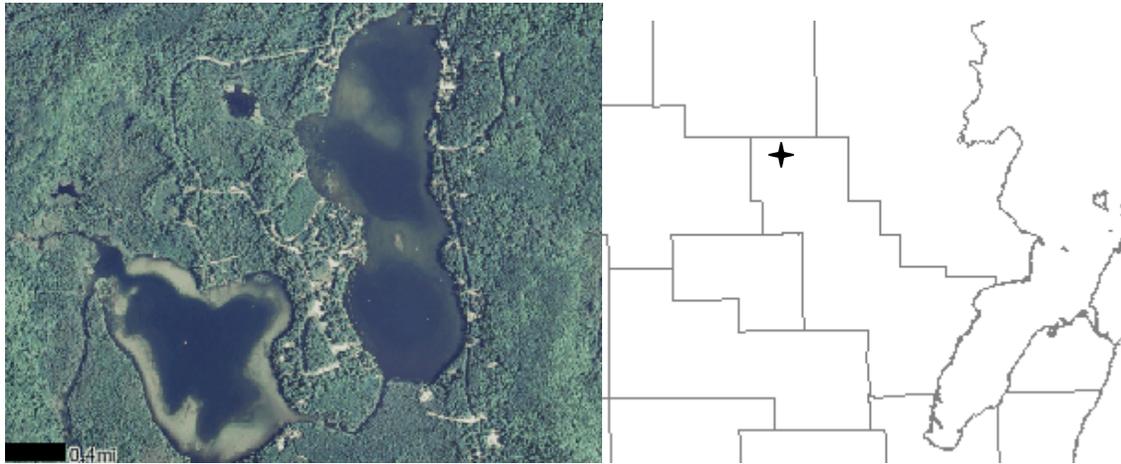
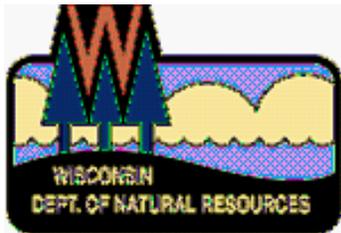


BEAR & MUNGER LAKES
Oconto County
2009 Fish Management Report

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Your purchase of fishing equipment
and motor boat fuel supports boating
access and Sport Fish Restoration.

March 2011

SUMMARY

Lake and location:

Bear Lake, Oconto County, T33N R16E Section 21

Physical / chemical attributes (Carson et al. 1977):

Surface acres: 78

Maximum depth (ft): 16

Lake type: drainage lake

Basic water chemistry: slightly alkaline with high transparency.

Littoral substrate: 75% marl, 20% muck, with the balance sand, gravel, and rubble.

Aquatic vegetation: Submergent vegetation is moderate in density in parts of the lake basin.

Other features: Bear Lake has three inlets from unnamed spring ponds and the outlet flows to Munger Lake. Navigable water type public access is available from Munger Lake. The shoreline is 50% upland consisting of hardwoods and 50% wetland composed primarily of swamp conifer.

Lake and location:

Munger Lake, Oconto County, T33N R16E Section 21

Physical / chemical attributes (Carson et al. 1977):

Surface acres: 97

Maximum depth (ft): 21

Lake type: drainage lake

Basic water chemistry: slightly alkaline with high transparency.

Littoral substrate: 88% muck, 10% sand, and 2% boulders.

Other features: The Town of Lakewood provides public access without parking. The shoreline is 80% upland consisting of mixed hardwoods and conifers and 20% wetland of shrub bog.

Purpose of survey:

Determine current status of fishery

Surveys:

WDNR Survey ID: 38151621 – Treaty fisheries assessment; April 14 to April 28, 2009

WDNR Survey ID: 38937711 – Fisheries assessments; Late spring bass and panfish; May 18, 2009

WDNR Survey ID: 38937714 – Fall recruitment survey; September 29, 2009

Fishery:

Rock bass, black crappie, and bluegill are abundant. Largemouth bass, yellow perch, and northern pike are common while walleye and muskellunge are present.

EXECUTIVE SUMMARY

- Bear and Munger Lakes, located in northern Oconto County, have been managed as a single system for several decades because fish are able to move freely between lakes. Bear Lake is 78 acres and Munger Lake is 97 acres. A public boat ramp is located on the east side of Munger Lake. Bear Lake can be accessed via a navigable channel from Munger Lake.
- The Wisconsin DNR regularly stocked muskellunge between 1957 and 1979. A 1987 survey documented natural reproduction of muskellunge but densities were low. The muskellunge stocking program was discontinued because natural reproduction was occurring and because silver pike, an extremely rare variant of northern pike, was present in both lakes.
- Overall, 4,019 fish representing 12 species and 1 hybrid were collected during the 2009 sampling season. The five most abundant species collected by number were rock bass (20%), black crappie (16%), bluegill (15%), yellow bullhead (12%), and largemouth bass (11%).
- A total of 621 black crappie ranging in length from 3.6 to 12.9 in was collected. A majority of black crappie (54%) were age 3 and averaged 5.0 in. The large age-3 year class was likely a result of the 2008 stocking of 750 fish. Successful reproduction and recruitment was evident indicating future stockings are not recommended and unnecessary to sustain this fishery.
- A total of 617 bluegill was collected. Bluegill ranged in length from 2.6 to 10.2 in and averaged 5.1 in. Bluegill PSD was 28 and within the desirable range for a balanced population.
- Four-hundred twenty-eight largemouth bass were collected during the 2009 survey. Bass ranged in length from 2.5 to 20.9 in and averaged 11.5 in. Largemouth bass PSD from the spring electrofishing sample was 35 and lower than the desirable range for a balanced population. Successful, consistent reproduction and excellent recruitment of largemouth bass was evident indicating that future stocking is unnecessary.
- A total of 69 walleye was collected and ranged in length from 6.6 to 25.3 in. Between 2003 and 2008, a total of 3,500 walleye were stocked. Walleye were reaching legal size (15 in) by age 3. Compared to the average mean length at age for northeast Wisconsin, walleye growth is about average at all ages. The Schumacher-Eschmeyer fyke net population estimate was 205 walleye or approximately 1.2 fish/acre.
- There was no evidence of natural reproduction of walleye. The stocking rate of large fingerling walleye has been inconsistent from year to year and inadequate to support a quality fishery. A more consistent stocking schedule should be implemented to improve walleye fishery. Annual stocking of 5 large fingerlings per acre or an alternate year stocking of 10 large fingerlings per acre is recommended (875 large fingerlings annually or 1,750 in alternate years).
- A total of 249 yellow perch was collected and accounted for 6% of the fish collected. Perch ranged in length from 2.9 to 10.4 in and averaged 6.3 in. Six percent of the perch collected were greater than 8.0 inches and of quality length. Successful reproduction and excellent recruitment of yellow perch was evident.
- Yellow perch stockings occurred in 1998 and 2003 and these fish have cycled through the population as indicated by the length frequency of perch collected in 2009. Successful reproduction and recruitment, as evidenced by the large year classes of age-3 and age-4 perch, suggests that future stockings are unnecessary and therefore not recommended.

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INTRODUCTION

Bear and Munger lakes are small drainage lakes located in northern Oconto County, Wisconsin. Bear Lake is 78 acres with a maximum depth of 16 feet (Figure 1). It has hard, slightly alkaline clear water which is extremely transparent. Most of the shoreline consists of upland mixed hardwoods and wetland swamp conifers. The littoral zone is 75% marl, 20% muck, with the remainder sand, gravel, and rubble.

Munger Lake is 97 acres with a maximum depth of 21 feet (Figure 2). Like Bear Lake, it has hard, slightly alkaline clear water. Eighty percent of the shoreline cover is a mixture of upland hardwoods and conifers while the remaining 20% is comprised of wetland shrub marsh. The littoral zone of Munger Lake is comprised of 88% muck, 10% sand, and 2% boulders.

A public boat ramp is located on the east side of Munger Lake. Bear Lake can be accessed via a navigable channel from Munger Lake and by foot across U.S. Forest Service and State property on the lake's western shoreline.

Bear and Munger Lakes have been managed as a single system for several decades because fish are able to move freely between lakes through a navigable channel. Between 1939 and 1951, these lakes were periodically stocked with northern pike and largemouth bass. The Wisconsin DNR regularly stocked muskellunge between 1957 and 1979. Surveys evaluating muskellunge stockings were conducted in 1970 and 1974 using electrofishing and fyke nets, respectively. A 1987 survey documented natural reproduction of muskellunge; but densities (fish / acre) were low in both lakes. The muskellunge stocking program was discontinued because natural reproduction was occurring and because silver pike, an extremely rare variant of northern pike, was present in both lakes. Three silver pike were collected during the 1987 survey.

Since the late 1990's, the Bear-Munger Lakes Management District has been stocking fish in both lakes (Table 1). Walleye has been the main focus of the stocking program although yellow perch, largemouth bass, and black crappie have also been stocked since 2003.

The last fisheries survey conducted on Bear and Munger Lakes in 2003 focused on gamefish recruitment utilizing mini-fyke nets and fall electrofishing targeting largemouth bass, northern pike, and walleye. On the other hand, sampling conducted in 2009 was a comprehensive fisheries survey that utilized spring fyke netting, spring electrofishing (April and May), and fall electrofishing which assessed 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).

METHODS

Data collection:

Five standard fyke nets (3-foot hoop, $\frac{3}{4}$ -bar, 1.5-inch stretch) on each lake and a standard WDNR Direct Current electrofishing boat were used to collect fish. Sampling gear, effort, date, and target species for the survey are listed in Table 2. Fish were measured to the nearest 0.1 inch total length (TL) and separated into half-inch groups (X.0-X.4 for inch group and X.5-X.9 for half-inch group). All fish were not measured in 2009. However, unmeasured fish were apportioned back to length groups based on the total number collected and presented in Table 4 and the length frequency tables located in Appendix III.

A sub-sample of scales or dorsal spines was collected for age and growth analysis from all gamefish. Aging structures (scales or spines) were collected from 5 non young-of-the-year (YOY) per half inch group. If gender could be determined, structures from 5 fish per sex were collected per half inch group. Aging structures for panfish and nongame fish consisted of 10 samples per half inch group when gender could not be established. Ages were assigned to each fish using standard WDNR procedures.

Data analysis:

Catch rates are expressed as electrofishing catch per unit effort or CPUE per hour/ mile and fyke net as net nights (NN) to provide a relative indication of catch rates. Inches are abbreviated as “in” in this report. Relative abundance was calculated as the percentage each species represented from the total sample (i.e. 22 fish of a species from a sample of 100 total fish = 22% relative abundance). CPUE was calculated as catch divided by sampling effort for each species collected. Length frequency distributions (both tables and figures) were tabulated for dominant gamefish and consisted of combined April, May, and October electrofishing samples as well as fyke net data. Proportional stock density 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), Anderson and Neumann (1996), and

Bister et al. (2000) (Table 3). Mean length at capture data was calculated for dominant gamefish and compared to an average of mean length at age for northeast Wisconsin.

