

**Lake Emily**  
**2017 Comprehensive Fishery Survey Report**  
**Dodge County, Wisconsin**  
**WBIC 161600**



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## Executive Summary

In 2017, a comprehensive fishery survey was conducted on Lake Emily using a variety of sampling methods throughout the open water period in attempt to sample the major components of the fishery. The objectives of the survey were to 1) assess the status of the Northern Pike (*Esox lucius*), Largemouth Bass (*Micropterus salmoides*) and panfish populations, 2) attain a population estimate for Northern Pike 3) update management recommendations for the fishery of Lake Emily. The results of the 2017 survey were compared to lakes with similar characteristics and the prior comprehensive fishery survey conducted on Lake Emily in 2012.

The 2017 survey produced a population estimate for adult Northern Pike of 13.7 Northern Pike/acre with below average size structure with a PSD of 34 and PSD-P of 3 indicating that quality size Northern Pike (equal to or greater than 21 inches) are present but in low proportion and very few northern pike are of preferred-size (equal to or greater than 28 inches). The population estimate is concerning considering Pierce et al (2003) suggests that high population density begins to influence growth when exceeding 5 fish/acre. The 2017 survey yielded only 4.8% of Northern Pike over the 26-inch minimum size limit but did show a fair number of quality-size Northern Pike over 21 inches.

Largemouth Bass catch rate has decreased since the previous survey conducted in 2012. In 2017, Largemouth Bass PSD was 82 and PSD-P was 46, indicating that both quality size Largemouth Bass (equal to or greater than 12 inches) and preferred-size (equal to or greater than 15 inches) Largemouth Bass were common in the population. However, size structure is disproportionate indicating potential issues with recruitment which may be related to the high-density Northern Pike population.

Bluegill catch rate has also decreased since the previous survey. In 2017, Bluegill PSD was 27 and PSD-P was 2 indicating a lack of both quality size Bluegill (equal to or greater than 6 inches) and preferred size (equal to or greater than 8 inches) Bluegill. The population size structure is likely influenced by numerous factors including predation by the high-density Northern Pike population, angler harvest and/or winter die off in 2014.

Management recommendations include:

1. Propose a more liberal Northern Pike regulation to allow harvest of smaller fish and reduce adult density below 5 Northern Pike/acre.
2. Restore Largemouth Bass catch rates to around 30/mile which aligns with average catch rates from similar lakes, reevaluate size structure, abundance and growth in the next survey. Reducing the density of the Northern Pike population may address Largemouth Bass recruitment issues by suppressing predation of juvenile Largemouth Bass.
3. Propose a more protective Bluegill regulation to improve size structure and restore catch rates to at least 300/mile which aligns with above average catch rates from similar lakes, reevaluate size structure, abundance and growth in the next comprehensive fishery survey.
4. Monitor the Common Carp population in the next comprehensive fishery survey.

## **Introduction**

Lake Emily is a 268-acre spring fed lake with a maximum depth of 10 feet located in northwestern Dodge County (Figure 1). An unnamed tributary to the Grand River drains the lake and a small dam located at the outlet is used to control water levels in the lake. There is some residential development along the northern and eastern shoreline. The remaining shoreline is natural however surrounding land use is primarily agricultural. The lake generally has a muck bottom, but also has areas of more coarse material including gravel and rock.

Lake Emily is classified as a shallow lake as the water column does not stratify during the summer months and water near the surface may be impacted by resuspension of sediment due to wind and wave action. The lake is classified as a headwater lake with a watershed less than four square miles. One measure of a lake's health is the trophic state, which relates to the amount of algae in the water. The average summer trophic state for Lake Emily for the last 5 years was hypereutropic (score 73) and was determined using chlorophyll data. For a shallow headwater lake, this trophic state is considered "poor". Documented aquatic invasive species include: Common Carp (*Cyprinus carpio*), Curly-Leaf Pondweed (*Potamogeton crispus*), Eurasian Watermillfoil (*Myriophyllum spicatum*), Phragmites (*Phragmites australis*) and Zebra Mussel (*Dreissena polymorpha*).

Public boat access with parking is available on the south side of the lake. Suitable public access provides opportunities for both anglers and recreational boaters. The fishery is one of three popular resources for anglers in Dodge County. Angling pressure can be very high at times, especially during the winter ice fishing season. Northern Pike and Largemouth Bass are the dominant gamefish species. Bluegill is the principal panfish species, but Black Crappie, Pumpkinseed and Yellow Perch are also common.

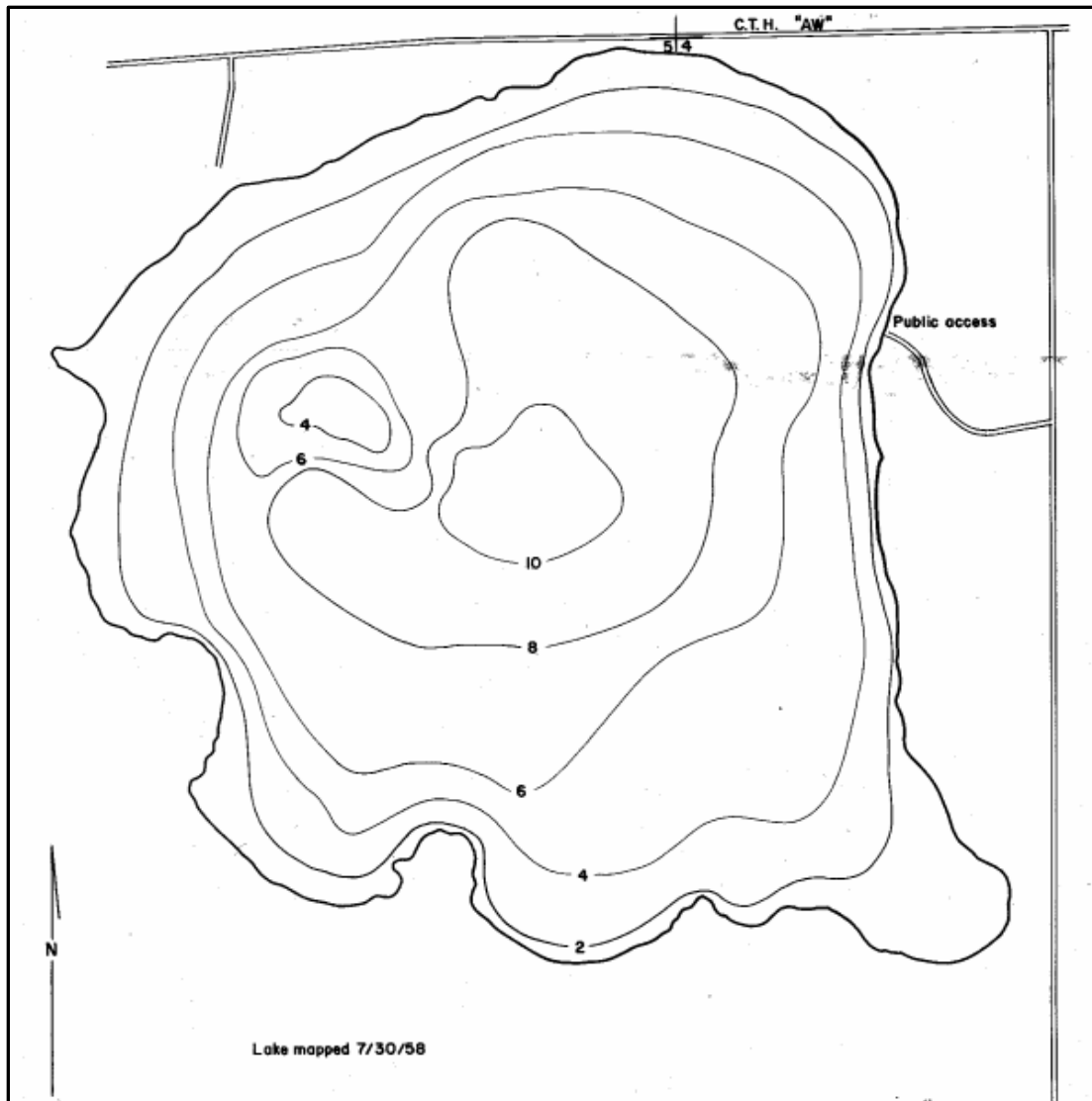
Historically, fisheries management activities on Lake Emily have revolved around two primary issues: rough fish overpopulation and winterkill. A chemical treatment was conducted in 1959 to remove a fishery of carp, bullheads and stunted panfish. In 1962 winterkill occurred again along with the dam washing out which allowed carp to reestablish. A second chemical treatment was conducted in 1969 and a carp barrier was installed on the dam to prevent re-entry into the lake. The issue of winterkill was initially addressed through aeration via the “chute” method. The chute was operated during five of the seven winters from 1970-77, but due to high operating costs; the method was discontinued in 1978 and replaced with a helixor system. Severe winterkill last occurred on Lake Emily in 1978, the first year of helixor operation. Since that time, a partial winter kill was documented during the winter of 2013-2014. Northern Pike and Largemouth Bass were stocked in 2014 in response to the partial winter kill.

