SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

Ward LAKE

2022

SURVEY REPORT

State: Oklahoma

Project Title: Ward Fish Management Survey Report

Period Covered: 2022

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Ward

ABSTRACT

Electrofishing in 2022 found Largemouth Bass relative abundance has declined significantly over the last 30 years while measurements of body condition have improved. Mortality estimates are low suggesting that recruitment is likely also low as stunting was not found in the Largemouth Bass population. While the current population provides a better size fish for anglers. Staff will continue to monitor the largemouth bass population to head off any further decline. Trap netting in 2022 revealed a strong crappie population. White and Black Crappie had strong growth rates reaching over 250 mm in 2 and 3 years respectively. Black Crappie body condition is low but White Crappie body condition is good. Anglers should have great success with harvestable size crappie in ward lake.

INTRODUCTION

Old Spiro Reservoir is located 3.2 km east of Spiro off highway 9 in LeFlore County, Oklahoma. Old Spiro Reservoir covers 24 surface hectares and was constructed in the 1920's by the city of Spiro. Old Spiro Reservoir has a mean depth of 2.1 m and a maximum depth of 6.1 m, and a secchi disc visibility of around 60 cm in the main pool in August; turbidity is primarily from plankton. Fish habitat consists primarily of aquatic vegetation and rock. In 1992 a fishing access project added a fishing dock, parking area and roadway on the north side of Highway 9. Highway 9 bisects part of the reservoir making cutting off sampling access to a quarter of the reservoir.

RESULTS

Largemouth Bass

Staff collected Largemouth Bass via boat electrofishing in 2022. Catch Per Unit Effort (CPUE) in 2022 was 22 and has dropped 80% since 1992 (table 1). Most of the collected individuals were greater than 370 mm (figure 1). Environmental conditions in 2022 were not ideal with staff having to sample between thunderstorms which may have influenced fish movement and susceptibility to electrofishing. While the catch rate in 2022 may have been negatively influenced by the weather, this significant decline in catch rate over the last 30 years is very concerning. Catch rates for sub-stock through quality size fish dropped significantly while catch rates for preferred size fish have remained steady over the last 30 years with the exception of 1999 (table 2). With the small sample size from the 2022 electrofishing survey and the majority of the sample comprised of larger fish, the Proportional Stocking Density (PSD) rose to 92, up from 42 in 1992 (table 3). The increase in the PSD estimate over the last 30 years paired with the

decrease in CPUE supports the theory that the Largemouth Bass population has declined in size. This is further supported by Relative weight (Wr) data which has shown an overall increase from 85.74 in 1992 to 97.8 in 2022 (table 4). While the Wr of certain size classes has jumped around slightly, values for quality size fish (300-380 mm) and below have increased significantly while larger size classes have remained stable. Age data was collected prior to 2019 but was collected in both 2019 and 2022. Data revealed that 50% of the 2022 age sample was comprised of 2- and 4-year-olds with the oldest individual being 7 years old (figure 2). Mean age at length was similar between 2019 and 2022 with growth being satisfactory in both years (table 5). Mean weight at age was also satisfactory (table 6). Von Bertalanffy L infinity estimates are similar between 2019 and 2022 with a maximum expected size of 540-550 mm (table 7). Mortality estimates are low but similar between the years at 9.6% and 10.85% in 2019 and 2022 respectively (table 8). The decline in CPUE is concerned that it could be an artifact of the age of the reservoir. Staff will continue to monitor the Largemouth Bass population to find solutions to the declining population size. A lack of age data in 1992, and 1999 as well as a large gap in standard sampling between 1999 and 2019 make it difficult to determine any mechanism besides reservoir aging that would lead to such a serious decline in abundance. While total catch has declined, the abundance of larger size fish provides good sport for the intrepid angler.

