2019 Lake Winnebago Bottom Trawling Assessment Report

Adam Nickel, Winnebago System Gamefish Biologist, March 2020

The Lake Winnebago bottom trawling assessment is one of the most important fisheries assessments conducted on the Winnebago System. Thanks to the continued support from local volunteers (over 400 hours/year), the 2019 trawling survey was successfully completed. The main objectives of the trawling assessment are to: 1) provide critical information on year class strength of game and nongame fish species, 2) monitor trends in the forage base, and 3) monitor general population trends of game and nongame fish species. The survey also provides great opportunities for volunteers to get a hands-on experience with conducting survey work on the Winnebago System.

The survey consists of sampling 46 standardized GPS waypoints during the first week of August, September, and October. Each sampling event involves towing a 27' wide trawl along the bottom for 5 minutes at 4 miles per hour, equating to around a 1-acre sample area. A fair amount of adult fish are captured 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, pan, and forage fish species on the Winnebago System. Department of Natural Resource (DNR) staff and local volunteers are always eager to board the Calumet Research Vessel each year and evaluate recruitment of various fish species. The 2019 trawling results revealed a few highlights including measurable walleye and yellow perch hatches and a near record year class of freshwater drum.

Trawling crew showcasing the various fish species sampled during October trawling on Lake Winnebago.

Walleye

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 marsh habitat, providing adequate flows to keep eggs well aerated, and flushing out newly hatched fry. Like 2018, water levels varied on the Wolf River throughout the spring of 2019. The initial snowmelt increased water levels throughout the basin, with discharge reaching 9,760 cubic feet per second (cfs) at the New London gauge in late March. Water levels decreased to a discharge of 4,690 cfs on April 10th before another big April snow storm hit the basin. Snowmelt led to increased water flows throughout the basin, with discharge peaking at 10,900 cfs on April 23. Like 2018, walleye spawning took place before and after the April snow storm, which left many wondering how the 2019 walleye hatch would turn out.

Despite varying water level conditions on the Wolf River in 2019, the trawling results indicated that a measurable walleye year class was produced. The high-water levels produced from the snow storm still provided viable conditions for walleye spawning success. The 2019 YOY walleye catch rate of 5.9/trawl was just above the long-term average of 4.6/trawl (Figure 1). The catch rate of 1.8 yearling walleye/trawl indicated fair survival from the 2018 year class (5.1 YOY/trawl). Nonetheless, it will be interesting to see how the 2018 and 2019 year classes contribute to the adult population in future years.

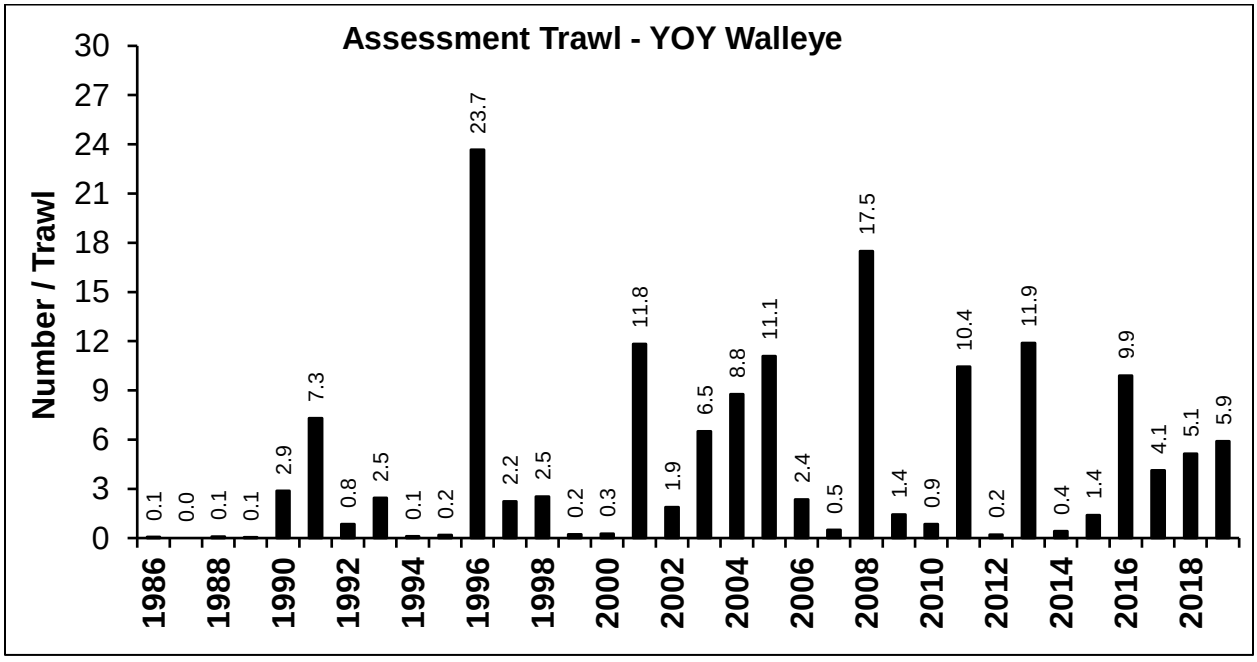

Figure 1. Average number of YOY walleye/trawl captured during bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

Sauger

There was one YOY sauger captured during the 2019 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 goal of the program was to enhance sauger spawning habitat and increase adult sauger numbers to hopefully increase natural reproduction.

Although the project did increase adult sauger numbers from 0.2/trawl in 2001 to 2.6/trawl in 2009 (Figure 2), natural reproduction continues to be limited and catch rates for adult sauger have decreased (0.3/trawl in 2019) to similar catch rates observed prior to the Sauger Rehabilitation Program. During the 2016 Winnebago Fisheries Advisory Council (WFAC) meeting representatives from various clubs discussed the current state of the sauger population and management options going forward. Three options were discussed including: (1) let nature prevail and likely manage for a low-density population, (2) resume sauger fry stocking in Lake Winnebago to increase adult numbers, and (3) experimental fry stocking in the upper Fox River. It was also discussed that options 2 and 3 would require volunteers to lead the project with limited Department staff involvement. Various pros and cons were discussed for each option and WFAC members voted for option three and Walleyes for Tomorrow offered to lead the project.

