

# **Green Bay Walleye Tagging Surveys- 2012-2013 Update**

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### **WDNR-Green Bay**

Large annual spring spawning migrations of walleye have been documented by WDNR staff on major Green Bay tributaries for many years. These rivers along with several other spawning locations scattered around Green Bay likely sustain the large walleye population that is found in Green Bay. Some walleye populations have been studied intensively in the past such as those found in the Fox River, while walleye that utilize the Menominee, Oconto or Peshtigo Rivers have had little evaluation.

Surveys have been conducted annually on the Fox River and lower Green Bay to assess walleye populations since the late 1980's using either fyke nets fished in spring to capture spawning age walleye or in fall using nighttime electroshocking to target young of year (YOY) walleye. Walleye surveys have also been conducted in spring about every five years in the Sturgeon Bay area to assess spawning fish. In an effort to gain a more complete understanding of walleye use of the Oconto, Peshtigo and Menominee Rivers, fall nighttime electroshocking surveys have been conducted annually from 2006 through 2011 and in 2013 to assess walleye YOY production. However, despite the large numbers of adult walleye known to utilize these rivers during spring runs, few YOY were ever captured during these surveys. Low YOY capture rates were likely due to poor spawning success or that either that YOY walleye were upstream of our index stations or had already moved out into Green Bay before our surveys were conducted. In 2012, DNR began to assess the magnitude of spawning migrations into these rivers, by using daytime electroshocking just below the dams in Stiles (Oconto River) and Peshtigo (Peshtigo River) to capture walleye during the estimated peak of the spring spawning run. This work continued in 2013 when we daytime electroshocked the Oconto, Peshtigo, Menominee and Fox Rivers during spring runs to assess walleye populations.

To capture walleye, a standard electroshocking boat with two netters was utilized at each location. During each shocking event, captured walleye were sexed and measured. A subsample of walleye were tagged with an individually numbered Floy tag and had a dorsal spine removed for age analysis. Up to ten spines per centimeter length interval were collected for ageing. One fish per ten tagged was double tagged to estimate tag loss. To gain more insight on walleye movement throughout the bay, similar tags were provided to the Sturgeon Bay fisheries crew that in 2013 surveyed the local walleye population with fyke nets in the Sturgeon Bay and Little Sturgeon Bay area.

## **Results**

2012

### Peshtigo River

Walleye were captured below the Peshtigo Dam on March 20 and 22 (Table 1). Surface water temperature ranged from 50°F to 52°F during the survey. During this period, 499 walleye were captured that ranged in size from 386 mm to 730 mm with an average length of 546 mm. Catch per effort (CPE) was 311.3 walleye per hour shocked on March 20. Effort was not recorded on March 22.

Most of the captured walleye (428 of 499) were judged to be male. Male walleye ranged in length from 386 mm to 652 mm and had an average length of 537 mm (Table 2). Dorsal spine samples were collected from 108 male walleye. Ages obtained from our samples ranged from age 3 through age 8 with age 5 being the dominant male age class (Table 3). It appears male walleye begin to spawn at age 3, with most walleye spawning by age 4. Growth, measured as length at age is above the state average at each age (Table 4).

Captured female walleye ranged in length from 502 mm to 730 mm with an average length of 593 mm (Table 2). Age samples were collected from 65 female walleye that had an age ranging from age 4 through age 10 (Table 5). Age 5 was the dominant female age class that we collected. Although we captured a few age 4 female walleye, it appears most females begin to spawn at age 5. Growth of female walleye was at or above state average growth (Table 4).

### Oconto River

Walleye were shocked below the dam in Stiles on March 19 (Table 1). The water temperature at the time of the survey was 55°F. We captured 212 walleye in 1.85 hours of shocking for a CPE of 114.5 walleye per hour shocked. The captured walleye ranged in length from 388 mm to 688 mm with an average walleye length of 512 mm.

Male walleye accounted for 114 of the 212 fish that we captured. Male walleye ranged in length from 388 mm to 592 mm and had an average length of 459 mm (Table 6). Dorsal spines were collected from 93 male walleye. Age 3 through age 9 walleye were in the sample with age 3 the dominant age class (Table 7). Few walleye were older than age 5 in our sample. Growth was above state averages but growth was less than observed on the Peshtigo River at each age (Table 4).

The 90 female walleye that we captured ranged in length from 496 mm to 688 mm and had an average length of 580 mm (Table 6). Spines were collected from 75 female walleye. Ages ranged from age 3 to age 9 with the age 5 year class dominating the sample (Table 8). Growth of female walleye in the Oconto River was above state averages (Table 4).

Eight walleye could not be sexed. They ranged in length from 367 mm to 546 mm with an average length of 472 mm (Table 6).

### 2012 Angler Returns

In 2012, we tagged 289 male walleye and 71 female walleye from the Peshtigo River, and 42 walleye were double tagged to help us estimate tag loss. During calendar year 2012, anglers returned information from 16 fish (Table 9). This information equates to a return rate of 4.4%. Tags from male or female walleye were returned in equal number despite tagging 4 times as many males as females. The single recaptured double tagged walleye was returned with both tags present. Eight tagged fish were captured by anglers fishing in the Peshtigo River, seven from west shore locations on Green Bay and one tag was returned by an angler fishing on the east shore of the bay (Figure 2). An average returned tag from a male was returned 55.3 days after tagging and 22.8 days after tagging for females. In the short term, March through December of 2012, it appears that walleye movement was limited to the local area.

From the Oconto River we tagged 90 female, 112 male and 7 unknown sex walleye. As of the end of 2012, we have had information returned to us from 11 fish, five males and six females (Table 9). This is a return rate of 5.3%. The return locations have been six from west shore rivers and four from the west shore of Green Bay (Figure 3). One tag return did not provide information on the location of capture. The days at large of returned tags were similar for males and females tagged from the Oconto River at 44.8 days and 42.0 respectively. Similar to walleye tagged from the Peshtigo River, walleye tagged from the Oconto River stayed along the west side of Green Bay in 2012.

2013

### Peshtigo River

Walleye were shocked and tagged below the Peshtigo Dam on April 9, 16 and 17 with the majority of fish handled on April 16. Water temperatures varied between 36°F on April 9 to 41°F on April 17. During this period, we tagged 453 walleye (305 males and 148 female) in 1.93 hours of electroshocking (Table 1). Total CPE was 234.7 walleye per hour shocked.

Male walleye ranged in length from 377 mm to 681 mm and had an average length of 519 mm (Table 10). Dorsal spine samples were collected from 210 male walleye. Ages obtained from our samples ranged from age 3 through age 10 with age 6 being the dominant male age class (Table 11). It appears male walleye begin to spawn at age 3, with most walleye spawning by age 4. Growth, measured as length at age was lower than what was estimated in 2012, but is still above the state average at each age (Table 4).

The 148 female walleye that we captured ranged in length from 463 mm to 738 mm and had an average length of 605 mm (Table 10). Spines were collected from 139 female walleye. Ages ranged from age 3 to age 11 with the age 6 year class dominating the sample (Table 12). Growth of female walleye in the Peshtigo River was similar to what was observed in 2012 and grow in both years was above the state average (Table 4).

### Oconto River

Walleye were sampled below the Stiles Dam on the Oconto River on April 22 and 23, 2013. The water temperature each day was 39°F. Over the course of the two sampling days, 532 walleye (401 male and 131 female) were tagged (Table 1). Effort was not recorded.

