

## 2017-18 Winnebago System Walleye Report

Adam Nickel, Winnebago System Gamefish Biologist, August 2018

The Winnebago System continues to boast a self-sustaining walleye population that serves as one of the premier recreational fisheries in the Midwest. Department staff and a host of local volunteers annually evaluate the Winnebago walleye population during core surveys that include the spring spawning stock assessment, Lake Winnebago bottom trawl assessment, and tournament monitoring. In addition to monitoring surveys, restoration of walleye spawning marshes on the Wolf and upper Fox Rivers has been one of the cornerstones of Winnebago walleye management. The Department and various conservation groups, including Walleyes for Tomorrow and Shadows on the Wolf, carry out spawning marsh maintenance activities including restoring natural flows, mowing, brushing, and culvert installation. In fact, the dry and cold 2017-18 winter provided good conditions for completing brushing projects on several marshes on the Wolf River including Spoehrs, Markmans, Kalwitz, and Fleases Marshes.



Spoehrs Marsh in April of 2017 Prior to Brush Work



Brush Work Being Conducted in Spoehrs Marsh during January of 2018

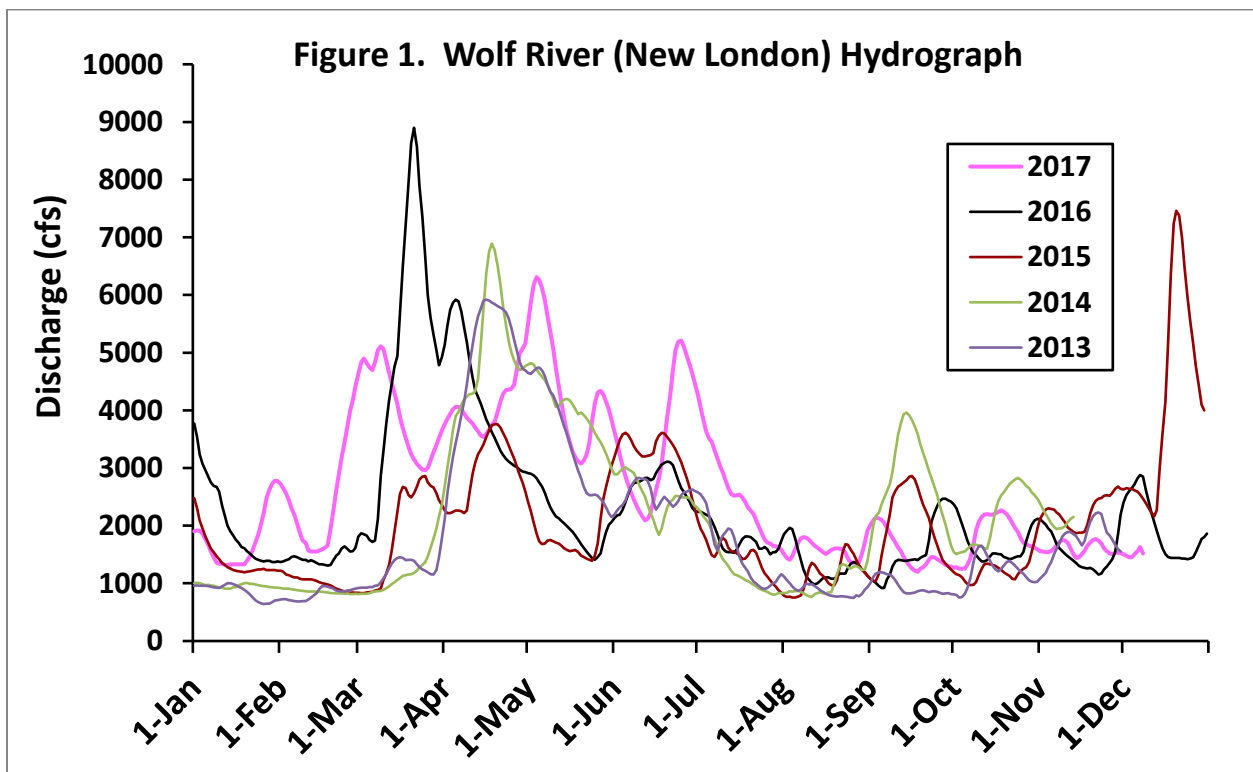


Spoehrs Marsh in April of 2018 After Brush Work

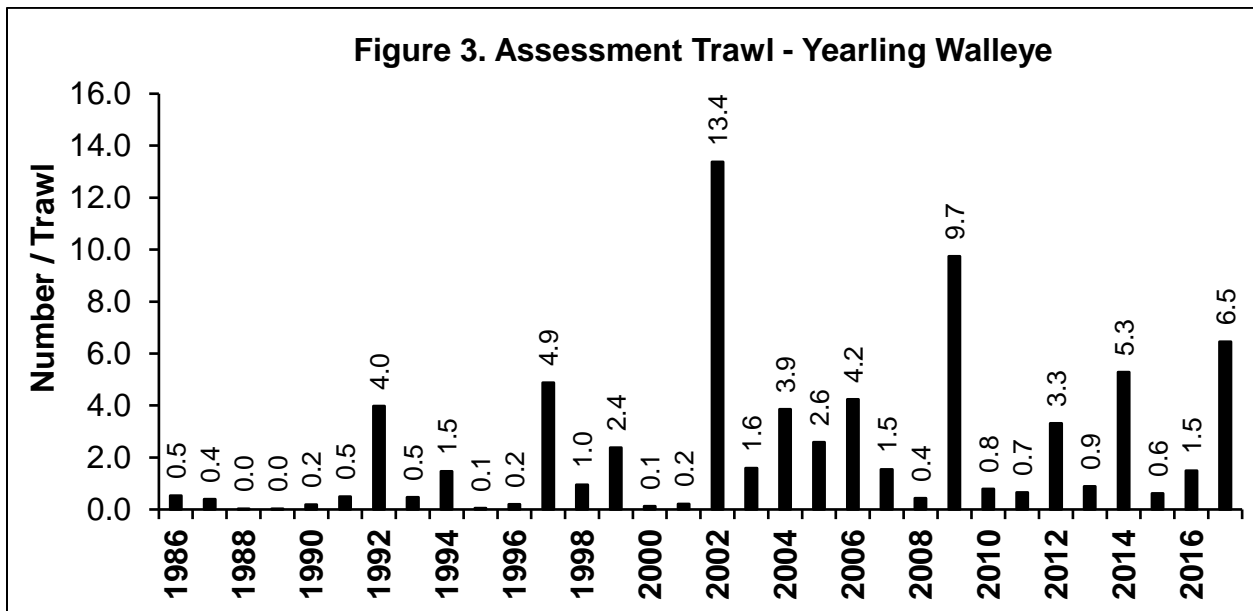
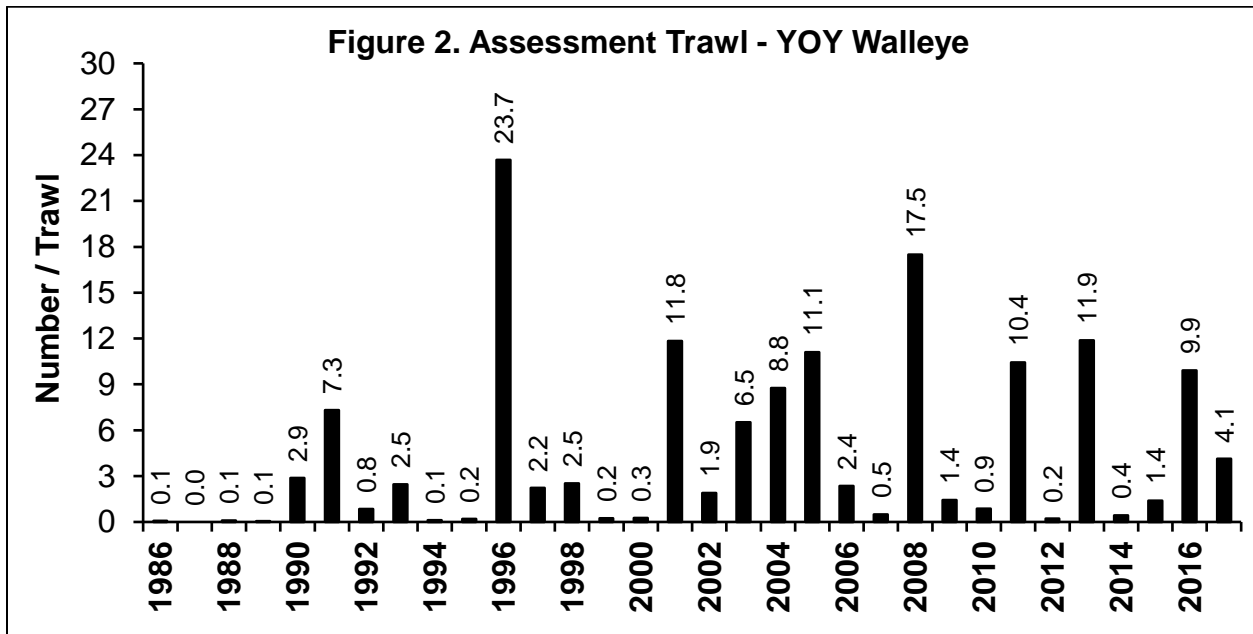
## 2017 Spring Water Levels and Walleye Hatch Results

