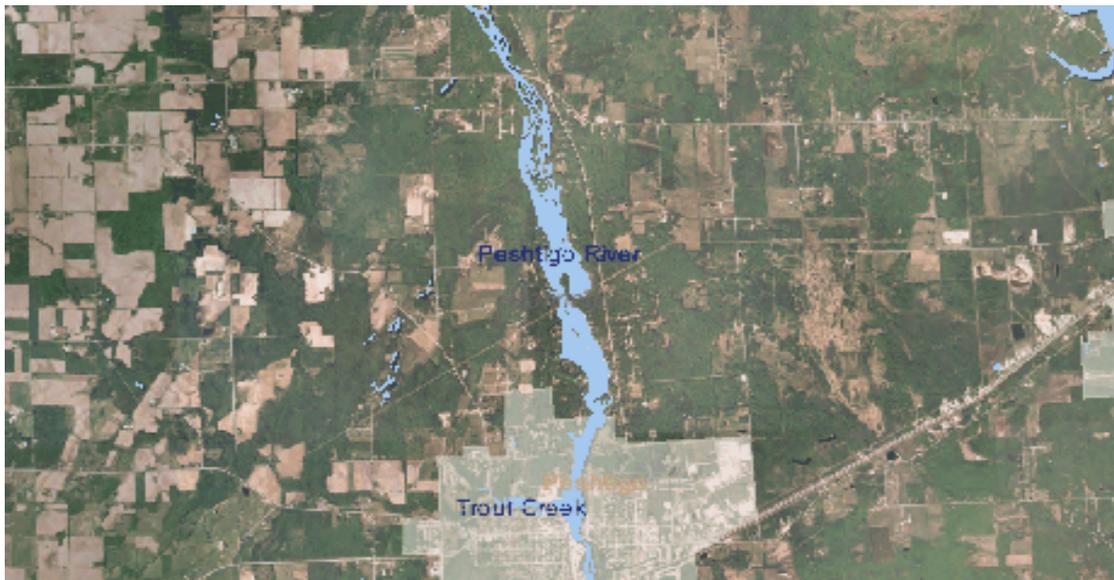


**Comprehensive Fisheries Survey of Peshtigo Flowage, Marinette County  
Wisconsin 2006 - 2007**

Waterbody Identification Code 515800



Justine Hasz  
Senior Fisheries Biologist  
Wisconsin Department of Natural Resources  
Peshtigo, WI  
July, 2008

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

**Report Approval signatures**

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Justine Hasz, Senior Fisheries Biologist, Date

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

Justine Hasz  
Senior Fisheries Biologist  
July, 2008

## Executive Summary

A basic fisheries survey of Peshtigo 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 = 1,337), largemouth bass, smallmouth bass and walleye. Bluegill are the most abundant panfish species with good numbers of black crappie, pumpkinseed, rock bass and yellow perch in the flowage. The recommended management of Peshtigo Flowage is for northern pike, largemouth bass, smallmouth bass, walleye and panfish.

## Lake and Location:

Peshtigo Flowage, Marinette County, T30N R23E Sec18.  
Located in southeast Marinette County, in the City of Peshtigo

## Physical / Chemical attributes (Wisconsin DNR, 1975):

**Morphometry:** 232 acres, maximum depth 15 feet, mean depth 6 feet, shoreline 6.6 miles

**Lake type:** Impoundment on the Peshtigo River

**Watershed:** 1,055 square miles with a drainage area of 5 square miles and 62 acres of adjoining wetlands.

**Basic Water Chemistry:** Hard water drainage lake having a slightly alkaline, light brown water of moderate transparency, Secchi disc – 9 feet (summer), pH 7.4, Conductance 289umhos.

**Littoral Substrate:** 60% sand, 20% muck, 15% gravel and 5% rock

**Aquatic Vegetation:** Large areas of submergent vegetation are present throughout the flowage with smaller areas of emergent vegetation.

Purpose of Survey: Assess the fishery status

## Dates of fieldwork:

Mini-fyke netting (juvenile fish) – July 25<sup>th</sup>, 2006

Electroshocking – October 3<sup>rd</sup>, 9<sup>th</sup>, 25<sup>th</sup> 2006 and May 23<sup>rd</sup>, 2007

Fyke netting (all species and ages) – March 27<sup>th</sup> – April 11<sup>th</sup>, 2007

## BACKGROUND

Peshtigo Flowage was established when the original dam was constructed in 1839 by the Peshtigo Lumber Company. In 1907, the wooden dam was rebuilt and in 1923 it was replaced with the current concrete structure. Wisconsin Public Service Corporation is the current owner and operator of the dam and hydroelectric facility. The dam at Peshtigo is the furthest downstream of a series of six dams on the Peshtigo River.

There is currently a moderate number of dwellings along the flowage and an inoperable paper mill. The mill owner and City of Peshtigo are negotiating the future land use of that property. The flowage is approximately 4 miles in length and runs north and south bounded at each end by a dam. Bagley or Potato Rapids dam and flowage are immediately upstream. The flowage is an expanded river channel that is long and narrow with large areas of dense emergent and submergent vegetation and large areas of braided river channel. Noteworthy emergent vegetation includes wild rice stands. There is one boat landing located in the City of Peshtigo (this is owned and operated by the City of Peshtigo) that has the majority of use for boat access to the flowage. There is an additional boat landing at an upstream location on the flowage that is owned and operated by the Wisconsin DNR and forms part of the Peshtigo River State Forest. The major recreational activities on the flowage are personal watercraft use, water skiing, fishing and canoeing. The dense amount of aquatic plants and braided river channels congregates the pleasure boat activities towards the lower end of the flowage within the City of Peshtigo. There is an ongoing effort from the City of Peshtigo for aquatic plant management using mechanical harvest of submergent vegetation within the city limits throughout the summer months. This flowage is also a destination for ice fishing activities.

Previous fisheries surveys were conducted on Peshtigo Flowage in 1953, 1959, 1960, 1974, 1978, 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 indicated the fishery to consist of northern pike, walleye, largemouth bass, smallmouth bass, bluegill, black crappie, rock bass, pumpkinseed, 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 Peshtigo 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 1980's, 1990's and 2000's (Table 1). Largemouth and smallmouth bass were stocked sporadically in the 1940's and 1950's (Table 1). Rainbow trout were also stocked privately at varying rates in the early 1990's (Table 1).

Table 1. DNR funded fish stocking 1941 through 2007 in Peshtigo Flowage, Marinette County, Wisconsin.

Year	Species	Size (average)	Number
1941	Walleye	Fry	1,000,000
1942	Walleye	Fry	800,000
1943	Smallmouth bass	Fingerling	5,000
1944	Smallmouth bass	Fingerling	4,275
1947	Largemouth bass	Fingerling	500
	Smallmouth Bass	Fingerling	6,000
1950	Walleye	Fingerling	4,900
	Smallmouth bass	Fingerling	9,000
1951	Smallmouth bass	Fingerling	6,000
1953	Walleye	Fingerling	5,420
1958	Walleye	Fingerling	5,400
1960	Walleye	Fingerling	600
1961	Walleye	Fingerling	45,000
1966	Walleye	Fingerling	45,000
1968	Walleye	Fingerling	45,000
1980	Walleye	Fingerling (3 inches)	23,000
1983	Largemouth bass	Fingerling (1 inch)	23,000
1991	Rainbow Trout	Yearling (6 inches)	200 (private)
1992	Walleye	Fingerling (3 inches)	5,025
	Rainbow Trout	Yearling (6 inches)	1,000 (private)
1993	Walleye	Fingerling (2.4 inches)	5,733
	Rainbow Trout	Yearling	1,000 (private)
2001	Walleye	Fingerling (2 inches)	10,000

## METHODS

Six mini-fyke nets (1/4" stretch mesh with turtle exclusion) targeting young-of-the-year fish were set on July 24<sup>th</sup> and lifted on July 25<sup>th</sup>, 2006 (Appendix Figure 1). A Wisconsin DNR standard direct current full size electrofishing boat was used on October 3<sup>rd</sup>, 9<sup>th</sup>, and 25<sup>th</sup>, 2006 along a total of 4.0 miles of shoreline (Appendix Figure 2) and on May 23<sup>rd</sup> 2007 along 4.0 miles of shoreline (Appendix Figure 3). Eight standard fyke nets (3/4" stretch mesh) were set on March 27<sup>th</sup> 2007 and lifted daily from March 28 – 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 1/2 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 Schumacher - Eschmeyer 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 4.0 miles of shoreline were shocked during that survey. All game fish were measured to the nearest 0.1 inch, sex determined where possible 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 Peshtigo 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 Peshtigo 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. N / A = information not available even though fish were sampled.

