

**Wilke Lake 2018 Comprehensive Fish Survey**  
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Wilke Lake is a seepage lake located in the southwest corner of Manitowoc County. The lake has a surface area of 97 acres, a maximum depth of 22 feet and an intermittent outlet. The shoreline is highly developed and the lake experiences heavy recreational use. Wilke Lake has had a history of panfish management and aquatic plant problems since the 1950's.

Fish surveys have been conducted on Wilke Lake since the early 1950's. These surveys found abundant, small, slow growing panfish populations dominated by Bluegill and Yellow Perch. Gamefish populations were dominated by Largemouth Bass and Northern Pike. Over the years, stocked Walleye and Hybrid Muskellunge also provided anglers with additional fishing opportunities. Abundant Carp were also captured during these surveys. Beginning in the late 1950's, various management strategies have been used to reduce panfish number and to improve their size structure. These strategies included: mechanical removal by seine, partial chemical treatment with toxaphene, aquatic plant removals (chemical and mechanical) and predator stocking. The first two strategies provided short-term improvements in growth rates but did not produce lasting results. Predator stocking and plant removals had mixed results with longer term benefits for some species and no impact on others.

Beginning in late April 2018, a comprehensive fish survey was begun on Wilke Lake that followed statewide survey protocols. Fyke nets and electroshocking was used to assess the fish populations of Wilke Lake.

Seven fyke nets were set in Wilke Lake on April 23<sup>rd</sup>, 2018 and fished until May 1 when they were removed. The nets were lifted and emptied seven times during the eight days they were deployed for a total effort of 56 net nights. 1,520 individual fish were captured representing thirteen species. Bluegill were the most abundant species caught, with lower numbers of Yellow Bullhead, Black Crappie and Northern Pike captured.

The entire 1.84 mile shoreline was electroshocked on the night of May 22, 2018 to assess the Largemouth Bass and panfish populations of Wilke Lake. In the 1.4 hours of shocking, 539 fish representing nine species were captured. Bluegill, Yellow Perch and Pumpkinseed Sunfish dominated our catch with fewer Largemouth Bass and other species captured.

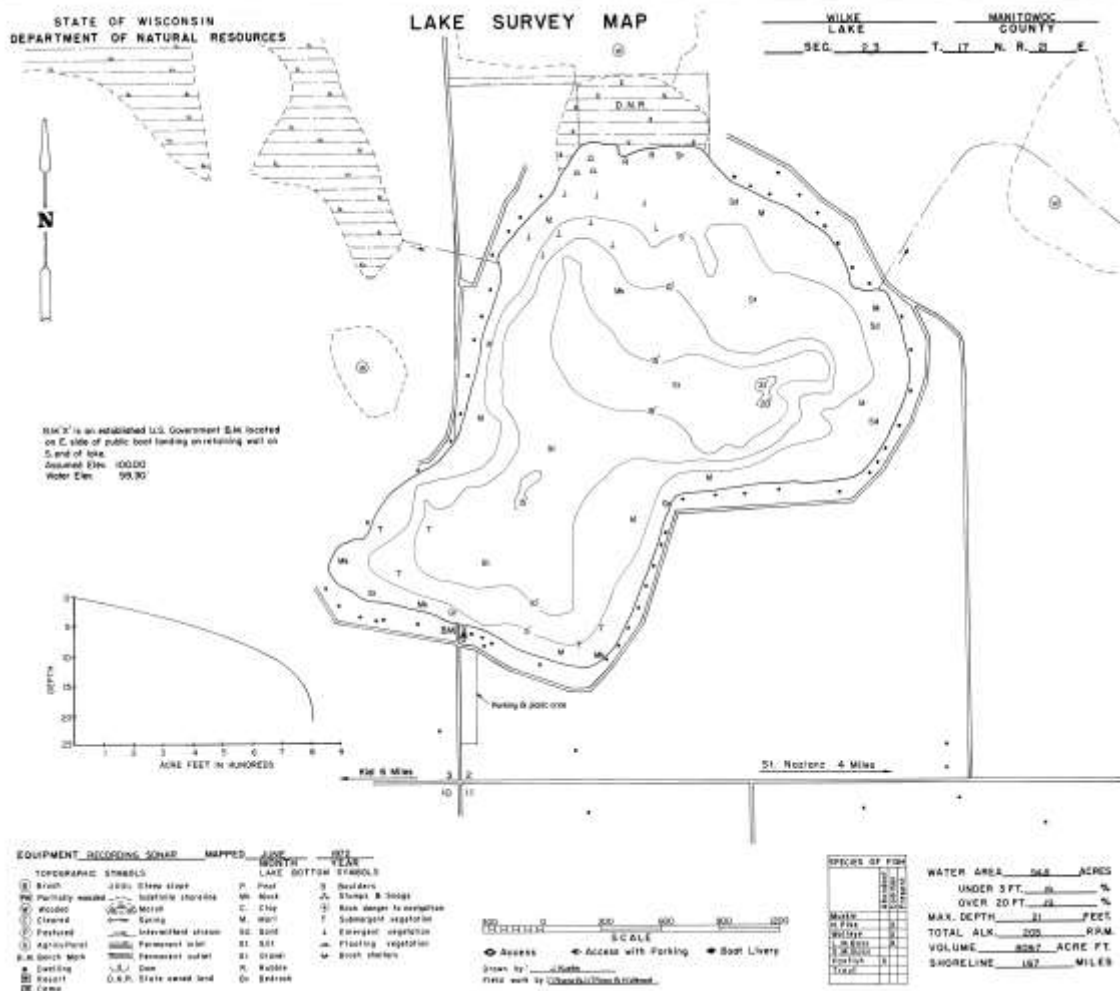
Changes to selected gamefish regulations and the addition of wood or other habitat to improve fish populations are fish management actions that are recommended for Wilke Lake.

## Introduction

Wilke Lake is a seepage lake located in the southwest corner of Manitowoc County (Figure 1). The lake has a surface area of 97 acres, a maximum depth of 22 feet and a shoreline development factor of 1.30 (Figure 2). Wilke Lake has an intermittent outflow that flows eastward through a wetland. The waters of Wilke Lake support large numbers of rooted aquatic plants that in recent years have required harvesting by the Wilke Lake Association. The shoreline is highly developed and the lake experiences heavy recreational use.



**Figure 1. Wilke Lake is located in the southwestern corner of Manitowoc County.**



**Figure 2. The bathymetric map of Wilke Lake showing the extensive littoral area of the lake.**

Wilke Lake has had a history of panfish management problems (Wirth 1952). Surveys in the 1950's determined panfish were over abundant and slow growing (Probst 1953, Cline 1956). During 1958 and 1959, the lake was seined several times to remove excess panfish, with no apparent success. Schultz (1963) indicated that the average size of captured Bluegill in follow-up surveys were smaller than their average length in surveys conducted before the removals. A partial chemical treatment with toxaphene to reduce panfish numbers in 1963 only achieved short term reductions in number and improved growth rates before Carp and panfish numbers rebounded quickly and panfish size decreased (Schultz 1965).

From 1963 to 1975, predator fish, consisting of Northern Pike, Walleye and Largemouth Bass were stocked and aquatic plant removals were done to improve panfish size by reducing their abundance through predation and reductions in cover (Belonger 1976) (Table 1). Hybrid Musky were stocked from 1976 to 1979 as an additional predator. Results from predator stocking was mixed, with good predator number and size, but small, overabundant panfish still present. Belonger (1979) suggested that Hybrid Musky survived well but were quickly harvested by anglers once reaching legal size which caused only

minimal impacts to panfish populations. He further indicated that Musky stocking had little effect on panfish size based on several electroshocking and seine surveys.

