SURVEY REPORT

OKLAHOMA FISHERIES MANAGEMENT PROGRAM

FISH MANAGEMENT SURVEY AND RECOMMENDATIONS

FOR

LAKE JEAN NEUSTADT

2024

INTRODUCTION

Lake Jean Neustadt impounds Phillips Creek, 6.8 miles northwest of Ardmore in Carter County, Oklahoma (Figure l). It covers 462 acres and was constructed in 1969 by the Soil Conservation Service. Lake Jean Neustadt is managed by the City of Ardmore for the purpose of recreation and municipal water supply. Lake Jean Neustadt has a relatively stable water level with a normal pool elevation of 809 feet msl, a mean depth of 10 feet, and a maximum depth of 47 feet. Boating and fishing access development projects completed in 1990 included construction of a restroom facility, parking lot, trash receptacles and handicapped accessible boat and fishing docks.

HABITAT

Natural fish habitat consists of aquatic vegetation, rock and limited amounts of flooded timber. The Oklahoma Department of Wildlife Conservation (ODWC) currently maintains 9 buoyed fish attractors to increase angler opportunities (Figure 2). Maps and GPS coordinates for these structures are available on the department's website at www.wildlifedepartment.com/fishing/wheretofish. In 2008, a statewide grant through the National Fish and Wildlife Foundation (NFWF) allowed for the purchase of materials to construct artificial habitat structures consisting of polyethylene pipe and concrete blocks. These artificial habitat structures, known as spider blocks, were placed around the fishing dock in the summer of 2009. Buoyed fish attractors throughout the lake were last refurbished in 2022. These trees should provide improved fishing opportunities for several years.

WATER QUALITY

Water quality data for Jean Neustadt is collected through the Oklahoma Water Resources Board as part of their Beneficial Use Monitoring Program (BUMP). The most current BUMP report for Lake Jean Neustadt can be viewed at http://www.owrb.ok.gov. A brief overview of several water quality parameters is included in Table 1.

FISHERY

The major sportfish in Lake Jean Neustadt include largemouth bass, spotted bass, white crappie, saugeye, and channel catfish. Historical stocking data is included in Table 2.

Slow growing, stunted crappie were first noted in Jean Neustadt in the late 1980s. This problem was addressed by stocking predatory species that would reduce the number of small crappie in the population. Stocked species included hybrid striped bass, saugeye, and flathead catfish. Saugeye appeared to have the greatest potential for crappie predation and stockings continued throughout the 1990s. Crappie growth rates and size structure improved during these years but reverted back to stunted conditions once saugeye stockings ceased in the late 1990s and early 2000s. Saugeye stockings resumed in 2006 in an effort to re-establish the saugeye population to a level that would biologically control and enhance the crappie fishery.

Regulations were changed in 2024 to mirror statewide limits with the exception of maintaining the 22 inch minimum for saugeye.

Lake Jean Neustadt was sampled by fall gillnetting in 2024 and spring electrofishing in 2013 (Figure 3) to evaluate the status of the crappie, saugeye, channel catfish, and black bass populations.

Black Bass

Both largemouth and spotted bass can be found at Lake Jean Neustadt. Largemouth bass are the dominant species, accounting for 87.5% of the black bass collected during the 2013 survey.

Largemouth bass catch rates and relative weights for all size groups were within the range of acceptable values for a quality fishery during the 2013 survey. The largemouth bass population has remained stable compared to the two previous surveys in 2004 and 2008. Spotted bass catch rates were low, but relative weights were acceptable. Historical data for largemouth and spotted bass catch rates and size structure are included in Tables 3- 4 and Figures 4-7.

Crappie

Crappie were sampled by fall gillnetting in 2024 to determine the size structure and growth rates of the population. Overall catch rates were similar to those in the 2016 - 2021 samples. Approximately 64% of the population consisted of crappie 6 – 7 inches long. Average growth rates have increased compared to the past several samples at Jean Neustadt. Growth exceeded acceptable levels for ages 1 – 4. Crappie historically live longer in Jean Neustadt than what is typical of other lakes in Oklahoma. However, in 2024 no crappie older than age-4 were sampled. Historical catch rate, size structure, and growth rate data collected by trap netting and gillnetting can be viewed in Tables 5-7 and Figures 8-14.

Saugeye

Saugeye were sampled by fall gillnetting in 2024 to determine the size structure and growth rate of the population. Gillnets collected fish from 2024, 2022, and a single fish from the 2019 stockings. Saugeye growth rates appear to be exceptional with individuals reaching 18 inches during their second growing season. Unfortunately, only 1 fish (2019 year class) exceeded the 22 inch length limit. Had there not been a stocking gap between 2019 and 2022 we would likely have seen more fish exceeding the length limit. This highlights the need to stock more consistently, either every other year or annually. Historical catch rate, size structure, and growth rate data collected by gillnetting and electrofishing can be viewed in Tables 8-10 and Figures 15-18.

Catfish

Channel catfish were sampled by gillnetting in 2018. Catch rates of preferred size channel catfish (>16 inches) have remained acceptable over the past four surveys. Channel catfish

appear to be in fair body condition and the size structure of the population appears stable. Catch rate and size structure data can be viewed in Table 11 and Figure 19.

THREATS TO FISHERY

Aquatic Nuisance Species (ANS)

Zebra mussels

Zebra mussels (*Dreissena polymorpha*) are small, thumbnail size mussels with a zebra-like pattern of stripes native to the Caspian Sea region of Asia. These invasive mussels reproduce rapidly and can spread from one waterbody to another through a free-floating, microscopic larval stage known as a veliger. Zebra mussels negatively impact the environment by altering the food chain and water chemistry of a lake. Zebra mussels also affect manmade facilities by clogging water intake pipes and disrupting withdrawal operations.

Zebra mussels have not been detected at Lake Jean Neustadt. They were first detected in nearby Lake Texoma in 2008, Lake Murray in 2012 and Ardmore City Lake in 2022. Since that time, adult zebra mussels have become widespread throughout these lakes. Because Jean Neustadt is located in close proximity (within 50 miles) of these lakes, there is a good likelihood that recreational users will utilize both reservoirs. This results in numerous vectors for the transfer of water and zebra mussel adults and veligers to Lake Jean Neustadt. The connectivity of the City of Ardmore's four lakes and their use as a municipal water source increases the threat level and the resulting negative impacts that a zebra mussel infestation would have. More information about invasive mussels can be found at http://www.100thmeridian.org.

Hydrilla

Hydrilla was first detected at Jean Neustadt during fall sampling 2024. Most likely source of the contamination came from nearby lakes with recently established infestations Ardmore City Lake (2019) or Scott King (2022) or Lake Murray with a longer history of hydrilla.

Hydrilla (*Hydrilla verticillata*) is an invasive and potentially damaging aquatic weed popular in the aquarium trade. It has the ability to establish at depths greater than 15 feet and form dense surface mats. Hydrilla is known to displace native species, negatively affect water quality, restrict water flow, and impair recreational activities. Its many modes of reproduction, including

fragmentation, allows for rapid spread and dispersal within and among water bodies. Hydrilla infestation at Jean Neustadt could be severe due to the relatively shallow nature of the lake (average depth 10 feet) and the ability of hydrilla to establish in deep water and outcompete native plants.

RECOMMENDATIONS

1. Maintain the saugeye population at a level that enhances the quality of the crappie population.
2. Conduct fall gillnet sampling in 2027 to monitor the crappie and saugeye populations.
3. Fish attractor buoys should be checked and brush shelters refurbished in 2026.
4. Continue to monitor hydrilla and address aquatic nuisance species threats through public outreach opportunities, literature, and signage.

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Table 1. Physical and chemical characteristics of Lake Jean Neustadt from December 2016 to September 2017 BUMP Report.

Operating Agencies:	
Recreation	City of Ardmore
Impoundment Date	1969
Watershed	17.29 square miles
Surface Area	462 acres
Capacity	6,106 acre-feet
Shoreline	11 miles
Shoreline Development Ratio	3.3
Mean Depth	10 ft.
Maximum Depth	47 ft.
Water Exchange Rate	0.761
Secchi Disk	18.9 in
pH Range	6.95 – 8.58
Conductivity Range	220.8 – 328.9 µS/cm
Salinity Range	0.10 – 0.14 ppt
Average Turbidity Value	16 NTU
Trophic State Index (chlorophyll a)	57
Trophic Class	Eutrophic

Table 2. Species, number and size of fish stocked in Lake Jean Neustadt from 1989 to 2024.

DATE	SPECIES	NUMBER	SIZE
1989	Saugeye	9,755	Fry
1989	Channel catfish	5,520	Fingerlings
1990	Saugeye	13,500	Fry
1990	Hybrid striped bass	4,500	Fry
1990	Flathead catfish	4,500	Fry
1990	Channel catfish	9,000	Fingerlings
1991	Flathead catfish	200	Fry
1991	Flathead catfish	5,070	Fingerlings
1991	Saugeye	9,000	Fry
1992	Threadfin shad	2,500	Adults
1992	Blue catfish	57	Adults
1993	Saugeye	8,910	Fry
1994	Saugeye	8,820	Fry
1995	Saugeye	9,135	Fry
1996	Saugeye	9,600	Fry
1996	Cert. Florida bass	4,600	Fingerlings
1997	Saugeye	9,116	Fry
2000	Channel catfish	12,400	Fingerlings
2004	Cert. Florida bass	11,234	Fingerlings
2006	Saugeye	28,420	Fry
2007	Saugeye	23,064	Fry
2008	Saugeye	24,970	Fry
2011	Saugeye	23,232	Fry
2013	Saugeye	24,000	Fry
2014	Saugeye	24,640	Fry
2016	Saugeye	48,000	Fry
2018	Saugeye	11,625	Fry
2019	Saugeye	11,620	Fry
2022	Saugeye	30,443	Fingerlings
2024	Saugeye	23,295	Fingerlings

Table 3. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of largemouth bass collected by spring electrofishing from Lake Jean Neustadt. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are $\geq$90.

	Total (≥40)		<8 in. (15-45)		8–13 in. (15-30)		≥12 in. (≥15)		≥14 in. (≥10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r	C/f	W_r
1984	261	31.6	10.8				12.6		8.1	
1987	110	62.9	12.6				36.0		20.6	
1990	105	42.0	4.0	135			34.8	99	25.6	99
1993	150	100.0	12.7	97			52.0	97	31.3	97
1997	102	102.0	40.0	97	38.0		43.0	88	24.0	88
1999	141	188.0	69.3	84	98.6		62.7	83	18.7	87
*2004	81	54.0	6.0	144	20.0	95	36.7	97	20.7	99
2008	84	56.0	21.3	110	24.7	98	21.3	97	8.0	96
**2013	63	63.0	14.0	94	31.0	90	23.0	96	16.0	99

* 2004 Denotes changed electrofishing protocol – Minimum of 1.5 hours of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.