The 401 male walleye we captured ranged in length from 356 mm to 655 mm and had an average length of 478 mm (Table 13). Spines were collected from 100 male walleye. Age 3 through age 10 and age 12 fish were noted in the sampled fish (Table 14). Age 4 and age 6 were the most common aged walleye in our sample. Age 10 (2003 year class) male walleye were also notably present in our sample. In 2013 length at age was less than what was measured in 2012, but walleye captured in each year displayed above state average length at each age (Table 4).

131 female walleye were captured during electroshocking. These walleye ranged in length from 478 mm to 688 mm and had an average length of 579 mm (Table 1). We took a spine from 82 female walleye yielding ages 4 through 10 from the sample (Table 15). Age 6 was the most commonly aged female walleye but ages 4, 5 and 7 were also common. Similar to males, age 10 female walleye were also notable in the age sample.

## Menominee River

Fisheries staff electroshocked for walleye below the Hattie Street dam on the Menominee River on April 8, 15 and 23 with a total effort of 4.1 hours. A total of 455 walleye (204 male and 250 female) were captured with a CPE of 111.0 walleye per hour shocked (Table 1). Water temperature throughout the period ranged from 36°F to 41°F.

A total of 205 male walleye were captured during electroshocking. These walleye ranged in length from 395 mm to 665 mm and had an average length of 507 mm (Table 16). Spines were collected and aged from 161 male walleye. Age 3 through age 15+ were in our sample (Table 17). Age 3 through age 7 occurred in similar number with older age fish much less abundant. Although not as strongly pronounced as in the Oconto River sample, age 10 walleye were also notable in this sample. Length at age for male walleye collected from the Menominee River was above state averages at each age (Table 4).

Staff captured 250 female walleye from the Menominee River during sampling events (Table 1). Female walleye ranged in length from 441 mm to 742 mm and had an average length of 606 mm (Table 16). The 185 spines that were collected for age analysis ranged in age from age 4 through age 15+ (Table 18). Age 6 females were the most common, but age 4 to age 5 and age 7 through age 10 female walleye were also commonly captured. Growth was above state average length at age values (Table 4).

## Fox River

The Fox River below the DePere Dam was electroshocked to capture walleye on April 3 and 4, 2013. A total of 484 walleye (422 male and 62 female) were captured during sampling (Table 1). Water temperature on both days was 38°F. Effort was not recorded.

The 422 male walleye that were handled ranged in length from 385 mm to 644 mm and had an average length of 422 mm (Table 19). A spine was collected for aging from 199 male walleye. Age ranged from age 3 through age 11 (Table 20). Age 5 was the most common aged male walleye, but age 4 fish were also very common. Similar to other rivers, age 10 males were notable in their abundance in our aged sample of walleye. Length at age was above state averages at all ages (Table 4).

A total of 62 female walleye were captured during shocking. Female walleye ranged in length from 428 mm to 746 mm and had an average length of 613 mm (Table 19). Age was determined for 59 female walleye. Ages ranged from age 4 through age 12 with age 10 and age 5 the most commonly aged female walleye in our sample (Table 21). Similar to male walleye, length at age for female walleye was above state averages (Table 4).

## 2013 Angler Returns

Walleye were tagged in the four river locations that were electroshocked and also in the Sturgeon Bay area during a spring walleye fyke net survey in 2013. Over course of 2013, we received tag return information for 68 walleye that were tagged in 2013 as well as 6 walleye tagged in 2012 (Table 9).

In 2013, we tagged 453 walleye from the Peshtigo River (Table 9). We received tag information back from 15 walleye (12 male and 3 female) for a return rate of 3.3%. Most of the returns came

from anglers fishing the Peshtigo River or from along the west shore of Green Bay north of the Pensaukee River (Figure 4). One fish was captured from the east shore near Bayshore County Park and the capture locations of six fish were unknown. The average male from which a tag was returned from was at large for 57 days (Table 9). The average female was at large for 66 days. We also received tag return information from 4 walleye that were tagged in 2012 from the Peshtigo River (Figure 2). Two of the returns were from the Peshtigo River and anglers did not provide capture information on the other two. One double tagged walleye was returned by an angler with only one tag in it. This was the only double tagged fish lacking two tags at the time of angler recapture.

During electroshocking on the Oconto River, we tagged 432 (401 male and 131 female) walleye (Table 9). We received recapture information from 20 walleye (11 male and 9 female) for a return rate of 4.6%. Recapture information indicated that for males the tags were at large for an average of 55.3 days and 45.8 days for female walleye. Anglers returned tags from around the southern bay with the most returns from the Oconto River and off of the Pensaukee River (Figure 5). We also received recapture information from two fish that were tagged from the Oconto River in 2012. These fish were recaptured from between Geano Beach and the Oconto River (Figure 3).

We tagged 454 (204 male and 250 female) walleye that were captured from the Menominee River during spring 2013 electroshocking (Table 9). From those walleye, we received recapture information from 16 (8 male and 8 female) fish which is a recapture rate of 3.5%. Return information indicates that the average time from the tagging date to angler capture date for males was 38.2 days and 53.6 days for female walleye. Most of the angler returns came from the Menominee River or just outside the river in Green Bay (Figure 6). A few walleye were also captured from along the west and east shores of Green Bay.

A total of 484 (422 male and 62 female) walleye were tagged below the DePere Dam on the Fox River (Table 9). Anglers returned tags from seven (5 male and 2 female) of these marked fish during 2013 for a return rate of 1.5%. The average time between tagging and angler capture was 82.4 days and 45.0 days for male and female walleye respectively. Most of the angler returns were from the southern bay with one tag returned from Sturgeon Bay and two that did not specify capture location (Table 7).

During fyke netting, Sturgeon Bay fisheries staff tagged 638 (354 male and 284 female) walleye (Table 9). In 2013, we received angler recapture on 10 fish (4 male and 6 female) for a return rate of 1.6%. The average time between tagging and angler recapture was 49.3 days for male walleye and 18.8 days for female walleye. Walleye that were tagged in the Sturgeon Bay area did not appear to move around much with all the tag returns from the east shore of Green Bay between Chaudoirs Dock and the City of Sturgeon Bay (Figure 8). One walleye return did not specify the recapture location.

## **Discussion**

Results from the two years of surveys indicate that walleye utilize the large west shore rivers as well as the Fox River and the Sturgeon Bay area in the spring for spawning. Young of year surveys conducted in fall on the Fox River and along the far southern Green Bay shoreline has documented strong walleye recruitment many times over the past 20 years (Figure 9). The strongest year classes were produced in 2013, 2003, 1993. Year classes produced in 2007 through 2011 were also above average. It is likely that walleye runs in all the surveyed areas contribute to the overall Green Bay walleye population. It is not clear why when we shock the Oconto and

Peshtigo Rivers in fall that we see no evidence of recruitment and only modest evidence of recruitment in the Menominee River when we have documented strong spring walleye runs in these rivers.

Comparing biological data between rivers indicates that walleye returning to these rivers are similar. Average length and return size range by sex are consistent between rivers. The age of return is also similar with males returning at age 3 and females returning at age 4. Analysis of year class strength for these rivers indicate that younger fish generally dominate the spring run with age 6 (year class 2007), age 5 (YC 2008) and age 4 (YC 2009) the most common ages. When compared to long term YOY index data from the Fox River and lower Green Bay, it is not surprising that age 5 are common because 2008 was a good walleye yoy year on both the river and bay (Figure 9). Also the strong representation of age 10 walleye was not surprising because of the large 2003 year class that still exists in Green Bay. It is surprising, however, that walleye older than age 10 appear to be fairly uncommon in Green Bay. Angler harvest, high natural mortality or underestimating aging during aging may be responsible for the lack of older walleye in the population. The length at age for walleye in each river appeared to be consistent between rivers in 2013 and between years for walleye in the Oconto and Peshtigo Rivers. As was found in past surveys, length at age at all ages for bay walleye was greater than state wide rates for inland waters.

