

2014 Winnebago System Walleye Report

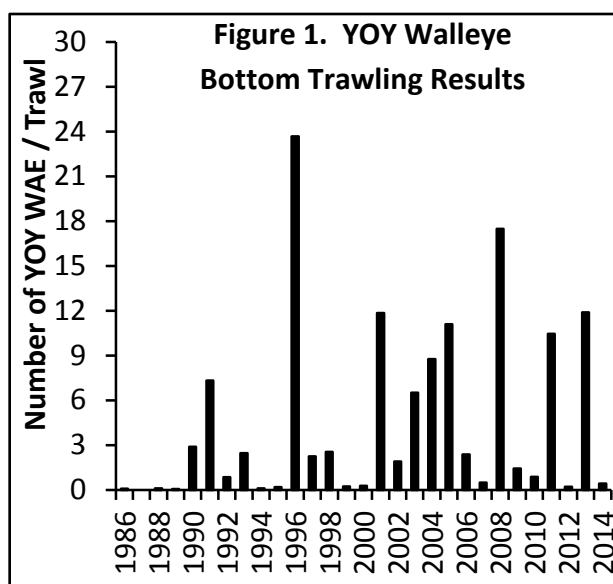
Adam Nickel, Winnebago Gamefish Biologist, 18 March 2015

The spring rush of 2015 will soon be upon us and the Oshkosh fisheries team will head to the upper Fox and Wolf Rivers to conduct the annual spring walleye spawning stock assessment. The annual assessment is critical for collecting the information needed to effectively manage the Winnebago walleye fishery that ranks as one of the top ten in the nation. The primary objectives of the survey include: 1) marking fish with anchor (floy) tags to estimate angler exploitation and abundance, 2) evaluating age and size class distribution of the adult spawning stock, 3) monitoring adult growth and mortality rates, and 4) assessing spawning marsh conditions.

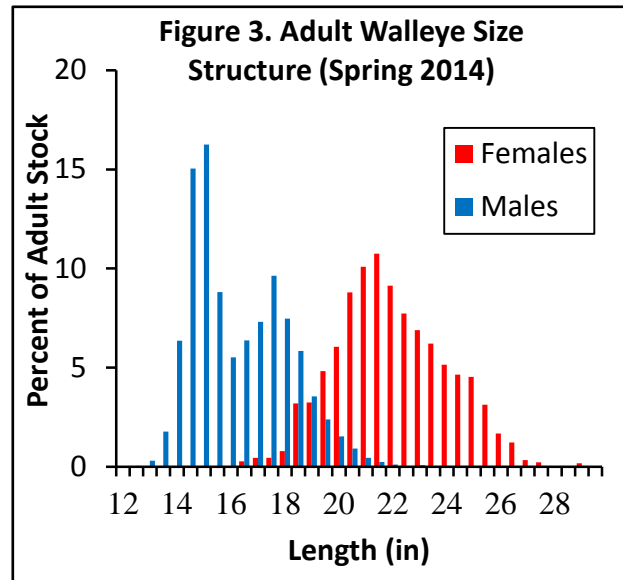
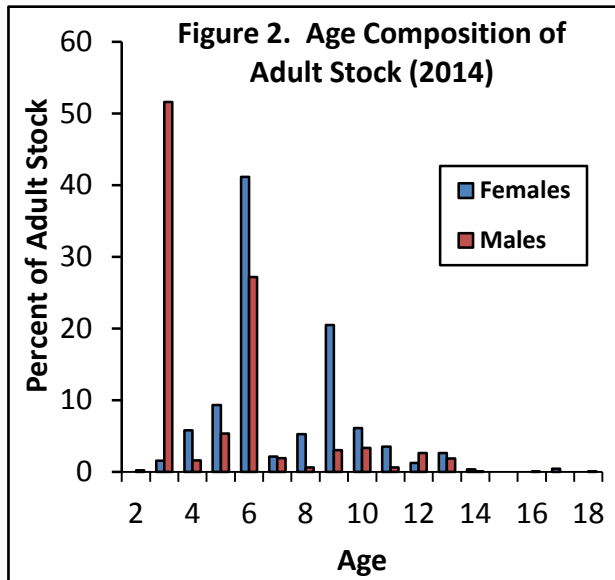
In 2014, boat electrofishing surveys were conducted for 8 days during April 7-21. Peak walleye spawning on the Winnebago System often occurs shortly after ice out when water temperatures reach 40-45°F, water temperatures during the 2014 survey ranged from 38°F-50°F. The timing of the spawn and length of the spawning window often varies year to year due to various factors including water temperature, photoperiod, and water levels. In 2014, the walleye spawning run was more drawn out and peak spawning likely occurred around mid-April, which was similar to when peak spawning occurred in 2013. Conversely, peak spawning in the 2012 survey occurred during March 18-20, which was attributed to a warm early spring.