Northern pike were first stocked into Lake Emily in 1979, when 100,000 fry were planted following the 1978 winterkill (Table 1). An additional 100,000 northern pike fry were stocked in 1981. Small fingerling northern pike (1072 fish approximately 8-inches in length) were stocked in September 1993. In order to boost the Northern Pike population, a Northern Pike rearing pond was installed adjacent to the lake in October 1994. The rearing pond was designed to flood a small wetland area where Northern Pike fry could be stocked and held for 3 to 4 weeks and then released to the lake via a water control structure. The rearing was utilized from 1994 to 2001 but was discontinued in 2003 when fishery survey data indicated the Northern Pike population was self-sustaining. The Lake Emily Fishing Improvement Club has stocked the lake sporadically with Black Crappie, Largemouth Bass, Northern Pike and Yellow Perch over the years (Table 1).

Following the 1978 winterkill, the lake was stocked with fingerling Largemouth Bass in 1979-81 (Table 1). The Largemouth Bass population in Lake Emily is currently maintained by natural reproduction, and the species is not currently stocked by the Department. The lake was also stocked heavily with Walleye fry following the 1969 chemical treatment. Exceptionally

high survival resulted in a very large, slow growing Walleye population. Over 100,000 Walleye ranging from 6- to 10 inches were removed from the lake by Department crews to thin the population (WDNR, 1978). The Walleye population was quickly reduced by angling pressure and natural mortality and growth rates of remaining fish were very low. Walleye fry were stocked again in 1986-1989 in an attempt to control an over abundant Yellow Perch population (Table 1). Walleye fingerling stocking was determined to be unsuccessful (WDNR, 1990). Walleye reproduction has historically been sporadic and growth rates of Walleye in Lake Emily are very low, typical of Walleye populations in small fertile lakes.

The significance of the fishery and high public use justifies regular monitoring of the fish community to assess management options and maximize the potential of the fishery. Past comprehensive fishery surveys were conducted on Lake Emily in 2006 and 2012. The objectives of the 2017 survey were to 1) assess the status of the Northern Pike, Largemouth Bass and panfish populations, 2) attain a population estimate for Northern Pike 3) update management recommendations for the fishery of Lake Emily.



LAKE EMILY  
 SECTION 4-5  
 TOWNSHIP 13 N  
 RANGE 13 E  
 TOWN FOX LAKE  
 COUNTY DODGE

AREA 268 Acres  
 TOTAL SHORELINE 2.9 Miles  
 MAX. DEPTH 10'  
 SCALE 1" = 400'

Figure 1. Contour map of Lake Emily in Dodge County, Wisconsin.

Table 1. Number of fish stocked in Lake Emily since 1972, by year, species, age class and source type.

Year	Species	Age Class	Number of Fish Stocked	Source Type
1972	LARGEMOUTH BASS	FRY	11800	PRIVATE HATCHERY
1972	NORTHERN PIKE	FRY	495000	DNR HATCHERY
1972	LARGEMOUTH BASS	FINGERLING	15000	PRIVATE HATCHERY
1973	LARGEMOUTH BASS	FINGERLING	4000	PRIVATE HATCHERY OTHER STATE'S GVT. HATCHERY
1973	YELLOW PERCH	ADULT	3650	HATCHERY
1973	MUSKELLUNGE	FINGERLING	53	DNR COOP PONDS
1978	LARGEMOUTH BASS	FINGERLING	35000	PRIVATE HATCHERY
1978	LARGEMOUTH BASS	FINGERLING	1604	DNR COOP PONDS
1978	NORTHERN PIKE	FRY	290000	DNR HATCHERY
1978	WALLEYE	FRY	500000	DNR HATCHERY
1979	LARGEMOUTH BASS	FRY	10000	PRIVATE HATCHERY
1980	LARGEMOUTH BASS	FINGERLING	10000	DNR COOP PONDS
1981	LARGEMOUTH BASS	FINGERLING	10000	PRIVATE HATCHERY
1981	NORTHERN PIKE	FRY	388830	DNR HATCHERY
1986	WALLEYE	FRY	320000	DNR HATCHERY
1987	WALLEYE	FINGERLING	45000	DNR COOP PONDS
1988	WALLEYE	FINGERLING	7375	DNR COOP PONDS
1989	WALLEYE	FINGERLING	15000	DNR COOP PONDS
1993	NORTHERN PIKE	FINGERLING	1072	DNR HATCHERY
1994	NORTHERN PIKE	FINGERLING	536	DNR COOP PONDS
1996	NORTHERN PIKE	FRY	100000	DNR HATCHERY
1998	NORTHERN PIKE	FRY	39600	DNR HATCHERY
1999	NORTHERN PIKE	FRY	50000	DNR HATCHERY
2000	NORTHERN PIKE	FRY	100000	DNR HATCHERY
2001	NORTHERN PIKE	FRY	100000	DNR HATCHERY
2002	NORTHERN PIKE	FRY	50000	DNR HATCHERY
2013	YELLOW PERCH	YEARLING	575	PRIVATE HATCHERY
2014	LARGEMOUTH BASS	LARGE FINGERLING	6695	DNR PONDS
2014	YELLOW PERCH	LARGE FINGERLING	625	PRIVATE HATCHERY
2014	NORTHERN PIKE	SMALL FINGERLING	10720	DNR HATCHERY
2015	LARGEMOUTH BASS	LARGE FINGERLING	10059	DNR PONDS
2015	YELLOW PERCH	LARGE FINGERLING	866	PRIVATE HATCHERY
2016	YELLOW PERCH	YEARLING	1000	PRIVATE HATCHERY
2017	YELLOW PERCH	LARGE FINGERLING	1333	PRIVATE HATCHERY
2020	BLACK CRAPPIE	ADULT	1000	PRIVATE HATCHERY
2021	LARGEMOUTH BASS	LARGE FINGERLING	8588	DNR PONDS

