2014 STATUS OF WALLEYE IN SOUTHERN GREEN BAY AND THE LOWER FOX RIVER

Background

Walleye stocks in southern Green Bay were decimated during the early to mid-1900s by habitat destruction, pollution, interactions with invasive species, and from over-exploitation. Following water quality improvements in the early 1970's, the Wisconsin Department of Natural Resources began to stock fry and fingerlings to rehabilitate the Walleye population. Stocking began in the Sturgeon Bay area and later expanded to include the lower Fox River (downstream from the DePere Dam). This stocking (fingerlings and fry) was so successful in southern Green Bay and the lower Fox River that it was discontinued in 1984 to allow surveys to determine if substantial natural reproduction and recruitment was occurring. However, stocking in the Sturgeon Bay area resumed in 1994 and continues with a mix of fry and fingerling being stocked to augment the population. The total number of number of Walleye stocked in Wisconsin waters of Green Bay has varied by location and year with over 70,000,000 fry and 4,500,000 fingerling stocked into Green Bay and the Fox River since 1973.

Table 1. Walleye stocking in Wisconsin's Green Bay waters since 1972. Walleye totals are in millions of fish stocked and are divided into two time periods: 1972 to 1984 (Rehabilitation phase) and 1994-2012 (Augmentation phase). No Walleye were stocked from 1985 to 1993 and Walleye stocked during the 1994 to 2012 period were all stocked in the Sturgeon Bay area.

	Fry		Fingerling	
Year	Green Bay	Fox River	Green Bay	Fox River
1973-1984	29.0	44.0	3.06	0.058
1994-2012	1	0.0	1.46	0.0

Although spawning abundance and young of year (YOY) production have been variable since monitoring began, the stock has not been augmented through stocking in southern Green Bay or the Fox River since 1984 and the Walleye population is considered to be self-sustaining. The purpose of this report is to summarize data collected during the 2014 field season on the southern Green Bay / lower Fox River Walleye stock, and to describe long-term trends in YOY production and angler catch and harvest.

Spring Tributary Electrofishing Surveys

Since 2012, Wisconsin DNR has assessed the magnitude of Walleye spawning migrations into the Fox River located in southern Green Bay and into the Oconto, Peshtigo and Menominee Rivers found along the west shore of Green Bay by using daytime electroshocking. Electrofishing was conducted just below the dams in these rivers to capture Walleye during the estimated peak of the spring spawning run in 2012 (Peshtigo and Oconto Rivers) and in 2013 and 2014 in all four rivers. The goal of these surveys was to tag 500 walleye per river at the peak of the run and not to survey throughout the run. For this report, the 2014 data from all rivers will be pooled.

Electroshocking runs in 2014 were conducted twice per river between April 8 and April 23, 2014 with water temperature varying by river from 33°F to 42°F. During electroshocking we captured 1,885 Walleye (1,025 males and 860 females) that ranged in length from 366 mm to 775mm and had an average length of 537 mm (Figure 1). Male Walleye ranged in length from 366 mm to 679 mm and had an average length of 500 mm. Female Walleye were larger than male Walleye ranging from 443 mm to 775 mm with an average length of 582 mm.

