

Twenty-Six Lake Fishery Survey, Burnett County, Wisconsin

2012

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Executive Summary

A comprehensive survey of Twenty-Six Lake (Burnett County) was conducted during 2012 by the Wisconsin Department of Natural Resources. The primary objective of this survey was to assess the status of largemouth bass, muskellunge, and panfish populations in Twenty-Six Lake.

Largemouth bass catch rates were very high in the 2012 survey, exceeding 99% of surveys on similar waterbodies. Growth rates and size structure of largemouth bass were very poor. The bluegill population was found to be high density but with poor size structure. Muskellunge were average density; though catch rates of adult fish declined since the previous survey in 2006.

Management recommendations include: 1) Maintain largemouth bass as the primary gamefish in Twenty-Six Lake and continue with the no minimum size limit, 2) Monitor impacts of liberalized bass regulations on bluegill populations, 3) Continue providing liberal harvest opportunities for northern pike, 4) Consider modifying muskellunge stocking requests, 5) Protect and enhance critical fish habitat, 6) Continue efforts to maintain and enhance habitat diversity whenever possible, and 7) Continue exotic species monitoring and control programs.

Introduction

Twenty-Six Lake is a hard water drainage lake in north central Burnett County. The lake's shoreline is primarily privately owned and well developed. Twenty-Six Lake is 218 acres with a maximum depth of 45 feet and mean depth of 20 feet. It has an inlet flow from Twenty-Six Lake Springs and an outlet to Loon Creek, Burnett County. Invasive species present in Twenty-Six Lake include Chinese mystery snail.

Twenty-Six Lake is a clear water, mesotrophic lake. TSI is an index for evaluating trophic state or nutrient condition of lakes (Carlson 1977; Lillie et. al. 1993). TSI values can be computed for water clarity (secchi disk measurements), chlorophyll-a, and total phosphorus values. TSI values represent a continuum ranging from very clear, nutrient poor water (low TSIs) to extremely productive, nutrient rich water (high TSIs). The data on Twenty-Six Lake (WDNR (online) 2012) indicate the nutrient conditions were mesotrophic (moderate productivity) when considering secchi disk, total phosphorus and chlorophyll-a TSI indices. Between 2001 and 2012, the mean secchi TSI value was 40.75 (S.D. = 2.12) from samples taken near the deep hole of Twenty-Six Lake.

Gamefish species present in Twenty-Six Lake include largemouth bass Micropterus salmoides, muskellunge Esox masquinongy, and northern pike Esox lucius. Panfish species include bluegill Lepomis macrochirus, black crappie Pomoxis nigromaculatus, pumpkinseed L. gibbosus, yellow perch Perca flavescens, and rock bass Ambloplites rupestris. Other fish species in Twenty-Six Lake include bowfin Amia calva, cisco Coregonus artedj, and white sucker Catostomus commersoni.

Recent fisheries management activities on Twenty-Six Lake have focused on fish stocking, sport angler regulations, and fish surveys. Since 1997, muskellunge have been the only fish species stocked into Twenty-Six Lake (Appendix Table 1). During this survey, all of the standard statewide fishing regulations applied to Twenty-Six Lake, except for a no minimum length limit on black bass (Appendix Table 2). Recent fisheries surveys were conducted in

2001, 2006, and 2012. The objective of this study was to assess the status of muskellunge, largemouth bass, and panfish populations on Twenty-Six Lake.

Methods

Twenty-Six Lake was surveyed during 2012 following Wisconsin Department of Natural Resources lake monitoring protocol. Spring sampling utilized fyke nets and electrofishing to assess gamefish and panfish populations.

The first phase of the survey was initiated soon after ice out with fyke nets (4 x 5 ft frame) set on 23 March. Nets were checked daily and set at areas expected to contain high concentrations of spawning muskellunge. Nets were removed on 29 March, with a total effort of 36 net nights. All muskellunge captured were measured to the nearest 0.5 in and given an RP (adults) or RV (juveniles) clip. Sex was determined by the presence of gametes.

Sampling targeting largemouth bass and panfish was conducted on 21 May. Largemouth bass were sampled over the entire shoreline. Panfish were sampled in two, 1/2 mile index stations (Figure 1).

