

# 2020 Lake Winnebago Bottom Trawling Assessment Report

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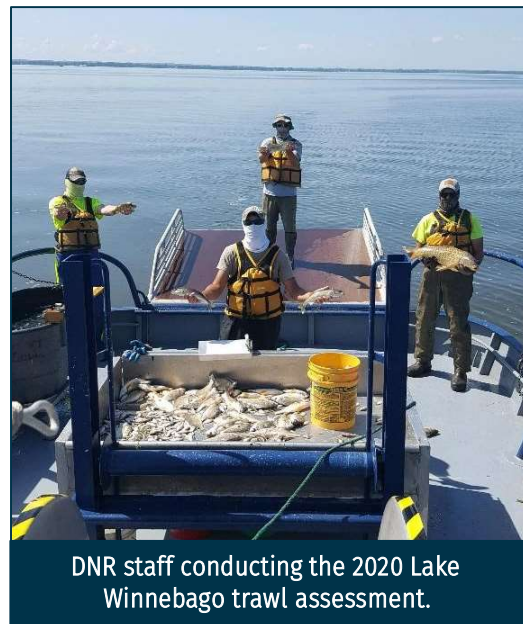
April 2021

## OVERVIEW

The Lake Winnebago bottom trawling assessment is critical for monitoring the Winnebago System fish community, and area anglers are eager to learn the results each year. The trawl assessment has been conducted annually since 1986. The main objectives include providing critical information on year class strength of game and nongame fish species, monitoring trends in the forage base, and monitoring general population trends of game and nongame fish species. One of the annual trawl survey staples has been the dedicated volunteer base that helps complete the survey each year. However, 2020 was a different year, and we were unable to use volunteers due to work restrictions associated with the COVID-19 pandemic. The DNR developed a protocol for completing the 2020 survey that included using limited DNR staff to complete the survey while wearing masks and practicing social distancing at all times. This protocol laid the framework for the 2020 trawl survey to be conducted safely.

The annual survey consists of sampling 46 standardized GPS waypoints during the first week of August, September and October. Each sample involves towing a 27' wide trawl along the bottom for five minutes at 4 miles per hour, equating to around 1-acre of area sampled. Staff captured a fair amount of adult fish during the survey, but the trawl is most effective at catching small fish (young of year (YOY) and yearlings). The standardized survey has been conducted annually since 1986, thus providing a long-term data set to evaluate trends in recruitment and adult abundance of various important game and nongame fish species on the Winnebago System.

The 2020 trawling results revealed several highlights, including record catch rates of YOY freshwater drum and yellow perch, a strong crappie hatch and a measurable walleye year class. Overall, there were 15 species of YOY fish sampled for a total of 79,835 YOY fish caught during the 2020 trawling survey. It was noteworthy that 2020 had the highest catch rate for YOY bluegill (1.3/trawl) on record (Appendix 1). For adult fish, there were 18 different species



DNR staff conducting the 2020 Lake Winnebago trawl assessment.

sampled for a total of 42,480 adult fish captured (Appendix 2). Interestingly, 2020 also had the highest number of adult lake sturgeon sampled on record (43 fish).

## **WALLEYE**

The 2020 YOY walleye catch rate was 3.6/trawl, just below the long-term average of 4.5/trawl (Figure 1). Although 2020 produced a measurable year class, the catch rate was lower than expected based on high spring water levels. Spring water level on the Wolf River is one of the main factors that drive walleye year class strength. High spring water levels are crucial for providing suitable walleye spawning conditions by allowing adult fish access to flooded marsh habitat, providing adequate flows to keep eggs well aerated and flushing out newly hatched fry.

Like 2019, the initial snowmelt increased water levels throughout the basin, with discharge reaching 7,830 cubic feet per second (cfs) at the New London gauge on March 17 (Appendix 3). Rain events led to a second peak in the hydrograph of 9,610 cfs in early April, resulting in good water levels and flow in walleye spawning marshes. However, similar to 2018 and 2019, a mid-April cold front dropped water temperatures from 51.3°F on April 8 to 39.9°F on April 15. Peak walleye spawning often occurs in the first two weeks of April on the Wolf River; it is likely that walleye spawning was well underway before the cold front. Therefore, despite optimal water levels, the cold front likely created less optimal conditions for walleye egg development and hatching success.

In addition, lower water temperatures can lead to lower zooplankton abundance, which walleye fry need for food to survive. Although there was not a strong year class in 2020, we have had measurable year classes from 2017-2020 which should help contribute to a strong adult population.

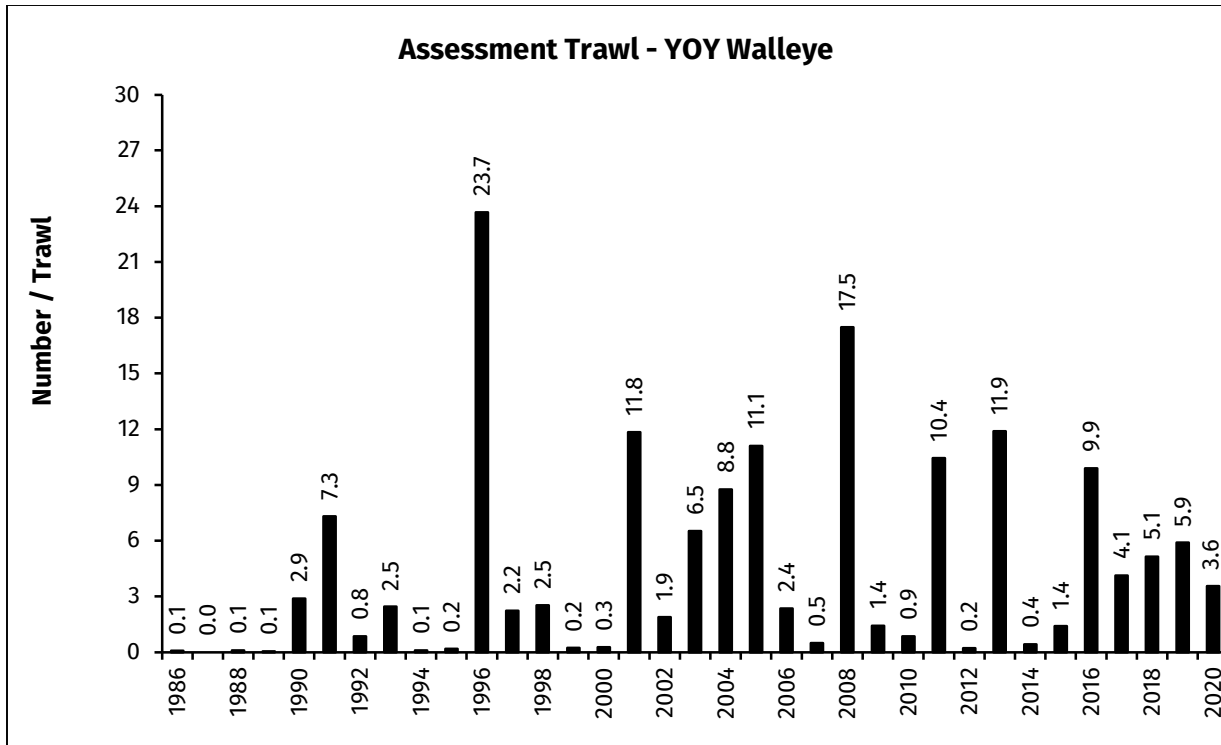


Figure 1. Average number of YOY walleye/trawl captured during bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## SAUGER

There were two YOY sauger captured during the 2020 trawling survey. Natural reproduction continues to be limited on Lake Winnebago, and adult sauger numbers have continued to decrease since the Sauger Rehabilitation Program ended in 2010 (Figure 2).

