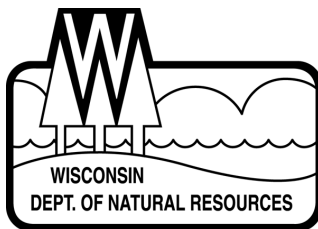


Fisheries Survey of Bolger Lake, Oneida County Wisconsin during 2003.

Waterbody Identification Code 973000



John Kubisiak
Senior Fisheries Biologist
Wisconsin Department of Natural Resources
Rhinelander
May, 2004



Your purchase of fishing equipment
and motor boat fuel supports boating
access and Sport Fish Restoration.

Fisheries Survey of Bolger Lake, Oneida County Wisconsin during 2003.

John Kubisiak
Senior Fisheries Biologist
May, 2004

EXECUTIVE SUMMARY

A fisheries survey of Bolger Lake targeting walleye was conducted during spring, 2003. Walleye (3.5 per acre) and smallmouth bass were the dominant gamefish. We also encountered largemouth bass, muskellunge and northern pike. Yellow perch, bluegill, rock bass and bluntnose minnow were common, and low numbers of pumpkinseed, yellow bullhead, white sucker and johnny darter were found. Previous surveys in 1961 and 1974 also captured black crappie and brown, black and yellow bullheads. I recommend managing for smallmouth bass, walleye, muskellunge and panfish.

Lake and location:

Bolger Lake, Oneida County, T39N R6E Sec27

Located in north central Oneida County between Minocqua and Hazelhurst.

Physical/Chemical attributes (Andrews and Threinen 1966):

Morphometry: 119 acres, maximum depth 39 feet.

Lake type: seepage.

Watershed: 2 square miles, including 12 acres of adjoining wetlands.

Water chemistry: Very soft, slightly acidic – alkalinity 6 mg/l, conductance 16 μ mhos.

Littoral substrate: 65% sand, 15% rock, 15% muck and 5% gravel.

Aquatic vegetation: Moderate.

Winterkill: None reported.

Other features: Clear water of high transparency.

Purpose of Survey: Adult walleye population estimate.

Dates of fieldwork: Walleye netting April 22-27, 2003.

Electroshocking April 27, 2003.

Mini-fyke juvenile fish netting August 19-20, 2003.

Fall electroshocking September 16, 2003

BACKGROUND

Spring and summer surveys

A single night of netting with five small-mesh fyke nets occurred on July 25-26 1961 (Morehouse 1961). The survey found 1 largemouth bass (4.3 inches long, possibly from the 1960 stocking, Table 1), 86 smallmouth bass, 80 bluegills, 87 yellow perch, 23 white suckers, 15 bullheads, 3 rock bass and 2 sunfish (presumably pumpkinseed). The survey indicated a stunted panfish population and muskellunge stocking was recommended.

A 1974 netting survey (23 net lifts during April 27-29 and June 3-5, Tyler 1975) found good populations of walleye (5.5 per net lift), muskellunge (1.6 per lift) and smallmouth bass (1.4 per lift). Only 2 largemouth bass were encountered (0.09 per lift). Bluegill were abundant (34.7 per lift), while catch of pumpkinseed, bullheads (brown, yellow and black), black crappie, yellow perch and white sucker (listed in order of decreasing catch) ranged from 3.3 to 1.3 per lift. Except for one 18 inch individual, smallmouth ranged in size from 6.5 to 11.4 inches. Good numbers of 10 to 13.4 inch walleyes were found, while 18% of the catch ranged from 16.5 to 24.9 inches. Walleye were not encountered in the 1961 survey and had not been stocked by DNR. It was presumed that local individuals had stocked them with subsequent natural reproduction. Rock bass was the only species encountered in 1961 that was missing from the 1974 survey.

An August 14 1980 beach-seine sample (7 hauls) found bluegill, largemouth bass, pumpkinseed and bluntnose minnow. Notes indicated few adult fish in the seine hauls.

A creel survey was conducted during 2003-04 (reported separately).

Table 1. Fish stocking during 1959 through 2003 in Bolger Lake, Oneida Co. Wisconsin.