<b>Species</b>	<b>Spring 1988 Fyke net</b>	<b>Spring 1999 Fyke net</b>	<b>July 2006 Mini-fyke</b>	<b>October 2006 Electro</b>	<b>April 2007 Fyke net</b>	<b>May 2007 Electro</b>
Black crappie	N / A	0.8	0.88	6.7	3.4	--
Bluegill	N / A	0.6	13.6	11.7	6.7	--
Largemouth bass	0.03	0.02	3.4	4.7	0.4	0.75
Northern pike	6.1	2.9	0.88	8.5	5.1	--
Pumpkinseed	N / A	1.1	7.1	4.9	2.0	--
Rock bass	N / A	1.9	1.4	15.0	1.3	--
Smallmouth bass	0.01	0.1	0.75	1.3	0.05	5.0
Walleye	1.4	0.3	0	2.7	0.12	--
Yellow perch	N / A	1.2	0	2.7	0.5	--

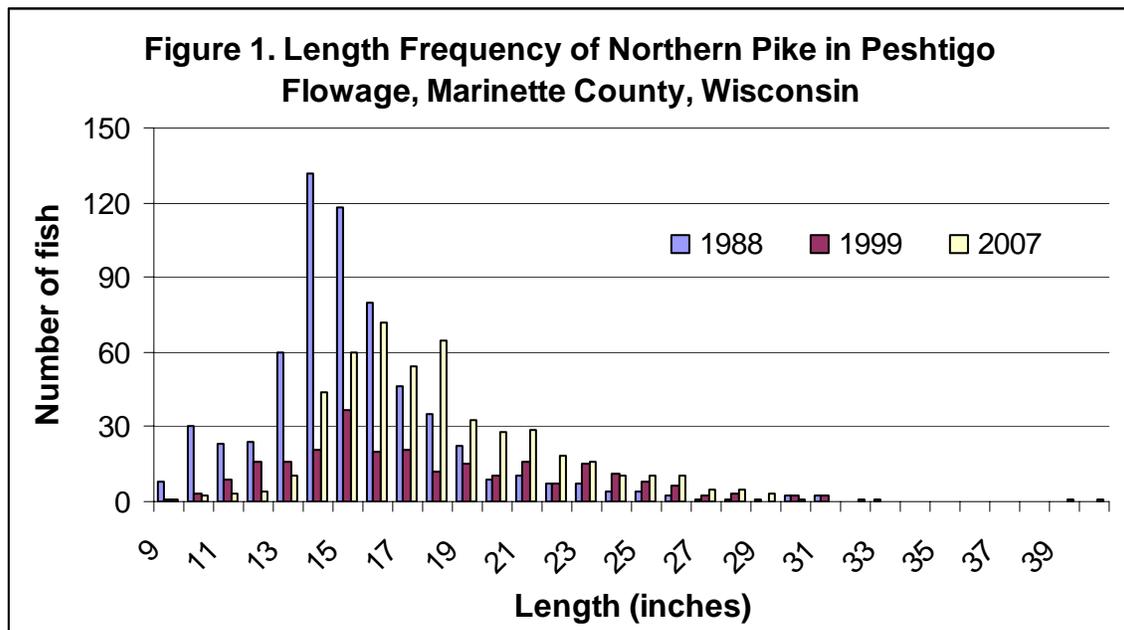
### Northern Pike

During the summer 2006 mini fyke netting survey, no juvenile northern pike less than 3 inches were captured in this flowage. There were 0.88 northern pike per net night captured over 3 inches and ranged in size from 3.8 to 25.0 inches. Electroshocking during the fall of 2006, produced 8.5 northern pike per mile ranging in size from 13.0 to 24.4 inches. During the spring 2007 fyke netting survey, we captured four hundred and eighty five northern pike ranging in size from 9.3 to 40.0 inches (Figure 1) and averaging 18.6 inches. Those statistics do not account for the recaptured fish (123). The catch per effort was 5.1 northern pike per net night. The population estimate was 1,337 northern pike with a 95% confidence interval of 1,047 to 1,850 fish (Figure 1a). The density was 5.8 fish per acre.

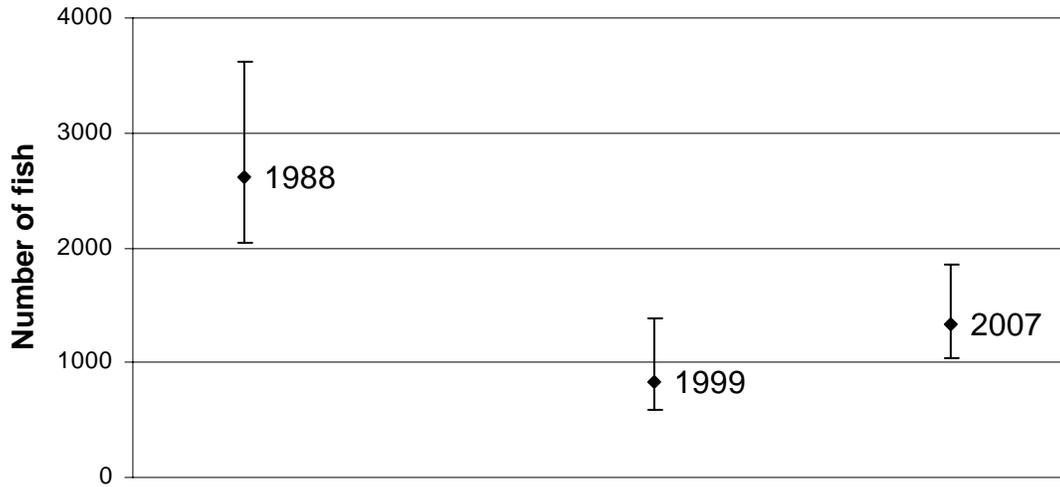
In 1999, a total of two hundred and fifty three northern pike were captured ranging in size from 9.5 to 31.4 inches (Figure 1). The catch per effort was 2.9 northern pike per net night. The total population estimate was 829 northern pike with a 95% confidence interval of 591 to 1,389 fish (Figure 1a). The density was 3.6 fish per acre.

In 1988, a total of six hundred and twenty nine northern pike were captured ranging in size from 9.0 to 33.4 inches (Figure 1). The catch per effort was 6.1 northern pike per net night. The total population estimate was 2,616 northern pike with a 95% confidence interval of 2,047 to 3,620 fish (Figure 1a). The density was 11.3 fish per acre.

Length frequency data for each of the three survey years demonstrated most of the pike were less than 20 inches in length. 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 and Figure 1b). The sample size of aged northern pike for 1988 was 168, 1999 was 132 and 2006 was 251 (Table 3). In the 2007 survey, there was a good representation across many year classes of northern pike.



**Figure 1a. Population Estimate of Northern Pike in Peshtigo Flowage, Marinette County, Wisconsin**



**Figure 1b. Mean Length at Age of Northern Pike in Peshtigo Flowage, Marinette County, Wisconsin**

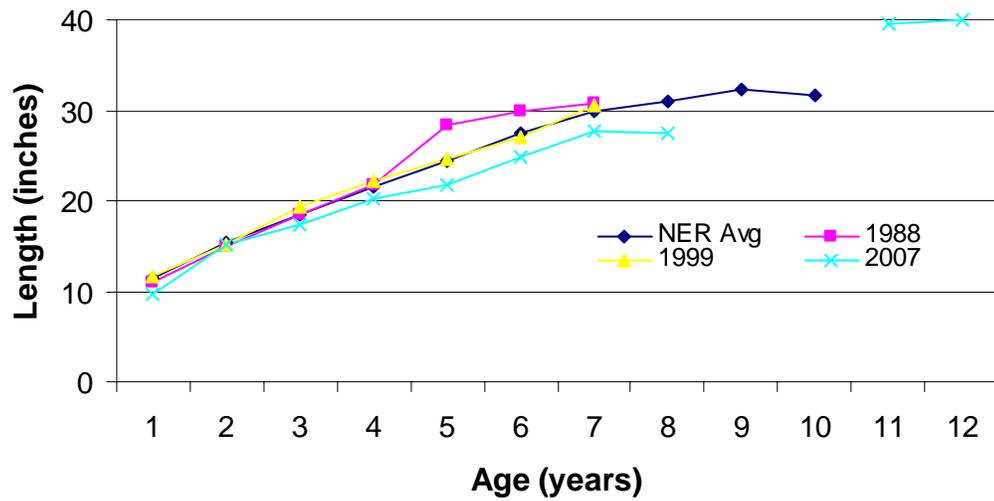


Table 3. 2007 Age- length distribution of northern pike from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age, 1988 and 1999 survey information. N equals sample size.

Age	1	2	3	4	5	6	7	8	11	12
<b>NER Average</b>	11.4	15.3	18.4	21.5	24.4	27.4	30.0	30.9		
<b>2007 Survey</b>	9.7	15.1	17.4	20.2	21.8	24.9	27.6	27.4	39.6	40.0
<b>2007 (N)</b>	2	65	86	36	22	25	10	3	1	1
<b>1999 Survey</b>	11.7	15.2	19.4	22.2	24.7	27.1	30.6	-	-	-
<b>1999 (N)</b>	6	24	32	41	18	8	3	-	-	-
<b>1988 Survey</b>	10.9	15.0	18.4	21.7	28.3	30.0	30.7	-	-	-
<b>1988 (N)</b>	23	95	33	11	2	2	2	-	-	-

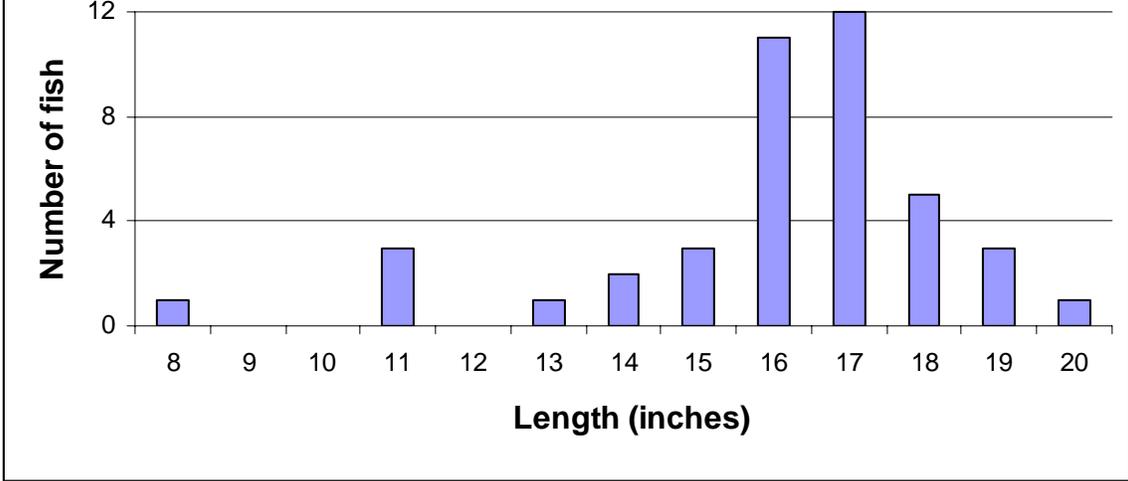
### Largemouth bass

During the summer 2006 mini fyke netting survey, a total of 27 largemouth bass were captured ranging in size from 1.9 to 3.0 inches. The catch per effort was 3.4 juvenile largemouth bass per net night. Electroshocking during the fall of 2006, produced 4.7 largemouth bass per mile ranging in size from 2.9 to 20.5 inches. During the spring 2007 electroshocking survey, a total of three largemouth bass were captured ranging in size from 8.4 to 20.6 inches. During the spring 2007 fyke netting survey, we captured forty two largemouth bass. Those bass ranged in size from 8.3 to 20.1 inches (Figure 2) and averaged 15.8 inches. Over 88% of the largemouth bass were greater than the minimum size limit of 14 inches. Those numbers do not include the recaptured fish (6). The catch per effort was 0.4 largemouth bass per net night. No population estimate was calculated. In 1999, a total of two largemouth bass were captured ranging in size from 6.5 to 16.4 inches (Figure 2). The catch per effort was 0.02 largemouth bass per net night. No population estimate was calculated.

