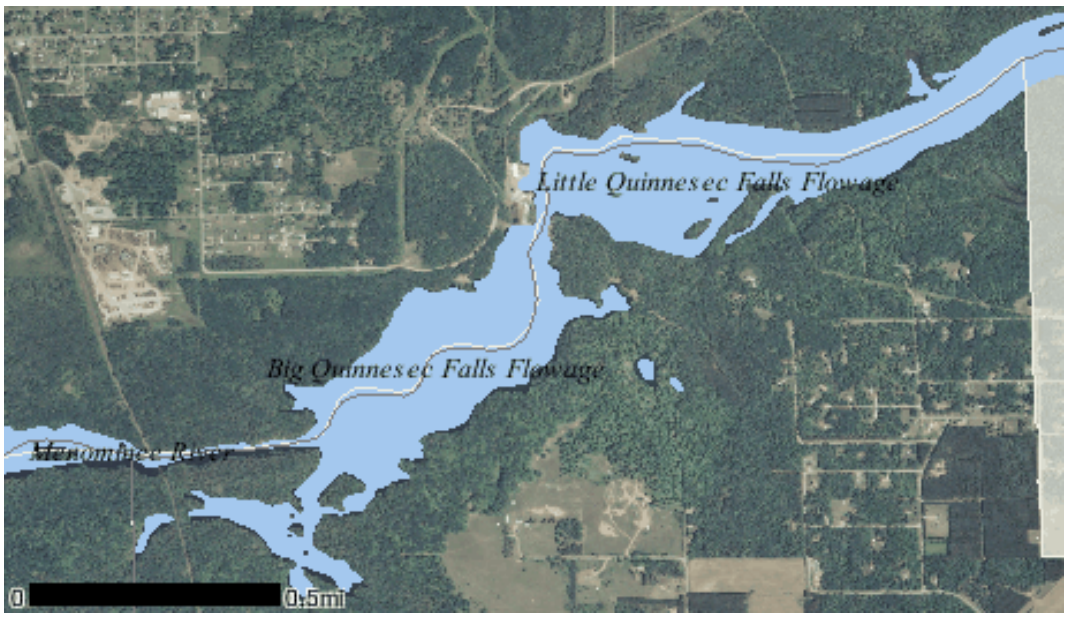
Big Quinnesec Flowage, Marinette County, Wisconsin
Fisheries Survey Report, 2009

Waterbody Identification Code: 647500

Big Quinnesec Flowage, Menominee River, Florence County, Wisconsin



Michael Donofrio
Fisheries Supervisor
Wisconsin Department of Natural Resources
Peshtigo, Wisconsin
May 2010

Big Quinnesec Flowage, Marinette County, Wisconsin
Fisheries Survey Report, 2009

Report Approval signatures

_____
Michael Donofrio, Fisheries Supervisor, Date

_____
George Boronow, Regional Fisheries Supervisor, Date

_____
Andrew Fayram, Bureau of Fisheries Management, Date

Big Quinnesec Flowage, Marinette County Wisconsin
Fisheries Survey Report, 2009

Michael Donofrio
Fisheries Supervisor
May 2010

SUMMARY

Lake and location
Big Quinnesec Flowage, Marinette County, T38N R20E Sec 6

Physical / chemical attributes (Carlson et al, 1971)
Surface acres: 127
Mean depth: 27 feet
Maximum depth: 45 feet
Lake type: drainage water body with only 2% less than 3 feet deep while 66% is over 20 feet in depth
Basic water chemistry: Slightly alkaline, stained light brown and moderate transparency
Littoral substrate: 50% boulder, 40% sand, 10% rubble
Aquatic vegetation: Sparse, 5% emergent and 5% submergent vegetation with Eurasian water milfoil
Other features: WE Energies owns and operates the Big Quinnesec Hydroelectric Project that controls the water level and outlet flows as a peaking operation.

Purpose of surveys
Spring and Fall Electrofishing assessments

Dates of fieldwork
Electrofishing surveys conducted April 28, June 8, and October 2, 2009.

BACKGROUND

Big Quinnesec is a 127 acre impoundment just west of the Niagara, WI. Big Quinnesec Flowage is one of ten impoundments on the Menominee River. The Menominee River, a boundary water with Michigan, enters the impoundment roughly 5 miles upstream of the dam which controls the water level. This impoundment would also be considered a widened river channel rather than a lake type impoundment.

The deepest part of the flowage is 45 feet, just above the dam. The average depth is 27 feet. The littoral area is 50% boulder, 40% sand, 10% rubble. There is just under 5 miles of shoreline and little development on this flowage.

