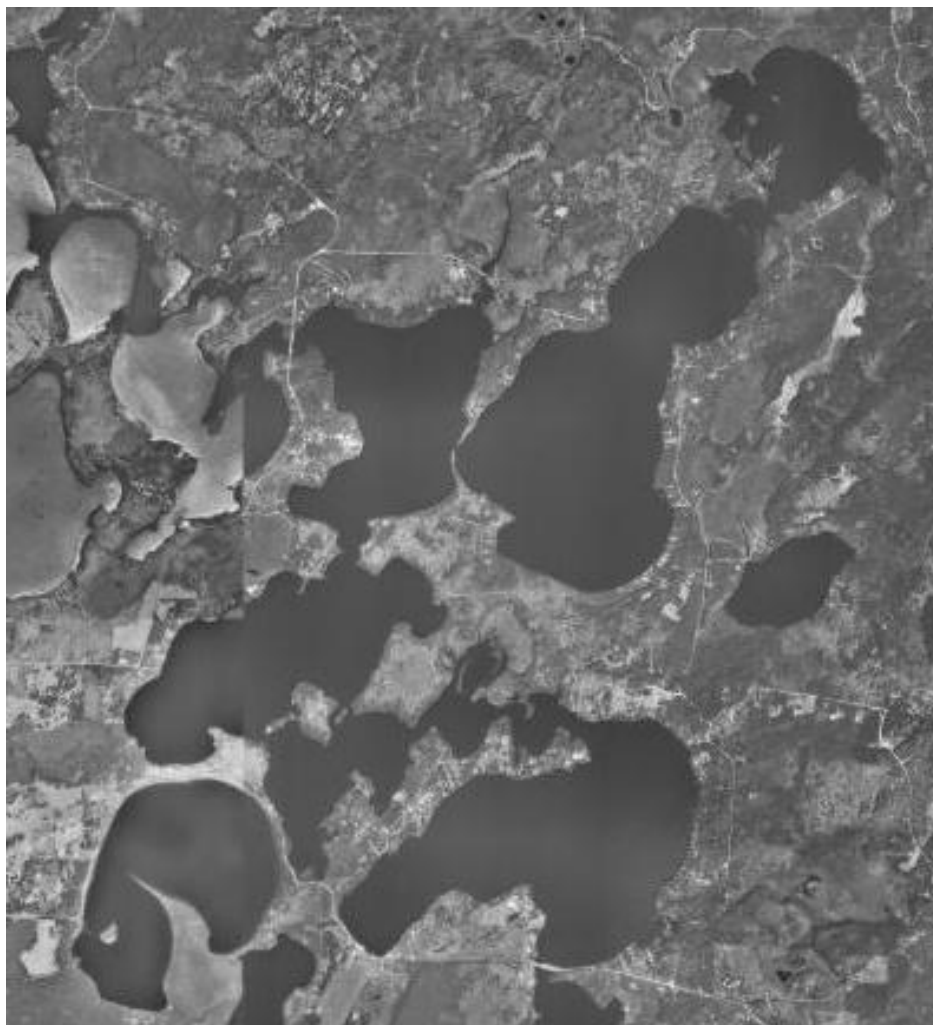
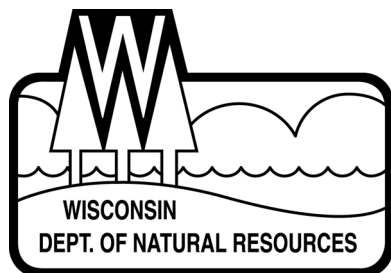


Comprehensive Fisheries Survey of the Central Three Lakes Chain, Oneida County Wisconsin during 2007.

Waterbody Identification Codes: Little Fork, 1610600; Big Fork, 1610700; Fourmile,
1610800; Medicine, 1611700; Laurel, 1611800; Big Stone, 1612200



John Kubisiak
Senior Fisheries Biologist
Rhinelanders
April, 2008



Your purchase of fishing equipment
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Comprehensive Fisheries Survey of the Central Three Lakes Chain, Oneida County Wisconsin during 2007.

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April, 2008

EXECUTIVE SUMMARY

The Three Lakes Chain is a 20-lake chain with a surface area of 7,626 acres and 106 miles of shoreline. A comprehensive fisheries survey was conducted in cooperation with a crew from Wisconsin Valley Improvement Company on six lakes in the central portion of the Chain during spring, 2007. Lakes surveyed include Little Fork, Big Fork, Fourmile, Medicine, Laurel and Big Stone, with a combined area of 2,414 acres. Information was collected on all gamefish and panfish, but a primary goal of the survey was to evaluate the effectiveness of a 14-18 inch protected-slot walleye regulation which has been in place since 1996. Walleye (combined population estimate, PE = 3.7 adults per acre) and muskellunge were abundant, along with lower numbers of northern pike (PE = 0.46 adults per acre), smallmouth and largemouth bass. Yellow perch dominated the panfish catch, followed by bluegill. Black crappie, pumpkinseed and rock bass were found at moderate abundance. Walleye length-at-age was about a year behind the regional average. Yellow perch were fast-growing at ages 1 and 2, but slowed to about a year behind average after age 3. Black crappie, bluegill and pumpkinseed length-at-age were a year or more ahead of regional averages. Non-game species include burbot, cisco, common shiner, creek chub, golden shiner, shorthead redhorse, silver redhorse and white sucker.

I recommend continuing to manage Three Lakes Chain for walleye, stocked muskellunge and panfish. Walleye are regulated by a protected slot: there is no minimum length limit, but fish 14 to 18 inches may not be kept. Walleye size structure and growth rates showed minimal change between 1994 (no minimum length limit) and 2007 (protected slot). Based on this sample, either regulation is appropriate for Three Lakes Chain. Depending on angler preferences, the walleye regulation could be changed to no minimum length limit, but only 1 fish over 14 inches.

Study lakes and location:

Six lakes in the Three Lakes Chain of Lakes, Oneida County, T38-39N R11E
Located in northeast Oneida County in the town of Three Lakes. Part of the Upper Wisconsin River watershed. Inlets to the study reach include a culvert from Spirit Lake, Eagle River and Fourmile Creek and the outlet is Eagle River. Water level is controlled by a dam with 12.6 feet of head at Long Lake, operated by Wisconsin Valley Improvement Company.

Physical/Chemical attributes of the six study lakes (Andrews and Threinen 1966 except where more recent data are available):

Morphometry: 2,414 combined acres; maximum depth of 57 feet is reached in Big Stone Lake.

Watershed: 292 square miles, including 164 acres of adjoining wetlands.

Lake type: Drainage. Outlet flows to Island Lake in the Eagle Chain of Lakes.

Basic water chemistry: medium-hard – alkalinity 50 mg/l, conductance 22 µmhos.

Water clarity: Light brown water of moderate transparency.

Littoral substrate: 67% sand, 13% gravel, 11% muck and some rock.

Aquatic vegetation: moderate.

Winterkill: none.

Boat landing: Concrete-plank ramps on Big Fork, Medicine, Laurel and Big Stone. US Forest Service Ramp on Laurel has parking for 10 vehicles with trailers while the others have roadside parking. There is also a resort-owned ramp with parking on Big Stone.

Other features: Shoreline 90% upland with a small amount of coniferous-bog wetlands adjoining the lakes.

Purpose of Survey: Assess status of gamefish species and develop management recommendations. Evaluate the effectiveness of a 14-18 inch protected-slot walleye regulation.

Dates of fieldwork: Walleye netting, April 17-24 2007.

Electroshocking, April 23-24 2007

Panfish netting September 10-14 2007.

BACKGROUND

Three nets were set on Little Fork from April 29 through May 1, 1948 (6 net-nights). The file contains 12 summary sheets listing catch of 419 walleye (95% males) with mean size (sexes combined) of 14.5 inches. The catch also includes 14 northern pike, 52 crappie, 63 perch, 22 rock bass, 3 “sunfish,” 33 suckers and 1 “whitefish” (likely a cisco).

Four large mesh and 4 fine mesh fyke nets were set on Laurel, Medicine and “Stone” (Big Stone) lakes during August 9-13, 1948 (32 net-nights). A single summary page lists 128 walleye, 16 largemouth bass, 6 smallmouth bass, 8 northern pike, 919 perch, 85 crappie, 22 rock bass, 3 sucker and 1 redhorse.

A 2000 foot shoreline seine was used on Big Stone and Big Fork lakes on July 13 and 14 (respectively), 1959. Big Stone yielded 1 muskellunge, 5 northern pike (12.0 to 14.9”), 1 smallmouth bass, 1 crappie, 27 walleye (3-12.1”) and 12 perch (3.6 to 10.5”). The Big Fork catch consisted of 8 muskellunge (13.1 to 48.0”), 5 northern pike (11.2 to 37.4”), 990 walleye (2.3 to 14.7”), 25 crappie (6.8 to 12.3”) and 135 perch (4.2 to 10.9”).

