Comprehensive Fisheries Survey of Bagley Flowage, Marinette County Wisconsin 2006 - 2007

Waterbody Identification Code 516800

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February, 2008

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Executive Summary
A basic fisheries survey of Bagley Flowage was conducted during the 2006 field season and was succeeded with a more comprehensive fisheries survey that was implemented during the 2007 field season. The dominant game fish species in the flowage are northern pike (population estimate = 738), largemouth bass (population estimate = 684), smallmouth bass and walleye. Bluegill are the most abundant panfish species with good numbers of rock bass, black crappie, pumpkinseed, and yellow perch in the flowage. The recommended management of Bagley Flowage is for northern pike, largemouth bass, smallmouth bass, walleye and panfish.

Lake and Location:
Bagley Flowage (Potato Rapids Flowage), Marinette County, T31N R22E Sec33.
Located in southeast Marinette County, 5 miles west of Peshtigo

Physical / Chemical attributes (Wisconsin DNR, 1975):
Morphometry: 281 acres, maximum depth 20 feet, mean depth 7 feet, shoreline 8.2 miles
Lake type: Impoundment on the Peshtigo River
Watershed: 1,005 square miles with a drainage area of 38 square miles and 32 acres of adjoining wetlands.
Basic Water Chemistry: Hard water drainage lake having a slightly alkaline, light brown water of moderate transparency, Secchi disc – 6 feet (summer), pH 7.2. Conductance 300umhos.
Littoral Substrate: 60% sand, 25% muck and 15% gravel
Aquatic Vegetation: Large areas of emergent and submergent vegetation are present throughout the flowage.
Other Features: The majority of the shoreline is undeveloped and owned by the State of Wisconsin. This flowage forms part of the Peshtigo River State Forest. The shoreline is primarily upland consisting of hardwoods and a few conifers.

Purpose of Survey: Assess the fishery status

Dates of fieldwork:
Mini-fyke netting (juvenile fish) – August 1st, 2006
Electroshocking – October 11th, 2006 and May 22nd, 2007
Fyke netting (all species and ages) – March 27th – April 11th, 2007

BACKGROUND

Bagley Flowage (also known as Potato Rapids Flowage) was created by the Peshtigo Pulp and Paper Company during 1920 - 1921. Wisconsin Public Service Corporation obtained the hydroelectric facility in 1925 and still operates it today. The majority of the shoreline along the flowage was recently purchased by the State of Wisconsin from Wisconsin Public Service Corporation. This purchase created part of the Peshtigo River State Forest. The remainder of the shoreline is in ownership of Wisconsin Public Service Corporation and a couple of small parcels in private ownership. There are several (20+) miles of natural Peshtigo river channel upstream from this impoundment until the next dam (Sandstone flowage, upstream from Crivitz, Wisconsin).

There are currently only a handful of dwellings along the flowage. With the majority of the land in public ownership, it is likely that the current status will be the extent of the development. The flowage is long and narrow with large areas of dense emergent and submergent vegetation. Twenty five percent of the flowage is less than three feet in depth. There is one boat landing on the flowage that is owned and operated by the Peshtigo River State Forest. The major recreational activities on the flowage are fishing and canoeing The dense amount of aquatic plants and shallow depths make other activities difficult on the flowage especially during the summer months. This flowage is also a very popular destination for ice fishing activities.

Previous fisheries surveys were conducted on Bagley Flowage in 1964, 1973, 1974, 1988 and 1999. For this report, comparisons have been made only with the information collected from the 1988 and 1999 surveys (Kornely, 1989 and 2000 unpublished DNR report and data). The previous surveys showed the fishery to consist of northern pike, walleye, smallmouth bass, largemouth bass, rock bass, bluegill, pumpkinseed, black crappie, yellow perch, warmouth and bullhead species. Rough fish are also abundant in the system and include several redhorse species and white sucker.

The fish stocking history for Bagley Flowage has varied over the last 60 years. Walleye were stocked on a regular basis in the 1940’s, 1950’s, 1960’s, and sporadically in the 1970’s, 1990’s and 2000’s (Table 1). Largemouth and smallmouth bass were stocked sporadically in the 1940’s and 1950’s (Table 1). Muskellunge were also stocked at varying rates between 1965 and 1972 (Table 1).

Table1. DNR and privately funded fish stocking 1940 through 2007 in Bagley Flowage, Marinette County, Wisconsin. (any private stocking?

Year	Species	Size (average)	Number
1940	Walleye	Fry	1,000,000
1941	Walleye	Fry	500,000
1942	Walleye	Fry	1,000,000
1943	Walleye	Fry	712,500
	Smallmouth bass	Fingerling	5,000
1944	Walleye	Fry	550,000
	Largemouth bass	Fry	7,200
1946	Walleye	Fry	1,500,000
1947	Largemouth bass	Fingerling	1,000
1948	Largemouth bass	Fingerling	7,500
	Smallmouth bass	Fingerling	6,000
1950	Walleye	Fry	1,125,000
	Walleye	Fingerling	6,200
	Smallmouth bass	Fingerling	10,000
1952	Smallmouth bass	Fingerling	2,500
1953	Walleye	Fingerling	6,500
1955	Walleye	Fingerling	6,530
1956	Walleye	Fingerling	6,400
1965	Muskellunge	Fingerling	1,500
1966	Walleye	Fingerling	35,000
1968	Muskellunge	Fingerling	1,200
1969	Walleye	Fingerling	12,320
1970	Walleye	Fingerling	7,913
1971	Walleye	Fingerling	10,000
1972	Muskellunge	Fingerling (13inches)	700
1992	Walleye	Fingerling (3 inches)	5,025
1993	Walleye	Fingerling (2 inches)	7,098
2003	Walleye	Small Fingerling (1 inch)	9,993
2003	Walleye	Large Fingerling (7 inches)	500
2005	Walleye	Small Fingerling (1 inch)	14,000

METHODS

Six mini-fyke nets (1/4" stretch mesh with turtle exclusion) targeting young-of-the-year fish) were set on July 31st, 2006 and lifted on August 1st, 2006 (Appendix Figure 1). A Wisconsin DNR standard direct current full size electrofishing boat was used on October 11th 2006 along 2.0 miles of shoreline (Appendix Figure 2) and on May 22nd 2007 along 3.75 miles of shoreline (Appendix Figure 3). Eight standard fyke nets (3/4" stretch mesh) were set on March 26th 2007 and lifted daily from March 27 – April 11, 2007 (Appendix Figure 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 2006, all species were collected in a ½ mile index station of shocking and game fish only were collected for an additional 1.5 mile station. 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 during that survey.

In the fyke netting survey during March - April 2007, 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 each gamefish, when applicable, and was calculated using only the fyke net caught fish from spring 2007.

In the electroshocking run during May 2007, only game fish were sampled and a total of 3.75 miles of shoreline were shocked during that survey. 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 with relevant species in northeast (NER) Wisconsin or the Wisconsin State average and were last updated in 2003. Those results served as comparisons for growth rates in this report as well as previous fish surveys on Bagley Flowage.

RESULTS AND DISCUSSION

Catch per unit effort results for all survey methods used in 2006 and 2007 and fyke net survey only from 1999 and 1988 are shown in Table 2. Nine game species were captured and detailed results for common species are written in this report. Numerous non-game species were also captured, but were not described beyond overall abundance.

Table 2. Catch per unit effort of game fish and panfish species during fishery surveys in 1988, 1999, 2006 and 2007 on Bagley Flowage, Marinette County, Wisconsin. Panfish were not collected during May 2007 electroshocking. Fyke net catch per effort is calculated as number of fish per net night. Electrofishing catch per effort is calculated as number of fish per mile.

