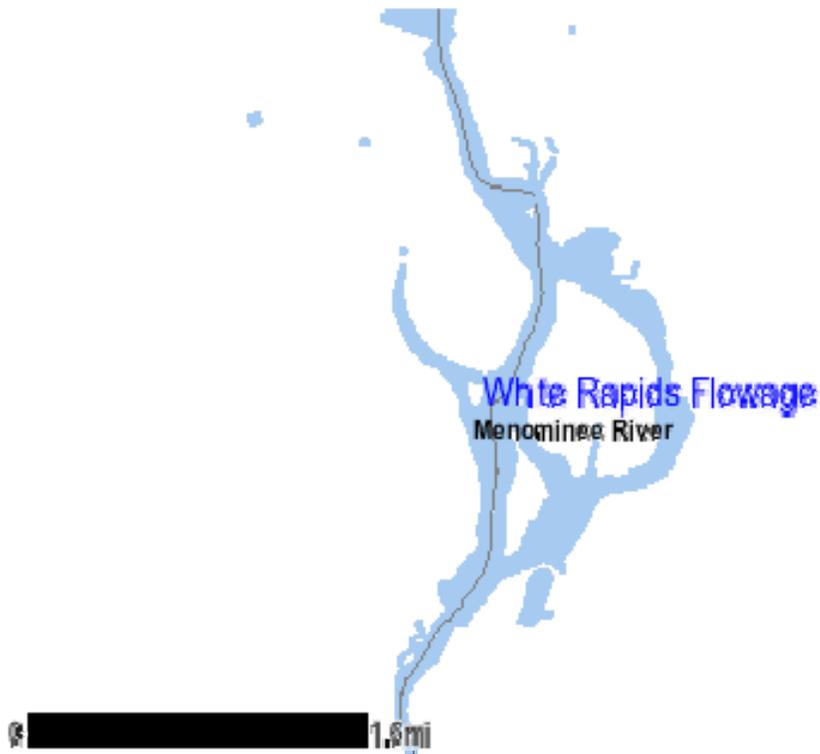


Fisheries Survey of White Rapids Flowage, Marinette County Wisconsin during 2005

Waterbody Identification Code 634300



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March 2006

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Report Approval signatures

Michael Donofrio, Fisheries Supervisor, Date

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EXECUTIVE SUMMARY

Fisheries surveys of White Rapids Flowage on the Menominee River were conducted during the 2005 field season. The dominant gamefish species in the flowage were walleye, smallmouth bass, largemouth bass and northern pike. Black crappie, yellow perch, bluegill and rock bass were also common fish species in this flowage. Population estimates weren't calculated, but good recruitment was evident from juvenile fish captures of most species. The diversity and stability of the fishery remains consistent with extensive surveys performed in 1991-92. I recommend managing this flowage for walleye, smallmouth bass, largemouth bass, northern pike, and panfish.

Lake and location:

White Rapids Flowage, Marinette County, T35N R22E Sec 18, 19

Located in eastern Marinette County, it is an impoundment of the Menominee River and boundary water with the State of Michigan.

Physical/ Chemical attributes (Carlson, Andrews, and Threinen 1975):

Morphometry: 447 acres, maximum depth 32 feet. About 30 percent of the flowage is less than 3 feet deep.

Lake type: Impoundment (1927).

Watershed: 3,228 square miles: including 70 acres of adjoining wetlands.

Basic water chemistry: hard water drainage with neutral PH. Light brown water of moderate transparency. Secchi disk reading of 10 feet, PH 7.0, Conductance 200 umhos.

Littoral substrate: 70 percent sand, 20 percent silt, and 10 percent boulders.

Aquatic vegetation: Submergent and emergent vegetation is moderate in density.

Eurasian milfoil has been found in this flowage.

Other features: The reservoir has 10.9 miles of shoreline and nearly 6 miles of island shoreline. The dam is regulated through a hydroelectric license issued by the Federal Energy Regulatory Commission to Wisconsin Electric Power Company or WE Energies.