Four of the study lakes were shocked during July, 1960 or June, 1961. On Big Stone, 34 walleyes (5.2 to 13.5 inches) were collected, along with 11 other species; another 105 walleye were “not measured” (Morehouse 1960a). A clipping from the 1960 Oneida County annual report states *“Following a seining survey of 1959 which resulted in little information, a shocker survey was conducted on Big Stone Lake on July 5, 1960. Many yearling walleyes were observed as well as a good run of panfish. Because of the larger number of walleyes, it is assumed that the distribution of that species during 1959 may have had a definite bearing on the population noted at this time. There seems to be less cover here than on most of the chain and efforts should be made to increase the catch. It is recommended that 50 brush shelters be installed in proper areas of Big Stone Lake to enable a greater harvest of the existing fish population.”* Medicine Lake yielded a July 20 1960 catch of 51 walleye (780 walleye in parentheses were presumably observed but not picked up), and 14 other species. The report indicates *“In this lake we found an excellent fish population consisting of muskies, walleyes, bass and panfish...Medicine Lake, along with Long and Big Lakes, are possibly the waters on the chain having the more balanced populations...Medicine Lake...does not require specific management on its own.”* (Morehouse 1960b).

Morehouse (1961a) collected 11 walleye and 4 other species on Big Fork on June 22 1961. Fourmile Lake was shocked the same night, but fish numbers were only estimated with 2 walleye and 14 other species reported (Morehouse 1961b). In contrast to his glowing reports and call for

greater harvest in 1960, Morehouse (1961a) recommends: *“Because of the scarcity of fish, however, in Four Mile (sic) and Big Fork lakes, the natural reproduction of the walleye coming through in 1961 and 1962 is questionable... We, therefore, recommend that Big Fork Lake be placed on the walleye stocking program in 1962 and stocked at the rate of 50 fingerlings per acre. This recommendation is to be followed through on certain waters of the Three Lakes Chain in 1962.”*

Big Stone Lake was surveyed with fyke nets (24 net-nights) during May 8-12, 1972 and 8 hauls of a minnow seine (30,000 square feet) on July 17, 1972 (Tyler 1973). The netting catch included 252 walleye, 34 northern pike, 7 muskellunge, 1 largemouth bass, 1,153 yellow perch and 7 other species. The seine catch included 4 walleye (2.5-3 inch), 12 largemouth bass (2-3 inch), 2 smallmouth bass (3-7 inch) and 1,500 yellow perch (1-4 inch). Minnows were noted as present and crayfish abundant. It was noted that *“Walleye fingerlings were stocked in 1967 and 1969 and some of the captured fish may be from these stockings. However, fair numbers of fish are present from years when the lake was not stocked.”* Under Fish stocking was recommended *“Heavy stocking of walleye fingerlings for a period of three years is recommended. However, this stocking should be done only after a shocker survey was completed and that year’s natural reproduction has been assessed. Periodic support stocking of muskellunge is also recommended.”*

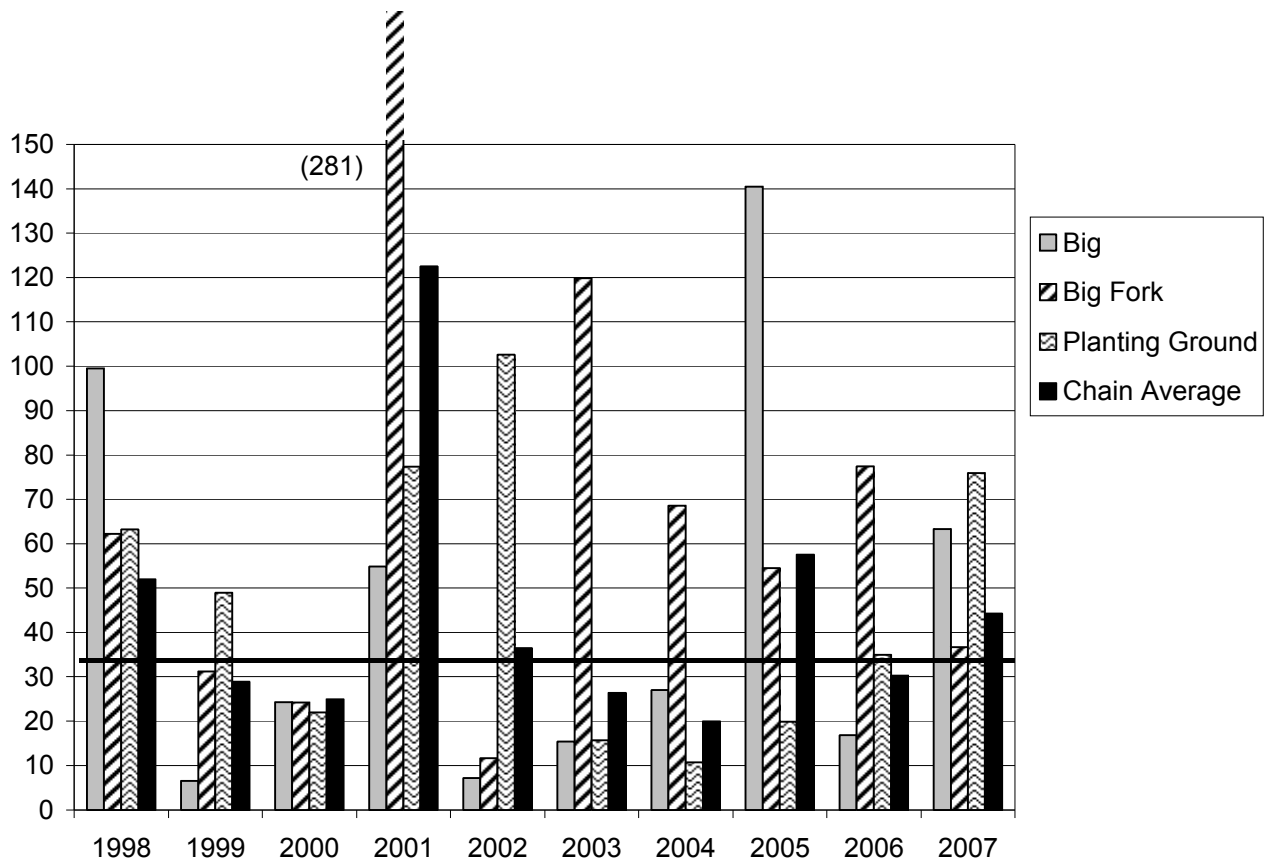
During fall, 1976 through fall, 1978, most of Three Lakes Chain received comprehensive surveys including fall electroshocking (sometimes during two years), spring and early summer netting (106 spring and 135 summer net nights on the 6 study lakes) and summer seining (Carlson, 1978a, 1978b, 1978c, 1979a, 1979b, 1979c). On the 6 study lakes, 30 species of fish were captured, including the following that were not captured during 2007 netting (mostly due to mesh size): brown bullhead, golden redhorse, mimic shiner, johnny darter, trout perch, mottled sculpin, brassy minnow, Iowa darter, blacknose shiner and pearl dace. Cisco were captured in all six lakes, with a combined total of 24 cisco. Walleye (20 per net night) and yellow perch (57 per net night) were the most abundant species during April netting, with Big Fork (54 per net night) dominating the walleye catch and Big Stone (104 per net night) leading the perch catch. June netting found low catches of panfish including black crappie (9.3), bluegill (6.7) and rock bass (5.0 per net night). Laurel Lake, followed closely by Fourmile, had the highest catch rate of panfish, except rock bass were highest in Fourmile and Medicine. Summer bullhead catch of 11.4 per net night was dominated by black bullhead (91%), followed by yellow bullhead (8.7%) and brown bullhead (0.45%). Catch of young-of-year (yoy) and age-1 walleye was very high during fall surveys, indicating strong yearclasses and good reproduction. The Fish Stocking section in the Big Stone survey is typical of the reports (Carlson 1979a): *“Discontinue walleye stocking. Stock 8 inch or larger muskellunge fingerling on an alternate year basis. All stocked fish should be fin clipped and evaluation surveys arranged to assess their contribution to the sport fishery.”*

A walleye mark-recapture population estimate and angler creel survey (reported separately) was conducted on most of Three Lakes Chain during 1994. Several lakes were combined during the survey, including Big Fork with Fourmile and Medicine with Laurel. The walleye population was estimated to be 4.4 adults per acre when estimates are averaged across the six lakes. This compares to a predicted population of 3.5 adult walleye per acre. An estimated 11.7% of the estimated population was at least 15 inches, while 1.8% were 20 inches or larger. Individual estimates per acre were 7.9 (Little Fork, $\pm 17\%$ CV), 3.6 (Big Fork and Fourmile, $\pm 10\%$), 4.9 (Medicine and Laurel, $\pm 21\%$) and 2.8 (Big Stone, $\pm 10\%$).

