

CORRESPONDENCE/MEMORANDUM

DATE: November 16, 2005
TO: Mike Vogelsang, Woodruff
FROM: Bob Young, Woodruff
SUBJECT: Pine Lake, Forest County

Attached is the DRAFT 2003 Comprehensive Fisheries Survey Report for Pine Lake in Forest County.

APPROVALS: _____
Mike Vogelsang, Headwaters Fishery Supervisor

Steve AveLallemant, NOR Fisheries Coordinator

NOTED: _____
Andy Fayram, FH/3

Cc: Tom Bashaw, Rhinelander

**Wisconsin Department of Natural Resources
Comprehensive Fisheries Survey Report**

Pine Lake, Forest County

2003



DRAFT

Lake and Location:

Pine Lake, Forest County, T37N-R12E-Sec 22 (WBIC 406900)

Physical/Chemical Attributes:

Morphometry: 1,670 acres, maximum depth 14 feet

Lake Type: Drainage (two inlets, one outlet to Wolf River)

Basic Water Chemistry: Soft water - alkalinity 35 mg/l, conductance 90 umhos

Littoral substrate: 40% sand, 35% muck, 15% gravel, and 10% rock

Aquatic vegetation: Common to dense

Shoreline character: 90% upland, 10% wetland

Level of shoreline development: High (avg. 1 structure < every 150 feet of shoreline)

Winterkill: Occasional partial kills reported

Other features: Dam at outlet with 1ft. head

Purpose of Survey: Assess status of gamefish, panfish and non-game species. Develop management recommendations.

Dates of Field Work: April 23, 2003 to September 24, 2003

Survey and Data Personnel: Matt Andre, Dave Brum, Kevin Gauthier, Ben Heimbach, Joe Hennesey, Marty Kiepke, Joelle Underwood, Jordan Weeks, Keith Worrall, Bob Young

Report Author: Bob Young, Fisheries Biologist, Woodruff

Report Date: March 4, 2004

I. SUMMARY

Pine Lake was surveyed in 2003 with a variety of sampling gear to assess the status of all major fish communities. Sampling began with early spring fyke netting and electroshocking, targeted at adult gamefish abundance, and concluded with fall electroshocking for gamefish young-of-year recruitment. Included between those periods was late spring electroshocking for adult bass, late spring fyke netting targeted at panfish, and summer mini-fyke netting for panfish and non-game species.

A diverse fish community consisting of 5 gamefish, 7 panfish and 6 non-game species was sampled during the survey period. Walleye was the most commonly encountered gamefish, followed by northern pike (NP) and largemouth bass (LMB). Stocking supports the walleye population, as there is little evidence of natural reproduction. The estimated adult walleye density of 0.8 per acre is well below average for even stocked lakes, but average size of walleyes is good. Walleye growth is well above average. There is a fairly low density, naturally reproducing population of LMB growing at normal rates. Northern pike are numerous, naturally reproducing, and growing at average rates. Few NP seem to reach quality size and the majority captured appeared to be relatively thin.

Among the panfish, a naturally reproducing, large population of bluegills with a fair to marginal size structure and poor growth rates is presently in Pine Lake. Pumpkinseed and black crappie are less numerous but have similar population characteristics. Rockbass and yellow perch are quite scarce. The relatively poor

size structure and growth rates of most panfish are likely related to inherent lake characteristics (dense aquatic plants), and possibly high angling pressure on larger sizes.

Management recommendations are as follows:

Largemouth bass - No active management of largemouth bass in Pine Lake is recommended at this time. The current regulation of 5 daily bag, 14 inches minimum length is adequate. More restrictive bass harvest regulations in the future, coupled with increased plant harvesting, could result in a larger bass population, a reduction of bluegill numbers and corresponding improvement in bluegill sizes and growth.

Northern pike - No active management of northern pike is recommended at this time.

Walleye - Walleye stocking by WDNR should be resumed in Pine Lake, every other year at a rate of 50 small fingerlings per acre. Larger, fall walleye fingerlings should be stocked when available from the Forest County Walleye Association cooperative rearing pond, at a rate of up to 20 per acre. The current regulation of 15-inch minimum size is appropriate for this low-density population with good growth rates.

Black Crappie, Bluegill, Pumpkinseed - No direct, active management of bluegill, pumpkinseed or black crappie in Pine Lake is recommended at this time. Encouraging more panfish predators, especially largemouth bass, could eventually improve panfish size structure by reducing the number of smaller individuals, thereby increasing growth rates of remaining fish. A significant reduction of aquatic plants to decrease cover and make panfish more vulnerable to predation would also help improve panfish size structure and growth.

Other panfish - No active management of other panfish in Pine Lake is recommended at this time.

General Lake Condition and Habitat -The lake association should refine its aquatic plant-harvesting plan to encourage both an increased harvest and cutting of well defined “lanes”. Research on other similar lakes has shown that maintaining open lanes is a good method of providing predator fish better access to over-abundant panfish.

II. PAST MANAGEMENT AND SURVEYS

Known Stocking History

Bluegill – adults&fingerlings, 1941

LM Bass – fry&fingerlings, 1943, 1945, 1950, 1960

N. Pike - fry&fingerlings, 1942-50, 1953, 1965

Perch – fingerlings, 1939, 1941

SM Bass – fingerlings, 1942

Shiner – adults, 1942

Sucker – adults, 1942

Walleye – > 17 million fry&fingerlings, 1937-43, 1945, 27 of 52 years 1952 - 2003

Past Surveys and Findings

Fish surveys were conducted with a variety of sampling gears in 1949, 1956, 1962, 1979, 1980, 1981, 1985-87, and 1991. Results have been similar for all surveys and primarily showed: 1) a high density, average to slow growing panfish population consisting mainly of bluegills, pumpkinseed, crappie and perch 2) a stable population of largemouth bass with normal growth rates, supported by natural reproduction 3) a stable population of northern pike with normal growth rates, supported by natural reproduction 4) a low density population of walleyes with normal growth rates, supported almost entirely by stocking 5) high angling use and 6) abundant to dense aquatic plant growth.

III. METHODS

**Pine Lake - Forest County
2003 Sample Summary**

<u>Dates</u>	<u>Gear Type</u>	<u>Sampling Effort</u>	<u>Primary Objective</u>	<u>Other Objectives</u>
April 23 – 28, 2003	Fyke Nets	9 – 4 Foot , 48 Lifts	Gamefish Population Estimates (Marking)	Collect Gamefish; Lengths, Mark and Aging Data. Gamefish and Nongamefish Catch per Unit Effort.
April 28, 2003	Electrofishing	All Shoreline 6.4 Mi.	Adult Walleye Recapture (1 st Run)	Collect Gamefish; Mark, Lengths and and Aging Data. Nongamefish CPE
May 7, 2003	Electrofishing	All Shoreline 6.4 Mi..	Bass PE Marking Run (2 nd Run)	Collect Gamefish: Mark, lengths and Aging Data. Nongamefish CPE
May 15, 2003	Electrofishing	All Shoreline 6.4 Mi..	Bass PE Marking Run (3 rd Run)	Collect Gamefish Aging Data, Mark And Lengths
May 29, 2003	Electrofishing	All Shoreline 6.4 Mi..	Bass Recapture Run (4 th Run)	Collect Gamefish Lengths and Mark
June 2-5, 2003	Fyke Nets	6 – 4 Foot, 18 Lifts	Panfish Survey, CPE	Collect Panfish Aging Data and Lengths.
July 29-30, 2003	Fyke Nets	8 - 3 Foot, 8 Lifts	Gamefish YOY and Nongamefish CPE	Identify species, Lengths, and CPE
September 24, 2003	Electrofishing	All Shoreline 6.4 Mi. plus 2, .5 mi. index sta. and 2, 1.5 mi. gamefish stations	Gamefish Recruitment (5 th Run)	CPE All Gamefish; baseline monitoring



Fyke net, Pine Lake



Running a fyke net, Pine Lake

Collecting data, Pine Lake

Electroshocking boat



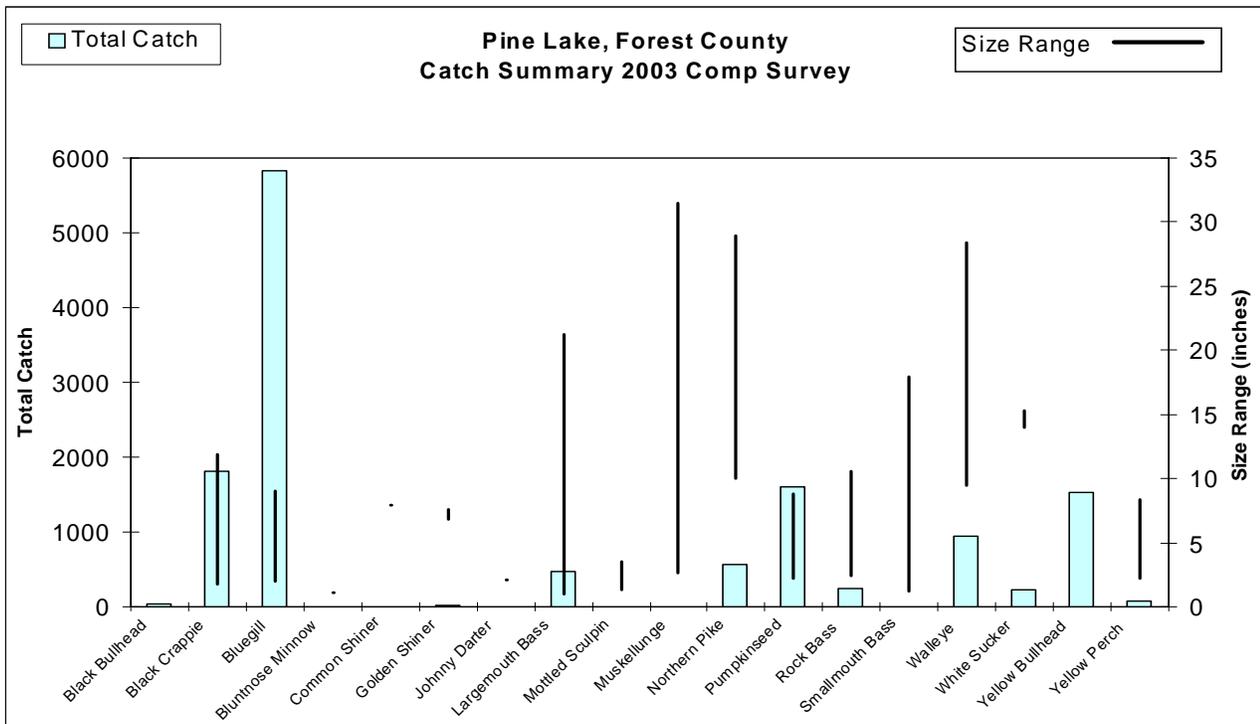
IV. SURVEY RESULTS

Results are summarized below. Corresponding data tables are in the Appendix.

CATCH SUMMARY

A diverse fish community consisting of 5 gamefish, 7 panfish and 6 non-game species was sampled during the survey period (Figure 1). Walleye was the most commonly encountered gamefish, followed by northern pike (NP) and largemouth bass (LMB). Among the panfish, bluegill were relatively much more abundant than pumpkinseed, black crappie, rock bass, or yellow perch.

Figure 1.



GAMEFISH RELATIVE ABUNDANCE

Early spring fyke netting, just after ice-out, yielded relatively more walleyes and northern pike than bass and muskies (Figure 2). Late spring fyke netting found relatively more northern pike than bass and walleye. Spring electroshocking (first 4 runs combined) collected good numbers of largemouth bass, compared to northern pike, walleye and smallmouth bass (Figure 3). Fall electroshocking yielded relatively few game fish, and no young-of-year walleye.

Figure 2.

