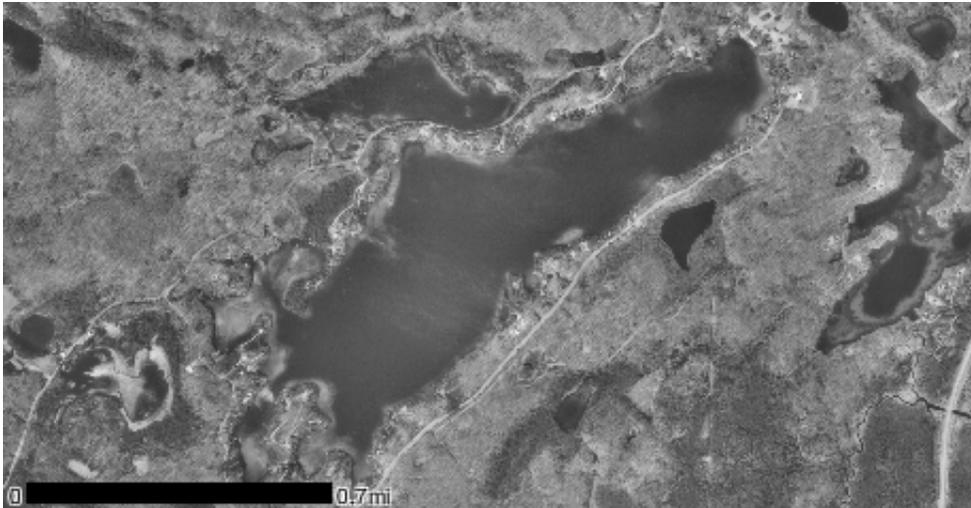


**Comprehensive Fisheries Survey of Maiden Lake, Oconto County
Wisconsin During 2005 and 2006**

Waterbody Identification Code 487500



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January, 2007

Comprehensive Fisheries Survey of Maiden Lake, Oconto County, Wisconsin during 2005 and 2006

Report Approval signatures

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Comprehensive Fisheries Survey of Maiden Lake, Oconto County Wisconsin During 2005 and 2006

Justine Hasz
Senior Fisheries Biologist
January 2007

Executive Summary

A basic fisheries survey of Maiden Lake was conducted during the 2005 field season and a more comprehensive fisheries survey was implemented during the 2006 field season. The dominant game fish species in the lake are largemouth bass (population estimate = 614) and walleye (population estimate = 463). Rock bass and bluegill are the most abundant pan fish species with good numbers of white suckers also being found in the lake. I recommend managing Maiden Lake for largemouth bass, walleye and pan fish.

Lake and Location:

Maiden Lake, Oconto County, T32N R16E Sec07

Located in northwestern, Oconto County, 2 miles south of Lakewood.

Physical / Chemical attributes (Wisconsin DNR, 1977):

Morphometry: 278 acres, maximum depth 52 feet, mean depth 20 feet, shoreline 5.6 miles.

Lake type: Drainage lake

Watershed: 3 square miles

Basic Water Chemistry: Hard water drainage lake having slightly alkaline clear water of very high transparency. Secchi disc – 26 feet (summer), PH 7.3. Conductance 270umhos

Trophic Status: Oligotrophic

Littoral Substrate: 30% gravel, 25% rock, 25% muck and 20% sand

Aquatic Vegetation:

Other Features: The majority of the shoreline is privately owned and very well developed. The shoreline is primarily upland, consisting of mixed hardwoods and conifers with small areas of swamp conifer wetlands.

Purpose of Survey: Assess the fishery status

Dates of fieldwork:

Mini-fyke netting (juvenile fish) – July 13, 2005

Electroshocking – October 12, 2005, April 25 and June 7, 2006

Fyke netting (all species and ages) – April 15 – 24, 2006

BACKGROUND

Maiden Lake has a highly developed shoreline with the majority of the shoreline being in private ownership with over 100 dwellings located along the shoreline as well as one resort. Public boat landing access is provided by the Town of Riverview at a site located on the northwest end of the lake. The public ramp is poorly maintained and has limited parking available. Public access is also available from a private boat landing located at the Maiden Lake Resort on the northeast end of the lake. The number of people recreating on Maiden Lake during the summer months has increased dramatically in recent years. It is a multiple use lake with anglers, water skiers, personal water craft, pleasure boaters, and float planes. To reduce user conflict, a slow no wake ordinance was imposed between 4pm and 10am daily.

Since 1985, Maiden Lake has been eligible for tribal off reservation spearing harvest. Between 1991 and 2000, a total of 289 walleye were harvested under this activity. No walleye have been harvested in this manner since 2000. Previous surveys have documented the walleye population to be naturally reproducing and self sustaining.

Previous fisheries surveys were carried out on Maiden Lake in 1956, 1967, 1977, 1983 and 1992. For this report, the comparisons have been made only to the information collected from the 1992 survey (Heizer, 1994). The previous surveys indicated the fishery consisted of walleye, largemouth bass, smallmouth bass, northern pike, yellow perch, rock bass, bluegill and black crappie along with several other forage fish species.

Maiden Lake has a long and varied fish management history which began 1) in 1940 with the stocking of largemouth bass; 2) walleye were then introduced into the lake in 1942 and stocked annually until 1947; 3) smallmouth bass were also stocked during this time period (Table 1). Rainbow trout were stocked in 1906 and 1961 and splake in 1968 (Table 1). In more recent years, there have been a couple of walleye stocking events in 1995 and 2001 (Table 1).