Fall electroshocking surveys are a good measure of walleye yearclass strength. Fall netting surveys were conducted in 1944 on Medicine Lake and 1948 on Medicine, Laurel and Big Stone. Fall electroshocking was conducted in 1976 and 1977 on Big Fork, Laurel, Little Fork and in 1977 and

1978 on Medicine and Big Stone. There was a 1983 fall survey on Little Fork, and Great Lakes Indian Fish and Wildlife Commission (GLIFWC) conducted fall surveys in 1987 on Big Fork and 1988 on Big Stone. During 1990-2007, there have been annual fall surveys on various lakes in the chain by either WDNR or GLIFWC; there were 54 surveys on the six study lakes, including annual surveys on Big Fork Lake. These surveys show consistently strong natural reproduction of walleye (Figure 1).

Figure 1. Walleye young-of-year (yoy) surveys in Three Lakes Chain, Oneida County Wisconsin. The solid horizontal line marks the Chain-wide 10-year average of 33.6 yoy walleye per mile of shoreline.



METHODS

Ice went out of Laurel Lake during the weekend of April 14-15, 2007, but there were still large ice floes on Little Fork, Big Fork, Medicine and Big Stone lakes when 10 nets were set on April 17, and ice was present on Medicine and Little Fork when the remaining 14 nets were set on the 18th. One WDNR crew and one crew from Wisconsin Valley Improvement Company (WVIC) worked cooperatively during spring and fall netting periods and WVIC staff assisted on WDNR electrofishing boats. Ten standard fyke nets (3/4" bar measure) targeting walleye were set on April 17, 2007, and an additional 14 nets were set on April 18. Few walleye were captured after 2 nights in Laurel Lake, so the 6 nets were moved to Big Stone on April 19. The nets were pulled during April 22-24. Nets were fished for 26 net nights in Little Fork, 29 in Big Fork, 17 in Fourmile, 30 in Medicine, 11 in Laurel and 24 in Big Stone, for a total of 137 net nights. Adult gamefish were given a lake-specific partial fin clip for use in mark-recapture population estimates (except Big Fork and Fourmile both received left ventral): right ventral, left ventral, left ventral, left pectoral, right pectoral and bottom tail, respectively. Juveniles were given a top-tail clip to show that they had

been handled. Age structures (scales or spines) were removed from ten gamefish per species, per half-inch group and weights were recorded for these fish.

Two WDNR-standard alternating current electrofishing boats were used to collect fish from Big Fork and Fourmile on April 23, and 3 electrofishing boats were used on Little Fork, Medicine and Big Stone on April 24. Laurel was excluded due to low numbers of walleye marked. Length or length category (nearest half-inch) was recorded for all gamefish.

Panfish netting was conducted during September 10-14 2008. We set 2 nets in Little Fork, 3 in Big Fork, 1 in Fourmile, 2 in Medicine, 4 in Laurel and 4 in Big Stone (except one net was pulled after 3 days), for a total of 63 net nights. Two fine-mesh nets ($\frac{1}{2}$ inch netting) were set in Little Fork and Laurel, while the remaining 14 nets had $\frac{3}{4}$ inch netting. A top-tail clip was given to all panfish during the fall netting period. Length category was recorded for all panfish except recaptures bearing the top-tail clip. Scales (and anal spines on yellow perch) were removed and weights recorded from ten panfish per species, per half-inch group.

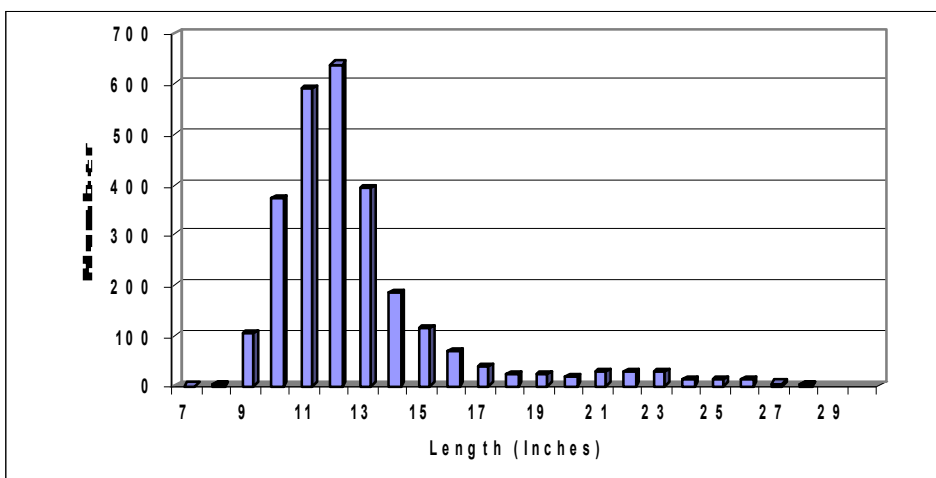
RESULTS AND DISCUSSION

Walleye

During walleye netting, 2,430 walleye were captured in 137 net nights, including 196 recaptures and 61 juvenile fish (walleye of unknown sex shorter than 15 inches), at a rate of 17.6 walleye per net night (Table 1). The electrofishing samples on April 23-24 yielded 1,742 walleye (75.1 fish per mile), including 998 juveniles. The combined mark-recapture population estimates of 7,966 adult walleye, or 3.7 per acre, is similar to the predicted value of 3.5 for six similar-sized lakes supported by natural reproduction. An estimated 12.6% of the estimated population is at least 15 inches, while 4.7% is 20 inches or larger (Figure 2). Individual estimates per acre are 2.5 (Little Fork, $\pm 26\%$ CV), 5.9 (Big Fork, $\pm 8.3\%$), 1.3 (Fourmile, $\pm 17\%$), 3.5 (Medicine, $\pm 9.6\%$) and 2.6 (Big Stone, $\pm 16\%$).

A walleye population can be sustained by one good yearclass every 3 to 4 years. A benchmark for recruitment is the modal catch of yoy walleye in lakes with good natural reproduction, about 16 per mile. Fall electroshocking surveys on Three Lakes Chain show substantial recruitment of yoy and age-1 walleye (Figure 1).

Figure 2. Length-frequency of adult walleye during 2007 in Three Lakes Chain, Oneida County WI.



Growth rates are often slow in high-density fish populations, due to competition for limited food resources. On Three Lakes Chain, walleye growth is slow for the first few years of life, resulting in length-at-age that lags behind average despite near-average growth at older ages. Length-at-age is about a year behind the regional average for female walleye (Figure 3; Appendix A). Males are a half-year to a year behind until they reached 16 inches at about age 7, after which time the growth rate seems to stagnate (Figure 4; Appendix A). It is possible that size-selective harvest of fish as they reach 18 inches impacts the growth rate we measured. Many female walleye are mature by age 4, a year earlier than in most regional lakes, and some slower-growing females are likely diverting energy to producing eggs instead of growing.

Total annual mortality of the adult walleye population was estimated at 35%, using a catch curve regression of age 4 and older fish (Figure 5). Mortality rates differed by gender: 25% for age 5 to 16 females versus 51% for age 4 to 13 males.

Figure 3. Female walleye length-at-age during 1994 and 2007 in Three Lakes Chain, Oneida County WI.

