WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Lake Altoona Fisheries Survey Report
Eau Claire County, Wisconsin 2025

Waterbody Code: 2128100

Photo Credit: Wisconsin DNR

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Executive Summary

In the spring of 2025, a survey was conducted on Lake Altoona to evaluate that status of the fisheries resource. The adult walleye population was estimated at 3.5 adults per acre, which is lower than documented in the previous survey, but still at a healthy level and typical for lakes in northern Wisconsin sustained by natural reproduction. The walleye population in Lake Altoona continues to be fueled by excellent natural reproduction as documented by fall electrofishing surveys. The mean length of the walleye present in the population was 17.0 inches, which is an inch longer than documented in the previous survey and considered excellent size structure. Smallmouth bass catch rates were lower but size structure was very good with the mean length at 17.0 inches. The northern pike population appears to be coming on strong with an increase in catch rates and size structure with 25.3 inches as a mean length. The yellow perch catch rates remain some of the highest in the state, with 653 fish per net night which is over two-fold increase of the mean from prior surveys. The size structure of the yellow perch population was down slightly, but growth rates remain very strong. Bluegill and black crappie catch rates were substantially higher than previous surveys and are comprised of young fish. Both bluegill and black crappie growth rates were above the statewide mean, so stunting is not an issue. Given time, these populations will grow into sizes more desirable by anglers and contribute to the phenomenal panfish fishery in which Lake Altoona is known.

Introduction

Lake Altoona is a 840-acre reservoir of the Eau Claire River located in west-central Eau Claire County, directly east of Eau Claire, Wisconsin. The lake has a maximum water depth of 25 feet, a mean depth of 10 feet, and 9.9 miles of shoreline. Lake Altoona is considered a eutrophic waterbody with an average secchi depth of 3.5 feet and a Trophic Status Index of 59 as measured in 2021. The lack of clarity in the water column can be attributed to natural staining, suspended sediments, and algae during the mid-summer months. Due to lack of light penetration in the water column and sandy substrate, submerged aquatic vegetation is relatively limited in Lake Altoona. Due to the high amount of shoreline development, nearshore woody habitat is also lacking. The Eau Claire River flows into the east side of Lake Altoona and exits at the dam on the west end. Fish have unobstructed access to 8-miles of the Eau Claire River upstream of the lake prior to reaching a natural barrier to fish migration at Big Falls; however, it is likely passible for some species at very high flows. There are two public boat landings present on the lake with the Eau Claire County landing getting most of the use on the south end of the lake. There has been large scale dredging projects in the lake, river and delta in recent years to prevent sediment accumulation. The sport and panfishery in Lake Altoona is comprised of walleye (*Sander vitreus*), smallmouth bass (*Micropterus dolomieu),* largemouth bass (*Micropterus salmoides*), northern pike (*Esox Lucius*), muskellunge (*Esox masquinongy*), bluegill (*Lepomis macrochirus),* black crappie (*Pomoxis nigromaculatus*), and yellow perch (*Perca flavescens*).

The purpose of this survey was to sample Lake Altoona under the Wisconsin DNR's tier 1 lake sampling protocol for public access lakes in Wisconsin. Data from this survey was compared to historical data to 1.) Evaluate walleye population and size structure and 2.) Evaluate the population and size structure of other important fishes, such as smallmouth bass, northern pike and panfish.

SURVEY EFFORT

Lake Altoona and the Eau Claire River up to Big Falls were sampled in the spring of 2025. Lake Altoona is on a four-year survey rotation, and it is scheduled to be surveyed again in 2029. Sampling procedure included spring fyke netting and electrofishing primarily to estimate walleye population abundance, growth rate and size structure. Survey data were also collected to establish catch rates, growth rates and size structure on other important fish species such as smallmouth bass, northern pike and panfish.

Metric Descriptions

- **PSD:** Proportional Stock Density – numerical description of population size structure. The percent of fish over a species-specific length standard when small fish, generally age-1, are disregarded. The higher the number, the greater proportion of large fish are present. Example for walleye: (# of fish ≥ 15 inches) / (# of fish ≥ 10 inches) X 100

- **RSD:** Relative Stock Density – similar to a PSD, but a specific length is supplied. Example for walleye: RSD-20 = (# of fish ≥ 20 inches) / (# of fish ≥ 10 inches) X 100

- **C.I.:** 95% confidence interval. There is a 95% certainty that the population estimate is between the upper and lower bounds given.

- **CPUE:** Catch Per Unit Effort – generally given in catch per mile of electrofishing or catch per net night (one 24-hour net set).

Survey Method

- **Fyke netting:** A total of six fyke nets, following SNI protocol, were set on Lake Altoona on the 31st of March just as the ice was receding. Fyke nets were checked on April 1st and collapsed due to inclement weather in the forecast. The nets were opened up on April 3rd and checked daily until removed on April 7th for a total of 30 net lifts. Walleye were measured for length and marked with a right ventral fin clip to facilitate a population estimate. For aging purposes scales and a dorsal spine were taken from five fish of each sex per inch group from walleye.

All northern pike were measured for length and the first three anal fin rays for five fish from each inch class per sex were taken from for aging. All bass were measured for length and a dorsal spine was taken from five per inch class for smallmouth bass. Twenty-five of each species of panfish were measured for length per net. Scales were taken for aging purposes from five of each half inch class of bluegill and black crappie. Spines were removed from a subsample of yellow perch to compare to age estimates from otoliths from the prior survey. All other fish were identified and counted.

- **Electrofishing**: The Eau Claire River was sampled during daylight hours on March 31st, April 4th, April 9th-12th using a pulsed DC mini-boom shocker. The purpose of sampling the river was to mark walleye for a population estimate as most of the walleye from Lake Altoona spawn in the Eau Claire River. The entire shoreline of Lake Altoona was sampled at nighttime on 15th of April using one pulsed DC miniboom shocker and one pulsed DC boomshocker. The purpose of this sampling was to capture walleye to obtain the recapture data needed to estimate population size. All walleye were collected, measured and inspected for a right ventral fin clip. The shoreline was sampled again with a pulsed DC boomshocker on the night of the 13th of May to capture centrarchids (bass, bluegill and crappie) while they were concentrated spawning; this survey was broken into four runs. Two, 0.5-mile bass-panfish runs in which all bass and panfish were collected and two 1.5-mile bass runs, where only bass were collected. For bass, aging structures were collected from five fish per inch group; scales were collected from fish less than 12 inches and dorsal spines were collected from fish greater than 12 inches. Scales were collected from panfish greater than three inches up to 5 per half inch group. One hundred of each fish species were measured for length and the rest were counted.

- **Data Analysis:** Spring fyke netting data from 2025 were compared to spring fyke net data from 2021, 2017 and 2012. Lake spring electrofishing data were compared to similar surveys in 2021, 2016 and 2012. The walleye population estimate (Chapman modification) from 2012 and 2021 were compared to the 2025 population estimate. Catch per unit effort and size structure data were compared to past surveys. Length at age for various species was calculated from the data collected in 2025 and compared to the statewide average to determine relative growth rates.

