSD-M and PSD M-T were lower in 2022 compared to 2012. Relative Weight (Wr) was lower in 2022 compared to previous samples and below target goals (table 4). Interestingly, Wr decreased with increasing size suggesting issues relating to foraging or food availability for larger fish. While many reservoirs exhibited lower Wr values in smaller

fish due to strong recruitment with improving values over time as fish escape the bottleneck we see an opposite trend in Talawanda 1 Largemouth Bass. This trend is consistent in previous samples with Wr values lower at all size classes compared to 2012 which is concerning. Age data was not collected prior to 2019 but has been collected with every sample since. Age 2 fish represent the largest proportion of Largemouth Bass in the sample with age 4, 5, and 6 constituting approximately 45% of the population (figure 2). Mean length at age increased in 2022 compared to 2019, the first year that age data is available (table 5). Mean weight at age was also greater in 2022 compared to 2019 (table 6). Von Bertalanffy estimates indicate a maximum length of 409 mm in 2022 and 425 mm in 2019 (table 7). Mortality estimates in 2019 and 2022 are 20.6% and 14.7% respectively (table 8). Mortality estimates for Largemouth Bass are low compared to other regional waters. Increasing catch rates of Largemouth Bass with declining Wr could indicate a forage or stunting issue in Talawanda 1, however the increasing mean length and weight at age compared to previous samples makes it more likely that there is limited forage. Talawanda 1 has excessive aquatic vegetation which can provide protection for forage species making it difficult for bass to forage which would explain lower Wr compared to previous years. Decreasing Wr with increasing size could also point to a lack of larger prey items needed to sustain the weight of larger bass. Continued monitoring of the bass population is warranted every few years. Habitat manipulation, and selective bass removal may help improve the bass population.

In Talawanda 2, only 40 Largemouth Bass were collected per hour in 2022 (table 9). This is a 33% drop from 2012 and a 20% drop from 2019 catch rates. Bass size structure improved with catch rates of Preferred size fish (380 mm) increasing significantly from 2012 while catch rates of sub-stock fish declined significantly (table 10). The smallest fish sampled were approximately 200 mm (figure 3). While overall catch rates have declined, these declines have primarily been the sub-stock and stock size fish. PSD results also show an increase from 2012 to 2022 (table 11). PSD was extremely high in 2019 at 96 but this is driven by a large decline in smaller fish abundance and a jump in fish falling in the quality size class. Throughout the last decade Wr have been stable with the only notable change being a bump in Wr of the memorable size fish in 2019 before dropping back down in 2022 (table 12). Age data was not collected prior to 2019. 2022 age data shows age 2 fish are over 40% of the sample followed by age 3 fish which are 20% (figure 4). The proportion of age 6 fish is greater than we would typically expect which is a result of a greater abundance of age 3 fish in 2019 that are still moving through the system and likely a result of a very good spawn in 2016. Mean length at age improved at all ages from 2019 to 2022 as did mean weight at age (table 13; 14). Estimates of L infinity from Von Bertalanffy dropped from 534.63 mm to 453.20 mm in 2022 (table 15). Largemouth Bass collected in 2022 did not have fish as old as the 2019 sample and had a lower maximum length sample leading to the decline of L infinity. Mortality estimates in 2019 and 2022 were 49.1% and 26.21% respectively. The lack of age data prior to 2019 limits our ability to track trends in Talawanda 2. Future samples will include the collection of age data to better monitor the reservoir and add to our understanding of trends. Currently the Largemouth Bass population is fair and stable.

Spotted Bass

Spotted Bass were not collected in Talawanda 1 so only results from Talawanda 2 are presented here. Spotted Bass catch rates were low with a CPUE of 15 but similar to 2019 catch rates (table 17). 80% of the Spotted Bass collected were of quality size and greater (280 mm; table 18; Figure 5). PSD improved from 2019 to 2022 while Wr was consistent between years (table 19; 20). Age data was collected in 2019 and 2022 and reveals that in 2022 over 40% of the age sample were 6-year-old fish (figure 6). However, conclusions cannot be drawn from this data as sample size was small. Mean length at age was similar between 2019 and 2022 as was mean weight at age except for mean weight at age 7 in 2022

(table 21; 22). In Estimates for Von Bertalanffy L Infinity was 374.28 mm which matches with the average mean length at age 7 (table 23). Estimates for Von Bertalanffy L Infinity are not available for 2019. Mortality estimates for 2019 and 2022 are 21.2% and 20% respectively.

