

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Bass Lake

2024 Fish Management Report

WBIC 417900



Photo Credit: WDNR

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Introduction

Bass Lake is a 145-acre seepage lake located in northwestern Oconto County. The lake has a maximum depth of 40 feet but averages 19 feet deep (Table 1). Bass Lake offers a variety of recreational opportunities in addition to fishing. The United States Forest Service (USFS) owns and operates the only boat landing on the southeast side of the lake. The USFS also maintains a beach and restroom facilities adjacent to the boat landing.

Bass Lake is in the Ceded Territory (22,400 square miles of northern Wisconsin that was ceded to the United States by the Lake Superior Chippewa Tribes in 1837 and 1842) and therefore eligible for tribal, off-reservation spearing harvest of gamefish but most notably, walleye *Sander vitreus*. The Wisconsin Department of Natural Resources (WDNR) stocked small fingerling walleye in 2001, 2005 and 2009 with minimal success (Table 2). Beginning in 2013, large fingerling walleye were stocked at 10/acre under the Wisconsin Walleye Initiative (Table 2). Brook trout, rainbow trout and brown trout were stocked in Bass Lake from the early 1970's until the mid 1980's. These stocking efforts were abandoned due to limited utilization and survival.

In 2008 a walleye spawning reef was constructed on USFS property in cooperation with WDNR and the Bass Lake Association. In 2014 this spawning reef was extended further out into the lake since receding water levels had left a considerable portion of the reef high and dry. In 2024, lake levels returned closer to normal pool elevation.

A creel survey was conducted during the 2016 – 2017 fishing season to sample the fishing activities of anglers and make projections of fishing effort, catch and harvest. A copy of the creel survey report can be found at the following link: <http://dnr.wi.gov/topic/fishing/documents/north/OcontoBass1617Creel.pdf>

The last fisheries survey of Bass Lake was conducted in 2016 (Long, 2017). The 2016 survey consisted of spring fyke netting, summer and fall shoreline electrofishing, and 3 nights of summer panfish netting. The 2016 survey generated a walleye population estimate of 1.5 adult walleye per acre. The panfish population in 2016 was dominated by rock bass, bluegill and yellow perch (Long, 2017).

The goal of the 2024 comprehensive fisheries survey was to assess the status of the fishery by characterizing gamefish populations based on relative abundance, proportional stock density (PSD), relative stock density (RSD), catch per unit effort (CPUE) and mean length at capture (age and growth).

Table 1: Physical and Chemical Attributes for Bass Lake (DNR, 1977).

Surface acres:	145
Maximum depth (ft):	40
Average depth (ft):	19
Shoreline length (mi):	2.7
Lake type:	Seepage
Lake class:	Complex, Warm, Clear
Basic water chemistry:	Medium hard, light brown water with moderate transparency.
Littoral substrate:	80% sand, 15% muck, 5% gravel
Aquatic vegetation:	Sparse
Other features:	A U.S. Forest Service beach and picnic grounds are located on the east side of the lake as well as a boat landing with parking. The shoreline is primarily upland consisting of mixed hardwoods and conifers, and the remainder is shrub-bog wetland. Bass Lake is located within the Ceded Territory.

Table 2. Bass Lake walleye stocking history.

Year	Species	Strain Stock	Number Stocked	Average Length	Source
2001	WALLEYE	UNSPECIFIED	7000	1.6	DNR
2005	WALLEYE	LAKE MICHIGAN	7405	1.4	DNR
2005	WALLEYE	UNSPECIFIED	1080	8.5	PRIVATE
2006	WALLEYE	MISSISSIPPI HEADWATERS	988	7.0	PRIVATE
2008	WALLEYE	UNSPECIFIED	995	7.5	PRIVATE
2009	WALLEYE	LAKE MICHIGAN	4963	1.7	DNR
2009	WALLEYE	MISSISSIPPI HEADWATERS	998	7.0	PRIVATE
2013	WALLEYE	LAKE MICHIGAN	1420	7.8	DNR
2015	WALLEYE	MISSISSIPPI HEADWATERS	1444	7.7	DNR
2017	WALLEYE	MISSISSIPPI HEADWATERS	1420	3.2	DNR
2017	WALLEYE	UNSPECIFIED	1420	7.3	DNR
2019	WALLEYE	ROCK-FOX	1420	7.0	DNR
2021	WALLEYE	MISSISSIPPI HEADWATERS	1419	7.3	DNR
2023	WALLEYE	LAKE MICHIGAN	1450	7.6	DNR
2025	WALLEYE	LAKE MICHIGAN	1450	7.2	DNR

Methods

Data Collection

Standard fyke nets (3-foot hoop, $\frac{3}{4}$ -bar, 1.5-inch stretch) were tended from March 28 to April 15, 2024 (SN1). The primary objective was to capture, measure, and mark adult walleye to estimate abundance. The musky survey (SN2) ran from April 18 to April 27, 2024. Summer panfish netting (SN3) was completed from June 10 to June 13, 2024.

A standard WDNR electrofishing boat was used on April 27, 2024 (SE1) to assess walleye abundance and on May 20, 2024 (SE2) to count and measure adult gamefish (e.g. bass) and panfish. The entire shoreline was surveyed: gamefish were collected from the entire shoreline whereas panfish were only collected for 1 mile (or 2 panfish stations). A fall electrofishing survey was not conducted.

All fish collected were measured to the nearest 0.1-inch (in) total length (TL). A sub-sample of scales, dorsal spines, or anal fin rays was collected for age and growth analysis from all gamefish. Aging structures from target species were collected from 5 fish per half inch group in the stock, quality and preferred length groups. Ages were assigned to each fish using standard DNR procedures.

