WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fisheries Survey Report for Camelot Lake

Adams County, Wisconsin

2022

WATERBODY IDENTIFICATION CODE 1378100

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Executive Summary

Camelot Lake in Adams County, WI is 393-acre reservoir that has a fishery comprised of largemouth bass, walleye, northern pike and panfish. A comprehensive fisheries survey was completed in the spring of 2022. Walleye relative abundance was 2.7 fish per net night, which is considered above the median for similar lakes. The walleye population estimate was 1.1 adult fish per acre, with more walleye found in the upper part of the lake (2.1 adult fish per acre) compared to the lower part of the lake (0.6 adults per acre). Growth rate of walleye was considered average, and size structure was good with 63% of walleye 15 inches or larger and 6% 20 inches or larger. Walleye are dependent on stocking, survey efforts have not found any evidence of natural reproduction. Increasing the stocking rate from 10 to 15 fish per acre may help achieve a target objective of 2.0 adult walleye per acre. Northern pike relative abundance was 2.3 fish per net night which is between the median and 75th percentile for similar lakes. Size structure was good, 69% of northern pike were 21 inches or larger, 6% were 28 inches or larger, and 15.7% were 26 inches or larger. Growth rate for northern pike was slow-average. The current fishing regulation for northern pike (26 inch minimum, 2 daily bag) is appropriate. Largemouth bass relative abundance was 35 fish per mile, which is just below the 75th percentile compared to similar lakes. Size structure was considered poor as 64% were 12 inches or larger, 8% were 15 inches or larger and 19% were 14 inches or larger (low-normal compared to similar lakes). Growth rate for largemouth bass was slow-average. A fishing regulation in the fisheries management toolbox is recommended to allow for the harvest of the abundant small largemouth bass and improve size structure – a 14–18-inch protected slot, 5 daily bag of only 1 can be over 18 inches. The current special regulation for panfish (daily bag limit of 25 of which no more than 10 of any species may be kept) will sunset in 2026 and revert to the 25 daily aggregate statewide panfish regulation. Bluegill, pumpkinseed, black crappie and yellow perch are the panfish species in Camelot Lake. Based on multiple years of surveys, bluegill size has improved since the experimental regulation went into effect. Mean size of bluegill was 6.0 inches, which is the largest mean size compared to past surveys. The objective of the experimental regulation was to increase mean size by 0.5 inch, which was met. Bluegill are the dominant panfish species in Camelot Lake, relative abundance was 103 fish per mile which is just below the median compared to similar lakes. Growth rate was average, body condition was good, and size structure was missing the mark with the percentage of preferred size (8 inch) fish being 1%. Pumpkinseed status was like bluegill regarding average size (6.2 inches) size structure (1.7% preferred size) and growth (average). Yellow perch and black crappie relative abundance was low and growth poor. To maintain or improve bluegill size structure a 10 daily aggregate panfish bag limit is recommended for when the experimental regulation ends. Overall, Camelot Lake provides a good gamefish and panfish fishery for anglers. Fish habitat improvement efforts have and continue to occur by the Lake Association's fish committee and volunteers along with the Lake Association, Tri-Lakes District and 14-Mile Watershed Alliance to improve structure (i.e., fish cribs and increase trees in the nearshore area) and water quality.

Introduction

Camelot Lake is a 393-acre man-made lake (reservoir) located in Adams County, Wisconsin. The lake was created in 1970 and consists of an upper part that is connected to a lower part via a dug channel (approximately 1.5 miles long). A dam was built on the Fourteenmile Creek (lower part of the lake) and a dam was built on Spring Branch Creek (upper part of the lake). The lower part is about two-thirds of the lake acreage. The maximum depth of the lake is 24 feet and mean depth is 9 feet. The lake is highly developed with two private boat launches and a public boat launch, which is located on the lower part by the dam (owned by Adams County). The upper part of Camelot Lake has an area upstream of CTH D that is referred to as Walden, which is a "No Motor Operation Area". The channel is a "Slow No Wake" area, in addition the main lake areas and buoyed locations are "Slow No Wake" for motorized craft before sunrise or after 8am, where personal watercraft restrictions are before 10am or after 8pm. Sand is the dominant substrate of the lake. The lake is considered eutrophic, blue green algae blooms do occur at times in the summer.

Invasive species in the lake include banded mystery snail, chinese mystery snail, curly-leaf pondweed, eurasian water-milfoil, hybrid eurasian/northern water-milfoil, purple loosestrife and zebra mussel.

Extensive fish stocking has occurred on the lake, starting in 1972 after the lake was filled with water (Table 1). Most of the fish stocking was comprised of walleye and largemouth bass.

In 2015, Camelot Lake was incorporated into the Wisconsin Walleye Initiative (The Wisconsin Walleye Initiative 2022) which had the goal of expanding the stockings of extended growth walleye. Extended growth walleye are larger in size (6.5-6.8") than small fingerlings (2.3") or large fingerlings (3-5") and have a better chance of surviving. Camelot Lake has odd year stockings and 10 walleye per acre are stocked (~3934 walleye per stocking). DNR fisheries staff conducted fall or spring electrofishing surveys to evaluate those walleye stockings, looking for signs of natural reproduction and fish stocked from previous years.

On April 1, 2016, Camelot Lake became part of a large statewide panfish study to evaluate special panfish regulations (Panfishing in Wisconsin 2022). The special panfish regulation that went into effect for Camelot Lake is a daily bag limit of 25 panfish, yet only 10 of each panfish species may be kept. The objective of this special fishing regulation is to improve size structure of panfish. A 2010 fisheries survey results showed that bluegill growth was good, yet size structure was poor. Research has shown that the only way to improve size structure when growth is not an issue, especially for bluegill, is to reduce harvest as anglers are known to selectively remove larger sizes of bluegill, yellow perch and crappie.

SURVEY EFFORT

In the spring of 2022, a comprehensive fisheries survey was completed by the DNR fisheries staff out of Wisconsin Rapids. The goal of this survey was to evaluate the status of the northern pike, walleye, largemouth bass, yellow perch, crappie and bluegill fishery. The status of the fishery can be compared to past fisheries survey work. In addition, Camelot Lake's fishery can be compared to other lakes in the state that have similar productivity levels and fish communities, especially Lake Sherwood and Lake Arrowhead that are reservoirs downstream of Camelot Lake that were also built on Fourteenmile Creek. Camelot

Lake is classified as a Warm Dark Complex Lake. All this information is one piece to help develop a fisheries management plan to guide future management.

Methods

On April 9, 2022, a fyke net survey started on Camelot Lake with a water temperature of 43.6°F (Figure 1). Private boat launches were used to set four fyke nets, ice had melted on the upper ends. Gradually, more nets were set as ice continued to melt and eventually fyke nets were set down by both dams. Fyke nets are a sampling gear used in fisheries management to target northern pike, walleye, yellow perch and crappie during their spawning period. These nets are set in locations that have an appropriate depth for the gear and at locations that fish utilize for spawning or passing by to reach spawning habitat. A lead net is attached to shore and the net is stretched out into the lake, perpendicular to shore. At the end of the lead is a series of hoop/box nets that traps the fish. Fyke nets are passive in that they rely on fish moving into the lead and following the lead into the series of hoop/box nets where they are trapped until being removed. Nets are checked after 24 hours of fishing, where all fish are dipped out of the cod end of the net and put into a tank of water on a boat. After fish collection, the net is tied and reset to continue fishing. Fyke nets were removed from the upper part of the lake on April 19, 2022, and for the lower part on April 25, 2022. Fish data was recorded by net. One fyke net that is fished in a 24-hour period is called one net-night. If a fyke net doesn't fish a night (e.g., rolled from the wind; muskrats chewed holes, etc.), that net and any fish in it is not counted towards effort. The survey had a total of 92 net nights: 25 net nights for the upper part of the lake and 67 net nights for lower part of the lake.

All fish caught in the fyke nets were counted and additional information was collected for some species. All walleye, northern pike and largemouth bass were measured in length to the nearest 0.1 inch. The majority of black crappie, bluegill, yellow perch and white sucker were measured to the nearest 0.1 inch. All walleye, northern pike and yellow perch were noted as female, male or unknown. All walleye, northern pike and largemouth bass were given a mark by clipping a fin. If a fish was recaptured from a previous day, the fish's length was measured, sexed and the fish was noted as a recapture. For a subsample of fish, the third dorsal spine was removed from walleye and the first three pectoral fin rays were removed from northern pike to estimate age. A subsample of yellow perch, black crappie and bluegill were sacrificed for estimating age using the otolith (fish ear bone), those subsampled fish were weighed to the nearest 0.1 gram when processed in the lab. Genetic tissue samples were collected for walleye and northern pike for statewide project requests. Walleye tissue samples will be used to evaluate the walleye stockings and northern pike samples will be used to examine genetic diversity of northern pike in the state to improve stocking guidance.