Spring water levels on the Wolf and upper Fox River are 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. The 2017 Wolf River hydrograph in New London indicated 3 peaks in discharge throughout the spring (Figure 1). The first peak occurred on March 9 and provided just enough flow for the upper walleye marshes near New London and Shiocton to operate. However, many of the marshes located further downstream were dry, thus water level conditions weren't optimal for walleye spawning on the Wolf River.

River discharge decreased throughout March, reaching a low of 2,960 cfs on March 25<sup>th</sup>, before rain events led to a second peak (4,060 cfs) in discharge on April 6<sup>th</sup>. With peak walleye spawning occurring in early-mid April, this second peak in discharge was likely crucial for maintaining adequate water levels for spawning adults and maintaining water levels for egg incubation. Discharge then decreased to 3,540 cfs by April 15<sup>th</sup>, before increasing throughout late April to a third peak discharge (6,310 cfs) on May 4<sup>th</sup>. Although most spawning was already complete by late April, this third peak in flow likely provided a window for egg incubation and fry to flush from the marshes. The variable 2017 spring conditions left many walleye enthusiasts wondering how the 2017 walleye hatch would compare to years with more optimal water conditions such as 2013 and 2016.



DNR staff conduct annual fall bottom trawl assessments to evaluate year class strength of sport and forage fish species in Lake Winnebago. The 2017 young of year (YOY) walleye catch rate was 4.1/trawl, which is just below the overall average of 4.5/trawl observed between 1986-2017 (Figure 2). Although the 2017 catch rate didn't rank as a top ten year class like in 2016 (9.9/trawl, ranked 7<sup>th</sup> since 1986), a measurable year class was still produced. The 2017 trawling survey also indicated a strong catch rate (6.5/trawl) of yearling walleye (2016 year class) which ranked as the 3<sup>rd</sup> highest yearling catch since 1986 (Figure 3). As a result, the strong 2016 year class and measurable 2017 year class should contribute to the adult population in future years.



## **2017 Spring Adult Spawning Stock Results**

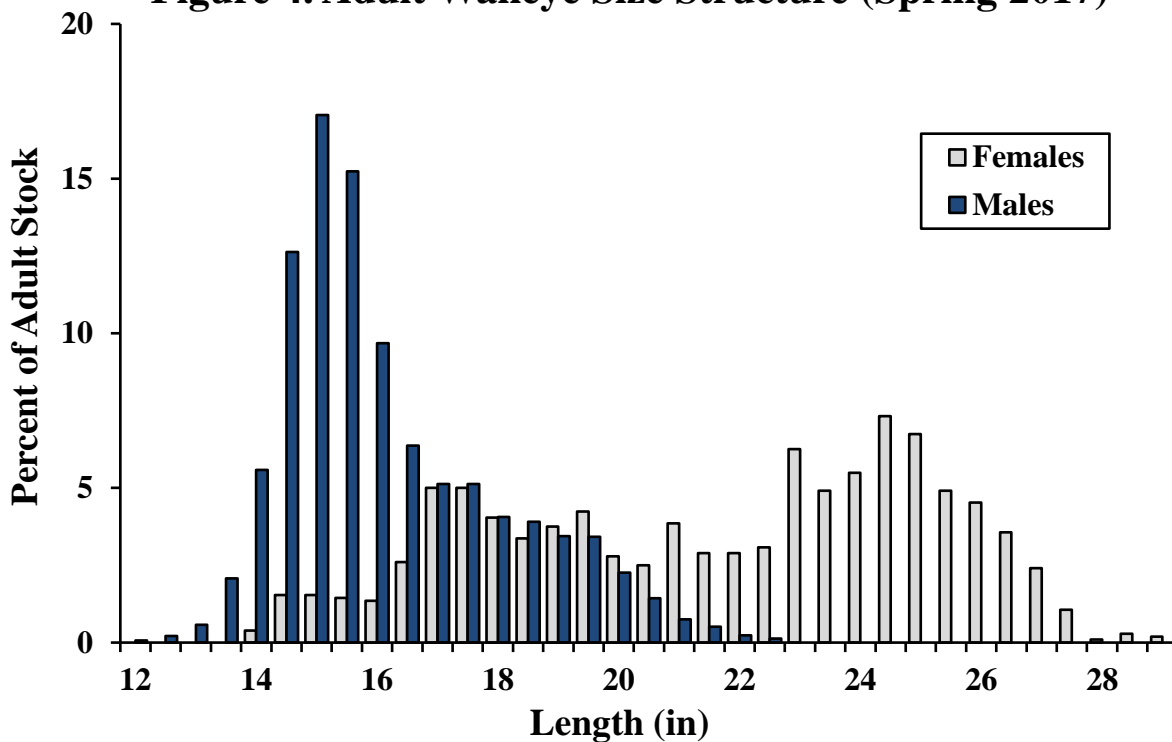
Although the 2017 spring water level conditions weren't optimal, DNR staff and volunteers were able to successfully complete the annual walleye stock assessment. The primary objectives of the assessment include: 1) marking fish with anchor (floy) tags to estimate angler exploitation and abundance, 2) evaluating age and size distribution of the adult spawning stock, 3) monitoring adult growth and mortality rates, and 4) assessing spawning marsh conditions.