The 2014 walleye spawning stock assessment was a success with 5,046 male and 1,746 female walleye tagged at seven locations throughout the Wolf River. Since 1993, an average of 5,862 male walleye and 1,193 female walleye have been tagged, thus the numbers tagged in 2014 were similar to the long-term average. One of the standout statistics in the 2014 survey was the difference in number of females tagged with 4,796 tagged in 2013 compared to 1,746 in 2014. In fact, almost two times as many females were tagged in 2013 compared to any other year. This was primarily due to a large influx of females from the strong 2008 year class (second strongest on record) and good water levels in the spawning marshes made females easier to target with electrofishing boats.

The Lake Winnebago fall bottom trawling surveys have indicated four strong walleye year classes (2005, 2008, 2011, and 2013) in the last 10 years (Figure 1). As a result, these strong year classes often provide an influx of fish into the adult spawning stock once sexual maturity is reached. Female walleye in the Winnebago System become sexually mature between 4-6 years of age, with approximately 30% reaching maturity at age 4, 82% by age 5, and 99% by age 6. Therefore, the majority of the females from the 2008 year class would have reached maturity



and made their first spawning migration in 2013. The emergence of this year class was evident, as 46.6% of the adult females sampled in 2013 were from the 2008 year class. The 2008 year class was still a dominate year class sampled in the 2014 survey, making up 41.2% of the females sampled (Figure 2). Moreover, 20.5% of the females sampled in 2014 were 9 years old that could be attributed to the strong 2005 year class.



The age composition of males observed during 2014 survey was dominated by the strong 2011 year class, comprising 50.6% of the males sampled. The presence of this strong year class was also illustrated by the high abundance of 14-16 inch male walleye observed in the length frequency (Figure 3). Aside from the 2008 and 2011 year classes, males from 13 other year classes were sampled, but none represented greater than 6% of the population. The oldest fish sampled in 2014 was an 18 year old male, while the oldest fish aged during our surveys to date was 21 years old (20.6 inch male walleye sampled in 2012).

Female walleye sampled during the 2014 survey ranged from 16.7-29.2 inches with an average length of 22.2 inches (Figure 3). Male walleye ranged from 12.6-24.6 inches with an average length of 16.5 inches. There were 202 females sampled that were ≥ 25 inches (11.6%) and 3 females sampled that were 29.0-29.2 inches. Although a 29 inch walleye meets the definition of a trophy in many anglers books fisheries staff often get inquires about why there isn't a greater abundance of larger fish in the Winnebago System, particularly those over 30 inches. Although it is likely that there are some walleye reaching 30 inches out there, DNR fisheries staff have yet to sample one during any surveys. The largest walleye collected by DNR fisheries staff was a 29.6 inch, 12.92 pound female (pictured right) sampled on April 21, 2013, a very respectable fish to say the least.