The rehabilitation program was conducted on Lake Winnebago from 2001-2010 and included several facets. Rock reefs were installed on the north end of Lake Winnebago to bolster sauger spawning habitat, stocking was conducted (7,998,000 fry, 10,000 fingerlings, and 6,576 extended growth fingerlings in Lake Winnebago), and a zero-bag limit for sauger was put in place. The program's goal was to enhance sauger spawning habitat and increase adult sauger numbers to increase natural reproduction.

Although the project did increase adult sauger numbers from 0.2/trawl in 2001 to 2.6/trawl in 2009, natural reproduction continues to be limited, and catch rates for adult sauger have decreased (0.3/trawl in 2020) to similar catch rates observed before the Sauger Rehabilitation Program.

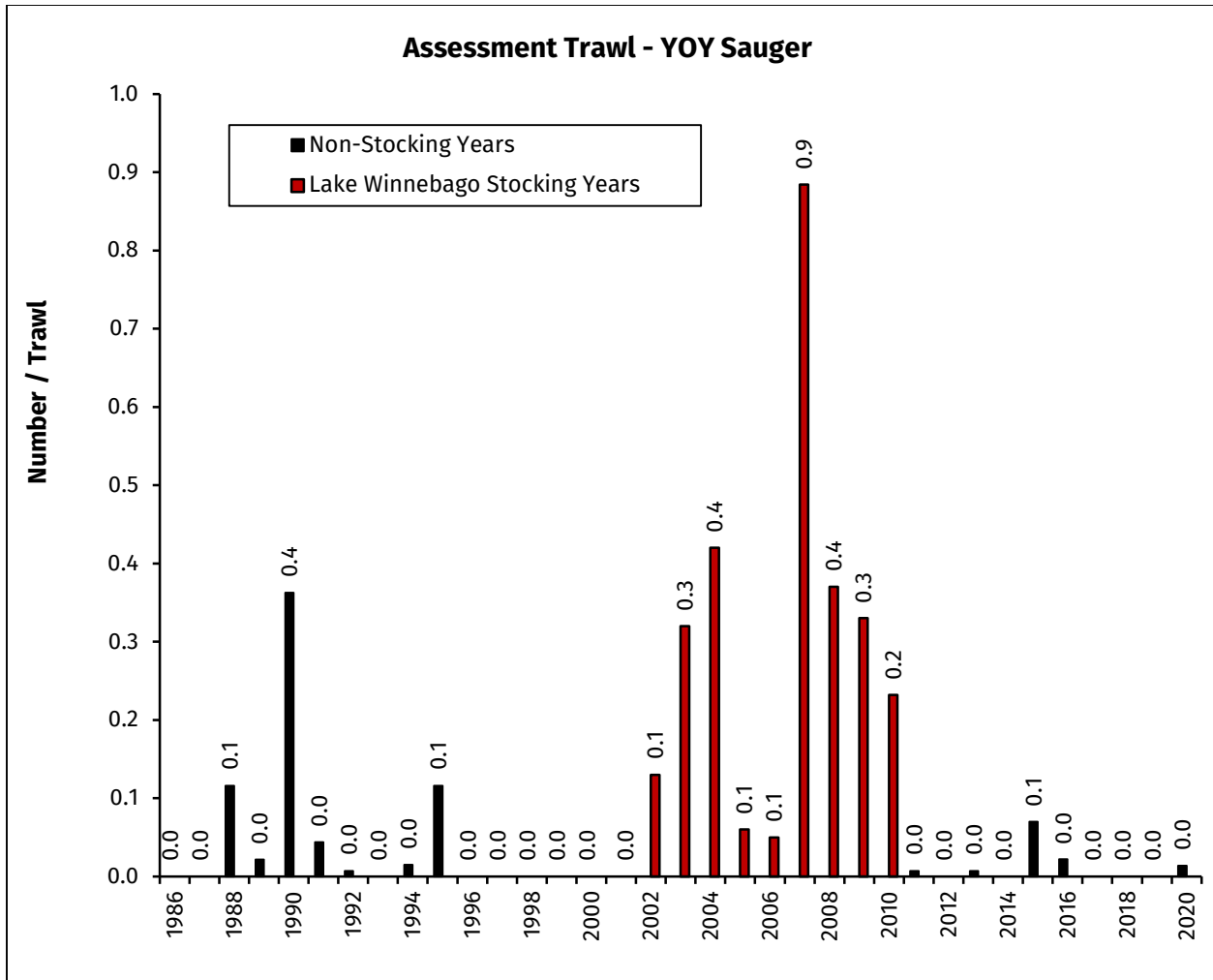


Figure 2. Average number of YOY sauger/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## YELLOW PERCH

Data collected during the 2020 bottom trawl assessment indicated a record year class for yellow perch. The observed catch rate of 13.8 YOY/trawl was the highest on record, and well above the long-term average of 2.1/trawl (Figure 3). Above-average year classes were also produced in 2019 (4.2/trawl) and 2018 (3.5/trawl). Anglers will welcome these recent year classes following a six-year stretch of relatively poor recruitment observed between 2012-2017.

If the 2020 year class survives well into older ages, these fish will complement the good 2018 and 2019 year classes to provide an excellent perch population and fishery over the next few years.