The dam is a concrete gravity structure approximately 50 feet high and 1,099 feet long.

The dam is known by the name of White Rapids. Another hydroelectric dam, Chalk Hill dam and hydroelectric facility is located approximately 2.5 miles upstream and operated by the same company.

The White Rapids Dam is one of ten dams on the Menominee River (see Appendix).

Purpose of the Surveys: Index fish surveys.

Dates of fieldwork: Mini-fyke nets: July 28, 2005.

Pulsed DC Electroshocking/ electrofishing: September 26 and October 10 2005

BACKGROUND

White Rapids Flowage was created in 1927 to generate power for the surrounding communities and industry. The White Rapids dam and hydroelectric facility is currently owned and operated by WE Energies and is licensed by the Federal Energy Regulatory Commission. The current license expires in 2037. The project boundary includes approximately 1,796 acres of land in Wisconsin and Michigan.

Little development occurs within the project boundary, except for a leased Girl Scout Camp on the west shore. The lease is between WE Energies and the Fox River Area Girl Scout Council. The lease and camp site has been maintained since 1939 and the lease is scheduled to expire in 2011. A gravel boat launch and wilderness campground area exists on the Michigan side of the impoundment. A concrete boat launch and developed camp site exists on the Wisconsin border. Shoreline fishing areas exist below Chalk Hill dam, approximately 2.5 miles upstream of White Rapids, along both state boundaries. All facilities are maintained by WE Energies.

The operation of this hydroelectric facility does impact the fishery resource. The presence of the dam impedes upstream and downstream fish migration, impinges and entrains many fish through the turbine operation and otherwise alters the morphology of the river channel. Lake Sturgeon reside upstream and downstream of the dam and very limited sturgeon harvest has occurred in this flowage. Wisconsin DNR fish stocking of other species has not occurred within or upstream of this flowage. Michigan DNR has stocked muskellunge into the Chalk Hill flowage and some of those fish have migrated downstream into White Rapids. Two previous fish surveys of this flowage occurred in 1991 and 1992. Some of the results from those surveys are referenced in this report.

METHODS

Six mini-fyke nets were lifted on July 28, 2005 for an assessment of juvenile fish species composition. A WDNR standard pulsed, direct current electrofishing boat was utilized during the evening of September 26 and October 10, 2005 with 2 dip netters. All species were retained for the first 0.5 mile of each shocking event in September and October, but only game fish were retained for the next 1.5 mile section of shoreline for each evening. The locations of surveyed areas appear on attached flowage maps.

Length to nearest tenth of an inch was recorded for all fish. Age structures (scales and spines) were removed from gamefish species of various lengths. Ages were determined according to standard WDNR procedures. Length at age comparisons are for all lakes sampled for those species in the northeast Wisconsin and were last updated in 2003. A mark and recapture study wasn't conducted on any species, so population estimates could not be calculated for this fishery.

RESULTS AND DISCUSSION

The White Rapids Flowage catch per unit effort results are depicted in Table 1 and respective analysis for each major species is written in subsequent portions of this report. No further analysis is presented for the following species: yellow bullhead, black bullhead, white sucker, shiner sp, redhorse sp and common carp. Although, a summary paragraph for these and other non-game species is included at the end of this report.

Table 1. Catch per unit effort of fish species during comprehensive fish surveys in 2005 of White Rapids Flowage, Marinette County Wisconsin. Netting catch rates are reported as number of fish per net/ day, while shocking rates are fish per mile of shoreline.