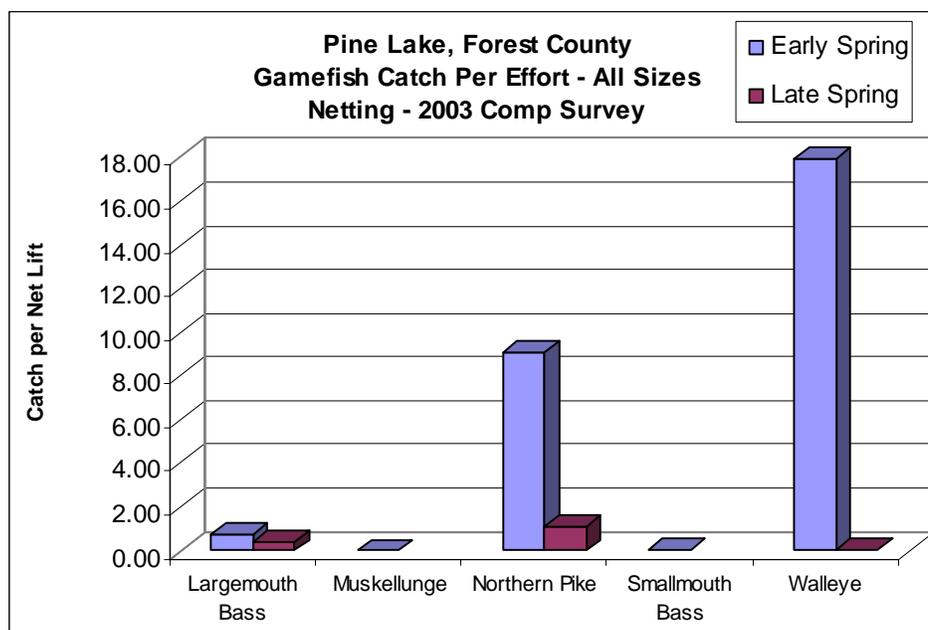
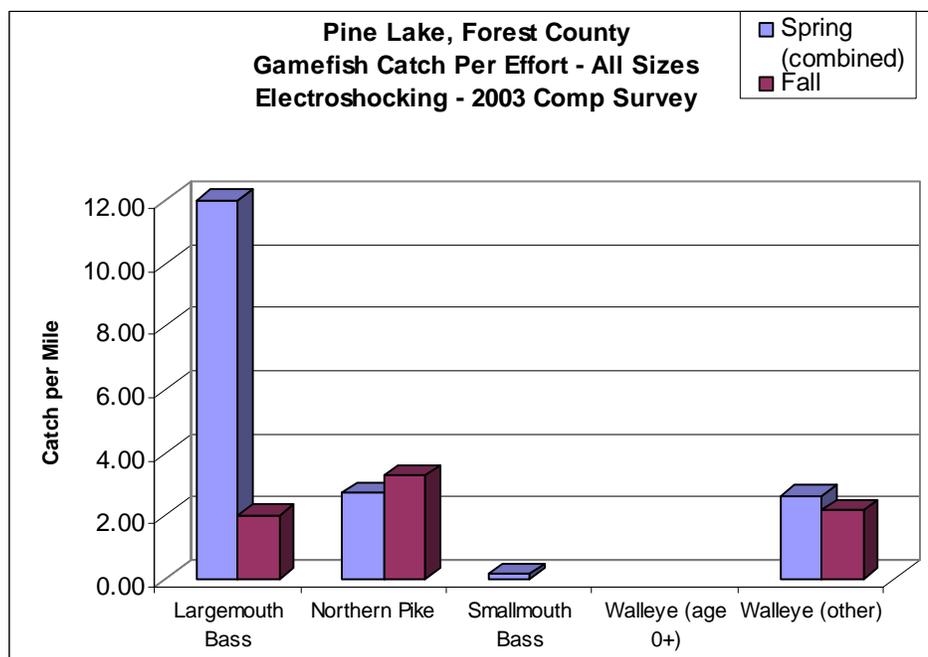


Figure 3.

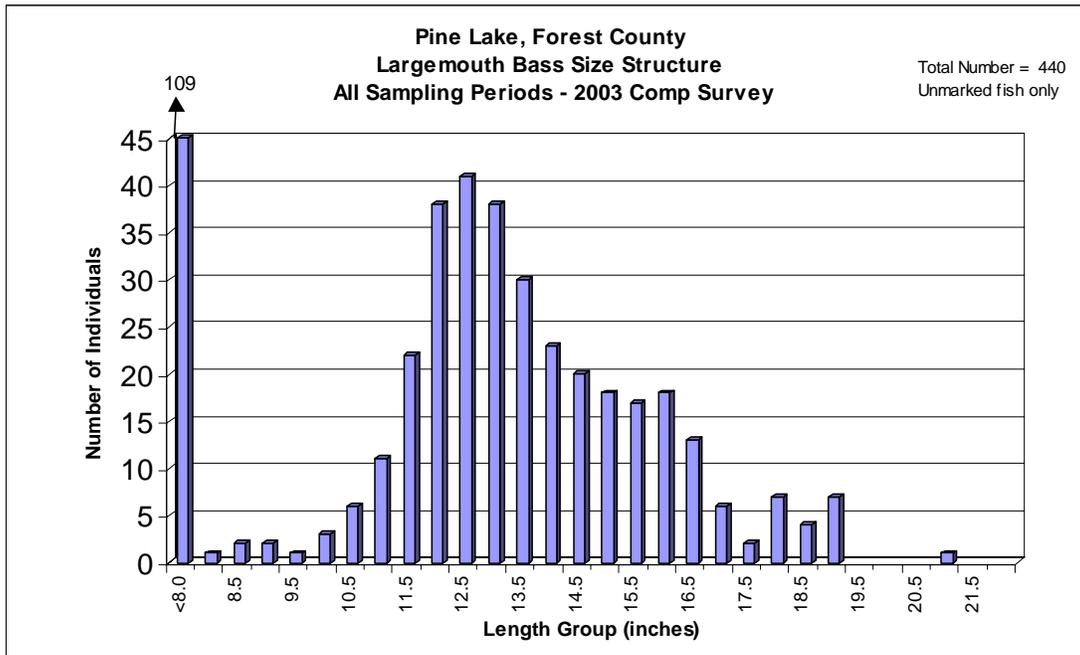


LARGEMOUTH BASS

Size Structure

A total of 440 largemouth bass (LMB) were measured for total length (TL) during the survey period (Figure 4). For the 337 LMB larger than 8.0 inches TL, the modal (most common) size was 12.5-12.9 inches, and the average was 13.1 inches TL. We found good numbers of LMB above the legal minimum size of 14 inches.

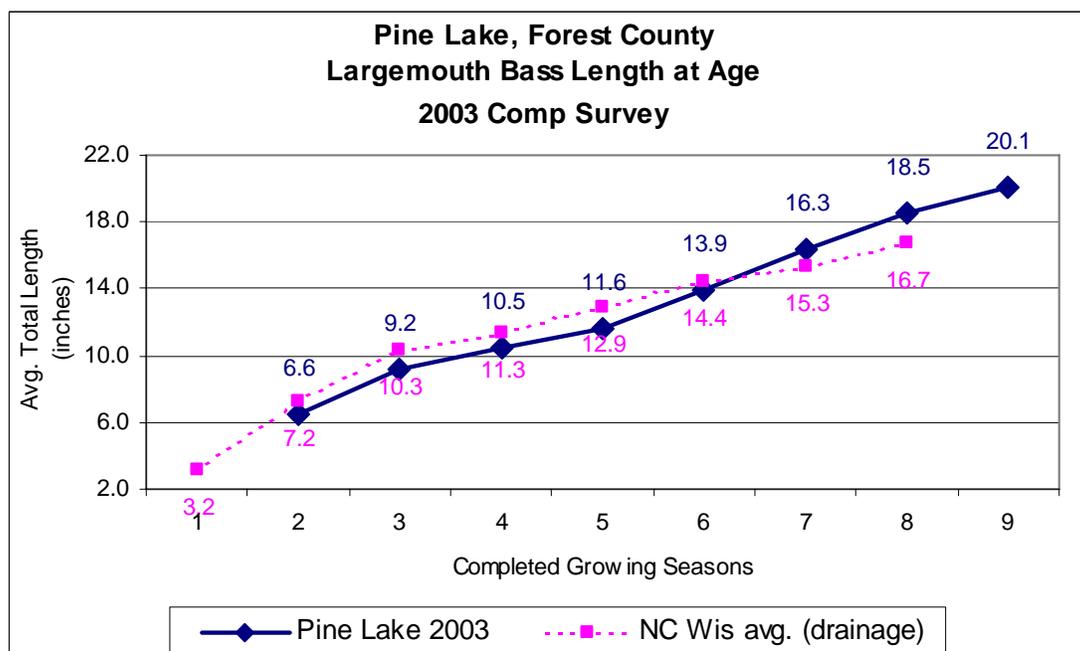
Figure 4.



Growth

A total of 106 largemouth bass (LMB) were aged by examining scales. Growth as inferred from length at age was near the average for similar north central Wisconsin lakes (Figure 5).

Figure 5.



Abundance

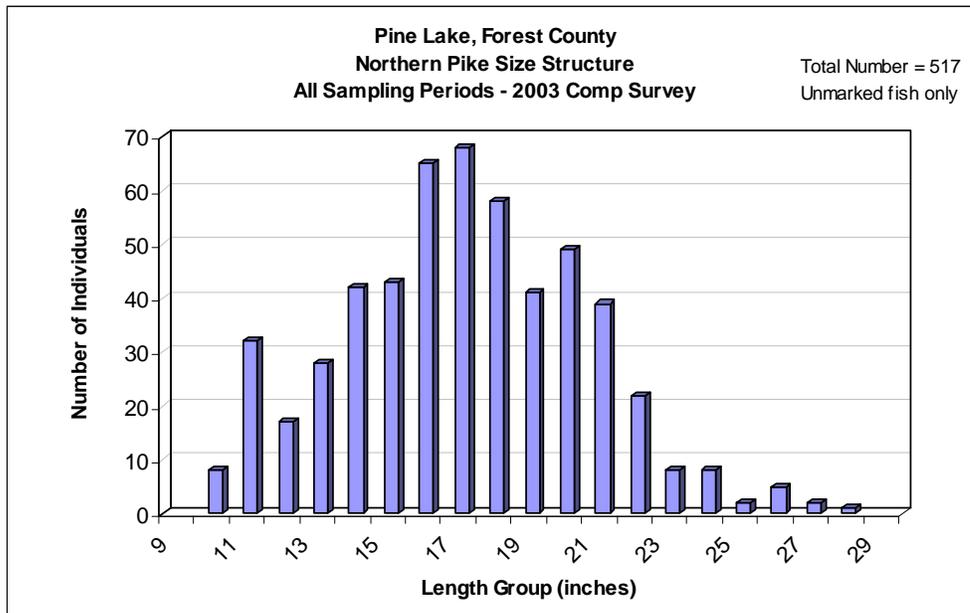
A mark/recapture, Chapman-modified, Schnabel sampling method used to calculate abundance estimated the adult LMB population at 2752 fish, or 1.6 per acre. Based on 95% confidence intervals, the actual numbers could range from 1665 to 4913 fish, or 1.0 to 2.9 fish per acre. The coefficient of variation for the estimate was 25.8%, well within the acceptable maximum of 40%.

NORTHERN PIKE

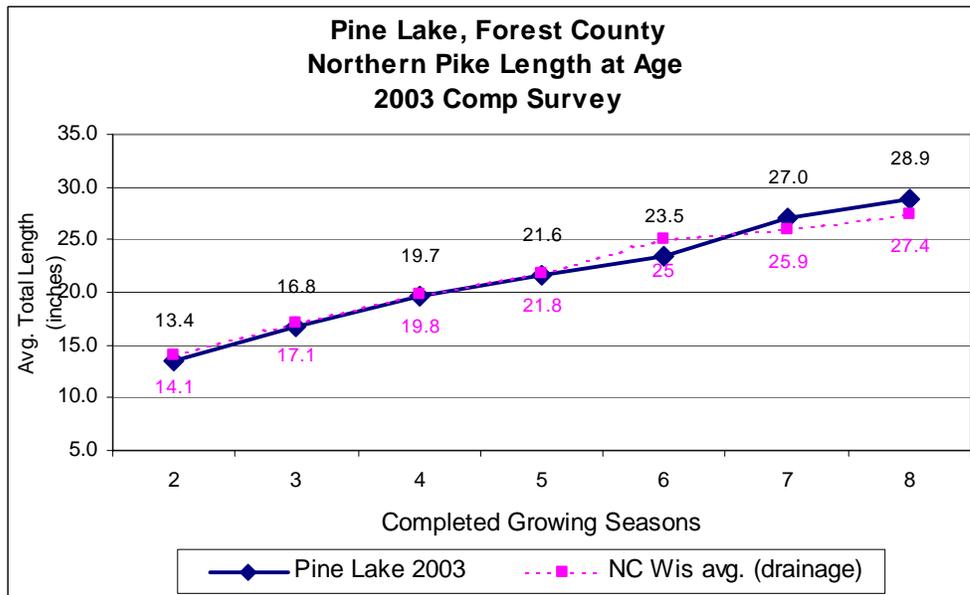
Size Structure and Condition

A total of 517 northern pike (NP) were measured for total length (TL) during the survey period (Figure 6). The modal size was 18 inches, and the average was 17.1 inches TL. Although we found good numbers of pike, they appeared to be relatively thin compared to those in other area lakes.