In 1988, a total of three largemouth bass were captured ranging in size from 6.4 to 10.9 inches (Figure 2). The catch per effort was 0.03 largemouth bass per net night. No population estimate was calculated.

The length at age of largemouth bass sampled in the 2007 survey showed better growth rates when compared to the NER average (Table 4 and Figure 2a). No length at age data was available from the 1988 and 1999 surveys. The sample size of aged largemouth bass for 2007 was 34. In the 2007 survey, there was a good representation across many year classes of largemouth bass.

**Figure 2. Length Frequency of Largemouth Bass in Peshtigo Flowage, Marinette County, Wisconsin during 2007.**



**Figure 2a. Mean Length at Age of Largemouth Bass in Peshtigo Flowage, Marinette County, Wisconsin**

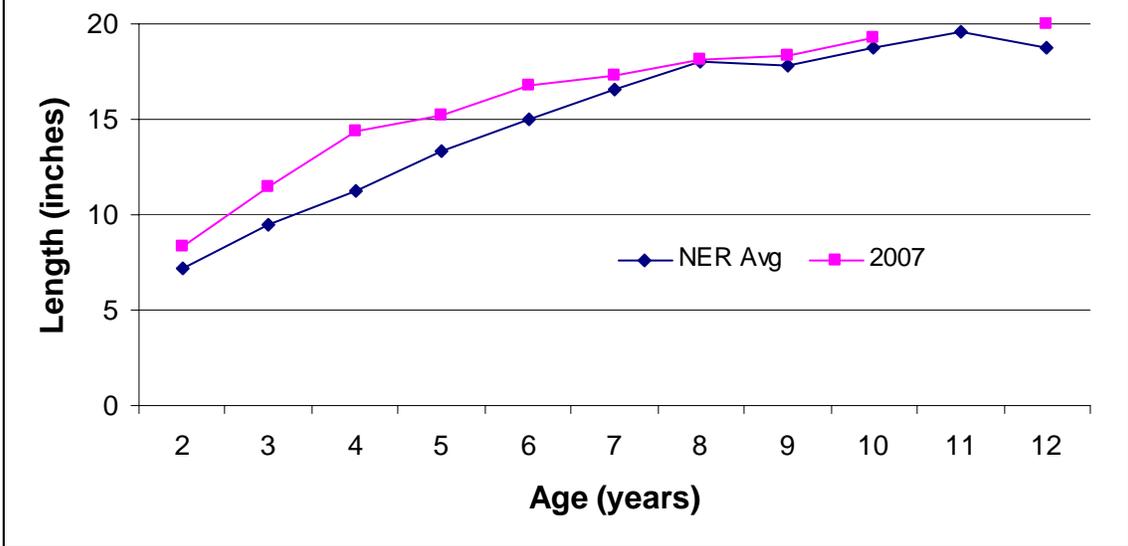


Table 4. 2007 Age- length distribution of largemouth bass from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age. N equals sample size.

<b>Age</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>NER Average</b>	7.2	9.5	11.3	13.3	15.0	16.6	18.0	17.8	18.7	19.6	18.8
<b>2007 Survey</b>	8.3	11.5	14.4	15.2	16.8	17.3	18.1	18.3	19.3	-	19.9
<b>2007 (N)</b>	1	2	3	1	6	12	3	3	1	-	2

### Smallmouth bass

During the summer 2006 mini fyke netting survey, no juvenile smallmouth bass under 3 inches were captured in this flowage. There were 0.75 smallmouth bass per net night captured over 3 inches and ranged in size from 4.4 to 11.7 inches. Electroshocking during the fall of 2006, produced 1.3 smallmouth bass per mile ranging in size from 5.4 to 12.8 inches. During the spring 2007 electroshocking survey, twenty smallmouth bass were captured ranging in size from 11.9 to 18.1 inches for a catch per effort of 5.0 fish per mile. During the 2007 spring fyke netting survey, we captured six smallmouth bass ranging in size from 14.9 to 17.1 inches and averaging 16.1 inches. There were no recaptured fish. The catch per effort was 0.05 smallmouth bass per net night. A population estimate could not be calculated because of the low number of captured fish. In 1999, a total of 8 smallmouth bass were captured ranging in size from 12.0 to 18.9 inches and averaged 15.4 inches. The catch per effort was 0.1 smallmouth bass per net night. No population estimate was calculated in 1999.

In 1988, a total of one smallmouth bass was captured at 19.0 inches. The catch per effort was 0.01 smallmouth bass per net night. No average length or population estimates were calculated in 1988.

### Walleye

During the summer 2006 mini fyke netting and the spring 2007 electrofishing surveys, no walleye were captured at Peshtigo flowage. Electroshocking during the fall of 2006, produced 2.7 walleye per mile ranging in size from 6.2 to 25.0 inches. During the spring 2007 fyke netting survey, a total of 14 walleye were captured ranging in size from 9.6 to 27.8 inches (Figure 3) and averaged 17.3 inches. No walleye were recaptured during this survey. The catch per effort was 0.12 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 twenty six walleye were captured ranging in size from 8.5 to 18.4 inches (Figure 3) and averaged 12.8 inches. The catch per effort was 0.3 walleye per net night. No population estimate was calculated.

In 1988, a total of one hundred and forty walleye were captured ranging in size from 7.5 to 27.4 inches (Figure 3). The catch per effort was 1.4 walleye per net night. The total

population estimate was 447 walleye with a 95% confidence interval of 302 to 860 fish. The density was 1.9 fish per acre.

The length at age of walleye sampled in the 2007 survey demonstrated varied growth rates for all ages observed when compared to the NER average as well as 1999 and 1988 surveys (Table 6 and Figure 3a). The sample size of aged walleye for 1988 was 72, 1999 was 40 and 2007 was 7 (Table 6). The few walleye captured in the 2007 survey represented a small number of age classes.

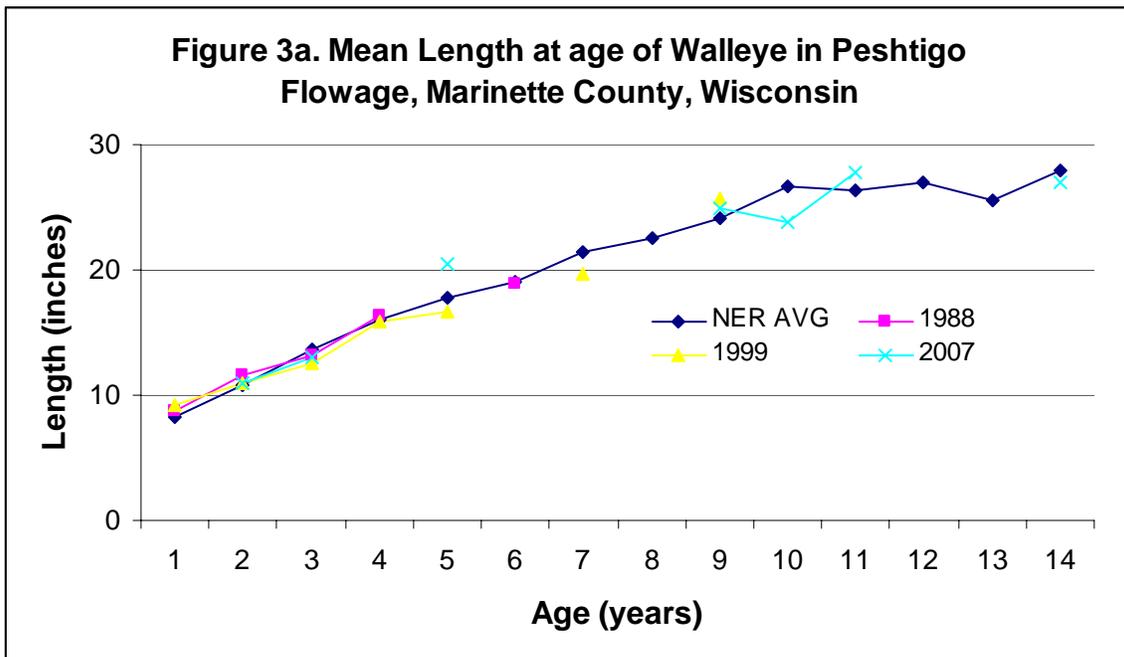
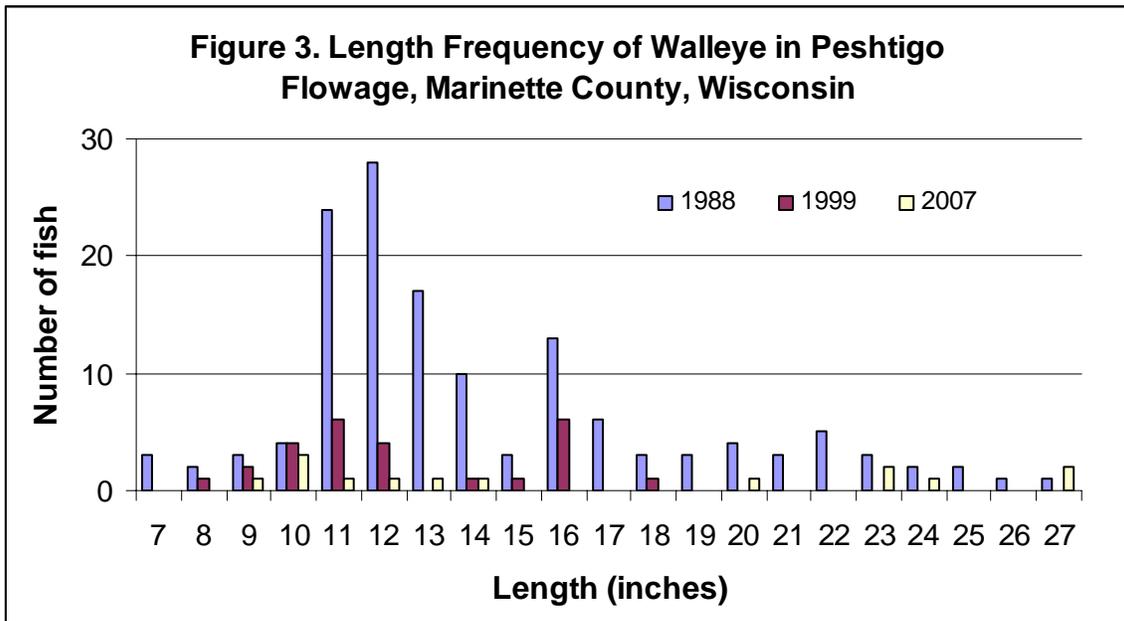


Table 6. 2007 Age- length distribution of walleye from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data 1999 and 1998 survey information. N equals sample size.