RESULTS & DISCUSSION

Overall, 4,019 fish representing 12 species and 1 hybrid were collected during the 2009 sampling season (Table 4). The five most abundant species collected by number were rock bass (20%), black crappie (16%), bluegill (15%), yellow bullhead (12%), and largemouth bass (11%).

A total of 806 rock bass were collected and ranged in length from 3.8 to 9.7 in and averaged 6.2 in. Few rock bass greater than 7.5 inches were collected (Figure 3). Electrofishing CPUE was 21.3/h and fyke net CPUE was 6.3/NN (Appendix III). Rock bass PSD was 53 and RSD^P was 0. A subsample of 56 rock bass was aged from 3 to 9 years old. Age-4 and age-6 rock bass accounted for 29 and 26%, respectively. Age-4 rock bass averaged 5.8 inches while age-6 rock bass averaged 7.2 inches (Appendix III).

During the 2009 survey, a total of 621 black crappie was collected (Figure 4). Black crappie were collected electrofishing at a rate of 4.4/h and fyke netting at a rate of 4.9/NN (Appendix III). Crappie ranged in length from 3.6 to 12.9 in and averaged 6.4 in. Black crappie PSD 27 was and RSD^P was 10. A subsample of 93 crappie was aged from 2 to 10 years old. A majority of black crappie (54%) were age 3 and averaged 5.0 in (Appendix III). The large age-3 year class was likely a result of the 2008 stocking of 750 fish averaging 4.0 in (Table 1). Successful reproduction and recruitment of crappie was evident. The length frequency and age-length key suggests that the crappie population is well balanced in terms of age and size structure (Appendix III). The growth of black crappie was below averaged compared to other lakes in northeast Wisconsin (Figure 5).

A total of 617 bluegill was collected yielding an electrofishing CPUE of 51.2/h and a fyke net CPUE of 4.6/NN (Appendix III). Bluegill ranged in length from 2.6 to 10.2 in and averaged 5.1 in (Figure 6). Bluegill PSD was 28, and within the desirable range for a balanced population (Table 3), while RSD^P was 1. Twenty-six percent of the bluegill collected were 6 in or greater and considered harvestable. A subsample of 48 bluegill was aged from 3 to 8. Forty-one percent of bluegill were age 3 and averaged 4.1 in (Appendix III). Age-4 bluegill accounted for 25% of the bluegill aged and averaged 5.2 in. However, age-5 bluegill averaged 5.1 in and accounted for 10% of the bluegill aged. A large year class of age-6 bluegill averaged 6.7 in and

accounted for 16% of those aged. A single age-8 bluegill measured 10.2 in. Bluegill growth was below average compared to the average mean length at age for northeast Wisconsin (Figure 7).

Yellow bullhead accounted for 12% of the fish collected and was the fourth most abundant species collected in 2009 (Table 4). Yellow bullhead ranged in length from 5.8 to 13.7 in and averaged 10.6 inches.

Four-hundred twenty-eight largemouth bass were collected during the 2009 survey. Spring electrofishing yielded a CPUE of 73.8/h and fall electrofishing a CPUE of 27.4/h (Appendix III). Largemouth bass were collected using fyke nets at a CPUE of 1.5/NN. Bass ranged in length from 2.5 to 20.9 in and averaged 11.5 in (Figure 8). Largemouth bass PSD and RSD^P from the spring electrofishing sample was 35 and 5, respectively. Bass PSD was lower than the desirable range for a balanced population (Table 3). A subsample of 115 largemouth bass was aged from 2 to 15 years old (Appendix III). A strong year class of age-4 bass averaging 10.0 in contributed to the low PSD. A large number of age-7 bass between 13.0 and 14.4 in were present and correspond to the 2003 stocking (Figure 8, Table 1, Appendix III). Bass are reaching legal size (14 in) between age 6 and age 7. Successful reproduction and excellent recruitment of largemouth bass was evident. The length frequency and age-length key suggests that the bass population is well balanced in terms of age and size structure (Appendix III). Largemouth bass growth was slightly below average for bass less than 14 inches compared to the average mean length at age for largemouth in northeast Wisconsin. Growth was variable from age 7 to age 15 (Figure 9).

Pumpkinseed comprised 9% of the fish collected (Table 4). Electrofishing produced a pumpkinseed CPUE of 29.3/h and a fyke net CPUE of 2.6/NN. Pumpkinseed ranged in length from 3.2 to 8.2 in and averaged 5.8 in (Figure 10). A subsample of 63 pumpkinseed was aged from 3 to 8 years old. Twenty-eight percent of pumpkinseed were age 5 and averaged 6.2 in (Appendix III). Age-4 and age-6 pumpkinseed each made up 19% of the fish collected and averaged 5.2 and 7.0 in, respectively.

A total of 249 yellow perch was collected and accounted for 6% of the fish collected (Table 4). Perch ranged in length from 2.9 to 10.4 in and averaged 6.3 in (Figure 11). Six percent of the perch collected were greater than 8.0 inches and of quality length (Table 3; Figure 11). A subsample of 57 yellow perch was aged from 2 to 7 years old. Forty-two percent of the perch were age 3 and averaged 6.6 in and 26% were age 4 and averaged 7.4 in. Age-6 yellow perch represented approximately 2% of the fish collected and correspond to the 2003 or 2004

stocking, depending on the size/age at stocking (Table 1; Appendix III). Successful reproduction and excellent recruitment of yellow perch was evident. The length frequency and age-length key suggests that the 2009 population had a satisfactory size and age structure (Appendix III).

Northern pike accounted for 5% of the fish collected in 2009. A total of 216 pike was collected and ranged in length from 8.6 to 29.8 in, while averaging 18.8 in (Figure 12). Northern pike electrofishing CPUE in was 5.9/h. Fyke netting CPUE was 1.4/NN. Pike PSD was 47 RSD^P was 2. The Schumacher-Eschmeyer fyke net population estimate was 1,049 northern pike or approximately 6.0 fish/acre. The northern pike population is healthy with numerous fish between 17 and 22 in, but few fish over the minimum length limit of 26 in (Figure 8).

A total of 69 walleye (this total includes recaptured fish) was collected during both electrofishing (2.3/h in the spring; 1.3/h in the fall) and fyke netting (0.4/NN). Walleye ranged in length from 6.6 to 25.3 in and averaged 16.2 in (Figure 13). Walleye PSD was 71 and RSD^P was 38. Walleye PSD was higher than the desirable range of 30 to 60 (Table 1). Between 2003 and 2008, a total of 3,500 walleye were stocked (Table 1). A subsample of 33 walleye was aged from 2 to 8 years old. Walleye were reaching legal size (15 in) by age 3. Age-6 walleye averaged 20.3 in and accounted for 28% of the walleye collected (Appendix III). It is unclear why this year class was stronger than other years when walleye was stocked at the same rate. Compared to the average mean length at age for northeast Wisconsin, walleye growth is about average at all ages (Figure 14). The Schumacher-Eschmeyer fyke net population estimate was 205 walleye or approximately 1.2 fish/acre. Three walleye ranging in length from 12.0 to 15.0 in were collected during the 2.3 h fall YOY assessment.

Seven muskellunge ranging in length from 39.0 to 47.5 in were collected. Muskellunge stockings were discontinued in 1979 because of the presence of silver pike in Bear and Munger Lakes. The muskellunge population is being maintained by natural reproduction. Additionally, golden shiner and brown bullhead were collected during the 2009 survey. In total, these 3 species accounted for less than 1% of all fish collected.

CONCLUSIONS & RECOMMENDATIONS

The 2009 fisheries survey of Bear and Munger Lakes indicated good numbers of gamefish including panfish species such as rock bass, black crappie, bluegill, and yellow perch and predator species such as largemouth bass and northern pike. All species showed good size and age structure and good recruitment. However, once bluegill, rock bass, and yellow perch are

greater than 7.0 or 7.5 in, the number of individuals declines rapidly. This is likely related to angler harvest. Additionally, the low largemouth bass PSD (35) and RSD^P (5) suggests that recruitment is good, but that there are few large fish (Figure 8).

The length frequency of northern pike (Figure 12) suggests that once a fish reaches 26 inches, then harvest of pike occurs. Northern pike are currently managed with a 2 fish / day and 26 inch minimum size limit (Table 5). This regulation was established to protect “silver pike”, a variant of northern pike. No silver pike were collected during the 2009 survey. The population estimate for northern pike revealed a density of approximately 6.0 fish per acre which is above average compared to other lakes in northern Wisconsin (Pierce et al. 2003). Due to the large forage base (panfish species) present and the need for predation on these species, no change in the regulations for northern pike is recommended at this time.

Yellow perch stockings occurred in 1998 and 2003 and these fish have cycled through the population as indicated by the length frequency of perch collected in 2009 (Appendix III). Successful reproduction and recruitment, as evidenced by the large year classes of age-3 and age-4 perch, suggests that future stockings are unnecessary and therefore not recommended.

In 2008, 750 four-inch black crappie were stocked. Now age 3, this year class will continue to cycle through the population. Growth at age 3 was below average. Due to the size of this year class, it is likely that growth for this year class will continue to be below average until these fish are removed from the population. At least 20 black crappie were collected per half-inch group between 6.5 and 9.0 in (Figure 4) and RSD^P was 10 (10% of the crappie collected were greater than the preferred size of 10 in; see Table 3). Year class strength for crappie populations is often variable because of their cyclic spawning nature. The size structure of the crappie collected in 2009 indicates that there are sufficient numbers of adult fish to reproduce and recruitment has been adequate to sustain a fishable population (Figure 4). Future stocking of black crappie is not recommended.

There was no evidence of natural reproduction of walleye and all fish collected were most likely a result of stocking. The stocking rate of large fingerling walleye has been inconsistent from year to year and inadequate to support a quality fishery. A more consistent stocking schedule should be implemented if the walleye fishery at Bear and Munger Lakes is going to improve. The walleye population estimate revealed a density of approximately 1.2 walleye/acre which is typical of what a self-sustaining population would produce. Annual stocking of 5 large fingerlings per acre or an alternate year stocking of 10 large fingerlings per

acre is recommended (875 large fingerlings annually or 1,750 in alternate years). Consistent stocking will create a more balanced population in terms of age and size structure as well as consistent fishing opportunities. Walleye growth was average at all ages (Figure 14) and should have a minimal impact on the fish community. It is recommended that walleye be fin clipped before stocking to determine the level of natural reproduction during future surveys.

The current fishing regulations for all species in Bear and Munger Lakes are adequate to protect and provide quality fishing for anglers (Table 5). Anglers fishing at Bear and Munger Lakes should have success targeting panfish (rock bass, bluegill, crappie, pumpkinseed, and yellow perch). The number northern pike that will be above the 26-inch minimum length limit may improve in the coming years (Figure 12). Additionally, the number of largemouth bass surpassing the 14-inch minimum length limit will likely increase over the next 2 years (Figure 8). Public access to these lakes could be improved since no public parking area is available at the boat ramp.