Crappie

Crappie were sampled with fall trap netting in 2019. We sampled 82.1 White Crappie CPUE (table 9). 40% of White Crappie were between the sizes of 170 mm and 200 mm (figure 3). Catch rates of sub-stock and stock size White Crappie were well above average and catch rates of preferred size (250 mm) and memorable size (300 mm) crappie were very good (table 10). PSD for White Crappie is acceptable at 41 and indicates a stable balanced population in Ward reservoir. Relative Weight was acceptable but low at 92.42, as was Wr for quality and preferred size fish possible indicating a forage limitation (table 11). Age one White Crappie comprised over 50% of the sample (figure 4). Mean length at age was very good with White crappie reaching 263 mm in 2 years and 304 mm in 3 years (table 12). Mean weight at age indicates good weight gain with crappie reaching 416 g in 3 years (table 13). Lengths and weights for 4- and 5-year-old fish were low and not accurate as only one fish within each age group was sampled. VON BERT. Mortality rates for White Crappie are high but within the normal range for the species at 67.62% (table 14).

Black Crappie abundance is much lower than White Crappie in Ward reservoir with a CPUE of 13.38 (table 17). Most of the fish collected were between 250 and 350 mm (figure 5). Quality and preferred size fish had the highest catch rates at 3.01 and 1.68 respectively (table 18). One Black Crappie was captured of trophy length (380 mm). Black Crappie PSD was acceptable at 39 (table 19). Relative Weights were low with only the Wr of trophy size fish being acceptable and the overall Wr being low at 86.97 (table 20). Few age classes were present in this sample with age one fish making up 65% of the sample (figure 6). Mean length at age reveals good growth rates with Black Crappie reaching 250 mm in 3 years (table 21). Black Crappie weight is fair with Black Crappie only weighing 212 g at age 2 (table 22). Black Crappie Von Bertalanffy estimates show a L infinity of 476.08. Mortality estimates for Black Crappie are 51.06% and are considered average for crappie in this area (table 24).

Recommendations

1. Continue monitoring the Largemouth Bass population and consider adding spawning habitat or infrequent bass stockings.
2. Work with the city as time allows to increase bank angler access.

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

Total CPUE	1992	1999	2019	2022
Mean	101	84	34	22
Count	2	3	3	3
SE	1	13.86	16	8.72
L 95% CI	99.04	56.84	2.64	4.91
U 95% CI	102.96	111.16	65.36	39.09

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

CPUE Size	1992		1999		2019		2022	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Sub-stock	10	6	5.33	2.67	6	6	2	2
Stock	50	6	16.67	5.46	6	3.46	2	2
Quality	27	5	28	4	8	5.29	4	2
Preferred	10	2	26	8.08	12		12	3.46
Memorable	4	4	8	2.31	2	2	2	2
Trophy	.	.	.	.	.	.	.	.

Table 3: Largemouth Bass proportional Stock Density by year.

PSD	1992	1999	2019	2022
PSD-Q	42	82	79	90
PSD-P	13	44	50	40
PSD-M	3	10	7	10
PSD-T	.	.	.	.
PSD S-Q	56	18	21	10
PSD Q-P	28	38	29	20
PSD P-M	10	33	43	60
PSD M-T	3	10	7	10

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

Wr	1992		1999		2019		2022	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Sub-stock	75.59	1.95	94.86	3.71	95.56	5.17	91.57	.
Stock	83.11	1.48	90.56	1.79	95.31	7.86	102.3	.
Quality	88.03	1.62	93.91	1.68	102.86	3.24	102.05	1.72
Preferred	99.49	2.77	97.31	1.56	91.81	10.99	97.43	2.62
Memorable	97.8	3.42	98.6	5.15	99.12	NA	93.3	.
Trophy	.	.	.	.	.	.	.	.
Total	85.74	1.17	94.92	1.01	96.15	4.32	97.8	1.73

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

Mean Length at Age	1992		1999		2019		2022	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
0	.	.	.	.	.	.	.	.
1	.	.	.	.	163.67	29.38	.	.
2	.	.	.	.	296	8.58	267	39.8
3	.	.	.	.	367	7	379	1
4	.	.	.	.	416.5	14.5	416.67	9.96
5	.	.	.	.	461.5	9.94	475	5
6	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	515	.
8	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.
10	.	.	.	.	540	NA	.	.