Early spring electrofishing was conducted to estimate the abundance of walleye in the lake, the numbers of walleye caught that were marked, recaptured and unmarked were used with the netting data to estimate the number of walleyes in the lake using a mark-recapture model. Electrofishing is active (not passive like fyke nets), where we are seeking out the spawning fish. Two dippers collected only walleye during this survey. On the night of April 19, 2022, the entire shore (4.7 miles) of the upper part of Camelot Lake was electrofished using a maxi-boom. Water temperature was 45.2° F. The shoreline (5.5 miles) of the lower part of Camelot Lake was electrofished on the night April 25, 2022, water temperature was

48.6°F. The upper survey took 2 hours and 10 minutes, while the lower survey took 2 hours and 34 minutes. These times do not include processing time for fish. A total of 10.2 miles were surveyed. Pulsed direct current was used with a pulse rate of 50%, duty cycle of 25, 175-205 volts and 9.5-12.5 amperes. Walleye abundance was estimated with 95% confidence intervals using mark-recapture data and a single census estimator (Ricker 1975).

Late-spring electrofishing took place to assess the largemouth bass and panfish populations. Two dippers collected fish. Upper Camelot Lake was electrofished the night of May 23, 2022. Water temperature was 66°F, within the temperature range that bass and bluegill are on their spawning beds yet not many beds were observed. Panfish were collected at two transects totaling 1.0 miles and 28 minutes of effort. Largemouth bass and other gamefish species were collected at 4 transects totaling 4.3 miles and 2 hours and 9 minutes of effort. Lower Camelot was surveyed later, May 31, 2022, and water temperature was 67.5°F. Panfish were collected at three transects totaling 1.5 miles and 54 minutes of effort. Largemouth bass and other gamefish species were collected at five transects totaling 4.5 miles and 2 hours and 19 minutes of effort. All panfish and gamefish were counted and measured to the nearest 0.1 inch by transect. A subsample of largemouth bass were sacrificed to estimate age using otoliths (fish ear bones), those fish were weighed to the nearest 0.1 gram in the lab. Common carp were counted during the surveys. The total effort for the lake (without looking at upper and lower separately) for panfish was 2.5 miles and 1 hour and 22 minutes; for gamefish the total effort was 8.8 miles and 4 hours and 28 minutes of effort.

Relative abundance was calculated for all species caught. Relative abundance is catch per unit of effort (CPUE) which is the number of fish captured divided by effort (net-night, miles shocked, or hours shocked). Largemouth bass CPUE with the electrofishing data is for those fish equal to or greater than 8 inches, whereas CPUE for bluegill and pumpkinseed are those equal to or greater than 3 inches. These CPUE values are compared to values for lakes that are classified as a Warm Dark Complex Lake, like Camelot Lake, past surveys, and recent surveys for lakes located downstream. Camelot Lake, Lake Sherwood, and Lake Arrowhead are all reservoirs on 14 Mile Creek. Lake Sherwood had a late-spring electrofishing survey for gamefish and panfish in 2021; and Lake Arrowhead had a fyke netting and electrofishing survey in 2022.

Size structure was evaluated for all panfish and gamefish species using descriptive statics (average length, minimum length, maximum length), a length frequency distribution, and Proportional Stock Density (PSD). PSD is an index used to describe size structure of fish. PSD is calculated by dividing the number of quality, preferred size (PSD-P) or memorable size (PSD-M) fish by the number of stock size fish for a given species. Length values are standard for the different species (Neumann et al. 2012). For largemouth bass, 14 inches is a common length for evaluating size structure too, so PSD of 14-inch fish (PSD-14) was calculated – percentage of 14-inch fish in the population that are at least stock size.

Growth was evaluated using mean length-at-age for a given species and comparing it to statewide growth information for that species.

Body condition was assessed using relative weight, where the weight and length of a fish species are compared to a standard for that species (Neumann et al. 2012). If values are 100 or greater then body condition is good and anything much less than 100 indicates poor body condition.

Historic electrofishing surveys for Camelot Lake took place annually during the 1970s, early 1980s, 2004 and 2011. In addition, a shorter late-spring electrofishing survey was completed in 2021 as needed for evaluating the special panfish regulation. These surveys were conducted at night during various months (May, June, July, September and October) and time (hours) electrofished was the effort recorded. The location of the surveys were sometimes lower Camelot, upper Camelot, or both. Location was not always recorded. This historic data can provide some insight into changes in the fishery for Camelot Lake.

Results

WALLEYE

Walleye stocking was consistent over the years, yet some changes occurred (Table 1). Small fingerling (1.2-2.0 inches) walleyes were stocked consistently on even years by the department from 2000-2012 with additional stocking events in 1999 and 2003. Two private stocking events of yearling (10.5 inches) and large fingerling (7.0 inches) walleyes occurred in 2012 and 2013. DNR stocked extended growth fingerling walleyes (6.4-8.2 inches) on odd years from 2015-2021.

The adult (≥ 13 inches) walleye population in Camelot Lake was estimated to be 422 (95% CI 306-598) fish, or 1.1 adult walleye per acre (95% CI 0.8-1.5). Mark-recapture data for upper and lower Camelot were used to get abundance estimates for each part of the lake with the assumption of no mixing through the channel connecting them during the survey. Walleye abundance in upper Camelot was estimated to be 271 (95% CI 204-368) fish, or 2.1 adult walleye per acre (95% CI 1.6-2.9). In lower Camelot, the estimate was 149 (95% CI 102-225) fish, or 0.6 adult walleye per acre (95% CI 0.4-0.9). Lake Arrowhead, a flowage downstream from Camelot Lake, had a similar adult walleye population estimate in 2022 that was 1.2 fish per acre.

Relative abundance was 2.7 fish per net night (Table 3). Compared to other lakes that are classified as Complex Warm Dark, this CPUE was just above the median (2.0 fish per net night).

Late-spring electrofishing surveys took place in 1998, 2021 and 2022. In 2022, walleye CPUE was 11.9 per hour. In 1998 and 2021, walleye CPUE was 5.5 and 29.0 per hour, respectively.

A total of 295 walleyes were measured during fyke netting and early spring electrofishing, 56 were females, 223 were males and 16 were of unknown sex. Walleyes ranged in length from 7.3-22.4 inches, with a mean length of 15.8 (±0.3) inches (Figure 2; Table 2 and 3). 63% of the walleyes were 15 inches or larger and 6% were 20 inches or larger.

Dorsal spines were used to estimate the age of walleye and age estimation error was apparent. Walleye were not stocked annually and fall survey work found no evidence of natural reproduction, yet walleye were estimated to be age 1-13 (Figure 3). If a fish's age is underestimated, growth rate is biased faster. Opposite is true where if a fish's age is

overestimated growth is biased slower. Otoliths are the best structure for estimating age, yet that requires sacrificing fish, and we did not want sacrifice walleye for this survey.

Growth was indexed using mean length-at-age, growth variability is normal for walleye of a given age (even with age estimation error) and was observed for the walleye (Figure 3). Overall growth was found to be the same as a state average walleye, within the +/- 1 standard deviation of the average (Figure 4).

NORTHERN PIKE

212 northern pike were caught in fyke nets and 11 of those were recaptures. The CPUE was 2.3 fish per net night, which is above the median and below the 75th percentile for pike populations in Complex Dark Lakes (Table 3). Lakes that are Complex Warm Dark have a northern pike median CPUE of 1.2 fish per net night and a 75th percentile of 3.7 fish per net night. In comparison, the CPUE for northern pike for Lake Arrowhead, reservoir downstream, was 0.6 fish per net night in 2022 which is low.

There were 96 females, 93 males and 12 unknowns caught. Northern pike ranged in length from 10.5 to 33.9 inches, mean length was 22.0 inches (Figure 5; Table 3). 69% of the fish were of quality length (21 inches) or greater, 6% were preferred length (28 inches) or greater, and no fish were of memorable size (34 inches) or greater (Table 2). 15.7% of the pike were 26 inches or greater, the fishing regulation is a minimum length limit of 26 inches with a daily bag limit of two. In comparison, northern pike in Lake Arrowhead ranged from 16.0 to 34.0 inches, 93% were at least quality length, 13% preferred size and 4% memorable size.

Growth was indexed using mean length at age 2-5. Age-2 northern pike were growing slower than the average northern pike in Wisconsin and growth was within 1 standard deviation of the average northern pike for ages 3-5 (Figure 6).

