Big McKenzie Lake Fishery Survey, Burnett County, Wisconsin

2012

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Executive Summary

A comprehensive survey of Big McKenzie 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 sport fish populations in Big McKenzie Lake. A secondary objective was to assess impacts to fish densities and population demographics following recent sport angler regulation changes.

The 2012 adult walleye population estimate on Big McKenzie Lake (0.5 fish/acre) was much lower than both Burnett County and Northwest Wisconsin averages. Growth rates for both male and female walleyes exceeded regional averages. Catch curve analysis estimated adult walleye mortality at 18%. Catch rates of YOY walleye have been very low in both stocked and non-stocked year surveys. Largemouth bass catch rates were lower than in the 2007 survey but still above average. Mean lengths of largemouth bass age 4-7 were greater than previous surveys. The bluegill population was found to be high density but with poor size structure. However, catch rates of bluegills greater than 7 in were higher than in the 1996 survey. Muskellunge were very low density, with only 31 fish greater than 24 in captured during the 2012 survey. Northern pike size structure improved since the previous survey.

Management recommendations include: 1) Maintain largemouth bass as the primary gamefish in Big McKenzie Lake and continue with the no minimum size limit, 2) Monitor impacts of liberalized bass regulations on bluegill populations, 3) Focus walleye stocking efforts on large fingerlings and consider discontinuing walleye stocking if survival is poor, 4) Consider modifying or eliminating muskellunge stocking requests, 5) Continue consumptive opportunities for northern pike, 6) Protect and enhance critical fish habitat, 7) Continue efforts to maintain and enhance habitat diversity whenever possible, and 8) Continue exotic species monitoring and control programs.

Introduction

Big McKenzie Lake is a hard water drainage lake in east central Burnett County. The lake's shoreline is primarily privately owned and well developed. Big McKenzie Lake is 1,129 acres with a maximum depth of 71 feet and mean depth of 19 feet. Big McKenzie Lake forms the headwaters of Big McKenzie Creek through the outlet on the north end of the lake that allows fish movement to Middle McKenzie Lake.

Big McKenzie 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 Big McKenzie Lake (WDNR (online) 2012) indicate the nutrient conditions were mesotrophic (moderate productivity) when considering secchi disk, total phosphorus and chlorophyll-a TSI indices. Between 1987 and 2011, the mean secchi TSI value was 44.52 (S.D. = 3.26) from samples taken near the deep hole of Big McKenzie Lake.

Gamefish species present in Big McKenzie Lake include largemouth bass Micropterus salmoides, smallmouth bass M. dolomieui, walleye Sander vitreus, 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 rubestris. Other fish species common in Big McKenzie Lake include bowfin Amia calva, common carp Cyprinus carpio, and white sucker Catostomus commersoni.

Recent fisheries management activities on Big McKenzie Lake have focused on fish stocking and sport angler regulations. Since 1997, walleye and muskellunge have been the only fish species stocked into Big McKenzie Lake (Appendix Table 1). During this survey, all of

the standard statewide fishing regulations applied to Big McKenzie Lake, except for an 18 in minimum size limit on walleye and no minimum length limit on black bass (Appendix Table 2).

Numerous surveys primarily targeting walleyes have been conducted by Wisconsin DNR and Great Lakes Indian Fish and Wildlife Commission in recent years. Since 1990, 21 fall surveys assessing juvenile walleye recruitment have been conducted on Big McKenzie Lake by either Great Lakes Indian Fish or Wildlife Commission or Wisconsin Department of Natural Resources staff. The only years Big McKenzie Lake was not assessed for juvenile walleye recruitment were 1993 and 2004. More comprehensive surveys were conducted in 1981, 1990, 1996, and 2007. The primary objective of this study was to assess the status of the sport fish populations on Big McKenzie Lake. A secondary objective was to assess changes to fish densities and demographics following recent sport angler regulation changes.

Methods

Big McKenzie 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. Summer mini-fyke netting was used to sample juvenile and nongame fish species. Fall electrofishing targeted young of year (YOY) walleye.

The first phase of the survey was initiated soon after ice out with fyke nets (4 x 5 ft frame) set on 25 March. Nets were checked daily and set at areas expected to contain high concentrations of spawning muskellunge, northern pike and walleye. Nets were removed on 02 April, with a total effort of 63 net nights. After removal of nets, the entire shoreline of Big McKenzie Lake was sampled with an electrofishing boat on 02 April for the recapture run.

Sampling targeting largemouth bass, smallmouth bass, and panfish was conducted on 14 May. Both bass species were sampled over three, two-mile index stations. A 1/2 mile index station was embedded in each station where panfish were collected in addition to bass.

All walleyes, muskellunge, northern pike, and largemouth bass captured during the spring portion of the survey were measured to the nearest 0.5 in and given the appropriate fin clip (Appendix Table 3). Sex was determined for walleyes, muskellunge, and northern pike by the presence of gametes.

Four mini-fyke nets (3 x 3 ft frame) were set on 07 August and run for one night. Juvenile and nongame fish species were targeted during this survey. Exclusion panels on the front frame of the nets were used to exclude larger fish and turtles.

The final component of the on-the-water sampling consisted of a fall electrofishing run on 20 September. During this survey, only walleye <12.0 in and muskellunge <20.0 in were targeted and collected over the entire shoreline.

For age analysis, scale samples were removed from walleyes and largemouth bass less than 12 in, while dorsal spines were removed from larger walleyes and largemouth bass. 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). Age interpretations on northern pike were not conducted due to the unreliability and difficulty of determining annuli. Casselman (1990) found this to be due to irregular growth and resorption or erosion on the midlateral region.

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 walleye and largemouth bass using the following von Bertalanffy equation:

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

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. Assuming dimorphic

separation of length at age, growth equations were calculated separately for male and female walleye.

The descending limb of a catch curve regression was used to estimate total annual mortality (Ricker 1975). As aging materials were not taken for all fish, an age-length key was used to assign a sample age distribution.

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 4).

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 is then compared to surveys of similar waterbodies throughout Wisconsin using the Fisheries Assessment Classification Tool (FACT) to determine how that value compares to other fisheries. For example, in Table 2, CPE8 is calculated by dividing the number of largemouth greater than 8 in captured during late spring electrofishing divided by the number of miles surveyed (28 fish/mile). This value was greater than 68 percent of surveys of similar waterbodies in Wisconsin.

Results

Walleye. The 2012 adult walleye population on Big McKenzie Lake was estimated at 609 fish (CV = 0.32), the lowest estimated abundance of any previous survey (Figure 1). This estimated density (0.5 fish/acre) was lower than both the Burnett County and Northwest Wisconsin averages of 2.5 and 2.7 fish/acre, respectively (WDNR unpublished data). This density was also below the average density of other ceded territory walleye lakes where stocking was the primary source of recruitment (1.9 fish/acre).

Adult walleyes captured in the spring 2012 survey ranged from 12.5 to 28.4 in (Figure 2). Mean lengths of male and female walleyes were 19.3 (S.D. = 1.8) and 23.5 in (S.D. = 2.3), respectively. All female walleyes captured in the 2012 survey were longer than the 18 in minimum size limit. Modal length of adult walleyes increased from 14 in to 19 in during the 1996 and 2012 surveys, respectively (Figure 3). The proportional stock density (PSD) and relative stock density of preferred size (RSDP) walleyes captured during spring fyke netting was 94.9 and 51.4, respectively. Compared to similar Wisconsin waterbodies (FACT), these values exceeded 77% of surveys for PSD and 90% of surveys for RSDP.

Growth rates for both male and female walleyes on Big McKenzie Lake exceeded regional averages (Figures 4 and 5). The von Bertalanffy growth curve for female and male walleyes in the 2012 Big McKenzie Lake survey had the largest and smallest mean maximum sizes, respectively (Figures 6 and 7). Catch curve analysis estimated annual mortality of Big McKenzie Lake adult walleye at 18.3% (Figure 8). This estimate of survival was similar to the previous estimate in 2007 and much lower than the 1996 estimate (Table 1).