For age analysis, scale samples were removed from largemouth bass less than 12 in, while dorsal spines were removed from larger fish. Muskellunge age determinations were not included in this report due to low accuracy in interpreting scale annuli for muskellunge 3-10 years of age (Fitzgerald et al. 1997).

Mean length-at-age comparisons were made to regional (18 county Northern Region) and statewide data using the WDNR Fish and Habitat statewide database. Mean length at age was used to assess growth for largemouth bass using the following von Bertalanffy equation:

$$l_t = L_{\infty}(1 - e^{-K(t-t_0)})$$

Where l_t is length at time t , L_{∞} is asymptotic length, K is a growth parameter, t is age in years, and t_0 is the age at which l_t is zero (Van den Avyle and Hayward 1999). L_{∞} predicts the average ultimate length attained for fish in that population.

Size structure quality of species sampled was determined using the indices proportional (PSD) and relative (RSD) stock densities (Anderson and Gutreuter 1983). The PSD and RSD value for a species is the number of fish of a specified length and longer divided by the number of fish of stock length or longer, the result multiplied by 100 (Appendix Table 3).

Catch per Unit Effort (CPE) was calculated as the number of fish captured above stock, preferred, and quality sizes divided by the appropriate unit of sampling effort for that species. That value was then compared to surveys of similar waterbodies throughout Wisconsin using the Fisheries Assessment Classification Tool (FACT) to determine how that value compared to other fisheries. For example, in Table 1, CPE8 was calculated by dividing the number of largemouth greater than 8 in captured during late spring electrofishing divided by the number of miles surveyed (80.3 fish/mile). This value exceeded 99 percent of surveys of similar waterbodies in Wisconsin.

Results

Largemouth bass. The mean length of largemouth bass collected during the 21 May 2012 survey on Twenty-Six Lake was 9.5 in (S.D. = 2.4), with a range of 3.2-17.7 in (Figure 2). A total of 305 largemouth bass ≥ 8.0 in (80.3/mile) were collected during that survey, which was greater than 99% of surveys in similar Wisconsin waterbodies (FACT). PSD and RSD-14 (16,2) in 2012 were similar to previous surveys (Table 1).

Largemouth bass growth rates were below statewide averages and similar to those found in the 2006 survey (Figure 3). Mean ultimate length from the von Bertalanffy growth equation was 17.1 in (Figure 4).

Panfish. A total of 585 bluegills (mean length = 4.6, S.D. = 1.9) were captured during the 21 May sampling on Twenty-Six Lake (Figure 5). CPE3 (428 bluegill/mile) was greater than 98% of similar surveys of Wisconsin waterbodies. The PSD value of 44 was greater than four percent

of statewide surveys. Low numbers of other panfish species were also collected during this survey (Table 2).

Muskellunge. A total of 25 adult muskellunge (mean length = 37.5, S.D. = 3.5) and two juveniles were captured during the spring 2012 survey (Figure 6). The adult muskellunge catch rate of 0.69 fish/net night exceeded 56% of surveys on similar Wisconsin waterbodies. During a similar survey of Twenty-Six Lake in 2006, adult muskellunge catch rates averaged 1.3 fish/net night.

Given the low number of fish captured in 2012, plans for a population estimate were cancelled. A muskellunge survey conducted in 2006 and 2007 estimated the adult population at 77 fish (0.34 fish/acre).

Discussion

The composition of the sport fishery in Twenty-Six Lake has not undergone substantial changes in the past 30 years. Centrarchid densities appear to have increased in recent years and currently dominate the sport fishery with relatively low numbers of esocids. Increasing centrarchid abundance has been observed on other regional lakes (Benike 2005a; Benike 2005b, Benike 2005c, Benike 2006, Toshner 2009, Benike 2010).

In 2010, a no minimum length limit for black bass on Twenty-Six Lake replaced the standard statewide 14 in minimum length limit. The intent of this regulation change was to improve largemouth bass size structure and allow greater harvest opportunity for anglers. After two years of increased angler harvest opportunity, largemouth bass densities increased slightly since the previous survey in 2006 and remained at very high levels. Growth rates for largemouth bass were also very poor in the 2012 survey.