Data Analysis

Catch per unit effort (CPUE) was calculated as catch by gear divided by sampling effort for each species collected. Length frequency distributions were tabulated from fish measured during the electrofishing and fyke net samples; not all panfish were measured. Population estimates for walleye and other gamefish were generated using multiple and single census mark-recapture methods. Proportional stock density (PSD) and relative stock density for preferred length fish (RSD^P) were calculated for dominant gamefish (Anderson and Neumann 1996). Preferred lengths of various gamefish have a minimum length between 45 and 55% of the world record length for that species (Anderson and Neumann 1996). Stock, quality, and preferred lengths were used as proposed by Gabelhouse (1984). Mean length at capture data was calculated for dominant gamefish and compared to the average of mean length at age for northern Wisconsin, previous survey data from Boot Lake and Lake Class data.

Results and Discussion

Overall, 1,645 fish representing 9 species were collected during the 2024 sampling season (Table 3). The five most abundant species collected by number were rock bass *Ambloplites rupestris* (40%), walleye (17%), largemouth bass *Micropterus salmoides* (15%), yellow perch *Perca flavescens* (7%) and bluegill *Lepomis macrochirus* (7%).

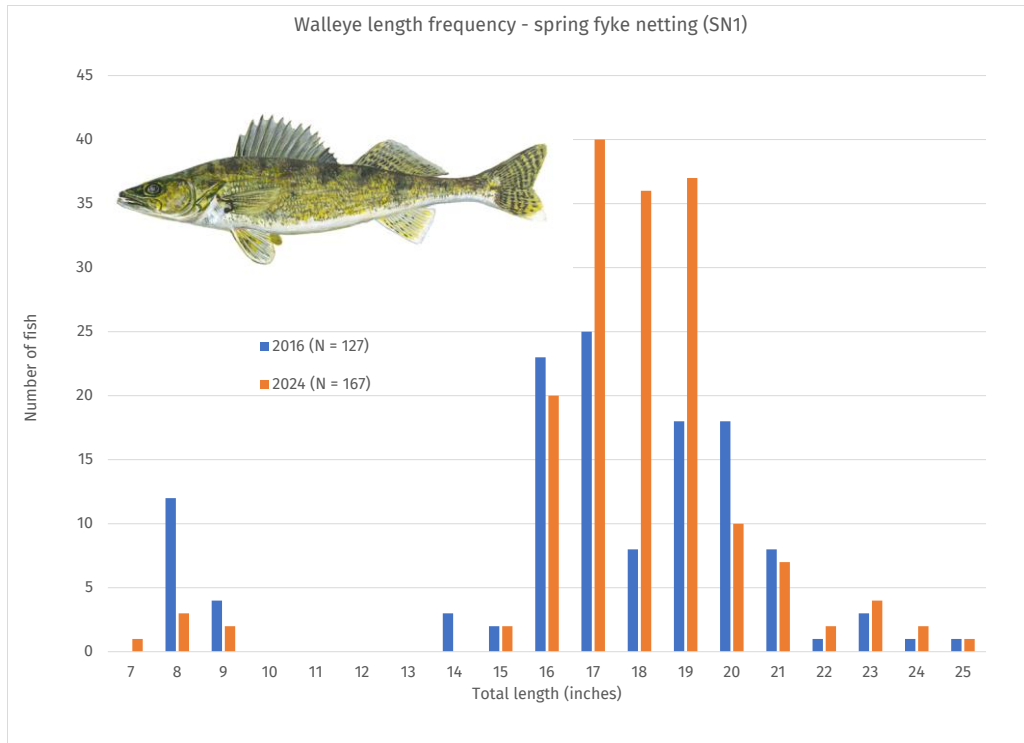


Figure 1. Length frequency of walleye collected during 2016 and 2024 surveys from Bass Lake, Oconto County, WI.

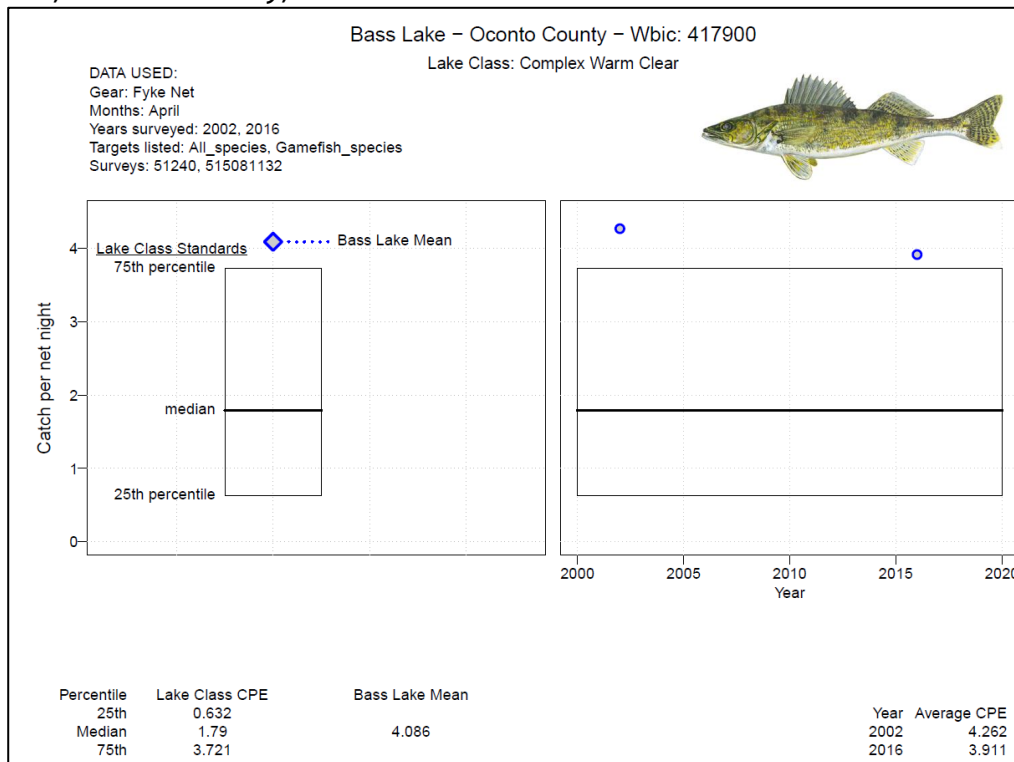


Figure 2. Lake classification walleye fyke netting CPUE for Bass Lake, Oconto County, WI.