## Methods

### Data Collection

Eight white nylon fyke nets (0.75-inch bar mesh, 3 x 5-foot frames) were set on Lake Emily to target spawning Northern Pike (Spring Netting I (SNI). Nets were checked daily from March 22 to March 28. All gamefish captured were measured to the nearest tenth of an inch and weight was taken to the nearest tenth of a pound on a subsample of Northern Pike. In order to attain a Northern Pike population estimate all Northern Pike sampled were marked: males received a left pectoral fin clip, females a right pectoral fin clip, and those of unknown sex received a top caudal clip. Throughout the survey Northern Pike were examined for marks and noted as recaptures if marks were found. A subsample of aging structures (anal fin rays) was collected to provide Northern Pike age and growth estimates.

Spring Electrofishing (SEII) using a WDNR standard DC boom shocker boat was conducted at night on May 22 targeting Largemouth Bass and panfish species. SEII sampling consisted of one half-mile station where all fish were collected and two one-mile stations where only Largemouth Bass were collected. All Largemouth Bass and panfish were measured to the nearest tenth of an inch. A subsample of aging structures (otoliths) was collected to provide Bluegill age and growth estimates. The SEII sampling event used two dippers, two probes with a total of 16 droppers, and a dip net bar mesh of 0.375 inches. Largemouth Bass were examined for top caudal fin clip marks to facilitate the calculation of a population estimate using SEII as the recapture sampling. All gamefish sampled were measured to the nearest 0.1 inch and Northern Pike, Walleye and Largemouth Bass were weighed to the nearest 0.1 pound. Aging structures were collected until five structures were collected for each species and each sex for every half-inch increment. A subsample of Bluegill, Yellow Perch, Black Crappie, Pumpkinseed, Rock Bass and Green Sunfish (*Lepomis cyanellus*) were measured to the nearest 0.1 inch. Other

Growth information from Northern Pike, Walleye and Largemouth Bass was obtained according to established protocols for each species and included fin rays, dorsal spines and scale samples collected throughout the comprehensive fishery survey. Growth data from Lake Emily was compared to average statewide growth rates utilized in the WDNR Fisheries Management Database.



## Data Analysis

Fyke net total catch and CPUE (#/net night; NN) were calculated for Northern Pike. A multiple recapture population estimate (Schnabel Method) was used for adult Northern Pike with 95% confidence intervals. Spring Largemouth Bass and panfish electrofishing total catch and CPUE (#/mile) were calculated for Largemouth Bass and Bluegill. Length frequency histograms were constructed for Northern Pike, Largemouth Bass and Bluegill to assess size structure.

Relative weight, the ratio of a fish's weight to the weight of a standard fish of the same length, based on a scale of 100, was used to assess body condition of Northern Pike. Mean relative weight ( $W_r$ ) was calculated by length group as an index of Northern Pike condition using a standard length-at-weight equation (Willis, 1998). Average relative weight was calculated for Northern Pike for each sex separately when sex data were available. Relative weight values between 75 and 100 indicate normal weight for a given length. A relative weight value greater than 100 indicates that a fish is in excellent condition. A relative weight value less than 75 indicates that a fish is in poor condition.

Proportional size distribution (PSD) was calculated for Northern Pike, Largemouth Bass and Bluegill to assess population size-structure. Stock lengths are based on standardized lengths for each species: Northern Pike (14 inches), Largemouth Bass (8 inches), Bluegill (3 inches) and quality lengths used were Northern Pike (21 inches), Largemouth Bass (12 inches) and Bluegill (6 inches). Proportional size distribution-preferred (PSD-P) was also calculated for Northern Pike, Largemouth Bass and Bluegill to assess the proportion of fish in the population that are a preferred length by anglers. These are based on standardized lengths for each species: Northern Pike (28 inches), Largemouth Bass (15 inches)- and Bluegill (8 inches) (Anderson and Neuman, 1996).

## **Results and Discussion**

### Northern Pike

A total of 964 Northern Pike were sampled during 2017 SNI for a catch rate of 27.5 Northern Pike/net night. This catch rate is well above all other lakes when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Lengths ranged from 14.7 to 35.5 inches and the mean length was 20.4 inches. The largest Northern Pike sampled was a 35.5-inch female weighing 14.3 pounds. In 2012, 501 Northern

Pike were sampled for a catch rate of 9.8/net night. This catch rate is above average (90<sup>th</sup> percentile) when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Lengths ranged from 9.9 to 37.5 inches and the mean length was 21.2 inches. The largest Northern Pike sampled was a 37.5-inch female weighing 11.5 pounds. Schnabel population estimates for adult Northern Pike were 13.7 Northern Pike/acre in 2017 and 5.6 Northern Pike/acre in 2012. Both densities are considered relatively high. The 2017 estimate of 13.7 fish/acre is somewhat concerning considering Pierce et al (2003) suggests that density begins to influence growth when exceeding 5 fish/acre.

Northern Pike body condition was excellent as suggested by relative weight ( $W_r$ ) values that ranged from 94 to 122, with a mean  $W_r$  of 100 ( $n = 221$ ). Sex specific relative weight for females was excellent and ranged from 105 to 122 with a mean  $W_r$  of 110 ( $n = 103$ ). Male sex specific relative weight was very good and ranged from 83 to 102 with a mean  $W_r$  of 92 ( $n = 119$ ). Relative weight values between 75 and 100 indicate normal weight for a given length and values greater than 100 indicate that a fish is in excellent condition. In 2012,  $W_r$  values ranged from 63 to 96, with a mean  $W_r$  of 87 ( $n = 500$ ). Sex specific relative weight for females was good and ranged from 78 to 101 with a mean  $W_r$  of 91 ( $n = 121$ ). Male sex specific relative weight was good and ranged from 77 to 94 with a mean  $W_r$  of 86 ( $n = 359$ ). The 2012 relative weight indicated a high-density population with slow growth, but the 2017 relative weight was more indicative of a moderate density-moderate growth population (Willis 1989).