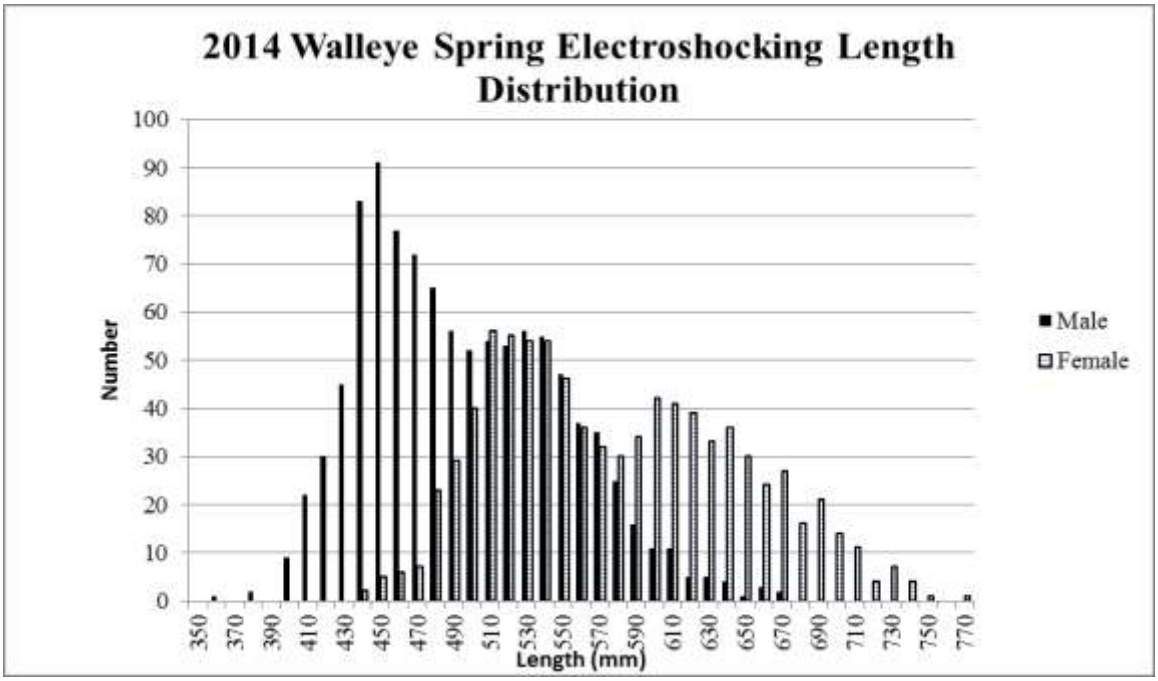


Figure 1. The length distribution of Walleye captured during 2014 spring electroshocking on the Fox, Oconto, Peshtigo and Menominee Rivers.

During these surveys, we removed a dorsal spine for age analysis. Up to ten spines per centimeter length interval for male and female Walleye were collected for aging. In 2014 we analyzed 904 spines (415 male and 489 female) to develop our Year Class (YC) distribution table. YC 2010 was the most common YC that we captured and these Walleye represented nearly 25% of the run (Figure 2). Age classes from 2007, 2008 and 2009 were also well represented in the 2014 run. It should be noted that YC 2003 (age 11) Walleye which was a very strong recruitment year, were still present in the 2014 run.

Based on the length frequency and age analysis it appears that most Walleye caught in our surveys were less than 600 mm in length and less than 8 years old. This corresponds well with annual fall YOY index electroshocking surveys that indicate that since 2007 Walleye have had good recruitment in six of the seven years (Figure 3). Also that male walleye spawn by age 3 while most females spawned by age 4.