Tag return information has been gathered from anglers during the first two years of this project. Although low return rates have hampered our ability to track large scale movements around Green Bay with clarity, some general trends can be noted. It appears that most tagged fish stay near their tagging river in the short term. Walleye tagged from west shore rivers seem to stay along the west shore, walleye tagged in the Sturgeon Bay area stay near Sturgeon Bay and fish tagged in the Fox River stay in the river or southern bay. The exception of this information was walleye that were tagged in the Oconto River 2013. It is not clear why those walleye following marking moved around southern Green Bay rather than staying near the Oconto River. However, since tag return numbers have been modest this result should be viewed with caution. Subsequent annual spring movement patterns will likely provide the greatest amount of information about site fidelity.

Many questions remain regarding the walleye population in Green Bay including those regarding stream/ river use, site fidelity, contributions to the sport fishery from unique spawning locations and the need for supplemental stocking in some locations. Further detailed survey work and cooperative studies will be necessary to answer these and other questions regarding walleye management in Wisconsin waters of Green Bay.

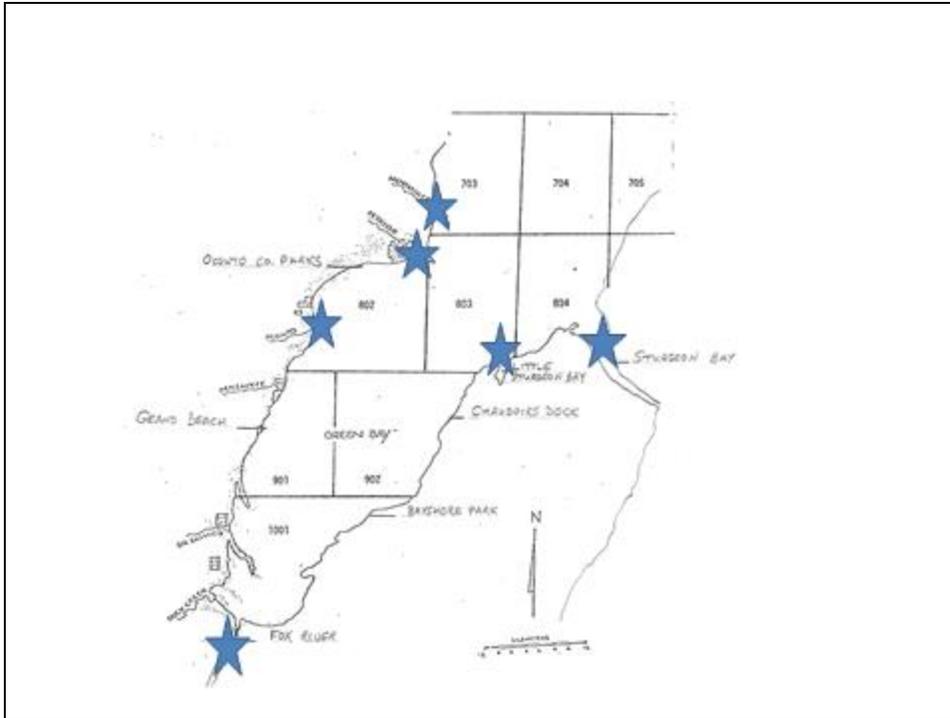


Figure 1. The tagging locations for walleye in Green Bay and the Fox River, 2012-2013. Walleye from the Oconto and Peshtigo Rivers were tagged in 2012 and 2013, while walleye from the Fox River, Menominee River and the Sturgeon Bay area were tagged in 2013 only.

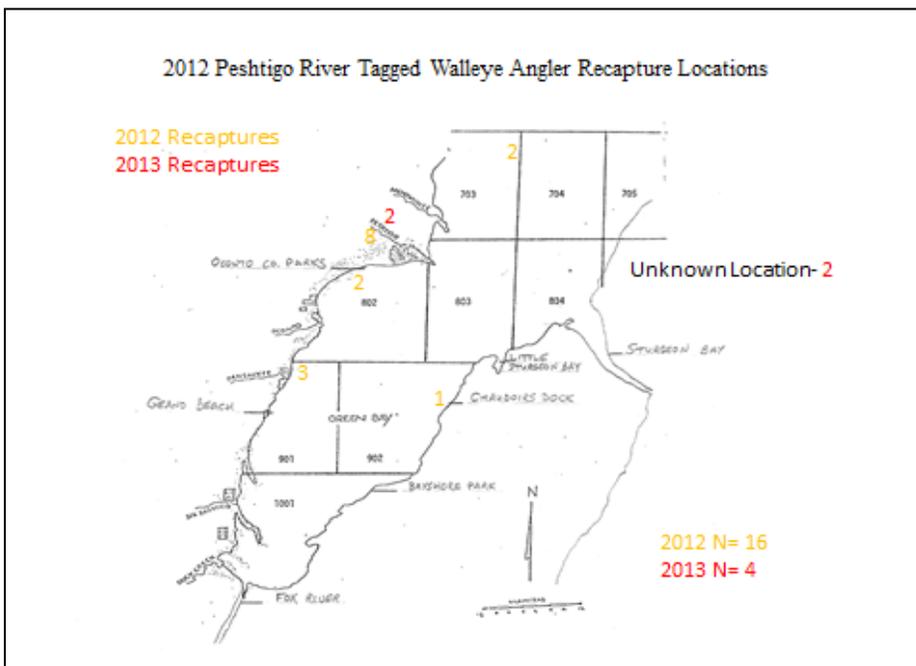


Figure 2. Angler recapture location of walleye tagged in the Peshtigo River in 2012. Returns from calendar year 2012 are in gold, with the returns from 2012 tagged fish from 2013 in red. The number indicates how many recaptures were from that location.

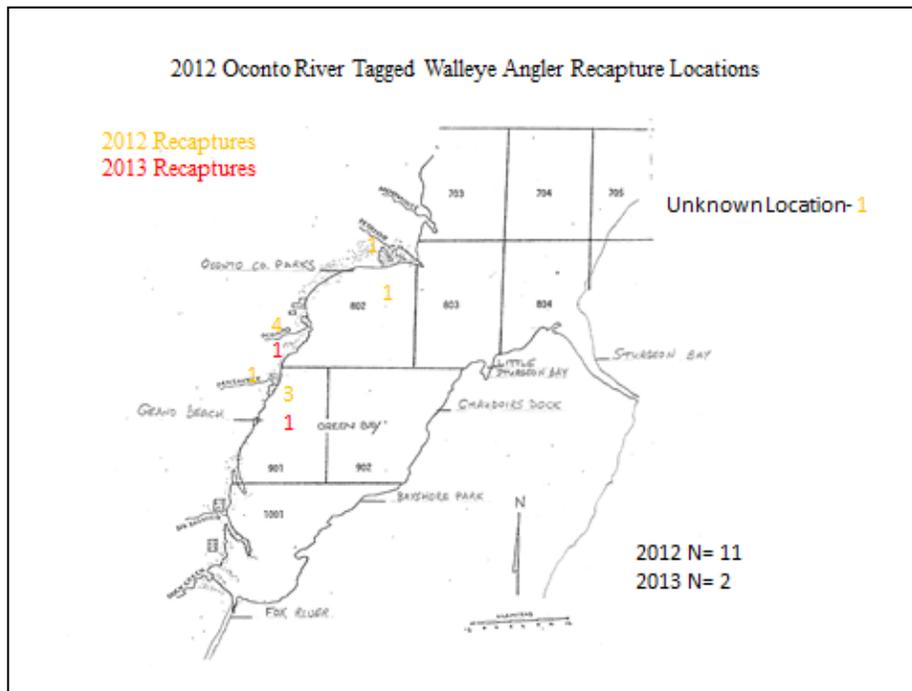


Figure 3. Angler recapture location of walleye tagged in the Oconto River in 2012. Returns from calendar year 2012 are in gold, with returns of 2012 tagged fish from 2013 in red. The number indicates how many recaptures were from that location.