Species	**Spring 1988 Fyke net**	**Spring 1999 Fyke net**	**August 2006 Mini-fyke**	**October 2006 Electro**	**April 2007 Fyke net**	**May 2007 Electro**
Black crappie	2.4	1.8	9.7	0	1.9	--
Bluegill	6.8	5.1	18.2	1.5	15.4	--
Largemouth bass	0.07	0.3	6.5	1.5	1.0	0
Northern pike	5.8	3.4	1.3	6	5.8	0
Pumpkinseed	4.7	3.2	7.8	0	1.8	--
Rock bass	12.3	5.9	2.7	9.5	2.8	--
Smallmouth bass	0.3	0.9	0.3	2.5	0.2	3.5
Walleye	0.7	0.5	0	0	0.05	0
Yellow perch	2.2	3.9	0.8	1.5	0.5	--

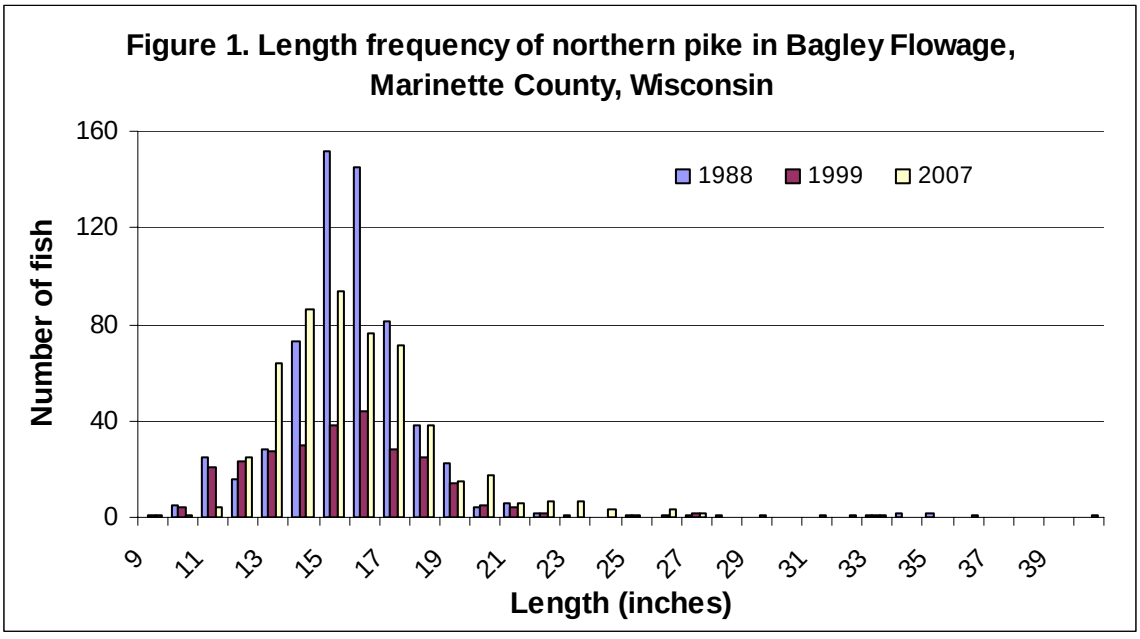
Northern Pike

During the summer 2006 mini fyke netting survey, no juvenile northern pike under 3 inches were captured in this flowage. There were 1.3 northern pike per net night captured over 3 inches and ranged in size from 4.3 to 15.0 inches. Electroshocking during the fall of 2006, produced 6 northern pike per mile ranging in size from 12.6 to 21.5 inches. During the spring of 2007, no northern pike were captured in the electroshocking survey. During the spring 2007 fyke netting survey, we captured five hundred and twenty six northern pike ranging in size from 9.2 to 40.0 inches (Figure 1) and averaging 16.4 inches. Those statistics do not account for the recaptured fish (143).The catch per effort was 5.8 northern pike per net night. The population estimate was 738 northern pike with a 95% confidence interval of 596.9 to 967.6 fish. The density was 2.6 fish per acre (Figure 1a).

In 1999, a total of two hundred and seventy one northern pike were captured ranging in size from 9.2 to 33.7 inches (Figure 1) and averaging 15.8 inches. The catch per effort was 3.4 northern pike per net night. No population estimate was calculated in that year.

In 1988, a total of six hundred and six northern pike were captured ranging in size from 10.0 to 35.4 inches (Figure 1) and averaging 15.5 inches. The catch per effort was 5.8 northern pike per net night. The total population estimate was 1,092 northern pike with a 95% confidence interval of 968 to 1,253 fish (Figure 1a). The density was 3.9 fish per acre.

The length at age of northern pike sampled in the 2007 survey showed slower growth for ages 1 to 7 when compared to the NER average and both the 1988 and 1999 surveys (Table 3). The sample size of aged northern pike for 1988 was 166, 1999 was 93 and 2006 was 240 (Table 3). In the 2007 survey, there was a good representation across many year classes of northern pike.



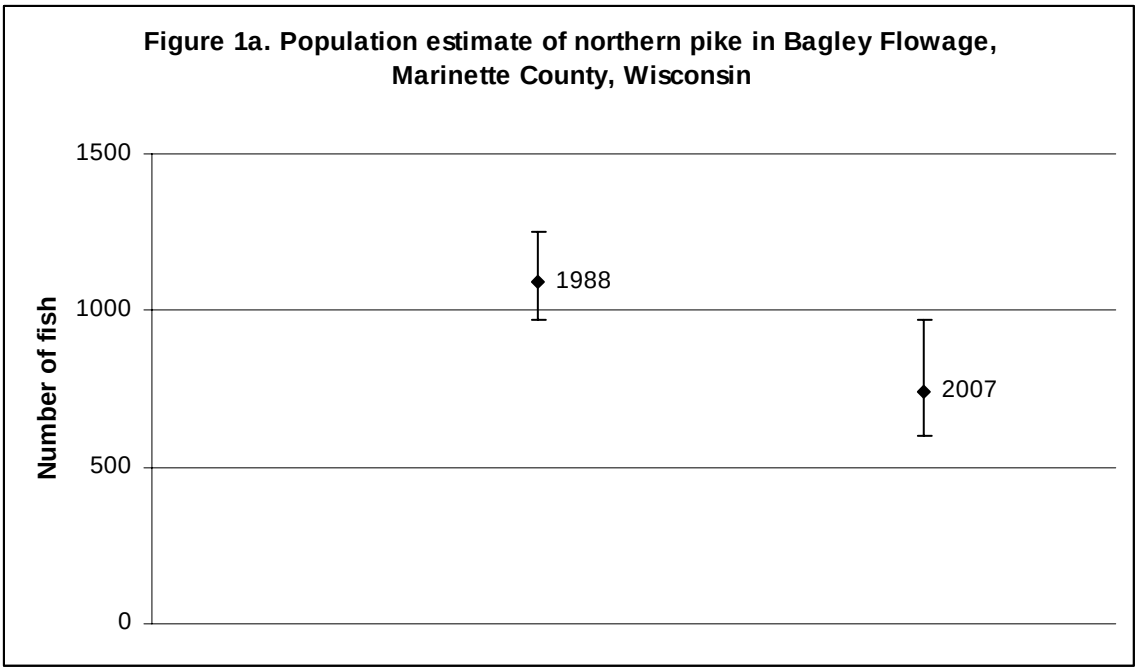


Table 3. 2007 Age- length distribution of northern pike from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age, 1988 and 1999 survey information. N equals sample size.

Age	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
NER Average	11.4	15.3	18.4	21.5	24.4	27.4	30.0	30.9	32.4	31.6
2007 Survey	9.8	14.0	16.2	18.3	21.7	24.1	29.2	36	--	36.7
2007 (N)	2	62	95	49	19	7	3	1	--	2
1999 Survey	11.6	14.5	16.9	20.0	23.3	27.4	26.4	--	--	--
1999 (N)	9	36	28	13	3	3	1	--	--	--
1988 Survey	11.6	15.5	17.5	20.4	--	--	--	--	--	--
1988 (N)	13	117	32	4						

Largemouth bass

During the summer 2006 mini fyke netting survey, a total of 39 largemouth bass were captured ranging in size from 1.7 to 3.1 inches. The catch per effort was 6.5 juvenile largemouth bass per net night. Electroshocking, during the fall of 2006, produced 1.5 largemouth bass per mile ranging in size from 8.0 to 16.7 inches. During the spring 2007 electroshocking survey, no largemouth bass were captured. During the spring 2007 fyke netting survey, we captured one hundred and ten largemouth bass. Those bass ranged in size from 9.0 to 19.5 inches (Figure 2) and averaged 15.8 inches. Those numbers do not include the recaptured fish (9). The catch per effort was 1.03 largemouth bass per net night. The population estimate was 684 largemouth bass with a 95% confidence interval of 399 to 2,393 fish. The density was 2.4 fish per acre.

