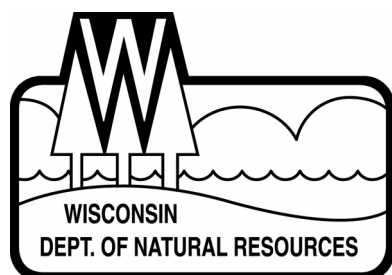


# Comprehensive Fisheries Survey of Mildred Lake, Oneida County Wisconsin during 2005.

Waterbody Identification Code 1004600



John Kubisiak  
Senior Fisheries Biologist  
Rhinelander  
April, 2006



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access and Sport Fish Restoration.

# Comprehensive Fisheries Survey of Mildred Lake, Oneida County Wisconsin during 2005.

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Senior Fisheries Biologist  
April, 2006

## EXECUTIVE SUMMARY

A comprehensive fisheries survey of Mildred Lake was conducted during spring, 2005. Smallmouth bass (population estimate, PE = 8.2 per acre) and largemouth bass (PE = 2.9 per acre) were the dominant gamefish, with low numbers of walleye (PE = 0.8 adults per acre), northern pike (PE = 0.7 per acre) and muskellunge. Bass were somewhat slow-growing, while growth of other gamefish was close to the regional average. Panfish species included black crappie, bluegill, pumpkinseed, bluegillxpumpkinseed hybrids, yellow perch, and yellow bullheads. White sucker and Iowa darter were also present. Panfish abundance was low, with poor size structure. Bluegill length-at-age was below average, especially for ages 6 and under. Black crappie, yellow perch and pumpkinseed growth rates were average or above.

I recommend continuing to manage Mildred Lake for bass and panfish. Muskellunge may provide a low-density stocked fishery with potential for quality size.

Lake and location: Mildred Lake, Oneida County, T37N R8E Sec20. Located in south-central Oneida County in the town of Newbold, about 7 miles northwest of Rhinelander. Mildred is part of the Upper Wisconsin River watershed and is connected to Clear Lake by a narrow channel.

Physical/Chemical attributes (Andrews and Threinen 1966):

**Morphometry:** 191 acres, maximum depth 45 feet.

**Watershed:** 3 square miles, including 2 acres of adjoining wetlands.

**Lake type:** Seepage (No outlet. Connected to Clear Lake by a narrow channel; Maud Lake has an overflow connection to Clear).

**Basic water chemistry:** Very soft – alkalinity 6 mg/l, conductance 18  $\mu$ mhos.

**Water clarity:** Clear water of high transparency.

**Littoral substrate:** 65% sand, 15% rubble, 10% gravel and some boulders and muck.

**Aquatic vegetation:** Floating and submergent plants moderate in the west bay and along scattered portions of shoreline.

**Winterkill:** None.

**Boat landing:** Asphalt and concrete ramp with parking for four vehicles with trailers.

**Other features:** Shoreline 99% upland with a limited area of bog wetland.

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

Dates of fieldwork: Walleye netting, April 12-18 2005.

Panfish netting June 13-17 2005.

Mini-fyke netting August 9-10 2005.

Hook & line bass marking June 2 2005.

Electroshocking (entire shoreline) April 18, May 24, June 6 and September 20 2005.

## BACKGROUND

Little historic survey information exists for Mildred Lake. An August 15 1955 visit indicated presence of perch, bluegill, northern pike and largemouth bass. A temperature and dissolved oxygen profile was taken, and likely set the stage for stocking of brook trout in 1957 and 58. However, trout stocking was discontinued, probably because of the lack of public access at that time. Four seine hauls on August 19 1980 found yellow perch, bluegill, largemouth bass and pumpkinseed (file data).

