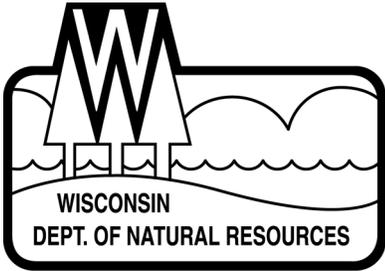


Comprehensive Fisheries Survey of Swamsauger Lake, Oneida County Wisconsin during 2010.

Waterbody Identification Code 1528700



John Kubisiak
Senior Fisheries Biologist
Rhinelanders
February, 2011



Your purchase of fishing equipment
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EXECUTIVE SUMMARY

A comprehensive fisheries survey was conducted in Swamsauger Lake during spring and fall, 2010. Walleye (population estimate, PE = 7.6 adults per acre) were the dominant gamefish, along with moderate numbers of northern pike (PE = 3.5 adults per acre) and low numbers of largemouth bass. The pike and walleye both showed good size through the mid-ranges, but few top-end individuals were present. Individuals from both species appeared to be in good condition, but lengths-at-age were below average, indicating slow growth. Panfish species were moderate in abundance, with excellent size and growth rates for most species. We found moderate catches of black crappie and bluegill, along with lower numbers of pumpkinseed, bluegill x pumpkinseed hybrids, yellow perch, rock bass and black and yellow bullhead. Non-game species in the catch include creek chub, golden shiner and white sucker. Walleye were stocked until recently, but are now reproducing naturally. Stocking is discontinued, but recruitment should be monitored with periodic fall surveys. Other species are self-sustaining. I recommend managing Swamsauger Lake for walleye, northern pike and panfish.

Lake and location:

Swamsauger Lake (some older references use Swampsauger or Swamp Sauger Lake), northwest Oneida County, T36N R04E Sec14. Swamsauger Lake is in the town of Minocqua, about 21 miles southwest of the city of Minocqua. Swamsauger is part of the Upper Wisconsin River watershed. It is a drainage lake with an inlet from McGrass Creek. The outlet forms Swamsauger Creek, which drains to the Willow Reservoir and the Tomahawk River.

Physical/Chemical attributes (Andrews and Threinen 1966):

Morphometry: 140.5 acres, maximum depth of 12 feet and 3.4 miles of shoreline

Watershed: 6 square miles, including 56 acres of adjoining wetlands.

Lake type: Drainage.

Basic water chemistry: Soft – alkalinity 38 mg/l, conductance 96` µmhos.

Water clarity: Light brown water of low transparency.

Littoral substrate: 45% sand, 35% muck, 15% rubble and 5% gravel.

Aquatic vegetation: moderate.

Winterkill: None reported.

Boat landing: One concrete plank ramp with parking for 5 vehicles with trailers and 5 additional vehicles.

Other features: Shoreline 55% upland with shrub, coniferous and bog wetlands adjoining portions of the lake.

Purpose of Survey: Assess status of game and panfish species and develop management recommendations.

Dates of fieldwork: Gamefish netting, March 30 – April 6 2010. Panfish netting, May 17-21 2010. Electroshocking (entire shoreline) April 6 and September 14, 2010.

BACKGROUND

Eleven fyke net lifts during August 12-14, 1974 resulted in 29 walleye, and 8 northern pike. Panfish included 410 black crappie, 49 bluegill, 17 pumpkinseed, 17 yellow perch and 12 rock bass (Tyler 1975). Nongame species included 31 white sucker and 9 bullhead (not differentiated, but black and brown bullhead were both listed as “present”). Johnny darter and blackchin shiner also listed as “present.” Black crappie size and condition was described as “impressive.” Walleye were reproducing naturally and fish stocking was not recommended.

An October 4, 2007 electrofishing survey resulted in 4.7 young of year (yoy), 4.7 age-1 and 30.3 larger walleye per mile, along with 3.2 northern pike and 1.8 largemouth bass per mile. White sucker were noted as “abundant”, black crappie, bluegill, pumpkinseed, yellow perch and golden shiner were listed as “common”, while black bullhead were “present.”

