

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
2023 Lake Eau Galle Comprehensive Lake Survey
Report

Waterbody Code 2056600



Photo Credit: Kasey Yallaly



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Executive Summary

Lake Eau Galle is a small impoundment on the Eau Galle River in southern Dunn County. The lake contains a diverse sport and panfishery and supports heavy angling pressure. The lake is currently surveyed by Wisconsin Department of Natural Resources (DNR) on an 8-year rotation with the last survey in 2015. A comprehensive fisheries survey was conducted in the spring of 2023. Fyke nets and boat electrofishing gear were used to determine the current health and status of the fishery. Largemouth bass *Micropterus salmoides*, bluegill *Lepomis macrochirus* and black crappie *Pomoxis nigromaculatus* were present in high densities. Largemouth bass exhibited excellent size structure. Black crappie were overabundant and exhibited poor size structure and growth rates. The northern pike *Esox lucius* population had excellent size structure and had established natural reproduction following the end of stocking in 2018. Stocking is no longer needed to supplement the population. The current fishing regulations are appropriate for Lake Eau Galle and angler harvest is encouraged for largemouth bass, northern pike, bluegill and black crappie to reduce or maintain densities, improve or maintain size structure and growth rates. Fisheries habitat improvements are recommended to enhance near shore habitat for multispecies benefits.

Introduction

Lake Eau Galle is a 351 acre impoundment on the Eau Galle River located near the Town of Eau Galle in southwestern Dunn County. There is a public utility dam at the outlet that was created for flood control purposes. The lake has a maximum depth of 18 feet and approximately 7 miles of shoreline. The lake is classified as a Complex Riverine Lake in Wisconsin's lakes classification system. Lake Eau Galle has two public boat landings. One is located on the south end of the lake within the Village of Eau Galle and the other is in Pineview County Park on the southeast side of the lake. Water clarity is generally poor due to suspended sediment and algal blooms. High sand loads from the Eau Galle River upstream of the lake have caused considerable sedimentation within the lake and the average maximum and average depths of the lake have decreased, especially on the upstream end of the impoundment. Fish habitat improvement has been extensive on Lake Eau Galle. Much of the lake shore has been stabilized by use of rip rap by the Eau Galle Sportsman's Club to prevent erosion. Low visibility limits the growth of submerged plants and limits near shore fish habitat. Fish cribs, boulder clusters and tree drops have been installed in the past to provide fish cover. Water depth and silt limit deep water fish habitat potential, only near shore habitat alternatives are applicable on a large scale. Invasive species present include curly-leaf pondweed *Potamogeton crispus* and eurasian water-milfoil *Myriophyllum spicatum*. Lake Eau Galle is managed for northern pike, largemouth bass and panfish. Currently, no stocking occurs in the lake. Northern pike stocking ceased after 2018 to evaluate stocking success and determine if natural reproduction occurs (Table 1).

High densities of common carp *Cyprinus carpio* have been an ongoing issue within the lake and past management has focused on removals. Past removals have been difficult due to lake bathymetry and connected waterbodies and success has been short lived. Water level drawdowns, chemical treatment and commercial harvest have been used as control methods. During the 1950-60's rough fish control focused on water level manipulations and chemical spot treatments to control carp spawning without success. During 1971, a major whole lake, chemical treatment effort was completed which also was unsuccessful in the long term. During the 1980's commercial fishing was used for rough fish control. This also proved ineffective and commercial rough fish removal was discontinued. Rough fish removal occurred during the 1997 draw down, however carp populations have since rebounded.

Periodic whole or partial drawdowns were also common throughout management history for dam repairs or rough fish control. Major drawdowns were often followed by fishery rehabilitation through stocking. Stocking usually occurred for three consecutive years to restore the fishery and species that were not self-sustaining were stocked on an alternate year basis following the initial rehabilitation. Major drawdowns occurred in 1971, 1979/1980 and 1997. At the time of the 2002 survey, the size structure of the fish community was not fully recovered from the 1997 drawdown.

Table 1. Stocking history of Lake Eau Galle.

YEAR	SPECIES	AGE CLASS	NUMBER STOCKED
1992	WALLEYE	FINGERLING	8765
1994	WALLEYE	FINGERLING	17550
1996	WALLEYE	FINGERLING	8960
1998	WALLEYE	SMALL FINGERLING	17550
1998	LARGEMOUTH BASS	SMALL FINGERLING	17550
1998	NORTHERN PIKE	SMALL FINGERLING	700
1999	WALLEYE	SMALL FINGERLING	15550
1999	LARGEMOUTH BASS	SMALL FINGERLING	52650
1999	NORTHERN PIKE	LARGE FINGERLING	700
2000	WALLEYE	SMALL FINGERLING	17550
2000	NORTHERN PIKE	SMALL FINGERLING	700
2006	WALLEYE	SMALL FINGERLING	12270
2006	NORTHERN PIKE	LARGE FINGERLING	700
2008	NORTHERN PIKE	LARGE FINGERLING	692
2012	NORTHERN PIKE	LARGE FINGERLING	750
2014	NORTHERN PIKE	LARGE FINGERLING	1400
2014	NORTHERN PIKE	SMALL FINGERLING	700
2016	NORTHERN PIKE	LARGE FINGERLING	700
2018	NORTHERN PIKE	LARGE FINGERLING	700

Methods

SURVEY EFFORT

Lake Eau Galle was sampled according to standard Spring Netting I and Spring Electrofishing II protocols as outlined in DNR Fisheries Monitoring Protocols. The primary objective for the Spring Netting I survey is to estimate relative abundance and size structure of northern pike. Boom shockers were used to electrofish the entire shoreline after water temperatures exceeded 70°F. Gamefish were collected and measured throughout, and panfish were collected and measured. A total of eight fyke nets were set on April 11, 2023 and were ran until April 18th for a total of 48 net nights. Fyke nets were deployed in areas of the lake that contained spawning habitat or were likely travel areas for northern pike. All newly captured northern pike were given a partial fin clip.

All gamefish, panfish and non-game species caught during this portion of the survey were counted, measured and weighed. Aging structures and weights were collected from a subsample of each species and are processed in a lab to estimate recruitment, growth and mortality of gamefish and panfish species.

METRIC DESCRIPTIONS

Catch per unit effort (CPUE) is an index used to measure fish population relative abundance, which simply refers to the number of fish captured per unit of distance or time. For netting surveys, CPUE is quantified by the number and size of fish per net night. For electrofishing, CPUE is quantified as the number caught per mile of shoreline electrofished. CPUE indexes are compared to statewide data by percentiles and within lake trends. For example, if a CPUE is in the 90th percentile, it is higher than 90% of the other CPUEs in the state.