Table 4. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of spotted bass collected by spring electrofishing from Lake Jean Neustadt. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are ≥ 90.

	Total (≥ 40)		< 8 inches (15-45)		8-13 inches (15-30)		≥ 14 inches (≥ 10)	
Year	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
1997	4	4.0	2.0		1.0		1.0	
1999	16	21.3	12.0		21.3		2.7	
*2004	16	10.7	0.7	78	8.0	85	1.3	86
2008	4	2.7	0		1.3	82	1.3	84
**2013	9	9.0	0		4.0	90	4.0	96

* 2004 Denotes changed electrofishing protocol – Minimum 1.5 hours of effort required.
** 2013 Denotes changed electrofishing protocol - Minimum of 1 hour of effort required.

Table 5. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of all crappie collected by trap netting from Lake Jean Neustadt. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ≥ 90.

	Total (≥ 25)		< 5 in.		≥ 5 in.		≥ 8 in. (≥ 10)		≥ 10 in. (≥ 4)	
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
1991	109	65.4	21.0		44.4		0.0		0.0	
1996	74	10.1	0.7		9.4		9.3		7.4	
1997	151	16.6	0		16.6		10.8		4.1	
1999	108	14.6	2.2	60	12.5	85	8.6	86	7.0	86
2001	167	17.8	3.8	70	13.9	87	13.9	92	12.7	93
2005	358	43.4	6.0	85	37.2	85	4.1	84	1.7	90
2008	326	32.6	0.6	86	32.0	96	3.9	90	1.3	95

Table 6. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of all crappie collected by gill netting from Lake Jean Neustadt. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are $\geq$90.

| | Total | | <5 in. | | $\geq$5 in. | | $\geq$8 in. | | $\geq$10 in. | |
| | ($\geq$ 4.8) | | | | | | ($\geq$ 1.9) | | ($\geq$ 0.96) | |
Year	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr	C/f	Wr
2010	197	24.7	0.5	90	24.1	90	2.9	90	1.5	97
2012	169	14.6	2.9	-	11.4	90	1.2	94	0.7	105
2014	143	11.9	0.3	-	11.6	90	4.2	87	1.5	93
2015	456	39.7	0.5	-	39.3	88	6.5	85	3.0	89
2016	210	19.5	0	-	19.5	83	4.2	85	2.3	94
2018	207	17.6	0.5	-	17.0	89	1.4	94	0.9	102
2021	236	19.6	0.4	-	19.2	86	4.3	86	1.9	95
2024	277	23.7	.17	-	23.6	85	8.2	83	2.4	91

Table 7. Mean length at age of all crappie collected by trap netting and gill netting from Lake Jean Neustadt. Numbers in parentheses represent sample size. Numbers in brackets represent values for acceptable growth rates.

Year	Age 1 [≥ 6.3 in]	Age 2 [≥7.9 in]	Age 3 [≥8.9 in]	Age 4 [≥9.8 in]	Age 5	Age 6	Age 7	Age 8	Age 9
1991	4.8 (10)	5.6 (3)	6.0 (12)	6.1 (5)		5.8 (1)	5.4 (1)		
1994		5.4 (17)	6.9 (20)	6.6 (25)	7.0 (12)	6.8 (3)	6.1 (1)		
1996	8.9 (5)	10.5 (9)	10.5 (16)	10.7 (7)	11.2 (2)	10.7 (10)			
1997	7.7 (22)	9.0 (21)	12.5 (3)	12.0 (12)	12.2 (4)	11.5 (6)	10.4 (4)		
1999	7.3 (34)	9.3 (6)	11.5 (26)			13.4 (2)	13.0 (2)		13.0 (1)
2001	6.0 (1)	10.5 (36)	12.6 (7)		13.2 (6)	13.8 (1)			
2005	4.5 (19)	6.2 (40)	6.9 (27)	8.3 (49)	12.1 (6)	14.2 (3)			
2008	6.2 (30)	7.7 (24)	8.2 (11)	8.5 (15)	9.1 (8)	9.4 (5)	10.4 (4)		
*2010	5.7 (20)	6.8 (15)	8.1 (26)	9.2 (8)	11.8 (1)	12.9 (2)	7.3 (4)	9.1 (4)	13.8 (1)
*2012	6.0 (1)	6.8 (14)	7.9 (23)	10.0 (9)	9.5 (9)	10.6 (2)			
*2014	6.8 (19)	8.7 (46)	8.8 (12)	9.9 (7)	7.6 (4)	7.3 (1)	12.7 (1)		
*2015	6.6 (37)	9.2 (14)	10.1 (31)	9.7 (14)	9.6 (6)	10.1 (7)	9.2 (1)		

*2016	6.3	7.8	11.3	11.3	12.6	13.8	9.5	12.9
	(3)	(58)	(5)	(12)	(2)	(2)	(2)	(1)
*2018	6.0	7.0	7.8	10.0				
	(8)	(10)	(31)	(12)				
*2021	6.7	7.8	9.6	10.5	8.9	11.2	14.2	
	(14)	(28)	(23)	(11)	(7)	(6)	(1)	
*2024	6.9	9.6	11.9	12.4				
	(41)	(55)	(7)	(4)				

* Denotes gill net data

Table 8. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of saugeye collected by gill netting from Lake Jean Neustadt. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are $\geq$90.

Year	No.	Total (> 2.4) C/f	< 12 inches ($\geq$ 1.4) C/f	W_r	12-18 inches ($\geq$ 0.48) C/f	W_r	$\geq$ 16 inches ($\geq$ 0.48) C/f	W_r
2010	22	2.76	0	-	0.38	93	2.74	91
2012	37	3.20	0	-	0.61	99	3.11	92
2014	81	6.75	3.0	97	1.50	95	2.67	90
2015	37	3.22	0	-	1.73	88	2.87	88
2016	60	5.59	0.6	86	0	-	5.03	95
2018	31	2.60	0	-	0.60	96	2.60	97
2021	23	2.00	0	-	0.34	91	2.00	95
2024	18	1.55	0.4	90	1.13	88	1.13	90

Table 9. Total number (No.), catch rates (C/f), and relative weights (W_r) by size groups of saugeye collected by night electrofishing from Lake Jean Neustadt. Numbers in parentheses represent acceptable C/f values for a quality fishery. Acceptable W_r values are ☐90.

Year	Total (> 15)		< 12 inches (≥ 10)		12-18 inches (≥ 3)		≥ 16 inches (≥ 2)	
	No.	C/f	C/f	W_r	C/f	W_r	C/f	W_r
2010	24	24.0	1.0	95	22.0	88	6.0	93

Table 10. Mean length at age of saugeye collected by gill netting from Lake Jean Neustadt.

Year	Age 0	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6
2010a	-	-	14.3	17.7	-	-	-
2010	-	-	18.6	19.7	22.8	-	-
2012	-	17.5	-	-	23.2	23.4	21.8
2014	-	14.7	-	22.0	-	-	23.8
2015	-	16.7	18.0	-	24.1	-	-
2016	-	-	20.5	21.4	-	25.1	-
2018	-	-	18.2	-	22.6	23.5	-
2021	-	-	18.8	21.3	-	-	-
2024	8.9	-	18.6	-	-	23.0	-

a - Denotes saugeye collected by spring night electrofishing.

Table 11. Total number (No.), fish per net night (C/f), and relative weights (Wr) by size groups of channel catfish collected by gill netting from Lake Jean Neustadt. Numbers in parentheses represent acceptable values for a quality fishery. Acceptable W_r values are $\geq$90.

Year	Total ($\geq$ 4.80)		< 12 in. ($\geq$ 2.4)		$\geq$ 12 in. ($\geq$ 2.4)		$\geq$ 16 in. ($\geq$ 1.2)	
	No.	C/f	C/f	Wr	C/f	Wr	C/f	Wr
2010	58	7.2	4.4	89	2.9	93	1.6	95
2012	79	6.8	1.3	84	5.5	83	0.9	88
2014	134	11.2	1.8	83	9.3	85	5.9	86
2015	55	4.9	1.6	82	3.3	91	1.9	95
2016	83	7.8	2.4	83	5.4	84	2.0	90
2018	86	7.3	2.4	80	4.8	84	2.5	87
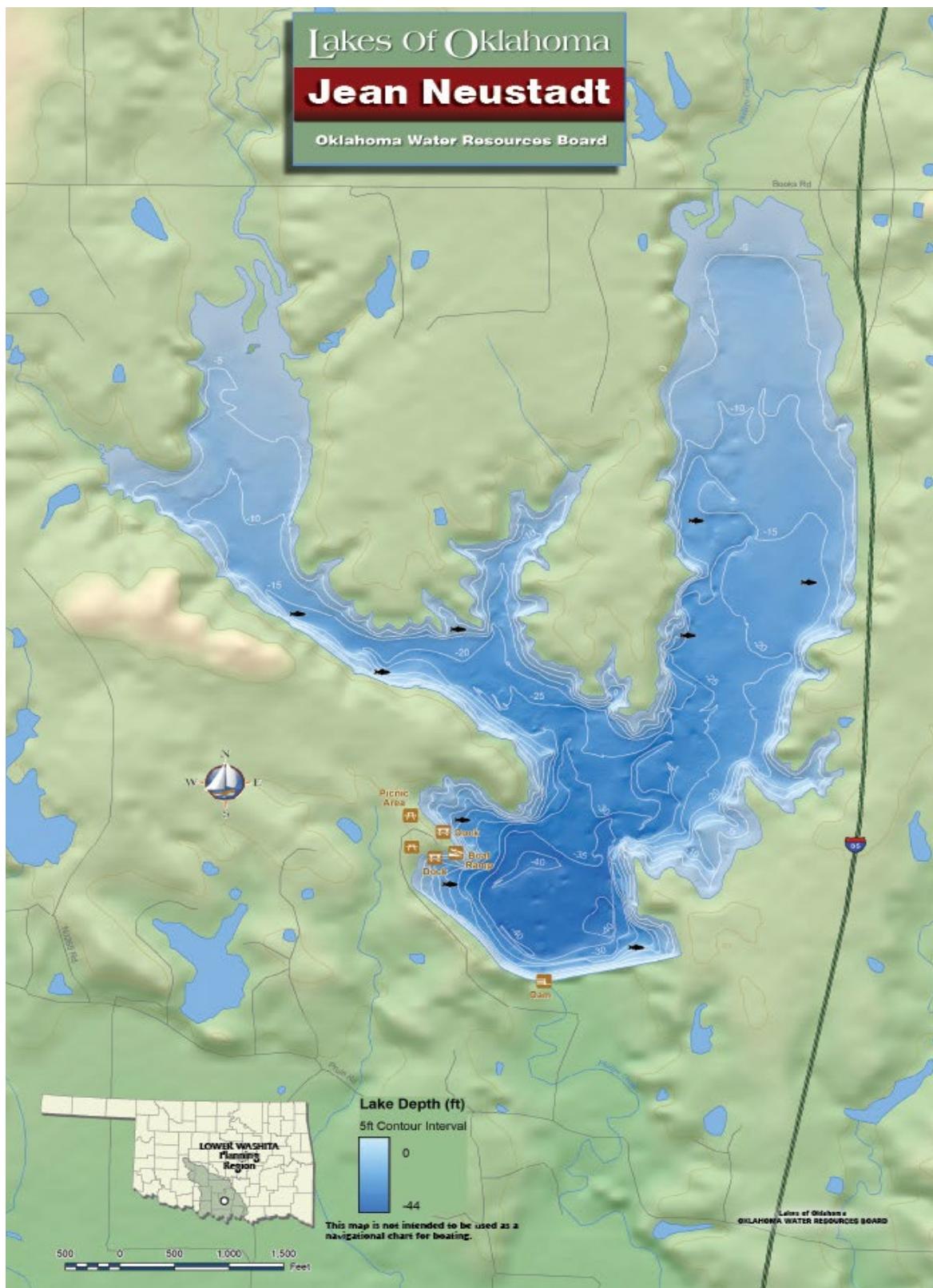
Figure 1. Map of Lake Jean Neustadt and vicinity.