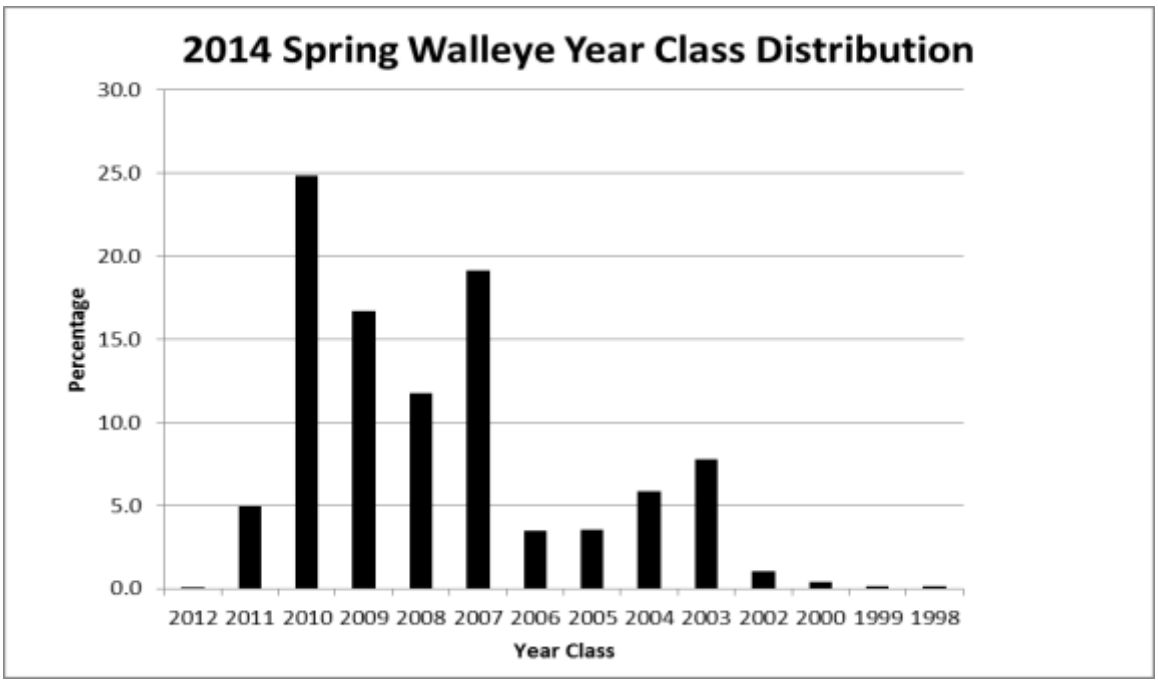


Figure 2. The year class distribution of Walleye captured during spring spawning runs in major southern Green Bay tributaries in 2014. Male and female ages are pooled to determine the percentage of the run represented by each year class.

Fall Electrofishing Index Surveys

Recruitment of YOY Walleye

Results of our 2014 Fall electrofishing index surveys show that the relative abundance of young of the year (YOY) Walleye at the fall fingerling stage was slightly above the YOY average catch from for the Fox River since 1993 (Figure 3) and indicates that 2014 will likely be an average year class. The 2014 age 0 catch per unit effort (CPUE) from the Fox River was 15.8 YOY/hour of electrofishing which is above the 1993-2013 average of 15.4 YOY/hour. The southern Green Bay catch was 13.2 YOY/hour, which is above the 1993-2013 average of 9.0 YOY/hour. The difference between the bay and river catch rates may be attributed either to differences in spawning success or to differences in water temperatures that were noted between Green Bay and the Fox River at the time each was surveyed. The average length of YOY Walleye in 2014 was 167 mm as compared to the 2012 YOY average length of 238 mm. A short growing season caused by a late spring and cool weather likely contributed to smaller Age 0 fish in 2014 than seen in previous years. Year-class failures have not been observed in more than two consecutive years from the Fox River and Green Bay since the springs of 1999 and 2000 (Figure 3).

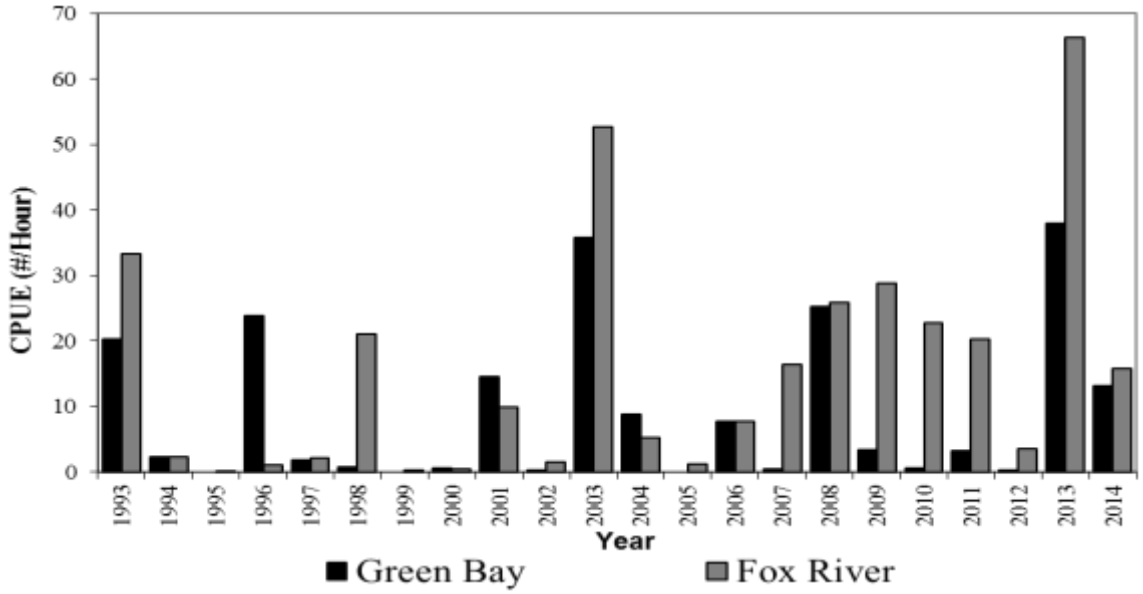


Figure 3. Relative abundance of young-of-year Walleye in the lower Fox River (DePere Dam to mouth), lower Green Bay (south of a line drawn from Longtail Point to Point Sable), as measured by catch per unit effort (CPUE; number per hour) from data collected in electrofishing index surveys during 1993-2014.