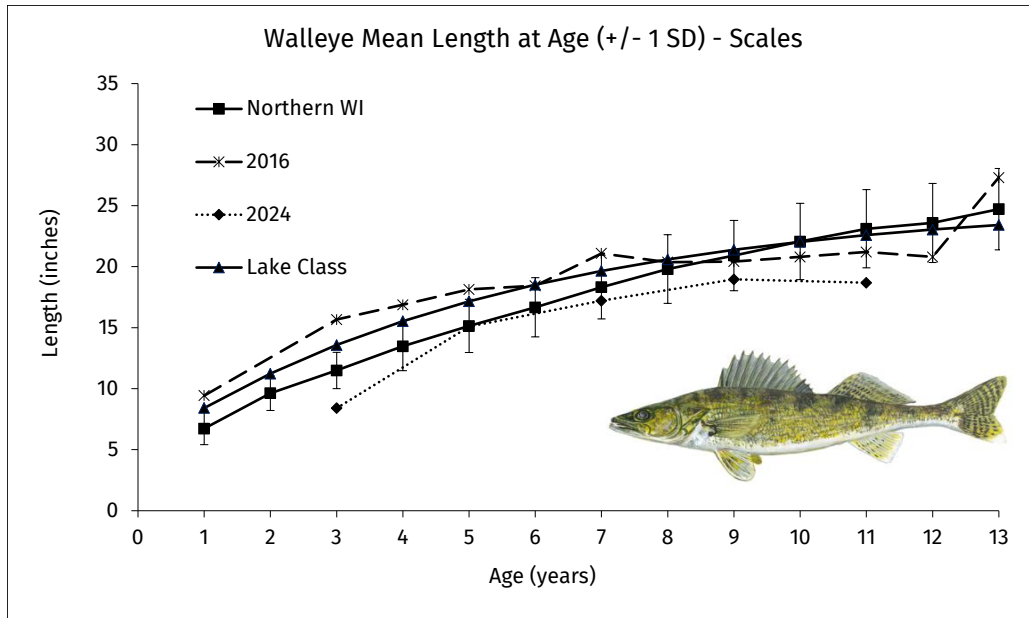


Figure 3. Mean length at age of walleye from Bass Lake, Oconto County, WI.

A subsample of 48 walleye was aged using scales (<12”) and dorsal spines (>12”). Ages ranged from 1 to 11 years old. Walleye growth was slightly below average compared to the mean length at age of walleye within the complex, warm, clear lake class (Figure 3).

Northern pike

Northern pike *Esox lucius* accounted for 8% of the fish collected (134 total). A total of 120 pike (not including 30 recaptures) was collected during SN1 spring fyke netting (Figure 4). Pike ranged in length from 10 to 41 inches and averaged 21 inches (Figure 4). Fyke netting CPUE increased from 0.1/NN in 2016 to 1.3/NN in 2024 which is comparable to the median percentile CPUE for lakes within its class (Figure 5). Overall, northern pike abundance and size structure improved since the 2016 survey. Reproduction is adequate to sustain the population. The adult northern pike population estimate (Schumacher-Eschmeyer) was 292 or 2.0 adults per acre.

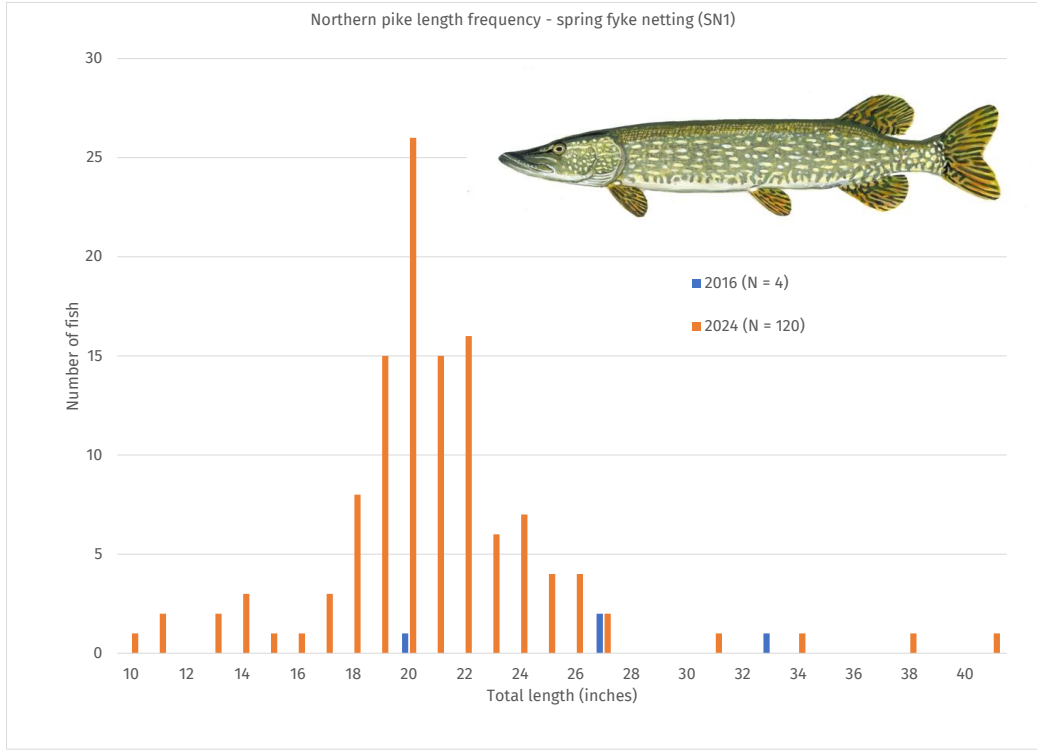


Figure 4. Length frequency of northern pike collected during spring fyke netting in 2016 and 2024 from Bass Lake, Oconto County, WI.