Similar to largemouth bass, the bluegill population is also very high density with poor size structure. Impacts of liberalized black bass regulations should also examine impacts to bluegill populations. Largemouth bass CPE has been found to be positively correlated with

bluegill PSD (Guy and Wills 1990). Also, Gabelhouse (1987) found largemouth bass PSD values between 20-40 maximized production of large bluegill.

The muskellunge population on Twenty-Six Lake is at average densities. However, catch rates in 2012 were lower than in the previous survey in 2006. Reductions in survival and growth of stocked muskellunge have been found in centrarchid-dominated communities (Wahl 1999). Recent increases in centrarchid densities on Twenty-Six Lake may be impacting muskellunge densities by reducing abundance of preferred forage items such as yellow perch and sucker (Bozek et al. 1999). If still present in Twenty-Six Lake, cisco may be an important forage item for muskellunge.

Good to excellent natural reproduction supports all fish communities in Twenty-Six Lake except muskellunge, which have been stocked regularly since first being introduced in 1938. Muskellunge stocking rates have varied between 0.5 and 1.1 fish/acre since 1998. Given the high densities of centrarchid species in Twenty-Six Lake, consideration should be given to utilizing yearling or similar sized stocked muskellunge to improve survival.

Northern pike appear to be low density on Twenty-Six Lake. In 2006, only 20 northern pike were captured during spring fyke netting (0.4/net night). Fish captured ranged in length from 10-27 inches (mean length 21.1 in, S.D = 4.6). A 1987 survey estimated the northern pike population ≥ 14 in at 1,465 fish, suggesting a much higher density than in 2006.

Conclusions and Management Recommendations

1. Largemouth bass are the primary sport fish on Twenty-Six Lake. Relative abundance of largemouth bass has increased in recent years and is very high density. The no minimum length limit provides increased angler harvest opportunity for this high density population and should be continued.

2. Bluegill were high density on Twenty-Six Lake with poor size structure. Potential impacts to the bluegill population with changes in largemouth bass densities should be evaluated.
3. Continue providing liberal harvest opportunities for northern pike.
4. Muskellunge are at average densities. Consideration should be given to modifying the number of muskellunge stocked and/or the size of fish stocked in Twenty-Six Lake to enhance survival. Since their introduction in 1938 Twenty-Six Lake has been a destination for muskellunge anglers.
5. Critical fish habitat in Twenty-Six Lake needs to be protected and enhanced where possible. Efforts should be made to work with the Twenty-Six Lakes Association and local angler groups stressing the importance of protecting critical habitat and water quality.
6. Efforts to increase habitat complexity in Twenty-Six Lake should be strongly encouraged. Input of coarse woody debris, protection of aquatic vegetation, and maintenance or restoration of 35 foot vegetative buffers are some examples of work that can increase habitat complexity.
7. Exotic species monitoring and control programs should continue. Efforts to keep aquatic invasive species out of a waterbody are much more effective than controlling these species once they are established.

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Table 1. Largemouth bass PSD and RSDP values and catches per mile from fish collected during spring electrofishing assessments on Twenty-Six Lake, Burnett County. CPEx was calculated as the number of fish captured above stock, preferred, and quality sizes divided by the number of miles sampled during the survey. The numbers in parentheses refers to the percentage of surveys of similar waterbodies in Wisconsin below the value for that survey as calculated from the FACT database.

Parameter	2012	2006	2001
PSD (percentile)	16.3 (2)	14.0 (1)	16.7 (2)
RSD14 (percentile)	1.9 (8)	1.4 (8)	3.6 (10)
CPE8 (percentile)	80.3 (99)	72.0 (98)	44.2 (86)
CPE12 (percentile)	13.2 (71)	9.2 (58)	7.4 (51)
CPE15 (percentile)	1.1 (25)	0.1 (6)	0.5 (14)

Table 2. Summary of rock bass, pumpkinseed, and black crappie captured during 2012 spring electrofishing assessments on Twenty-Six Lake, Burnett County.

