2015-2016 Winnebago System Yellow Perch Stock Assessments

Post-Season Synopsis

Ryan Koenigs, Winnebago Sturgeon and Panfish Biologist, July 15, 2016

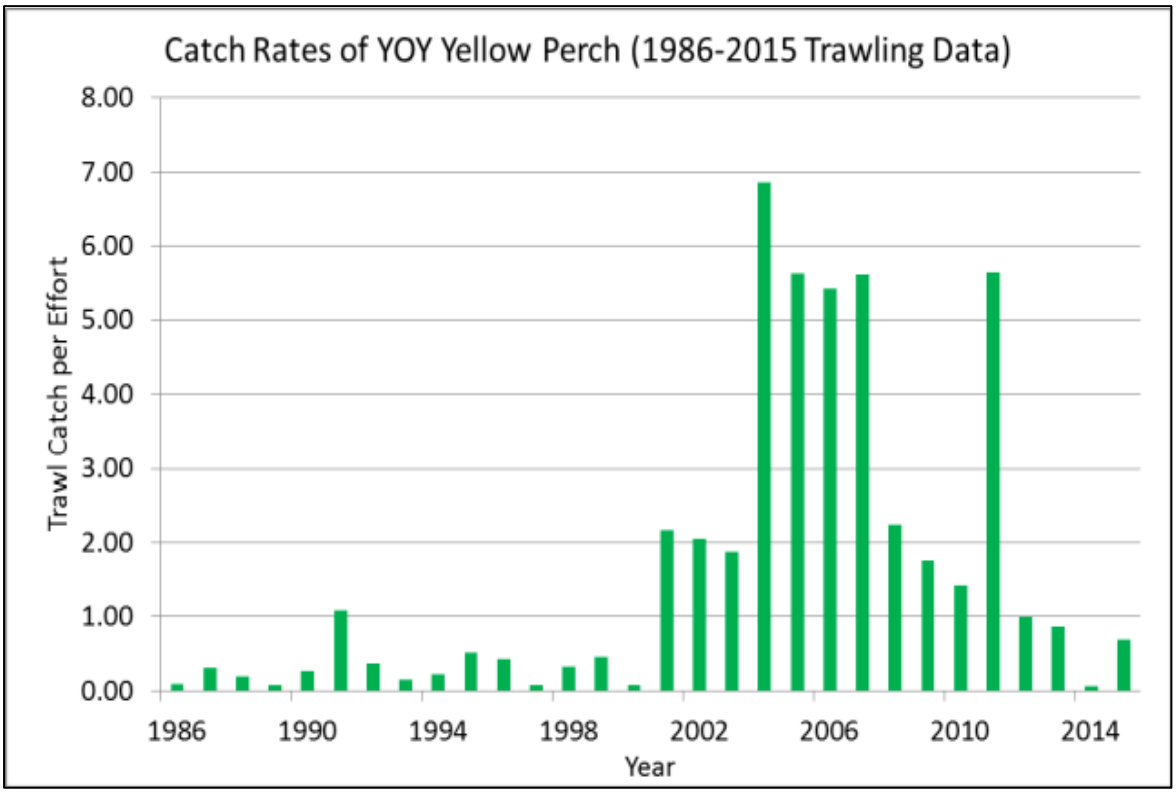
The yellow perch fishery on the Winnebago System has gained popularity over the last decade, but most perch anglers will tell you that the last couple of years have been much tougher fishing. Some anglers are still catching nice sized fish, but population numbers, and in turn catch rates, are down relative to previous years. Our DNR fisheries crew in Oshkosh has been conducting bottom trawl survey since 1986 to monitor trends in year class strength and abundance of a multitude of fish species in Lake Winnebago.

Lake Winnebago Bottom Trawling Results

Trawling results indicate a reduction in recruitment the last few years resulting in decreased adult abundance, which supports trends observed by anglers. More specifically, trawling results demonstrate that Lake Winnebago maintained a low density perch population from 1986-2000 due to relatively poor recruitment (0.31 young-of year/trawl) (Figure 1). However, improving water clarity and an increase in vegetative habitat contributed to a significant increase in recruitment from 2001-2011 (3.70 YOY/trawl). Unfortunately, yellow perch recruitment has significantly declined in recent years (0.66 YOY/trawl in 2012-2015), largely due to loss of aquatic vegetation since 2010. Trends in recruitment translated to changes in adult catch rates as well. Peak catches were observed from 2006-2011, but have been steadily declining in recent years (Figure 1).