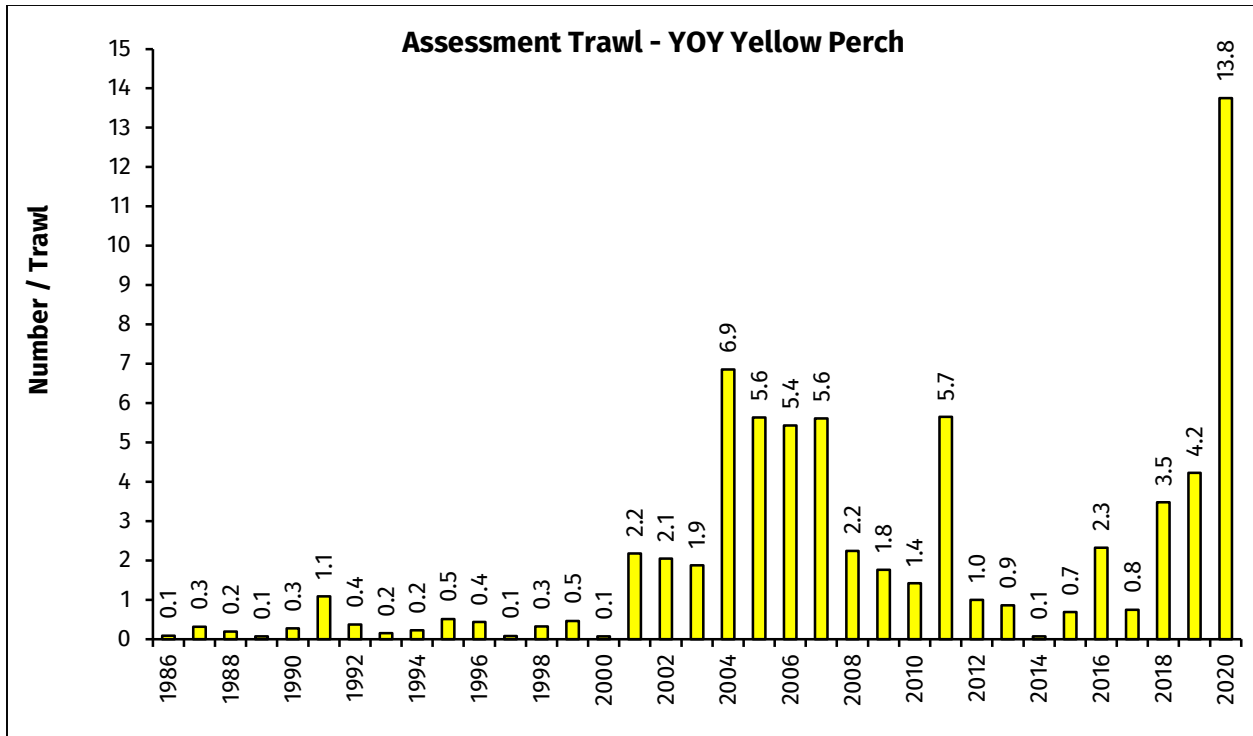


Figure 3. Average number of YOY yellow perch/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## CRAPPIE

The 2020 crappie hatch was strong with a catch rate of 13.9 YOY/trawl, ranking as the second-highest catch rate on record and well above the 3.2/trawl long-term average (Figure 4). The 2016 record year class (24.1 YOY/trawl) still dominates the adult size structure with fish ranging from 9-11 inches.

Although the 2016 year class has begun to fade from the adult population, anglers still had some fishing success in 2020, particularly in bay areas during the spring. Hopefully, environmental conditions will provide good overwinter survival conditions for the strong 2020 year class, which should increase future angling opportunities.

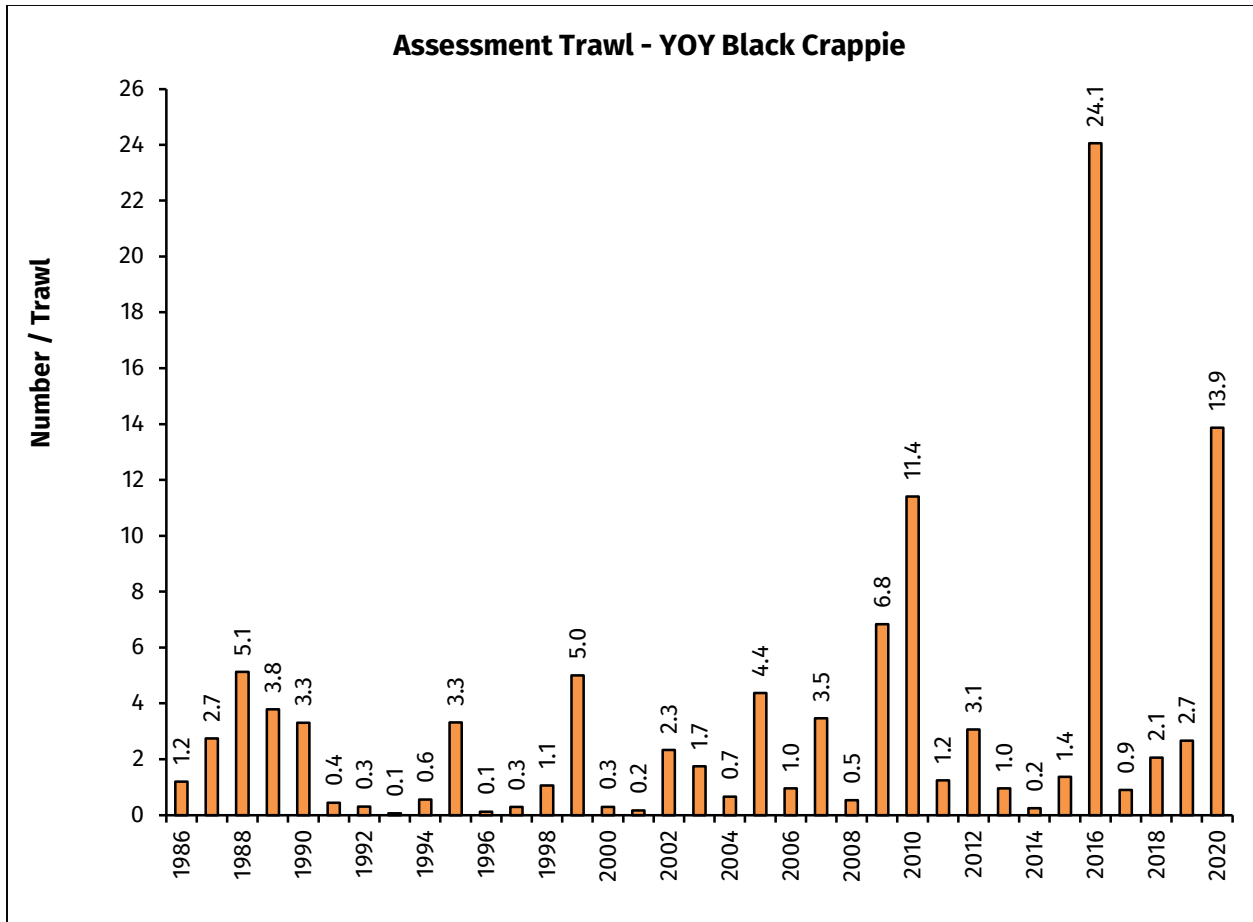


Figure 4. Average number of YOY black crappie/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