<b>Age</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>NER Average</b>	8.3	10.8	13.6	16.0	17.7
<b>2007 Survey</b>	-	11.0	13.0	-	20.5
<b>2007 (N)</b>	-	2	4	-	1
<b>1999 Survey</b>	9.2	10.9	12.5	15.8	16.6
<b>1999 (N)</b>	3	9	5	5	4
<b>1988 Survey</b>	8.7	11.6	13.2	16.4	-
<b>1988 (N)</b>	3	13	9	7	-

### Panfish

#### Bluegill

During the summer 2006 mini fyke netting survey, 13.6 bluegill per net night were captured and 8.5 fish per net night were juveniles under 3 inches. The bluegill ranged in size from 1.1 to 5.3 inches in length. Electroshocking during the fall of 2006 produced 11.7 bluegill per mile ranging in size from 2.9 to 8.8 inches. During the spring 2007 fyke netting survey, we captured a total of eight hundred bluegill ranging in size from 3.5 to 10.3 inches (Figure 4) and averaging 7.3 inches. The catch per effort was 6.7 bluegill per net night.

In 1999, a total of fifty two bluegill were captured ranging in size from 4.0 to 8.9 inches (Figure 4) but no average was calculated. The catch per effort was 0.6 bluegill per net night. In 1988, not all bluegill captured were counted, a total of twenty six bluegill were measured ranging in size from 4.0 to 9.7 inches (Figure 4), but no average length was calculated. The catch per effort was not calculated for 1988.

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 overall when compared to the 1999 and 1988 surveys (Table 7 and Figure 4a). The sample size of aged bluegill for 1988 was 27, 1999 was 21 and 2007 was 99 (Table 7). In the 2007 survey, there was a good representation across many year classes of bluegill.

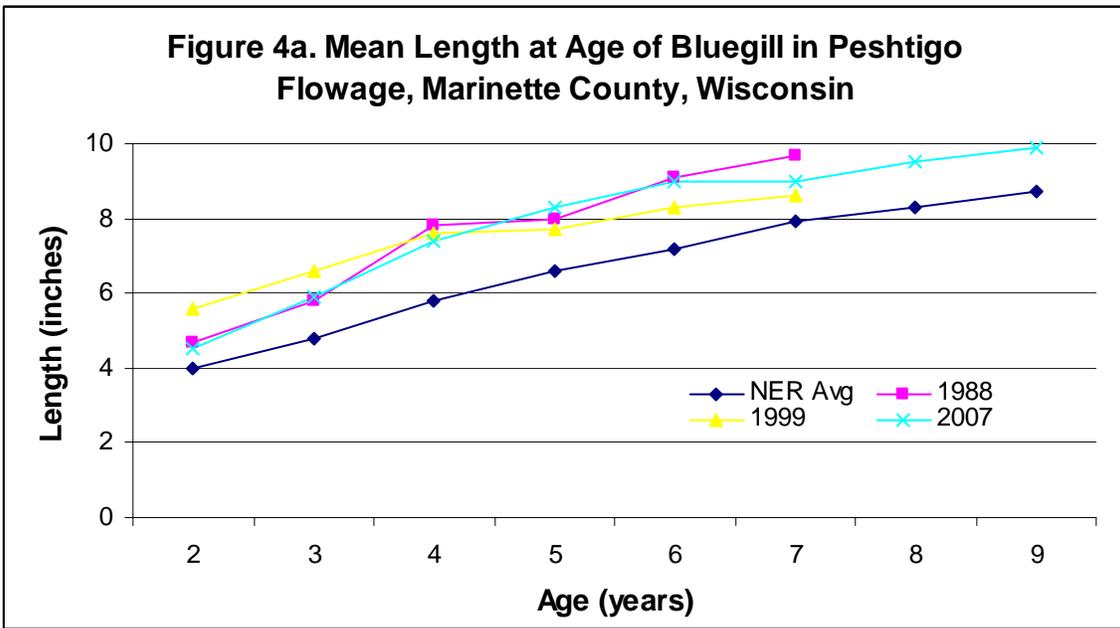
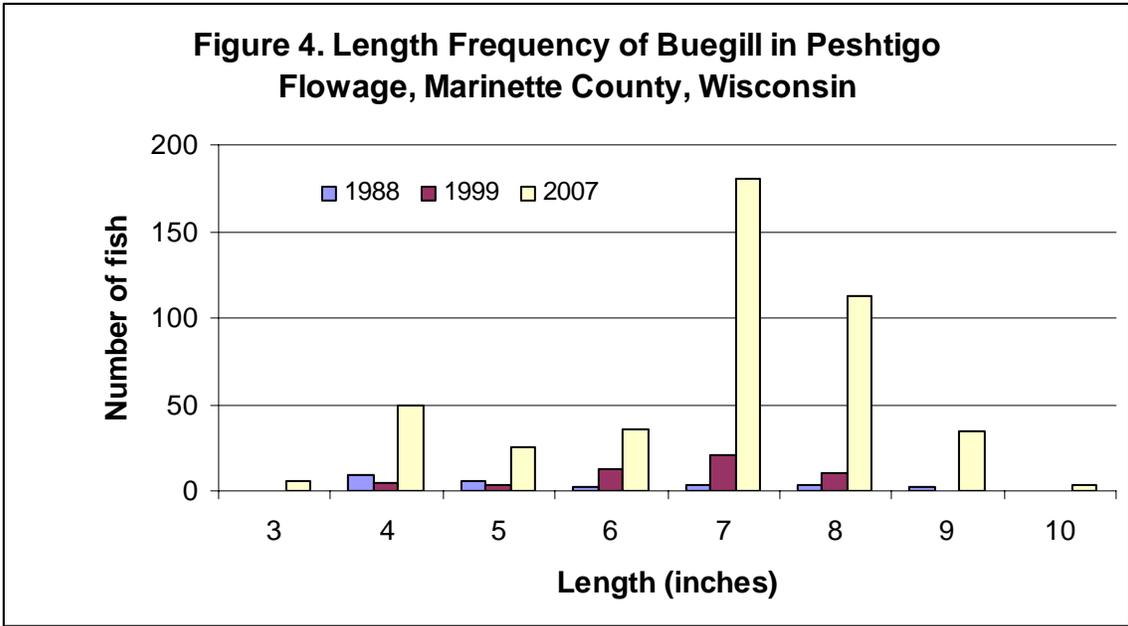


Table 7. 2007 Age- length distribution of bluegill from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample.

Age	2	3	4	5	6	7	8	9
<b>NER Average</b>	4.0	4.8	5.8	6.6	7.2	7.9	8.3	8.7
<b>2007 Survey</b>	4.5	5.9	7.4	8.3	9.0	9.0	9.5	9.9
<b>2007 N</b>	30	11	33	10	3	3	8	1
<b>1999 Survey</b>	5.6	6.6	7.6	7.7	8.3	8.6	-	-

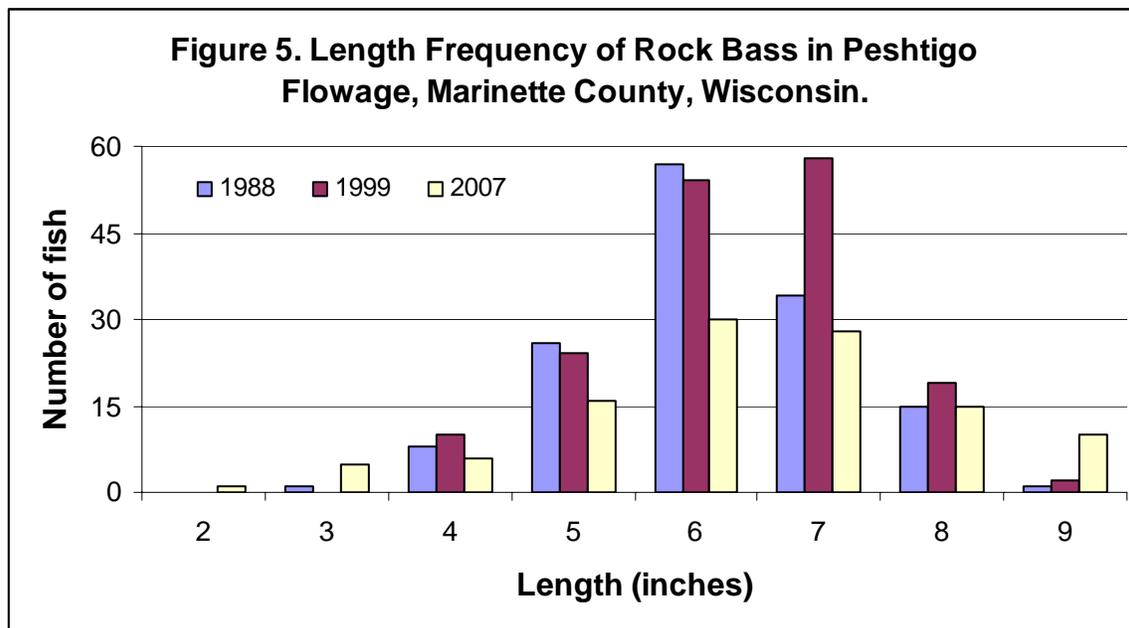
<b>1999 (N)</b>	1	3	4	6	5	2	-	-
<b>1988 Survey</b>	4.7	5.8	7.8	8.0	9.1	9.7	-	-
<b>1988 (N)</b>	12	5	3	5	1	1	-	-

Rock bass

During the summer 2006 mini fyke netting survey, no juvenile rock bass under 3 inches were captured in this flowage. There were 1.4 rock bass per net night captured over 3 inches and ranged in size from 3.3 to 6.5 inches in length. Electroshocking during the fall of 2006 produced 15 rock bass per mile ranging in size from 3.1 to 9.2 inches. During the spring 2007 fyke netting survey, we captured a total of one hundred and fifty two rock bass ranging in size from 2.8 to 9.9 inches (Figure 5) and averaging 6.9 inches. The catch per effort was 1.3 rock bass per net night.