## METHODS

Ice still covered portions of the west basin of Mildred Lake when eight standard fyke nets (3/4" bar measure) were set on April 12, 2005. These nets targeted walleye and northern pike and were fished through April 17 (when five were pulled) or 18. Six standard fyke nets were fished June 13-17 (targeting panfish). Six mini-fyke nets (3/16" bar mesh with 1" bar mesh exclusion netting across the mouth) were fished one night on August 9-10 (targeting juvenile and non-game fish). A WDNR-standard alternating current electrofishing boat was used to collect fish on April 18, May 24, June 6 and September 20, 2005. Hook and line marking of bass was conducted on June 2. Length or length category (nearest half-inch) was recorded for all gamefish and on panfish during June. Adult gamefish were given a right-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, 128 walleye were captured in 6 nights (including 36 recaptures), at a rate of 2.7 walleye per net night (Table 1). Another 3 unmarked walleye were captured during panfish netting. The first electrofishing sample on April 18 yielded 26 walleye (5.1 fish per mile), and subsequent electrofishing runs produced 0 and 1 walleye. The mark-recapture population estimate of 154 adult walleye ( $\pm 21.7$  SD), or 0.8 per acre, is below the 1.0 per acre benchmark to be considered a fishable-size population. There is no record of walleye being stocked in Mildred Lake since a 1934 stocking of 172,440 (presumably fry, Table 2). However, it is rumored that undocumented stocking of both walleye and muskellunge occurred about 10 to 15 years ago. The limited amount of suitable spawning gravel and the presence of only a few yearclasses are consistent with this scenario. Walleye growth varied widely among individual fish, but mean length-at-age was mostly near the regional average (Appendix A).

Table 1. Fish catch per unit effort during spring, 2005 comprehensive survey of Mildred Lake, Oneida County Wisconsin. Netting catch rates are reported as number of fish per net night, while electrofishing catch rates are number of fish per mile of shoreline. Panfish data were not collected during all sampling events and were only collected on two 0.5-mile index stations on September 20.

species	walleye netting	April 18 shocking	May 24 shocking	June 6 shocking	panfish netting	Aug 10 mini-fyke	Sept 20 shocking
walleye	3.4	5.1	0	0.2	0.1	0	0.2
largemouth bass	0.3	11.8	8.6	12.9	0.8	8.8	8.2
smallmouth bass	0.4	18.8	22.9	21.2	1.2	2.3	18.0
muskellunge	0.2	1.8	0.8	1.0	0.08	0	0.6
northern pike	1.1	0.2	1.0	0.4	1.3	0	0
black crappie	15.5				3.7	2.2	1.0
bluegill	12.4				19.9	39.2	55.0
hybrid bluegill							
xpumpkinseed	0.1				0.04	0	0
Iowa darter	0				0	0.3	0
pumpkinseed	0.1				0.5	0.3	1.0
white sucker	1.9				0.1	0	0
yellow bullhead	0.7				1.8	1.7	1.0
yellow perch	1.8				0.08	6.5	7.0

Figure 1. Length-frequency of adult walleye during 2005 in Mildred Lake, Oneida County Wisconsin.

