SURVEY REPORT

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

KONAWA LAKE

2019

SURVEY REPORT

State: Oklahoma

Project Title: Konawa Lake Fish Management Survey Report

Period Covered: Changes in ODWC standard reporting occurred since the 2007 Survey Report. This report discusses survey results from 2007-2019.

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Konawa Lake

ABSTRACT

Konawa Lake was surveyed by spring electrofishing (2007, 2008, 2010, 2011, 2017, 2018), fall gill netting (2008, 2015) and by fall shad netting (2010, 2014, 2015, 2017, 2019) techniques to monitor trends in fish populations; monitor Largemouth bass size structure and growth rates and to evaluate Largemouth bass regulations. Largemouth bass size structure increased but growth rates and body conditions slightly decreased. Stockpiling occurred at 16 to 17 inches with the high abundance of preferred size (15-20 in) fish. Recruitment decreased to an undesirable level in 2017 and remained low for 2018. Shad abundance decreased along with White bass and Hybrid striped bass.

Konawa Lake will be surveyed by boat electrofishing, fall gill netting and fall trap netting in 2020 to continue monitoring of Largemouth bass, Hybrid striped bass, White bass, Channel catfish, shad and Crappie population trends. Age and growth data will be collected. Management recommendations will be made once 2020 data has been collected and analyzed. Harvest of 15 to 17 inch Largemouth bass and 15 to 20 inch Channel catfish is encouraged.

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 6 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.

Konawa Lake was surveyed in 2007, 2008, 2010, 2011, 2017, and 2018 by spring electrofishing , in 2008 and 2015 by fall gill netting and 2010, 2014, 2015, 2017 and 2019 by fall floating shad nets to monitor trends in fish populations.

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 2007, 2008, 2010, 2011, 2017, and 2018 by means of boat electrofishing. Randomly selected shoreline units were sampled. LMB abundance climbed from 2007 to a noticeable peak in the catch per unit of effort (CPUE) in 2011 (CPUE= 266). Then dropped slightly for 2017 (CPUE=212) and 2018 (CPUE=191) (Figure 1). However, CPUE increased and remained high for preferred size fish (CPUE=129). CPUE for 21 inches and greater increased above the 2010 Konawa Lake Management Plan objective of a (CPUE $\geq$ 3) in the 2011, 2017 and 2018 surveys. It is important to note that the standard sampling procedures (SSP) for Largemouth bass electrofishing surveys changed from 15 minute to 10 minute units in 2015. While this change decreased the amount of time sampled per unit, it is impossible to tell how that would have affected catch rates. CPUE's can vary based on habitat types sampled.

Body condition or relative weights (Wr) for most size classes and years surveyed are above acceptable values of 90(Table 1). Relative weights varied from year to year with fluctuation in abundance. The most recent survey in 2018 showed a slight decrease in relative weights for most size classes, but were still considered to be good. Preferred size showed a decrease in body condition that was below the mark we consider to be acceptable (Wr=87). The largest fish sampled was from the most recent 2018 survey at 24.61 (in) in length and 8.38 (lbs).

Proportional size distribution (PSD) values have increased in nearly every size class and year from 2010 to 2018 indicating an increase in proportion of larger size fish (Table 2). However, the PSD values in quality (PSD-Q =97) and preferred (PSD-P = 72) size classes have increased to a higher level than desired. Memorable size class increased to an ideal level (PSD-M=4). 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. This can be seen with stock size fish drastically decreasing in the 2017 (CPUE = 6.7) and 2018 (CPUE = 5) surveys (Table 1). Largemouth bass length frequency histograms (Figure 2) also demonstrates an increase in overall size structure but shows few fish in the smaller size classes.

Age data was collected on a subset of Largemouth bass from the 2010 and 2017 surveys. Growths for both surveys were moderate taking approximately three years to reach 14 inches then slows greatly at age four (roughly 15 inches). Von Bertalanffy growth curves are similar for both surveys but indicate a slight decrease in growth rates from 2010 to 2017 which can be seen with the decreasing 2017 K value or growth rates (K=0.44) (Figure 3, Table 3). Minimal growth occurs once reaching 17 inches, which can be seen with the L infinity values or estimated mean maximum length for 2018 (L inf. =17.69 in) increasing slightly from 2010 (L inf.=17.05) but both maintain a maximum growth around 17 inches. Age frequencies indicate excellent recruitment in 2010 and the few years prior with nearly 15% age one and 20% age two. 2017 survey showed a different picture indicating poor recruitment with less than 5% age one, 11% age two and nearly 30 % were age five (Figure 4).

Florida Largemouth Bass (FLMB) were stocked periodically in Konawa lake from 1977-2005 (Appendix 2) in an effort to introduce FLMB genetics into the bass population. FLMB will grow quicker and larger than native Northern Largemouth bass, given enough forage and the right conditions within the system. Largemouth bass genetics were sampled in 2012, 2014 and 2018 to determine the extent of Florida largemouth bass genetics within the population. Results showed 70%, 73.2% and 60.5% respectively of fish sampled contained pure FLMB or F1, a first generation cross (Table 4). No pure Northern largemouth bass were sampled in the 2014 and 2018 samples. Stockings were discontinued due to high abundance of bass.

While size structure increased, abundance of stock and quality size classes decreased, relative weights decreased, growth rates decreased and recruitment decreased from the last few surveys. Poor recruitment 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 for forage. However, recruitment needs to be monitored. Continued poor recruitment will become an issue.