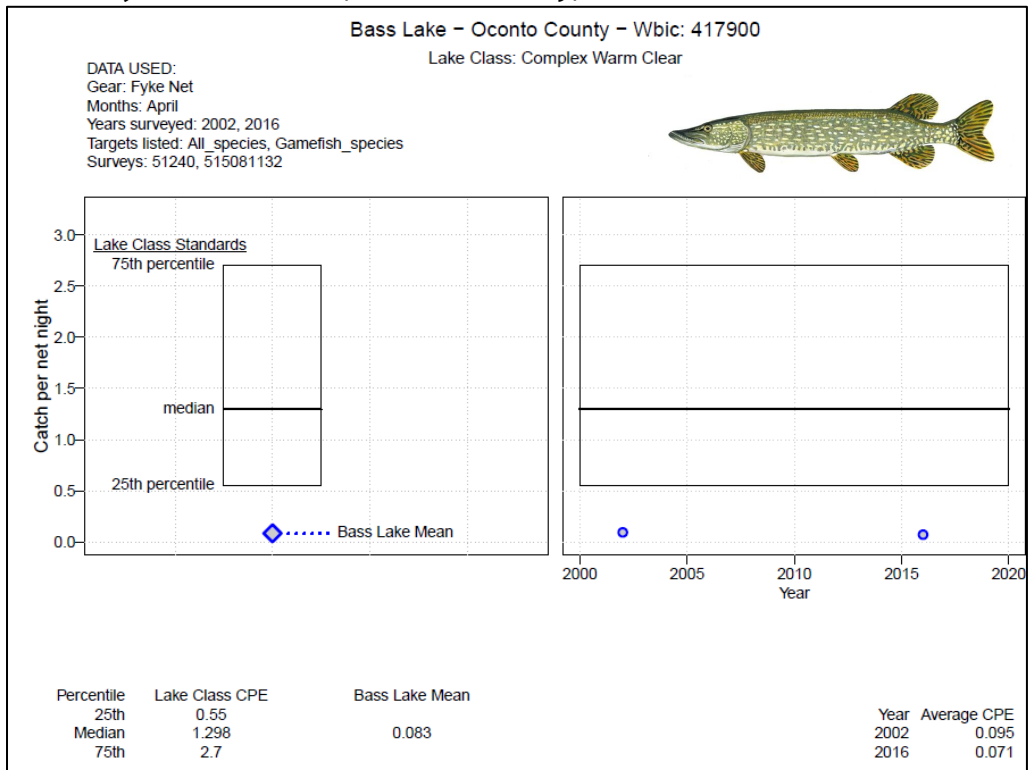


Figure 5. Lake classification northern pike fyke netting CPUE for Bass Lake, Oconto County, WI.

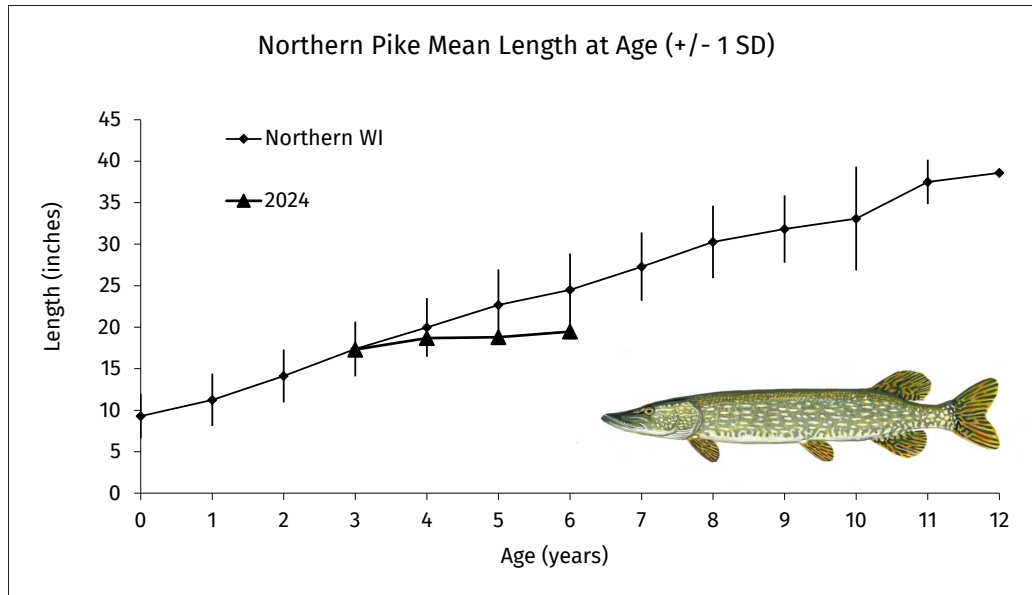


Figure 6. Mean length at age of northern pike from Bass Lake, Oconto County, WI.

A subsample of 8 northern pike was aged using anal fin rays. Ages ranged from 3 to 6 years old. Pike growth was average at ages 3 and 4 but slightly below average at ages 5 and 6 compared to the mean length at age of pike in northern Wisconsin (Figure 6).

Yellow perch

A total of 157 yellow perch was collected (Table 3). In 2024 no yellow perch were collected during the spring fyke netting (SN1); all perch were collected during the SE2 electrofishing survey. Perch ranged in length from 2 to 7 inches but only averaged 4 inches from the SE2 electrofishing survey. On the other hand, in 2016 only 8 perch were collected during the SE2 electrofishing and 140 perch were collected during spring fyke netting (SN1). No perch were aged from the 2024 survey.