Recommendations

1. Continue to monitor Largemouth Bass on Talawanda 1 and work to improve body condition and numbers of larger size individuals.
2. Focus future efforts on Talawanda 2 sampling catfish and other sportfish species.
3. Reduce the amount of vegetation in Talawanda 1 to improve Largemouth Bass foraging and increase bank angler access.

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

Total CPUE	2012	2019	2022
Mean	51.6	55	73
Count	5	6	6
SE	6.18	18.13	15.45
L 95% CI	39.49	9.97	42.75
U 95% CI	63.71	35.46	103.23

Table 2: Talawanda 1 Largemouth Bass CPUE by size class across time.

CPUE Size	2012		2019		2022	
	Mean	SE	Mean	SE	Mean	SE
Sub-stock	15.6	4.87	2	0.48	9	4.58
Stock	6	2.68	16	7.06	12	4.38
Quality	13.2	3.5	23	13.2	26	7.54
Preferred	13.2	4.8	14	3.63	24	6.93
Memorable	2.4	1.47	0	.	2	2
Trophy	1.2	1.2	0	.	0	.

Table 3: Talawanda 1 Largemouth Bass Proportional Stock Density by year.

PSD	2012	2019	2022
PSD	83	70	81
PSD-P	47	26	41
PSD-M	10	.	3
PSD-T	3	.	.
PSD S-Q	17	30	19
PSD Q-P	37	43	41
PSD P-M	37	26	38
PSD M-T	7	.	3

Table 4: Talawanda 1 Largemouth Bass Relative Weight with standard errors across PSD classes by year.

Wr	2012		2019		2022	
	Mean	SE	Mean	SE	Mean	SE
Sub-stock	96.93	3.89	93.14	5.34	81.44	.
Stock	98.14	5.48	89.62	1.51	90.58	2.56
Quality	89.05	2.47	82.18	1.79	82.51	1.71
Preferred	90.6	2.11	78.53	1.72	80.18	1.12
Memorable	64.83	5.21	.	.	66.79	0.51
Trophy	76.15	.	.	.	.	.
Total	89.8	12.22	83.81	1.15	82.64	1.08

Table 5: Talawanda 1 Largemouth Bass Mean length at age with standard errors.

Mean Length at Age (mm)	2019		2022	
	Mean	SE	Mean	SE
1	162	6	128.8	13.17
2	261.1	5.46	285.72	8.33
3	302.79	6.65	348	7
4	339.8	3.37	358.11	9.22
5	345.75	8.47	387.45	5.67
6	380.17	5.2	396.67	5.81
7	406	18.82	431.33	17.69
8	391	7.99	390.67	12.12
9	456	.	.	.
10	416.5	5.5	.	.
11	.	.	534	.

Table 6: Talawanda 1 Largemouth Bass Mean weight at age with standard errors.

Mean Weight at Age (g)	2019		2022	
	Mean	SE	Mean	SE
1	47	3	27.1	9.24
2	218.5	11.99	297.11	27.03
3	334.64	21.58	502	29.46
4	482.6	15.29	589.33	54.7
5	501	51.55	686.73	40.69
6	670	37.9	771.17	40.42
7	867.33	131.34	988	109.4
8	731	25.56	750.67	856.15
9	1019	.	.	.
10	802	17	.	.
11	.	.	1662	.

Table 7: Talawanda 1 Largemouth Bass Von Bertalanffy metrics.

Von Bert	2019	2022
L inf	425.615	409.5
K	0.33	0.732
t0	-0.73	0.459

Table 8: Talawanda 1 Largemouth Bass mortality estimates.