Age and growth analysis based on estimates from anal fin rays indicated that Northern Pike sampled in 2017 grew slightly faster than statewide averages but slower than regional averages from southern Wisconsin (Figure 3). The growth rate below the regional average suggests that the high-density population level has negatively impacted growth however relative weight indicated that fish condition was not a concern.

Prior to 1995 the Northern Pike population in Lake Emily was regulated with a no minimum length limit, 5 fish daily bag limit regulation. Since 1995 Lake Emily has been regulated with the Northern Pike southern management zone base regulation of 26-inch minimum length limit and 2 fish daily bag limit. The 2017 survey showed below average size structure with a PSD of 34 and PSD-P of 3 indicating that quality size Northern Pike (equal to or greater than 21 inches) are present but in low proportion and very few northern pike are of preferred-size (equal to or greater than 28 inches). In 2012 Northern Pike PSD was higher at 55,

however the PSD-P of 4 was low, again indicating that preferred-size Northern Pike are uncommon. Historically, Northern Pike PSD was 54 in 2006 SNI and 63 in 1999 SNI. PSD-P was 6 in 2006 SNI and 1 in 2001 SNI. In 2019, only 4.8% of Northern Pike were greater than the 26-inch minimum length limit and in 2012 9.3% of Northern Pike sampled were greater than 26 inches.

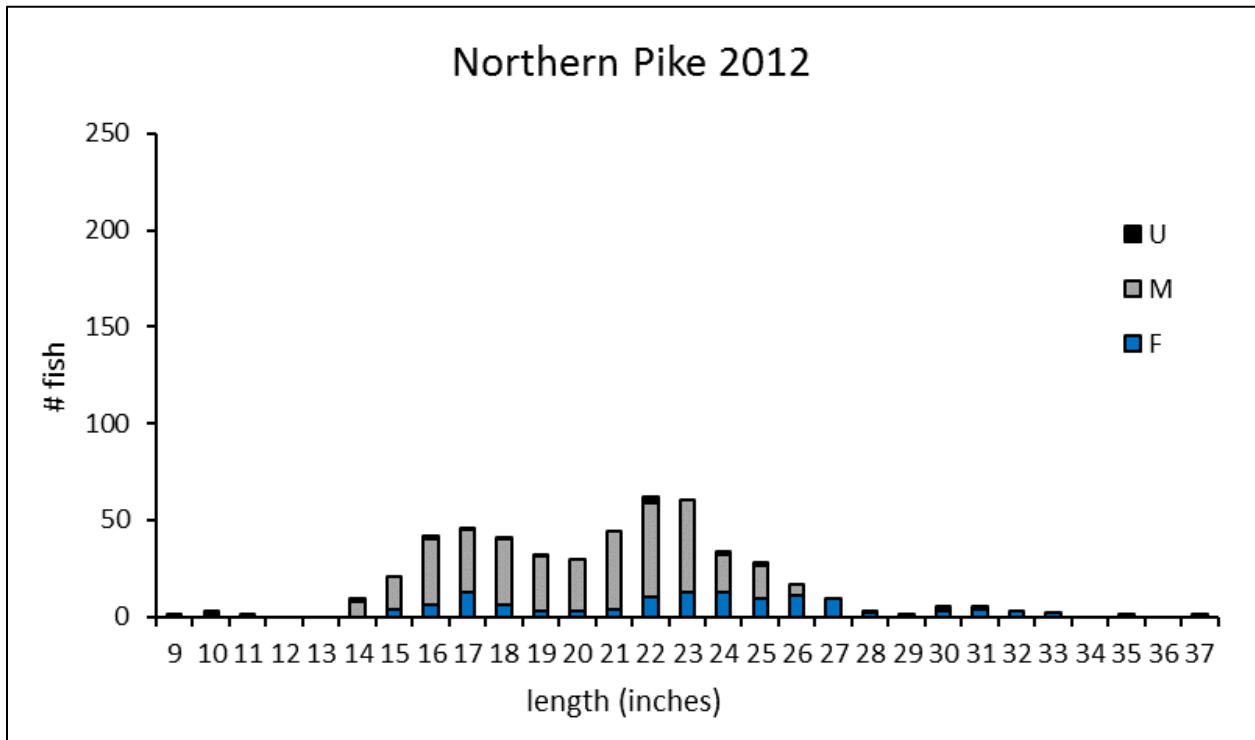
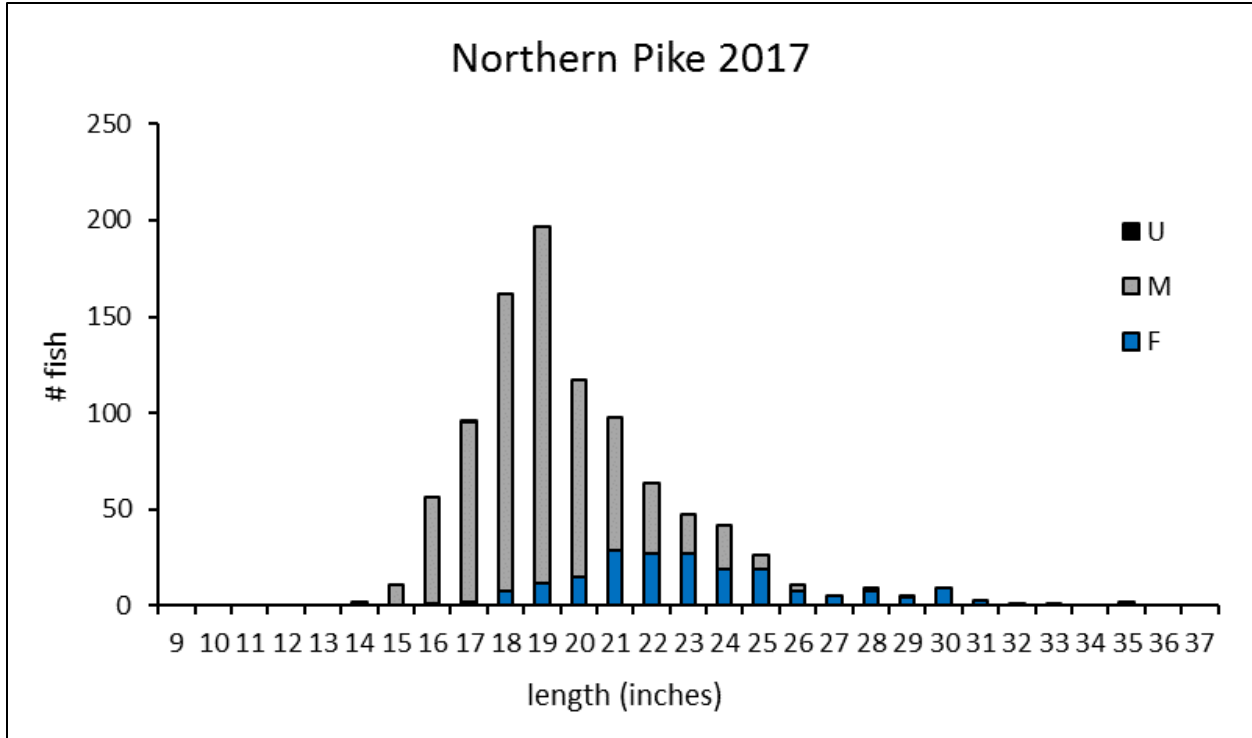


Figure 2. Length frequency histograms of male, female and unknown sex Northern Pike sampled during the 2017 and 2012 spring fyke net survey (SNI) of Lake Emily, Dodge County, Wisconsin.