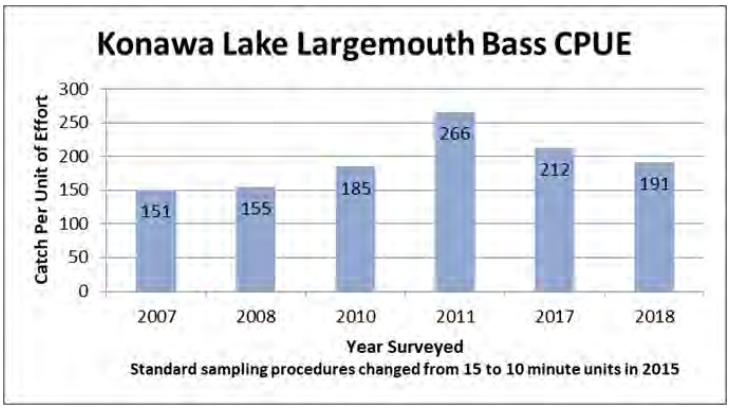


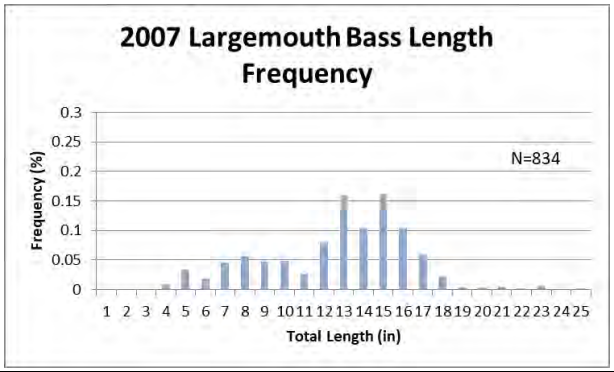
Figure 1. Catch Per Unit of Effort (CPUE) for Largemouth Bass 2007-2018.

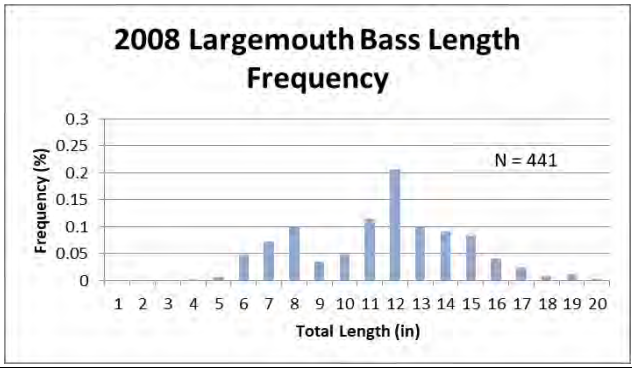
Table 1. Total number (No.), catch per unit of effort (CPUE), and relative weights (W_r) by size groups of **Largemouth bass** collected by spring electrofishing from Konawa Lake. Acceptable W_r values are ≥90.

		Total CPUE	Stock 7.9 in		Quality 11.8 in		Preferred 15 in		Memorable 20.1 in		≥21 in		Trophy 24.8	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	592	131.6	29.8	95	54.7	96	34.6	93	0.7	90	0.2	99	.	.
2007	834	151.6	26.6	96	67.5	89	31	85	2.4	87	1.8	92	.	.
2008	441	155.7	57.5	.	48.7	.	15.5	.	0.0	.	0.0	.	.	.
2010	836	185.8	17.8	103	77.3	98	69.8	92	2.7	95	2.2	99	.	.
2011	1198	266.2	39.5	104	116.2	90	79.6	86	3.8	84	3.6	.	0.4	.
2017	638	212.7	6.7	100	62.3	97	132.3	90	7.3	95	5.0	93	.	.
2018	573	191	5.0	92	47.0	92	129.3	87	7.0	94	4.9	98	.	.

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.

Year Surveyed	PSD-Q (11.8 in)	PSD-P (15 in)	PSD-M (20.1 in)
2006	74	28	1
2007	79	26	2
2008	53	13	.
2010	89	43	2
2011	83	35	2
2017	97	67	4
2018	97	72	4





