Pipe and North Pipe Lakes
Treaty Assessment Survey
Polk County, Wisconsin
2004-2005
(MWBIC: 2490500)

By

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Executive Summary

Pipe Lake, a 342-acre seepage lake located in east central Polk County west of Cumberland, Wisconsin was surveyed in 2004-2005 following the Wisconsin Department of Natural Resources Treaty Assessment protocol. Projected angler effort for all species of fish was 17.3 hours/acre, of which 54% was directed towards largemouth and smallmouth bass. Largemouth bass were the most common gamefish caught and harvested by anglers followed by smallmouth bass, northern pike and walleye. The smallmouth bass fishery has remained stable since 1995, while the largemouth bass population has increased 323% since 1995. Conversely, the 2004 adult walleye population estimate of 1.2 fish/acre was 51% and 67% lower compared to past surveys of 1.9 fish/acre in 1995 and 2.1 fish/acre in 1989. A strong inverse relationship exists between walleye and largemouth abundance in Pipe Lake. Based on this information, largemouth bass regulation changes are recommended in an effort to reduce largemouth bass densities and potentially restore walleye abundance to historic levels.

Introduction

Pipe Lake is a 342-acre seepage lake located west of Cumberland, Wisconsin in east central Polk County. The lake is separated into two basins, a large south basin and a smaller north basin which is often referred to as North Pipe Lake. Based on 2004 Self Help Lake Monitoring, the south basin of Pipe Lake is considered mesotrophic, while the north basin is considered eutrophic. The maximum water depth on the south and north basins are 68 and 37 feet respectively. The southern basin of Pipe Lake has a steep shoreline and a limited littoral zone. The south basin also has probably the best water quality of any major lake in Polk County and is currently classified as an Outstanding Resource Water (ORW) by the Wisconsin Department of Natural Resources (WDNR). The water is very clear and has summer secchi depth readings commonly near 15 ft. The north basin consists of darker stained water and summer secchi depth readings commonly near 5 ft.

Pipe Lake has 6.9 miles of shoreline. One public boat landing is present on the north end of the southern basin. Most of the shoreline has been developed into residential and recreational housing, however much of the shoreline development has been conducted in a manner that is aesthetically pleasing and protected near shore habitat. Pipe Lake has a diverse fishery consisting of walleye Sander vitreus, northern pike Esox lucius, largemouth bass Micropterus salmoides, smallmouth bass Micropterus dolomieui, as well as bluegill Lepomis macrochirus, black crappie Pomoxis nigromaculatus, pumpkinseed Lepomis gibbosus, warmouth Lepomis gulosus, yellow perch Perca flavescens, green sunfish Lepomis cyanellus and rock bass Ambloplites rupestris.

Walleye stocking in Pipe Lake was initiated in 1933. Walleye stocking from 1933-1974 consisted of sporadic fry or small fingerling (< 3 in) stockings. Walleye stocking was terminated in 1974 because adequate natural reproduction was present to sustain the walleye fishery. In 1999, regular stocking of small fingerling walleye during odd numbered years began because walleye natural reproduction was no longer able to sustain a desirable walleye fishery (Cornelius 1997). According to Becker (1983), Pipe 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 and smallmouth bass, northern pike, and panfish.

Methods

Pipe Lake was sampled during 2004-2005 following the Wisconsin Department of Natural Resources treaty assessment protocol (Hennessy 2002). This sampling included spring fyke netting and electroshocking to estimate walleye 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 abundance was determined for the total population and separately for adult fish. Adult walleye were defined as being $\geq$ 15 in or sexable (Hennessy 2002). Survey data were also collected to estimate abundance and angler catch information on other species such as bass, northern pike, and panfish.

Creel census data were collected in 2004-2005 beginning the first Saturday in May and continuing through 1 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 Pipe Lake was 15 in with a daily bag that fluctuates on an annual basis dependent on annual safe harvest estimates. The minimum length limit for 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 2004-2005 survey were compared with a previous survey data on Pipe Lake in 1989 and 1995 and historic fall electrofishing surveys from 1976, 1977, 1989, 1992, 1993, 1995, 1999 and 2004. Population estimates from the 1989 survey were generated by the Great Lakes Indian and Wildlife Comission (GLIFWC) using spring nightime electrofishing that consisted of one marking run and one recapture run. Population estimates from 1995 consisted of spring fyke netting followed by nightime electrofishing (similar to the estimate conducted in 2004). 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 1976, 1977, 1986, 1992, 1993, 1994, 1995 and 1999-2004.