Species	July 2005 mini-fyke nets	September 2005 shocking	October 2005 shocking
Smallmouth bass	12.5	5.0	16.5
Northern pike	0	11.5	8.0
Walleye	0.5	29.0	72.0
Largemouth bass	3.7	8.0	6.0
Black crappie	5.2	110.5	31.5
Bluegill	0.5	43.5	26.5
Pumpkinseed	1.2	9.5	12.0
Rock bass	0.7	8.0	11.5
Yellow perch	12.0	89.5	20.5
Yellow bullhead	0.3	0	0
Black bullhead	44.0	3.5	1.0
Common Carp	2.7	6.0	0
White sucker	0.8	2.5	1.0
Muskellunge	0	0	1.0
Shiner sp.	0.4	22.0	0.3
Redhorse sp.	0	2.5	6.3

Smallmouth Bass

During 2005 mini-fyke netting, juvenile smallmouth bass were observed as 12.5 fish per net/ day. Several fish (N= 88) in the 1-4 inch size range were captured with mini-fyke nets. An average of 10.8 fish per mile was captured during electrofishing surveys. Smaller numbers of smallmouth bass (N= 30) were measured in the 4 to 19 inch size groups during electrofishing (Figure 1). During electroshocking surveys in 1991 and 1992, only 6 smallmouth bass were captured and the size range was 7 to 15 inches. A sub-sample of the smallmouth bass were aged and those results indicated good growth. The length at age of smallmouth bass sampled in 2005 met or exceeded the northeast Wisconsin average for ages 1-9 years, although the sample sizes were small (Table 2). Only one 13.3 inch fish was aged in 1991 as 4 years old.

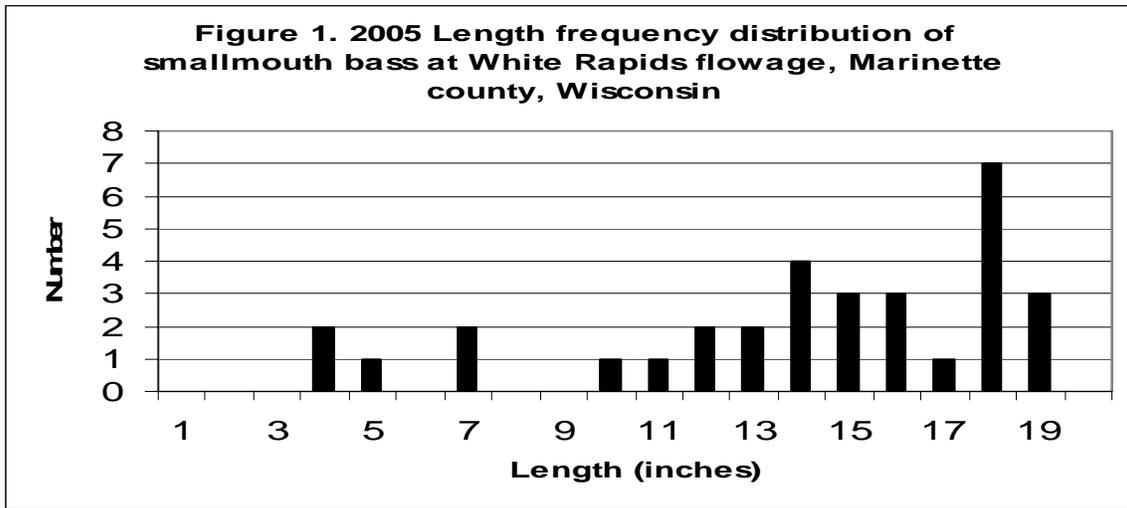


Table 2. 2005 Age- average length distribution of smallmouth bass from White Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age. N equals sample size.

Age	0	1	2	3	4	5	6	7	8	9	10
NER Average	5.2	5.1	7.6	9.9	12.3	14.2	15.8	17.1	18.5	18.6	19.9
2005 White Rapids	4.2	7.4	10.7	12.6	14.3	16.1	18.1	-	19.0	19.3	18.8
2005 (N)	2	2	1	4	7	4	3	0	4	3	1

Largemouth bass

During 2005 mini-fyke netting, juvenile largemouth bass were captured as 3.7 fish per net/ day. Electroshocking produced an average of 7 fish per mile in 2005. Largemouth bass (N= 17) were captured in the 3-19 inch size groups (Figure 2). Few adults (N= 3) were measured in the 15 to 19 inch groups. During shocking surveys in 1991 and 1992, 28 largemouth bass were captured in the 3 to 16 size range. Only 1.4% of the largemouth bass were greater than 14 inches in 1991-92. Limited length at age data for largemouth bass was collected in 2005. The average length for one year old bass exceeded the regional average by 1.0 inch, but the growth rates were less than the Regional and 1991 survey averages for 2 and 3 year olds (Table 3).