Proportional Stock Density (PSD) is an index used to describe the size structure of fish populations. It is calculated by dividing the number of quality size fish by the number of stock size fish for a given species. PSD values between 40 - 60 generally describe a balanced fish population.

Length frequency distribution is a graphical representation of the number or percentage of fish captured by half-inch or one-inch size intervals. Smaller fish (or younger age classes) may not always be represented in the length frequency due to different habitat usage or sampling gear limitations.

Mean length at age is an index used to assess fish growth. Calcified structures (e.g., otoliths, spines or scales) are collected from a specified length bin of interest (e.g., 7.0-7.5 inches for bluegill). Mean age is compared to statewide data by percentile with growth characterized by the following benchmarks: slow (<33rd percentile); moderate (33rd to 66th percentile); and fast (>66th percentile).

Relative weight is an index used to assess the plumpness (i.e., condition) of fish. It is calculated by comparing the observed weight of a fish to the standard weight (i.e., predicted average weight) of that fish, given its length. A relative weight of 93 means

it has average plumpness/weight compared to other fish of the same length. Relative weights above 93 mean it is plumper than average.

Results

NORTHERN PIKE

A total of 175 northern pike were collected during the netting survey and 20 were collected during the spring electrofishing survey for a catch rate of 3.7 fish per net night or 4.3 fish per mile. Relative abundance was higher than in 2015 in which CPUE was 2.3 fish per net night (Figure 1). Pike ranged in length from 9.0 to 43.2 inches and mean length was 24.7 inches (Table 2; Figure 1) which increased from mean length in 2015 of 22.6 inches. PSD for Northern Pike was 77 and RSD-P was 32. Both PSD and RSD-P increased from the 2015 survey of 74 and 21, respectively. Approximately nine percent of fish were larger than 34 inches and 24 percent were larger than 30 inches. Relative weight of northern pike was good with a W_r value of 93. Based on length frequency analysis, recruitment of northern pike appeared to be consistent with evidence of natural reproduction since the conclusion of stocking in 2018. Based on age analysis of fish in the 18–19 inch range, fish less than 20 inches can be considered the result of natural reproduction within the lake. Catch rates of fish ≤ 20 inches was 0.88 fish per net night. Growth of northern pike was considered to be slow for both females and males with mean age of females in the 18.0-18.9 inch range in the 25th percentile and males in the 33rd percentile.

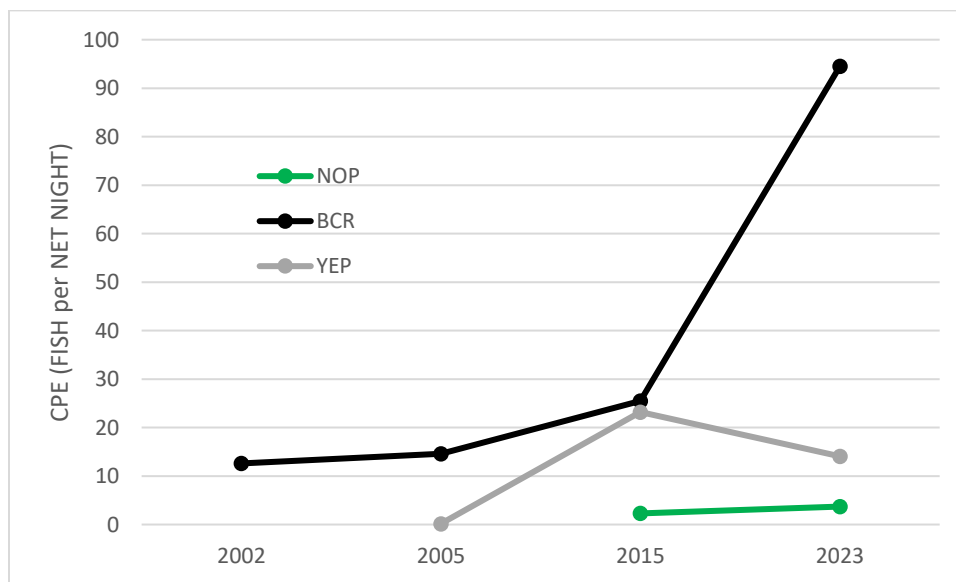


Figure 1. Catch rates (CPUE) of northern pike (NOP), black crappie (BCR) and yellow perch (YEP) from 2002 to 2023 in fyke netting surveys expressed as fish per net night.

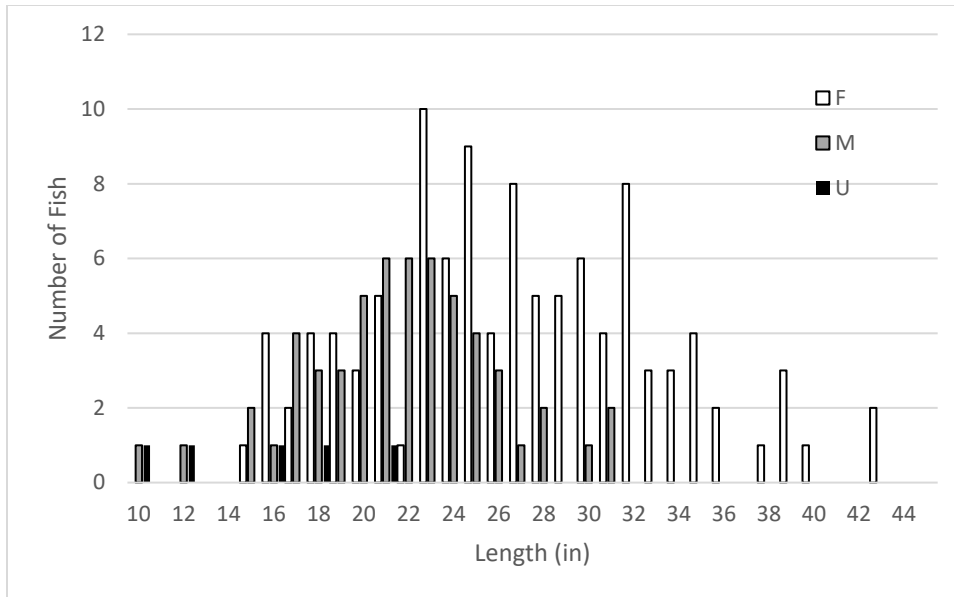


Figure 2. Length frequency distribution of northern pike collected from fyke nets in Lake Eau Galle in Dunn County in 2023. White bars represent females (F), gray bars represent males (M) and black bars represent unknown (U) sex fish.