There were 4,528 adult male and 812 adult female walleye tagged on the Wolf River between March 27- April 6. Walleye were tagged in 12 different spawning areas, with Spoehrs (1,935), Bernerggers (855), Ruedens (758), Woolfraths (564), and Leslies (474) leading the way in number of fish tagged. In addition, 141 adult male and 41 adult female walleye were tagged on the upper Fox River with the majority of fish being tagged in Hopps (99) and Barbolas (76) marshes. The 2017 walleye spawn began during late March, with peak spawning occurring early to mid-April which was similar to the 2013-2015 spawning seasons. In 2016, walleye spawning began in late March with peak spawning occurring during early April.

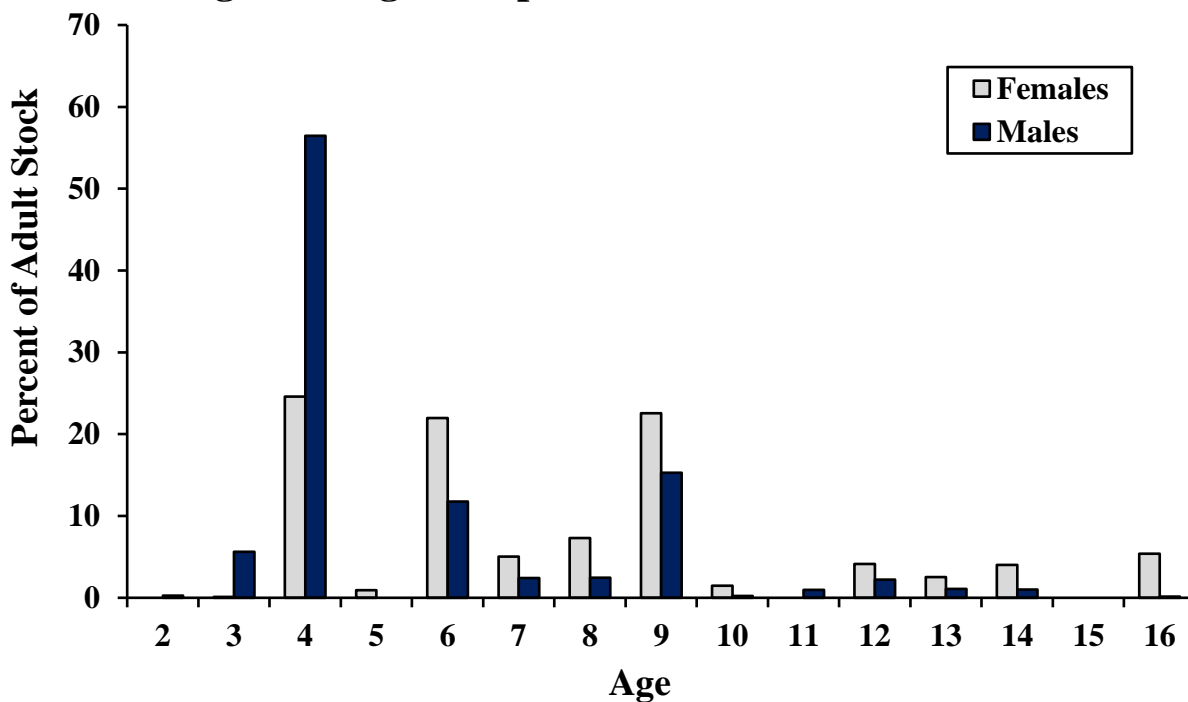
Male walleye ranged from 12.0-24.2 inches, with an average length of 16.3 inches (Figure 4). Age analyses indicated that the three strong age classes of 2013 (56.5%), 2008 (15.3%), and 2011 (11.8%) comprised 83.6% of the males sampled (Figure 5). In total, there were 10 other year classes represented, with the oldest fish aged at 16 years old, representing residual fish from the strong 2001 year class. Nearly 100% of male walleyes are mature by age 3 and the strong 2013 year class continues to dominate the male age composition. Despite being 9 years old, the strong 2008 year class continues to make its presence known comprising a larger percentage of the age composition than the 2011 year class.