Volunteers from Walleyes for Tomorrow have been leading efforts for the experimental fry stocking project on the upper Fox River since the spring of 2017. Each spring, spawn is taken from ripe fish captured from the spawning reefs that were created on the north shore of Lake Winnebago. Fertilized eggs are transferred to a portable walleye wagon on the upper Fox River in Berlin. Genetic samples are taken from all adult parents, which will allow for sauger captured during future years to be genetically tested to evaluate if they were produced from fry stockings or natural reproduction. Thus far, 1 YOY sauger was captured during the trawling assessment in 2017 and 2019. Genetic samples from those fish are currently being analyzed to determine if they were survivors from the fry stocking or naturally reproduced. Walleyes for Tomorrow and volunteers plan to run the project again in 2020. It will be interesting to see how the project develops in future years as preliminary results become available.

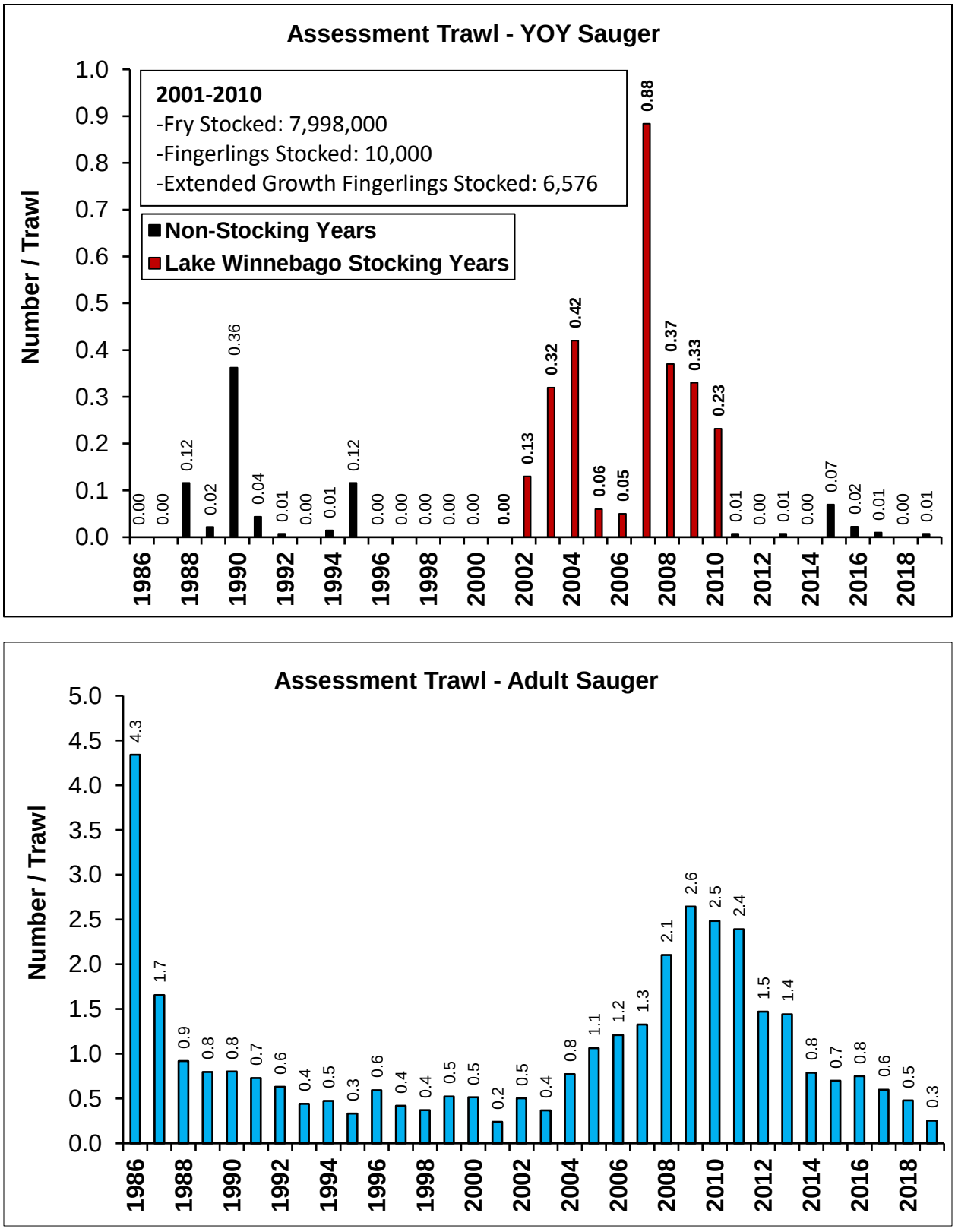

Figure 2. Average number of adult sauger/trawl (lower panel) and YOY sauger/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

Yellow Perch

Data collected during the 2019 bottom trawl assessment also indicated a measurable year class for yellow perch. The observed catch rate of 4.2 YOY/trawl is well above the long-term average of 1.7/trawl and is the highest catch rate observed since 2011 (5.7/trawl; Figure 3). The adult yellow perch catch declined from 6.7/trawl in 2018 to 2.5/trawl in 2019. Although adult catch rates declined, a respectable size structure provided angling opportunities for fish ranging 9-11 inches during the summer of 2019, particularly earlier in the year. The strong year classes in 2018 and 2019 should contribute to the population and fishery in future years. Contact Ryan Koenigs (Ryan.koenigs@wisconsin.gov) if you have any specific questions related to yellow perch assessment or management on the Winnebago System.