Results

WALLEYE

The adult walleye population in 2025 was estimate at 2,915 (95% C.I. 2,193-3,638) or 3.5 per acre. For comparison, in 2021 was estimated at 8,297 (95% C.I. =5,703-10,891) or 9.9 fish per acre, and during the 2012 survey the adult walleye population was

estimated at 3,035 (95% CI=1,773-4,297) or 3.6 fish per acre. All size structure indices were higher than previous surveys as the mean length of walleye in the 2025 survey was 17.0 inches (range: 11-27.3 inches), the PSD was 81 and RSD 20 was 12 (Figure 1). In comparison, the mean length of walleye in the 2021 survey was 16.0 inches, the PSD was 61, and RSD-20 was 4.3. The mean length of walleye in the 2012 survey was 15.3 inches, while the walleye PSD and RSD-20 values were 42 and 3, respectively.

Eleven age classes were present in this survey ranging from 3-13 years of age (Figure 2). Out of the 1,097 walleye captured in this survey, 872 were male, 162 were female, and 63 were of unknown sex for a male to female ratio of 5.4:1 which is lower than 22.8:1 recorded in the 2021 survey meaning that more females were caught in the 2025 survey. There is good representation in the population of age classes five through nine, and prior age classes are not fully represented in the survey data because a proportion of them are still immature. Total annual mortality for adult walleye was estimated at 47% (Figure 3).

Length at age was higher than the statewide average for females (Figure 4). Younger male walleye grew slightly slower than the statewide average and then surpassed the average growth rate for nine years of age and older (Figure 5).

Fall electrofishing catch rates of age-0 walleye from 2011-2025 are shown in Figure 6, which is a good measure of reproductive success. Over this timeframe, the catch ranged from 9.3 per mile to 253 per mile and the mean was 103 per mile.

Figure 1: Walleye length frequency Lake Altoona, Eau Claire County, 2025.

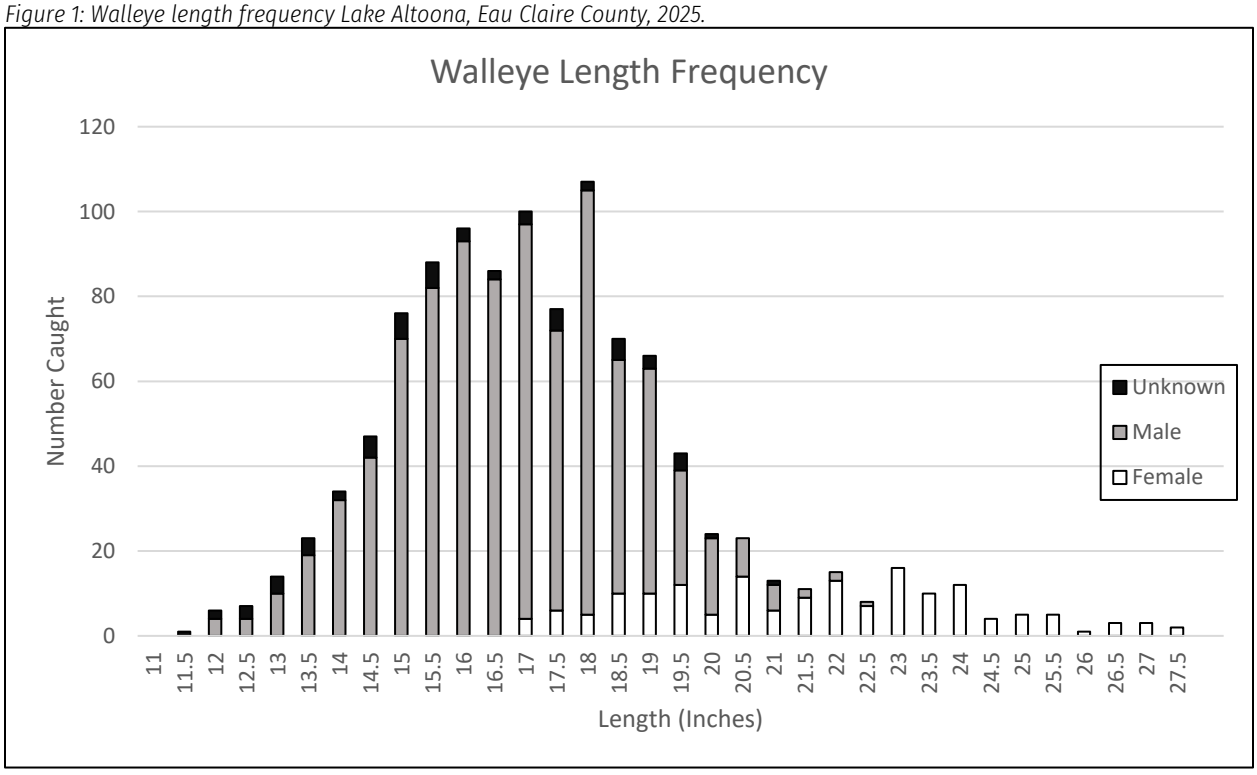


Figure 2: Walleye age frequency by sex Lake Altoona, Eau Claire County, 2025.

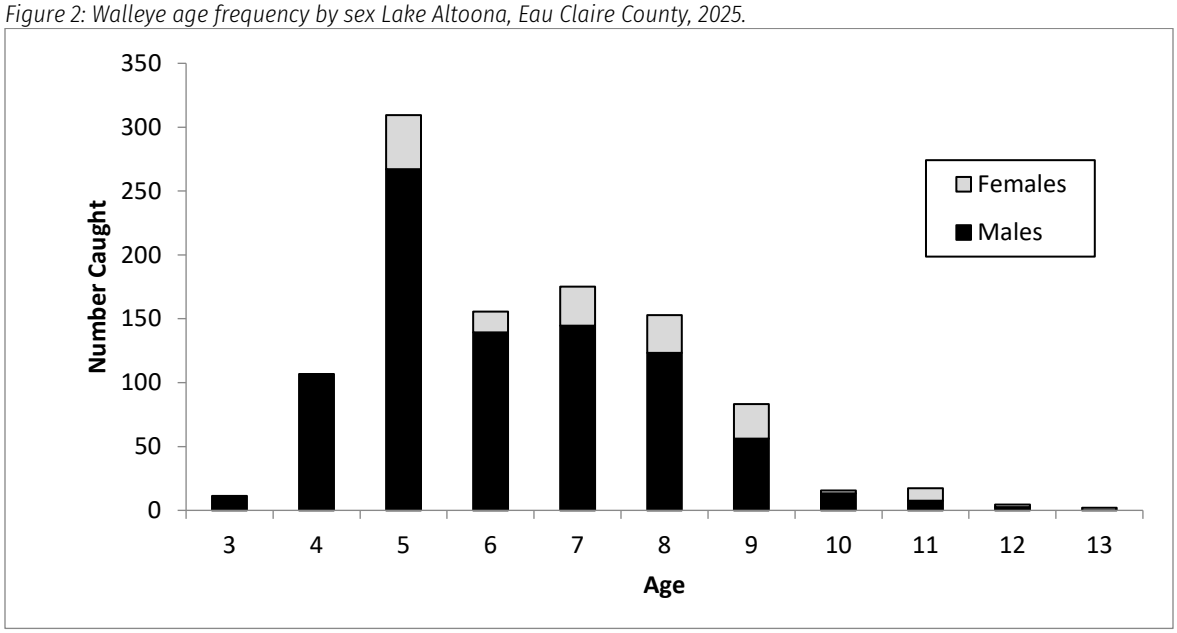


Figure 3: Catch curve for walleye on Lake Altoona, Eau Claire County, 2025. Total annual mortality was 47%.