In 1999, a total of one hundred and sixty seven rock bass were captured ranging in size from 4.2 to 9.4 inches (Figure 5) no average length was calculated. The catch per effort was 1.9 rock bass per net night. In 1988, not all rock bass captured were counted, a total of one hundred and forty two rock bass were measured ranging in size from 3.9 to 9.2 inches (Figure 5), but no average length was calculated. The catch per effort was not calculated for 1988.

The length at age of rock bass sampled in the 2007 survey revealed overall slightly better growth rates for all ages sampled when compared to the Wisconsin State average, 1999 and 1988 surveys (Table 8 and Figure 5a). The sample size of aged rock bass for 1988 was 78, in 1999 it was 9 and 59 in 2006 (Table 8). In the 2007 survey, there was a good representation across many year classes of rock bass.



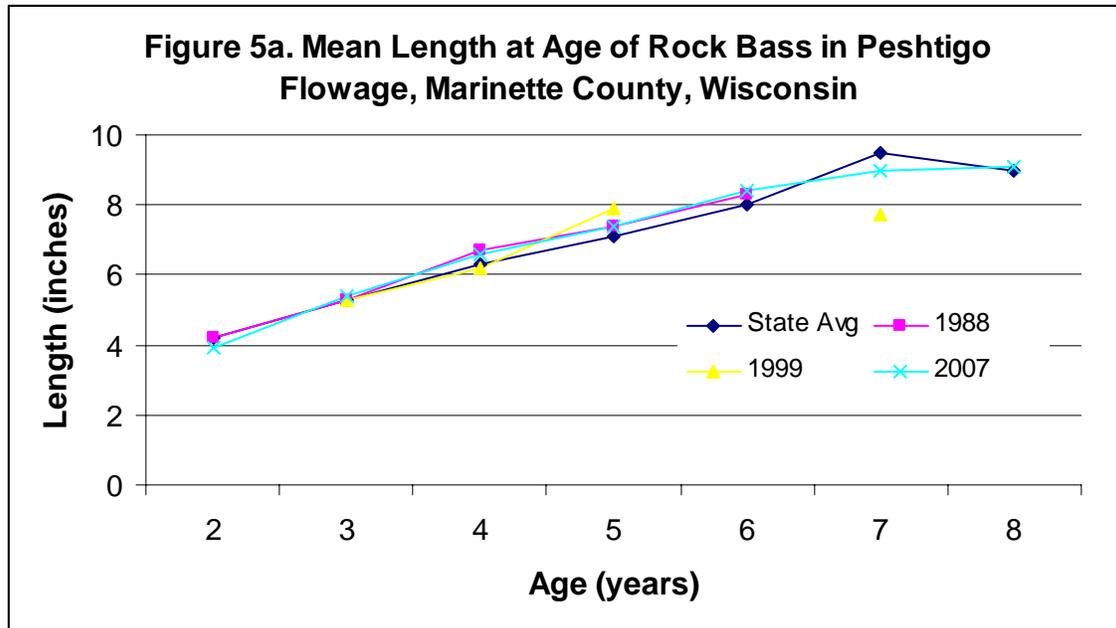


Table 8. 2007 Age- length distribution of rock bass from Peshtigo Flowage, Marinette County Wisconsin compared to the Wisconsin State average length at age data (no NER average data is available), 1999 and 1988 survey data. N equals sample.

Age	2	3	4	5	6	7	8
<b>State Average</b>	4.2	5.3	6.3	7.1	8.0	8.5	9.0
<b>2007 Survey</b>	3.9	5.4	6.6	7.4	8.4	9.0	9.1
<b>2007 (N)</b>	11	8	14	13	5	3	5
<b>1999 Survey</b>	-	5.3	6.2	7.9	-	7.7	-
<b>1999 (N)</b>	-	4	3	1	-	1	-
<b>1988 Survey</b>	4.2	5.3	6.7	7.4	8.3	-	-
<b>1988 (N)</b>	3	16	30	18	11	-	-

### Black crappie

During the summer 2006 mini fyke netting survey, 0.9 black crappie per net night and 0.63 per net night were juveniles under 3 inches. The black crappie ranged in size from 1.9 to 5.0 inches in length. Electroshocking during the fall of 2006 produced 6.7 black crappie per mile ranging in size from 3.1 to 11.8 inches. During the spring 2007 fyke netting survey, we captured a total of four hundred and eleven black crappie ranging in size from 4.6 to 13.1 inches (Figure 6) and averaging 9.6 inches. The catch per effort was 3.4 black crappie per net night.

In 1999, a total of sixty nine black crappie were captured ranging in size from 3.8 to 13.8 inches (Figure 6) no average length was calculated. The catch per effort was 0.8 black crappie per net night. In 1988, not all black crappie captured were counted, a total of eighty four black crappie were measured ranging in size from 5.2 to 13.4 inches (Figure 6), but no average length was calculated. The catch per effort was not calculated for 1988.

The length at age of black crappie sampled in the 2007 survey indicated faster growth rates for all ages sampled when compared to the NER average and slightly slower growth rates overall when compared to the 1999 and 1988 surveys (Table 9 and Figure 6a). The sample size of aged black crappie for 1988 was 57, 1991 was 34 and 2007 was 96 (Table 9). In the 2007 survey, there was a good representation across many year classes of black crappie.

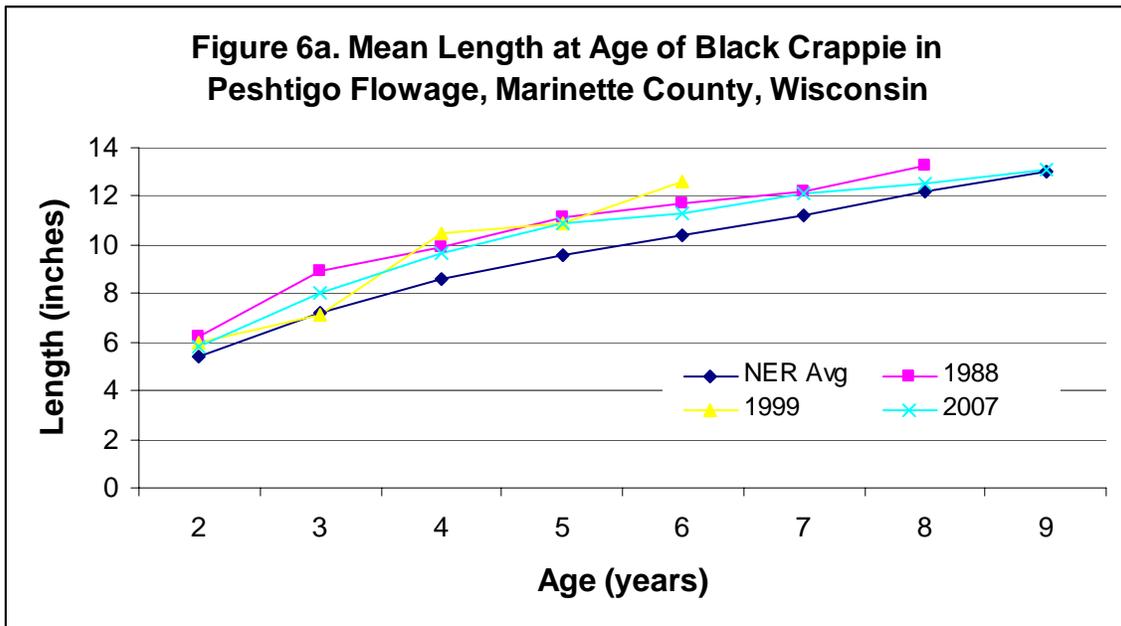
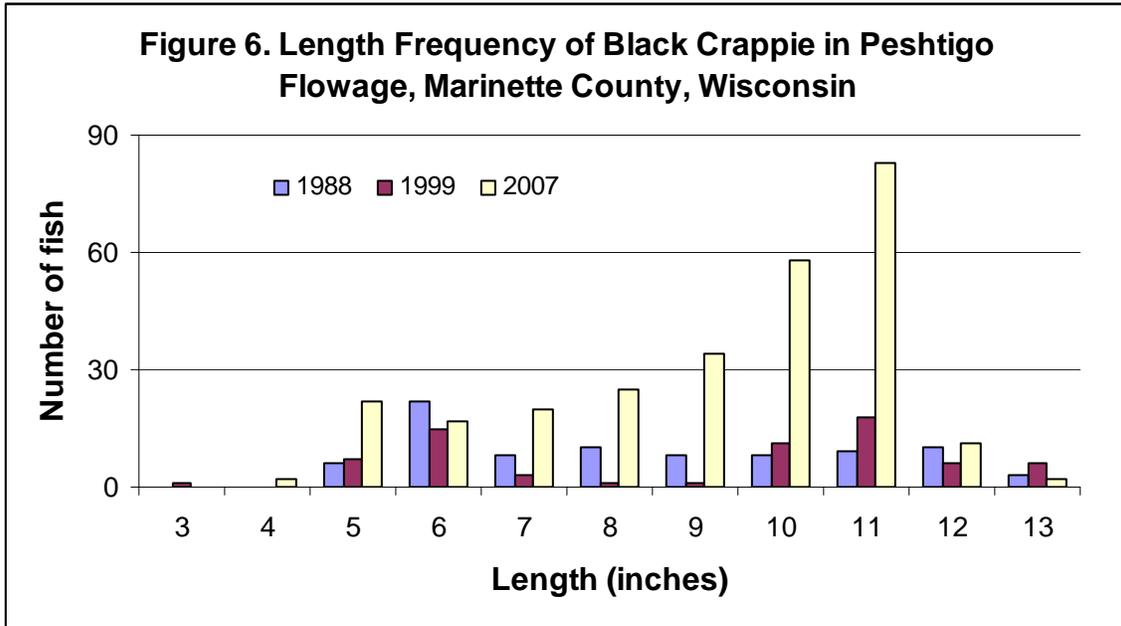


Table 9. 2007 Age- length distribution of black crappie from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample size.