Female walleye ranged from 14.4-29.3 inches, with an average length of 22.8 inches. Like males, age analyses for adult females indicated that the three strong age classes from 2013 (24.6%), 2008 (22.5%), and 2011 (22.0%) comprised 69.1% of females sampled. Female walleye typically reach maturity between 4-6 years of age (~30% mature at age 4; 82% by age 5; and 99% by age 6). Therefore, it was expected that a new cohort of adult females (ranging 18-21 inches) from the strong 2013 year class would be making their first spawning run up the Wolf and upper Fox Rivers in 2017. Anglers can expect that a high proportion of their catch in the next few years will be comprised of fish from the strong 2013 year class.

**Figure 4. Adult Walleye Size Structure (Spring 2017)**



**Figure 5. Age Composition of Adult Stock (2017)**



## Walleye Exploitation and Reward Tag Study

One of the primary objectives of the walleye spawning stock assessment is to tag walleye each spring to track annual exploitation rates. Walleye exploitation has been tracked annually on the Winnebago System since 1993 and relies heavily on anglers returning tags from tagged fish that they catch. However, estimating the tag reporting rate is difficult as there are many factors that may affect tag reporting rates. For instance, some anglers may choose to not return tags from tagged fish they catch, anglers could forget to return tags, tags may be lost, or some anglers may not know about the tag return program. Historically, annual walleye exploitation on the Winnebago System has been calculated with an estimated tag reporting rate of 50%, which is a critical parameter that can drastically alter exploitation estimates. With funding provided by Battle on Bago and Walleyes for Tomorrow, the Department began a walleye reward tag study in 2016 and 2017 to further investigate angler tag reporting rates.

Each year Department staff aim to tag around 5,000 walleyes on the Wolf and upper Fox Rivers with the standard yellow floy tags to estimate annual exploitation. The reward tag study involved tagging 200 adult walleyes (100 female and 100 male) with pink \$100.00 reward tags in 2016 and 2017. Anglers that catch a reward tag fish and report the information then received a \$100.00 check. Each reward tag is valid for one year after tagging and it was assumed that most anglers would return the tag for the reward, which then provides accurate exploitation estimates. Estimated tag reporting rate of the non-reward tags could then be calculated based on the proportion of standard non-reward yellow tags that were returned versus the pink reward tags that were returned. The results indicated that the estimated angler tag reporting rate was 29% (95% Confidence Interval 23.0%-37.5%) in 2016 and 39% in 2017.

Thus far, the reward tag study has indicated that walleye tag reporting rates are lower than the 50% estimate that was used historically to calculate exploitation rates. These results mean that walleye exploitation rates on the Winnebago System are higher than previously estimated. Using this new information, adult male walleye exploitation estimates have ranged from 10.0%-35.0% since 1993, with an annual average of 20.7% (using 35% tag reporting rate; Figure 6). Adult female walleye exploitation ranged from 10.0%-46.0%, with an annual average of 28.7%. For adult females, annual exploitation surpassed 40% in 6 years since 1993. For 2017, the estimated exploitation rates were 15.1% for adult males and 8.4% for adult females.