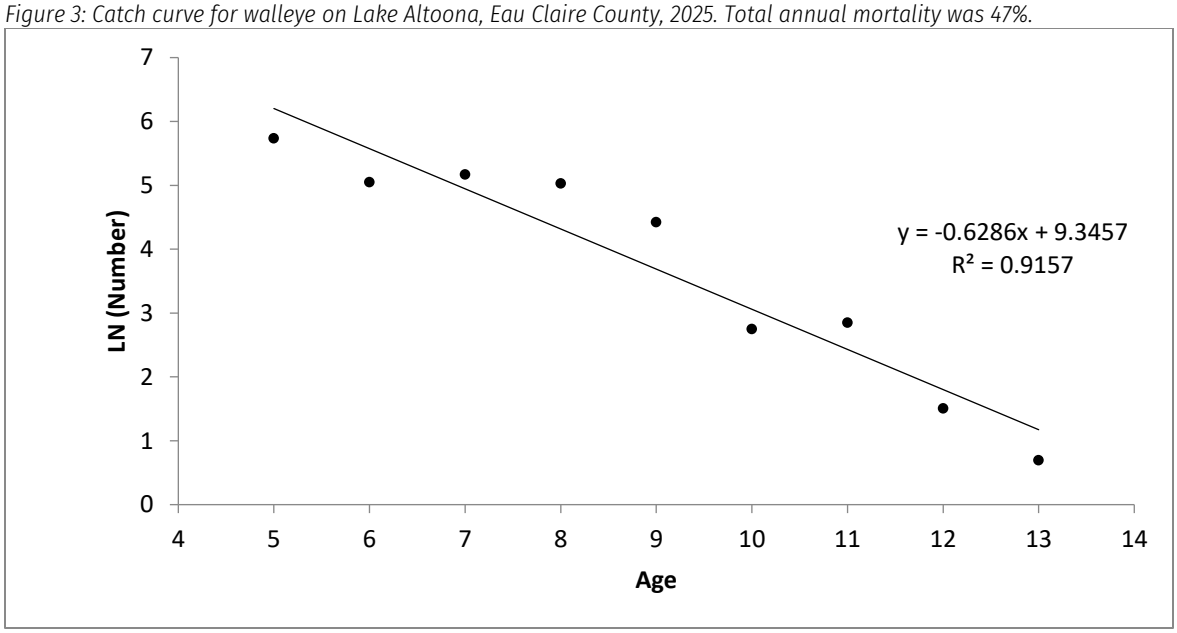


Figure 4: Length at age for female walleye on Lake Altoona, Eau Claire County, 2025 compared to the statewide average.

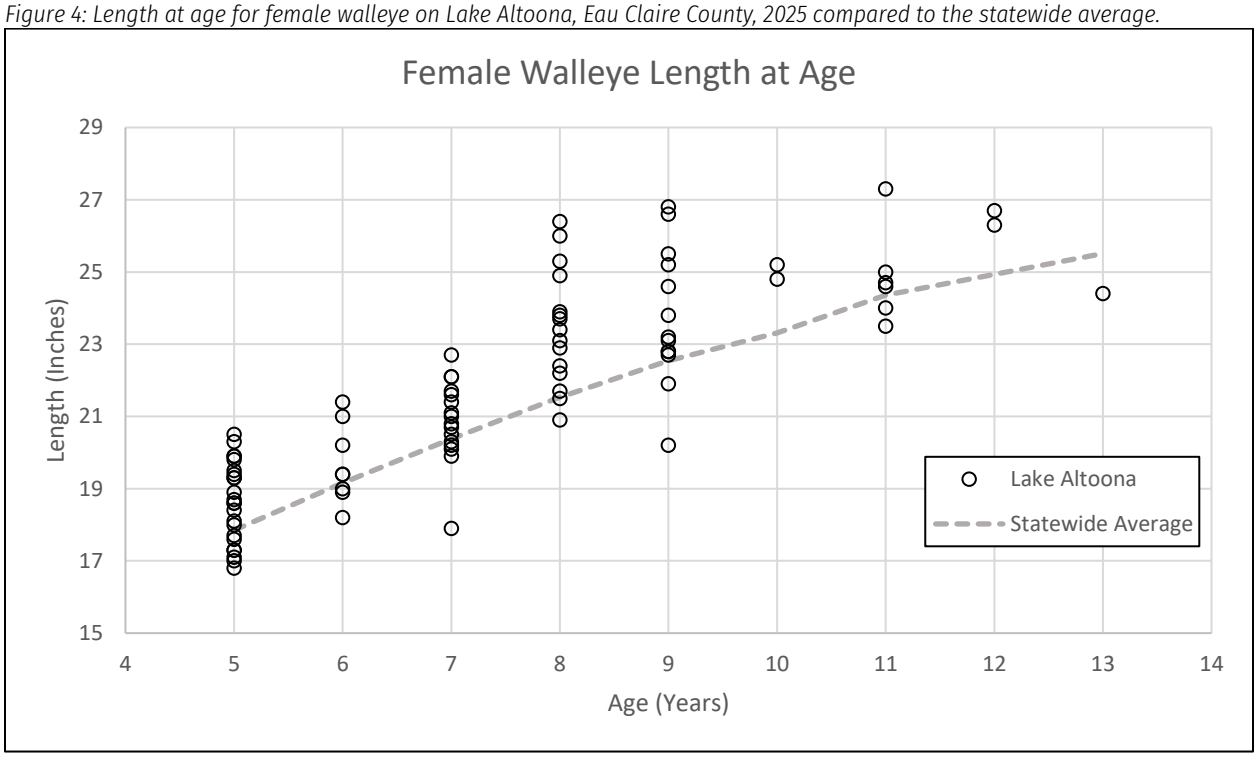
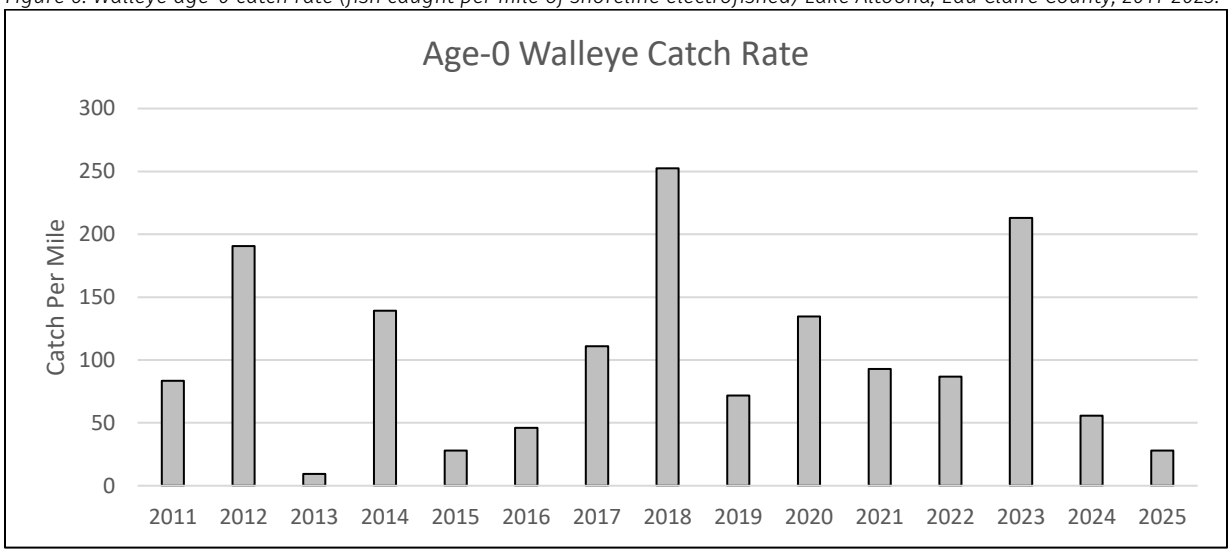


Figure 5: Length at age for male walleye on Lake Altoona, Eau Claire County, 2025 compared to the statewide average.