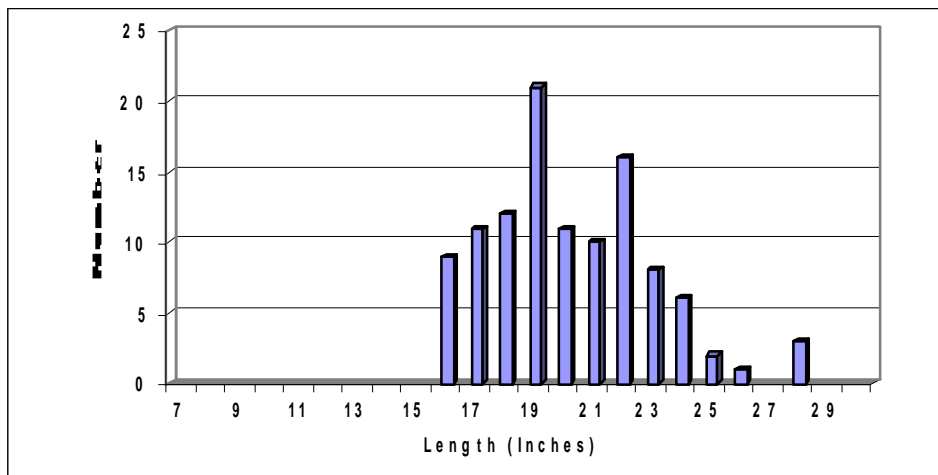


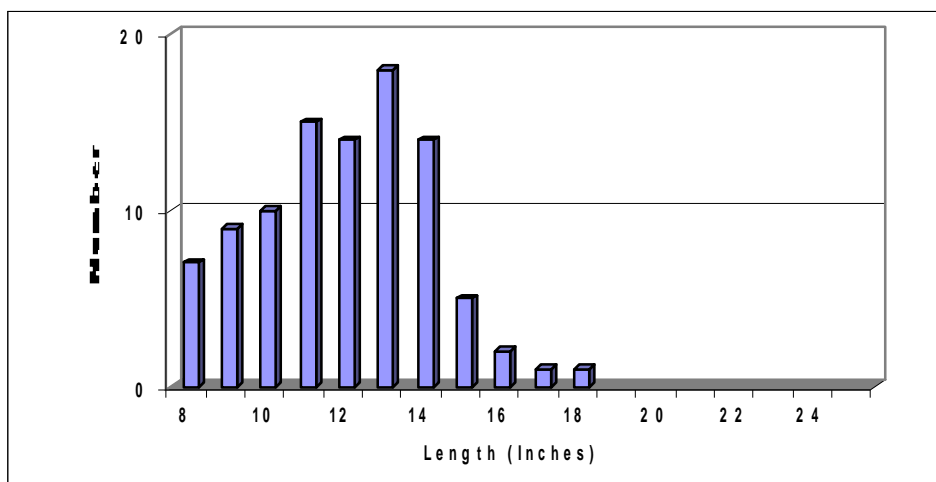
Table 2. Fish stocking record through 2005 in Mildred Lake, Oneida County Wisconsin.

Year	Species	Size	Number
1934	walleye		172,440
1936	bass		140
1936	perch		3,500
1941	bullhead	adult	2,500
1941	perch	adult	300
1941	perch	fingerling	2,700
1941	shiners	fingerling	1,000
1941	sucker	adult	2,000
1941	sunfish	adult	500
1957	brook trout	fingerling	21,420
1958	brook trout	fingerling	13,965
1980	muskellunge	large fingerling	400
2004	muskellunge	large fingerling	191

### Smallmouth Bass

Three hundred seventy-seven smallmouth bass were captured (including recaptures and juvenile fish) during spring sampling. The adult (greater than 8 inches) smallmouth bass population was estimated at 1,569 ( $\pm 420$  SD), or 8.2 per acre. Smallmouth bass length-at-age was behind the regional average after age two (Appendix A), likely due to high abundance and competition for food. Smallmouth bass length-frequency (Figure 2) indicates adult size centered on 13 inches, with a decline in numbers after 14 inches. The proportion of the population (Relative Stock Density, RSD) contributed by 14-inch and larger fish (i.e., RSD-14) was 4%. The largest smallmouth handled was 18.1 inches.

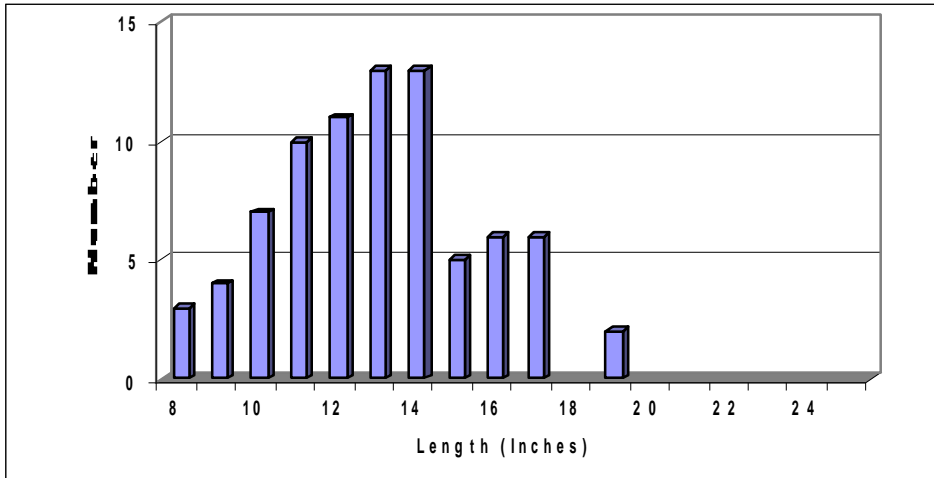
Figure 2. Length-frequency of smallmouth bass during 2005 in Mildred Lake, Oneida County Wisconsin.