In addition to tagging adult walleyes on the Wolf and upper Fox Rivers, the Department also began tagging immature female walleye in Lake Winnebago and the Upriver Lakes in 2015. The new tagging efforts indicated an estimated annual exploitation for immature females at 59% in 2015, 24% in 2016, and 19% in 2017. The high exploitation on immature females in 2015 was focused mainly on 15-18 inch fish from the 2011 walleye year class that had not yet

reached sexual maturity. The 2017 exploitation estimate was based of the tagging of 116 immature female walleye (range 14.1-19.4 inches) tagged on Lake Poygan (68), Lake Winnebago (41), and Lake Butte des Morts (7). The Department will aim to tag immature female walleye in 2018 and future years to establish trends and evaluate harvest pressure on these immature walleyes. During sampling for immature females on Lake Winnebago and the Upriver Lakes, adult male and adult female walleye are also being tagged. In 2017, there were 230 adult male and 18 adult female walleye tagged on Lake Winnebago and 63 adult male and 47 adult female walleye tagged on the Upriver Lakes.

One trend that has become evident over the years is that annual forage base levels, particularly gizzard shad, can significantly impact walleye exploitation rates. Walleye anglers throughout the system know that walleye fishing can be difficult in years with strong gizzard shad hatches whereas fantastic walleye fishing can occur in years without strong shad hatches. In fact, many anglers have experienced both ends of the pendulum in the last two years. The 2016 annual bottom trawling assessment indicated strong year classes of young of year (YOY) trout perch (359.8/trawl) and gizzard shad (102.4/trawl; Figure 7). The high abundance of primary forage items for walleye led to difficult fishing and low overall walleye exploitation in 2016 and 2017.

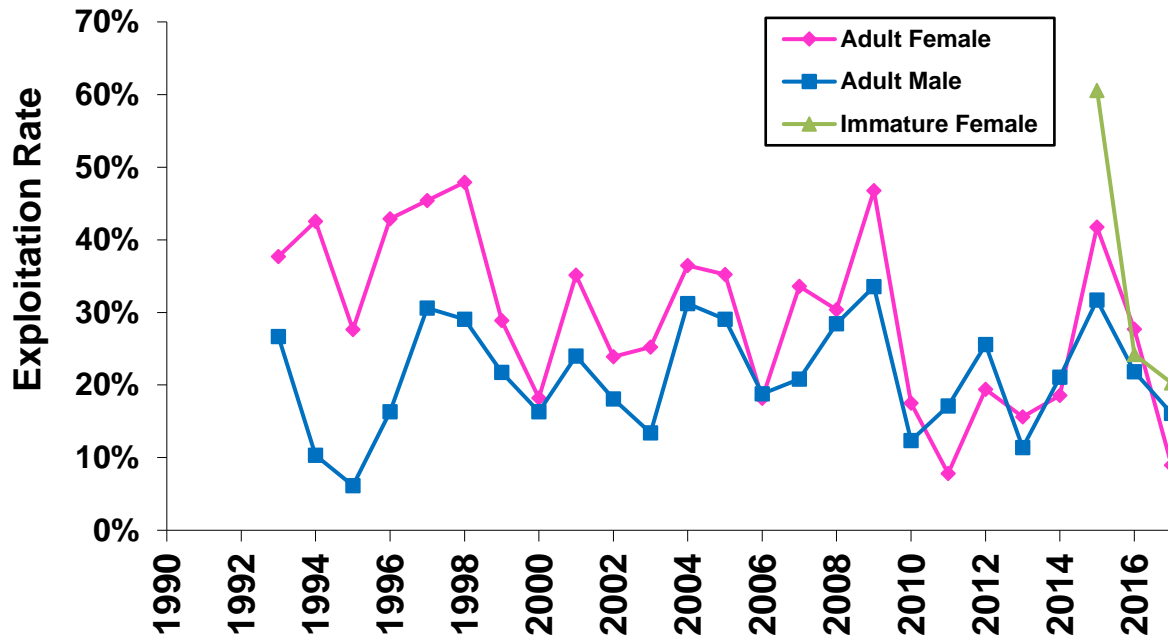
For 2017, YOY trout perch catch remained strong (456.3/trawl), but the YOY gizzard shad catch rate (1.3/trawl) was the lowest observed since 1998. The lack of YOY gizzard shad in the system and strong 2013 walleye year class resulted in a superb walleye bite from late summer of 2017 through 2018. In fact, many anglers referenced the winter of 2017-18 as some of the best walleye ice fishing they have ever experienced on the system. As a result, walleye exploitation on the system will likely be higher in 2018 and the walleye bite may continue to be strong until new forage fish hatches become available, particularly gizzard shad.