The average catch rate of Young of Year (YOY) walleye in surveys conducted by both Great Lakes Indian Fish and Wildlife Commission and Wisconsin DNR crews between 1995 and 2012 was 1.9 fish/mile (S.D. = 2.3, N = 17; (Figure 9)). YOY catch rates in years with no walleye stocking averaged 0.5 fish/mile (S.D. = 0.48, N = 6) compared to 2.6 fish/mile (S.D. = 2.61, N = 11) in years where small fingerling walleyes were stocked. Catch rates of walleye less than 10 in averaged 1.6 fish/mile from 2000-2012, greater than 21% of similar surveys statewide (FACT).

Largemouth bass. The mean length of largemouth bass collected during the 14 May 2012 survey on Big McKenzie Lake was 10.7 in (S.D. = 2.7), with a range of 8.0-16.4 in (Figure 10). A total of 169 largemouth bass $\geq$ 8.0 in (28.2/mile) were collected during that survey, which was greater than 68% of surveys in Wisconsin (FACT). PSD and RSD-14 were lower in 2012 than in any previous survey (Table 2).

Largemouth bass growth rates were similar to statewide averages up to six years (Figure 11). Older aged largemouth bass had growth rates below statewide averages. Mean ultimate length from the von Bertalanffy growth equation was 16.9 in (Figure 12).

Northern pike. A total of 71 northern pike, ranging in length from 9-37 in were captured during 2012 spring fyke netting surveys (Figure 13). Mean lengths of male and female northern pike captured in 2012 were 20.9 in (S.D. = 2.4) and 24.1 in (S.D. = 4.2), respectively. PSD and RSDP values for northern pike sampled during spring netting were both higher in 2012 than in the 1996 survey (Table 3). Though calculated from a relatively small sample, catch rates in 2012 were higher for northern pike greater than 28 in than in the 1996 survey (Table 3).

Panfish. A total of 282 bluegills $\geq$ 3.0 in (mean length = 5.2, S.D. = 1.3) were captured during the 14 May sampling on Big McKenzie Lake (Figure 14). This catch rate of 188 bluegill/mile was greater than 78% of similar surveys of Wisconsin waterbodies. The PSD value of 28 was greater than less than one percent of statewide surveys.

Muskellunge. A total of 31 muskellunge greater than 24 in were captured during the spring 2012 survey (Figure 15). Given the low number of fish captured, plans for a population estimate were cancelled. A total of 25 muskellunge between 9-14 inches were also captured during spring fyke netting on Big McKenzie Lake. These fish most likely were stocked in fall 2011, suggesting very good overwinter survival.

Smallmouth bass. No smallmouth bass were collected during the 2012 survey of Big McKenzie Lake.

Nongame fish. A total of 11 fish species were captured during the 2012 mini fyke netting survey (Figure 16). Bluegill, largemouth bass, and brook silverside Labidesthes sicculus were the primary species sampled. Catch rates of bluntnose minnow Pimephales notatus and yellow perch were much lower than in the 1996 survey.

Discussion

The sport fishery of Big McKenzie Lake has undergone substantial changes in the past 30 years. A 1981 survey (Johannes 1983) found walleye and bluegill as the dominant species of interest in Big McKenzie Lake. Since that survey, largemouth bass have steadily increased in numbers while walleye densities have declined. Currently, the sport fishery is dominated by centrarchid species with very low numbers of percids and esocids. For example, in the 2007-2008 angler survey, centrarchid species constituted 96% of the estimated harvest. Shifts in species abundance towards increasing centrarchid abundance and stable or decreasing percid abundance have been observed on other regional lakes (Benike 2005a; Benike 2005b, Benike 2005c, Benike 2006, Toshner 2009, Benike 2010). In the early 1900s, largemouth bass and northern pike were considered the main gamefish in Big McKenzie Lake (Johannes 1983) and recent shifts in species abundance may be returning the fishery closer to its more stable state.

In 2005, the standard statewide 14 in minimum size limit for black bass was replaced with a no minimum size limit on Big McKenzie Lake. The intent of this regulation change was to improve largemouth bass size structure and allow higher levels of walleye natural reproduction. Largemouth bass densities have declined since the previous survey in 2007. However, catch rates in 2012 still exceeded surveys from similar Wisconsin waterbodies. Growth rates for largemouth bass up to six years also increased, nearing statewide averages for the first time in any survey.

The size structure of the bluegill population appears to have improved since the previous spring survey in 1996. 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. It is likely that increases in largemouth bass densities have contributed to the improved size structure of bluegills and impacts of liberalized black bass regulations should also examine impacts to bluegill populations.

Good to excellent natural reproduction supports all fish communities in Big McKenzie Lake except walleye and muskellunge. Catch rates of YOY walleye have been low in both non-stocked years and when small fingerlings were stocked. Natural reproduction of walleye has been consistent but at extremely low levels. Years where small fingerling walleyes were stocked had higher catch rates for YOY walleye but still at relatively low levels.

Any walleye stocking efforts by the Wisconsin DNR should be directed towards re-establishing a self-sustaining population in Big McKenzie Lake. Given the poor survival of small fingerling walleyes, future efforts should be focused on stocking of large fingerling walleye that may have greater survival than small fingerlings (Kampa and Hatzenbeler 2009). To evaluate survival of large fingerlings, fall electrofishing surveys should be conducted in the year after the stocking occurred. If mean catch rates of yearling walleye do not exceed 6 fish/mile after at least two of these surveys, stocking by the Wisconsin DNR should be discontinued.

Big McKenzie Lake has had an 18 in minimum length limit for walleye since 2011. With very few walleyes less than 18 inches captured, the regulation is likely providing very little additional protection to adult walleye then the statewide standard minimum length of 15 in. Also, only 14% of harvested walleye were less than 18 in during the 2007-2008 creel survey when the minimum length limit was 15 in. However, the regulation does protect juvenile walleyes to maturity and should be retained until the fishery becomes self-sustaining.

The muskellunge population on Big McKenzie Lake is at low densities but appears stable compared to the previous survey in 2007. Reductions in survival and growth of stocked muskellunge have been found in centrarchid-dominated communities (Wahl 1999). Recent shifts to greater centrarchid densities on Big McKenzie Lake may be a primary cause of decreases in muskellunge densities by reducing abundance of preferred forage items such as yellow perch and sucker (Bozek et al. 1999). Changes to Big McKenzie Lake stocking quotas should be considered once research being conducted by the Wisconsin DNR on muskellunge stocking rates has been completed.

Directed angler effort towards muskellunge was 2,388 hours (4.5% of total effort) in the 2007-2008 survey (Appendix Table 5). With such low interest among anglers in the current muskellunge fishery consideration should be given to discontinuing muskellunge stocking if improvements to density or size structure do not occur.

Northern pike size structure improved since the previous assessment in 1996 but only four fish greater than 28 inches were captured during this survey. Big McKenzie Lake has an abundance of deep, cool water that has been found to allow growth and survival of large northern pike (Jacobson 1992). However, optimal prey items for trophy northern pike such as cisco Coregonus artedi (Colby et al. 1987), medium size yellow perch (Margenau et al. 1998), and white sucker (Jacobson 1992) may be limited in Big McKenzie Lake. Sampling targeting cisco captured no fish in 2011 (Martin Jennings, personal communication). Also, few yellow perch were captured either in the 2012 spring survey or by sport anglers in the 2007-2008 creel survey. Although white sucker density was high historically in Big McKenzie Lake (Hanson 1986), few fish were observed during spring fyke netting in 2012.

With very few common carp observed during spring surveys, densities appear to be at relatively low levels on Big McKenzie Lake. The infertile water and high density bluegill population on Big McKenzie Lake makes it unlikely that common carp numbers will increase to densities that will have significant impacts on aquatic resources.

Conclusions and Management Recommendations

1. Largemouth bass are the primary sport fish on Big McKenzie Lake. Relative abundance of largemouth bass has declined in recent years but remains above state averages. The no minimum length limit provides increased angler harvest opportunity for this high density population and should be continued.