Figure 2: Jean Neustadt Lake Habitat Sites
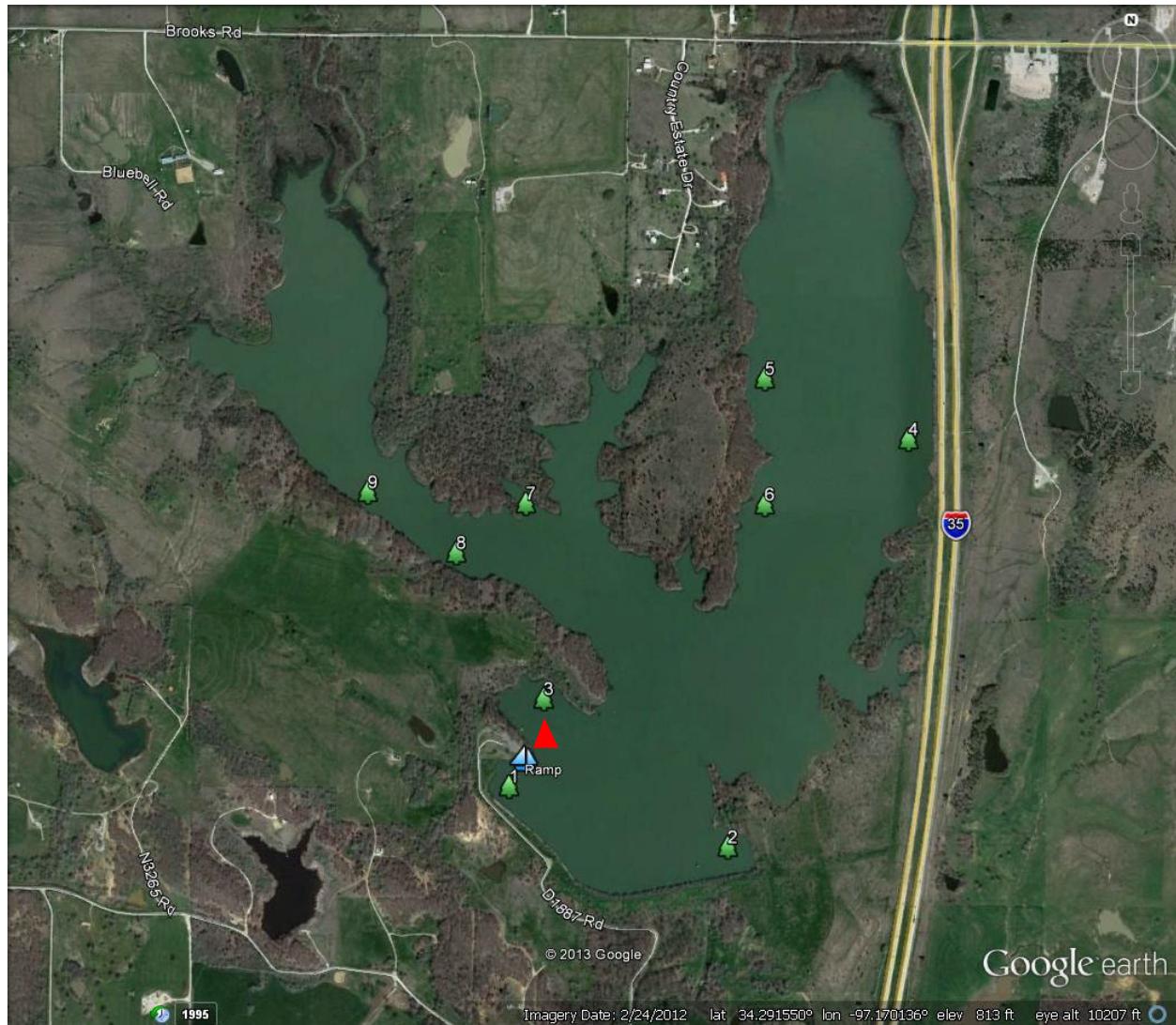
Habitat Sites:

Spider Blocks - ▲

Habitat - 🌳

Figure 3: Jean Neustadt Lake Sampling Sites
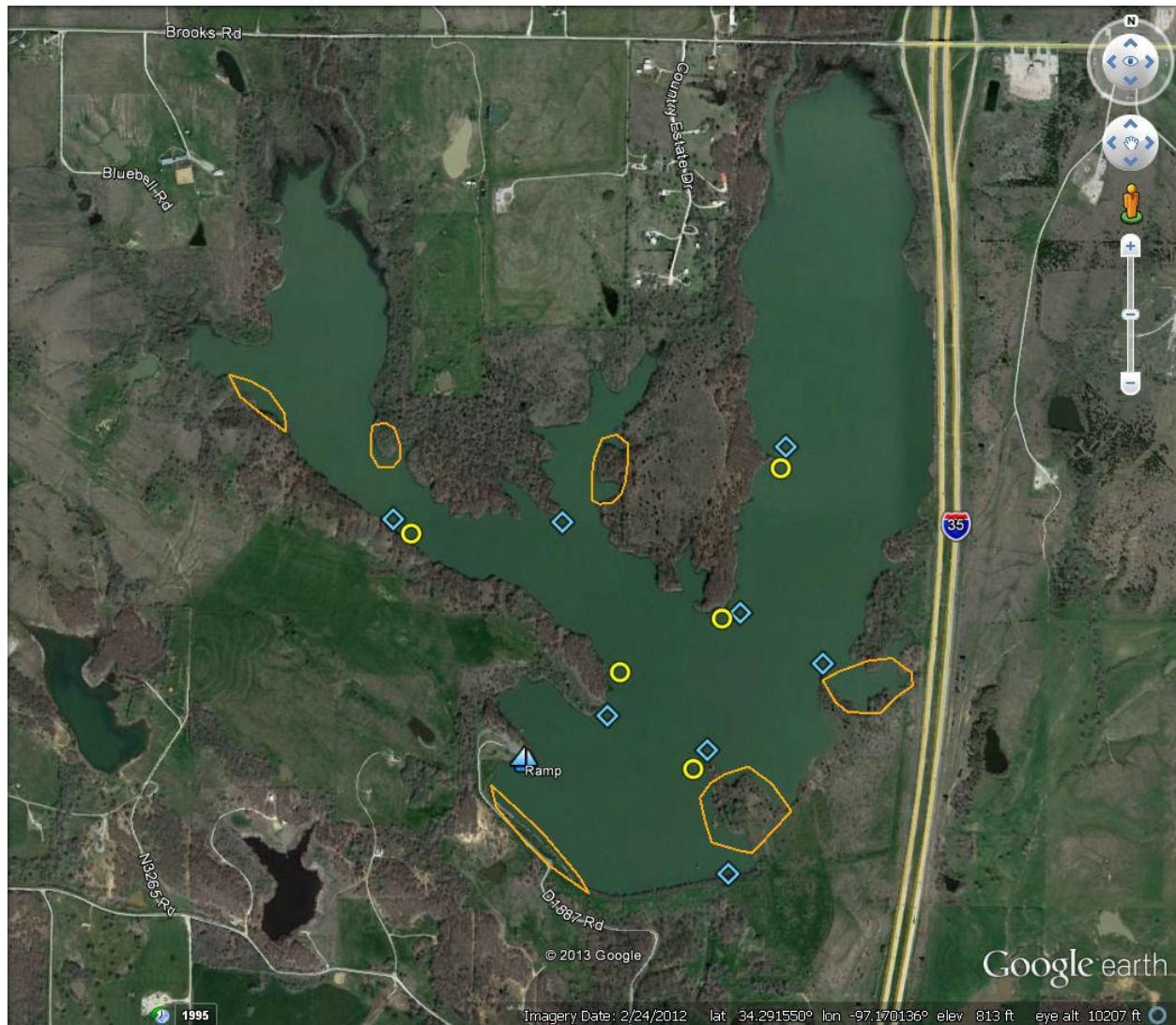
SSP Sampling Sites:

Spring Electrofishing -

Gill Netting -

Fall Trap Netting -
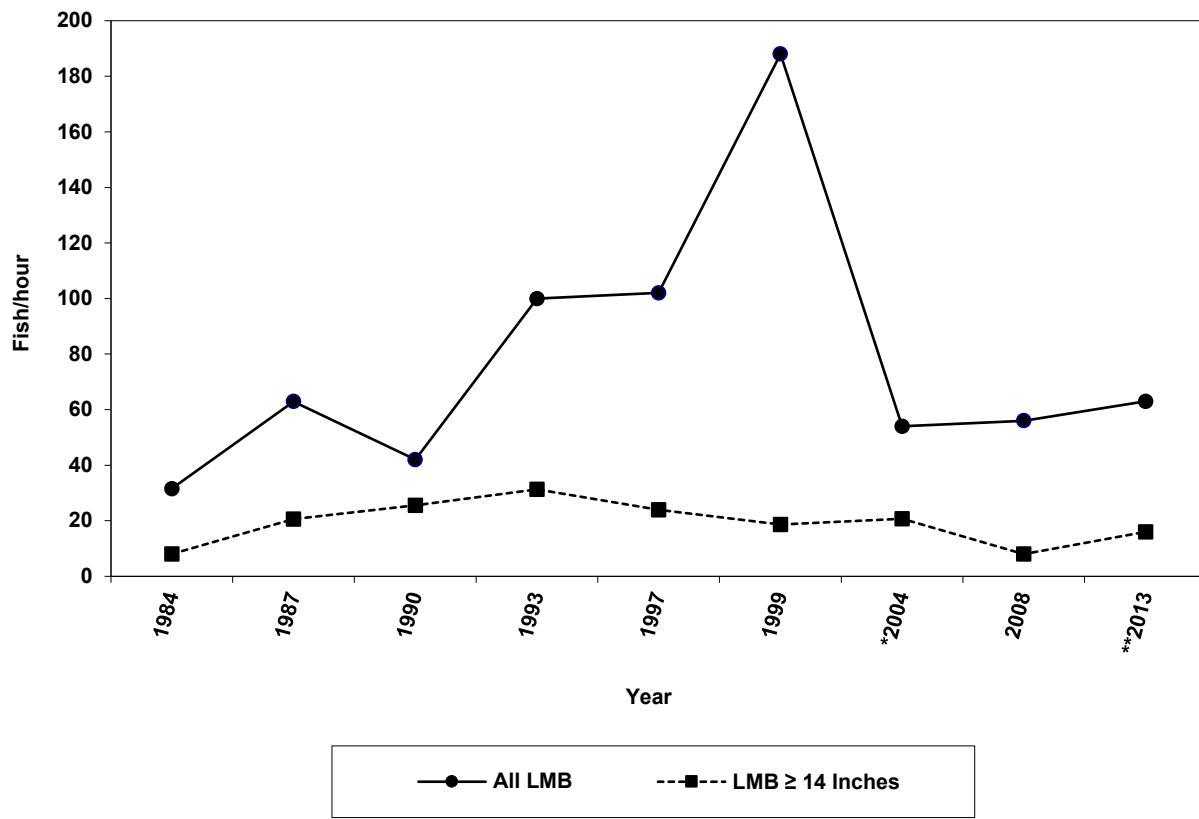
Figure 4. Total catch rates of largemouth bass and catch rates of largemouth bass ≥ 14 inches collected by spring electrofishing.