Each year otoliths are taken from a subsample of male and female walleye for age estimation. The otoliths are tiny ear bones in fish that develop growth rings allowing fisheries staff to conduct age and growth analyses on each particular fish sampled (Figure 4). Otoliths from male walleye are collected during spring spawning assessments while otoliths are removed from female walleye mortalities at major walleye tournaments on Lake Winnebago during the summer. The collection of otoliths has been, and will continue to be, vital for guiding walleye management on the system. The growth analyses have indicated that Winnebago walleyes have good growth rates that are above the state averages, but growth slows dramatically as fish mature and reach older ages. In fact, growth analyses have indicated that the asymptotic length (mean length of the fish when growth plateaus) of Winnebago male walleyes averages around 20.7 inches and 25.6 inches for females (Figure 5).

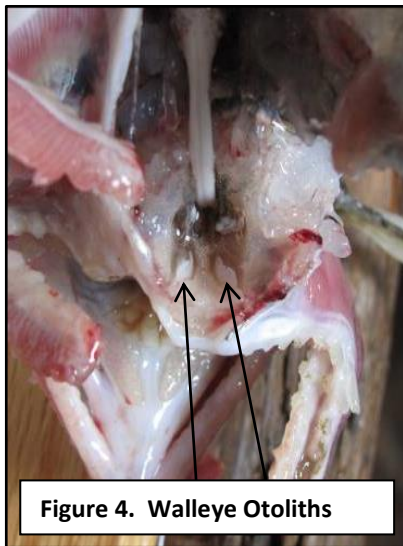
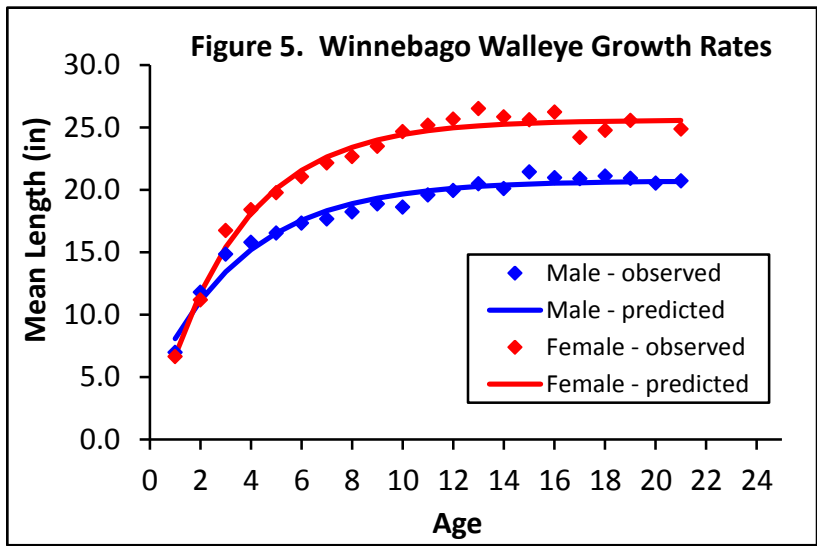


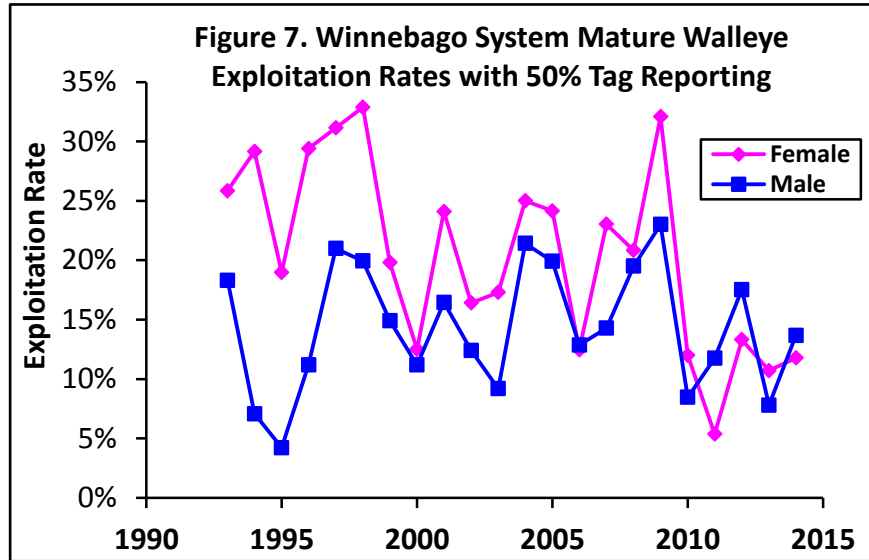
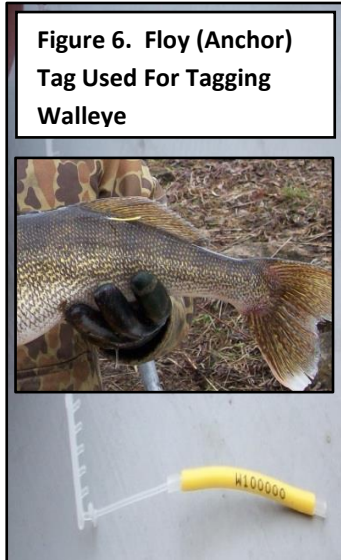
Figure 4. Walleye Otoliths



