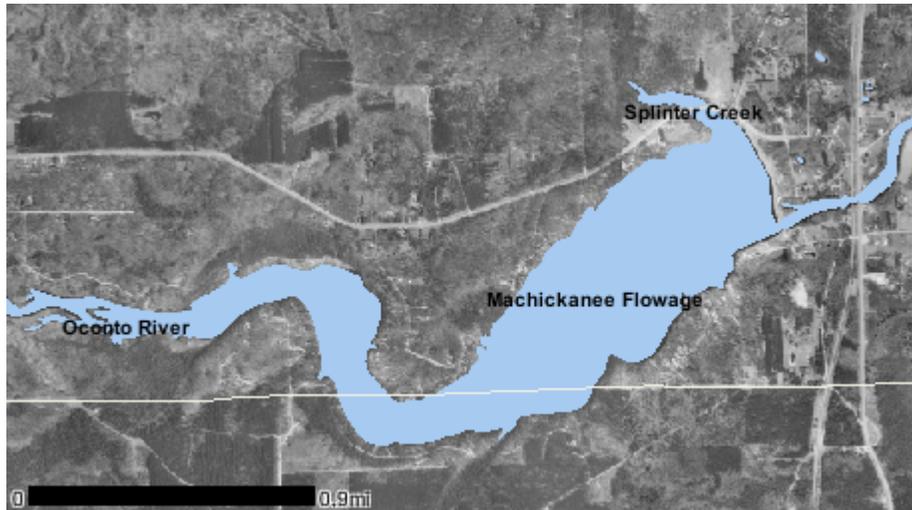


**Comprehensive Fisheries Survey of Machickanee Flowage, Oconto County,
Wisconsin, during 2003**

Waterbody Identification Code 448200



Lee Meyers
Fisheries Biologist
Wisconsin Department of Natural Resources
Green Bay
June 2007

**Comprehensive Fisheries Survey of Machickanee Flowage,
Oconto County, Wisconsin during 2003**

Report Approval signatures

Lee Meyers, Fisheries Biologist, Date

Michael Donofrio, Fisheries Supervisor, Date

George Boronow, Regional Fisheries Supervisor, Date

Steve Hewett, FM Bureau Section Chief, Date

Comprehensive Fisheries Survey of Machickanee Flowage, Oconto County, Wisconsin During 2003

Lee Meyers
Fisheries Biologist
June 2007

Executive Summary

A comprehensive fisheries survey of Machickanee Flowage was conducted during 2003 which captured a total of 4,535 fish by fyke net and 650 fish by electroshocker. The dominant game fish species in the 463-acre lake are largemouth bass (adult population estimate = 1,916) and northern pike (adult population estimate = 347). Bluegill, black crappie and pumpkinseed sunfish are the most abundant panfish species. I recommend continuing the present management of Machickanee Flowage for largemouth bass, northern pike and panfish.

Lake and Location:

Machickanee Flowage, Oconto County, T27-28N, R20E Sec 32-34
Located in southern Oconto County in the Township of Stiles.

Physical / Chemical attributes (Carlson, Andrews and Threinen, 1977):

Mophometry: 463 acres, maximum depth 21 feet, shoreline 7.7 miles.

Lake type: drainage

Watershed: 770 square miles with 77 acres of wetland adjoining the flowage

Basic Water Chemistry: Hard water impoundment having slightly alkaline, light brown water of medium transparency. Secchi disk reading 7.8 feet, PH 7.1, 86 MPA

Trophic Status: Mesotrophic (moderate fertility)

Littoral Substrate: 80% sand and 20% muck.

Aquatic Vegetation: A dense, diverse aquatic plant population is present throughout the lake (mostly Eurasian Milfoil).

Other Features: The lake is formed by an impoundment on the Oconto River. The dam is a hydro-electric producer owned by Oconto Electric Cooperative licensed by FERC.

Tributaries: Splinter Creek (class1 trout), Brehmer Creek (class 1 trout)

Purpose of Survey: Assess the fishery status

Dates of fieldwork:

Fyke netting (all species) – April 2 - 17, 2003

Electroshocking – May 22 and October 1, 2003

BACKGROUND

Machickanee Flowage has a highly developed shoreline (Al Stranz, pers. comm.) mostly in private ownership and the only public land is a good boat landing access is maintained by Oconto County. The access site also has a shore fishing walkway which will need some repair in the near future. The present hydro-dam, operated by Oconto Electric Cooperative started operation in 1950, maintains a 22 foot head (Kent Lyng, OEC, personal comm.) and flowage water levels are management following FERC guidelines. The number of people recreating and private dwelling development on Machickanee Flowage has increased over the years especially since the rehabilitation project under taken in 1981 to remove carp and bullhead and restock gamefish populations. A Slow-No-Wake zone was established by the Township to stop shore erosion on the very upper portion of the flowage.