The lake has sparse macrophyte growth with a plant community comprised of vallisineria, coontail, and several potamogeton species. The presence of Eurasian water milfoil was reported for this flowage.

In 2001, the Federal Energy Regulatory Commission re-licensed the Big Quinnesec Hydroelectric Project operated by WE Energies. WE Energies shall release from the Big Quinnesec project from June 16 through April 9 a minimum flow into the Menominee River below the project that, in any day, is not less than 50 percent of the maximum flow on the same day. The project operated at run-of-river mode from April 10 through June 15 and the pool elevation is maintained between 1033.4 feet and 1034.9 feet above sea level at all times.

The last comprehensive survey was conducted in 1995 including spring fyke netting, shoreline seining, gill netting and spring and fall electrofishing. Fishing pressure on this flowage is believed to be low in the winter and light to moderate during the rest of the year. According to stocking records for Michigan and Wisconsin, no fish have been stocked into these waters. There are two public accesses to the flowage: one is operated by WE Energies and located just upstream of the dam and second is maintained by the Town of Aurora.

METHODS

Data collection

A WDNR standard direct current electrofishing boat was used to sample 4 miles of shoreline on the evening of April 28, 2.0 miles of shoreline on June 8 and 4 miles of shoreline on October 2, 2009 (see attachments). Only walleye and muskellunge were captured and processed on the April and October sampling dates. In June, all fish captured were identified to species and counted for the first ½ mile and only game fish during the succeeding 1.5 miles each evening. Total length of gamefish and a sub-sample of panfish were measured to the nearest 0.1 inch. Scales or dorsal spines were collected from a sub-sample of fish stratified within 0.5 inch bins. Ages were assigned to fish after scales and spines were aged using standard WDNR procedures.

Data analysis

Total catch and catch per gear type was calculated for all species. Length frequency distributions were performed for walleye, smallmouth bass, rock bass and yellow perch. A subsample of walleye, northern pike, largemouth and smallmouth bass were aged for comparisons with previous surveys. Proportional Stock Density (PSD) and Relative Stock Density of preferred length fish (RSD-preferred, Anderson and Neumann 1996) were calculated for smallmouth bass, walleye, largemouth bass, rock bass and yellow perch. Stock length, quality length, and preferred length values were as proposed by Gabelhouse (1984).

RESULTS AND DISCUSSION

A total of 337 fish of 8 different species were collected in 2009. Catch per date and catch rates are shown for each species sampled at Big Quinnesec (Table 2). Walleye was the most abundant species in 2009. Rock bass, yellow perch, largemouth bass and smallmouth bass were common. Bluegill, muskellunge, and northern pike were sampled in low numbers in 2009. Black crappie were sampled in 1995 but not in 2009. Electrofishing comparisons indicated a decrease in the abundance of black crappie,

muskellunge, bluegill, northern pike, walleye and smallmouth bass since 1995, but an increase in abundance of largemouth bass and rock bass from 1995 to 2009.

Smallmouth Bass

No smallmouth bass were captured during spring netting in 1995. The electrofishing catch rate was 20 fish per hour in 1995 compared to a catch rate of 6 per hour in 2009 (Table 2). A total of 41 smallmouth bass were sampled in 2009. Smallmouth bass ranged in size from 2.0 to 14.9 inches in 1995 compared to an average of 11.0 and a size range from 6.0 to 17.5 inches in 2009. The 2009 size structure was good with 46% of the fish greater than 11 inches (PSD) and 15% of fish greater than 15 inches (RSD-preferred) and similar to the values from 1995 at a PSD of 60% and RSD15 of 4% in 1995. Size structure was similar for both survey years with good representation from juvenile and adult bass (Figure 1). Smallmouth bass growth rates were better for 2009 than 1995 (Table 3). Smallmouth bass reproduction was not as negatively impacted by the impoundment fluctuations compared to more lentic species. This occurrence may have resulted in greater inter-specific competition for food with other species.

Walleye

Only 11 walleye were fyke netted in the spring of 1995 with a size range from 12.5 to 25.4 inches and 0.10 fish per net night (Table 2). In the 2009 electrofishing surveys, 152 walleye were collected with a size range of 4.9 to 26.1 inches and an average length of 9.5 inches. In 2009, the walleye PSD was 29% and 6% of the walleye were greater than 20 inches (RSD 20) compared to a PSD of 26%. No walleye were greater than 20 inches in 1995. Usually, walleye are difficult to sample in a flowage because of poor access to the shallow waters in the headwater area. Size structure was similar for both survey years (1995 and 2009) with excellent representation from juvenile walleye and average numbers of adult (over 15 inches) were observed in both years (Figure 2). Recruitment appears to be high in this flowage since 82% of the walleye sampled were 4-6 inches in length for 1995 and 51% for 2009. Walleye growth rates were slower than Northeast Wisconsin average length at age for all years except age 1 (Table 4).