Figure 6: Walleye age-0 catch rate (fish caught per mile of shoreline electrofished) Lake Altoona, Eau Claire County, 2011-2025.



SMALLMOUTH BASS

The electrofishing catch rate was lower in 2025 at 4.3 fish caught per mile compared to a mean catch rate of 11.3 fish per mile from the previous three surveys (2012-2021). The mean length of smallmouth bass caught was 17.0 inches (range: 12-19.8 inches) in 2025 (Figure 7), which is greater than the mean from the prior three surveys of 13.0 inches. Other size structure indices were higher as well in 2025 as the PSD was 100 and RSD-18 was 32. The mean PSD and RSD-18 in the previous three surveys were 66 and 7.8, respectively. Length at age for smallmouth bass was greater than the statewide mean for almost all smallmouth bass aged (Figure 8).

Figure 7: Smallmouth bass length frequency Lake Altoona, Eau Claire County, 2025.

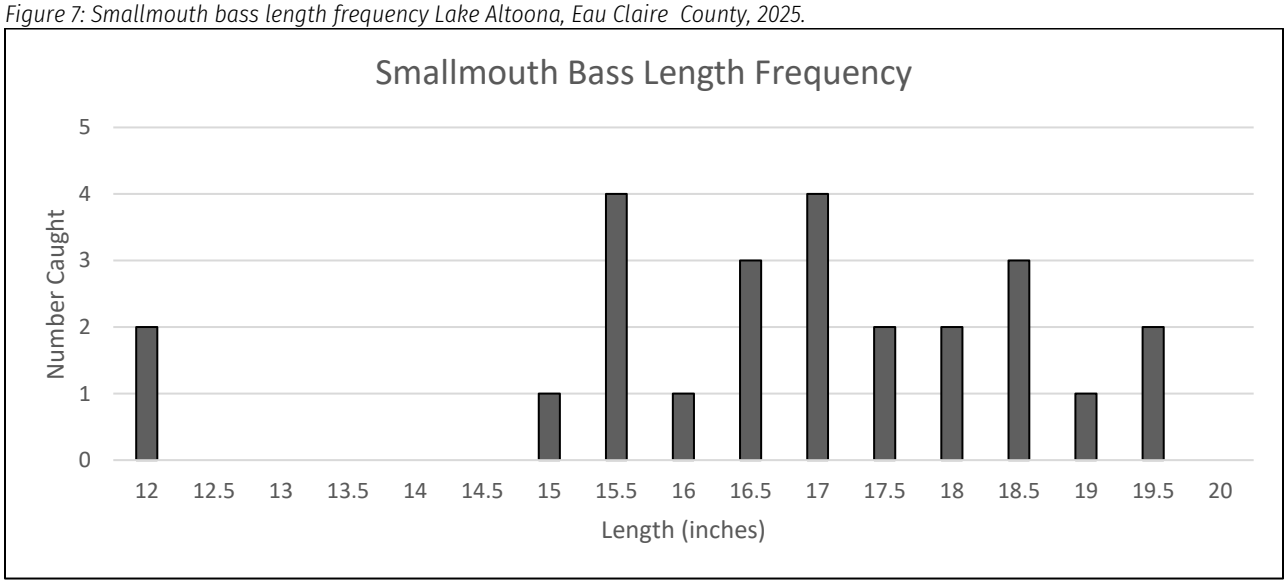
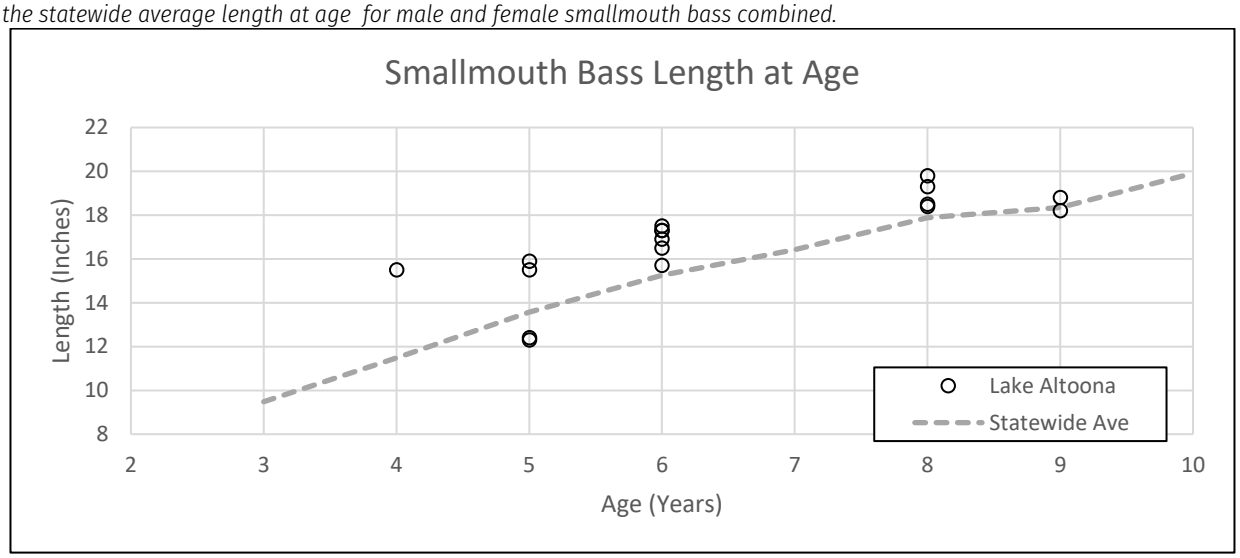


Figure 8: Length at age for male and female smallmouth bass combined on Lake Altoona, Eau Claire County, 2025 compared to the statewide average length at age for male and female smallmouth bass combined.



NORTHERN PIKE

The 2025 spring fyke netting surveys yielded a catch rate of 3.6 fish per net night which is higher than the mean of 1.3 per net night recorded in prior three surveys (2012-2021). Along with catch rates being higher, size structure improved as well in 2025 with the mean length of fish at 25.3 inches (range: 11.4-38.1 inches), the PSD at 88 and the RSD 28 at 25 (Figure 9). The mean length of northern pike in the previous three surveys was 23.2 inches, the PSD was 59 and RSD-28 was 20. Mean length at age was variable but was generally above the statewide mean (Figure 10).

Figure 9: Northern pike length frequency Lake Altoona, Eau Claire County, 2025.