2. Bluegill are high density on Big McKenzie Lake and catch rates of larger fish has improved since the previous survey. Potential impact to the bluegill population with decreasing largemouth bass densities should be evaluated.
3. After years of very low levels of natural reproduction and poor survival of stocked small fingerlings, the walleye population on Big McKenzie Lake is at extremely low levels. Stocking should focus on large fingerlings with a goal of re-establishing a self-sustaining population. Consideration should be given to discontinuing walleye stocking if catch rates of yearling walleyes do not exceed 6 fish/mile in at least two out of three years after stocking of large fingerlings.
4. Muskellunge are at very low densities. Consideration should be given to modifying the number of muskellunge stocked and/or the size of fish stocked in Big McKenzie Lake. If densities or size structure does not improve, stocking of muskellunge should be discontinued.
5. Northern pike densities are at moderate levels and should provide good consumptive opportunities for anglers. Numbers of very large fish may be limited by lack of optimal prey items such as cisco, yellow perch, and white sucker.
6. Critical fish habitat in Big McKenzie Lake needs to be protected and enhanced where possible. Efforts should be made to work with the Big McKenzie Lakes Association and local angler groups stressing the importance of protecting critical habitat and water quality.
7. Efforts to increase habitat complexity in Big McKenzie 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.

8. 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.

Acknowledgements

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Table 1. Adult walleye estimates of A (survival) during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin.

Year	A	R^2	Ages Included
2012	0.183	0.45	5-15
2007	0.170	0.72	4-13
1996	0.395	0.88	4-10

Table 2. Largemouth bass PSD and RSDP values and catches per mile from fish collected during spring electrofishing assessments on Big McKenzie 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	2007	1996
PSD (percentile)	36 (11)	48 (26)	50 (30)
RSD14 (percentile)	14 (11)	20 (17)	23 (21)
CPE8 (percentile)	28 (68)	65 (96)	12 (34)
CPE12 (percentile)	10 (62)	31 (95)	6 (45)
CPE15 (percentile)	2 (41)	2 (41)	2 (41)

Table 3. Northern pike PSD and RSDP values and catches per net night from fish collected during spring spawning population assessments on Big McKenzie Lake, Burnett County. Only fish captured during spring fyke netting were included in analyses. CPEx was calculated as the number of fish captured above stock, preferred, and quality sizes divided by the number of net nights for the survey.

Parameter	2012	1996
PSD	65	43
RSDP	4	1
CPE14	1.1	1.9
CPE21	0.7	0.8
CPE28	0.05	0.01

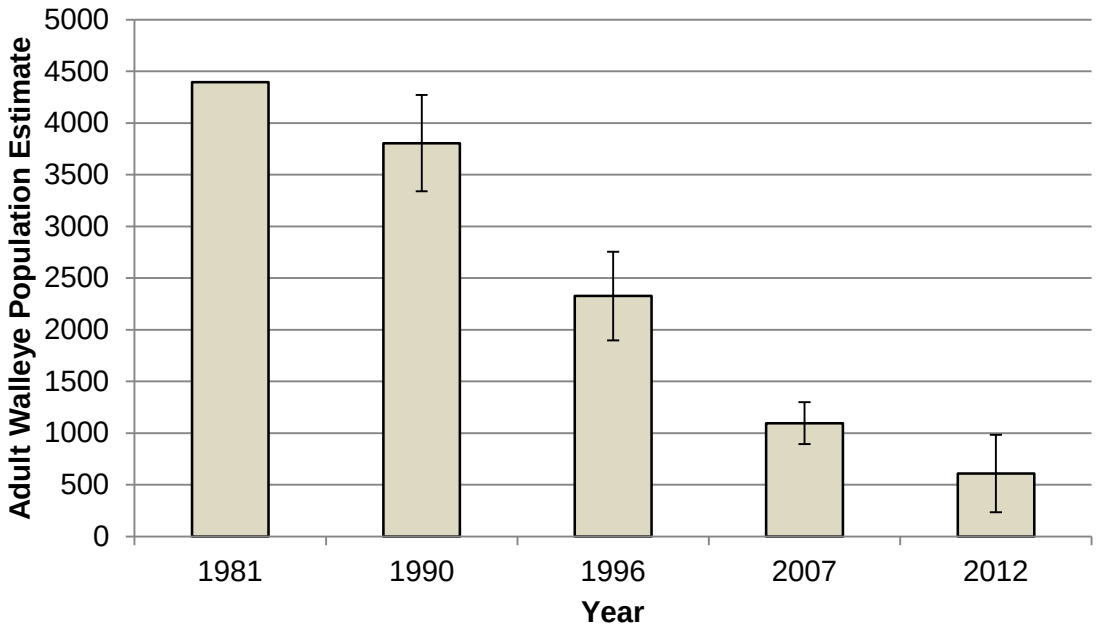

Figure 1. Adult walleye population estimates (95% confidence intervals) for Big McKenzie Lake, Burnett County, Wisconsin. Confidence intervals were not calculated for the 1981 survey.

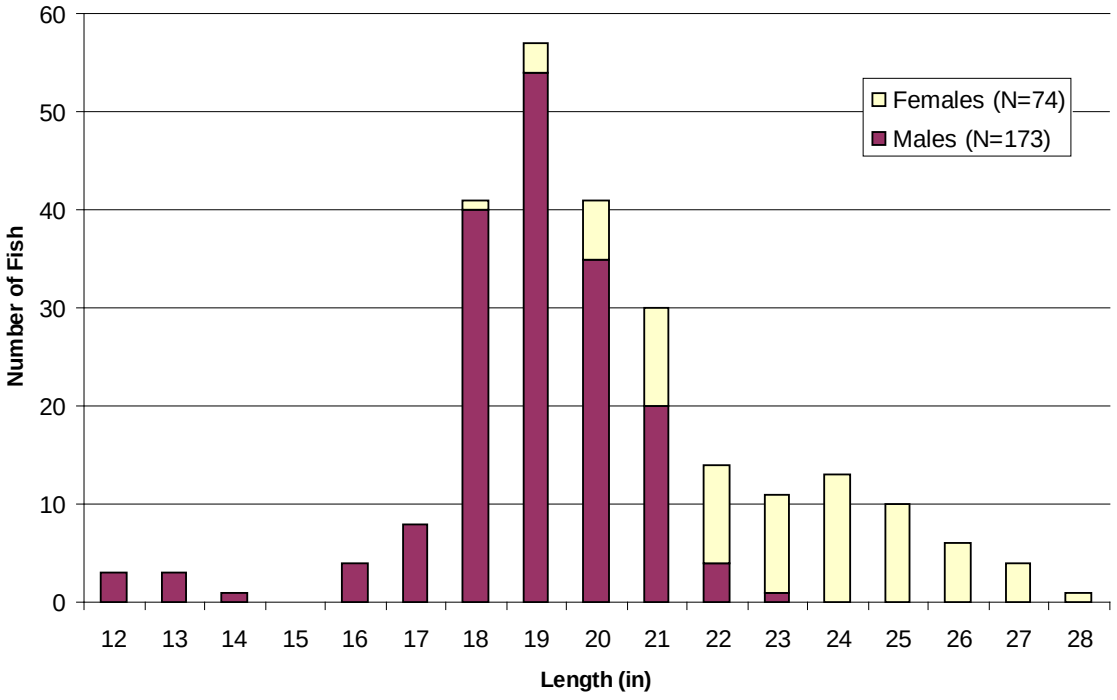

Figure 2. Length frequencies of adult walleyes captured during spring 2012 sampling on Big McKenzie Lake, Burnett County, Wisconsin (N=247).

