

SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION



FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

KONAWA LAKE

2020

SURVEY REPORT

State: Oklahoma

Project Title: Konawa Lake Fish Management Survey Report

Period Covered: 2020

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Konawa Lake

ABSTRACT

Konawa Lake was surveyed by spring electrofishing in 2020 to monitor Largemouth bass size structure, growth rates and to evaluate Largemouth bass regulations. A beneficial decrease in Largemouth bass abundance and PSD's were observed, resulting in an increase of body condition, growth rates and mean maximum length. Growth rates slowed between 16 and 17 inches where stock piling occurs. Poor recruitment occurred from the 2019 year class, but a strong 2018 year class was present.

Current trophy Largemouth bass regulations should be maintained. Harvest of 15 to 17 inch Largemouth bass is encouraged to help reduce competition and increase growth rates. Monitoring of Largemouth bass will continue.

INTRODUCTION

Konawa Lake impounds Jumper Creek two miles east of the town of Konawa in Seminole County, Oklahoma. It covers 1,350 surface acres. Construction began in 1968 and was completed in 1970. The lake is owned by Oklahoma Gas and Electric Company. This lake serves as the cooling water source for a gas-fired power generation station; therefore water temperatures are higher year-round than in most other lakes in the state.

Konawa Lake has a mean depth of 17 feet and a maximum depth of 49.8 feet, a shoreline development ratio of 3.5, and a secchi disc visibility of around 37.4 inches in the main pool in August. Turbidity is from plankton. The lake has a shoreline length of 20 miles and a storage capacity of 23,000 acre-feet. It has large stretches of shoreline covered by cattails while most of the remainder is eroded clay banks and riprap.

Fish habitat consists primarily of aquatic vegetation. Due to good water fertility, the lake generally supports abundant populations of several game and forage fish species. Twenty fish attractor sites consisting of artificial habitat structures made from polyethylene pipe called "spider blocks" have been installed by the Oklahoma Department of Wildlife Conservation (ODWC)(Appendix 1).

Striped bass x white bass hybrids have been stocked annually since 1988; however, in recent years stockings have been reduced to every few years, with the purpose of reducing competition for forage in order to maintain growth rates of Largemouth bass and Hybrid striped bass. Florida largemouth bass (FLMB) have been stocked since 1973 (Appendix 2), however, stockings ceased in 2005 to prevent overcrowding. Monitoring of FLMB genetics continues.

Tilapia were present for several years but have not been collected in surveys for quite some time.

A boating access project consisting of a two lane boat ramp, boat dock, restrooms and paved parking lot was completed in 1997.

As of January 1, 2003, bass fishing regulations were changed from a slot length limit of 406-559 mm (16-22 inches) with only one bass 22 inches or longer per day to six bass per day only one of which can be 22 inches or longer. The reason for the regulation change was to encourage more angler harvest of smaller bass. All other species follow statewide creel regulations.

Management objectives for Konawa Lake based on the 2010 Konawa Lake Management plan:

- Largemouth bass – Maintain the catch rate for largemouth bass at or above 130/hr with a catch rate of bass >21 inches exceeding 3/hr.
- Conduct spring electrofishing surveys at least bi-annually to monitor progress. Collect age and growth data and evaluate Florida largemouth bass stocking success by collecting fish periodically for genetic analysis.
- White bass - Continue periodic monitoring of the white bass population with gillnetting surveys and collect age and growth data.
- Striped bass x white bass hybrids – Maintain a reduced total catch rate of 2.0/net set of gill netting and conduct gill netting surveys every 2-3 years to monitor stocking success and collect age and growth information. Adjust stocking frequency and/or rate if necessary to maintain satisfactory predator growth rates.

- Channel catfish - Maintain a catch rate of 4.8/net set of gill netting and conduct gill netting surveys every 3-5 years to monitor population status.

Management problems include stockpiled Largemouth bass population at 12-17 inches in length and reduced power generation which lowers the water temperatures, negatively affecting Threadfin shad and overall productivity of the lake.