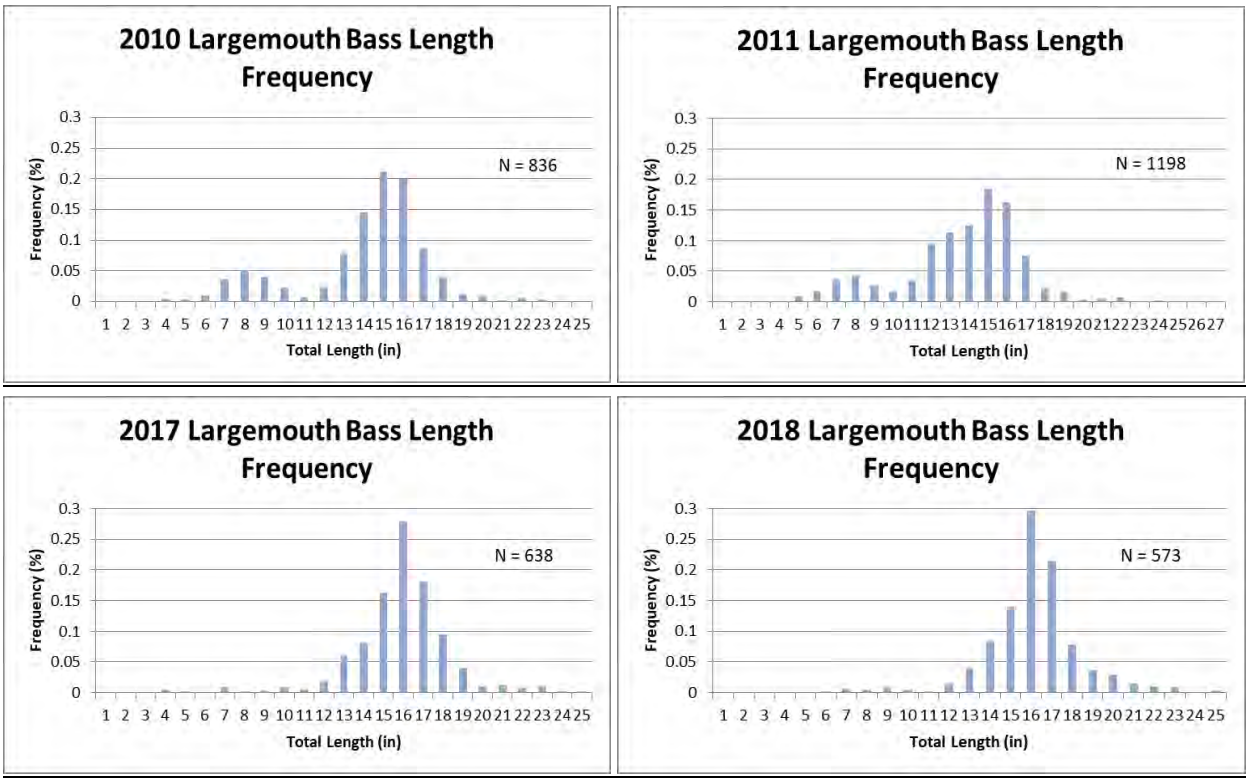


Figure 2. Largemouth Bass Length Frequencies for Konawa Lake 2007-2018.

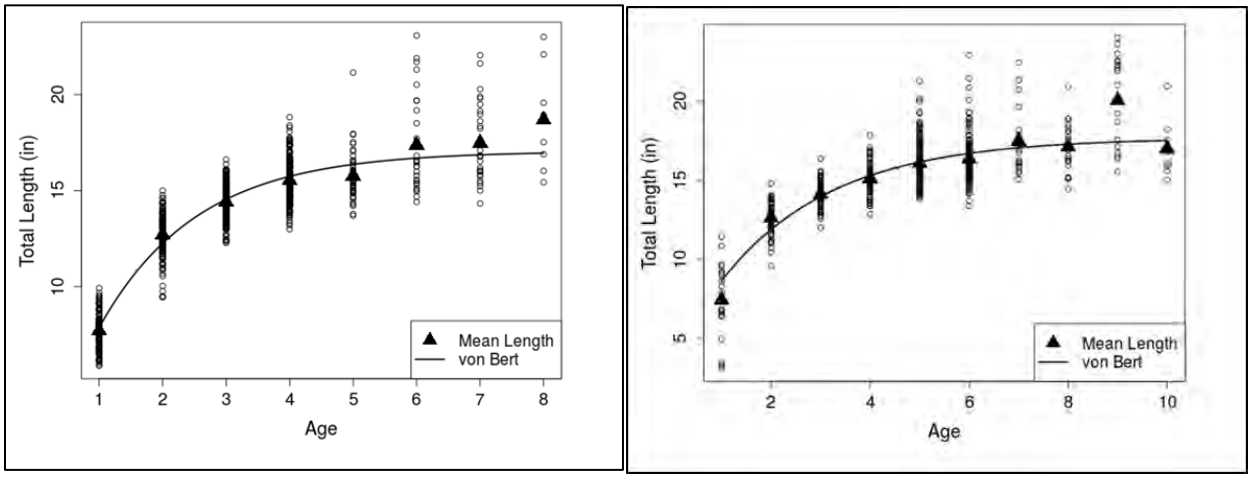


Figure 3. 2010 (left) and 2017 (right) Largemouth Bass Electrofishing Mean Length at Age: Von Bert Estimated Growth Curve. The Von Bert Growth Curve indicates the estimated growth rate of Largemouth bass.

Table 3. Mean Total Length at age (inches), L infinity (estimated mean maximum length) and K (growth rate) for Largemouth Bass from Konawa Lake.

Year	Age 1	Age 2	Age 3	Age4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	L inf.	K
2010	7.7	12.7	14.4	15.5	15.8	17.4	17.5	18.7	.	.	17.04	0.65
2017	7.4	12.6	14.1	15.1	16	16.3	17.5	17.1	20.1	17	17.69	0.44