Mortality Table	2019	2022
Instantaneous	0.23	0.16
Annualized	20.62	14.69

Figure 1: Talawanda 1 Largemouth Bass length frequency histogram.

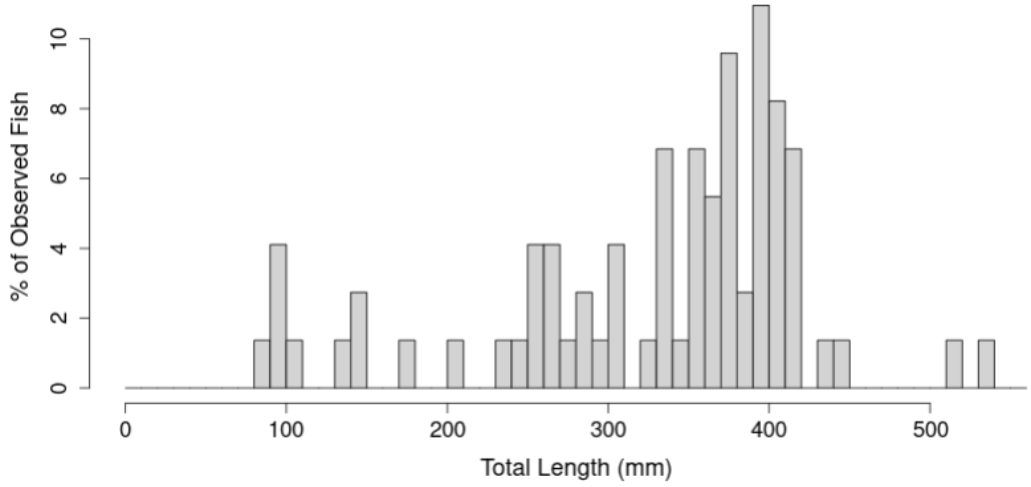

Figure 2: Talawanda 1 Largemouth Bass age frequency histogram.

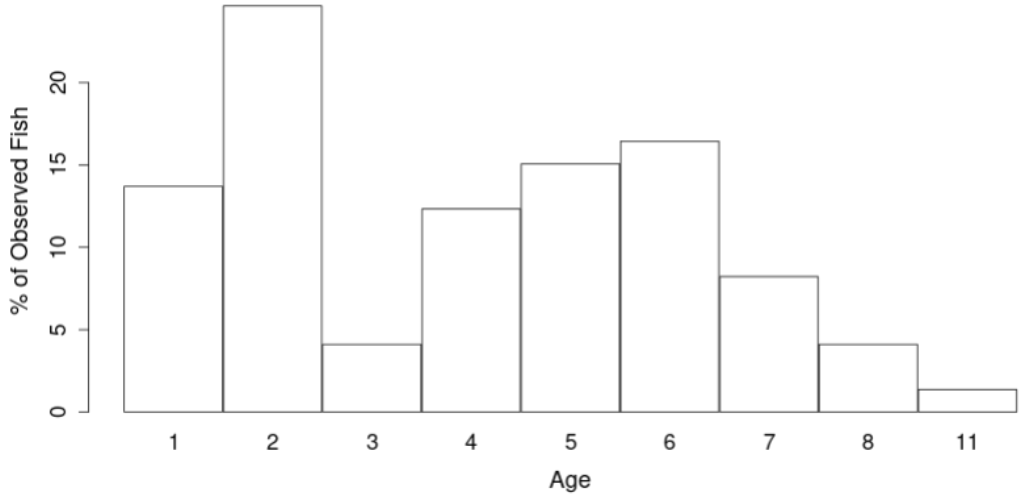

Table 9: Talawanda 2 Largemouth Bass Catch Per Unit Effort (CPUE) by year.

Total CPUE	2012	2019	2022
Mean	59	50	40
Count	6	6	6
SE	9.48	13.21	9.63
L 95% CI	40.43	24.12	21.12
U 95% CI	77.57	75.88	58.88

Table 10: Talawanda 2 Largemouth Bass CPUE by size class across time.