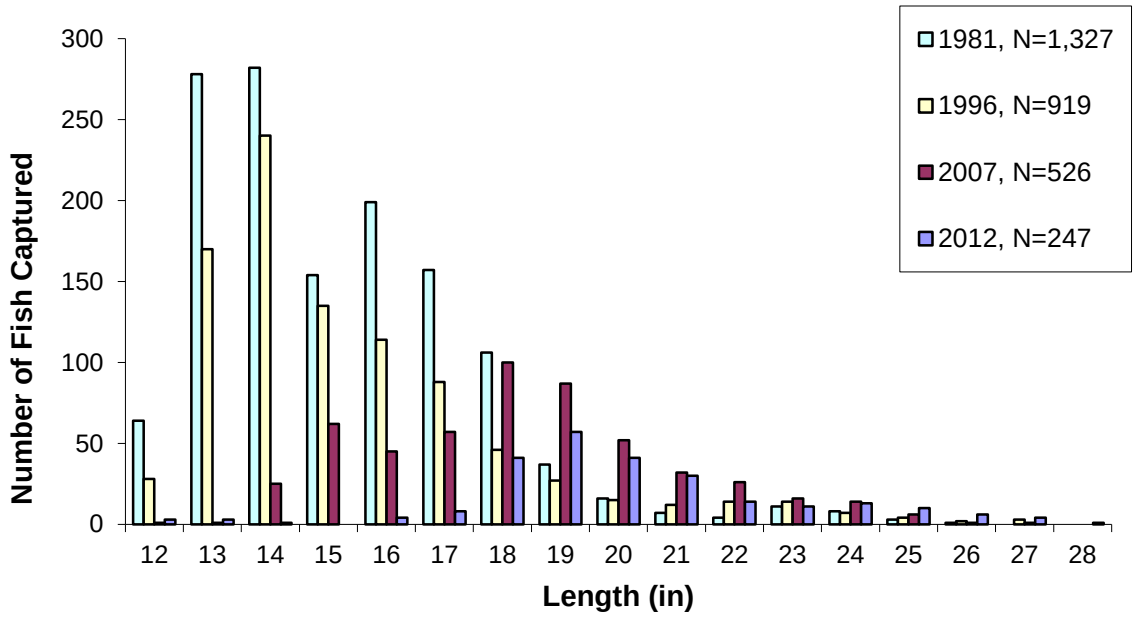

Figure 3. Length frequencies of spawning walleyes captured in Big McKenzie Lake, spring 2012, 2007, 1996, and 1981.

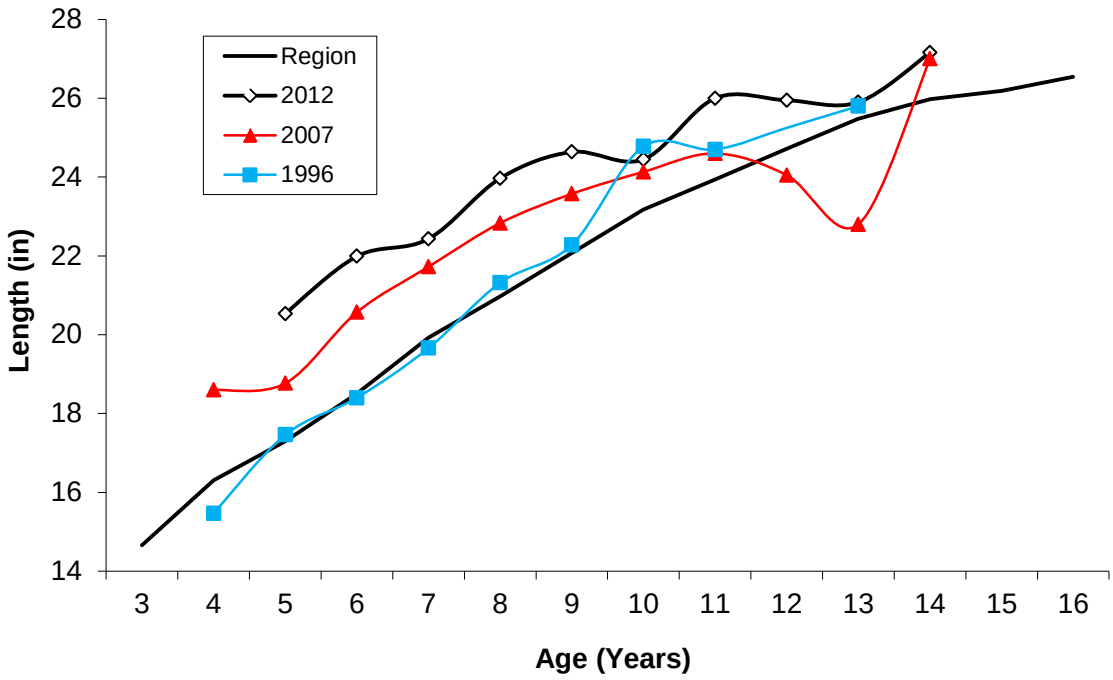

Figure 4. Mean lengths at age for female walleyes captured during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin. Regional averages are displayed for comparison.

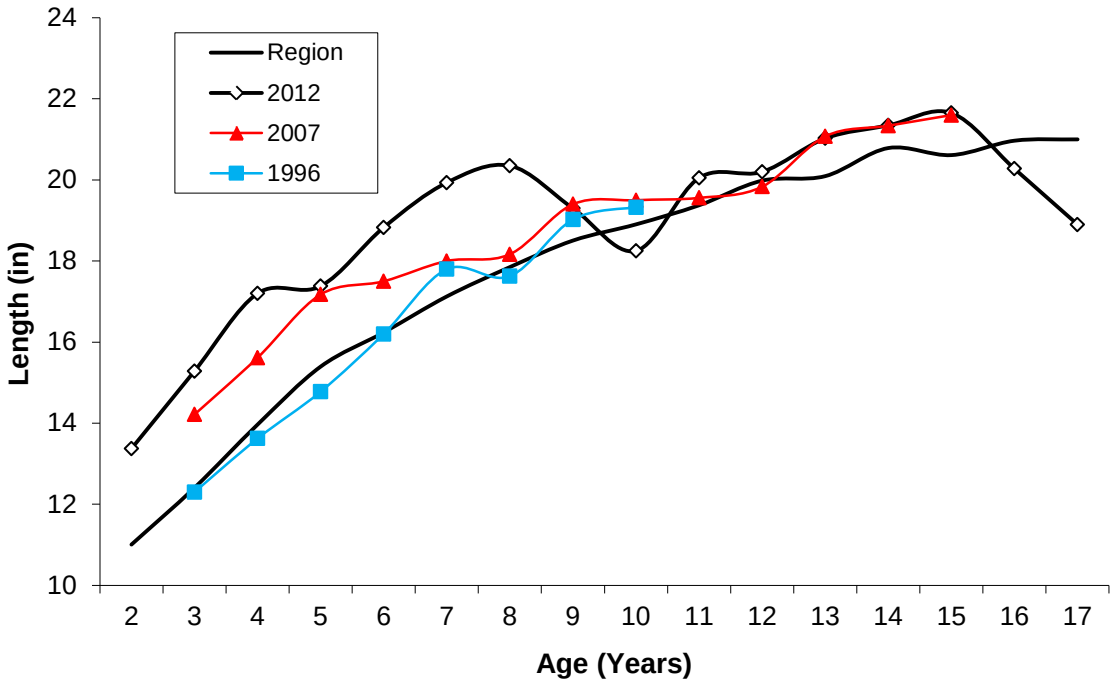

Figure 5. Mean lengths at age for male walleyes captured during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin. Regional averages are displayed for comparison.