LARGEMOUTH BASS

Largemouth bass were the most abundant gamefish species sampled in Lake Eau Galle. Catch rates were high with 101.4 captured per mile of shoreline which was substantially higher than in 2015 during which CPUE was 28.3 fish per mile (Figure 3). A total of 435 were sampled during the spring electrofishing survey and 27 were sampled during the netting survey. Largemouth bass ranged in length from 4.6 to 19.6 inches with a mean length of 13.1 inches (Table 2; Figure 4). Mean length of bass declined slightly from the 2015 estimate of 14.3 inches. PSD of bass was 67 and RSD-P was 33. PSD declined slightly from the 2015 estimate of 79 while RSD-P was similar. Approximately 42% of the sample were larger than 14 inches and 22% were larger than 16 inches. Recruitment of largemouth bass was relatively consistent with strong age 3, 4, 7, 11 and 12-year classes resulting from the years of 2020, 2019, 2016, 2012 and 2011 (Figure 5). Weak year classes resulted from the years of 2018, 2017 and 2013. Growth of bass in terms of mean length at age was average for young fish (≤ 5 years of age) and slightly below average for older fish (≥ 5 years of age) (Figure 6). Bass reached legal harvestable size in approximately 4.5 years. Ages of largemouth bass collected during the survey ranged in age from 1 to 14 years of age. The catch curve regression model (fitted to age-3 to age-14) estimated annual mortality to be 20.7% ($Z = -0.23$, $R^2 = 0.6$).

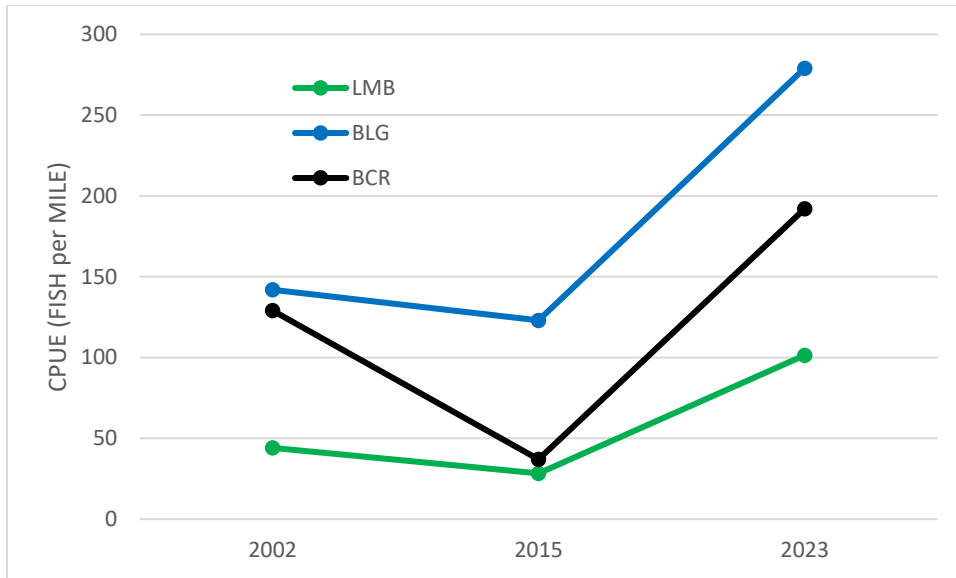


Figure 3. Catch rates (CPUE) of largemouth bass (LMB), bluegill (BLG) and black crappie (BCR) from 2002 to 2023 from spring electrofishing surveys.

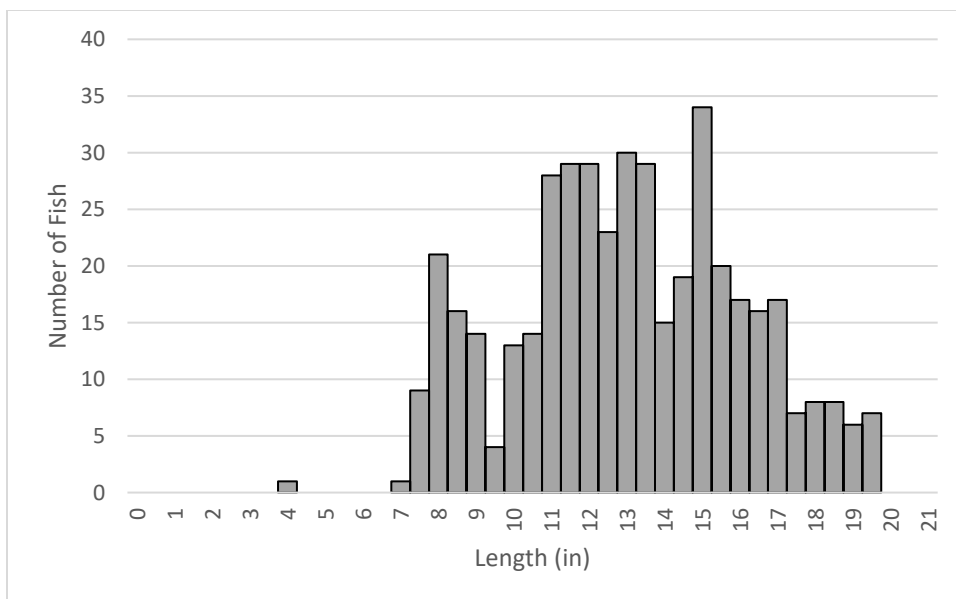


Figure 4. Length frequency distribution of largemouth bass collected via night-time boat electrofishing in Lake Eau Galle in Dunn County in 2023.