Previous fisheries surveys were conducted on Machicknaee Flowage in 1977, 1979-81, 1988, and 1995. For this report, comparisons have been made only to the information collected from the 1995 fyke net survey (Schoenike, 1996). Previous surveys showed that the fishery consisted of carp, white sucker and bullhead with occasional winkerills until water quality improvements were made in 1978 and a rehabilitation project to remove the “rough” fish was undertaken in 1980-81. Since the completion of the rehabilitation project, the fishery has consisted of largemouth bass, northern pike, bluegill, black crappie, and yellow perch, along with several forage fish species. A low number of carp and bullheads are still present. Although several walleye stocking introductions occurred in 1982-83, a walleye population never developed.

Table 1. *DNR funded fish rehabilitation stocking 1981 through 1983, Machichanee Flowage, Wisconsin.*

Year	Species	Size (average)	Number
1981	Rainbow Trout	Yearling (7 inches)	5,000
1982	Bluegill (male)	Adults	4,000
1982	Walleye	Fry (1 inch)	2 million
1982	Walleye	Fingerling (3 inches)	46,500
1982	Fathead minnow	adults	750 pounds
1982	Rainbow trout	Yearling (7 inches)	5,000
1982	Smallmouth	Fingerling	18,00
1982	Largemouth bass	Fingerling	12,000
1983	Walleye	Fingerling (3 inches)	46,500
1983	Rainbow trout	Yearling (7 inches)	5,000
1983	Smallmouth	Fingerling	600
1983	Largemouth bass	Fingerling	18,00

METHODS

Standard fyke nets (3/4" bar, 1.5 inch stretch mesh) were set for an "ice-out" sample. Four nets were set on April 1 and lifted through April 3 and then five nets were fished from April 7 to 17, 2003 (see Appendix, Figure 1, GPS coordinates of net locations can be found in the database) for a total of 58 net days. A Wisconsin DNR standard direct current full size electrofishing boat was used on the evenings of May 22 and October 1, 2003 (Appendix, Figure 2). During the spring fyke netting survey, all game fish were given a top caudal fin clip (for mark recapture population estimate); scale samples for aging were only collected from male northern pike with a length measured to the nearest 0.1 inch. An additional 250 individuals per game species had length measurements to the nearest 0.1 inch and all others were counted. Scale samples were collected from a sample of bluegill with a length to the nearest 0.1 inch. An additional 250 lengths per panfish species were taken to the nearest 0.1 inch and all additional fish were counted. The Schnabel population multiple recapture estimation technique was used for northern pike and largemouth bass using only the fyke net caught fish during spring 2003 period. A Bailey Modification population estimate was made on the largemouth bass using the fyke net catch for the marking run and May 22 electrofish catch as the recapture run.

During the electroshocking runs, two 0.5 mile panfish stations were established along the north shoreline and all species were collected within those stations (Appendix map). Another 2 miles of shoreline was electrofished for just gamefish species. A sample of each species was measured to the nearest 0.1 of an inch and a total count of all fish caught was made.

The 1995 survey report (Schoenike, 1996) had extensive age and growth data on all game and panfish species of Machickanee Flowage and all fish species exhibited good growth rates in 1995.

RESULTS AND DISCUSSION

Catch per unit effort results for all survey methods used in 2003 and fyke net survey only from 1995 are shown in Table 2 with respective analysis for each major species written below.

Table 2. *Catch per unit effort of major game fish and panfish species during fishery surveys in 1995 and 2003 on Machickanee Flowage, Oconto County, Wisconsin.*

Species	Spring 1995 Fyke net	April 2003 Fyke net	May 22 2003 Electrofishing	October 1 2003 Electrofishing
Black crappie	2.2	11.4	*7.0/mi	*8.0/mi
Bluegill	13.2	42.2	*292/mi	*119/mi
Largemouth bass	0.7	4.0	20.0/mi	19.0/mi
Yellow perch	4.3	0.7	*4.0/mi	*2.0/mi
Northern pike	3.9	5.6	0.5	1.7
Pumpkinseed	0.8	2.2	*20.0	*2.0
Rockbass	3.0	3.0	0	0
Smallmouth bass	0.01	0.1	5.0	4.7
Walleye	0	0	0	0
White sucker	0.7	3.0	2.2	0.3
Carp	0.1	0.2	0	0
Bullhead spp.	1.4	0.8	*9.0	0
Effort	93 net nights	58 net nights	*1.0 mile (0.55 Hr) 3.0 miles (2.2 Hrs)	*1.0 (0.4 Hr) 2.0 miles (0.80 Hrs)

Gamefish species

Largemouth bass

In the spring 2003 fyke netting survey, we captured 233 largemouth bass averaging 16.3 inches, ranging in size from 7.7 to 20.5 inches in length (Figure 1), not counting the recaptured fish (22), for a catch per effort of 4.0 largemouth bass per net night. Eighty-seven percent of the bass caught by fyke net in 2003 were over the 14 inch legal length limit. A population estimate of 1,916 adult largemouth bass with a 95% confidence interval 1,085 to 3,283 fish (Schnabel estimate) for a total density of 4.1 bass per acre was determined from the fyke net catch. A Bailey modification population estimate based upon the fyke net marking effort and May 22 shocker recapture, estimated 3,722 largemouth bass (8.0 per acre). The bass sampled by fyke net averaged 16.3 inches compared to 13.2 inches by electroshocker in May. I believe, the two population estimates are comparable as the estimate using the May 22 shocker effort includes a larger portion of the bass population including immatures down to age 2 (6-8 inches). The October 1 shocker catch averaged 12.2 inches (Figure 2) in length. Electroshocking during the spring 2003 produced 20.0 largemouth bass per mile and the fall 2003 shocking effort produced 19.0 bass per mile.

