

2013-2014 Okauchee Lake Comprehensive Fisheries Survey

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Andrew Notbohm, WDNR fisheries technician holding a 48.2" 42 lb. female muskellunge captured with a fyke net on Okauchee Lake.

ABSTRACT

A comprehensive fisheries assessment of Okauchee Lake was conducted in the spring of 2013 and 2014. The objectives of the assessment were to estimate the muskellunge population density as well as assess local gamefish and panfish populations. Species captured included muskellunge, walleye, largemouth bass, smallmouth bass, northern pike and panfish.

Muskellunge are not native to inland waters of Southeastern Wisconsin so their presence in Okauchee Lake is the result of an intensive stocking program. Northern pike, largemouth and smallmouth bass in Okauchee Lake have excellent natural reproduction therefore these species are not currently stocked. Historical walleye stocking efforts of both large and small fingerling have had very little success in Okauchee Lake.

Stocking efforts have produced a muskellunge population density below the statewide average, but with excellent size structure. The 2013-2014 assessment resulted in a muskellunge population estimate of 0.11 fish per acre which is approximately one-sixth the density of muskellunge found in nearby Pewaukee Lake. The current assessment indicates muskellunge size structure is above average with the majority of fish measuring greater than 40 inches. The highlight of these fish was a 49 inch female muskellunge captured in 2014 that weighed over 40 pounds (pictured above). Muskellunge in Okauchee Lake grow at a rate faster than the Wisconsin statewide average due to high productivity and abundant forage.

Additional information was gathered as a part of the statewide pellet reared muskellunge stocking evaluation. Electrofishing was done in the fall post stocking to gauge short term survival rates of minnow only, (MO) vs. minnow finished, (MF). Results of this study will not be included in this report. This project was done in cooperation with the University of Wisconsin Stevens Point and the Wild Rose State Fish Hatchery.

Walleye are found throughout the Oconomowoc River watershed including upstream North and Pine Lakes as well as downstream Oconomowoc, Fowler and Lac LaBelle. Unfortunately for Okauchee Lake, walleye are found in very low abundance despite historical stocking efforts. There is much to learn from this and future studies as to what physical and biological factors which are limiting walleye recruitment on Okauchee Lake.

Largemouth bass are a highly targeted gamefish species in Okauchee Lake attracting a number of annually organized tournaments. Quality largemouth bass abundance and size structure has been historically stable on Okauchee Lake. Smallmouth bass are also present along with white bass, rock bass and an occasional yellow bass. Okauchee Lake is home to the state record white bass captured in 1977 weighing 4 lbs. and 6 ounces.

Northern pike are likely the most abundant gamefish found in Okauchee Lake. Size structure is below average, and few trophy sized fish are present.

Black crappie abundance and size structure is excellent. In addition to data collected during this survey, anglers' reports indicate black crappies have been providing consistent action.

Ciscos are found in very high abundance on Okauchee Lake providing an excellent forage base for the diverse gamefish population. Ciscos are a cold water species of the trout family that depend upon deep cold water. Okauchee Lake has a maximum depth of 93 feet.

METHODS

A Comprehensive Fisheries Assessment was conducted on Okauchee Lake during the spring of 2013 and the spring of 2014. The main objective of the assessment was to estimate the adult muskellunge population. In addition to estimating abundance, musky size structure and growth were evaluated. Other gamefish and panfish populations were examined in a similar fashion.

The 2013-2014 comprehensive fisheries assessment of Okauchee Lake began on April 13, 2013 with the setting of 14 fyke nets. During the 2013 season, the 14 nets were fished through May 1, 2013, for a total of 234 net-nights. The 2014 sampling season commenced with setting fyke nets on April 15. During the 2014 season, up to 12 nets were fished on Okauchee Lake through May 13, 2014. Net locations are shown in Figure 1. Effort for the 2014 season included a total of 321 net-nights. All nets used during both years of the survey were constructed of either three-foot or four-foot frames and either ½-inch or ¾-inch bar mesh.

Spring Electrofishing II for the 2013-2014 comprehensive fisheries assessment started on May 20, 2014 and continued through June 4, 2014. No electrofishing effort for walleye and muskellunge was conducted as a part of this survey. All electrofishing effort in 2014 was focused on the bass and panfish populations. During the three nights of electrofishing, gamefish only runs received 5 hours of effort while catch all runs received 0.25 hours.

During 2013-2014 comprehensive survey, all gamefish species and a subsample of panfish were measured to the nearest tenth-inch. A subsample of gamefish was also weighed to the nearest

tenth-pound. During 2013, only muskellunge and walleye were measured to the nearest tenth-inch and only a subsample of muskellunge was weighed to the nearest tenth-pound. A subsample of panfish was also measured to the nearest tenth-inch in 2014.

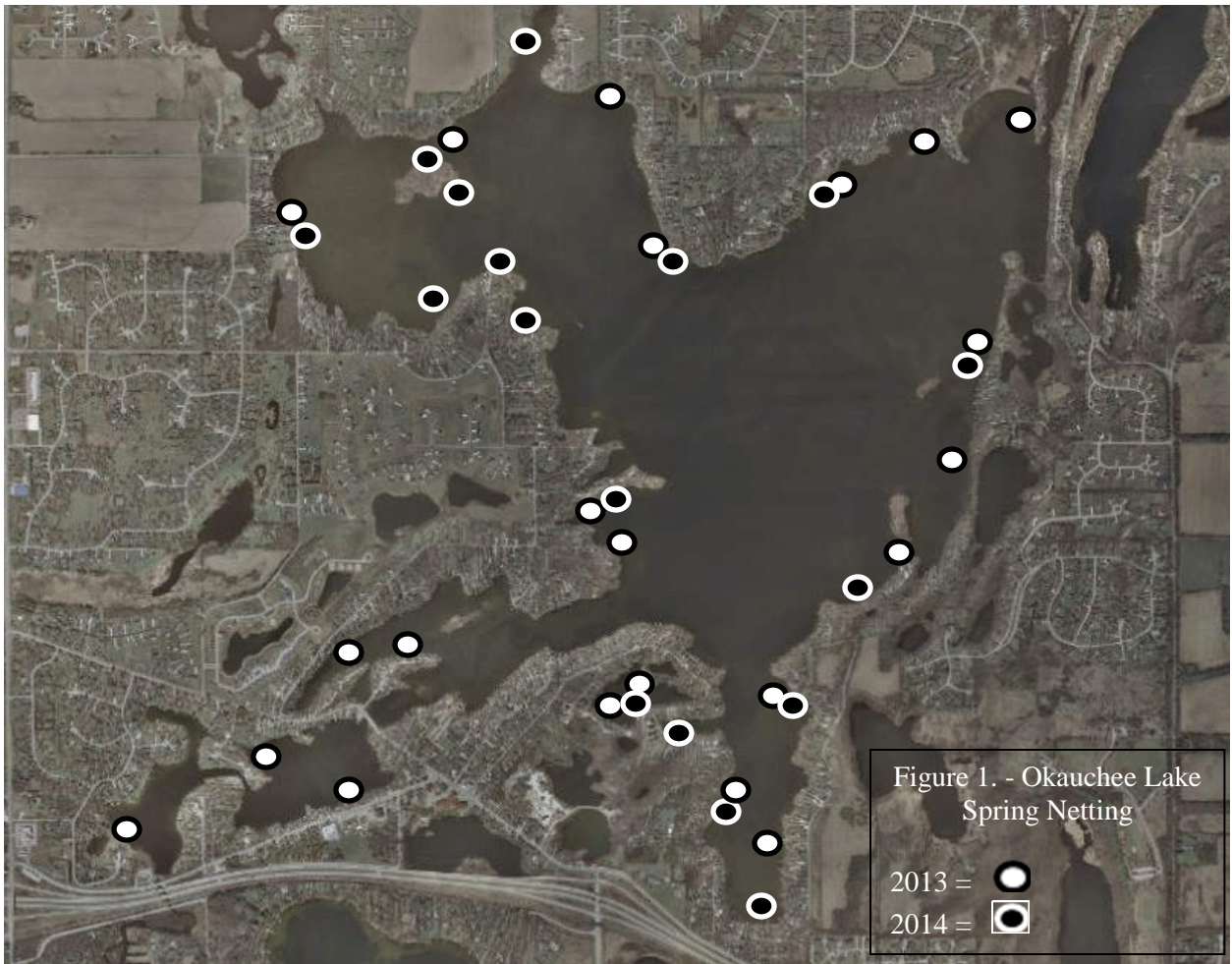
During the 2013 & 2014 portion of the assessment, northern pike and muskellunge were given differential fin-clips to identify recaptures and facilitate abundance estimates (female – right pectoral, male – left pectoral, unknown or immature – top caudal). Muskellunge were also marked with numbered floy tags for the purposes of a double mark to help identify recaptures during the two year population estimate. In the case of any potential floy tag loss, close observation of the new growth aided in determining when the fish was initially marked. Fin clips observed within the same season do not reveal any new growth while one year old marks have distinctive growth on the previously clipped fin.

Recapture efforts during 2014 included marking new muskellunge and examining all muskellunge for prior clips throughout fyke netting. Fyke netting was used to target muskellunge and obtain a ratio of new catches to recaptures. A muskellunge population estimate was

calculated for 2014 using the Petersen formula $N = \frac{MC}{R}$, where M is the number of marked fish

at large, C is the number of fish captured during the recapture run, and R is the number of recaptured fish identified during the recapture run. To obtain an official muskellunge population estimate, the entire 2014 sampling season was utilized as a single recapture event and the resulting data was inserted into the Petersen formula.

Scales were collected from muskellunge and northern pike, which allowed for estimation of growth and survival rates for each species. Mean length and catch per effort were calculated and length frequencies were created for all species sampled.