In 1999, a total of twenty two largemouth bass were captured ranging in size from 9.7 to 20.7 inches (Figure 2) and averaged 16.2 inches. The catch per effort was 0.3 largemouth bass per net night. No population estimate was calculated.
In 1988, a total of seven largemouth bass were captured ranging in size from 8.5 to 20.4 inches (Figure 2) and averaged 14.7 inches. The catch per effort was 0.07 largemouth bass per net night. No population estimate was calculated.
The length at age of largemouth bass sampled in the 2007 survey showed varied growth rates, however generally the growth rates were slower when compared to the NER average and the 1999 survey (Table 4). No length at age data was available from the 1988 survey. The sample size of aged largemouth bass for 1999 was 22 and 2006 was 93 (Table 4). In the 2007 survey, there was a good representation across many year classes of largemouth bass.

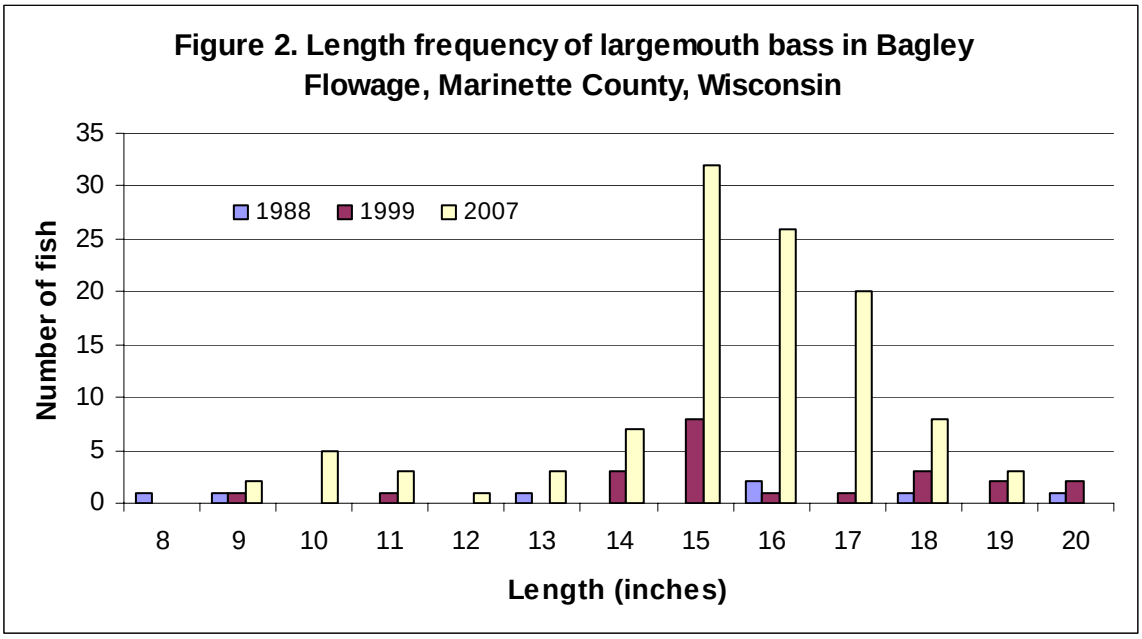


Table 4. 2007 Age- length distribution of largemouth bass from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age and the 1999 survey information. N equals sample size.

Age	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
NER Average	9.9	12.3	14.2	15.8	17.1	18.5	18.6	19.9	-	-	-
2007 Survey	11.7	11.2	14.5	14.8	16.4	17.0	17.9	18.7	17.8	-	18.5
2007 (N)	3	5	10	13	9	15	7	2	1	-	1
1999 Survey	9.7	13.6	15.3	-	18.0	20.2	-	19.2	-	20.6	-
1999 (N)	1	3	10	-	3	2	-	2	-	1	-

Smallmouth bass

During the summer 2006 mini fyke netting survey, a total of 2 smallmouth bass were captured ranging in size from 2.3 to 2.4 inches. The catch per effort was 0.33 juvenile smallmouth bass per net night. Electroshocking, during the fall of 2006, produced 2.5 smallmouth bass per mile ranging in size from 12.9 to 17.9 inches. During the spring 2007 electroshocking survey, thirteen smallmouth bass were captured ranging in size from 6.6 to 17.9 inches for a catch per effort of 3.5 fish per mile. During the 2007 spring fyke netting survey, we captured twenty three smallmouth bass ranging in size from 12.4 to 18.1 inches (Figure 3) and averaging 16.3 inches. Those numbers did not account for the one recaptured fish. The catch per effort was 0.2 smallmouth bass per net night. A population estimate could not be calculated because of the low number of fish captured. In 1999, a total of 74 smallmouth bass were captured ranging in size from 12.2 to 19.7 inches (Figure 3) and averaged 15.6 inches. The catch per effort was 0.9 smallmouth bass per net night. No population estimate was calculated in 1999.

In 1988, a total of thirty six smallmouth bass were captured ranging in size from 11.5 to 18.4 inches (Figure 3).The catch per effort was 0.3 smallmouth bass per net night. No average length or population estimate were calculated in 1988.

The length at age of smallmouth bass sampled in the 2007 survey showed faster growth at ages 4-5 when compared to the NER average and slower growth for the same ages when compared to the 1999 and 1988 surveys. Slower growth was observed for all ages 6 and older when compared to the NER average as well as 1999 and 1988 surveys. The sample size for aged smallmouth bass for 1988 was 33, 1999 was 71 and 2006 was 21 (Table 5). In the 2007 survey, there was a small sample size that represented several year classes of smallmouth bass.

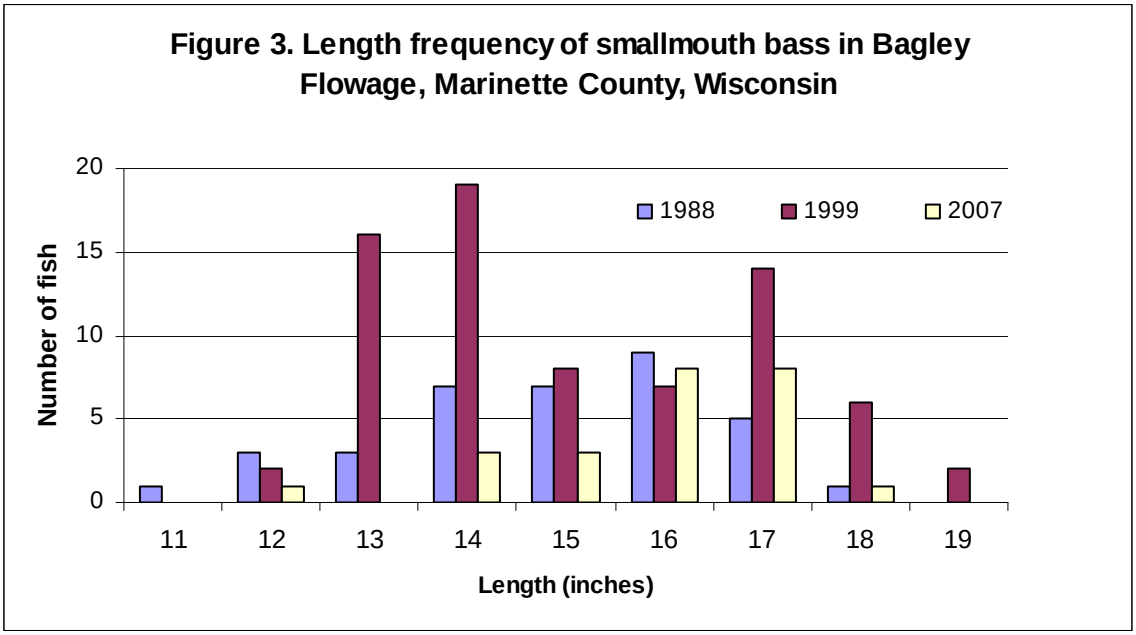


Table 5. 2007 age-length distribution of smallmouth bass from Bagley Flowage, Marinette County, Wisconsin compared to the Northeast (NER) Wisconsin average length at age, 1988 and 1999 survey information.