METHODS

The ice was mostly out when 6 standard fyke nets ($\frac{3}{4}$ -inch mesh, bar measure) were set on March 30, 2010, targeting walleye and northern pike. An additional net was set on March 31. One net was pulled on April 5 and the remaining nets were pulled on April 6. Effort totaled 47 net-nights. A WDNR-standard alternating current electrofishing boat was used to collect gamefish on April 6 and September 14, 2010. Six standard $\frac{3}{4}$ -inch fyke nets (except one $\frac{1}{2}$ -inch mesh net was set to target smaller fish) were fished May 17-19, 2010 and 7 nets were fished May 19-21 (26 net-nights), targeting panfish. Length or length category (nearest half inch) was recorded for all gamefish and for panfish in June. Swamsauger’s dark-stained water makes it difficult to capture fish stunned during electrofishing and likely reduced the catch. Visibility was estimated at less than 12 inches on April 6, had increased to 2-3 feet during May 17-21 panfish netting but was less than 6 inches on September 14. This compares to a visibility of 2 feet during an October 4 2007 electrofishing survey. The exceptionally dark water on September 14 was also noted on other lakes in the area after late-summer rains flushed tannins that had been accumulating during the last 7 years of drought. Swamsauger had the lowest visibility of the 14 lakes I visited during fall, 2010 electrofishing. Adult gamefish were given a left-ventral fin clip and juveniles were given a top-tail clip for use in mark-recapture population estimates. Age structures (scales or spines) were removed from ten fish per species, per half-inch group.

RESULTS AND DISCUSSION

Walleye

During walleye netting, 545 walleye were captured in 7 nights, including 117 recaptures, at a rate of 11.6 walleye per net night (Table 1). The electrofishing sample on April 6 yielded 146 walleye (42.9 fish per mile), including 16 juveniles (unknown-gender fish less than 15 inches in length). The mark-recapture population estimate of 1,076 adult walleye (± 144 SD), or 7.6 per acre, is above the predicted value of 3.7 for a 141-acre lake supported by natural reproduction, but within the normal range (95% prediction interval) of 1.2 to 11.2 adult walleye per acre. Walleye size was centered on 14 inches and 23% of adult walleye 15 inches or larger. There were low numbers of larger fish, with only 2.0% exceeding 20 inches in length (Figure 1). Few walleye exceeded age 8, and lengths-at-ages were below average, especially at older ages. The largest walleye was a 26.7-inch, 8.25 pound female aged at 15 years with a scale.

Fall electrofishing surveys are normally a good index of walleye recruitment. However, identifying and dipping young walleye is a difficult task during electrofishing surveys on Swamsauger because the dark-stained water only allows fish to be seen and collected from the top few inches of the water column. Fall catch of 4.7 yoy (prior to stocking) and 4.7 age-1 walleye in 2007 and 3.5 age-1 walleye in 2010 likely reflect good recruitment, given the limited visibility.

Data on past walleye abundances are limited. Swamsauger likely supported a native walleye population due to its connection to the Tomahawk River system. A reproducing population was found during the August, 1974 survey (Tyler 1975). The status of the walleye population is unclear when Swamsauger Preservation Association began stocking walleye in 2000 (Table 2). Natural reproduction may have been adequate in 2000, or it is possible that walleye were at low abundance but several years of stocking increased the population enough to be self-sustaining. Regardless of past recruitment, Swamsauger currently supports a high-density population with a high proportion of young fish coming into the population. Stocking should be suspended and recruitment monitored with periodic surveys.

Table 1. Fish catch per unit effort during a 2010 survey of Swamsauger Lake, Oneida County WI. Netting catch rates are reported as number of fish per net night, while electrofishing catch rates are number of fish per mile of shoreline. Only gamefish data were collected during shocking runs.

species	spring netting	April 14 shocking	panfish netting	Sept 8 shocking
walleye	11.6	42.9	6.0	7.3
largemouth bass	0.57	0.29	0.25	0
northern pike	3.6	1.5	1.23	1.8
black bullhead	0.57		0.76	
black crappie	9.5		28.0	
bluegill	0.85		24.7	
hybrid bluegill x pumpkinseed	0.19		3.2	
creek chub	0.25		0	
golden shiner	0.24		0.31	
pumpkinseed	0.88		6.4	
rock bass	0.80		1.5	
white sucker	9.7		2.3	
yellow bullhead	0.87		1.5	
yellow perch	5.0		0.47	

Figure 1. Length-frequency of adult walleye during 2010 in Swamsauger Lake, Oneida County Wisconsin.

