Summary Report: 2014 Mississippi River Pool 8 Fall Walleye and Sauger Young-of-the-Year Assessment

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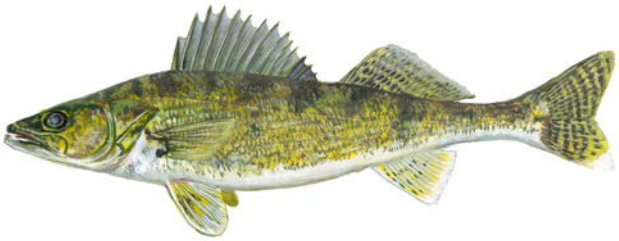


Objective: To summarize fall electro fishing of young-of-the-year walleye and sauger in Pool 8.

INTRODUCTION

Walleye and sauger are highly sought after recreational fish of the Upper Mississippi River. Both species provide recreational fishing opportunities and a food source. Although generally good, angler success is variable, as walleye and sauger populations naturally fluctuate. Some of these population fluctuations can be attributed to spawning success and survival of fish through their first year.

Previous fish assessments have shown walleye and sauger young-of-year (YOY) recruitment can significantly vary from year to year. A young-of-year fish is defined as a fish less than 1 year old. These annual fluctuations appear to be due to biotic and abiotic factors during critical life stages. These limiting factors may determine year class strength.

This report primarily summarizes YOY survey results from Pool 8 in 2014 and compares them to results from previous years.

METHODS

In the 1980‘s, electro fishing index stations were established in the tail waters of pools 5, 8 and 10 to annually assess fall YOY abundance. Pools are sampled concurrently. Stations are sampled with a direct current electro fishing boat generating about 250 volts at about 16 amps, pulsed at 80 cycles per second at a 20% duty cycle. The sampling crew consists of one dipnetter and one boat operator. Each index station is electro fished with a single downstream timed run. The dipnetter attempts to collect all walleye and sauger less than 12 inches in total length. All fish are measured to the nearest millimeter and catch per hour (CPH) is determined for each station. The average CPH is calculated by dividing the total number of fish by the total time for all six stations combined. We also calculated catch per mile of shoreline.

The locations of the six sampling stations in the tailwater of Pool 8 are given in Figure 1. These stations were sampled during the night of November 4, 2014. During 2014, only part of stations 17 and 19 were electro fished due to bridge construction.

The 2014 Pool 8 length criteria used for determining YOY is less than or equal to 9.4 inches for walleye and less than or equal to 7.7 inches for sauger. These maximum lengths were determined through examination of the 2014 total length frequency distributions from this investigation and an earlier fall 2014 non-YOY Pool 8 survey. Within these length distributions, a midpoint of length within a frequency "trough" was chosen as the maximum size to define a YOY.

RESULTS

Mean water temperature was 7.4 ºC (45 ºF) which was 1.0 ºC below the long-term average. The Lock and Dam 7 tailwater elevation was 632.13 feet which was 0.36 feet below the long-term average. The discharge was 28,200 cubic feet per second which was 5501 cubic feet per second below the long-term average.

During 2014, YOY CPH for walleye ranged from 33 to 128 per hour (average = 75.31) (Table 1), while sauger CPH ranged from 0 to 50 per hour (average = 21.35) (Table 1). YOY walleye had an average of 84.18 fish per mile of shoreline while sauger had 23.87 per mile.

Over the past 32 years, both species have shown high annual variability in recruitment. Average walleye CPH has varied from 2.9 fish/h to 596.7 fish/h. Similarly, average sauger has varied from 1.8 fish/h to 400.1 fish/h (Figure 2).

For walleye, the long-term (1983-2014) index average calculated from pooled data was 106.6 per hour. In 2014, average CPH was 75.3 per hour. All seven years since 2008 have been below the long-term average. We have never measured seven consecutive years of below average recruitment since this survey began in 1983 (Figure 2). The most we've measured is four consecutive years from 1993 through 1996.