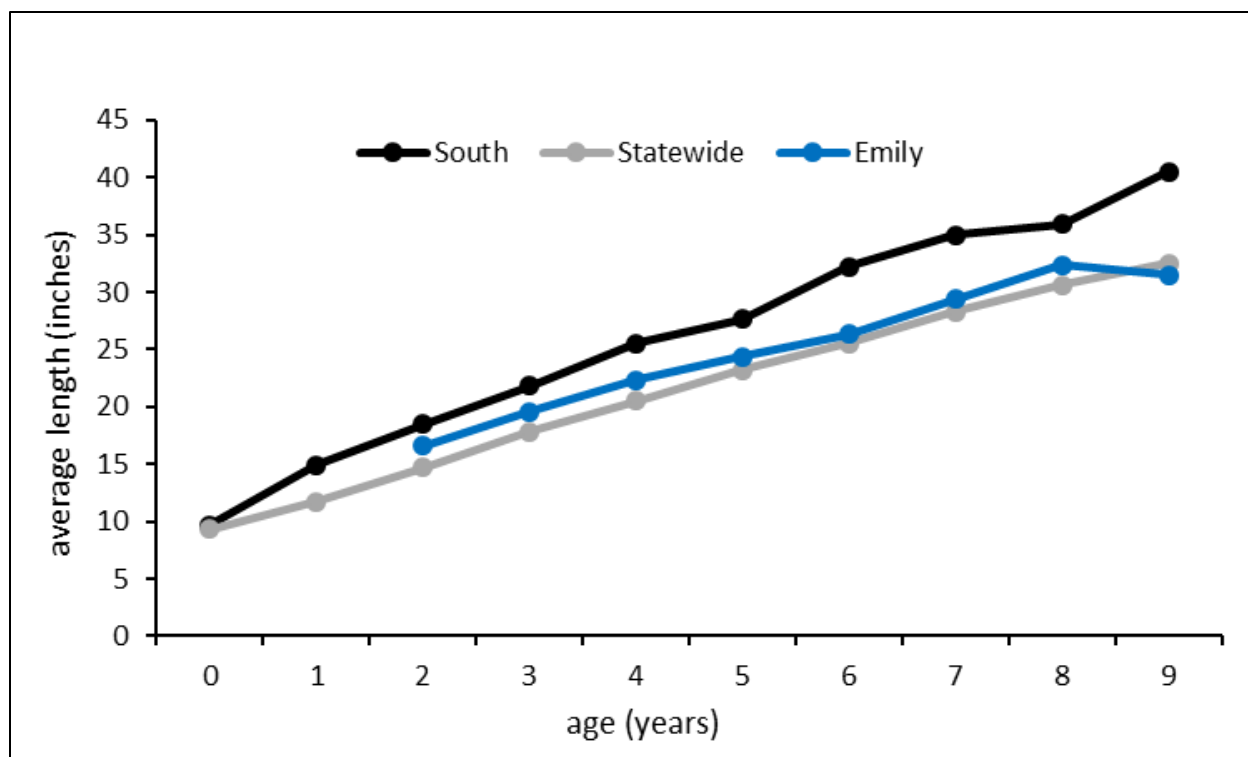


Figure 3. Northern Pike mean length at age determined using dorsal spines collected during the spring 2017 fyke netting (SNI) of Lake Emily, Dodge County, Wisconsin.

### Largemouth Bass

A total of 45 Largemouth Bass were sampled during SEII for a catch rate of 15.7/mile (31 Largemouth Bass/hour). This catch rate is slightly below average when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Lengths ranged from 7.1 to 18.5 inches with an average length of 13.3 inches. A total of 97 Largemouth Bass were sampled in 2012 SEII for a catch rate of 57 Largemouth Bass/mile (70 Largemouth Bass/hour). This catch rate is above average when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Lengths ranged from 2.5 to 18.5 inches and the average length was 11.4 inches. While Largemouth Bass catch rates were lower in 2017 compared to 2012, catch rates of Largemouth Bass are known to be variable but are often the only measure of abundance available given the difficulty in obtaining a true population estimate.

In 2017, Largemouth Bass PSD was 82 and PSD-P was 46, indicating that both quality size Largemouth Bass (equal to or greater than 12 inches) and preferred-size (equal to or greater

than 15 inches) Largemouth Bass were common in the population. In 2012, Largemouth Bass PSD was 52 and PSD-P was 8, indicating that while quality size Largemouth Bass were common, there was a lack of Largemouth Bass of preferred size (Figure 4).

Prior to 1989 Lake Emily was regulated with no minimum length limit, 5 fish daily bag limit regulation for Largemouth Bass. In 1989 a 14-inch minimum length limit, 5 fish daily bag limit regulation was implemented. In the 2012 survey, 10.8% of fish were greater than 14 inches indicating that angler harvest appeared to have an impact on the Largemouth Bass population at that time. The 2017 survey yielded a greater proportion of fish over 14 inches (60%). This figure is skewed because of the lack of smaller fish and the population looks to be comprised of one strong year class since the winter die off of 2013-2014. The lack of smaller fish points to recruitment issues and may be a result of predation from the high-density Northern Pike population. Changes to management of Northern Pike and close monitoring of the Largemouth Bass population are warranted.