Figure 6.



Growth
Figure 7.



Abundance

A mark/recapture, Chapman-modified, Schnabel sampling method used to calculate abundance estimated the adult NP population at 18674 fish, or 11.2 per acre. Only 4 marked fish were subsequently recaptured. Based on 95% confidence intervals, the actual numbers could range from 7324 to 74691 fish, or 4.4 to 44.7 fish per acre. The coefficient of variation for the estimate was 50%, above the acceptable maximum of 40%. In spite of the poor estimate, we know NP are quite numerous in Pine Lake.

SMALLMOUTH BASS

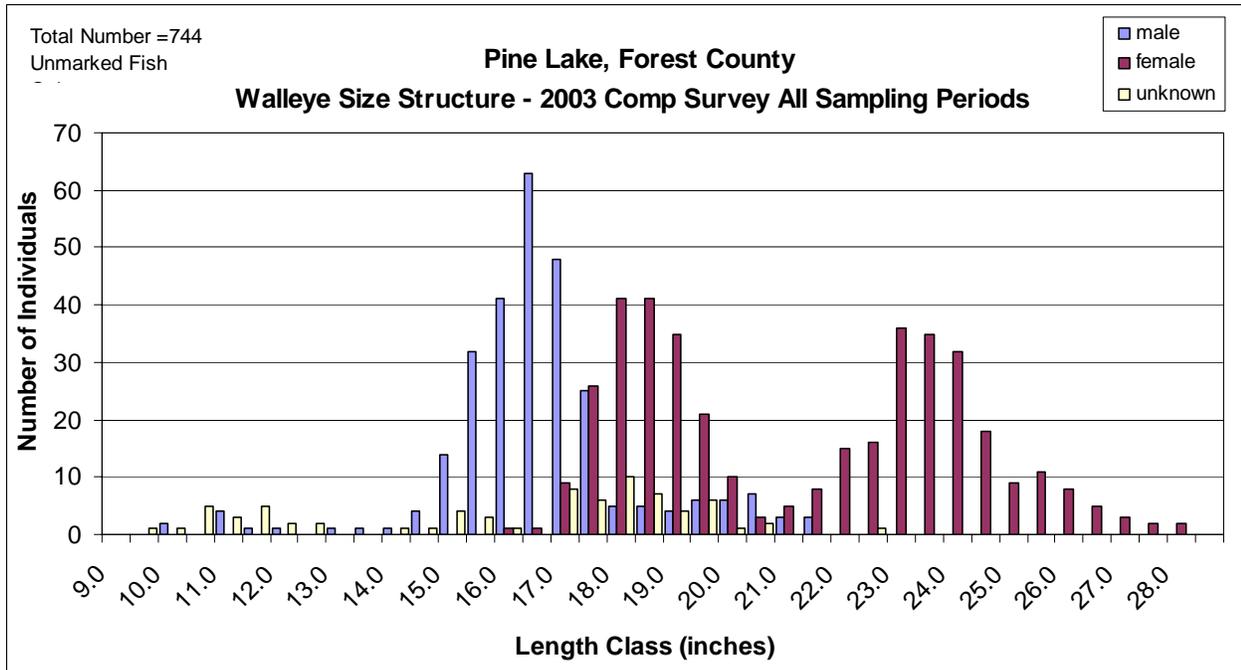
Only 7 smallmouth bass were captured during the entire survey period, ranging in size from 1.2 to 17.9 inches.

WALLEYE

Size Structure

A total of 744 walleye were measured for total length (TL) during the survey period. The modal size was 17 inches, and the average was 19.3 inches TL (Figure 8). Average walleye sizes in 2003 were somewhat better than in 1985, but overall, average size appears stable when compared to past surveys (Figure 9).

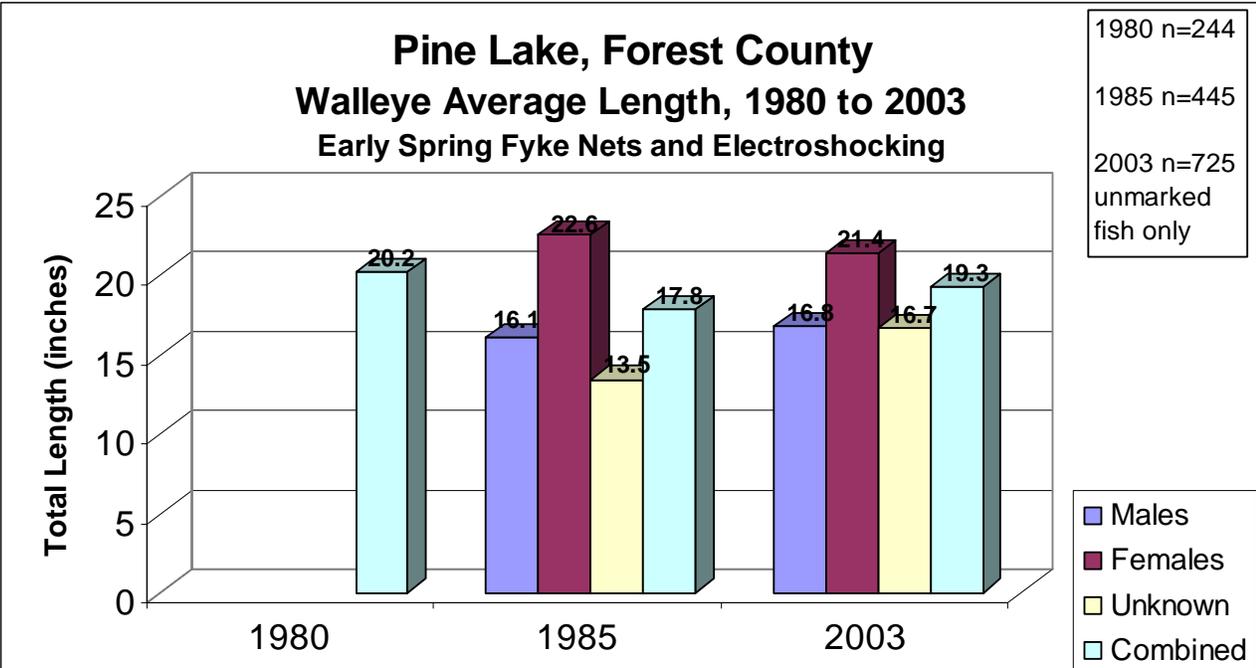
Figure 8.





Pine Lake walleye

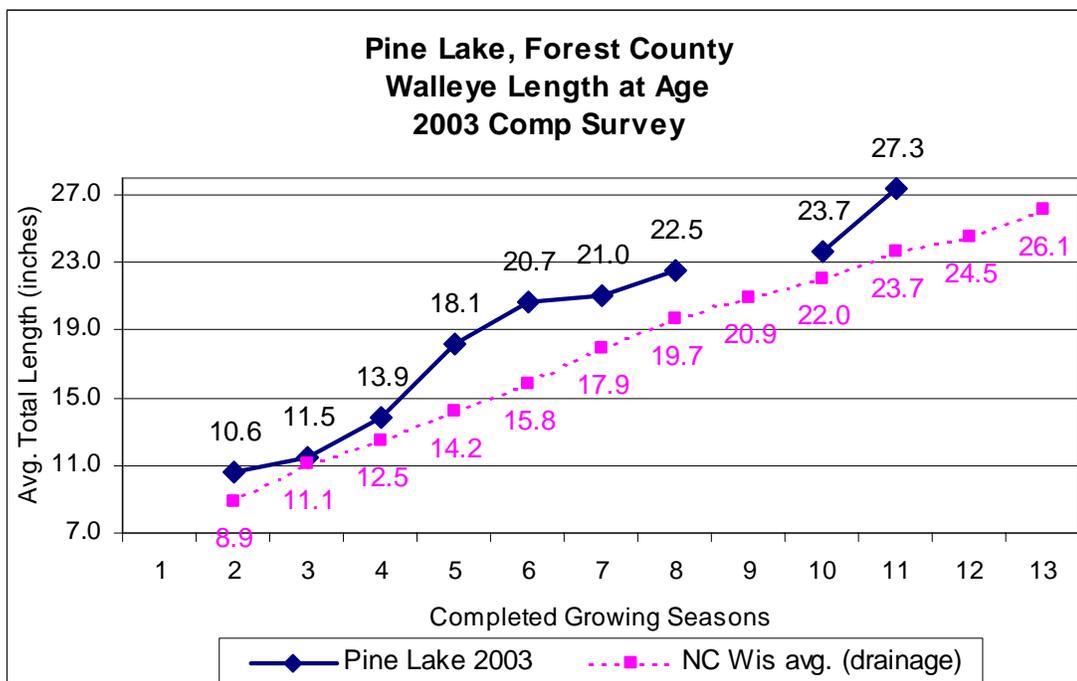
Figure 9.



Growth

A total of 226 walleye were aged by examining scales. Growth as inferred from length at age was well above the average for similar north central Wisconsin lakes (Figure 10).

Figure 10.

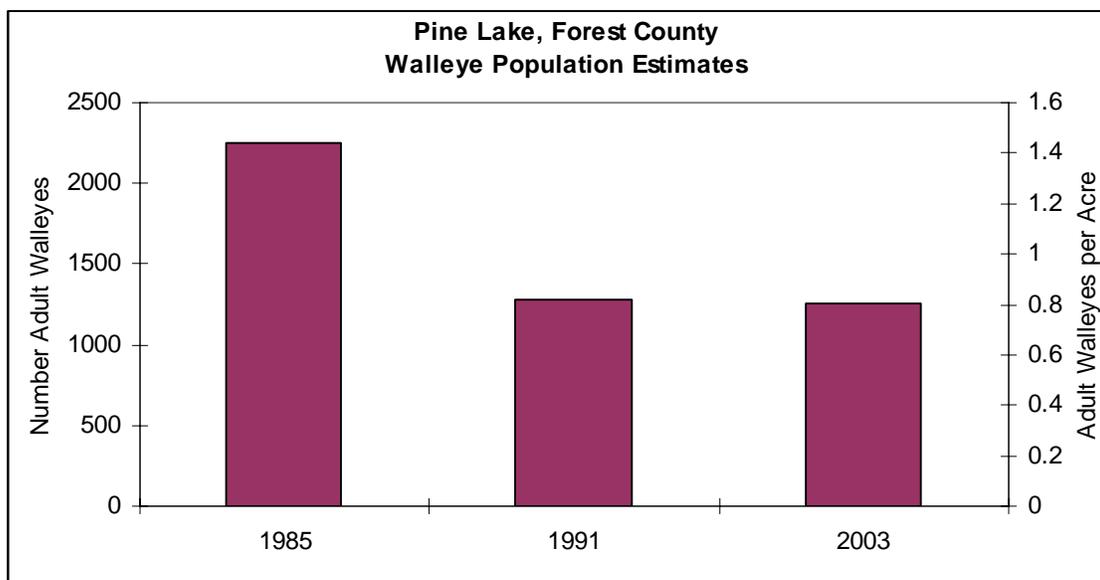


Abundance

A mark/recapture, Chapman-modified, Petersen sampling method used to calculate abundance estimated the adult walleye population at 1261 fish, or 0.8 per acre. Based on 95% confidence intervals, the actual numbers could range from 961 to 1562 fish, or 0.6 to 0.9 fish per acre. The coefficient of variation for the estimate was 12.1%, well below the acceptable maximum of 40%.