**Table 1. Fish stocking record for Wilke Lake, 1933-2017. Fish were stocked at various ages ranging from small fingerling to adult transfers during this period. The Panfish stockings in 1935 included Yellow Perch and Bluegill. Panfish and Walleye stocked in the even years of 2000's were stocked under permits issued to the Wilke Lake Association. All other stockings were made by the WCD or DNR.**

Year	Species	Number Stocked
1933	LARGEMOUTH BASS	154
1934	LARGEMOUTH BASS	392
1935	LARGEMOUTH BASS	3
1935	PANFISH	2450
1936	BLUEGILL	1200
1936	LARGEMOUTH BASS	340
1936	WALLEYE	330
1936	YELLOW PERCH	330
1937	BLUEGILL	8000
1937	SMALLMOUTH BASS	30
1937	YELLOW PERCH	660
1940	BLUEGILL	10000
1940	LARGEMOUTH BASS	3000
1940	YELLOW PERCH	2000
1941	LARGEMOUTH BASS	5000
1943	LARGEMOUTH BASS	800
1944	LARGEMOUTH BASS	2000
1946	LARGEMOUTH BASS	2000
1947	LARGEMOUTH BASS	900
1947	NORTHERN PIKE	900
1948	LARGEMOUTH BASS	500
1949	LARGEMOUTH BASS	2000
1960	NORTHERN PIKE	200
1963	LARGEMOUTH BASS	254
1963	NORTHERN PIKE	745
1964	LARGEMOUTH BASS	15676
1964	NORTHERN PIKE	2462
1964	WALLEYE	4550
1965	NORTHERN PIKE	500
1972	NORTHERN PIKE	100
1972	NORTHERN PIKE	100
1972	WALLEYE	700

Year	Species	Stocked
1973	NORTHERN PIKE	100
1974	NORTHERN PIKE	100
1975	NORTHERN PIKE	100
1975	WALLEYE	50
1976	HYBRID MUSKY	400
1977	HYBRID MUSKY	400
1978	HYBRID MUSKY	400
1978	WALLEYE	50
1979	HYBRID MUSKY	400
1989	MUSKELLUNGE	115
1989	WALLEYE	4493
1992	WALLEYE	2412
1994	WALLEYE	2368
1995	WALLEYE	2379
1999	WALLEYE	9500
2001	WALLEYE	9500
2002	BLACK CRAPPIE	780
2002	YELLOW PERCH	715
2003	WALLEYE	9500
2004	BLACK CRAPPIE	625
2004	WALLEYE	740
2005	WALLEYE	4700
2006	LARGEMOUTH BASS	993
2007	YELLOW PERCH	1439
2008	WALLEYE	624
2009	WALLEYE	3315
2011	BLACK CRAPPIE	1554
2011	WALLEYE	3653
2013	WALLEYE	3315
2015	BLACK CRAPPIE	497
2015	WALLEYE	3752
2016	WALLEYE	397
2017	WALLEYE	3239

In 1981, a comprehensive fish survey that used fyke nets, a barge seine, and electroshocking gear to assess the lake was conducted (Hogler 1998). This survey found that Northern Pike numbers were high, but small in size. Other gamefish, notably Hybrid Musky and Walleye, were much less abundant. Panfish were numerous, small in size, and somewhat slow growing.

The most recent surveys of Wilke Lake occurred in 2005 and 2010 when the entire shoreline was shocked at night to assess the fish population of the lake. The 2005 survey was conducted in October (Hogler 2006). Three gamefish species, Largemouth Bass, Northern Pike and Walleye were captured during the survey with Largemouth Bass the

dominant gamefish. Panfish were captured in good numbers but were judged to be small in size with most of the captured panfish less than 150 mm (6") in length.

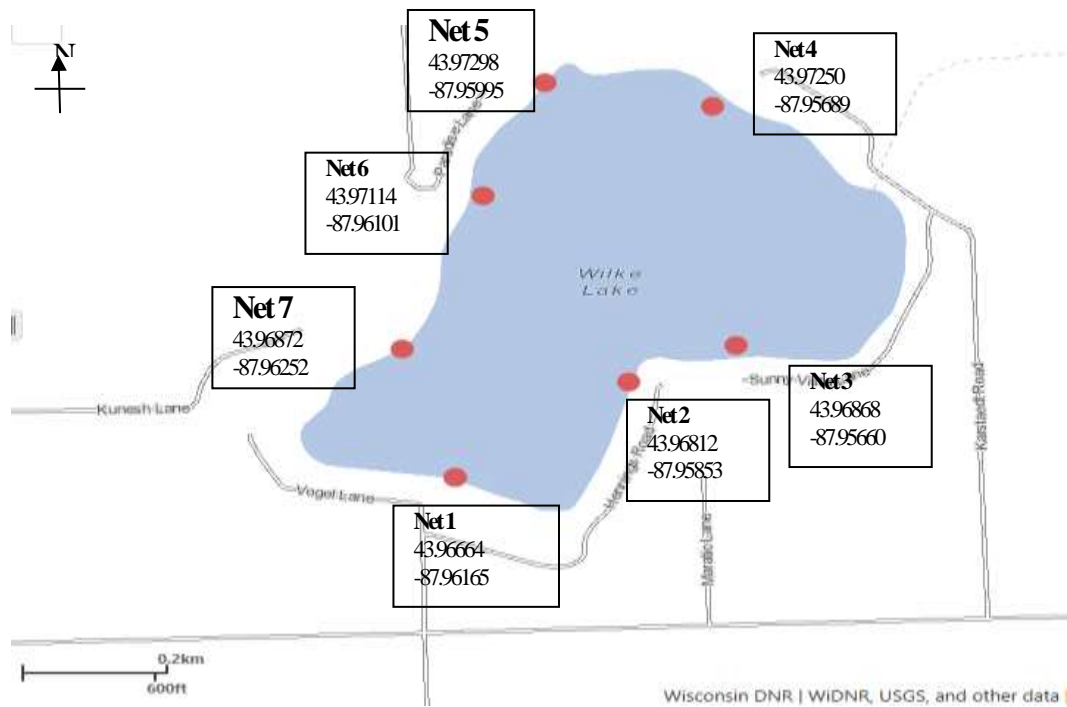
The May 2010 electroshocking survey found that Bass and Bluegill dominated the catch (Hogler 2010). Largemouth Bass was the dominant gamefish in the lake with Walleye and Northern Pike captured in lower numbers. The number of bass that were captured in 2010 was more than twice what was captured in 2005, but few were greater than 14" (356 mm). Since the growth of bass was better than statewide averages, the lack of large fish suggested that anglers may be harvesting many of the legal size bass in the lake. Northern Pike number and size also improved since the 2005 survey. The reasons for the increase in number and size were unknown. Walleye have been stocked in alternate years by DNR to provide an additional fishing opportunity, but despite consistent Walleye stocking (Table 1), stocking continued to produce only a very limited Walleye fishery with few individuals being captured in our surveys or by anglers. Panfish continued to dominate the fish community of the lake, although most were small in size. The 2010 survey also captured mostly small, under 150 mm (6") Bluegill that exhibited slow growth. Yellow Perch were small in size as well, but growth appeared to be near statewide average growth. The lack of older Bluegill and Perch could indicate that high angler harvest once a fish reaches 150 mm (6").

Beginning in late April 2018, a comprehensive fish survey was begun on Wilke Lake following statewide survey protocols. Fyke nets and electroshocking was used to assess the fish of lake.

## **METHODS**

### **Spring Fyke Netting**

A standard comprehensive fisheries survey on Wilke Lake began in April and continued through May 2018. Seven fyke nets were set on April 23 and were lifted through May 1 (Figure 3). Fyke nets were set to capture and mark adult spring spawning Northern Pike, Walleye and Yellow Perch. Biological data was also collected from the other species that were captured in the nets. All fish were identified and measured, spines, rays or scales were removed from a sub-sample of selected species for age determination and all gamefish were marked to allow a population estimate to be made.



**Figure 3. Spring 2018 fyke net locations on Wilke Lake.**

### Spring Electrofishing

#### Centrarchid Electrofishing

On the night of May 22, the entire shoreline was electroshocked to estimate adult Largemouth Bass and panfish relative abundance. All fish were netted, identified, checked for marks and measured.

### Statistical Analyses

Basic fisheries statistics, such as average length, length frequencies by survey type, age distributions, and population estimates were calculated when possible. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.

The Schnabel population estimation method was used to estimate community population

size when the recapture numbers were large enough to provide an unbiased estimate of population size. For the Schnabel method, multiple marking and recapture periods were used to calculate the population estimate (Ricker 1975).

## RESULTS

### Fyke Net

Seven fyke nets were set in Wilke Lake on April 23<sup>rd</sup>, 2018 and fished until May 1 when they were removed. The nets were lifted and emptied seven times during the eight days they were deployed for a total effort of 56 net nights. 1,520 individual fish were captured representing thirteen species (Table 2). Total CPE was 27.14 fish per net per night. Bluegill were the most abundant species caught, with lower numbers of Yellow Bullhead, Black Crappie and Northern Pike captured. CPE (fish/net/night) ranged from a high of 15.0 for Bluegill to 0.02 for Golden Shiner, Smallmouth Bass and Yellow Perch.