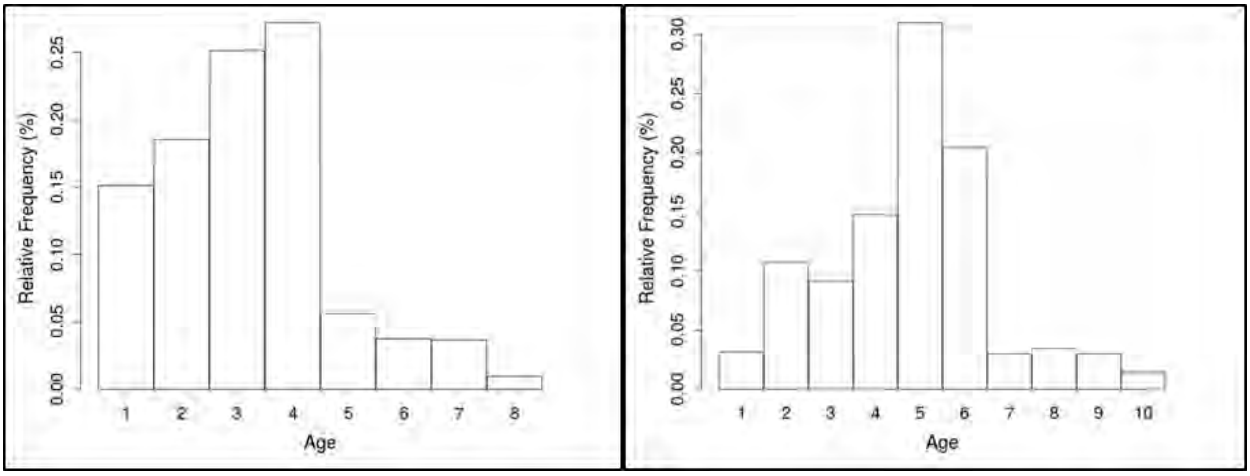


Figure 4. 2010 (left) and 2017 (right) Age Frequency of Largemouth bass.

Table 4. Largemouth Bass Genetic Samples 2012-2018.

Bass DNA Summary									
Year	% FLMB	% NLMB	% F1	% FX-F	% FX-N	% FX	% DNR	% F+F1	# Sampled
2012	67.5%	2.5%	2.5%	27.5%	0.0%	0.0%	0.0%	70.0%	40
2014	73.2%	0.0%	0.0%	26.8%	0.0%	0.0%	0.0%	73.2%	41
2018	55.3%	0.0%	5.3%	36.8%	0.0%	2.6%	5.0%	60.5%	40

Genotype	Description
FLMB	Only Florida Strain Alleles
NLMB	Only Native Strain Alleles
F1	First Cross-Both Alleles present for all markers
FX-F	Hybrid Cross-mostly Florida Alleles
FX-N	Hybrid Cross-mostly Native Alleles
FX	Hybrid Cross-equal number of Alleles for 2 or 3 markers
DNR	Did not run or file unreadable.

Channel Catfish

Channel catfish were surveyed in 2008 and 2015 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in the 2015 survey. Both surveys indicated a high abundance of Channel catfish with a (CPUE = 22) in 2008 and (CPUE = 12.9) in 2015 (Table 5). Body condition was considered fair to poor for stock and quality size classes for both surveys with relative

weights in the low 80's and high 70's. However, preferred and memorable size classes showed acceptable values of 90 and above (Table 5). Length frequency histograms (Figure 5) and proportional size distribution (PSD) values (Table 6) showed a slight increase in overall size structure with memorable (PSD-M) increasing from zero to one in 2015. Age data were not collected on either sample. The largest fish sampled was 29.8 (in) and weighed 10.47 (lbs). The 2010 management plan objective to maintain a catch rate of 4.8 channel catfish a net set has been achieved. Channel catfish harvest is recommended to reduce abundance and increase body conditions and growth rates.

Table 5. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of **Channel catfish** collected by fall gill netting from Konawa Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 11 in		Quality 16.1 in		Preferred 24 in		Memorable 28 in		Trophy 35.8 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	114	13.7	9.5	81	3.9	88	0.4	110	.	.	.	.
2008	199	22.0	6.7	84	6.9	83	0.6	95	.	.	.	.
2015	115	12.9	6.1	79	5.7	83	0.9	90	0.11	98	.	.

Table 6. Proportional Size Distribution (PSD) of Channel catfish. 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.

Year Surveyed	PSD-Q (16.1 in)	PSD-P (24 in)	PSD-M (28 in)
2006	31	3	.
2008	52	4	.
2015	53	8	1

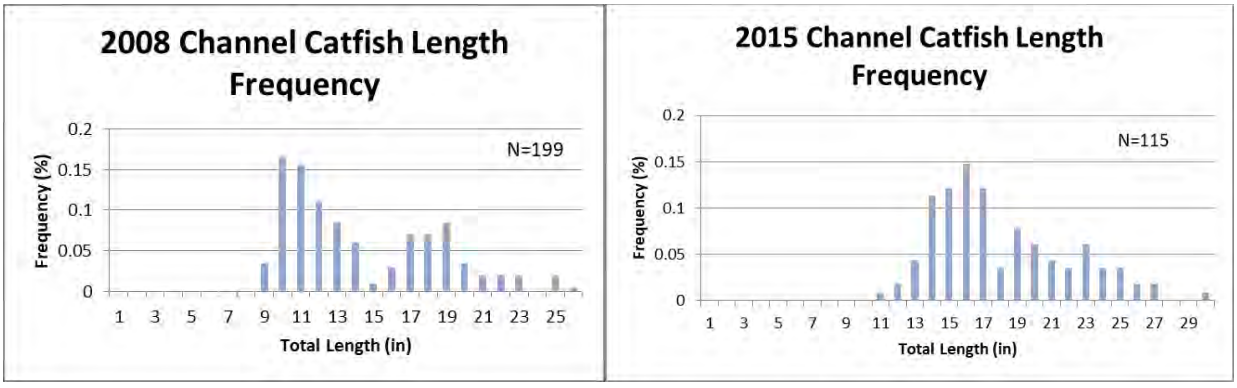


Figure 5. Channel Catfish Gill Net Length Frequency Histogram 2008-2015.