The 2003 estimate was nearly identical to that of 1991, while the 1985 estimate was relatively higher (Figure 11).

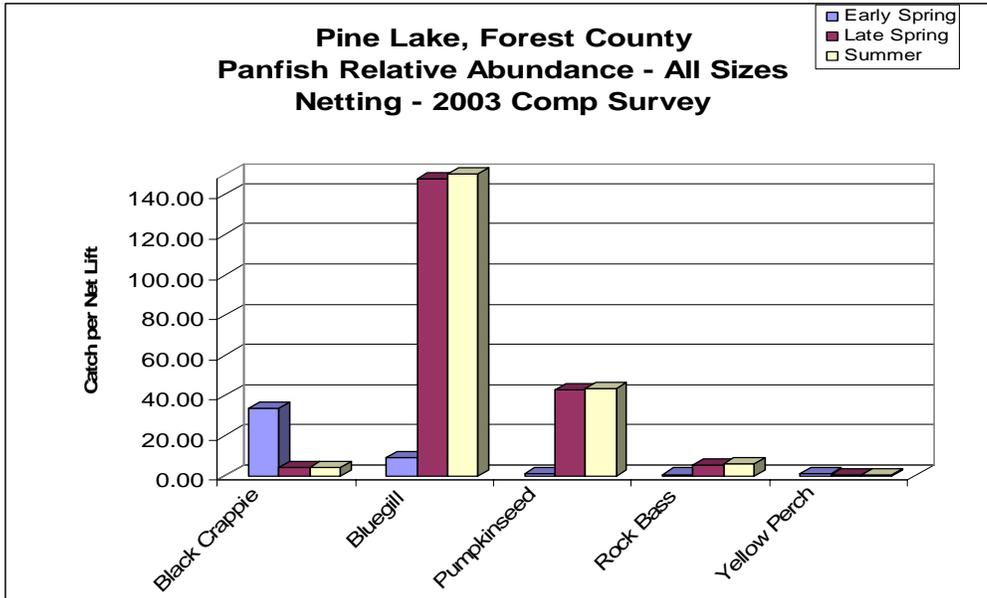
Figure 11.



PANFISH RELATIVE ABUNDANCE

Bluegill were relatively much more numerous than the other panfish, especially in the late spring and summer nets, which were targeted at centrarchid panfish (Figure 12). Rock bass were common in areas of rocky substrate but scarce elsewhere. Yellow perch were quite scarce throughout the survey at all sites.

Figure 12.



BLACK CRAPPIE

Size Structure

A total of 335 crappies were measured for TL in spring fyke nets. Modal size was 8 inches, while the maximum was 10.8 inches (Figure 13). Black crappie size quality as determined by proportional and relative stock indices was somewhat poor, with 47% larger than a “quality” size of 8 inches, and only 6% larger than a “preferred” size of 10 inches (Figure 14).

Figure 13.

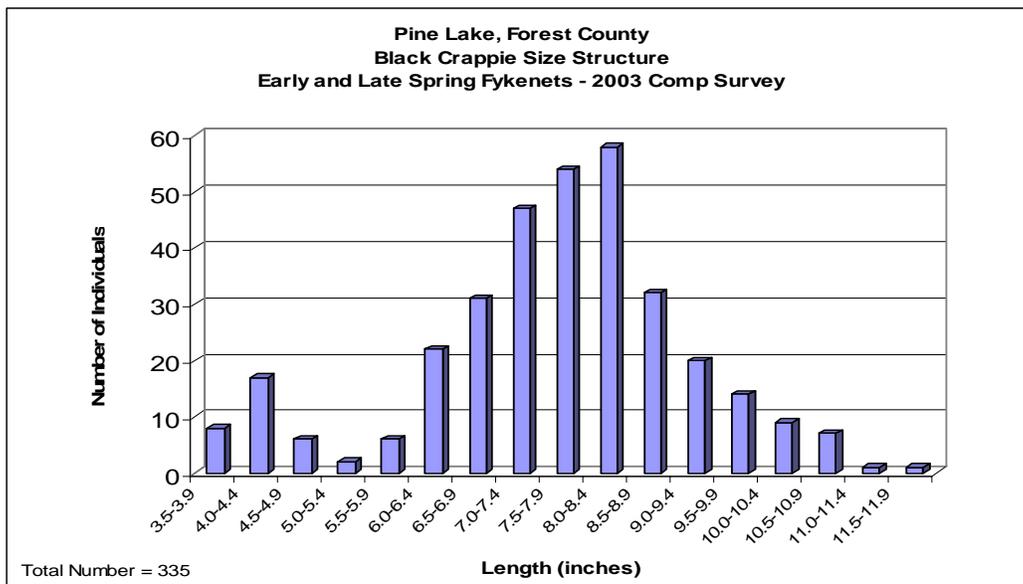
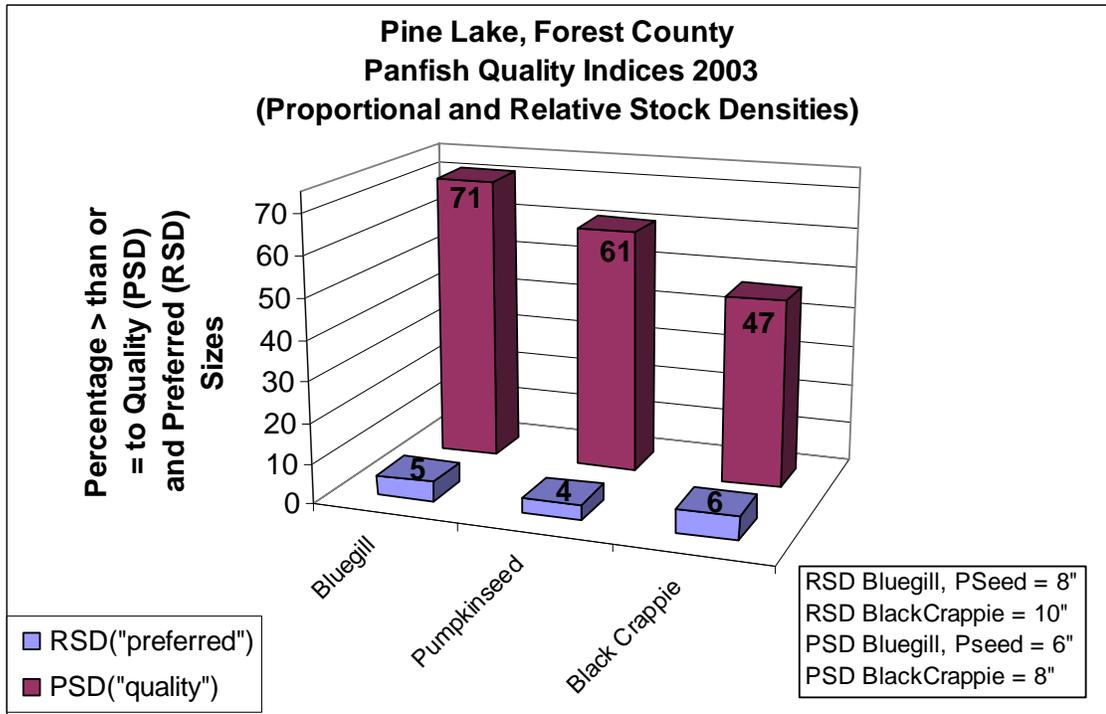


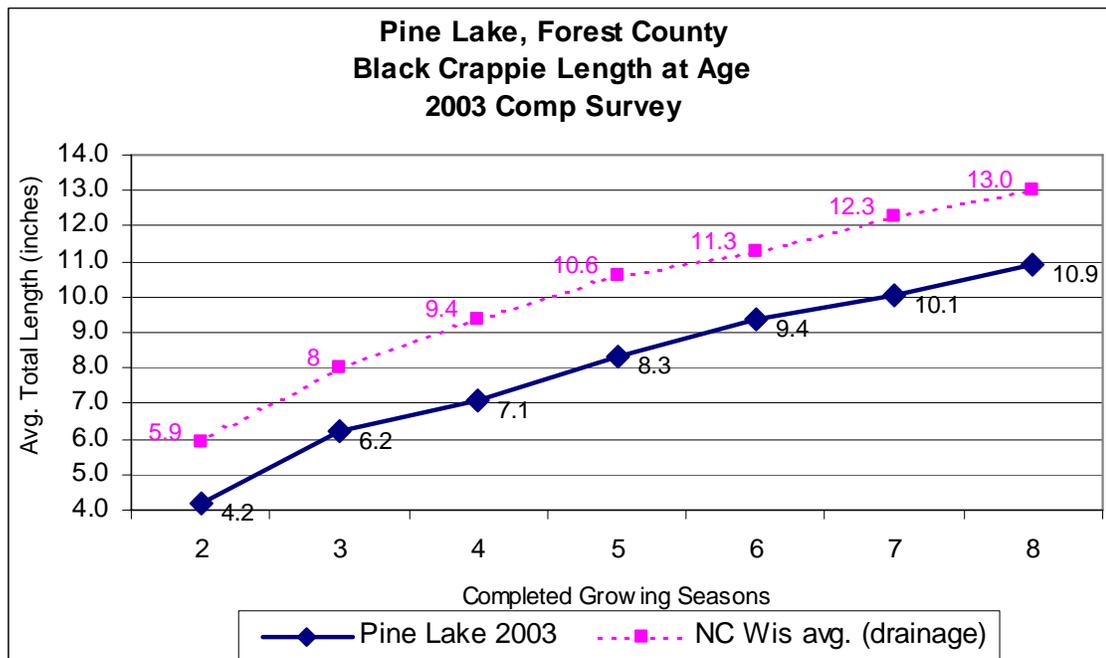
Figure 14.



Growth

A total of 127 black crappie were aged by examining scales. Growth as inferred from length at age was well below the average for similar north central Wisconsin lakes (Figure 15).

Figure 15.

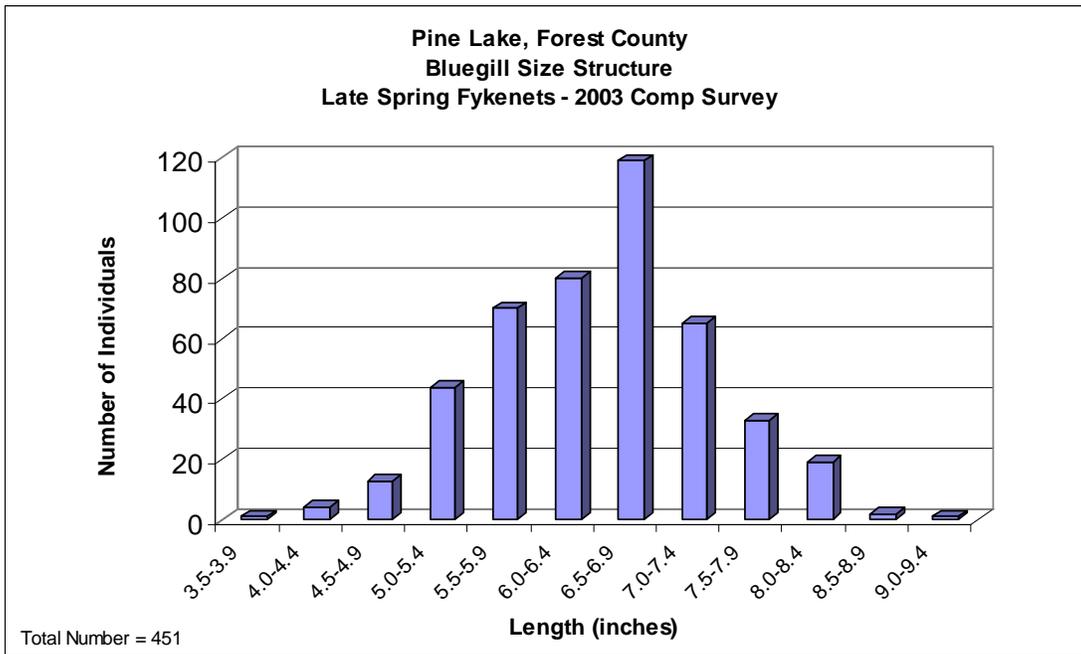


BLUEGILL

Size Structure

A total of 451 bluegills were measured for TL in late spring fyke nets. Modal size was 6.7 inches, while the maximum was 9 inches (Figure 16). Bluegill size quality as determined by proportional and relative stock indices revealed 71% were larger than a “quality” size of 6 inches, but only 5% larger than a “preferred” size of 8 inches (Figure 14).