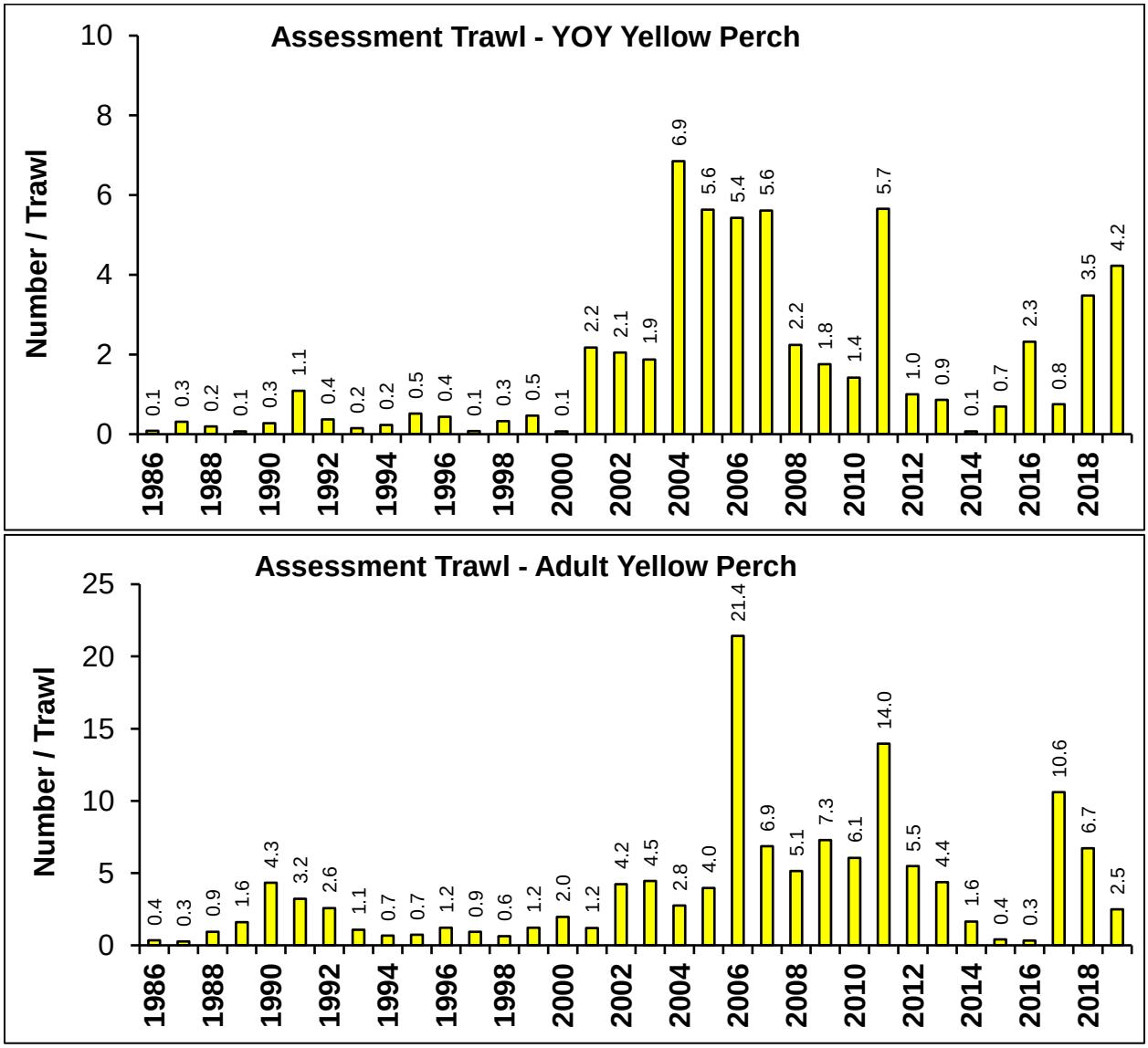

Figure 3. Average number of adult yellow perch/trawl (lower panel) and YOY yellow perch/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

Crappie

The 2019 black crappie hatch was measurable with a catch rate of 2.7/trawl, slightly below the 2.8 YOY/trawl average (Figure 4). Despite lower adult catches in 2019 (0.4/trawl), the 2016 record year class (24.1 YOY/trawl) still dominates the adult size structure with fish ranging 9-11 inches. Although the 2016 year class has begun to fade from the adult population, anglers may still find some nice sized crappies in 2020. Hopefully environmental conditions will line up so there is another strong crappie hatch in the next few years that will provide another boost to the fishery.

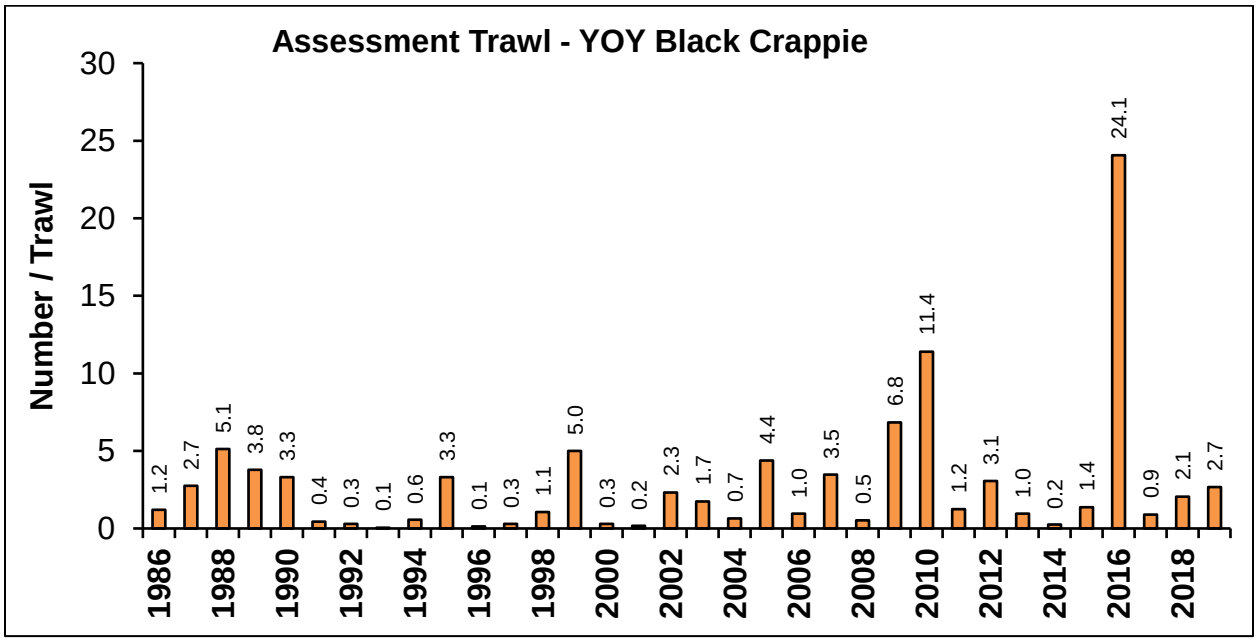

Figure 4. Average number of YOY black crappie/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