Species	Mean Length	CPE
Rock bass	5.0	20
Pumpkinseed	6.8	12
Black crappie	9.7	5

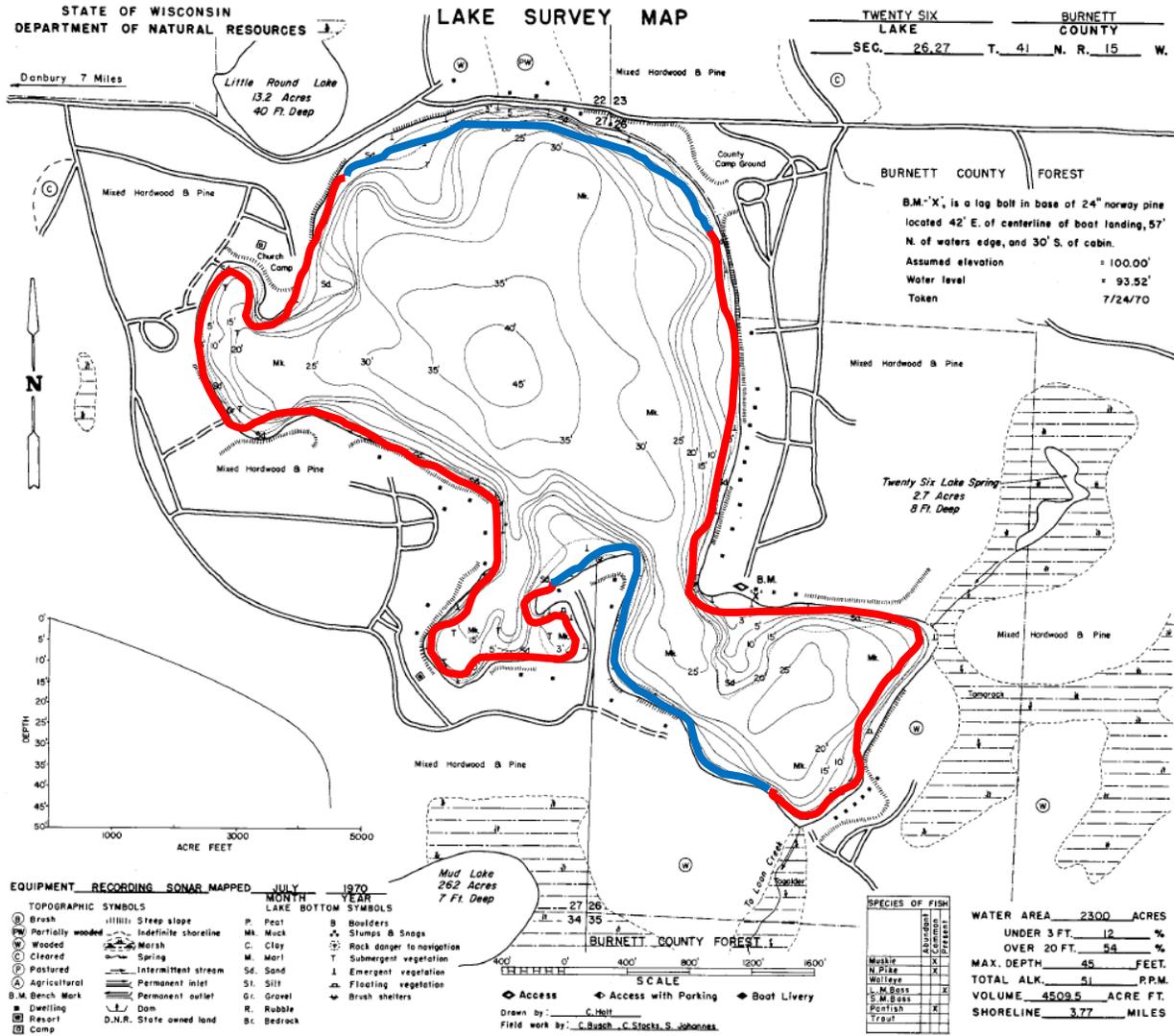


Figure 1. Map depicting stations surveyed on Twenty-Six Lake on 21 May 2012. Shoreline outlined in blue identify the ½ mile index stations where largemouth bass and panfish were collected. Only largemouth bass were collected along shoreline outlined in red.