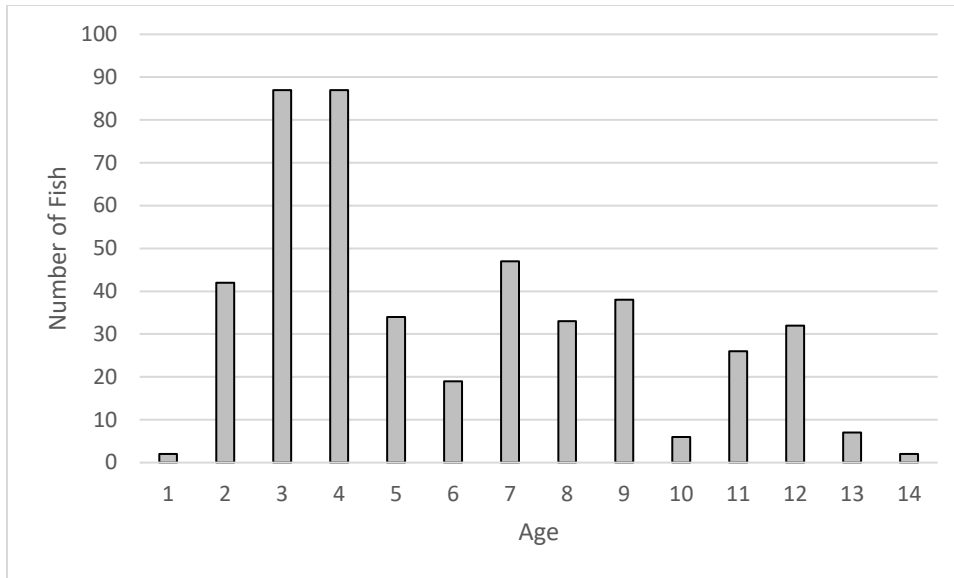


Figure 5. Age frequency distribution of largemouth bass collected via night-time boat electrofishing in Lake Eau Galle in Dunn County in 2023.

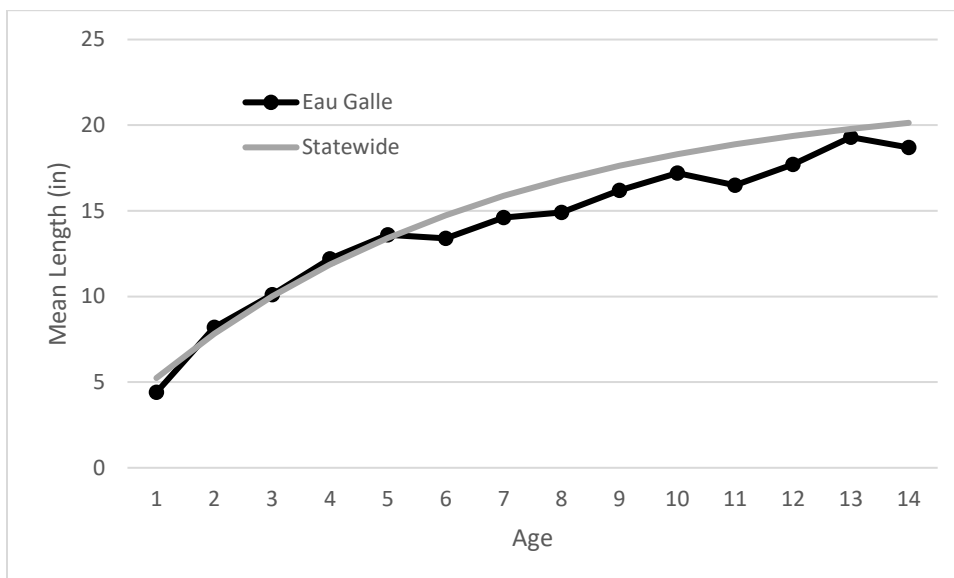


Figure 6. Mean length at age of largemouth bass collected from Lake Eau Galle in Dunn County in 2023 and mean length at age of largemouth bass from Complex Riverine lakes across Wisconsin.

BLACK CRAPPIE

Black crappie were very abundant during the 2023 survey and a total of 4,728 were captured throughout the surveys. CPUE was high in fyke nets and resulted in a catch rate of 94.5 fish per net night (Table 2), considerably higher than in 2015 during which the CPUE was 25 fish per net night (Figure 1). Lengths of crappie ranged from 2.5 to 11.3 inches and mean length was 8.1 inches (Figure 7). Mean length of crappie in 2023 was higher relative to the 2015 survey of 6.2 inches. PSD was 66 and RSD-P was 1 which is similar to the 2015 survey in which PSD was 73 and RSD-P was 2. Crappie

exhibited relatively erratic recruitment with strong years classes followed by years of weaker year classes. Currently, the majority of crappie with Lake Eau Galle are composed of the age-5 and age-6 or 2018 and 2017 year classes which currently average 7.7 and 8.5 inches in length, respectively (Figure 8). Growth rates of black crappie were very slow when compared to the statewide average mean length at age for crappie in similar lakes (Figure 9). Growth rates in 2015 were similar to the statewide average. On average, mean length at age-4 of black crappie in similar lakes statewide is 8.6 inches while crappie in Lake Eau Galle are 6.2 inches at that age. Mean length at age was 2.1 inches slower than the statewide average. Black crappie reached 8 inches in length in five years within the lake. Ages of black crappie collected from Lake Eau Galle ranged from 1 to 9 years. Despite slow growth rates, condition of black crappie was good with a mean Wr of 96.

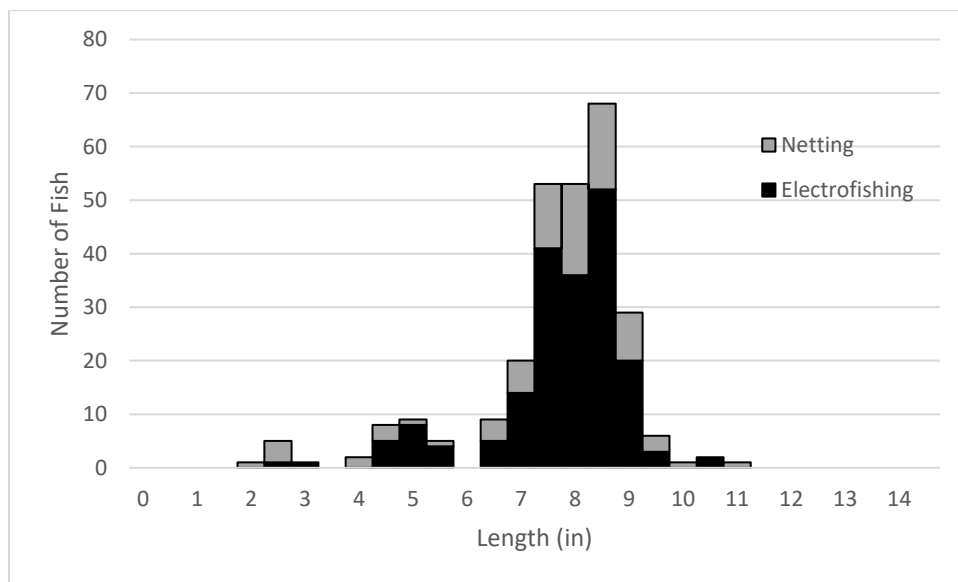


Figure 7. Length frequency distribution of black crappie collected via night-time boat electrofishing and fyke nets in Lake Eau Galle in Dunn County in 2023.