Age	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
NER Average	9.9	12.3	14.2	15.8	17.1	18.5	18.6	19.9	--	--
2007 Survey	--	12.4	14.5	14.9	16.2	16.8	17.1	17.9	16.7	--
2007 (N)	--	1	1	3	2	5	7	1	1	--
1999 Survey	13.6	14.0	14.6	16.3	16.9	17.7	17.0	17.6	18.6	18.6
1999 (N)	4	17	23	4	4	7	2	5	2	3
1988 Survey	12.1	13.6	15.5	16.9	17.8	--	--	--	--	--
1988 (N)	2	8	15	6	2	--	--	--	--	--

Walleye

During the summer 2006 mini fyke netting, 2006 fall electrofishing and the spring 2007 electrofishing surveys, no walleye were captured at Bagley flowage. During the spring 2007 fyke netting survey, a total of 6 walleye were captured ranging in size from 8.0 to 27.0 inches (Figure 4) and averaged 14.8 inches. No walleye were recaptured during this survey. The catch per effort was 0.05 walleye per net night. No population estimate was calculated because of the low number of walleye captured during the survey.

In 1999, a total of forty walleye were captured ranging in size from 7.2 to 18.7 inches (Figure 4) and averaged 10.1 inches. The catch per effort was 0.5 walleye per net night. No population estimate was calculated.

In 1988, a total of seventy seven walleye were captured ranging in size from 8.5 to 23.4 inches (Figure 4). The catch per effort was 0.7 walleye per net night. No average length or population estimate were calculated.

The length at age of walleye sampled in the 2007 survey demonstrated slower growth rates for all ages observed when compared to the NER average as well as 1999 and 1988 surveys (Table 6). The sample size of aged walleye for 1988 was 72, 1999 was 40 and 2006 was 6 (Table 6). The few walleye captured in the 2007 survey represented a small number of age classes.

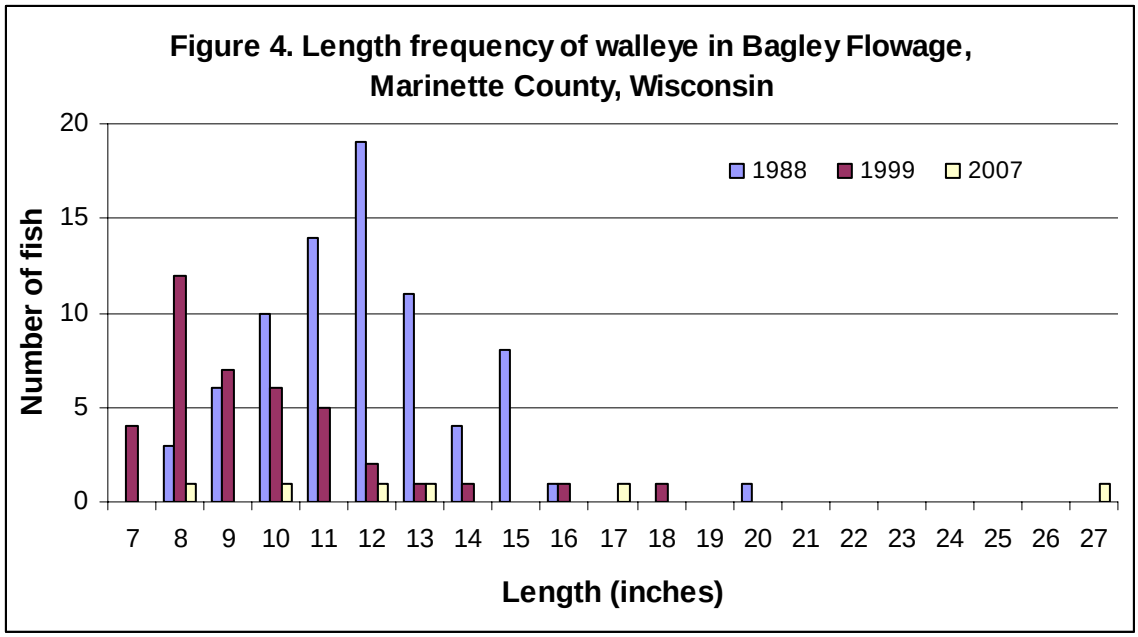


Table 6. 2007 Age- length distribution of walleye from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data 1999 and 1998 survey information. N equals sample size.

Age	**1**	**2**	**3**	**4**	**5**	**6**	**14**
NER Average	8.3	10.8	13.6	16.0	17.7	19.0	27.9
2007 Survey	8.0	10.1	13.3	15.1	--	--	27.0
2007 (N)	1	1	1	2	--	--	1
1999 Survey	8.3	10.4	11.6	16.3	--	18.5	--
1999 (N)	17	14	7	1	--	1	--
1988 Survey	9.0	12.0	15.3	--	19.8	--	--
1988 (N)	7	51	13	--	1	--	--

Panfish

Bluegill

During the summer 2006 mini fyke netting survey, 18.2 bluegill per net night were captured and 7.8 fish per net night were juveniles under 3 inches. The bluegill ranged in size from 1.3 to 5.1 inches in length. Electroshocking during the fall of 2006 produced 1.5 bluegill per mile ranging in size from 4.4 to 7.4 inches. During the spring 2007 fyke netting survey, we captured a total of one thousand, seven hundred, and ninety bluegill ranging in size from 3.2 to 9.8 inches (Figure 5) and averaging 7.2 inches. The catch per effort was 15.4 bluegill per net night.

In 1999, a total of four hundred and six bluegill were captured ranging in size from 3.7 to 9.8 inches (Figure 5) and averaged 7.4 inches. The catch per effort was 5.1 bluegill per net night. In 1988, a total of four hundred and seventy six bluegill were captured ranging

in size from 4.0 to 9.1 inches (Figure 5), but no average length was calculated. The catch per effort was 4.6 bluegill per net night.
The length at age of bluegill sampled in the 2007 survey indicated faster growth rates for all ages sampled when compared to the NER average and slightly slower growth rates when compared to the 1999 and 1988 surveys (Table 7). The sample size of aged bluegill for 1988 was unknown, 1999 was 117 and 2006 was 82 (Table 7). In the 2007 survey, there was a good representation across many year classes of bluegill.

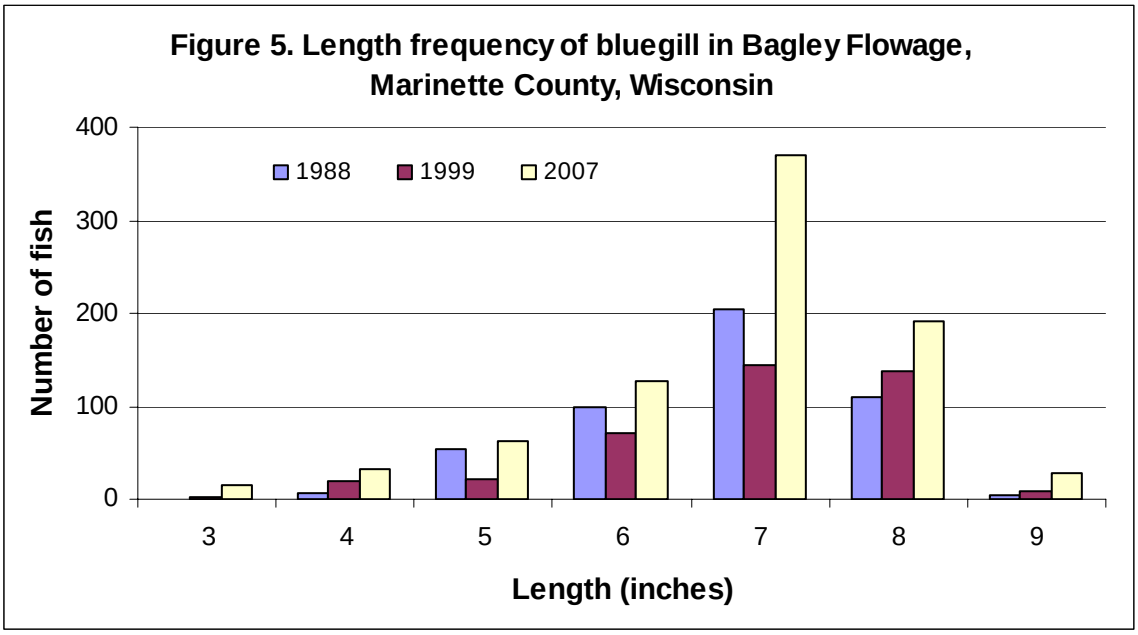


Table 7. 2007 Age- length distribution of bluegill from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample size (no sample size was available for the 1988 survey).