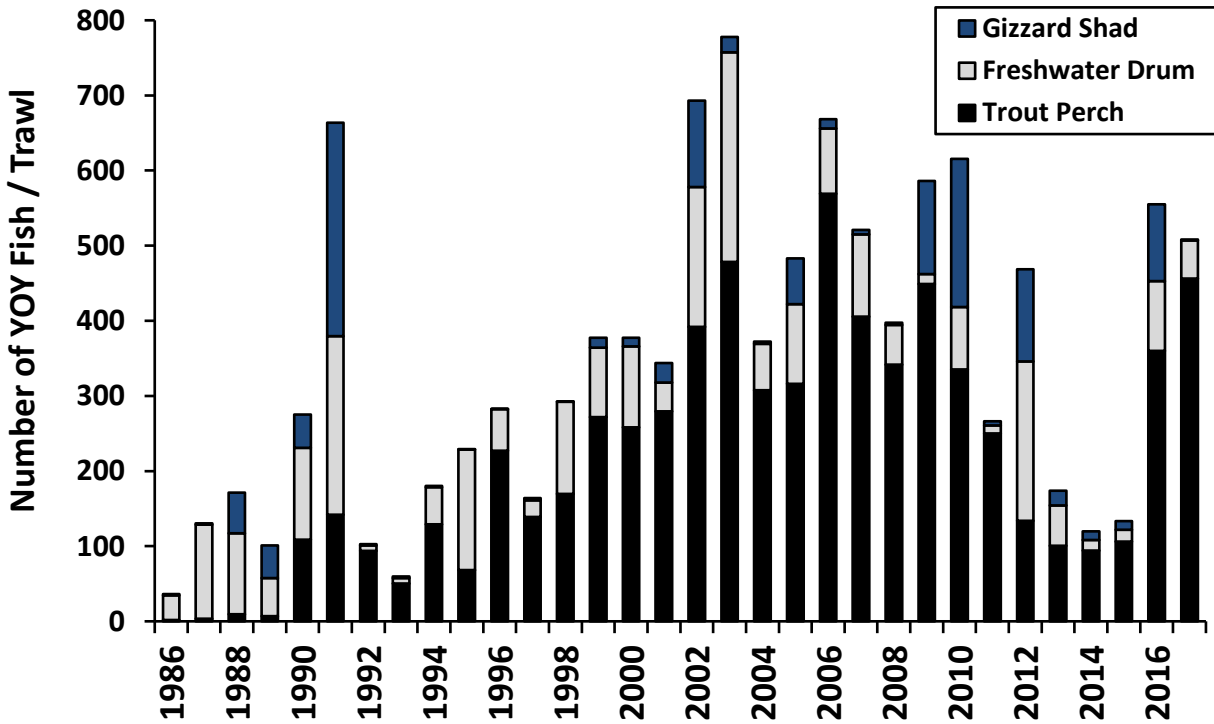
Pink Reward Tagged Walleye Above, Standard Yellow Tag Below



**Figure 6. Exploitation of Walleye on the Winnebago System (1993-2017) with 34% Tag Reporting Rates**



**Figure 7. Lake Winnebago Bottom Trawl Results**





## Walleye Population Outlook

Although the Winnebago System has continued to maintain a healthy, self-sustaining walleye population, results from annual walleye monitoring surveys and the reward tag study have spurred some good discussion regarding the walleye population and future outlooks. Walleye recruitment on the system has always displayed a boom and bust pattern that is highly dependent on environmental conditions, especially spring water levels. Variable recruitment is normal in many walleye populations throughout North America. However, the annual Lake Winnebago trawling survey has indicated some changes in recruitment patterns over the last two decades.

From 2000-2009, there were five walleye year classes produced with greater than 5 YOY walleye/rawl, including the 2001 (11.8/rawl), 2003 (6.5/rawl), 2004 (8.8/rawl), 2005 (11.1/rawl), and 2008 (17.5/rawl) year classes. Multiple strong year classes that were produced during the 2000s have fueled a robust walleye population and provided exceptional recreational walleye fishing opportunities throughout the system. However, as those year classes continue to fade out of the population, the health of the fishery will depend on the future year classes of fish.

From 2010-2017, there have been three year classes produced with greater than 5 YOY walleye/rawl, including 2011 (10.4/rawl), 2013 (11.9/rawl), and 2016 (9.9/rawl). However, YOY trawling results have shown that the recent recruitment pattern has been more boom and bust compared to the 2000s. For example, less than 1.5 YOY walleye/rawl have been produced in 4 of the last 8 years. Although weak year classes are not uncommon in walleye fisheries and represent the balancing act that takes place in Mother Nature, continuing to track year class strength is key for managing the walleye fishery and projecting the outlook. For now, fewer year classes of walleye have been produced since 2010 compared to the previous decade, but only time will tell if a strong year class will be produced in 2018 or 2019.