In 2014, during our nighttime index electroshocking survey on the lower Fox River, we captured 525 Walleye that had average length of 346 mm (range 125 mm to 620 mm). The length-frequency distribution of captured Walleye indicates that the stock's size structure is dominated by young Walleye and that year-class failures, low recruitment, slow growth, or excessive mortality have not greatly impacted the population although few large Walleye were captured in fall despite good numbers of large Walleye captured during spring surveys (Figure 2). Fish from the 2014 year class (YOY) and from the strong YC 2013 dominated our catch based on ages obtained from scales and spines collected from Walleye less than 300 mm in length.

On Green Bay, we captured 104 walleye that averaged 267 mm in length (range 128 mm to 660 mm) during fall index electroshocking (Figure 5). The size distribution of captured Walleye from Green Bay was similar to the length frequency from the Fox River. Based on the age frequency (Table 4) from the Fox River, it is likely our Green Bay catch had a high proportion of age 0+ and age 1+ Walleye in it.

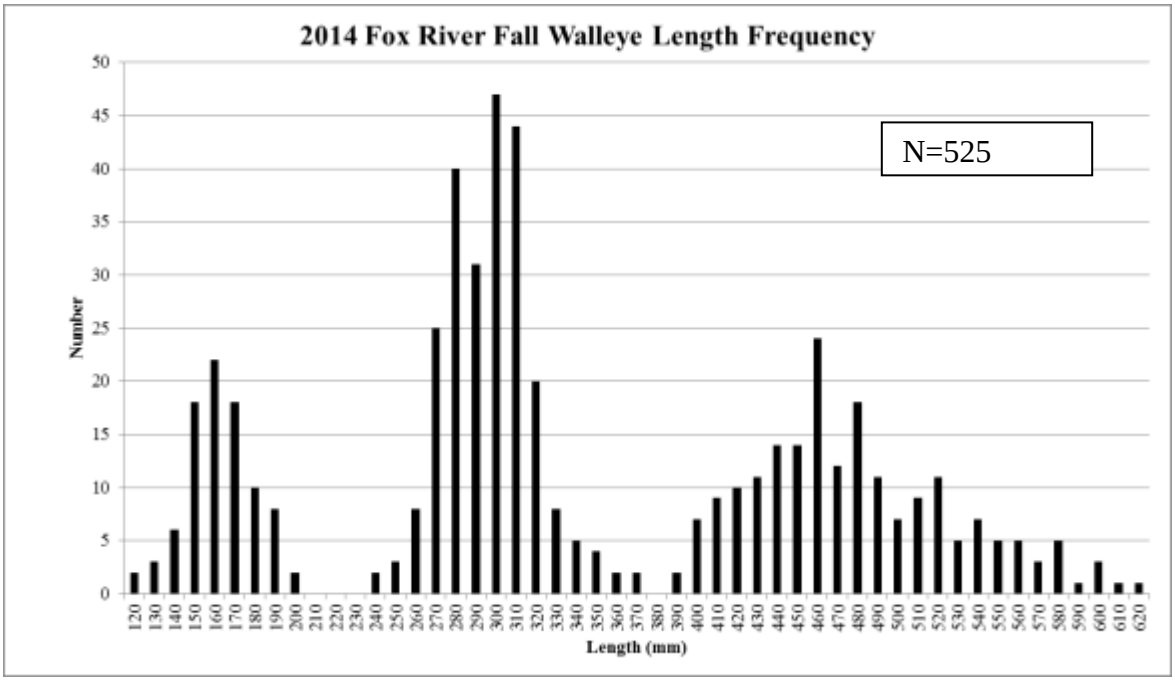


Figure 4. Length-frequency distribution of Walleye sampled while electrofishing the lower Fox River during fall 2014.