* 2004 Denotes changed electrofishing protocol – Minimum of 1.5 hours of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.
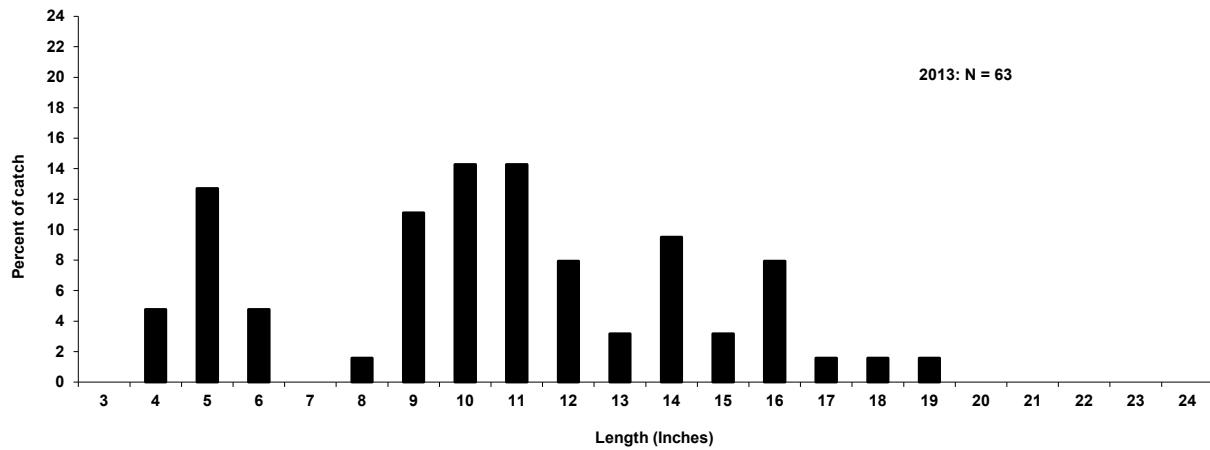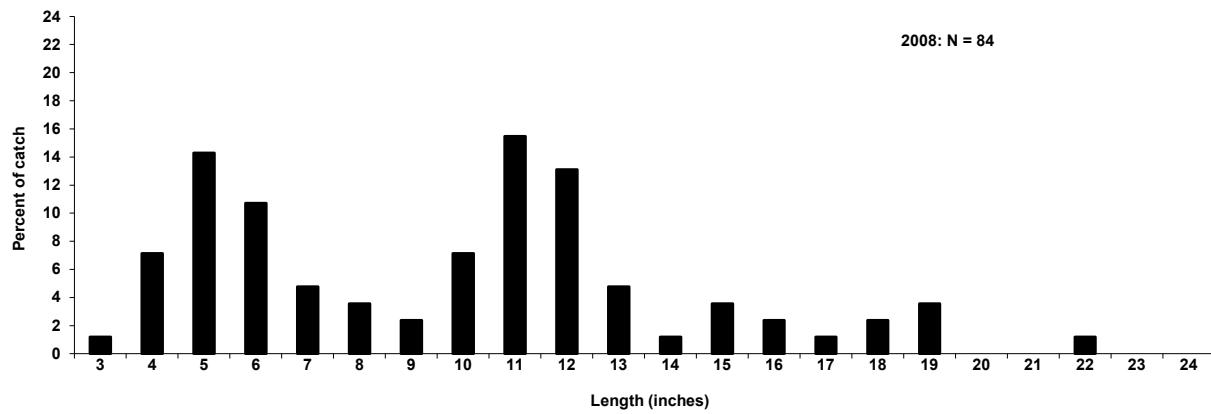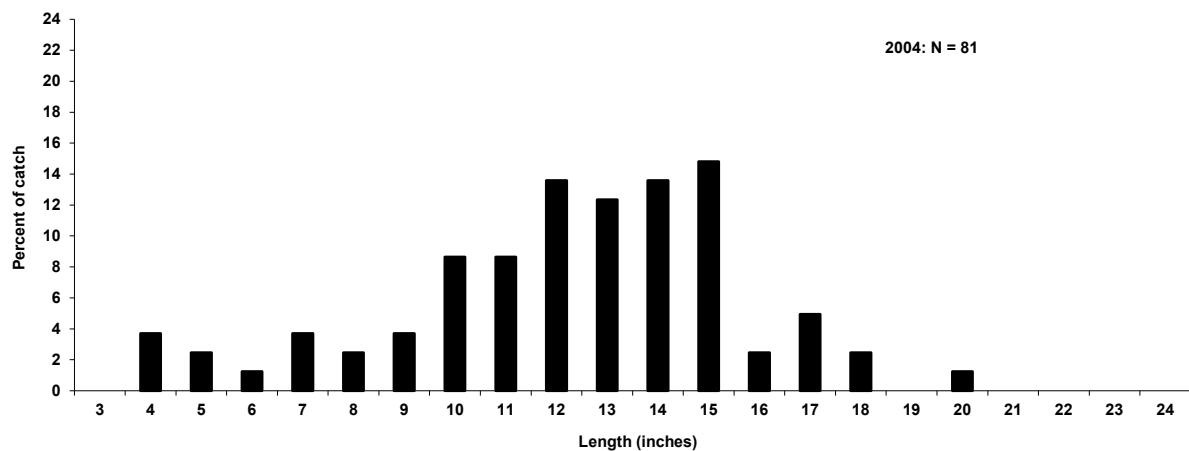
Figure 5. 2004, 2008, and 2013 length frequency distribution for largemouth bass collected by spring electrofishing at Lake Jean Neustadt.
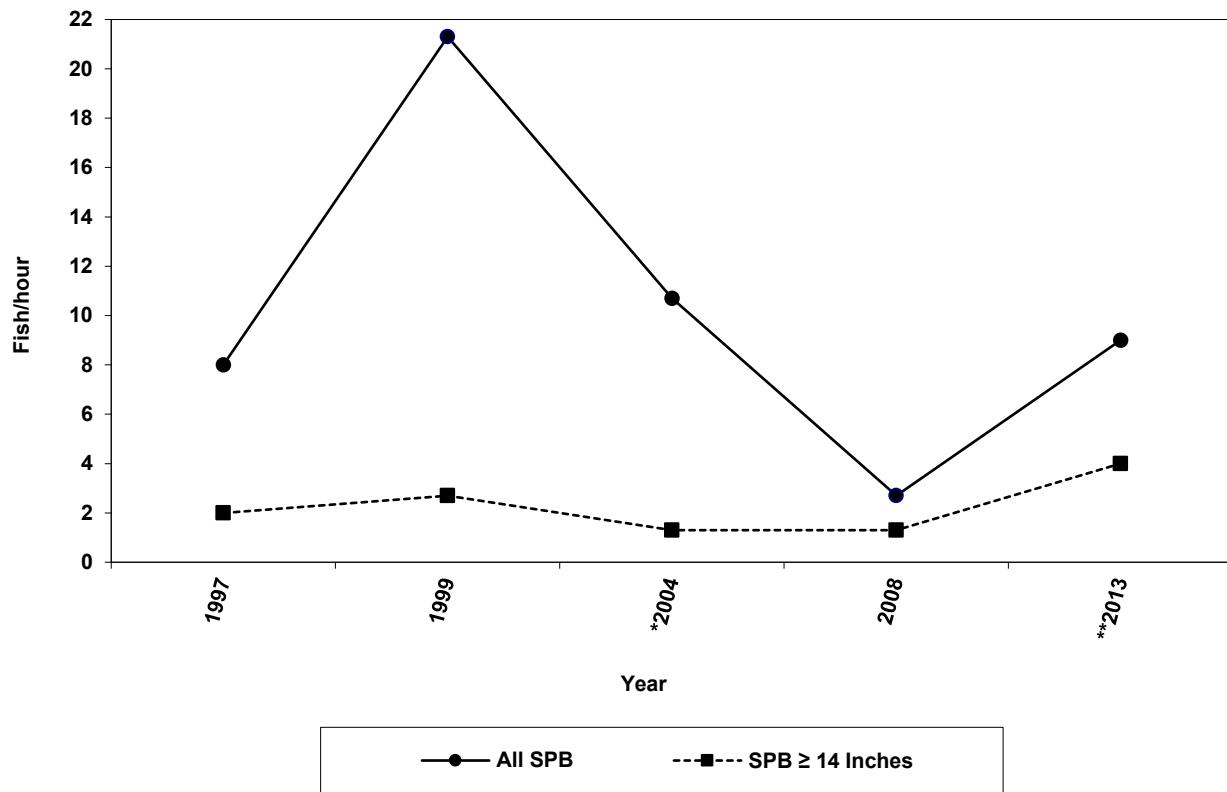
Figure 6. Total catch rates of spotted bass and catch rates of spotted bass ≥ 14 inches collected by spring electrofishing.