The current walleye fishery is now mainly fueled by the strong 2008, 2011, and 2013 year classes. However, the 2008 year class is already over 10 years old and will continue to fade from the population over the next few years. In addition, high exploitation on adult males (31.7%), adult females (41.7%), and immature females (60.6%; primarily 2011 year class fish) during the 2015 fishing season significantly diminished the 2011 year class. This was further indicated in the 2017 adult aging assessment where the 2011 year class only represented 11.8% of males and 21.9% of females. As a result, the strong 2013 and 2016 year classes represent the future of the fishery over the next few years. Although the walleye population continues to be strong and is providing some exceptional fishing opportunities in 2018, it is important to assess the current trends and study results.

## Regulation Change Discussion Update

To ensure that a strong Winnebago System walleye population continues in the future, the Department has been discussing the potential for regulation changes and soliciting input from the Winnebago Fisheries Advisory Council (WFAC), local clubs, and stakeholders. In 2016 and 2017, fisheries staff gave various clubs around the system a walleye population status update and had them fill out a questionnaire regarding walleye regulation changes. There were 17 different organizations that were included and 623 questionnaires were filled out by those in attendance.

The questionnaires asked if respondents thought a regulation change was needed and which of the following options were favored: 1) reducing the bag limit to 3 (66% voted yes), 2) minimum size limit of 15 inches (57% yes), 3) protected slot limit (28% yes), and 4) season closure (March 1-First Saturday in May) for the system (48% yes). Around 67% answered yes to exploring walleye regulation changes for the system and reducing the walleye bag limit to 3 was the most favorable option. This is the option that would also likely be most effective at reducing adult and immature female walleye exploitation on the system to maintain a strong walleye population and recreational fishing opportunities throughout the system.

To further discuss walleye regulation changes with local stakeholders, the Department held three public walleye meetings in Oshkosh, Chilton, and New London during March of 2018. At the end of each meeting, attendees were given a chance to vote in favor or opposition of the proposed bag limit reduction. An advisory question asking if attendees would favor reducing the daily walleye bag limit to 3 on the Winnebago System was also posed at the 2018 Spring Hearings.

2018 Public Meeting Questionnaire Results		
Location	Yes	No
Oshkosh	110	32
Chilton	92	19
New London	80	72
Overall	282	123

2018 Spring Hearing Results		
Location	Yes	No
Statewide	3366	1816
Local Counties	489	415
Calumet	39	31
Fond du Lac	47	71
Green Lake	39	40
Marquette	32	13
Menominee	5	4
Outagamie	104	64
Shawano	42	49
Waupaca	66	62
Waushara	36	22
Winnebago	79	59

Results from the three public meetings indicated strong overall support for reducing the daily walleye bag limit to 3 (70% voted yes). However, the regulation change was heavily favored at the Oshkosh and Chilton meetings, whereas the New London meeting results were more split. The Spring Hearing advisory question results indicated strong overall statewide support (65% voted yes), the question passed in 63 counties and did not pass in 9 counties. A breakdown of local counties within the Winnebago System indicated majority support (54%), but did not pass in Fond du Lac, Green Lake, and Shawano Counties.

It is important to note that the 2018 Spring Hearings were only advisory questions to further gauge public support for the change. The regulation change question would still have to be proposed as a regulation change at the Wisconsin Conservation Congress Spring Hearings in 2019. If the proposed bag limit was supported during the spring hearings and was approved by various administrative levels, then it would go into effect in spring of 2020. So right now, we are continuing the process of getting stakeholders and the public engaged in the process and evaluating support for reducing the daily walleye bag limit to 3. Annual walleye assessment and trawling survey results during 2018 will help to guide future decisions and the reward tag study will continue in 2018 to further inform decisions.

I hope you enjoyed the 2017 walleye report and thank you for taking the time to read and learn more about Winnebago System fisheries management. Remember, if you happen to catch a tagged walleye, yellow perch, bass, or northern pike please either mail the catch information to the Oshkosh DNR office (625 East County Road Y, Oshkosh WI 54901), email it to [DNRWINNEBAGOSYSTEMTAGRETURNS@wisconsin.gov](mailto:DNRWINNEBAGOSYSTEMTAGRETURNS@wisconsin.gov), or call 920-303-5429. Good luck fishing in 2018 and be safe on the water!



*Sincerely, Adam Nickel*

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