LARGEMOUTH BASS

During the late-spring electrofishing survey, 344 largemouth bass were caught, 317 were 8 inches or greater. CPUE was 35 per mile. This CPUE is high and just below the 75th percentile (37.3 fish per mile) for Complex Warm Dark lakes. In comparison, largemouth bass CPUE was 38 per mile in 2021 for Lake Sherwood and 36 per mile in 2022 for Lake Arrowhead.

Largemouth bass ranged in size from 4.4 to 18.8 inches, mean length was 12.0 inches (Figure 7 and Table 2). PSD was 64, or 64% of the largemouth bass caught were of quality size (12 inches) or larger and 8% were of preferred size (15 inches) or larger. 19% were 14 inches or larger, which is considered borderline normal-low compared to similar lakes.

Late-spring electrofishing surveys also took place for Camelot Lake in 1998 and 2021, overall size structure has become poorer since 1998 based on mean length (reduced by 1-inch) and the percentage of 14 inch and 15 inch bass is lower (Table 2).

Size structure of largemouth bass was similar to Lake Sherwood and better than Lake Arrowhead. The average size of largemouth bass for Lake Arrowhead was 10.8 inches and 48% were of quality size, 5% preferred size, and 13% were 14 inches or larger (considered low). For Lake Sherwood in the 2021 survey, average size was 11.8 inches, 71% caught were 12

inches or greater, 7% of the bass were 15 inches or larger, and 24% of the bass were 14 inches or greater.

Generally accepted PSD index values for balanced fish populations have a largemouth bass. PSD that ranges from 40-70 and PSD-P values of 10-40. Camelot Lake, Lake Sherwood, and Lake Arrowhead are missing the mark with the numbers of 15-inch and larger sized largemouth bass.

Growth of largemouth bass was assessed from a sample of bass sacrificed in the 2021 (n=7) and 2022 (n=5). In 2021, fish were 14.0-14.6 inches and ranged in age from 5-11 years old, so good growth for the 5–6-year-old fish to slow growth for 7–11-year-old fish. Fish from 2022 were in the 10-inch length bin and ranged in age from 4-5 years old, indicating slow to average growth (Figure 8). Length and growth rates do vary for a given age class with all fish species, yet data collected from these surveys do not give a good picture if growth is slow or average for largemouth bass in the population. Growth is for sure not fast.

All the largemouth bass sacrificed in 2021 were in good body condition (average relative weight = 128) and the fish from 2022 were in poor body condition (average relative weight = 75). Larger fish were sacrificed in 2021 could have been more efficiently using their prey or more prey availability at that time and for that size. Also, these larger fish may have weighed more if they still had eggs and milt prior to spawning.

During the 2022 fyke net survey 48 largemouth bass were caught (Table 3 and 4). Fyke nets are selective towards larger bass and are not the standard sampling gear to assess largemouth bass populations in Wisconsin. The largest largemouth bass caught in the fyke nets was 21.1 inches.

BLUEGILL

Bluegill were sampled with late-spring electrofishing, 258 bluegill were caught for a CPUE of 103 fish per mile. This relative abundance is below the median (117 per mile) compared to Complex Warm Dark lakes. CPUE was like the bluegill CPUE for Lake Sherwood in 2021 (102 per mile) and lower than Lake Arrowhead in 2022 (143 per mile).

Bluegill ranged in length from 1.9 to 8.0 inches with a mean length of 6.0 inches (Figure 9). PSD was 50, or50% of the bluegills were at least quality length (6 inches) and 0.4% were of preferred size (8 inches) or larger.

Average size and PSD for bluegill was greater in Camelot Lake compared to Lake Sherwood and Lake Arrowhead. For Lake Sherwood, bluegill ranged in length from 1.4-8.2 inches and had a mean length of 5.3 inches, which was the largest average size from past historic surveys. 32% of the bluegills were 6 inches or longer and 1% were 8 inches or longer. For Lake Arrowhead, bluegill ranged in length from 3.0 to 9.1 inches and mean length was 5.4 inches. 27% of the bluegills were 6 inches or longer and 1% were 8 inches or longer.

Compared to the most recent surveys, size structure may have improved in Camelot Lake compared to 2011 (Table 2). In 2011, 8-10% of the bluegill were of quality size and no bluegill were caught of preferred size. Mean length was 5.0 and 4.7 inches. In 2021, 38% were quality

size (6 inches) or larger and 1% were of preferred size (8 inches) or larger and mean length was 5.3 inches.

Generally accepted PSD index values for balanced fish populations have a bluegill PSD that ranges from 20-60 and PSD-P values of 5-20, Camelot Lake like Lake Sherwood and Lake Arrowhead are missing the mark with the numbers of 8 inch and larger sized bluegills.

Fyke nets are not the standard gear for assessing bluegill in Wisconsin, yet 268 bluegill were caught and of those 222 were measured. The CPUE was 2.9 per net night. Bluegill in the nets ranged from 3.5 to 8.2 inches, mean length was 6.2 inches (Figure 10). 62% of the bluegill were at least quality length and 3% were of at least preferred size.

Bluegill CPUE in fyke nets was lower in Camelot Lake and size structure was better, like found with electrofishing, compared to Lake Arrowhead in 2022. For bluegill in Lake Arrowhead, CPUE was 13.8 per net night, mean length was 5.4 inches and 35% were of at least quality length and 3% were of at least preferred size.

Growth was the same as the average bluegill in Wisconsin or within 1 standard deviation of the average, yet growth slowed after age 7 (Figure 11). Growth was a bit slower compared to 2004 and 2011, yet scales were used in those years and may have underestimated age and therefore biased growth high. Bluegill were growing proportionately (b=3.0) with length when evaluating the weight-length relationship.

Relative weight ranged from 41 to 279 with average of 151, most observed was 117. Most of the fish are above 100, indicating that they're in good body condition.

PUMPKINSEED

Pumpkinseed is in the sunfish family like bluegill, but they're two distinct species. They were surveyed with late-spring electrofishing. In 2022, 117 pumpkinseeds were caught with a CPUE of 47 per mile. Pumpkinseed ranged in length from 4.0 to 8.2 inches with a mean length of 6.2 inches (Figure 12). 64% of fish were quality length (6 inches) or larger, 1.7% were of preferred length (8 inches) or larger.

For comparison, in 2021 Lake Sherwood had a pumpkinseed CPUE of 42 per mile and length ranged from 3.5-7.4 inches with an mean length of 5.7 inches. In 2022, Lake Arrowhead had a pumpkinseed CPUE of 49 per mile and sizes ranged from 3.7 to 7.2 inches with a mean length of 5.8 inches.

Growth was indexed using mean length at age and found to be average (Figure 13). Relative weight ranged from 73 to 103, with an average of 84, so poor to good body condition.

Compared to past surveys, the CPUE, maximum size, and average size was greatest in 2022 (Table 2).

YELLOW PERCH

For late-spring electrofishing, yellow perch CPUE was 10.4 per mile or 19.0 per hour. Compared to past late-spring electrofishing surveys, this CPUE value was a bit lower (Table

2). The fish ranged in length from 3.3 to 7.8 inches (n=26; Figure 14). Maximum and minimum sizes are not different from yellow perch caught in past surveys (Table 2).

38 yellow perch were caught in the fyke nets, CPUE was 0.4 fish per net night, which is low. Yellow perch ranged in length from 5.2 to 7.7 inches (Figure 15). Growth was found to be within one standard deviation of the average yellow perch, yet below the average line (Figure 16).

In comparison, the CPUE of yellow perch in the 2022 survey Lake Arrowhead survey was 31 per mile and 11.5 per net night, yellow perch are more abundant in Lake Arrowhead.

BLACK CRAPPIE

During the 2022 survey, 117 black crappie were caught in the fyke nets giving a relative abundance of 1.3 fish per net night.

Black crappie ranged in length from 4.4 to 11.7 inches with an average length of 8.2 inches (Figure 17). 79% of the fish were of quality length (8 inches) or larger and 23% were of preferred length (10 inches) or larger. Growth was found to be within one standard deviation of the average black crappie, yet overall slower than the average crappie (Figure 18). Relative weight ranged from 26 to 93 and average was 57, indicating that majority of the fish were in poor body condition.

There is limited historical black crappie data. In 2004, 26 black crappie were caught in an electrofishing survey. These fish ranged in length from 3.4 to 8.3. These fish were growing the same as the average black crappie in Wisconsin and faster than the black crappie of 2022 (Figure 18). Scales were used in 2004 while otoliths were used in 2022.