For sauger, the long-term (1983-2014) index average calculated from pooled data was 92.2 per hour. In 2014, CPH was 21.4 per hour, below the long-term average. Similar to walleye, YOY sauger abundance, as measured by our samples, was below average for six of the last seven years.

In spite of the post 2008 below average annual abundance estimates, there was no statistically significant long-term trend seen in either species' CPH from 1983-2014. Also, we could find no trend from a subset of years that included the last six to fourteen years.

In addition to observing recent low YOY catch rates in Pool 8, low catch rates were evident in Pool 5. YOY walleye catch rates were below average in five of the last seven years, and YOY sauger catch rates were below average in seven of the last seven years. Similar to Pool 8, we have not seen this many consecutive years of below average abundance estimates in Pool 5 since initiating this survey in 1980.

In Pool 10, recent relative catch rates were better than the other two pools. Pool 10 walleye and sauger catch rates have been normal, with about four of the last seven years below the average for each species.

Length frequency distributions for Pool 8 walleye and sauger are given in Figure 3. During 2014, average total length of YOY sauger was the same as its long-term mean. Walleye were 0.3 inches shorter than its long-term mean. Length of 2014 YOY walleye ranged from 5.7 to 8.9 inches and had a mean of 7.3 inches (n = 194); while sauger length ranged from 5.8 to 7.4 inches and had a mean of 6.6 inches (n =

55). Over the past 32 years, walleye average annual lengths have varied from 6.6 to 8.0 inches (mean = 7.6) and 6.0 to 7.3 inches (mean = 6.6) for sauger (Figure 4).

We compared mean total YOY lengths of each species among two subsets of years: 2008 through 2014, and 1983 through 2007. The year 2008 was chosen because that is the first of seven years we measured below average abundance. For YOY walleye, there was a statistically significant difference ($p<0.0001$) between mean lengths. Prior to 2008, walleye mean length was 7.6 inches, while from 2008 through 2014 mean length was 7.2 inches. An identical comparison was done for sauger and these results were statistically significant as well ($p<0.0001$). In earlier years the mean length of sauger was 6.6 inches while in later years the mean length was 6.3 inches.

These comparisons suggest that weak year classes of both species may be related to that year's fish growth. Upon initial examination, slow YOY growth rates appear to be associated with weak fall abundance estimates. Additional analysis is needed to determine if this is the case.

Table 1. Catch per unit effort of walleye and sauger young-of-year (YOY) sampled at six stations in Pool 8 of the Mississippi River in November, 2014.

Station	Walleye YOY/h	Sauger YOY/h	Walleye YOY/mile	Sauger YOY/mile
14	72.8	50.0	73.81	50.65
15	70.0	0.00	65.31	0.00
16	124.4	22.4	158.45	28.64
17	128.2	0.00	168.81	0.00
18	32.7	6.23	35.801	6.82
19	40.0	4.0	49.98	5.0
AVERAGE	**75.31**	**21.35**	**84.18**	**23.87**

COMPARISONS WITH OTHER WISCONSIN RIVERS

We compared walleye YOY catch per hour between the Mississippi River and other Wisconsin Rivers sampled in the fall. These other rivers included the Baraboo, Bark, Black, Buffalo, Chippewa, Crawfish, Flambeau, Fox, La Crosse, Saint Croix, Manitowish, Rock System, Milwaukee, Menomonee, and Wisconsin rivers. Statewide catch per hour varied from zero to 257. The mean catch rate was 1.7. This compares to the Mississippi combined (all three pools combined) catch rate of 79.1 per hour (Figure 5). For a comparison of the frequency distributions of catch rates, see Figure 5. Clearly, the Mississippi River has far fewer occurrences of zero catches and has more frequent rates above 50 YOY per hour.