## Largemouth Bass

The adult largemouth bass population was estimated at 544 ( $\pm$  134 SD), or 2.9 per acre. The largest largemouth was 19.9 inches. Most of the 211 handled were less than 15 inches (Figure 3), but the RSD-14 shows that 40% of the sample was contributed by fish 14 inches and larger. Growth rates were slightly below average (Appendix A). Length-frequencies for both species of bass show an abrupt decrease in the abundance of bass 15 inches and larger, likely due to angler harvest of legal-size bass coupled with slow growth.

Figure 3. Length-frequency of largemouth bass during 2005 in Mildred Lake, Oneida County Wisconsin.



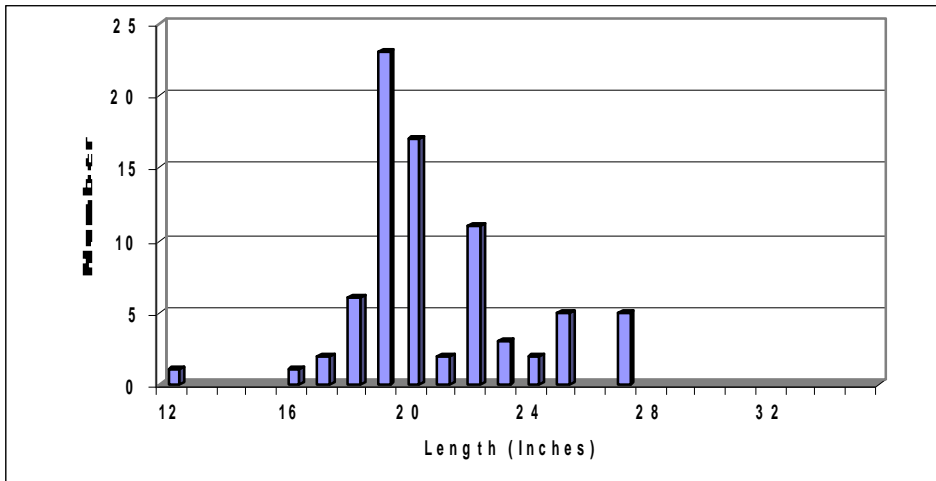
## Northern Pike

Eighty-nine northern pike were captured (including 3 juveniles and 16 recaptures), all gears combined. The northern pike population (including sexually mature fish and all fish over 12 inches) was estimated at 134 ( $\pm$  33 SD), or 0.7 per acre using the Schnabel multiple-capture method (Ricker 1975). Northern pike populations less than 2 adults per acre are considered low-density. Average size of adult northern pike was 20.9 inches and the largest northern pike was a 27.9 inch female (Figure 4). Northern pike length-at-age varied widely among individual fish, but averaged very close to regional values (Appendix A). Spawning habitat for northern pike is very limited, but pike may immigrate to Mildred from connected Clear Lake.

## Muskellunge

Three adult male and 26 juvenile muskellunge were captured during the spring survey. One adult male and two juvenile muskellunge were captured during fall shocking. The adult muskellunge measured 37.4, 41.1, 41.2 and just over 44 inches long. Muskellunge were stocked in Mildred Lake in 1980 and 2004 (Table 2). It is likely that the adult fish originated from undocumented stockings over a decade ago. The juveniles were all stocked in 2004. They averaged about 11 inches in spring samples and 17.5 inches in fall.