CPUE Size	2012		2019		2022	
	Mean	SE	Mean	SE	Mean	SE
Sub-stock	18	4.1	4	2.97	1	1
Stock	24	6.57	2	2	12	2.68
Quality	14	2.97	33	8.01	11	2.86
Preferred	2	1.26	10	2.53	15	7.22
Memorable	1	1	1	1	1	1
Trophy	.	.	.	.	.	.

Table 11: Talawanda 2 Largemouth Bass proportional Stock Density by year.

PSD	2012	2019	2022
PSD-Q	41	96	69
PSD-P	7	24	41
PSD-M	2	2	3
PSD-T	.	.	.
PSD S-Q	59	4	31
PSD Q-P	34	72	28
PSD P-M	5	22	38
PSD M-T	2	2	3

Table 12: Talawanda 2 Largemouth Bass Relative Weight with standard errors across PSD classes by year.

Wr	2012		2019		2022	
	Mean	SE	Mean	SE	Mean	SE
Sub-stock	89.55	3.19	89.31	4.81	86.99	.
Stock	79.75	1.64	81.25	1.09	82.08	2.92
Quality	83.87	1.54	83.86	1.04	86.63	3.96
Preferred	63.1	1.45	86.03	2.87	82.66	1.44
Memorable	70.01	.	90.87	.	75.87	.
Trophy	.	.	.	.	.	.
Total	82.64	1.39	84.77	0.98	83.52	1.5

Table 13: Talawanda 2 Largemouth Bass Mean length at age with standard errors.

Mean Length at Age	2019		2022	
	Mean	SE	Mean	SE
0	.	.	.	.
1	182.75	8.12	199	6
2	.	8.09	288.47	8.95
3	329.44	8.09	367.25	16.52
4	367.32	6.93	403.75	5.48
5	362.43	17.29	.	.
6	.	.	403	9.67
7	394	.	452.5	7.5
8	.	.	520	.
9	554	.	.	.

Table 14: Talawanda 2 Largemouth Bass Mean weight at age with standard errors.

Mean Weight at Age	2019		2022	
	Mean	SE	Mean	SE
0	.	.	.	.
1	69.75	12.65	91	13
2	.	.	286.53	26.66
3	442.56	30.51	666	75.37
4	651.05	52.04	843.5	27.86
5	640.29	97.42	.	.
6	699	.	802.5	57.99
7	.	.	1260	80
8	.	.	1744	.
9	2570	.	.	.

Table 15: Talawanda 2 Largemouth Bass Von Bertalanffy metrics.

Von Bert	2019	2022
L inf	534.63	453.21
K	0.23	0.495
t0	-1.04	-0.104

Table 16: Talawanda 2 Largemouth Bass mortality estimates.

Mortality Table	2019	2022
Instantaneous	0.67	0.30
Annualized	49.1	26.21

Figure 3: Talawanda 2 Largemouth Bass length frequency histogram.

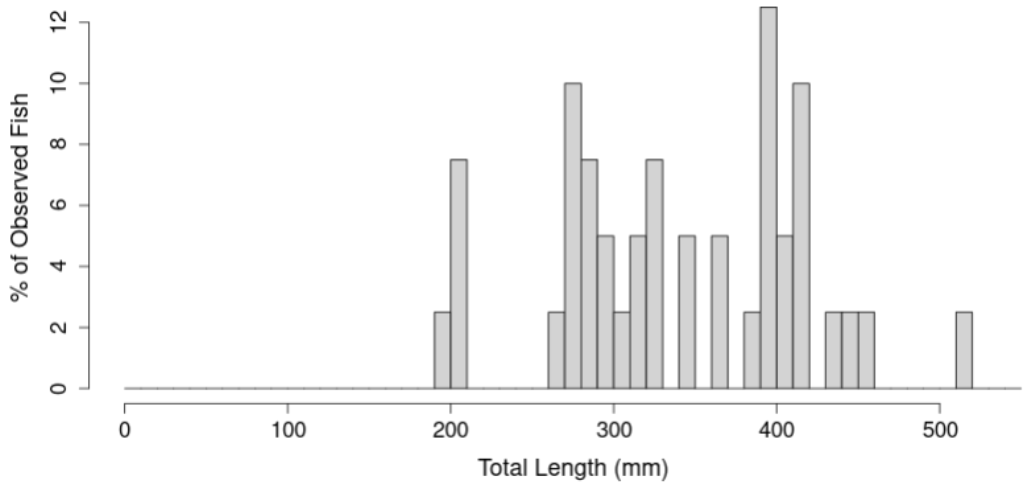

Figure 4: Talawanda 2 Largemouth Bass age frequency histogram.