Results

Angling Effort. Projected angling pressure for all fish species in 2004-2005 was 17.3 hours/acre. Overall, 86% of the angling pressure in 2004-2005 was during the open water season and 14% was during the ice fishing season. In comparison, projected angling pressure in 1995-1996 was 31.9 hours/acre of which 87% was open water angling pressure and 13% was during the ice fishing season.

Walleye. The adult walleye population in 2004 was 421 or 1.2 fish/acre (95% C.I. 301-540). Adult walleye abundance was 51% and 67% lower in 2004 compared to 1995 and 1989 respectively (Figure 1). The adult walleye population in 1995 was 634 or 1.9 fish/acre (95% C.I. 439-829) and in 1989 was 704 or 2.1 fish/acre (90% C.I. 490-918). The relative abundance of all walleye sampled during fall electrofishing surveys also suggests a decreasing walleye abundance from 1977 to 2004 (Figure 2).

Year class strength of walleye has been low (Table 1). An exception was 1986 when 40 YOY/mile were sampled. Walleye YOY were more abundant from 1976 to 1995 compared to 1996-2004. Excluding the large 1986 year class, the mean number of YOY per mile from fall electrofishing surveys was 4 fish/mile (N=6, Range = 1-7 fish/mile) compared to 1 fish/mile from 1996-2004 (N=6, Range = 0-3 fish/mile). The absent or weak year classes in 1996-2004 were after stocking occurred in three of those years (Table 1).

Angling effort for walleye made up 10% of the total directed effort (open water and ice combined) on Pipe Lake in 2004-2005. Interestingly, a large portion of the ice fishing directed effort was for walleye (22%; Table 2). Angler catch/hr and harvest/hr during the open water season was 0.09 fish/hr and .05 fish/hr respectively. Mean length of walleye harvested in 2004-2005 was 18.7 in (SD = 2.2, N = 12). In comparison, angler effort for walleye was 18% of the directed effort (open water and ice combined) on Pipe Lake in 1995-1996.

Angler projected harvest in 2004-2005 was 37 walleye during the open water and ice fishing periods combined. Tribal spear fishers harvested 45 fish in Pipe Lake in 2004. Total adult walleye exploitation was estimated at 21%. In comparison, angler projected harvest in 1995-1996 was 176 walleye during the open water and ice fishing period combined. Tribal spear fishers harvested 62 walleye in 1995 and total walleye exploitation was very high at 46% (Cornelius 1997).

Growth of walleye in Pipe Lake was average, however walleye growth was higher than the local and regional means for age 3 fish (Table 3).

Largemouth Bass. The adult largemouth bass population (≥ 8in) in 2004 was 3,056 or 8.9 fish/acre (95% C.I. 2,101-4,010). However, 87% of the largemouth bass from the 2004 estimate were less than 13.9 in. The largemouth bass population has increased 323% compared to a 1995 population estimate of 719 or 2.1 fish/acre (95% C.I. 559-879). Historic fall electrofishing surveys for largemouth bass suggest largemouth bass relative abundance has increased 200% from 9/hr in 1976 to 27/hr in 2004 (Figure 3).

Anglers directed considerably more effort toward largemouth bass in 2004-2005 compared to walleye. Nearly 28% of the directed angling effort during open water targeted largemouth bass. Angler catch rate was good at 0.78 fish/hr. However, projected angler harvest for largemouth bass in 2004-2005 was only 92 fish. Mean length of largemouth bass harvested in 2004-2005 was 17.2 in (SD = 2.5, N = 10). Growth of largemouth bass was average (Table 4). In comparison, angler effort for largemouth bass was 19% of the directed effort in 1995-1996 and projected harvest of largemouth bass was 128 fish.

Smallmouth Bass. The adult smallmouth bass population (≥ 8in) in 2004 was 1,172 or 3.4 fish/acre (95% C.I. 530-1,814). In addition, it was estimated that 46% of the smallmouth bass population was greater than 13.9 in length. The smallmouth bass population was similair to a 1995 population estimate of 1,201or 3.5 fish/acre (95% C.I. 698-1,704).