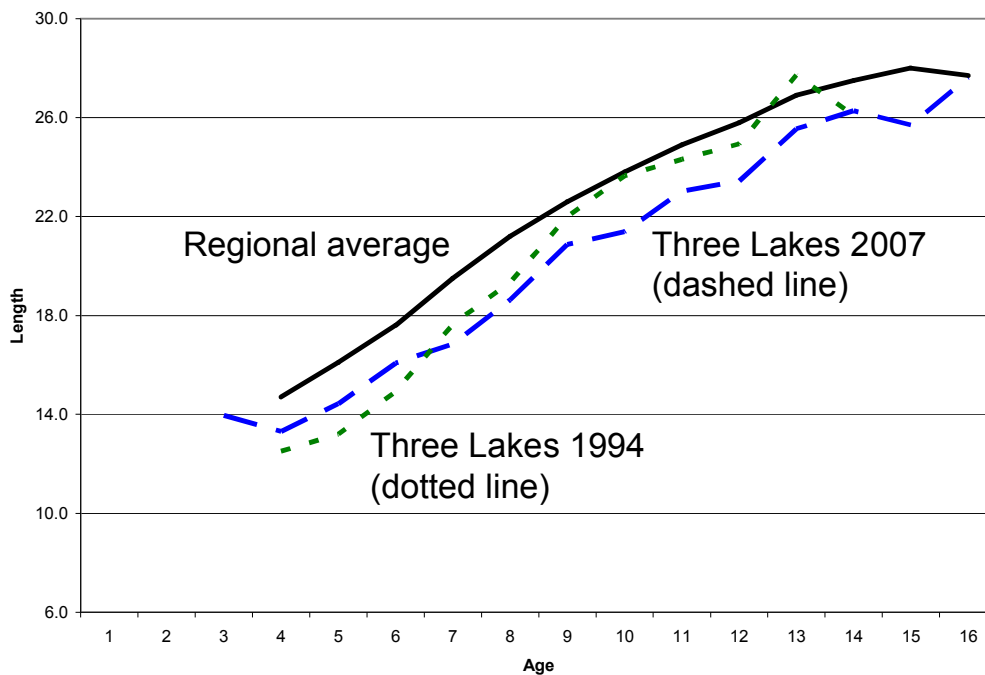


Figure 4. Male walleye length-at-age during 1994 and 2007 in Three Lakes Chain, Oneida County WI.

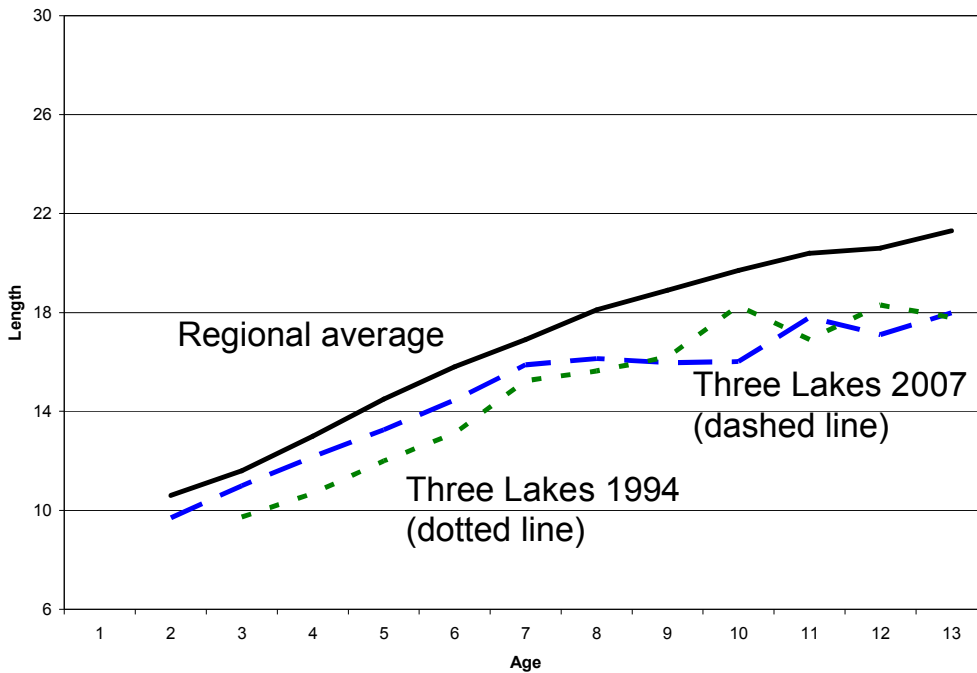
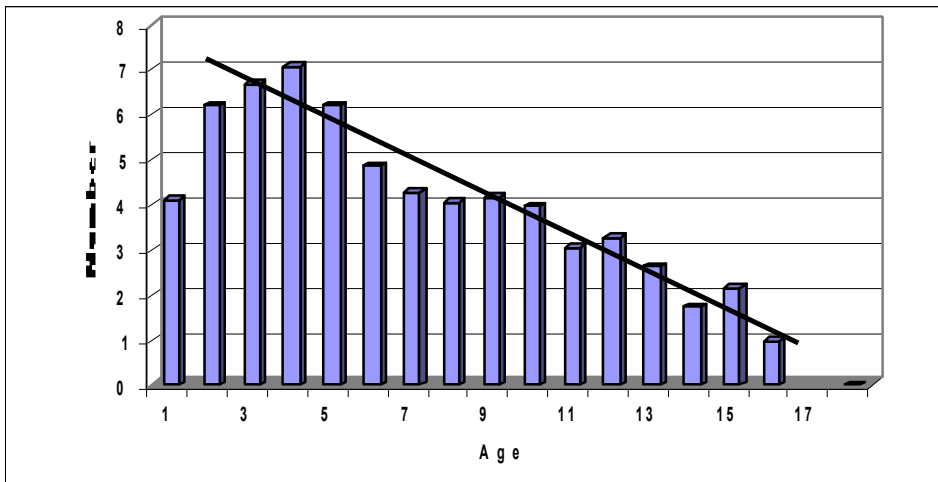


Figure 5. Walleye catch curve (natural log of catch at age) from Three Lakes Chain, Oneida County Wisconsin during 2007. Regression line indicates a total annual mortality of 35%.



14-18 inch protected slot walleye regulation

Walleye fishing on Three Lakes Chain is regulated by a protected slot: there is no minimum length limit but fish from 14 inches through 18 inches may not be kept. The daily bag limit is three walleye with only one fish over 18 inches allowed. The slot regulation has been in effect since 1996, while from 1958 through 1995 there was no minimum length limit on walleye. The goal of the slot regulation is to encourage harvest of abundant smaller fish and improve the abundance of quality-size fish larger than 14 inches.

The slot regulation is best suited for lakes with high recruitment and average or better growth rates, to allow harvest of over-abundant smaller fish while improving the number of larger quality-size fish. On Three Lakes Chain, recruitment is more than adequate to get fish into the protected slot. Length-at-age is about a year behind the regional average (Figures 3 and 4; Appendix A). However, a comparison of past surveys shows a decline in the relative number of fish 14 inches and larger from 39.1% in the 1977-78 surveys (Carlson, 1978a, 1978b, 1978c, 1979a, 1979b, 1979c) to 19.1% in 1994, despite a regulation of no minimum length limit on walleye from 1958 through 1995. Although the slot limit was implemented in 1996, there was little difference in the relative number of fish 14 inches and larger between 1994 (19.1%) and 2007 (22.4%, Figure 6). These results are not consistent with slot-limit results from other high-recruitment lakes, which generally show improvement in the number of walleye between 14 and 18 inches (unpublished data). Fish populations are not static and size structure varies for reasons other than length limits. Nevertheless, the data suggest that the two regulations will produce similar results on Three Lakes Chain.

Figure 6. Length-frequencies by percent of total numbers of 14-inch and larger walleye during 2007 (solid bars), 1994 (hash-marked) and 1977-78 (clear) in Three Lakes Chain, Oneida County WI.

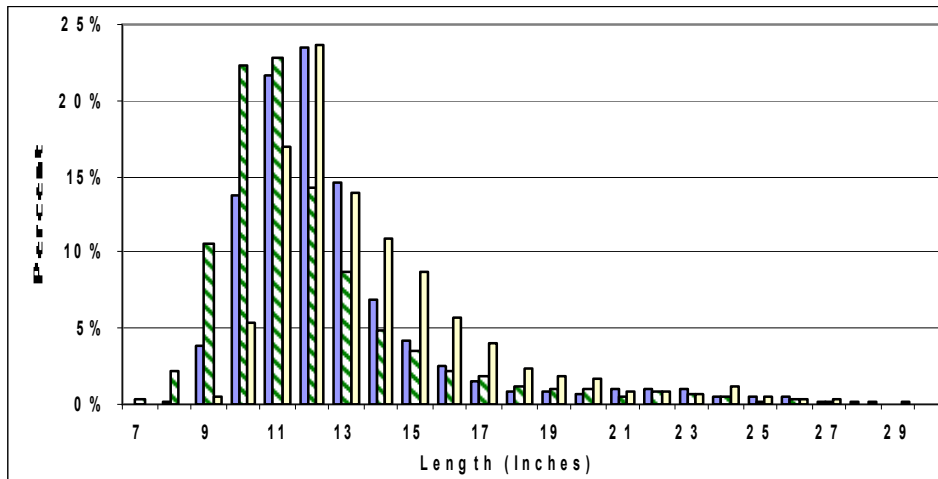


Table 1. Fish catch per unit effort during a 2007 survey of six lakes in Three Lakes Chain, Oneida County Wisconsin. Historic net catch from the same lakes is included for comparison. Netting catch rates are reported as number of fish per net night, while electrofishing (shocking) catch rates are number of fish per mile of shoreline. Only gamefish data were collected during electrofishing.