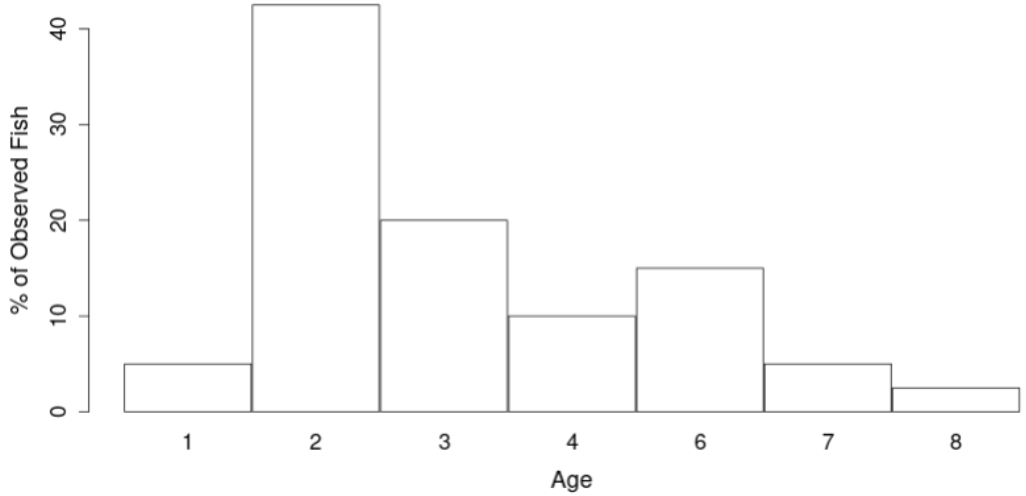

Table 17: Talawanda 2 Spotted Bass Catch Per Unit Effort (CPUE) by year.

Total CPUE	2019	2022
Mean	11	15
Count	6	6
SE	4.75	7.55
L 95% CI	1.68	0.2
U 95% CI	20.32	29.8

Table 18: Talawanda 2 Spotted Bass CPUE by size class across time.

CPUE Size	2019		2022	
	Mean	SE	Mean	SE
Sub-stock	.	.	2	1.26
Stock	2	2	1	1
Quality	7	2.41	5	1.84
Preferred	2	1.26	7	4.75
Memorable	.	.	.	.
Trophy	.	.	.	.

Table 19: Talawanda 2 Spotted Bass proportional Stock Density by year.

PSD	2019	2022
PSD-Q	82	92
PSD-P	18	54
PSD-M	.	.
PSD-T	.	.
PSD S-Q	18	8
PSD Q-P	64	38
PSD P-M	18	54
PSD M-T	.	.

Table 20: Talawanda 2 Spotted Bass Relative Weight with standard errors across PSD classes by year.

Wr	2019		2022	
	Mean	SE	Mean	SE
Sub-stock	.	.	89.3	.
Stock	88.24	2.88	97.74	.
Quality	82.01	2.05	83.89	4.11
Preferred	80.92	0.36	79.04	1.37
Memorable	.	.	.	.
Trophy	.	.	.	.
Total	82.94	1.55	82.84	2.08

Table 21: Talawanda 2 Spotted Bass Mean length at age with standard errors.

Mean Length at Age	2019		2022	
	Mean	SE	Mean	SE
0	.	.	.	.
1	.	.	120.5	55.5
2	.	.	190	.
3	249	.	301.33	9.96
4	303	2	295	.
5	314	6.66	365	.
6	360	10.69	338	18.7
7	333	.	378	4.58

Table 22: Talawanda 2 Spotted Bass Mean weight at age with standard errors.