Much of this difference could be due to sampling locations in the statewide data. On the Mississippi River, we routinely sample tailwaters, while statewide, many of the sampling locations do not appear to be in tailwaters. Fall samples in tailwaters often produce higher catch rates since, at least on the Mississippi River, walleye tend to congregate there.

CONCLUSIONS

For at least the last six years, Mississippi River YOY abundance estimates for both sauger and walleye are below the long term average which was calculated from the years 1983 through 2014. In Pool 8, mean lengths of YOY fish for both species have become significantly smaller since 2008. The Mississippi River has, on average, 47 times the catch rates of other Wisconsin rivers, although at least some of this difference is due to the locations sampled within these rivers.

Figure 1. Location of Six Routine YOY Walleye and Sauger Electro fishing Runs, with UTM15 NAD83 Coordinates, Located Downstream of Lock and Dam 7, in Pool 8 of the Mississippi River.

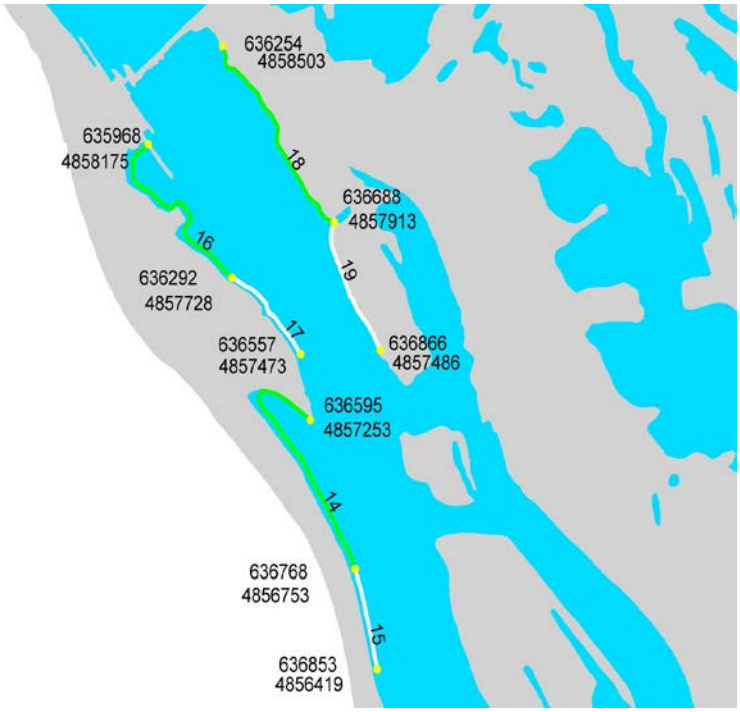


Figure 2. Number per Hour, Fall Pool 8 YOY Walleye and Sauger, 1983-2014.
(Using annual length cutoffs from length distributions)