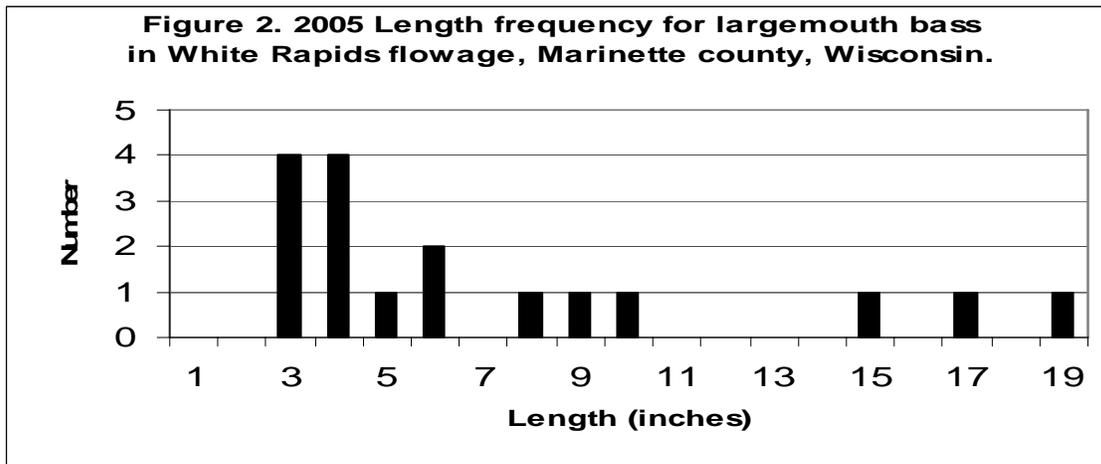


Table 3. 2005 Age- length distribution of largemouth bass from White Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age and 1991 survey information. N equals sample size.

Age	0	1	2	3	4	5	6	7
NER Average	3.6	4.7	7.2	9.5	11.3	13.3	15.0	16.6
2005 White Rapids	-	5.7	6.3	9.3	15.9	-	-	17.8
2005 (N)	0	11	8	3	1	0	0	1
1991 survey	-	-	9.4	11.6	13.9	15.4	-	19.5
1991 (N)	0	0	6	5	5	14	0	1

Walleye

During 2005 mini-fyke netting, juvenile walleye were captured as 0.5 fish per net/ day. Electroshocking produced an average of 50 fish per mile in 2005. In 1991, 312 walleye were captured during evening electroshocking and 208 were sampled in 1992. In 1992, more walleye were caught in the 4 to 9 inch size groups compared to 2005 (Figure 3). Few walleye in the 10 to 17 inch size groups were caught in 1992 and 2005. A 1992 length frequency distribution for 208 walleye ranged from 4 to 16 inches. A 2005 length frequency distribution for 99 walleye sampled demonstrated that all walleye were 4 to 17 inches in length. From electrofishing surveys, 86% were less than 14 inches in 2005 compared to 98 percent in 1992. The length at age of walleye sampled in 2005 was approximately equal to the Region averages (Table 4). The 1991 length at age data revealed slower growing fish than NER average or 2005 data.

