

**Magnor Lake  
Treaty Assessment Survey  
Polk County, Wisconsin  
2007-2008  
(MWBIC: 2624600 )**



**By**

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## **Executive Summary**

Magnor Lake, a 231-acre drainage lake located in southeastern Polk County near Clayton, Wisconsin was surveyed in 2007-2008 following the Wisconsin Department of Natural Resources Treaty Assessment protocol. Projected angler effort for all species of fish was 88.1 hours/acre, of which 79% was directed towards panfish. Largemouth bass were the most common gamefish caught and harvested by anglers followed by northern pike and walleye. The 2007 adult walleye population (0.7 fish/acre) was 84% and 93% lower compared to past surveys of 4.5 fish/acre in 1994 and 10.0 fish/acre in 1989. Largemouth bass were present in moderate density at 5.3 fish/acre. Northern pike relative abundance was low at 1.6 fish/net lift however growth was very good. Management recommendations call for changes in walleye stocking to improve recruitment and adult densities.

## Introduction

Magnor Lake is a 231-acre drainage lake located in southeast Polk County, west of Clayton, Wisconsin. The lake is connected by a man-made channel to nearby Barbo Lake (44 acres, max depth 4 feet). The maximum water depth of Magnor Lake is 26 feet and 2.6 miles of shoreline are present. One public boat landing is present on the east shore near State Highway 63. Magnor Lake has a diverse fishery consisting of walleye Sander vitreus, northern pike Esox lucius, largemouth bass Micropterus salmoides, as well as bluegill Lepomis macrochirus, black crappie Pomoxis nigromaculatus, pumpkinseed Lepomis gibbosus, yellow perch Perca flavescens, green sunfish Lepomis cyanellus and bullheads Ameiurus spp.

Walleye stocking in Magnor Lake was initiated in 1934. Walleye stocking has consisted of sporadic fry or small fingerling (< 3 in) stockings. Fish stocking since 1990 is provided in (Table 1). According to Becker (1983), Magnor Lake was not within the native range of walleye in Wisconsin. No other fish stocking occurs. The objectives of this study were to assess the status of the walleye population as part of the treaty assessment sampling rotation of lakes for the Ceded Territory of Wisconsin. Secondary objectives included assessing the status of other important fish species such as largemouth bass, northern pike, and panfish.

## Methods

Magnor Lake was sampled during 2007-2008 following the Wisconsin Department of Natural Resources treaty assessment protocol (Hennessy 2002). This sampling included spring fyke netting and electroshocking to estimate walleye and largemouth bass abundance, fall electroshocking to estimate year class strength of walleye young-of-the-year (YOY) and gamefish relative abundance as well as a creel survey (both open water and ice). Walleye and largemouth bass abundance was determined for adult fish. Adult walleye were defined as being  $\geq 15$  in or sexable and adult bass were larger than 7.9 inches (Hennessy 2002). Survey data were also collected to estimate abundance and angler catch information on other species such as northern pike, and panfish.

Creel census data were collected in 2007-2008 beginning the first Saturday in May and continuing through the first Sunday in March of the following year (the open season for game fish angling in Wisconsin). No creel survey data were collected during November because thin ice created dangerous fishing conditions. Creel survey methods followed a stratified random design as described by Rasmussen et al. (1998). The minimum length limit for walleye in Magnor Lake was 15 in with a daily bag that

fluctuates on an annual basis dependent on annual safe harvest estimates, ranging from two to five fish. The daily bag for walleye during 2007-2008 was 3 fish. The minimum length limit for largemouth bass was 14 in with a daily bag of 5 in total. No minimum length limits are in effect for northern pike or panfish and the bag limits were 5 and 25, respectively.