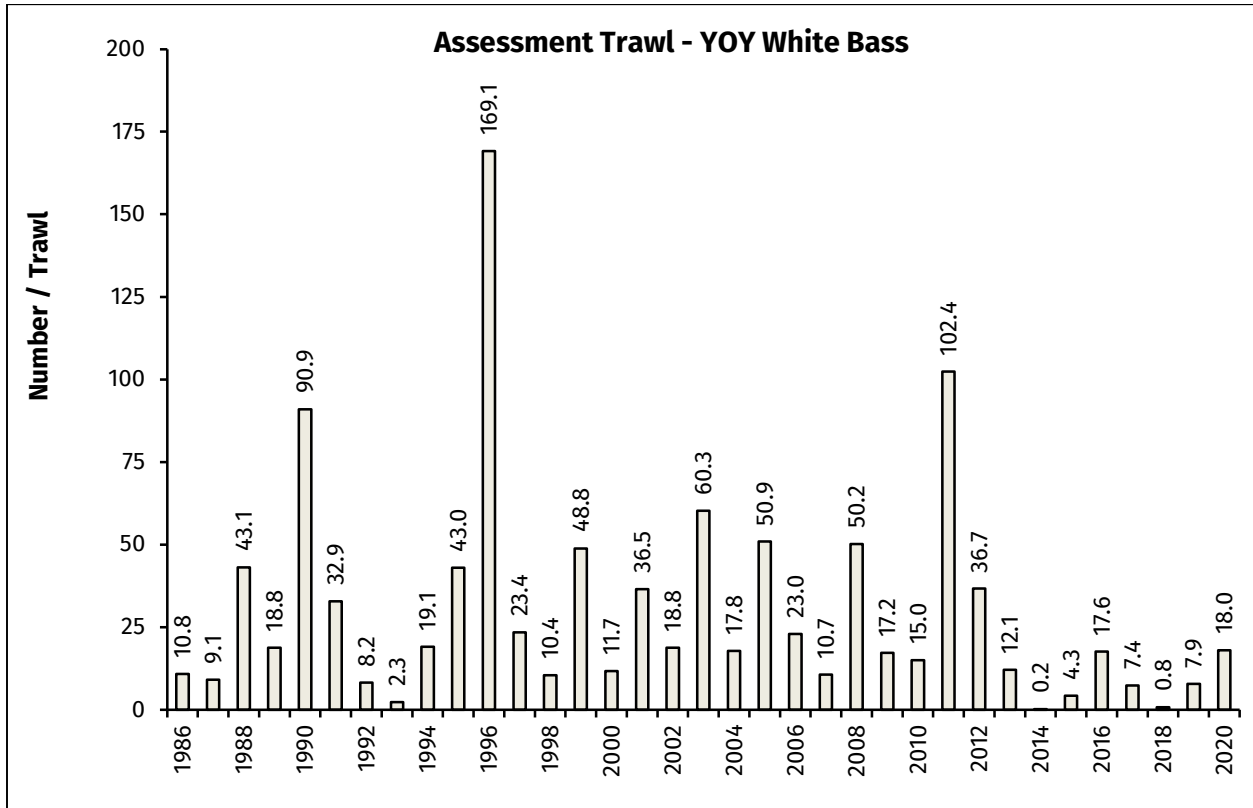
## WHITE BASS

White bass continue to be a sought-after sport fish in the Winnebago System, and challenging fishing conditions in recent years have led many anglers to inquire about the state of the white bass fishery.

The 2020 YOY white bass catch rate was 18.9/trawl, which was the highest catch observed during trawling since 2012 (36.7/trawl), but still below the long-term average of 30.0/trawl (Figure 5). The strong 2011 (second largest on record; averaged 102.4/trawl) and the above-average 2012 year classes have continued to fade from the population.

As a result, anglers have reported that white bass have been tough to find in recent years. Despite having some measurable year classes in recent years, a strong white bass hatch hasn't materialized since 2011, and the adult white bass catch rate has remained below the long-term average of 7.7/trawl. As a result, a strong year class is needed to boost the adult population and fishery. Luckily, it is common for adult

populations to reach record lows and then pull off record year classes. Hopefully environmental conditions will line up for a strong white bass hatch in the near future.



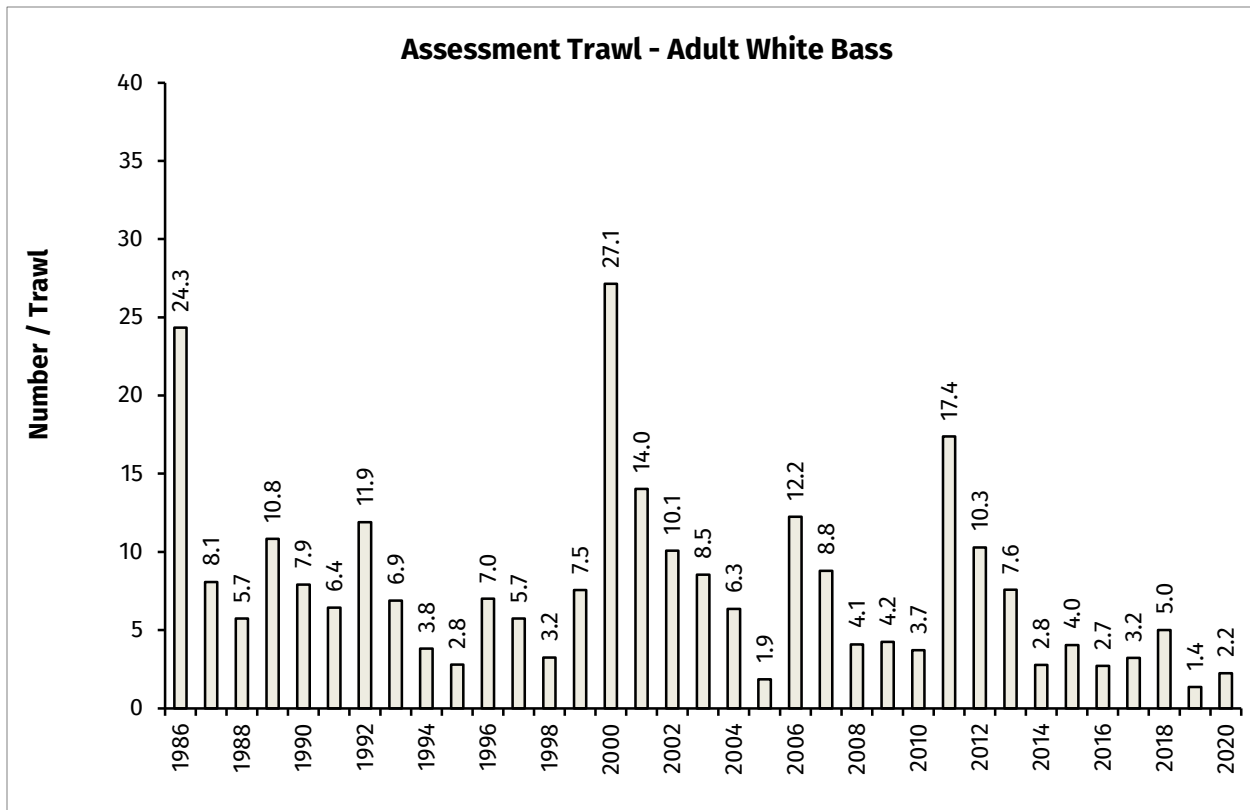


Figure 5. Average number of adult white bass/trawl (lower panel) and YOY white bass/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## FORAGE FISH SPECIES