In 1995, 63 largemouth bass were caught in fyke nets averaging 12.8 inches in length, ranging in size from 6 to 19 inches with 37% over 14 inches (Figure 1). The fyke net catch per effort

was 0.7 largemouth bass per net night. A total population estimate for bass was not calculated during the 1995 survey.

Figure 1. Length frequency of largemouth bass captured by fyke net in spring 2003 compared to 1996, Machickanee Flowage, Oconto County, Wisconsin.

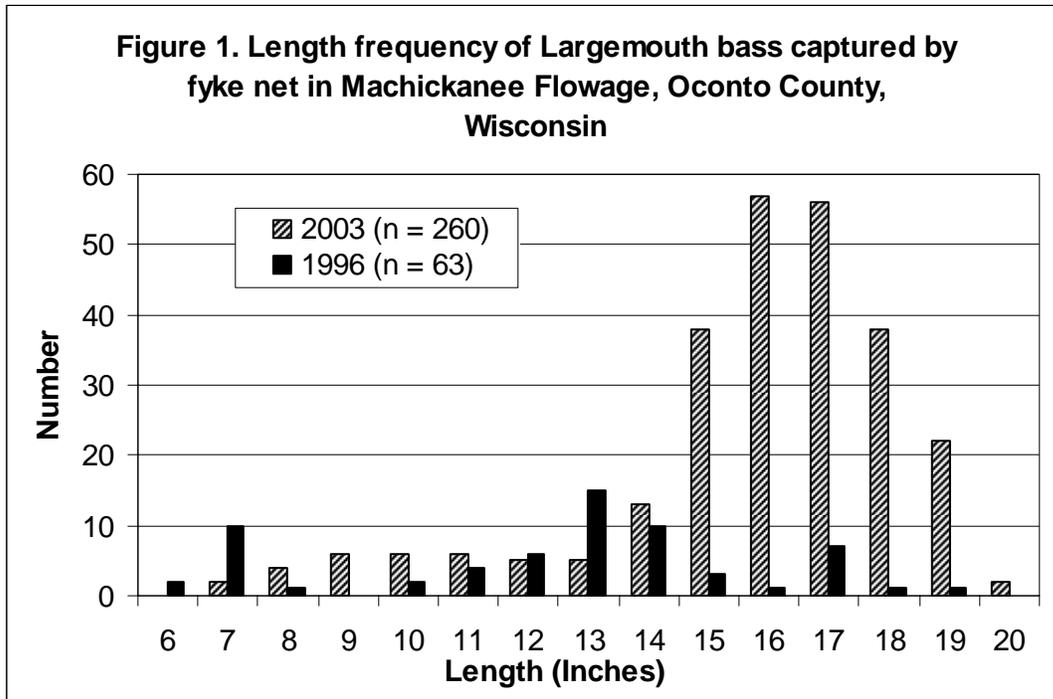
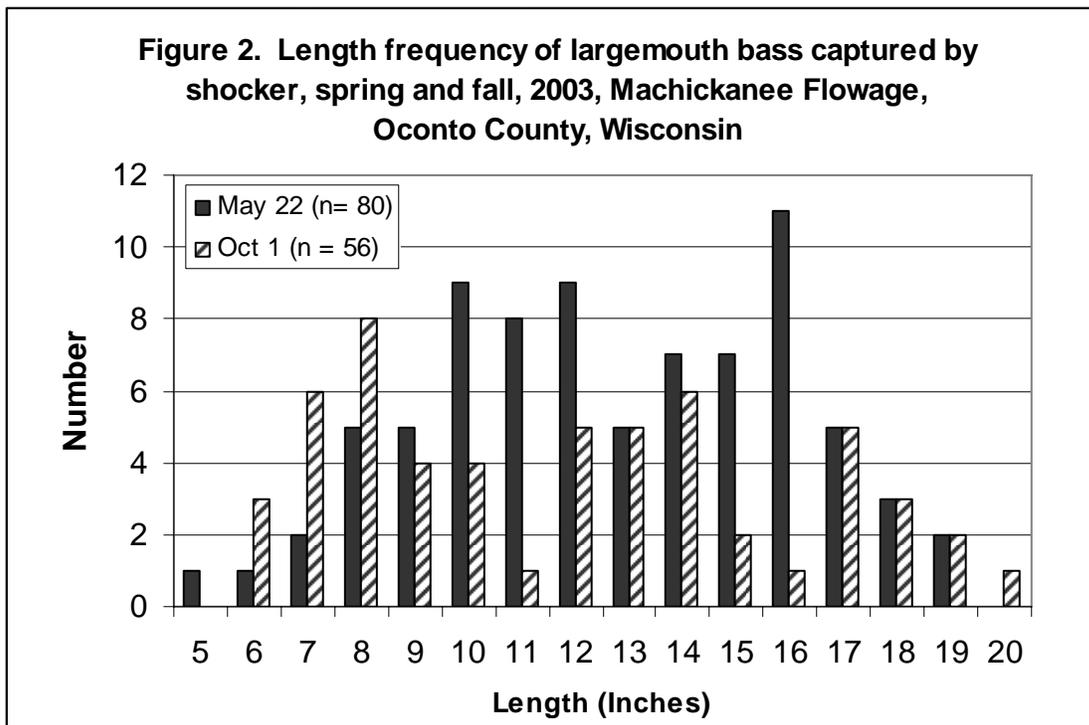