Data collected during the 2007-2008 survey were compared with previous survey data on Magnor Lake in 1989 and 1994 and historic fall electrofishing surveys from 1971, 1977, 1985, 1989, 1994 and 2001. Population estimates from the 1989 and 1994 survey were generated by the Great Lakes Indian and Wildlife Commission (GLIFWC) using spring nighttime electrofishing that consisted of one marking run and one recapture run. In addition, northern pike catch and harvest statistics were compared with 55 northern Wisconsin lakes (Margenau et al. 2003). Growth data were compared with local (Barron and Polk County) and regional (18 county WDNR Northern Region) means utilizing the WDNR Fisheries and Habitat database. Age assessment for walleye was determined from both scale samples (< 12 in) and dorsal spine sections ( $\geq 12.0$  in). Juvenile walleye (YOY) electrofishing runs were conducted in 1994, 1997, 1999, 2000, 2001, 2002 and 2007.

## Results

Angling Effort. Projected angling pressure for all fish species in 2004-2005 was 88.1 hours/acre. Overall, 79% was for panfish and only 21% was directed towards gamefish (Table 2).

Walleye. The adult walleye population in 2007 was 169 or 0.7 fish/acre (95% C.I. = 107-231 ). Adult walleye abundance was 84% and 93% lower in 2007 compared to 1994 and 1989 respectively (Figure 1). The adult walleye population in 1994 was 1,035 or 4.5 fish/acre (95% C.I. = 892-1178) and in 1989 was 2,315 or 10.0 fish/acre (90% C.I. = 1678-2952). The relative abundance of all walleye sampled during fall electrofishing surveys also suggests a decrease in walleye relative abundance from 1971 to 2001 (Figure 2). Size structure of walleye was skewed towards larger fish and only a few small fish were present in the population (Figure 3).

Year class strength of walleye has been poor (Table 1). An exception was 1994 when a modest year class was documented (13 YOY walleye/mile). Absent and one very weak year class were documented from 1997-2007, many of these years sampled were during years when walleye were stocked.

Angling effort for walleye made up 6.1% of the total directed effort (open water and ice combined) on Magnor Lake in 2007-2008. No projected angler walleye harvest occurred and no tribal spearing occurred

in 2007. Growth of walleye in Magnor Lake was above average compared to local and regional means (Table 3).

Largemouth Bass. The adult largemouth bass population ( $\geq 8$ in) in 2007 was 1,232 or 5.3 fish/acre (95% C.I. = 762-1702). Historic fall electrofishing surveys for largemouth bass suggest relative abundance has increased 333% from 9 fish/hr in 1976 to 39 fish/hr in 2001 (Figure 4). Length frequency analysis suggests a quality largemouth bass fishery is present (Figure 5). More specifically, PSD and RSD-14 and RSD-18 were high at 82, 63 and 15, respectively which suggests the fishery is dominated by larger fish.

Anglers directed similar effort towards largemouth bass in 2007-2008 compared to walleye. Nearly 7.4% of the directed angling effort targeted largemouth bass. Angler catch rate was good at 0.55 fish/hr. Projected angler harvest for largemouth bass in 2007-2008 was 156 fish. Mean length of largemouth bass harvested in 2007-2008 was 16.0 in (SE = 0.25, N = 36). Growth of largemouth bass was average to slightly above average when compared to the local and regional means (Table 4).

Northern Pike. Northern pike relative abundance was low (1.6 fish/net lift) compared to the mean catch of 7.1 fish/net lift of similar local lakes sampled recently (Table 5). Northern pike growth was very good (Table 6). Fall electrofishing surveys suggest that the relative abundance has been variable since 1971 (Figure 6). Anglers pursuing northern pike in 2007-2008 represented 7.8% of the directed angling effort on Magnor Lake. Projected angler harvest of northern pike was 119. Mean length of northern pike harvested in 2007-2008 was very good at 26.0 in (SE=0.58, N=30).