RESULTS

Muskellunge

Muskellunge were sampled by fyke net during spring 2013 and spring 2014 with moderate success. Catch statistics are shown in table 1 and table 2 inserted below. Thirty-nine muskellunge were captured in 2013 and 17 were captured in 2014. Muskellunge were also collected via electrofishing during spring 2013 but no length or weight data was recorded. Catch rates during fyke netting was low in both 2013 and 2014 as one fish was captured every nine to ten net nights. The largest muskellunge captured during the entire two year survey was a 48.2-inch female in spring 2013. The largest muskellunge captured during 2014 was 47.3-inch female. The largest males captured during the two year survey were a 40.8-inch fish in 2013 and a 42.2-inch fish in 2014. Average size between the two years was remarkably similar.

Table 1. Gender specific muskellunge catch statistics for Okauchee Lake. Fish were captured by fyke net during the spring 2013 portion of a two year comprehensive fisheries assessment. Total effort was 234 net nights.

Sex	Number Caught	Number Measured	Mean Length (in)	St. Dev	Max	CPE	Mean Wt. (lbs.)	St. Dev
Male	14	14	38.4	2.9	40.8	0.06	14.2	7.9
Female	25	25	42.5	5.1	48.2	0.11	21.5	3.1
Total	39	39				0.17	17.85	

Table 2. Gender specific muskellunge catch statistics for Okauchee Lake. Fish were captured by fyke net during the spring 2014 portion of a two year comprehensive fisheries assessment. Total effort was 321 net nights.

Sex	Number Caught	Number Measured	Mean Length (in)	St. Dev	Max	CPE	Mean Wt. (lbs.)	St. Dev
Male	9	9	39.9	1.37	42.2	0.03	17.8	5.17
Female	8	8	42.3	8.43	47.3	0.02	25.4	8.42
Total	17	17				0.05	21.6	

When 2013 and 2014 data for female, male and muskellunge of unknown gender were combined, a length frequency mode of 36 inches was observed, (Figure 2). When combining 2013 and 2014 data, female muskellunge showed a length frequency mode of 46.6 inches, while the male modal length was 38.8 inches (Figure 3).

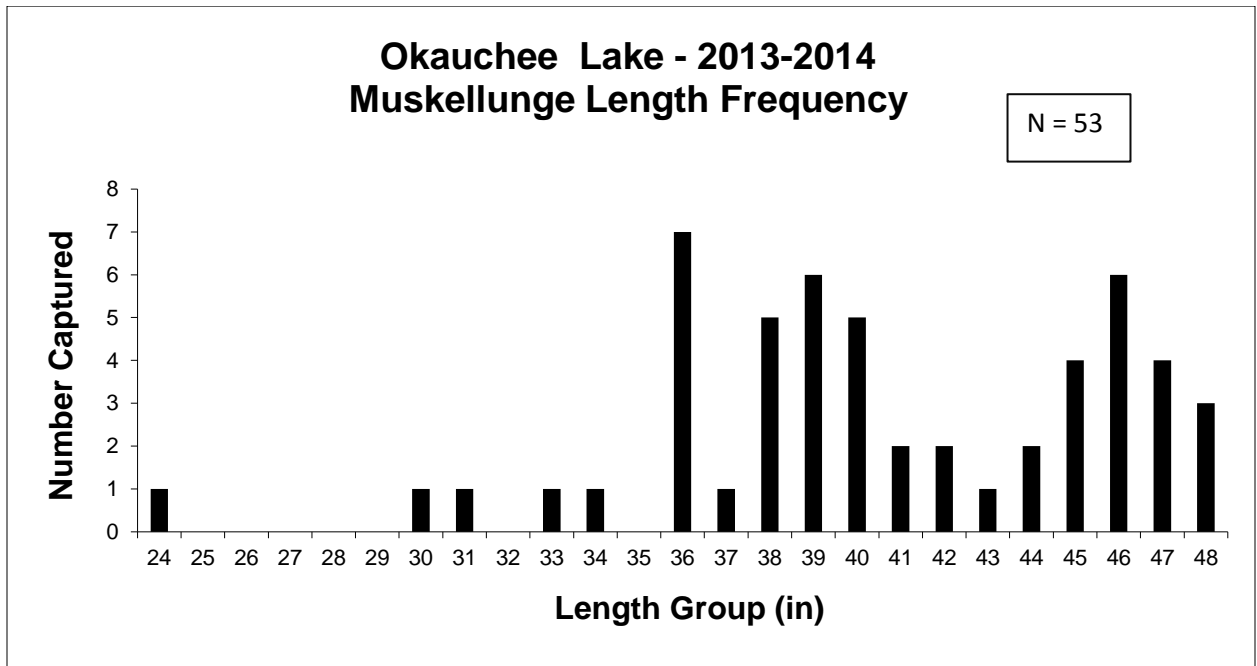


Figure 2 - Combined gender muskellunge length frequency for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2013-2014 comprehensive fisheries assessment.

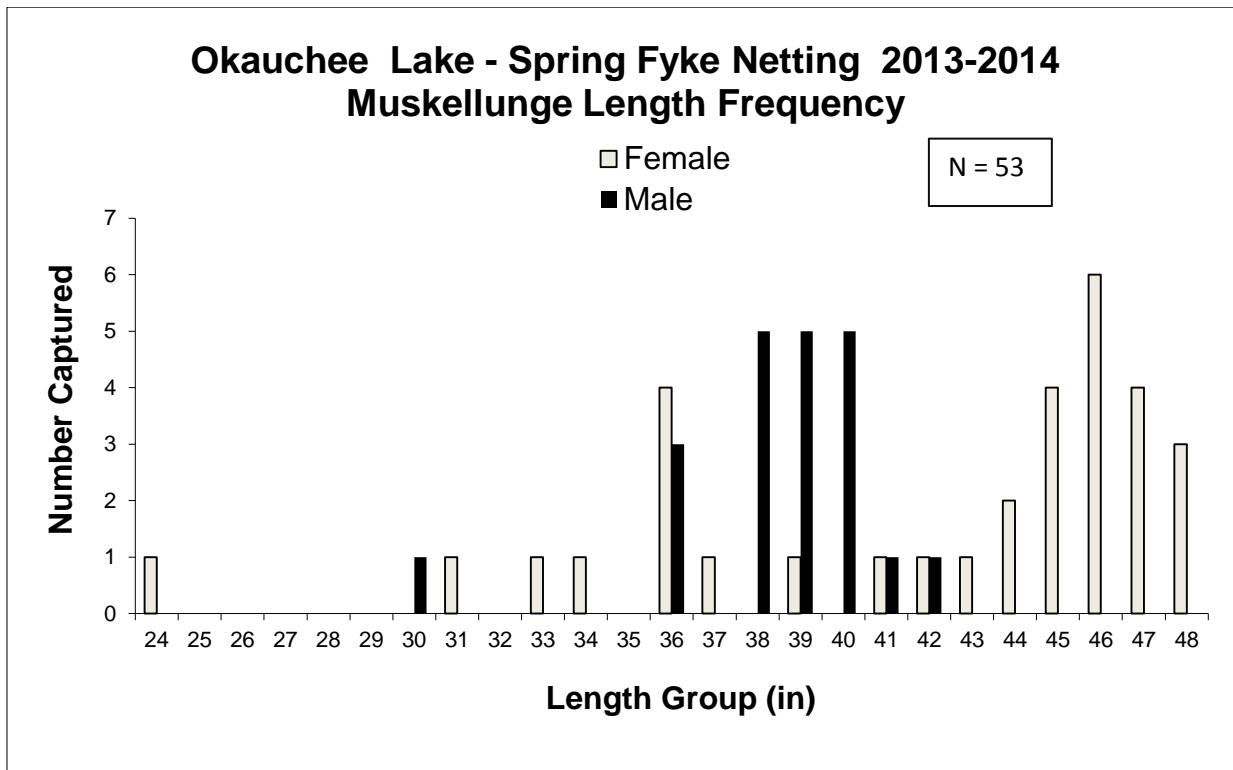


Figure 3 - Gender specific muskellunge length frequency for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2013-2014 comprehensive fisheries assessment.

Gender-specific proportional stock density (PSD), using a stock length of 20 inches and a quality length of 30 inches was calculated for muskellunge captured in combined years of 2013 and 2014. PSD values were high for males and females. Male PSD was 100%, whereas female PSD was 97%. Relative stock density (RSD-38), using a stock length of 20 inches and a preferred length of 38 inches was 78% for combined gender, 81% for males and 76% for females. In addition to PSD and RSD-38 values, the percentage of muskellunge captured that were at or above the 40-inch minimum size limit for angler harvest was calculated. During combined years, 61% of muskellunge were greater than the legal size limit.

Table 3. Number of individual muskellunge as Stock, Quality, Preferred, Memorable, Trophy and Legal Proportions. Okauchee Lake - 2013 & 2014									
Species	Stock	Quality	Preferred	Memorable	Trophy	Legal	PSD - 30	RSD - 38	RSD - 40
Muskellunge (in)	20	30	38	42	50	40			
Muskellunge - All	54	53	42	23	0	33	98.15	77.78	61.11
Muskellunge - Male	21	21	17	1	0	10	100.00	80.95	47.62
Muskellunge - Female	33	32	25	22	0	23	96.97	75.76	69.70

Muskellunge (continued).

A mark and recapture effort revealed a population estimate of 132 adult muskellunge using the Peterson formula as shown in Table 4. This population estimate is considered low confidence due to the high coefficient of variation and overall small sample size. Individual muskellunge age was estimated using scales. Length at age was similar to the statewide average, as demonstrated in Figure 4. Due to the low sample size, both the population estimate and length at age data was combined for both genders.