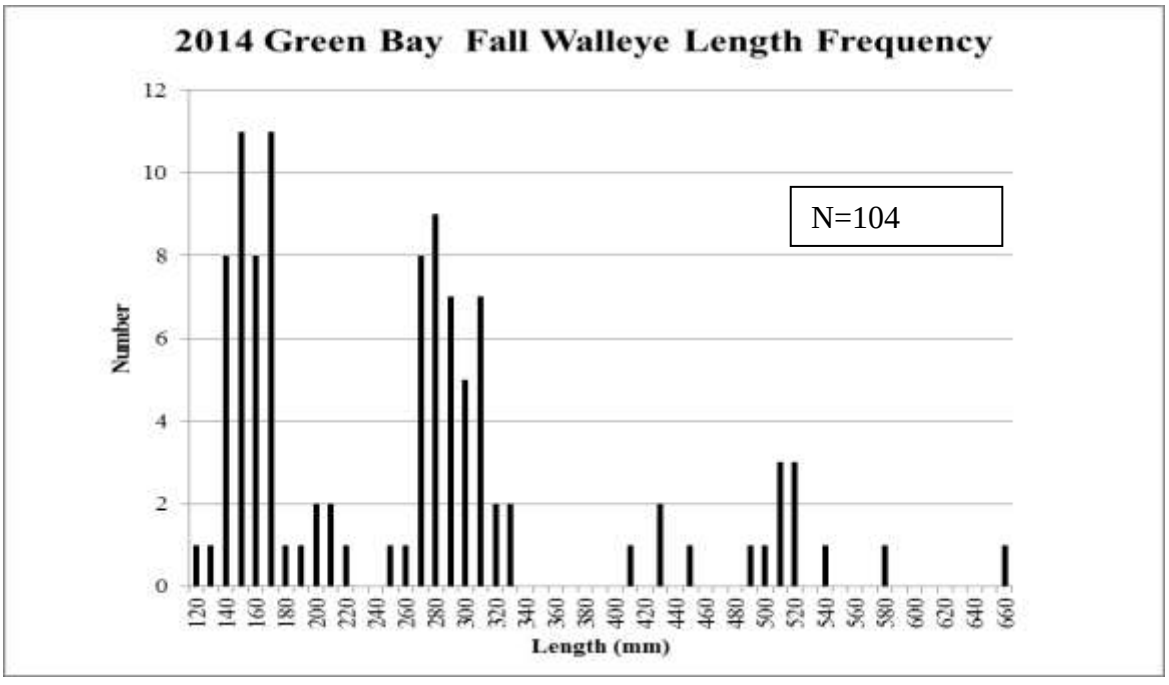


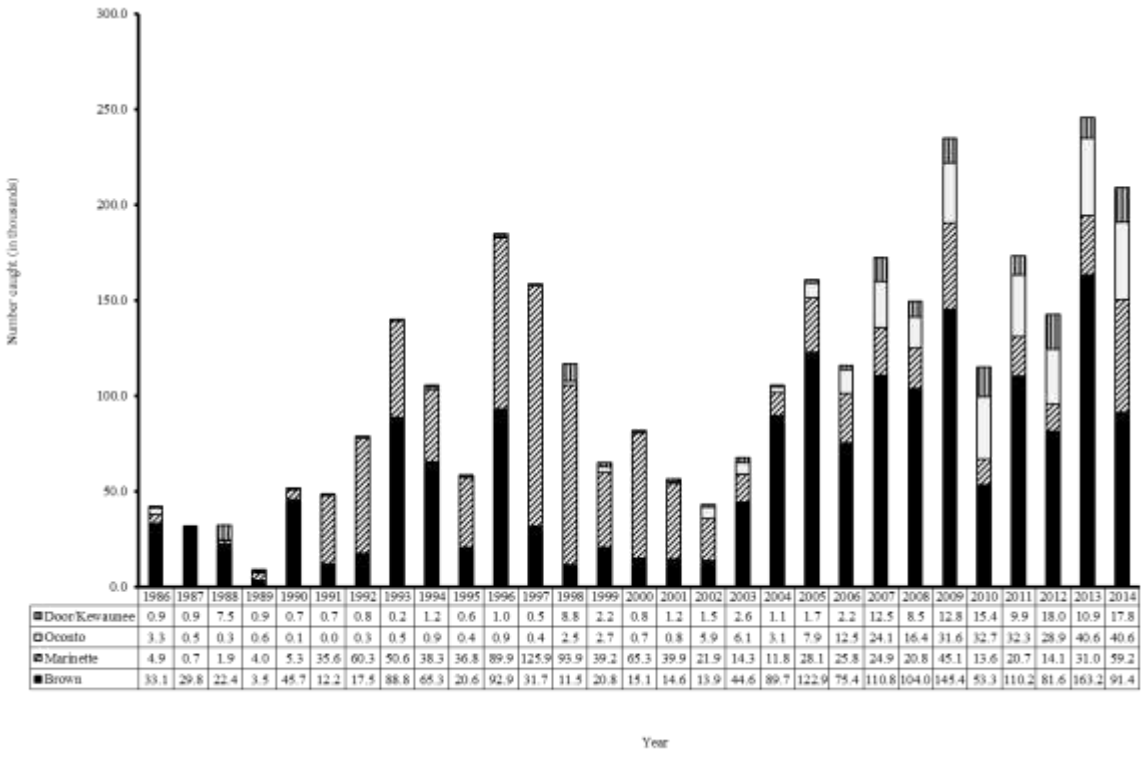
Figure 5. Length-frequency distribution of Walleye sampled while electrofishing lower Green Bay during 2014.