Figure 4. Length-frequency of adult northern pike during 2005 in Mildred Lake, Oneida County Wisconsin.



### Panfish

Mildred is a clear, relatively infertile lake with a low amount of aquatic vegetation. This results in low abundance of panfish species, with the exception of black crappie. Size structure of all panfish species was generally poor, but a few quality-size bluegill and black crappie were found (Figures 5 – 9). Bluegill were slow-growing (Appendix A), possibly due to the low primary productivity of Mildred. However, other panfish species were growing at or above the regional averages (Appendix A). Early spring netting showed good catches of bluegill and black crappie, while a moderate catch of bluegill dominated June panfish netting (Table 1). June bluegill catch rates of 20 per net night are low, but within the normal range. Bluegill size was centered at 4 to 4.5 inches, and large numbers of these smaller fish were concentrated in vegetated shallows. A few larger bluegill could be found scattered in deeper water around the lake. Black crappie length-frequency (Figure 7) was centered on 7.5 inches. Several yearclasses were present, including a few quality-size crappie up to 13.2 inches. Most yellow perch were age 2 and 3, resulting in poor size despite adequate growth rates (Figure 8). This could be due to sporadic recruitment, or because older fish were cropped off by predators. No rock bass were encountered in the survey, and it appears that this species is absent from the lake.

Figure 5. Length-frequency of bluegill during 2005 in Mildred Lake, Oneida County Wisconsin.

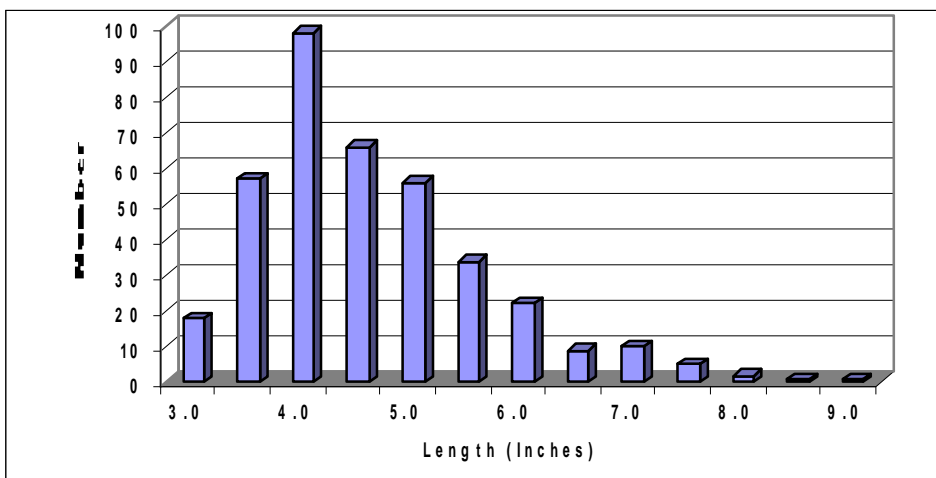


Figure 6. Length-frequency of pumpkinseed during 2005 in Mildred Lake, Oneida County WI.