Anglers directed considerably more effort toward smallmouth bass in 2004-2005 compared to walleye. Thirty four percent of the open water directed angling effort targeted smallmouth bass (Table 2). Angler catch rate was good at 0.65 fish/hr. Projected angler harvest for largemouth bass in 2004-2005 was only 23 fish. Mean length of smallmouth bass harvested in 2004-2005 was 17.4 in (SD = 0.7, N = 8). Growth of smallmouth bass was below average (Table 5). In comparison, angler effort for smallmouth bass was 33% of the directed effort in 1995-1996 and projected harvest of smallmouth bass was 286 fish.

Northern Pike. Northern pike abundance was not estimated during the 2004 sampling event (netting, electroshocking). Fall electrofishing surveys suggest that the relative abundance has been variable since 1976 (Figure 4). Only 6% of the directed angling effort was for northern pike in 2004-2005. Open water angler catch rates were 0.84 fish/hr and ice angler catch rates were lower at 0.31 fish/hr. Projected angler harvest was only 51 northern pike during the openwater and ice fishing seasons of which 61% occurred during open water. Mean length of northern pike harvested in 2004-2005 was 25.9 (S D=3.6, N=11). In comparison, angler effort for northern pike was 8% of the directed angling effort in 1995-1996 and projected harvest of northern pike was 74 fish.

Panfish. Population abundance was not estimated for panfish during 2004-2005 netting and electroshocking. Fourteen percent of the directed angling effort was for bluegill in 2004-2005. Fifteen percent of the directed angling effort was for black crappie in 2004-2005. Combined, 29% of the directed angling effort in 2004-2005 was for black crappie and bluegill. The projected number of bluegill harvested in 2004-2005 was 1,590 and the projected number of black crappie harvested in 2004-2005 was 2,290. The average length of bluegill and black crappie harvested in 2004-2005 was 5.9 in (SD = 0.7, N= 132) and 8.6 in (SD = 1.25, N = 320), respectively. Yellow perch were not a major component of the angling effort. In 2004-2005, only 1% of the directed angling effort was for yellow perch and no fish were harvested. In comparison, directed effort was bluegill, black crappie and yellow perch were 14, 5 and 1 percent respectively in 1994-1995. Projected harvest of these three species was 1,876, 418 and 185 fish, respectively.

Discussion

Walleye. Adult walleye abundance decreased from 1989-2004. This decrease is likely related to poor year class strength over the past decade (1995-2004) and possible overexploitation of the adult population. Fall YOY walleye surveys conducted since 1995 suggest that year class strength has decreased, even with stocking, with half of the surveys failing to document any recruitment.

Walleye abundance in 2004 remained low. The likely reason that walleye abundance has not increased may be due to two factors. First, walleye natural reproduction appears to be very limited at best in Pipe Lake, whereas historically it appeared natural reproduction was able to sustain the fishery without stocking. (Cornelius, 1997). Second, walleye fingerling stocking has just recently began in 1999 after several decades with no stocking. It does appear that some very limited survival of stocked walleye is occurring Jennings et al. (2005), but overall walleye recruitment has been poor over the past decade. 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) 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. Three other studies completed on nearby Ward, Half Moon and Big Butternut Lakes (Benike 2005a; Benike 2005b, Benike 2005c) in Polk County also showed a similar trend of decreasing walleye abundance with a 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 survivialship. 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 Pipe Lake has increased 6 fish per acre from 1995 to 2004, it's reasonable to assume the largemouth bass may be utilizing walleye as prey.

A practical alternative that would have little to no cost impact would be to try and reduce largemouth bass densities on Pipe Lake. One approach would be to remove the current 14-in minimum length limit for bass. However considering Pipe Lake is the only lake in Polk County with a quality smallmouth bass fishery, this option is not appealing. Another alternative would be to remove the 14 in minimum length limit for largemouth bass and retain this regulation for smallmouth bass. Unfortunately, it is feared that enough anglers have a difficult time distinguishing the differences between largemouth bass and smallmouth bass that this option would cause additional enforcement and angler compliance issues. However, one practical alternative that could be implemented is to institute a protective length limit for bass. The goal of the protective length limit would be to maintain or possibly enhance larger sized bass, but allow harvest of smaller bass which are more abundant in the population. More specifically, considering 87% of the estimated largemouth bass population was less than 14.0 in, this regulation would allow additional harvest of smaller abundant largemouth bass but protect the existing quality size structure of the existing largemouth and smallmouth bass fishery. The goal of this management effort would be to lower largemouth bass densities to a point where stocked small fingerling walleye survival would be enhanced. More importantly, if it were successful, adult walleye abundance would hopefully increase and natural reproduction could once again contribute to the fishery. Lastly, the quality-sized bass in the population would not be jeopardized with this regulation option and it could even enhance the number of larger bass present in the population but reduce bass densities overall, especially for bass less than 14.0 in.