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APPENDIX I – TABLES

Table 1. Fish stocking history for Bear and Munger Lakes since 1998; Oconto County, WI.

Stocking Date	Species	Number Stocked	Avg Length (IN)
09/01/98	Yellow perch	1575	
11/14/03	Yellow perch	313	5
11/02/03	Walleye	476	5
07/10/03	Largemouth bass	2500	2
10/31/04	Walleye	600	
10/31/04	Yellow perch	625	
11/09/05	Walleye	500	
10/17/06	Walleye	500	7
11/08/07	Walleye	470	8
10/24/08	Walleye	313	7
11/08/08	Black crappie	750	4
11/24/10	Walleye	1300	

Table 2. Sampling gear, date, target species, sampling effort, and location (distance) for 2009 fisheries survey on Bear and Munger Lakes, Oconto County, Wisconsin.

Sampling Gear	Date	Target Species	Sampling Effort hours (h) or net night (NN)	Shoreline Distance (mi)
Fyke net	April 16 - April 28	All fish	126 NN	*
Electrofishing	23-Apr	walleye, northern pike	2.7 h	4.6
Electrofishing	18-May	All fish	0.7 h	1.0
Electrofishing	18-May	Gamefish	2.3 h	3.9
Electrofishing	29-Sep	YOY walleye	2.3 h	4.2

* GPS coordinates for electrofishing and fyke net locations located in APPENDIX III.

Table 3. Proposed length categories for various fish species. Measurements are total lengths for each category in inches. Updated from Anderson and Neumann (1996) and Bister et al. (2000).

Species	PSD	RSD-P	Stock	Quality	Preferred	Memorable	Trophy
Black crappie			5	8	10	12	15
Bluegill	20 - 60	5 - 20*	3	6	8	10	12
Brown bullhead			5	8	11	14	17
Largemouth bass	40 - 70	10 - 40*	8	12	15	20	25
Muskellunge			20	30	38	42	50
Northern pike	30 - 60		14	21	28	34	44
Pumpkinseed			3	6	8	10	12
Rock bass	20 - 60		4	7	9	11	13
Walleye	30 - 60		10	15	20	25	30
Yellow perch			5	8	10	12	15
Yellow bullhead			4	7	9	11	14

*Range based on management strategy for balanced populations.

Table 4. Relative abundance and length range of fishes collected in Bear and Munger Lakes, Oconto County, Wisconsin 2009.

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER			
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)
Rock bass	806	20.1	3.8 - 9.7
Black crappie	621	15.5	3.6 - 12.9
Bluegill	617	15.4	2.6 - 10.2
Yellow bullhead	475	11.8	5.8 - 13.7
Largemouth bass	428	10.6	2.5 - 20.9
Pumpkinseed	353	8.8	3.2 - 8.2
Yellow perch	249	6.2	2.9 - 10.4
Northern pike	216	5.4	8.6 - 29.8
Hybrid sunfish	149	3.7	3.5 - 8.7
Walleye	69	1.7	6.6 - 25.3
Golden shiner	27	0.7	not measured
Muskellunge	7	0.2	39.0 - 47.5
Brown bullhead	2	< 0.1	not measured
Total	4019		

*Common names of fishes recognized by the American Fisheries Society.

Table 5. 2010-11 fishing regulations for Bear and Munger Lakes, Oconto County, Wisconsin.

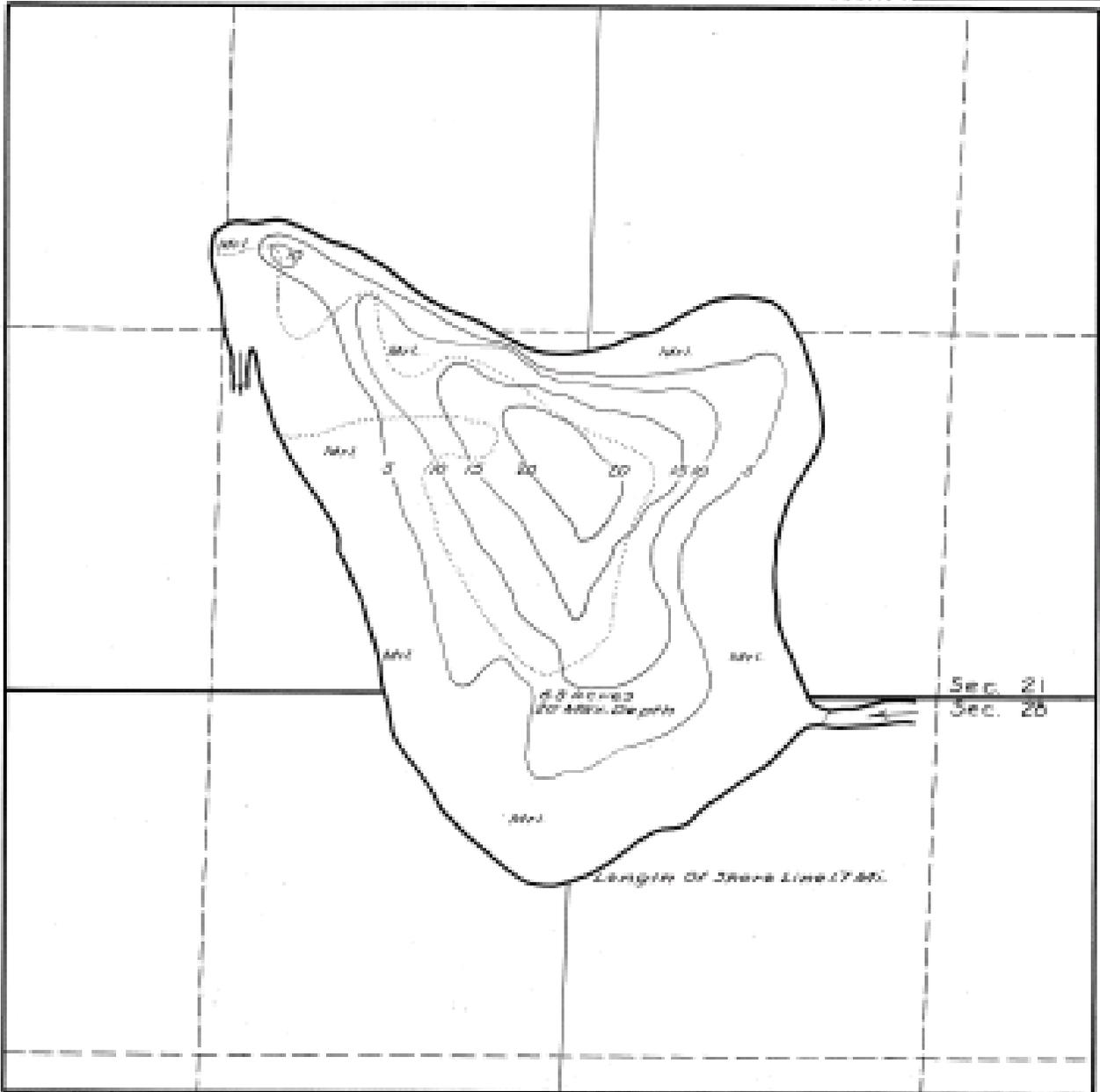
Species	Open Season	Daily Limit	Minimum Length
Largemouth and Smallmouth bass	1 st Saturday in May - June 18 June 19 - 1 st Sunday in March	0 5 in total	Catch and release 14 inches
Northern pike	1 st Saturday in May - 1 st Sunday in March	2	26 inches
Muskellunge	Last Saturday in May - November 30	1	34 inches
Walleye	May 1 - March 6	5	15 inches
Panfish (bluegill, pumpkinseed, crappie, and yellow perch)	Open all year	25 in total	None
Yellow bullhead	Open all year	None	None
Rock bass	Open all year	None	None
Trout species	1 st Sunday in May - 1 st Saturday in March	5 in total	7 inches

APPENDIX II – FIGURES

LAKE SURVEY MAP

WISCONSIN CONSERVATION DEPARTMENT
 BIOLOGY DIVISION
 LAKE AND STREAM IMPROVEMENT SECTION

LAKE DEAR
 SECTION 21-28
 TOWNSHIP 33 N
 RANGE 10 E
 TOWNSHIP WHEELER
 COUNTY ONEIDA



DATE July 24, 1952
 COMPILED BY W.C.S. R.C.P.
 TRACED BY W.C.S. R.C.P.
 SOURCE OF INFORMATION
U.S. Coast and Geodetic Survey
Robert Brown Survey
 SOUNDINGS 100s, 200s, 300s
U.S. Coast Service
 DATES OF MAP REVISION _____
 WORK AGENCY _____

LAKE IMPROVEMENT RECORD

TYPE	DATE				
BRUSH REFUGES	_____	_____	_____	_____	_____
SAPLING TANGLES	_____	_____	_____	_____	_____
SPANNING BOXES	_____	_____	_____	_____	_____
MINNOW SPANNERS	_____	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____	_____

SCALE 1/10000 = 1 inch = 200 feet

- LEGEND**
- NEED BEDS
 - ROCKY SHOALS
 - SAND
 - CLAY
 - GRAVEL
 - MUCK
 - DWELLING
 - ABANDONED DWELLING
 - RESORT
 - Advt Advt

Figure 1. Map of Bear Lake, Oconto County, Wisconsin (<http://dnr.wi.gov/lakes/maps/DNR/0471200a.pdf>).