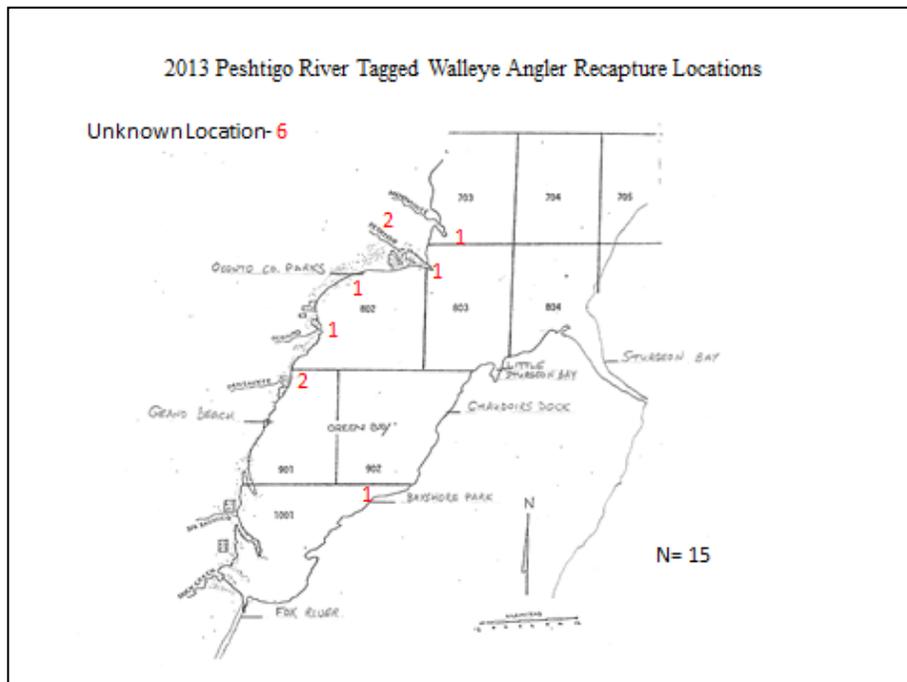


Figure 4. Angler recapture location of walleye tagged in the Peshtigo River in 2013. The number indicates how many recaptures were from that location.

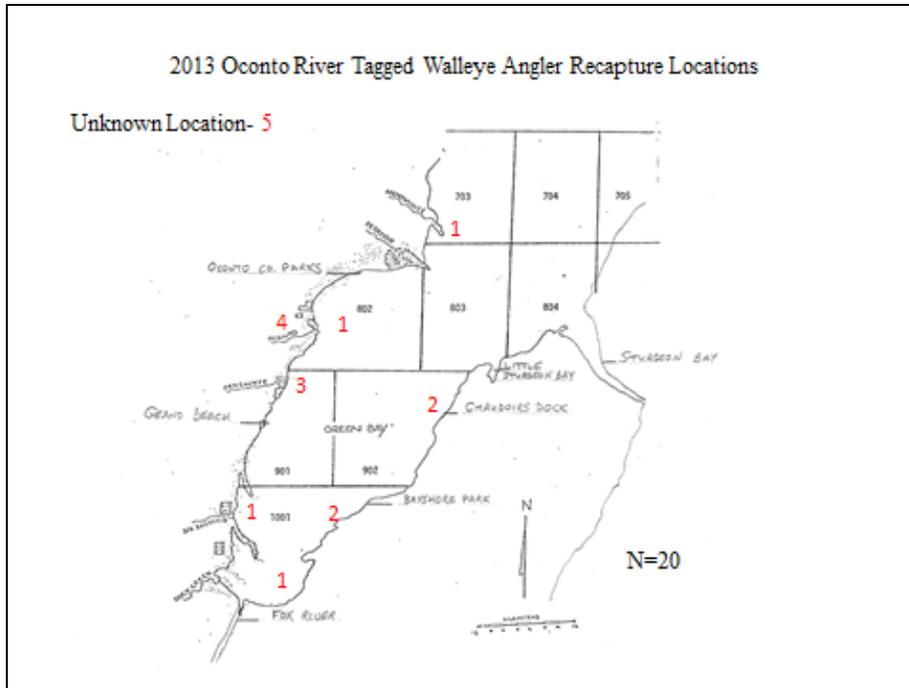


Figure 5. Angler recapture location of walleye tagged in the Oconto River in 2013. The number indicates how many recaptures were from that location.

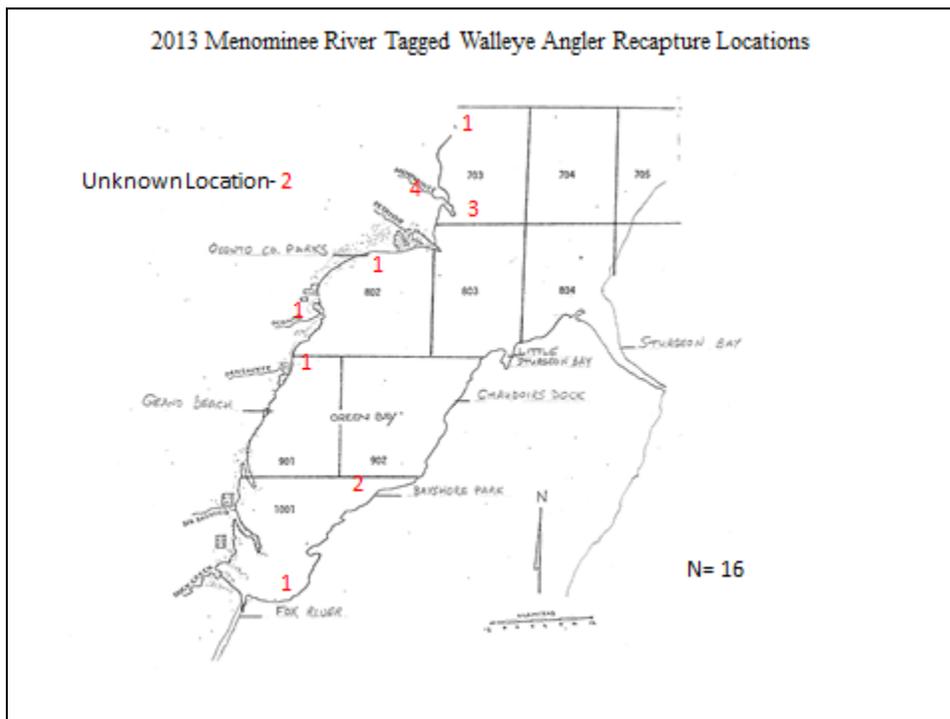


Figure 6. Angler recapture location of walleye tagged in the Menominee River in 2013. The number indicates how many recaptures were from that location.