**Table 2. Wilke Lake spring 2018 fyke net catch summary. Catch Per Effort (CPE) is expressed as Fish/net/night. Lengths are reported in mm and inches (").**

Species	Total Catch	CPE (fish/net/night)	Average Length	Length Range
Northern Pike	195	3.48	494 mm (19.4")	306 mm- 647 mm (12.0"- 25.5")
Golden Shiner	1	0.02	--	-
White Sucker	3	0.05	--	-
Yellow Bullhead	268	4.79	296 mm (11.7")	153 mm- 364 mm (6.0"- 14.3")
Green Sunfish	12	0.21	185 mm (7.3")	138 mm- 212 mm (5.4"- 8.3")
Pumpkinseed	14	0.25	171 mm (6.7")	105 mm- 214 mm (4.1"- 8.4")
Bluegill	840	15.0	132 mm (5.2")	73 mm- 211 mm (2.9"- 8.3")
Smallmouth Bass	1	0.02	435 mm (17.1")	435 mm (17.1")
Largemouth Bass	11	0.20	303 mm (11.9")	207 mm- 415 mm (8.1"- 16.3")
Black Crappie	134	2.39	225 mm (8.9")	113 mm- 317 mm (4.4"- 12.5")
Hybrid Sunfish	24	0.43	145 mm (5.7")	104 mm- 205 mm (4.1"- 8.1")
Yellow Perch	1	0.02	190 mm (7.5")	190 mm (7.5")
Walleye	16	0.29	438 mm (17.2")	263 mm- 605 mm (10.4"- 23.8")
<b>Total</b>	<b>1520</b>	<b>27.14</b>		

**Gamefish**  
Northern Pike

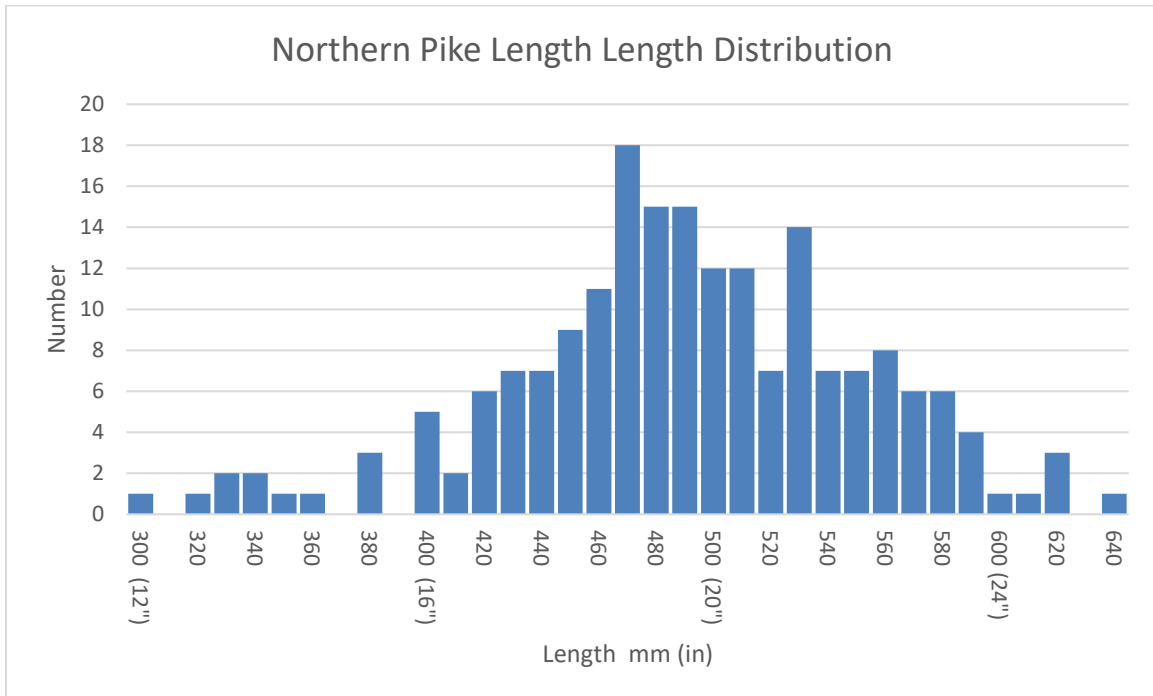
Northern Pike were the most common gamefish species that was captured during the fyke net portion of the survey. The 195 Northern Pike ranged in length from 306 mm to 647 mm (12" to 25.5") and had an average length of 494 mm (19.4") (Table 3)

**Table 3. The length frequency of gamefish captured during the 2018 fyke survey of Wilke Lake. Length is reported in mm and inches ().**

Length (in) mm	Northern Pike	Smallmouth Bass	Largemouth Bass	Walleye
(8") 200			1	
210			1	
220			1	
230				
240				
(10") 250			1	
260				1
270				1
280				
290			1	
(12") 300	1		2	1
310				
320	1			
330	2			
340	2			2
(14") 350	1		2	
360	1			
370				
380	3			
390				
(16") 400	5		1	
410	2		1	
420	6			
430	7	1		1
440	7			
(18") 450	9			3
460	11			1
470	18			1
480	15			
490	15			
(20") 500	12			1
510	12			
520	7			
530	14			1
540	7			1
(22") 550	7			1
560	8			
570	6			
580	6			
590	4			
(24") 600	1			1
610	1			
620	3			
630				
640	1			
<b>Total</b>	<b>195</b>	<b>1</b>	<b>11</b>	<b>16</b>
<b>Ave. Length</b>	<b>494 mm (19.4")</b>	<b>435 mm (17.1")</b>	<b>303 mm (11.9")</b>	<b>438 mm (17.2")</b>
<b>S.D.</b>	<b>61.3 mm (2.4")</b>	<b>--</b>	<b>73.4 mm (2.9")</b>	<b>103.7 mm (4.1")</b>



Most of the captured Northern Pike were between 400 mm and 600 mm (16” to 24”) in length (Figure 4). Only a single pike was greater in length than 625 mm (25”).



**Figure 4. Length distribution of Northern Pike captured by fyke net from Wilke Lake in 2018. Lengths are reported in mm and inches ().**

The 2<sup>nd</sup> and 3<sup>rd</sup> anal rays were removed from 193 of the captured Northern Pike for age analysis. Rays were cross sectioned and viewed under a microscope to count annular (yearly) rings. Samples indicated that ages 1 through 9 were present in the aged Northern Pike (Table 4). Age 4 and age 5 Northern Pike were the dominant age classes in our sample. These fish were hatched in 2014 and 2013 respectively. Other aged Northern Pike were found in lower abundances.

When the average length at each age for pike from Wilke Lake is compared to pike from other lakes across Wisconsin, pike at all ages are smaller indicating below average growth (Table 5). In general, pike in Wilke Lake show little growth beyond age 6.

**Table 4. The age distribution by length of Northern Pike captured by fyke net from Wilke Lake in spring 2018.**

Length (in) mm	Age									Total	
	1	2	3	4	5	6	7	8	9		
(12") 300	1									1	
310										0	
320				1						1	
330		1		1						2	
340	1	1								2	
(14") 350		1								1	
360		1								1	
370										0	
380		3								3	
390										0	
(16") 400		5								5	
410		1	1							2	
420		2	2	1	1					6	
430		2	1	3	1					7	
440		1		2	4					7	
(18") 450			1	6	2	1				10	
460			1	4	3	2		1		11	
470			1	7	5	1	3	1		18	
480			1	7	4	1	2			15	
490			1	8	3	2	1			15	
(20") 500				7	4	1				12	
510				5	4	1	1	1		12	
520				3	2	1				6	
530			1	6	3	4				14	
540				3	1	1	1		1	7	
(22") 550				1	4	1				6	
560				4	3		1			8	
570					3		3			6	
580				1	1	3		1		6	
590				1	2		1			4	
(24") 600					1					1	
610										0	
620						2	1			3	
630										0	
640							1			1	
<b>Total</b>		<b>2</b>	<b>18</b>	<b>10</b>	<b>71</b>	<b>51</b>	<b>21</b>	<b>15</b>	<b>4</b>	<b>1</b>	<b>193</b>
<b>Ave. Length</b>		<b>323 mm (12.7")</b>	<b>398 mm (15.7")</b>	<b>460 mm (18.1")</b>	<b>493 mm (19.4")</b>	<b>510 mm (20.1")</b>	<b>529 mm (20.8")</b>	<b>539 mm (21.2")</b>	<b>507 mm (20.0")</b>	<b>540 mm (21.3")</b>	
<b>S.D.</b>		<b>24.1 mm (0.9")</b>	<b>31.9 mm (1.3")</b>	<b>37.3 mm (1.5")</b>	<b>46.3 mm (1.8")</b>	<b>47.6 mm (1.9")</b>	<b>49.9 mm (2.0")</b>	<b>57.9 mm (2.3")</b>	<b>55.9 mm (2.2")</b>	<b>--</b>	