Year	Species	Size	Number
1959	largemouth bass	Fingerling	2,000
1960	largemouth bass	Fingerling	5,000
1962	muskellunge	Fingerling	1,087
1968	muskellunge	Fingerling	282
1970	muskellunge	Fingerling	311
1972	muskellunge	Fingerling	200
1975	walleye	Fingerling	11,900
1976	walleye	Fingerling	5,000
1977	walleye	Fingerling (3")	5,000
1978	walleye	Fingerling (2")	4,800
1982	muskellunge	Fingerling (9")	200
1986	muskellunge	Fingerling	200
1995	walleye	Fingerling	3,003
1998	walleye	Fry	200,000
	walleye	Fingerling	11,000
2000	walleye	Fingerling (1.7")	11,900
2002	walleye	Fingerling (1.7")	11,900

METHODS

Six standard fyke nets (3/4" stretch mesh) were lifted on April 22 – 26 2003 (targeting walleye). Six mini-fyke nets (1/4" stretch mesh with 2-inch exclusion netting across the mouth, targeting young-of-year) were lifted on 19 and 20 August 2003. A WDNR-standard alternating current electrofishing boat was used to collect fish on April 27, May 5 and September 16 2003. Length or length category (nearest half-inch) was recorded for all gamefish and on panfish during two half-mile electrofishing stations on September 16. 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 five gamefish per half-inch group.

Fall recruitment surveys

Fall young-of-year surveys were conducted by United States Fish and Wildlife Service (USFWS) in mid-October of 1991 and 1992 and by Wisconsin Department of Natural Resources in mid-September of 1997, 2002 and 2003. Catch of young-of-year (yoy) walleye averaged 1.6 per mile in non-stocked years and was 2.58 per mile after the 2002 stocking. Catch of age-1 walleye averaged 0.82 in non-stocked years and was 1.29 after the 2002 stocking. These values compare to a regional average catch of 9 yoy walleyes per mile in stocked lakes. In general, a catch in the teens is needed to produce a walleye yearclass.

Muskellunge show up best at cool water temperatures and recruitment surveys should be performed at a surface temperature close to 50 degrees. The 1991 and 1992 surveys were performed at 51 and 46 degrees, while temperatures during more recent surveys were 66 to 71 degrees. Nine young-of-year muskellunge were encountered in 1991 (10.4-12.4 inches, 2.9 per mile), but not in any other year. The 1991 and 1992 reports both indicated that several 30 to 40 inch muskellunge were observed but not netted.

RESULTS AND DISCUSSION

Walleye

During walleye netting, 459 walleyes were captured (including 151 recaptures) in 5 nights, at a rate of 15.3 walleyes per net day (Table 2). Two electrofishing samples yielded 137 walleyes (105 were recaptures). The mark-recapture population estimate is 418 adult walleyes (± 30 SD) or 3.5 per acre. Only 10 juvenile walleyes were marked, and the second recapture sample consisted of 82% recaptures, resulting in a total population estimate of 396 walleyes (± 20 SD), or 3.3 walleyes per acre. This is 71% above the predicted population of 216 walleyes (from a regression model of stocked northern Wisconsin walleye populations).

Bass

Only 2 adult and ten juvenile largemouth bass were encountered in Bolger Lake. Forty-three adult and 18 juvenile (less than 8 inches in length) smallmouth bass were captured during the survey, mostly during the fall shocking run (Table 1). Too few bass were encountered to calculate a population estimate. Most bass were 12 inches or smaller (Figure 2).

Table 2. Catch per unit effort of gamefish and panfish species during a spring, 2003 walleye survey of Bolger Lake, Oneida County Wisconsin. Netting catch rates are reported as number of fish per net night, while shocking catch rates are number of fish per mile of shoreline. September 16 panfish data reflect the average of two half-mile index stations.

species	April 22-26 netting	April 27 shocking	May 5 shocking	Aug 19-20 mini-fyke	Sep 16 shocking
walleye	15.30	24.07	26.67	0	1.61
muskellunge	0.23	0	0	0	0
smallmouth bass	0.07	0	3.70	2.33	8.06
largemouth bass	0	0	0.37	0.83	0.32
northern pike	0.17	0	0	0	0.32
bluegill	1.57			82.75	62.00
pumpkinseed	0.10			0.50	4.00
yellow bullhead	0			0.42	3.00
bullhead (unidentified)	0			0.08	0
yellow perch	8.53			0.17	0
rock bass	4.63			1.92	5.00

Figure 1. Length-frequency of walleyes during 2003 in Bolger Lake, Oneida County Wisconsin.