Species observed in recent surveys include: Largemouth Bass, Hybrid Striped Bass, White Bass, White Crappie, Channel Catfish, Flathead Catfish, Gizzard Shad, Threadfin Shad, Common Carp, Longnose gar and Drum.

RESULTS

Largemouth Bass

Largemouth bass (LMB) were surveyed in spring of 2020 by means of boat electrofishing. 18 Randomly selected shoreline units were sampled. LMB abundance had decreased some since the last survey in 2018 but still considered to be high (CPUE = 142) in 2020 (Figure 1). All size classes had decreased in abundance except for substock (0-7.8 in) and stock (7.9-11.8 in) size fish which had a considerable increase. CPUE for 21 inches and greater size decreased slightly from 2018 to (CPUE = 3.7) in 2020 but remained above the 2010 Konawa Lake Management Plan objective of a (CPUE \geq 3) (Table 1). Length frequency histogram shows more than 50% of LMB sampled were preferred size (15-20 in) fish (Figure 2).

Body condition or relative weights (Wr) for most size classes increased in 2020 compared to the 2018 survey (Table 1). Memorable (20.1 in) and larger size fish experienced a decrease in body condition with memorable size fish slightly below desired (Wr=88) conditions. The largest fish sampled during the 2020 survey was measured at 23.8 (in) in length and 8.0 (lbs) in weight.

Proportional size distribution (PSD) values have decreased in both quality (PSD-Q =77) and preferred (PSD-P = 64) size fish compared to the 2017 survey, indicating a decrease in proportion of larger size fish (Table 2). While high PSD values indicate higher proportion of large fish, too high may indicate poor recruitment with too few fish in the smaller size classes and too low may indicate overabundance of fish in the smaller size classes. A decrease in the 2020 PSD's indicates a more balanced population and better conditions for trophy bass management.

Age data was collected on a subset of Largemouth Bass from the 2020 survey. Growth was considered moderate taking approximately three years to reach 14 inches then slows greatly between age five and six (roughly 17 inches) (Table 3). A visual representation of Largemouth Bass growth can be seen on the Von Bertalanffy growth curve, where 2017 and 2020 results are similar (Figure 3,) both with moderate growth up until roughly 17 inches. Minimal growth occurs once reaching 17 inches, however, 2020 had a slight increase in the estimated mean maximum length, which can be seen with the L infinity values for 2020 (L inf. =18.5 in) (Table 3). Age frequencies indicate poor recruitment occurred from the 2019 year

class with Less than 10% at age one but had increased from the 2016 and 2017 year classes, however, 2018 had a strong year class with more than 25% age two (Figure 4).

A beneficial decrease in Largemouth bass abundance was observed from the 2020 survey. Largemouth bass body conditions, growth rates and overall estimated mean maximum growth increased as a result of the decreased abundance. Poor recruitment from the 2019 year class could be caused by predation from the high abundance of larger fish. Harvest of Largemouth bass from 15 to 17 inches should be encouraged. Low recruitment for a short time can be good for Konawa Lake, reducing abundance and allowing for less competition will increase growth potential. However, recruitment needs to be monitored. Continued poor recruitment will become an issue.