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

Mean Weight at Age	1992		1999		2019		2022	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
0	.	.	.	.	.	.	.	.
1	.	.	.	.	60.67	25.86	.	.
2	.	.	.	.	352.6	32.4	306.67	123.53
3	.	.	.	.	793	41	815	3
4	.	.	.	.	1224	223	1032.67	83.45
5	.	.	.	.	1285.25	224.72	1778	60
6	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	2078	.
8	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.
10	.	.	.	.	2578	NA	.	.

Table 7: Largemouth Bass Von Bertalanffy metrics.

Von Bert	1992	1999	2019	2022
L inf	.	.	542.98	547.27
K	.	.	0.38	0.423
t0	.	.	0.03	0.396

Table 8: Largemouth Bass mortality estimates.

Mortality Table	1992	1999	2019	2022
Instantaneous	.	.	0.1	0.11
Annualized	.	.	9.6	10.85

Figure 1: Largemouth Bass length frequency histogram.

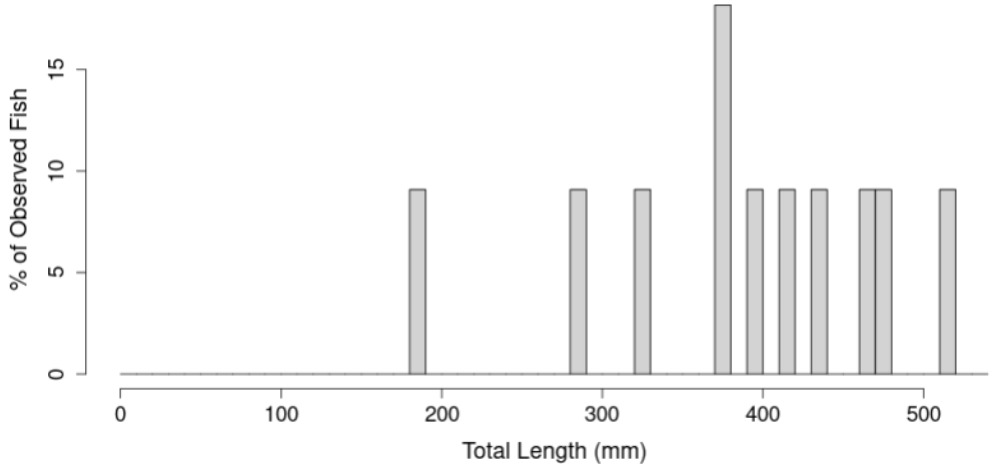

Figure 2: Largemouth Bass age frequency histogram.

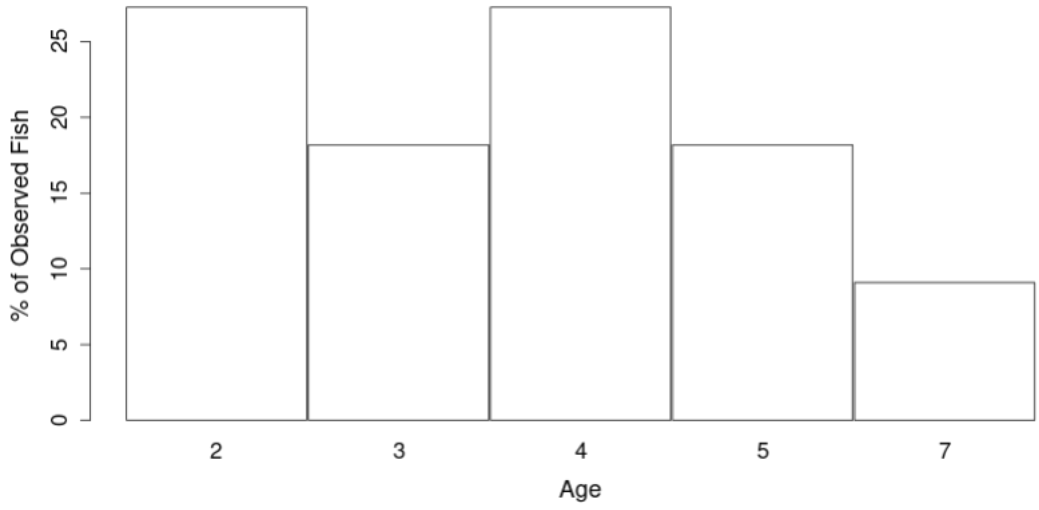

Table 9: White Crappie Catch Per Unit Effort (CPUE) by year.