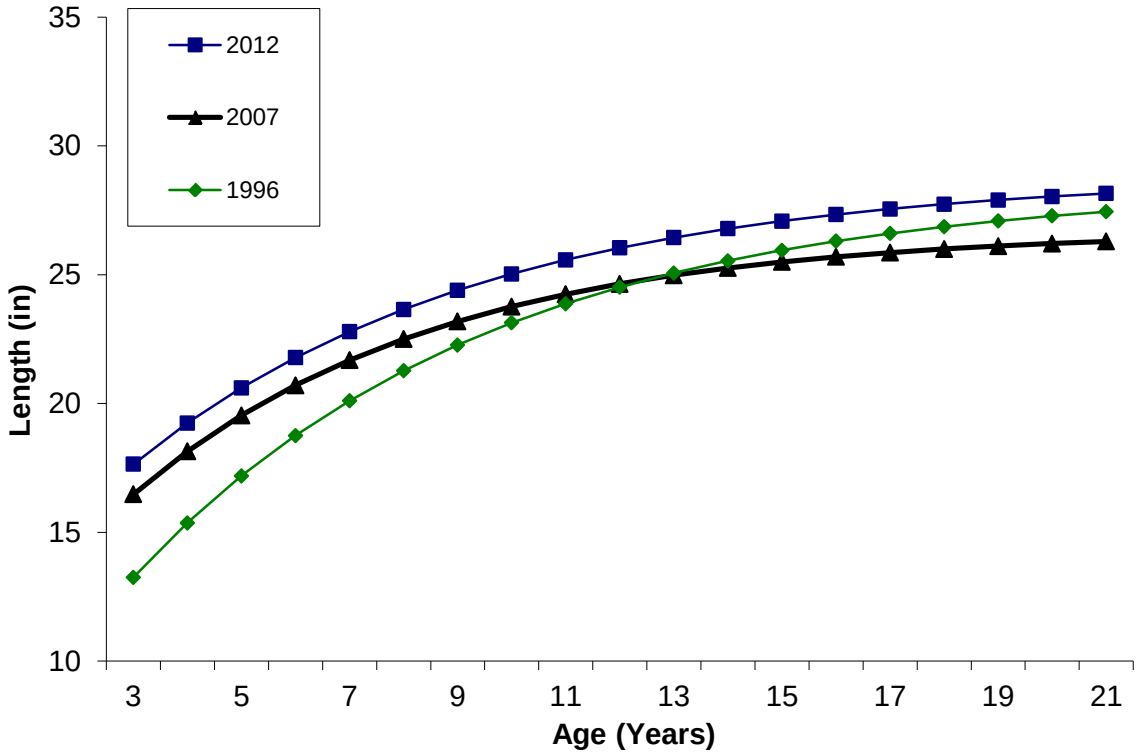

Figure 6. von Bertalanffy growth curves for female walleyes captured during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin.

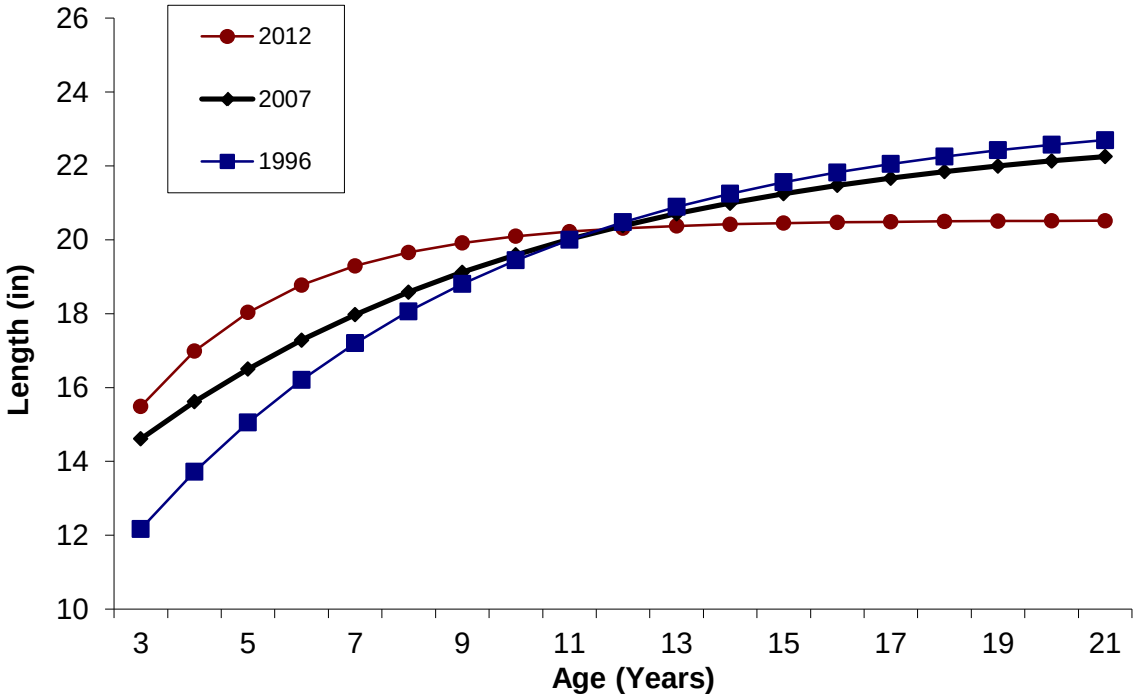

Figure 7. von Bertalanffy growth curves for male walleyes captured during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin.

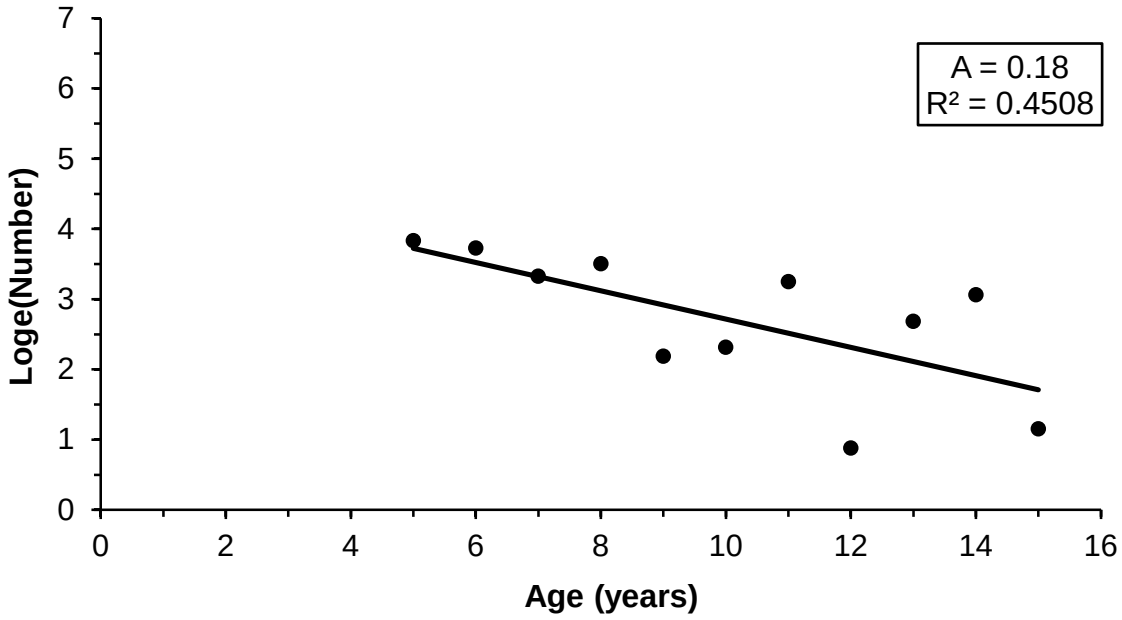

Figure 8. Catch curve for adult walleye sampled in Big McKenzie Lake, Burnett County, Wisconsin, in spring 2012.