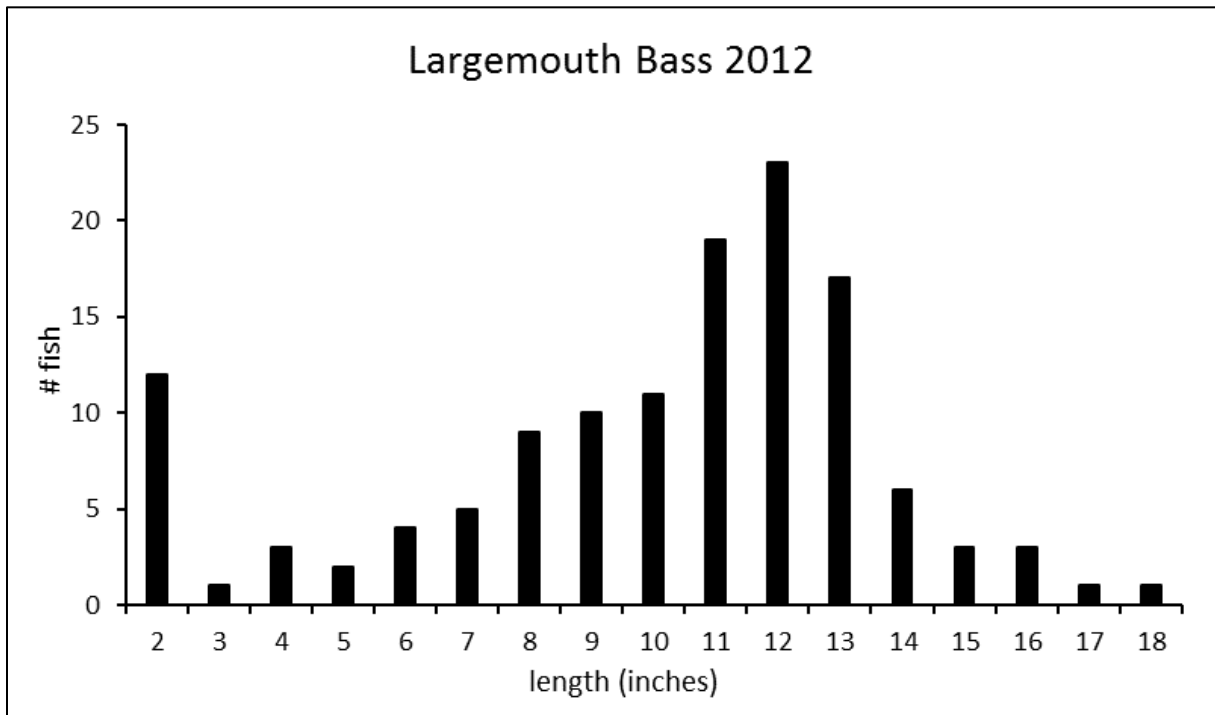
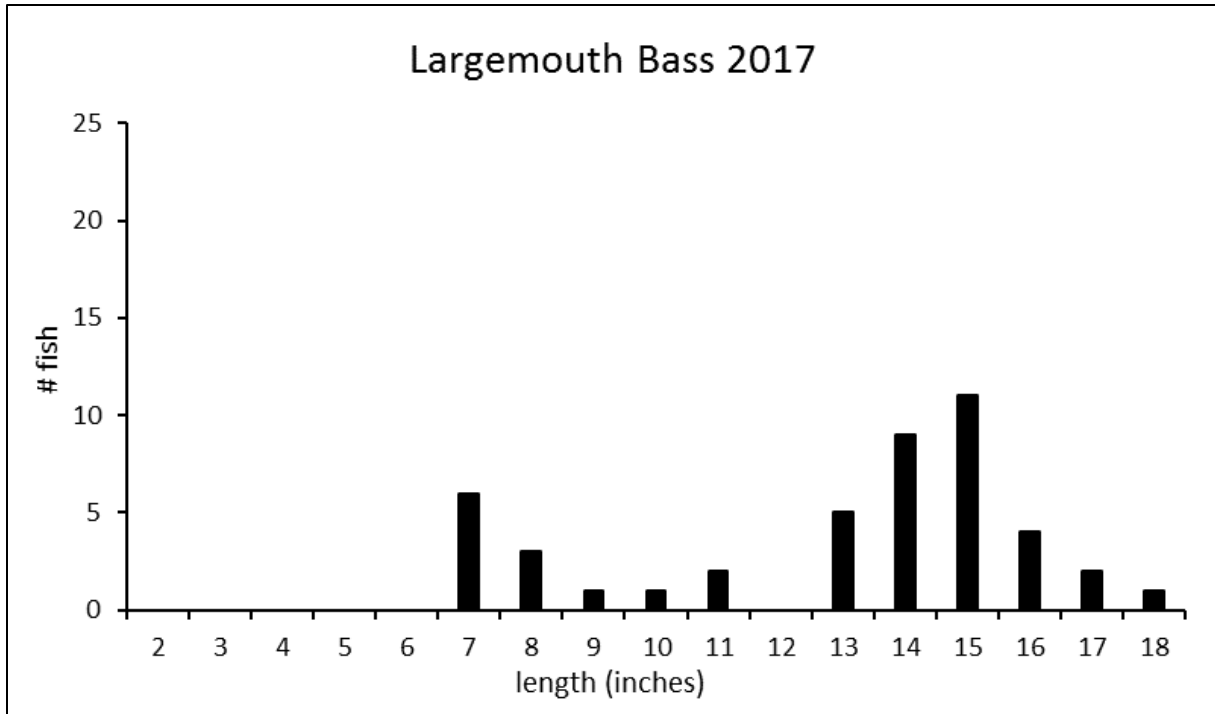


Figure 4. Length-frequency histograms of Largemouth Bass sampled during the 2017 and 2012 SEII surveys of Lake Emily, Dodge County, Wisconsin.

## Bluegill

A total of 95 Bluegill were sampled during SEII for a catch rate of 190 Bluegill mile (356 Bluegill/hour). This catch rate is average when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Bluegill ranged in size from 2 to 7.1 inches with an average length of 4.0 inches. A total of 766 Bluegill were sampled in 2012 SEII, for a catch rate of 766 Bluegill/mile (869 Bluegill/hour). This catch rate is well above average (99<sup>th</sup> percentile) when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. The catch rate of Bluegill in 2012 was four times higher than the 2017 catch rate. In 2012, lengths ranged from 2.5 to 7.4 inches and the average length was 5.3 inches.

The 2017 length frequency histogram showed that quality size fish (equal to or greater than 6 inches) were uncommon, this was also demonstrated by the low PSD of 27 (Figure 6). In 2017, PSD-P was 2, indicating a lack of preferred-size Bluegill (equal to or greater than 8 inches). The length frequency histogram indicated a decline in Bluegill greater than 3 inches. This decline of larger Bluegill is likely attributed to a combination of predation by the abundant Northern Pike population, angler harvest and/or winter die off in 2014.

The 2012 length frequency histogram showed a steep drop off above quality-size Bluegill (equal to or greater than 6 inches) resulting in a relatively low PSD of 33 (Figure 6). In 2012, PSD-P was 0, indicating an absence of preferred-size Bluegill (equal to or greater than 8 inches). Age and growth analysis based on estimates from otoliths indicated that in 2017, Bluegill grew about the same as the statewide average but slower than average from southern Wisconsin (Figure 5). This suggests that overharvest is likely contributing to the lack of quality fish, not growth issues or “stunting”. The downward trend in catch rate should be monitored in future surveys and a more protective regulation should be proposed if the trend continues.

An additional fall electrofishing (FE) survey was conducted as part of the 2012 comprehensive fishery survey. A total of 1,031 Bluegill were sampled during 2012 FE for a catch rate of 1,031 Bluegill mile (1,439 Bluegill/hour). This catch rate is well above average (99<sup>th</sup> percentile) when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. Bluegill size structure was similar to 2012 SEII with Bluegill ranging from 1.9 to 7.4 inches with an average length of 4.5 inches.