Lake Winnebago and Lake Butte des Morts Fyke Net Results

In addition to bottom trawl assessments, DNR fisheries staff have been intensively fyke netting yellow perch for the past five years (2012-2016) (Photo inset). These surveys provide data to evaluate relative adult abundance (catch rates), size and age structure, growth, and mortality of the yellow perch population. Nets are typically set shortly after ice out to collect pre-spawn fish at various locations. Nets have been set annually in the Fox River (2012-2016) at Oshkosh to collect reference data, while additional locations on Lake Winnebago and Lake Butte des Morts were sampled in 2015 and 2016. On Lake Winnebago nets were set in Asylum Bay (2015-2016) and Van Dyne Creek (2015), while nets were set in Lake Butte des Morts at Sunset Bay (2015-2016), Spring Brook (2016), Terrell's Island (2016), Scott's Bay (2015-2016), Preacher's Bend (2016), and Nickel's Marsh (2015-2016).



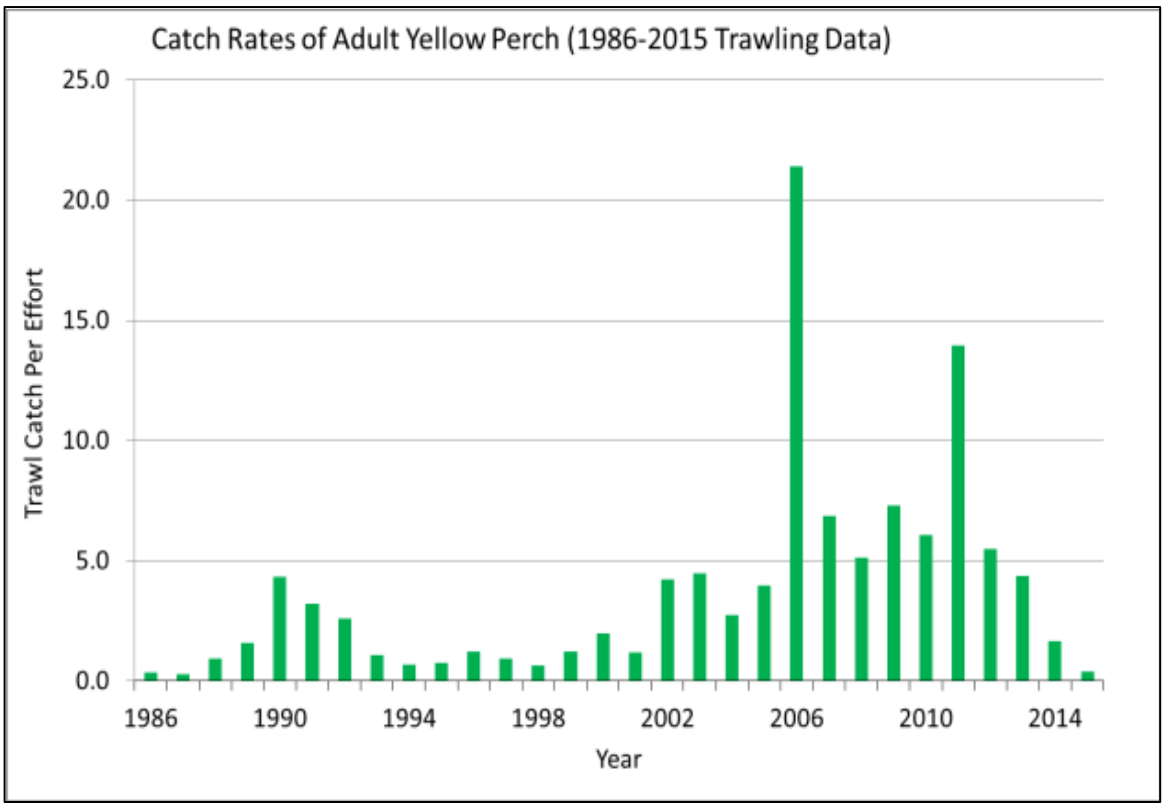


Figure 1. Displays the catch rates of young-of-year (top) and adult (bottom) yellow perch observed during bottom trawl assessments conducted on Lake Winnebago (1986-2015).