species	walleye netting	April shocking	fall panfish netting	1994 walleye netting	1977-78 netting
walleye	17.7	75.1	1.7	18.1	20.4 (spring)
largemouth bass	0.066	0.043	1.7		
muskellunge	0.55	1.2	0.13	0.77	
northern pike	2.1	1.1	0.46	1.6	
hybrid muskie x pike	0	0	0.016		
smallmouth bass	0.31	2.3	0.14		
black bullhead	0.036		0.048		10.3 (summer)
black crappie	3.9		6.4		9.3 (summer)
bluegill	4.9		53.6		6.7 (summer)
hybrid bluegill x pumpkinseed	0.56		1.1		
burbot	0.13		0.016		
cisco	0.015		0		
common shiner	0.029		0		
creek chub	0.0073		0		
golden shiner	0.50		0.40		
pumpkinseed	0.80		7.5		
rock bass	2.2		1.4		5.1 (summer)
shorthead redhorse	0.021		0.016		
silver redhorse	0		0.016		
white sucker	0.87		0.40		
yellow bullhead	1.2		1.4		1.0 (summer)
yellow perch	85.7		3.1		56.4 (spring)

Table 2 Fish-stocking record during 1990 through 2007 in six lakes in Three Lakes Chain, Oneida County WI (Little Fork, Big Fork, Fourmile, Medicine, Laurel and Big Stone Lakes).

Year	Lake	Species	Size	Number	Comments
1990	Medicine	muskellunge	lg fingerling (10-12 inch)	800	
1990	Big Stone	muskellunge	lg fingerling (10-12 inch)	600	
1991	Big Fork	muskellunge	lg fingerling (10.9 inch)	420	
1991	Medicine	muskellunge	lg fingerling (11.7 inch)	300	
1991	Big Stone	muskellunge	lg fingerling (10.9 inch)	420	
1992	Medicine	muskellunge	lg fingerling (8.8 inch)	275	
1993	Big Fork	muskellunge	lg fingerling	600	
1993	Medicine	muskellunge	lg fingerling	300	
1993	Big Stone	muskellunge	lg fingerling	600	
1995	Laurel	yellow perch	adult	46	field transfer
1995	Laurel	bluegill	adult	252	from Lake of
1995	Laurel	pumpkinseed	adult	17	the Hills
1996	Medicine	muskellunge	lg fingerling (10.8 inch)	175	
1996	Medicine	bluegill	adult (4 inch)	1,691	field transfer
1996	Medicine	pumpkinseed	adult (4 inch)	161	field transfer
1996	Laurel	bluegill	adult (4.6 inch)	1,065	field transfer
1996	Laurel	pumpkinseed	adult (4.6 inch)	118	field transfer
1996	Big Stone	bluegill	adult	1,739	field transfer
1996	Big Stone	pumpkinseed	adult	194	field transfer
1996	Big Stone	muskellunge	lg fingerling	300	
1998	Laurel	bluegill	adult (4 inch)	1,960	field transfer
1998	Big Stone	bluegill	adult	891	Lake of the Hills
1998	Big Stone	muskellunge	lg fingerling (12.5 inch)	600	
2000	Big Stone	muskellunge	lg fingerling (10.9 inch)	600	
2002	Laurel	black crappie	adult (9 inch)	97	field transfer
2002	Laurel	bluegill	adult (5.8 inch)	694	from Lake of
2002	Laurel	pumpkinseed	adult (5.8 inch)	962	the Hills
2002	Laurel	yellow perch	adult (7.0 inch)	30	Vilas Co.
2002	Big Stone	muskellunge	lg fingerling (10.2 inch)	274	
2004	Big Fork	muskellunge	lge fingerling (10.3 inch)	260	
2004	Medicine	muskellunge	lg fingerling (10.3 inch)	140	
2004	Big Stone	muskellunge	lg fingerling (10.3 inch)	205	
2006	Big Fork	bluegill	adult (4.9 inch)	1,915	field transfer
2006	Big Fork	pumpkinseed	adult (4.9 inch)	629	from Maple L.
2006	Big Fork	BGxPKS hybrid	adult (4.5 inch)	314	Oneida Co.
2006	Big Fork	muskellunge	lg fingerling (9.9 inch)	315	
2006	Medicine	bluegill	adult (4.5 inch)	2,157	field transfer
2006	Medicine	pumpkinseed	adult (4.5 inch)	1,043	from Maple L.
2006	Medicine	BGxPKS hybrid	adult (4.1 inch)	503	Oneida Co.
2006	Medicine	muskellunge	lg fingerling (10.5 inch)	151	
2006	Laurel	bluegill	adult (5.1 inch)	2,190	field transfer
2006	Laurel	pumpkinseed	adult (5.0 inch)	420	from Maple L.
2006	Laurel	BGxPKS hybrid	adult (5.0 inch)	390	Oneida Co.
2006	Big Stone	bluegill	adult (4.9 inch)	2,015	field transfer
2006	Big Stone	pumpkinseed	adult (4.9 inch)	742	from Maple L.
2006	Big Stone	BGxPKS hybrid	adult (4.5 inch)	778	Oneida Co.
2006	Big Stone	muskellunge	lg fingerling (10.5 inch)	137	

Bass

Bass catch tends to be low during the cold walleye-netting period. A targeted bass survey with electroshocking during late May would have increased the catch. Only 10 largemouth bass were captured during spring sampling, and another 106 were captured during the fall netting survey. Over 70% of largemouth were less than 6 inches in length. Small fish are under-represented in the catch in most bass surveys, which target spawning fish in late spring. The high catch of small fish was mostly from fall netting and may be an artifact of selectivity by nets set in vegetation. However, good numbers of juvenile bass (both species) were observed in minifyke nets during 2006. It appears that recruitment is adequate but survival to larger sizes is poor. Seven fish were 14 inches and larger and the longest largemouth was 19.3 inches (Figure 7). Smallmouth bass exhibited the opposite size structure as largemouth, with few small fish but a fair number of quality-size fish up to 20.6 inches (Figure 8). Smallmouth bass are more likely to be found in wooded or rocky cover than largemouth, and may be more vulnerable to predation by the abundant walleye. We captured 104 smallmouth during the survey, including 4 recaptures of previously-marked fish.

Figure 7. Length-frequency of largemouth bass during 2007 in Three Lakes Chain, Oneida County Wisconsin.

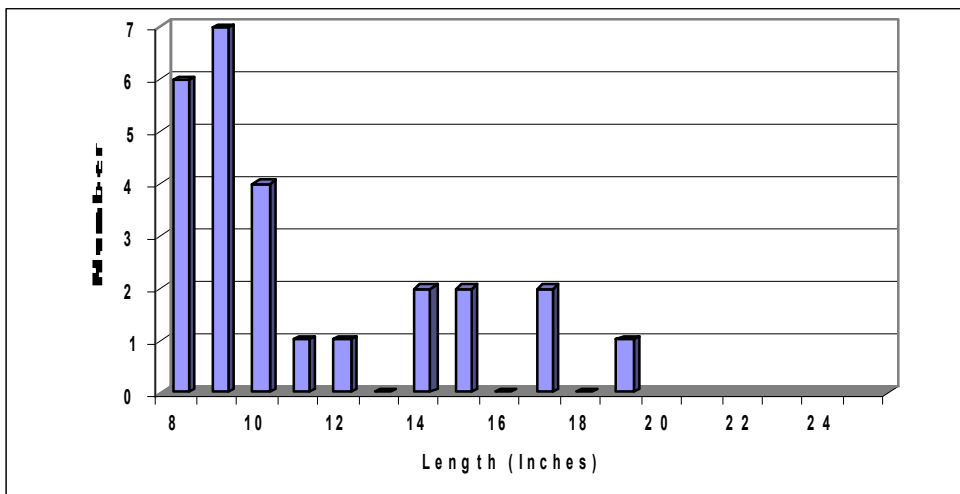
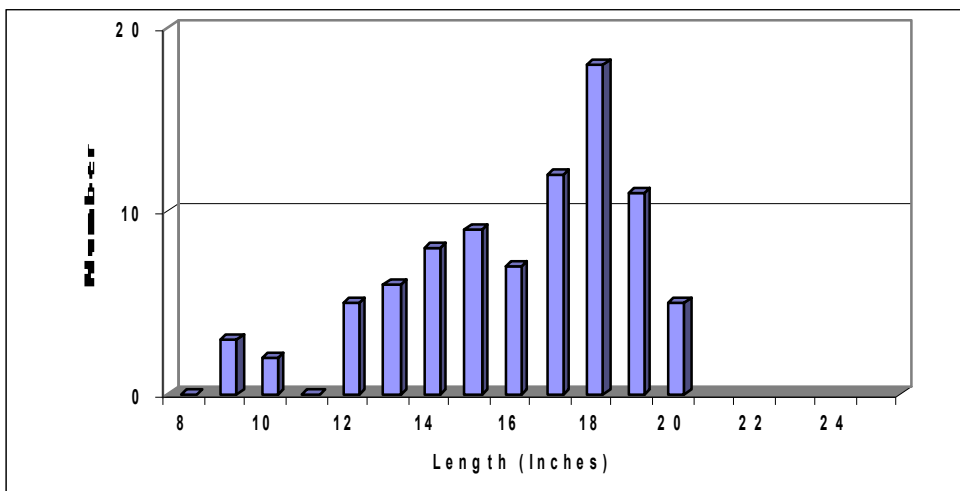