### FRESHWATER DRUM

The 2020 trawling survey indicated a record freshwater drum year class with an impressive catch rate of 393.8 YOY/trawl, surpassing the long-term average of 96.3/trawl (Figure 6). The freshwater drum population has now produced two strong year classes since the substantial Viral Hemorrhagic Septicemia (VHS) kill in the spring of 2018. Meanwhile, the adult freshwater drum catch rate hit a record low of 230.1/trawl in 2018 following the significant die-off and remained low in 2020 (285.3/trawl). This provides a classic example of fish populations responding to substantial declines in adult numbers by increasing recruitment to boost population abundance.

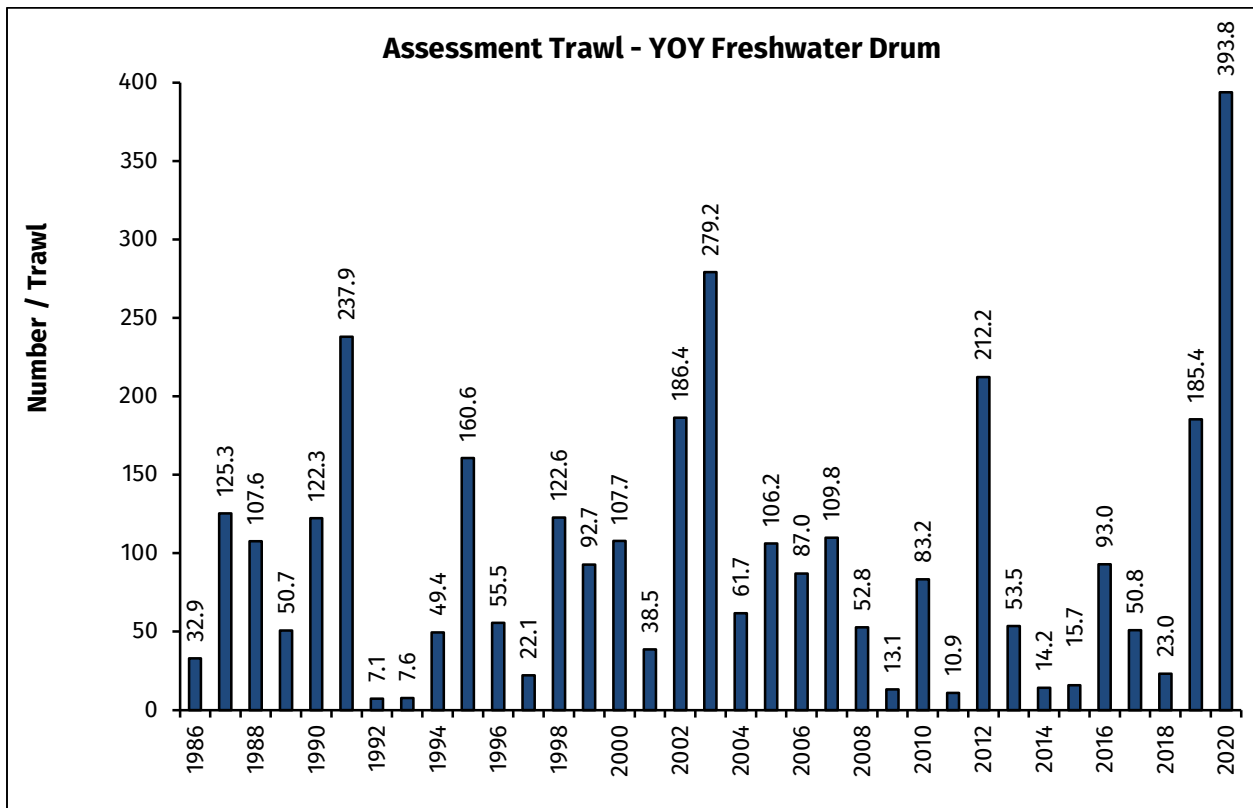
Although freshwater drum are often overlooked and viewed negatively on the system, the strong 2019 and 2020 year classes are well-welcomed. Freshwater drum are a top forage item for gamefish species during their early life stages, and the recent year classes have provided stability to the forage base. Adult freshwater drum are also one of the primary prey sources for double-crested cormorants, as observed during a 3-year diet study conducted on the Winnebago System from 2015-2017

(<https://onlinelibrary.wiley.com/doi/abs>).



Therefore, the high abundance of adult freshwater drum buffers the impact of cormorant predation on sport fish populations. Anglers can expect to see an increase in adult freshwater drum numbers in future years and may want to consider bringing along a few extra worms.

I would encourage anglers to even give them a try in the frying pan. If you follow a few simple steps, you'll be hard-pressed to tell them apart from other popular gamefish and panfish filets. First, it is important to harvest them during cooler water periods and then put them on ice immediately. During the filleting process, take the top loin above the lateral line and then deep fry them with your favorite fish breading. Add some tartar sauce, and you'll be in for quite a treat.