Black crappie were less abundant in Camelot Lake compared to Lake Arrowhead, in 2022 the CPUE was 8.8 fish per net night for Lake Arrowhead. The size range was the same for the lakes, black crappie in Lake Arrowhead ranged from 4.1 to 11.0 inches. In Lake Arrowhead, there was a good year class in 2020, where the two-year-old fish (4.5-6.5 inches) were the most caught.

OTHER SPECIES

Other fish species caught during the 2022 survey while fyke netting included black bullhead (n=15), golden shiner (n=2), white sucker (n=37), and yellow bullhead (n=617). Most of the past surveys on Camelot Lake only collected gamefish and panfish. In 2021, other species observed during the electrofishing survey were noted but not caught which included one common carp, and bullheads and common shiner were noted as common.

Discussion and Recommendations

Fisheries staff completed fall nighttime electrofishing surveys in 2011, 2014, 2015, 2017, 2019, and an electrofishing survey in the spring of 2021; all these surveys took place prior to walleye stocking to look for evidence of natural reproduction and survival of stocked walleyes from prior years. The CPUE of walleye caught during the surveys ranged from 0.3

per mile to 7.5 per mile. Sizes of walleye caught were all greater than 9 inches in length, no evidence of age-0 walleye was present which would indicate no natural reproduction. The low numbers of walleyes captured gave us the impression that the stocked walleyes were not surviving well; however, the 2022 spring survey revealed that the stocked walleye have created a fishery. Fall electrofishing surveys may not be an effective survey for assessing survival of stocked walleyes. Dorsal spines used to estimate the age of walleye were not accurate as walleye of all age classes were found. Genetic samples that were collected, when analyzed, may shed light on stocking success of the different stockings.

Walleye stocking has created a fishery of 1.1 adult walleye per acre, typically for walleye fisheries we'd like that to be at or above 1.5 adult walleye per acre, yet this was within the 95% confidence interval. Walleye were more abundant in the upper part of Camelot Lake compared to the lower part of the lake. Stocked walleye in the beginning of the Wisconsin Walleye Initiative were stocked at the public launch located on the lower part of the lake by the dam. These fish would have had to move through the channel to get to the upper part of the lake. Eventually the private launches were used to stock the walleye, but how many fish were stocked into each part was not documented. For future stockings, the proportion of fish stocked into the parts of the lake could consider sizes of the upper and lower parts, about two thirds of the fish would go into the lower part and the rest of the fish into the upper part of the lake. The stocking rate for walleye is 10 fish per acre, this stocking rate could be increased to 15 walleye per acre and evaluated to see if the adult abundance can reach the adult goal of 2.0 per acre. The Camelot Lake District would need to purchase the five adults per acre from a private producer to supplement the stocking from the department.

The fishing regulation for walleye is the general inland walleye regulation, the season is from the first Saturday in May until the first Sunday in March. 63% of the walleye caught were over 15 inches, creating a fishery for anglers. Size structure of the walleye population was good.

Compared to past fisheries surveys largemouth bass abundance has increased, size structure has become poorer and growth may have slowed. The current fishing regulation for largemouth bass is the statewide regulation - a minimum length limit of 14 inches with a daily bag limit of five. The management objective of this regulation is to sustain or increase densities. This regulation could continue to be used to maintain current conditions of having an abundant quality largemouth bass population. Fisheries management has a fishing regulation in our toolbox to improve size structure and allow for consumption of largemouth bass. This special regulation is geared for high density, slow growing populations and is a 14–18-inch protected slot with a daily bag limit of 5 only 1 of which can be over 18 inches. The largemouth bass population in Camelot Lake would be a good candidate for this fishing regulation if anglers want to try to improve the numbers of 14–18-inch largemouth bass in the population and allow for consumption of smaller bass. The effectiveness of this special regulation is dependent on anglers harvesting bass.

Northern pike relative abundance, growth, and size structure is good. The current regulation is a minimum length limit of 26 inches with a daily bag limit of two fish, the objective of this regulation is to create a quality northern pike fishery, and it is working. There is a special regulation that would allow for consumption of smaller northern pike and maintain the quality fishery. The regulation is a 25–35-inch protected slot with a daily bag limit of two or five fish depending on the population. There is a chance that northern pike would not have

the growth potential to reach 35 inches in Camelot Lake, so this regulation would then act like a 25-inch maximum length limit. Considering this, the current 26-inch minimum length limit and 2 daily bag for northern pike seems appropriate.

The panfish fishery may have changed over the years to some degree, yet population dynamics are variable, and monitoring was not consistent. Yellow perch during late-spring electrofishing surveys have ranged from 3.6 to 24.5 per hour, and in recent years was 19.3 and 19.0 per hour. Yellow perch CPUEs were higher during years that had summer surveys and not late-spring. Yellow perch relative abundance is relatively low. Bluegills are the dominant panfish. Bluegills are lacking the numbers of preferred size (8 inches) fish that anglers enjoy keeping and that we'd like to see for a balanced largemouth bass and bluegill population. Bluegill relative abundance is good and just below the median compared to Complex Warm Dark Lakes. Bluegill growth is average and body condition good. Pumpkinseeds didn't comprise much of the catch in past surveys compared to the recent surveys, yet they are not as abundant as bluegill. The maximum size of bluegill and pumpkinseed caught during the 2021 and 2022 are the largest compared to past surveys, fish over 8 inches were not caught in the past and may indicate an improvement to their size structure. Black crappie relative abundance is low, yet this may be due to timing of the fyke netting as they typically spawn later. Their growth is within one standard deviation of the average crappie, but overall growth is slower than the average crappie, and body condition was poor. Size structure of crappie is decent, most of the fish caught were of quality size (8 inches) or larger, maximum size was 11.7 inches.

The special panfish regulation will sunset in 2026 and revert to the statewide daily bag limit of 25. When stunting (slow growth) is not an issue, the only way to improve size structure of panfish is to reduce harvest. The special regulation that is currently in place will not be an option in 2026. Camelot Lake would be a candidate for a of 10 panfish daily bag limit.

Acknowledgements

The data collected for this report would not have been possible without many DNR staff and volunteers. Thanks to Jake Thompson and Colton Wolosek for help with the electrofishing surveys and processing all the fish and otoliths for age estimation. Thanks to all the volunteers for helping check fyke nets and electrofishing, especially John Kolinski, as we were short staffed in 2022.

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Neumann, R. M., C. S. Guy, and D. W. Willis. 2012. Length, weight, and associated indices. Pages 637-670 *in* A. V. Zale, D. L. Parrish, and T. M. Sutton, editors. Fisheries techniques, 3rd edition. American Fisheries Society, Bethesda, Maryland.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Department of the Environment and Marine Service, Ottawa.

Figure 1. Map of Camelot Lake located in Adams County, Wisconsin where there is an upper part (Spring Branch Creek) and a lower part (Fourteenmile Creek) connected by a channel.

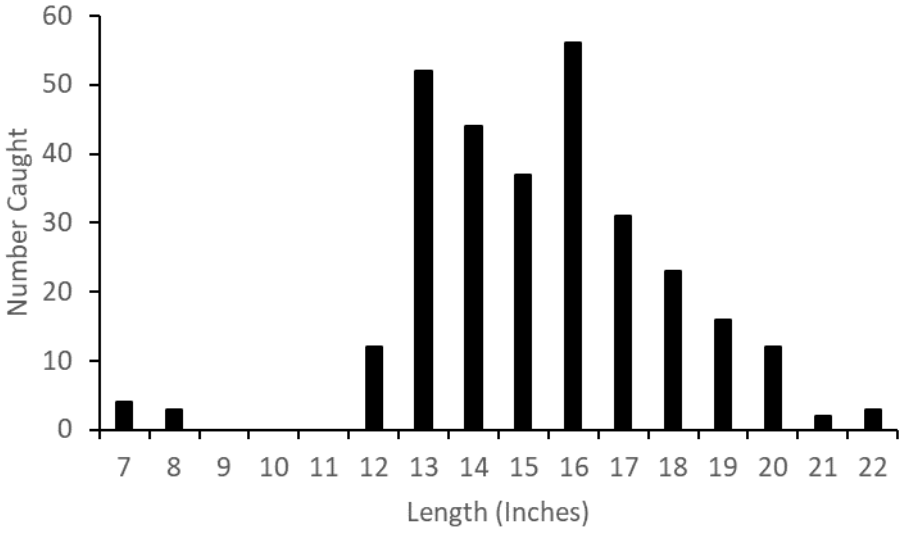

Figure 2. – Length frequency of walleye captured in the spring of 2022 using fyke nets and electrofishing in Camelot Lake, Adams County, Wisconsin (n=295). The 7–8-inch fish are from the 2021 stocking.