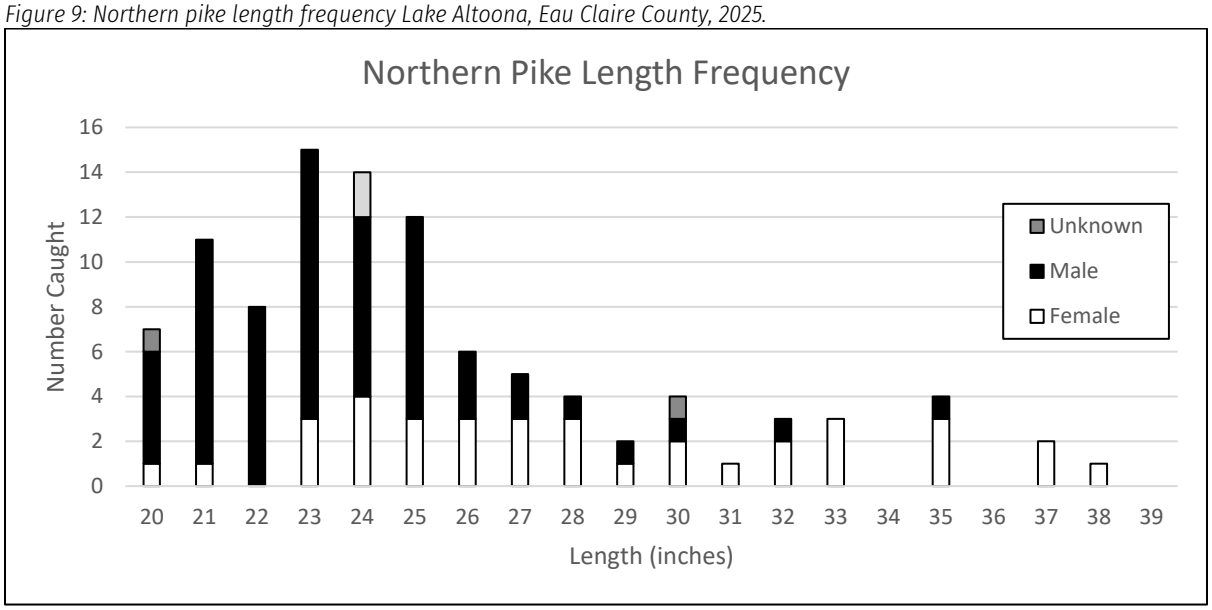
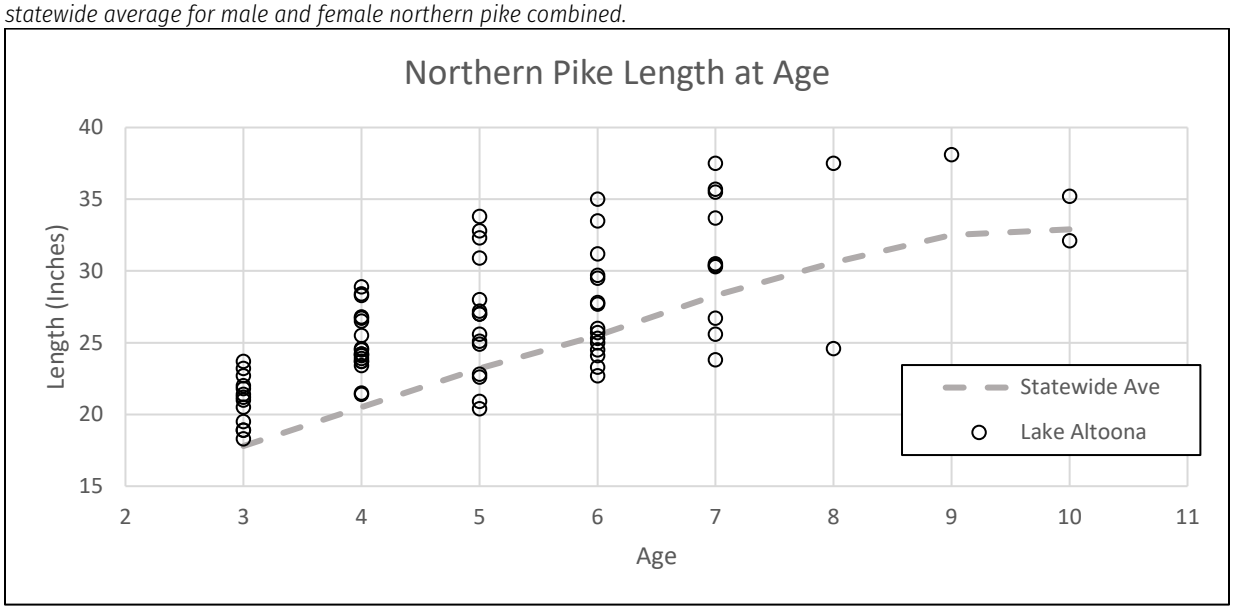


Figure 10: Length at age for male and female northern pike combined on Lake Altoona, Eau Claire County, 2025 compared to the statewide average for male and female northern pike combined.



YELLOW PERCH

In 2025, the yellow perch catch rate was 653 per net night which is considerably higher than the mean from the previous three surveys (2012-2021) of 296 per net night. Size structure remained good as has been documented in the past, but it dropped slightly in the most recent survey. In 2025, the mean length was 8.5 inches (range: 4.2-13.9 inches), the PSD was 56 and RSD-10 was 22 (Figure 11). The mean length in the prior three surveys was 8.9 inches, the PSD was 82 and the RSD-10 was 33. Yellow perch length at age was above the statewide mean to age-10 and dropped to the statewide mean for older aged fish (Figure 12).

Figure 11: Yellow perch length frequency Lake Altoona, Eau Claire County, 2025.