Panfish. Population abundance was not estimated for panfish during 2007-2008 netting and electroshocking. Anglers pursuing bluegill in 2007-2008 accounted for 34.9% of the directed angling effort, while black crappie accounted for 30.4%. Combined, 65.3% of the directed angling effort in 2007-2008 was for black crappie and bluegill. The projected number of bluegill harvested in 2007-2008 was 12,957 and the projected number of black crappie harvested in 2007-2008 was 9,183. The average length of bluegill and black crappie harvested in 2007-2008 was 7.4 in (SE = 0.2, N= 1,360) and 8.6 in (SE = 0.3, N = 914), respectively. Yellow perch were a much smaller component of the panfish angling effort. In 2007-2008, only 8.6% of the directed angling effort was for yellow perch and projected harvest was 1,749 fish (SE = 0.07, N=220). The remaining fishing effort targeted pumpkinseed, green sunfish and bullheads. Projected harvest of these species was 795, 30 and 530 fish, respectively.

## Discussion

Walleye. Adult walleye abundance has decreased from 1989-2007. This decrease is likely related to poor year class strength. Walleye natural reproduction appears to be absent in Magnor Lake, whereas historically it appeared natural reproduction occurred (Cornelius, 2002). In addition, walleye small fingerling stocking has not provided any measurable recruitment since 1994. Predation on early life stages of walleye may be affecting year class strength and subsequent adult densities. Brooking et al. (2001) stated that when other top predators such as largemouth bass and northern pike increase in relative abundance in a lake, the likelihood of increased predation on small fingerling walleye is high and likely hinders stocking success. Largemouth bass have also been found to be effective predators on other stocked fish such as esocids (Stein et al. 1981). This study found that largemouth bass predation accounted for up to 45% of stocked hybrid muskellunge (*Esox masquinongy* x *E. lucius*) mortality within 40 d of stocking. In addition, Nate et al. (2003) indicated that high largemouth bass and northern pike densities characterized lakes with walleye populations that are maintained by stocking versus natural reproduction. Four other fishery surveys completed on nearby Ward, Half Moon, Big Butternut and Lower Turtle Lakes (Benike 2005a; Benike 2005b, Benike 2005c, Benike 2006) in Polk and Barron Counties also showed a similar trend of decreasing walleye abundance with an increase in largemouth bass abundance during the same time period. Most recently, Fayram et al. (2005) documented that largemouth bass interact strongly with walleye populations through predation as well as, limit stocked walleye survivalship. The authors further suggest that management goals seeking to simultaneously maximize both largemouth bass and walleye populations may be unrealistic. Considering the relative abundance of largemouth bass in Magnor Lake has increased 333% from 1971 to 2002, it's reasonable to assume that largemouth bass may be utilizing walleye as prey. Considering this, walleye stocking could be converted to large fingerling walleye on a trial basis for an 8-10 year period in an effort to improve recruitment. A recent study on Beaver Dam Lake in Barron County (Benike 2008) indicated that large fingerling walleye stocking outperformed small fingerling walleye by over 4,500%. The size structure of the largemouth bass population in Magnor Lake was good during the 2007-2008 survey, and adult densities and recruitment were only moderate hence complete removal of the 14 inch length limit is less desirable. However, if walleye recruitment can be increased by stocking larger fingerling walleye, it may be possible to slow or even stop the expansion of the largemouth bass population by simple recruitment displacement. Magnor Lake could provide a nice test lake for this hypothesis and help shed some light if under certain scenarios (low bass recruitment, moderate

bass abundance and a quality size structure) if a pulse large fingerling stocking period may provide a positive response to the walleye fishery without negatively impacting the size structure of the largemouth bass fishery.

Largemouth Bass. Largemouth bass densities were moderate (5.3 fish/acre) but historic data indicates that largemouth bass populations have been expanding in area lakes over the past several decades. The size structure of largemouth bass was very good with many large fish in the population and fish in excess of 20 inches were present. A quality largemouth bass fishery in Magnor Lake should be maintained.

Northern Pike. Northern pike were the second most common gamefish harvested by anglers. However, the abundance of northern pike was also low (1.6 fish/ net lift). Mean length of northern pike harvested was very good (26.0 in) when compared to (21.6 in) from a study of 55 northern Wisconsin lakes (Margenau et al. 2003). Northern pike growth was also very good and the potential for quality fish exists.

Panfish. Panfish were in the most common fish caught and harvested on Magnor Lake. Size ranges of panfish appear acceptable and no management changes are recommended at this time. Panfish will likely continue to be the most important component of the angling experience on Magnor Lake in the future.