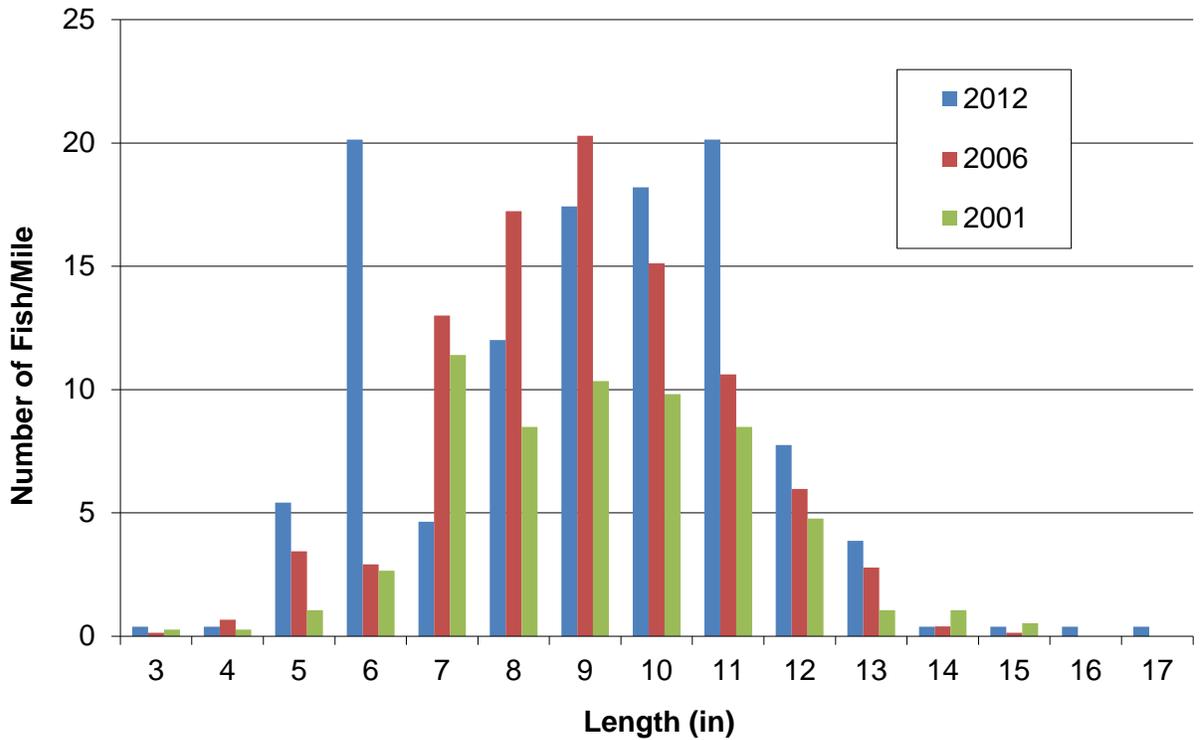


Figure 2. Number of largemouth bass captured per mile of shoreline in Twenty-Six Lake, Burnett County, Wisconsin, during spring 2012, 2006, and 2001 surveys.