Age	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NER Average	4.0	4.8	5.8	6.6	7.2	7.9	8.3	8.7
2007 Survey	4.1	5.6	6.6	7.5	8.2	9.1	9.4	9.6
2007 N	17	12	10	13	23	3	2	2
1999 Survey	4.6	6.1	6.9	7.9	8.2	9.1	--	--
1999 (N)	23	10	11	46	26	1	--	--
1988 Survey	4.4	6.0	7.4	8.4	9.0	--	--	--

Rock bass
During the summer 2006 mini fyke netting survey, 2.7 rock bass per net night were captured and 1.8 fish per net night were juveniles under 3 inches. The rock bass ranged in size from 1.4 to 7.4 inches in length. Electroshocking during the fall of 2006 produced 9.5 rock bass per mile ranging in size from 2.7 to 8.4 inches. During the spring 2007 fyke netting survey, we captured a total of three hundred and nineteen rock bass ranging in

size from 3.1 to 9.7 inches (Figure 6) and averaging 6.5 inches. The catch per effort was 2.8 rock bass per net night.
In 1999, a total of four hundred and sixty eight rock bass were captured ranging in size from 3.7 to 9.8 inches (Figure 6) and averaging 7.0 inches. The catch per effort was 5.9 rock bass per net night. In 1988, a total of eight hundred and fifty eight rock bass were captured ranging in size from 4.4 to 9.5 inches (Figure 6), no average length was calculated. The catch per effort was 8.3 rock bass per net night.
The length at age of rock bass sampled in the 2007 survey revealed slightly slower growth rates for all ages sampled when compared to the Wisconsin State average, 1999 and 1988 surveys (Table 8). The sample size of aged rock bass for 1988 was unknown, but it was 31 in 1999 and 60 in 2006 (Table 8). In the 2007 survey, there was a good representation across many year classes of rock bass.

Figure 6. Length frequency of rock bass in Bagley Flowage, Marinette County, Wisconsin

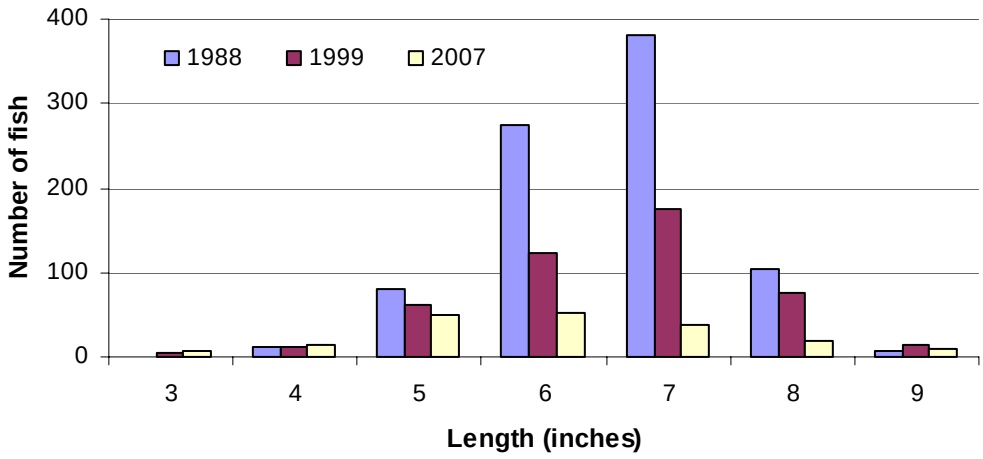


Table 8. 2007 Age- length distribution of rock bass from Bagley Flowage, Marinette County Wisconsin compared to the Wisconsin State average length at age data (no NER average data is available), 1999 and 1988 survey data. N equals sample size (no sample size was available for the 1988 survey).

Age	2	3	4	5	6	7	8
State Average	4.2	5.3	6.3	7.1	8.0	8.5	9.0
2007 Survey	3.6	5.2	5.9	6.8	7.9	8.5	8.9
2007 (N)	4	13	19	8	9	6	1
1999 Survey	3.9	5.5	6.4	7.4	7.7	9.2	--
1999 (N)	1	4	9	10	6	1	
1988 Survey	4.7	5.1	6.4	7.7	8.9	9.3	--

Black crappie

During the summer 2006 mini fyke netting survey, 9.7 black crappie per net night were captured ranging in size from 1.5 to 2.3 inches in length. No black crappies were captured during the fall 2006 electroshocking survey. During the spring 2007 fyke netting survey, we captured a total of two hundred and nineteen black crappie ranging in size from 4.6 to 13.3 inches (Figure 7) and averaging 8.9 inches. The catch per effort was 1.9 black crappie per net night.

In 1999, a total of one hundred and forty black crappie were captured ranging in size from 5.1 to 13.8 inches (Figure 7) and averaging 9.3 inches. The catch per effort was 1.8 black crappie per net night. In 1988, a total of one hundred and sixty seven black crappie were captured ranging in size from 4.8 to 13.0 inches (Figure 7). No average length was calculated for this species. The catch per effort was 1.6 black crappie per net night.

The length at age of black crappie sampled in the 2007 survey showed varied growth rates with the majority of ages showing faster growth rates when compared to the NER average and the 1988 survey (Table 9). The growth rates in the fish sampled from 2007 indicated overall slightly slower growth rates when compared to the black crappie sampled in the 1999 survey (Table 9). The sample size of aged black crappie for 1988 was unknown, but 1991 was 69 and 2006 was 58 (Table 9). In the 2007 survey, there was a good representation across many year classes of black crappie.

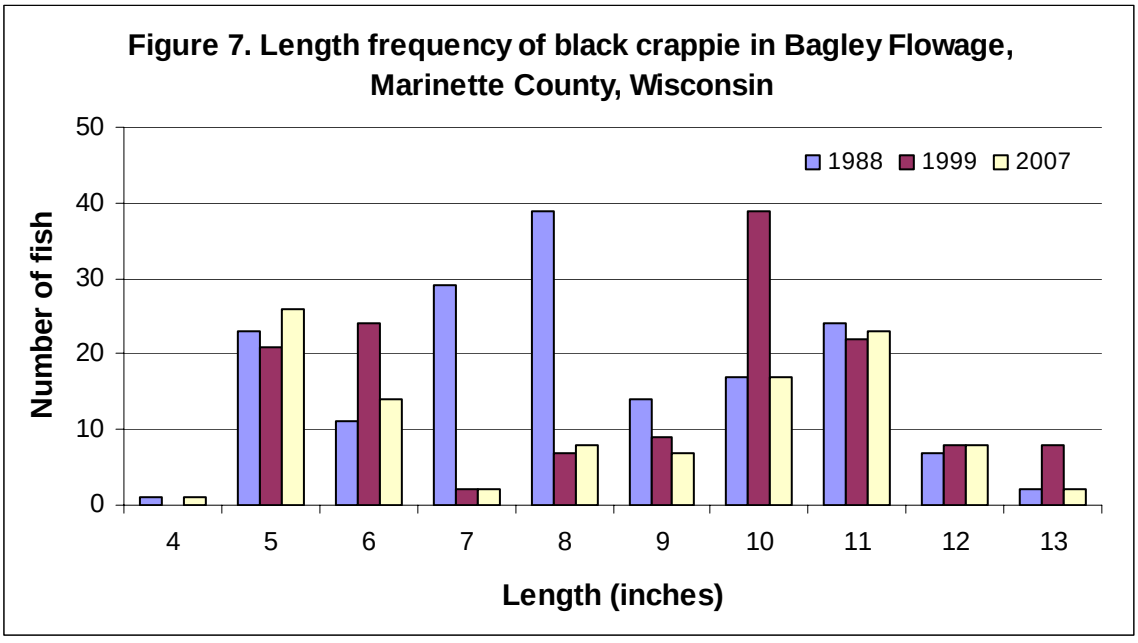


Table 9. 2007 Age- length distribution of black crappie from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample size (no sample size was available for the 1988 survey).