Another reason for the decline in walleye abundance could be from over exploitation. The 1995 survey documented that total walleye exploitation was very high at 46% (Cornelius 1997). Currently, safe harvest goals are to maintain total adult walleye exploitation less than 35%. While exploitation was lower in 2004

(21%), concern is warranted because of the low numbers of walleye present in Pipe Lake. Increasing minimum length limits could help restore the abundance of walleye in Pipe Lake if deemed necessary in the future, however they are not recommended at this time because it would complicate the evaluation of the experimental bass regulation proposal. It would be impossible to determine if the liberalized bass length limits or an increase in the minimum length for walleye was responsible for possibly increasing the adult walleye population if both options were pursued..

*Largemouth Bass***.** Largemouth bass were heavily targeted by anglers in terms of effort, but very few fish were actually harvested. Harvest data indicates that anglers are selectively harvesting only larger, trophy sized largemouth bass (mean length 17.2 in; SD = 2.5, N = 10). In addition, 87% of the estimated largemouth bass population was less than 14.0 inches in length. Liberalizing bass regulations would not appear to adversely impact any major component of the angling experience on Pipe Lake. If bass regulations were liberalized to allow harvest of bass less than 14 in, it is likely that overall densities of bass would decrease especially for smaller bass in the 10-14 in size range, but that the quality size structure would be maintained or even possibly enhanced by a protective length limit. In addition, the possibility of selective removal of largemouth bass using electrofishing should be considered. Considering the high abundance of sub-legal largemouth bass present in the population and the potential impact the high largemouth bass population may be having on the historic natural reproducing walleye population, selective removal of largemouth bass less than 14 in should help expedite the proposed management action of reducing the density of largemouth bass less than 14 in.

Smallmouth Bass. Smallmouth bass were the most common fish targeted by anglers, however most of the fish were released and only a few larger trophy sized fish were harvested. Forty percent of the estimated smallmouth bass population was larger than 13.9 in, which suggests a balanced, quality fishery. The proposed, protective length limit for bass should maintain or even possibly enhance the number of larger smallmouth bass in the population. Pipe Lake should continue to provide a unique and exceptional smallmouth bass fishery for northwestern Wisconsin.

Northern Pike. Northern pike were the second most common gamefish harvested by anglers, however the projected number of fish harvested was low. In addition, the 2004-2005 creel indicated that open water catch rates and mean length of fish harvested were higher than average but harvest rates were similar to those noted for 55 northern Wisconsin lakes by Margenau et al. (2003). Overall, the northern pike fishery is considered adequate and should provide above average angling opportunities.

Panfish. Panfish were in the most common fish caught and harvested on Pipe Lake. Bluegill and black crappie catch and harvest rates have increased between 1995 and 2004. Yellow perch have a very limited role in the fishery. Panfish will likely continue to be an important component of the angling experience on Pipe Lake in the future.

Management Recommendations

1. It is recommended that the 14-inch minimum length limit be removed for bass on Pipe Lake and a 14-18 in protective length limit be implemented on an experimental basis. The goal of this regulation proposal is to reduce largemouth bass densities less than 14 in, maintain or enhance the existing size structure of 14 in and larger smallmouth and largemouth bass, reduce predation on as well as, enhance survival of stocked walleye, and ultimately increase walleye densities in an effort to restore the walleye fishery similar to historic conditions found prior to 1995.

2. In an effort to expedite the reduction of largemouth bass less than 14 inches, mechanical removal of 1200 largemouth bass less than 14 inches should occur by May of 2008. The removed bass will be stocked in an effort to rehabilitate bass populations on adjacent lakes that have suffered from recent fish winterkills.