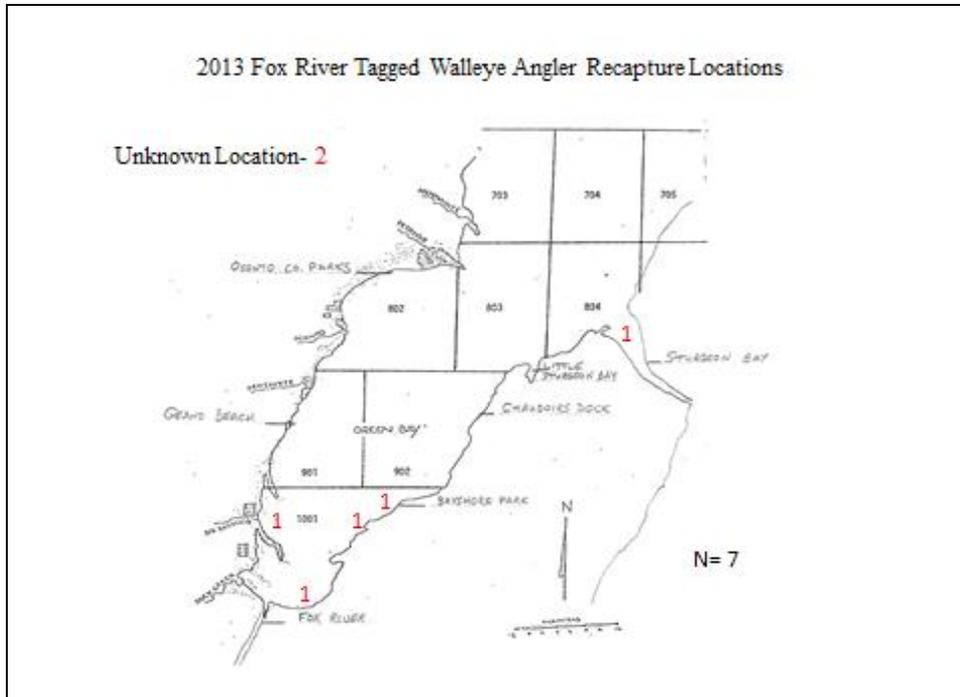


Figure 7. Angler recapture location of walleye tagged in the Fox River in 2013. The number indicates how many recaptures were from that location.

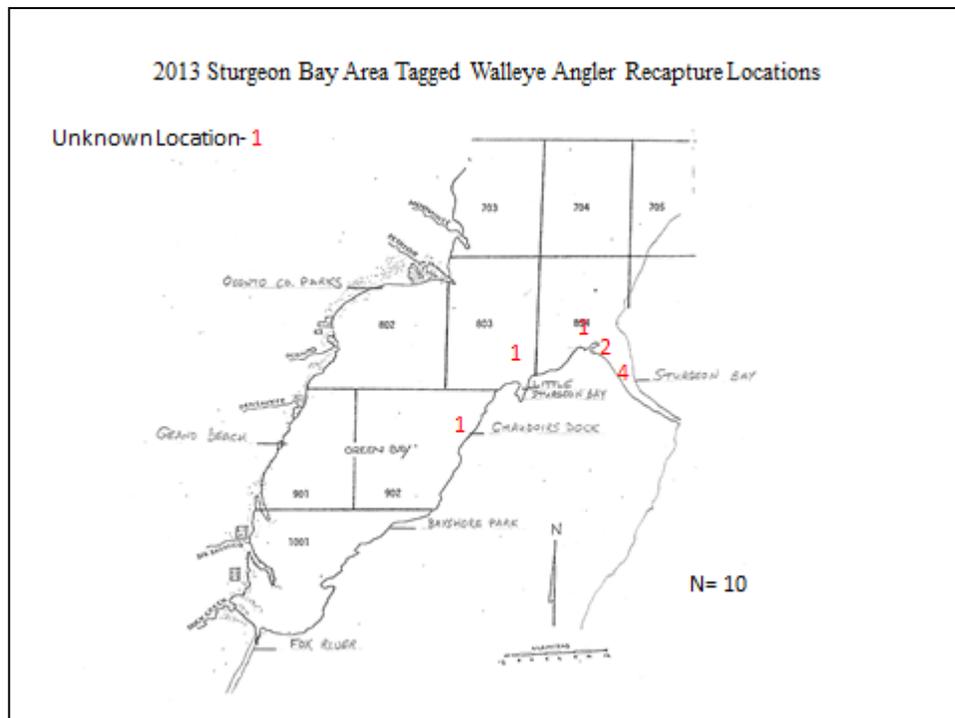
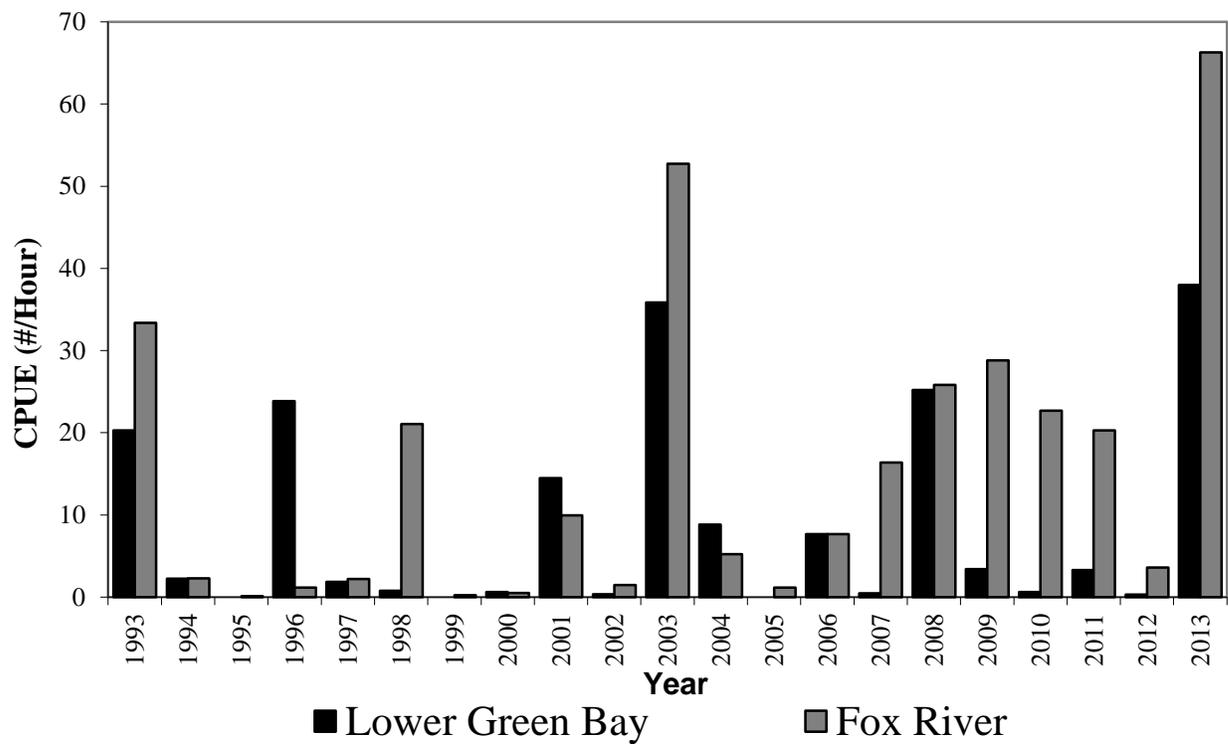


Figure 8. Angler recapture location of walleye tagged in the Sturgeon Bay area in 2013. The number indicates how many recaptures were from that location.