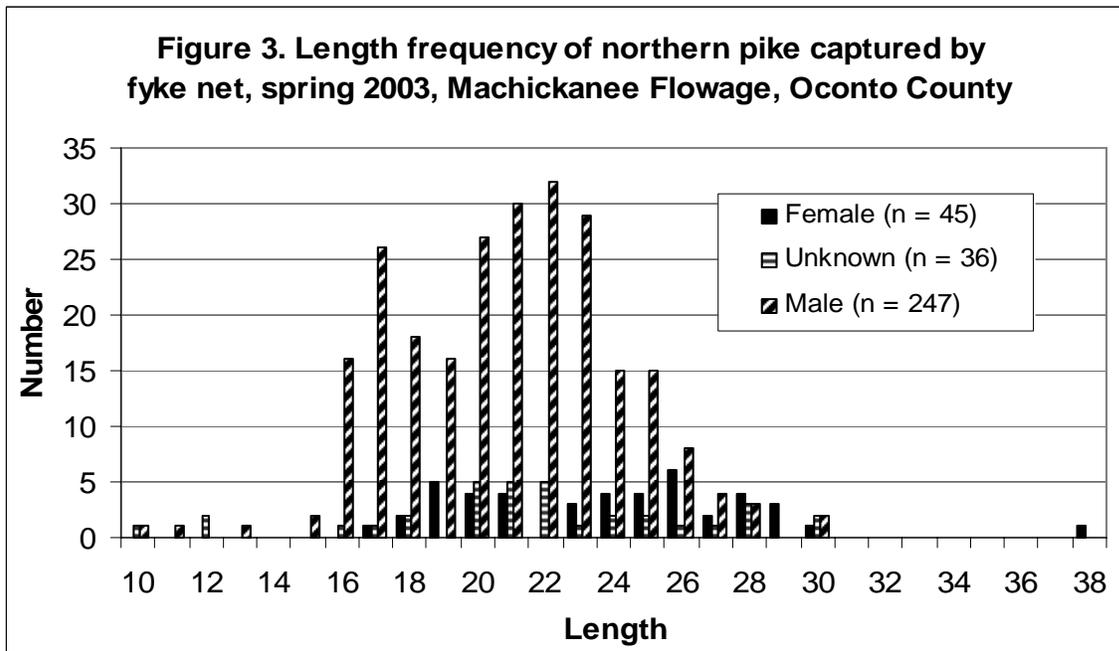
Figure 2. Length frequency of largemouth bass captured by electroshocker, Spring & Fall, 2003, Machickanee Flowage, Oconto County, Wisconsin.



Northern Pike

In the 2003 spring fyke netting survey, we captured 325 northern pike averaging 21.7 inches, ranging from 10.2 to 38.0 inches in length (Figure 3), for a catch per effort of 5.6 northern pike per net night. The above number do not include the **high number** of recaptured fish (205) during the survey. The population catch was composed of 14% female averaging 24.3 inches (range 17.8 to 38.0), 79% males that averaging 21.2 inches (range 10.6 to 30.4) and 7% undetermined sex averaging 21.9 inches (range 10.2-30.8). A population estimate was calculated to be 347 adult northern pike with a 95% confidence interval of 338 to 462 fish (Schnabel estimate) for a density of 0.8 northern pike per acre. In 1995, 359 northern pike were captured by fyke net, averaging 18.6 inches in length, ranging 10.5 to 41.0 inches with 23% over 22 inches. The 1995 catch per effort was 3.9 northern per net night. The 1995 population estimate was 708 adult northern pike with a 95% confidence interval of 611 to 842 fish (Schumacher-Eschmeyer formula) for a population density of 1.5 northern per acre.

Figure 3. Length frequency of northern pike captured by fyke net in spring 2003, Machickanee Flowage, Oconto County, Wisconsin.



The length-at-age of male northern pike sampled in 2003 showed slower growth rates when compared to the 1995 growth rate (Table 3). However, between 1995 and 2003, it appears that the adult population was reduced by approximately half. However, the average northern pike length in 2003 was 3 inches more than in 1995. The angling harvest regulations remained at no minimum length limit and a 5 daily bag during the period.