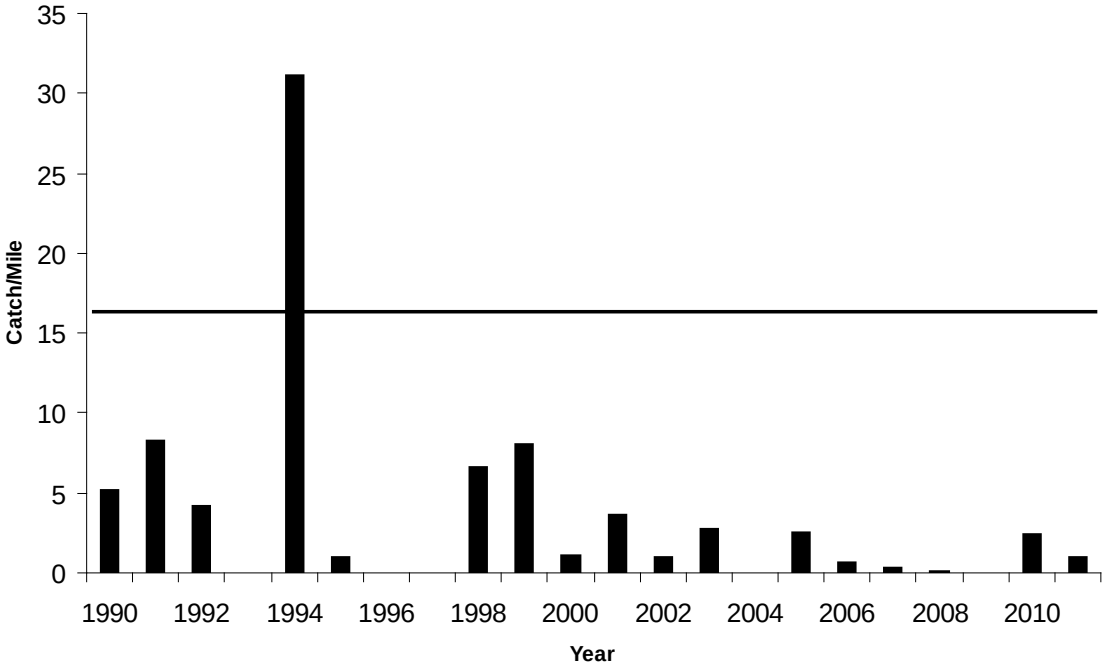

Figure 9. Young of year (YOY) walleye relative abundance determined by fall electrofishing surveys on Big McKenzie Lake, Burnett County, Wisconsin. The solid horizontal line indicates the modal catch of 16 YOY walleye per mile in northern Wisconsin lakes supported by natural reproduction. Fall surveys were not conducted on Big McKenzie Lake in 1993 and 2004.

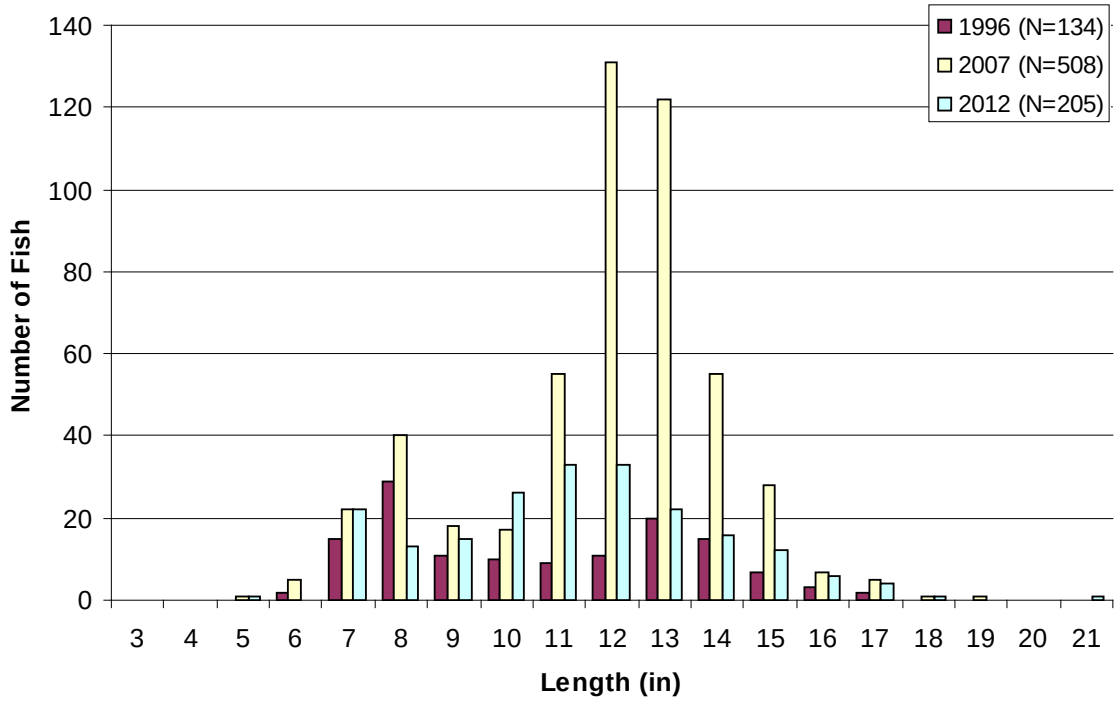

Figure 10. Length frequency of largemouth bass captured in Big McKenzie Lake, Burnett County, Wisconsin, in spring 2012, 2007, and 1996 surveys.

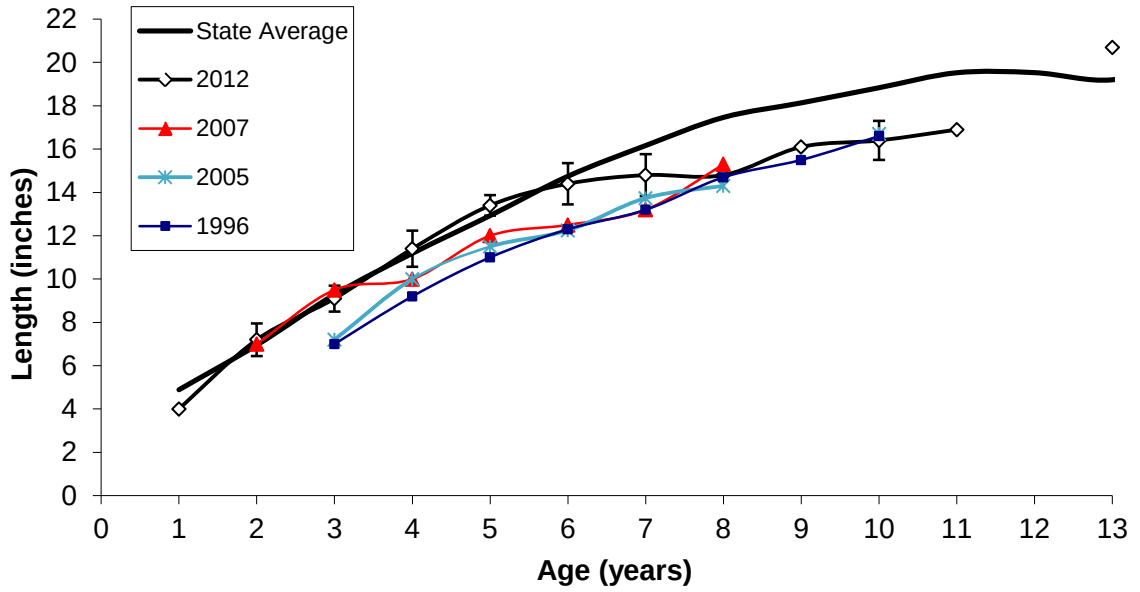

Figure 11. Mean lengths at age (± one standard deviation) for largemouth bass captured during spring surveys on Big McKenzie Lake, Burnett County, Wisconsin. Statewide averages are displayed for comparison.