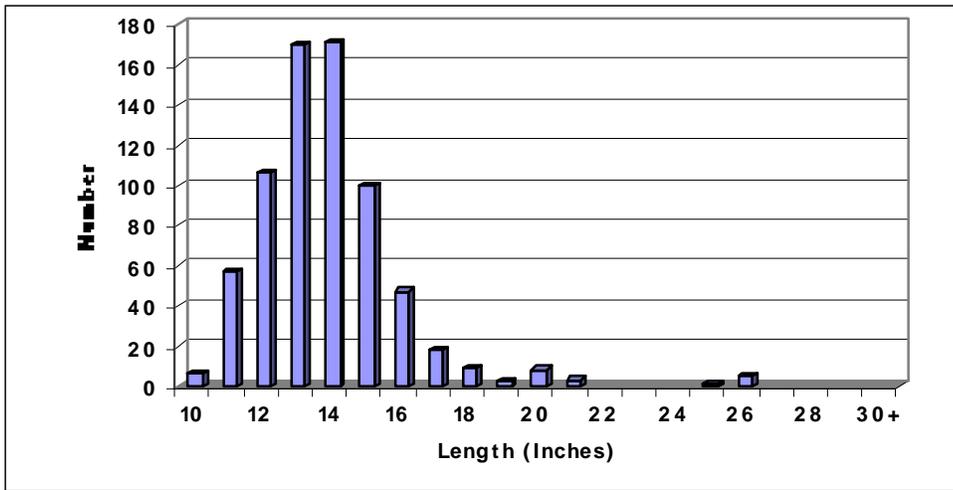


Table 2. Fish stocking record through 2010 in Swamsauger Lake, Oneida County WI.

Year	Species	Size	Number	Comments
1937	northern pike	fry	129,100	
1939	northern pike	fry	35,000	
1939	northern pike	fry	50,000	
1940	northern pike	fry	50,000	
1941	northern pike	fry	50,000	
1942	largemouth bass	fingerling	350	
2000	walleye	large fingerling (8 inch)	500	Swamsauger Pres. Assoc.
2001	walleye	large fingerling (10 inch)	500	“ “
2001	bluegill	large fingerling (4 inch)	100	“ “
2002	walleye	large fingerling (10 inch)	500	“ “
2002	bluegill	large fingerling (4 inch)	100	“ “
2003	walleye	large fingerling (7 inch)	600	“ “
2004	walleye	large fingerling (9 inch)	500	“ “
2005	walleye	large fingerling (8 inch)	500	“ “
2006	walleye	large fingerling (10 inch)	500	“ “
2007	walleye	large fingerling (10 inch)	500	“ “
2009	walleye	large fingerling (8.5 inch)	1,000	“ “

Largemouth Bass

Largemouth bass were at low abundance in Swamsauger and appear to be a minor species. No bass were captured during the 1974 survey (Tyler 1975). Six largemouth were captured during a fall, 2007 survey, ranging 2.5 to 13.9 inches. Only 20 largemouth (including 2 recaptures) were encountered during the 2010 survey. The bass ranged 13.5 to 15.9 inches in length.

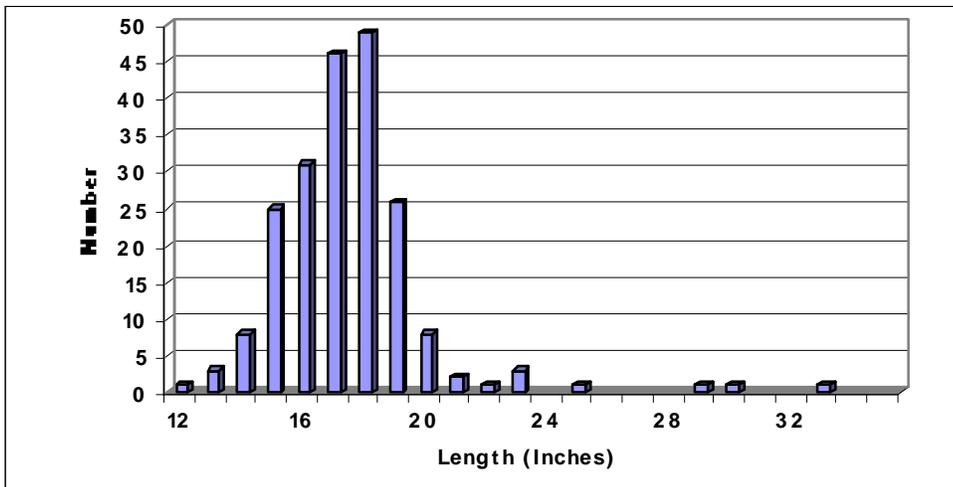
Northern Pike

We captured 214 northern pike (including 24 recaptures of previously-marked fish). The northern pike population (including sexually mature fish and all fish over 12 inches) was estimated at 502 (\pm

102 SD), or 3.5 per acre, using the Schnabel multiple-capture method (Ricker 1975). Separate male (266 ± 64 SD) and female (241 ± 91 SD) estimates were also calculated. This is considered moderate density for a northern pike population.