Hybrid Striped Bass

Hybrid striped bass were surveyed in 2008 and 2015 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in the 2015 survey. 2008 survey indicated a high abundance of stock (CPUE=7.2), quality (CPUE=9.3) and preferred (CPUE=1.2) size classes. Body condition was considered good for stock (Wr=96) and quality (Wr=94) size fish. Body condition of preferred size fish was fair (Wr=84). 2015 survey showed a decrease in abundance (CPUE=1.6) with the largest fish at 15.9 (in) in length and 1.96 (lbs) in weight. Overall body condition (Wr=92) was good (Table 7).

Growth rates were considered good reaching a mean length of 16 inches by age one and 20 inches by age three (Table 8). The 2015 survey achieved the 2010 management plan objective of having a reduced catch rate of 2.0 fish a net set. Age data were not collected from Hybrid striped bass for the 2015 survey.

Hybrid striped bass can compete with Largemouth bass for forage. Body condition and growth rates of both species should be monitored to make sound stocking decisions.

Hybrid striped bass surveys are planned for fall of 2020. Future stocking decisions will be made based on data from 2020.

Table 7. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of **Hybrid striped bass** collected by fall gill netting from Konawa Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 9.8 in		Quality 16.1 in		Preferred 20.1 in		Memorable 24 in		Trophy 28	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	62	7.5	3.9	87	2.8	86	0.6	80	.	.	.	.
2008	108	12.1	7.2	96	9.3	94	1.2	84	.	.	.	.
2015	14	1.6	1.6	92	.	.	.	.	.	.	.	.

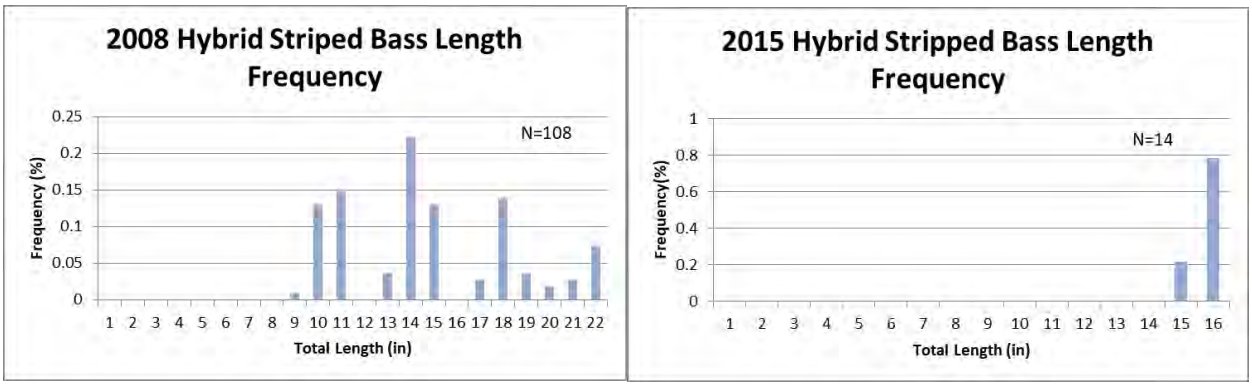


Figure 6. Hybrid Striped Bass Gill Net Length Frequency Histogram 2008-2015.

Table 8. Mean Total Length at age for Hybrid Striped Bass from Konawa Lake.

Year	Age 1	Age 2	Age 3	Age4	Age 5	Age 6	Age 7	Age 8	Age 9
2008	16.04	14.05	20.27	.	.	.	.	.	.

White Bass

White bass were surveyed in 2008 and 2015 using suspended gill nets. Standard sampling protocols for gill net lengths changed in 2009 to 80 foot nets. Gill net lengths and effort varied prior to 2009. Ten stations were randomly sampled for a period of 24 hours in the 2015 survey. Overall abundance continued to decrease from 2006 to 2015 but maintained a moderate CPUE of 4.9 (Table 9). Body conditions of quality and preferred size fish were considered to be good (Wr= 95,94). The largest fish sampled out of both surveys was 14.7 (in) in length and 1.57 (lbs.) in weight.

Table 9. Total number (No.), catch per unit of effort (CPUE), and relative weights (Wr) by size groups of White Bass collected by fall gillnet from Konawa Lake. Acceptable Wr values are ≥90.

		Total CPUE	Stock 5.9 in		Quality 9.1 in		Preferred 11.8 in		Memorable 15 in		Trophy 18.1 in	
Year	No.	CPUE	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr	CPUE	Wr
2006	145	17.7	3.6	88	0.9	91	12.9	88	0.23	94	.	.
2008	54	5.9	.	.	2.2	100	3.8	99	.	.	.	.
2015	44	4.9	.	.	0.56	95	4.3	94	.	.	.	.