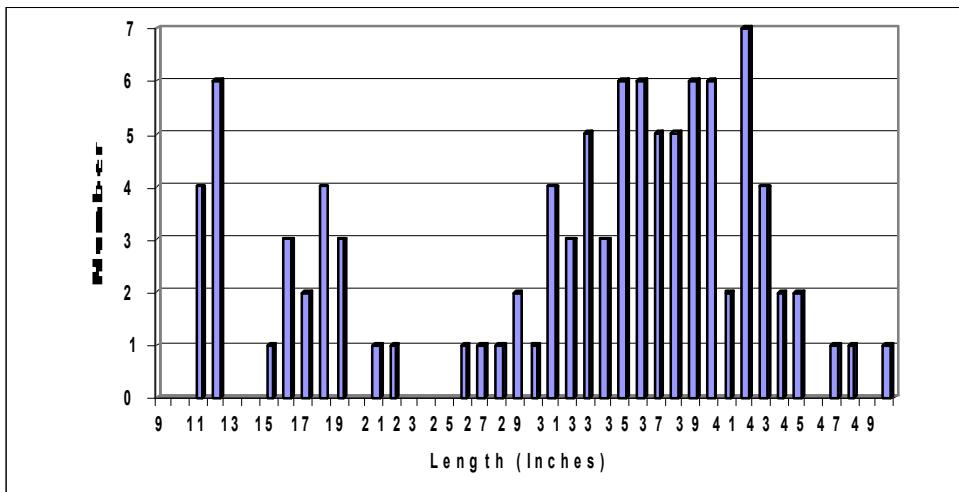
Figure 8. Length-frequency of smallmouth bass during 2007 in Three Lakes Chain, Oneida County Wisconsin.



Muskellunge

One hundred and four muskellunge were captured during spring netting and shocking, including 4 recaptures and 25 juvenile fish. In addition, a 37.0-inch tiger (hybrid muskellunge x northern pike) was captured in Fourmile Lake. Eight fish were captured during fall panfish netting. Muskellunge are stocked in Three Lakes Chain at a rate of 0.25 large fingerlings (generally 9-12 inch) per acre of water in even-numbered years. The Chain has a reputation as an action fishery, with good numbers of mid-30-inch fish, but few over 40 inches. However, 36% of the adult population (30 inches and larger) was at least 40 inches, while 6.7% were 45 inches or longer (Figure 9). The largest muskellunge was a 50-inch female from Medicine Lake.

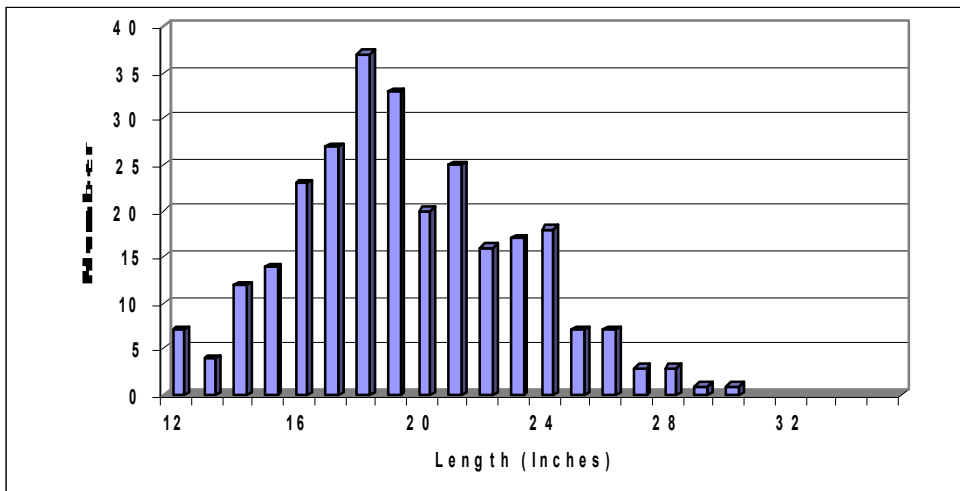
Figure 9. Length-frequency of muskellunge during 2007 in Three Lakes Chain, Oneida County Wisconsin.



Northern Pike

Three hundred nineteen northern pike were captured during spring netting and shocking (including 3 juvenile and 36 recaptures). Another 29 northerns were captured during fall netting. The northern pike population (including sexually mature fish and all fish over 12 inches) was estimated for the 6 lakes combined at 1,110 (± 187 SD), or 0.46 per acre, using the Schnabel multiple-capture method (Ricker 1975). The Medicine + Laurel population was estimated at 370 northern pike (± 95 SD), or 0.61 per acre. This is very low density for a northern pike population. Average size of adult northern pike was 19.7 inches and only 5% of adults were 26 inches or larger (Figure 10). The largest northern pike was a 30.0 inch female from Medicine Lake.

Figure 10. Length-frequency of adult northern pike during 2007 in Three Lakes Chain, Oneida County Wisconsin.



Panfish

Little Fork, Big Fork, Medicine and Big Stone Lakes have relatively sandy basins and low amounts of aquatic vegetation. Fourmile and Laurel, in contrast, have fairly extensive areas of wetlands and aquatic vegetation. Three Lakes Chain is known for a strong perch fishery, but generally low centrarchid panfish abundance. Netting during the cold early spring period typically yields high catches of yellow perch and crappie but few bluegill or pumpkinseed. Yellow perch (in spring) and bluegill dominated the panfish catch, along with lower numbers of black crappie, pumpkinseed and rock bass (Table 1).

Black crappie catch was strongest in Fourmile Lake, with 11 per net night in spring and 21 per net night in fall. Crappie size structure showed good numbers of fish between 8 and 12 inches (Figure 11). Bluegill catch was highest in Laurel (96 per net night) and Medicine (82 per net night). The Medicine bluegill catch was mainly contributed by abundant 3 to 4-inch fish from one net in a well-vegetated location, but most of Medicine’s shoreline is sandy and open. The bluegill length-frequency reflects the high catch of 3.5 to 4.5 inch fish, but good numbers of fish up to 8 inches were also present (Figure 12). Yellow perch catch was highest in Little Fork (121 per net night) and Big Fork (108 per net night). Yellow perch were quite abundant and are undoubtedly an important forage species in the Chain. Quality-size fish made up a small proportion of the overall population but are abundant enough to provide good fishing if anglers can target them away from the smaller fish (Figure 17). By comparison, our catches were generally higher than Carlson’s 1977-1978 surveys (Carlson, 1978a, b, c; 1979a, b, c). Carlson found the highest catches of black crappie (20 per net night during summer) and bluegill (17 per net night) in Laurel, while yellow perch were most abundant in Big Stone (104 per net night during early spring).

Figure 11. Length-frequency of black crappie during 2007 in Three Lakes Chain, Oneida County WI.

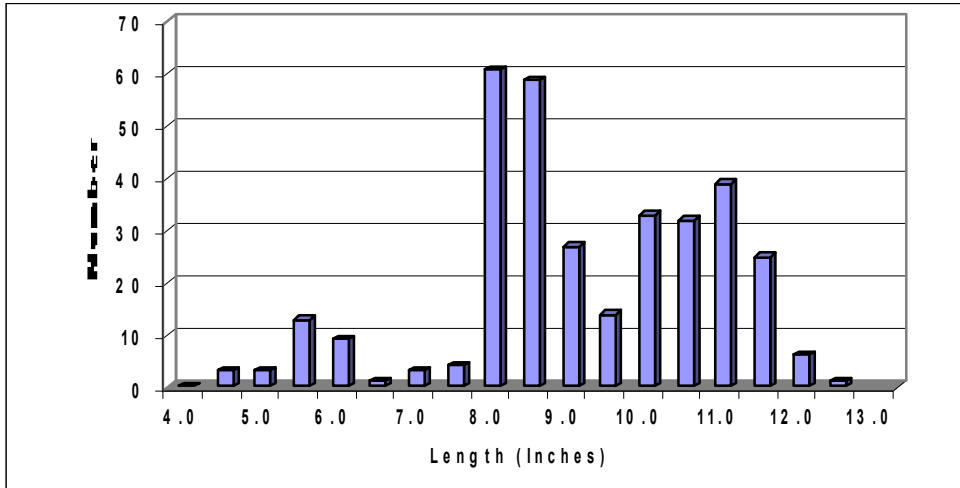


Figure 12. Length-frequency of bluegill during 2007 in Three Lakes Chain, Oneida County WI.