Average size of adult northern pike was 17.9 inches. Less than 9% of pike exceeded 20 inches and only three fish exceeded 26 inches (Figure 3). Length-at-ages were well behind regional averages for both male and female pike (Appendix A). The largest northern pike was a 33.8 inch, 10.7 pound female aged at 15 from a scale.

Figure 2. Length-frequency of adult northern pike during 2010 in Swamsauger Lake, Oneida County Wisconsin.



Panfish

Panfish were counted during both netting periods, but lengths were only taken during May 17-21 panfish netting. It is typical to capture higher numbers of yellow perch and black crappies during the early walleye-netting period, with bluegill and pumpkinseed catch increasing at warmer temperatures and longer photoperiod. This held true on Swamsauger for perch, bluegill and pumpkinseed. Black crappie were the dominant panfish species in both netting periods, but crappie catch increased from 9.5 per net night in walleye nets to 28 per net night in the panfish nets (Table 1). Ice-out and spring warming were about two weeks ahead of normal in 2010, and crappies may have remained in the shallows later because the photoperiod was right for spawning. Crappie size was dominated by 4-year-old fish, which averaged 9.8 inches in length. Two other size classes centered on 8 and 12 inches are evident in the length-frequency (Figure 3, Appendix A).

Overall, panfish catch was moderate. At high densities, panfish growth rates decline and stunting often occurs. The abundant predator population and moderate aquatic vegetation in Swamsauger are keeping panfish numbers well in check and producing exceptional growth and size of panfish (Figures 3-8). Angler harvest can also structure panfish populations by taking the largest fish out of the population. The large size being reached in Swamsauger suggests low to moderate harvest by anglers coupled with fast growth. Length-at-ages were about 1 year ahead of the regional averages for bluegill and black crappie; 2 years ahead for pumpkinseed. Yellow perch and rock bass were growing a year or more behind average (Appendix A).

Figure 3. Length-frequency of black crappie during 2010 in Swamsauger Lake, Oneida County WI.

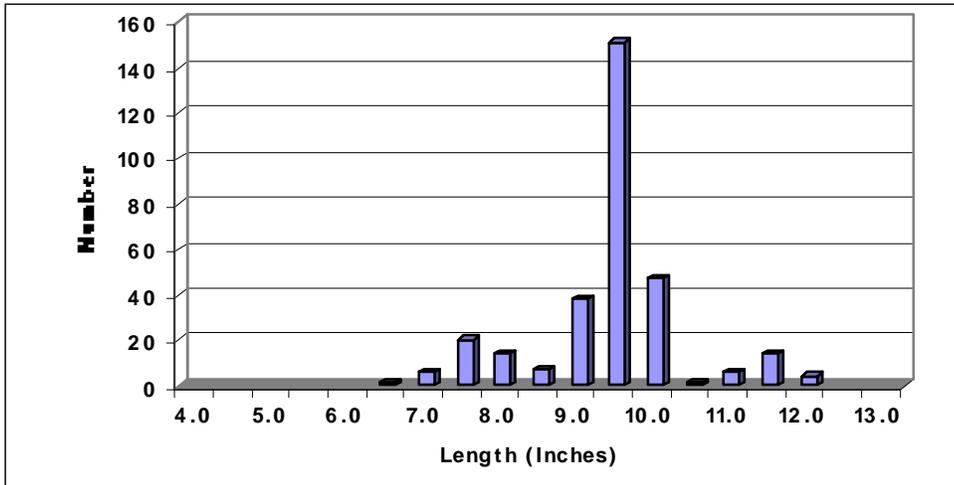


Figure 4. Length-frequency of bluegill during 2010 in Swamsauger Lake, Oneida County WI.