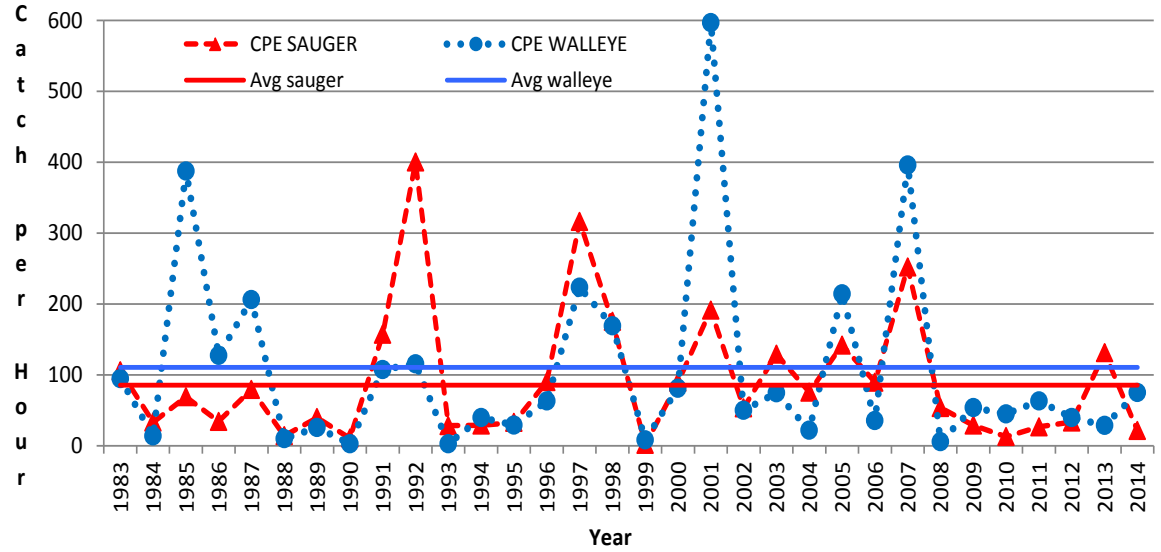


Figure 3. Population Length Frequency Distribution of Young-of-the-Year Walleye and Sauger. Pool 8, Mississippi River, Fall 2014.

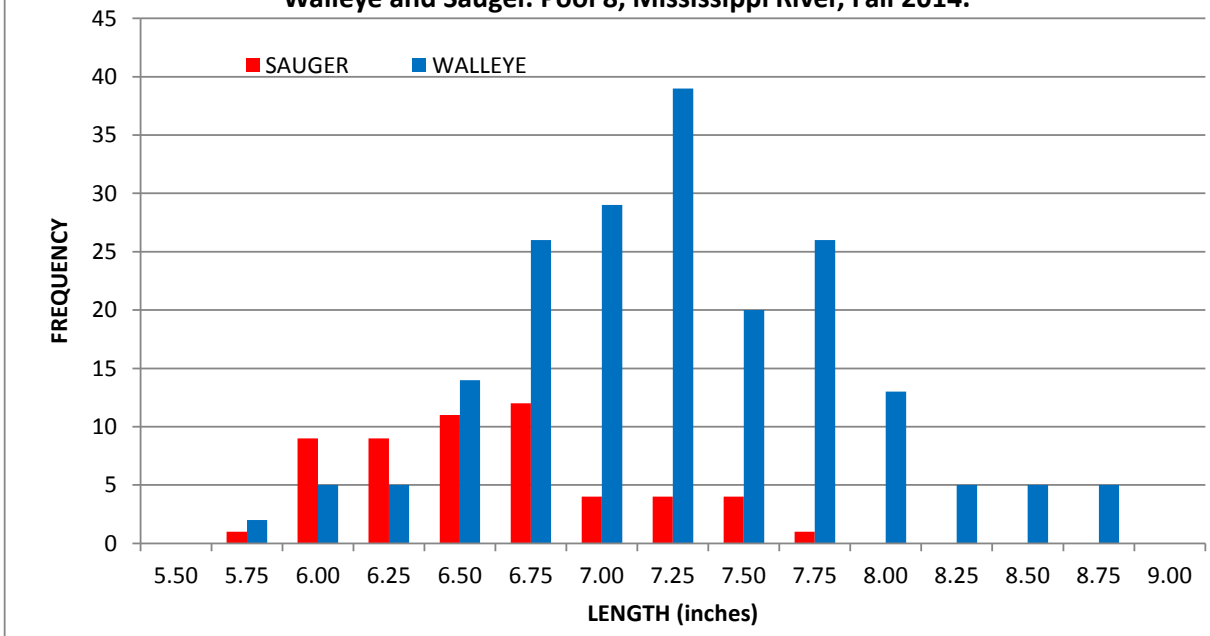


Figure 4. Mean Length in Inches, Fall Pool 8 YOY Walleye and Sauger, 1983-2014. Numbers are sample size. *(Using annual length cutoffs from length distributions)*