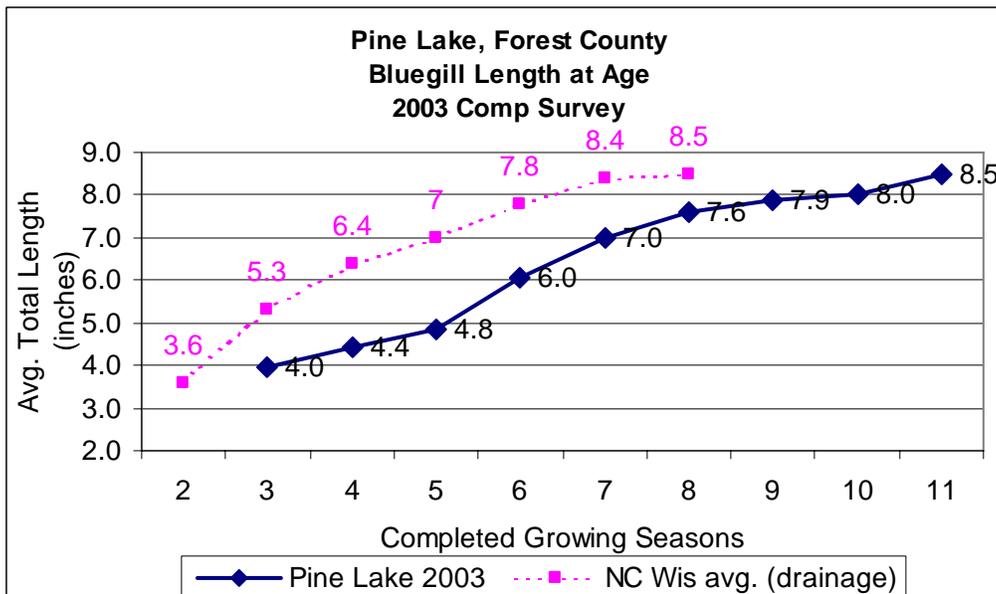
Figure 16.



Growth

A total of 92 bluegill were aged by examining scales. Growth as inferred from length at age was well below the average for similar north central Wisconsin lakes (Figure 17).

Figure 17.

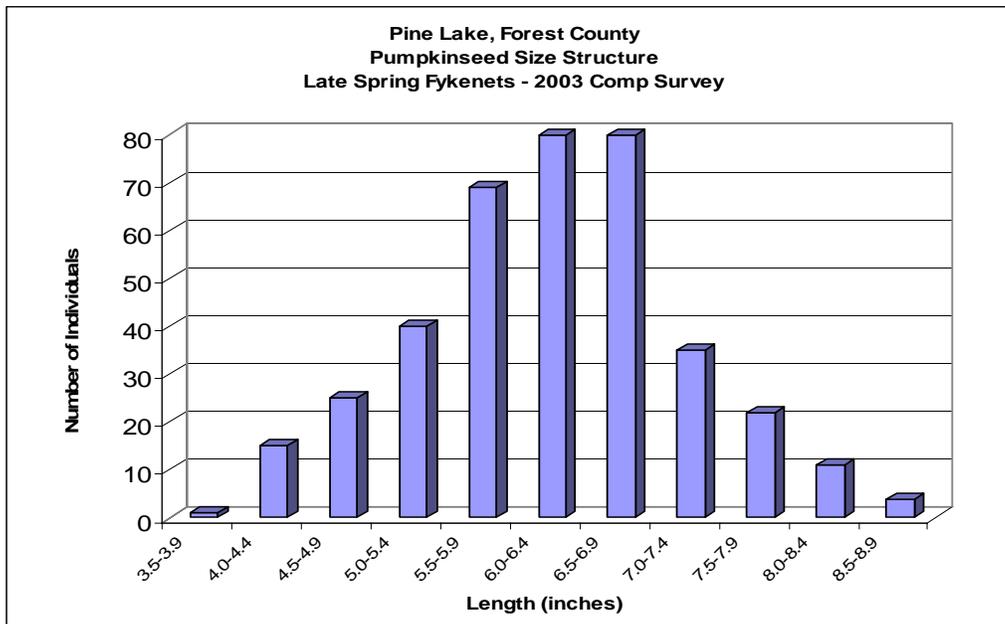


PUMPKINSEED

Size Structure

A total of 382 pumpkinseed sunfish were measured for TL in late spring fyke nets (Figure 18). Those that appeared to be bluegill x pumpkinseed hybrids were counted as pumpkinseeds. Modal size was 6.5 inches, while the maximum was 9 inches. Pumpkinseed size quality as determined by proportional and relative stock indices revealed 61% were larger than a “quality” size of 6 inches, but only 4% larger than a “preferred” size of 8 inches (Figure 14).

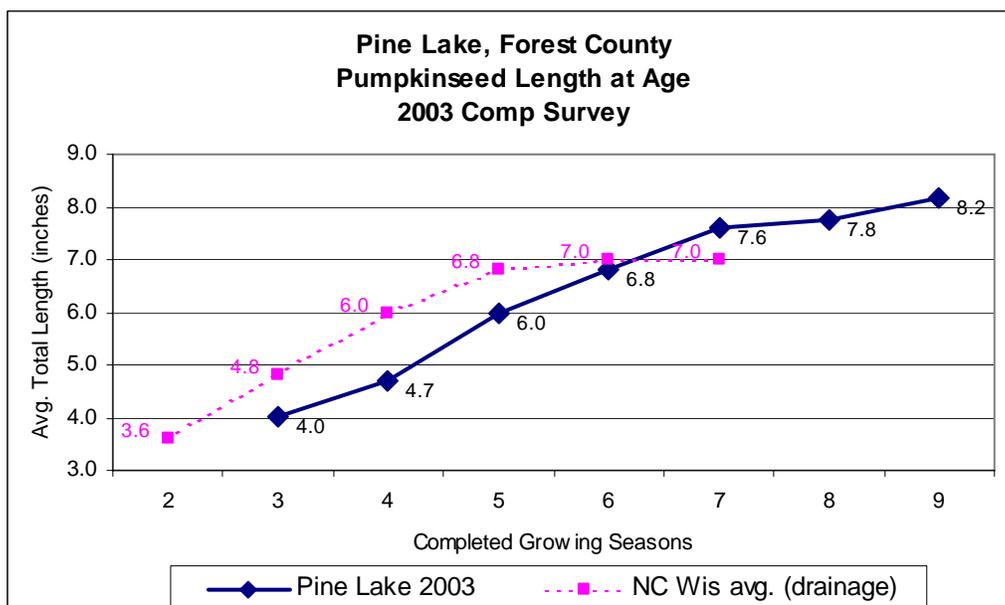
Figure 18.



Growth

A total of 93 pumpkinseed were aged by examining scales. Growth as inferred from length at age was generally well below the average for similar north central Wisconsin lakes (Figure 19).

Figure 19.

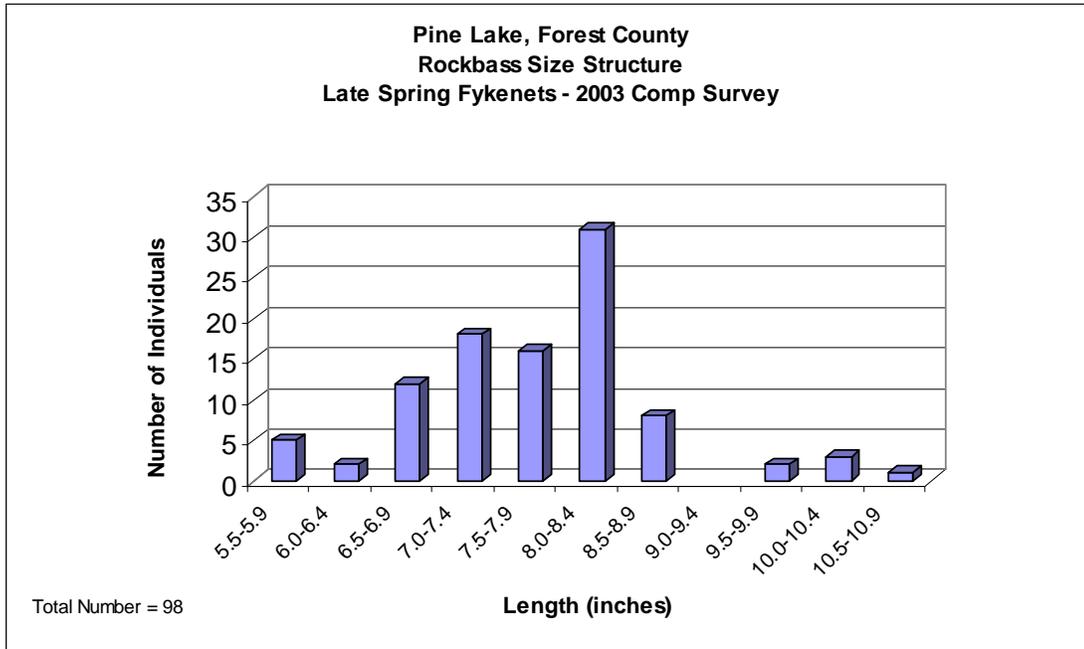


ROCKBASS

Size Structure

A total of 98 rockbass were measured for TL in late spring fyke nets (Figure 20). Modal size was 8 inches, while the maximum was 11 inches.

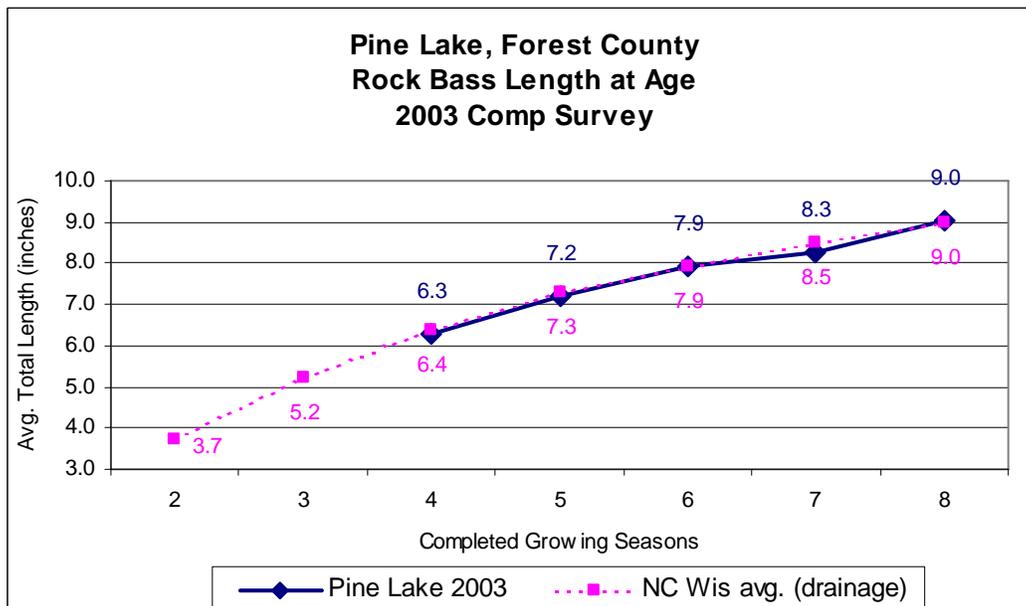
Figure 20.



Growth

A total of 55 rockbass were aged by examining scales. Growth as inferred from length at age was similar to the average for comparable north central Wisconsin lakes (Figure 21).

Figure 21.