Reference fyke net data from the Fox River and Asylum Bay support the trend of a significant decrease in yellow perch abundance since 2012 (Table 1). Catch rates at Van Dyne Creek (4.8 fish/net) and Lake Butte des Morts (2.2 fish/net) in 2015 were lower than at either reference location. Results from Lake Butte des Morts were likely skewed as these nets were set later in spring, post yellow perch spawning, targeting muskellunge. Eight different locations were sampled in 2016, with the reference sites of Asylum Bay and the Fox River having the lowest observed catch rates (Table 2). Catch rates were fairly consistent throughout Lake Butte des Morts, with the exception of Spring Brook yielding much higher catch rates than any other other location.

Year	Fox River Catch/net	Asylum Bay Catch/net
2012	1439.0	183.0
2013	236.5	
2014	250.0	
2015	11.8	7.5
2016	3.0	3.7

Table 1. Displays catch rates of adult yellow perch captured in spring fyke nets set in the Fox River (Oshkosh) and Asylum Bay (2012-2016).

Location	CPE	Mean Length (inches)
Asylum Bay	3.7	9.3
Fox River (Oshkosh)	3.0	9.1
Sunset Bay	11.0	8.1
Spring Brook	32.6	8.1
Terrell's Island	12.3	7.9
Preacher's Bend	11.6	7.8
Scott's Bay	10.1	7.6
Nickel's Marsh	6.0	8.3

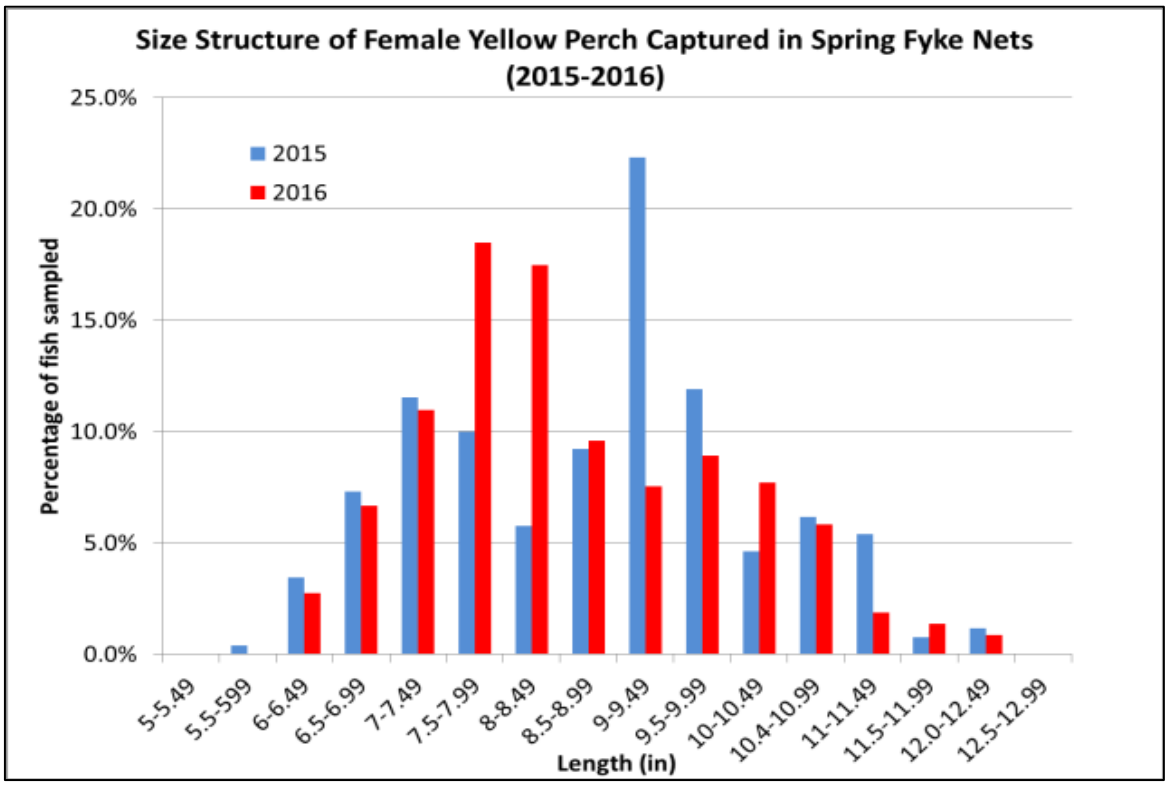
Table 2. Displays catch rates of adult yellow perch captured in spring fyke nets set in Lake Winnebago and Lake Butte des Morts (2016).