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 to many anglers asking about the state of the white bass population. The 2019 YOY white bass catch rate was 7.9/trawl, which was an increase from 2018 (0.8/trawl), but well below the long-term average of 30.3/trawl (Figure 5). The strong 2011 year class (2nd largest on record; averaged 102.4/trawl) and the above average 2012 year class have dominated the adult white bass population in recent years. However, many anglers reported that white bass were tough to find in 2018 and 2019, particularly during the famous spring river runs. Environmental conditions, such as water levels and forage trends, can affect fishing success but having strong year classes is critical for providing a quality fishery. The number of adult white bass has decreased in recent years as the 2011 and 2012 year classes have faded from the adult population.

The 2019 adult white bass catch was 1.4/trawl which is the lowest documented catch rate for adult white bass since the trawling survey began in 1986 (Figure 5). Despite having some measurable year classes in recent years, environmental conditions have not been conducive for a strong white bass hatch since 2011. As a result, a strong year class is needed to provide a boost to the adult population and fishery. Luckily, we have seen adult populations reach record lows before on the system and then pull off record year classes. For example, the largest walleye year class on record was produced in 1996 (23.7/trawl) when adult numbers were low. More recently, the adult freshwater drum population hit a record low in 2018 and produced a top five year class in 2019 (185.4/trawl). Therefore, it will be interesting to see if environmental conditions line up for a strong white bass hatch in 2020.

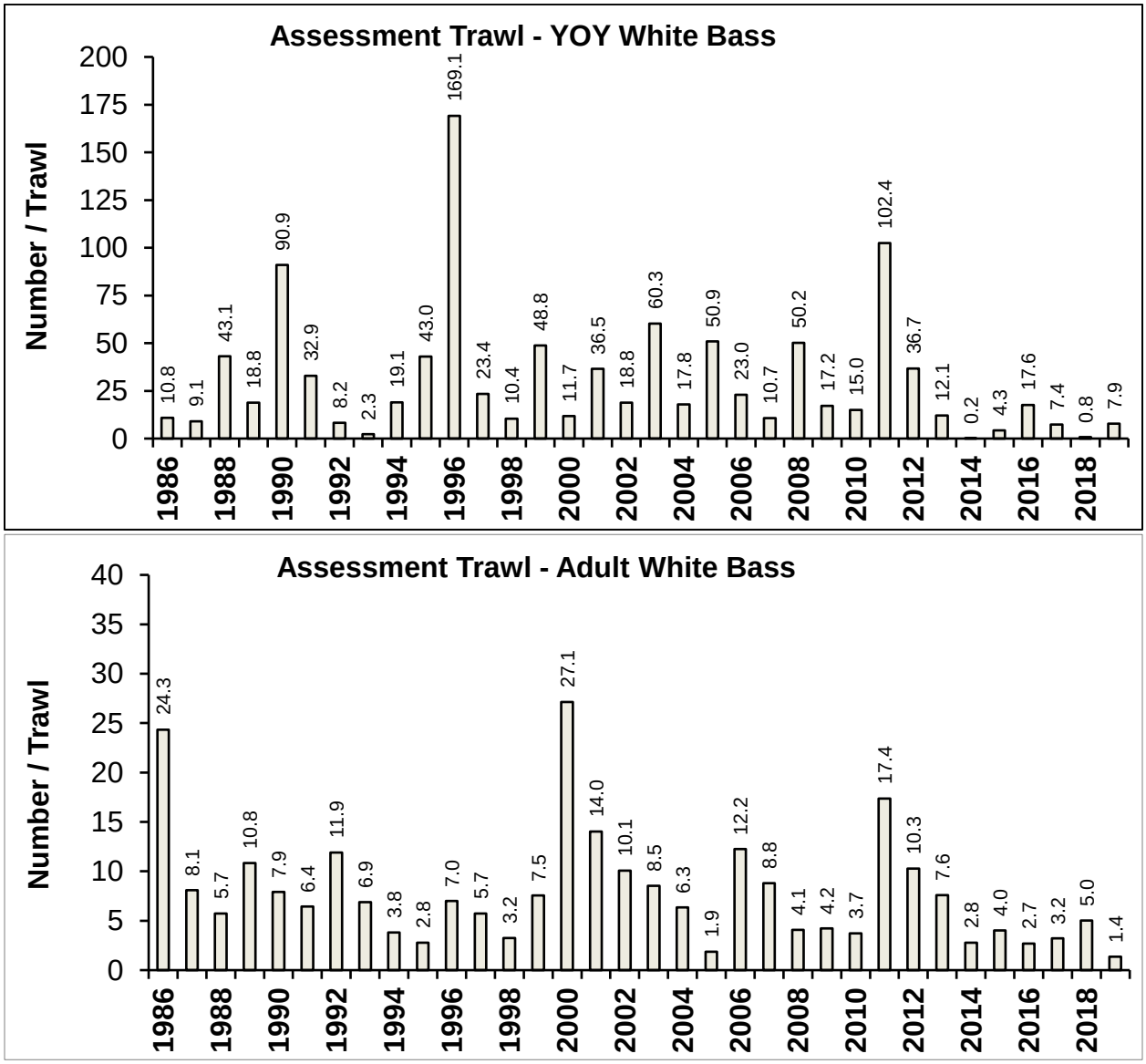

Figure 5. Average number of adult white bass/trawl (lower panel) and YOY white bass/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

Forage Fish Species

Freshwater Drum

Many anglers and lakeshore residents have been curious to see how freshwater drum, also known as sheepshead, would respond to the substantial Viral Hemorrhagic Septicemia (VHS) kill that occurred in the spring of 2018. The adult freshwater drum catch rate hit a record low of 230.1/trawl in 2018 following the large die-off. Despite the reduced number of adult freshwater drum, a top-five year class was produced in 2019 with a catch rate of 185.4 YOY/trawl (Figure 6). This strong year class provides a classic example of fish populations responding to substantial declines in adult numbers by increasing recruitment to boost the population. Although freshwater drum are often overlooked and viewed negatively on the system, the strong 2019 year class is well-welcomed. Freshwater drum are an important forage item for gamefish species during their early life stages and the 2019 year class provided stability to the forage base.