**Figure 9. Walleye young of year CPUE from the Fox River and lower Green Bay from 1994 through 2013. YOY data is collected during annual fall index surveys conducted during nighttime hours.**

**Table 1. Spring walleye capture summary from electroshocking surveys below Peshtigo dam, Peshtigo River, Marinette County, Wisconsin, below Stiles dam, Oconto River, Oconto County Wisconsin, below Hattie Street Dam, Menominee River, Marinette County and the DePere Dam, Fox River, Brown County in 2012 and 2013.**

Year	Peshtigo River			Oconto River			Menominee River			Fox River		
	Captured	Tagged	Average Length	Captured	Tagged	Average Length	Captured	Tagged	Average Length	Captured	Tagged	Average Length
<b>2012</b>												
Male	428	289	537 mm	114	112	459 mm						
Female	71	71	593 mm	90	90	580 mm						
Unknown	0	0		8	7	472 mm						
Total	499	360		212	209							
<b>2013</b>												
Male	305	305	519 mm	401	401	478 mm	205	204	507 mm	422	422	472 mm
Female	148	148	605 mm	131	131	579 mm	250	250	606 mm	62	62	613 mm
Unknown	0	0		0	0		0	0		0	0	
Total	453	453		532	532		455	454		484	484	

**Table 2. The length frequency of male and female walleye captured during electroshocking below Peshtigo dam, Peshtigo River, Marinette County, Wisconsin. March 20 and March 22, 2012.**

<b>Length (mm)</b>	<b>Female</b>	<b>Male</b>
380		1
90		
400		
10		4
20		2
30		2
40		6
50		5
60		6
70		13
80		14
90		24
500	2	37
10	2	49
20	2	34
30	3	36
40	4	30
50	4	33
60	5	23
70	5	28
80	3	18
90	6	23
600	9	19
10	2	8
20	2	6
30	4	4
40	2	2
50	4	1
60	1	
70	3	
80	1	
90	3	
700		
10	1	
20	2	
30	1	
<b>Total</b>	<b>71</b>	<b>428</b>
<b>Ave. Length</b>	<b>603</b>	<b>537</b>
<b>S.D.</b>	<b>56.0</b>	<b>45.3</b>

**Table 3. The 2012 age distribution of male walleye captured from the Peshtigo River, Marinette County, Wisconsin. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Age					
	3	4	5	6	7	8
380	1					
90						
400						
10	3	1				
20	2					
30		2				
40	4		2			
50	3	2				
60	1	3	2			
70		8	5			
80		8	3	3		
90		12	12			
500		9	28			
10		10	39			
20			27	7		
30		7	29			
40			12	12		6
50			7	13	13	
60			8	3	12	
70				5	14	9
80					11	7
90				5		18
600					6	13
10				2		6
20					1	5
30					3	1
40						2
50						1
<b>Total</b>	<b>14</b>	<b>62</b>	<b>174</b>	<b>50</b>	<b>60</b>	<b>68</b>
<b>Ave. Length</b>	<b>434</b>	<b>494</b>	<b>520</b>	<b>553</b>	<b>577</b>	<b>594</b>
<b>S.D.</b>	<b>21.2</b>	<b>25.5</b>	<b>22.2</b>	<b>28.4</b>	<b>20.9</b>	<b>23.7</b>

**Table 4. A comparison of average length at age of walleye captured during spring electroshocking surveys on the Peshtigo, Oconto, Menominee and Fox River in 2012 and 2013 to statewide averages. All measurements are in millimeters.**

Location	Year/Sex	AGE												
		0	1	2	3	4	5	6	7	8	9	10	11	12
State Average		162	206	250	356	371	420	460	494	524	553	551	594	622
Peshtigo River	2012													
	Male				434	494	520	553	577	594				
	Female					525	567	595	605	631	681	655		
	2013													
	Male				430	466	494	540	544	576	605	622		
	Female				465	524	533	604	591	631	670	681	700	
Oconto River	2012													
	Male				419	465	500	539	555	550				
	Female				495	515	572	573	605	619	648			
	2013													
	Male				423	458	476	517	513	500-	545	543		655
	Female					518	540	593	594	611	615	639	640	
Menominee River	2013													
	Male				433	469	492	535	530	537	588	571	555	640
	Female					519	553	596	615	633	620	656	675	725
Fox River	2013													
	Male				424	458	468	499	554	550	465	542	533	
	Female					499	594	605	621	620	651	678	670	705

**Table 5. The 2012 age distribution of female walleye captured from the Peshtigo River, Marinette County, Wisconsin. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Age						
	4	5	6	7	8	9	10
500	1	1					
10	2						
20		2					
30		2	1				
40		4					
50		3		1			
60	1	3			1		
70		5					
80		3					
90		3			2	1	
600		4	1		4		
10					2		
20				1	1		
30				1	1	2	
40			1		1		
50					3		1
60						1	
70					3		
80					1		
90						3	
700							
10						1	
20						2	
30						1	
<b>Total</b>	<b>4</b>	<b>30</b>	<b>3</b>	<b>3</b>	<b>19</b>	<b>11</b>	<b>1</b>
<b>Ave. Length</b>	<b>525</b>	<b>567</b>	<b>595</b>	<b>605</b>	<b>631</b>	<b>681</b>	<b>655</b>
<b>S.D.</b>	<b>27.1</b>	<b>27.1</b>	<b>55.7</b>	<b>43.6</b>	<b>34.1</b>	<b>44.6</b>	<b>--</b>

**Table 6. The length frequency of walleye captured during electroshocking below the Stiles Dam on the Oconto River, Oconto County, Wisconsin on March 19, 2012.**

Length (mm)	Male	Female	Unknown
350	1		
360			1
370	1		
380	3		
390	1		
400	8		
410	14		
420	13		
430	9		
440	6		
450	5		1
460	7		1
470	9		1
480	5		2
490	4	1	
500	8	3	1
510	7	3	
520	4	3	
530	4	3	
540	1	5	1
550	2	8	
560		12	
570	1	8	
580		9	
590	1	7	
600		5	
610		5	
620		5	
630		2	
640		4	
650		2	
660		2	
670		2	
680		1	
690			
700			
<b>Total</b>	<b>114</b>	<b>90</b>	<b>8</b>
<b>Ave. Length</b>	<b>459</b>	<b>580</b>	<b>472</b>
<b>S.D.</b>	<b>47.9</b>	<b>43.2</b>	<b>50.9</b>

**Table 7. The age distribution of male walleye captured from the Oconto River, Oconto County, Wisconsin in March 2012. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Age					
	3	4	5	6	7	8
350	1					
60						
70	1					
80	3					
90	1					
400	8					
10	14					
20	11	2				
30	8	1				
40	3	3				
50		3	2			
60	2	4	1			
70	1	5	3			
80		2	3			
90			4			
500		1	6	1		
10			6		1	
20		1	2			1
30			3	1		
40				1		
50				2		
60						
70						1
80						
90					1	
600						
10						
20						
<b>Total</b>	<b>53</b>	<b>22</b>	<b>30</b>	<b>5</b>	<b>2</b>	<b>2</b>
<b>Ave. Length</b>	<b>419</b>	<b>465</b>	<b>500</b>	<b>539</b>	<b>555</b>	<b>550</b>
<b>S.D.</b>	<b>21.3</b>	<b>24</b>	<b>22.2</b>	<b>20.7</b>	<b>56.6</b>	<b>35.4</b>