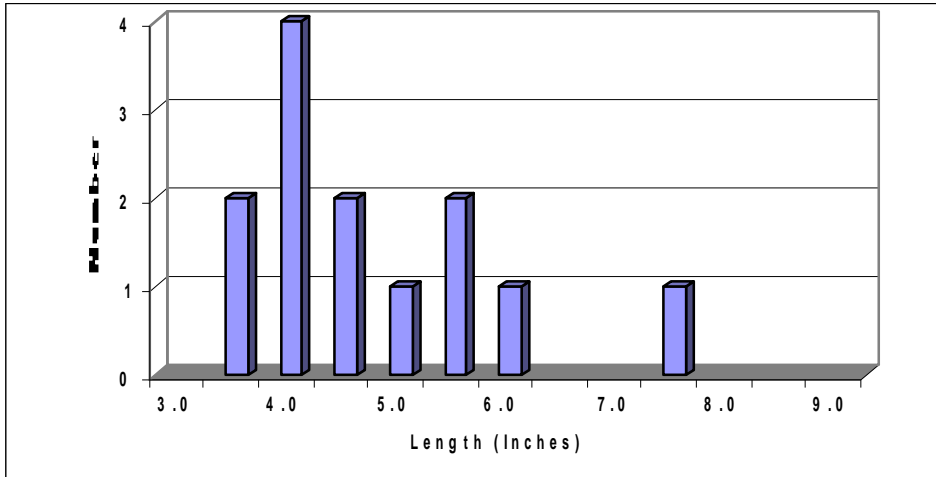


Figure 7. Length-frequency of black crappie during 2005 in Mildred Lake, Oneida County WI.

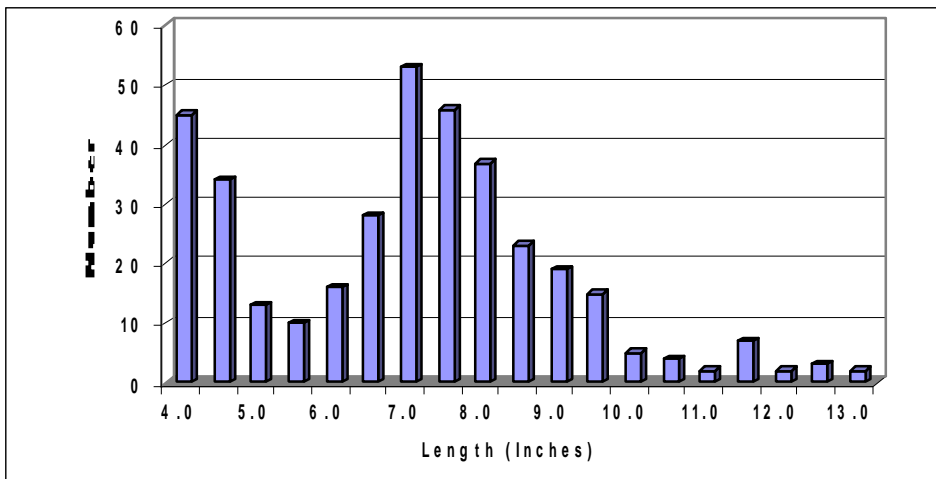


Figure 8. Length-frequency of yellow perch during 2005 in Mildred Lake, Oneida County WI.

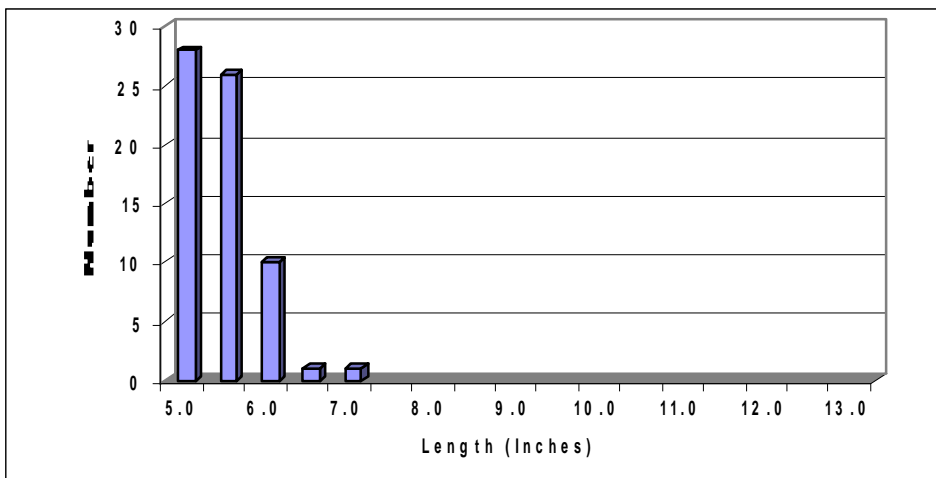
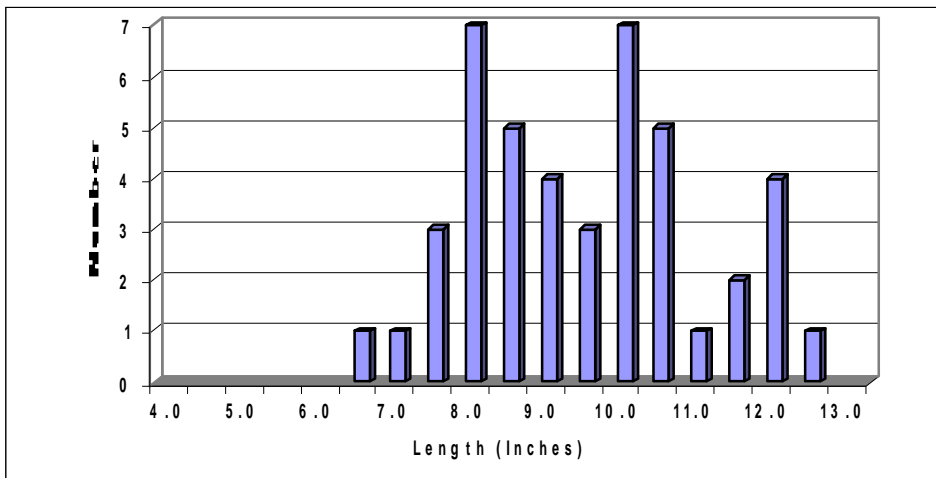