Trout Perch

The 2019 YOY trout perch catch rate of 116.0/trawl was below the long-term average of 216.9/trawl (Figure 7). Despite the decrease in catch during 2019, 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, however, many anglers have never seen a trout perch as they generally reside in deeper waters during daylight hours. 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. Priegel (1962) observed trout perch spawning among shoreline rocks on Lake Winnebago and noted that in some cases wave action would force fish onto the rocks and as the water recedes fish are left on the moist rocks where the eggs and milt were released. When the next wave came in fish were swept back into the water and eggs were scattered among the rocks. Hopefully environmental conditions will favor a strong trout perch hatch in 2020.

Gizzard Shad

How was the gizzard shad hatch this year? That's been a common question over the years and is often one of the first questions anglers ask when the trawling survey is completed. The 2019 trawling survey indicated a weak gizzard shad hatch with a catch rate of 0.07 YOY/trawl, that ranks as the lowest catch rate since trawling began in 1986 (Figure 8). Gizzard shad are known for their boom or bust recruitment cycles and the Winnebago System has had bust year classes over the last three years with an average of 0.6 YOY/trawl. Although

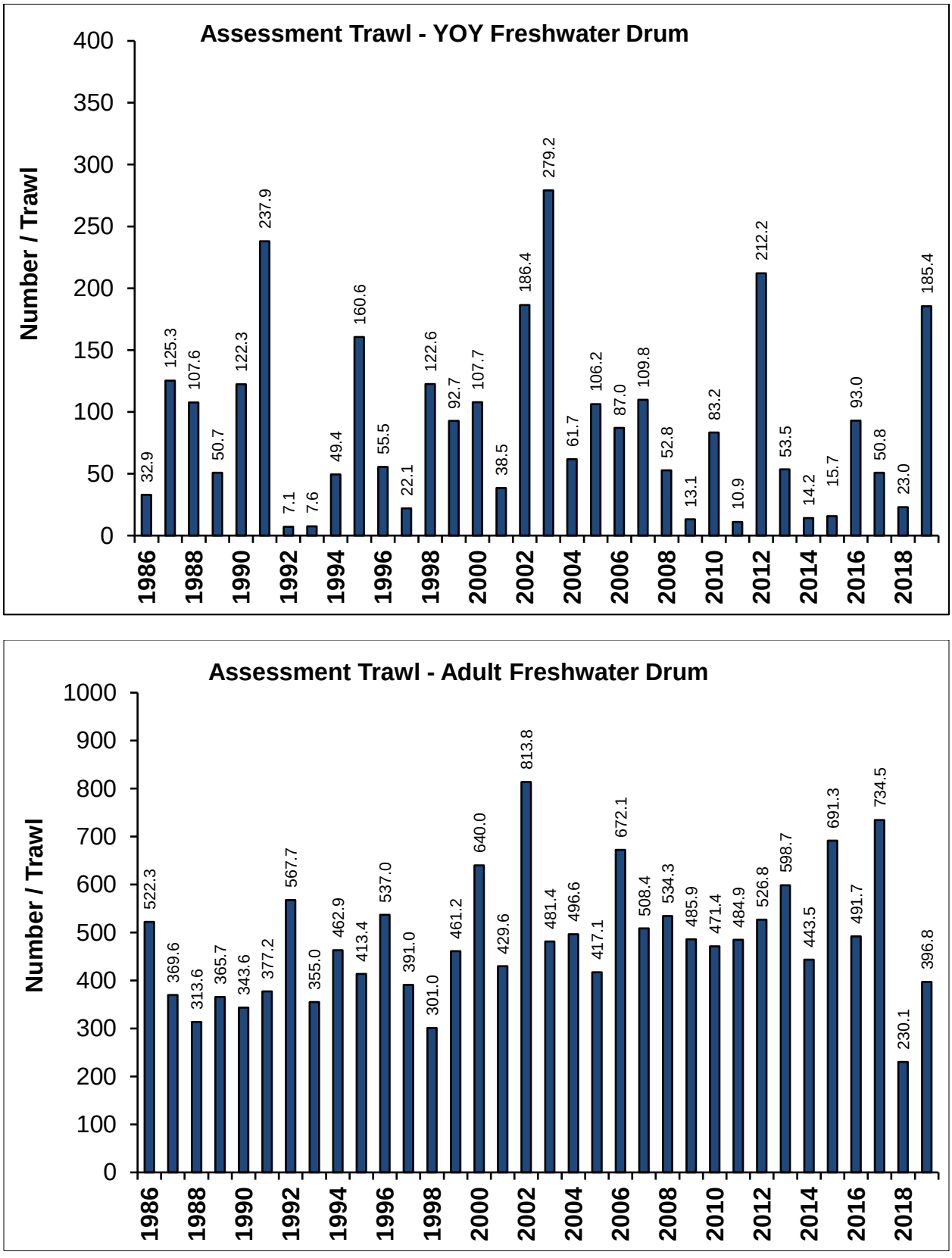

Figure 6. Average number of adult freshwater drum/trawl (lower panel) and YOY freshwater drum/trawl (upper panel) captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