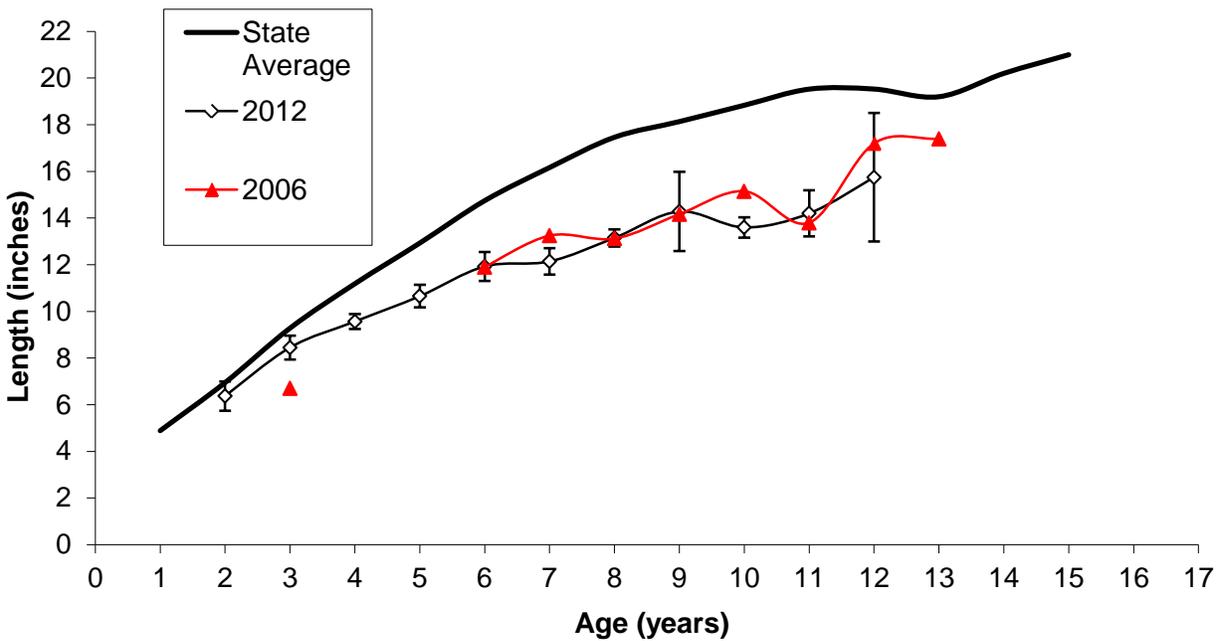


Figure 3. Mean lengths at age (\pm one standard deviation) for largemouth bass captured during spring surveys on Twenty-Six Lake, Burnett County, Wisconsin. Statewide averages are displayed for comparison.