Largemouth Bass

During 2009 electrofishing survey, 22 largemouth bass ranging from 9.1 to 18.1 inches were captured compared to 12 largemouth bass in the 1995 electrofishing surveys. The 1995 largemouth bass were all juveniles ranging from 2-4 inches. The 2009 size structure was good with 32% of the fish greater than 12 inches (PSD) and 14% of fish greater than 15 inches (RSD-preferred). Nearly all of the largemouth bass sampled in 2009 were aged and compared to northeast region of Wisconsin (NER) average length at age. The bass aged at 3 years were slightly larger than the NER but slightly less for ages 4-6 and 10.

Northern Pike

Fyke netting in 1995 resulted in 85 northern pike with a size range of 10.0 to 36.4 inches. The fyke net catch rate was 0.74 per net night in 1995 (Table 2). The 1995 electrofishing catch rate was 27 fish / hour compared to 1 fish per hour in 2009. Electrofishing surveys in 1995 yielded 124 pike with a size range of 6.0 to 28.4 inches. During 2009 electrofishing, only 7 pike were sampled with an average length of 17.2 inches and a size range from 12.4 to 26.7 inches. The northern pike growth rates were comparable between the 1995 and 2009 surveys for ages 2-4 years, as pike were only aged for those 3 years in 2009.

Rock Bass

Rock bass were the most abundant panfish captured in 1995 and 2009. Their catch rate was the highest for any species in the 2009 electrofishing surveys (Table 2). Sixty- three rock bass were sampled in 2009 with a size range from 2.5 to 9.5 inches and an average length of 6.0 inches. The 2009 PSD value was very good at 44%. The size distribution was similar for both survey years with good representation for several inch groups (Figure 3). Rock bass were not aged in 2009.

Yellow Perch

Fyke netting in 1995 yielded 339 yellow perch or 2.95 perch per net night (Table 2). The number of perch caught during the 1995 and 2009 electrofishing events was nearly the same at 41 and 42. However, the 2009 catch rate was twice the value for 1995. In 2009,

the size ranged from 3.5 to 8.0 inches with an average of 6.1 inches. The 2009 PSD value was low at 3% and RSD10 was zero. Perch of various lengths were present in 1995 and 2009 with evidence of natural recruitment (Figure 4). Yellow perch were not aged in 2009.

Bluegill

The catch rate was relatively low in both survey years as 2.6 in 1995 and 4.5 in 2009 (Table 2). Only 2 bluegill were fyke netted in 1995. The 2009 length range was 4.0 to 6.5 inches and a mean length of 5.8 inches. Only 9 bluegill were sampled in 2009 with electrofishing equipment and 12 bluegill in 1995. Evidence of natural recruitment was low on both years, but not unusual since this flowage lacks shallow water habitat preferred by this species. Bluegill were not aged in 2009.

Other Species

Two juvenile muskellunge were captured in 2009 at 11.1 and 12.1 inches. Low numbers of juvenile musky were also observed during 1995 surveys. Black crappie were observed in good numbers in 1995 but were absent in 2009. The electrofishing route was the same but 14 years lapse between the surveys does not provide reasonable information as to the changes in that fishery. Likely black crappie exist in this flowage in low numbers. Four pumpkinseed were sampled in 2009 from 5.1 to 6.3 inches. Low numbers of white sucker and mottled sculpin were also observed in 2009.

CONCLUSIONS AND RECOMMENDATIONS

Big Quinnesec flowage is difficult to survey primarily because of sharp drop offs and abundant deep waters (only two percent of the basin is less than three feet in depth). Overall, the fishery of Big Quinnesec Flowage appears to be in good condition. In 2009, three electrofishing events on this flowage indicated a fishery with good walleye and bass species populations. The 1995 and 2009 surveys demonstrated strong evidence of walleye recruitment in this flowage. The panfish community is supported by good numbers of rock bass and yellow perch, although bluegill, pumpkinseed, and black crappie were

rarely sampled in 2009. The 2009 surveys also documented low numbers of northern pike and muskellunge.

Proportional stock densities (PSD) are defined as some length within 20-26% of an angling world record length. The following ranges of proportional stock density values are indicative of balance when the population supports a substantial fishery are 30-60 for smallmouth bass, northern pike, walleye; 30-50 for yellow perch, 40-70 for largemouth bass, and 20-40 for bluegill. Therefore, PSD values for smallmouth bass, walleye, rock bass and largemouth bass at Kingsford Flowage indicated balanced populations; while PSD values for northern pike, bluegill, yellow perch demonstrated unbalanced populations. However, PSD values are only one factor used to manage a fishery and a more comprehensive survey would better reveal the status of this fishery.