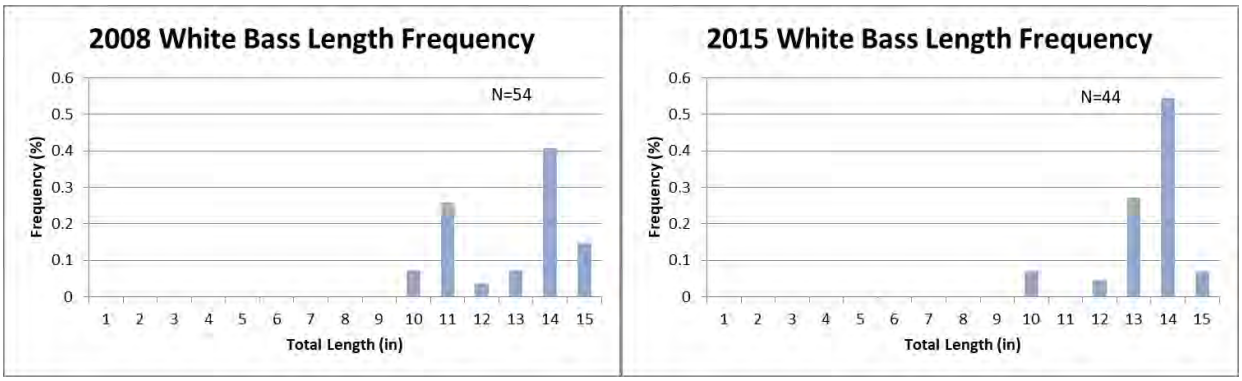


Figure 7. White Bass Gill Net Length Frequency Histogram 2008-2015.

Crappie

Gill net surveys indicated a low abundance of crappie in Konawa Lake. Only three Crappie were collected in the 2008 survey and zero in the 2015 survey. The largest fish collected was 11.73 (in) in length and 0.97 (lbs) in weight. Sample size was too small analyze size structures and age. Trap net surveys are recommended to obtain more data about Crappie abundance and size structure.

Shad

Gizzard and Threadfin shad were sampled by suspended gill nets in 2008 and 2014 and by floating shad nets in 2010, 2014, 2015, 2017 and 2019. Abundance of Gizzard and Threadfin shad varied greatly by year and gear type. Threadfin shad abundance has consistently remained higher than Gizzard shad in all floating shad net surveys. 2017 shad net survey showed the lowest abundance (CPUE=0.2 Gizzard, CPUE=10.7 Threadfin) for both species (Table 10) from 2006 to 2019. Abundance increased slightly for both species in the 2019 survey (CPUE=7.4 Gizzard, CPUE=28.8 Threadfin). Threadfin shad rarely exceed 6 inches in length; therefore they remain at optimal forage size for Largemouth bass which is less than six inches. Length frequency histograms (Figures 8 and 9) indicate the percent of fish from each survey within the optimal forage size.

Threadfin shad are one of the main forage for sport fish species in Konawa Lake. They cannot tolerate water temperatures below the low 50's. With reduced power generation water temperatures are likely to stay cooler for longer periods; in return Threadfin shad abundance will decrease. Productivity for the entire system relies on the warmer temperatures created from power generation. Continued monitoring of shad abundance is necessary for stocking recommendations of Largemouth bass and Hybrid striped bass.

Table10. Total number (No.) and catch per unit of effort (CPUE) by size groups of Gizzard and Threadfin Shad collected by fall shad netting and gill netting from Konawa Lake.

Shad Net							Gill Net					
Gizzard					Threadfin		Gizzard				Threadfin	
Year	No.	Total CPUE	<6 inches	≥ 6 Inches	No.	Total CPUE	No.	Total CPUE	<6 inches	≥6 inches	No.	Total CPUE
2006							250	30.2	13.7	16.5	543	65.3
2008							100	11.0	0.6	10.5	16	1.8
2010	0	.	.		65	11.1						
2014	44	4.6	4.4	0.2	325	33.9						
2015	2	0.2	0.2	.	274	27.4	58	6.5	0.11	6.37	9	1.0
2017	2	0.2	0.2	.	96	10.7						
2019	104	7.4	7.4	.	402	28.8						