Table 3. 2003 Age- length distribution of *male* northern pike from Machickanee Flowage, Oconto County, Wisconsin, compared to 1995 survey information. Sample size equals (N).

Males	Age	1	2	3	4	5	6	7	8	9
1003 Survey		10.6	16.0	18.1	22.1	23.6	25.7	27.9		-
2003 (N)		1	15	3	11	7	7	3		-
1995 survey		14.8	18.8	21.7	23.5	23.5	29.7	-	-	32.3
1995 (N)		55	34	18	13	4	3	0	0	1

Smallmouth bass

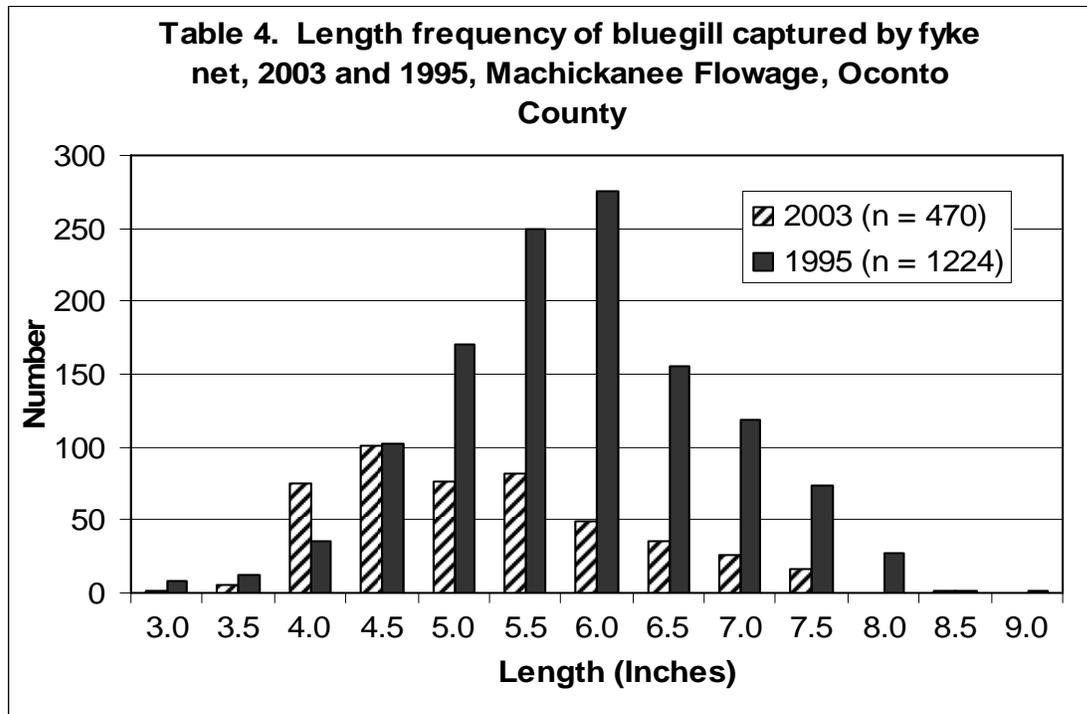
One 7.1 inch smallmouth was captured in 1995 fyke nets compared to 7 smallmouth in 2003 nets which ranged from 12.3 to 18.0 inches in length. During 2003 a slightly higher smallmouth catch was observed by electrofishing with 20 SMB (5.0 per mile) captured on May 22 and 14 captured (4.7 per mile) on October 1. Electrofishing was not conducted in 1995, so there is no comparison with 2003.

Panfish

Electroshocking in 2003 captured bluegill, yellow perch, black crappie, pumpkinseed and rock bass (Table 2). During the spring 2003 fyke netting survey, bluegill was the most abundant panfish with a catch per effort of 42.3 fish per net night. Other abundant panfish included black crappie with a catch rate of 11.4 and pumpkinseed captured at a rate of 2.2 fish per net night (Table 2). Other notable panfish caught included rock bass (3.0 fish per net night) and yellow perch (0.7 fish per net night, Table 2). No population estimates were made for panfish during the 2003 surveys.

Bluegill

During the 2003 spring fyke netting survey, 2,446 bluegill were netted for a catch per effort of 42.2 fish per net night (Table 2). Bluegill averaged 5.4 inches, ranging in length from 3.2 to 8.9 inches and 27% were greater than 6 inches (Figure 4). In the 1995 fyke netting survey, 1,224 bluegill were caught averaging 6.1 inches, ranging in size from 3.1 to 9.2 inches and 53 percent were over 6 inches in length. The bluegill catch per effort in 1995 was 13.2 per net night (Table 2).