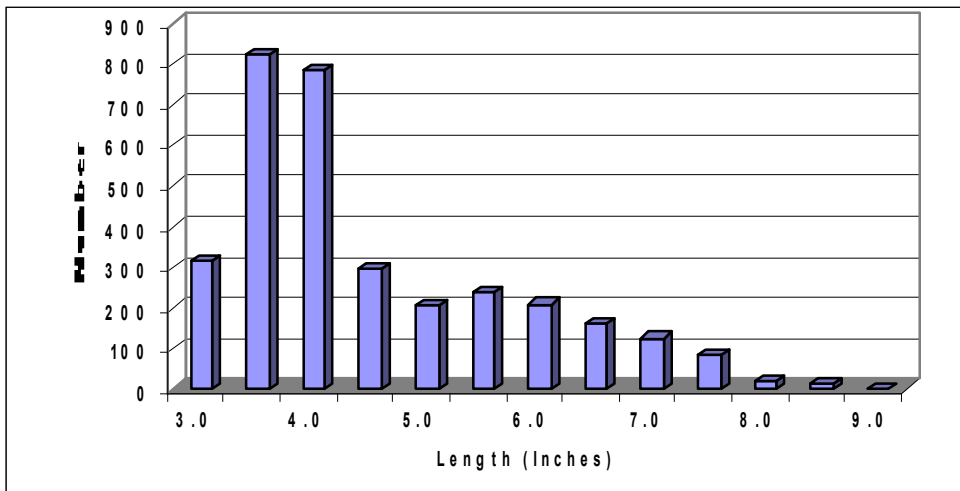


Figure 13. Length-frequency of pumpkinseed during 2007 in Three Lakes Chain, Oneida County WI.

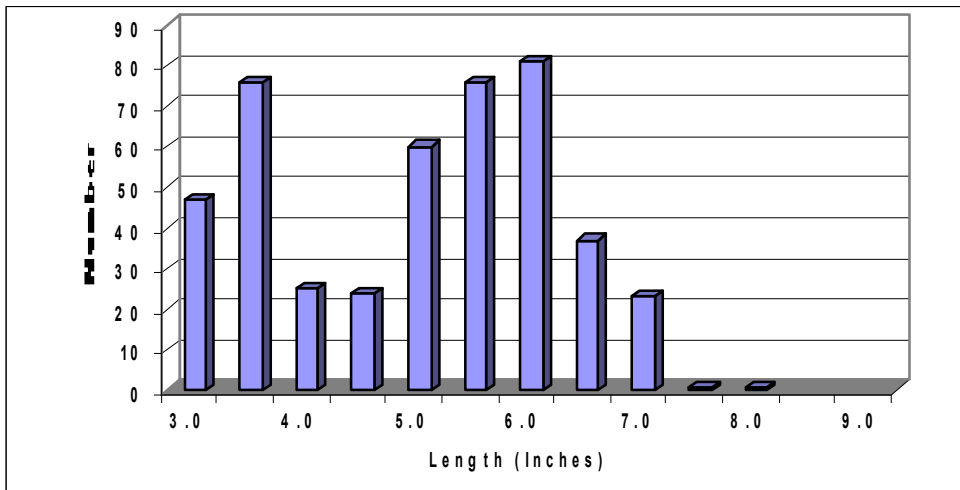


Figure 14. Length-frequency of hybrid bluegill x pumpkinseed during 2007 in Three Lakes Chain, Oneida County WI.

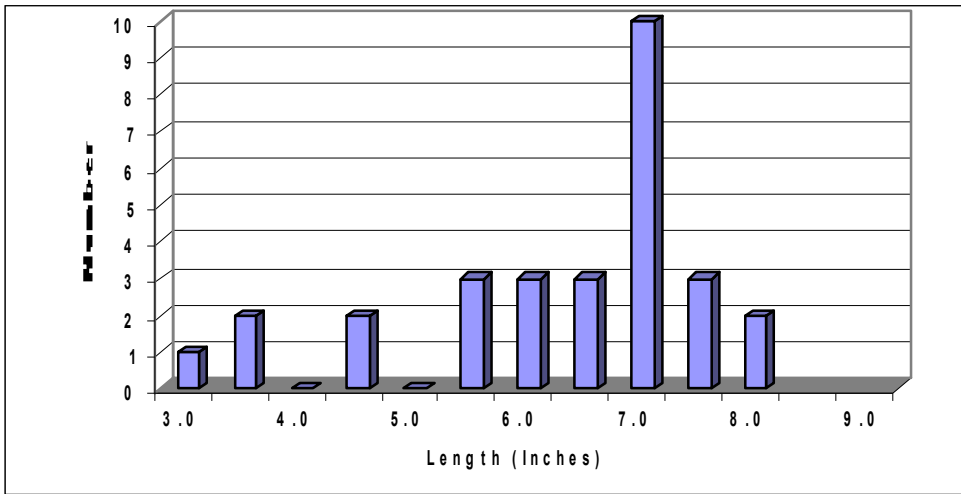


Figure 15. Length-frequency of rock bass during 2007 in Three Lakes Chain, Oneida County WI.

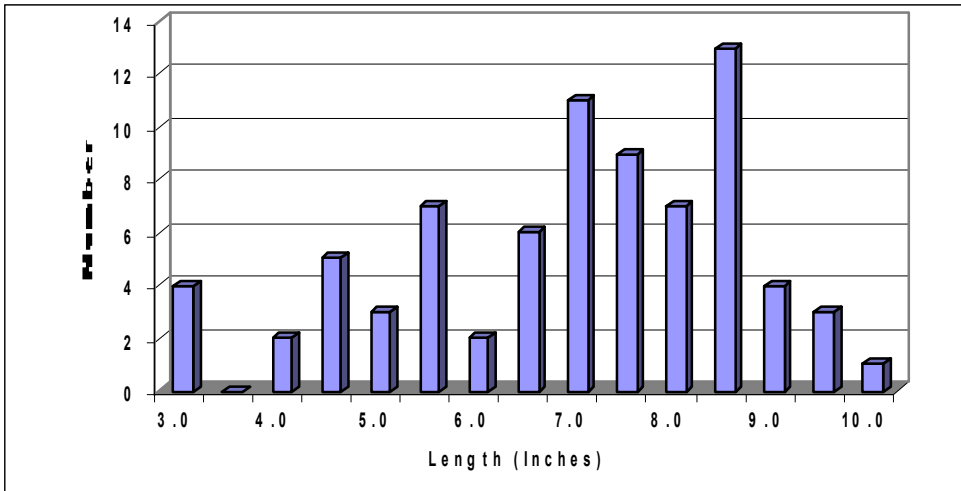


Figure 16. Length-frequency of yellow bullhead during 2007 in Three Lakes Chain, Oneida County WI.