### **Management Recommendations**

1. In an effort to increase the density of the walleye population (1.5-2.0 fish/acre) in Magnor Lake stocking quotas should be converted from small to large fingerling walleye for an 8-10 year period and be re-evaluated. Stock contribution should on average exceed 10 YOY/mile during stocked years.
2. In an effort to minimize largemouth bass predation on stocked walleye and maintain a moderate density population with a quality size structure, bass densities should be maintained less than 5 adult fish/acre, however RSD-14 should be at or above 40. At this time, no regulation changes for bass are recommended however, if bass abundance continues to increase and growth and size structure becomes poorer, liberalization of bass regulations may be warranted in the future.

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Table 1. Walleye stocking and fall fingerling catch per unit of effort (CPUE) from electrofishing for Magnor Lake, Polk County, Wisconsin. Fall fingerling CPUE may also include naturally reproduced walleye.

Year	Length (in)	Number Stocked	Stocking rate (no/acre)	Fall Electrofishing (no YOY/mile)
1990	< 3.0"	11,520	50	ns*
1992	< 3.0"	11,500	50	ns
1994	< 3.0"	13,508	58	13
1996	< 3.0"	11,500	50	ns
1997	< 3.5"	4,587	20	0
1998	< 3.5"	8,337	36	ns
1999	N/A	none	N/A	0
2000	< 3.5"	11,200	48	1
2001	N/A	none	N/A	0
2002	< 3.0"	11,190	48	0
2004	< 3.0"	11,265	49	ns
2005	< 1.0"	800,000	3,463	ns
2006	< 3.0"	11,452	50	ns
2007	N/A	none	N/A	0

\* ns indicates no sampling was done.

Table 2. 2007-2008 creel survey data for major game and panfish species, Magnor Lake, Polk County, Wisconsin.

Species	Directed Effort %	Catch rate (fish/hr)	Harvest rate (fish/h)	Mean len. (in) harvested
Walleye	6.1	0.03	0.00	N/A
Largemouth bass	7.4	0.55	0.03	16.0
Northern pike	7.8	0.06	0.03	26.0
Bluegill	34.9	2.63	0.88	7.4
Black crappie	30.4	2.04	0.72	8.6
Yellow perch	8.6	1.05	0.17	7.8

Table 3. Walleye mean length (in) at age, Magnor Lake 2007, and local and regional means, Wisconsin. Local and regional mean length information is from WDNR Fisheries and Habitat database.

Age	N	Magnor Lake Mean 2007	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	3	16.5	0.5	13.4	2.3	11.9
4	1	18.8	N/A	15.4	2.1	14.1
7	11	23.5	1.3	20.4	2.5	19.3

Table 4. Largemouth bass mean length (in) at age, Magnor Lake 2007, and local and regional means, Wisconsin. Local and regional mean length information is from the WDNR Fisheries and Habitat database.

Age	N	Magnor Lake Mean 2007	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	16	10.0	1.1	9.3	2.0	9.0
4	4	12.0	0.3	11.7	2.0	11.0
5	28	13.6	0.5	13.2	2.1	12.7
6	27	14.8	0.6	14.9	2.0	14.6

Table 5. Northern pike fyke net catch per unit effort (fish/net lift) Barron and Polk County lakes.

Length (in)	Granite Lake 2005	Largon Lake 2003	Bass Lake 2007	Horseshoe Lake 2007	Poskin Lake 2007	Long Lake 2004	Magnor Lake 2007	Mean*
≥ 14	5.7	7.6	0.8	3.6	14.9	9.8	1.6	7.1
≥ 21	0.6	5.7	0.6	0.8	3.5	7.1	1.4	3.1
≥ 26	0.2	2.6	0.3	0.1	1.1	2.3	0.4	1.1
≥ 30	0.1	1.0	0.0	0.0	0.7	1.1	0.1	0.5
≥ 32	0.1	0.6	0.0	0.0	0.6	0.7	0.1	0.4
≥ 34	0.1	0.3	0.0	0.0	0.5	0.4	0.0	0.2
≥ 36	0.1	0.1	0.0	0.0	0.4	0.3	0.0	0.2

\* Mean does not include Magnor Lake.