<b>Age</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
<b>NER Average</b>	5.4	7.2	8.6	9.6	10.4	11.2	12.2	13.0
<b>2007 Survey</b>	5.8	8.0	9.7	10.9	11.3	12.1	12.5	13.1
<b>2007 (N)</b>	22	20	21	9	15	6	2	1
<b>1999 Survey</b>	6.0	7.1	10.5	10.9	12.6	-	-	-
<b>1999 (N)</b>	18	3	8	4	1	-	-	-
<b>1988 Survey</b>	6.2	8.9	9.9	11.1	11.7	12.2	13.3	-
<b>1988 (N)</b>	18	13	10	2	8	3	3	-

### Pumpkinseed

During the summer 2006 mini fyke netting survey, 7.1 pumpkinseed per net night were captured and 1.4 fish per net night were juveniles under 3 inches. The pumpkinseed size ranged from 2.5 to 6.3 inches in length. Electroshocking during the fall of 2006 produced 4.5 pumpkinseed per mile ranging in size from 2.8 to 7.5 inches. During the spring 2007 fyke netting survey, we captured a total of two hundred and thirty eight pumpkinseed ranging in size from 3.0 to 9.2 inches (Figure 7) and averaging 6.5 inches. The catch per effort was 2.0 pumpkinseed per net night.

In 1999, a total of ninety nine pumpkinseed were captured ranging in size from 3.6 to 10.8 inches (Figure 7) no average length was calculated. The catch per effort was 1.1 pumpkinseed per net night. In 1988, not all the pumpkinseed captured were counted, a total of one hundred and seventy pumpkinseed were measured ranging in size from 3.8 to 7.7 inches (Figure 7), but no average length was calculated. The catch per effort was not calculated for 1988.

The length at age of pumpkinseed sampled in the 2007 survey showed overall faster growth rates for all ages sampled when compared to the NER average and 1988 survey and slightly slower growth rates overall when compared to the 1999 survey (Table 10 and Figure 7a). The sample size of aged pumpkinseed for 1988 was 74, 1991 was 34 and 2007 was 64 (Table 10). In the 2007 survey, there was a good representation across many year classes of pumpkinseed.

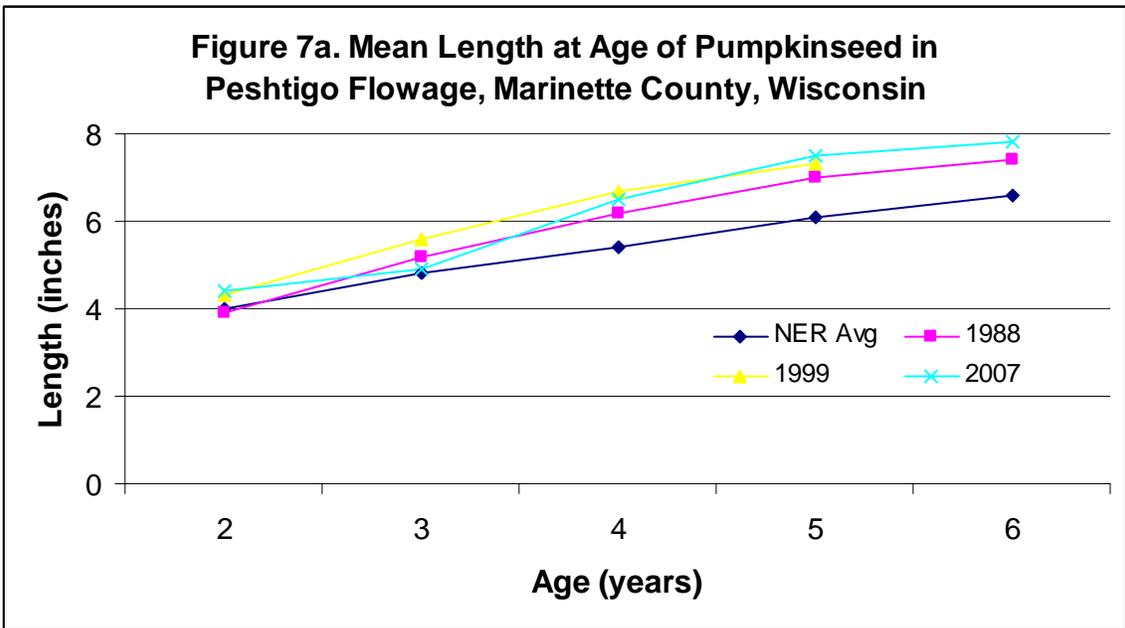
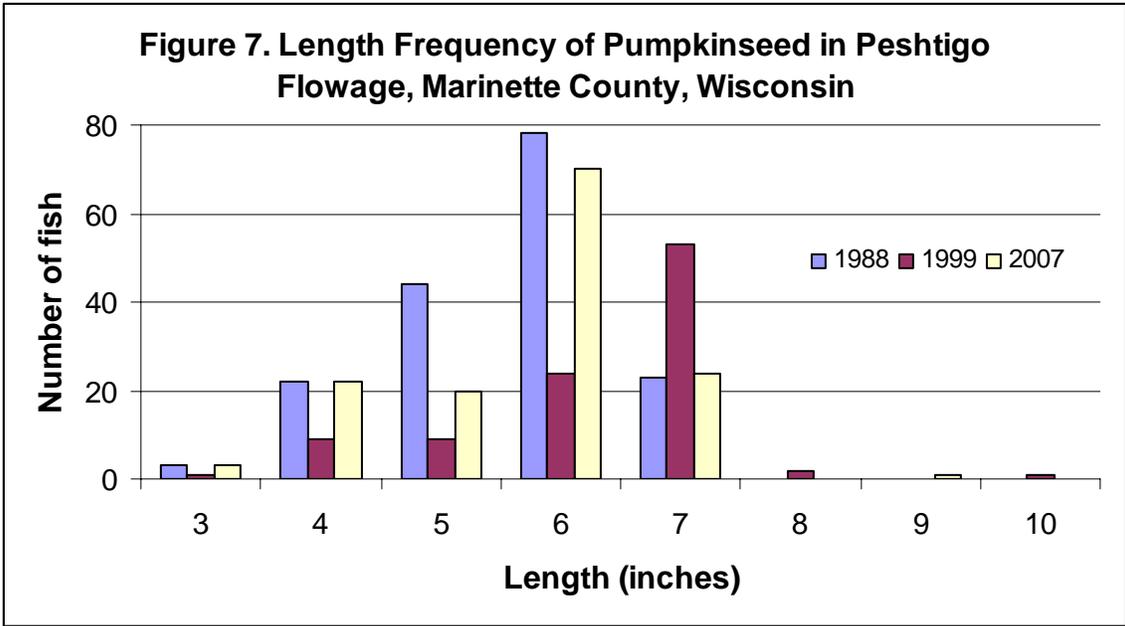


Table 10. 2007 Age- length distribution of pumpkinseed from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age as well as 1999 and 1988 survey data. N equals sample size.

Age	2	3	4	5	6
<b>NER Average</b>	4.0	4.8	5.4	6.1	6.6
<b>2007 Survey</b>	4.4	5.9	6.5	7.5	7.8
<b>2007 (N)</b>	15	11	32	5	1
<b>1999 Survey</b>	4.3	5.6	6.7	7.3	-
<b>1999 (N)</b>	8	5	11	10	-

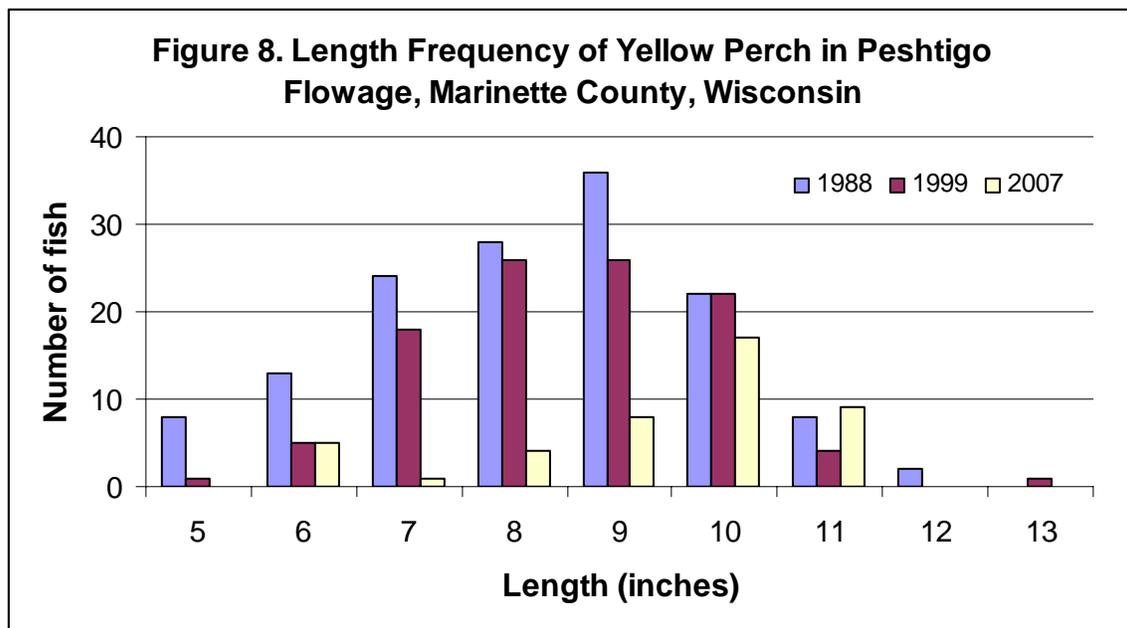
<b>1988 Survey</b>	3.9	5.2	6.2	7.0	7.4
<b>1988 (N)</b>	11	12	32	15	4

Yellow perch

We did not capture any yellow perch during the summer 2006 mini fyke netting survey. Electroshocking during the fall of 2006 produced 2.7 yellow perch per mile, ranging in size from 4.9 to 11.5 inches. During the spring 2007 fyke netting survey, we captured a total of fifty nine yellow perch ranging in size from 6.3 to 11.6 inches (Figure 8) and averaging 9.7 inches. The catch per effort was 0.5 yellow perch per net night.