* 2004 Denotes changed electrofishing protocol – Minimum of 1.5 hours of effort required.
** 2013 Denotes changed electrofishing protocol – Minimum of 1 hour of effort required.
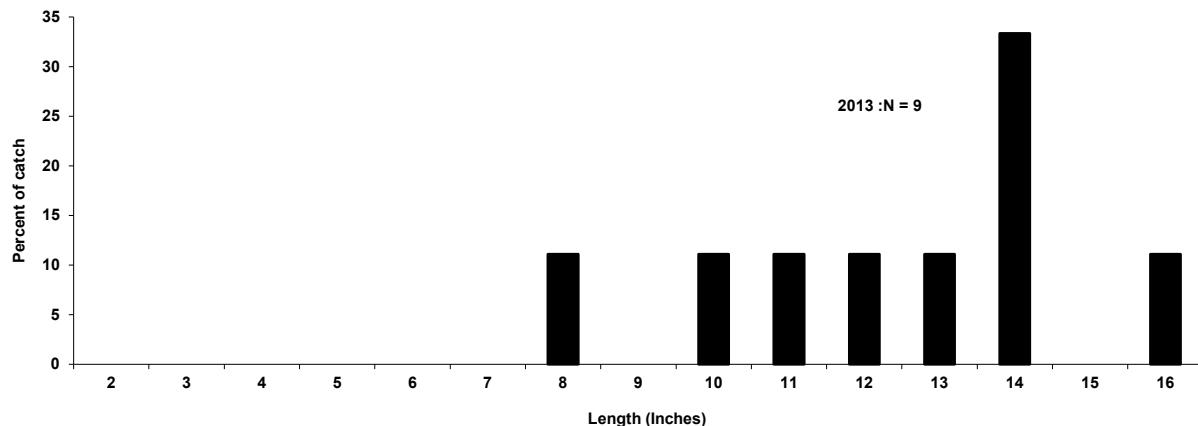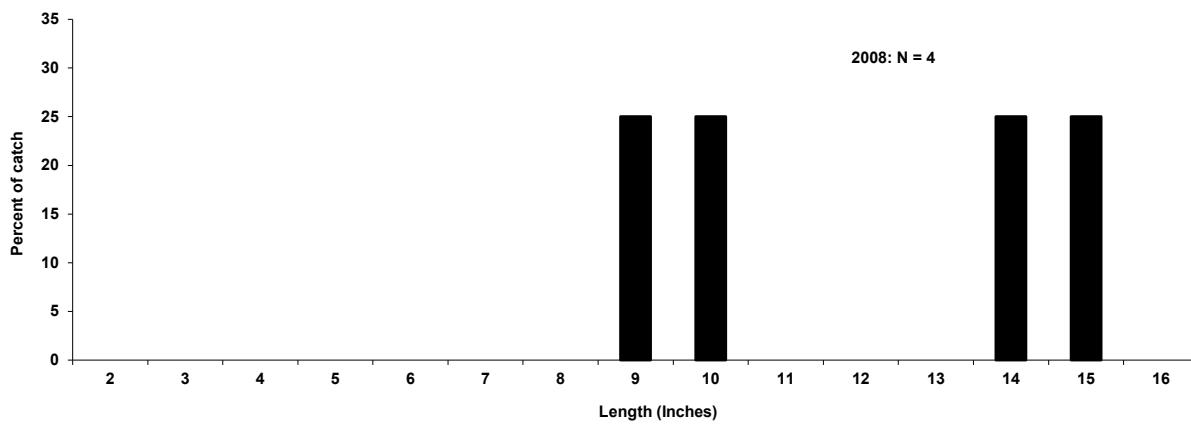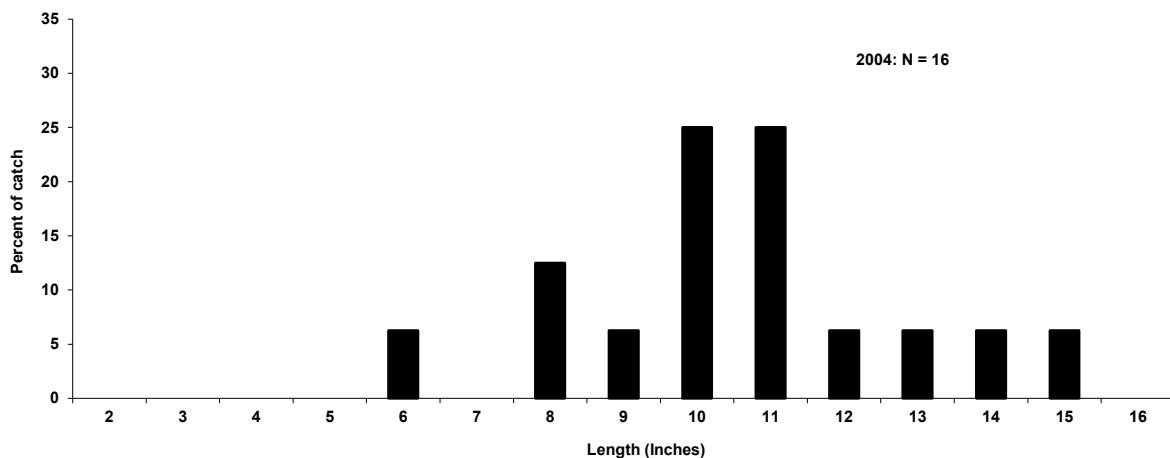
Figure 7. 2004, 2008, and 2013 length frequency distribution for spotted bass collected by spring electrofishing at Lake Jean Neustadt.
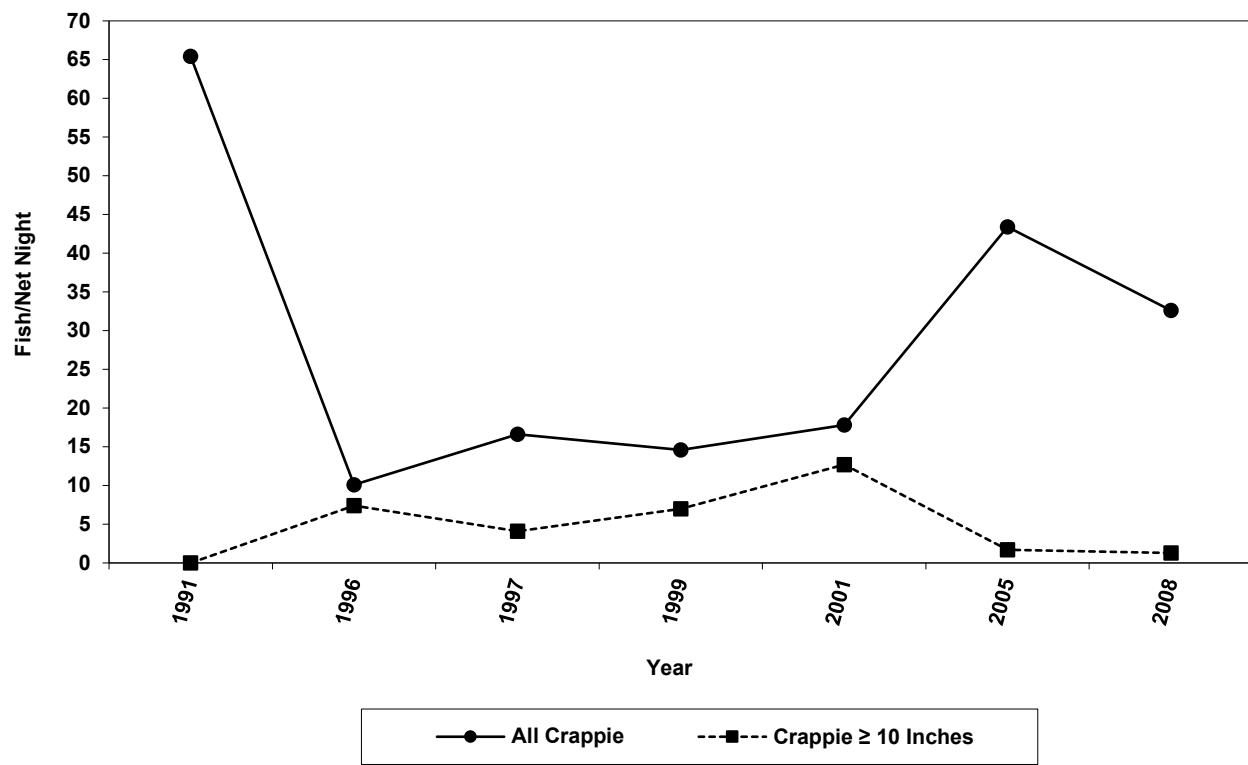
Figure 8. Total catch rates of all crappie and catch rates of all crappie ≥ 10 inches collected by trap netting at Lake Jean Neustadt.
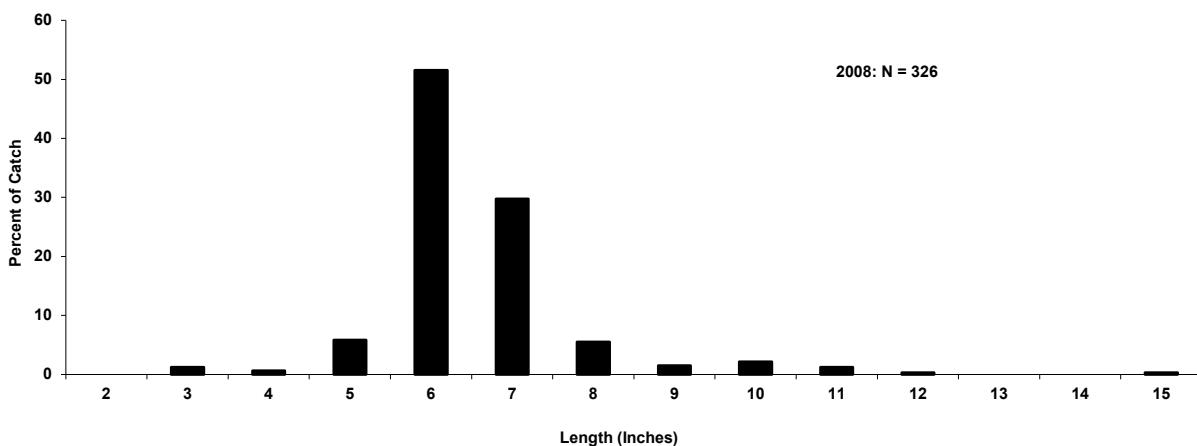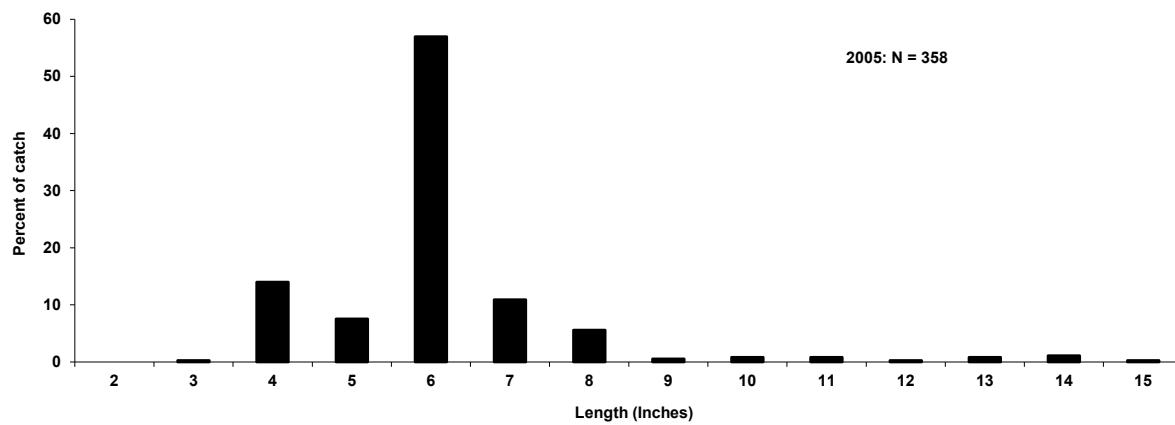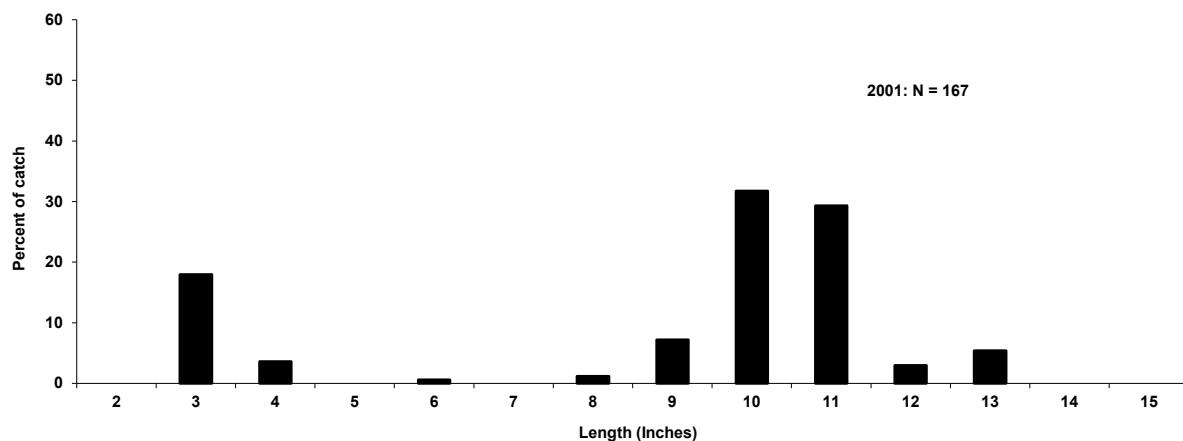
Figure 9. 2001, 2005 and 2008 length frequency distribution for all crappie collected by trap netting at Lake Jean Neustadt.
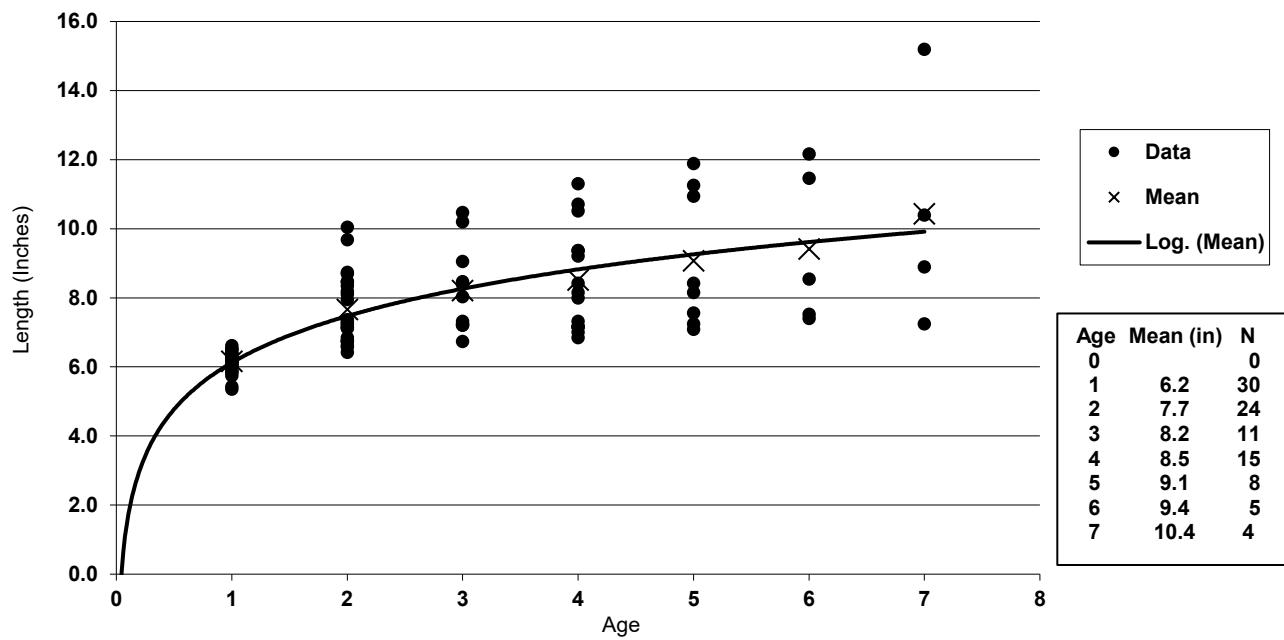
Figure 10. 2008 Length at age data for all crappie collected from Lake Jean Neustadt by trap netting. N = 97
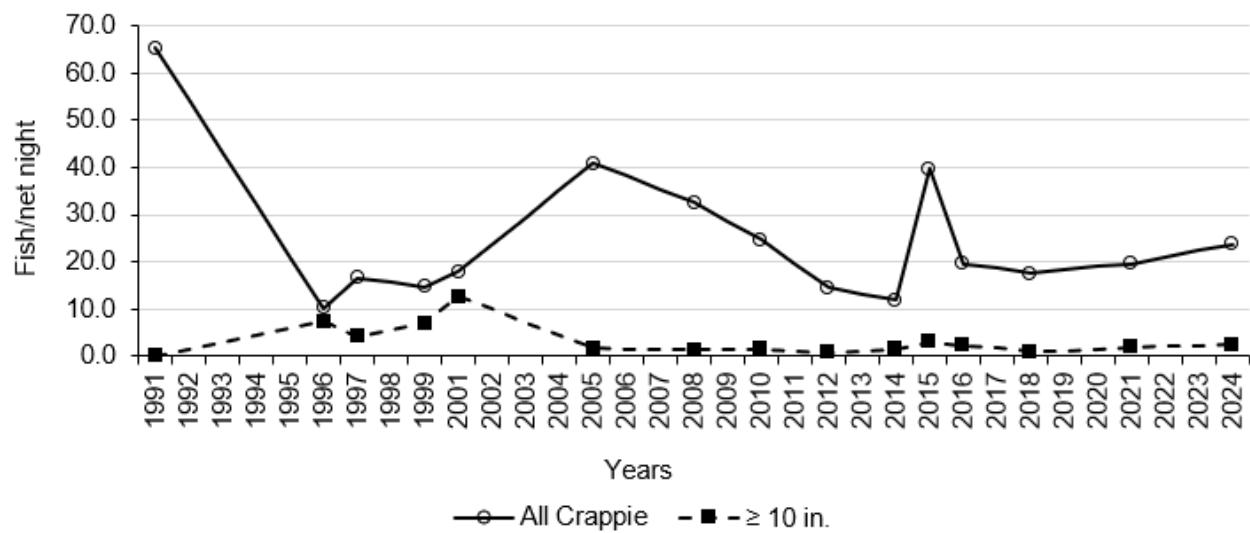
Figure 11. Total catch rates of all crappie and catch rates of all crappie ≥ 10 inches collected by gill netting at Lake Jean Neustadt.