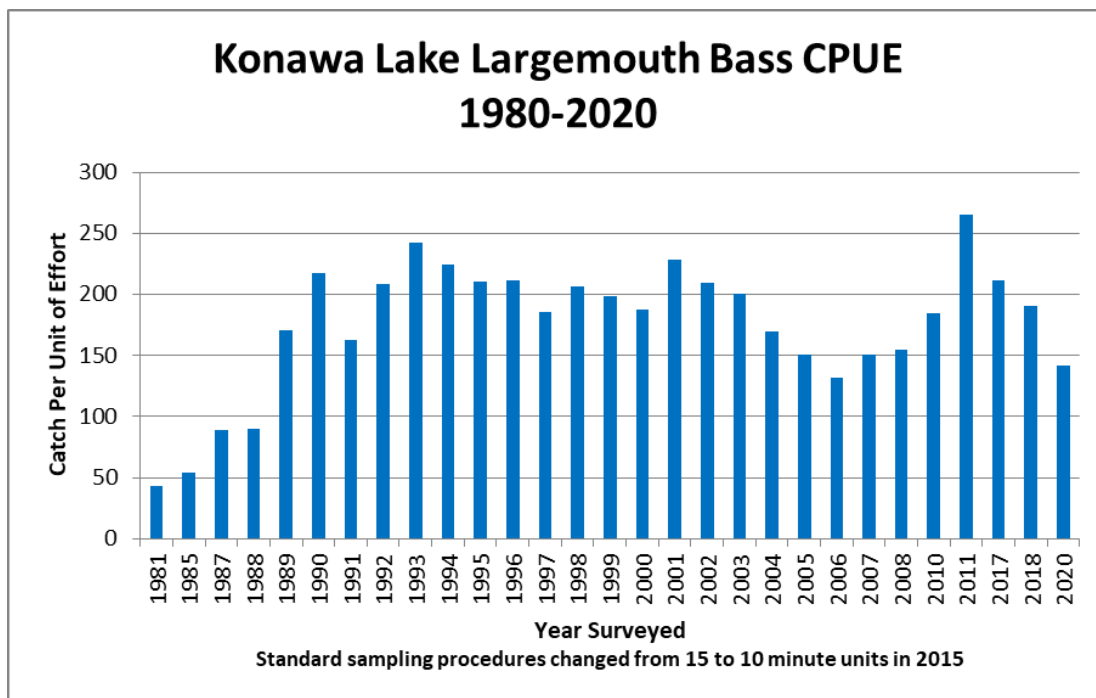


Figure 1. Catch Per Unit of Effort (CPUE) for Largemouth Bass 1980-2020.

Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (W_r) by size groups of Largemouth bass collected by spring electrofishing from Konawa Lake. Acceptable W_r values are ≥ 90 .

		Total CPUE	Substock 0-7.8 in	Stock 7.9 in	Quality 11.8 in	Preferred 15 in	Memorable 20.1 in	≥ 21 in					
Year	No.	CPUE	CPUE	CPUE	W_r	CPUE	W_r	CPUE	W_r	CPUE	W_r	CPUE	W_r
2010	836	185.8	18.2	17.8	103	77.3	98	69.8	92	2.7	95	2.2	99
2011	1198	266.2	26.7	39.5	104	116.2	90	79.6	86	3.8	84	3.6	.
2017	638	212.7	3.3	6.7	100	62.3	97	132.3	90	7.3	95	5.0	93
2018	573	191	2.7	5.0	92	47.0	92	129.3	87	7.0	94	4.9	98
2020	427	142	8.0	31.3	99	16.7	101	81.0	91	5.3	88	3.7	90

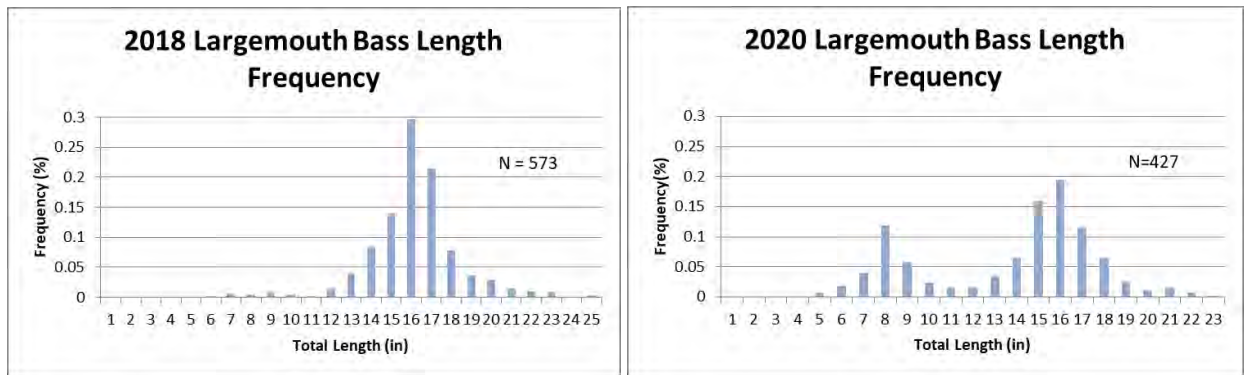


Figure 2. Largemouth Bass Length Frequency Histograms for Konawa Lake.