Bluegill

A total of 654 bluegill was collected during the 2024 survey: 43 from the SE2 electrofishing survey, 405 during SN1 spring fyke netting, and 206 throughout the SN3 summer panfish netting. Bluegill ranged in length from 2 to 8 inches during the SE2 electrofishing survey and averaged 5 inches (Figure 7). Electrofishing CPUE declined from 76/mile in 2016 to 39/mile in 2024 which is below the 25th percentile CPUE for lakes within its classification (complex, warm, clear; Figure 8). Bluegill PSD and RSD^P from the electrofishing sample was not calculated due to the small sample size (< 50 individuals).

A total of 206 bluegill was collected during the SN3 summer fyke netting survey (Figure 9). Bluegill averaged 6 inches and CPUE increased from 8 bluegill/NN in 2016 to 11/NN in 2024.

A subsample of 34 bluegill was aged from 3 to 9 years old. Bluegill growth improved between 2016 and 2024 but was still average compared to the mean length at age in northern Wisconsin and for lakes within its class (Figure 10). Bluegill were reaching 6 inches in length by age 5 (Figure 10).

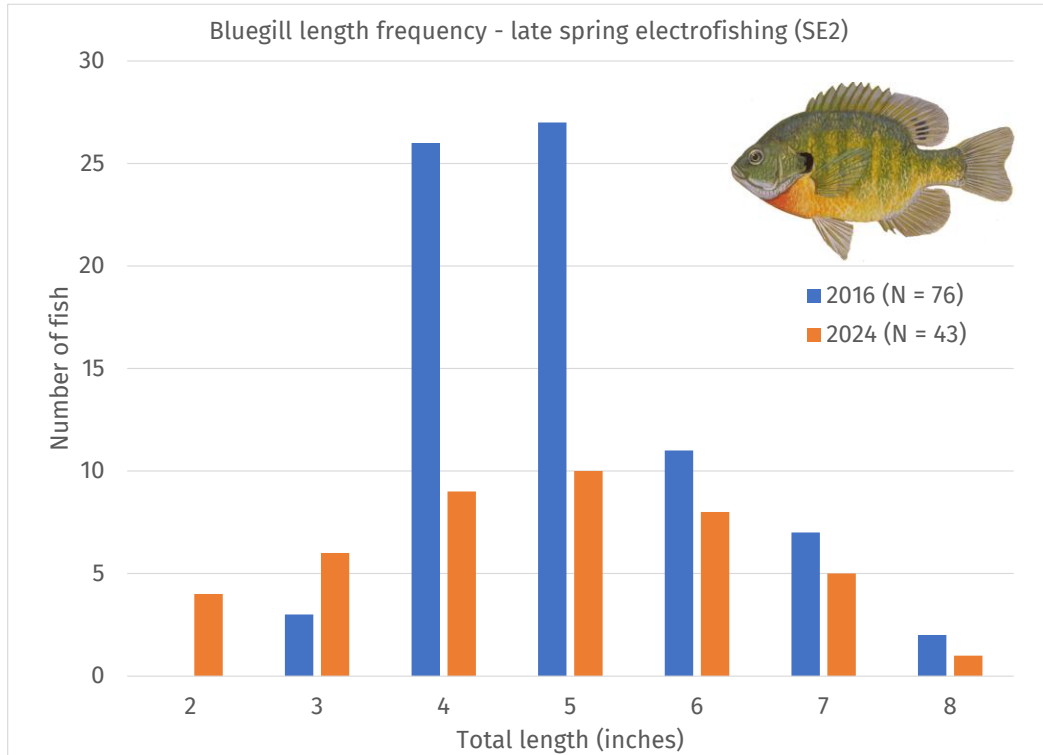


Figure 7. Length frequency of bluegill collected during SE2 electrofishing on Bass Lake, Oconto County, WI.

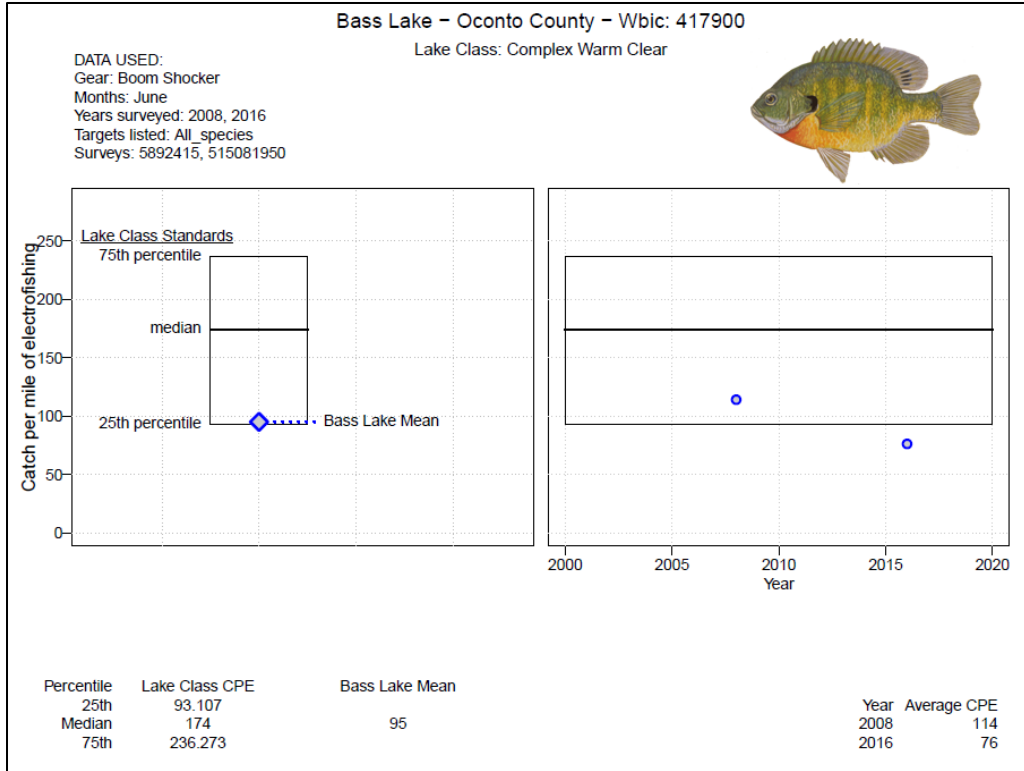


Figure 8. Lake classification bluegill electrofishing CPUE for Bass Lake, Oconto County, WI.