In 1999, a total of one hundred and three yellow perch were captured ranging in size from 5.7 to 13.0 inches (Figure 8) no average length was calculated. The catch per effort was 1.2 yellow perch per net night. In 1988, not all the yellow perch captured were counted, a total of one hundred and forty one yellow perch were measured ranging in size from 5.4 to 12.4 inches (Figure 8), but no average length was calculated. The catch per effort was not calculated for 1988. The number of perch captured during the 2007 fyke net surveys was dramatically less than the 1988 and 1999 surveys

The length at age of yellow perch sampled in the 2007 survey showed overall faster growth rates when compared to the NER average, similar growth rates for ages 2-5 and slower growth rates for ages 6-7 when compared to the 1999 and 1988 surveys (Table 11 and Figure 8a). The sample size of aged yellow perch for 1988 was 63, 1991 was 29 and 2007 was 32 (Table 11). In the 2007 survey, there was a small sample of yellow perch that represented several year classes.



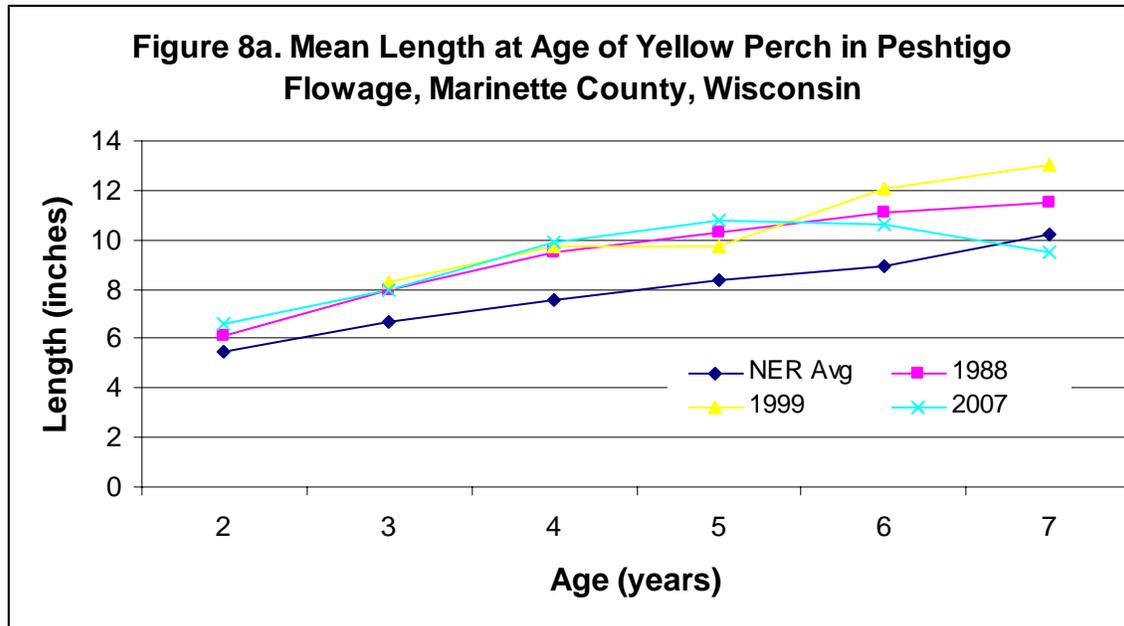


Table 11. 2007 Age- length distribution of yellow perch from Peshtigo Flowage, Marinette County Wisconsin compared to Northeast (NER) Wisconsin average length at age data, 1999 and 1988 survey data. N equals sample.

Age	2	3	4	5	6	7
<b>NER Average</b>	5.5	6.7	7.6	8.4	8.9	10.2
<b>2007 Survey</b>	6.6	8.0	9.9	10.8	10.6	9.5
<b>2007 (N)</b>	2	6	12	7	4	1
<b>1999 Survey</b>	-	8.3	9.7	9.7	12.1	13.0
<b>1999 (N)</b>	-	7	8	11	2	1
<b>1988 Survey</b>	6.1	8.0	9.5	10.3	11.1	11.5
<b>1988 (N)</b>	18	19	13	3	9	1

#### Other fish species

Other species caught during the 2006 and 2007 surveys included: black bullhead, bowfin, brown bullhead, common carp, common shiner, golden redhorse, golden shiner, greater redhorse, green sunfish x bluegill, pumpkinseed x bluegill, pumpkinseed x warmouth, shorthead redhorse, silver redhorse, warmouth, white sucker and yellow bullhead.

## CONCLUSIONS AND RECOMMENDATIONS

Peshtigo 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 significant decrease in the overall population size when compared to the 1988 survey and a slight increase from the 1999 survey. The population density decreased from 11.3 northern pike per acre in 1988 to 3.6 fish per acre in 1999 and increased to 5.8 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, 96% of the northern pike captured were age four and younger. That composition in 1999 was 78% and 75% in 2007. The growth rates of northern pike in 2007 were slower when compared to the NER average and both the previous surveys. 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 (6.7%) and decreased from the 1999 (28.5%) surveys when compared to the 2007 survey (22.6%). Since the change in the northern pike regulation on the Peshtigo Flowage in 1995 the northern pike population has shown an improvement in the size structure, with larger fish being caught in the 2007 survey than in previous years. I do not recommend any change in the current management of northern pike in Peshtigo Flowage.

The largemouth bass population in 2007 illustrated an increase between this year and both the 1988 and 1999 surveys shown through the increased number of fish surveyed in the 2007 survey. The catch rates increased from 0.03 fish per net night in 1988 and 0.02 in 1999 and 0.4 in 2007. No population estimates were calculated, because of the low number of largemouth bass captured at Peshtigo flowage. The overall growth rates of largemouth bass from the 2007 survey showed better growth rates when compared to the NER average. The faster growth rates are not typical for this geographical area, however the abundant food source found in the impoundment is likely a contributing factor to these fast growth rates. The percent of largemouth bass captured over the quality size of 12 inches in the 2007 survey was 90.5%. I do not recommend any change in the current management of the largemouth bass population in Peshtigo Flowage.

A very low density smallmouth bass population continues to be present in Peshtigo Flowage. The population density fluctuated between the three survey years: 1988, 1999 and 2007. The spring fyke net catch rates varied from 1988 (0.01) to 1999 (0.1) and 0.05 in 2007. I do not recommend any change in the current management of the smallmouth bass population in Peshtigo Flowage.

The walleye population in Peshtigo Flowage is more likely stronger than observed in our surveys due to the nature of the walleye spawning run. The Flowage itself has limited 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 14 walleye were captured this number is lower than in the previous two surveys, 1988 (140) and 1999 (26). 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 Peshtigo Flowage. To more accurately describe the walleye population, future studies should focus on detecting the spawning areas that are more likely located upstream in an area below the dam and determine if they then move back downstream to the flowage proper after spawning.

The panfish fishery in Peshtigo 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 increased from 1999 (0.6) to 2007 (6.7). Bluegill were the dominant pan fish species during the 2007 survey. The percent of bluegill surveyed of quality size (over 6 inches) has varied between survey years from 1988 (44.4%), to 1999 (84.6%), and 2007 (81.9%). 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 slight decrease in catch rates from the spring fyke net surveys in 1999(1.9) to 2007 (1.3). The percent of rock bass surveyed of quality size (over 7 inches) has shown an increase between survey years from 1988 (35.2%), to 1999 (47.3%), and 2007 (47.7%). The growth rates of rock bass captured during the 2007 survey showed slightly better 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 an increase in catch rates during the spring fyke netting surveys from 1999 (0.8) to 2007 (3.4). The percent of black crappie surveyed of quality size (over 8 inches) showed an increase between survey years from 1988 (57.1%), to 1999 (62.3%), and 2007 (77.7%). The growth rates of black crappie captured during the 2007 survey revealed overall faster growth rates when compared to the NER average, but slower rates than the 1988 and 1999 surveys. A good range of age classes were represented in the 2007 survey indicating good recruitment over the years.

The pumpkinseed population showed a slight decrease in catch rates from the spring fyke netting surveys from 1999 (1.1) to 2007 (2.0). The percent of pumpkinseed surveyed of quality size (over 6 inches) showed some variation between the survey years with no trend from 1988 (59.4%), to 1999 (80.8%), and 2007 (67.9%). The growth rates of pumpkinseed captured during the 2007 survey yielded faster growth when compared to the NER average and the 1988 survey and slower rates than the 1999 survey. A good range of age classes were represented in the 2007 survey indicating multiple recruitment events over the years.

The yellow perch population showed a lower catch rate in 2007 (0.5) when compared to 1999 (1.2). The percent of yellow perch surveyed of quality size (over 8 inches) increased over the survey years from 1988 (68.1%), to 1999 (76.7%), and 2007 (86.4%). The growth rates of yellow perch captured during the 2007 survey indicated overall faster

growth when compared to the NER average and similar rates for ages 2-5 for both the 1988 and 1999 surveys. Several age classes were represented during the 2007 survey showing recruitment is occurring.