Table 6. Northern pike mean length (in) at age, Magnor Lake 2007, and local and regional means, Wisconsin. Local and regional mean length information is from the WDNR Fisheries and Habitat database.

Age	N	Magnor Lake Mean 2007	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	27	22.1	1.8	18.0	4.0	17.4
4	23	24.5	2.3	19.8	3.3	20.0
5	8	29.2	2.1	22.9	4.3	22.7

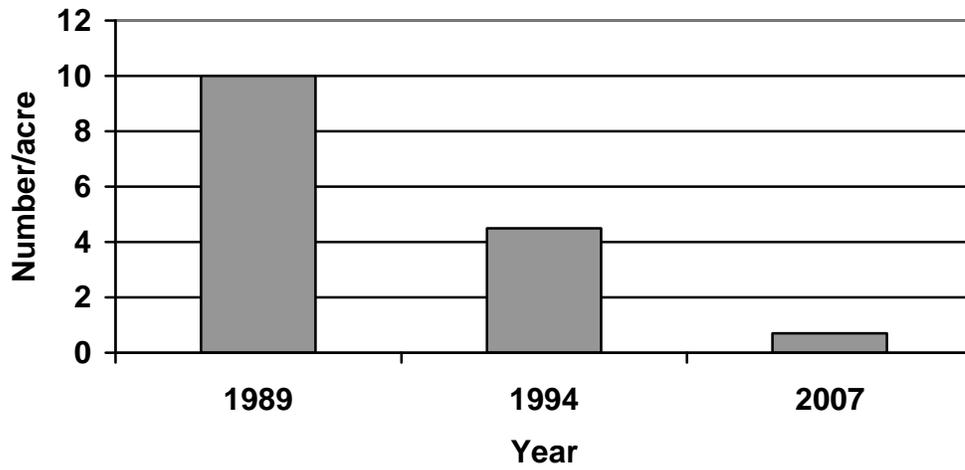


Figure 1. Adult walleye population density (number/acre), Magnor Lake, Polk County, Wisconsin.

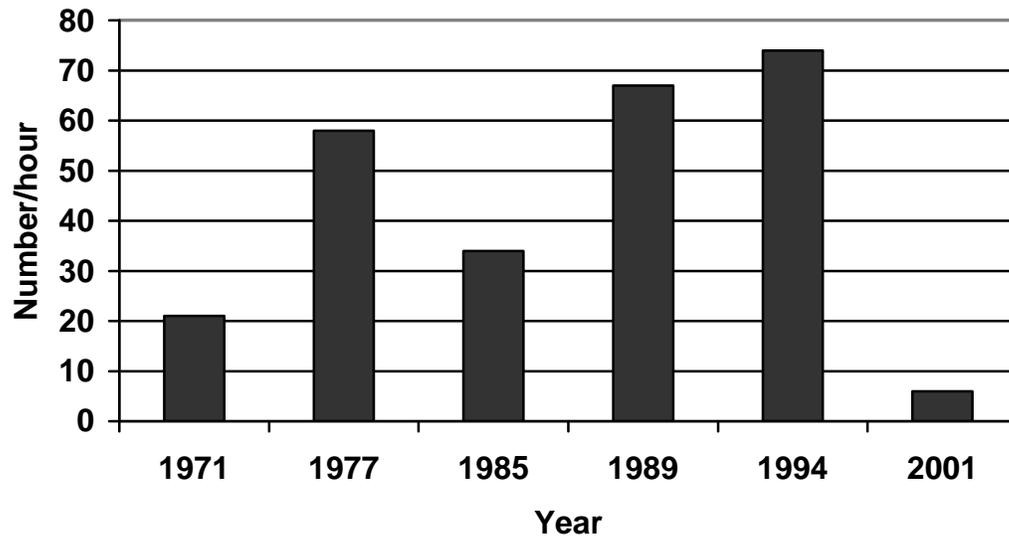


Figure 2. Relative abundance of walleye from fall electrofishing surveys, Magnor Lake, Polk County, Wisconsin.