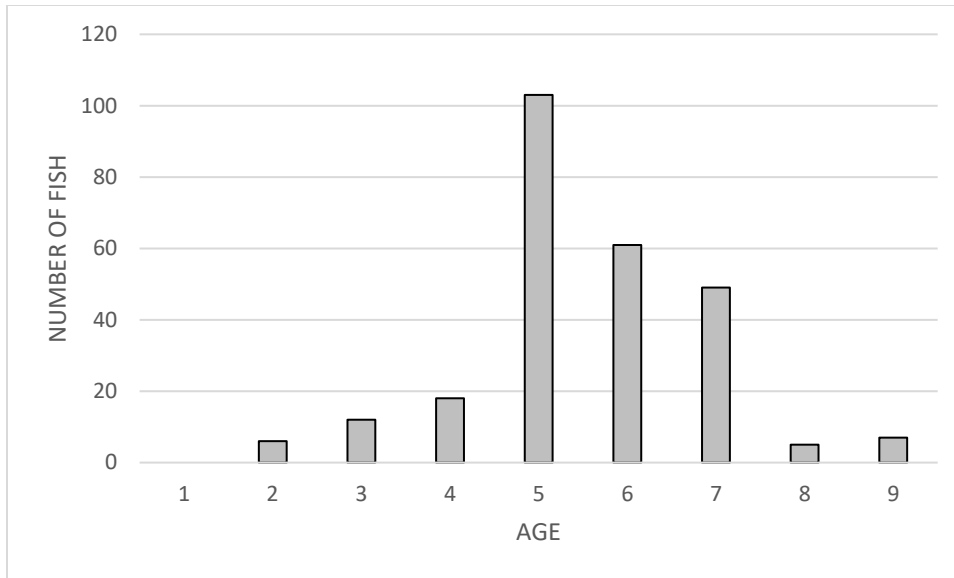


Figure 8. Age frequency distribution of black crappie collected via night-time boat electrofishing in Lake Eau Galle in Dunn County in 2023.

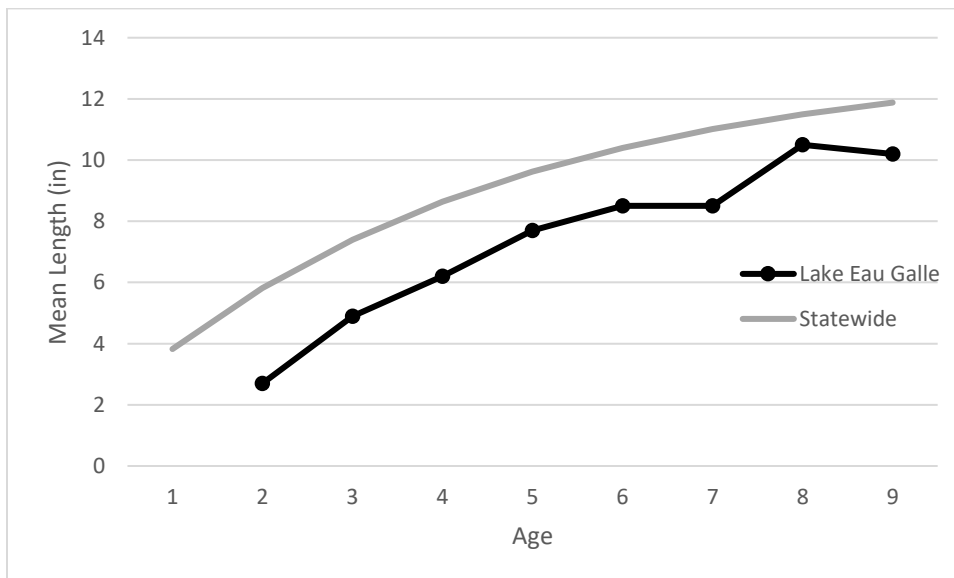


Figure 9. Mean length at age of black crappie collected from Lake Eau Galle in Dunn County in 2023 and mean length at age of black crappie from Complex Riverine lakes across Wisconsin.

BLUEGILL

Bluegill were the second most abundant panfish species in the lake and a total of 2,277 were sampled throughout the surveys. Catch rates were high at 279 fish per mile of shoreline which increased from the 2015 survey CPUE of 123 fish per mile (Figure 3). Bluegill ranged in length from 2.0 to 9.2 inches and had a mean length of 5.7 inches (Figure 10) which was similar to mean length in 2015 of 5.6 inches. PSD of bluegill was 39 and RSD-P was 5. PSD declined from the 2015 estimate of 53 but RSD-P was similar at 3. Approximately 5% of bluegills were larger than 8 inches. Relative weight of bluegill was excellent with a mean of 101. Recruitment of bluegill was consistent

based on age frequency analysis, however the age-5 (2018) year class appeared to be weak (Figure 11). Growth of bluegill appears to be average when compared to Complex Riverine lakes across the state (Figure 12), but growth has declined from 2015 in which growth rates were above average. On average, bluegill reached 7 inches in five years. Ages of bluegill collected in the survey ranged from 1-10 years of age. Mortality of bluegill appears to increase sharply after age 4.