**Table 5. Length at age for Largemouth Bass, Bluegill, Northern Pike and Black Crappie captured by fyke nets from Wilke Lake in 2018 compared to Statewide averages. Lengths are in mm and inches (). Northern Pike, Bluegill and Black Crappie age samples were collected from the fyke nets and the Largemouth Bass age samples were collected during spring electroshocking.**

Largemouth Bass

Age	2018	Statewide Average
0		
1		97 mm (3.8")
2	193 mm (7.6")	165 mm (6.5")
3	294 mm (11.6")	229 mm (9.0")
4	281 mm (11.0")	290 mm (11.4")
5	--	338 mm (13.3")
6	378 mm (14.9")	384 mm (15.1")
7	409 mm (16.1")	414 mm (16.3")
8	--	447 mm (17.6")
9	444 mm (17.5")	470 mm (18.5")
10	442 mm (17.4")	485 mm (19.1")

Bluegill

Age	2018	Statewide Average
0		
1		64 mm (2.6")
2	96 mm (3.8")	97 mm (3.8")
3	104 mm (4.1")	122 mm (4.8")
4	120 mm (4.7")	147 mm (5.9")
5	142 mm (5.6")	167 mm (6.6")
6	150 mm (5.9")	183 mm (7.2")
7	161 mm (6.4")	196 mm (7.8")
8	166 mm (6.5")	208 mm (8.2")
9	186 mm (7.3")	

Northern Pike

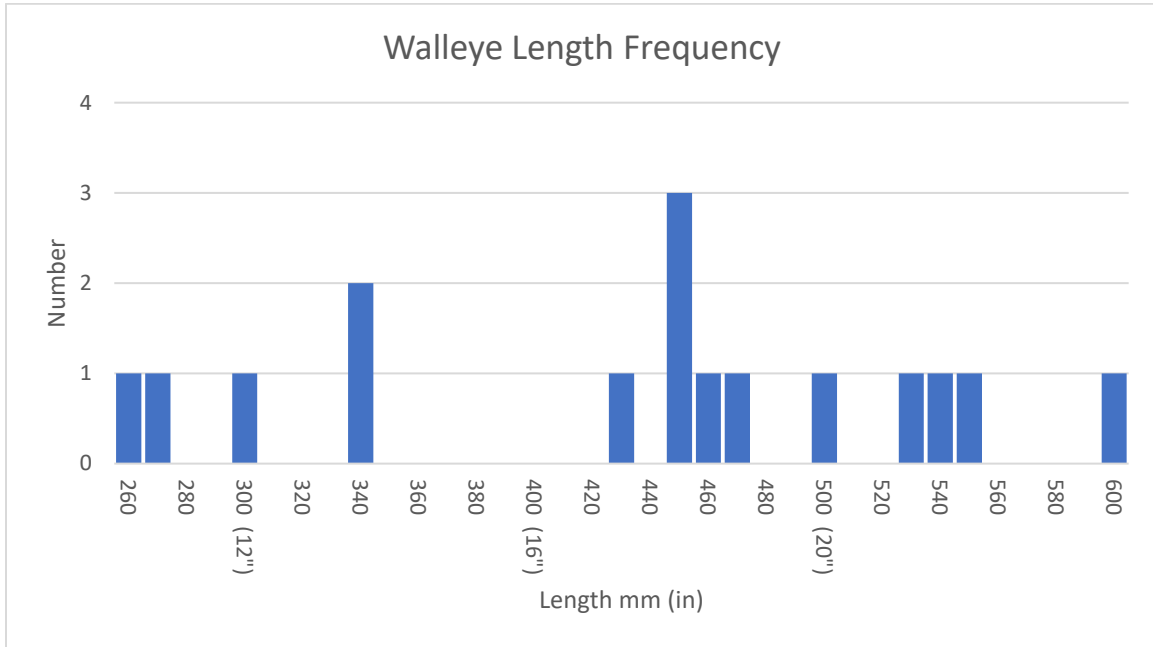
Age	2018	Statewide Average
0		
1	323 mm (12.7")	356 mm (14.0")
2	398 mm (15.7")	406 mm (16.0")
3	460 mm (18.1")	470 mm (21.5")
4	493 mm (19.4")	546 mm (24.0")
5	510 mm (20.1")	610 mm (24.0")
6	529 mm (21.2")	650 mm (25.6")
7	539 mm (21.2")	706 mm (27.8")
8	507 mm (20.0")	762 mm (30.0")
9	540 mm (21.3")	787 mm (30.9")

Black Crappie

Age	2018	Statewide Average
0		
1	113 mm (4.4")	79 mm (3.1")
2	153 mm (6.0")	137 mm (5.4")
3	173 mm (6.8")	183 mm (7.2")
4	208 mm (9.0")	218 mm (8.6")
5	239 mm (9.4")	241 mm (9.5")
6	251 mm (9.9")	267 mm (10.5")
7	251 mm (9.9")	274 mm (10.8")
8	279 mm (11.0")	

### Walleye

Sixteen Walleye were captured during fyke netting. The Walleye ranged in length from 263 mm to 605 mm (10.4” to 23.8”) with an average length of 438 mm (17.2”) (Table 2). The lengths of captured Walleye were scattered across the range of captured fish (Table 3, Figure 5)

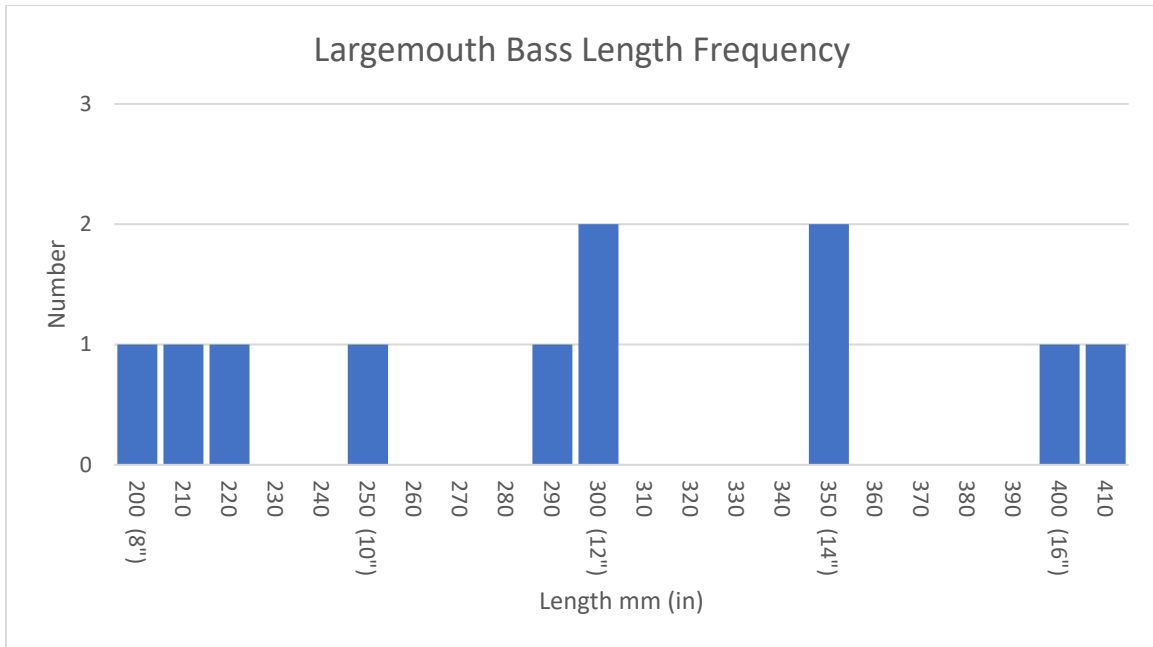


**Figure 5. The length frequency of Walleye captured from Wilke Lake by fyke net in 2018. Lengths are reported in mm and inches (").**

The 2<sup>nd</sup> dorsal spine from Walleye was removed for age analysis. The spines were cross sectioned and viewed under a microscope to count annular rings. Ages 2, 3, 7 and 13 or Walleye stocked in 2016, 2015, 2011 and 2005 respectively were found in our aged sample. Too few fish were aged to adequately analyze growth rates.