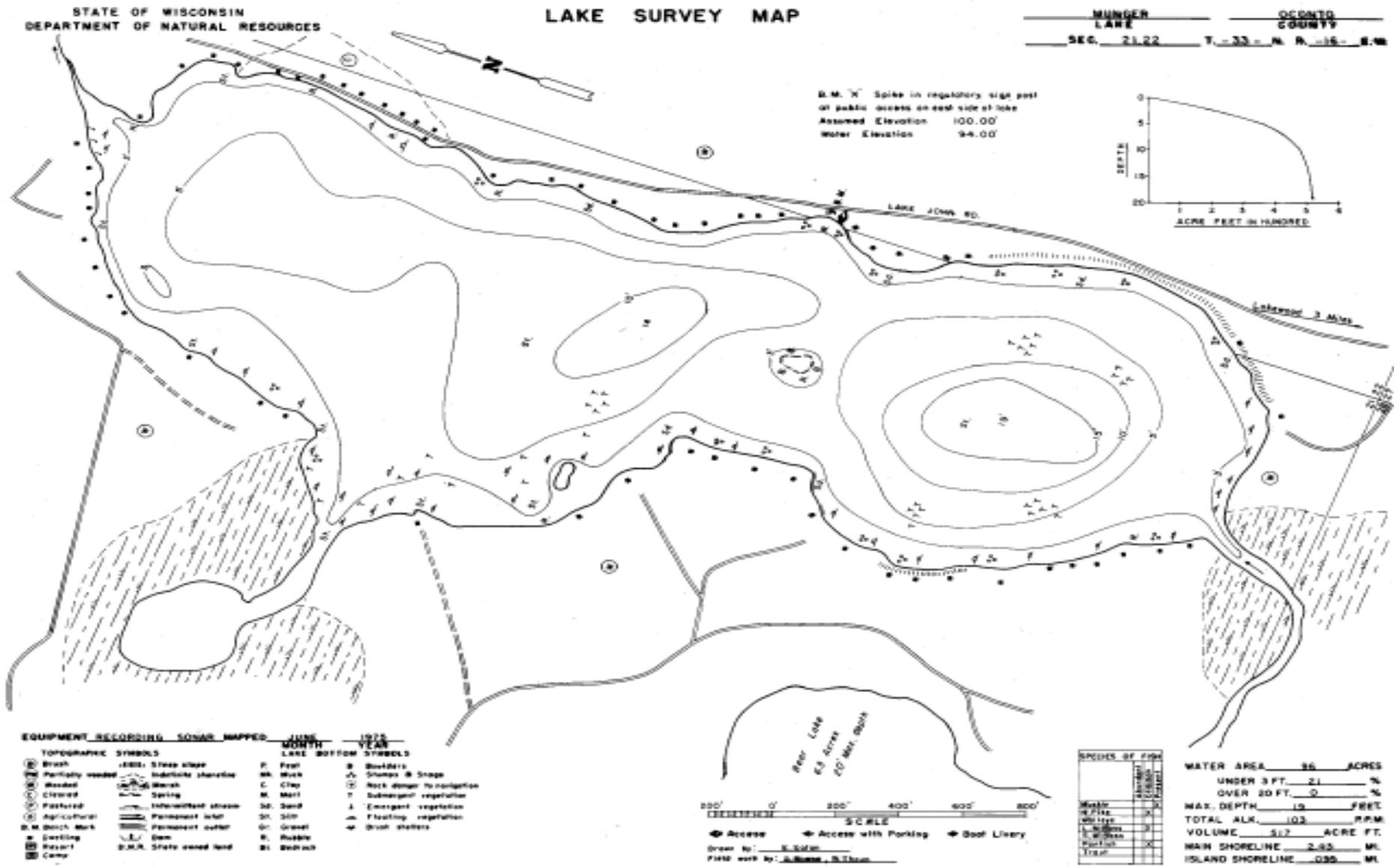


Figure 2. Map of Munger Lake, Oconto County, Wisconsin (<http://dnr.wi.gov/lakes/maps/DNR/0470900a.pdf>).

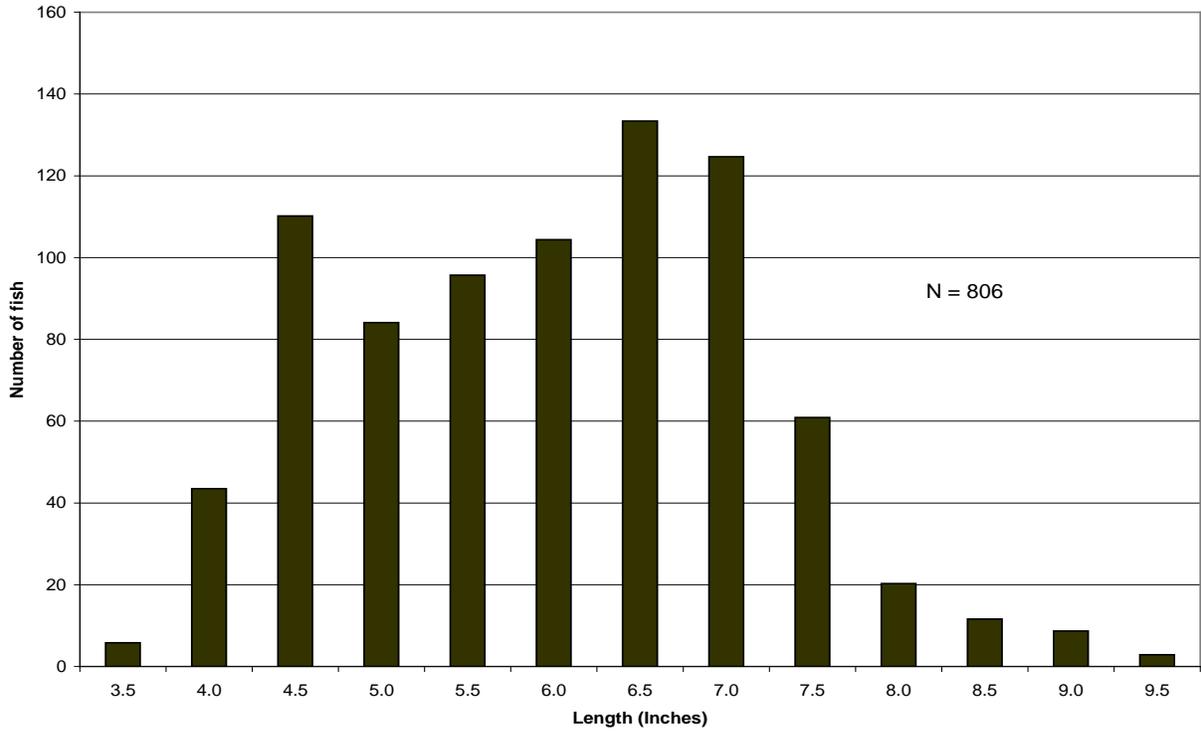


Figure 3. Rock bass length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

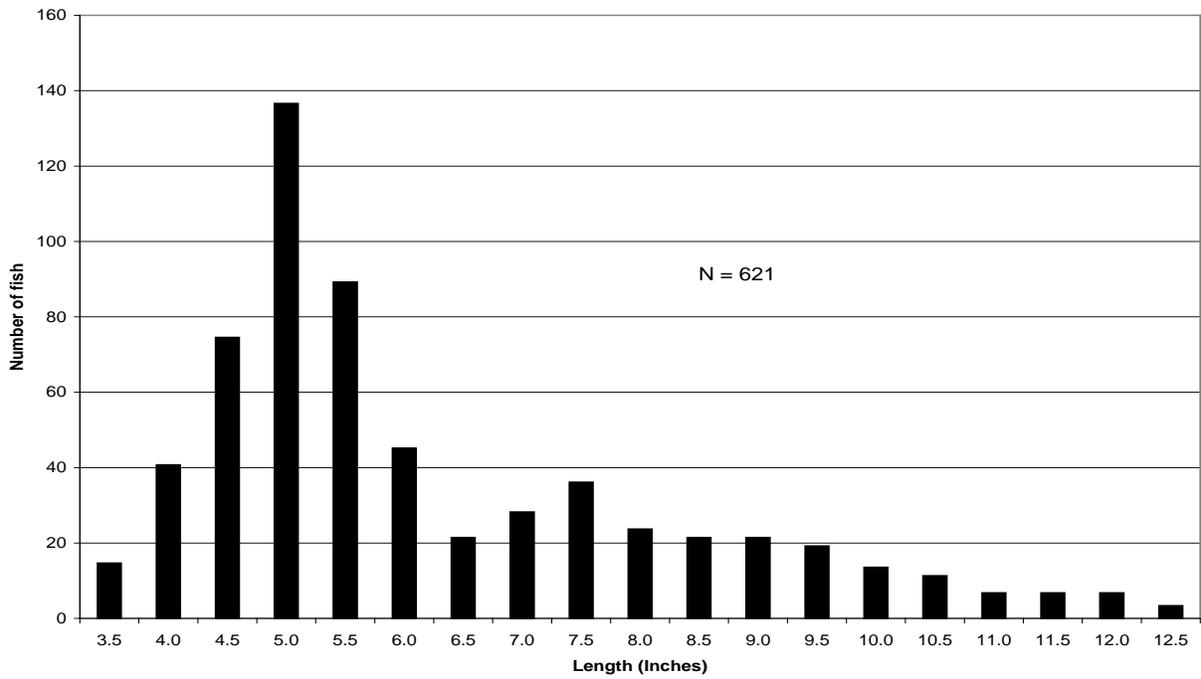


Figure 4. Black crappie length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

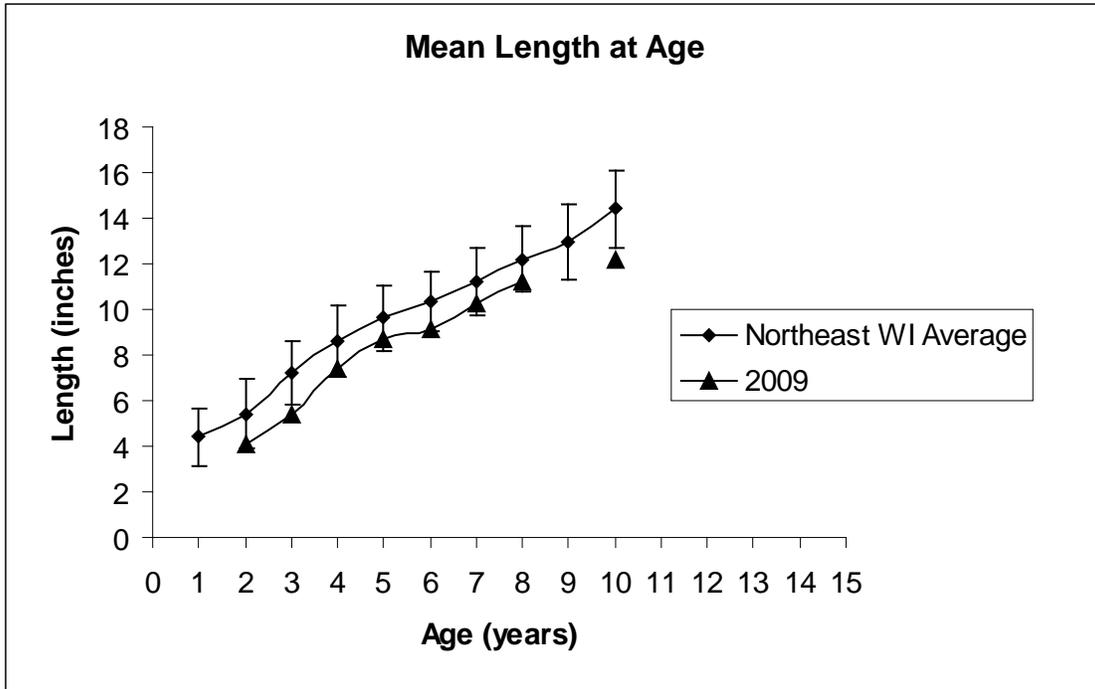


Figure 5. Black crappie mean length at age (+/- 1 SD); Bear and Munger Lakes, Oconto County, Wisconsin 2009.