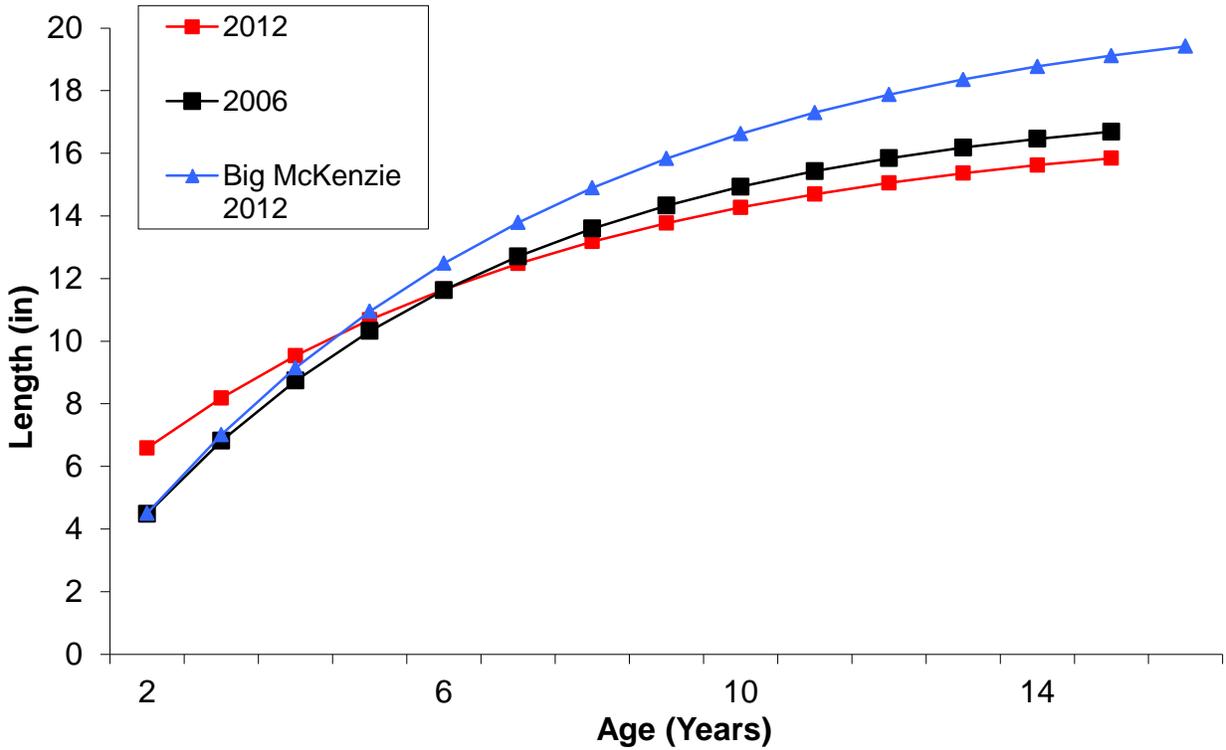


Figure 4. von Bertalanffy growth curves for largemouth bass captured during spring 2012 and 2006 surveys on Twenty-Six Lake, Burnett County, Wisconsin and spring 2012 survey on Big McKenzie Lake, Burnett County for comparison.

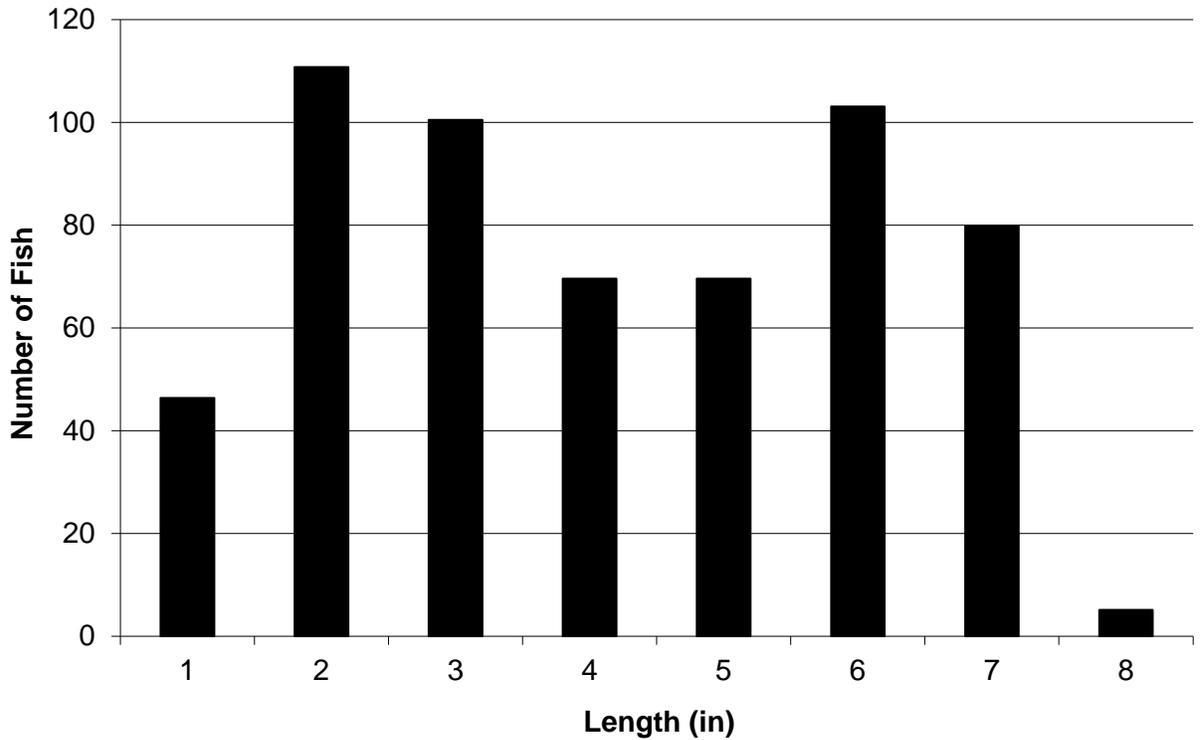


Figure 5. Length frequency of bluegill captured during spring 2012 survey on Twenty-Six Lake, Burnett County, Wisconsin (N=585).