Table 4. Adult muskellunge mark and recapture data and Petersen population estimate from Okauchee Lake. Data was collected in spring of 2013 and 2014 (R/C=0.29, CV=37.57%).

Marked M	Examined C	Recaptured R	Population Estimate N	Lower 95% C.I.	Upper 95% C.I.
39	17	5	132	378	70

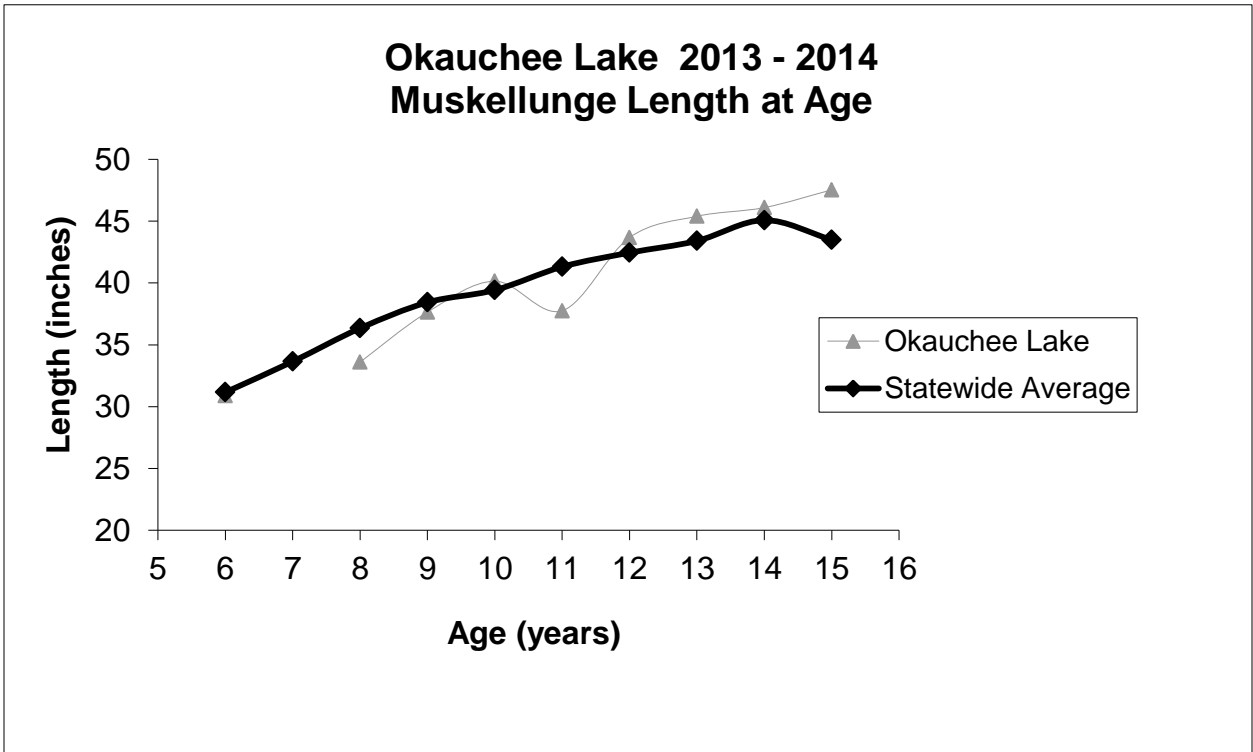


Figure 4 - Combined gender muskellunge length at age for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2013-2014 comprehensive fisheries assessment.

Northern Pike

Northern pike data was collected only during the 2014 netting portion of the comprehensive survey while fyke netting. Table 5, inserted below shows catch statistics for this netting effort. During this portion of the survey, 492 northern pike were sampled in 304 net nights for an average catch rate of 0.78 pike per net night. This reported catch per effort is relatively low due to nets fishing additional days when targeting muskellunge. Caution should be used when comparing these catch rates to other lakes where netting effort may have been concluded when water temperatures were in the mid-40 degree mark. The average length for male northern pike was 18 inches and 21.5 inches for females during this time period.

A Schnabel continuous mark and recapture effort for northern pike included ten lifts sampling a total of 14 days starting on April 15th and ending on April 28th 2014. During this time frame, twelve nets fished a total of 168 net nights and captured a total of 439 northern pike. Catch per effort is calculated for this time period as 2.61 pike per net night. Using the normal Schnabel mark and recapture population estimate formula, the population of combined gender resulted in an estimated 5,433 or 4.58 northern pike per surface acre. The recapture to capture ratio for this estimate was 3% and computation of the 95% confidence intervals resulted in a lower limit of 3,510 and an upper limit of 12,008.

Table 5. Gender specific northern pike catch statistics for Okauchee Lake. Fish were captured by fyke net during the spring 2014 portion of a two year comprehensive fisheries assessment. Total effort was 304 net nights.

Sex	Number Caught	Number Measured	Mean Length (in)	St. Dev	Max	CPE	Mean Wt. (lbs)	St. Dev
Male	250	240	17.9	2.31	26.2	0.82	1.3	0.57
Female	225	217	21.5	3.53	32.3	0.74	2.4	1.38
Unknown	17	17	10.9	2.07	14.5	0.06	0.5	0.22

When both northern pike genders were combined, a typical length frequency distribution was observed as shown in Figure 5 with the modal length observed at 18 inches. When separating northern pike by gender, a slightly different pattern is observed. Figure 6 shows length frequency distribution of northern pike separated by gender. Modal length of males was again observed at 18 inches while female modal length was 20 inches. 240 males and 217 females were used to develop the length frequency distribution of northern pike sampled in 2014. Age data using scales was used to estimate mean length at age of northern pike in Figure 7. Mean length at age was very similar to that of the statewide average indicating average growth of northern pike in Okauchee Lake.

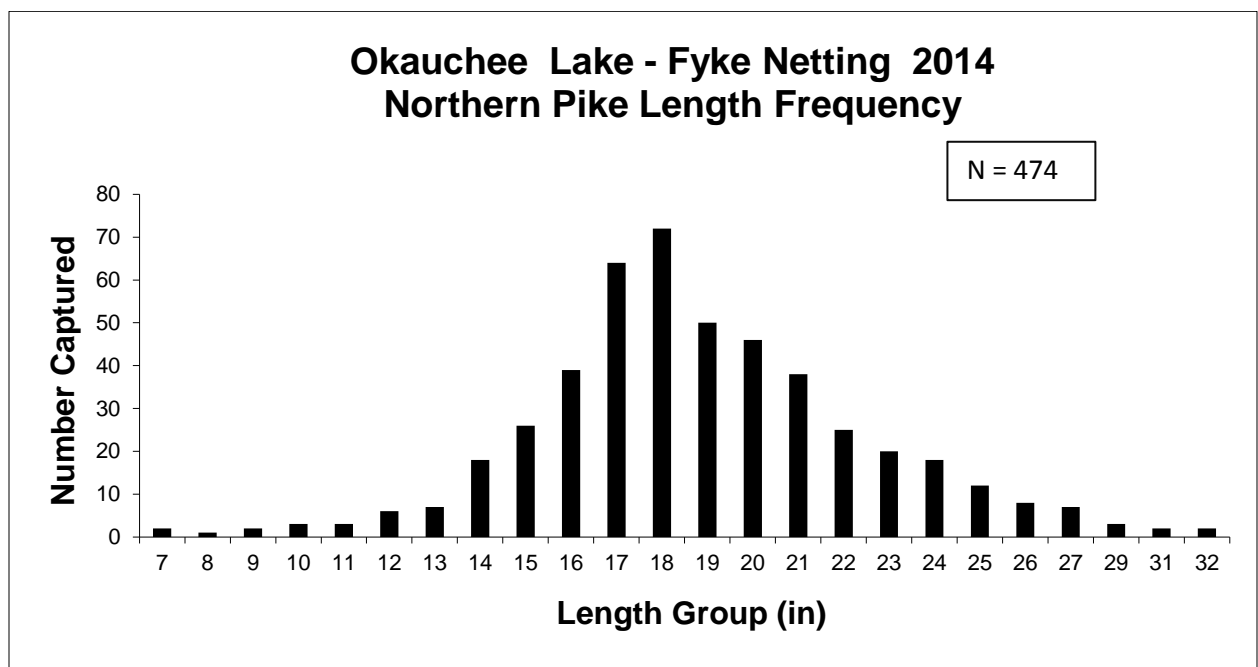


Figure 5 - Combined gender northern pike length frequency for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