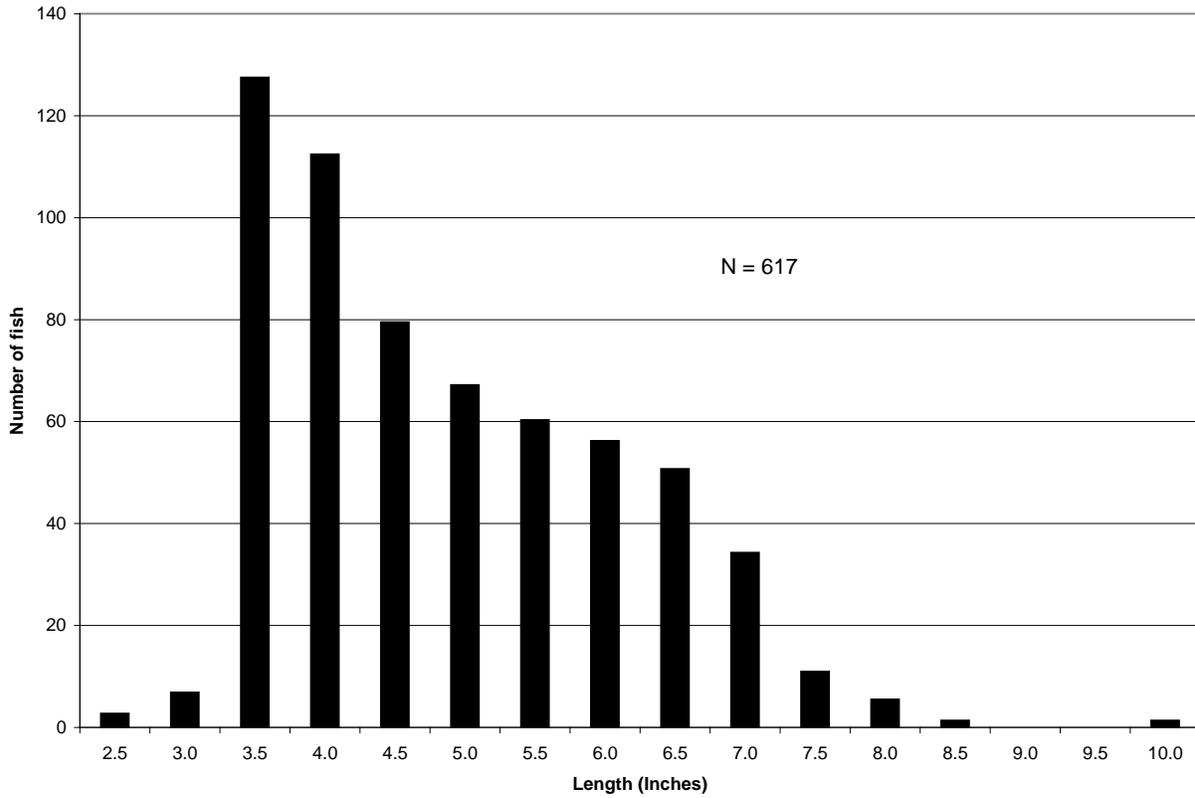


Figure 6. Bluegill length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

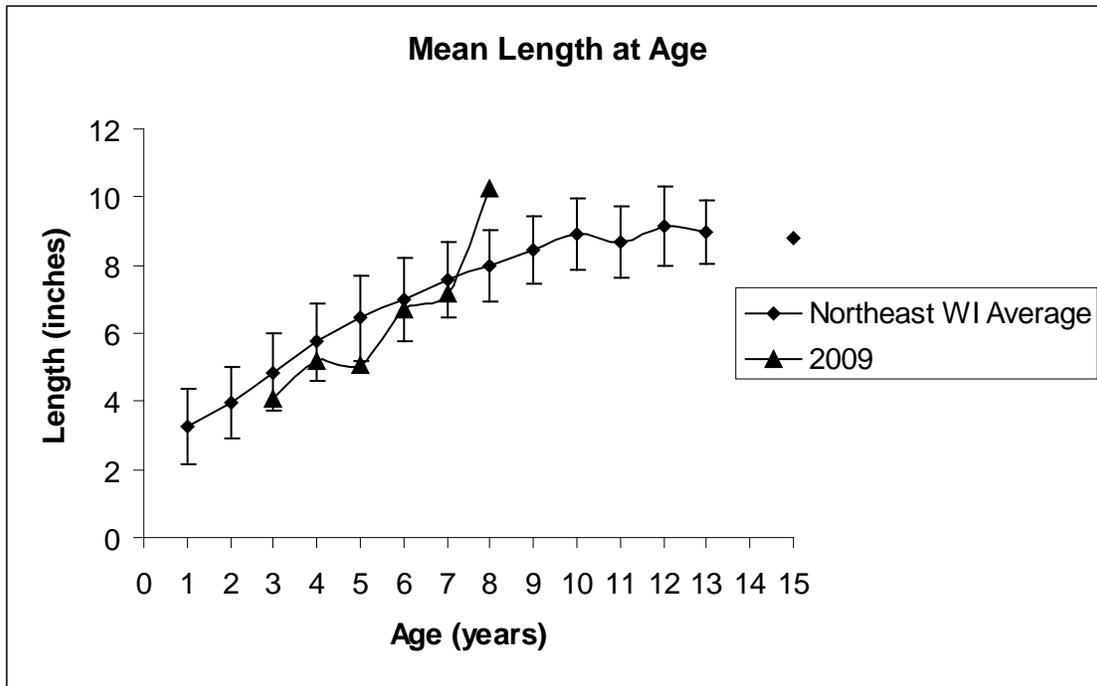


Figure 7. Bluegill mean length at age (+/- 1 SD); Bear and Munger Lakes, Oconto County, Wisconsin 2009.

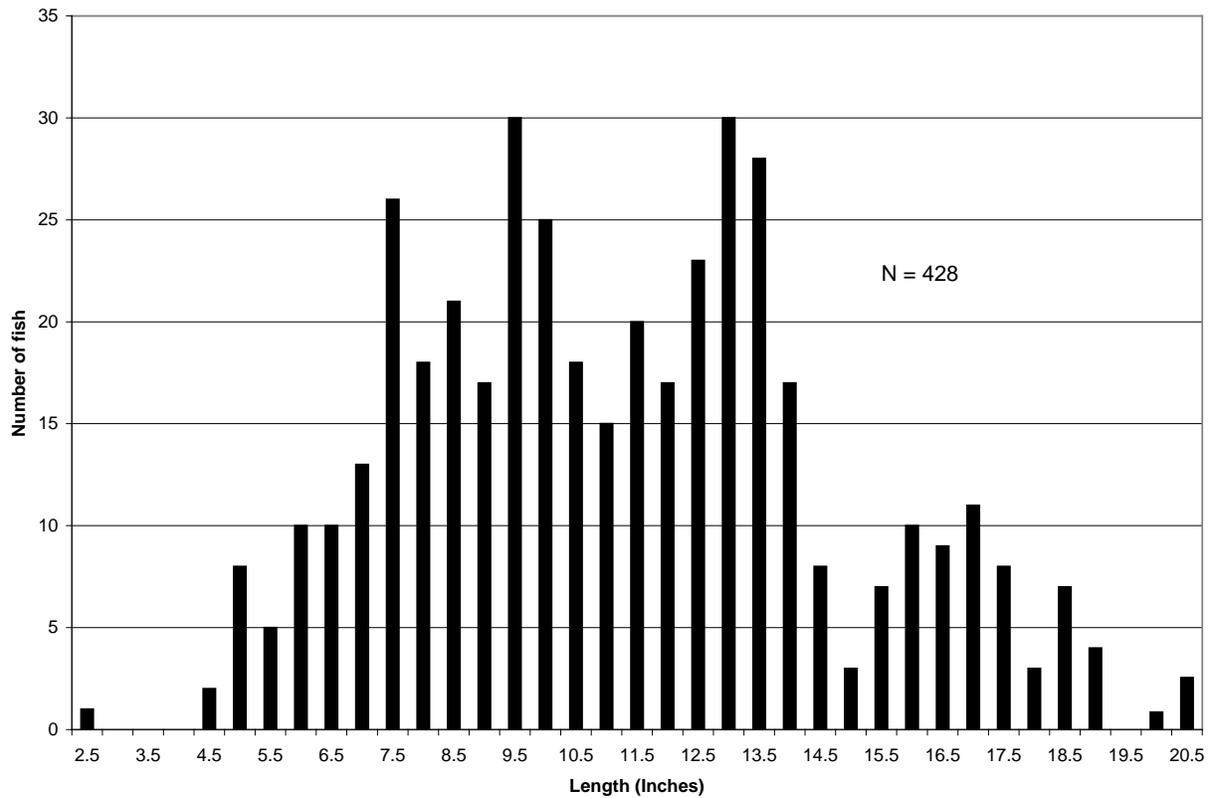


Figure 8. Largemouth bass length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

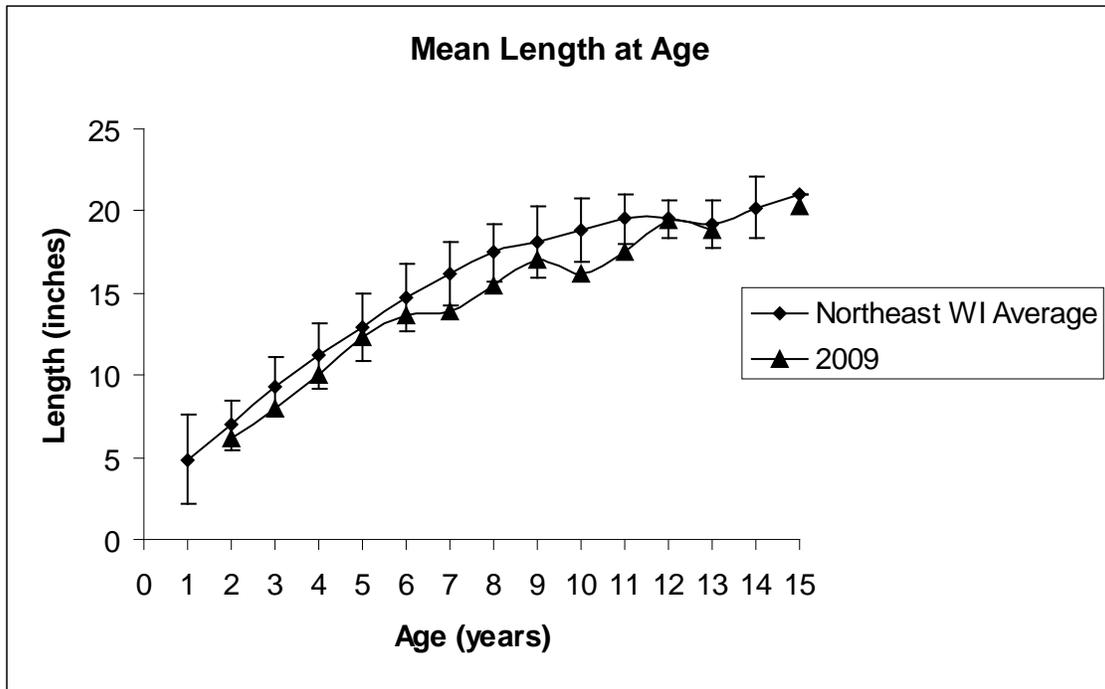


Figure 9. Largemouth bass mean length at age (+/- 1 SD); Bear and Munger Lakes, Oconto County, Wisconsin 2009.