**Table 8. The age distribution of female walleye captured from the Oconto River, Oconto County, Wisconsin in March 2012. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Age						
	3	4	5	6	7	8	9
450							
60							
70							
80							
90	1						
500		3					
10		3					
20		1	1	1			
30		1	1	1			
40			5				
50			7			1	
60			10	2			
70			3	3	2		
80			5	4			
90			3	2		2	
600			4			1	
10			2		1	1	1
20			1		1		3
30					1	1	
40						1	3
50							2
60						2	
70							2
80							1
90							
700							
<b>Total</b>	<b>1</b>	<b>8</b>	<b>42</b>	<b>13</b>	<b>5</b>	<b>9</b>	<b>12</b>
<b>Ave. Length</b>	<b>495</b>	<b>515</b>	<b>572</b>	<b>573</b>	<b>605</b>	<b>619</b>	<b>648</b>
<b>S.D.</b>	<b>--</b>	<b>10.7</b>	<b>23.7</b>	<b>21.3</b>	<b>28.3</b>	<b>36.4</b>	<b>22.6</b>

**Table 9. Angler tag return locations from fish tagged in 2012 and 2013 from the Peshtigo, Oconto, Menominee and Fox Rivers as well as those tagged in the Sturgeon Bay area in 2013.**

Tag Location	Sex	Year Recaptured		
		2012	2012 in 2013	2013
<b>Fox River</b>				
Tagged				
	Male			422
	Female			62
Recaptured				
	Male			5
	Female			2
Days at Large				
	Male			82.4
	Female			45
<b>Menominee River</b>				
Tagged				
	Male			204
	Female			250
Recaptured				
	Male			8
	Female			8
Days at Large				
	Male			38.2
	Female			53.6
<b>Oconto River</b>				
Tagged				
	Male	112		401
	Female	97		131
Recaptured				
	Male	5	0	11
	Female	6	2	9
Days at Large				
	Male	44.8	0	55.3
	Female	42	456.5	45.8
<b>Peshtigo River</b>				
Tagged				
	Male	289		305
	Female	71		148
Recaptured				
	Male	8	3	12
	Female	8	1	3
Days at Large				
	Male	55.3	408	57
	Female	22.8	Unk.	66
<b>Sturgeon Bay</b>				
Tagged				
	Male			354
	Female			284
Recaptured				
	Male			4
	Female			6
Days at Large				
	Male			49.3
	Female			18.8

**Table 10. The length frequency of male and female walleye captured during electroshocking below Peshtigo dam, Peshtigo River, Marinette County, Wisconsin on April 9, 16 and 17, 2013.**

Length (mm)	Male	Female
350		
360		
370	1	
380	1	
390	2	
400	1	
410	8	
420	13	
430	14	
440	15	
450	14	
460	13	2
470	17	1
480	9	
490	6	1
500	10	8
510	17	2
520	21	9
530	26	5
540	19	9
550	18	1
560	11	4
570	21	6
580	4	11
590	13	6
600	8	6
610	7	13
620	3	10
630	6	13
640	2	10
650		2
660	1	6
670	3	4
680	1	2
690		4
700		4
710		4
720		3
730		2
740		
750		
Total	305	148
Ave. Length	519	605
S.D.	63.5	63.2

**Table 11. The 2013 age distribution of male walleye captured from the Peshtigo River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Male Total	Age							
	Year Class	3 2010	4 2009	5 2008	6 2007	7 2006	8 2005	9 2004	10 2003
350									
360									
370	1	1							
380	1	1							
390	2	1		1					
400	1	1							
410	8	7	1						
420	13	12	1						
430	14	10	4						
440	15	9	5	1					
450	14	6	8						
460	13		8	4	1				
470	17		15		2				
480	9		5		3	1			
490	6			1	3	2			
500	10		1	4	4	1			
510	17		3	3	9	2			
520	21			2	14	5			
530	26				18	5	3		
540	19			2	11	4	2		
550	18				7	5	2	4	
560	11				5	5		1	
570	21				15	2	2	2	
580	4				2	1	1		
590	13				2		2	5	4
600	8				1	1	1	3	2
610	7					1	1	2	3
620	3						1	2	
630	6				1		1	1	3
640	2							1	1
650									
660	1							1	
670	3							1	2
680	1							1	
690									
700									
710									
720									
730									
740									
750									
Total	305	48	51	18	98	35	16	24	15
Ave. Length	519	430	466	494	540	544	576	605	622
S.D.	63.5	17.7	21.5	38.1	30.5	29.1	33.6	37.5	27.1

**Table 12. The 2013 age distribution of female walleye captured from the Peshtigo River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Female Total	Age								
		3	4	5	6	7	8	9	10	11
	Year Class	2010	2009	2008	2007	2006	2005	2004	2003	2002
350										
360										
370										
380										
390										
400										
410										
420										
430										
440										
450										
460	2	1	1							
470	1					1				
480										
490	1		1							
500	8		5	3						
510	2		2							
520	9		5	4						
530	5		1	2	2					
540	9		5		4					
550	1		1							
560	4		1	1	2					
570	6			2	4					
580	11				9	2				
590	6				5		1			
600	6				3	3				
610	13				11		1	1		
620	10				7	1			2	
630	13				7		1		5	
640	10				6	1	1		2	
650	2				1			1		
660	6						1	4	1	
670	4							2	2	
680	2								2	
690	4							1	3	
700	4								3	1
710	4								4	
720	3							1	2	
730	2								2	
740										
750										
Total	148	1	22	12	61	8	5	10	28	1
Ave. Length	605	465	524	533	604	591	631	670	681	700
S.D.	63.2	0	23.2	25.5	30.9	51.1	27.1	27.9	36.7	0

**Table 13. The length frequency of male and female walleye captured during electroshocking below the Stiles Dam on the Oconto River on April 22 and 23, 2013.**

Length (mm)	Male	Female
350	1	
360	1	
370	1	
380	1	
390	4	
400	13	
410	23	
420	26	
430	35	
440	30	
450	30	
460	21	
470	29	2
480	26	3
490	29	2
500	20	3
510	26	10
520	23	9
530	18	6
540	14	3
550	9	2
560	3	6
570	2	13
580	2	12
590	3	13
600	4	11
610	3	9
620	1	8
630	2	4
640		6
650	1	5
660		2
670		1
680		1
690		
700		
Total	401	131
Ave. Length	478	579
S.D.	50.8	48.7

**Table 14. The 2013 age distribution of male walleye captured from the Oconto River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Male Number	Age									
		3	4	5	6	7	8	9	10	11	12
	Year Class	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
350	1	1									
360	1	1									
370	1	1									
380	1	1									
390	4	4									
400	13	10		3							
410	23	17		6							
420	26	13	13								
430	35	14	21								
440	30	5	15	5		5					
450	30	10	15				5				
460	21		17		4						
470	29		7	7	15						
480	26		16			5			5		
490	29		6	12	11						
500	20			8	8				4		
510	26		4	5	9	4			4		
520	23				17	6					
530	18				9	4			5		
540	14				11			3			
550	9				7				2		
560	3					3					
570	2				1				1		
580	2			1	1						
590	3				2				1		
600	4					2	1		1		
610	3						1		2		
620	1								1		
630	2								2		
640											
650	1										1
660											
670											
680											
690											
700											
Total	401	77	114	47	95	29	7	3	28	0	1
Ave. Length	478	423	458	476	517	513	500	545	543	--	655
S.D.	50.8	21.1	23.7	39.8	30.4	44.3	75.7	--	50.2	--	--