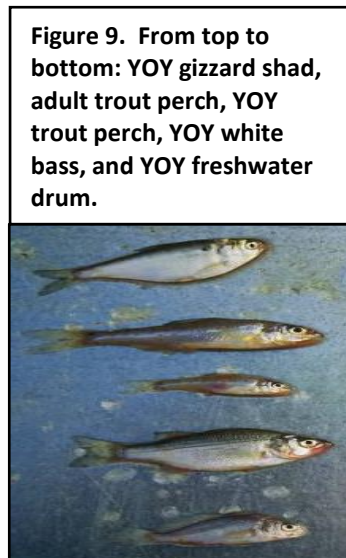
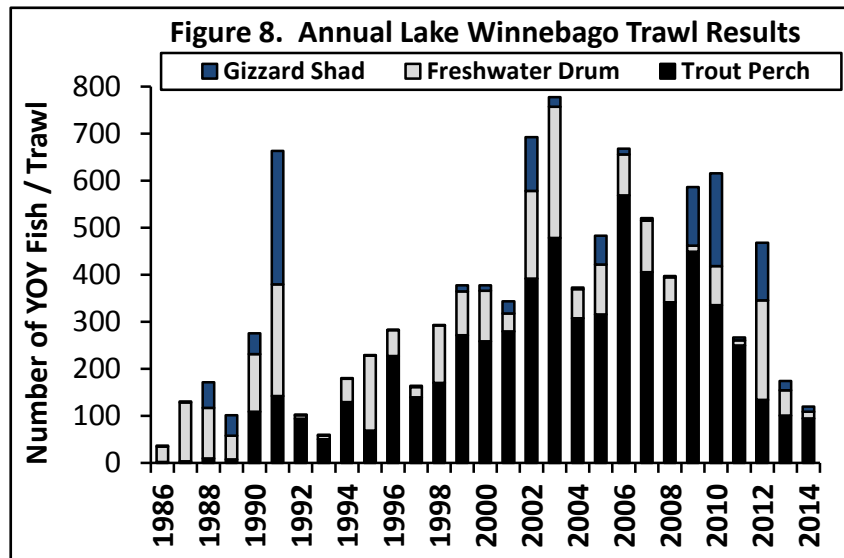
As a result, the system simply doesn't have the growth potential to produce a lot of 30+ inch walleyes and instead produces large numbers of nice sized eater fish with a few bigger (20-29") ones mixed in. Other factors that may influence the growth of Winnebago walleye could also include genetics, water temperature regimes, and available forage. One attribute that the Winnebago System lacks is deeper and cooler water during the summer months, therefore walleye cannot seek out those areas to save energy when water temperatures rise. Furthermore, although there is typically plenty of trout perch, gizzard shad, freshwater drum, and other forage items available, other foods sources such as cisco are not available in the Winnebago System. Cisco are an important forage fish in deep water systems and may provide more bioenergetics value for species such as walleye. Nonetheless, there are many factors impacting the growth and structure of the Winnebago walleye population and fishery.