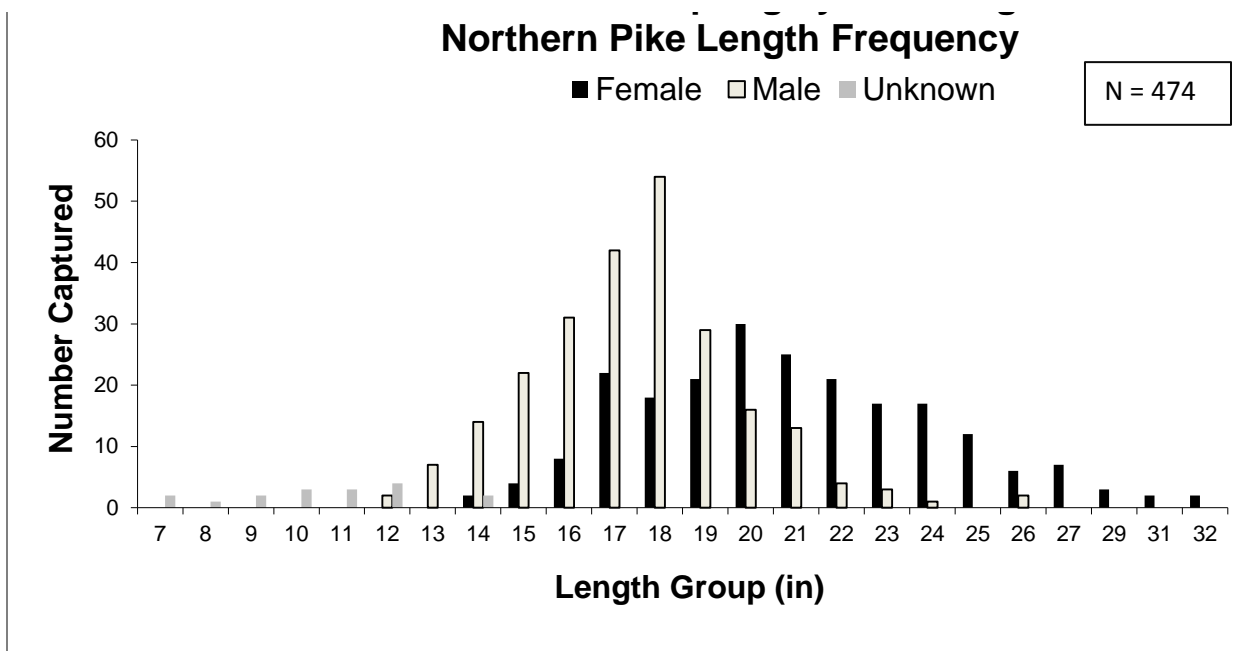


Figure 6 - Combined gender northern pike length frequency for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Northern pike size structure was below average for lakes in southern Wisconsin with a PSD of 30% (Table 6). Gender-specific proportional stock density shows that female northern pike make up a greater proportion of the large fish in the system. Female PSD was 52 % while male PSD was 10%. Female relative stock density (RSD-26), using a stock length of 14 inches and a preferred length of 26 inches (which is the legal length limit for angler harvest), was 9% while male RSD-26 was 1%.

	Male NOP	Female NOP	Combined Gender
PSD21	10%	52%	30%
RSD26	1%	9%	2%
RSD28	0%	3%	5%

Table 6 – PSD & RSD values northern pike captured in Okauchee Lake during the spring 2014 portion of the survey. Stock length = 14 inches, Quality Length =21 inches, Preferred Length = 28 inches

When plotting northern pike length at age, we observed similar growth to that of the statewide average, (Figure 7). This growth rate is lower when compared to other southern Wisconsin lakes. When plotting mortality using a catch curve, (Figure 8), a relatively low annual mortality rate (A) of 46% was observed in adult fish from ages four through nine.

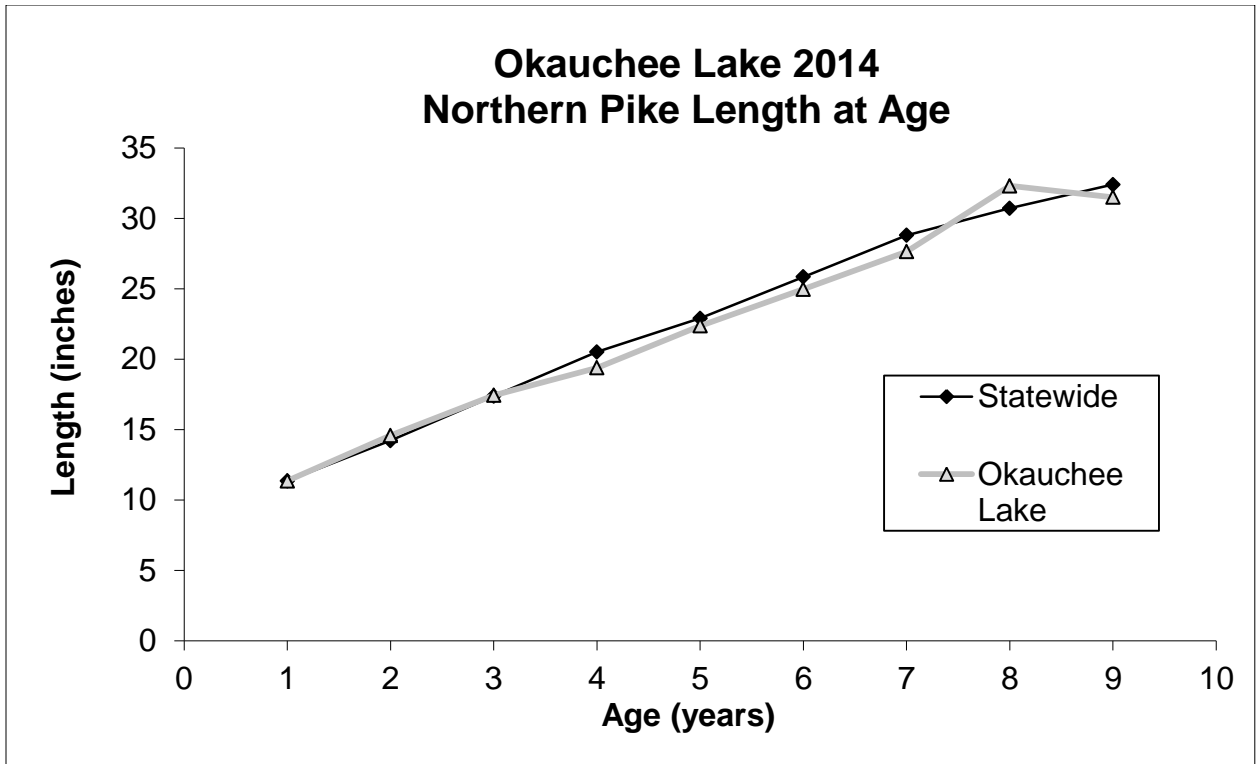


Figure 7 - Combined gender northern pike length at age for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

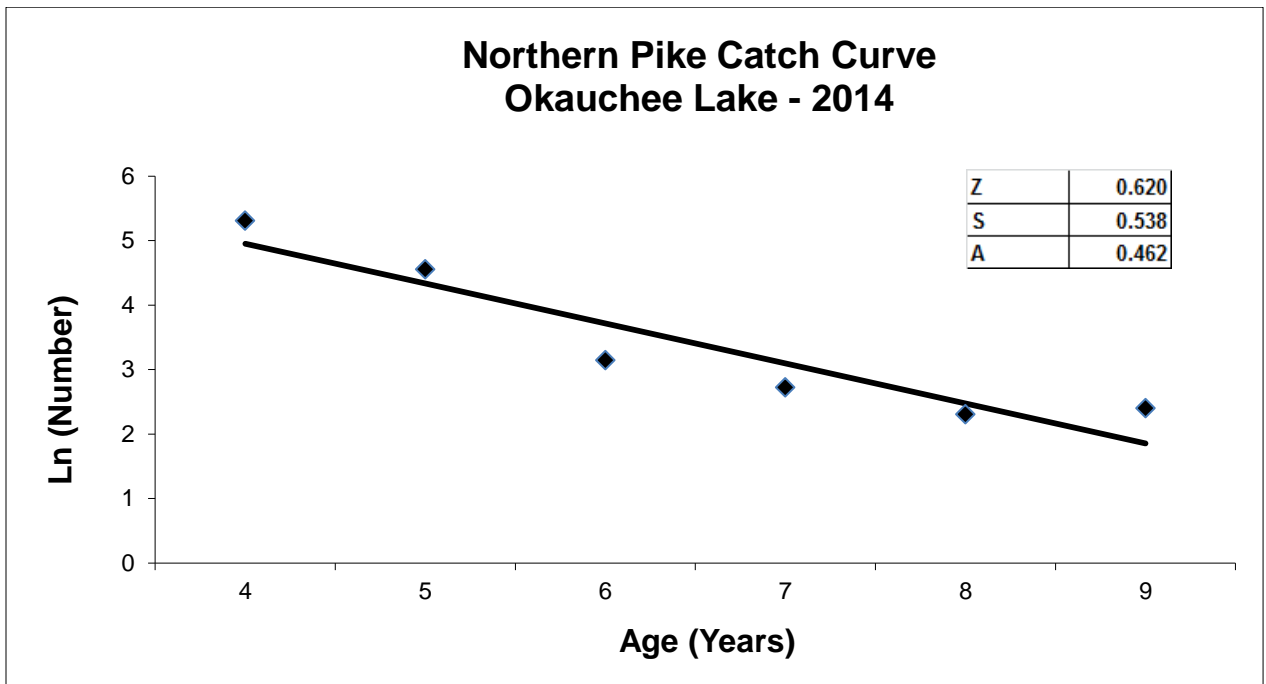


Figure 8 – Northern Pike Catch Curve for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Walleye

Only ten walleyes were captured during the entire survey. Size structure was large with an average size of 22.5 inches. Four of the ten fish were marked with a ventral fin clip corresponding to one of two large fingerling stocking events in either 2007 or 2009. Nine of the ten fish captured were caught during fyke netting and a length frequency distribution in Figure 9 describes the size structure.