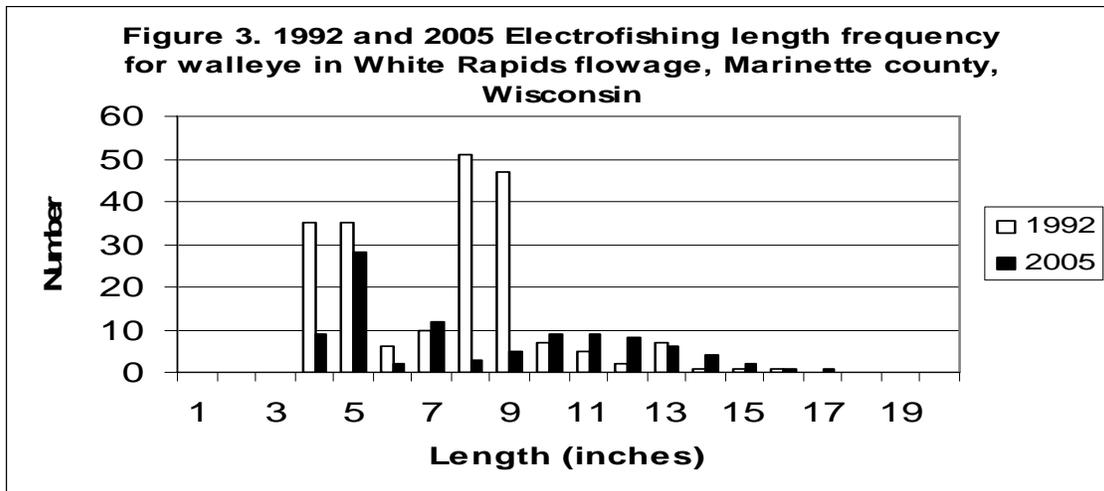


Table 4. 2005 Age- length distribution of walleye from White Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin and 1991 survey length at age data. N equals sample size.

Age	0	1	2	3	4	5	6
NER Average	5.7	8.3	10.8	13.6	16.0	17.7	19.0
White Rapids	7.1	8.3	10.3	13.6	15.3	18.0	-
N	7	15	28	21	13	5	0
1991 survey	0	0	0	0	11.9	13.9	15.9
N					9	7	1

Northern Pike

During mini-fyke netting, juvenile northern pike were not captured in 2005. Electroshocking produced an average of 9.7 fish per mile in 2005. During fall electroshocking surveys in 1991-92, only 10 northern pike were captured in this flowage. The average length of the 1991-92 northern pike was 20.6 inches. In 1991, three hundred and eighty-two pike were netted during spring fyke net surveys in 1991. The size range for those 1991 fyke netted fish was 11.5 to 42.9 inches. In 2005, pike ranged in size from 10 to 30 inches and relatively few pike were captured compared to other gamefish (Figure 4). The 2005 average length was 18.3 inches. The length at age of northern pike sampled in 2005 indicated a faster growth rate than similar data for the northeast Wisconsin average (Table 5).