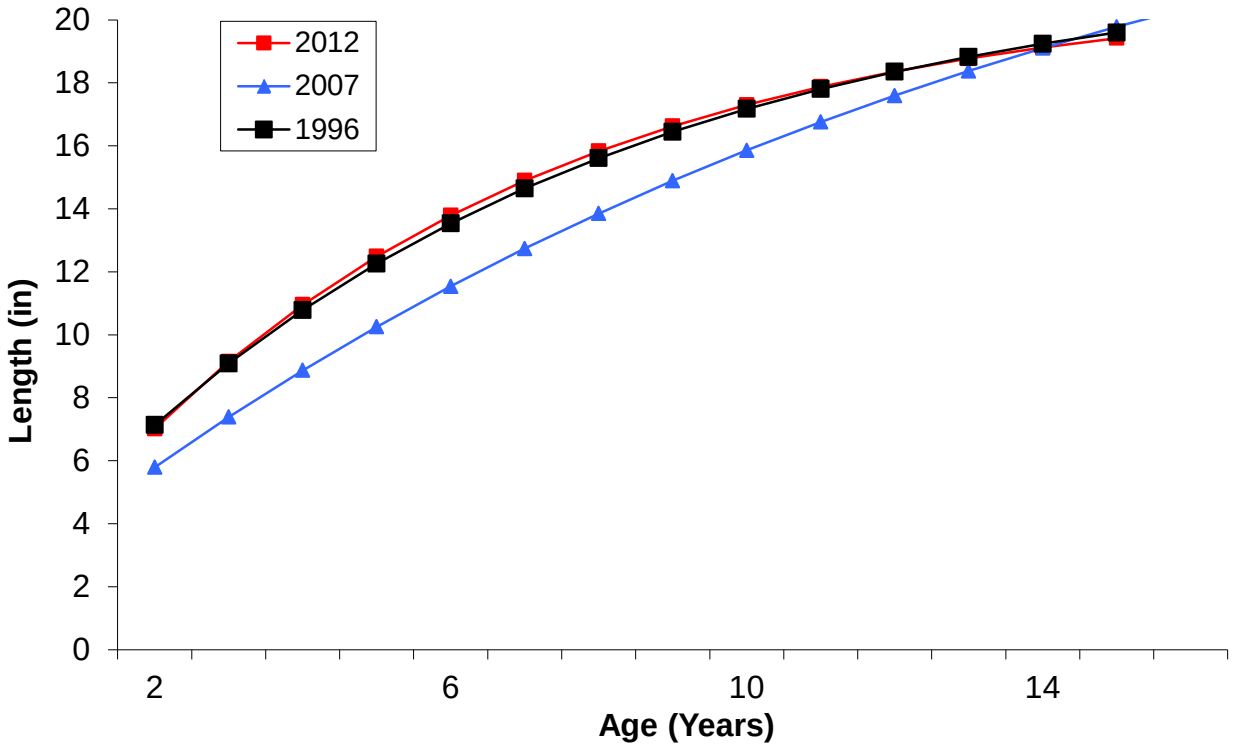

Figure 12. von Bertalanffy growth curves for largemouth bass captured during spring 2012, 2007, and 1996 surveys on Big McKenzie Lake, Burnett County, Wisconsin.

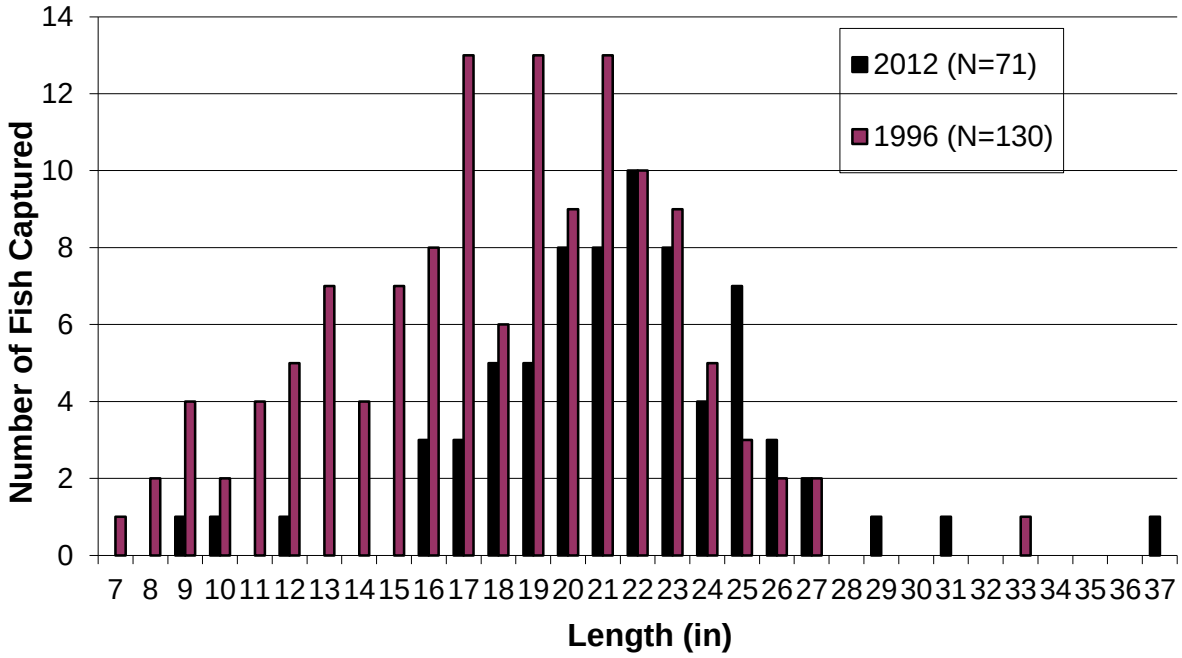

Figure 13. Length frequency of northern pike captured in Big McKenzie Lake, Burnett County, Wisconsin, in spring 2012 and 1996 surveys.

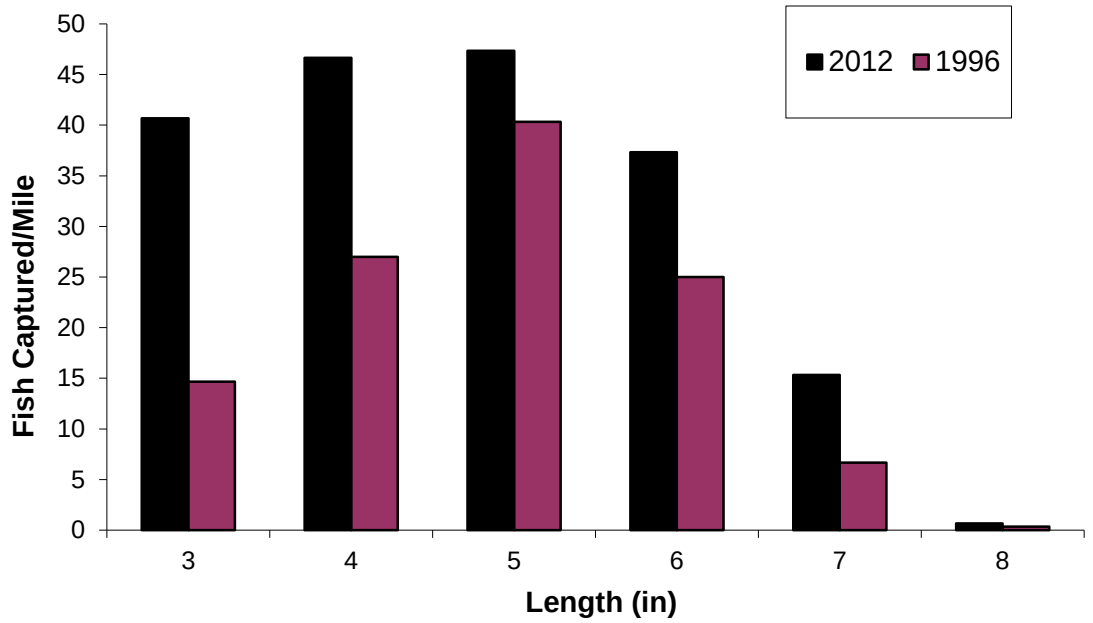

Figure 14. Number of bluegill captured per mile of shoreline sampled during spring 2012 and 1996 surveys on Big McKenzie Lake, Burnett County, Wisconsin.