Age	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NER Average	5.4	7.2	8.6	9.6	10.4	11.2	12.2	13.0

2007 Survey	5.7	7.0	8.6	11.0	11.6	11.9	13.0	--
2007 (N)	14	7	7	15	8	4	3	--
1999 Survey	5.8	7.2	9.2	10.8	11.9	12.9	14.0	13.0
1999 (N)	18	11	10	22	4	2	1	1
1988 Survey	5.6	8.1	9.9	10.8	11.6	11.7	12.6	--

Pumpkinseed

During the summer 2006 mini fyke netting survey, 7.8 pumpkinseed per net night were captured and 5.2 fish per net night were juveniles under 3 inches. The pumpkinseed size ranged from 2.3 to 5.0 inches in length. No pumpkinseed were captured during the fall 2006 electroshocking survey. During the spring 2007 fyke netting survey, we captured a total of two hundred and twelve pumpkinseed ranging in size from 4.2 to 7.8 inches (Figure 8) and averaging 6.5 inches. The catch per effort was 1.8 pumpkinseed per net night.

In 1999, a total of two hundred and fifty four pumpkinseed were captured ranging in size from 4.0 to 8.6 inches (Figure 8) and averaging 6.6 inches. The catch per effort was 3.2 pumpkinseed per net night. In 1988, a total of three hundred and twenty six pumpkinseed were captured ranging in size from 4.0 to 7.7 inches (Figure 8), no average length was calculated. The catch per effort was 3.1 pumpkinseed per net night.

The length at age of pumpkinseed sampled in the 2007 survey showed faster growth rates for all ages sampled when compared to the Wisconsin State average and slightly slower growth rates when compared to the 1999 and 1988 surveys (Table 10). The sample size of aged pumpkinseed for 1988 was unknown, but 1991 was 65 and 2006 was 34 (Table 10). In the 2007 survey, there was a good representation across many year classes of pumpkinseed.

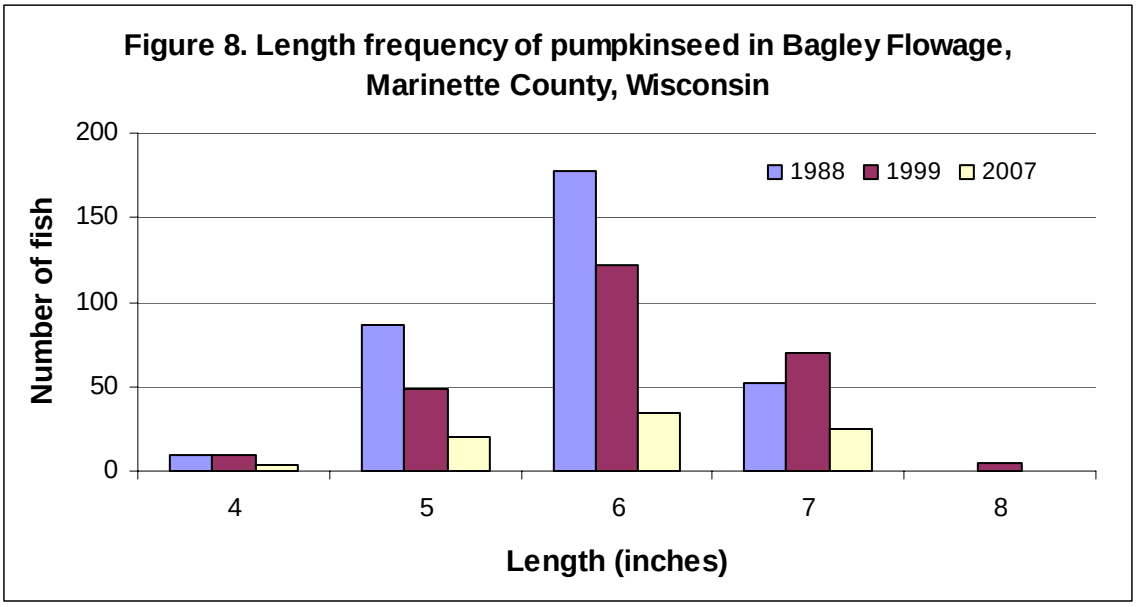


Table 10. 2007 Age- length distribution of pumpkinseed from Bagley Flowage, Marinette County Wisconsin compared to Wisconsin State average length at age data (no NER average data is available) as well as 1999 and 1988 survey data. N equals sample size (no sample size was available for the 1988 survey).

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Age	**2**	**3**	**4**	**5**	**6**
NER Average	4.0	4.8	5.4	6.1	6.6
2007 Survey	4.2	5.5	6.5	7.0	7.4
2007 (N)	1	10	12	7	4
1999 Survey	4.3	6.0	6.6	7.2	--
1999 (N)	8	6	40	11	--
1988 Survey	4.4	5.5	6.5	7.3	7.5

Yellow perch

During the summer 2006 mini fyke netting survey, 0.8 yellow perch per net night were captured and 0.2 fish per net night were juveniles under 3 inches. The yellow perch ranged in size from 2.3 to 4.9 inches in length. Electroshocking during the fall of 2006 produced 1.5 yellow perch per mile, ranging in size from 4.9 to 11.2 inches. During the spring 2007 fyke netting survey, we captured a total of fifty three yellow perch ranging in size from 6.6 to 12.6 inches (Figure 9) and averaging 8.9 inches. The catch per effort was 0.5 yellow perch per net night.

In 1999, a total of three hundred and fourteen yellow perch were captured ranging in size from 5.0 to 11.8 inches (Figure 9) and averaging 8.6 inches. The catch per effort was 4.0 yellow perch per net night. In 1988, a total of one hundred and fifty four yellow perch were captured ranging in size from 5.9 to 11.8 inches (Figure 9), no average length was calculated. The catch per effort was 1.5 yellow perch per net night.

The length at age of yellow perch sampled in the 2007 survey showed overall faster growth rates when compared to the NER average as well as 1999 and 1988 surveys (Table 11). The sample size of aged yellow perch for 1988 was unknown, but 1991 was 40 and 2006 was 28 (Table 11). In the 2007 survey, there was a small sample of yellow perch that represented several year classes.

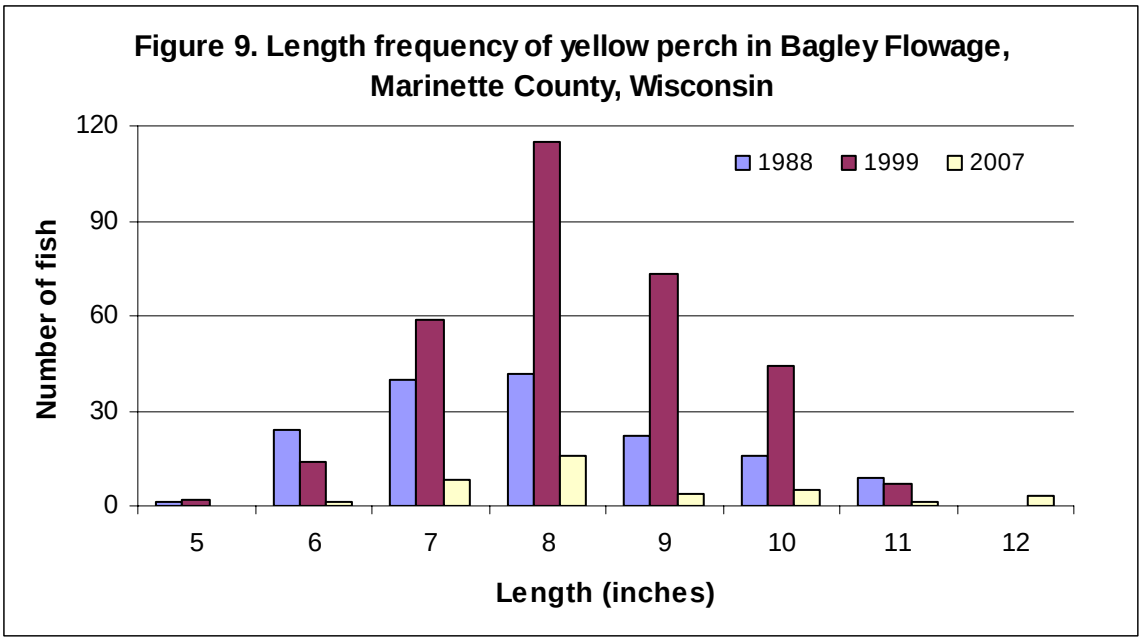

Table 11. 2007 Age- length distribution of yellow perch from Bagley Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample size (no sample size was available for the 1988 survey).