### Bass

During the fyke net survey 11 Largemouth Bass and 1 Smallmouth were captured (Table 2). The 11 Largemouth Bass ranged in length from 207 mm to 415 mm (8.1” to 16.3”) and had an average length of 303 mm (11.9”) (Table 3). Only 3 (27.7%) of the captured Largemouth Bass were greater than the 356 mm (14”) harvest size minimum limit for Wilke Lake (Figure 6).



**Figure 6. The distribution of Largemouth Bass lengths captured by fyke net.**

The single Smallmouth Bass was 435 mm (17.1") in length.

## **Panfish**

### Bluegill

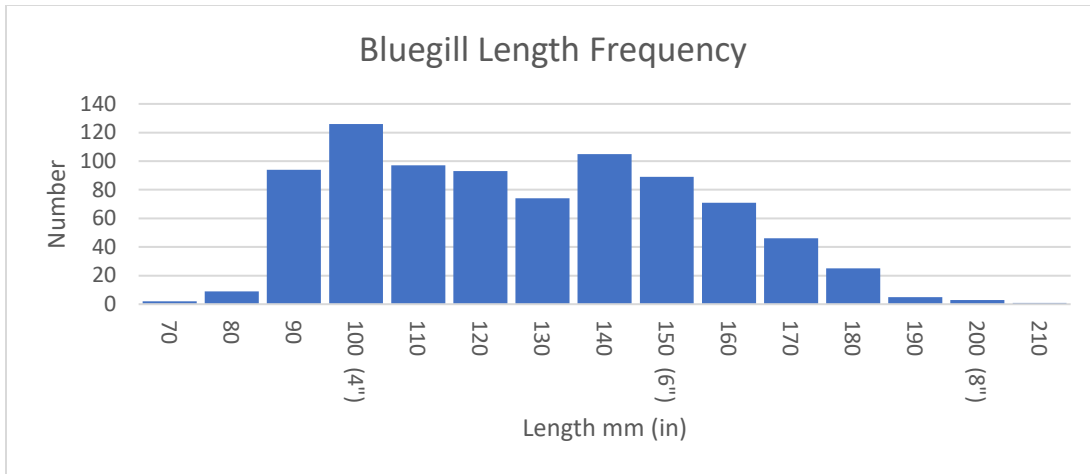
Bluegill were the most common fish species captured during fyke netting. The 840 captured Bluegill ranged in length from 73 mm to 211 mm (2.9 to 8.3") and had an average length of 132 mm (5.2") (Table 2). Most of the Bluegill were between 90 mm and 180 mm (3.5" and 7") in length (Figure 7). Very few Bluegill were greater than 180 mm (7") in length. 240 of the captured Bluegill (28.6%) were greater in length than 150 mm (6"), while only 4 (0.5%) were greater than 200 mm (8") in length.

Scales were removed from a subsample of Bluegill for age analysis. Scales were viewed under magnification to count annular rings. Sampled Bluegill from Wilke Lake ranged in age from 2 through 11 (Table 7). Age 2 through age 7 were the most common ages with older aged Bluegill less common.

The average length at age 2 is similar to Statewide averages, but from age 3 and older the average length at each age is less than Statewide average lengths for Bluegill by 25 mm to 50 mm (1 to 2"). In general, Bluegill in Wilke Lake grow slower than Bluegill in other lakes across Wisconsin.

**Table 6. The length frequency of panfish captured during the 2018 fyke survey of Wilke Lake. Length is reported in mm and inches ().**

Length (in) mm	Yellow Bullhead	Green Sunfish	Pumpkinseed	Bluegill	Black Crappie	Hybrid Sunfish	Yellow Perch
70				2			
80				9			
90				94			
(4") 100			1	126		4	
110				97	1	4	
120				93		1	
130		1	1	74		3	
140			2	105	4	3	
(6") 150	1			89	2	1	
160		2	2	71	5	3	
170	1	1	2	46	3		
180	1	2	2	25	10		
190		2	1	5	6	3	1
(8") 200	2		2	3	9	2	
210	2	3	1	1	16		
220	8				12		
230	10				18		
240	8				20		
(10") 250	11				7		
260	14				7		
270	16				4		
280	26				3		
290	18				1		
(12") 300	29				2		
310	40				4		
320	38						
330	25						
340	8						
(14") 350	9						
360	1						
<b>Total</b>	<b>268</b>	<b>11</b>	<b>14</b>	<b>840</b>	<b>134</b>	<b>24</b>	<b>1</b>
<b>Ave. Length</b>	<b>296 mm (11.7")</b>	<b>185 mm (7.3")</b>	<b>171 mm (6.7")</b>	<b>132 mm (5.2")</b>	<b>225 mm (8.9")</b>	<b>145 mm (5.7")</b>	<b>190 mm (7.5")</b>
<b>S.D.</b>	<b>36.5mm (1.4")</b>	<b>22.6 mm (0.9")</b>	<b>30.6 mm (1.2")</b>	<b>27.1 mm (1.1")</b>	<b>38.7"  (1.5")</b>	<b>33.4 mm (1.3")</b>	<b>—</b>



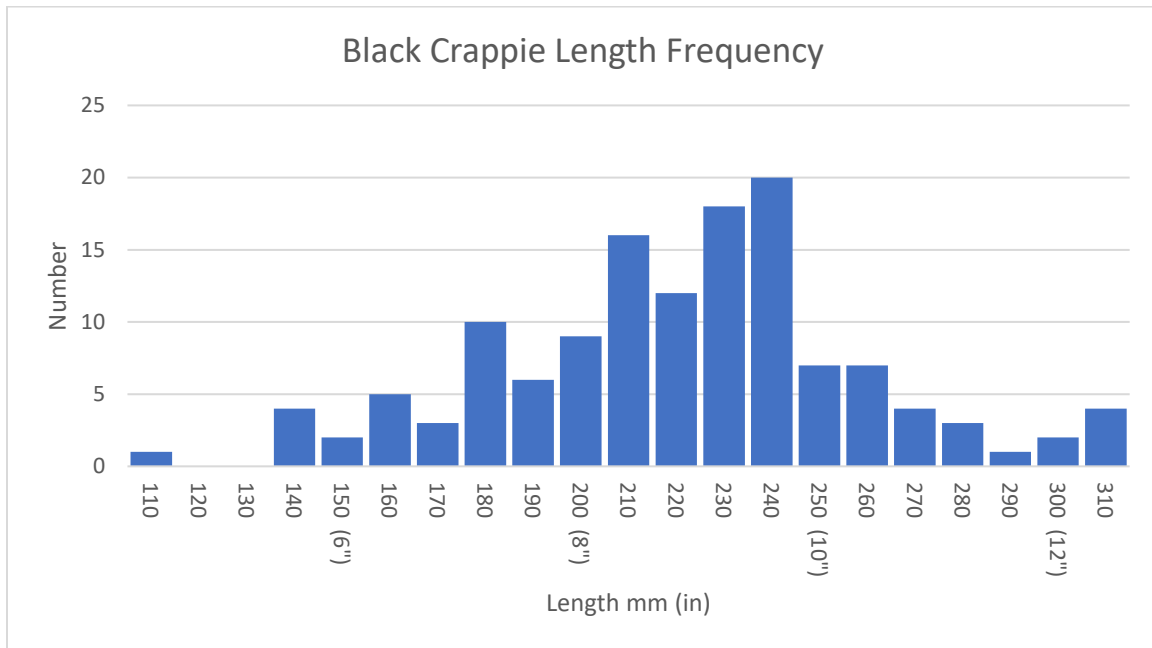
**Figure 7.** The length distribution of Wilke Lake Bluegill captured by fyke net. Lengths are reported in mm and inches ().