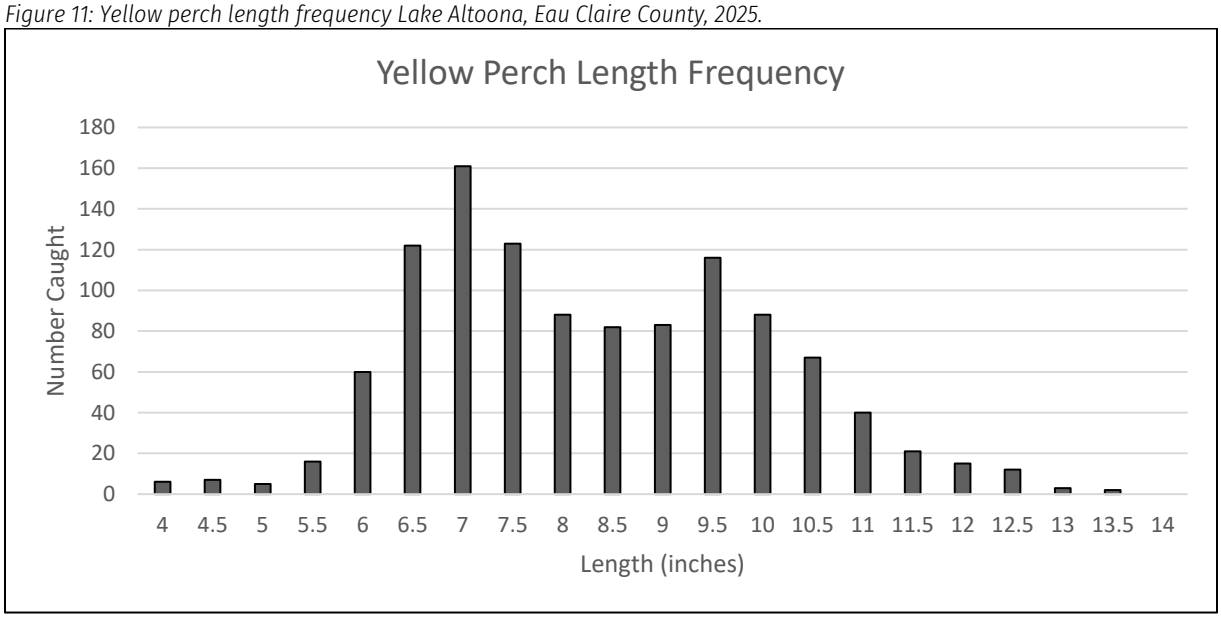
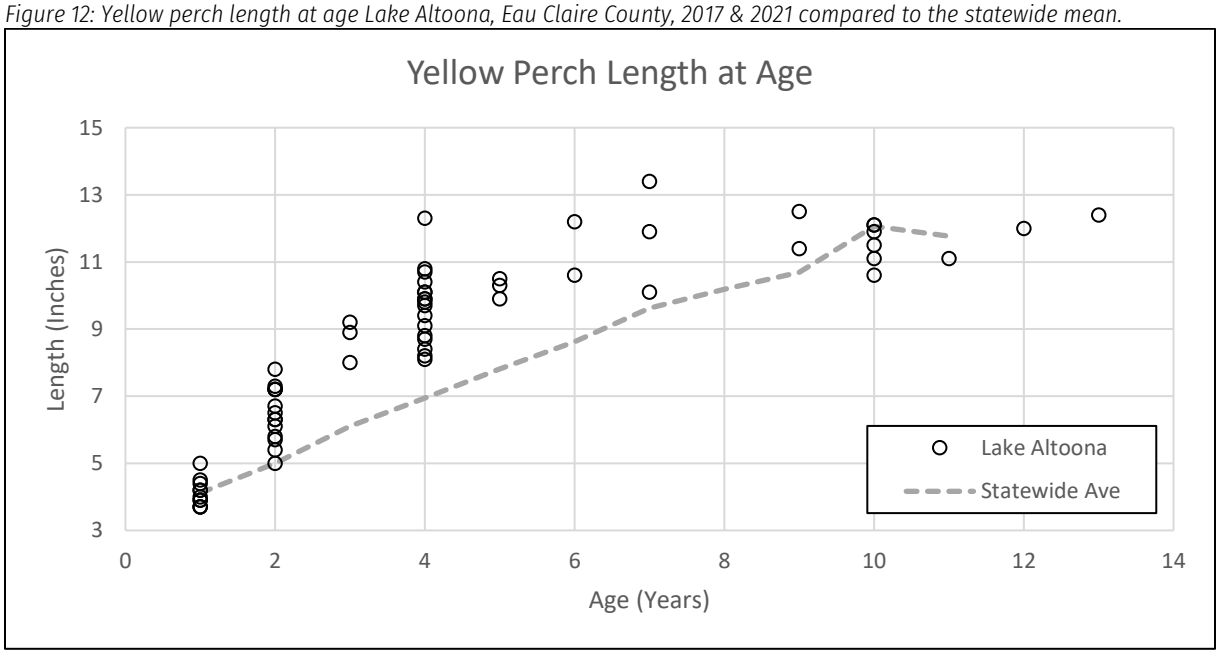


Figure 12: Yellow perch length at age Lake Altoona, Eau Claire County, 2017 & 2021 compared to the statewide mean.



BLUEGILL

Bluegill electrofishing catch rate increased substantially in 2025 to 56 fish per mile compared to the mean from the previous three surveys (2012-2021) of 3.5 fish per mile. Although the catch rate was higher, size structure was lower as the mean length of bluegill captured in 2025 was 5.9 inches (range: 3.4-9.9 inches) (Figure 13) which is smaller than the mean length of 7.1 inches from the previous three surveys. The PSD and RSD-8 were smaller also with the 2025 indices at 42 and 5, respectively, compared to mean PSD of 81 and RSD-8 of 44 over the previous three surveys. Bluegill growth rates were faster when compared to the statewide mean (Figure 14).

Figure 13: Bluegill length frequency Lake Altoona, Eau Claire County, 2025.

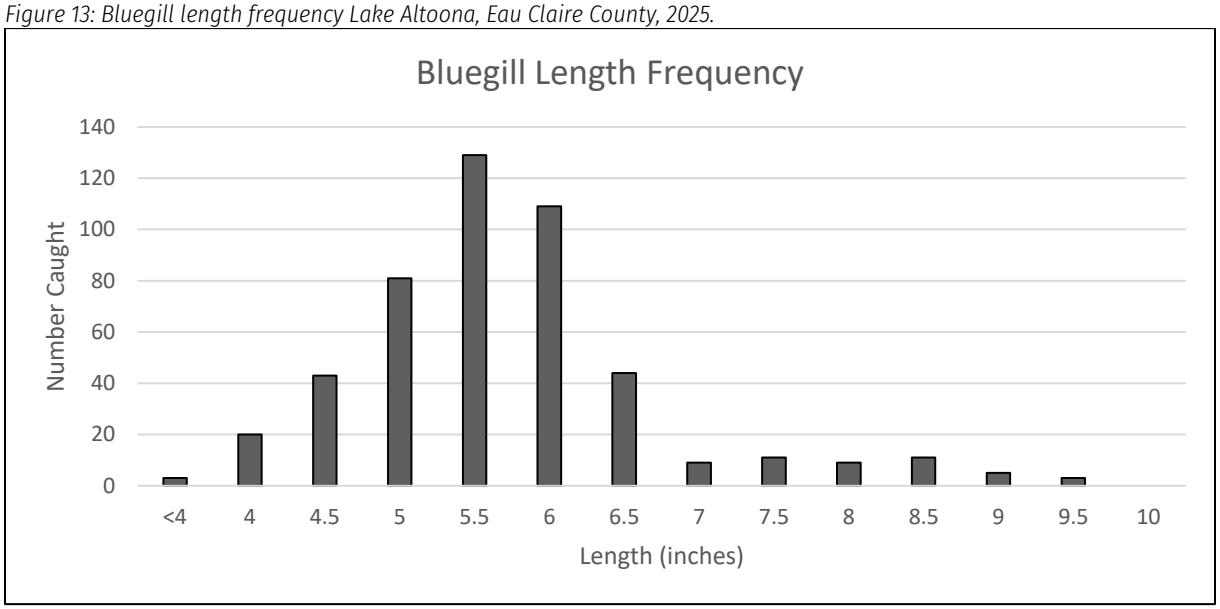
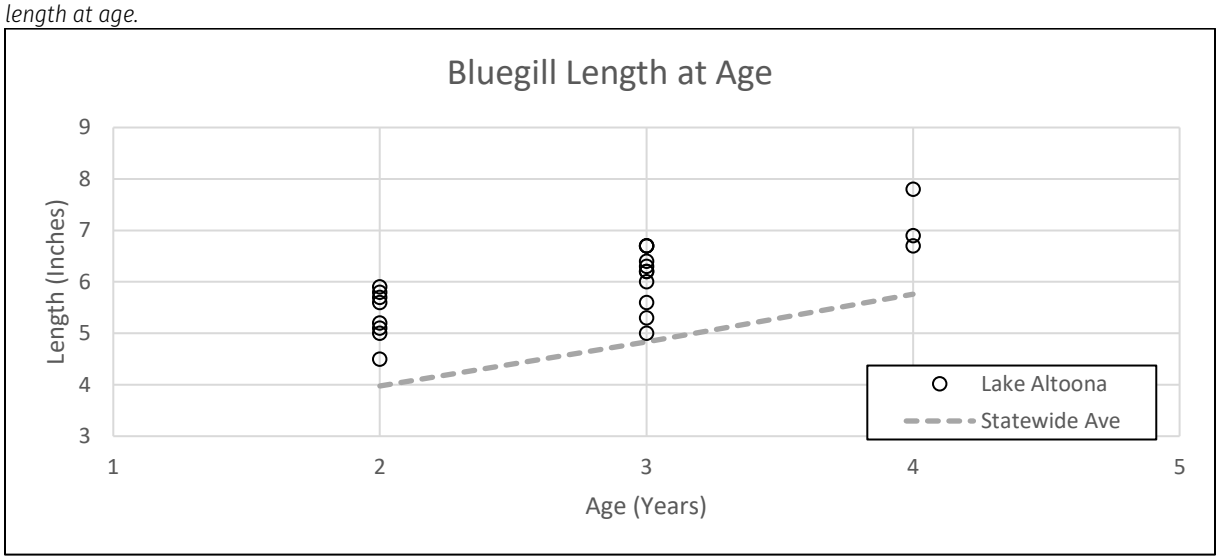