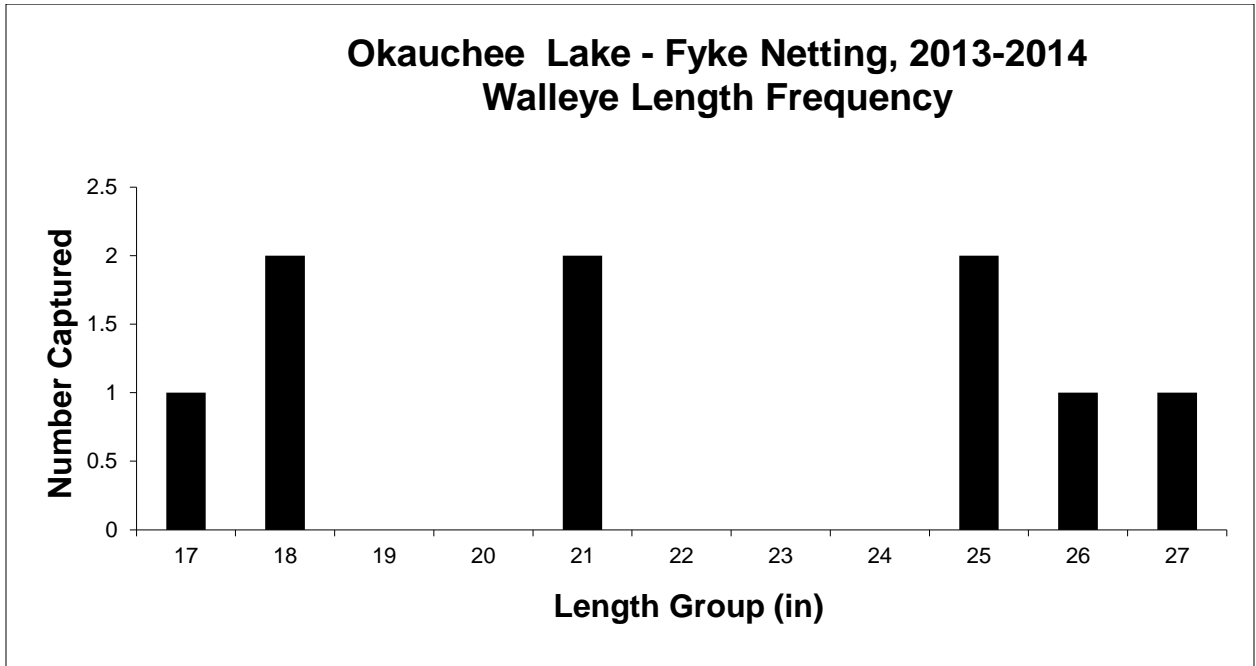


Figure 9 - Combined gender walleye length frequency distribution for Okauchee Lake. Fish were captured by fyke net in spring of the year during the 2014 portion of the comprehensive fisheries assessment.



Andrew Notbohm, WDNR fisheries technician holding a 27" walleye captured with a fyke net on Okauchee Lake.

Largemouth Bass

Largemouth bass were sampled with moderate success using both electrofishing and fyke netting gear as shown in Table 4. A total of 315 largemouth bass were sampled when combining gear types resulting in a mean length of 12.6 inches. When captured with a fyke net the mean length was calculated at 14.5 inches. In comparison, when captured by electrofishing, largemouth bass displayed an average length of 11.5 inches. Sampling bias regularly occurs with largemouth bass when using fyke nets versus using electrofishing gear. In addition to the quality mean average length, many large fish were observed with the largest bass observed being over 21 inches.



Andrew Notbohm, WDNR fisheries technician holding a 17” largemouth bass captured with a fyke net on Okauchee Lake.

Table 7. Largemouth bass catch statistics for Okauchee Lake. Fish were captured electrofishing during the spring 2014 portion of a two year comprehensive fisheries assessment. Total effort was 11.75 miles of boom shocking and 304 net nights.						
Gear	Number Caught	Number Measured	Mean Length (in)	St. Dev	Max	CPE
Fyke Netting	158	158	14.5	3.0	21.3	0.52 per net night
Electrofishing	157	157	11.5	3.1	19.2	13.3 per mile

Largemouth bass were grouped into one inch bins to create length frequency distribution histograms shown in Figures 10 & 11. Figure 10 shows the length frequency distribution of bass captured by electrofishing. The electrofishing data shows a healthy number of 9 inch fish indicating strong recruitment. Figure 11 displays length frequency distribution of largemouth bass captured by fyke net. Fyke netting data shows the high number of memorable sized bass and a number of trophy sized fish.

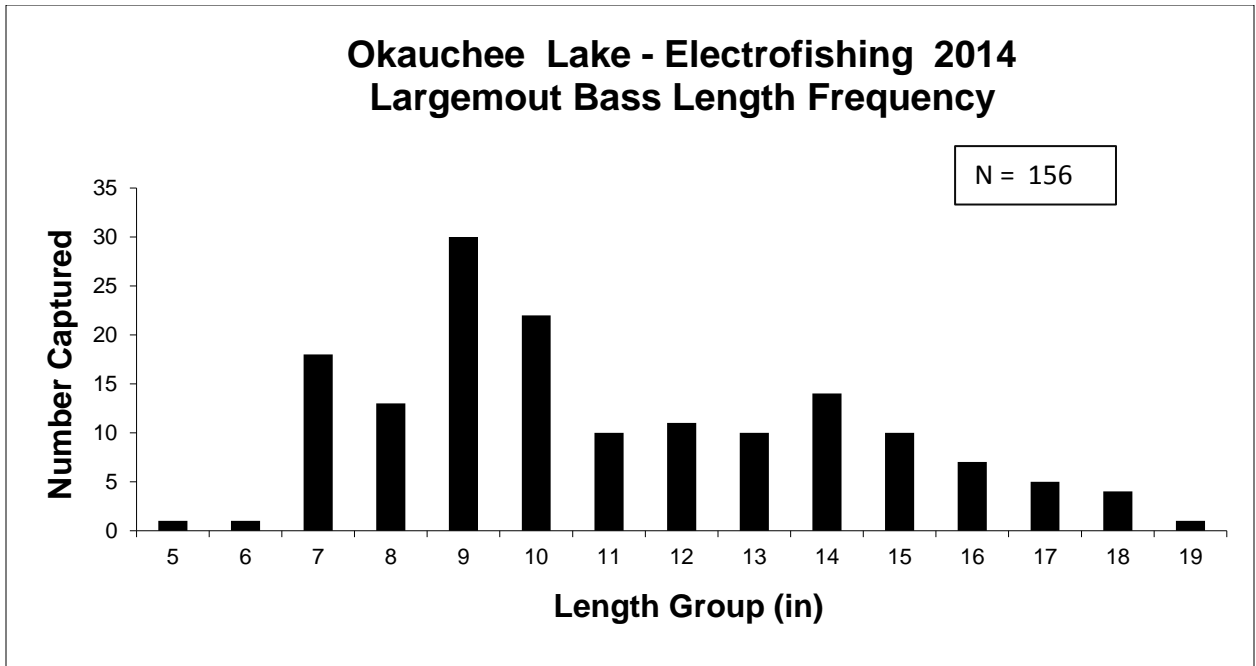


Figure 10 - Largemouth bass length frequency distribution for Okauchee Lake. Fish were captured by electrofishing in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

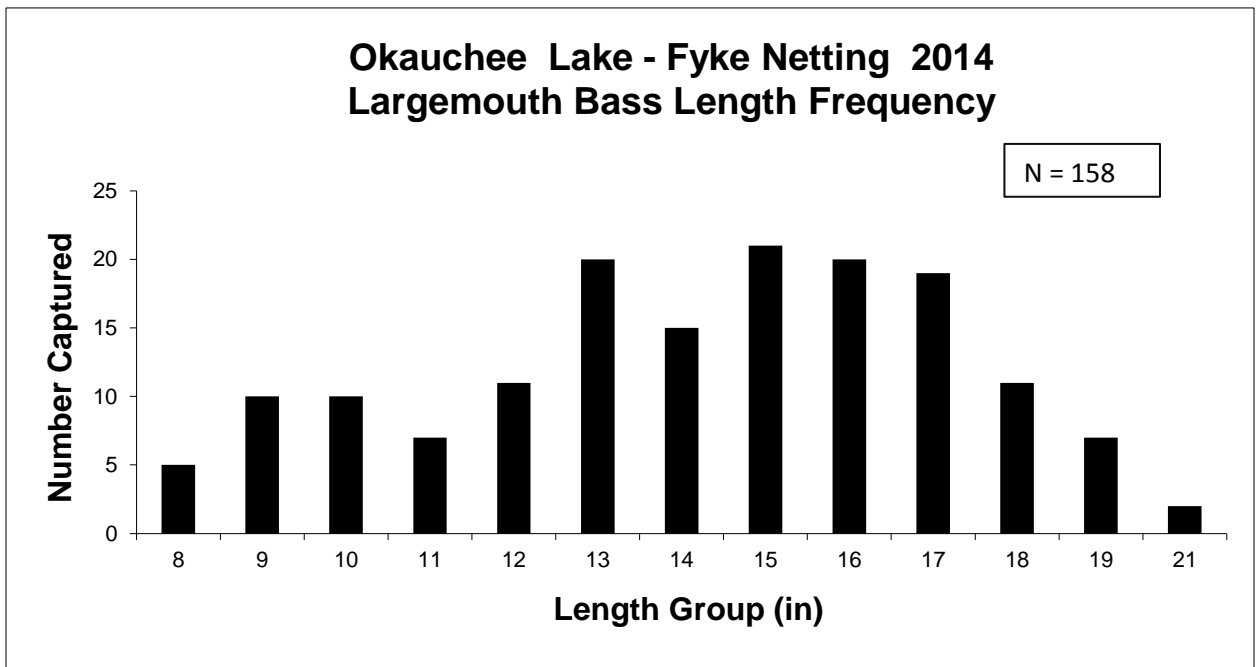


Figure 11 - Largemouth bass length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Largemouth bass size structure is described using proportional and relative stock densities in Table 8. When combining both gear types and using a stock length of 8 inches, PSD 12 was 60% while RSD 14 was 43%. The resulting RSD values demonstrate the balanced size and age structure of largemouth bass in Okauchee Lake.