**Table 7.** The age distribution by length for Bluegill from Wilke Lake captured by fyke net in 2018. The age distribution of the entire measured catch was a projection based on the distribution of ages from scale samples. Lengths are reported in mm and in inches ().

Length (in)    mm	Age									
	2	3	4	5	6	7	8	9	10	11
70	2									
80	6	3								
90	50	38	6							
(4") 100	16	95	15							
110		26	52	19						
120		3	35	31	24					
130			14	14	35	6	5			
140			4	50	29	17	5			
(6") 150			5	31	33	20				
160				21	25	25				
170				2	20	22		2		
180					4	6	8	6		1
190							2	1	1	1
(8") 200					1			1	1	
210							1			
<b>Total</b>	<b>74</b>	<b>165</b>	<b>131</b>	<b>168</b>	<b>171</b>	<b>96</b>	<b>21</b>	<b>10</b>	<b>2</b>	<b>2</b>
<b>Ave. Length</b>	<b>96 mm (3.8")</b>	<b>104 mm (4.1")</b>	<b>120 mm (4.7")</b>	<b>142 mm (5.6")</b>	<b>150 mm (5.9")</b>	<b>161 mm (6.4")</b>	<b>166 mm (6.5")</b>	<b>186 mm (7.3")</b>	<b>200 mm (7.9")</b>	<b>185 mm (7.3")</b>
<b>S.D.</b>	<b>6.4 mm (0.3")</b>	<b>7.3 mm (0.3")</b>	<b>12.7 mm (0.5")</b>	<b>15.9 mm (0.6")</b>	<b>17.2 mm (0.7")</b>	<b>13.5 mm (0.5")</b>	<b>26.0 (1.0")</b>	<b>8.8 mm (0.4")</b>	<b>7.1 mm (0.3")</b>	<b>7.1 mm (0.3")</b>

### Black Crappie

Black Crappie were the second most common panfish captured by fyke net (Table 2). The 134 Black Crappie that were captured ranged in length from 113 mm to 317 mm (4.4” to 12.5”) and had an average length of 225 mm (8.9”). Most of the measured crappie were less than 250 mm (10”) in length (Table 6 and Figure 8).



**Figure 8. The length distribution of Wilke Lake Black Crappie captured by fyke net. Lengths are reported in mm and inches ().**

Scales were collected from a subsample of captured Black Crappie for age analysis. Ages 1 through 10 and age 13 were identified in our sample (Table 8). Age 4 was the most common age followed by ages 5 and 6. Other ages were less common in our sample.

The average length of Black Crappie from Wilke at each age was similar to the length at age for crappie in other lakes across Wisconsin (Table 5). It appears that growth of Black Crappie from Wilke Lake is average.

During fyke netting other panfish species were captured but in lower abundances than Bluegill or Black crappie. Nets captured 24 Hybrid Sunfish, 14 Pumpkinseed Sunfish, 12 Green Sunfish and 1 Yellow Perch. These fish had average lengths of 145 mm (5.7”), 171 mm (6.7”), 185 mm (7.3”) and 190 mm (7.5”) respectively.

### Other Species

Three additional species were captured during. These species included 268 Yellow Bullhead, 3 White Sucker and 1 Golden Shiner (Table 2). The Yellow Bullhead ranged in length from 153 mm to 364 mm (6.0” to 14.3”) and had an average length of 296 mm (11.7”) (Table 6). The other species were not measured.



**Table 8. The age distribution by length for Black Crappie from Wilke Lake captured by fyke net in 2018. The age distribution of the entire measured catch was a projection based on the distribution of ages from scale samples. Lengths are reported in mm and in inches ().**

Length (in) mm		Age												
		1	2	3	4	5	6	7	8	9	10	11	12	13
70														
80														
90														
(4")	100													
110		1												
120														
130														
140			2	1	1									
(6")	150		1	1										
160			1	4										
170				3										
180				6	3	1								
190				1	5									
(8")	200				5	4								
210					6	6	4	2						
220					5	5	2							
230					4	2	8	2	1					
240					2	3	10	4	1					
(10")	250							3	1	2				1
260						1	2	4						
270						1	1	1			1			
280							1		1					
290										1				
(12")	300								1	1				
310						1		1	2					
<b>Total</b>		<b>1</b>	<b>4</b>	<b>16</b>	<b>31</b>	<b>24</b>	<b>28</b>	<b>17</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Ave. Length</b>		<b>113 mm (4.4")</b>	<b>153 mm (6.0")</b>	<b>173 mm (6.8")</b>	<b>208 mm (8.2")</b>	<b>228 mm (9.0")</b>	<b>239 mm (9.4")</b>	<b>251 mm (9.9")</b>	<b>279 mm (11.0")</b>	<b>271 mm (10.7")</b>	<b>279 mm (11.0")</b>	--	--	<b>257 mm (10.1")</b>
<b>S.D.</b>		--	<b>7.7 mm (0.3")</b>	<b>13.6 mm (0.5")</b>	<b>23.6 mm (0.9")</b>	<b>27.4 mm (1.1")</b>	<b>16.1 mm (0.6")</b>	<b>25.0 mm (1.0")</b>	<b>34.7 mm (1.4")</b>	<b>30.9 mm (1.2")</b>	--	--	--	

## Spring Electroshocking

The entire 1.84 mile shoreline was electroshocked on the night of May 22, 2018 to assess the Largemouth Bass and panfish populations of Wilke Lake. In the 1.4 hours of shocking, 539 fish representing nine species were captured (Table 9). Total CPE was 292.93 fish per mile or 376.05 fish per hour shocked. Bluegill, Yellow Perch and Pumpkinseed Sunfish dominated our catch with fewer Largemouth Bass and other species captured.

**Table 9. Wilke Lake 2018 spring electroshocking catch summary. Catch Per Effort (CPE) is expressed as fish per mile shocked or fish per hour shocked. Population estimated were made using fyke nets as the marking portion and electroshocking as the recapture run. Lengths are reported in mm and inches ().**

Species	Total Catch	Fish/mile	Fish/hour	Average Length	Length Range	Population Estimate	P.E. Range
Northern Pike	18	9.78	12.56	485 mm (19.1")	387 mm- 609 mm (15.2"- 24.0")	422	325-603
Golden Shiner	3	1.63	2.09	149 mm (5.8")	132 mm-176 mm (5.2"-6.9")		
Yellow Bullhead	15	8.15	10.47	286 mm (11.3")	228 mm- 347 mm (9.0"-13.7")	293	203-440
Pumpkinseed	63	34.24	43.95	158 mm (6.2")	72 mm-227 mm (2.8"- 9.0")		
Bluegill	301	163.59	210.0	115 mm (4.5")	46 mm- 204 mm (1.8"- 8.0")		
Largemouth Bass	41	22.28	28.60	321 mm (12.6")	181 mm- 462 mm (7.1"-18.2")	97	43-233
Black Crappie	13	7.07	9.07	229 mm (9.0")	193 mm-271 mm (7.6"- 10.7")		
Hybrid Sunfish	10	5.43	6.98	156 mm (6.1")	99 mm- 219 mm (3.9"- 8.7")		
Yellow Perch	75	40.76	52.33	110 mm (4.3")	79 mm- 149 mm (3.1"- 5.9")		
<b>Total</b>	<b>539</b>	<b>292.93</b>	<b>376.05</b>				