A small length-at-age sample of bluegill in 2003 showed average growth when compared to other northeast Wisconsin lakes for ages 4 to 7 (Table 4). The length-at-age for bluegill

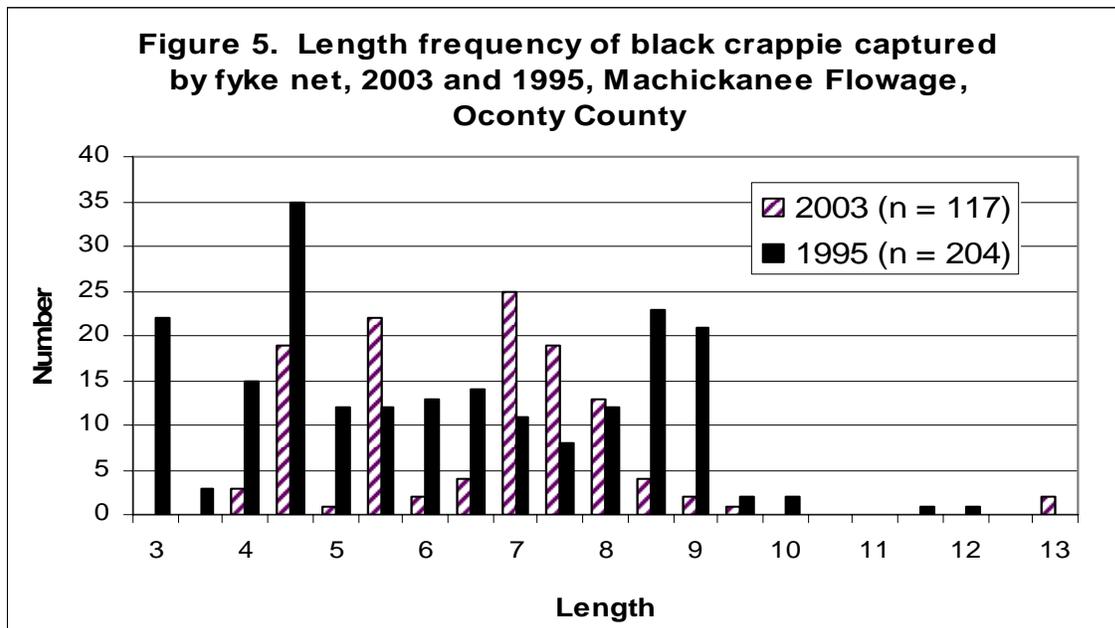
collected from Machickanee Flowage in 1995 was comparable to growth for ages 2 to 9 of other northeast Wisconsin lakes (Table 4).

Table 4. 2003 Age- length distribution of bluegill from Machickanee Flowage, Oconto County, Wisconsin compared to 1995 and other northeast (NER) Wisconsin bluegill average length-at-age data. (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
2003 Survey	-	-	-	6.0	6.6	7.5	7.5	-	8.9
2003 (N)	-	-	-	1	5	2	3	-	1
1995 Survey	-	3.5	3.9	4.8	6.9	7.8	8.1	8.1	9.2
1995 (N)	-	8	5	40	11	16	9	1	2

Black crappie

During the 2003 spring fyke netting survey, we captured 661 black crappie for a catch per effort of 11.4 fish per net night (Table 2). Black crappie averaged 6.8 inches, ranging from 4.2 to 13.3 inches in length and 19% were greater than 8 inches (Figure 5). In the 1995 fyke netting survey, 204 (2.2 per net night) black crappie were caught, averaging 5.9 inches, ranging in size from 2.0 to 12.4 inches and 30 percent were greater than 8 inches (Figure 5).



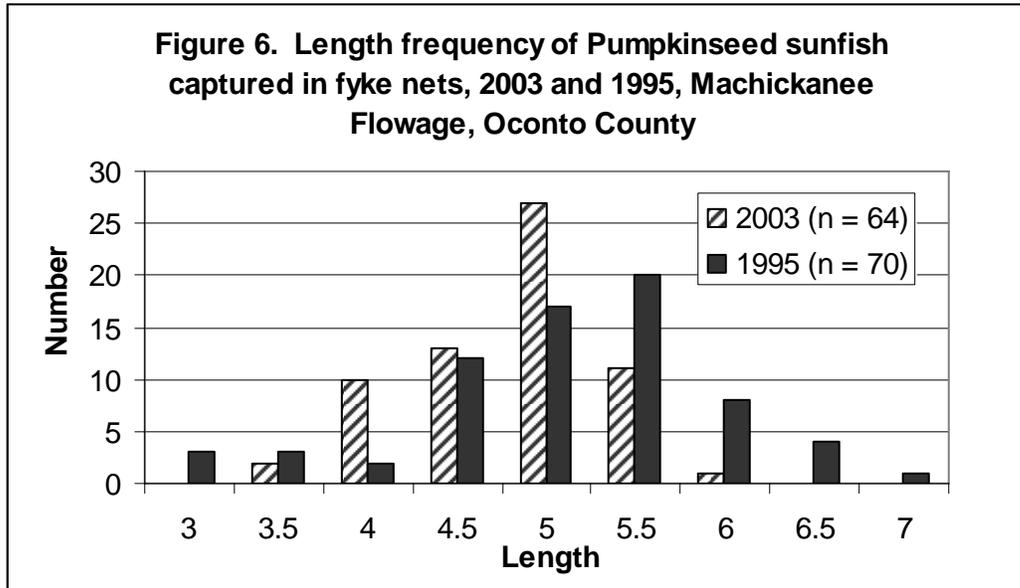
The length-at-age of black crappie was not sampled in 2003, however 1995 was included for comparison to other northeast Wisconsin lakes (Table 6).