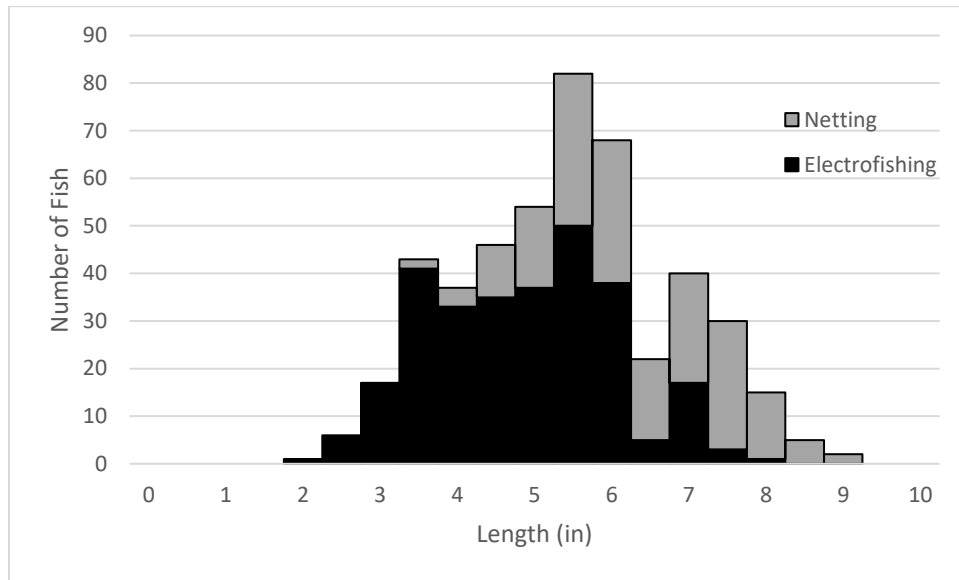


Figure 10. Length frequency distribution of bluegill collected via night-time boat electrofishing and fyke nets in Lake Eau Galle in Dunn County in 2023.

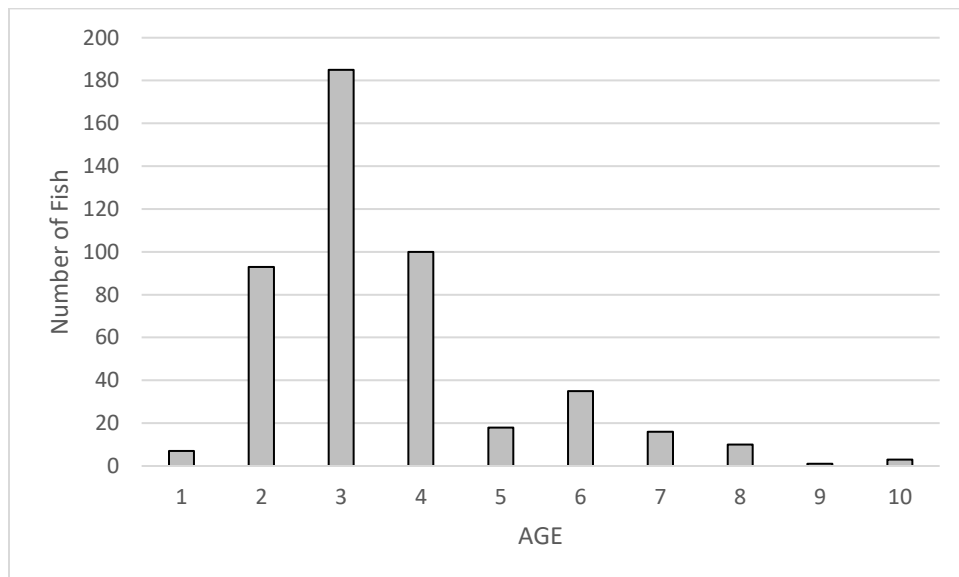


Figure 11. Age frequency distribution of bluegill collected via night-time boat electrofishing in Lake Eau Galle in Dunn County in 2023.

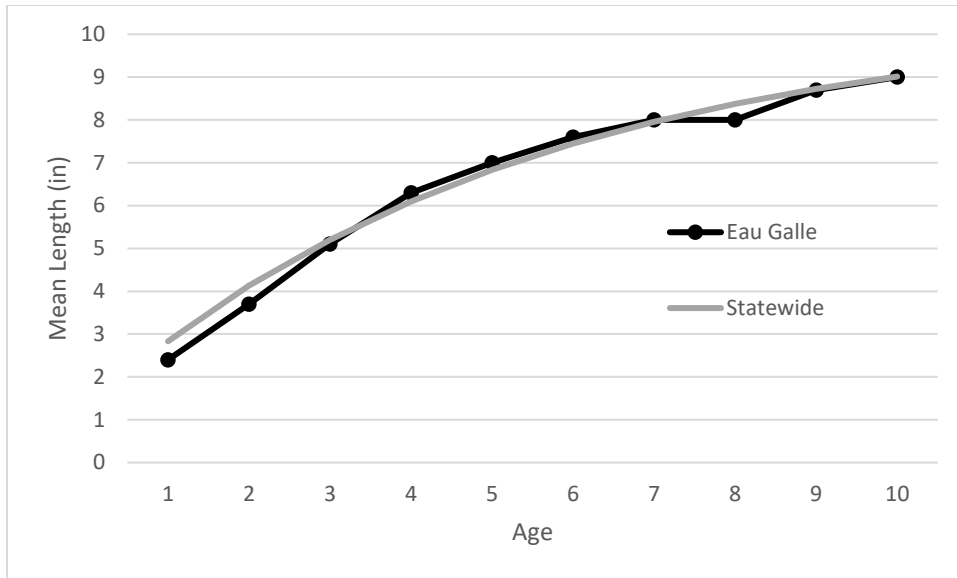


Figure 12. Mean length at age of bluegill collected from Lake Eau Galle in Dunn County in 2023 and mean length at age of bluegill from Complex Riverine lakes across Wisconsin.

YELLOW PERCH

Yellow perch *Perca flavescens* were found to be in moderate abundance with a total of 693 captured during the netting and electrofishing surveys. Catch rates in fyke nets were moderate to high at 14.1 fish per net night which was within the 75th percentile for similar lakes statewide (Table 2). Catch rates of perch declined from the 2015 survey of 23.2 fish per net night (Figure 1). Perch ranged in length from 3.4 to 9.5 inches and had a mean length of 5.4 inches (75th percentile; Figure 13), which was lower than the 2015 estimate of 6.2 inches. Only 1 perch was larger than 8 inches in 2023, whereas 7% of the fyke net catch in 2015 were larger than 8 inches. Condition of yellow perch was excellent with a mean relative weight of 111. Recruitment of yellow perch appeared to be consistent with the exception of the strong 2019-year class (Figure 14). Growth of yellow perch was average during the first two years of life and then slowed to below average for age 3+ fish (Figure 15). On average, mean length at age of yellow perch was 1.6 inches less than the statewide average of perch in similar lakes after fish reach 3+ years of age. Yellow perch typically reached 8 inches in length in five years.