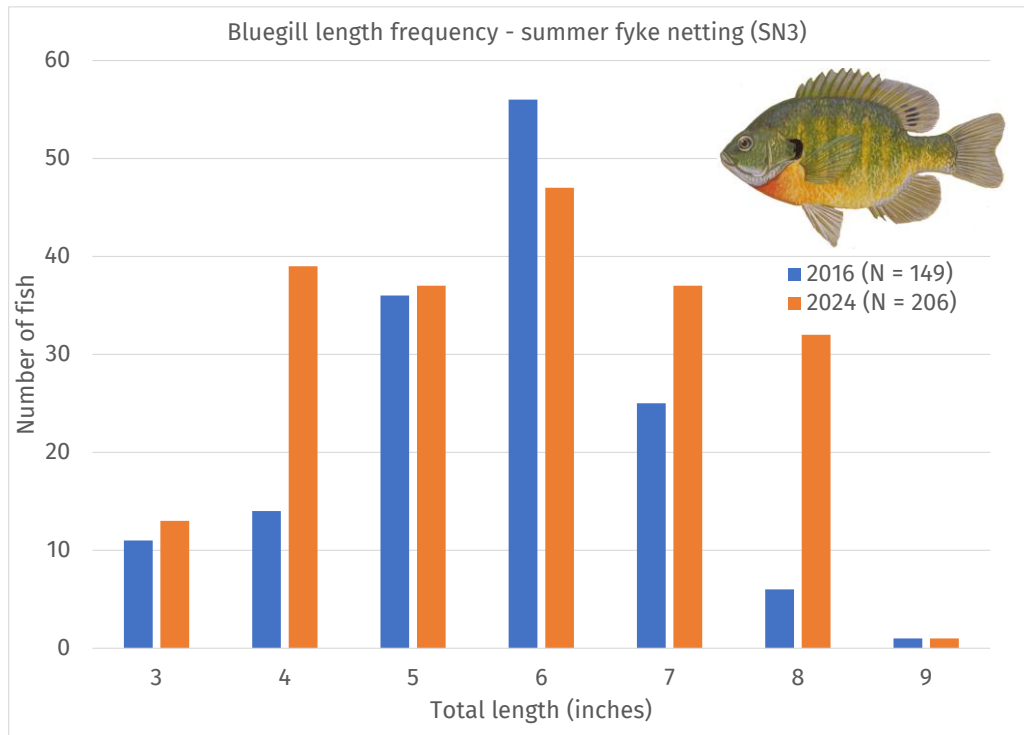


Figure 9. Length frequency of bluegill collected during summer fyke netting (SN3) on Bass Lake, Oconto County, WI.

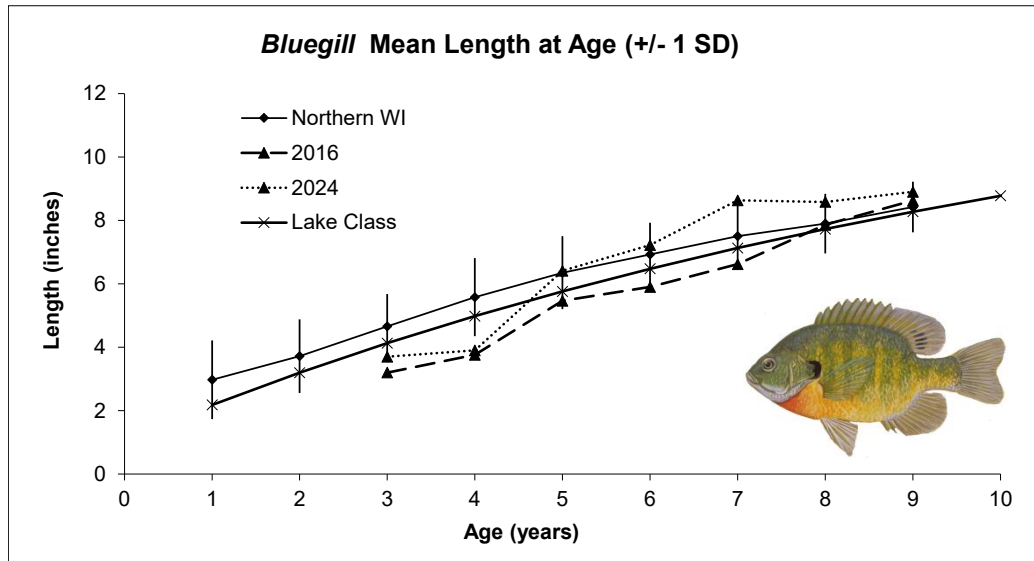


Figure 10. Mean length at age of bluegill from Bass Lake, Oconto County, WI.

Largemouth bass

Largemouth bass were the third most abundant predator species collected during the 2024 survey (Table 3). Overall, 112 largemouth bass were collected during the SE2 electrofishing survey and ranged in length from 9 to 19 inches and averaged 14 inches (Figure 11). PSD increased from 57 to 86 and RSD^p increased from 8 to 34 between the 2016 and 2024 surveys. Electrofishing CPUE increased from 29 bass/mile in 2016 to 43 bass/mile in 2024. This is higher than the median CPUE (26 bass/mile) for lakes within its class but slightly lower than the average bass CPUE for Bass Lake (49 bass/mile; Figure 12).