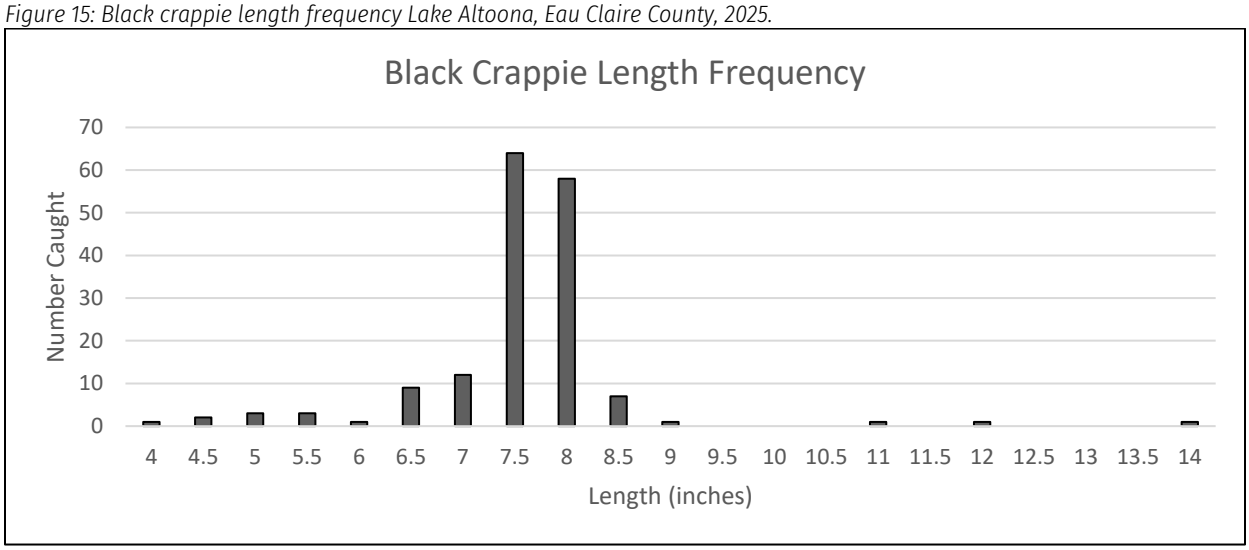
Figure 14: Length at age for bluegill on Lake Altoona, Eau Claire County, 2025, compared to the statewide average for bluegill length at age.



BLACK AND WHITE CRAPPIE

The black crappie electrofishing catch rate increased considerably in 2025 relative to data collected from the previous three surveys. Thirty-eight black crappie per mile were collected compared to a mean of 1.9 fish per mile over the prior three surveys (2012-2021). Despite the higher catch rate, size structure indices were lower as the mean length was 7.8 inches (range: 4.3-14.2 inches) the PSD was 43 and the RSD-10 was 2 (Figure 15). Over the past three surveys, the mean length was 9.1 inches, the PSD 86 and the RSD-10 was 59. All the black crappie aged were two years old, and the mean length was 7.7 inches. The mean length throughout the state for a two-year-old black crappie is 5.8 inches, so growth rates appear above the statewide mean for the limited number of fish that were aged. No white crappie were caught in this survey, but they have been caught in past surveys on Lake Altoona at very low levels.

Figure 15: Black crappie length frequency Lake Altoona, Eau Claire County, 2025.



Discussion:

WALLEYE

The walleye population in Lake Altoona is still in healthy condition despite a decline in adult abundance from the previous survey. The 2025 adult walleye population estimate was 3.5 adults per acre, or 2,915 fish. The population is back down to a level typically seen in walleye lakes sustained by a natural reproduction in northern Wisconsin which is between three and four adults per acre. There should not be a concern that the population came down considerably from the 2021 estimate of 9.9 adult walleye per acre because a population that large is not sustainable and likely occurred due to numerous factors aligning all at once (e.g. several strong year classes, good forage, limited mortality, etc.). The population size estimate in 2012 was 3.6 adults per acre so the 2025 estimate is very close to that and at a level more characteristic of a lake such as Lake Altoona given its habitat attributes.

One reason why the adult walleye population is at its current level is that Lake Altoona has a history of excellent natural reproduction. From 2011-2025, Lake Altoona averaged 103 age-0 walleye per mile of shoreline electrofished. This average catch rate is high considering a catch rate of 20 age-0 walleye per mile will generally produce a year class that will survive to adulthood. Eleven age classes were represented in the adult population which is a sign of consistently strong natural reproduction that produced consecutive adult year classes. Walleye year class strength is known to be highly variable and is likely primarily driven by environmental conditions, so it is common to have consecutive poor year classes followed by a large year class that generally helps compensate for poor spawning success in prior years. This phenomenon can be seen in the Lake Altoona age-0 catch rate data. There are plans to continue annual fall electrofishing surveys to monitor walleye year class strength for the foreseeable future.

The male to female ratio of adult walleye captured during the 2025 survey was 5.4:1, which is at a fairly normal level and down from a highly skewed male to female sex ratio of 22.8:1 observed in the 2021 survey. In 2021, 92% of the walleye captured were male, 6% were female and the sex could not be determined for the remaining 2% of fish. The sex ratio captured in a survey is not likely the true sex ratio in the population, but it is biased due to different spawning behaviors between male and female walleye. Male walleye are known to frequent the spawning grounds for a longer period of time than female walleye which increases their probability of being captured in the survey. It is not uncommon to have a skewed sex ratio of male walleye in a survey, but a ratio of 22.8:1 is extremely high, so it was good to see it come back down to a more normal level. For example, the sex ratio of walleye in 2012 was 4.1:1. Based on the information collected in the 2025 survey, there is no reason to be concerned about the lack of females in the population and the results from the 2021 survey were likely a sampling artifact.