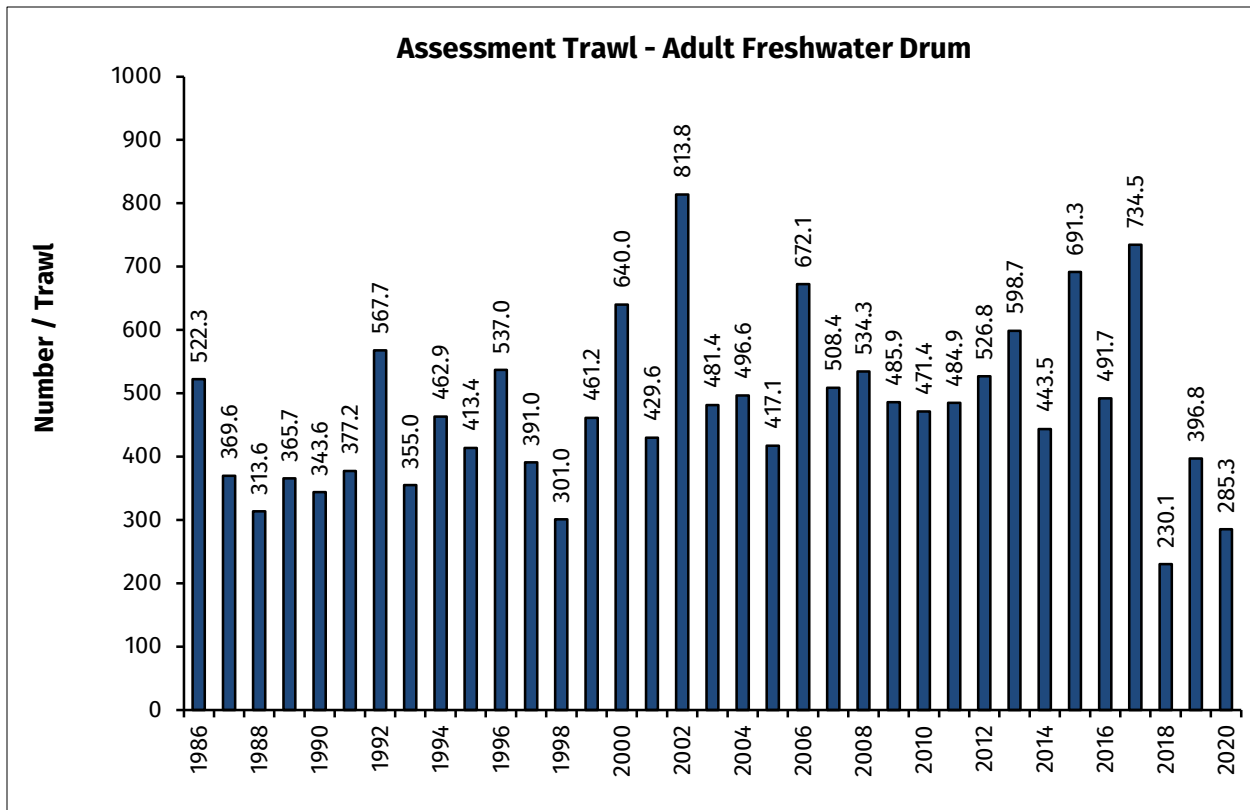


Figure 6. Average number of adult freshwater drum/trawl (lower panel) and YOY freshwater drum/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## TROUT PERCH

The 2020 YOY trout perch catch rate of 133.3/trawl was a slight increase from the 2019 catch rate of 116.0/trawl (Figure 7). Although these were below the long-term average of 214.5/trawl, there has been an overall increase in trout perch numbers in recent years since the low catches observed between 2013-2015.

Trout perch are a staple forage item for many gamefish species on the system, including walleye and sauger. Also referred to as the grounder minnow, sand roller or silver chub, trout perch are often more visible during their spawning season (May-June) and usually select sand bars, rocks, or small tributaries for spawning areas and have been observed spawning among shoreline rocks on Lake Winnebago (Priegel 1962).

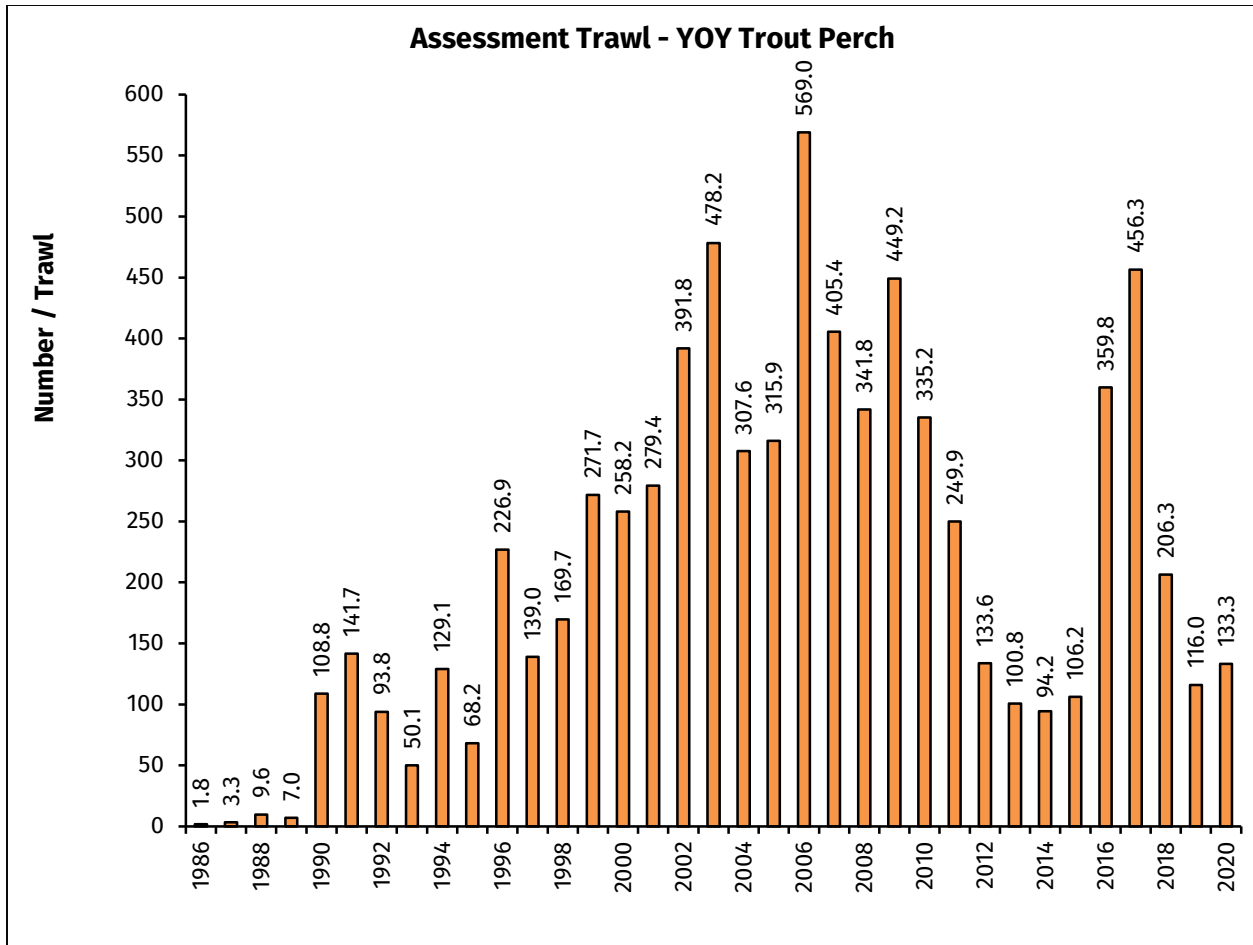


Figure 7. Average number of YOY trout perch/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

### GIZZARD SHAD

Results from the 2020 trawling survey revealed a weak gizzard shad hatch (0.3 YOY/trawl) for the fourth consecutive year (Figure 8). In fact, catch rates have not surpassed 1.3 YOY shad/trawl since the strong 2016 hatch (102.4/trawl). The low hatches observed in recent years are comparable to the 1990s when weak year classes were observed from 1992-1998. Gizzard shad are known for their boom or bust recruitment cycles and the Winnebago System has certainly had bust year classes over the last four years with an average of 0.5 YOY/trawl.