Age and Growth

Similar to results observed in 2012-2014, the adult population of yellow perch was dominated by young (2-3 years old) fish in both 2015 (84.7% of females and 72.7% of males) and 2016 (84.1% of females and 72.2% of males). The strong contribution of young fish suggests that the Winnebago System is home to a boom-bust perch fishery that is heavily dependent on strong year classes. Abundance, and in turn fishing success, is high 2-3 years following strong year classes, while abundance is lower when weaker year classes persist. Unfortunately, both trawling and fyke net surveys indicate that we are currently in a bust cycle resulting from poor recruitment in recent years.

Catch rates of yellow perch may have been low in 2015 and 2016, but the size structure was well represented by larger fish (Figure 2). For example, survey results from 2015 (67.3%) and 2016 (61.1%) yielded much higher percentages of females larger than 8” relative to 2012 (21.1%). This observation was confirmed by anglers who reported not catching large numbers of fish in 2015, but that the fish were of nice size.

Adult yellow perch abundance may currently be low, but there are still some quality size fish in the system and fish grow quite rapidly. Most anglers report harvesting fish starting at 8” and growth data indicate fish reach this length during their third summer of growth. Further, fish reach 10” at age 4 for females and at age 5 for males (Figure 3). Therefore, fishing success can improve in short order following a strong year class. On the flip side, 2-3 year old fish are the strongest contributors to the population, so a strong year class is likely unable to sustain quality fishing for more than 1-2 years.



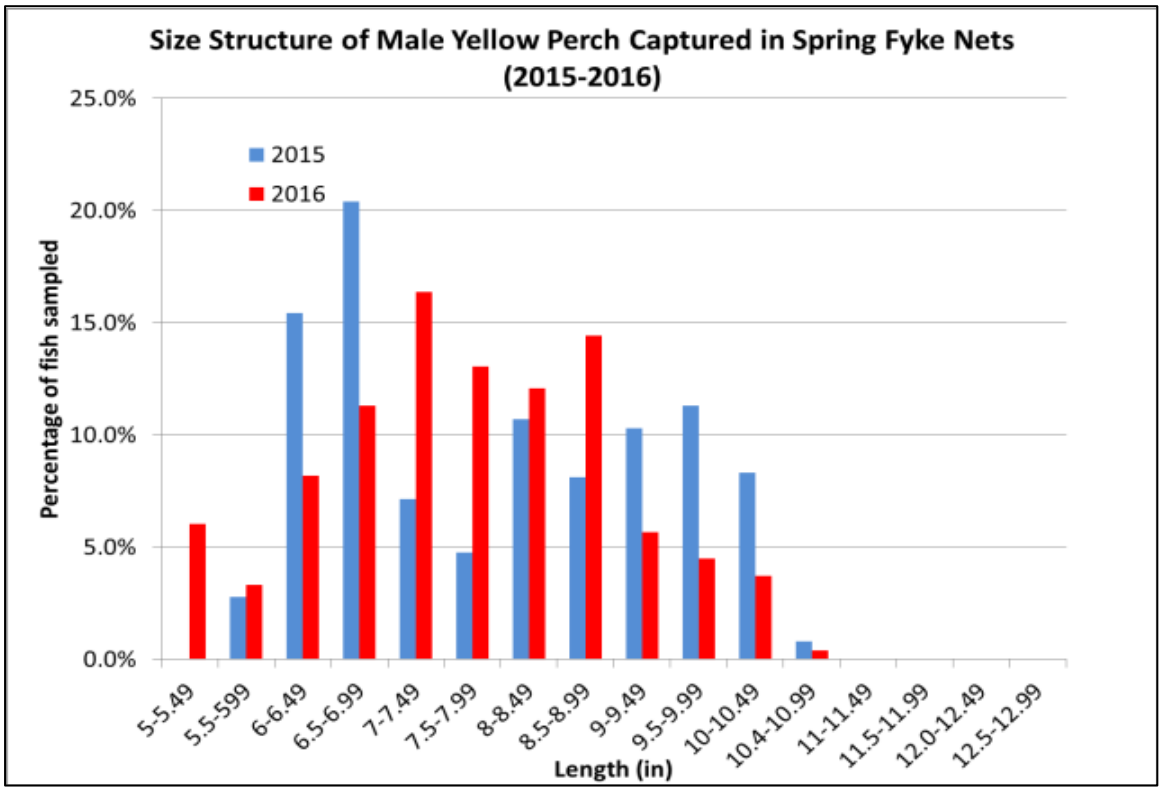


Figure 2. Displays the size structure of adult female (top) and male (bottom) yellow perch captured during spring fyke net surveys conducted on the Winnebago System (2015-2016).