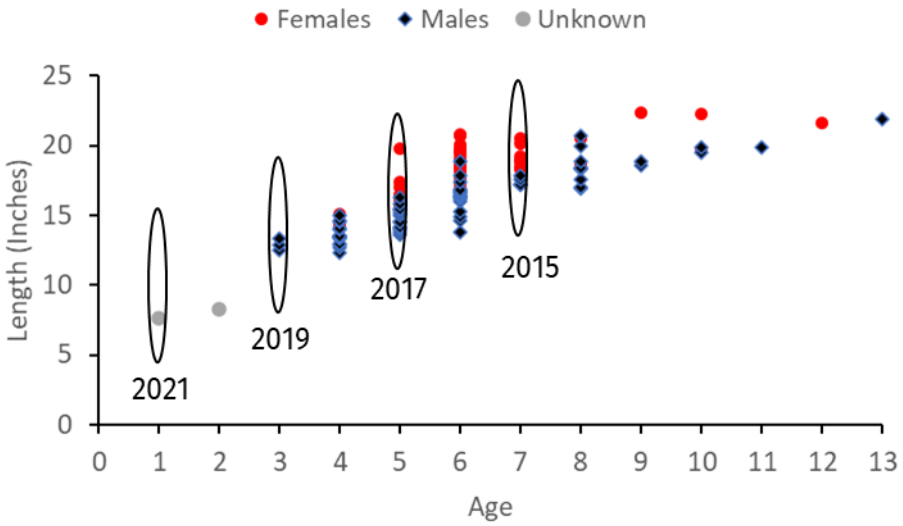

Figure 3. – Estimated age and length of walleye~~s~~ captured in the 2022 fisheries survey with ages/year classes that were stocked for Camelot Lake, Adams County, Wisconsin.

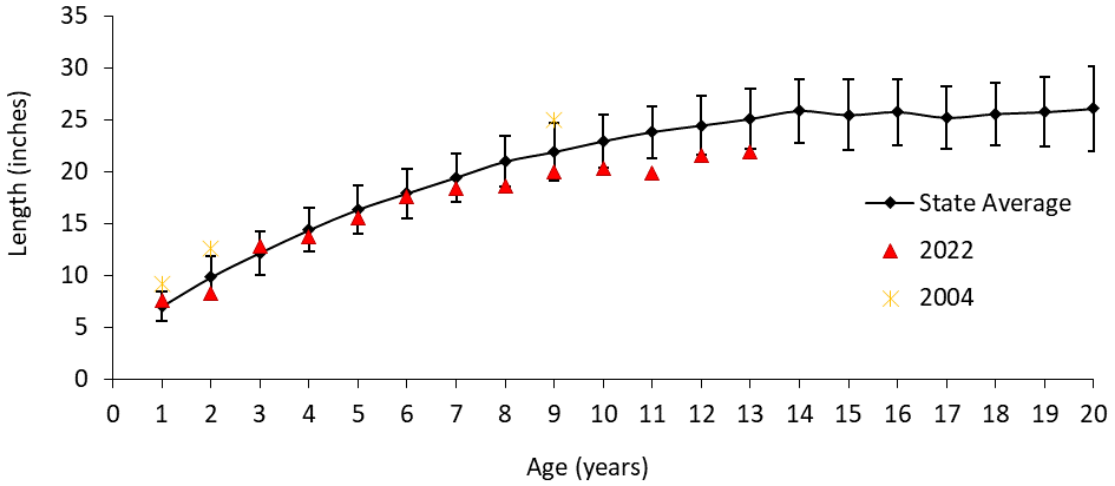

Figure 4. – Mean length at age of walleye captured in 2022 and 2004 for Camelot Lake, Adams County, Wisconsin compared to the statewide average walleye.

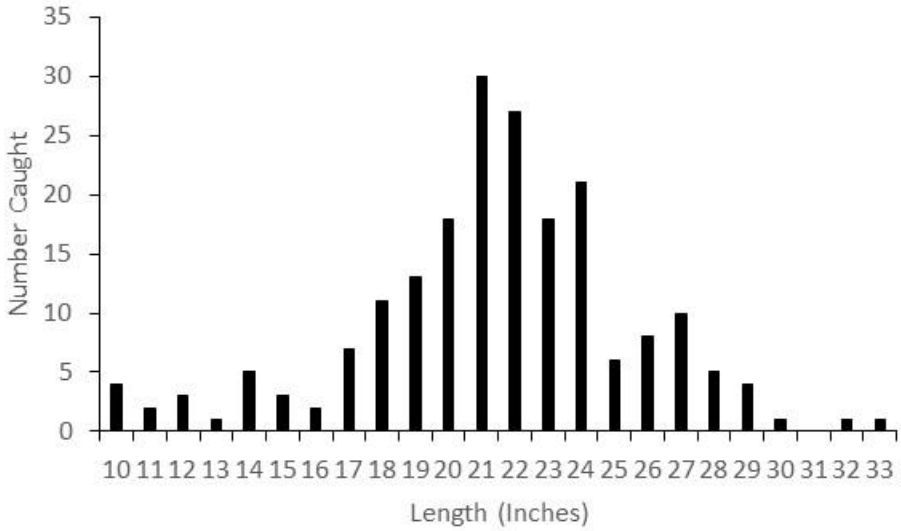

Figure 5. – Length frequency of northern pike captured in the spring of 2022 using fyke in Camelot Lake, Adams County, Wisconsin (n=201).

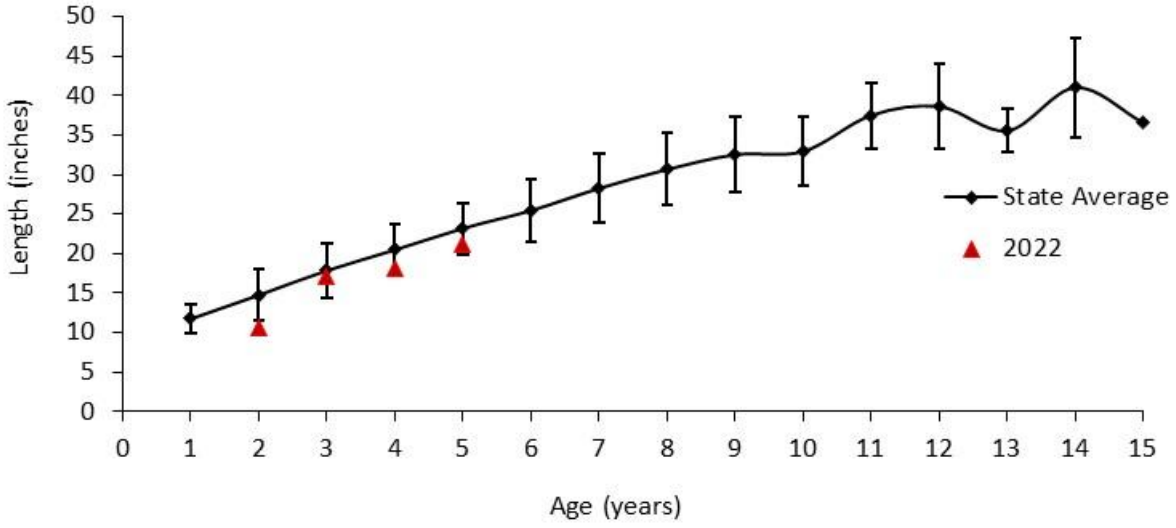

Figure 6. – Mean length at age of northern pike captured in 2022 for Camelot Lake, Adams County, Wisconsin compared to the statewide average northern pike.

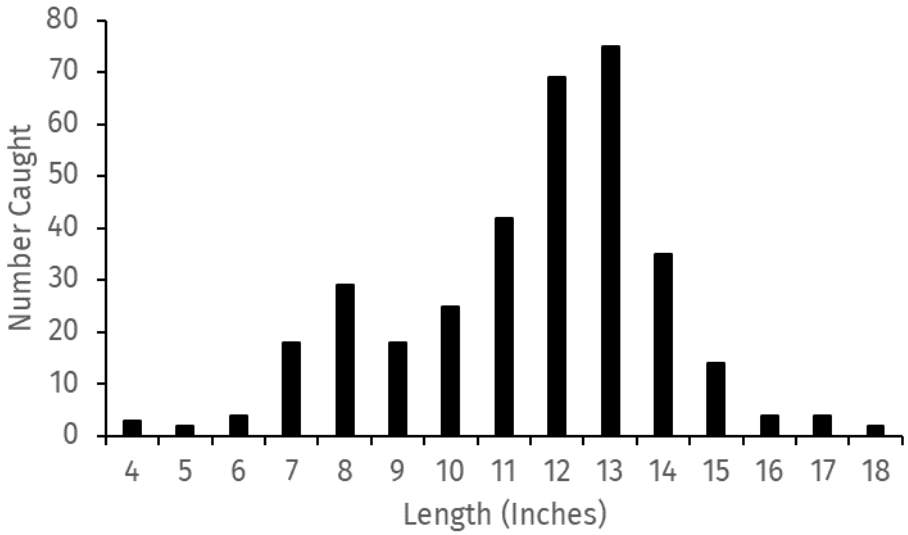

Figure 7. – Length frequency of largemouth bass captured in the spring of 2022 using electrofishing in Camelot Lake, Adams County, Wisconsin (n=344).