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Age	**2**	**3**	**4**	**5**	**6**	**7**
NER Average	5.5	6.7	7.6	8.4	8.9	10.2
2007 Survey	--	7.6	8.7	9.8	12.3	12.3
2007 (N)	--	10	11	4	2	1
1999 Survey	6.2	7.0	8.5	9.6	9.2	11.5
1999 (N)	1	10	15	12	1	1
1988 Survey	5.9	7.1	8.7	10.8	10.4	--

Other fish species

Other species caught during the 2006 and 2007 surveys included: black bullhead, bluntnose minnow, bowfin, brown bullhead, common carp, golden redhorse, golden shiner, greater redhorse, northern hog sucker, shorthead redhorse, silver redhorse, tadpole madtom, warmouth, white sucker and yellow bullhead.

CONCLUSIONS AND RECOMMENDATIONS

Bagley Flowage supports a good quality and diverse fishery with natural reproduction of all the major species present. The northern pike population in 2007 showed a decrease in the overall population size when compared to the 1988 survey (no population estimate was available from 1999). The population density decreased from 3.9 northern pike per acre in 1988 to 2.6 fish per acre in 2007. However, more year classes of northern pike were represented in the 2007 survey when compared to both the 1999 and 1988 surveys. In the 1988 survey, 100% of the northern pike captured were age four and younger. That composition in 1999 was 92.5% and 86.7% in 2007. The average length of northern pike had also increased (16.4 inches) when compared to the 1999 (15.8 inches) and the 1988 (15.5 inches) surveys. The growth rates of northern pike in 2007 were slower when compared to the NER average and both the previous surveys. However, the 1988 and 1999 surveys also indicated overall slower growth when compared to the NER average. Slower growth rates are observed in many Marinette County waters with the northern climate and moderate fertility of the water. The percent of northern pike surveyed over the quality size of 21 inches increased from the 1988 (2.8%) and 1999 (4.1%) surveys when compared to the 2007 survey (6.5%). The large number of young northern pike found in this survey as well as previous surveys resulted in a smaller size structure for this population. I do not recommend any change in the current management of northern pike in Bagley Flowage.

The largemouth bass population in 2007 illustrated an increase between this year and both the 1988 and 1999 surveys. The catch rates increased from 0.07 fish per net night in 1988 to 0.3 in 1999 and 1.0 in 2007. No population estimates were previously calculated because of the low number of largemouth bass captured at Bagley flowage. The increased number of largemouth bass captured in the 2007 survey provided a population estimate of 684 fish or catch rate of 2.4 fish per acre. The overall growth rates of largemouth bass from the 2007 survey showed slower growth rates when compared to the NER average and 1999 survey. The slower growth rates are typical for this impoundment. The percent of largemouth bass captured over the quality size of 12 inches increased from the 1988 survey (71% inches), to the same percent in both the 1999 and 2007 surveys (91%). I do not recommend any change in the current management of the largemouth bass population in Bagley Flowage.

A low density smallmouth bass population continues to be present in Bagley Flowage. The population density fluctuated between the three survey years: 1988, 1999 and 2007. The spring fyke net catch rates varied from 1988 (0.3) to 1999 (0.9) and 0.2 in 2007. The percent of smallmouth bass surveyed over the quality size of 12 inches did not change significantly between surveys, 1988 (97%), 1999 (100%) and 2007 (100%). The growth rates of the smallmouth bass captured in the 2007 survey revealed mixed growth rates. However, the growth rates were generally slower than the NER average and the previous surveys. These growth rates were consistent with the slower growth rates of all species found in the flowage. I do not recommend any change in the current management of the smallmouth bass population in Bagley Flowage.

The walleye population in Bagley Flowage is more likely stronger than observed in our surveys due to the nature of the walleye spawning run. During the 1988 survey, it was noted that walleye were found to be spawning a lot further upstream of Bagley Flowage in the free running portion of the river. The Flowage itself does not have any suitable habitat to attract spawning walleye. The walleye that are caught in the fyke netting surveys do not represent the spawning walleye population of the flowage. During the 2007 survey, only 6 walleye were captured this number is lower than in the previous two surveys, 1988 (77) and 1999 (40). The unseasonably cold weather during the fyke netting season may have also played a part in the decreased walleye catch. The flowage has been home to a low level walleye population for many years and the habitat available in the flowage does not allow for an increase in this population. Walleye have been stocked into the flowage in the past but do not appear to have increased the population size. I do not recommend any change in the current management of walleye in Bagley Flowage. To more accurately describe the walleye population, future studies should focus on detecting the spawning areas that are more likely located upstream in riffles areas and determine if they then move back downstream to the flowage proper after spawning. A tagging study and/ or radio telemetry assessment could be performed if funds and staff were available.

The panfish fishery in Bagley Flowage is in good health with an abundant variety of species present including: bluegill, rock bass, black crappie, pumpkinseed and yellow perch that contribute greatly to the overall fishery of the flowage.
The bluegill population is robust and the catch rate of bluegill from the spring fyke netting surveys have increased over the years from 1988 (4.6), to 1999 (5.1), and 2007 (15.4). The bluegill were the dominant pan fish species during the 2007 survey. This result was a shift from previous surveys where rock bass had been the dominant species. The percent of bluegill surveyed of quality size (over 6 inches) has varied slightly between survey years from 1988 (87.4%), to 1999 (89.4%), and 2007 (86.6%). The growth rates of bluegill captured in the 2007 survey were found to be faster than the NER average, but slightly slower than the two previous surveys. A good range of age classes were represented in the 2007 survey indicating good recruitment over the years.
The rock bass population indicated a decrease in catch rates from the spring fyke net surveys in 1988 (8.3), to 1999(5.9), and 2007 (2.8). The percent of rock bass surveyed of quality size (over 7 inches) has also decreased between survey years from 1988 (57.3%), to 1999 (56.6%), and 2007 (36.2%). The growth rates of rock bass captured during the 2007 survey showed slightly slower growth rates when compared with the Statewide average as well as 1988 and 1999 surveys. A good range of age classes were represented in the 2007 survey indicating good recruitment over the years.
The black crappie population demonstrated no significant change with a slight increase in catch rates during the spring fyke netting surveys from 1988 (1.6), to 1999 (1.8), to 2007 (1.9). The percent of black crappie surveyed of quality size (over 8 inches) showed slight variations between survey years from 1988 (61.7%), to 1999 (66.4%), and 2007 (60.2%). The growth rates of black crappie captured during the 2007 survey revealed overall faster growth rates when compared to the NER average and the 1988 survey, but slower rates than the 1999 survey. A good range of age classes were represented in the 2007 survey indicating good recruitment over the years.

The pumpkinseed population showed a decrease in catch rates from the spring fyke netting surveys from 1988 (3.1), to 1999 (3.2), and 2007 (1.8). The percent of pumpkinseed surveyed of quality size (over 6 inches) showed some variation between the survey years with no trend from 1988 (70.6%), to 1999 (77.6%), and 2007 (72%). The growth rates of pumpkinseed captured during the 2007 survey yielded faster growth when compared to the State average and slower growth than both the 1988 and 1999 surveys. A good range of age classes were represented in the 2007 survey indicating multiple recruitment events over the years.
The yellow perch population showed lowest catch rate in 2007 (0.5) when compared to1988 (1.5) and 1999 (4.0).. The percent of yellow perch surveyed of quality size (over 8 inches) increased over the survey years from 1988 (57.8%), to 1999 (76.1%), and 2007 (76.3%). The growth rates of yellow perch captured during the 2007 survey indicated overall faster growth when compared to the NER average and both the 1988 and 1999 surveys. Several age classes were represented during the 2007 survey showing recruitment is occurring.