3. The adult walleye population should be maintained between 2.0-4.0 adults per acre by 2014. Walleye stocking should also continue during even numbered years during the experimental bass regulation period.

4. Largemouth bass densities should be reduced to 1.0-3.0 bass per acre by 2014, with 40% of the population larger than 14 in. This management goal is targeted at reducing largemouth bass densities, especially for fish less than 14 in but maintaining or improving the number of larger bass in the population.

5. The smallmouth bass population should be maintained between 2.0-4.0 fish per acre, with 40% of the adult population larger than 14 inches. This management recommendation should maintain the existing smallmouth bass fishery in its present state.

6. The northern pike population and panfishery appear to be healthy. No changes are recommended at this time.

7. Littoral zone areas should be protected to provide critical spawning, nursery and overwintering habitat for the existing fish community in Pipe Lake. No large-scale chemical treatment of aquatic plants is recommended, unless deemed appropriate at some future point. Minor chemical treatments for navigational purposes should be considered on a case by case basis.

8. Lake shore property owners should maintain or restore at least a 35 foot vegetative buffer to maintain near shore habitat and to protect the water quality of Pipe Lake. Pipe Lake is one of the best lakes in Polk County in terms of water clarity and quality. Elimination of protective lakeshore buffers will likely lead to an increase in nutrients that will likely contribute to an increase in algae blooms and a decrease in overall water quality and fish habitat.

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Table 1. Walleye stocking and fall fingerling catch per unit of effort (CPUE) from electrofishing for Pipe 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)
1976				1
1977				2
1986				40
1992				3
1993				5
1994				7
1995				4
1999	< 3.0 in	13,500		0
2000				1
2001	< 3.0 in	13,500		2
2002				0
2003	< 3.0 in	17,282		3
2004				0

Table 2. 2004-2005 and 1995-1996 creel survey data by season for major game and panfish species, Pipe Lake, Polk County, Wisconsin.

Species	Season	Year	Directed Effort %	Catch rate (fish/hr)	Harvest rate (fish/h)	Mean len. (in) harvested
Walleye	Open water	2004	8.4	0.09	0.05	18.6
	Ice	2005	22.1	0.01	0.01	19.2
	Combined	04-05	10.2	0.07	0.04	18.7
	Open water	1995	16.9	0.07	0.05	17.8
	Ice	1996	29.7	0.07	0.07	20.6
	Combined	95-96	18.1	N/A	N/A	N/A
Largemouth bass	Openwater	2004	27.9	0.78	0.01	17.5
	Ice	2005	0	0	0	0
	Combined	04-05	24.3	0.78	0.01	17.2
	Open water	1995	19.3	0.28	0.03	14.9
	Ice	1996	9.8	0.07	0.07	14.9
	Combined	95-96	18.5	N/A	N/A	N/A
Smallmouth bass	Openwater	2004	34.2	0.65	0.01	17.4
	Ice	2005	0	0	0	0
	Combined	04-05	29.8	0.65	0.01	17.4
	Openwater	1995	35.4	0.52	0.05	14.8
	Ice	1996	9.8	0	0	0
	Combined	95-96	33.1	N/A	N/A	N/A
Northern pike	Openwater	2004	2.2	0.84	0.19	27.6
	Ice	2005	34.6	0.31	0.04	22.9
	Combined	04-05	6.4	0.47	0.08	25.9
	Openwater	1995	5.9	0.17	0.04	21.8
	Ice	1996	33.4	0.09	0.05	22.2
	Combined	95-96	8.4	N/A	N/A	N/A
Bluegill	Openwater	2004	12.0	3.89	1.34	5.7
	Ice	2005	27.3	3.63	1.19	7.3
	Combined	04-05	14.0	3.82	1.31	5.9
	Openwater	1995	14.0	2.25	0.81	7.2
	Ice	1996	12.2	1.19	0.83	7.1
	Combined	95-96	13.9	N/A	N/A	N/A
Black crappie	Openwater	2004	14.8	2.49	1.82	8.4
	Ice	2005	16.1	3.95	1.37	10.7
	Combined	04-05	15.0	2.70	1.76	8.6
	Openwater	1995	4.9	1.66	0.53	10.1
	Ice	1996	4.4	0.35	0.35	10.4
	Combined	94-95	4.9	N/A	N/A	N/A

Table 3. Walleye mean length (in) at age, Pipe Lake 2004, and local and regional means, Wisconsin. Local and regional mean length information is from WDNR Fisheries and Habitat database.