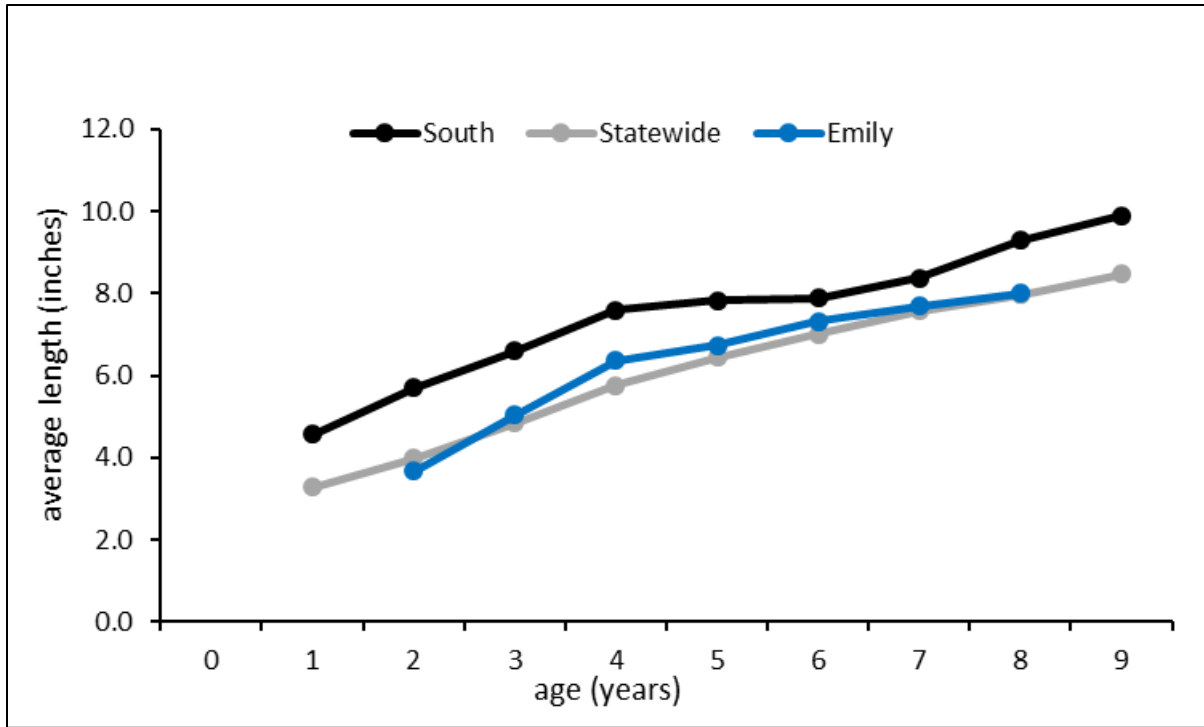


Figure 5. Bluegill mean length at age determined using otoliths collected during the 2017 comprehensive fishery survey of Lake Emily, Dodge County, WI.

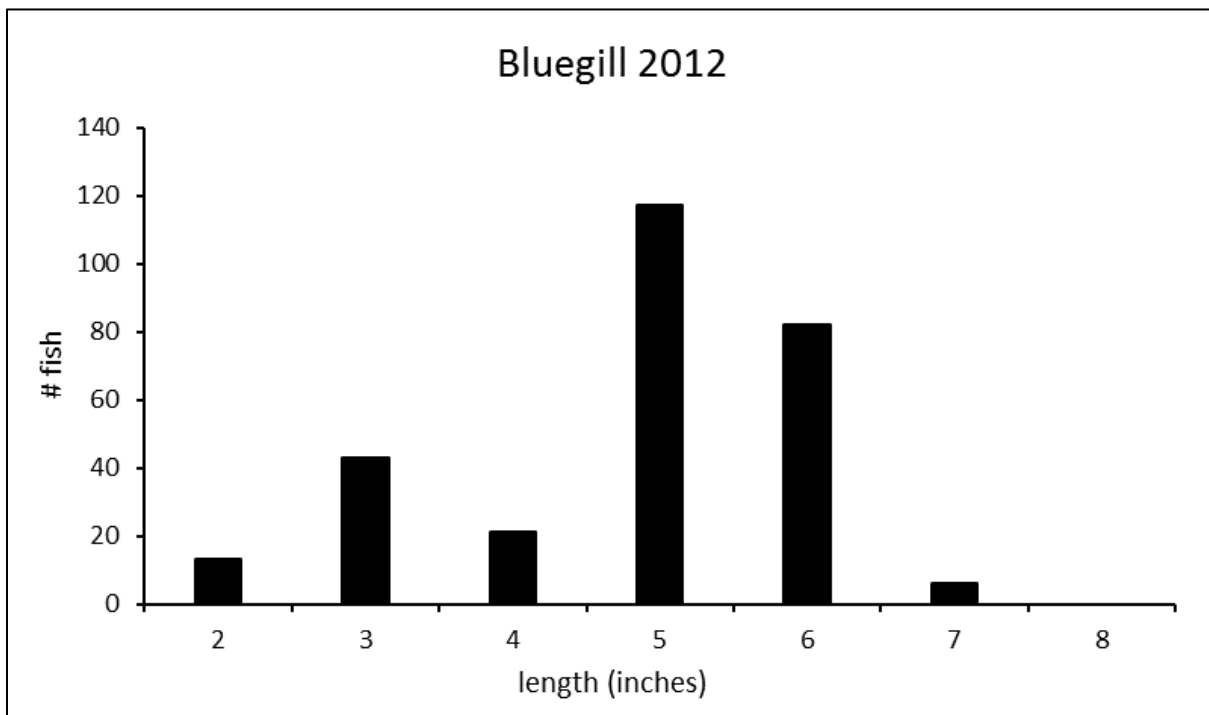
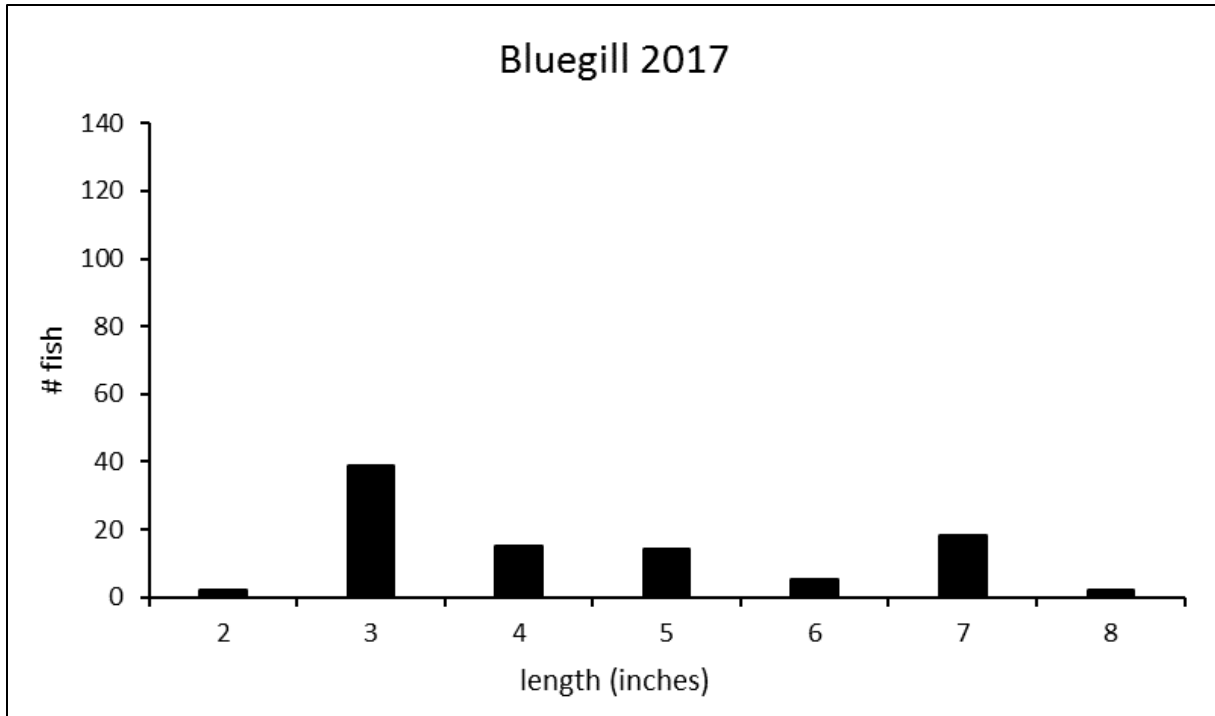