Table1. DNR and privately funded fish stocking 1940 through 2006 in Maiden Lake, Oconto County, Wisconsin. All stockings are DNR unless otherwise noted.

Year	Species	Size (average)	Number
1940	Largemouth bass	Fingerling	500
1942	Walleye	Fry	400,000
1943	Smallmouth bass	Fingerling	2,500
1943	Walleye	Fry	375,000
1944	Smallmouth bass	Fingerling	2,500
1944	Walleye	Fingerling	843
1945	Walleye	Fry	500,000
		Fingerling	944
1946	Walleye	Fingerling	2,243
		Yearling	33
1947	Walleye	Fry	600,000
		Fingerling	4,500
1949	Smallmouth bass	Fingerling	2,850
1950	Smallmouth bass	Fingerling	8,600
1960	Rainbow trout	Fingerling	14,300
1961	Rainbow trout	Fingerling	6,800
1968	Splake	Small Fingerling	1,000
		Large Fingerling	2,500
1995	Walleye	Fingerling (6 inches)	2,100 (Private)
2001	Walleye	Small Fingerling (2 inches)	12,000

METHODS

Six mini-fyke nets (1/4" stretch mesh with turtle exclusion targeting young-of-the-year fish) were set on July 12th, 2005 and lifted on July 13th, 2005 (Appendix 1). A Wisconsin DNR standard, direct current, full size electrofishing boat was used on October 12th 2005 along 4.0 miles of shoreline (Appendix 2), on April 25th, 2006 along 4.94 miles of shoreline and on June 7th, 2006 along 4.5 miles of shoreline (Appendix 3). Four standard fyke nets (3/4" stretch mesh) were set on April 14th 2006 and an additional four were set on April 15th 2006. The fyke nets were lifted daily from April 15 -24, 2006 (Appendix 4). In the mini fyke netting survey, data collected included measuring the first 30 fish of each species and then a total count for each species. In the electroshocking run during October 2005, all species were collected in two 1/2 mile index stations of shocking and game fish only were collected for an additional two 1.5 mile stations. Up to a total of 250 individuals of each species were randomly selected and measured to the nearest 0.1 of an inch and a total count of all fish was made.

In the fyke netting survey during April 2006, all game fish were given a top caudal fin clip (for mark recapture population estimate), an ageing structure was collected from 5 fish per 0.5 inch group per sex with a length to the nearest 0.1 inch and weight in grams. An additional 250 individuals per species had length taken to the nearest 0.1 inch and all other were counted. An ageing structure was collected from 10 pan fish per 0.5 inch group per species with a length to the nearest 0.1 inch and a weight in grams. An additional 250 lengths per species measured to the nearest 0.1 inch were collected and all additional fish were counted. The Schnabel population estimation technique was used for gamefish and was calculated using only the fyke net caught fish from spring 2006.

In the electroshocking runs during April and June 2006, only game fish were sampled and a total of 9.44 miles of shoreline was shocked. All game fish were measured to the nearest 0.1 inch, sex determined and checked for a fin clip. Length at age comparisons are for all lakes sampled for relevant species in northeast (NER) Wisconsin and were last updated in 2003 and serve as comparisons for growth rates in this report. Length at age for the 2006 survey was collected from only fyke net sampled fish.

All length frequency comparisons use fyke net only fish data.

RESULTS AND DISCUSSION

Catch per unit effort results for all survey methods used in 2005 and 2006 are shown in Table 2 with respective analysis for each major species written below each sampling event. Similar values are described from the 1992 fyke net survey.

Table 2. Catch per unit effort of game fish and panfish species during fishery surveys in 2006, 2005 and 1991 on Maiden Lake, Oconto County, Wisconsin. Panfish were not collected during April and June 2006 electroshocking. All fyke net effort is measured in number per net night and electrofishing effort is measured as number per mile of shoreline shocked. Pan fish were only sampled on 20 net nights during the 1992 spring fyke netting survey.

Species	Spring 1992 Fyke net	July 2005 Mini-fyke net	October 2005 Shocking	April 2006 Fyke)	April 2006 Shocking	June 2006 Shocking
Black crappie	1.3	-	-	0.05	-	-
Bluegill	27.8	6.0	59.3	0.7	-	-
Green Sunfish	0.9	12.8	11.0	0.1	-	-
Largemouth bass	1.0	9.5	25.8	0.8	8.5	26.4
Northern pike	0.1	-	3.3	0.2	0.4	0.7
Rock bass	37.9	1.2	34.8	3.5	-	-
Smallmouth bass	0.7	0.7	19.8	0.4	4.5	20.2
Walleye	4.6	0.2	0.8	2.0	4.2	-
White sucker	-	-	0.3	1.9	-	-
Yellow perch	4.8	-	0.5	0.1	-	-
Effort	92/20	6	4.0	84	4.94	4.5

Walleye

During the summer 2005 mini fyke netting survey, 0.2 walleye per net night were captured. Electroshocking during the fall of 2005, produced 0.8 walleye per mile and during the spring 2006, 4.2 fish per mile. During the spring 2006 fyke netting survey, we captured one hundred and fifty walleyes ranging in size from 10.8 to 29.0 inches in length (Figure 1) not counting the recaptured fish (17). The catch per effort was 2.0 walleye per net night. A population estimate of 463 adult walleye with a 95% confidence interval of 295 – 719 fish and a density of 1.7 walleye per acre.