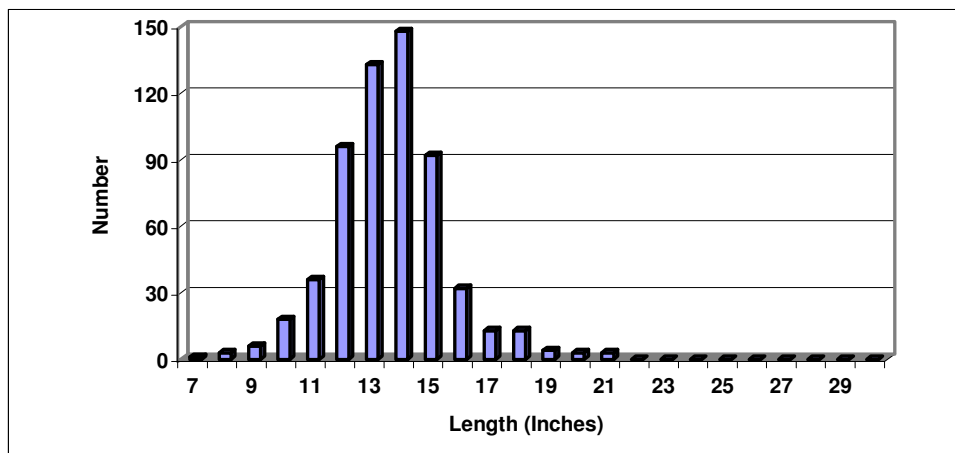
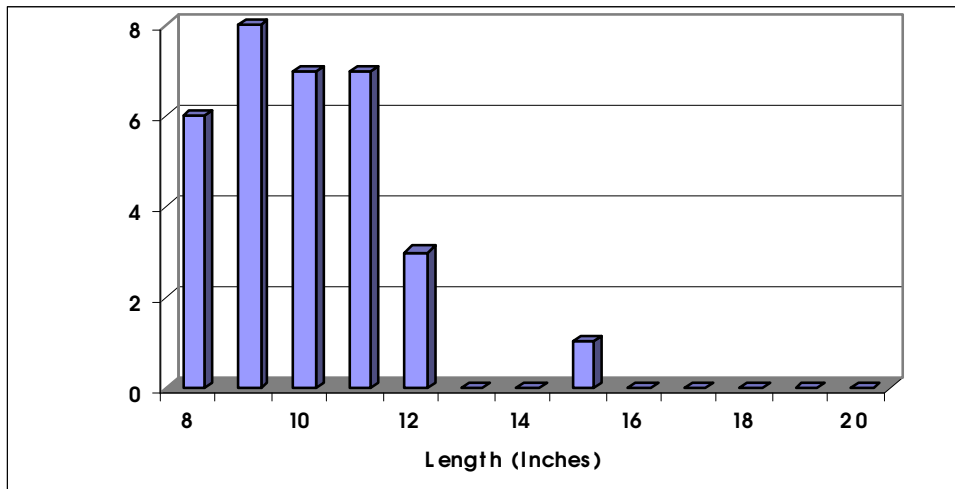


Figure 2. Length-frequency of smallmouth bass during 2003 in Bolger Lake, Oneida County Wisconsin.



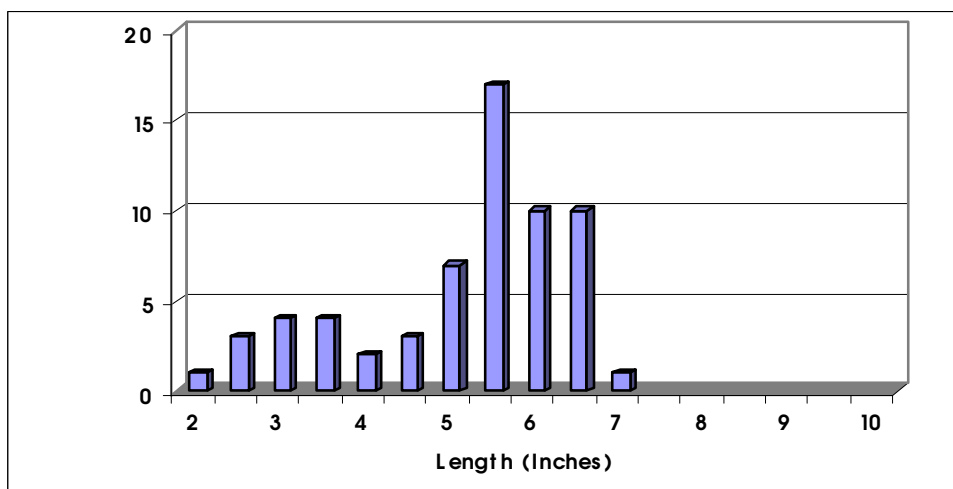
Northern Pike and Muskellunge

Only six northern pike and seven muskellunge were captured, all gears combined. Northern pike were 2 to 5 years of age and ranged from 12.9 to 23.9 inches in length. Muskellunge ranged from 9 to 16 years of age and ranged in size from 36 to 51 inches in length, with 5 fish 44 inches and larger.