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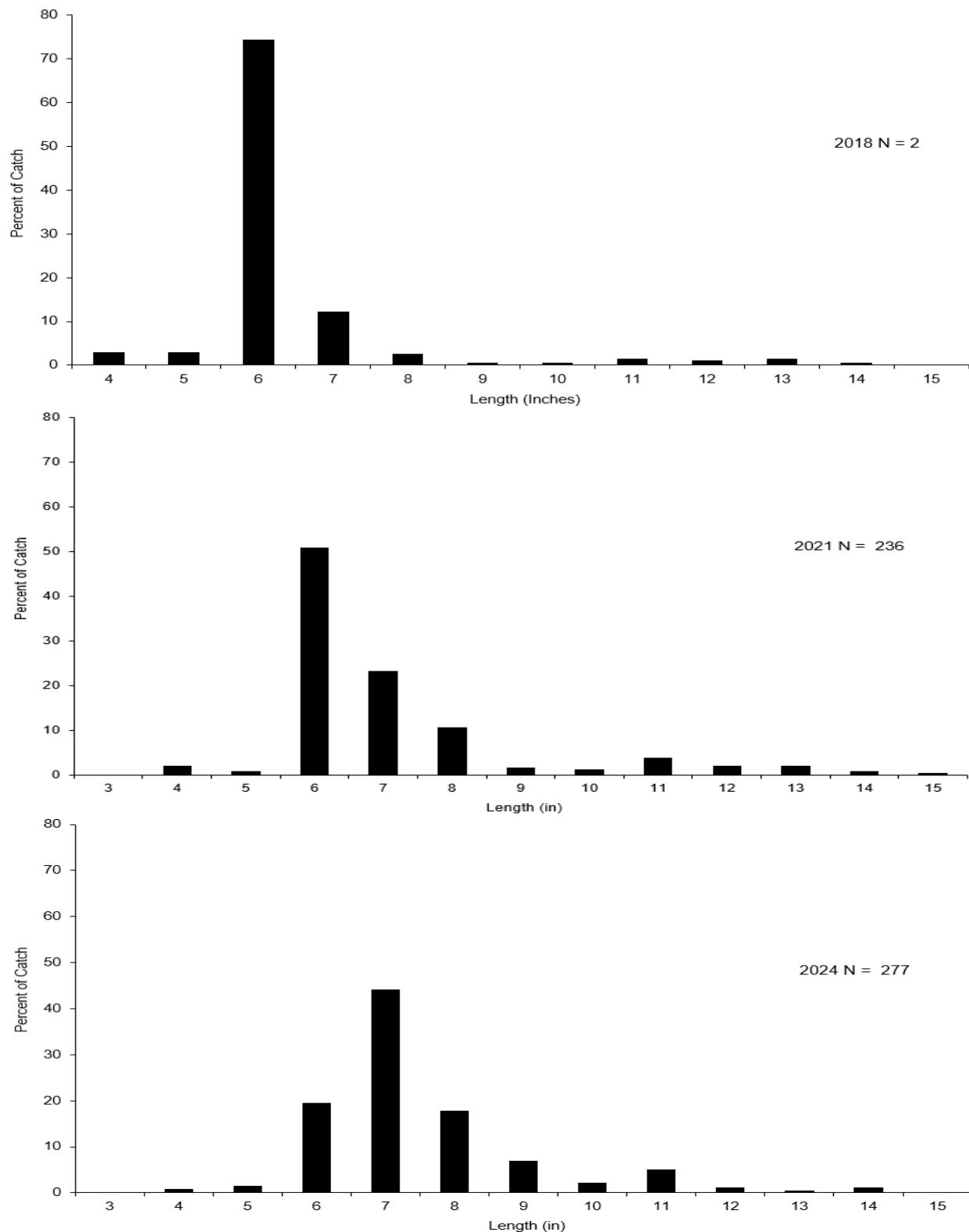
Figure 12. 2018, 2021 and 2024 length frequency distribution for all crappie collected by gill netting at Lake Jean Neustadt.
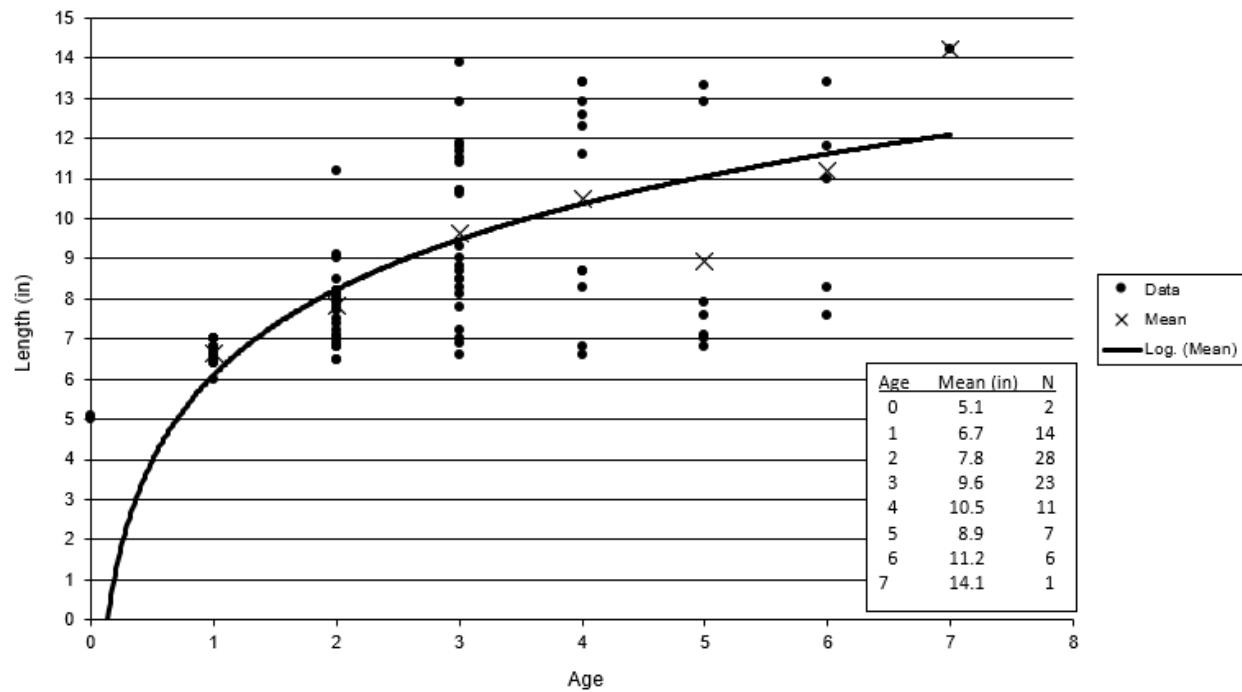
Figure 13. 2021 Length at age data for all crappie collected from Lake Jean Neustadt by gill netting. N = 92
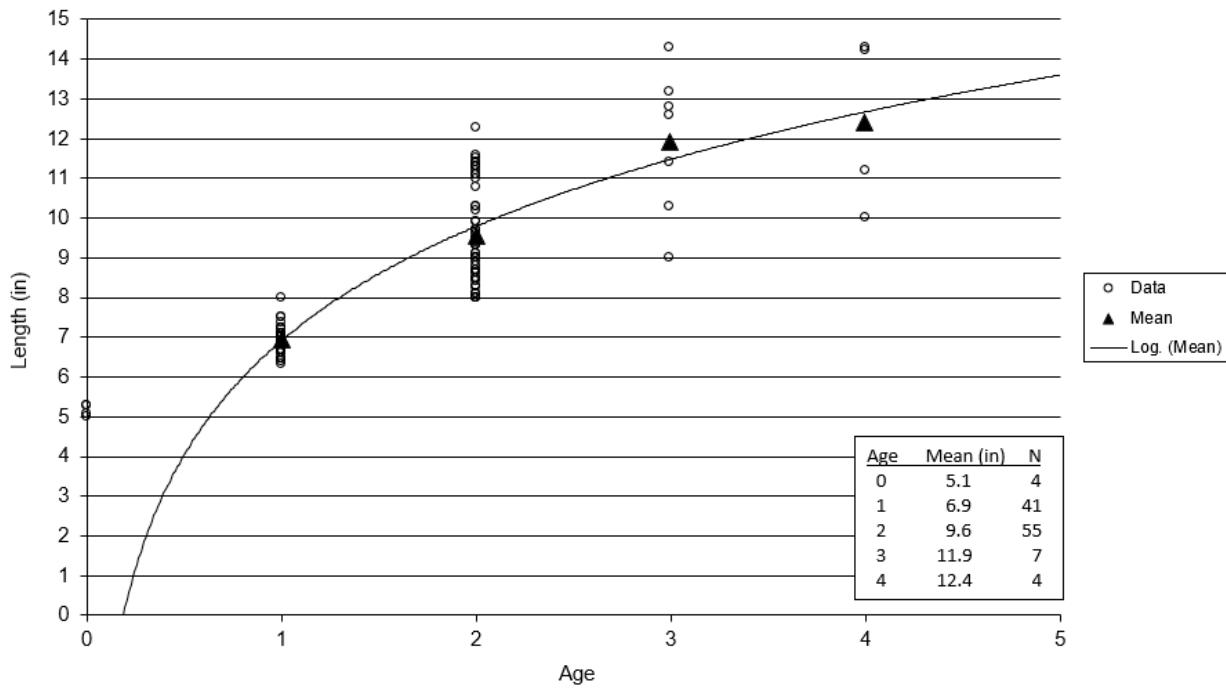
Figure 14. 2024 Length at age data for all crappie collected from Lake Jean Neustadt by gill netting. N = 111