The regulation of the hydro-electric facilities and the subsequent stabilization of the water level appear to have had a positive effect on improving the fishery. Additional fisheries habitat improvements such as shoreline restoration and the addition of coarse woody structure may increase fish recruitment and growth rates although the lack of a good littoral zone on this flowage would make those improvements difficult.

The current regulations seem to be appropriate. I would recommend a comprehensive survey of these waters in the next 5 years. Public access to Big Quinnesec Flowage is adequate. There is also shore access fishing. I would recommend no improvements to the current landing facilities.

ACKNOWLEDGEMENTS

I would like to thank Greg Kornely, Cliff Sebero, Cory Weinandt, and Ron Rhode for their assistance in collecting, processing, tabulating and aging the fish from Big Quinnesec Flowage. I also appreciate editorial comments from George Boronow.

REFERENCES

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Carlson, H, L.M. Andrews, and C.W. Threinen. 1971. Surface Waters of Florence County. Department of Natural Resources, Madison, WI.

Gabelhouse, D. W., Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4:273-285.

TABLES AND FIGURES

TABLE 1. Current fishing regulations for Big Quinnesec Flowage.

Species	Open Season	Daily limit	Minimum length
Largemouth and Smallmouth Bass	1st Saturday May- June 20 June 21- Dec 31	0 5 in total	Catch and release 14 inches
Northern Pike	first Saturday in May – first Sunday in March	5	none
Muskellunge	May 15- November 30	1	40 inches
Walleye	1st Sunday March- 1st Sat May 1st Sunday May- 1st Saturday March	1 5 in total	15 inches 15 inches
Panfish (bluegill, pumpkinseed, yellow perch, white and black crappie)	Open all year	25 in total	None
Catfish	Open all year	10 in total	none

TABLE 2. Catch summary for electrofishing samples from Big Quinnesec, 2009. The electrofishing sample was collected on April 28th, June 8th and October 7th, for a total of 7 hours of effort. On all 2009 dates, only 2 hours was allotted for panfish effort. The 1995 fyke net effort was 115 net nights. In 1995, 4.6 hours spring (May 31) and fall (September 27) electrofishing was performed.

Species	Fyke netting 1995		Electrofishing 2009		Electrofishing 1995	
	Total Catch	Mean Catch per net night	Total Catch	Catch per hour	Total Catch	Catch rate
Black Crappie	2	.02	0	-	38	8.3
Yellow Perch	339	2.95	41	20.5	56	12.2
Muskellunge	4	.03	2	0.3	7	1.5
Bluegill	2	.02	9	4.5	12	2.6
Largemouth Bass	0	-	22	3.1	12	2.6
Northern Pike	85	.74	7	1	124	27.0
Rock Bass	30	.26	63	31.5	42	9.1
Smallmouth Bass	0	-	41	5.9	93	20.2
Walleye	11	.10	152	21.6	482	104.8