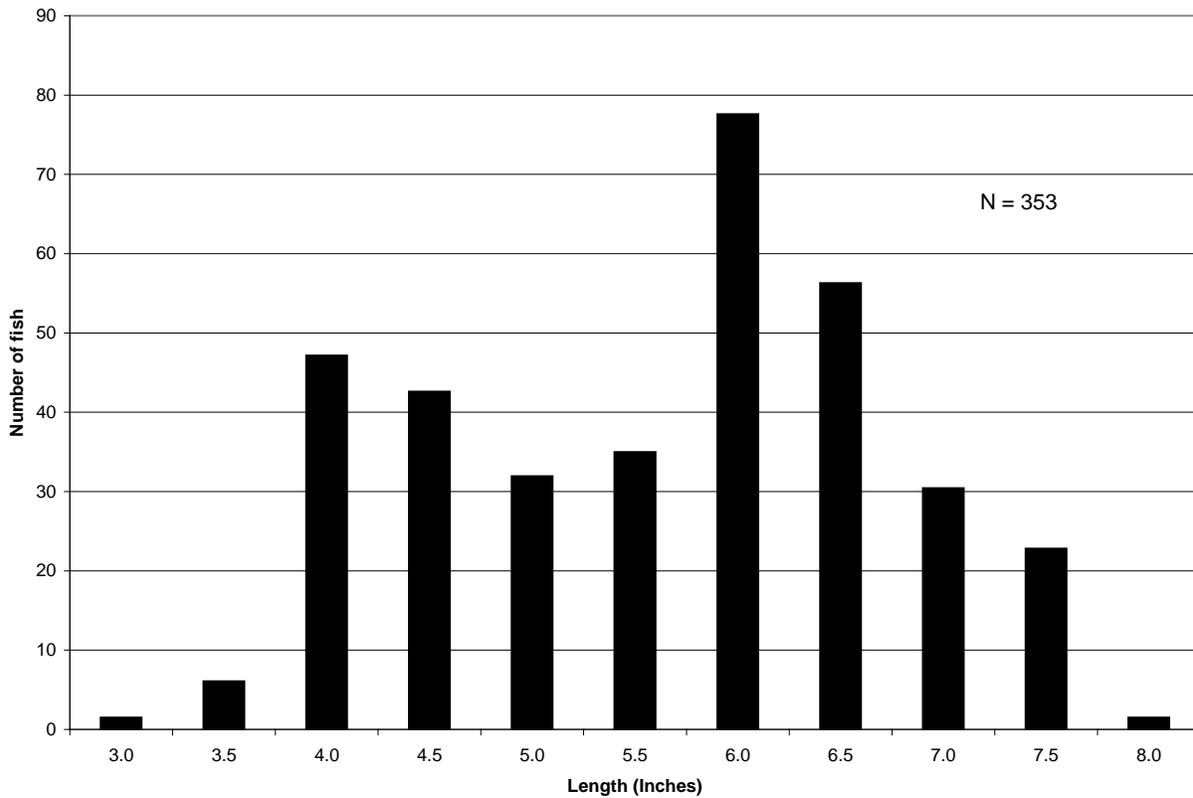


Figure 10. Pumpkinseed length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

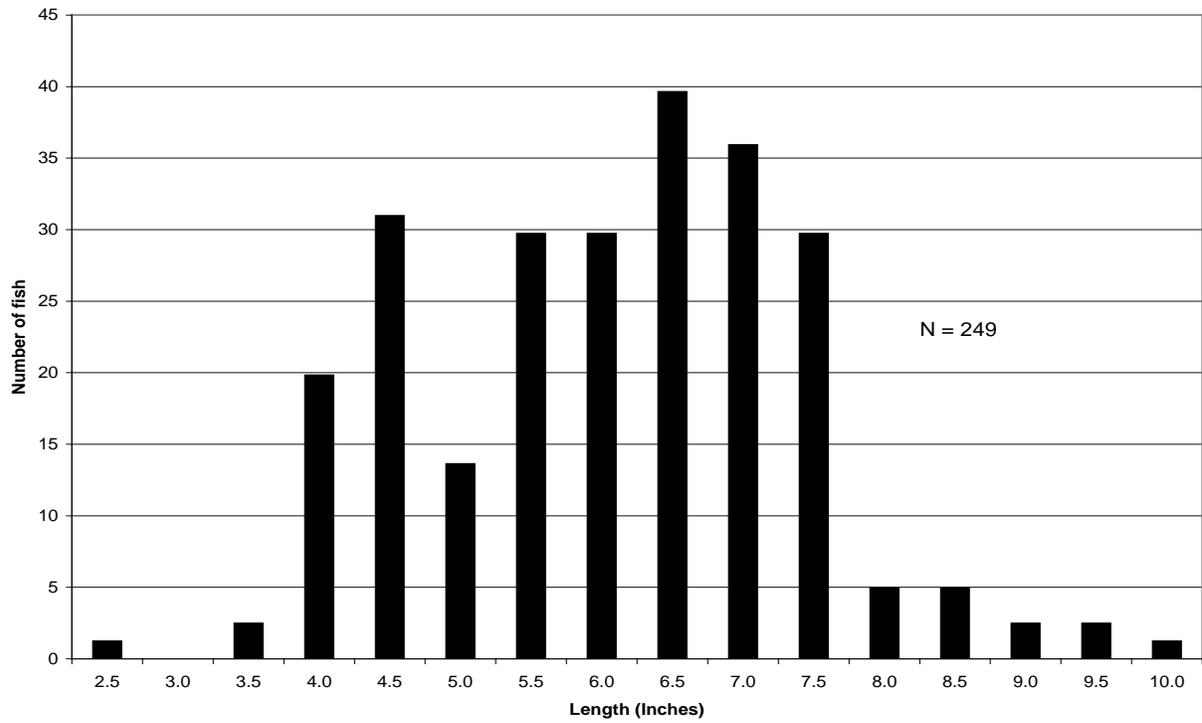


Figure 11. Yellow perch length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

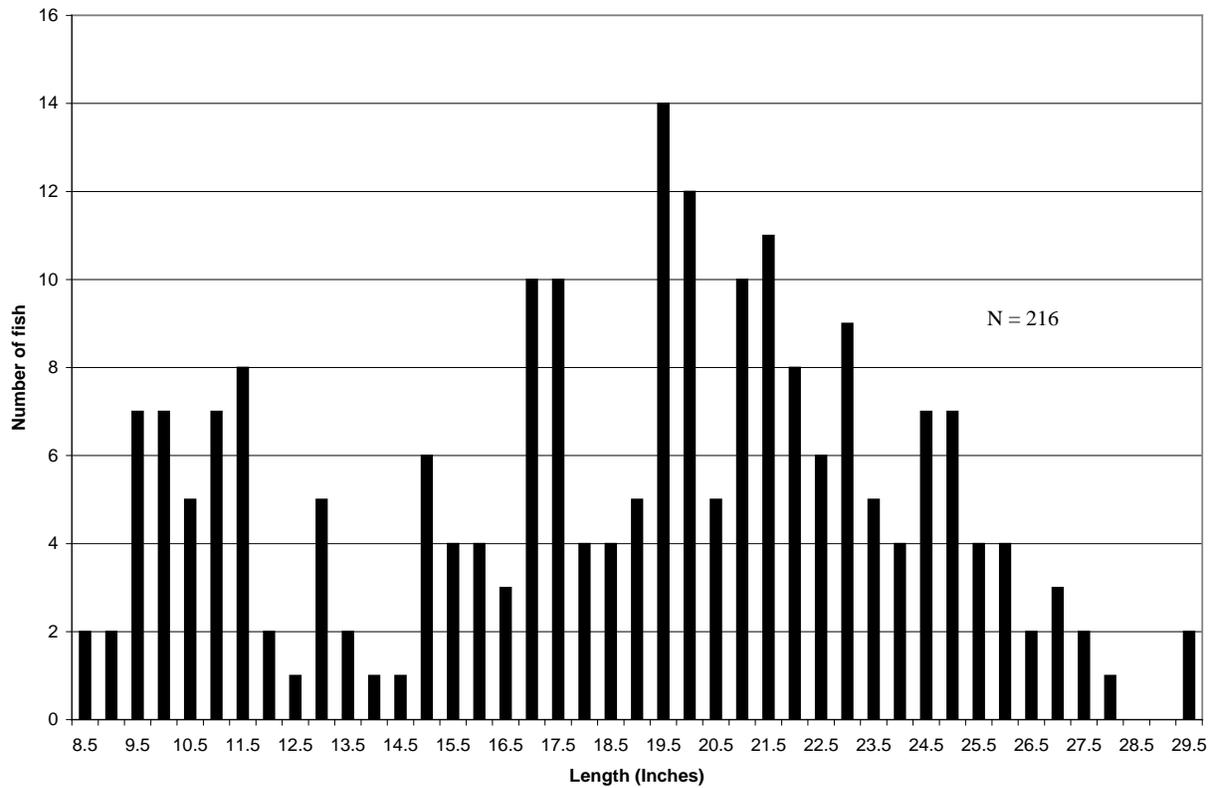


Figure 12. Northern pike length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

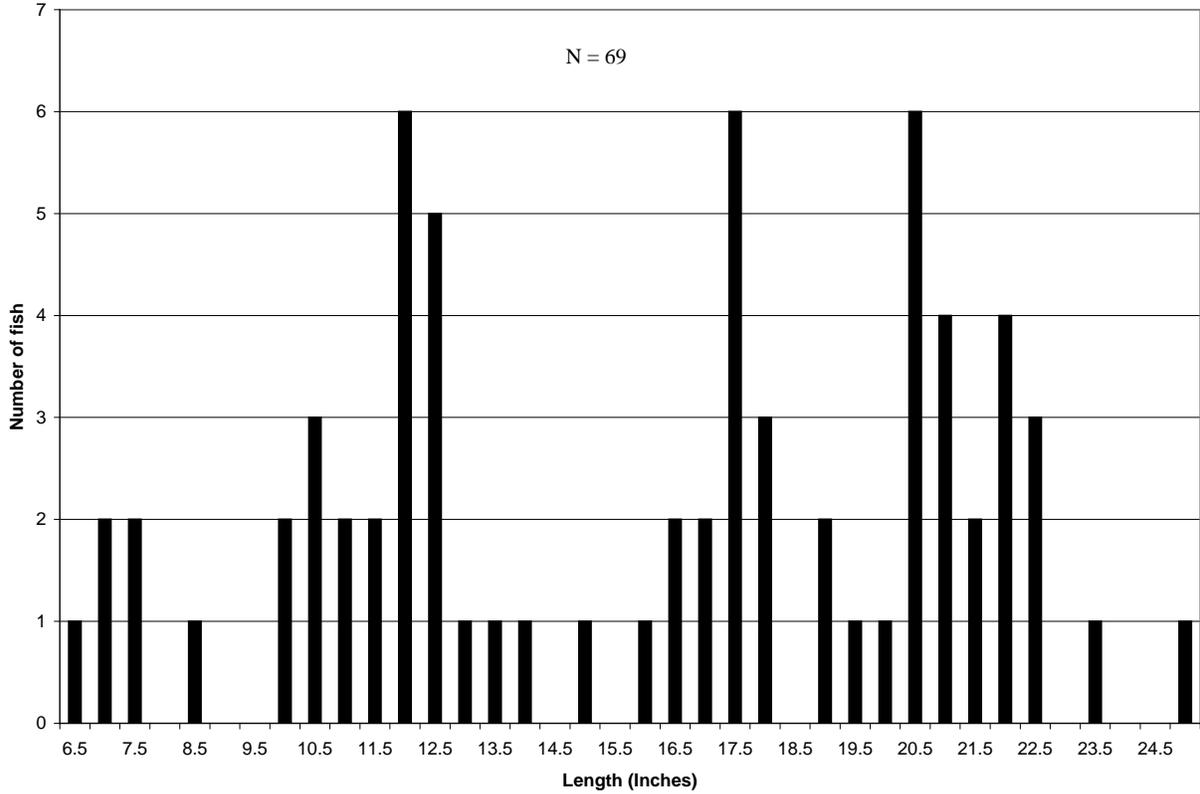


Figure 13. Walleye length frequency; Bear and Munger Lakes, Oconto County, Wisconsin 2009.