In 1992, a total of four hundred and twenty three walleye were captured ranging in size from 7.7 to 27.9 inches (Figure 1) and a catch per effort of 4.6 walleye per net night. A 1992 population estimate of 663 adult walleye with a 95% confidence interval of 573 – 767 fish, and a density of 2.4 walleye per acre.

The length at age of walleye sampled in 2006 showed slower growth at most ages when compared to the NER average and better growth for most ages when compared to the 1992 survey (Table 3). In both the 2006 and 1992 surveys, there was a good representation across many year classes of walleye.

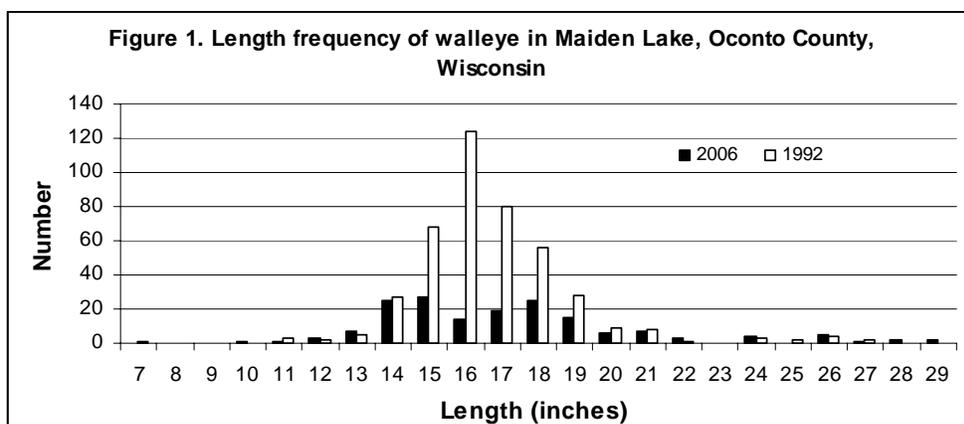


Table 3. 2006 Age- length distribution of walleye from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age data and 1992 survey information. N equals sample size.

Age	2	3	4	5	6	7	8	9	10	11	12	13
NER Average	10.8	13.6	16.0	17.7	19.0	21.5	22.6	24.1	-	-	27.0	25.5
2006 Survey	11.6	13.8	15.2	16.1	-	16.8	21.5	19.2	19.3	19.1	22.5	25.0
2006 (N)	3	5	22	13	-	5	6	10	18	9	11	4
1992 Survey	11.4	13.1	15.3	15.3	16.5	16.6	17.4	17.9	17.9	20.4	24.0	24.6
1992 (N)	4	2	9	10	16	38	12	11	11	12	3	2

Largemouth bass

During the summer 2005 mini fyke netting survey, 9.5 juvenile largemouth bass per net night were captured. Electroshocking during the fall of 2005 produced 25.8 largemouth bass per mile, 8.5 per mile in April 2006 and 26.4 per mile in June 2006 surveys. In the spring of 2006 fyke netting survey, we captured sixty seven largemouth bass ranging in size from 8.5 to 21.1 inches in length (Figure 2), not counting the recaptured fish (2). The catch per effort was 0.8 largemouth bass per net night. A population estimate of 614 adult largemouth bass with a 95% confidence interval of 221 – 1,207 fish and a density of 2.2 largemouth bass per acre.

In 1992, a total of ninety one largemouth bass were captured ranging in size from 6.0 to 19.4 inches (Figure 2), and a catch per effort of 1.0 largemouth bass per net night. A 1992 population estimate of 598 adult largemouth bass with a 95% confidence interval of 282 – 1,150 fish and a density of 2.2 largemouth bass per acre.

The length at age of largemouth bass sampled in 2006 showed slower growth at most ages of largemouth bass when compared to the NER average and the 1992 surveys (Table 4). The 2006 survey showed less variation in ages of largemouth bass sampled than the 1992 survey. However, the age data from the 2005 electroshocking survey showed a better variation of age classes from age 1 through 7 when compared to the 2006 spring fyke netting data.

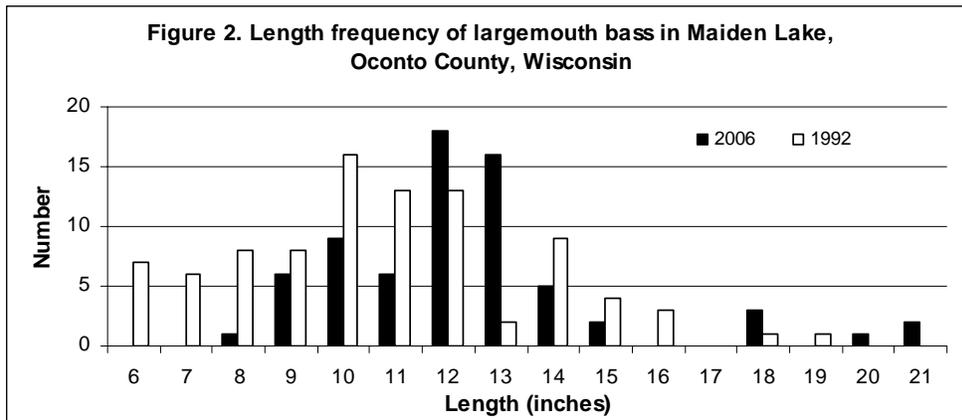


Table 4. 2006 Age- length distribution of largemouth bass from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1992 survey information. N equals sample size.