Panfish

Panfish were not a target of this survey, and no targeted panfish netting was conducted. Yellow perch and rock bass dominated April netting, while bluegill and rock bass showed the highest catch during fall shocking. Enough bluegill lengths were collected during fall shocking to give an indication of size structure (Figure 3).

Figure 3. Length-frequency of bluegill during 2003 in Bolger Lake, Oneida County Wisconsin.



CONCLUSIONS AND RECOMMENDATIONS

Bolger Lake is a clear seepage lake with very low alkalinity (6 mg/l). Low alkalinity lakes generally have low productivity, and are best suited for a relatively low-density fish community. Higher fish densities typically lead to stunting and poor growth rates. Bolger is capable of producing exceptional individuals, as evidenced by several large muskellunge. Based on past surveys, it is likely that largemouth bass, walleye and muskellunge are introduced species. Largemouth were stocked in 1959 and 1960, while muskellunge stocking was initiated in 1962. From age data (Appendix), some of the muskellunge likely resulted from stocking in mid-1980s, while others were from natural recruitment in mid-1990s. Walleye were absent from the 1961 survey (Morehouse 1961), but were apparently introduced prior to the 1974 survey (Tyler 1975). Both walleye and muskellunge show low levels of natural reproduction, and I recommend supplemental stocking to maintain their populations.

ACKNOWLEDGEMENTS

Mike Coshun supervised field collections and calculated population estimates. Jason Halveson, Kevin Gauthier, Marty Kiepke, Steve Kramer, Becky Papke and Joel Underwood assisted in the field. John (Ned) Thabes entered and summarized data. Steve Kramer assigned ages from scales and spines.

LITERATURE CITED

Andrews, L. M. and C. W. Threinen. 1966. Surface water resources of Oneida County. Wisconsin Conservation Department, Madison, Wisconsin. 284 pages.

Morehouse, L. E. 1961. Investigation of Bolger Lake, Oneida County. Wisconsin Conservation Department, Woodruff, Wisconsin. 1-page memorandum and 15 pages of data and summaries.

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 – Bolger Lake, Oneida County. Wisconsin Department of Natural Resources, Woodruff, Wisconsin. 3-page memorandum and 8 pages of data and summaries.

Cover image courtesy of TerraServer-USA website and the United States Geological Survey. <http://terraserver-usa.com>

APPENDIX A FISH AGE RESULTS

Table A.1. Female walleye length-at-age in Bolger Lake, Oneida County Wisconsin during 2003.

Age	Number of fish	Bolger avg length	Northern WI avg
2			
3			11.8
4			14.0
5	3	16.6	15.1
6	2	16.4	16.4
7	2	16.7	18.7
8	5	18.4	20.7
9	6	17.8	22.1
10	3	19.9	23.5
11			24.8
12			25.6
13			26.4
14			27.1
15			27.8
16			28.9

Table A.2. Male walleye length-at-age in Bolger Lake, Oneida County Wisconsin during 2003.

Age	Number of fish	Bolger avg length	Northern WI avg
2	3	9.9	11.1
3	12	12.1	11.2
4	4	13.3	12.2
5	5	14.9	13.5
6	2	15.6	15.1
7	2	16.7	16.6
8	5	17.6	17.7
9	5	17.2	18.6
10			19.0
11			20.0
12	1	18.7	20.2
13	3	19.5	20.9
14	1	19.8	22.0

Table A.3. Length and age of individual northern pike in Bolger Lake, Oneida County Wisconsin during 2003.

Sex	Age	Length	WI avg
male	2	12.9	15.8
male	5	19.0	22.4
female	4	20.6	23.0
female	5	20.5	25.1
female	5	23.9	25.1