YELLOW PERCH

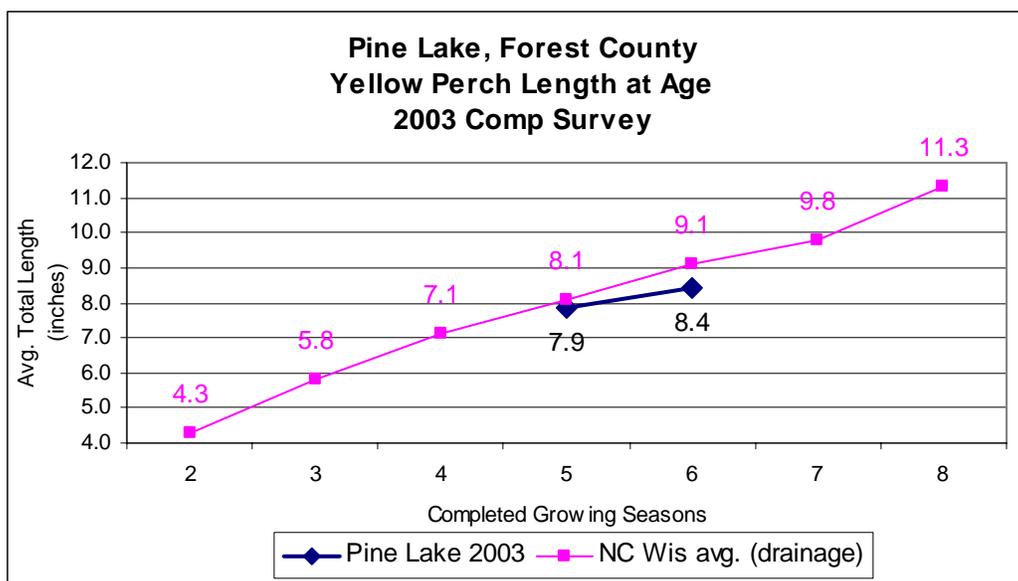
Size Structure

Very few yellow perch were captured during the survey period, and too few were measured for a representative sample of size.

Growth

A total of 4 yellow perch were aged by examining scales. Growth as inferred from length at age for this small sample was below the average for similar north central Wisconsin lakes (Figure 22).

Figure 22.



V. DISCUSSION AND RECOMMENDATIONS

GAMEFISH

Largemouth Bass – A naturally reproducing, fair sized population with good size structure and average growth rates is presently in Pine Lake.

Recommendation: No active management of largemouth bass in Pine Lake is recommended at this time. The current regulation of 5 daily bag, 14 inches minimum length is adequate. The lake association may want to consider developing local support for a more restrictive bass harvest regulation in the future. A one bag, 18" minimum length limit on bass would encourage a greater bass population size and could result in better predatory control of small bluegill. A reduction of bluegill numbers and corresponding increase in bluegill growth rates would be desirable for Pine Lake panfish anglers. See related recommendations for panfish.

Northern Pike – A naturally reproducing, relatively large population with poor size structure and condition, and average growth rates is presently in Pine Lake. In spite of a large forage base, few pike are growing to quality sizes in Pine Lake. Experience with other northern Wisconsin lakes has shown that a lake's attributes may limit pike growth and condition. In Pine Lake, large expanses of dense aquatic plant growth can

effectively hide small fish from predators like pike, and the warm summer temperatures may cause physical stress and affect condition. Angling can also contribute to poor size structure by removing mostly larger individuals.

Recommendation: No active management of northern pike in Pine Lake is recommended at this time. The current regulation of 5 bag, no minimum size is appropriate. A greater reduction of aquatic plant density and coverage by harvesting would help to increase predation on panfish by northern pike, which could help stimulate pike growth rates and condition.

Walleye – A low-density, fast growing walleye population supported by stocking exists in Pine Lake. No young-of-year (YOY) walleye were captured in 2003 or earlier fall electroshocking runs during non-stocked years, indicating no apparent natural reproduction. However, there may be limited walleye natural reproduction and recruitment to larger sizes in some years, as there is spawning habitat available, especially in the southern part of the lake. The current adult population estimate of 0.8 per acre is only half of the northern Wisconsin average for stocked lakes, of 1.9 per acre. Although adult walleye density remains low, it is a popular fishery that offers serious anglers the chance for very nice walleyes. Notably, the lake has not had a significant number of walleye stocked since 1998. The peaks in numbers of fish in the size structure (Figure 8) correspond with the walleye stockings of 1991-92, 1995 and 1998. We know that stocking has produced a larger, more fishable population size in the past (1985) which was nearly twice that of the current population level.

Recommendation: Walleye stocking should be resumed in Pine Lake, every other year at a rate of 50 small fingerlings per acre. Larger, fall walleye fingerlings should be stocked when available from the Forest County Walleye Association cooperative rearing pond, at a rate up to 20 per acre. The current regulation of 15-inch minimum size is appropriate for this low-density population with good growth rates.

PANFISH

Black Crappie, Bluegill and Pumpkinseed – A naturally reproducing, large population of bluegills with a fair to marginal size structure and poor growth rates is presently in Pine Lake. Pumpkinseed and black crappie are less numerous but have similar population characteristics.

The shallow nature of the lake basin and resulting abundant aquatic vegetation provides an excess of habitat and hiding cover for bluegills and other panfish. The general lack of larger panfish may be a result of high harvest rates of larger individuals, and slow growth rates from overabundance. The outbreak of *Columnaris* disease and resulting fish kill in summer 2003 may help to improve future panfish size structure by having thinned the population.

Recommendation: No direct, active management of bluegill, pumpkinseed or black crappie in Pine Lake is recommended at this time. Encouraging a higher density of panfish predators, especially largemouth bass, could eventually improve panfish size structure by reducing the number of smaller individuals, thereby increasing growth rates of remaining fish. A significantly increased annual harvest of aquatic plants to reduce cover and make panfish more vulnerable to predation would also help. An increase in plant harvesting would be necessary prior to changing bass minimum size regulations to encourage more bass/fewer panfish.

Other Panfish - Rockbass and yellow perch were relatively very low in abundance compared to bluegill, pumpkinseed and crappies (Figure 12).

Recommendation: No active management of other panfish in Pine Lake is recommended at this time.

GENERAL LAKE CONDITION and HABITAT

As mentioned above, submerged aquatic plants are very abundant in Pine Lake due to its shallow nature and extensive littoral zone. Reduction of aquatic plant coverage and density can only help improve panfish sizes and condition.

Recommendation: The lake association should refine its aquatic plant-harvesting plan to encourage increased harvest and cutting of well defined “lanes”. Research on other similar lakes has shown that maintaining open lanes is a good method of providing predator fish better access to over-abundant panfish.

APPENDIX

Appendix Table numbering corresponds with Figures in the SURVEY RESULTS section.

Table 1. Pine Lake, Forest County

2003 Comprehensive Fisheries Survey

Catch Summary

Fish Species		Catch (and Size Range in Inches) by Sampling Period															Total Catch	
		Early Spring Netting			Spring Electrofishing			Late Spring Netting			Summer Netting			Fall Electrofishing				
Common Name	Scientific Name	Catch	MinSize	MaxSize	Catch	MinSize	MaxSize	Catch	MinSize	MaxSize	Catch	MinSize	MaxSize	Catch	MinSize	MaxSize	Catch	MinSize
Black Bullhead	<i>Ictalurus melas</i>	3	ND	ND				19	ND	ND	19	ND	ND				41	
Black Crappie	<i>Pomoxis nigromaculatus</i>	1600	3.5	11.9				73	3.9	10.8	75	1.8	10.8	71	2.3	10.7	1819	1.8
Bluegill	<i>Lepomis macrochirus</i>	420	ND	ND				2657	3.9	9.0	2711	2.0	9.0	48	2.9	7.0	5836	2.0
Bluntnose Minnow	<i>Pimephales notatus</i>										1	1.1	1.1				1	1.1
Common Shiner	<i>Notropis cornutus</i>							1	ND	ND	1	7.9	7.9				2	7.9
Golden Shiner	<i>Notemigonus crysoleucas</i>	4	ND	ND				8	ND	ND	8	6.8	7.6				20	6.8
Johnny Darter	<i>Etheostoma nigrum</i>													1	2.1	2.1	1	2.1
Largemouth Bass	<i>Micropterus salmoides</i>	37	11.0	18.9	308	5.5	21.2	7	5.7	6.1	99	1.0	7.4	13	2.2	19.4	464	1.0
Mottled Sculpin	<i>Cottus bairdi</i>										2	1.3	1.8	2	2.1	3.5	4	1.3
Muskellunge	<i>Esox masquinongy</i>	1	31.5	31.5							1	2.6	2.6				2	2.6
Northern Pike	<i>Esox lucius</i>	437	10.0	28.9	70	12.5	26.9	20	12.3	24.8	20	12.0	24.8	21	16.0	22.4	568	10.0
Pumpkinseed	<i>Lepomis gibbosus</i>	48	ND	ND				768	3.9	8.8	786	2.2	8.8	5	2.7	5.4	1607	2.2
Rock Bass	<i>Ambloplites rupestris</i>	36	ND	ND				94	5.7	10.6	106	2.4	10.6	2	7.5	9.0	238	2.4
Smallmouth Bass	<i>Micropterus dolomieu</i>	3	1.2	17.9	3	13.6	17.0				1	1.2	1.2				7	1.2
Walleye	<i>Stizostedeion vitreum vitreum</i>	862	10.0	28.4	68	9.5	24.9	1	27.3	27.3	1	27.3	27.3	14	13.0	22.9	946	9.5
White Sucker	<i>Catostomus commersoni</i>	227	ND	ND				1	ND	ND	1			2	14.0	15.3	231	14.0
Yellow Bullhead	<i>Ictalurus natalis</i>	1140	ND	ND				189	ND	ND	195							1524
Yellow Perch	<i>Perca flavescens</i>	62	ND	ND				4	3.5	8.4	5	2.2	8.4	11	2.7	7.3	82	2.2

ND = No Data

	Early Spring	Late Spring
Largemouth Bass	0.77	0.39
Muskellunge	0.02	
Northern Pike	9.10	1.11
Smallmouth Bass	0.04	
Walleye	17.96	0.06

	Spring (combined)	Fall
Largemouth Bass	47.98	2.02
Northern Pike	10.90	3.27
Smallmouth Bass	0.62	
Walleye (age 0+)		
Walleye (other)	10.59	2.18

Table 4. LMB Pine Lake 2003 Length Frequency				
unmarked fish only				
INCH				
GROUP	04/23 - 06/05/03	7/29-30/03	9/24/03	Totals
<8.0	14	92	3	109
8			1	1
8.5	1		1	2
9	2			2
9.5	1			1
10	3			3
10.5	6			6
11	11			11
11.5	22			22
12	38			38
12.5	40		1	41
13	38			38
13.5	30			30
14	22		1	23
14.5	19		1	20
15	18			18
15.5	16		1	17
16	18			18
16.5	13			13
17	6			6
17.5	2			2
18	7			7
18.5	3		1	4
19	6		1	7
19.5				
20				
20.5				
21	1			1
21.5				
TOTALS	337	92	11	440

Table 5. Largemouth Bass length at age (inches)		
	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
1		3.2
2	6.6	7.2
3	9.2	10.3
4	10.5	11.3
5	11.6	12.9
6	13.9	14.4
7	16.3	15.3
8	18.5	16.7
9	20.1	

unmarked fish only			
INCH			
GROUP	04/23 - 06/05/03	9/24/03	totals
<8.0			0
8			0
9			
10	8		8
11	32		32
12	17		17
13	28		28
14	42		42
15	43		43
16	62	3	65
17	61	7	68
18	56	2	58
19	40	1	41
20	45	4	49
21	37	2	39
22	20	2	22
23	8		8
24	8		8
25	2		2
26	5		5
27	2		2
28	1		1
29	0		
30	0		
TOTALS	517	21	538

	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2	13.4	14.1
3	16.8	17.1
4	19.7	19.8
5	21.6	21.8
6	23.5	25
7	27.0	25.9
8	28.9	27.4