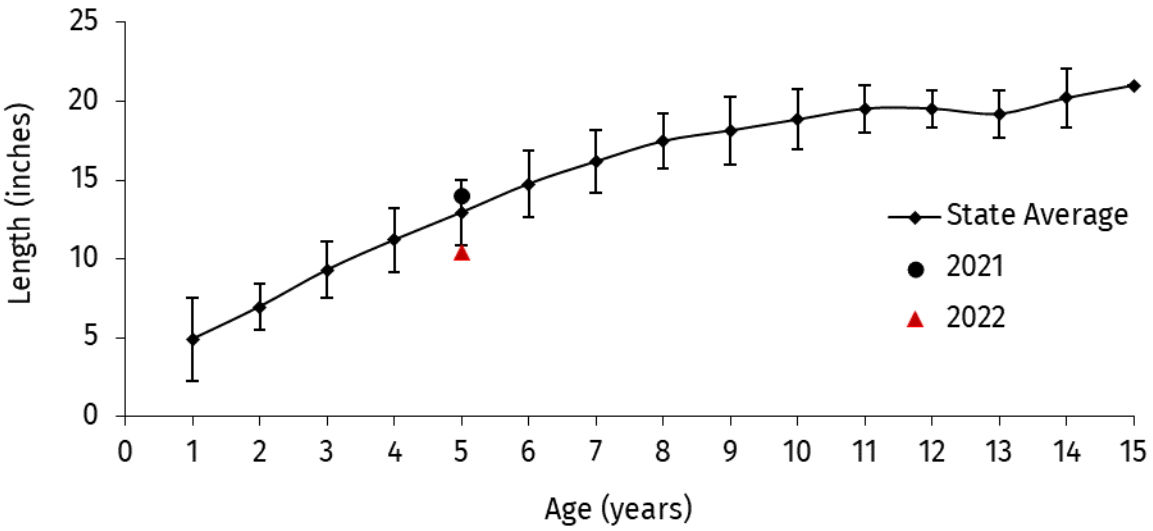

Figure 8. – Mean length at age of largemouth bass captured in 2022 and 2021 for Camelot Lake, Adams County, Wisconsin compared to the statewide average largemouth bass, otoliths were used to index largemouth bass in the 14-inch and 10-inch length groups.

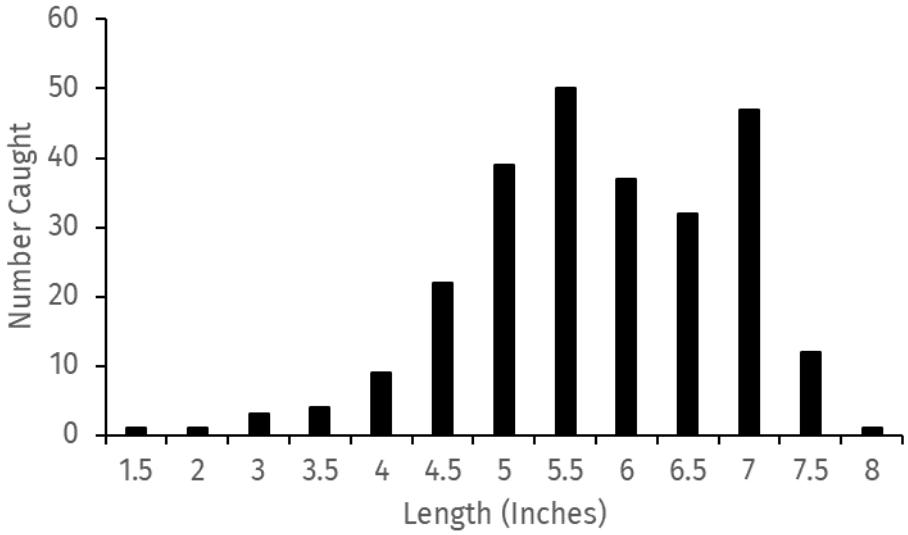

Figure 9. – Length frequency of bluegill captured in the spring of 2022 using electrofishing in Camelot Lake, Adams County, Wisconsin (n=258).

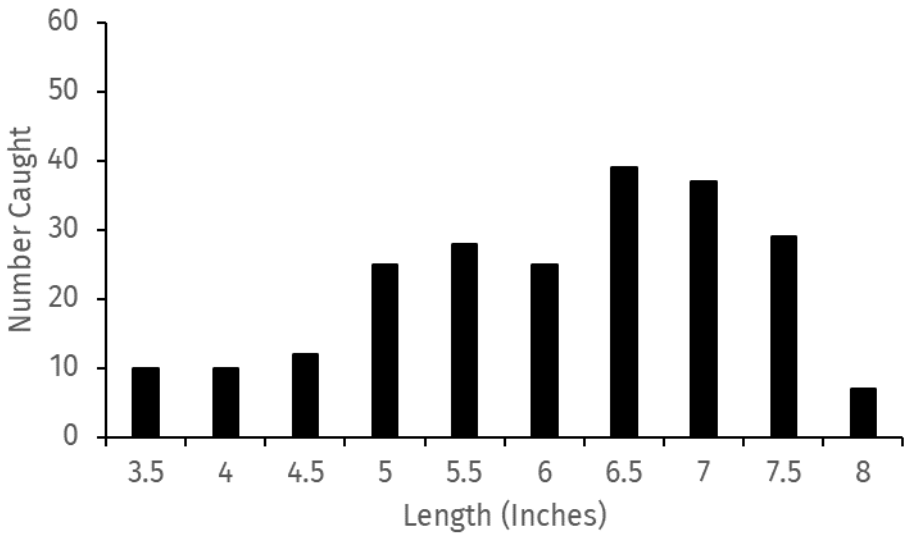

Figure 10. – Length frequency of bluegill captured in the spring of 2022 using fyke nets in Camelot Lake, Adams County, Wisconsin (n=222).

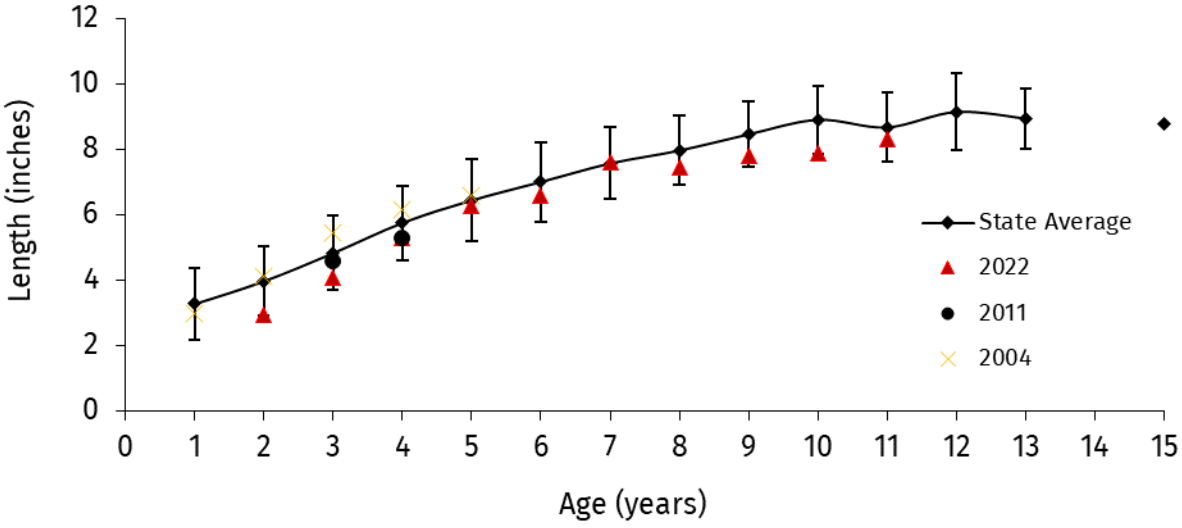

Figure 11. – Mean length at age of bluegill captured in 2022, 2011, and 2004 electrofishing surveys for Camelot Lake, Adams County, Wisconsin compared to the statewide average bluegill, otoliths were used in 2022 and scales were used in 2004 and 2011.