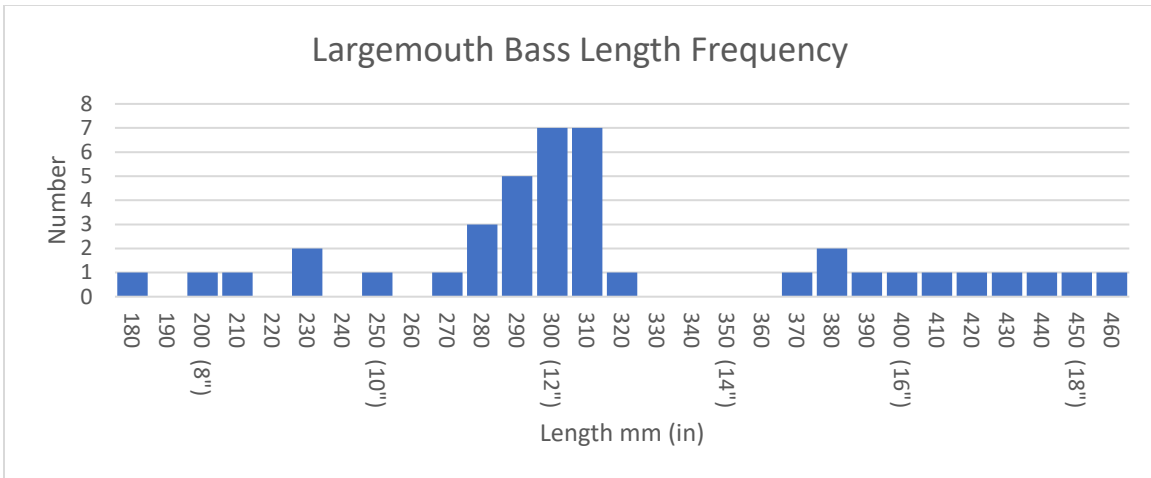
### **Gamefish** **Largemouth Bass**

Largemouth Bass were the most common gamefish captured during electroshocking. The 41 Largemouth Bass ranged in length from 181 mm to 462 mm (7.1" to 18.2") and had an average length of 321 mm (12.6") (Table 10). Most Largemouth Bass had lengths between 280 mm (11") and 310 mm (12.2") with few fish smaller or larger (Figure 9). Eleven (26.8%) of the captured bass had lengths greater than the 14" (356 mm) minimum harvest size limit for Bass in Wilke Lake.

The population estimate of 97 (confidence range 43-233) for Largemouth Bass should be viewed with caution because of the low number of marked and recaptured bass.

**Table 10. The length frequency of fish captured during the 2018 spring electroshocking survey of Wilke Lake. Length is reported in mm and inches ().**

Length (in) mm	Northern Pike	Yellow Bullhead	Pumpkin- seed	Bluegill	Largemouth Bass	Black Crappie	Hybrid Sunfish	Yellow Perch
40				3				
(2") 50				1				
60				20				
70			2	73				1
80			2	19				1
90			4	17			1	13
(4") 100			1	22			2	25
110				14				25
120			3	11			2	4
130			6	13				1
140			4	28				5
(6") 150			7	31				
160			10	16				
170			4	19			1	
180			5	9	1			
190			5	4		1	1	
(8") 200			7	1	1	3	1	
210			1		1	1	2	
220		1	2			2		
230					2	1		
240		1				3		
(10") 250		2			1	1		
260								
270		2			1	1		
280		4			3			
290					5			
(12") 300		1			7			
310		2			7			
320		1			1			
330								
340		1						
(14") 350								
360								
370					1			
380	1				2			
390	1				1			
(16") 400					1			
410					1			
420					1			
430					1			
440	2				1			
(18") 450					1			
460	2				1			
470	4							
480	2							
490								
(20") 500								
510	1							
520	1							
530	3							
540								
(22") 550								
560								
570								
580								
590								
(24") 600	1							
<b>Total</b>	<b>18</b>	<b>15</b>	<b>63</b>	<b>301</b>	<b>41</b>	<b>13</b>	<b>10</b>	<b>75</b>
<b>Ave. Length</b>	<b>485 mm (19.1")</b>	<b>286 mm (11.3")</b>	<b>158 mm (6.2")</b>	<b>115 mm (4.5")</b>	<b>299 mm (11.8")</b>	<b>229 mm (9.1")</b>	<b>156 mm (6.1")</b>	<b>110 mm (4.3")</b>
<b>S.D.</b>	<b>52.7 mm (2.1")</b>	<b>30.8 mm (1.3")</b>	<b>37.9 mm (1.5")</b>	<b>39.9 mm (1.6")</b>	<b>67.7 mm (2.7")</b>	<b>22.3 mm (0.9")</b>	<b>50.2 mm (2.0")</b>	<b>13.8 mm (0.5")</b>



**Figure 9. The length distribution of Wilke Lake Largemouth Bass captured by fyke net. Lengths are reported in mm and inches ().**

The 2<sup>nd</sup> dorsal spine was removed from captured bass for age analysis. Spines were cross-sectioned and viewed with a microscope to identify annual age rings. Age 2 through Age 4 and ages 6, 7, 9 and 10 were present in our sample (Table 11). Age 3 was the dominant year class with fish of other ages much less common. Several age classes, age 5 and age 8 were not identified in our sample.

When the average length at age for Largemouth Bass from Wilke Lake are compared to bass in other Wisconsin lakes, it appears that from age 2 through age 7 bass in Wilke Lake grew above or near Statewide averages (Table 5). Older age bass (age 9 and 10), were shorter at age than bass from other lakes. Since the number of bass that were older than age 3 was low, growth comparisons should be viewed with caution.

**Table 11. The age distribution by length for Largemouth Bass from Wilke Lake captured by electroshocking in 2018. Lengths are reported in mm and in inches ().**

Length		Number	Age								
(in)	mm		2	3	4	5	6	7	8	9	10
	180	1	1								
	190										
(8")	200	1	1								
	210	1		1							
	220										
	230	2		1	1						
	240										
(10")	250	1		1							
	260										
	270	1		1							
	280	3		3							
	290	5		4	1						
(12")	300	7		7							
	310	7		6	1						
	320	1		1							
	330										
	340										
(14")	350										
	360										
	370	1					1				
	380	2					1	1			
	390	1						1			
(16")	400	1						1			
	410	1									1
	420	1						1			
	430	1						1			
	440	1								1	
(18")	450	1									1
	460	1									1
	Total	41	2	25	3	0	2	5	0	1	3
	Ave. Length	321 mm (12.6")	193 mm (7.6")	294 mm (11.6")	281 mm (11.0")	--	378 mm (14.9")	409 mm (16.1")	--	444 mm (17.5")	442 mm (17.4")
	S.D.	67.8 mm (2.6")	17.0 mm (0.7")	25.2 mm (1.0")	45.2 mm (1.8")	--	4.2 mm (0.2")	21.3 mm (0.8")	--	--	24.9 mm (1.0")

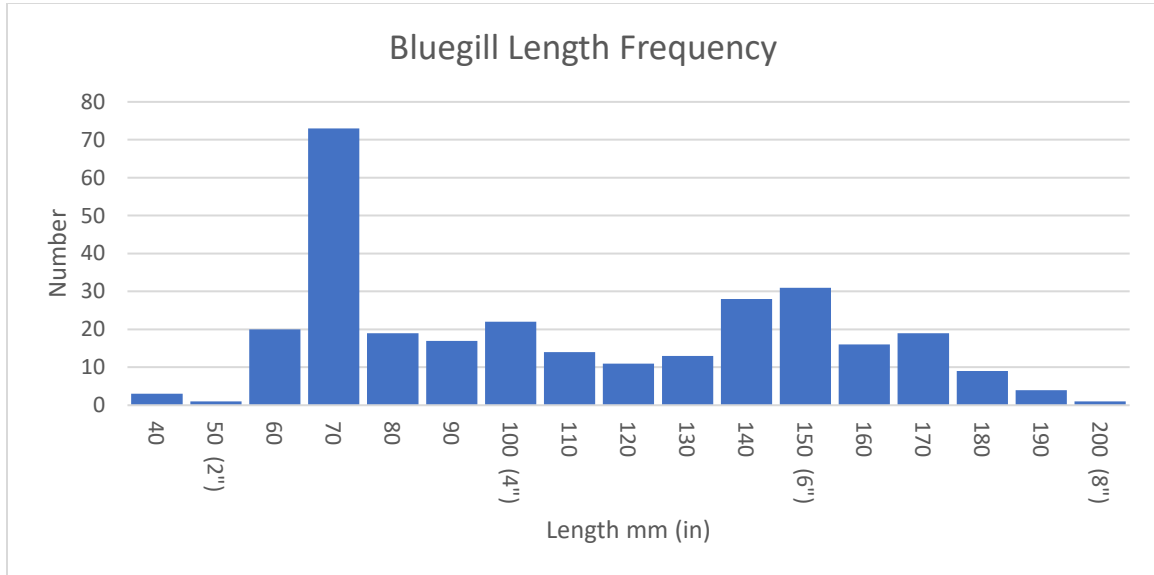
Northern Pike

Eighteen Northern Pike were captured during electroshocking (Table 9). These pike ranged in length from 387 mm to 609 mm (15.2" to 24") and had an average length of 485 mm (19.1) (Table 11). No captured Northern Pike were greater in length than the 26" (660 mm) minimum size limit for pike in Wilke Lake. A population estimate estimated that there were 422 (confidence range 325 to 663) or 4.44 pike per surface acre in Wilke Lake.