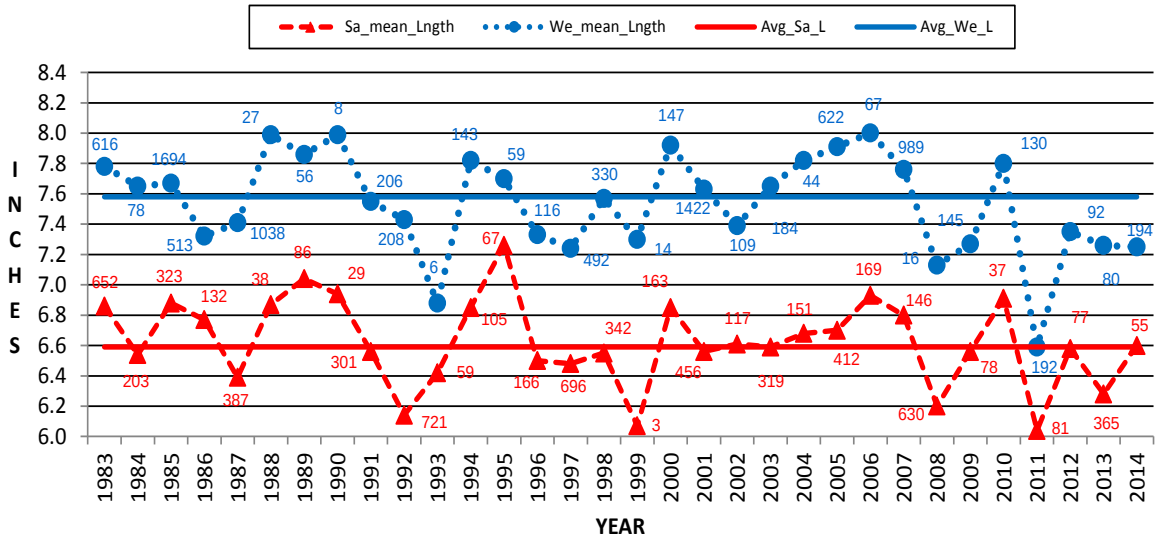
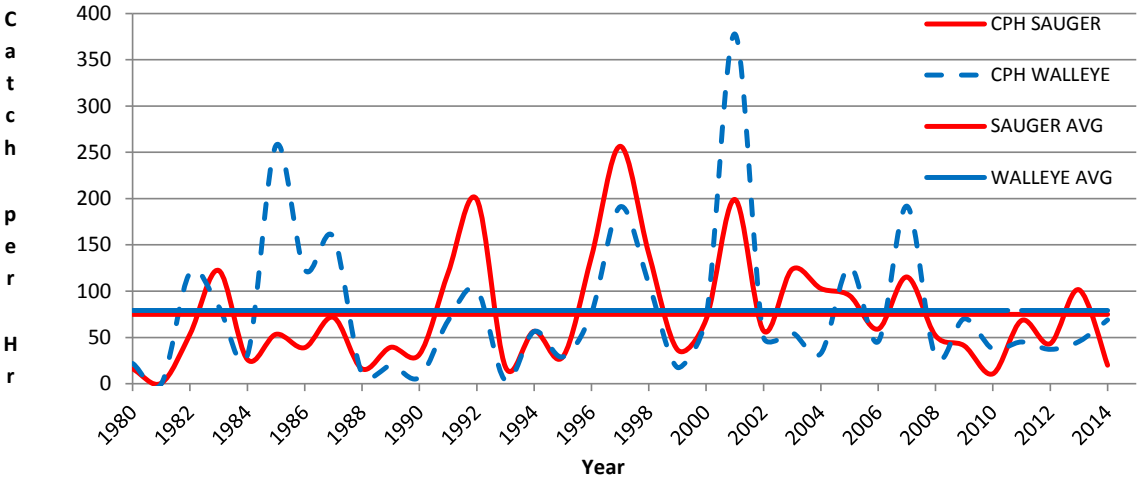


Figure 5. Number per Hour vs Year, Fall Pools 5, 8 & 10 YOY Walleye and Sauger, 1980-2014.