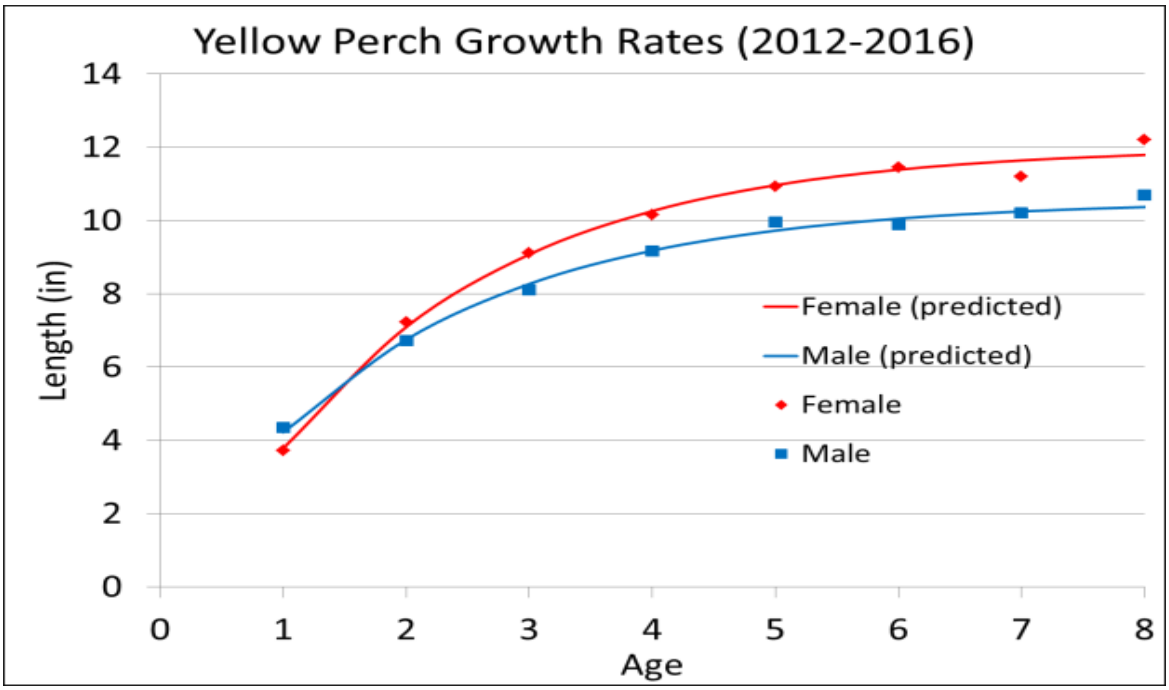


Figure 3. Displays the growth rates of male and female yellow perch in the Winnebago System.

I've spent most of the report to this point explaining the "what", but I'm sure many readers are now questioning the "why". Specifically why is the adult population dominated by young fish? Why has abundance decreased and what has caused the decrease in recruitment?

The first question is quite easy to answer. Our age data demonstrate that yellow perch on the Winnebago System experience high mortality rates (63% average total annual mortality for females and 69.0% for males) meaning the majority of the fish don't survive past age 3. The question is whether the high mortality is attributable to fishing mortality (harvest) or natural mortality. This can be a tough nut to crack, but the answer has important ramifications towards the effectiveness of any fishing regulation. In essence, a reduced bag limit may not provide much benefit if the population experiences high natural mortality.

Creel Survey Results

Creel surveys and tagging programs are the two most commonly used methods to evaluate effects of harvest. Given the size of the Winnebago System, a full-creel survey would be extremely costly. However, the DNR did conduct a partial creel survey of the perch fishery from July-September of 2012. A two man crew checked anglers at a single landing 3 days per week (2 weekdays and 1 weekend) over a 3 month period. The crew rotated around 7 groups of high use boat landings on Lake Winnebago, being at each landing every 2.5 weeks. In total, 35 shifts each lasting 6 hours (9:00 AM – 3:00 PM) were included in the survey. During that time creel clerks interviewed 1,970 anglers

(1,070 boats) who fished a total of 7,400 hours. These anglers reported a total harvest of 16,685 perch (8.5 perch/angler). Sex data was collected from a sample of the harvested fish, of which 76.8% were female.