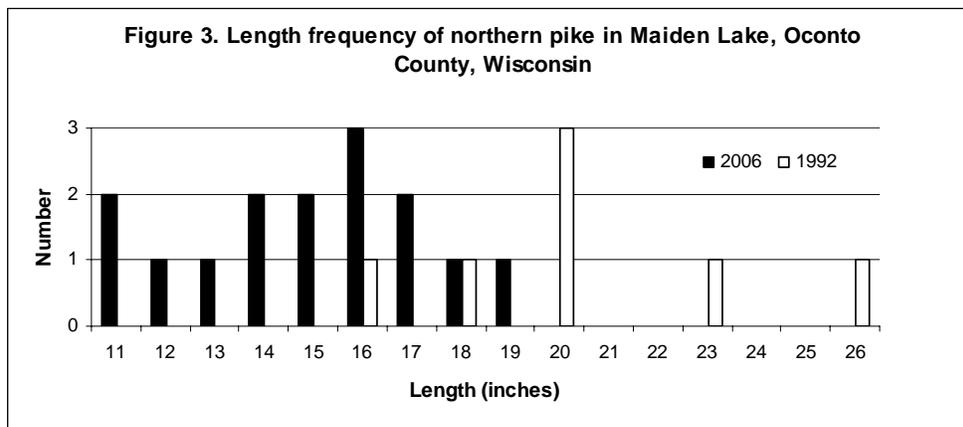
Age	3	4	5	6	7	8	9	10	11	12
NER Ave.	9.9	12.3	14.2	15.8	17.1	18.5	18.6	19.9	-	-
2006 Survey	-	9.5	11.7	11.6	15.2	-	18.7	-	-	21.1
2006 (N)	-	3	21	6	2	-	1	-	-	1
1991 Survey	7.3	10.0	10.7	12.0	13.9	15.7	15.8	19.2	18.7	-
1992 (N)	16	19	19	11	10	5	3	1	1	-

Northern Pike

During the summer 2005 mini fyke netting survey, no juvenile northern pike were captured. Electroshocking during the fall of 2005 produced 3.3 northern pike per mile, 0.4 fish per mile in April 2006 and 0.7 fish per mile in June 2006. In the spring 2006 fyke netting survey, we captured fifteen northern pike ranging in size from 11.4 to 37.0 inches in length (Figure 3), not counting the recaptured fish (1). The catch per effort was 0.4 northern pike per net night. No population estimate was calculated due to the low number of northern pike captured during the survey.

In 1992, a total of seven northern pike were captured ranging in size from 16.0 to 26.9 inches for a catch per effort of 0.1 northern pike per night. No population estimate was calculated due to the low number of northern pike captured during the survey.

The length at age of northern pike sampled in 2006 is from a low number sample however, they appeared to show slower growth when compared to the NER average and the 1992 survey (Table 5).



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Table 5. 2006 Age- length distribution of northern pike from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1992 survey information. N equals sample size.

Age	2	3	4	5	6	7	8
NER Average	15.3	18.4	21.5	24.4	27.4	30.0	30.9
2006 Survey	13.2	14.8	16.3	19.3	-	-	37.0
2006 (N)	3	3	5	2	-	-	1
1992 Survey	18.9	18.8	-	-	20.5	23.7	26.7
1992 (N)	1	3	-	-	1	1	1

Smallmouth bass

During the summer 2005 mini fyke netting survey, 0.7 juvenile smallmouth bass per net night were captured. Electroshocking during the fall of 2005 produced 19.8 smallmouth bass per mile, 4.5 fish per mile in April 2006 and 20.2 fish per mile in June 2006. In the spring 2006 fyke netting survey, we captured thirty five smallmouth bass ranging in size from 8.1 to 16.5 inches (Figure 4), and a catch per effort of 0.4 smallmouth bass per net night. No population estimate was calculated due to the low number of smallmouth bass caught during the spring 2006 fyke netting survey.

In 1992, a total of sixty three smallmouth bass were captured ranging in size from 7.0 to 19.9 inches (Figure 4), and a catch per effort of 0.7 smallmouth bass per net night. No population estimate was calculated due to the low number of smallmouth bass sampled during the spring 1992 fyke netting survey.

The length at age of smallmouth bass sampled in 2006 showed slower growth rates when compared to the NER average, and better growth rates overall when compared to the 1992 survey (Table 6). In both the 2006 and 1992 surveys, there was a good representation across many year classes of smallmouth bass.

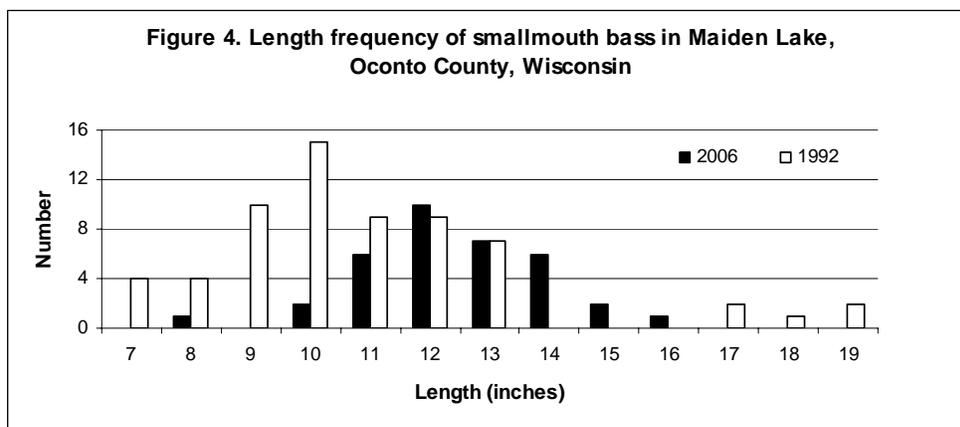


Table 6. 2006 Age- length distribution of smallmouth bass from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1992 survey information. N equals sample size.