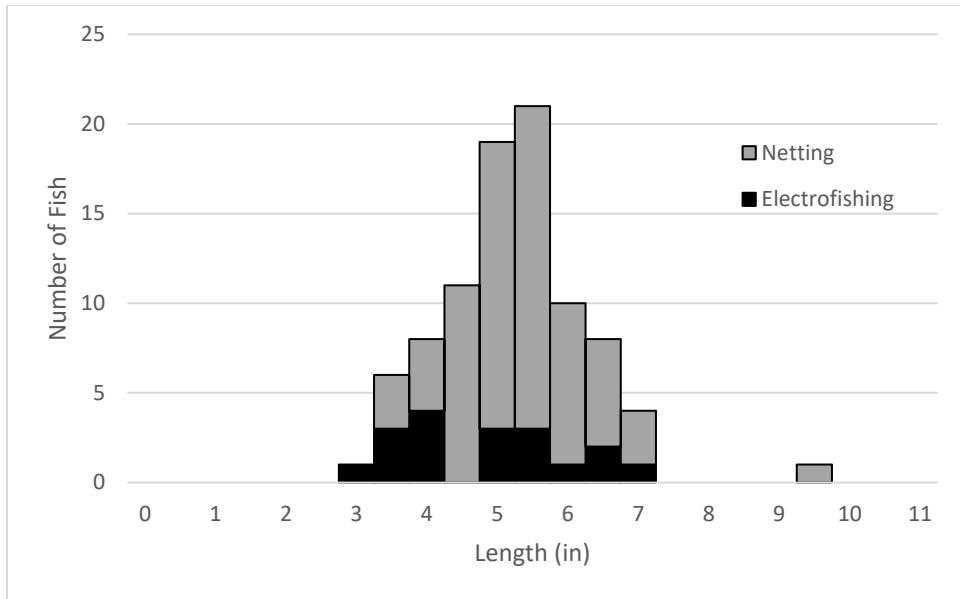


Figure 13. Length frequency distribution of yellow perch collected from Lake Eau Galle in Dunn County in spring 2023.

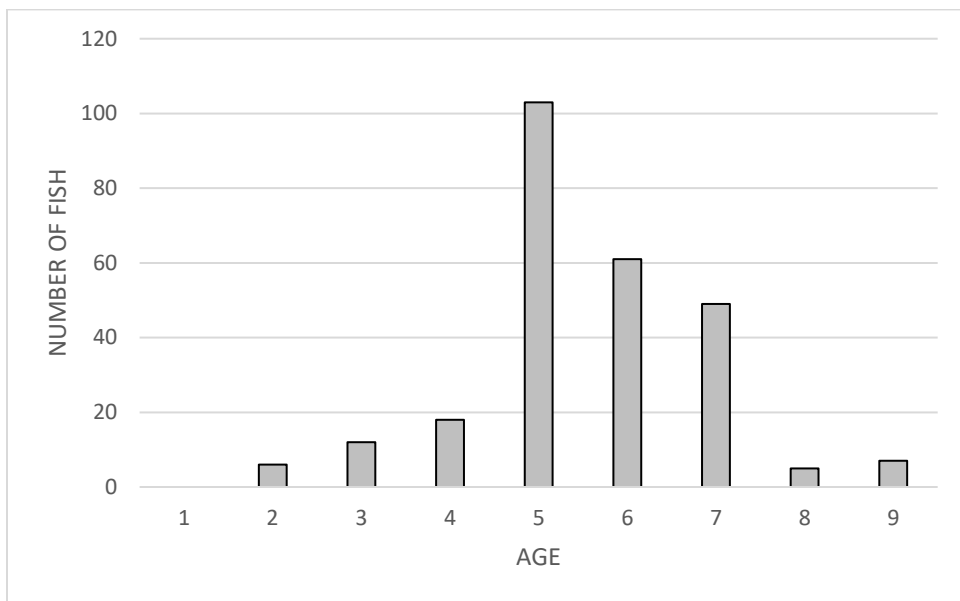


Figure 14. Length frequency distribution of yellow perch collected from Lake Eau Galle in Dunn County in spring 2023.

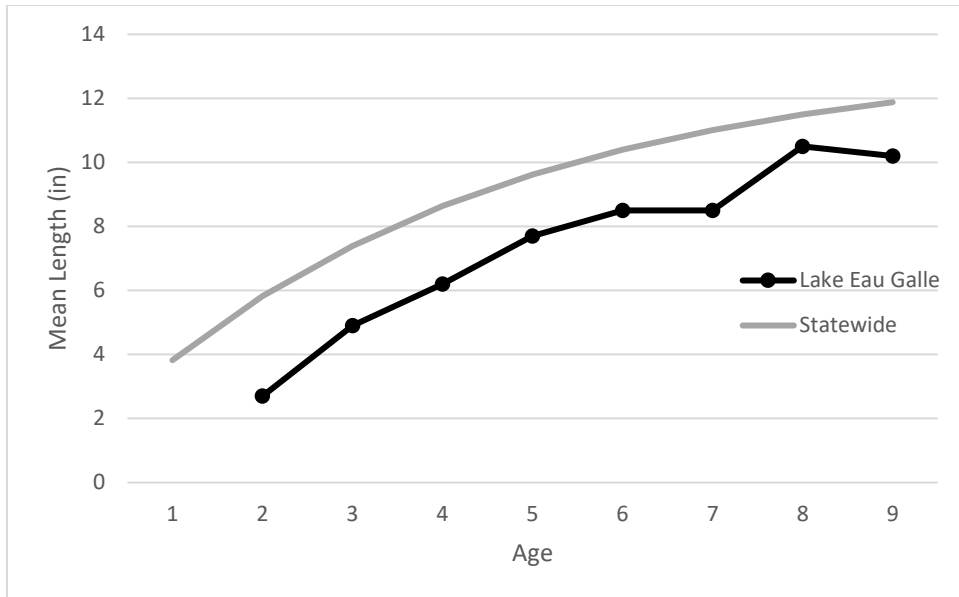


Figure 15. Mean length at age of yellow perch collected from Lake Eau Galle in Dunn County in 2023 and mean length at age of yellow perch from Complex Riverine lakes across Wisconsin.

Table 2. Survey summary metrics for fish species collected in the 2023 survey of Lake Eau Galle, Dunn County. Percentiles for lakes classified as Complex Riverine lakes in Wisconsin are listed in parentheses ().