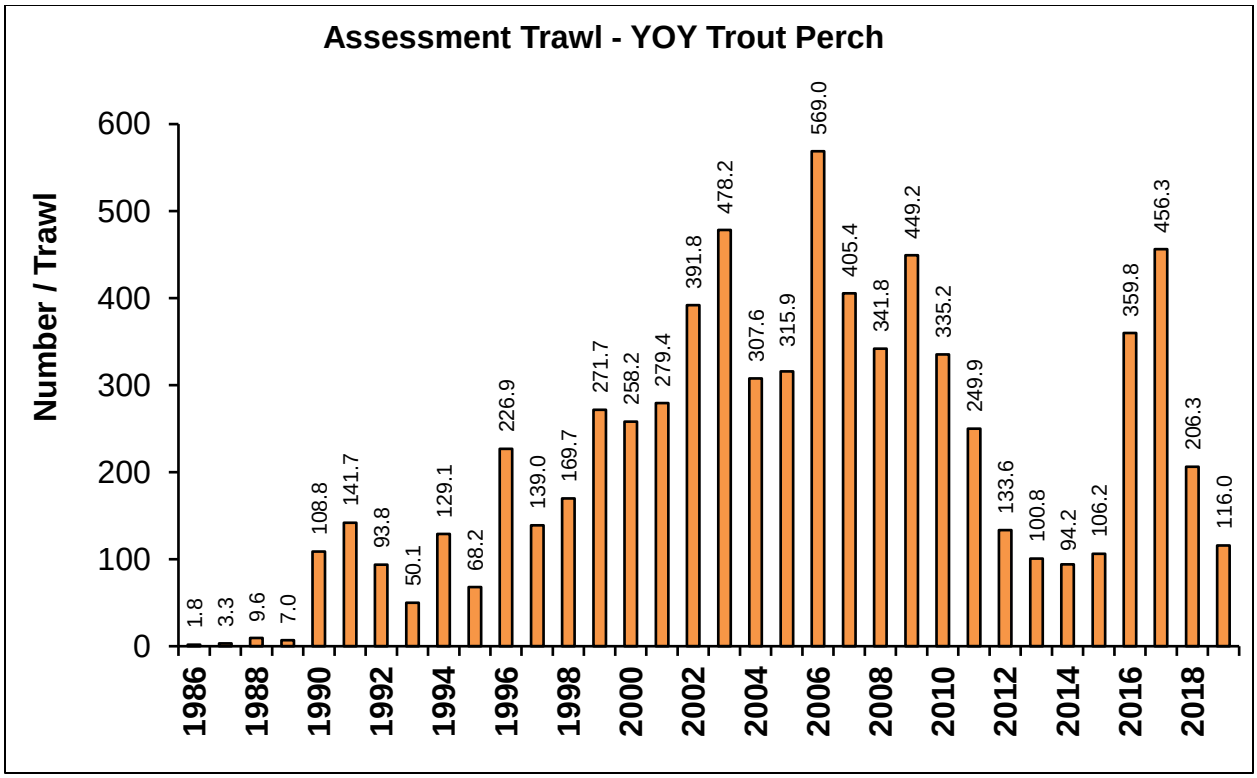

Figure 7. Average number of YOY trout perch/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

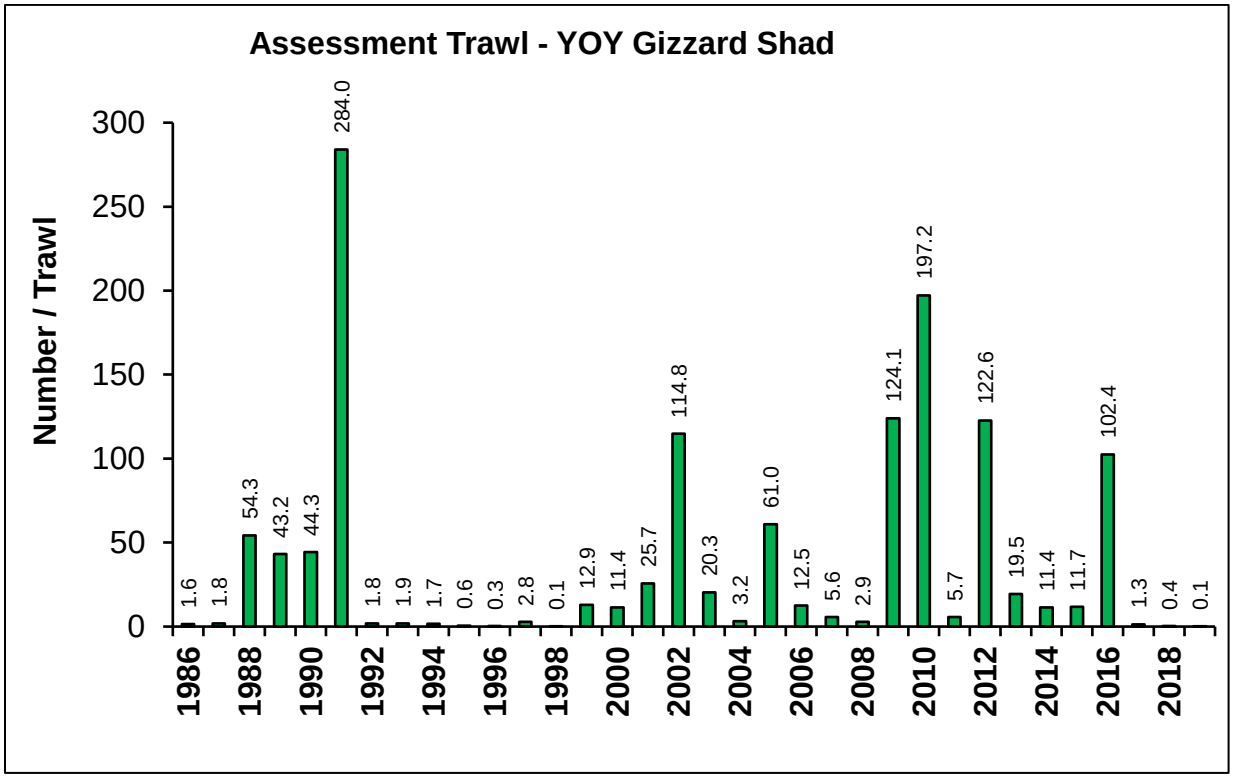

Figure 8. Average number of YOY gizzard shad/trawl captured during fall bottom trawl assessments conducted on Lake Winnebago from 1986-2019.

it is often difficult to understand the environment factors that drive year class strength for certain fish species, it appears that 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 walleye fishing in 2020.