Another important factor in the walleye fishery is angler exploitation; in fact tagging walleye each spring to track exploitation is one of the primary purposes of the walleye spawning stock assessment. Since the walleye tagging program began in 1993, exploitation rates have been tracked annually. The program relies upon anglers to report the catch of any tagged walleye (Figure 6) to the Oshkosh DNR office. Exploitation rates often vary on an annual basis due to year class strength, forage availability, and fishing success. Since 1993, male walleye exploitation rates have ranged from 4.2-23.0%, averaging 14.4% while female walleye exploitation rates have ranged from 5.4-32.9%, averaging

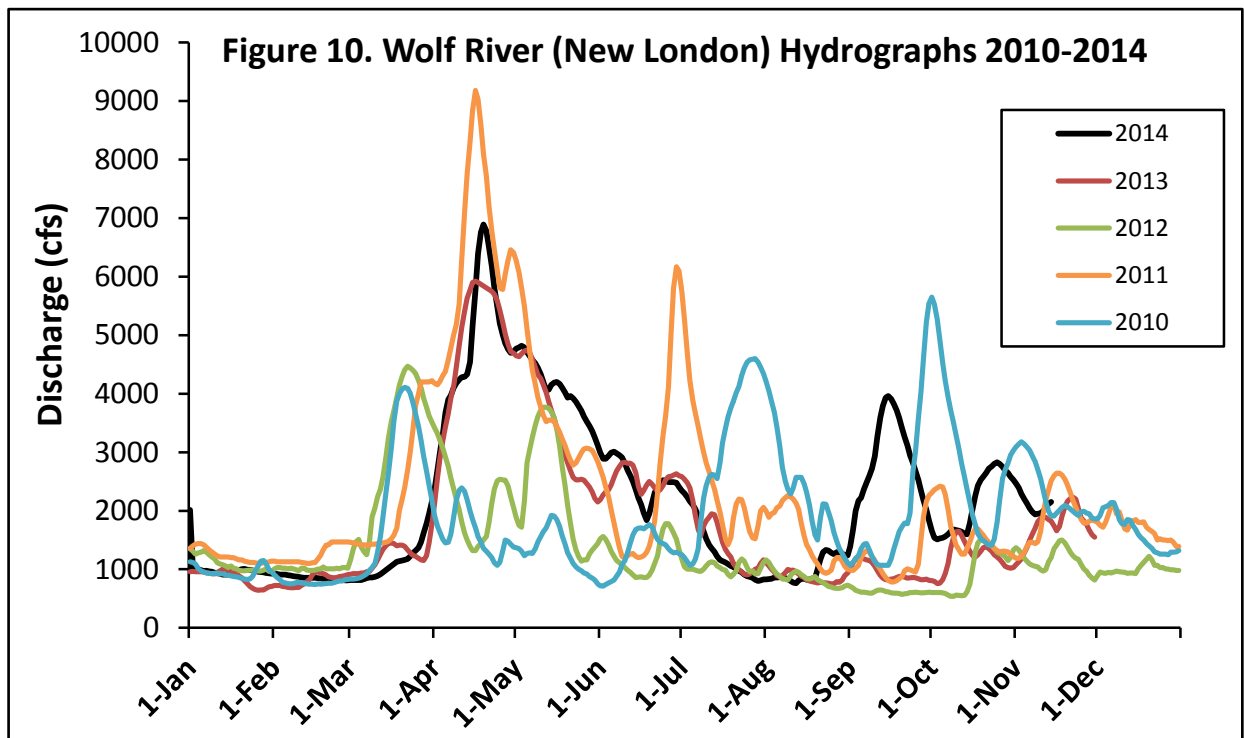
20.4% (Figure 7). In most years, exploitation rates have stayed below the 30% mark that fishery managers often consider the tipping point where harvest levels may not be sustainable. Although female exploitation rates exceeded 30% in 1997, 1998, and 2009 the high exploitation rates were not sustained over consecutive years.