Catch and Harvest

Total catch of Walleye from Wisconsin waters of Green Bay was estimated by creel survey at 208,893 fish during the 2014 open water season (March–October 31) (Figure 5). This was a 14.9 % decrease from the estimated 245,709 Walleye that were caught during the 2013 open water season. The 2014 Walleye catch was the second highest measured since the creel survey began in 1986. The largest decline in catch between 2014 and 2013 was in Brown County. Walleye catch in Door/Kewaunee and Marinette Counties increased in 2014 from the 2013 level while the Walleye catch in 2013 and 2014 was similar each year in Oconto County.

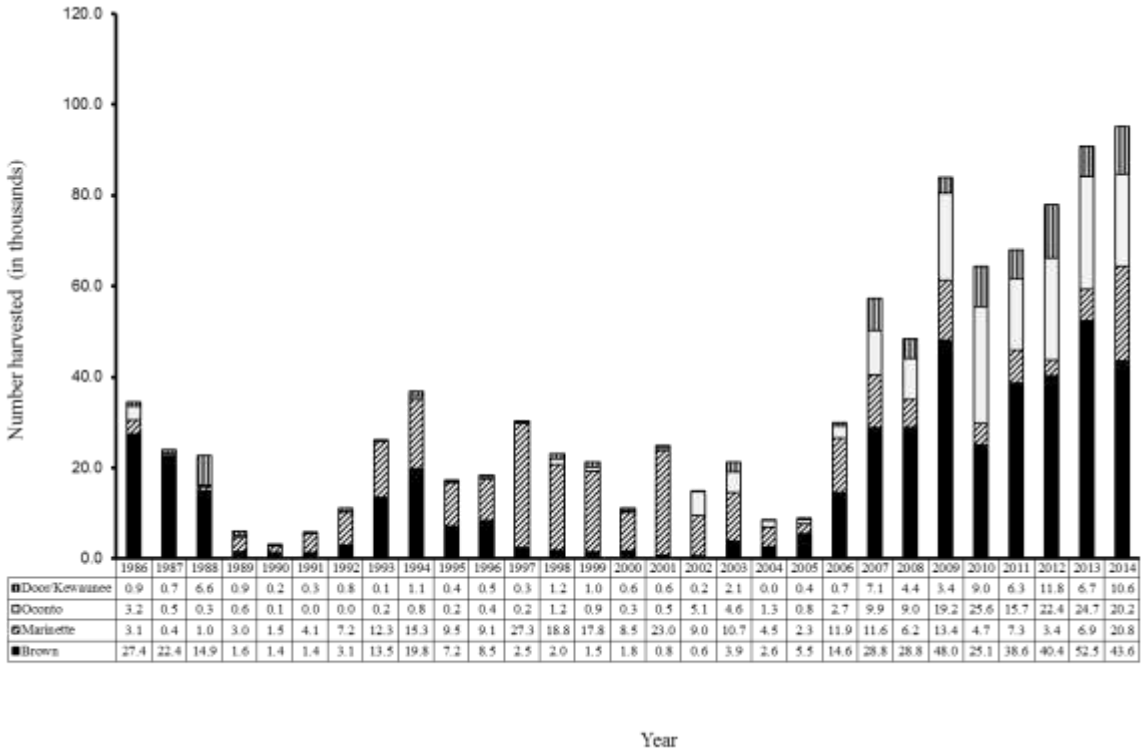
The total open water season harvest of Walleye from Wisconsin waters of Green Bay increased by 5.3% from 90,834 Walleye harvested in 2013 to 95,271 in 2014 despite the decline in catch noted in 2014 (Figure 6). The 2014 harvest of Walleye was the highest measured since 1986 and was well above the average annual harvest from 1986 to 2014 of 33,732 walleye. In 2014, harvest increased in Door/Kewaunee and Marinette Counties and decreased in Brown and Oconto Counties when compared 2013 harvest estimates.