Overall, there were 11 species of YOY fish species sampled for a total of 44,488 YOY fish caught during the 2019 trawling survey (Table 1). For adult fish, there were 17 different species sampled for a total of 57,964 adult fish captured in 2019 (Table 2). I hope you have enjoyed reading the 2019 Lake Winnebago trawling report. Please contact me at the phone number or email below if you have any questions or comments regarding the Winnebago trawling survey. Anyone interested in volunteering for the 2020 trawling survey should contact me and we will try to get you on the schedule. This critical survey could not be conducted without the help of our great volunteers (over 400 hours donated annually) and we are always looking for new volunteers to bring aboard the Calumet Research Vessel. Good luck fishing, be safe on the ice and water, and remember to take a kid or someone new out fishing in 2020!

Local volunteers and DNR staff sorting/counting young of year fish that were sampled during trawling.

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Table 1. List of trawling records (#/trawl) for the young of year fish species sampled during the Lake Winnebago trawling survey in 2019.

Year	Trout Perch	Freshwater Drum	Gizzard Shad	White Bass	Walleye	Black Crappie	Yellow Perch	Emerald Shiner	Sauger	Bluegill	Channel Catfish
1986	1.80	32.90	1.58	10.82	0.07	1.20	0.09	0.03	0.00	0.03	0.00
1987	3.30	125.26	1.83	9.11	0.00	2.74	0.31	0.03	0.00	0.04	0.02
1988	9.56	107.59	54.32	43.12	0.09	5.13	0.20	0.25	0.12	0.00	0.00
1989	7.01	50.72	43.23	18.77	0.05	3.78	0.07	0.01	0.02	0.00	0.00
1990	108.76	122.29	44.27	90.95	2.88	3.31	0.27	0.16	0.36	0.00	0.00
1991	141.72	237.93	283.99	32.88	7.31	0.45	1.09	0.17	0.04	0.00	0.02
1992	93.83	7.09	1.78	8.25	0.85	0.30	0.37	0.02	0.01	0.00	0.00
1993	50.12	7.57	1.95	2.33	2.46	0.06	0.15	0.00	0.00	0.01	0.02
1994	129.12	49.41	1.66	19.05	0.10	0.56	0.23	0.04	0.01	0.01	0.00
1995	68.16	160.56	0.62	42.98	0.19	3.31	0.51	0.00	0.12	0.05	0.01
1996	226.88	55.49	0.25	169.11	23.67	0.12	0.43	0.19	0.00	0.00	0.01
1997	138.99	22.09	2.83	23.41	2.23	0.29	0.08	0.25	0.00	0.00	0.00
1998	169.69	122.58	0.13	10.45	2.53	1.07	0.33	0.15	0.00	0.06	0.01
1999	271.65	92.69	12.89	48.85	0.23	5.01	0.46	1.12	0.00	0.04	0.12
2000	258.15	107.74	11.39	11.73	0.27	0.30	0.07	0.85	0.00	0.00	0.00
2001	279.38	38.51	25.72	36.53	11.83	0.17	2.17	0.25	0.00	0.00	0.00
2002	391.83	186.39	114.75	18.78	1.89	2.33	2.05	0.26	0.13	0.01	0.01
2003	478.25	279.15	20.33	60.26	6.51	1.75	1.88	0.02	0.32	0.00	0.01
2004	307.62	61.73	3.18	17.83	8.76	0.65	6.85	0.14	0.42	0.01	0.00
2005	315.94	106.18	60.96	50.93	11.10	4.38	5.63	0.59	0.06	0.08	0.04
2006	568.96	87.02	12.51	23.00	2.36	0.96	5.43	0.32	0.05	0.01	0.01
2007	405.41	109.79	5.60	10.68	0.49	3.46	5.61	16.95	0.88	0.13	0.00
2008	341.75	52.78	2.87	50.17	17.48	0.53	2.24	1.05	0.37	0.04	0.13
2009	449.16	13.08	124.05	17.19	1.43	6.84	1.76	1.58	0.33	0.03	0.00
2010	335.21	83.24	197.21	14.97	0.86	11.41	1.42	1.31	0.23	0.41	0.02
2011	249.89	10.92	5.65	102.41	10.44	1.25	5.65	1.72	0.01	0.03	0.01
2012	133.61	212.19	122.60	36.71	0.21	3.07	1.00	5.46	0.00	0.39	0.01
2013	100.78	53.46	19.49	12.09	11.88	0.96	0.86	3.43	0.01	0.00	0.00
2014	94.23	14.20	11.41	0.20	0.42	0.25	0.07	0.17	0.00	0.00	0.00
2015	106.19	15.67	11.70	4.28	1.40	1.37	0.69	0.08	0.07	0.00	0.00
2016	359.77	92.96	102.42	17.61	9.90	24.05	2.32	3.47	0.02	0.00	0.00
2017	456.30	50.78	1.28	7.38	4.13	0.90	0.75	0.16	0.00	0.00	0.00
2018	206.35	23.02	0.39	0.78	5.14	2.06	3.48	0.72	0.00	0.12	0.10
2019	115.96	185.41	0.07	7.89	5.90	2.66	4.22	0.19	0.01	0.05	0.02
Average	216.92	87.60	38.38	30.34	4.56	2.84	1.73	1.21	0.11	0.05	0.02

Table 2. List of trawling records (#/trawl) for the adult fish species sampled during the Lake Winnebago trawling survey in 2019.