Bagley flowage is a moderately fertile body of water that has the capability of sustaining a quality size fishery as seen in the data presented in this report. Although many of the popular species growth rates have declined and were below the NER average, the overall health of the fishery is good. The flowage has many miles of open flowing river that also help support this fishery. However, the ability of the fish to move out of the flowage upstream for more than 20 miles makes surveying this flowage a challenge. The adverse weather conditions during the spring fyke netting season of 2007 added to the ability of the fish to move to more favorable locations during the spawning season and could be linked to some of the changes seen in the overall number of fish.. The decline in the northern pike population may be linked to the lower water levels that have been observed in recent years. Previous studies noted that northern pike reproduction was better during years with high spring water. The flowage has good natural habitat that should be protected for the fisheries resource. The addition of woody cover along the shoreline from either naturally fallen trees or artificially placed trees is encouraged to provide good fish habitat for many of the species found in the flowage.
No fisheries regulation changes are recommended at this time as the fishery is supporting a good size and age range of all species surveyed.

Public access to Bagley Flowage is good with one boat launch operated by the Wisconsin Department of Natural Resources and located on the east side of the impoundment off of Bagley Road. Walk in shore fishing access is also available on either side of the dam, as well as at the north end of the flowage off of Bagley Road. I would recommend minor improvements to the current landing facility providing better parking and additional disabled access fishing areas.

ACKNOWLEDGEMENTS

Ron Rhode, Greg Kornely and Richard Rost completed the field work, age analysis and data entry. Mike Donofrio provided editorial comments.

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

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Kornely, Greg 2000. Report on the Fisheries in Peshtigo and Bagley Flowage, Marinette County, 1999. Wisconsin DNR Memo.

Appendix

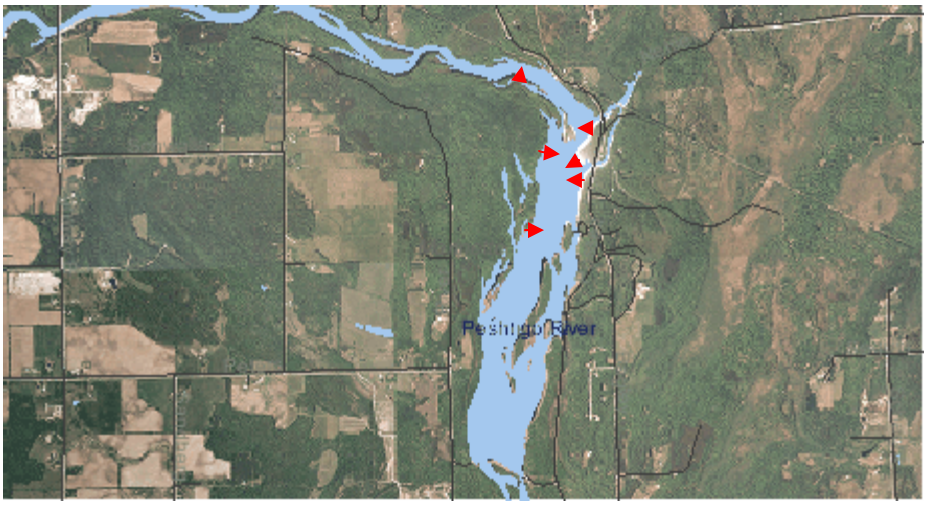

Figure 1. Location of 6 mini fyke nets for the baseline monitoring survey July 31st – August 1st 2006.

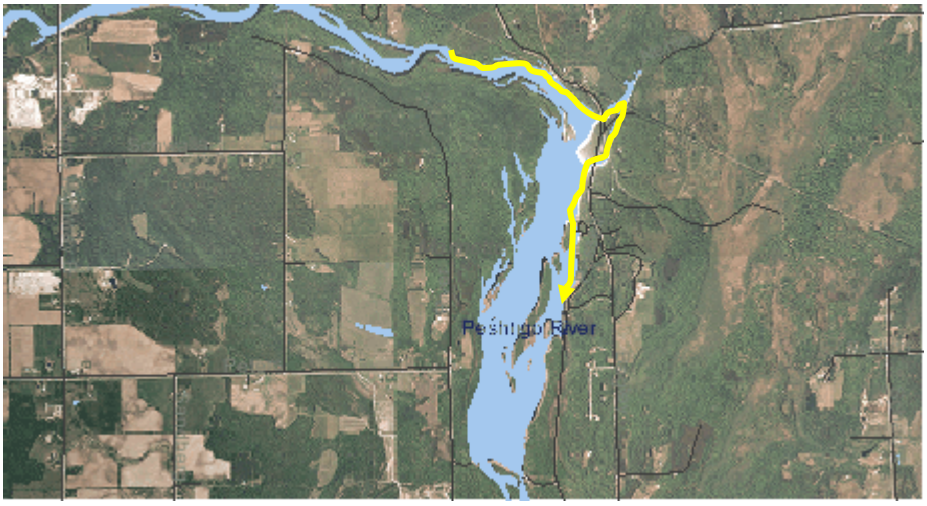

Figure 2. Location of the 2 mile baseline monitoring electroshocking survey On October 11th 2006.

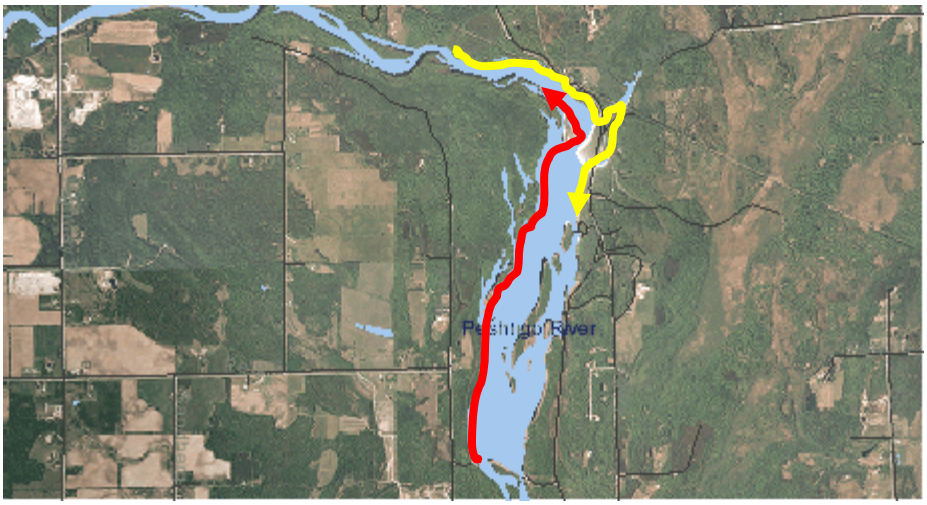

Figure 3. Location of the 3.75 mile comprehensive electroshocking survey on May 22nd, 2007.

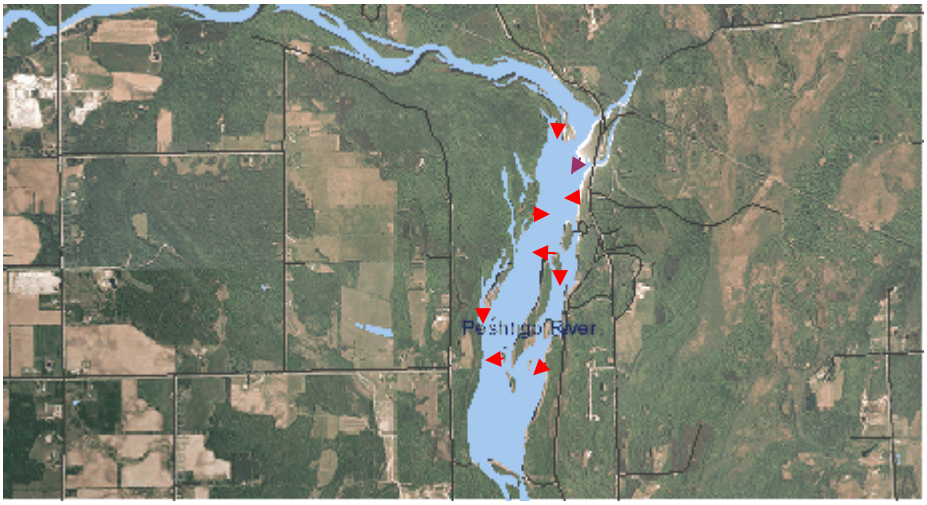

Figure 4. Location of 8 standard fyke nets for the comprehensive fishery Survey March 26th – April 11th, 2007.