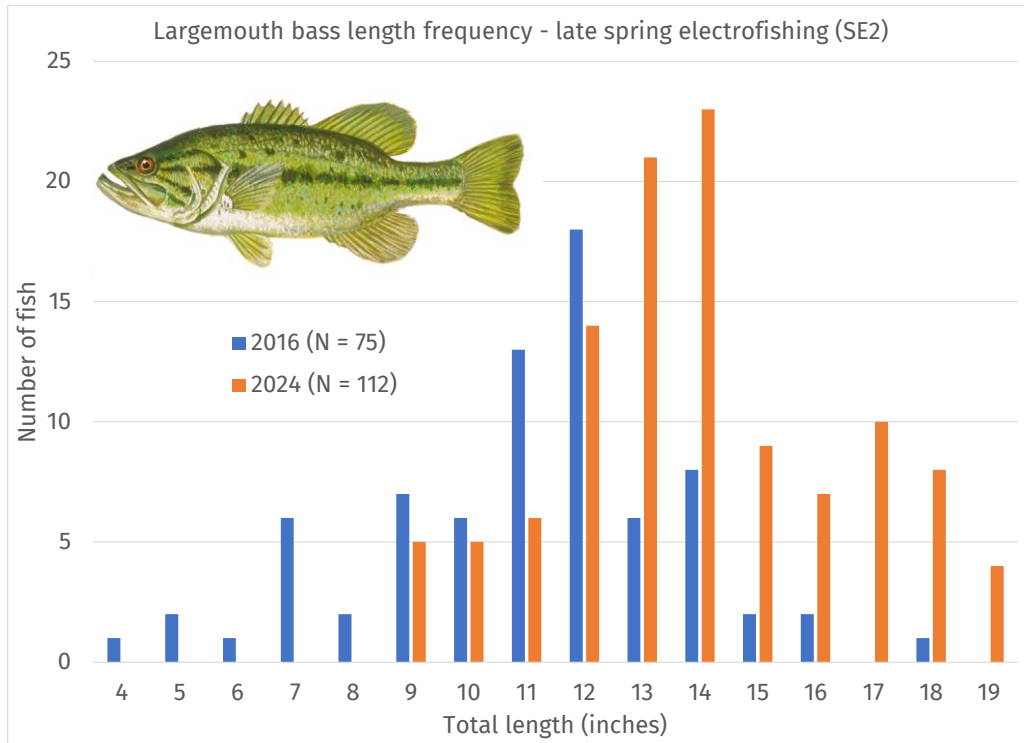


Figure 11. Length frequency of largemouth bass collected during 2016 and 2024 SE2 electrofishing surveys from Bass Lake, Oconto County, WI.

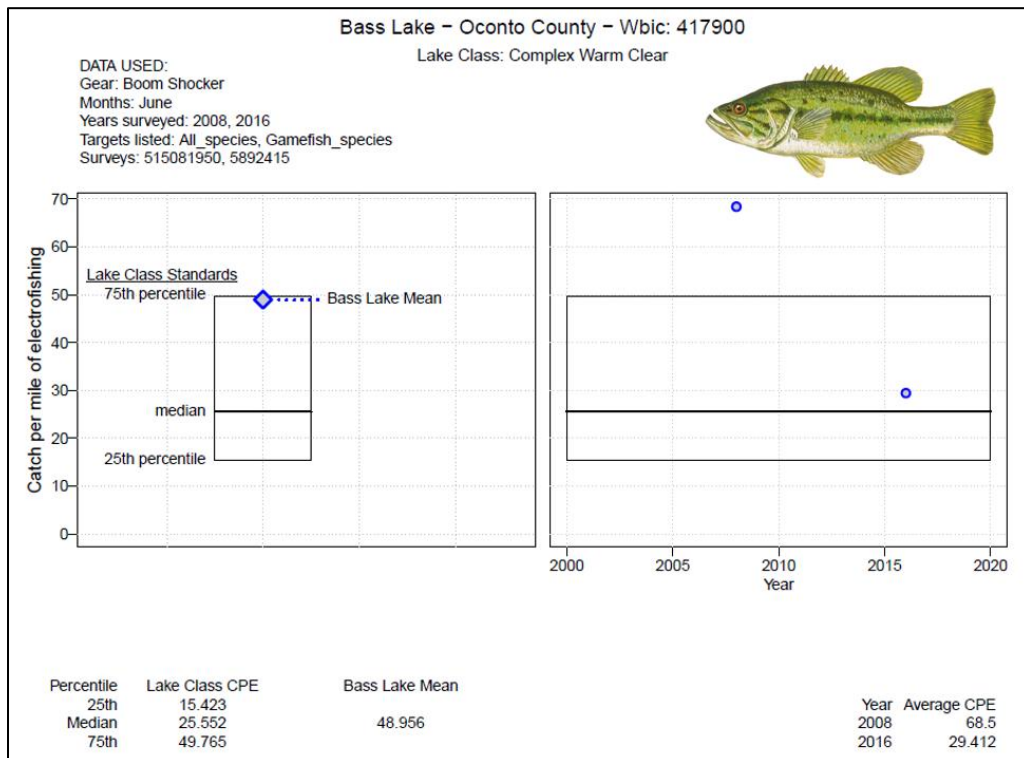


Figure 12. Lake classification largemouth bass electrofishing CPUE for Bass Lake, Oconto County, WI.