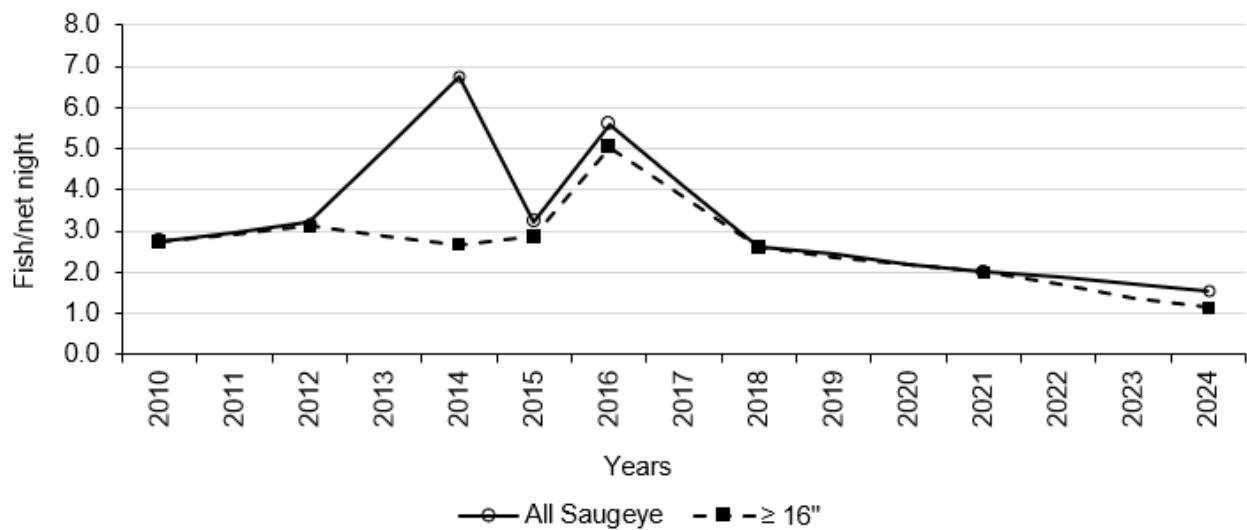
Figure 15. Total catch rates of all saugeye and catch rates of all saugeye ≥ 16 inches collected by gill netting at Lake Jean Neustadt.
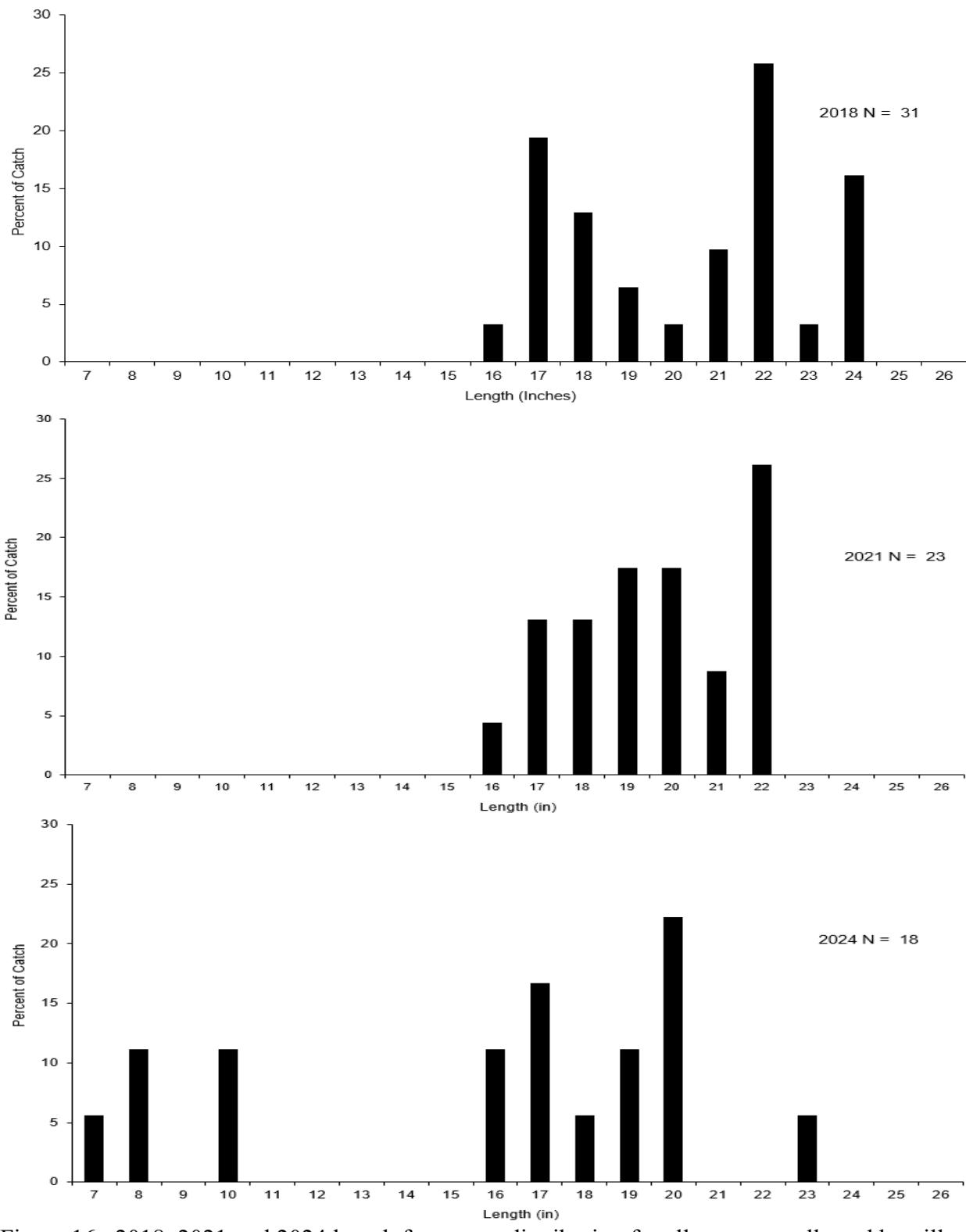
Figure 16. 2018, 2021 and 2024 length frequency distribution for all saugeye collected by gill netting at Lake Jean Neustadt.
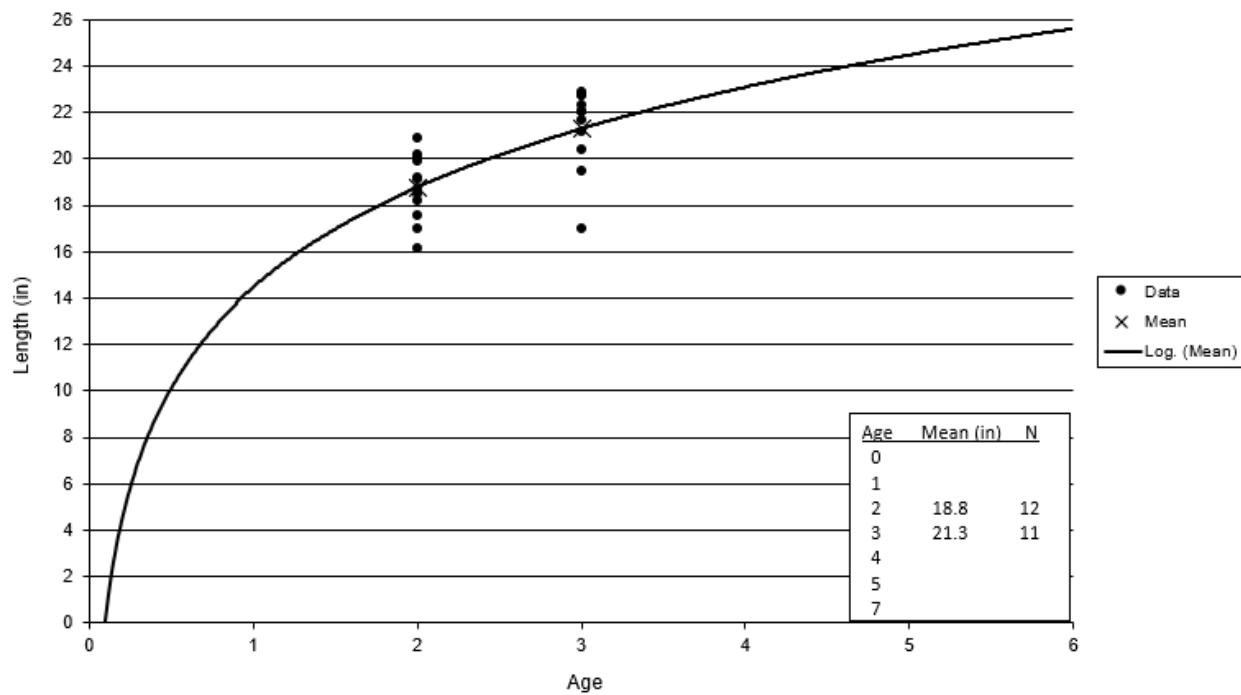
Figure 17. 2021 Length at age data for saugeye collected from Lake Jean Neustadt by gill netting. N = 23
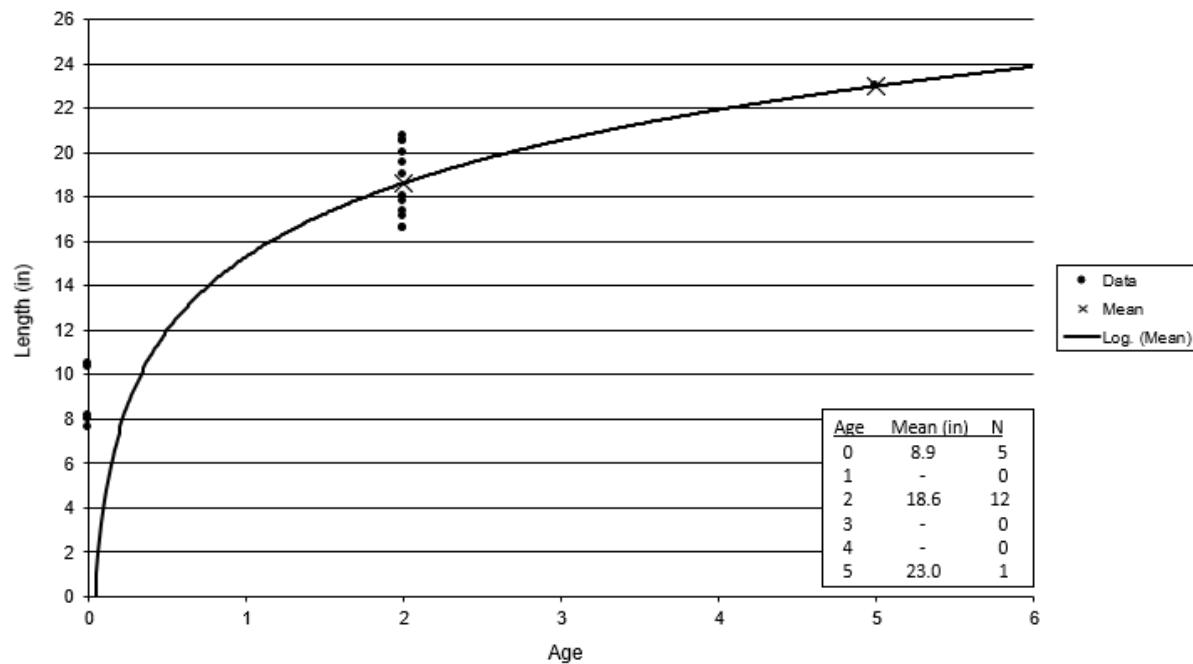