Table 8. Pine Lake Walleye Lengths

Length (in.)	April 23-28 fykes plus April 28 s				May 7 electro	May 15 electro	June 5 electro	Sept 24 electro	GRAND TOTAL
	male WE	female WE	unk. WE	TOTALS	unk. WE	unk. WE	unk. WE	unk. WE	
< 8.0				0					
8.0 - 8.4				0					
8.5 - 8.9				0					
9.0 - 9.4				0					
9.5 - 9.9				0			1		1
10.0 - 10.4	2			2	1				3
10.5 - 10.9	0		4	4			1		5
11.0 - 11.4	4		2	6			1		7
11.5 - 11.9	1		4	5			1		6
12.0 - 12.4	1		1	2			1		3
12.5 - 12.9	0		2	2					2
13.0 - 13.4	1		0	1					1
13.5 - 13.9	1		0	1					1
14.0 - 14.4	1		0	1				1	2
14.5 - 14.9	4		0	4					5
15.0 - 15.4	14		1	15			1	2	18
15.5 - 15.9	32		0	32				3	35
16.0 - 16.4	41	1	1	43					43
16.5 - 16.9	63	1	0	64					64
17.0 - 17.4	48		9	57			1		65
17.5 - 17.9	25	26	6	57					57
18.0 - 18.4	5	41	9	55	1				56
18.5 - 18.9	5	41	7	53					53
19.0 - 19.4	4	35	3	42				1	43
19.5 - 19.9	6	21	6	33					33
20.0 - 20.4	6	10	1	17					17
20.5 - 20.9	7	3	1	11				1	12
21.0 - 21.4	3	5	0	8					8
21.5 - 21.9	3	8	0	11					11
22.0 - 22.4		15	0	15					15
22.5 - 22.9		16	0	16				1	17
23.0 - 23.4		36	0	36					36
23.5 - 23.9		35	0	35					35
24.0 - 24.4		32	0	32					32
24.5 - 24.9		18	0	18					18
25.0 - 25.4		9	0	9					9
25.5 - 25.9		11	0	11					11
26.0 - 26.4		8	0	8					8
26.5 - 26.9		5	0	5					5
27.0 - 27.4		3	0	3					3
27.5 - 27.9		2		2					2
28.0 - 28.4		2		2					2
28.5 - 28.9				0					
29.0 - 29.4				0					
29.5 - 29.9				0					
30.0 - 30.4				0					
30.5 - 30.9				0					
> 30.9				0					
Totals	277	393	55		2	4	3		744

Table 9. Walleye Avg Length Pine Lake

Early spring fyke nets (1980-1985) and early spring fyke nets plus first recap run (2003)

Survey Year	Males	Females	Unknown	Combined	Number Fish
1980				20.2	244
1985	16.1	22.6	13.5	17.8	445
2003	16.8	21.4	16.7	19.3	725

	1985	1991	2003
Number Adult Walleyes	2255	1277	1261
Number per Acre	1.4	0.8	0.8

age	Pine Lake 2003 survey avg length	NC Wis avg. (drainage) length
1		
2	10.6	8.9
3	11.5	11.1
4	13.9	12.5
5	18.1	14.2
6	20.7	15.8
7	21.0	17.9
8	22.5	19.7
9		20.9
10	23.7	22.0
11	27.3	23.7
12		24.5
13		26.1

	Early	Late	
	Spring	Spring	Summer
Black Crappie	33.33	4.06	4.17
Bluegill	8.75	147.61	150.61
Pumpkinseed	1.00	42.67	43.67
Rock Bass	0.75	5.22	5.89
Yellow Perch	1.29	0.22	0.28

Table 13. Black Crappie LF Pine Lake 2003
fyke nets early and late spring

Size Range	number BC
<2	
2.0-2.4	
2.5-2.9	
3.0-3.4	
3.5-3.9	8
4.0-4.4	17
4.5-4.9	6
5.0-5.4	2
5.5-5.9	6
6.0-6.4	22
6.5-6.9	31
7.0-7.4	47
7.5-7.9	54
8.0-8.4	58
8.5-8.9	32
9.0-9.4	20
9.5-9.9	14
10.0-10.4	9
10.5-10.9	7
11.0-11.4	1
11.5-11.9	1
12.0-12.4	
Totals	335

species	sample	number >= min pref length (8")	number >= min quality length (6")	number >= min stock length (3")	RSD("preferred")	PSD("quality")	No. of Fish
Bluegill	late spr fykes	22	319	451	5	71	451
Pumpkinseed	late spr fykes	15	232	382	4	61	382
Black Crappie	early and late	18	142	304	6	47	335

	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2	4.2	5.9
3	6.2	8
4	7.1	9.4
5	8.3	10.6
6	9.4	11.3
7	10.1	12.3
8	10.9	13.0

Size Range	number BG
<2	
2.0-2.4	
2.5-2.9	
3.0-3.4	
3.5-3.9	1
4.0-4.4	4
4.5-4.9	13
5.0-5.4	44
5.5-5.9	70
6.0-6.4	80
6.5-6.9	119
7.0-7.4	65
7.5-7.9	33
8.0-8.4	19
8.5-8.9	2
9.0-9.4	1
9.5-9.9	
Totals	451

	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2		3.6
3	4.0	5.3
4	4.4	6.4
5	4.8	7
6	6.0	7.8
7	7.0	8.4
8	7.6	8.5
9	7.9	
10	8.0	
11	8.5	

Size Range	number PS
<2	
2.0-2.4	
2.5-2.9	
3.0-3.4	
3.5-3.9	1
4.0-4.4	15
4.5-4.9	25
5.0-5.4	40
5.5-5.9	69
6.0-6.4	80
6.5-6.9	80
7.0-7.4	35
7.5-7.9	22
8.0-8.4	11
8.5-8.9	4
9.0-9.4	
9.5-9.9	
Totals	382

	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2		3.6
3	4.0	4.8
4	4.7	6.0
5	6.0	6.8
6	6.8	7.0
7	7.6	7.0
8	7.8	
9	8.2	

Table 20. Pine Lake 2003

Rockbass LF	
fyke nets June 3-5	
Size Range	number RB
4.0-4.4	
4.5-4.9	
5.0-5.4	
5.5-5.9	5
6.0-6.4	2
6.5-6.9	12
7.0-7.4	18
7.5-7.9	16
8.0-8.4	31
8.5-8.9	8
9.0-9.4	
9.5-9.9	2
10.0-10.4	3
10.5-10.9	1
11.0-11.4	
11.5-11.9	
12.0-12.4	
Totals	98

Table 21. Rockbass length at age (inches)

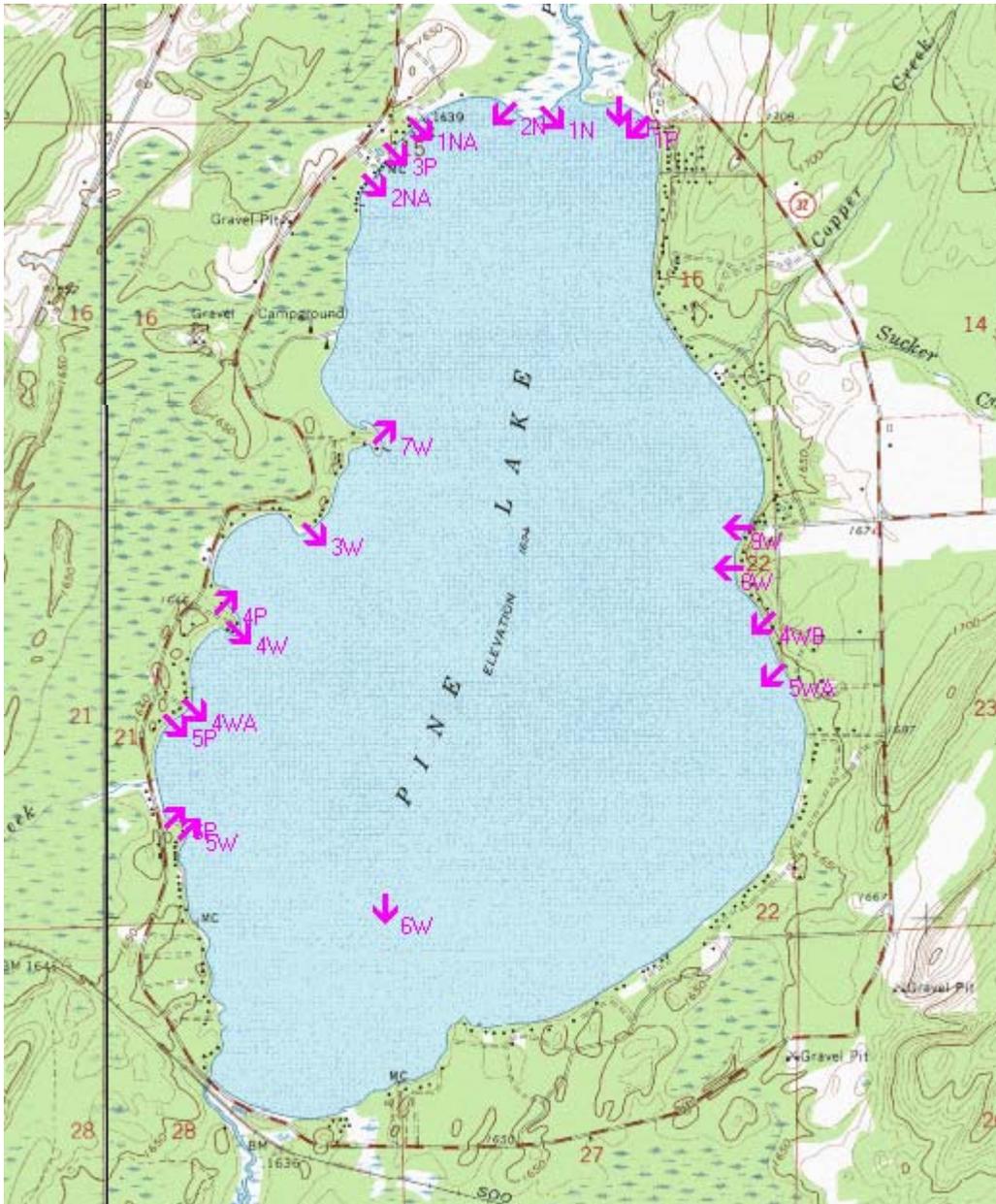
	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2		3.7
3		5.2
4	6.3	6.4
5	7.2	7.3
6	7.9	7.9
7	8.3	8.5
8	9.0	9.0
9		
10	10.4	

Table 22. Yellow perch length at age (inches)