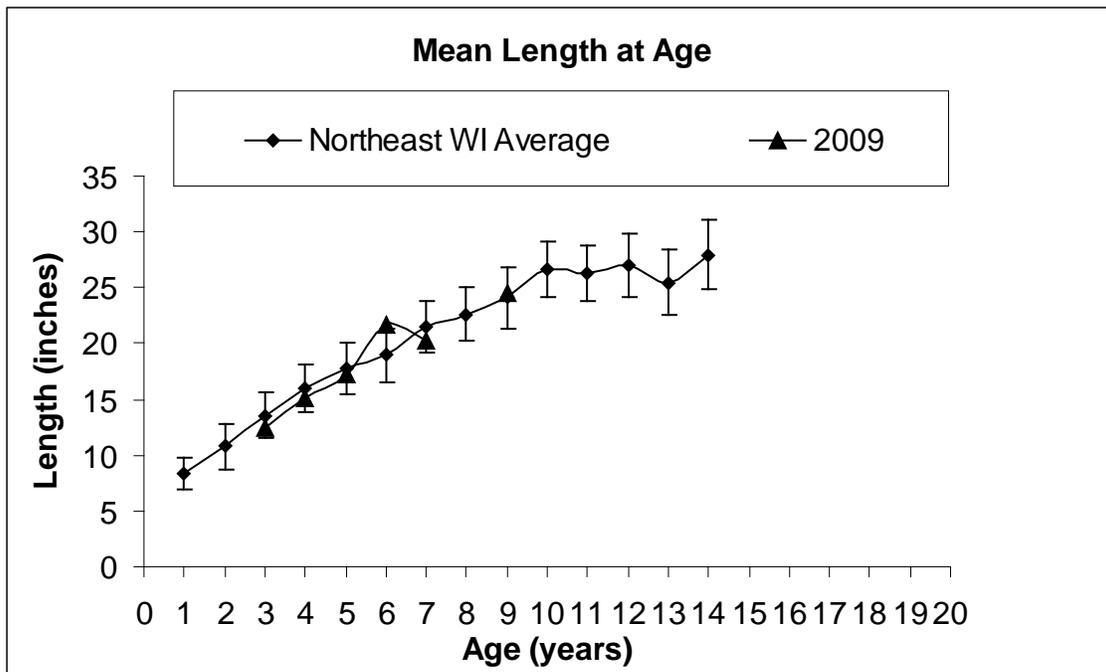


Figure 14. Walleye mean length at age (+/- 1 SD); Bear and Munger Lakes, Oconto County, Wisconsin 2009.

APPENDIX III – LENGTH FREQUENCY TABLES & AGE-LENGTH KEYS

NUMBER, PERCENTAGE, AND AGE OF Rock bass							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5				20.5			
3.0				21.0			
3.5	6	0.7	3	21.5			
4.0	43	5.4	3	22.0			
4.5	110	13.7	3, 4	22.5			
5.0	84	10.4	3, 4	23.0			
5.5	96	11.9	4	23.5			
6.0	104	12.9	4, 5, 6, 7	24.0			
6.5	133	16.5	4, 5, 6	24.5			
7.0	125	15.5	5, 6	25.0			
7.5	61	7.6	6, 7	25.5			
8.0	20	2.5	6, 7, 8	26.0			
8.5	12	1.4	9	TOTAL	806		
9.0	9	1.1	8, 9				
9.5	3	0.4	not aged				
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 21.3/h	FYKE NET CPUE = 6.3/NN
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AGE-LENGTH KEY FOR Rock bass													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0													
1.5													
2.0													
2.5													
3.0													
3.5	4	4			4								
4.0	30	5			30								
4.5	76	5			61	15							
5.0	58	5			23	35							
5.5	66	5				66							
6.0	72	5				29	14	14	14				
6.5	92	5				18	37	37					
7.0	86	6					29	57					
7.5	42	5						34	8				
8.0	14	4						4	6	4			
8.5	8	2									8		
9.0	6	5								4	2		
9.5	2	0											
10.0													
Total	556	56			118	163	80	146	29	7	10		
Mean TL					4.7	5.8	6.8	7.2	7.1	8.8	8.9		
SE					0.03	0.04	0.04	0.04	0.16	0.20	0.07		

NUMBER, PERCENTAGE, AND AGE OF Black crappie							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5				20.5			
3.0				21.0			
3.5	15	2.4	2	21.5			
4.0	41	6.5	2	22.0			
4.5	75	12.0	3	22.5			
5.0	137	22.0	3	23.0			
5.5	89	14.4	3	23.5			
6.0	45	7.3	3, 4	24.0			
6.5	21	3.5	3, 4	24.5			
7.0	28	4.5	4	25.0			
7.5	36	5.8	4, 5, 6	25.5			
8.0	24	3.8	4, 6	26.0			
8.5	21	3.5	4, 5	TOTAL	621		
9.0	21	3.5	5, 6, 7				
9.5	19	3.1	5, 6, 7, 8				
10.0	14	2.2	7, 8				
10.5	11	1.8	6, 7, 8				
11.0	7	1.1	7, 8				
11.5	7	1.1	6, 8, 10				
12.0	7	1.1	8				
12.5	3	0.5	8, 10				
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 4.4/h	FYKE NET CPUE = 4.9/NN
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AGE-LENGTH KEY FOR Black crappie													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0													
1.5													
2.0													
2.5													
3.0													
3.5	13	5		13									
4.0	36	5		36									
4.5	66	5			66								
5.0	121	10			121								
5.5	79	8			79								
6.0	40	5			24	16							
6.5	19	5			8	11							
7.0	25	5				25							
7.5	32	5				20	6	6					
8.0	21	5				17		4					
8.5	19	4				5	14						
9.0	19	6					6	10	3				
9.5	17	6					3	6	5	3			
10.0	12	5							7	5			
10.5	10	5						2	6	2			
11.0	6	3							4	2			
11.5	6	3						2		2		2	
12.0	6	1								6			
12.5	3	2								1		2	
13.0													
Total	550	93		49	298	94	30	30	25	21		4	
Mean TL				4.1	5.4	7.4	8.7	9.2	10.3	11.2		12.2	
SE				0.03	0.03	0.08	0.11	0.21	0.12	0.22		0.31	

NUMBER, PERCENTAGE, AND AGE OF Bluegill							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5	3	0.4	not aged	20.5			
3.0	7	1.1	3	21.0			
3.5	128	20.7	3	21.5			
4.0	112	18.2	3, 4, 5	22.0			
4.5	80	12.9	3, 4	22.5			
5.0	67	10.9	4, 5	23.0			
5.5	60	9.8	4, 5	23.5			
6.0	56	9.1	4, 6, 7	24.0			
6.5	51	8.2	6	24.5			
7.0	34	5.6	6, 7	25.0			
7.5	11	1.8	6, 7	25.5			
8.0	5	0.9	7	26.0			
8.5	1	0.2	7	TOTAL	617		
9.0							
9.5							
10.0	1	0.2	8				
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 51.2	FYKE NET CPUE = 4.6/NN
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AGE-LENGTH KEY FOR Bluegill													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0													
1.5													
2.0													
2.5	2	0											
3.0	5	2			5								
3.5	93	6			93								
4.0	82	5			50	16	16						
4.5	58	5			35	23							
5.0	49	4				37	12						
5.5	44	5				26	18						
6.0	41	4				10		21	10				
6.5	37	4						37					
7.0	25	5						10	15				
7.5	8	3						3	5				
8.0	4	3							4				
8.5	1	1							1				
9.0													
9.5													
10.0	1	1								1			
10.5													
Total	450	48			183	113	46	70	36	1			
Mean TL					4.1	5.2	5.1	6.7	7.2	10.3			
SE					0.03	0.06	0.10	0.05	0.12	0			

NUMBER, PERCENTAGE, AND AGE OF Yellow bullhead							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5				20.5			
3.0				21.0			
3.5				21.5			
4.0				22.0			
4.5				22.5			
5.0				23.0			
5.5	7	1.5	not aged	23.5			
6.0	5	1.0		24.0			
6.5	5	1.0		24.5			
7.0	2	0.5		25.0			
7.5	12	2.6		25.5			
8.0	12	2.6		26.0			
8.5	15	3.1		TOTAL	475		
9.0	22	4.6					
9.5	47	9.8					
10.0	56	11.9					
10.5	93	19.6					
11.0	69	14.4					
11.5	73	15.5					
12.0	20	4.1					
12.5	17	3.6					
13.0	12	2.6					
13.5	7	1.5					
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 0/h	FYKE NET CPUE = 3.7/NN
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NUMBER, PERCENTAGE, AND AGE OF Largemouth bass							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0	4	0.9	12, 13
1.5				19.5			
2.0				20.0	1	0.2	15
2.5	1	0.2	not aged	20.5	3	0.7	12
3.0				21.0			
3.5				21.5			
4.0				22.0			
4.5	2	0.5	not aged	22.5			
5.0	8	1.9	not aged	23.0			
5.5	5	1.2	2	23.5			
6.0	10	2.3	2, 3	24.0			
6.5	10	2.3	2, 3	24.5			
7.0	13	3.0	3	25.0			
7.5	26	6.1	3	25.5			
8.0	18	4.2	3	26.0			
8.5	21	4.9	3, 4	TOTAL	428		
9.0	17	4.0	4				
9.5	30	7.0	4				
10.0	25	5.8	3, 4, 5				
10.5	18	4.2	4				
11.0	15	3.5	not aged				
11.5	20	4.7	4, 5				
12.0	17	4.0	5, 6				
12.5	23	5.4	4, 5				
13.0	30	7.0	5, 6, 7				
13.5	28	6.5	6, 7, 8, 10				
14.0	17	4.0	6, 7				
14.5	8	1.9	7, 8, 9				
15.0	3	0.7	6, 7, 8				
15.5	7	1.6	8, 9				
16.0	10	2.3	8, 9				
16.5	9	2.1	7, 8, 9				
17.0	11	2.6	9, 10, 11				
17.5	8	1.9	8, 10, 12				
18.0	3	0.7	10, 11, 13				
18.5	7	1.6	9				