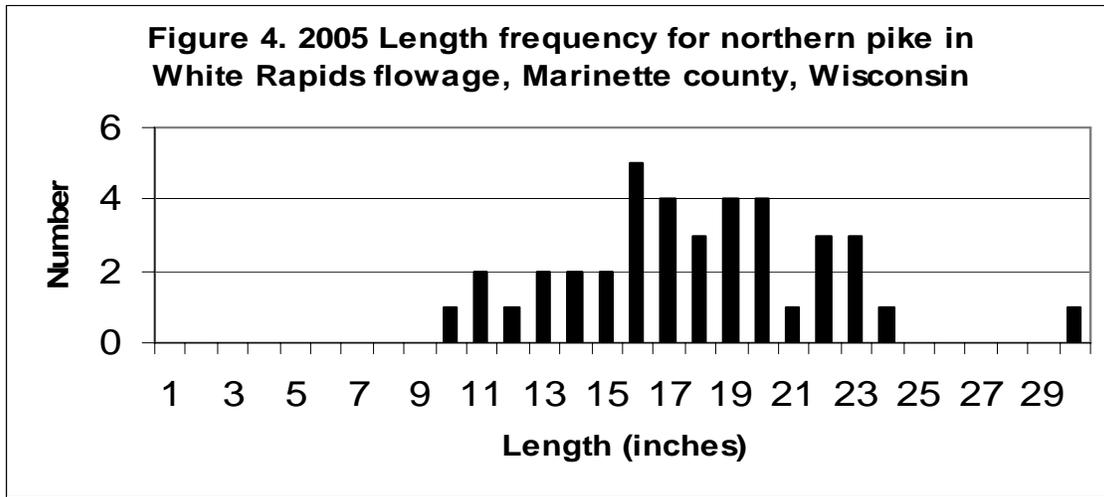


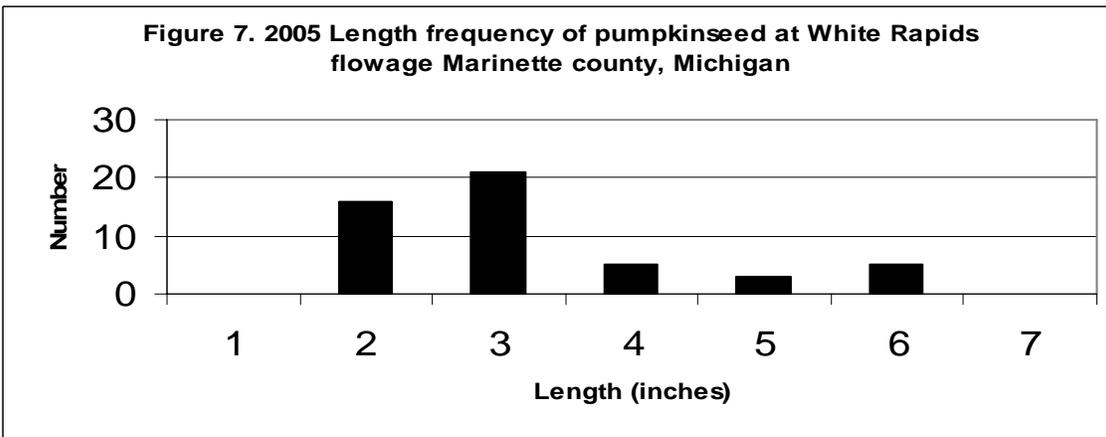
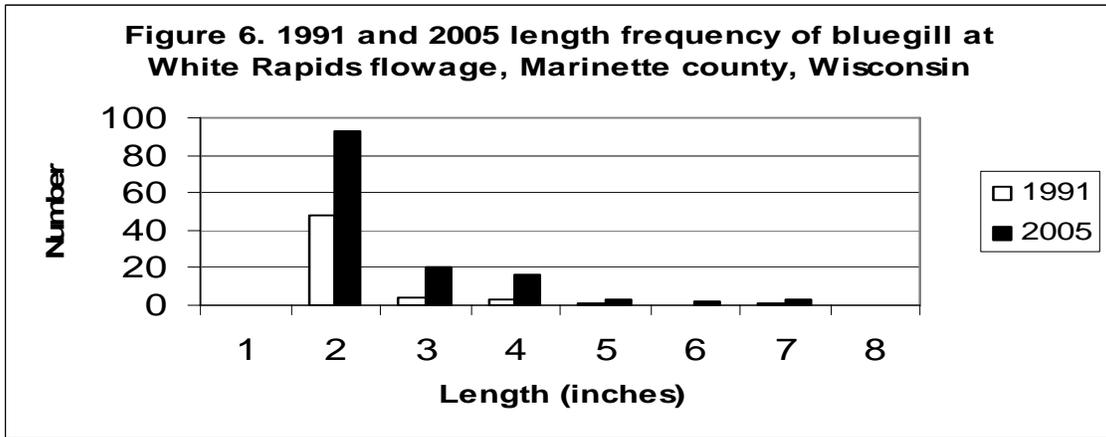
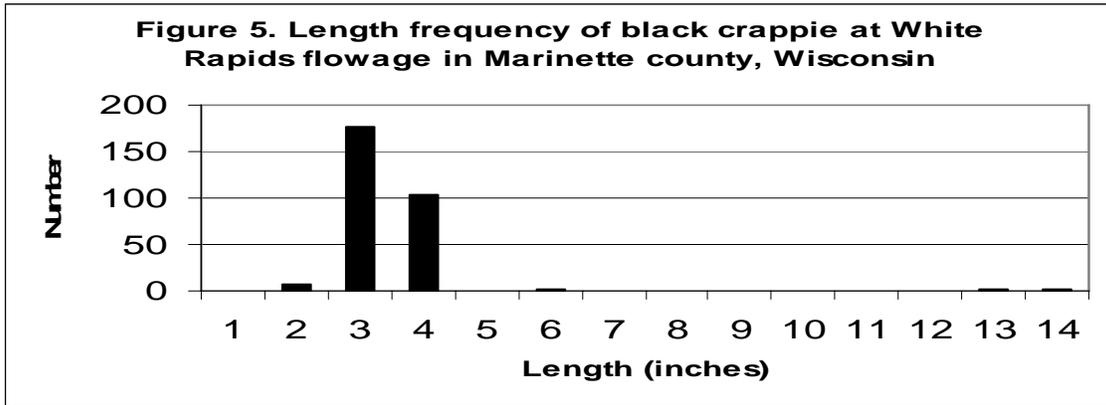
Table 5. 2005 Age- length distribution of northern pike from White Rapids Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age information. N equals sample size.