Figure 9. Length-frequency of yellow bullhead during 2005 in Mildred Lake, Oneida County WI.



### MANAGEMENT RECOMMENDATIONS

Mildred Lake supported a strong bass fishery, although numbers of both species dropped off dramatically at 15 inches, likely due to angler harvest and slow growth. Northern pike, muskellunge and walleye were present at low densities, with the latter two populations likely a result of undocumented stockings reported from around a decade ago. Bluegill were the dominant panfish, showing moderate density for that species. Black crappie were relatively abundant, with several yearclasses present. Yellow bullhead showed good size and abundance, while low numbers of yellow perch and pumpkinseed were present. Mildred is best managed as a bass-panfish fishery. Muskellunge and walleye are unlikely to be sustained with natural reproduction, but may be supported with maintenance stocking. Muskellunge may provide some additional angling opportunity and have trophy potential if maintained at a low density. Walleye stocking would likely show poor success given the current populations of bass and crappie.

### ACKNOWLEDGEMENTS

Steve Gilbert, Dennis Goulee, Fred Hagstrom, Aaron Nelson, Steve Timler, Mike Vogelsang and Doug Yonker assisted in the field. Aaron Nelson and I assigned ages from fish scales. Aaron Nelson entered and summarized data. Mike Coshun calculated walleye and bass population estimates.

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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.

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<http://terraserver-usa.com>

## APPENDIX A FISH AGE RESULTS

Age structures (scales or spines) were removed from ten fish per species, per half-inch group. The aged sub-samples were applied against the spring length-frequency to eliminate bias when average lengths were calculated for species with more than 50 lengths recorded. Lengths are reported in inches and weights are in pounds.

Table A.1. Female walleye length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2000 and 2005.

Age of fish	Number	Mildred avg length	Northern WI avg	Mildred avg weight
3			13.0	
4			14.7	
5			16.0	
6			17.6	
7	1	22.3	19.5	3.75
8	2	18.8	21.2	2.31
9	5	23.9	22.6	4.56
10	7	21.8	23.8	3.72
11	10	22.6	24.9	4.25
12	3	22.5	25.8	4.21
13	3	23.6	26.9	4.69
14	0		27.5	
15	2	22.9	28.0	3.97
16	1	28.3	27.7	9.30

Table A.3. Smallmouth bass length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age of fish	Number	Mildred avg length	Northern WI avg	Mildred avg weight
1	1	4.3	3.5	
2	12	6.4	6.9	0.13
3	33	8.9	9.3	0.40
4	19	11.1	11.8	0.72
5	7	12.8	13.5	1.03
6	13	13.7	15.2	1.24
7	15	14.1	16.1	1.53
8	2	13.9	17.1	1.72
9	1	18.3	17.7	3.13

Table A.2. Male walleye length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2000 and 2005.