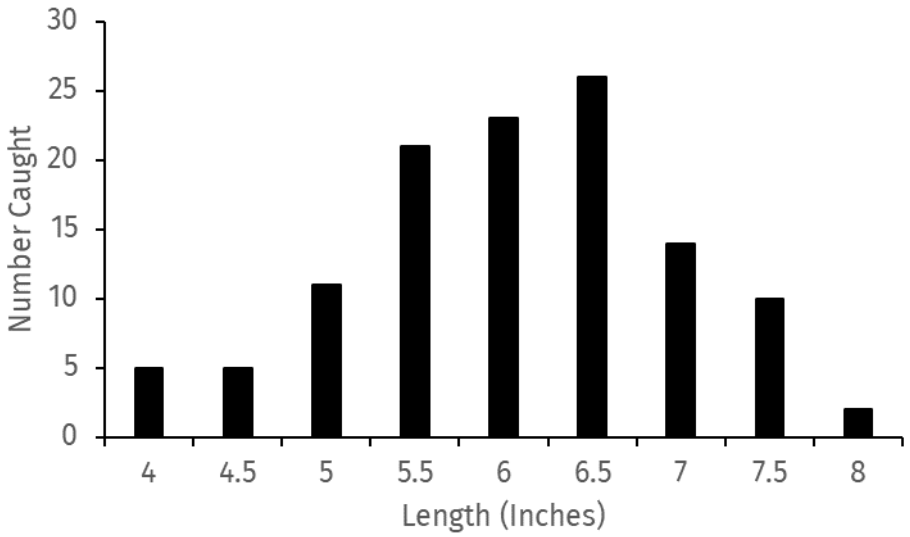

Figure 12. – Length frequency of pumpkinseed captured in the spring of 2022 using electrofishing in Camelot Lake, Adams County, Wisconsin (n=117).

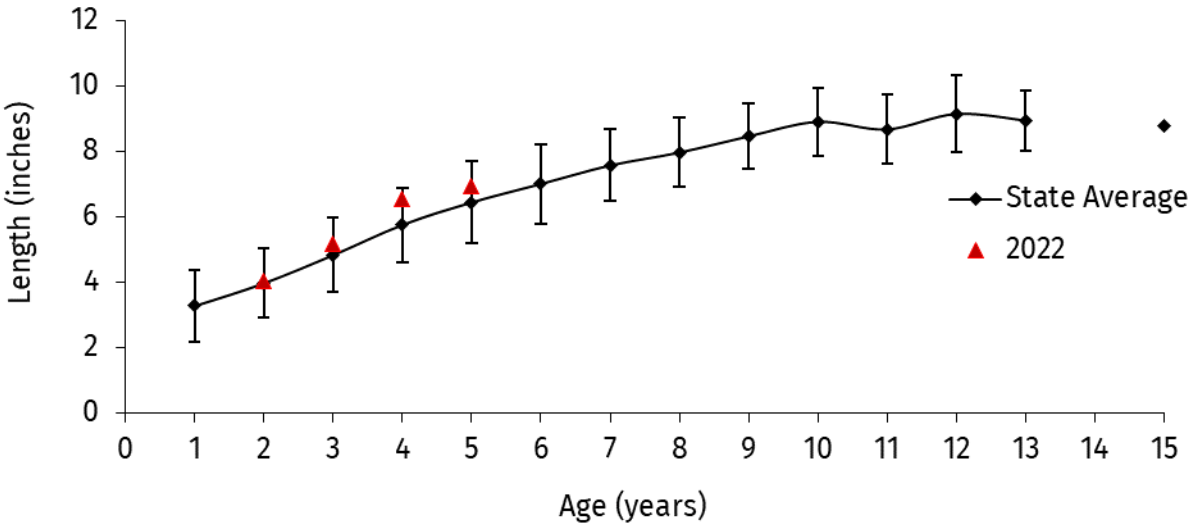

Figure 13. – Mean length at age of pumpkinseed captured in the 2022 electrofishing survey for Camelot Lake, Adams County, Wisconsin compared to the statewide average bluegill (pumpkinseed growth curves are unavailable), otoliths were used to estimate age.

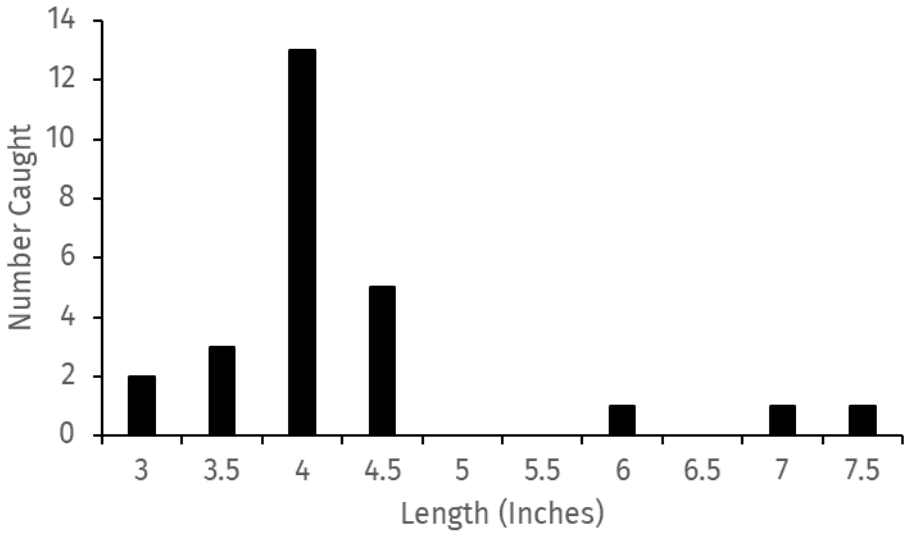

Figure 14. – Length frequency of yellow perch captured in the spring of 2022 using electrofishing in Camelot Lake, Adams County, Wisconsin (n=26).

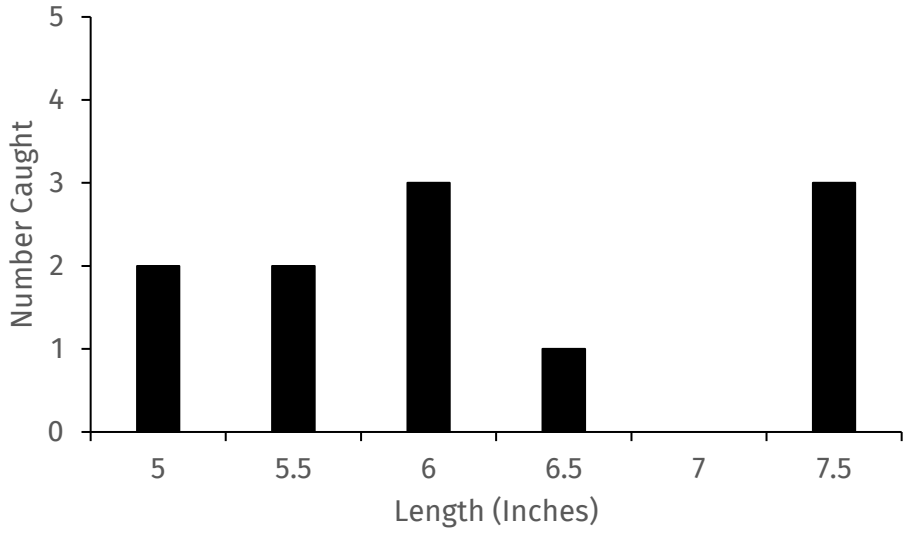

Figure 15. – Length frequency of yellow perch captured in the spring of 2022 using fyke nets in Camelot Lake, Adams County, Wisconsin (n=38).