	Electrofishing	Fyke Netting	Combined Gear
PSD 12	45%	80%	60%
RSD 14	30%	60%	43%
RSD 20	0%	1.3%	0.6%

Smallmouth Bass

Catch statistics were calculated for smallmouth bass and are displayed in Table 9. Significantly fewer smallmouth bass were captured than largemouth bass during both fyke netting and electrofishing during the 2014 survey. The 19 smallmouth bass capture while netting had an impressive average length of 15.8 inches, but catch rate was less than one bass per 14 net nights. Smallmouth bass were captured nearly ten times less than largemouth bass when using electrofishing gear.

Sex	Number Caught	Number Measured	Mean Length (in)	St. Dev	Max	CPE
Fyke Netting	20	19	15.8	2.1	18.8	0.07 per net night
Electrofishing	17	17	12.2	2.6	17.3	1.4 per mile

Despite the relatively small sample size of smallmouth bass, size structure appears to be well balanced with fish captured between 8 and 17 inches. Figure 12, inserted below, shows the diversity of smallmouth bass length groups sampled by electrofishing in 2014.

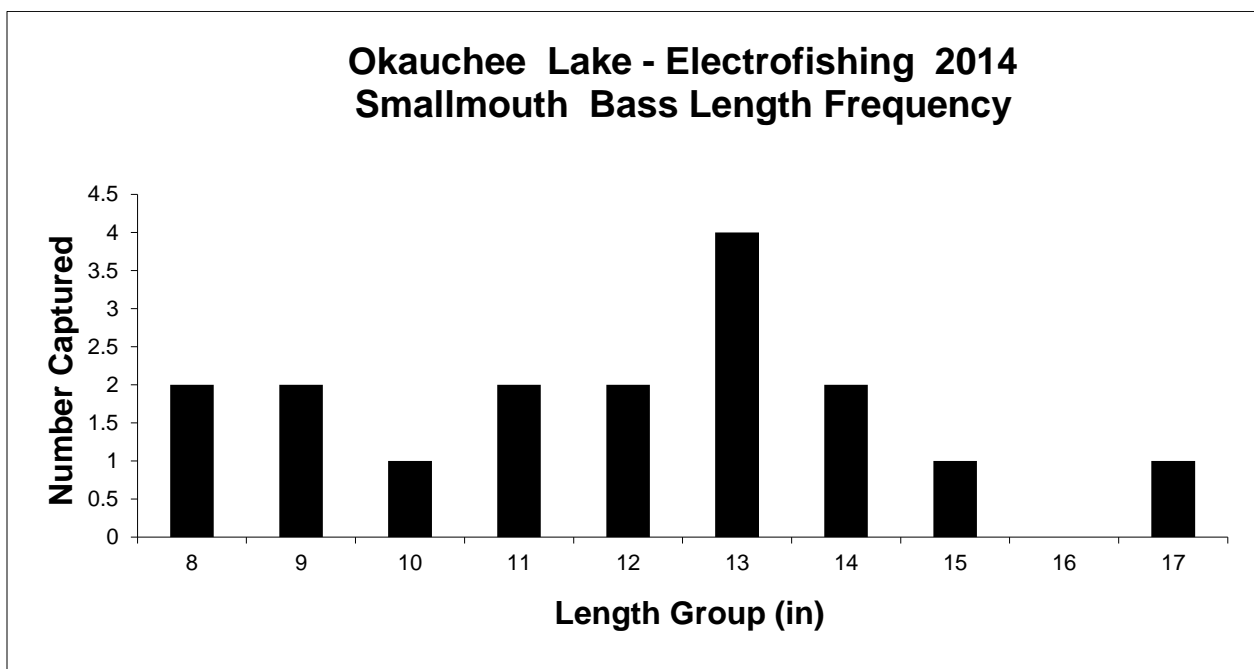


Figure 12 - Smallmouth bass length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Black Crappie

Okauchee Lake black crappies were captured at a good rate while fyke netting in both spring of 2013 and 2014. Most crappies were captured in shallow bays when temperatures approached the 50 degree mark. Icehouse bay produced the most fish and quality size structure was observed, Figure 13 inserted below. Using a stock length of 5 inches and quality length of 8 inches produced a PSD value of 57%. RSD 10 or a preferred length of 10 inches represented 46% of the sample while RSD 12 was estimated at 10%. The average length of black crappies was 8.7 inches with the largest being 13.2 inches. Only one black crappie was captured while electrofishing compared to 67 captured while fyke netting.

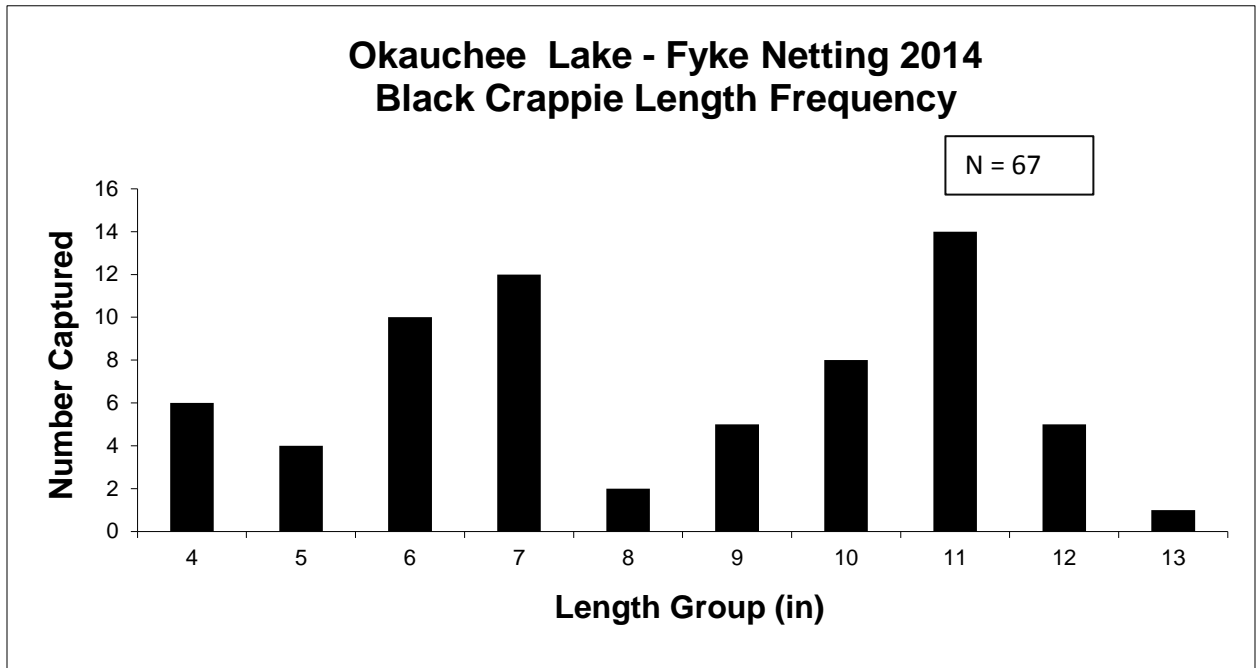


Figure 13 – Black Crappie length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Bluegill

Bluegill showed average size structure and moderate abundance while fyke netting and electrofishing. The average length of the 703 bluegills sampled while fyke netting was just over 5 inches with a mode of 4 inches. The largest bluegill captured while fyke netting was measured at 9.4 inches, Table 10 shows catch statistics while Figures 14 & 15 demonstrate bluegill length frequency distribution for both fyke netting and electrofishing.

Table 10 - Bluegill catch statistics for Okauchee Lake. Fish were captured electrofishing and fyke netting during the spring 2014 portion of a two year comprehensive fisheries assessment. Catch per unit effort is only calculated during catch all runs totaling 0.5 miles of electrofishing effort.

Gear	Number Measured	Mean Length (in)	St. Dev	Max	CPE
Fyke Netting	703	5.1	1.2	9.4	NA
Electrofishing	24	5.3	1.2	8.3	50 per mile