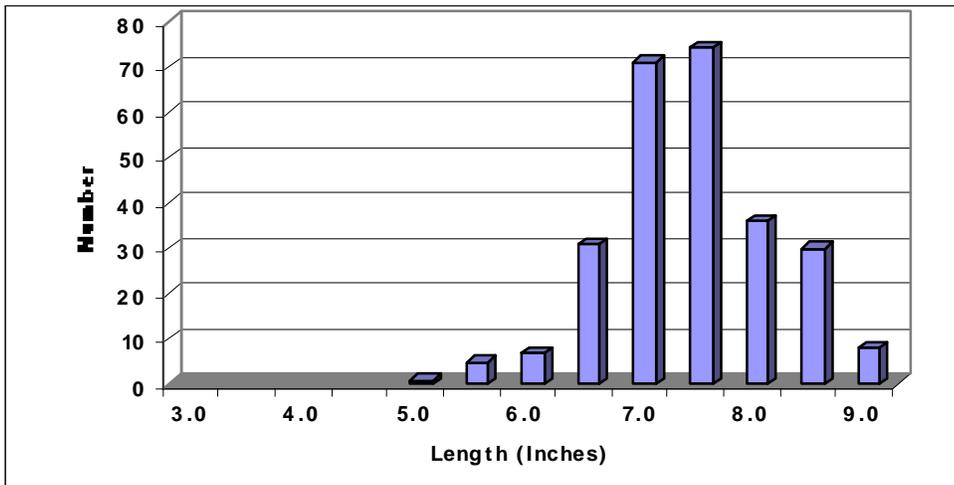


Figure 5. Length-frequency of pumpkinseed during 2010 in Swamsauger Lake, Oneida County WI.

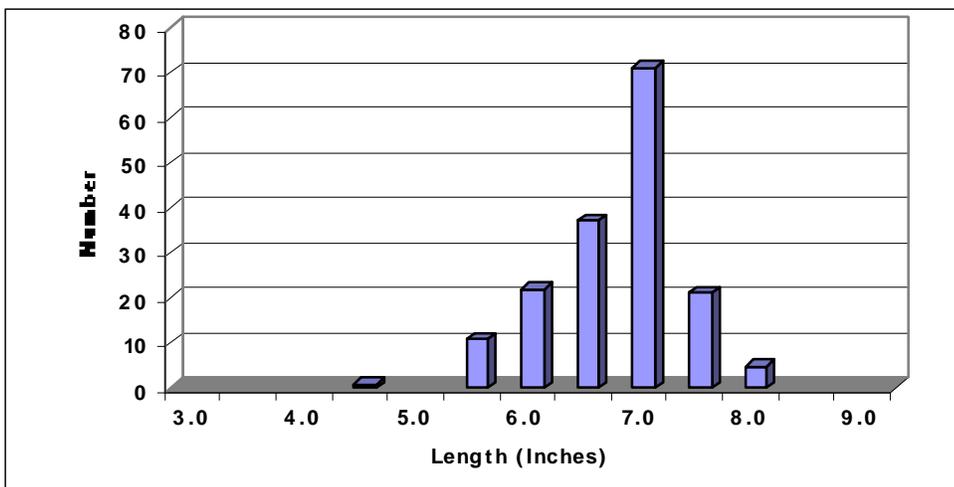


Figure 6. Length-frequency of bluegill x pumpkinseed hybrids during 2010 in Swamsauger Lake, Oneida County WI.

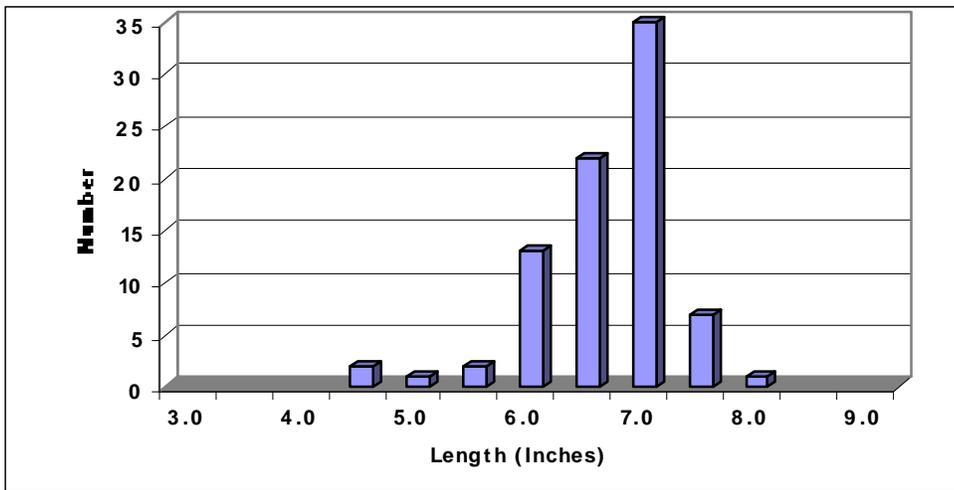


Figure 7. Length-frequency of yellow bullhead during 2010 in Swamsauger Lake, Oneida County WI.