Age	2	3	4	5	6	7	8	9
NER Average	7.6	9.9	12.3	14.2	15.8	17.1	18.5	18.6
2006 Survey	-	11.1	12.2	11.6	13.6	13.3	13.3	16.5
2006 (N)	-	2	2	7	4	2	1	1
1992 Survey	4.9	7.4	9.3	10.2	11.5	13.1	13.6	17.7
1992 (N)	1	3	9	17	21	3	1	3

Panfish

Rock bass

During the summer 2005 mini fyke netting survey, 1.2 rock bass per net night were captured of which 1.0 fish per net night were juveniles under 3 inches. Electroshocking during the fall of 2005 produced 34.8 rock bass per mile ranging in size from 2.7 to 11.2 inches. During the spring 2006 fyke netting survey, we captured a total of two hundred and eighty nine rock bass ranging in size from 4.2 to 11.7 inches (Figure 5). The catch per effort was 3.5 rock bass per net night. During the 1992 spring fyke netting survey, a sub sample of one hundred and fifty eight rock bass were sampled for length and a total of seven hundred and fifty eight rock bass were captured. The subsample of rock bass ranged in size from 4.2 to 11.8 inches (Figure 5). The catch per effort was 37.9 rock bass per net night.

The length at age of rock bass sampled from the 2006 survey showed slower growth rates for younger aged fish (3 – 7) and good growth rates for older aged fish (8 – 11) when compared to the NER average and the 1992 survey. In both the 2006 and 1992 surveys, there was a good representation of year classes of rock bass present.

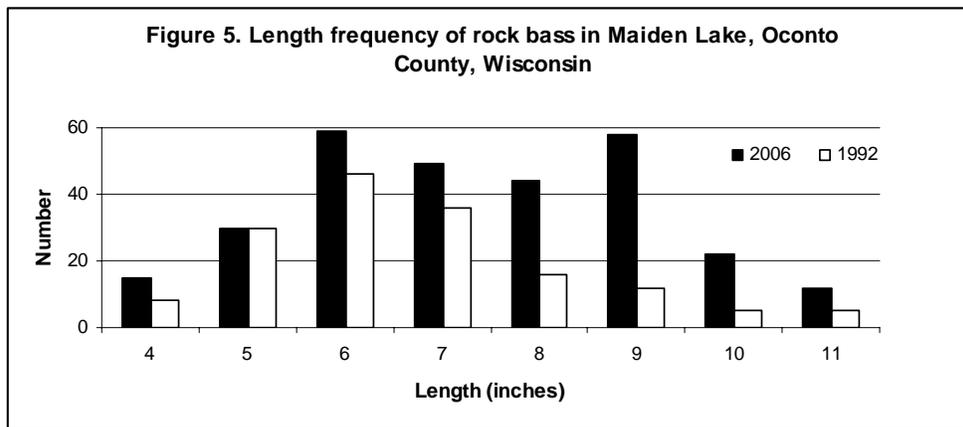


Table 7. 2006 Age- length distribution of rock bass from Maiden Lake, Oconto County Wisconsin compared to the Wisconsin State average length at age data (no NER average data was available) and 1992 survey information. N equals sample size.

Age	3	4	5	6	7	8	9	10	11
State Average	5.3	6.3	7.1	8.0	8.5	9.0	9.5	9.7	10.7
2006 Survey	-	5.4	5.6	7.2	8.1	9.0	10.5	10.6	11.1
2006 (N)	-	3	18	19	17	19	8	2	2
1992 Survey	4.8	5.5	7.1	8.3	9.0	10.5	11.0	11.1	11.7
1992 (N)	3	15	19	14	4	6	4	2	1

Bluegill

During the summer 2005 mini fyke netting survey, 6.0 bluegill per net night were captured of which 2.8 fish per net night were juveniles under 3 inches. Electroshocking during the fall of 2005 produced 59.3 bluegill per mile ranging in size from 1.3 to 7.4 inches. During the spring 2006 fyke netting survey, we captured a total of sixty one bluegill ranging in size from 4.4 to 10.1 inches (Figure 6), and a catch rate of 0.7 bluegill per net night. During the 1992 spring fyke netting survey, a sub sample of one hundred and six bluegill were sampled for length and a total of five hundred and fifty six bluegill were captured. The sub sample of bluegill ranged in size from 3.7 to 10.0 inches (Figure 6). The catch per effort was 27.8 bluegill per net night.

The length at age of bluegill sampled from the 2006 survey showed slightly slower growth rates when compared to the NER average and similar growth rates when compared to the 1992 survey (Table 8). In the 2006 survey, older ages of bluegill were observed in the sample compared to a more varied range of ages in the 1992 survey (Table 8). The size range of bluegill sampled in the fall 2005 electroshocking survey would suggest that younger ages (1 - 4) of bluegill are present in the lake.