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. Values in parentheses indicated the desired proportion for trophy bass management.

Year Surveyed	PSD-Q (50-80)	PSD-P (30-60)	PSD-M (10-25)
2010	89	43	2
2011	83	35	2
2017	97	67	4
2018	97	72	4
2020	77	64	4

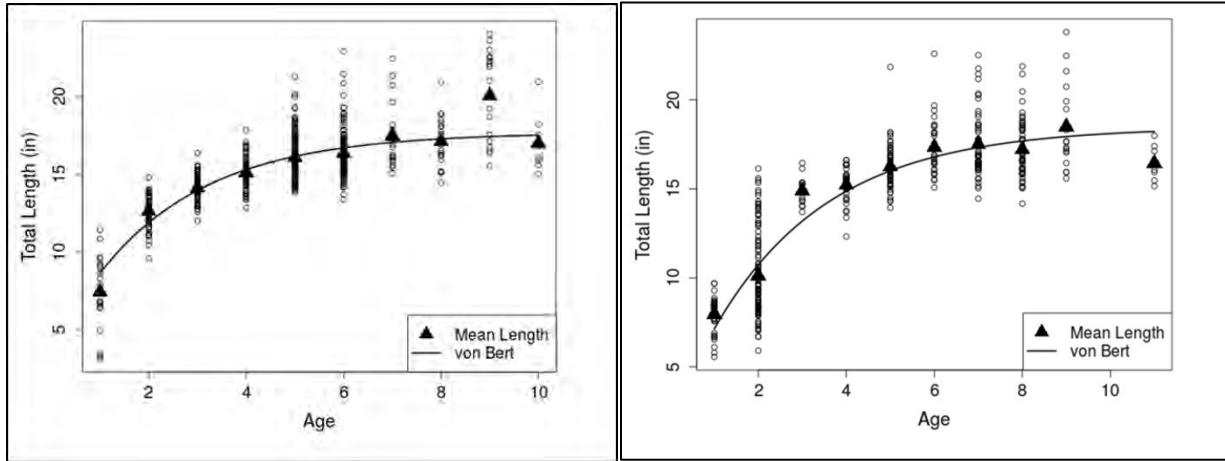


Figure 3. 2017 (left) and 2020 (right) Largemouth Bass Mean Length at Age: Von Bert Estimated Growth Curve. The Von Bert Growth Curve indicates the estimated growth rate of Largemouth bass.

Table 3. Mean Total Length at age (inches) and L infinity (estimated mean maximum length) for Largemouth bass from Konawa Lake.

<u>Year</u>	<u>Age 1</u>	<u>Age 2</u>	<u>Age 3</u>	<u>Age 4</u>	<u>Age 5</u>	<u>Age 6</u>	<u>Age 7</u>	<u>Age 8</u>	<u>Age 9</u>	<u>Age 10</u>	<u>L inf.</u>
2010	7.7	12.7	14.4	15.5	15.8	17.4	17.5	18.7	.	.	17.0
2017	7.4	12.6	14.1	15.1	16	16.3	17.5	17.1	20.1	17	17.7
2020	8.0	10.1	14.9	15.2	16.2	17.3	17.5	17.2	18.5	.	18.5