Age	N	Pipe Lake Mean 2004	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	24	15.1	1.2	13.4	2.3	11.9
5	16	16.9	1.3	17.5	1.9	16.1
6	16	19.7	1.7	18.8	2.0	17.7
7	6	20.7	1.0	20.4	2.5	19.3

Table 4. Largemouth bass mean length (in) at age, Pipe Lake 2004, and local and regional means, Wisconsin. Local and regional mean length information is from the WDNR Fisheries and Habitat database.

Age	N	Pipe Lake Mean 2004	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	12	8.9	0.4	9.3	2.0	9.0
4	23	11.9	1.4	11.7	2.0	11.0
5	16	13.7	0.7	13.2	2.1	12.7

Table 5. Smallmouth bass mean length (in) at age, Pipe Lake 2004, and local and regional means, Wisconsin. Local and regional mean length information is from the WDNR Fisheries and Habitat database.

Age	N	Pipe Lake Mean 2004	SD	Barron & Polk County (Local Mean)	SD	Northern Region (Regional Mean)
3	23	8.4	1.0	9.9	1.3	9.2
4	15	11.6	1.4	11.9	1.7	11.1
5	17	12.7	1.2	14.5	2.3	13.3

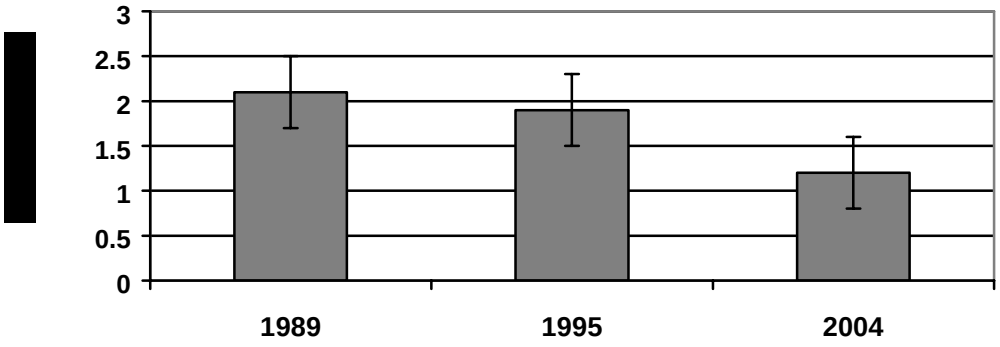

Figure 1. Adult walleye population density, Pipe Lake, Polk County, WI. Error bars represent 95% confidence intervals.

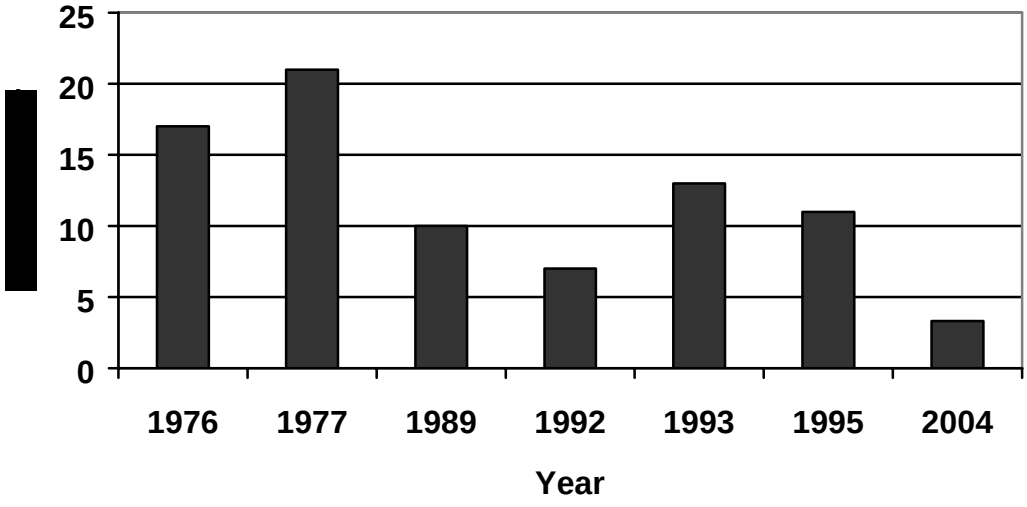

Figure 2: Relative abundance of walleye from fall electrofishing surveys, Pipe Lake, Polk County, Wisconsin.