Figure 18. 2024 Length at age data for saugeye collected from Lake Jean Neustadt by gill netting. N = 18
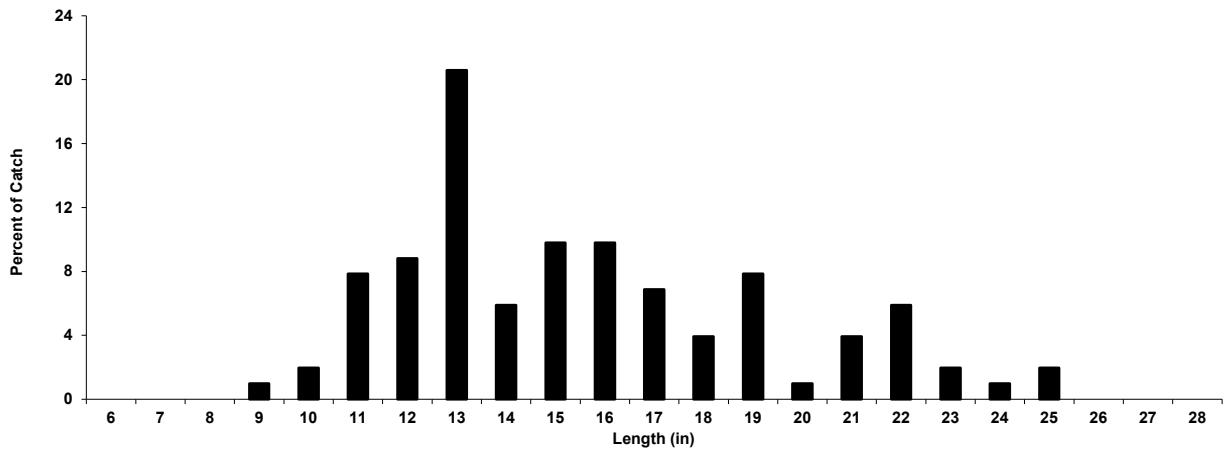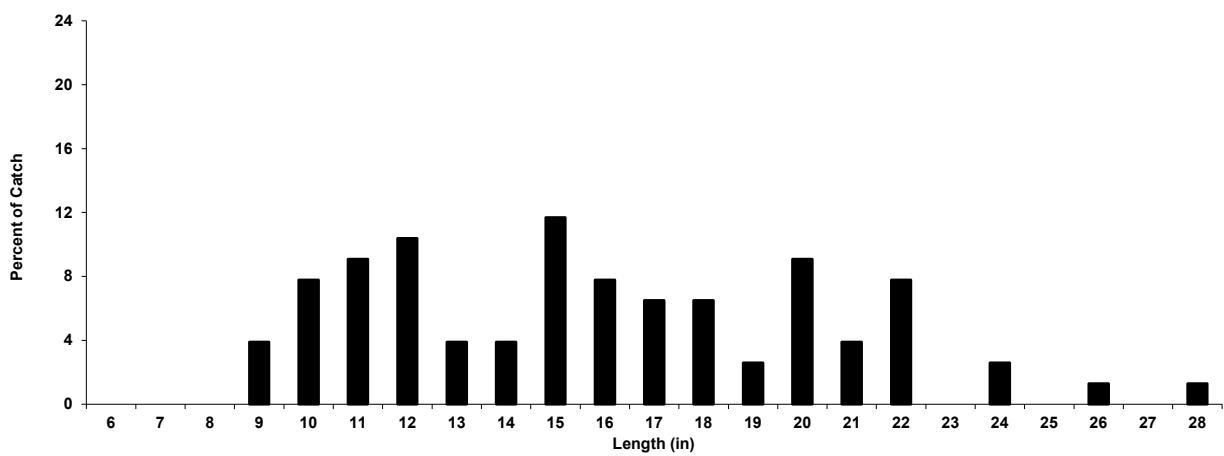
Figure 19. 2021 and 2024 length frequency distribution for channel catfish collected by gill netting at Lake Jean Neustadt.