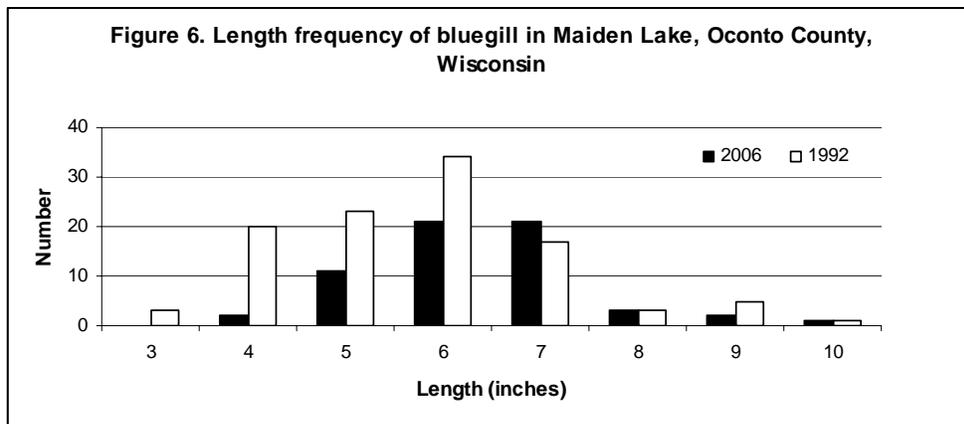


Table 8. 2006 Age- length distribution of bluegill from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age data and 1992 survey information . N equals sample size.

Age	1	2	3	4	5	6	7	8	9
NER Average	3.0	4.0	4.8	5.8	6.6	7.2	7.9	8.3	8.7
2006 Survey	-	-	-	-	6.2	6.7	7.8	7.8	-
2006 (N)	-	-	-	-	16	10	3	1	-
1992 Survey	2.2	-	3.9	5.0	5.7	7.2	7.4	8.6	9.5
1992 (N)	1	-	6	14	19	7	3	4	3

Yellow perch

During the summer 2005 mini fyke netting survey, no yellow perch were captured. Electroshocking during the fall of 2005 produced 0.5 yellow perch per mile ranging in size from 4.1 to 6.5 inches. During the spring 2006 fyke netting survey, we captured a total of eleven yellow perch ranging in size from 6.9 to 10.2 inches (Figure 7). The catch per effort was 0.1 yellow perch per net night. During the 1992 spring fyke netting survey, a total of three hundred and ninety four yellow perch were collected ranging in size from 5.2 to 12.8 inches (Figure 7) and a catch per effort of 4.8 yellow perch per net night. The length at age of yellow perch sampled from the 2006 survey showed overall slower growth when compared to the NER average and the 1992 survey (Table 9). There were few year classes of yellow perch represented in the 2006 survey when compared to the 1992 survey.

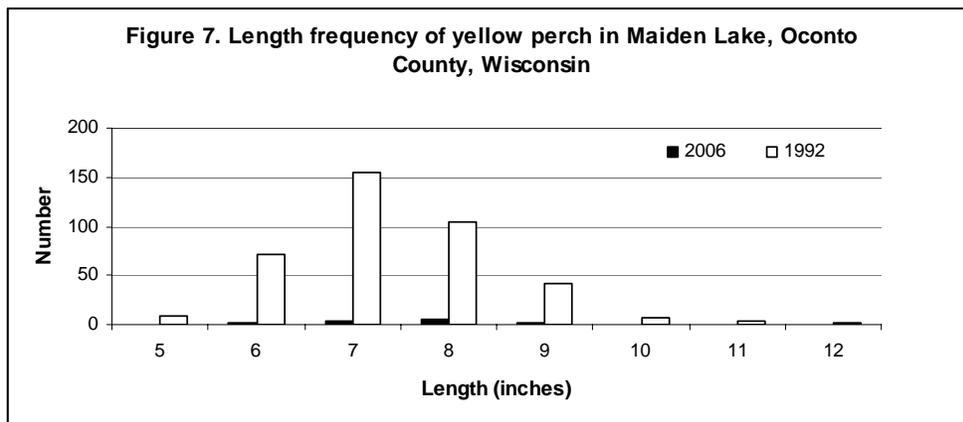


Table 9. 2006 Age- length distribution of yellow perch from Maiden Lake, Oconto County Wisconsin compared to Northeast (NER) Wisconsin average length at age data and 1992 survey information. N equals sample size.

Age	3	4	5	6	7	8	9
NER Average	6.7	7.6	8.4	8.9	10.2	10.4	-
2006 Survey	-	7.5	7.4	8.7	-	-	-
2006 (N)	-	1	3	5	-	-	-
1992 Survey	7.0	7.6	7.9	9.4	-	-	12.2
1992 (N)	7	10	14	7	-	-	2

Other fish species

Thirteen other species were caught during the 2005 and 2006 surveys and included black crappie, blacknose shiner, bluntnose minnow, central mudminnow, fathead minnow, green sunfish, green sunfish x bluegill hybrid, hornyhead chub, Iowa darter, northern pike x muskellunge hybrid, pumpkinseed, white sucker and yellow bullhead.