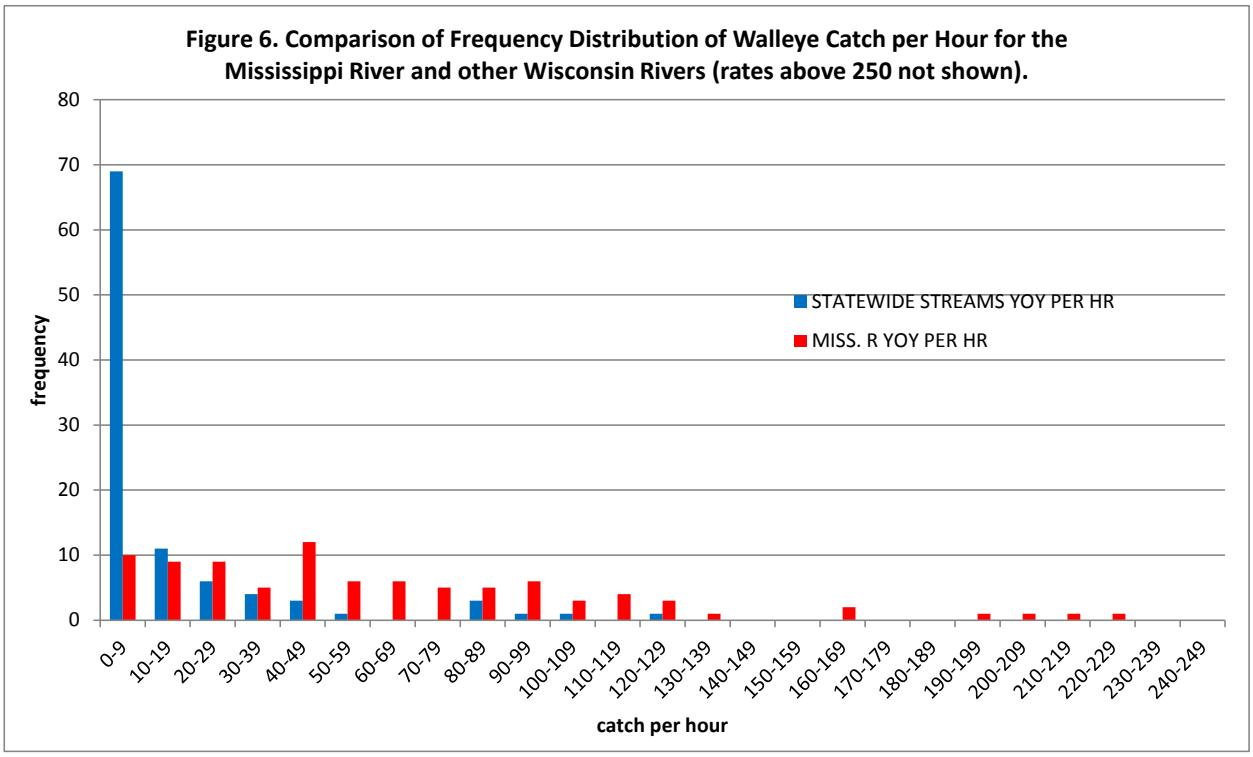


Figure 6. Comparison of Frequency Distribution of Walleye Catch per Hour for the Mississippi River and other Wisconsin Rivers (rates above 250 not shown).
frequency
80
70
60
50
40
30
20
10
0
STATEWIDE STREAMS YOY PER HR
MISS. R YOY PER HR
0-9
10-19
20-29
30-39
40-49
50-59
60-69
70-79
80-89
90-99
100-109
110-119
120-129
130-139
140-149
150-159
160-169
170-179
180-189
190-199
200-209
210-219
220-229
230-239
240-249
catch per hour