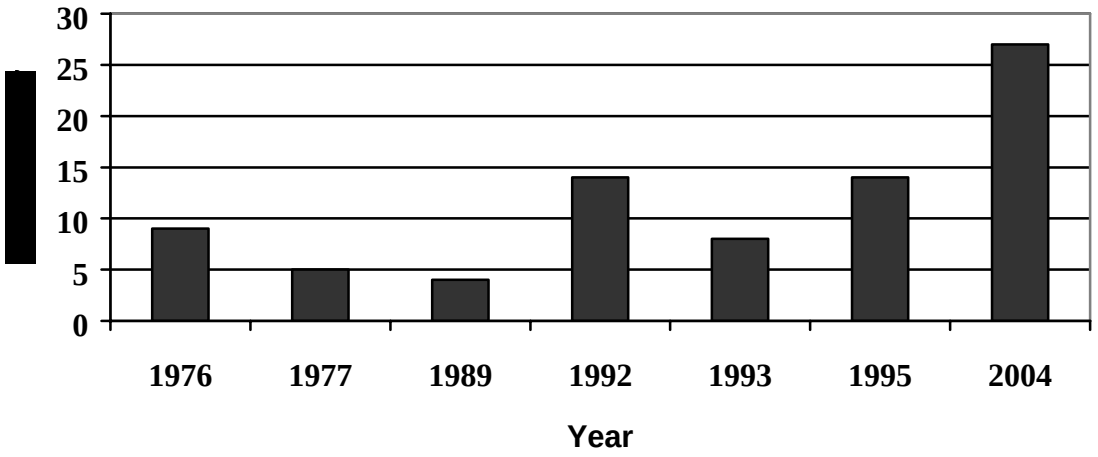

Figure 3: Relative abundance of largemouth bass from fall electrofishing surveys, Pipe Lake, Polk County, Wisconsin.

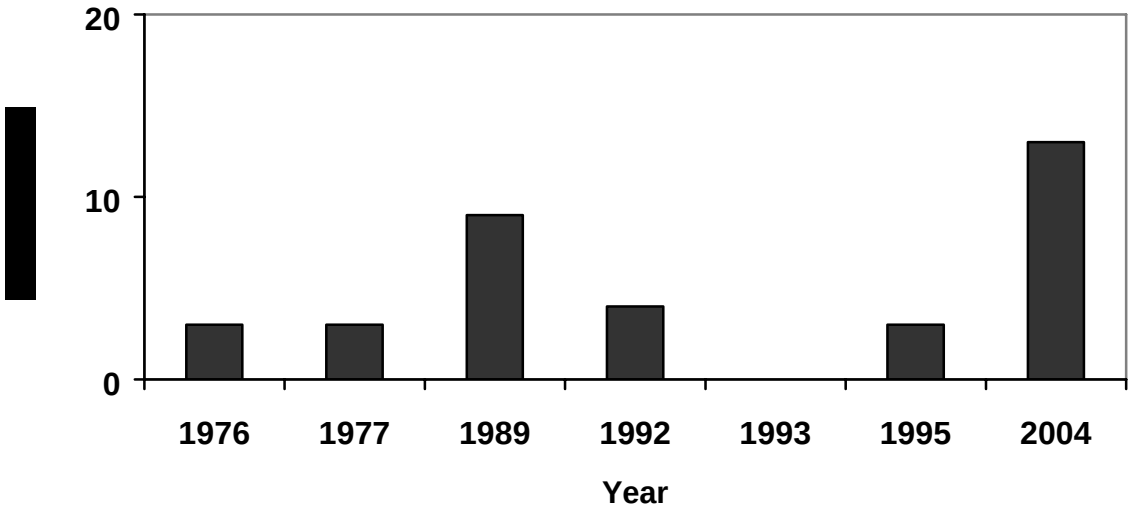

Figure 4: Relative abundance of northern pike from fall electrofishing surveys, Pipe Lake, Polk County, Wisconsin.