Figure 2. Length-frequency histograms of Bluegill sampled during the 2017 and 2012 SEII surveys of Lake Emily, Dodge County, Wisconsin.

### Yellow Perch

A total of 17 Yellow Perch were sampled during SNI for a catch rate of 0.49 Yellow Perch/net night. This catch rate is below average when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. A total of 37 Yellow Perch were sampled in 2012 SNI for a catch rate of 0.73 Yellow Perch/net night. This catch rate is slightly below average when compared to lakes with similar characteristics (warm water temperatures and turbid water) across the state. In 2012, lengths ranged from 4.9 to 8.9 inches and the average length was 6.5 inches.

A total of 29 Yellow Perch were sampled during 2017 SEII for a catch rate of 58 Yellow Perch/mile (109 Yellow Perch/hour). A total of 24 Yellow Perch were sampled in 2012 SEII for a catch rate of 24 Yellow Perch/mile (26.6 Yellow Perch/hour).

### Common Carp

Five Common Carp were sampled during the 2017 comprehensive fishery survey. Common Carp were sampled during the 2012 comprehensive fishery survey, the first-time common carp had been sampled in surveys of Lake Emily since the 1969 chemical treatment. Immigration of Common Carp likely occurred during the statewide flooding events of 2008. The low-head dam on Lake Emily can become submerged during high-water events. In 2017, the carp grates located on the dam were redesigned to be easier to clean of debris and installed to prevent further carp immigration into the lake. The combination of high-density top predator and high density panfish populations will likely suppress recruitment of Common Carp through predation on juvenile Common Carp and Common Carp eggs, respectively. However, the Common Carp population should continue to be monitored in future comprehensive fishery surveys.

### Other Species

During the 2017 comprehensive fishery survey, other species were observed in low abundance that do not warrant analysis but are reported here for consideration. These species included: Black Crappie (*Pomoxis nigromaculatus*), (n = 34)), Brown Bullhead (*Ameiurus nebulosus*), (n = 5)), Golden Shiner (*Notemigonus crysoleucas*), (n = 8)), Pumpkinseed (*Lepomis*

*gibbosus*), (n = 13)), Walleye (*Sander vitreus*), (n = 2)) and Yellow Perch (*Perca flavescens*), (n = 46)).

## **Management Recommendations**

Lake Emily poses some challenges for fisheries management. The 2017 survey produced a population estimate for adult Northern Pike of 13.7 Northern Pike/acre with below average size structure with a PSD of 34 and PSD-P of 3 indicating that quality size Northern Pike (equal to or greater than 21 inches) are present but in low proportion and very few northern pike are of preferred-size (equal to or greater than 28 inches). The population estimate is concerning considering Pierce et al (2003) suggests that high population density begins to influence growth when exceeding 5 fish/acre. The 2017 survey yielded only 4.8% of Northern Pike over the 26-inch minimum size limit but did show a fair number of quality-size Northern Pike over 21 inches.

Largemouth Bass catch rate has decreased since the previous survey conducted in 2012. In 2017, Largemouth Bass PSD was 82 and PSD-P was 46, indicating that both quality size Largemouth Bass (equal to or greater than 12 inches) and preferred-size (equal to or greater than 15 inches) Largemouth Bass were common in the population. However, size structure is disproportionate indicating potential issues with recruitment which may be related to the high-density Northern Pike population.

Bluegill catch rate has also decreased since the previous survey. In 2017, Bluegill PSD was 27 and PSD-P was 2 indicating a lack of both quality size Bluegill (equal to or greater than 6 inches) and preferred size (equal to or greater than 8 inches) Bluegill. The population size structure is likely influenced by numerous factors including predation by the high-density Northern Pike population, angler harvest and/or winter die off in 2014.

Management recommendations include:

1. Propose a more liberal Northern Pike regulation to allow harvest of smaller fish and reduce adult density below 5 Northern Pike/acre.
2. Restore Largemouth Bass catch rates to around 30/mile which aligns with average catch rates from similar lakes, reevaluate size structure, abundance and growth in the next survey. Reducing the density of the Northern Pike population may address

Largemouth Bass recruitment issues by suppressing predation of juvenile Largemouth Bass.

3. Propose a more protective Bluegill regulation to improve size structure and restore catch rates to at least 300/mile which aligns with above average catch rates from similar lakes, reevaluate size structure, abundance and growth in the next comprehensive fishery survey.
4. Monitor the Common Carp population in the next comprehensive fishery survey.

## Appendices

Appendix 1. Catch per unit effort for 2017 spring fyke net (SNI) and spring electrofishing (SEII) surveys of Lake Emily, Dodge County.

Species	Fyke Net Results			Electrofishing Results		
	Number (#)	#/net night	Ave. Length (in.)”	Number (#)	#/mile	Ave. Length (in.)
<b>Black Crappie</b>	33	0.9	---	1	2	---
<b>Bluegill</b>	39	1.1	---	95	190	4.9
<b>Brown Bullhead</b>	5	0.14	---	---	---	---
<b>Common Carp</b>	---	---	---	5	1.7	---
<b>Golden Shiner</b>	---	---	---	8	16	---
<b>Largemouth Bass</b>	1	0.03	---	45	15.7	13.3
<b>Northern Pike</b>	964	27.5	20.4	---	---	---
<b>Pumpkinseed</b>	1	0.03	---	12	24	5.7
<b>Walleye</b>	2	0.1	17.8	---	---	---
<b>Yellow Perch</b>	17	0.5	---	29	58	4.2

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