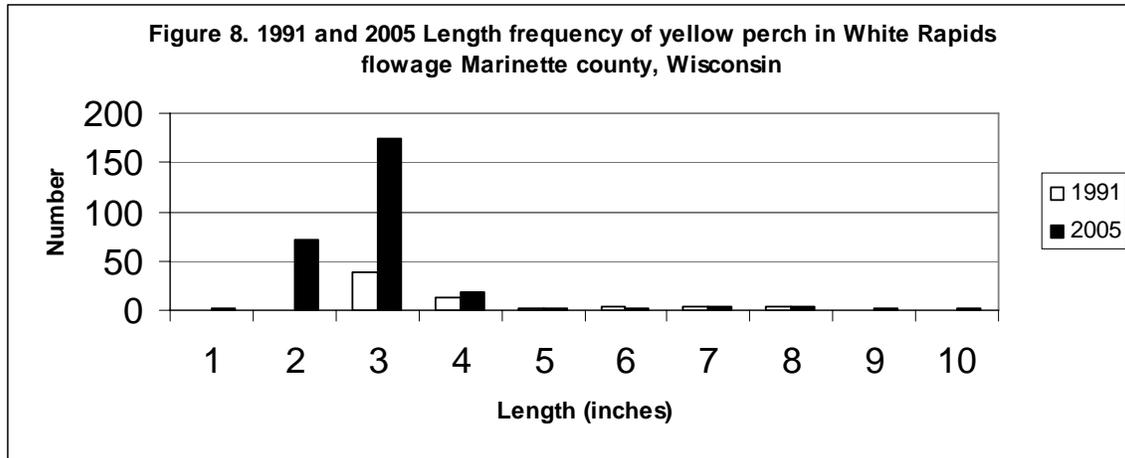
Age	0	1	2	3	4	5	6
NER Average	9.3	11.4	15.3	18.4	21.5	24.4	27.4
White Rapids	11.3	14.3	16.9	19.8	22.7	-	30.0
N	3	7	9	12	7	0	1

Panfish

Mini-fyke nets lifted in July of 2005 indicated that black bullhead were the most abundant panfish caught at 44 fish per net day followed by yellow perch (12), black crappie (5.2), pumpkinseed (1.2), rock bass (0.7) and bluegill (0.5). The 2005 electrofishing surveys revealed a very good population of black crappie (71 fish per mile) and yellow perch (55) and bluegill (35), compared to lesser numbers of pumpkinseed (10.7) and rock bass (9.7). A 1991 electrofishing survey yielded more yellow perch (64) and bluegill (57), than rock bass (19). Bullhead species were also very common during 1991 net surveys.