Peshtigo 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 when compared to previous surveys they remain above the NER average, the overall health of the fishery is good. The flowage has many miles of open flowing river as well as many inaccessible back waters that also help support this fishery. However, the ability of the fish to move around the entire flowage 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 flowage has some 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 Peshtigo Flowage is good with one boat launch located off of Hwy 41 in the City of Peshtigo and is owned and operated by the City. A second boat launch is owned and operated by the Wisconsin Department of Natural Resources located just north of Hwy 64 at the north end of the impoundment. There is also shore access fishing located in the City of Peshtigo. I would recommend no improvements to the current landing facilities. However, I would recommend additional disabled and walk in access fishing areas. I also recommend protection of native wild rice stands on this flowage.

## ACKNOWLEDGEMENTS

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

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## Appendix

- Figure 1. Location of 6 mini fyke nets for the baseline monitoring survey July 24<sup>th</sup> – July 25<sup>th</sup> 2006.
- Figure 2. Location of the 4 mile baseline monitoring electroshocking survey on October 3<sup>rd</sup>, 9<sup>th</sup> and 25<sup>th</sup> 2006.
- Figure 3. Location of the 4 mile comprehensive electroshocking survey on May 23<sup>rd</sup>, 2007.
- Figure 4. Location of 8 standard fyke nets for the comprehensive fishery survey March 27<sup>th</sup> – April 11<sup>th</sup>, 2007.

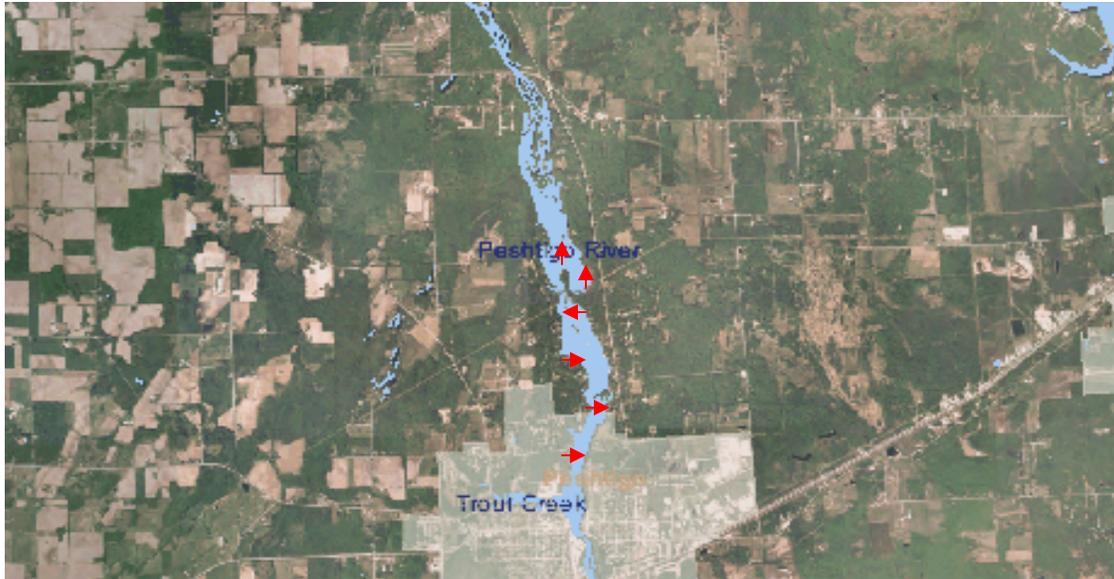


Figure 1. Location of 6 mini fyke nets for the baseline monitoring survey July 24<sup>th</sup> – July 25<sup>th</sup> 2006.

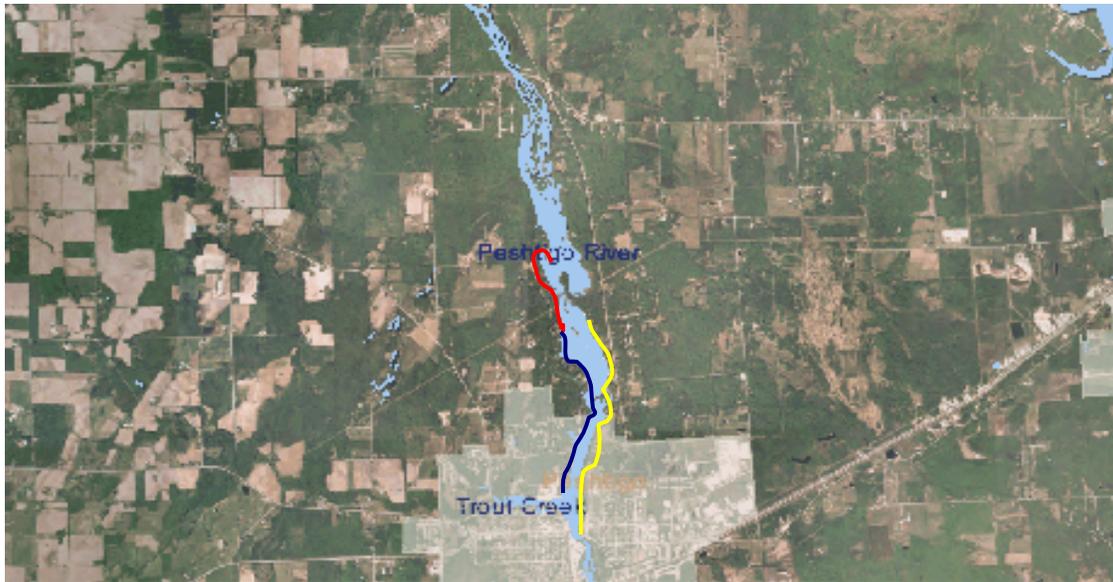


Figure 2. Location of the 4 mile baseline monitoring electroshocking survey on October 3<sup>rd</sup> (Red), 9<sup>th</sup> (blue), 25<sup>th</sup> (yellow).

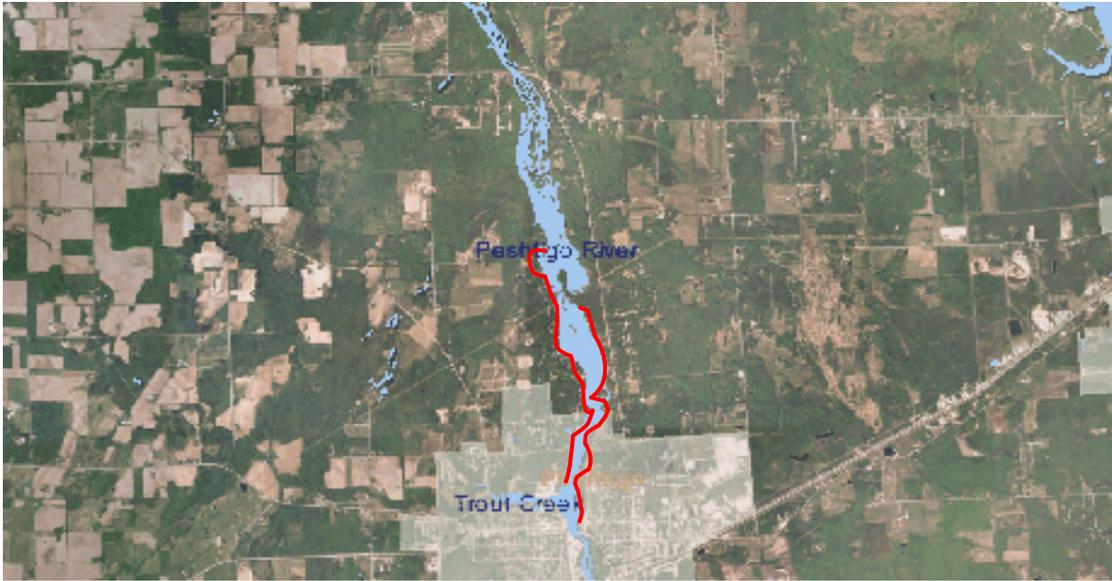


Figure 3. Location of the 4 mile comprehensive electroshocking survey on May 23<sup>rd</sup>, 2007.

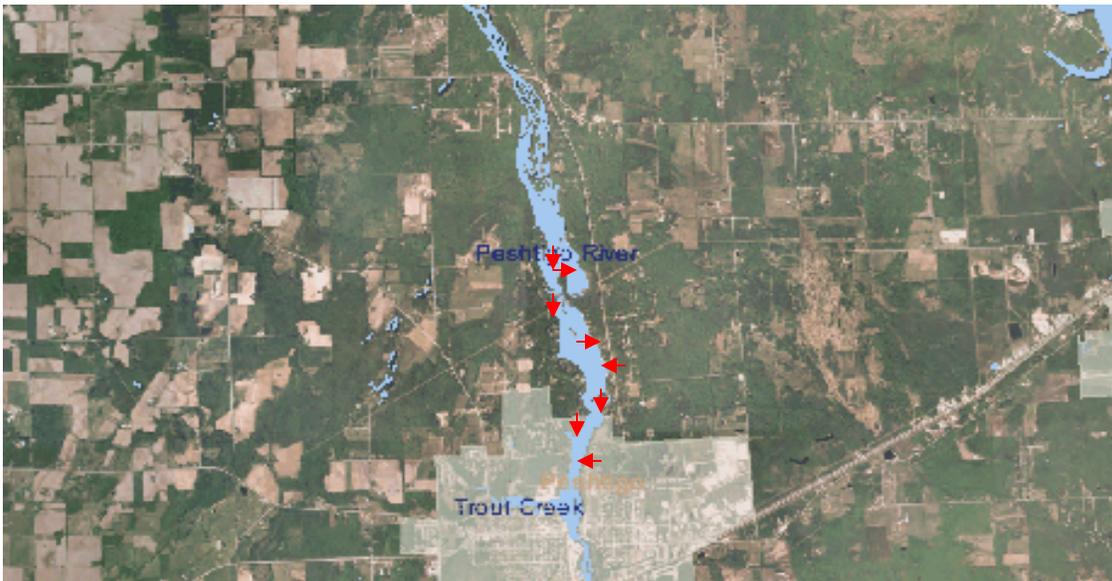


Figure 4. Location of 8 standard fyke nets for the comprehensive fishery survey March 27<sup>th</sup> – April 11<sup>th</sup>, 2007.