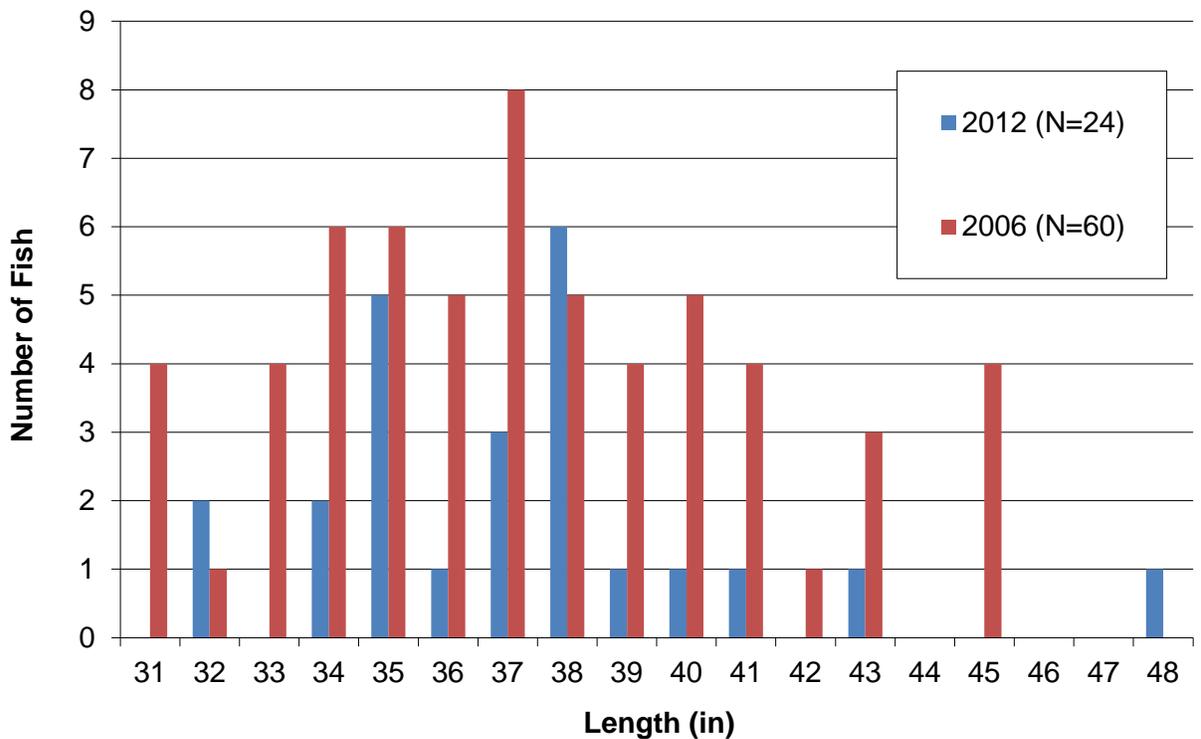


Figure 6. Length frequency of muskellunge captured in Twenty-Six Lake, Burnett County, Wisconsin, in spring 2012 and 2006 surveys.

Appendix Table 1. Fish stocking records for Twenty-Six Lake, Burnett County, Wisconsin, since 1998.

Year	Species	Number Fish Stocked	Mean Fish Length (in)
1999	Muskellunge	250	11
2001	Muskellunge	250	10
2003	Muskellunge	228	11
2005	Muskellunge	184	12
2007	Muskellunge	123	12
2009	Muskellunge	230	9
2011	Muskellunge	230	10

Appendix Table 2. General Fishing Regulations for Twenty-Six Lake, Burnett County, Wisconsin, in 2012.

Fish Species	Open Season	Daily Limit	Minimum Length
Walleye	May 05-March 03	2	18"
Largemouth and Smallmouth Bass	May 05-March 03	5	NONE
Muskellunge	May 26-November 30	1	40"
Northern Pike	May 05-March 03	5	NONE
Panfish	Open Season Year Round	25	NONE

Appendix Table 3. Values used in proportional and relative stock density calculations.

Fish Species	Stock Size (in)	Quality Size (in)	Preferred Size (in)
Largemouth Bass	8	12	15
Bluegill	3	6	8