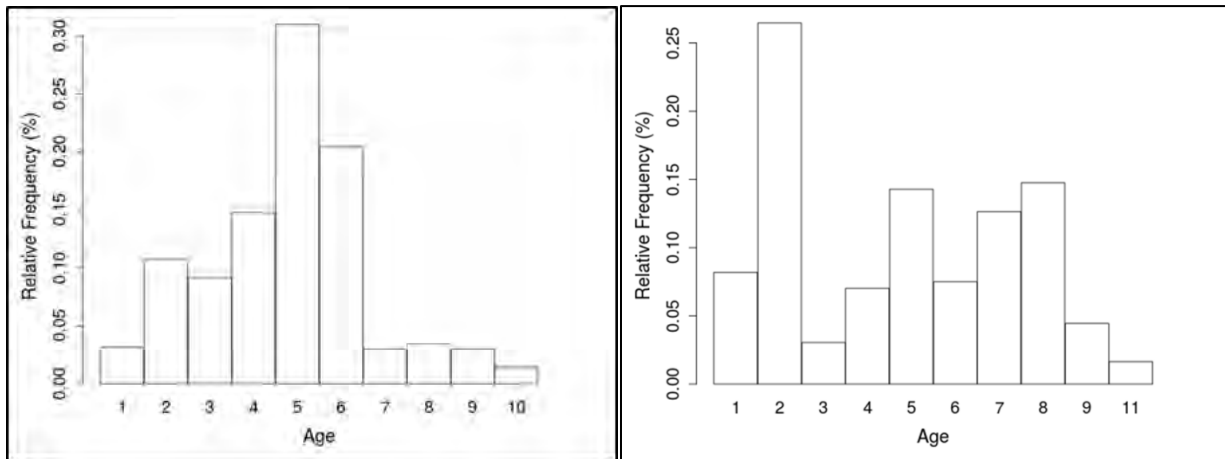
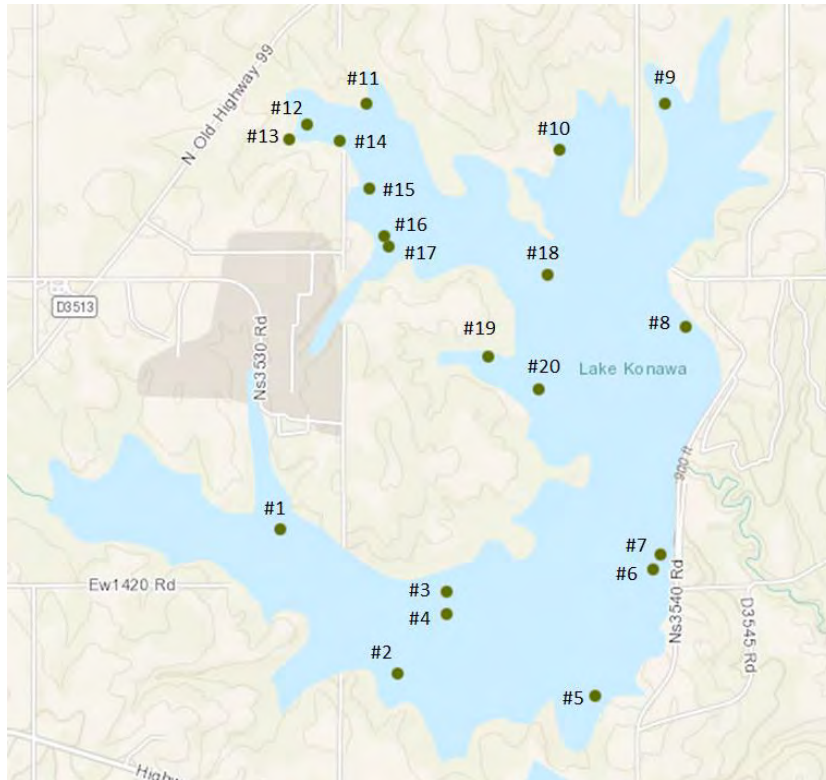


Figure 4. 2017 (left) and 2020 (right) Age Frequency of Largemouth bass.