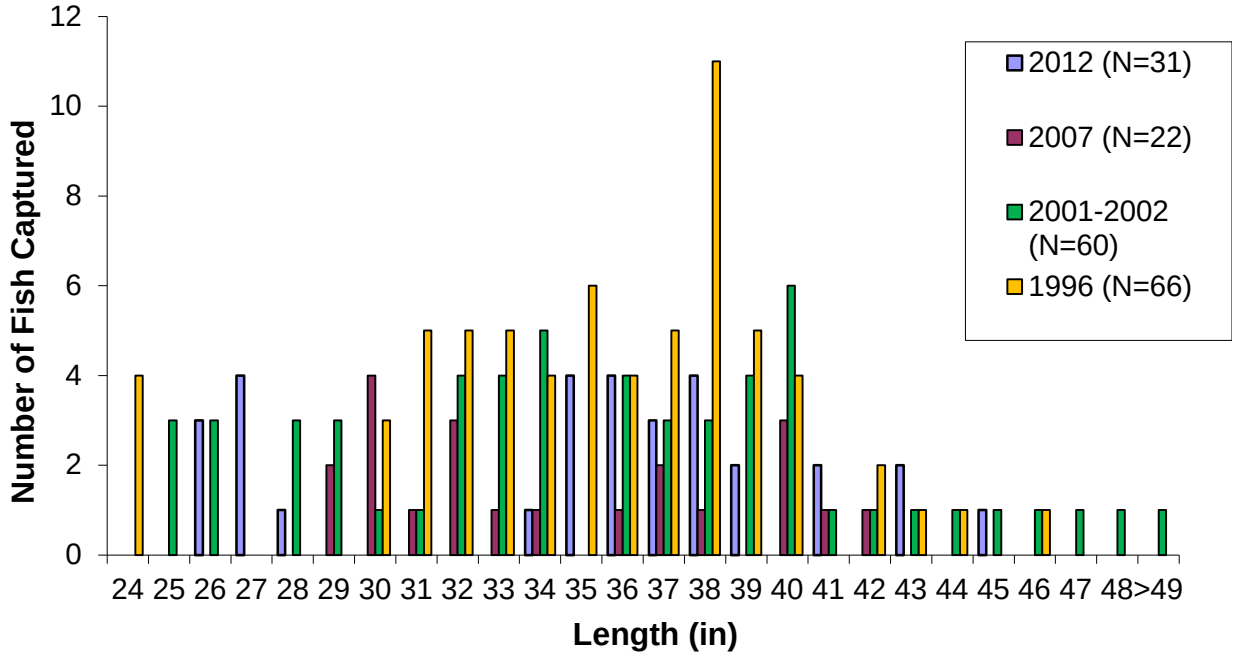

Figure 15. Length frequency of muskellunge captured in Big McKenzie Lake, Burnett County, Wisconsin, in spring 2012, 2007, 2001-2002, and 1996 surveys.

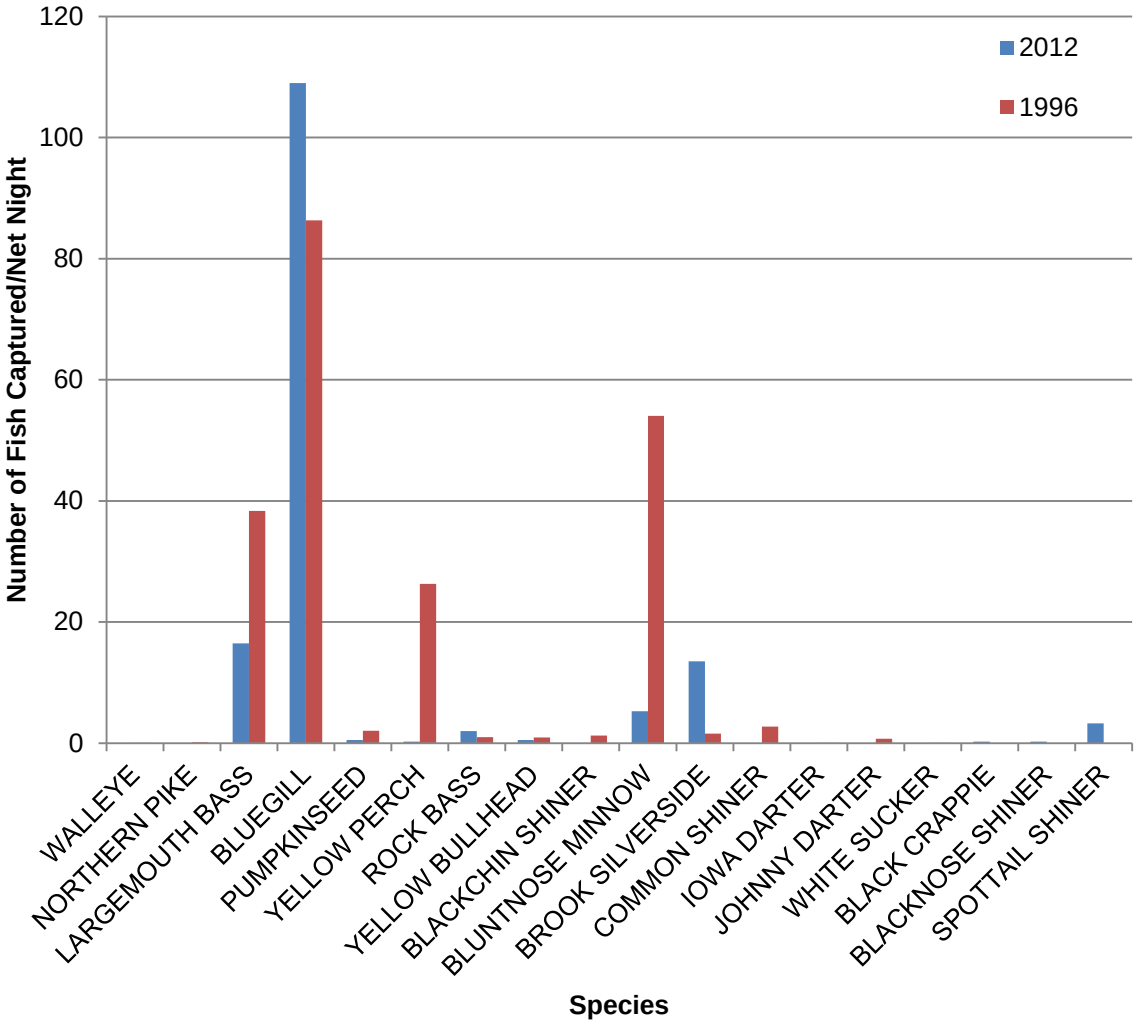

Figure 16. Number of fish captured per net night during summer mini fyke net sampling of Big McKenzie Lake, Burnett County, Wisconsin in 1996 and 2012.

Appendix Table 1. Fish stocking records for Big McKenzie Lake, Burnett County, Wisconsin, since 1998.

Year	Species	Number Fish Stocked	Mean Fish Length (in)
1998	Walleye	74,721	1.9
1999	Walleye	43.865	3.5
1999	Muskellunge	1,200	11.7
2000	Walleye	16,960	1.6
2001	Walleye	58,554	1.6
2001	Muskellunge	1,200	9.0
2003	Walleye	67,769	2.0
2003	Muskellunge	1,185	11.3
2004	Walleye	60,184	1.1
2005	Walleye	67,437	2.8
2005	Muskellunge	1,184	10.8
2006	Walleye	45,056	3.6
2007	Walleye	2,675	8.3
2007	Muskellunge	632	11.6
2008	Walleye	41,475	1.4
2009	Muskellunge	1,185	9.4
2010	Walleye	25,449	3.8
2011	Muskellunge	1,185	10.0

Appendix Table 2. General Fishing Regulations for Big McKenzie 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. Size cutoffs used to determine whether primary or secondary fin clips should be applied to gamefish when gender could not be determined. TC indicates top caudal fin clip.

Fish Species	Primary Fin Clip	Secondary Fin Clip
Walleye	≥15 in	≥ 7" < 15" (TC Clip)
Bass	≥8 in	< 8” (TC Clip)
Muskellunge	≥30 in	Immature fish < 30 in (TC Clip)
Northern Pike	≥12 in	< 12" (TC Clip)

Appendix Table 4. 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
Northern Pike	14	21	28
Smallmouth Bass	7	11	14
Walleye	10	15	20

Appendix Table 5. Summary of effort, catch, harvest, and mean length statistics for Big McKenzie Lake, Burnett County, Wisconsin, 2007-2008.

	Largemouth Bass	Bluegill	Northern Pike	Walleye	Black Crappie	Muskellunge
Directed Effort	14,420	11,392	6,326	5,869	3,892	2,388
Directed Effort/Acre	12.2	9.6	5.3	5.0	3.3	2.0
Projected Catch (# of fish)	14,487	21,769	2,926	163	2,869	83
Catch/Acre	12.2	18.4	2.5	0.1	2.4	0.1
Specific Catch Rate (Fish/Hour)	0.82	1.69	0.19	0.03	0.71	0.02
Projected Harvest (# of fish)	3,437	8,100	484	143	1,551	19
Harvest/Acre	2.9	6.8	0.4	0.1	1.3	0.0
Specific Harvest Rate (Fish/Hour)	0.20	0.68	0.04	0.02	0.39	0.01
Mean Length (in)	12.9	7.3	22.6	20.0	9.9	41.0