Age of fish	Number	Mildred avg length	Northern WI avg	Mildred avg weight
3			11.6	
4			13.0	
5	1	17.3	14.5	1.63
6	5	16.5	15.8	1.43
7	4	18.0	16.9	1.89
8	7	18.2	18.1	1.99
9	11	19.2	18.9	2.28
10	8	19.5	19.7	2.27
11	6	19.9	20.4	2.53
12	2	21.5	20.6	2.91
13	3	21.1	21.3	2.96
14	3	21.8	22.0	3.25
15	1	24.3	21.6	4.44

Table A.4. Largemouth bass length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age of fish	Number	Mildred avg length	Northern WI avg	Mildred avg weight
3	9	8.9	8.9	0.19
4	16	10.2	10.5	0.43
5	9	11.9	12.1	0.73
6	13	13.3	13.6	1.20
7	14	13.5	14.9	1.18
8	10	14.1	15.8	1.58
9	8	15.4	16.2	1.78
10	5	16.6	17.1	2.40
11	2	16.9	17.8	3.25
14	1	19.8		5.06

Table A.5. Female northern pike length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age of fish	Number Mildred	Mildred avg length	Northern WI avg	Mildred avg weight
1			13.1	
2			14.4	
3	2	19.1	16.9	1.38
4			20.4	
5	4	22.9	23.1	2.28
6	3	22.1	24.4	2.04
7	2	27.6	27.3	3.72
8	2	22.3	28.8	2.09
9			32.1	
10	1	27.6	33.8	3.31

Table A.7. Male muskellunge length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005. No females were captured.

Age of fish	Number Mildred	Mildred length	Northern WI avg	Mildred avg weight
10	1	41.2	37.3	19.10
18	1	44.0		
20	1	41.1		18.19

Table A.6. Male northern pike length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age of fish	Number Mildred	Mildred avg length	Northern WI avg	Mildred avg weight
1			10.7	
2			13.4	
3	2	17.2	16.2	1.00
4	8	19.6	18.9	1.51
5	1	23.3	20.6	2.50
6	5	19.9	22.3	1.61
7	2	22.0	23.4	2.03
8	1	19.2	24.8	1.38
9	1	20.3	23.9	1.75
10	1	22.5	21.5	

Table A.8. Bluegill length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age of fish	Number Mildred	Mildred avg length	Northern WI avg	Mildred avg weight
1	1	2.3	2.5	0.007
2	8	3.2	3.9	0.015
3	20	4.2	5.0	0.039
4	30	4.8	6.2	0.096
5	12	5.6	6.8	0.146
6	5	5.8	7.8	0.159
7	10	7.2	8.2	0.300
8	3	6.9	8.7	0.328
9	2	7.8	8.7	0.386

Table A.9. Black crappie length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age	Number of fish	Mildred avg length	Northern WI avg	Mildred avg weight
1	28	4.5	3.4	0.037
2	41	6.7	5.3	0.138
3	34	7.7	7.1	0.234
4	20	9.3	9.0	0.542
5	19	10.0	10.0	0.649
6	10	10.8	10.7	0.821
7	2	12.3	11.6	1.280
8	2	12.8	11.7	1.312
9	3	12.4	10.4	1.105

Table A.10. Yellow perch length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age	Number of fish	Mildred avg length	Northern WI avg	Mildred avg weight
1				3.0
2	11	5.6	4.6	0.068
3	22	6.0	6.0	0.088
4	7	6.7	6.9	0.127
5	1	7.8	7.9	0.194
6				9.0
7				9.9
8				10.8
9				12.1

Table A.11. Pumpkinseed length- and weight-at-age in Mildred Lake, Oneida County Wisconsin during 2005.

Age	Number of fish	Mildred avg length	Northern WI avg	Mildred avg weight
1			2.2	
2			3.6	
3	3	5.0	4.8	0.109
4	3	5.1	5.7	0.108
5	1	6.2	6.5	
6			6.8	
7			7.3	