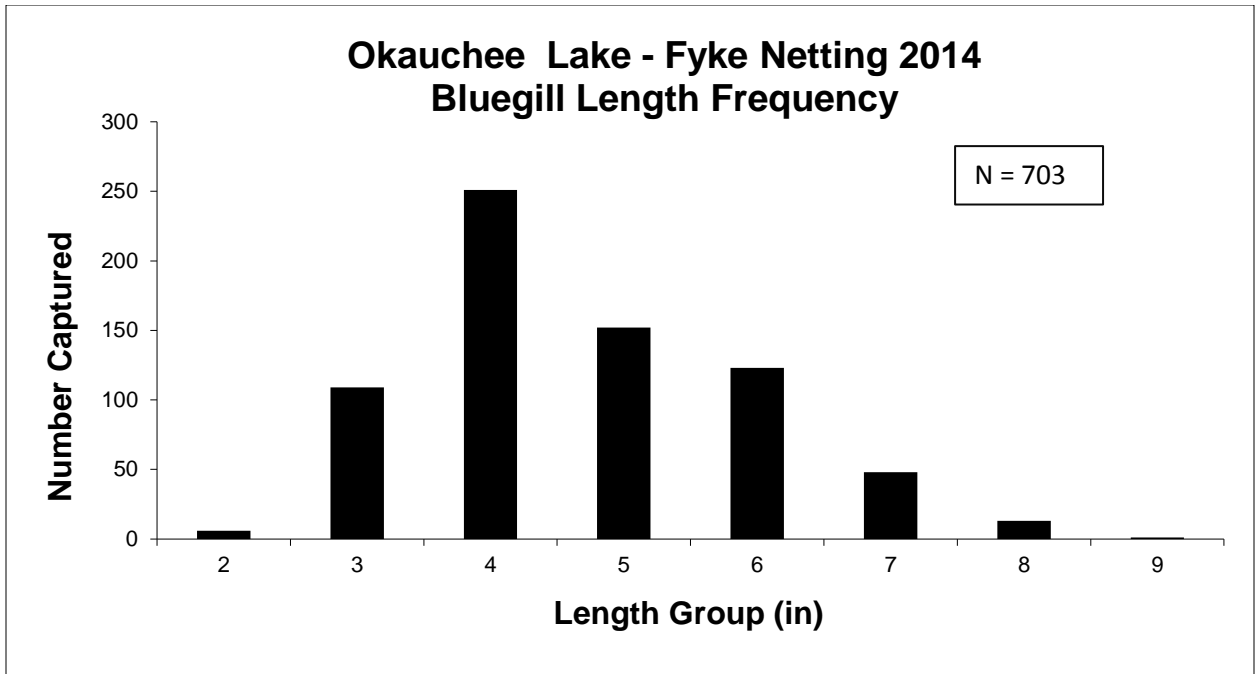


Figure 14 – Bluegill length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

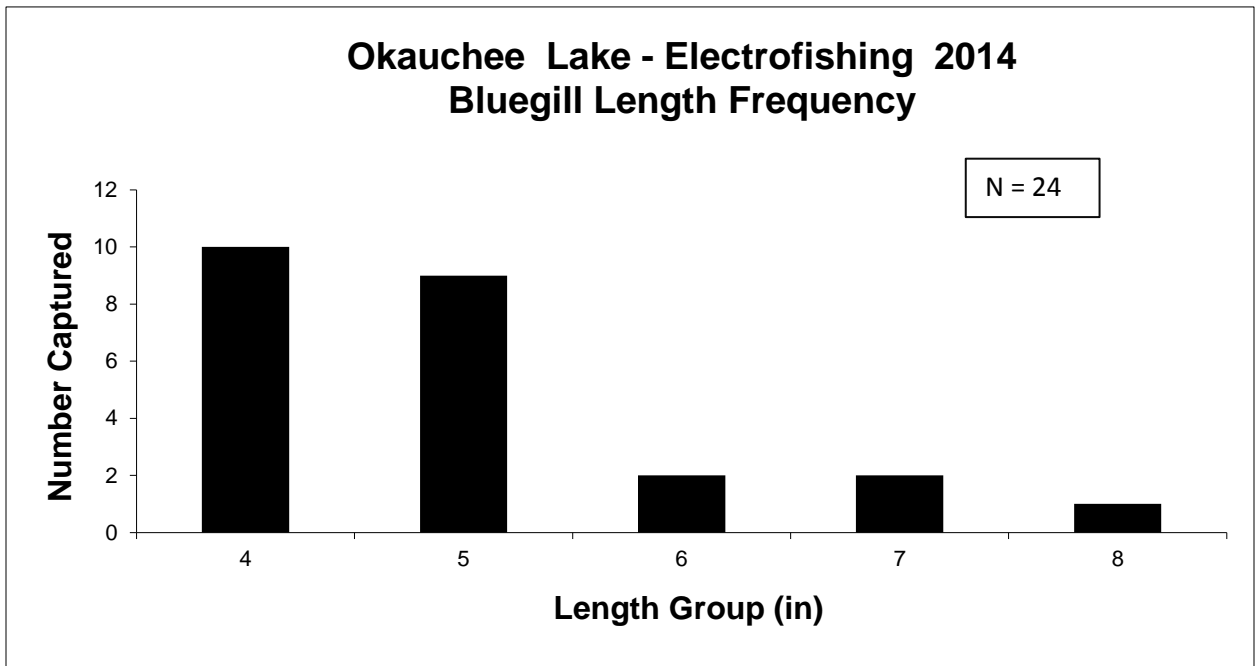


Figure 15 –Bluegill length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Other Species

Pumpkinseeds were captured at a moderate rate with slightly larger size structure than bluegill. The average length of pumpkinseed was 5.5 inches, (Figure 16) in comparison to 5.1 for bluegill.

Rock bass were captured at a low rate while average size was a respectable 7.9 inches with fish up to 11 inches observed (Figure 17). Other species observed over the course of the two year study include longnose gar, golden shiner, yellow perch, common carp, yellow bullhead and black bullhead.

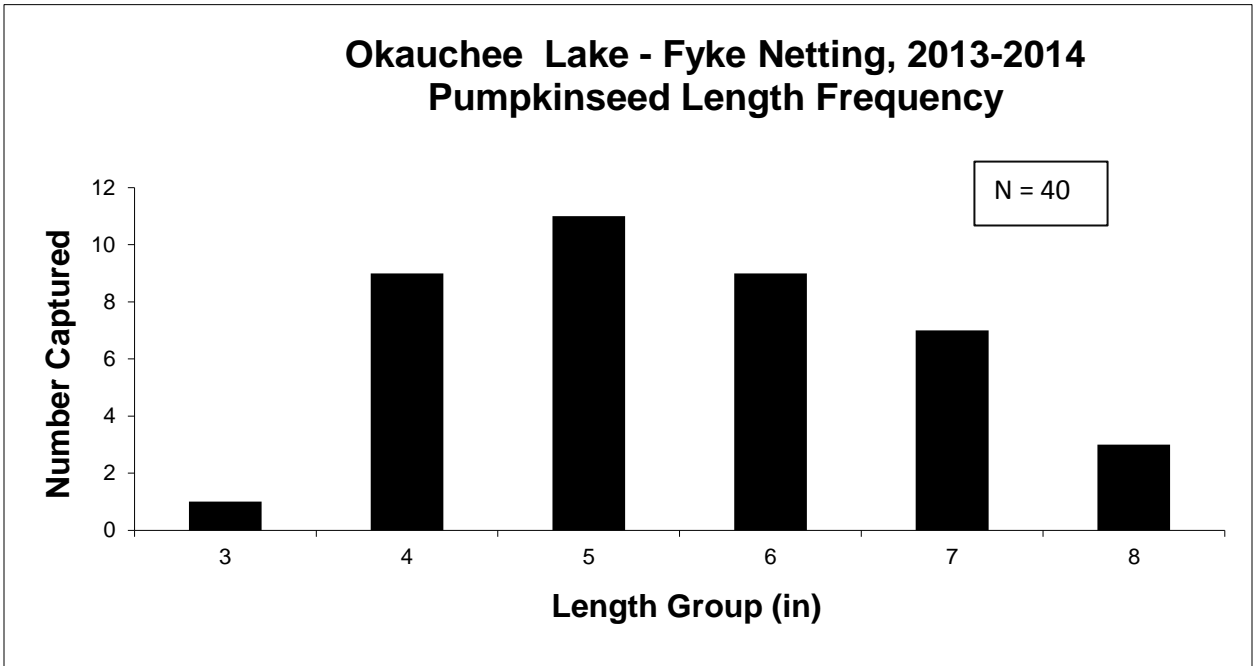


Figure 16 –Pumpkinseed length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

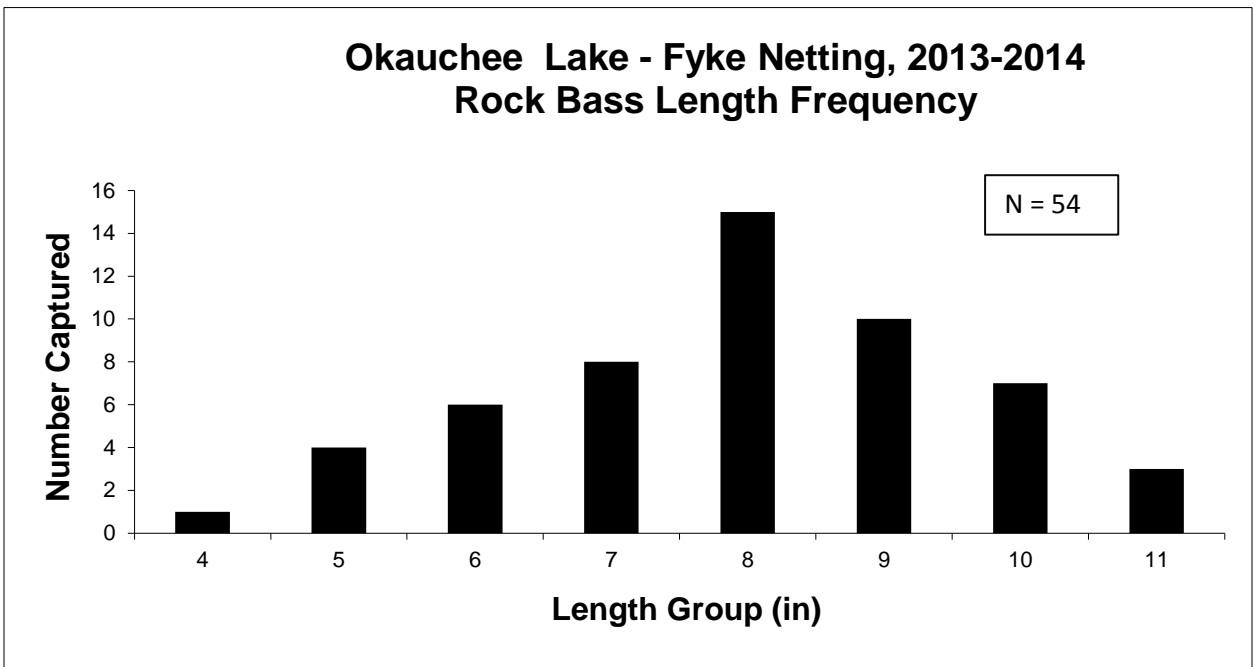


Figure 17 –Rock bass length frequency distribution for Okauchee Lake. Fish were captured by fyke netting in spring of the year during the 2014 portion of the comprehensive fisheries assessment.