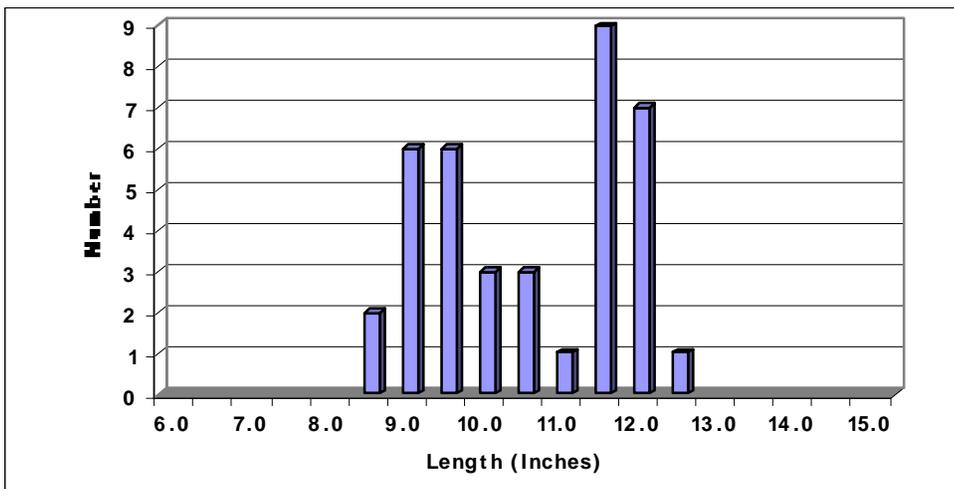
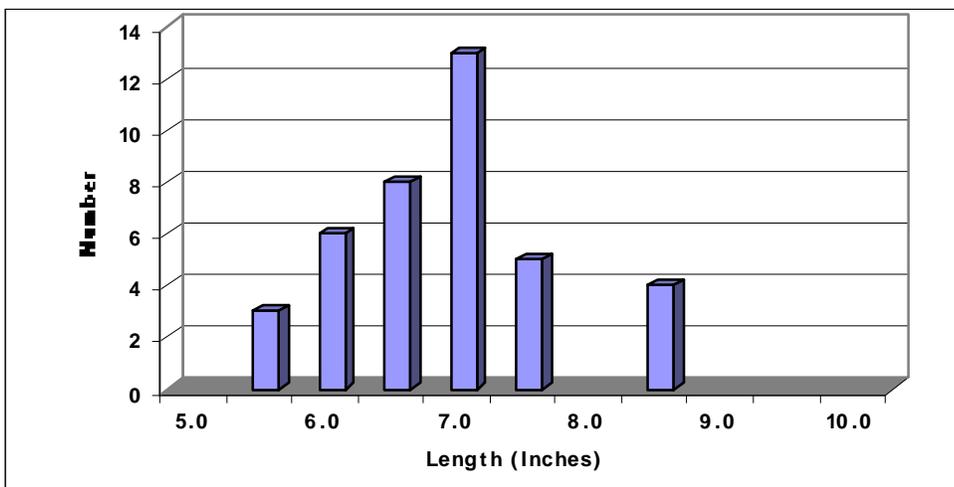


Figure 8. Length-frequency of rock bass during 2010 in Swamsauger Lake, Oneida County WI.



MANAGEMENT RECOMMENDATIONS

Walleye were the dominant gamefish, along with moderate-density northern pike and a very small number of largemouth bass. Gamefish populations were dominated by smaller, younger fish, with only 2.0% of walleye and 8.7% of northern pike exceeding 20 inches. Black crappie and bluegill dominated the panfish catch. Yellow perch, pumpkinseed and bluegill x pumpkinseed hybrids were also found at lower abundance, with lesser numbers of rock bass and yellow and black bullhead. Panfish size was exceptional. White sucker provide a fairly abundant forage species, and golden shiner and creek chub were also captured. Walleye and northern pike were slow growing, likely a result of their high abundance leading to competition. However, the abundant gamefish are keeping panfish numbers trimmed to a moderate density, resulting in excellent black crappie, bluegill and pumpkinseed growth. Swamsauger is best managed for walleye and northern pike. Walleye stocking is discontinued, but recruitment should be monitored with periodic surveys.