Mean Weight at Age	2019		2022	
	Mean	Mean	Mean	Mean
0	.	.	.	.
1	.	.	31	29
2	.	.	84	.
3	175	.	318.67	56.83
4	338	4	282	.
5	341.33	15.81	538	.
6	537	58.96	469	61.9
7	446	.	606	12.49

Table 23: Talawanda 2 Spotted Bass Von Bertalanffy metrics.

Von Bert	2019	2022
L inf	369.88	374.28
K	0.509	0.521
t0	0.792	0.276

Table 24: Talawanda 2 Spotted Bass mortality estimates.

Mortality Table	2019	2022
Instantaneous	0.31	0.22
Annualized	26.63	20

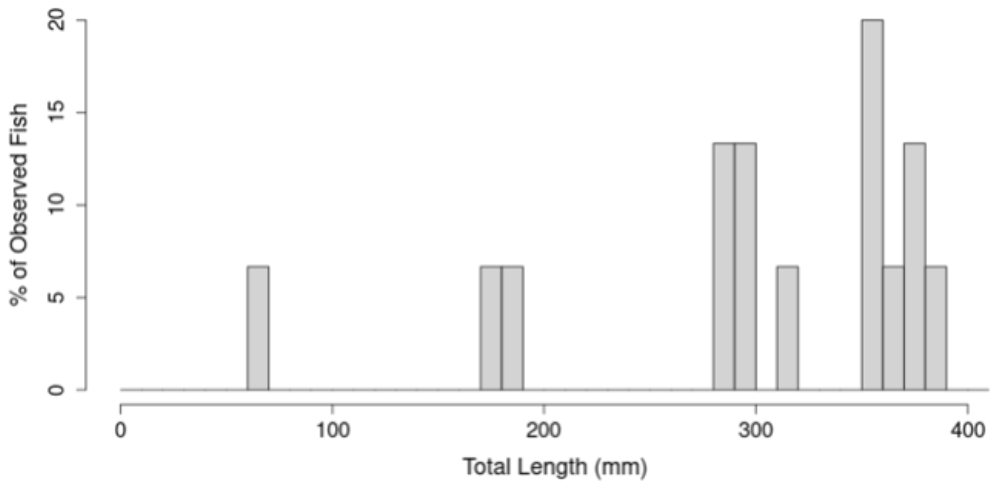

Figure 5: Talawanda 2 Spotted Bass age frequency histogram.

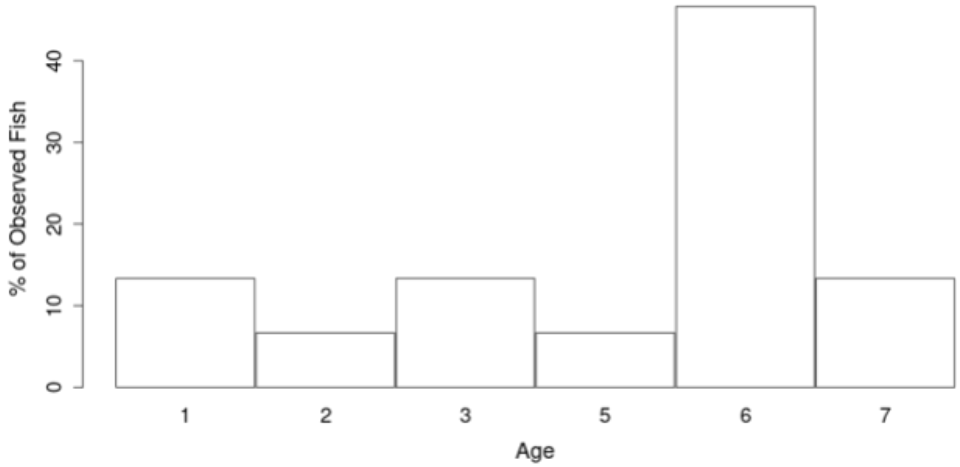

Figure 6: Talawanda 2 Spotted Bass length frequency histogram.