The panfish length frequency data discussed was only from electroshocking data for all sampling years. 2005 electroshocking length frequency data revealed large numbers of juvenile (2-4 inches) black crappie with only 3 fish over 6 inches (Figure 5). The electroshocking length frequency data for bluegill was a similar range for 1991 and 2005, but more bluegill from each inch group were recorded in 2005 (Figure 6). The pumpkinseed length frequency from 2005 data indicated a range from 2.2 to 6.4 inches and an average of 3.6 (Figure 7). A comparison of the 1991 and 2005 length frequency chart for yellow perch indicated a similar size distribution. An abundance of juvenile fish but few adults were observed during both survey years (Figure 8). In summary, adult panfish composed a minor portion of the fish sampled: black crappie (1%), bluegill (5%), pumpkinseed (26%), and yellow perch (5%) in 2005. Panfish age structures weren't collected at White Rapids in 2005.





Other fish species

Other species caught during the 2005 surveys included redhorse sp., white sucker, carp, bluntnose minnow, shiner sp., Johnny darter, and logperch. In 2005, shiner species were the most abundant non-game fish followed by common carp. These species were also present during the 1991-92 surveys as well as burbot.

In 2005, two muskellunge were captured (11.9 and 43.0 inches). The 43 inch muskellunge was aged as 9 years. Muskellunge have been stocked for several years by the Michigan DNR above the White Rapids flowage. Six muskellunge, 31-37 inches in length, were also observed in 1991-92. Lake sturgeon are present in this section of the Menominee River, but were not captured during 1991, 1992, or 2005 surveys. Rusty crayfish were captured in mini-fyke nets and common at all locations.

CONCLUSIONS AND RECOMMENDATIONS

White Rapids Flowage supports a very good fishery and natural reproduction of all species is evident. The walleye and northern pike populations appear strong. Limited numbers of adult smallmouth and largemouth bass were observed, but natural recruitment was evident through the capture of juveniles. Strong year classes of young (1 and 2 year old) largemouth bass, walleye and northern pike were documented in 2005. The 1991 net survey indicated a good size structure of the northern pike population. In 1991 and 1992, several adult walleye were netted and natural recruitment was also evident in those surveys.

The existing fishery is very good and no stocking is needed to enhance the populations of various species. The smallmouth bass fishery in the Menominee River flowages is particularly targeted by fishermen. The present fishing regulations are maintaining a good quality fishery and no changes are needed at this time (Table 6).

The hydroelectric company, WE Energies, has operated this dam as run of river since 1997 and provides relatively, stable flows through the flowage. That license won't expire until 2037. WE Energies also owns the entire shoreline zone, so that habitat should be maintained in a natural state and no development is anticipated in the coming years. The power company maintains two boat launches in the flowage and those facilities are adequate. The agencies are currently meeting with WE Energies to facilitate a fish passage plan and associated structures around White Rapids and Chalk Hill dams. Those

developments should be a major priority of the resource agencies to allow passage of lake sturgeon around these dams. This migration is a priority for spawning access to suitable habitat below Sturgeon Falls. The agencies should also strive to implement the numerous objectives outlined in the 1992 Menominee River Fisheries Plan.

Table 6. 2006-07 White Rapids Flowage Fishing Regulations for selected species, Marinette County Wisconsin.

Species/ Regulation	Smallmouth and largemouth bass	Walleye	Northern Pike	Panfish
Season	3 rd Saturday in June through Nov 30 5 in total	March 2 to Friday preceding the 1 st Saturday in May = 1;	1 st Saturday in May to Mar 1 = 5	Open all year
Season	First Saturday in May to Friday preceding 3 rd Saturday in June Catch and release only	1 st Saturday in May to Mar 1 = 5	Closed Mar 2 to Friday preceding the 1 st Saturday in May	Open all year
Daily limit	0/ 5 in total (see above)	1/ 5 in total (see above)	0/ 5 (see above)	25 in total
Size limit	14 inches	15 inches	None	None

ACKNOWLEDGEMENTS

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LITERATURE CITED

Kornely, G. 1994. Report on the Fishery in White Rapids Flowage, Marinette County, 1991-92. Wisconsin Department of Natural Resources.

Carlson, H, Lloyd M. Andrews and C.W. Threinen. 1975. Surface Waters of Marinette County. Wisconsin Conservation Department, Madison, WI. 106 pages.

Cover image courtesy of TerraServer-USA website and United States Geological Survey.