Walleye catch and harvest has been relatively high since 2006, with the greatest contribution to the fishery from the lower Fox River, lower Green Bay and Marinette County. Increases in catch are likely due to strong year classes in 2003, and from 2008 to 2011. Walleye harvest increased at a faster rate in 2014 than did catch, as anglers began to harvest fish from the abundant 2011 year class. It is expected in future years that catch will increase sharply as fish from the strong 2013 year class and the good 2014 year class begin to enter the fishery.



	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Door/Kewaunee	0.9	0.9	7.5	0.9	0.7	0.7	0.8	0.2	1.2	0.6	1.0	0.5	8.8	2.2	0.8	1.2	1.5	2.6	1.1	1.7	2.2	12.5	8.5	12.8	15.4	9.9	18.0	10.9	17.8
Oconto	3.3	0.5	0.3	0.6	0.1	0.0	0.3	0.5	0.9	0.4	0.9	0.4	2.5	2.7	0.7	0.8	5.9	6.1	3.1	7.9	12.5	24.1	16.4	31.6	32.7	32.3	28.9	40.6	40.6
Marinette	4.9	0.7	1.9	4.0	5.3	35.6	60.3	50.6	38.3	36.8	89.9	125.9	93.9	39.2	65.3	39.9	21.9	14.3	11.8	28.1	25.8	24.9	20.8	45.1	13.6	20.7	14.1	31.0	59.2
Brown	33.1	29.8	22.4	3.5	45.7	12.2	17.5	88.8	65.3	20.6	92.9	31.7	11.5	20.8	15.1	14.6	13.9	44.6	89.7	122.9	75.4	110.8	104.0	145.4	53.3	110.2	81.6	163.2	91.4

Figure 6. Estimated total open water season (March-October) walleye catch from Wisconsin waters of Green Bay and the lower Fox River by county during 1986-2014.



	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Door/Kewaunee	0.9	0.7	6.6	0.9	0.2	0.3	0.8	0.1	1.1	0.4	0.5	0.3	1.2	1.0	0.6	0.6	0.2	2.1	0.0	0.4	0.7	7.1	4.4	3.4	9.0	6.3	11.8	6.7	10.6
Oconto	3.2	0.5	0.3	0.6	0.1	0.0	0.0	0.2	0.8	0.2	0.4	0.2	1.2	0.9	0.3	0.5	5.1	4.6	1.3	0.8	2.7	9.9	9.0	19.2	25.6	15.7	22.4	24.7	20.2
Marinette	3.1	0.4	1.0	3.0	1.5	4.1	7.2	12.3	15.3	9.5	9.1	27.3	18.8	17.8	8.5	23.0	9.0	10.7	4.5	2.3	11.9	11.6	6.2	13.4	4.7	7.3	3.4	6.9	20.8
Brown	27.4	22.4	14.9	1.6	1.4	1.4	3.1	13.5	19.8	7.2	8.5	2.5	2.0	1.5	1.8	0.8	0.6	3.9	2.6	5.5	14.6	28.8	28.8	48.0	25.1	38.6	40.4	52.5	43.6

Figure 7. Estimated total open water season (March-October) walleye harvest from Wisconsin waters of Green Bay and the lower Fox River by county during 1986-2014.

The Future of the Sport Fishery

The future of the southern Green Bay/lower Fox River Walleye stock and sport fishery appears to be very promising. Substantial Walleye year classes have been measured the past seven of eight falls during electroshocking with 2013 cohort being the strongest year class measured since 2003. Furthermore, year-class failures have not been observed in more than two consecutive years since 1999-2000 indicating strong recruitment on a regular basis. As the 2013 and 2014 year classes fully recruit to the fishery in the next couple of years, yearly catch and harvest are likely to increase because these fish will obtain a size desired by anglers. Additionally, as contaminant levels continue to decrease from the Fox River PCB clean-up, Walleye harvest will also likely continue to increase.

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