ACKNOWLEDGEMENTS

Steve Timler and I supervised the field work for this survey with assistance from Doug Day, Marty Kiepke, Steve Kramer and Aaron Nelson. Steve Timler assigned fish ages from scales.

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Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Bull 191, Dept. Env. Fish. Mar. Sci., Ottawa.

Tyler, D. K. 1975. Lake Investigation – Swamsauger Lake, Oneida County. Wisconsin Department of Natural Resources, Woodruff, WI. Two-page memorandum with 8 attached pages of tables.

APPENDIX A

FISH AGE RESULTS

For species with at least 50 lengths and over 15% measured but not aged, a length-age key from the aged sub-sample was applied against the full length-frequency to eliminate bias from a non-random subsample.

Table A.1. Male walleye length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
2			11.3
3	10	11.8	11.9
4	17	13.4	13.3
5	8	14.0	14.2
6	14	15.1	15.6
7	1	17.1	16.6
8	7	16.3	17.6
9	2	17.1	18.7
10			19.2
11			19.4
12			20.0

Table A.2. Female walleye length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
3			13.3
4	4	14.2	15.0
5	11	14.8	16.2
6	13	15.1	17.8
7	13	17.0	19.6
8	6	18.8	21.0
9	1	21.0	22.5
10	1	20.5	23.5
11	1	21.6	24.7
12	1	25.3	25.4
15	2	26.6	27.7

Table A.3. Male northern pike length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
2	2	11.3	13.4
3	4	15.5	16.2
4	14	16.8	18.9
5	15	17.1	20.6
6	7	18.4	22.3
7	7	18.4	23.4
8	2	20.0	24.8
9	1	18.7	23.9

Table A.4. Female northern pike length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
2			
3	2	15.6	16.9
4	13	17.5	20.4
5	13	17.8	23.1
6	12	18.6	24.4
7	3	19.2	27.3
8	3	21.7	28.8
9	1	22.2	32.1
10	1	23.5	
11	2	29.7	
12			
15	1	33.8	

Table A.5. Largemouth bass length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
3			8.9
4			10.5
5	6	15.2	12.1
6	5	14.4	13.6
7	1	15.4	14.9
8			15.8
9			16.2

Table A.7. Bluegill length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
2			3.9
3	3	5.5	5.0
4	24	6.9	6.2
5	32	7.8	6.8
6	9	8.4	7.8
7	7	9.3	8.2
8	4	10.1	8.7

Table A.9. Hybrid bluegill x pumpkinseed length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length
3	4	5.3
4	30	7.0
5	8	7.1

Table A.11. Rock bass length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
3	1	5.6	6.0
4	2	5.9	6.9
5	14	6.7	7.9
6	13	7.2	9.0
7	3	8.7	9.9
8			10.8
9			12.1

Table A.6. Black crappie length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