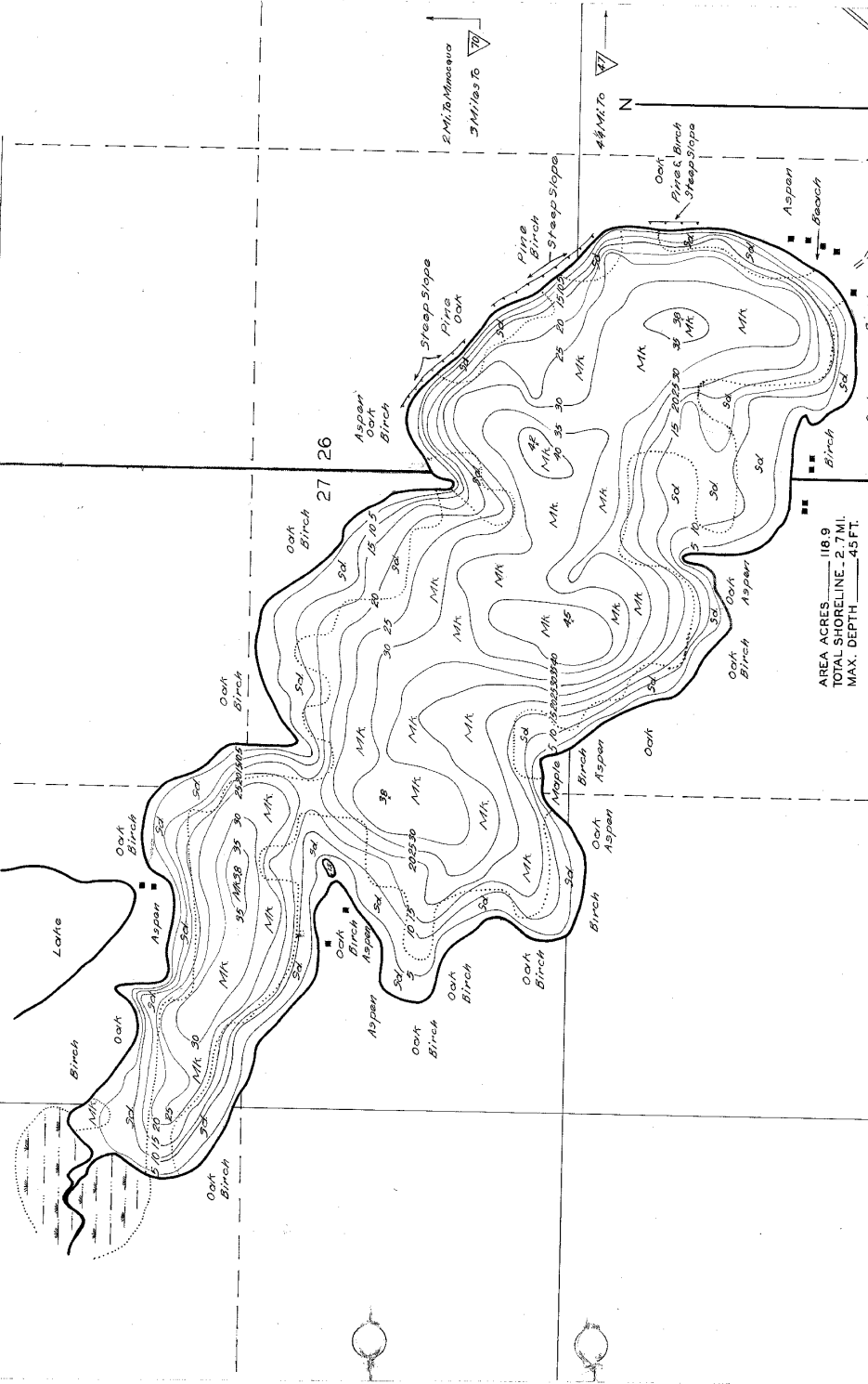
Table A.4. Length and age of individual muskellunge in Bolger Lake, Oneida County Wisconsin during 2003.

Sex	Age	Length	WI avg
male	9	36	34.6
male	11	40	36.0
male	13	44	39.0
female	16	51	
unknown	14	45	45.1
unknown	15	46	43.5

LAKE BOLGER
SECTION 26-27
TOWNSHIP 39 N
RANGE 6 E
TOWN OF MINOCQUA
COUNTY ONEIDA

LAKE SURVEY MAP

WISCONSIN CONSERVATION DEPARTMENT
BIOLOGY DIVISION
LAKE AND STREAM IMPROVEMENT SECTION



AREA ACRES 118.9
TOTAL SHORELINE 2.7 MI.
MAX. DEPTH 45 FT.

SCALE 1 INCH EQUALS 300 FT.

- LEGEND
- WEED BEDS
 - ROCKY SHOALS
 - SAND
 - CLAY
 - GR GRAVEL
 - MK MUCK
 - DWELLING
 - ABANDONED DWELLING
 - RESORT

LAKE IMPROVEMENT RECORD

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

DATE SEPT 4 1941
 COMPILED BY W.T.Z. (WEA.)
 SOURCE OF INFORMATION CAMP BLUE LAKE
 LAKE SURVEY PROJECT FEB 1941
 SOUNDINGS AT 150 FT. INTERVALS
 DATES OF MAP REVISION
 WORK AGENCY C.C.C.