Spring ELECTROFISHING CPUE = 73.8/h	FYKE NET CPUE = 1.5/NN
Fall ELECTROFISHING CPUE = 27.4/h	

AGE-LENGTH KEY FOR Largemouth bass																	
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.0																	
1.5																	
2.0																	
2.5	1	0															
3.0																	
3.5																	
4.0																	
4.5	2	0															
5.0	8	0															
5.5	5	2		5													
6.0	10	5		8	2												
6.5	10	4		3	8												
7.0	13	6			13												
7.5	26	5			26												
8.0	18	3			18												
8.5	21	4			11	11											
9.0	17	4				17											
9.5	30	6				30											
10.0	25	4			6	13	6										
10.5	18	5				18											
11.0	15	0															
11.5	20	4				5	15										
12.0	17	5					10	3	3								
12.5	23	6				4	19										
13.0	30	5					12	6	12								
13.5	28	6						5	14	5		5					
14.0	17	6						6	11								
14.5	8	4							2	4	2						
15.0	3	3							1	1	1						
15.5	7	2									4	4					
16.0	10	4									5	5					
16.5	9	4								2	2	5					
17.0	11	4										6	3	3			
17.5	8	4									2		4		2		
18.0	3	3											1	1		1	
18.5	7	1											7				
19.0	4	3													3	1	
19.5																	
20.0	1	1															1
20.5	3	2													3		
21.0																	
Total	428	115		16	83	97	63	21	46	22	28	12	4	8	2		1
Mean TL				6.2	8.0	10.0	12.3	13.6	13.9	15.5	17.0	16.2	17.5	19.4	18.8		20.3
SE				0.09	0.10	0.09	0.11	0.17	0.13	0.26	0.24	0.56	0.27	0.46	0.43		0

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF Pumpkinseed							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5				20.5			
3.0	2	0.4	not aged	21.0			
3.5	6	1.7	3	21.5			
4.0	47	13.4	3, 4	22.0			
4.5	43	12.1	3, 4	22.5			
5.0	32	9.1	3, 4, 5	23.0			
5.5	35	9.9	4, 5	23.5			
6.0	78	22.0	4, 5, 7	24.0			
6.5	56	15.9	5, 6	24.5			
7.0	30	8.6	6, 7	25.0			
7.5	23	6.5	6, 7, 8	25.5			
8.0	2	0.4	6	26.0			
8.5				TOTAL	353		
9.0							
9.5							
10.0							
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 29.3/h	FYKE NET CPUE = 2.6/NN
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AGE-LENGTH KEY FOR Pumpkinseed													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0													
1.5													
2.0													
2.5													
3.0	1	0											
3.5	4	1			4								
4.0	31	10			25	6							
4.5	28	7			12	16							
5.0	21	6			10	7	4						
5.5	23	6				11	12						
6.0	51	10				5	41		5				
6.5	37	11					10	27					
7.0	20	5						12	8				
7.5	15	6						5	7	3			
8.0	1	1						1					
8.5													
Total	232	63			51	45	66	45	20	3			
Mean TL					4.5	5.2	6.2	7.0	7.2	7.8			
SE					0.06	0.09	0.04	0.06	0.13	0			

NUMBER, PERCENTAGE, AND AGE OF Yellow perch							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0			
1.5				19.5			
2.0				20.0			
2.5	1	0.5	not aged	20.5			
3.0				21.0			
3.5	2	1.0	not aged	21.5			
4.0	20	8.0	not aged	22.0			
4.5	31	12.4	not aged	22.5			
5.0	14	5.5	not aged	23.0			
5.5	30	11.9	3	23.5			
6.0	30	11.9	2, 3	24.0			
6.5	40	15.9	3, 4	24.5			
7.0	36	14.4	3, 4	25.0			
7.5	30	11.9	3, 4	25.5			
8.0	5	2.0	4, 6	26.0			
8.5	5	2.0	4, 5	TOTAL	249		
9.0	2	1.0	4				
9.5	2	1.0	6				
10.0	1	0.5	7				
10.5							
11.0							
11.5							
12.0							
12.5							
13.0							
13.5							
14.0							
14.5							
15.0							
15.5							
16.0							
16.5							
17.0							
17.5							
18.0							
18.5							

ELECTROFISHING CPUE = 155.1/h	FYKE NET CPUE = 1.1/NN
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AGE-LENGTH KEY FOR Yellow perch													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0													
1.5													
2.0													
2.5	1	0											
3.0													
3.5	2	0											
4.0	16	0											
4.5	25	0											
5.0	11	0											
5.5	24	5			24								
6.0	24	7		3	21								
6.5	32	10			13	19							
7.0	29	12			17	12							
7.5	24	15			10	14							
8.0	4	2				2		2					
8.5	4	2				2	2						
9.0	2	1				2							
9.5	2	2						2					
10.0	1	1							1				
10.5													
Total	201	57		3	84	52	2	4	1				
Mean TL				6.3	6.6	7.4	8.8	9.0	10.3				
SE				0	0.08	0.09	0	0.43	0				

NUMBER, PERCENTAGE, AND AGE OF Northern pike							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0	5	2.3	
1.5				19.5	14	6.5	
2.0				20.0	12	5.6	
2.5				20.5	5	2.3	
3.0				21.0	10	4.6	
3.5				21.5	11	5.1	
4.0				22.0	8	3.7	
4.5				22.5	6	2.8	
5.0				23.0	9	4.2	
5.5				23.5	5	2.3	
6.0				24.0	4	1.9	
6.5				24.5	7	3.2	
7.0				25.0	7	3.2	
7.5				25.5	4	1.9	
8.0				26.0	4	1.9	
8.5	2	0.9	not aged	26.5	2	0.9	
9.0	2	0.9		27.0	3	1.4	
9.5	7	3.2		27.5	2	0.9	
10.0	7	3.2		28.0	1	0.5	
10.5	5	2.3		28.5			
11.0	7	3.2		29.0			
11.5	8	3.7		29.5	2	0.9	
12.0	2	0.9		TOTAL	216		
12.5	1	0.5					
13.0	5	2.3					
13.5	2	0.9					
14.0	1	0.5					
14.5	1	0.5					
15.0	6	2.8					
15.5	4	1.9					
16.0	4	1.9					
16.5	3	1.4					
17.0	10	4.6					
17.5	10	4.6					
18.0	4	1.9					
18.5	4	1.9					

ELECTROFISHING CPUE = 5.9/h	FYKE NET CPUE = 1.4/NN
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NUMBER, PERCENTAGE, AND AGE OF Walleye							
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AGE OF FISH
1.0				19.0	2	2.9	6
1.5				19.5	1	1.4	not aged
2.0				20.0	1	1.4	6
2.5				20.5	6	8.7	6
3.0				21.0	4	5.8	5
3.5				21.5	2	2.9	5
4.0				22.0	4	5.8	5, 6
4.5				22.5	3	4.3	6
5.0				23.0			
5.5				23.5	1	1.4	8
6.0				24.0			
6.5	1	1.4	not aged	24.5			
7.0	2	2.9	not aged	25.0	1	1.4	8
7.5	2	2.9	not aged	25.5			
8.0				26.0			
8.5	1	1.4	not aged	TOTAL	69		
9.0							
9.5							
10.0	2	2.9	3				
10.5	3	4.3	not aged				
11.0	2	2.9	2				
11.5	2	2.9	2				
12.0	6	8.7	2				
12.5	5	7.2	2, 3				
13.0	1	1.4	2				
13.5	1	1.4	2				
14.0	1	1.4	2				
14.5							
15.0	1	1.4	not aged				
15.5							
16.0	1	1.4	not aged				
16.5	2	2.9	3				
17.0	2	2.9	4				
17.5	6	8.7	3, 6				
18.0	3	4.3	6				
18.5							

Spring ELECTROFISHING CPUE = 2.3/h	FYKE NET CPUE = 0.4/NN
Fall ELECTROFISHING CPUE = 1.3/h	

AGE-LENGTH KEY FOR Walleye														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
6.0														
6.5	1	0												
7.0	2	0												
7.5	2	0												
8.0														
8.5	1	0												
9.0														
9.5														
10.0	2	1			2									
10.5	3	0												
11.0	2	1		2										
11.5	2	1		2										
12.0	6	2		6										
12.5	5	3		3	2									
13.0	1	1		1										
13.5	1	1		1										
14.0	1	1		1										
14.5														
15.0	1	0												
15.5														
16.0	1	0												
16.5	2	2			2									
17.0	2	1				2								
17.5	6	5			4			2						
18.0	3	3						3						
18.5														
19.0	2	1						2						
19.5	1	0												
20.0	1	1						1						
20.5	6	2						6						
21.0	4	1					4							
21.5	2	1					2							
22.0	4	2					2	2						
22.5	3	1						3						
23.0														
23.5	1	1								1				
24.0														
24.5														
25.0	1	1								1				
25.5														
Total	69	33		16	9	2	8	19		2				
Mean TL				12.4	15.0	17.3	21.6	20.3		24.5				
SE				0.20	1.07	0	0.16	0.40		0.75				

GPS coordinates for electrofishing and fyke net locations during 2009 fisheries survey of Bear and Munger Lakes, Oconto County, Wisconsin.

FYKE NETS				ELECTROFISHING				
1	N	45.3185	W 88.4982	23-Apr-2009	Complete circuit (entire shoreline of both lakes)			
2	N	45.3196	W 88.5031					
3	N	45.3229	W 88.5008	18-May-2009	0.5 mile	Begin	N 45.3193	W 88.4974
4	N	45.3206	W 88.4979		(all fish)	End	N 45.3227	W 88.5007
5	N	45.3235	W 88.4943		1.5 mile	Begin	N 45.3227	W 88.5007
6	N	45.3250	W 88.4943		(gamefish only)	End	N 45.3210	W 88.4907
7	N	45.3277	W 88.4968		0.5 mile	Begin	N 45.3210	W 88.4907
8	N	45.3283	W 88.4955		(all fish)	End	N 45.3271	W 88.4917
9	N	45.3304	W 88.4922		1.5 mile	Begin	N 45.3271	W 88.4917
10	N	45.3202	W 88.4924		(gamefish only)	End	N 45.3193	W 88.4974
10A	N	45.3241	W 88.4926	29-Sep-2009	Complete circuit (entire shoreline)	Begin	N 45.3244	W 88.4907
						End	N 45.3195	W 88.4974
						Begin	N 45.3195	W 88.4974
						End	N 45.3201	W 88.4934
					Both sides of channel	N 45.3201	W 88.4934	
						N 45.3201	W 88.4934	