Table 6. 2002 Age- length distribution of black crappie from Machickanee Flowage, Oconto County Wisconsin compared to other northeast (NER) Wisconsin crappie average length-at-age data. (N) equals sample size.

Age	2	3	4	5	6	7	8	9	10
NER Average	5.4	7.2	8.6	9.6	10.4	11.2	12.2	13.0	14.0
1995 Survey	4.6	6.4	8.8	9.9	12.0	11.7	-	-	-
1995 (N)	16	21	28	4	1	1	-	-	-

Pumpkinseed sunfish

During the 2003 spring fyke net survey, we captured 128 pumpkinseed for a catch per effort of 2.2 fish per net night (Table 2). Pumpkinseeds averaged 5.0 inches, ranging from 3.6 to 6.2 inches in length and 2% were greater than 6 inches (Figure 6). During the 1995 fyke netting survey, 70 were caught (0.8 per net night), averaging 6.4 inches, ranging in size from 3.0 to 7.4 inches with 19% greater than 6 inches.



Other fish species

A grand total of 4,535 fish were captured during the 2003 fyke net survey. Other fish species captured by fyke in 2003 included 174 rockbass (4.2 – 8.7 inches in length) and 39 yellow perch (6.4- 7.7 inches in length). Also captured during the 2003 surveys were a total of 49 bullheads (45 yellow, 3 black, and 1 brown bullhead). There were 173 white suckers (12.3 to 20.0 inches), 12 common carp, and 12 northern hog sucker. Golden shiner, common shiner, northern creek chub were forage minnow species captured in 2003.

Yellow perch were captured at a higher rate in 1995 with 4.3 captured per net night compared to 0.7 in 2003 (Table 2). Bullheads were also more abundant in 1995 with 1.4 per net night compared to 0.8 in 2003. The rockbass population was captured at similar levels in both surveys (3.0 per net night). White sucker and carp were captured at higher rates in 2003 (Table 2). However, there were only 12 total carp captured in the 2003. Golden shiner, common shiner and hog sucker were captured in both surveys. One brown and one brook trout were captured in 1995, but no trout were reported in 2003.

CONCLUSIONS AND RECOMMENDATIONS

Unlike the unsightly appearance of the flowage 25 years prior and the presence of only carp, white sucker and bullhead for a fish population in the 1970's, the 2003 fishery of Machickanee Flowage consists of a very nice mix of largemouth bass, northern pike, bluegill and black crappie. This 463-acre flowage on the Oconto River supports a diverse fishery with adequate natural reproduction of the fish species present that will continue to support a quality fishing experience.

The 2003 comprehensive fish survey indicates some changes in the game fish populations since 1995. The results were fewer numbers of northern pike and yellow perch, however with larger average size of northern pike in 2003 compared to 1995. Largemouth bass and bluegill numbers have increased since 1995 with an excellent size range of bass present. Although bluegill numbers are high, only 27% are over 6 inches and most of those are between the 6 and 7 inch size range. The dominant panfish species of Machickanee Flowage continue to be bluegill and black crappie. With natural fish populations there are population cycles of abundance, and although the yellow perch population is down in 2003; it is likely that the yellow perch population will increase in the future. No fish stocking of any species is needed for this lake.

Machickanee Flowage is a moderately fertile lake and therefore has the capability of sustaining a quality size fishery as seen in our survey results. Growth rates sampled in the 1995 survey are comparable to other northeast Wisconsin lakes. There is no evidence, from the limited aging sample or the length frequencies in the 2003 survey, to suggest significant changes in fish grow from the good growth rates present in the 1995 survey.

Following the next survey, more protection from harvest maybe desired for the northern pike population. A 26 inch, 2 bag regulation, would result in more protection of the mid-size range pike. The size structure of bluegill present in 2003 appeared limited. Another consideration would be a reduced bag limit on panfish to promote a larger size structure in the bluegill population.

Private riparian shoreline owners should be encouraged to maintain as much shoreline as possible in a natural condition (such as, allowing shore vegetation to grow, or leaving tree drops in the water (attached to shore)).

The macrophytes become abundant during the summer months and actually may help provide a "fish refuge" from angler harvest. A Slow-No-Wake zone was established by the Township on the very upper portion of the flowage to slow bank erosion.

There is ample public access to Machickanee Flowage provided by 3 access sites, one boat landing near the south side of the dam, shore walk-in access in the upper reaches and shore access on the northwest side of the dam/dike. Oconto County Parks Department maintains the boat landing which has ample parking space for about 10 boat trailer units and bathroom facilities. This boat landing site also has a shore fishing dock/walkway, which will need some repairs in the near future (maybe some state matching funds available to help).