The creel was not intended to estimate harvest, but the observed catch starts to make one think twice when considering a variety of factors including: sampling only occurred 3 days/week, clerks were only at a single landing per shift, clerks only creeled ½ of the fishing day, only Lake Winnebago was included and only for 3 months, etc. When these factors are considered the data suggest that yellow perch harvest from the Winnebago System can be high. However, we are not able to estimate exploitation rates, as we don't have an estimated total harvest or population size, both of which would be very costly to estimate.

Tagging Results

Therefore, the DNR started to mark perch with white anchor tags (similar to the yellow tags used to mark walleye) in the spring of 2015. Each tag has a unique number identifying that fish and the address of the DNR Service Center in Oshkosh. Anglers are encouraged to notify the DNR via email (DNRWinnebagoSystemTagReturns@Wisconsin.gov), phone (920-303-5429), or mail anytime they catch a tagged fish. A total of 583 fish were marked in 2015 with an additional 421 fish marked in 2016. As of July 22, we have had reports of 20 tagged fish harvested, of which 15 were marked in 2015 and 5 were marked in 2016. Further tagging and angler reporting will provide an estimate of harvest rates and help better estimate fishing and natural mortality.

Cormorant Diet Results

Many anglers attribute the yellow perch decline to predation from double-crested cormorants and American white pelicans. Pelicans are federally protected and there hasn't been any diet research conducted in the Midwest. However, multiple studies have reported that cormorants are natural predators that consume prey items that are readily available. On the Winnebago System, the DNR is now in the second year of a three year diet study to evaluate impacts of cormorant predation on sport and panfish populations. Gut contents of 353 cormorants (226 from Lake Butte des Morts and 127 from Lake Winnebago) were analyzed in 2015. A total of 12 different fish species were observed with gizzard shad (505), freshwater drum (229), white bass (18), emerald shiners (13), yellow perch (11), stickleback (6), and walleye (4) being the most commonly encountered prey items. These results confirm that cormorants are consuming prey items that are most readily available to them, freshwater drum and gizzard shad. There has not been a strong hatch of yellow perch in recent years, so it's not surprising to see few yellow perch in diets. The next two years of sampling should shed more light on potential impacts of cormorant predation.

Photos displaying diet contents of two double-crested cormorants sampled from the Winnebago System in summer 2015. Left photo displays 16 gizzard shad, 1 yellow perch, and 1 emerald shiner while diet on the right displays 2 adult freshwater drum.

Summary

In summary, recent research has clearly revealed a few trends in the Winnebago System perch population and fishery. First of all, the system exhibits a boom-bust fishery that heavily relies on strong recruitment to provide a quality fishery. Further, adults experience high mortality and angler harvest has the potential to be high. However, there are still some important questions that need to be further evaluated. We need to continue to mark yellow perch to estimate exploitation rates and evaluate movement of fish within the system. Exploitation data will help evaluate potential regulation options to ensure the best regulation is in place. We also need to further study the impact of cormorant predation.

The most important factor though is habitat, restoring rooted aquatic vegetation is imperative to the future of the Winnebago System yellow perch fishery. Yellow perch, and other panfish species, rely heavily on aquatic vegetation for spawning habitat, food production areas, and cover from predators. Abundance of aquatic vegetation correlates to water clarity, and the increased turbidity (reduced water clarity) on Lake Winnebago has resulted in a consistent decline of rooted vegetation since 2010. This decline is on the heels of a decade of improving water clarity that led to the increase in perch production from 2001-2011. The Upriver Lakes have experienced a consistent decline in vegetation over the last 15-20 years, which is likely the driving factor behind declining perch populations in those lakes.

In the immediate future, we plan to continue to monitor trends in recruitment and relative adult abundance through bottom trawl assessments in fall of 2016. Further, we plan to continue fyke netting trend locations of Asylum Bay and the Fox River in Oshkosh in Spring of 2017, while also setting nets in multiple locations throughout Lake Poygan and Lake Winneconne. Stay tuned for follow up reports from these surveys and remember to report that catch of any tagged fish (perch or walleye). Good luck fishing during the remainder of the summer and stay safe on the water!

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