Gizzard shad do best when the system experiences warm, dry years. For example, strong gizzard shad hatches were documented during the drier years in 2009 (124.1/trawl), 2010 (197.2/trawl) and 2012 (122.6/trawl). Therefore, it is probable that the wet cycle in recent years has limited gizzard shad hatches. The weak shad hatches have led to favorable angling opportunities for gamefish throughout the system and anglers could be in for another productive year of fishing in 2021. However, it is likely only a matter of time before a boom year class materializes.

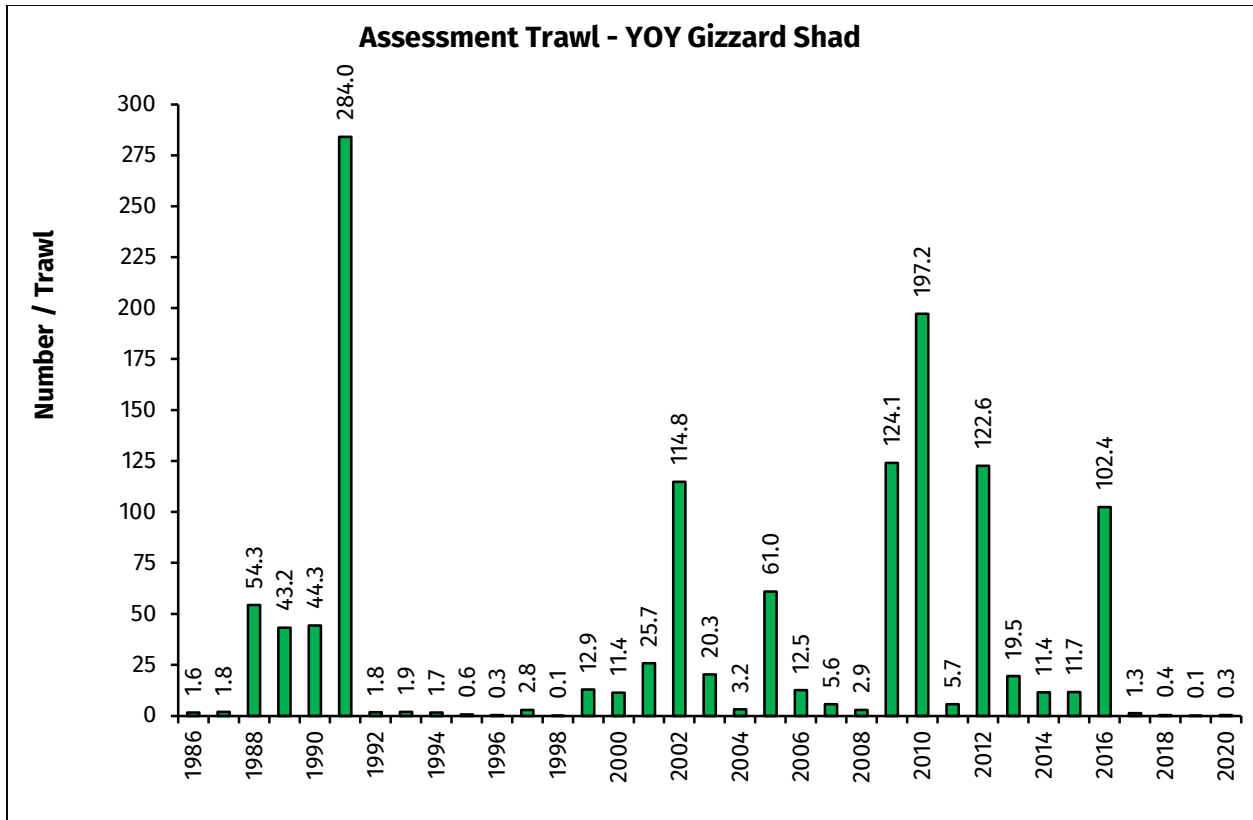


Figure 8. Average number of YOY gizzard shad/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2020.

## SUMMARY

I hope you have enjoyed reading the 2020 Lake Winnebago trawling report. Despite the challenges posed by COVID-19, we developed an approved protocol that allowed us to complete this critical survey while keeping DNR staff safe. In the future, we look forward to engaging more volunteers again in our trawling assessment once it's safe to do so.

Please contact me at the phone number or email below if you have any questions or comments regarding the Winnebago trawling survey.

Good luck fishing and be safe on the ice and water. Remember to take a kid or someone new out fishing in 2021!



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- Priegel, G.R. 1962. Food of walleye and sauger in Lake Winnebago. Research Report. Wisconsin Conservation Department. Madison.

Appendix 1. List of trawling records (#/trawl) for the young of year fish species with the top ten catch rates during the 2020 Lake Winnebago trawling survey.