ACKNOWLEDGEMENTS

Russ Heizer, Greg Kornely, Ron Rhode and Tom Meronek who completed the field work and data entry. Justine Hasz, Mike Donofrio, and George Boronow for editorial comments.

LITERATURE CITED

Carlson, H., Lloyd M. Andrews and C.W. Threinen. 1977. Surface waters of Oconto County. Department of Natural Resources, Madison, Wisconsin. 104 pages.

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

Schoenike, Dean. 1996. Machickanee Flowage General Fishery Survey, April, 1995. Wisconsin DNR Memo. 28 pp.

Appendix

Figure 1. General location (red **Arrows**) of fyke nets for the comprehensive fishery survey April 3rd – 17th, 2003. Refer to GPS coordinates in WI DNR Fish Management Database system.

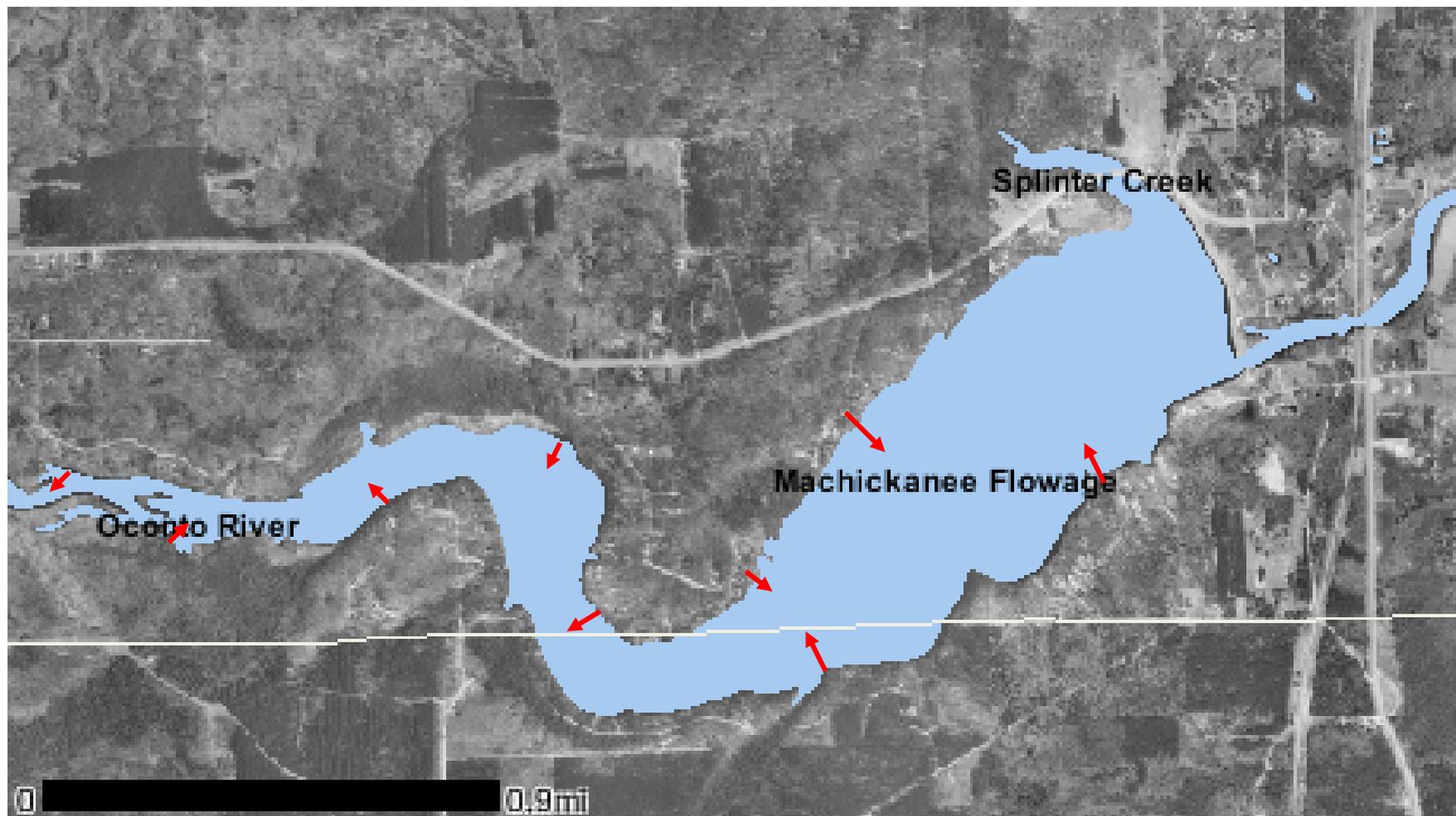


Figure 2. Location of four, 0.5-mile (green, **Dashed line**, gamefish only) and two, 0.5-mile (red, **Solid line**, panfish stations (all fish)) electroshocking surveys on May 22 October 1, 2003, Machickanee Flowage, Oconto County.