CONCLUSIONS AND RECOMMENDATIONS

Maiden Lake supports a diverse fishery with natural reproduction of all the major species present. The walleye population shows some successful natural reproduction and recruitment with a good range of year classes present in the 2006 survey. The population estimate of walleye in the 1992 survey (663) is not significantly different to the population estimate in the 2006 survey (463). Based on that information, I would classify Maiden Lake as a low density walleye lake. There is walleye spawning habitat available at several locations around the lake, however in this survey as well as previous surveys it was noted that the walleye will spawn in a very short time period and in a very small area of the lake even though more habitat is available to them. The walleye spawning habitat in 2006 was also noted as having a slime layer or algae covering on the rocky substrate that could be impacting the survival of the walleye eggs. The 2006 growth rates of walleye in Maiden Lake are slower overall than the regional average, but better than in the 1992 survey. The largemouth bass population estimate in the 2006 survey (614) is not significantly different than the estimate from the 1992 survey (598), however growth rates showed slower growth in the 2006 survey when compared to the regional average and the 1992 survey. Smallmouth bass are still a small component of the overall fishery in Maiden Lake and showed better growth rates in the 2006 survey when compared to the 1992 survey, however growth rates were still lower than the regional average. Northern Pike are present in Maiden Lake but make up only a small component of the entire fishery.

The pan fish fishery overall is in good health, however it has seen a major shift in the dominant species since 1992 when yellow perch were the dominant species. The 2005 and 2006 surveys showed a dramatic drop in the number of yellow perch in the lake. The dominant species of pan fish in the current survey were blue gill and rock bass. All species of pan fish surveyed in the lake are supported through natural reproduction. The major decline in the yellow perch population could be attributed to the lack of suitable habitat in the lake for successful reproduction, cover, and/ or overfishing. The densities of top predators in the system are similar to levels from the 1992 surveys, so predation on perch is not thought to be an issue. The dominant pan fish species in the 2006 survey were rock bass and bluegill. The rock bass population is healthy with overall good growth rates and a good representation of year classes present. The bluegill population showed average growth rates for the region and only had older ages present in the survey (age 5 and older). The lack of younger aged bluegill in the survey shows that recruitment may be an issue in Maiden Lake.

To enhance the fishery and improve the successful reproduction of many of the species found in Maiden Lake, I recommend that additional fishery habitat be added to the lake. Several kinds of fishery habitat improvements and additions are needed in the lake including, repairing and refurbishing current fish cribs, adding additional fish cribs, placing submerged tree drops and shoreline tree drops.

Public access to Maiden Lake is limited to one town owned boat launch located on the west north west bay of the lake. This access is in poor condition and has parking for only two vehicles and trailers along side the access road. Access is also available from a private boat landing located at the Maiden Lake Resort on the Northeast end of the lake. I would recommend repairing the public boat access site and providing additional parking for no resident lake users.

ACKNOWLEDGEMENTS

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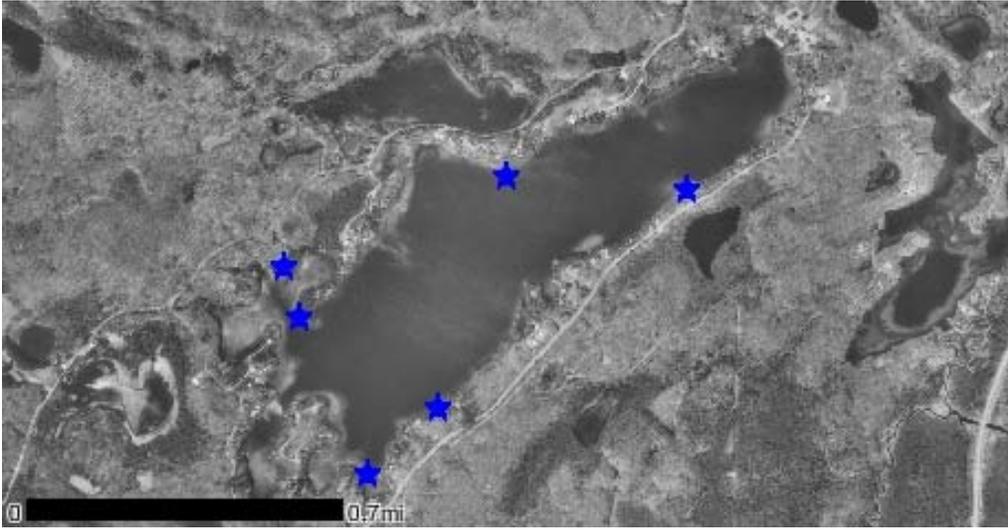
Cover image and appendix maps courtesy of WebView and the Wisconsin Department of Natural Resources.