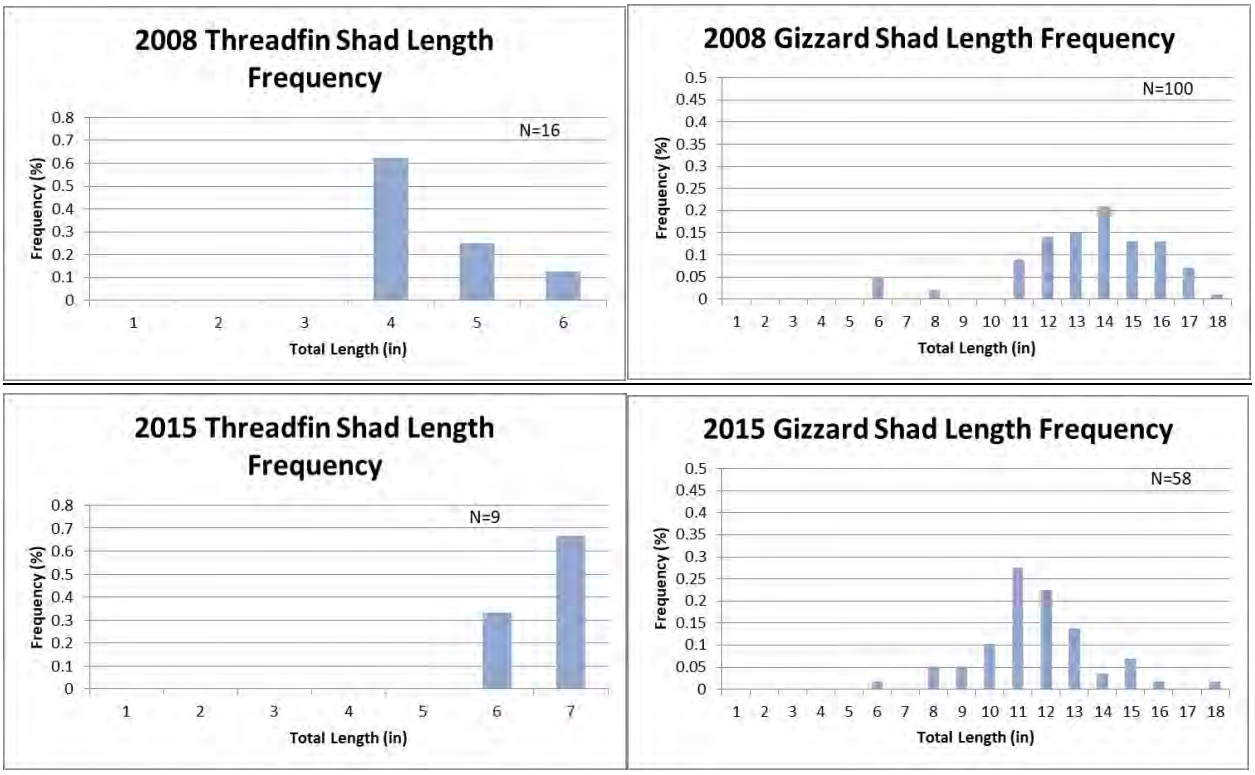
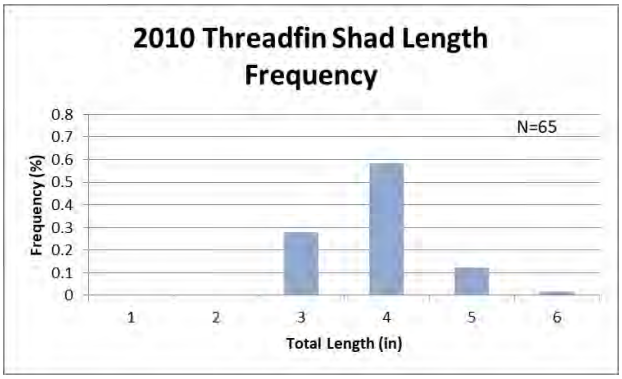
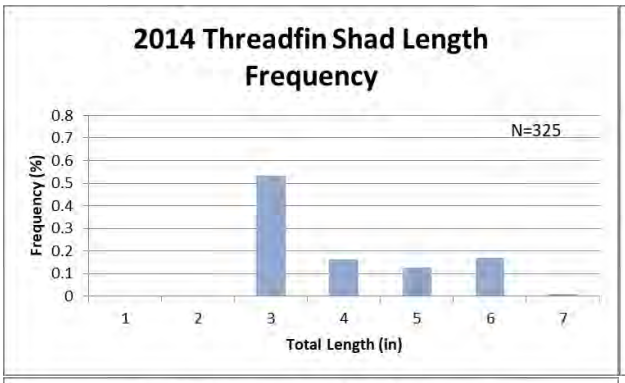
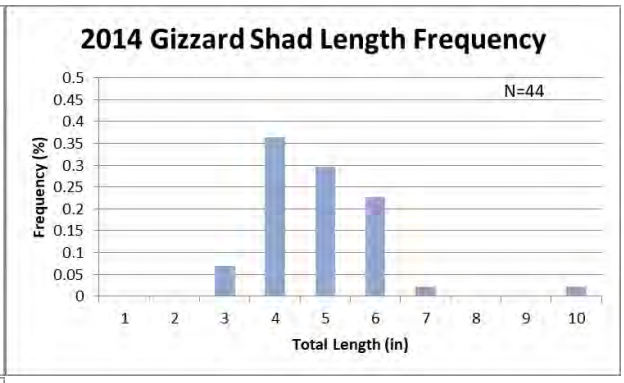
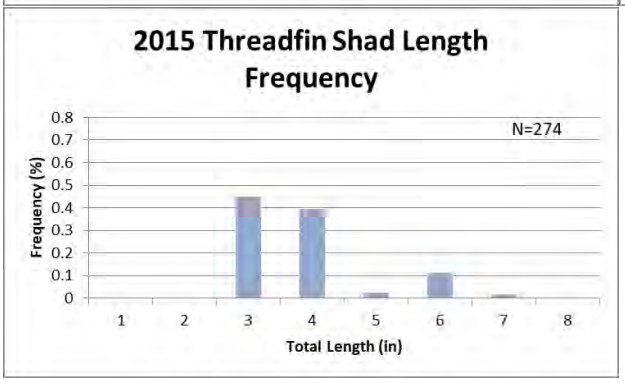


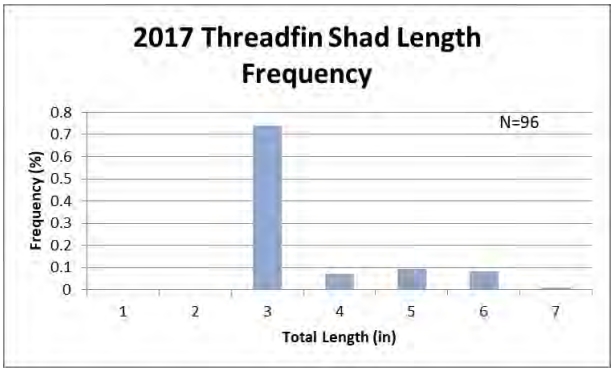
Figure 8. Gizzard and Threadfin Shad Length Frequency Histogram from suspended gill nets 2008 and 2015.