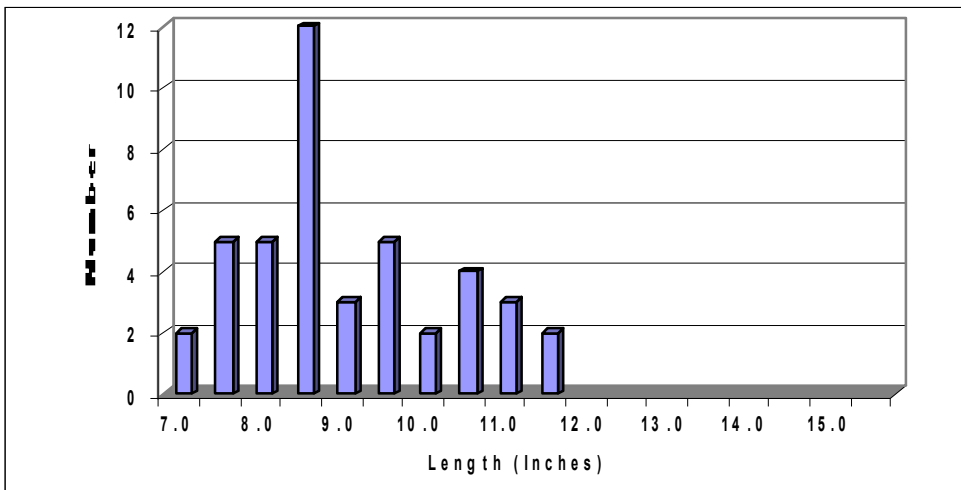
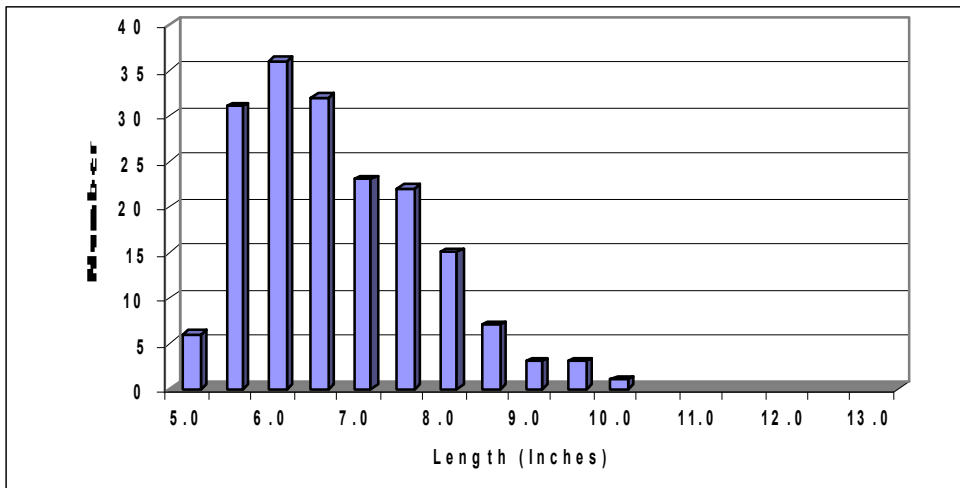


Figure 17. Length-frequency of yellow perch during 2007 in Three Lakes Chain, Oneida County WI.



MANAGEMENT RECOMMENDATIONS

Three Lakes Chain supports a diverse fishery. Walleye were the dominant gamefish, along with moderate populations of muskellunge, northern pike, smallmouth bass and largemouth bass. Walleye size was centered on 10 to 15 inches, but fairly good numbers of larger fish were present. Bass numbers appeared to be low. A few, mostly small-sized largemouth were captured. Smallmouth bass showed low numbers but very good size structure. All sizes of muskellunge were well-represented, and 36% of the adult population was 40 inches or larger. The northern pike population was very low-density. Pike length was centered on 18 inches, but sizes up to 30 inches were represented. Yellow perch were the dominant panfish, followed by bluegill, pumpkinseed, black crappie and rock bass.

Walleye length-at-age lagged about a year behind average by age 2. Slow growth is often the case in high-density populations like Three Lakes Chain, due to competition for limited food resources. Growth of the abundant yellow perch was also somewhat slow, while growth of lower-density bluegill, pumpkinseed, rock bass and crappie was a year or more ahead of the regional averages.

Stocking of large fingerlings helps maintain the muskellunge population, while other species are reproducing naturally. Three Lakes is best managed for walleye, muskellunge, yellow perch and black crappie. Smallmouth and largemouth bass, northern pike and bluegill provide a secondary fishery.

ACKNOWLEDGEMENTS

Wisconsin Valley Improvement Company (WVIC) provided field personnel for this study, and the second netting boat, nets and gear. Dave Coon (Fisheries Biologist for WVIC) and I coordinated the field work with daily assistance from WVIC Fisheries Technician Cathy Wendt and WDNR Fisheries Technician Steve Timler. Jeff Blonski assisted with spring gamefish netting and John Schinker helped lift and pull nets during rain and snow squalls on the last day of panfish netting. Blonski, Jason Halverson, Marty Kiepkke, Steve Kramer, Tim Tobias and Keith Worrall assisted with electroshocking. Fish ages were assigned by Aaron Nelson (perch from scales and spines), Steve Timler (assorted species and quality control), Cathy Wendt (centrarchid panfish from scales) and me (walleye from scales and spines). Nelson and Wendt entered and summarized data. Mike Coshun calculated walleye population estimates and I generated the northern pike estimates.

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<http://terraserver-usa.com>

APPENDIX A FISH AGE RESULTS

The walleye and largemouth bass aged sub-samples were applied against an age-length key to eliminate bias from a non-random subsample.

Table A.1. Female walleye length-at-age in Three Lakes Chain, Oneida County Wisconsin during 2007 and 1994.

Age	Northern WI avg	2007		1994	
		Number of fish	Three Lakes avg length	Number of fish	Three Lakes avg length
3		2	13.9		
4	14.7	22	13.3	1	12.5
5	16.1	16	14.4	33	13.2
6	17.6	13	16.1	83	14.9
7	19.5	17	16.8	65	17.6
8	21.2	19	18.6	56	19.3
9	22.6	21	20.9	32	22.0
10	23.8	25	21.4	22	23.6
11	24.9	12	23.0	15	24.3
12	25.8	17	23.4	7	24.9
13	26.9	9	25.5	5	27.7
14	27.5	4	26.3	1	26.1
15	28.0	5	25.7		
16	27.7	2	27.6		
17		0			
18		1	25.3		

Table A.2. Male walleye length-at-age in Three Lakes Chain, Oneida County Wisconsin during 2007, 1994 and 1948. The 1948 walleye ages are bracketed on the length-frequency sheet (including 333 males and 11 females) with no indication of the number or sex of fish aged.

Age	Northern WI avg	2007		1994		1948
		Number of fish	Three Lakes avg length	Number of fish	Three Lakes avg length	Three Lakes weighted avg length
2	10.6	12	9.7			
3	11.6	25	11.0	37	9.7	11.3
4	13.0	41	12.2	90	10.7	12.2
5	14.5	20	13.3	54	12.0	13.9
6	15.8	6	14.5	81	13.1	15.4
7	16.9	7	15.9	22	15.2	
8	18.1	7	16.1	16	15.6	
9	18.9	8	16.0	7	16.2	
10	19.7	5	16.0	6	18.2	
11	20.4	1	17.8	3	16.9	
12	20.6	1	17.3	1	18.3	
13	21.3	2	18.0	1	17.8	

Table A.3. Unknown-sex walleye length-at-age in Three Lakes Chain, Oneida County Wisconsin during 2007 and 1994.

Age	Northern WI avg	2007		1994	
		Number of fish	Three Lakes avg length	Number of fish	Three Lakes avg length
1		3	8.3	1	6.9
2		17	8.5	8	7.9
3		10	10.2	31	9.1
4		18	11.8	12	10.2
5		6	13.2	11	12.4
6		8	14.6	22	14.6
7		0		7	16.0
8		1	17.6		

Table A.4. Bluegill length-at-age in Three Lakes Chain, Oneida County Wisconsin during fall, 2007.

Age	Number of fish	Three Lakes avg length	Northern WI avg
1	29	3.7	2.5
2	35	4.8	3.9
3	9	5.9	5.0
4	12	6.9	6.2
5	21	6.9	6.8
6	16	7.6	7.8
7	3	8.7	8.2
8	1	7.3	8.7
9	1	9.1	8.7

Table A.6. Hybrid bluegill x pumpkinseed length-at-age in Three Lakes Chain, Oneida County Wisconsin during fall, 2007.

Age	Number of fish	Three Lakes avg length
0	0	
1	2	3.6
2	4	5.5
3	2	6.3
4	0	
5	6	7.1
6	4	7.8

Table A.5. Pumpkinseed length-at-age in Three Lakes Chain, Oneida County Wisconsin during fall, 2007.

Age	Number of fish	Three Lakes avg length	Northern WI avg
1	31	3.5	2.2
2	45	5.5	3.6
3	12	6.3	4.8
4	3	7.0	5.7
5	14	6.8	6.5
6	3	6.6	6.8

Table A.7. Black crappie length-at-age in Three Lakes Chain, Oneida County Wisconsin during fall, 2007.

Age	Number of fish	Three Lakes avg length	Northern WI avg
0	13	2.9	
1	28	6.4	3.4
2	37	8.1	5.3
3	7	9.4	7.1
4	25	10.5	9.0
5	16	12.2	10.0
6	6	12.2	10.7
7	1	11.8	11.6

Table A.8. Yellow perch length-at-age in Three Lakes Chain, Oneida County Wisconsin during fall, 2007.

Age	Number of fish	Three Lakes avg length	Northern WI avg
1	16	4.7	3.4
2	22	6.1	5.3
3	20	6.8	7.1
4	20	7.8	9.0
5	17	8.6	10.0
6	1	10.2	10.7