Year	Freshwater Drum	Trout Perch	White Bass	Black Crappie	Yellow Perch	Walleye	Bluegill	Emerald Shiner	Gizzard Shad	Channel Catfish
1986	32.9	1.8	10.8	1.2	0.1	0.1	0.0	0.0	1.6	0.00
1987	125.3	3.3	9.1	2.7	0.3	0.0	0.0	0.0	1.8	0.02
1988	107.6	9.6	43.1	5.1	0.2	0.1	0.0	0.2	54.3	0.00
1989	50.7	7.0	18.8	3.8	0.1	0.1	0.0	0.0	43.2	0.00
1990	122.3	108.8	90.9	3.3	0.3	2.9	0.0	0.2	44.3	0.00
1991	237.9	141.7	32.9	0.4	1.1	7.3	0.0	0.2	284.0	0.02
1992	7.1	93.8	8.2	0.3	0.4	0.8	0.0	0.0	1.8	0.00
1993	7.6	50.1	2.3	0.1	0.2	2.5	0.0	0.0	1.9	0.02
1994	49.4	129.1	19.1	0.6	0.2	0.1	0.0	0.0	1.7	0.00
1995	160.6	68.2	43.0	3.3	0.5	0.2	0.1	0.0	0.6	0.01
1996	55.5	226.9	169.1	0.1	0.4	23.7	0.0	0.2	0.3	0.01
1997	22.1	139.0	23.4	0.3	0.1	2.2	0.0	0.2	2.8	0.00
1998	122.6	169.7	10.4	1.1	0.3	2.5	0.1	0.2	0.1	0.01
1999	92.7	271.7	48.8	5.0	0.5	0.2	0.0	1.1	12.9	0.12
2000	107.7	258.2	11.7	0.3	0.1	0.3	0.0	0.8	11.4	0.00
2001	38.5	279.4	36.5	0.2	2.2	11.8	0.0	0.2	25.7	0.00
2002	186.4	391.8	18.8	2.3	2.1	1.9	0.0	0.3	114.8	0.01
2003	279.2	478.2	60.3	1.7	1.9	6.5	0.0	0.0	20.3	0.01
2004	61.7	307.6	17.8	0.7	6.9	8.8	0.0	0.1	3.2	0.00
2005	106.2	315.9	50.9	4.4	5.6	11.1	0.1	0.6	61.0	0.04
2006	87.0	569.0	23.0	1.0	5.4	2.4	0.0	0.3	12.5	0.01
2007	109.8	405.4	10.7	3.5	5.6	0.5	0.1	16.9	5.6	0.00
2008	52.8	341.8	50.2	0.5	2.2	17.5	0.0	1.1	2.9	0.13
2009	13.1	449.2	17.2	6.8	1.8	1.4	0.0	1.6	124.1	0.00
2010	83.2	335.2	15.0	11.4	1.4	0.9	0.4	1.3	197.2	0.02
2011	10.9	249.9	102.4	1.2	5.7	10.4	0.0	1.7	5.7	0.01
2012	212.2	133.6	36.7	3.1	1.0	0.2	0.4	5.5	122.6	0.01
2013	53.5	100.8	12.1	1.0	0.9	11.9	0.0	3.4	19.5	0.00
2014	14.2	94.2	0.2	0.2	0.1	0.4	0.0	0.2	11.4	0.00
2015	15.7	106.2	4.3	1.4	0.7	1.4	0.0	0.1	11.7	0.00
2016	93.0	359.8	17.6	24.1	2.3	9.9	0.0	3.5	102.4	0.00
2017	50.8	456.3	7.4	0.9	0.8	4.1	0.0	0.2	1.3	0.00
2018	23.0	206.3	0.8	2.1	3.5	5.1	0.1	0.7	0.4	0.10
2019	185.4	116.0	7.9	2.7	4.2	5.9	0.0	0.2	0.1	0.02
2020	<b>393.8</b>	<b>133.3</b>	<b>18.0</b>	<b>13.9</b>	<b>13.8</b>	<b>3.6</b>	<b>1.3</b>	<b>0.4</b>	<b>0.3</b>	<b>0.04</b>
<b>Average</b>	96.4	214.5	30.0	3.2	2.1	4.5	0.1	1.2	37.3	0.02

Appendix 2. List of trawling records (#/trawl) for the adult fish species with the top ten catch rates during the 2020 Lake Winnebago trawling survey.

Year	Freshwater Drum	Walleye	Yellow Perch	White Sucker	White Bass	Common Carp	Channel Catfish	Trout Perch	Quillback	Emerald Shiner
1986	522.3	1.4	0.4	1.6	24.3	1.1	0.3	0.1	0.4	0.0
1987	369.6	0.8	0.3	1.5	8.1	0.8	0.1	0.2	0.4	0.0
1988	313.6	0.3	0.9	1.2	5.7	0.9	0.3	1.0	0.3	0.0
1989	365.7	0.3	1.6	1.2	10.8	1.3	0.4	3.1	0.9	0.4
1990	343.6	0.2	4.3	1.4	7.9	0.8	0.3	4.0	0.8	0.6
1991	377.2	0.6	3.2	1.1	6.4	0.7	0.5	47.7	0.3	0.1
1992	567.7	4.6	2.6	1.8	11.9	1.2	0.6	20.7	0.4	0.4
1993	355.0	4.7	1.1	2.2	6.9	1.6	0.4	5.5	0.6	0.0
1994	462.9	6.3	0.7	1.6	3.8	2.3	0.5	13.8	0.5	0.0
1995	413.4	3.8	0.7	1.2	2.8	1.4	0.4	8.0	0.3	0.0
1996	537.0	3.3	1.2	2.0	7.0	0.8	0.3	18.5	0.6	0.1
1997	391.0	6.4	0.9	1.7	5.7	0.9	0.6	0.6	1.0	1.1
1998	301.0	4.5	0.6	2.0	3.2	1.5	0.6	0.5	1.3	0.2
1999	461.2	4.7	1.2	2.0	7.5	1.9	0.6	3.7	1.4	2.0
2000	640.0	2.8	2.0	2.2	27.1	1.9	0.9	2.1	1.0	3.9
2001	429.6	1.0	1.2	1.6	14.0	1.1	0.7	7.9	1.0	4.9
2002	813.8	14.4	4.2	2.9	10.1	1.0	0.9	4.8	1.6	1.0
2003	481.4	11.7	4.5	2.1	8.5	1.4	1.4	6.3	0.8	0.4
2004	496.6	8.2	2.8	1.2	6.3	1.8	0.8	1.7	0.7	0.8
2005	417.1	5.4	4.0	1.8	1.9	1.4	0.6	1.4	0.3	0.1
2006	672.1	7.5	21.4	1.4	12.2	2.3	0.8	3.2	0.5	0.2
2007	508.4	6.0	6.9	2.7	8.8	2.4	0.7	0.3	1.0	5.1
2008	534.3	3.4	5.1	2.0	4.1	3.4	0.8	0.3	0.5	6.7
2009	485.9	10.8	7.3	2.3	4.2	2.2	0.9	1.9	1.3	15.2
2010	471.4	3.4	6.1	2.0	3.7	2.7	0.8	0.1	1.0	1.3
2011	484.9	3.9	14.0	5.1	17.4	3.6	1.3	8.9	1.0	17.9
2012	526.8	4.7	5.5	5.4	10.3	1.9	2.2	0.2	0.8	0.7
2013	598.7	3.4	4.4	4.0	7.6	2.0	3.3	8.7	0.5	1.1
2014	443.5	6.6	1.6	4.6	2.8	1.6	1.7	0.5	0.3	0.3
2015	691.3	6.8	0.4	4.4	4.0	1.8	1.5	8.7	0.8	0.1
2016	491.7	4.6	0.3	3.6	2.7	0.8	1.7	4.8	0.6	0.3
2017	734.5	9.0	10.6	3.0	3.2	1.3	1.5	0.8	0.6	0.1
2018	230.1	10.3	6.7	3.2	5.0	1.6	1.4	0.5	0.9	0.7
2019	396.8	8.0	2.5	4.4	1.4	2.3	1.7	0.3	1.1	0.3
2020	<b>285.3</b>	<b>5.9</b>	<b>4.0</b>	<b>2.9</b>	<b>2.2</b>	<b>2.1</b>	<b>1.4</b>	<b>1.3</b>	<b>1.1</b>	<b>0.5</b>
<b>Average</b>	474.7	5.1	3.9	2.4	7.7	1.7	0.9	5.5	0.8	1.9

Appendix 3. Wolf River hydrograph at the New London USGS gauge from 2013-2020.