Since 2010, male and female exploitation levels have stayed below 18%, including in 2014 when exploitation was estimated at 14.5% and 12.7% respectively. The lower exploitation rates over the last few years can likely be tied to forage base trends, specifically the strong hatches of gizzard shad in 2010 and 2012 that saturated the system with forage for walleye to feed on, in return making fishing more difficult (Figure 8). However, it should be noted that overall forage base numbers including gizzard shad have been lower in 2013 and 2014, thus overall fishing success may increase going into the spring of 2015. In fact, the cumulative YOY catch of trout perch, freshwater drum, and gizzard shad (Figure 9) averaged 119.84/trawl in 2014 which is the lowest cumulative average recorded since 1993. Nonetheless, the forage base going into 2015 appears to be lower than in years past which could set up for a productive year of fishing in 2015.



At this point many of us are wondering what the spring of 2015 will shape up to be. Although many may be wishing for no more snow and few spring rain storms, walleye enthusiasts on the Winnebago System know that more water in the spring leads to greater inundation of walleye spawning marshes on the Wolf and upper Fox Rivers. The higher water levels in the spawning marshes leads to more available spawning habitat for walleye, provides sufficient flows to keep eggs well aerated and clean, and eventually flushes hatched walleye fry from the spawning marshes downstream to the Upriver Lakes and Lake Winnebago where they can more effectively feed on zooplankton. As a result, high water during the spring from snow melt and rain events generally increases the probability of a strong walleye year class. For example, the hydrographs for the Wolf River in New London since 2010 indicated high spring water levels in 2011 and 2013 (Figure 10), which corresponds to the 6th and 3rd strongest walleye year classes observed since assessment trawling surveys began in 1986. However, as demonstrated in 2014, high water during the spring is not the only factor needed for a strong walleye year class.



The 2014 mean YOY walleye catch was 0.4/trawl, indicating a weak walleye year class. Despite high water in the spawning marshes during the spring of 2014, the walleye hatch did not appear to survive well. Having high water in the marshes and sufficient flow through them to flush out newly hatched fry is critically important, but zooplankton availability at time of hatch is also crucial. Yolk sacs provide walleye fry nourishment for the first few days after hatching, but walleye fry need a good available source of zooplankton for food to survive once the yolk sac has been absorbed. The spring of 2014 was cooler than normal and river water

levels were higher during May and June, resulting in below average water temperatures. Poor zooplankton hatches in the spring often coincide with cool water temperatures, thus it is plausible that a lack of zooplankton during the 2014 spring walleye hatch contributed to the weak walleye year class. Cooler water temperatures in the spring and summer also led to slower growth of YOY walleye so other factors such as predation may have also played a role, particularly given the lack of forage observed in 2014.

Weak year classes are not uncommon in walleye fisheries and represent the balancing act that takes place in Mother Nature on an annual basis. The 2008 and 2011 strong walleye year classes continue to drive a good walleye fishery in the Winnebago System. Approximately, 30% of the females from the 2011 year class will become sexually mature by this spring and make their first spawning run. The strong 2013 year class should also begin to contribute to the adult population and angler harvest in 1-2 years. Nonetheless, although 2014 will go in the records as a weak walleye year class, the strong 2008, 2011, and 2013 year classes should continue to provide ample opportunities for good walleye fishing on the Winnebago System for at least the foreseeable future. Good luck fishing in 2015 and remember if you happen to catch a tagged walleye please mail them to the Oshkosh DNR office (625 East County Road Y, Oshkosh WI 54901) or email them to dnrlakewinnebagotagreturns@wisconsin.gov.



Fisheries crews and local volunteers conducting annual spring electrofishing (left) and trawling surveys (right).

Adam D. Nickel

Senior Fisheries Biologist – Bureau of Fisheries Management
Winnebago System Gamefish Biologist
Wisconsin Department of Natural Resources
625 E County Road Y, Suite 700
Oshkosh, WI 54901
Phone: (920) 424-3059
Fax: (920) 424-4404
adam.nickel@wisconsin.gov