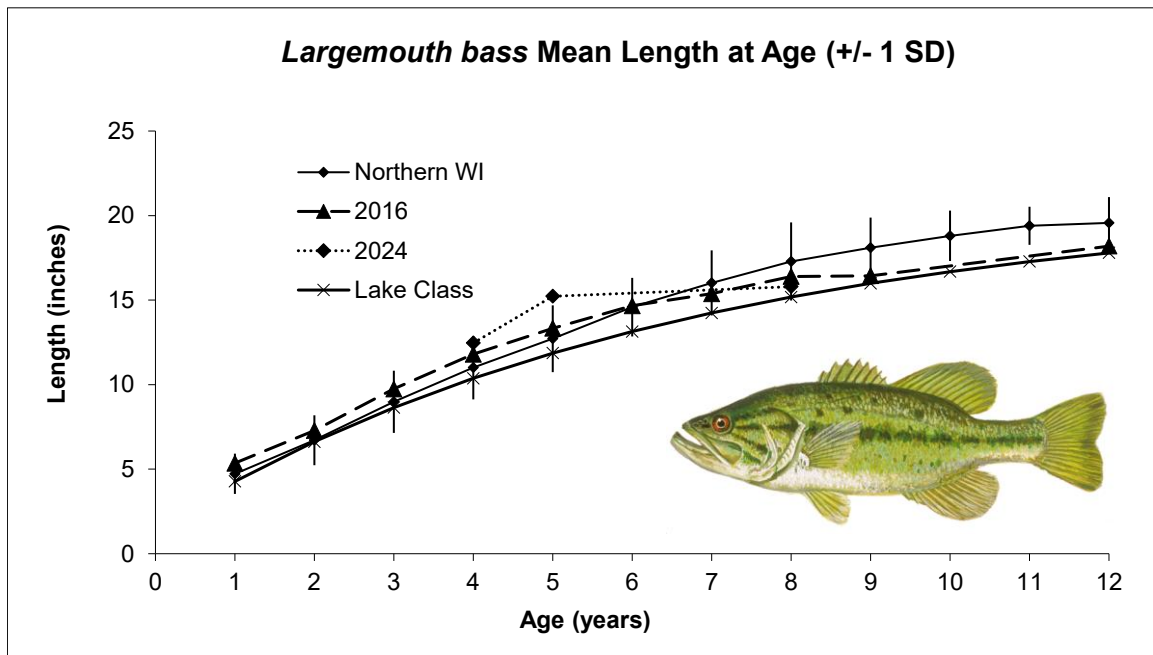


Figure 13. Mean length at age of largemouth bass from Bass Lake, Oconto County, WI.

A subsample of 19 largemouth bass was aged using scales (<12”) and dorsal spines (>12”). Ages ranged from 4 to 8 years old. Largemouth bass growth was average at all ages compared to the mean length at age of largemouth bass in northern Wisconsin and for lakes within its class (Figure 13). Largemouth bass were reaching 14 inches by age 5.

Conclusions and Recommendations

Large fingerling walleye stocking was initiated in 2013 at the rate of 10/acre in alternate years (Table 2). Adult walleye density improved slightly between 2016 and 2024 and is meeting the established goal of 1.5 adults/acre. A total of 56NN of netting effort occurred in 2016 compared to 116 NN in 2024. The extra netting effort in 2024 attributed to the decline in CPUE from 3.9 to 2.6 walleye/NN. Walleye size structure is good and 60% of the walleye collected were harvestable-sized (18 inches or larger; Figure 1). Natural reproduction is not occurring despite the addition and renovation of a walleye spawning reef. However, walleye stocking at the rate of 10 large fingerlings / acre should continue since adult density is satisfactory.

Fyke netting CPUE for northern pike increased significantly between 2016 and 2024. In 2016, only 4 northern pike were collected compared to 120 in 2024 (Figure 4). One explanation for the increased catch of pike between netting surveys could simply be timing. In 2016, spring fyke netting began on April 18th and was

completed by April 27th whereas in 2024, spring fyke netting started on March 27th and concluded April 13th. The largest pike collected was 41 inches long (Figure 14)! Pike abundance is in line with what should be expected from lakes within the complex, warm, clear lake class (Figure 5).



Figure 14. Fisheries technician Cory Wienandt with a 41-inch northern pike on Bass Lake, Oconto County, WI.

Based on the results from the SE2 electrofishing (39/mile), bluegill abundance has declined since the last survey. The average electrofishing CPUE for Bass Lake from the 2008 and 2016 surveys is 95 bluegill/mile (Figure 8). However, in 2016 the SE2 survey was conducted June 15th versus May 20, 2024. It's unclear if the timing of the survey affected the electrofishing results but summer panfish netting (SN3) CPUE increased from 8/NN in 2016 to 11/NN in 2024. The SN3 survey was more reflective of the adult population because smaller, juvenile bluegill are not collected in large numbers using fyke nets. Ultimately the bluegill population is stable and no change in the fishing regulation is recommended.

Largemouth bass abundance and size structure both improved between 2016 and 2024. Most notably, the number of largemouth bass over 15 inches in the sample increased over 25% between the 2016 and 2024 surveys (Figures 11 & 15). The increase in abundance does not appear to have impacted growth (Figure 13). Additionally, bass abundance does not appear to have impacted the survival or recruitment of stocked walleye to the fishery. Therefore, no regulation change is recommended despite the increase in abundance.



Figure 15. Senior Fisheries Biologist Chip Long and Fisheries Team Supervisor Adam Nickel with two largemouth bass collected on Bass Lake, Oconto County, WI.

The next comprehensive fisheries survey (spring fyke netting, SE1 electrofishing, summer panfish fyke netting, SE2 electrofishing, and fall electrofishing) of Bass Lake is scheduled for 2032 and will focus on the age, growth, abundance, and recruitment of the dominant gamefish. Access to Bass Lake is available to anglers from the National Forest boat landing and offers ample parking. The National Forest also owns and operates a beach and restroom facilities adjacent to the boat landing. Shore fishing opportunities are limited at both locations. Boaters are reminded to remove all vegetation from their boat and trailer before leaving to limit the spread of invasive species. A map of Bass Lake can be found at the following internet address; <http://dnr.wi.gov/lakes/maps/DNR/0417900a.pdf>

Literature Cited

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