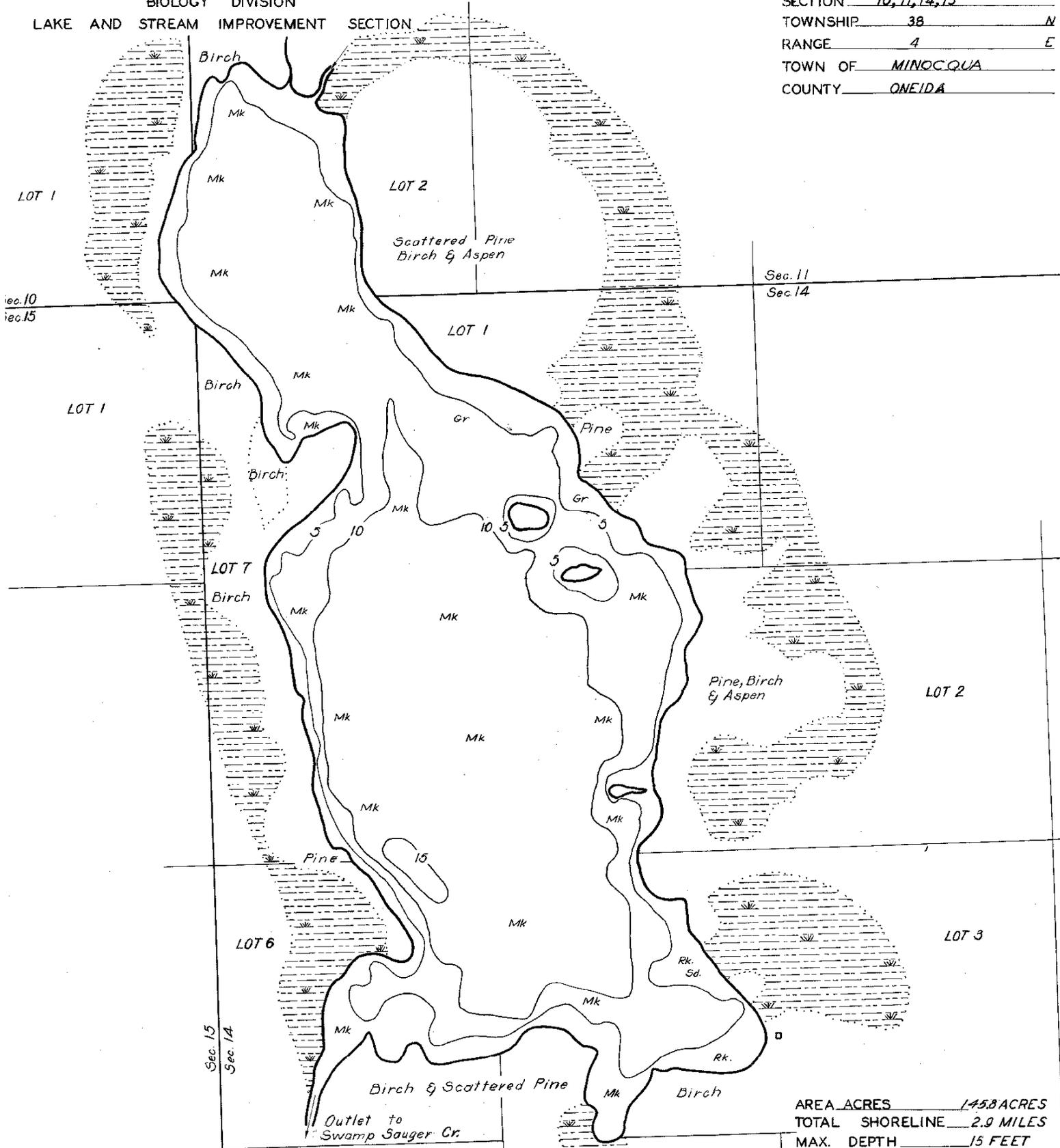
Age	Number of fish	Swamsauger avg. length	Northern WI avg.
1			3.4
2	11	7.6	5.3
3	28	9.1	7.1
4	23	9.8	9.0
5	11	10.5	10.0
6	7	11.9	10.7
7	2	12.3	11.6

Table A.8. Pumpkinseed length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
2	3	5.4	3.6
3	23	6.4	4.8
4	25	7.3	5.7
5	1	7.2	6.5
6	1	8.4	6.8
7			7.3
8			7.3

Table A.10. Yellow perch length at age in Swamsauger Lake, Oneida County Wisconsin during 2010.

Age	Number of fish	Swamsauger avg. length	Northern WI avg.
3	1	6.4	7.1
4	1	6.7	9.0
5	3	7.5	10.0
6	3	8.4	10.7



AREA ACRES 145.8 ACRES
 TOTAL SHORELINE 2.9 MILES
 MAX. DEPTH 15 FEET
 SCALE 1" = 400'

DATE MAY 1941
 COMPILED BY R.H.
 TRACED BY B.W. CCC
 SOURCE OF INFORMATION CAMP BLUE LAKE - LAKE SURVEY PROJECT AERIAL PHOTOGRAPH
 SOUNDINGS _____

LAKE IMPROVEMENT RECORD

TYPE	DATE			
◇ BRUSH REFUGES				
⊞ SAPLING TANGLES				
□ SPAWNING BOXES				
* MINNOW SPAWNERS				
TOTAL				

LEGEND

- ⊞ WEED BEDS
- ⊞ ROCKY SHOALS
- Sd SAND
- Cl CLAY
- Gr GRAVEL
- Mk MUCK