SPECIES	NUMBER COLLECTED	CATCH PER UNIT EFFORT	LENGTH RANGE	MEAN LENGTH
NORTHERN PIKE	190	3.7 PER NET NIGHT (50)	9.8-43.2	24.7 (99)
LARGEMOUTH BASS	462	101.4 PER MILE (95)	4.6-19.6	13.1 (95)
BLUEGILL	2277	279.4 PER MILE (90)	2.5-9.2	5.7 (75)
BLACK CRAPPIE	4728	94.5 PER NET NIGHT (99)	2.5-11.3	8.1 (90)
YELLOW PERCH	693	14.1 PER NET NIGHT (75)	3.4-9.5	5.4 (75)
BIGMOUTH BUFFALO	5	1.2 PER MILE	-	-
BLACK BULLHEAD	11	0.2 PER NET NIGHT (25)	-	-
BROWN TROUT	4	0.1 PER NET NIGHT	9.7-15.8	13.0
COMMON CARP	65	1.4 PER NET NIGHT	18.4-33.7	25.6 (90)
GOLDEN REDHORSE	17	0.4 PER NET NIGHT	-	-
GOLDEN SHINER	284	-	-	-
PUMPKINSEED	1	-	-	-
WHITE SUCKER	198	4.1 PER NET NIGHT (95)	-	-
YELLOW BULLHEAD	21	0.4 PER NET NIGHT (25)	-	-

Discussion

Centrarchid populations within Lake Eau Galle have experienced increases in abundance relative to previous surveys. Catch rates of largemouth bass in particular, were above the 95th percentile compared to Complex Riverine lakes throughout the state. Catch rates during the 2015 survey were within the 75th percentile. Overall, bass exhibited excellent size structure with high PSD estimates, but still within the range of a balanced population. However, PSD and mean length of largemouth bass

declined from the 2015 survey along with an increase in abundance and reduction in growth rates (Engel and Scott 2015). It appears that largemouth bass size structure and growth rates are beginning to decline due to increases in densities and low mortality. Catch and release practices for bass species has increased in popularity and currently the majority of largemouth bass anglers rarely harvest bass, according to recent creel surveys on area lakes (Yallaly and Schurrer 2022). Declines in harvest of bass can negatively impact populations by allowing densities to increase to the point that density dependence factors become apparent (Hansen et al. 2015) and growth rates, size structure and individual fish condition declines. Therefore, harvest of largemouth bass is recommended to maintain or improve the current size structure and prevent negative impacts to the population. Recruitment of largemouth bass was somewhat consistent across years other than weak year classes in 2017 and 2018 which coincided with strong year classes of black crappie. Several studies have documented asynchronous recruitment among fish species within systems because species may respond differently to environmental variables and interactions among species may influence recruitment dynamics (Gopalan et al. 1998; Hall and Rudstam 1999; Madenjian et al. 2000). Largemouth bass recruitment has been shown to be positively related to increases in spring water levels, summer water levels and average summer air temperatures, whereas black crappie recruitment has been shown to be positively related to spawning stock abundance, spring water levels and summer water levels, and negatively related to rapid drops in spring water levels. (Michaletz and Siepker 2013).

Black crappie within Lake Eau Galle exhibited slow growth rates, high abundance and poor size structure. Abundance has increased dramatically since 2015 and growth rates have slowed since then as well. Three relatively large year classes are responsible for the increase in abundance. Density dependent factors are likely heavily influencing crappie demographics. Overabundant and slow growing crappie populations present challenges for management and improvement of the population. Angler harvest is currently not high enough to reduce densities and improve growth rates likely due to the fact that the size structure of crappies is skewed towards individuals that are not large enough for most anglers to harvest. However, harvest of crappie is encouraged in order to aid in improvement of growth rates and size structure of the population.

Bluegill densities were also high and have increased in abundance relative to previous surveys. Growth rates and size structure in terms of PSD has declined since 2015 but still remains at desirable levels and within the range of a balanced population. Growth rates of bluegill were average but were found to be above average in 2015 indicating a decline. Similar to largemouth bass, 2018 produced a weak year class of bluegill.

In addition to centrarchids, Lake Eau Galle contains a high-quality northern pike population that has continued to increase in abundance from previous surveys. Stocking ceased in 2018 to allow for a stocking evaluation during the 2023 survey.

Northern pike have established a naturally reproducing population and stocking is no longer needed to maintain or supplement the population. Pike exhibited excellent size structure with an increase in maximum length, mean length and PSD from 2015. However, growth rates are slow to average and the current liberal harvest regulations are appropriate for northern pike in Lake Eau Galle and angler harvest is recommended to maintain current densities and size structure.

Yellow perch have declined since 2015 but remain at moderate to high abundance as indicated by catch rates in the 75th percentile. The size structure of yellow perch is relatively poor with only one fish captured larger than 8 inches. Mortality of larger perch is likely high and may be due to high angler harvest. Perch also exhibited slow growth rates and may be experiencing high intra- and inter-specific competition with other species.

Common carp appeared to be present in high densities based off of fyke net catch rates in 2023 which is similar to previous surveys of the lake. Rough fish control in the form of chemical treatments and commercial harvest have occurred several times in the past with limited and short term success. Water level manipulations have also been used several times in attempts to reduce carp abundance but carp rebounded quickly. Several other native non-game species are present in the lake and do not negatively impact lake habitat or gamefish populations.

Overall, Lake Eau Galle contains a productive, diverse and popular sport and panfishery. Several major lake drawdowns occurred throughout the 1970s through the 1990s and negatively impacted the sport fish and panfish populations. Since then, populations have recovered well and no stocking is needed to supplement populations. Additionally, northern pike appear to have established a naturally reproducing population and stocking is no longer needed to sustain pike in Lake Eau Galle. The northern pike population exhibits excellent size structure but angler harvest is still encouraged to maintain this. Black crappie, bluegill and largemouth bass are present in high densities and angler harvest is encouraged on these populations to aid in reducing densities and increase growth rates and size structure.

Recommendations

No regulation changes are proposed for the lake. Regulations are currently liberal and encourage harvest of species which is desirable from a management perspective to improve or maintain growth rates and size structure of fish populations. Black crappie are overabundant and angler harvest is highly encouraged. Due to low water clarity which limits aquatic plant growth, providing additional fish habitat in the form of large woody debris is recommended. Near shore habitat installation projects in the form of fish sticks would benefit fish habitat and subsequent populations. Northern pike stocking is no longer needed or beneficial and is not recommended because of adequate natural reproduction.

1. No changes in fishing regulations is recommended.
2. Angler harvest of sport fish and panfish species, especially black crappie is recommended.
3. Installation of near shore woody habitat in the form of fish sticks is recommended.
4. Encourage best management practices within the watershed to reduce sedimentation and nutrient loading in Lake Eau Galle.

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