Cisco

As a part of a statewide cisco monitoring effort implemented by WDNR fisheries research Okauchee Lake was vertically gill netted in 2013. Results were good with Okauchee Lake having the fourth highest catch rate of the 133 cisco lakes sampled from 2011-2014, (Lyons, 2014). Ciscos are an important forage species for Okauchee Lake resulting in excellent growth rates for popular gamefish species.

Stocking History

Okauchee Lake has an extensive stocking history including a very successful muskellunge stocking program started in 1982, (Table 11). Walleye stocking has been significantly less productive whether stocking small or large fingerlings. Additional small fingerling stocking evaluation results concluded that small fingerling stocking had very limited success, (Beyler, 2004). Hybrid “Tiger” muskellunge were stocked in Okauchee Lake from 1981 through 1989. The statewide hybrid muskellunge stocking program has been discontinued.

Year	Species	Age Class	Number Fish Stocked	Ave. Length
1982	MUSKELLUNGE	FINGERLING	500	11
1983	MUSKELLUNGE	FINGERLING	305	7
1984	MUSKELLUNGE	YEARLING	500	10
1985	MUSKELLUNGE	FINGERLING	500	12
1986	MUSKELLUNGE	FINGERLING	500	11
1987	MUSKELLUNGE	FINGERLING	1,911	10
1988	MUSKELLUNGE	FINGERLING	1,000	9
1989	MUSKELLUNGE	FINGERLING	500	11
1991	MUSKELLUNGE	FINGERLING	1,700	11
1992	MUSKELLUNGE	FINGERLING	3,250	11
1993	MUSKELLUNGE	FINGERLING	2,018	11.33
1994	MUSKELLUNGE	YEARLING	111	13
1996	MUSKELLUNGE	FINGERLING	10,006	5.15
1997	MUSKELLUNGE	YEARLING	110	14
1997	MUSKELLUNGE	LARGE FINGERLING	5,000	5.6
1998	MUSKELLUNGE	LARGE FINGERLING	276	14
1999	MUSKELLUNGE	LARGE FINGERLING	4,386	4.5
2000	MUSKELLUNGE	YEARLING	108	13
2000	MUSKELLUNGE	LARGE FINGERLING	250	9.2
2001	MUSKELLUNGE	LARGE FINGERLING	2,374	10
2001	MUSKELLUNGE	LARGE FINGERLING	385	12
2002	MUSKELLUNGE	LARGE FINGERLING	2,372	10.2
2003	MUSKELLUNGE	YEARLING	4	20
2003	MUSKELLUNGE	LARGE FINGERLING	2,374	10.5
2004	MUSKELLUNGE	LARGE FINGERLING	2,374	10.4
2004	MUSKELLUNGE	LARGE FINGERLING	250	12
2005	MUSKELLUNGE	LARGE FINGERLING	1,554	11.4
2005	MUSKELLUNGE	LARGE FINGERLING	550	10.5
2006	MUSKELLUNGE	LARGE FINGERLING	522	10.8
2007	MUSKELLUNGE	LARGE FINGERLING	1,583	12.4
2008	MUSKELLUNGE	LARGE FINGERLING	2,374	10.4
2009	MUSKELLUNGE	LARGE FINGERLING	1,055	10.6
2011	MUSKELLUNGE	LARGE FINGERLING	2,374	9.3
2012	MUSKELLUNGE	LARGE FINGERLING	2,374	9.6
2013	MUSKELLUNGE	LARGE FINGERLING	1,187	11.35

Year	Species	Stocking Type	Quantity	Rate
2014	MUSKELLUNGE	LARGE FINGERLING	1,185	9.5
1981	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	1,230	8
1982	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	500	9
1983	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	1,000	8
1984	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	1,900	9
1985	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	500	7
1986	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	1,200	7
1987	NORTHERN PIKE X MUSKELLUNGE	YEARLING	1,500	9
1988	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	500	7
1989	NORTHERN PIKE X MUSKELLUNGE	FINGERLING	500	7
1978	WALLEYE	FINGERLING	22,600	4
1979	WALLEYE	FINGERLING	60,003	2
1980	WALLEYE	FRY	2,200,000	-
1981	WALLEYE	FINGERLING	60,000	1
1982	WALLEYE	FINGERLING	71,425	2.83
1984	WALLEYE	FRY	1,200,000	1
1985	WALLEYE	FINGERLING	82,067	3
1986	WALLEYE	FINGERLING	59,087	3
1989	WALLEYE	FINGERLING	59,950	3
1990	WALLEYE	FINGERLING	71,100	2
1991	WALLEYE	FINGERLING	14,962	3.83
1992	WALLEYE	FINGERLING	62,400	2
1992	WALLEYE	FINGERLING	52,800	2
1999	WALLEYE	SMALL FINGERLING	25,000	-
1999	WALLEYE	SMALL FINGERLING	97,149	1.5
2005	WALLEYE	LARGE FINGERLING	3,700	7
2007	WALLEYE	LARGE FINGERLING	5,750	8
2014	WALLEYE	SMALL FINGERLING	42,359	1.38

Discussion

Muskellunge are currently managed as an A1 trophy fishery. The population estimate of 0.11 muskellunge per surface acre is considered within management goals for a trophy fishery. This estimate is lower than the 2002 survey results of 0.18 adult muskellunge per acre. Okauchee Lake has a reproductive classification of category 3 which means the population has no known natural reproduction of muskellunge. Stocking of muskellunge is required for maintenance of the population. Growth rates of muskellunge in Okauchee rate are excellent as a result of an abundant and diverse forage base. Okauchee Lakes' maximum depth of 93 feet of water and diversity of habitat results in excellent trophy potential for muskellunge. Emigration occurs with muskellunge as Oconomowoc Lake, which is downstream of the Okauchee Lake Dam, has developed into an A1 trophy muskellunge fishery as well. Further emigration has occurred to create fishable populations of muskellunge in downstream Fowler Lake and Lac LaBelle, although no attainable population estimates have been acquired due to the very low abundance. Upstream migration may have occurred at a low rate to North and Pine Lakes, but this population is sparse. Essentially, stocking Okauchee Lake at a rate of 1-2 per acre for the last 32 years has created four fishable populations of muskellunge on the Oconomowoc River Chain of Lakes. Total combined surface acreage the four lakes starting with Okauchee Lake downstream is 3,256 as shown in Table 12. When comparing muskellunge abundance to other area lakes; nearby Pewaukee Lake has over five times as many muskellunge per surface acre. Downstream Oconomowoc Lake has a similar abundance and size structure. Okauchee and Oconomowoc Lake are considered trophy waters while Pewaukee is considered action water, although Pewaukee has some trophy potential as well. Together, these waterbodies provide both trophy and action angling opportunities in the Waukesha – Oconomowoc area.

Table 13 - Oconomowoc Chain Fishable Muskellunge Waters Surface Acres	
Okauchee Lake	1187
Oconomowoc Lake	818
Fowler Lake	97
Lac LaBelle	1154
Total Surface Acres	3256

When examining northern pike abundance, fyke net data is best analyzed prior to the post spawn period or when the water temperature reached the 45 degree mark. The fyke netting effort during this period resulted in a CPUE of 2.6 northern pike per net night and a low confidence population estimate of 4.6 adult northern pike per acre. When examining northern pike size structure, RSD-26 resulted in only 2%, allowing very few fish for angler harvest. When examining annual mortality rate of adult northern pike ages 4 through 9, mortality is below average due to the fact that slower than average growth rates combined with the minimum length limit of 26 inches protects the bulk of this population from angler harvest. In summary, Okauchee Lake has high northern pike abundance with poor size structure. Both the abundance and size structure results are very similar to the 2002 comprehensive survey.

The walleye abundance in Okauchee Lake is very low but size structure is excellent. Recruitment of walleye has been a problem dating back to early walleye stocking efforts, (Schumacher, Beyler, 1988-2004). Large fingerling walleye stocking efforts in 2007 and 2009 accounted for 40% of the fish sampled during this survey. Although only four walleyes were captured from this stocking effort, only 9,450 large fingerlings were stocked during this two year period. Suggested large fingerling stocking rates are 10 per acre on an alternate year basis while this stocking effort averaged only 4 per surface acre on an alternate year basis. During the 2014 Oconomowoc Lake survey, walleyes with the left ventral and right ventral fin clip were observed in low abundance indicating downstream emigration may be occurring at a significant rate, similar to the muskellunge population.

Largemouth and smallmouth bass populations in Okauchee Lake are doing excellent providing angling opportunities for both action and trophy potential. Bass tournaments are held annually on Okauchee Lake with good success. Recruitment of largemouth bass is consistent as indicated by multiple year classes represented in this sample.

Panfish populations are thriving in Okauchee Lake with black crappies offering the highest quality angling opportunities. Black crappies have an excellent size structure and abundance combined with consistent recruitment. Bluegills provide some harvest opportunities but size structure is average. Occasional yellow perch and rock bass can supplement harvest opportunities with fair abundance and size structure.

Okauchee Lake Fisheries Management Recommendations

- Implement a northern pike regulation of a maximum length limit of 24” and a daily bag limit of 2 to improve size structure and provide angler harvest opportunity.
- Begin a large fingerling walleye stocking program at a rate of 20 per surface acre on an alternate year basis.
- Increase stocking rate to 2 muskellunge per surface acre using the combined surface acreage of 3,256 on an annual basis
- Continue to monitor bass and panfish populations through catch rates, average sizes, and abundance estimates.
- Implement storm water BMPs throughout the watershed to control nutrient loading into the lake.
- Reduce Eurasian Water Milfoil and curly leaf pondweed abundance using hand pulling, mechanical harvest or a selective herbicide.

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