**Table 15. The 2013 age distribution of female walleye captured from the Oconto River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Female Number	Age									
		3	4	5	6	7	8	9	10	11	12
	Year Class	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
350											
360											
370											
380											
390											
400											
410											
420											
430											
440											
450											
460											
470	2		2								
480	3		2		1						
490	2		2								
500	3		1	2							
510	10		6	4							
520	9		5	2	2						
530	6		2	2	1	1					
540	3		1	1			1				
550	2			2							
560	6			3		2	1				
570	13			3	5	5					
580	12				10	2					
590	13				9	2		2			
600	11				7		2		2		
610	9					5			4		
620	8				6		2				
630	4					3				1	
640	6		1		3				1	1	
650	5						1	1	3		
660	2						1		1		
670	1								1		
680	1								1		
690											
700											
Total	131	0	22	19	44	20	8	3	13	2	0
Ave. Length	579	--	518	540	593	594	611	615	639	640	--
S.D.	48.7	--	34.3	25.2	31.2	27.3	41	34.6	28.1	7.1	--

**Table 16. The length frequency of male and female walleye captured during electroshocking below the Hattie Street Dam on the Menominee River on April 8, 15 and 23, 2013.**

Length (mm)	Males	Females
390	1	
400	3	
410	6	
420	5	
430	4	
440	17	1
450	11	
460	12	1
470	12	
480	6	1
490	11	4
500	11	5
510	18	6
520	8	4
530	20	2
540	18	10
550	11	17
560	10	8
570	4	10
580	4	19
590	3	18
600	1	23
610		24
620	3	14
630	2	18
640	1	15
650	1	9
660	1	10
670		10
680		6
690		4
700		2
710		6
720		2
730		
740		1
750		
Total	204	250
Ave. Length	507	606
S.D.	54.2	53.6

**Table 17. The 2013 age distribution of male walleye captured from the Menominee River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Male Total	Age												
		3	4	5	6	7	8	9	10	11	12	13	14	15+
	Year Class	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
390	1	1												
400	3	2		1										
410	6	5	1											
420	5	5												
430	4	4												
440	17	9	4	4										
450	11	4	7											
460	12	1	9	1	1									
470	12		3	7	2									
480	6		2	3		1								
490	11		3	2	1	5								
500	11			1	5	3	2							
510	18			2	7	5	2		2					
520	8		1		4	1	1		1					
530	20			6	8	6								
540	18			2	9	5							2	
550	11		1		4	2	3			1				
560	10				3	5	1	1						
570	4				1		1	1	1					
580	4				1	1		1	1					
590	3				2				1					
600	1				1									
610														
620	3							1	1				1	
630	2								1		1			
640	1										1			
650	1													1
660	1											1		
670														
680														
690														
700														
Total	204	31	31	29	49	34	10	4	8	1	2	1	3	1
Ave. Length	507	433	469	492	535	530	537	588	571	555	640	665	571	655
S.D.	54.2	17.5	25.8	36.5	29.9	26.3	26.6	26.3	48	0	7.1	0	46.2	0

**Table 18. The 2013 age distribution of female walleye captured from the Menominee River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Females	Age											
		4	5	6	7	8	9	10	11	12	13	14	15+
	Year Class	200 9	200 8	200 7	200 6	200 5	200 4	200 3	200 2	200 1	200 0	199 9	199 8
430													
440	1	1											
450													
460	1	1											
470													
480	1	1											
490	4	3	1										
500	5	3	2										
510	6	4	2										
520	4	3	1										
530	2	1	1										
540	10	5	1	3	1								
550	17	2	6	7				2					
560	8		2	3	1	2							
570	10	1		7	1		1						
580	19		2	12		2	2	1					
590	18			12	2	2	2						
600	23		2	12	5		2	2					
610	24			12		6	6						
620	14		1	8	3	1			1				
630	18			2	2	4	4	4			2		
640	15			3	3	1	5	3					
650	9				2		1	4	2				
660	10			1		1		7	1				
670	10					2		7	1				
680	6							3	2			1	
690	4					2		2					
700	2					1				1			
710	6					1			2			1	2
720	2							2					
730													
740	1									1			
750													
Total	250	25	21	82	20	25	23	37	9	2	2	2	2
Ave. Length	606	519	553	596	615	633	620	656	675	725	635	700	715
S.D.	53.6	29.9	35.3	25.8	30.2	42.4	22.9	37.6	29.2	28.3	0	21.2	0

**Table 19. The length frequency of male and female walleye captured during electroshocking below the DePere Dam on the Fox River on April 3 and 4, 2013.**

Length (mm)	Male	Female
350		
360		
370		
380	2	
390	4	
400	10	
410	10	
420	37	1
430	41	
440	48	
450	49	
460	36	
470	38	
480	28	1
490	18	
500	14	3
510	12	4
520	20	1
530	14	2
540	12	2
550	6	2
560	5	3
570	4	4
580	5	
590	3	2
600	1	4
610	1	1
620	1	2
630	2	2
640	1	3
650		2
660		3
670		5
680		5
690		4
700		3
710		1
720		
730		
740		1
750		
Number	422	61
Ave. Length	472	613
SD	46.4	71.4

**Table 20. The 2013 age distribution of male walleye captured from the Fox River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Male Total	Age								
		3	4	5	6	7	8	9	10	11
	Year Class	2010	2009	2008	2007	2006	2005	2004	2003	2002
350										
360										
370										
380	2	1	1							
390	4	2	2							
400	10	10								
410	10	6	4							
420	37	25	6	6						
430	41	18		18				5		
440	48	5	19	19					5	
450	49		22	22	5					
460	36		14	8	14					
470	38		19	10	9					
480	28		3	21	4					
490	18		6	3	6					3
500	14		2	7	3		2			
510	12		1	5	5	1				
520	20			6	6	2	2	2	2	
530	14			3	9		1			1
540	12				3	3		1	5	
550	6				1	2	2		1	
560	5			1			2		2	
570	4				2		1		1	
580	5					2	1		2	
590	3				1				2	
600	1						1			
610	1					1				
620	1								1	
630	2								2	
640	1									1
650										
Number	422	67	99	129	68	11	12	8	23	5
Ave. Length	472	424	458	468	499	554	550	465	542	533
SD	46.4	23.3	23.7	30.1	34.4	30.2	31.5	55.5	65.3	65

**Table 21. The 2013 age distribution of female walleye captured from the Fox River. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.**

Length (mm)	Female Total Year Class	Age									
		3	4	5	6	7	8	9	10	11	12
		2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
400											
410											
420	1		1								
430											
440											
450											
460											
470											
480	1		1								
490											
500	3		2	1							
510	4		1	3							
520	1		1								
530	2		1	1							
540	2			2							
550	2			2							
560	3			2			1				
570	4			2	1	1					
580											
590	2							2			
600	4				2	1			1		
610	1				1						
620	2				1				1		
630	2					1				1	
640	3					2				1	
650	2							2			
660	3							1	2		
670	5						1		4		
680	5								5		
690	4							2	2		
700	3								1	1	1
710	1									1	
720											
730											
740	1								1		
750											
Number	61	0	7	13	5	5	2	7	17	4	1
Ave. Length	613	--	499	594	605	621	620	651	678	670	705
SD	71.4	0	36.4	24.4	18.7	30.5	77.8	41.6	30.2	46.5	0