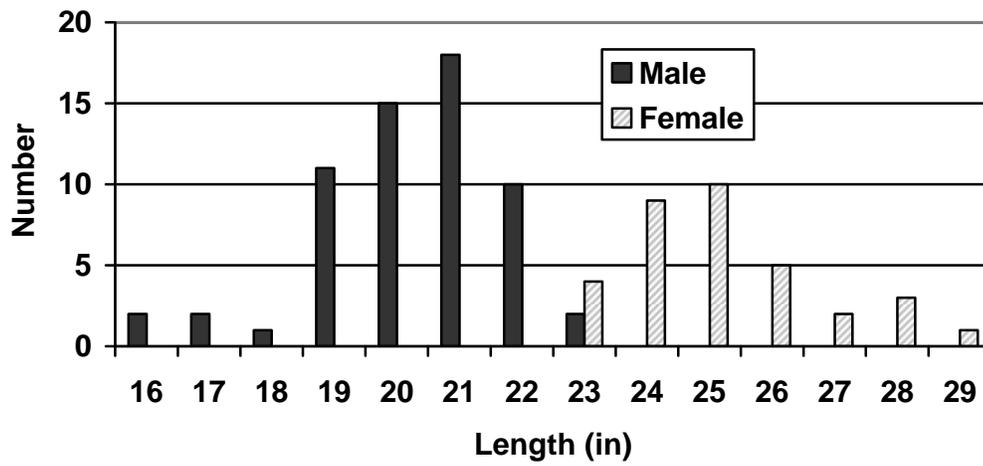


Figure 3. Walleye length frequency by sex, Magnor Lake, Polk County, Wisconsin (N=95 ).

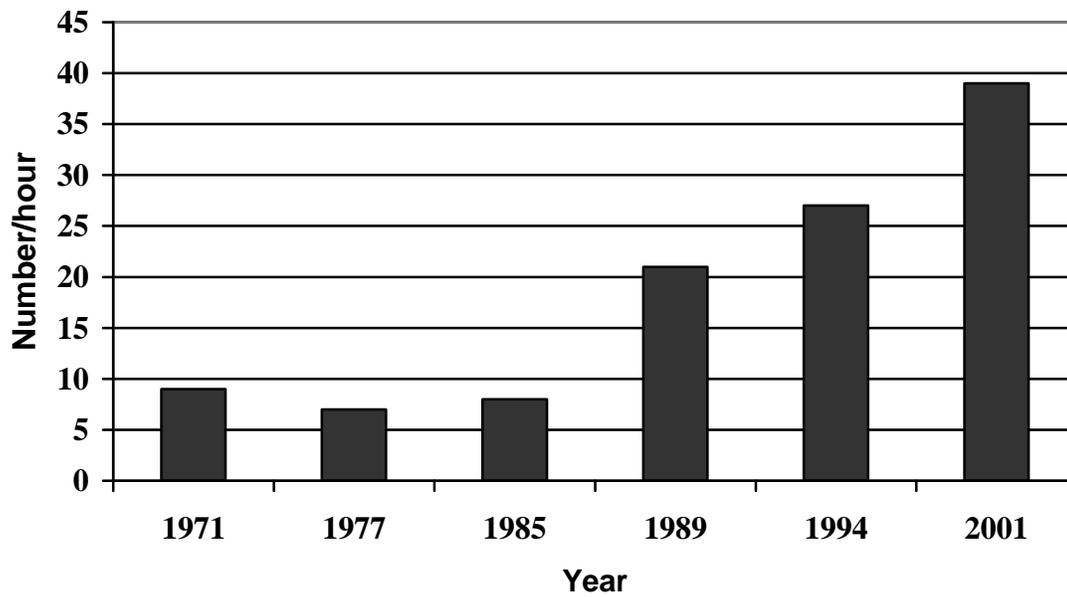


Figure 4. Relative abundance of largemouth bass from fall electrofishing surveys, Magnor Lake, Polk County, Wisconsin.