Year	Freshwater Drum	White Bass	Trout Perch	Walleye	Yellow Perch	White Sucker	Emerald Shiner	Common Carp	Black Crappie	Sauger	Channel Catfish	Quillback	Bullhead	Bluegill	Lake Sturgeon	Bigmouth Buffalo	Redhorse
1986	522.32	24.34	0.12	1.44	0.36	1.56	0.01	1.06	0.60	4.34	0.28	0.37	2.55	0.00	0.10	0.06	0.02
1987	369.61	8.08	0.21	0.81	0.27	1.45	0.04	0.83	0.07	1.65	0.09	0.40	1.28	0.00	0.22	0.03	0.02
1988	313.64	5.73	0.98	0.28	0.94	1.17	0.04	0.92	0.14	0.92	0.25	0.26	2.20	0.00	0.12	0.02	0.01
1989	365.67	10.84	3.10	0.30	1.60	1.17	0.41	1.28	1.47	0.80	0.39	0.91	3.38	0.01	0.13	0.07	0.01
1990	343.63	7.91	4.01	0.20	4.34	1.36	0.64	0.81	0.99	0.80	0.30	0.79	3.21	0.00	0.05	0.25	0.03
1991	377.16	6.43	47.72	0.61	3.22	1.13	0.12	0.68	0.20	0.73	0.53	0.28	2.08	0.01	0.08	0.18	0.01
1992	567.68	11.89	20.70	4.55	2.58	1.81	0.45	1.17	0.51	0.63	0.55	0.43	2.01	0.00	0.14	0.15	0.00
1993	354.96	6.88	5.54	4.75	1.07	2.25	0.00	1.63	0.10	0.44	0.44	0.64	1.11	0.01	0.08	0.04	0.00
1994	462.92	3.81	13.83	6.26	0.67	1.64	0.03	2.25	0.04	0.47	0.50	0.47	0.53	0.00	0.07	0.06	0.01
1995	413.42	2.78	7.98	3.78	0.74	1.23	0.01	1.36	0.02	0.33	0.36	0.30	0.09	0.00	0.07	0.09	0.01
1996	536.96	7.00	18.49	3.30	1.22	2.03	0.08	0.84	0.11	0.59	0.30	0.59	0.04	0.03	0.15	0.11	0.15
1997	390.98	5.74	0.57	6.43	0.93	1.68	1.12	0.94	0.03	0.42	0.59	0.97	0.01	0.00	0.11	0.05	0.01
1998	301.01	3.25	0.47	4.54	0.63	1.96	0.19	1.49	0.04	0.37	0.57	1.33	0.03	0.01	0.09	0.01	0.01
1999	461.16	7.55	3.71	4.72	1.21	2.03	2.02	1.89	0.08	0.52	0.60	1.42	0.03	0.04	0.08	0.01	0.01
2000	640.01	27.13	2.12	2.83	1.97	2.25	3.93	1.92	0.39	0.51	0.92	1.04	0.07	0.01	0.06	0.09	0.00
2001	429.60	14.01	7.87	1.00	1.20	1.63	4.88	1.12	0.27	0.24	0.67	0.99	0.02	0.03	0.08	0.02	0.00
2002	813.85	10.07	4.83	14.39	4.23	2.94	1.04	1.01	0.39	0.50	0.88	1.65	0.03	0.03	0.23	0.15	0.01
2003	481.45	8.54	6.32	11.67	4.46	2.12	0.40	1.43	0.49	0.37	1.35	0.83	0.02	0.04	0.17	0.25	0.01
2004	496.64	6.35	1.73	8.15	2.75	1.15	0.78	1.78	0.68	0.77	0.83	0.66	0.00	0.01	0.13	0.15	0.02
2005	417.13	1.86	1.36	5.39	3.97	1.80	0.11	1.38	0.30	1.06	0.59	0.35	0.02	0.08	0.13	0.08	0.00
2006	672.09	12.25	3.18	7.46	21.42	1.43	0.20	2.30	2.93	1.21	0.77	0.48	0.36	1.68	0.09	0.07	0.01
2007	508.38	8.79	0.28	5.99	6.86	2.68	5.09	2.39	1.10	1.33	0.73	0.98	0.26	1.96	0.22	0.03	0.01
2008	534.26	4.07	0.32	3.42	5.13	2.01	6.68	3.41	0.81	2.10	0.76	0.49	0.57	0.15	0.14	0.09	0.00
2009	485.91	4.23	1.87	10.78	7.29	2.34	15.22	2.22	0.91	2.64	0.94	1.34	0.40	0.62	0.17	0.04	0.03
2010	471.42	3.72	0.12	3.44	6.06	2.03	1.32	2.67	0.63	2.49	0.83	0.96	0.22	0.11	0.12	0.10	0.00
2011	484.88	17.37	8.88	3.94	13.96	5.08	17.91	3.61	21.78	2.39	1.34	0.96	0.58	0.20	0.17	0.15	0.01
2012	526.79	10.28	0.16	4.67	5.49	5.36	0.70	1.86	5.13	1.47	2.24	0.79	0.85	0.01	0.17	0.19	0.01
2013	598.73	7.59	8.69	3.43	4.38	4.04	1.13	1.96	3.17	1.44	3.30	0.49	0.93	0.04	0.17	0.19	0.01
2014	443.54	2.78	0.49	6.64	1.64	4.62	0.27	1.62	0.48	0.79	1.66	0.35	0.43	0.01	0.11	0.17	0.03
2015	691.30	4.03	8.69	6.80	0.40	4.38	0.06	1.80	0.60	0.70	1.50	0.75	0.65	0.04	0.15	0.06	0.00
2016	491.70	2.70	4.81	4.62	0.33	3.62	0.32	0.81	0.38	0.75	1.67	0.57	0.23	0.00	0.16	0.02	0.00
2017	734.47	3.21	0.78	9.04	10.60	3.00	0.12	1.30	7.82	0.60	1.50	0.60	0.20	0.40	0.20	0.10	0.00
2018	230.07	5.01	0.54	10.34	6.71	3.17	0.66	1.60	1.82	0.48	1.41	0.86	0.17	0.07	0.20	0.04	0.01
2019	396.77	1.36	0.32	7.99	2.49	4.39	0.34	2.26	0.43	0.25	1.65	1.14	0.15	0.17	0.25	0.04	0.01
Average	480.30	7.87	5.61	5.12	3.86	2.43	1.95	1.64	1.61	1.03	0.92	0.75	0.73	0.17	0.14	0.09	0.01