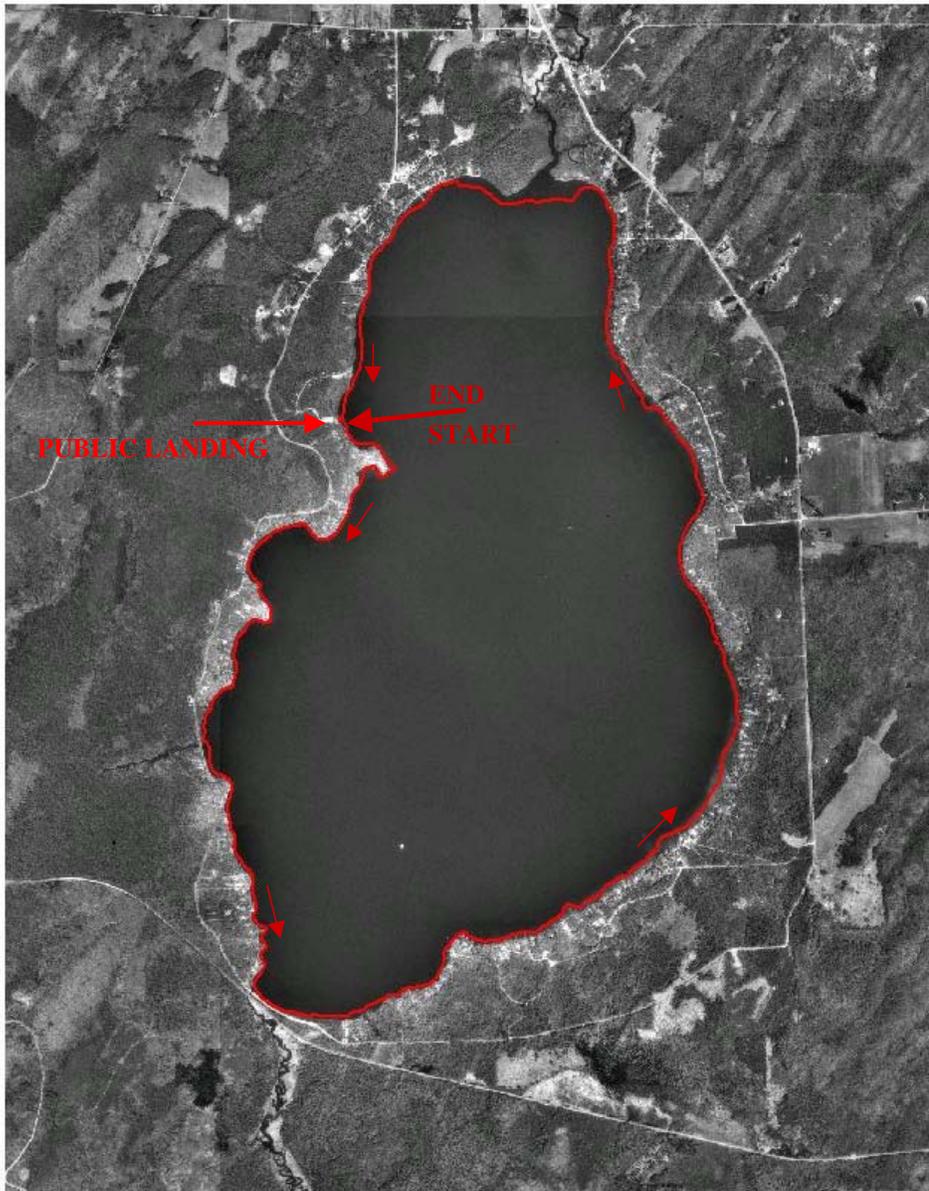
	Pine Lake 2003	NC Wis avg. (drainage)
age	survey avg length	length
2		4.3
3		5.8
4		7.1
5	7.9	8.1
6	8.4	9.1
7		9.8
8		11.3

SAMPLE LOCATIONS

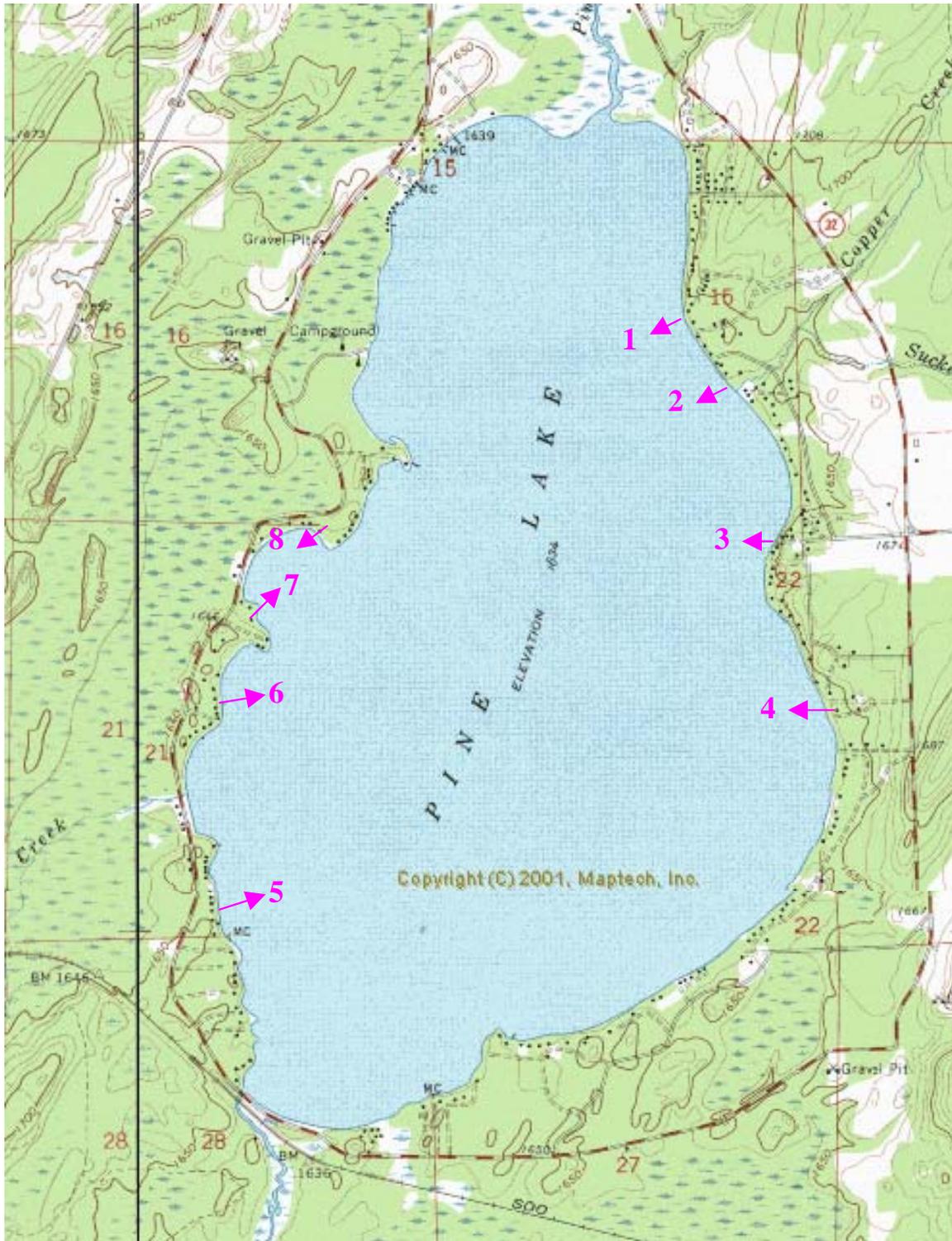
Fyke Nets in Pine Lake, Forest County 2003 Comp Survey



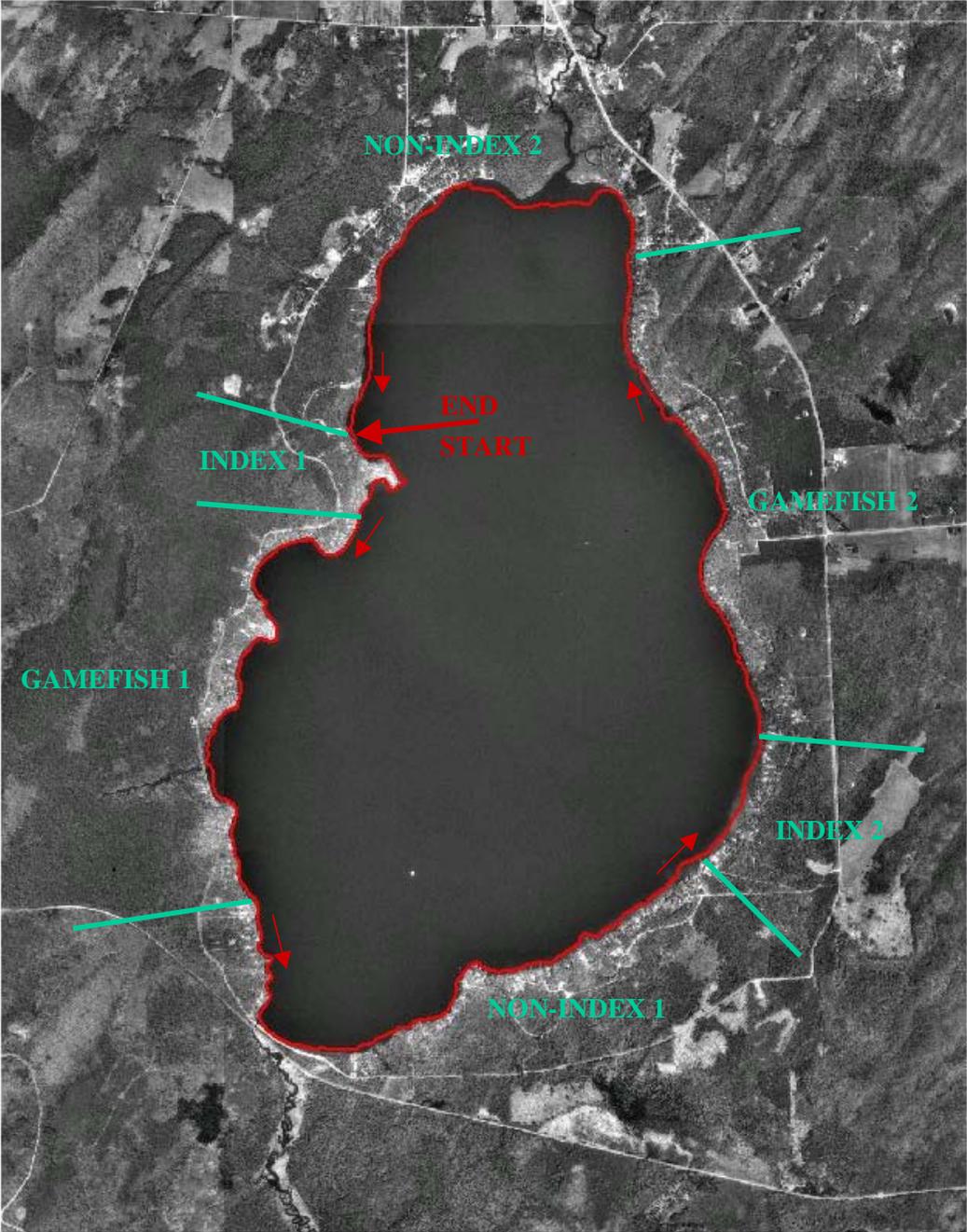
Electroshocker Route April-May
2003 Comp Survey Pine Lake, Forest County



Mini-fyke nets 7/29-30/2003 Pine Lake, Forest County



Electroshocker route and stations 9/24/03 Pine Lake, Forest County



SAMPLE LOCATION COORDINATES

Pine Lake, Forest County
2003 Comp Survey

Net and Station Locations
Map Datum WGS84

NETS

Date	Net Number	Latitude Degrees	Latitude Minutes	Longitude Degrees	Longitude Degrees
April 22-27, 2003	1N	45 N	41.716	88 W	58.626
April 22-27, 2003	1NA	45 N	41.691	88 W	59.029
April 22-27, 2003	2N	45 N	41.723	88 W	58.773
April 22-27, 2003	2NA	45 N	41.570	88 W	59.170
April 22-27, 2003	3W	45 N	40.826	88 W	59.354
April 22-27, 2003	4W	45 N	40.614	88 W	59.583
April 22-27, 2003	4WA	45 N	40.450	88 W	59.717
April 22-27, 2003	4WB	45 N	40.632	88 W	57.990
April 22-27, 2003	5W	45 N	40.188	88 W	59.736
April 22-27, 2003	5WA	45 N	40.522	88 W	57.957
April 22-27, 2003	6W	45 N	40.012	88 W	59.146
April 22-27, 2003	7W	45 N	41.041	88 W	59.148
April 22-27, 2003	8W	45 N	40.748	88 W	58.105
April 22-27, 2004	9W	45 N	40.834	88 W	58.074
June 2-5, 2003	1	45 N	41.696	88 W	58.364
June 2-5, 2003	2	45 N	41.720	88 W	58.420
June 2-5, 2003	3	45 N	41.638	88 W	59.104
June 2-5, 2003	4	45 N	40.676	88 W	59.627
June 2-5, 2003	5	45 N	40.415	88 W	59.779
June 2-5, 2004	6	45 N	40.216	88 W	59.781

STATIONS

Date	Station	Latitude Degrees	Latitude Minutes	Longitude Degrees	Longitude Degrees
September 24, 2004	End Index 1/Start Gamefish 1	45 N	40.936	88 W	59.300
September 24, 2005	End Gamefish 1/Start Non-Index1	45 N	39.946	88 W	59.681
September 24, 2006	End Non-Index 1/Start Index 2	45 N	40.041	88 W	58.096
September 24, 2007	End Index 2/Start Gamefish 2	45 N	40.359	88 W	57.870
September 24, 2008	End Gamefish 2/Start Non-Index 2	45 N	41.559	88 W	58.316