Total CPUE	2019
Mean	82.10
Count	3
SE	52.39
L 95% CI	-20.59
U 95% CI	184.78

Table 10: White Crappie CPUE by size class across time.

CPUE Size	2019	
	Mean	SE
Sub-stock	15.41	9.43
Stock	39.54	24.71
Quality	7.71	5.83
Preferred	12.40	9.02
Memorable	7.03	3.82
Trophy	.	.

Table 11: White Crappie proportional Stock Density by year.

PSD	2019
PSD-Q	41
PSD-P	29
PSD-M	11
PSD-T	.
PSD S-Q	59
PSD Q-P	12
PSD P-M	19
PSD M-T	11

Table 12: White Crappie Relative Weight with standard errors across PSD classes by year.

Wr	2019	
	Mean	SE
Sub-stock	101.10	2.13
Stock	91.92	0.48
Quality	89.49	1.09
Preferred	87.78	0.88
Memorable	97.50	1.69
Trophy	.	.
Total	92.42	0.48

Table 13: White Crappie Mean length at age with standard errors.

Mean Length at Age	2019	
	Mean	SE
0	112	2.32
1	187.80	1.77
2	263.60	6.62
3	304	5.75
4	272	.
5	338	.

Table 14: White Crappie Mean weight at age with standard errors.

Mean Weight at Age	2019	
	Mean	SE
0	16.40	1.22
1	82.19	3.19
2	263.40	22.68
3	416.40	30.83
4	257	.
5	621	.

Table 15: White Crappie Von Bertalanffy metrics.

Von Bert	2019
L inf	465.13
K	0.29
t0	-0.84

Table 16: White Crappie mortality estimates.

Mortality Table	2019
Instantaneous	0.89
Annualized	59.06

Table 17: Black Crappie Catch Per Unit Effort (CPUE) by year.

Total CPUE	2019
Mean	13.38
Count	3
SE	5.59
L 95% CI	2.43
U 95% CI	24.34

Table 18: Black Crappie CPUE by size class across time.

CPUE Size	2019	
	Mean	SE
Sub-stock	0.67	0.67
Stock	7.70	3.55
Quality	3.01	1.54
Preferred	1.68	1.21
Memorable	0	.
Trophy	0.33	0.33

Table 3: Black Crappie proportional Stock Density by year.

PSD	2019
PSD-Q	39
PSD-P	16
PSD-M	3
PSD-T	3
PSD S-Q	61
PSD Q-P	24
PSD P-M	13
PSD M-T	.

Table 20: Black Crappie Relative Weight with standard errors across PSD classes by year.

Wr	2019	
	Mean	SE
Sub-stock	.	.
Stock	88.37	1.04
Quality	85.37	1.39
Preferred	81.62	2.52
Memorable	.	.
Trophy	96.04	.
Total	86.97	0.89

Table 21: Black Crappie Mean length at age with standard errors.

Mean Length at Age	2019	
	Mean	SE
0	.	.
1	175.20	3.19
2	236.30	4.80
3	247.50	3.23
4	275	.
5	385	.

Table 22: Black Crappie Mean weight at age with standard errors.

Mean Weight at Age	2019	
	Mean	SE
0	.	.
1	181.60	5.21
2	181.60	12.03
3	198.50	12.80
4	266	.
5	1030	.

Table 23: Black Crappie Von Bertalanffy metrics.

Von Bert	2019
L inf	476.08
K	0.18
t0	-1.47

Table 24: Black Crappie mortality estimates.

Mortality Table	2019
Instantaneous	0.66
Annualized	48.33