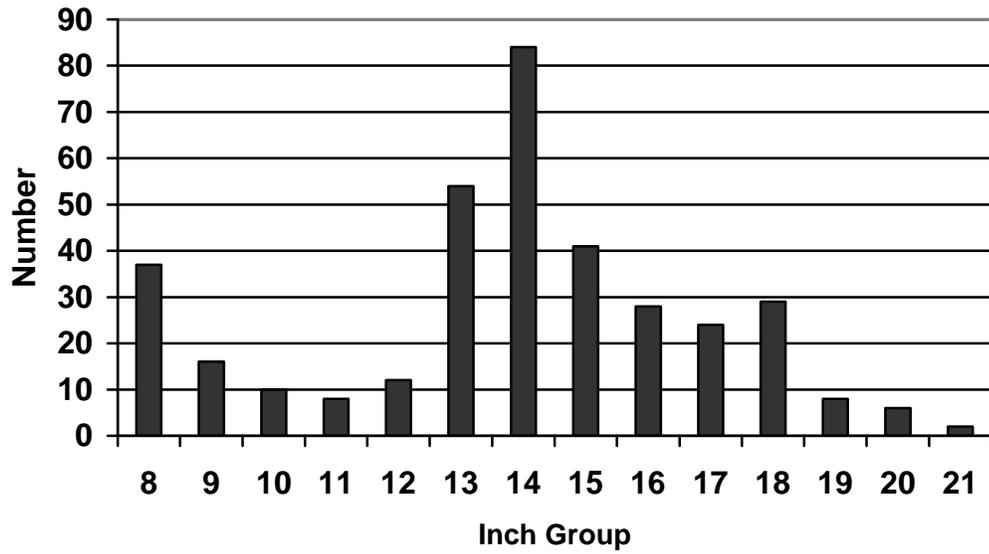


Figure 5. Largemouth bass length frequency, Magnor Lake, Polk County, Wisconsin 2007.

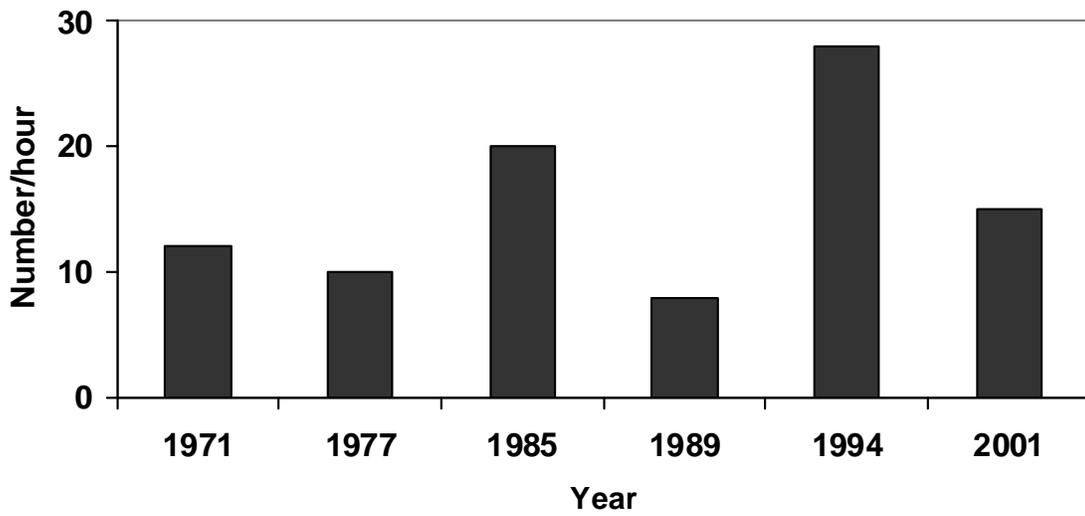


Figure 6. Relative abundance of northern pike from fall electrofishing surveys, Magnor Lake, Polk County, Wisconsin.