## Panfish

### Bluegill

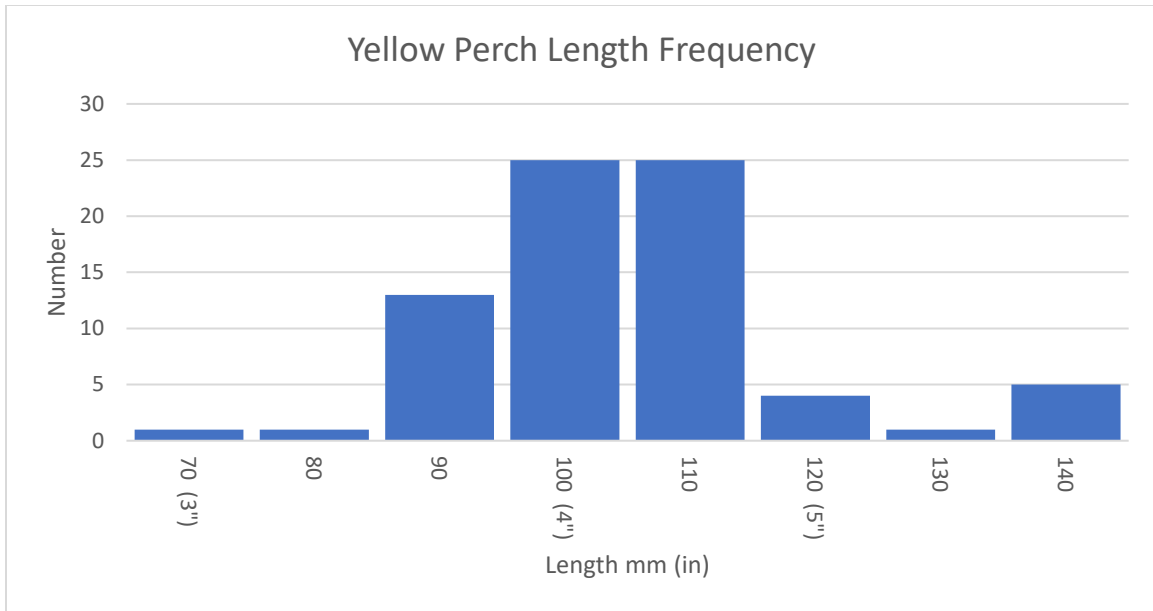
During electroshocking, Bluegill were the most abundant panfish captured (Table 10). The 301 captured Bluegill ranged in length from 46 mm to 204 mm (1.8" to 8.0") and had an average length of 115 mm (4.5"). Bluegill length was nearly evenly distributed across the sizes captured (Table 11 and Figure 10). 76 of the 301 (25.2%) captured Bluegill were greater than 150 mm (6") in length. Only one Bluegill (0.3%) was greater in length than 200 mm (8").



**Figure 10. The length distribution of Wilke Lake Bluegill captured by electroshocking. Lengths are reported in mm and inches ().**

### Yellow Perch

Yellow perch were commonly captured during electroshocking (Table 9). The 75 captured perch ranged in length from 79 mm to 149 mm (3.1" to 5.9") and had an average length of 110 mm (4.3"). The distribution of Yellow Perch lengths was centered around 100 mm (4") with few small or large perch captured (Table 10 and Figure 11). No captured perch were greater than 150 mm (6") in length.



**Figure 11. The length distribution of Wilke Lake Yellow Perch captured by electroshocking. Lengths are reported in mm and inches ().**

#### Other Panfish

During electroshocking, we also captured 63 Pumpkinseed Sunfish, 13 Black Crappie and 10 Hybrid Sunfish (Table 9). Average lengths for these species were 158 mm (6.2"), 229 mm (9.0") and 156 mm (6.1") respectively (Table 10).

#### Other Species

Fifteen Yellow Bullhead and 3 Golden Shiner were also captured during spring electroshocking (Table 9). The 15 Yellow Bullhead ranged in length from 228 mm to 347 mm ( 9.0" to 13.7") and had an average length of 286 mm (11.3") (Table 10). It was estimated that there were 293 (range 203 to 440) bullhead in Wilke Lake.

## **DISCUSSION**

A comprehensive fish survey was conducted in 2018 to assess the fish populations of Wilke Lake. A combination of fyke nets and night electroshocking was used to capture fish. A total of 2,059 individual fish representing thirteen species were captured. Across the two surveys, Bluegill, Yellow Bullhead and Northern Pike dominated the catch. Other species were captured in lower number. Bluegill dominated both the fyke net and electroshocking catches with Northern Pike the most common gamefish captured by fyke net and Largemouth Bass the most common gamefish captured by shocking.

#### **Gamefish**

Northern Pike were the most common gamefish captured during this survey (Tables 2 and 9). Pike lengths, however, were skewed toward small fish with none of the captured pike

greater in length than 648 mm (25.5”) which is less than the minimum harvest length of 26” (660 mm) (Table 3). The growth of Northern Pike was below Statewide averages at all ages (Table 5). Although weights were not measured, visual observations of captured pike seemed to indicate fish were thin for their length. Compared to past surveys (Hogler 1998), Northern Pike numbers are slowly trending downward.

Largemouth Bass were collected in modest number during this survey as compared to the typical bass catch during surveys of other local lakes (Tables 2 and 9). The lengths of captured bass were typically distributed with 75% below and 25% above the minimum size limit (Figure 9). Analysis of length at age indicated average growth for bass in Wilke lake, however, it also indicated several missing or poor year classes (Table 5). The causes of these weak year classes are not known but could be related poor spawning success, predation by other predators or harvest by anglers. Largemouth Bass numbers may be showing some improvement compared to past surveys (Hogler 2010).

Walleye were captured in limited number. Spawning size fish were collected during the survey, but few small fish and no yearling Walleye were seen (Tables 2 and 9). It appears the population is dependent on stocking or has very limited natural reproduction.

### **Panfish**

The panfish community in this lake is dominated by Bluegill, Black Crappie, Pumpkinseed Sunfish and Yellow Perch (Tables 2 and 9). By total number, these species dominated our fyke net and electroshocking catches. The average size of captured Bluegill was in the 125 mm (5”) range for bluegill which was similar to past surveys (Hogler 2010). Length at age analysis of scales for Bluegill indicated that fish are slow growing at all ages greater than age 2. Compared to past surveys, Bluegill numbers are slowly trending downward (Hogler 1998 and Hogler 2010), but average length has not responded to decreases in abundance.

Black Crappie averaged 225 mm (9”) in length (Tables 2 and 9) in 2018. Length at age analysis indicates that crappie growth in Wilke Lake is at or above Statewide average growth. Black Crappie number in 2018 has improved over catches from past surveys (Hogler 2010).

Yellow perch are also small in size as seen by their length frequencies from each survey type. Perch numbers in 2018 appear to be lower than in past surveys (Hogler 1998 and Hogler 2010).

Yellow Bullhead appear to be present in moderate numbers (Tables 2 and 9). The size of captured bullhead was good. Unlike past surveys, carp were not captured in the 2018 survey.

## **CONCLUSIONS AND RECOMMENDATIONS**

Based on survey results from 2018 and previous surveys, Wilke Lake continues to be bass-panfish lake that features Largemouth Bass, Northern Pike and stocked Walleye as predators and a diverse panfish community consisting of Bluegill, Black Crappie,



Pumpkinseed Sunfish and Hybrid Sunfish. Problems with gamefish abundance, slow growth of bluegill and an abundant plant community identified in the 1950's as problems, continue to make fish management on this lake difficult. It is recommended that:

- Establish a more restrictive regulation, 18" minimum, 1 bag for Largemouth Bass to improve bass numbers and to provide more predation on slow growing Bluegill.
- Evaluate the continuation of Walleye stocking by the State. This survey and other surveys have found poor survival and no natural reproduction by Walleye. If Walleye stocking is continued, consider a more restrictive regulation, 18" minimum and 3 bag to improve Walleye number and to increase predation on Bluegill.
- Change the Northern Pike regulation from the standard regulation of 26" minimum, 2 bag to no minimum size, with a protected, no harvest slot of 25" to 35" and a 2 bag.
- Work with the Wilke Lake Association to install fish sticks or other woody habitat design to improve habitat for bass.

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