The size structure of the adult population continues to be impressive. The mean length of walleye has steadily been improving since the 2012 survey. It has increased from 15.3 inches in 2012 to 16.0 inches in 2021 to 17.0 inches in 2025. It is atypical to have a population with an average sized walleye of 17 inches in the northern part of the state. Generally, a good portion of the population is below the minimum length limit of 15 inches, but 81% of the adult population surpassed this mark in Lake Altoona. The RSD-20, or proportion of fish over 10 inches that are also over 20 inches, has increased steadily as well from 3 in 2012 to 4.3 in 2021 to 12 in 2025. Improvements in size structure may be partially due to the Ceded Territory walleye regulation, a 15 inch minimum size limit and a 20 to 24 inch protected slot, which went into effect on Lake Altoona in 2016. This regulation is more protective of larger walleye, comprised mainly of females, than the previous regulation of a 15 inch minimum length limit. Strong growth rates are another reason for the excellent size structure. Most of the female walleye are growing faster than the statewide average and male walleye are growing near the statewide average. Strong growth rates are likely fueled by the abundant yellow perch population as they are a typical prey item for walleye and commonly found in their diets when they coexist. The robust yellow perch population may make it difficult for anglers to catch walleye as their preferred prey item is in abundance. Evidence of limited harvest is portrayed in the age structure of the population as there are strong, older year classes (age-6 through age-9) indicating survival to older ages. If there are poor yellow perch year classes in the future, there could be a lot of hungry walleye in Lake Altoona making for potential future successful fishing trips.

SMALLMOUTH BASS

Smallmouth bass are the dominant bass species in Lake Altoona which can be attributed to the habitat that is available. Smallmouth bass prefer riverine environments compared to largemouth bass, so smallmouth bass are likely benefiting from the connection that Lake Altoona has with the Eau Claire River. The catch rate of smallmouth bass fell in the 2025 survey to 4.3 per mile, which is less than half of the mean catch rate observed in the three previous survey (2012-2021), but size structure showed great improvements. The mean length in the 2025 survey was 17.0 inches, an increase of 4.0 inches relative to past surveys. The RSD-18, or proportion of fish greater than 7 inches that were also over 18 inches, was 32 compared to a mean of 7.8 from the three previous surveys. This is a substantial increase in size structure and indicative of a healthy smallmouth bass population as almost one third of the smallmouth bass captured were 18 inches or greater. Near trophy sized fish were present in the 2025 survey as smallmouth bass up to 19.8 inches were sampled.

NORTHERN PIKE

The northern pike population has shown the most improvement among gamefish species in Lake Altoona since the last survey. In the 2025 survey, 108 northern pike were captured, or 3.6 per net night, which is almost a three-fold increase from the

mean catch rate of 1.3 per net night from the previous surveys. Size structure showed improvements as well with the mean length at 25.3 inches in the 2025 survey, which is up over two inches relative to the mean from the past surveys. The RSD-28, or proportion of fish greater than 14 inches also over 28 inches, was 25, an increase of 5 from the prior surveys mean. Growth rates remain above the statewide mean, so stunting is not an issue. Yellow perch are a common diet item for northern pike, and the strong yellow perch population likely contributes to the strong growth rates. With the yellow perch catch rates much higher in the 2025 survey and size structure down slightly, the increasing northern pike population may help reduce the yellow perch density and improve size structure. All in all, the northern pike population is a great supplemental gamefish opportunity to have in Lake Altoona with many quality fish present in the population.

PANFISH

YELLOW PERCH: Yellow perch are likely the primary quarry for most anglers that fish Lake Altoona and the 10 panfish bag limit is helping protect their population. Catch rates increased to 653 yellow perch per net night. This is over double the mean catch rate of 296 per net night from the previous surveys. Catch rate would have been even higher in the 2025 survey, but the net with the highest catch rates was moved to a different location as catch rates were getting too high to process in a timely manner with over 3,000 yellow perch per net night. These catch rates are likely some of the highest seen in Wisconsin lakes. The mean length was down 0.4 inches from the mean of 8.9 inches from previous surveys. The RSD-10 was down slightly as well, but still in good shape at 22 which means when only when taking into account yellow perch 5 inches and greater, 22% were over 10 inches. Otoliths were taken from yellow perch during prior surveys, which provides a more reliable age estimate than other structures. The age estimates showed fast growth rates that were well above the statewide average. Spines were taken from a subsample of yellow perch from the 2025 survey and confirmed above average growth rates still remain. Fast growth rates are likely the main contributor to the phenomenal yellow perch fishery in Lake Altoona. The fast growth rates will likely compensate for minor dip in size structure, and given large increase in catch rates, the yellow perch population is set up for success in the coming years.

BLUEGILL:

The bluegill population has taken off in Lake Altoona relative to previous survey data as this species was historically at a very low baseline level. Catch rates were 56 per mile in 2025 compared the mean catch rate of 3.5 per mile from previous surveys. This is a drastic improvement and a great sign for the Lake Altoona fishery. The population of bluegill appears to be young as only three year classes (age-2 to age-4) comprised the majority of the population. Given that the population is made up of young fish, the mean length of the bluegill population was lower by 1.2 inches. Stunting does not appear to be an issue as growth rates were well above the statewide average. Overtime, this population will grow into a size range more

desirable to anglers and contribute to the excellent panfish fishery in which Lake Altoona is known.

BLACK CRAPPIE:
There was a large age-2 black crappie year class present in the population during the 2025 survey, and this age class comprised the majority of the catch. Crappie are known to have variable recruitment, which means they have 'boom or bust' year classes, and the 2023 year class appears to have been a good one in terms of recruitment. Catch rates were 38 black crappie per mile of shoreline sampled compared to a mean of 1.9 from prior surveys. The age-2 year class comprised roughly 80% of the catch and the mean length of this cohort was 7.7 inches. The statewide average for an age-2 crappie is 5.8 inches indicating faster than average growth rates. If the age-2 year class continues to grow faster than the statewide average, by age-4 (2027) they should be reaching the 10 inch mark, which is typically a size that is desirable by anglers. The future of the black crappie fishery looks bright, and upcoming survey data will determine if this year class will survive to a creelable size.

FISH HABITAT

Steps can be taken to improve panfish habitat which could lead to improvements in population sizes. Nearshore woody habitat is lacking in Lake Altoona which was made particularly apparent during the 2016 drawdown. Nearshore woody habitat serves many fish habitat purposes. Various fish species spawn near submerged trees such as bluegill, bass, crappie and perch. Downed trees also provide refuge habitat from predators for panfish and juvenile gamefish species. Considering small fish use nearshore woody habitat, it serves as a great foraging habitat for gamefish. Fallen trees can contribute to improving water quality by dissipating wave energy and reducing the erosive power of waves saving the shoreline from being washed into the lake. Downed trees can increase the productivity of a lake by providing a surface for periphyton (algae) to grow, which feeds off the nutrients of the decaying wood. Once periphyton becomes established, trees are colonized by aquatic insects which feeds on the periphyton. After aquatic insects take up residence, forage fish, panfish and juvenile gamefish will forage on the aquatic insects. Once smaller fish start using the downed trees for foraging or refuge, adult gamefish will use it for feeding as well. An entire mini-ecosystem is created from downed trees. Nearshore woody habitat can also be added by not removing fallen trees from a lake, and by a tree drop or fish stick project which are artificial ways to increase the number of downed trees along the shoreline. In recent years, members of the Lake Altoona improvement and rehabilitation district along with local conservationists teamed up to install nearshore woody habitat structures along the shoreline and they should be commended for their efforts to improve fish habitat on the lake.