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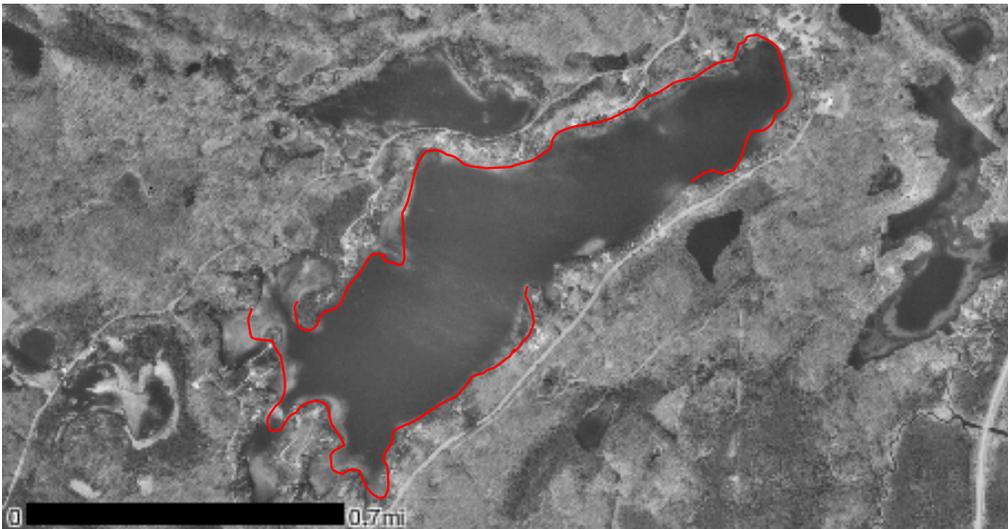
Appendices

- Appendix 1. Location of 6 mini fyke nets for the baseline monitoring survey July 12th – 13th, 2005.
- Appendix 2. Location of the 4 mile baseline monitoring electroshocking survey on October 12th, 2005.
- Appendix 3. Location of the 4.94 and 4.5 mile comprehensive electroshocking survey on April 25th and June 7th, 2006..
- Appendix 4. Location of 8 standard fyke nets for the comprehensive fishery survey April 14th – 24th, 2006.

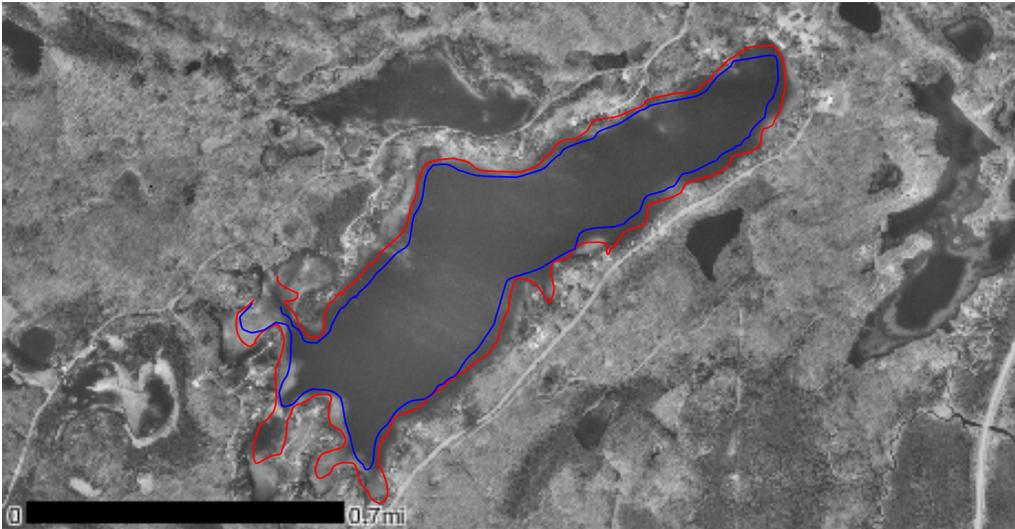
APPENDICES



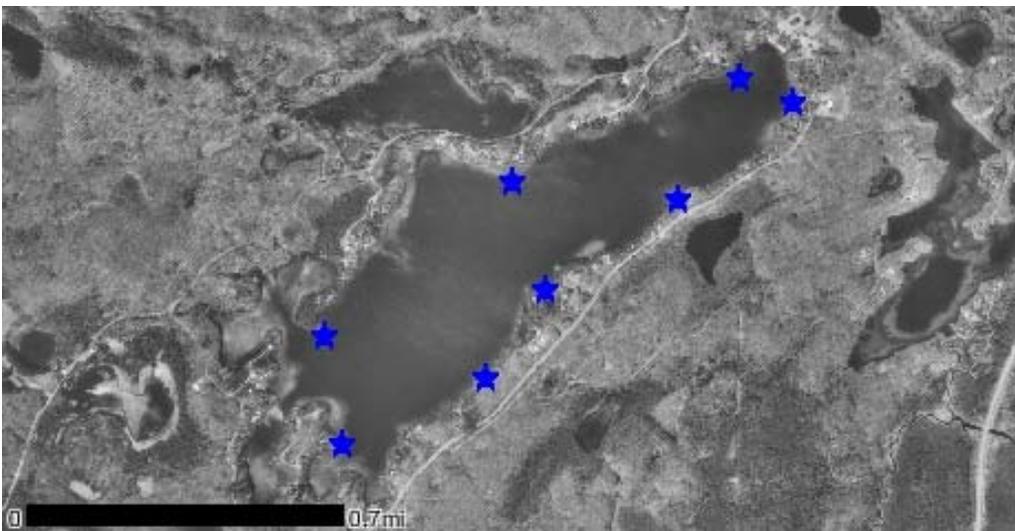
Appendix 1. Location of 6 mini fyke nets for the baseline monitoring survey July 12th – 13th, 2005.



Appendix 2. Location of the 4 mile baseline monitoring electroshocking survey on October 12th, 2005.



Appendix 3. Location of the 4.94 and 4.5 mile comprehensive electroshocking survey on April 25th (red) and June 7th (blue), 2006.



Appendix 4. Location of the 8 standard fyke nets for the comprehensive fishery survey April 14th – 24th, 2006.