Recommendations

1. Maintain current Largemouth Bass regulation of six bass per day of which only one may be larger than 22 inches.
2. Encourage harvest of 15 to 17 inch Largemouth Bass to lower abundance and increase growth rates.
3. Maintain periodic electrofishing surveys to monitor size structure, growth rates and recruitment of largemouth bass.
4. Monitor Bass genetics for potential to revert back to Northern strain Largemouth Bass.
5. Conduct a creel survey in the next few years to determine angler attitudes towards Largemouth Bass management at Konawa Lake. Larger fish but lower abundance or maintain high abundance but limited trophy potential.
6. Install temperature loggers to monitor thermal tolerances for Threadfin Shad.



Appendix 1. Konawa Lake Fish Attractor Locations

Fish Attractor Site Information for Konawa Lake

<u>Area Name</u>	<u>Site #</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Habitat Type</u>	<u>Marked</u>	<u>Bank Access</u>	<u>Date</u>
Intake	1	34.9587	-96.7258	Spider Blocks	Yes	No	6/16/2010
S. Bank Across from S. Island	2	34.9519	-96.719	Spider Blocks	Yes	No	2/20/2012
W. of S. Island	3	34.9557	-96.7162	Spider Blocks	Yes	No	4/9/2008
S. point of S. Island	4	34.9547	-96.7161	Spider Blocks	Yes	No	6/15/2010
S. Bank W. of SE. Ramp	5	34.9508	-96.7075	Spider Blocks	Yes	No	6/15/2010
Between S. End of Dam & SE. Ramp	6	34.9568	-96.7043	Spider Blocks	Yes	Yes	6/15/2010
S. End of Dam	7	34.9575	-96.7038	Spider Blocks	Yes	Yes	4/30/2009
SE. of Swim Beach	8	34.9683	-96.7023	Spider Blocks	Yes	Yes	6/15/2010
Cove N. of NE. Ramp	9	34.9788	-96.7035	Spider Blocks	Yes	No	4/30/2009
Hump in Middle of N. Cove	10	34.9766	-96.7097	Spider Blocks	Yes	No	4/9/2008
Rock Corner on N. Back from Discharge	11	34.9788	-96.7208	Spider Blocks	Yes	No	4/30/2009
NW. of Discharge	12	34.9778	-96.7243	Spider Blocks	Yes	No	6/15/2010
NW. of Discharge in Cove	13	34.9771	-96.7252	Spider Blocks	Yes	Yes	6/15/2010
Old Road Bed NW. of Discharge	14	34.977	-96.7224	Spider Blocks	Yes	Yes	4/9/2008
Old Foundation N. of Discharge	15	34.9748	-96.7206	Spider Blocks	Yes	Yes	4/9/2008
Mouth of Discharge	16	34.9725	-96.7198	Spider Blocks	Yes	No	2/20/2012
Mouth of Discharge	17	34.9721	-96.7195	Spider Blocks	Yes	No	4/30/2009
Old Road Bed	18	34.9707	-96.7103	Spider Blocks	Yes	No	2/20/2012
E.-W. Cove E. of Plant	19	34.9668	-96.7138	Spider Blocks	Yes	No	6/15/2010
Mid Lake W. Bank	20	34.9652	-96.7108	Spider Blocks	Yes	No	2/20/2012

Appendix 2. Species, number and size of fish stocked in Konawa Lake since 2000.

DATE	SPECIES	NUMBER	SIZE (inches)
2000	Florida LMB	27,400	2.75
	Striped bass hybrid	15,000	2
2001	Florida LMB	27,405	3
	Striped bass hybrid	13,805	1.25
2002	Striped bass hybrid	15,000	1.5
2003	Florida LMB	27,040	3
	Striped bass hybrid	15,625	1.3
2004	Striped bass hybrid	14,400	1.5
2005	Florida LMB	26,560	3
	Blue catfish	6,336	5
	Striped bass hybrid	14,620	1.5
2007	Striped bass hybrid	13,950	1.5
2014	Striped bass hybrid	9,100	1.5
	Striped bass hybrid	4,900	1.75
2017	Striped bass hybrid	15,050	1.5