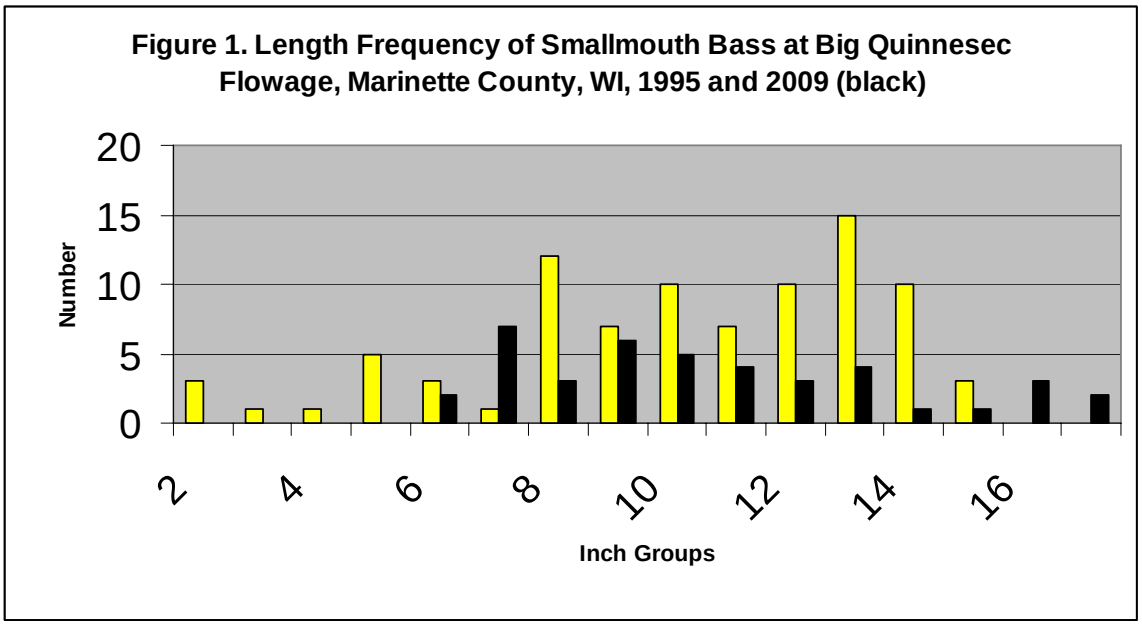


Table 3. 2009 Age-length distribution of smallmouth bass from Big Quinnesec Flowage, Marinette County, Wisconsin compared to Northeast (NER) Wisconsin average length at age data. N equals sample size.

Age	2	3	4	5	6	7
1995 Survey	5.4	9.2	10.1	11.6	12.9	13.6
1995 (N)	1	3	7	2	6	3
2009 Survey	6.4	8.6	11.2	13.4	15.3	17.1
2009 (N)	1	16	9	5	4	3

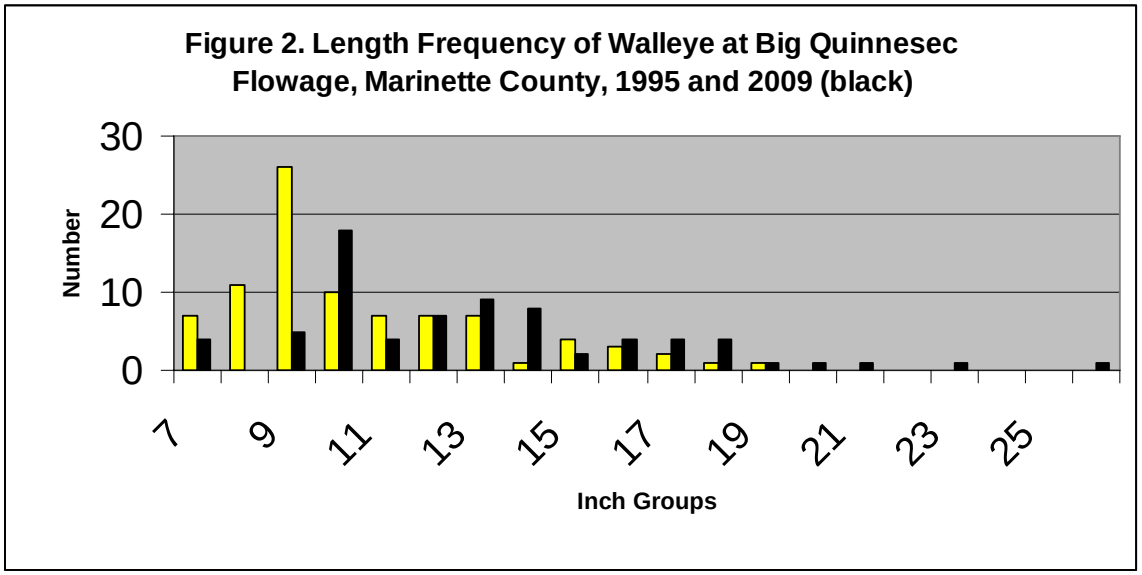


Table 4. 2009 Age- length distribution of walleye from Big Quinnesec Flowage, Marinette County, Wisconsin compared to Northeastern (NER) Wisconsin average length at age data. N equals sample size.

Age	1	2	3	4	5	6	7	8	9	10	11
NER Average	8.3	10.8	13.6	16.0	18.0	19.1	21.2	22.5	23.9	26.7	26.3
2009 Survey	9.4	10.4	11.8	13.3	15.1	17.0	18.2	19.4	22.6	----	26.1
2009 (N)	5	16	12	3	9	2	2	2	2	0	1

Table 5. Age- length distribution of largemouth bass from Big Quinnesec Flowage, Marinette County, Wisconsin compared to Northeastern (NER) Wisconsin average length at age data. N equals sample size.

Age	3	4	5	6	7	8	9	10
NER Average	9.6	11.5	13.3	14.9	16.5	18.3	18.2	18.8
2009 Survey	10.3	10.8	13.2	14.7	----	----	----	18.1
2009 (N)	11	4	2	3	0	0	0	1