2010 Threadfin Shad Length Frequency
N=65
Frequency (%)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
Total Length (in)


2014 Threadfin Shad Length Frequency
N=325
Frequency (%)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
7
Total Length (in)


2014 Gizzard Shad Length Frequency
N=44
Frequency (%)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
2
3
4
5
6
7
8
9
10
Total Length (in)


2015 Threadfin Shad Length Frequency
N=274
Frequency (%)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
7
8
Total Length (in)


2017 Threadfin Shad Length Frequency
N=96
Frequency (%)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
7
Total Length (in)

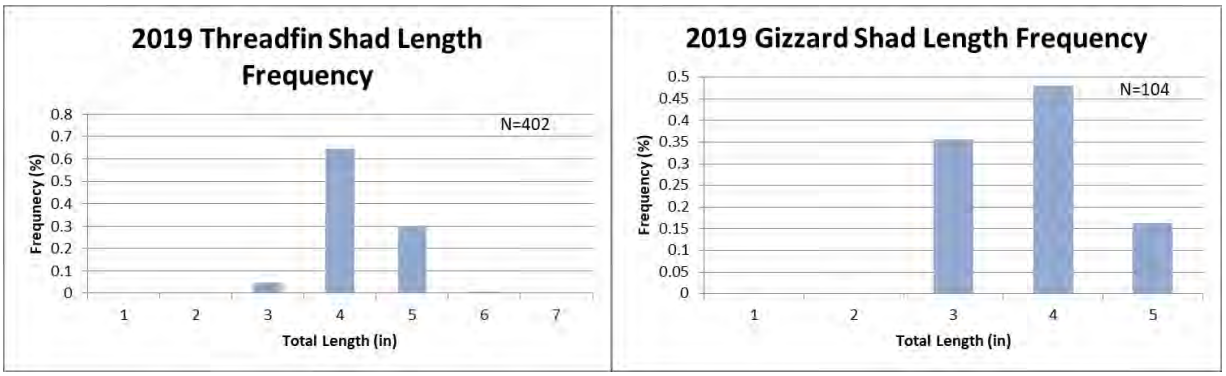
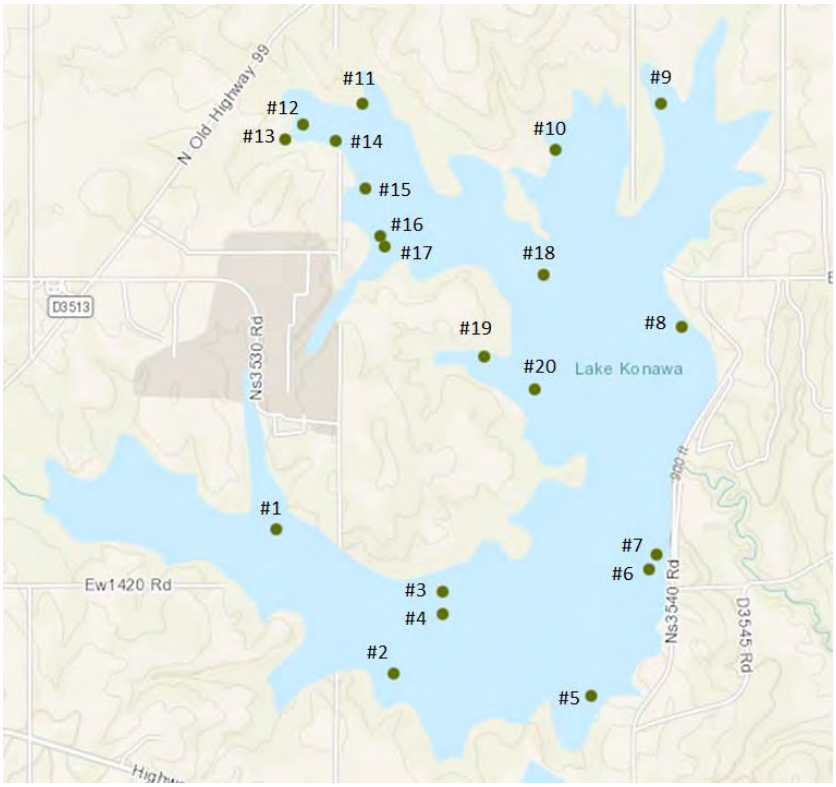


Figure 9. Gizzard and Threadfin Shad Length Frequency Histograms from floating shad nets 2010-2019. Missing Gizzard shad length frequency histograms indicate too few were sampled to be presented.

Recommendations

1. Encourage harvest of 15 to 17 inch Largemouth Bass and 15 to 20 inch Channel Catfish to lower abundance and increase growth rates.
2. Maintain periodic electrofishing surveys to monitor size structure, growth rates and recruitment of largemouth bass.
3. Monitor Bass genetics for potential to revert back to Northern strain Largemouth Bass.
4. Evaluate Hybrid Striped Bass body condition and growth rates in 2020 Gillnet survey. Create stocking schedule based on collected data.
5. Continue Shad net surveys every few years to monitor Threadfin and Gizzard shad abundance.
6. Monitor water temperatures to assess potential for Threadfin shad die off.
7. Conduct periodic gillnet surveys to assess additional fish species abundance and size structure.
8. Conduct trap net survey to better assess crappie abundance and size structure in 2020.



Appendix 1. Konawa Lake Fish Attractor Locations

Fish Attractor Site Information for Konawa Lake

Area Name	Site #	Latitude	Longitude	Habitat Type	Marked	Bank Access	Date
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