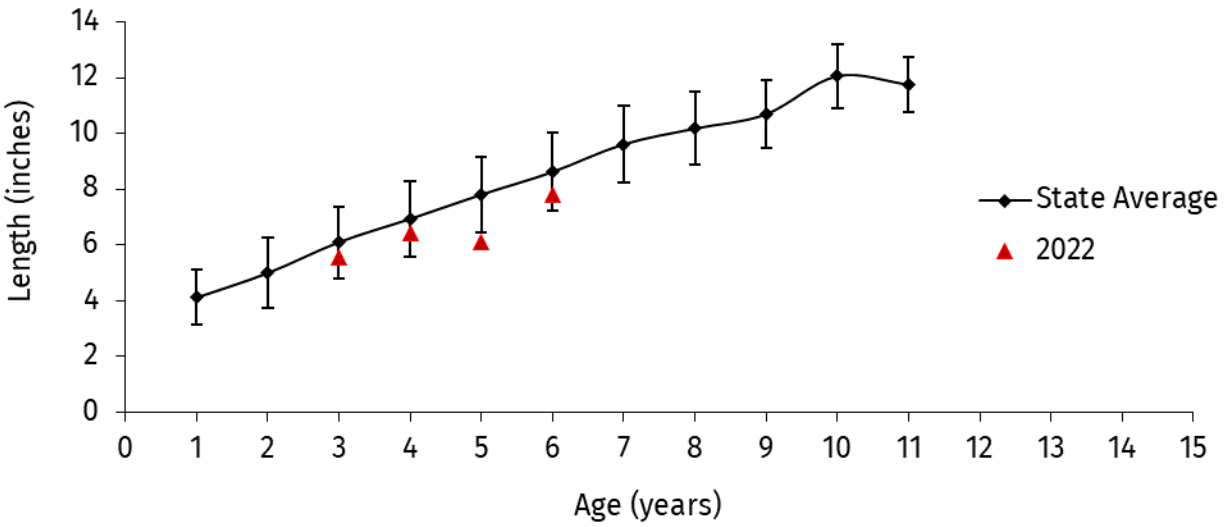

Figure 16. – Mean length at age of yellow perch captured in the 2022 survey for Camelot Lake, Adams County, Wisconsin compared to the statewide average yellow perch, otoliths were used to estimate age.

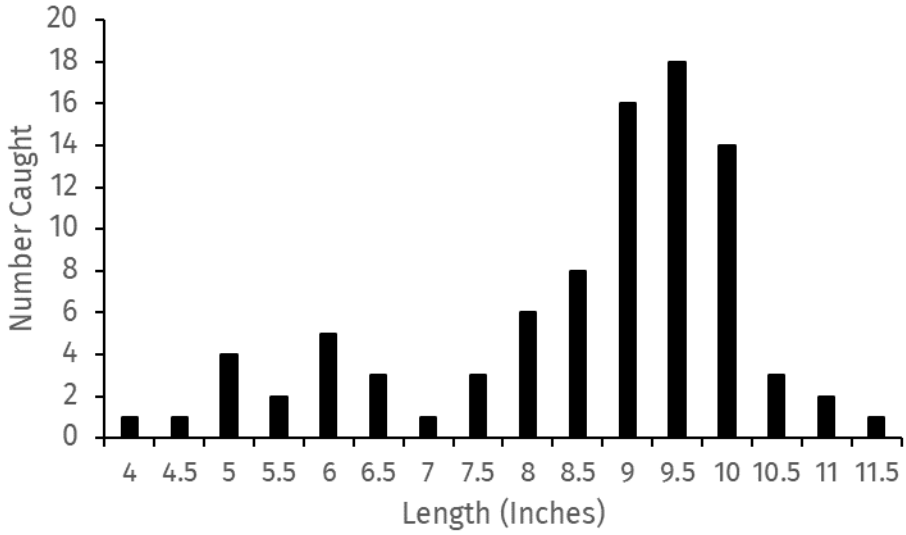

Figure 17. – Length frequency of black crappie captured in the spring of 2022 using fyke nets in Camelot Lake, Adams County, Wisconsin (n=88).

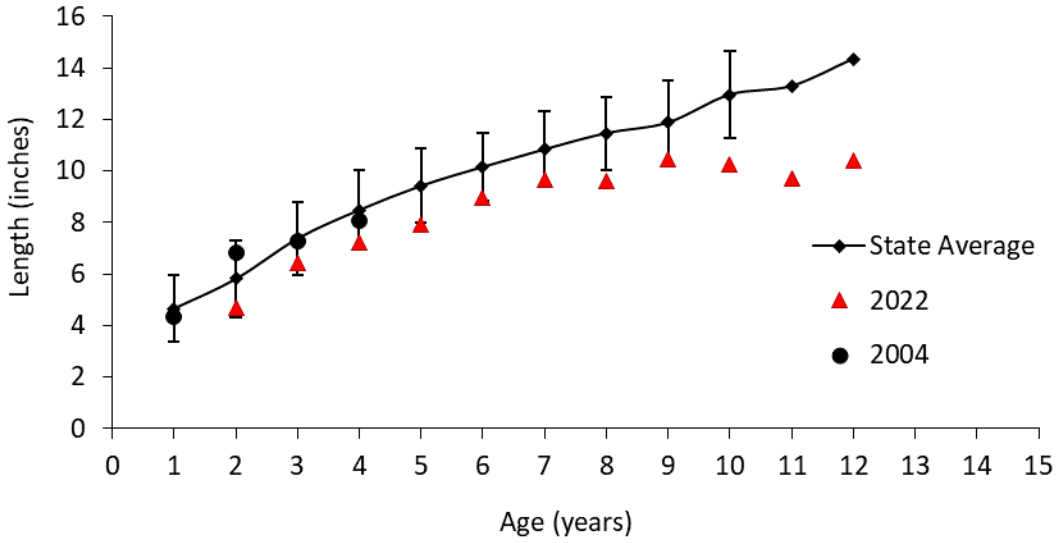

Figure 18. - Mean length at age of black crappie captured in the 2022 survey for Camelot Lake, Adams County, Wisconsin compared to the statewide average black crappie, otoliths were used to estimate age.

Table 1. – Fish stocking records for Camelot Lake, Adams County, Wisconsin.

Year	Species	Number	Length (Inches)	Hatchery
1972	Bluegill	1000	5.0	DNR
1972	Largemouth bass	50,000	1.0	DNR
1972	Walleye	21,000	5.0	DNR
1975	Walleye	25,000	3.0	DNR
1977	Walleye	25,000	3.0	DNR
1978	Walleye	6	Unk	DNR
1979	Walleye	25,571	5.0	DNR
1982	Walleye	25,000	3.0	DNR
1984	Walleye	20,000	3.0	DNR
1986	Walleye	20,000	3.0	DNR
1987	Walleye	69,000	2.0	DNR
1987	Largemouth bass	13,500	1.0	DNR
1988	Largemouth bass	9,500	1.0	DNR
1988	Walleye	22,500	4.5	DNR
1990	Walleye	22,568	4.0	DNR
1992	Walleye	18,177	2.7	DNR
1993	Largemouth bass	11,125	2.0	DNR
1994	Largemouth bass	11,125	3.0	DNR
1994	Walleye	11,080	2.4	DNR
1996	Largemouth bass	6,000	2.3	DNR
1999	Largemouth bass	44,500	1.3	DNR
1999	Walleye	40,000	1.5	DNR
2000	Walleye	11,109	2.0	DNR
2002	Walleye	22,250	1.9	DNR
2003	Walleye	22,230	2.3	DNR
2004	Walleye	22,226	1.2	DNR
2006	Walleye	15,465	1.7	DNR
2008	Black Crappie	3700	5.0	Private
2008	Walleye	15,645	1.4	DNR
2009	Black Crappie	3000	5.0	Private
2010	Walleye	15,661	1.7	DNR
2010	Black Crappie	3000	6.0	Private
2011	Black Crappie	3000	6.0	Private
2012	Walleye	1300	7.0	Private
2012	Walleye	13,307	1.6	DNR
2013	Walleye	1400	10.5	Private
2015	Walleye	3934	7.5	DNR
2016	Northern Pike	120	10.0	Private

Table 1 continued. – Fish stocking records for Camelot Lake, Adams County, Wisconsin.

Year	Species	Number	Length (Inches)	Hatchery
2017	Walleye	3932	6.8	DNR
2019	Walleye	3932	6.4	DNR
2021	Walleye	3934	6.7	DNR

*Table 2. – CPUE (number per hour), minimum size (inches), maximum size (inches), mean size (inches), sample size (n), and size structure indices (PSD is the %≥ of quality, preferred size, or memorable lengths) for gamefish and panfish species caught during nighttime electrofishing surveys conducted on Camelot Lake, Adams County on various dates from 1972 until 2022. *NA indicates a species was not collected. A "-"indicates that the sample size was less than 50 to calculate mean length or PSD values.*

Year	1972	1973	1974	1975	1976	1977	1978	1979	1980	1983
Location	Upper	Lower	Upper	Both	Both	Both	Both	Lower	Unk	Unk
Date	06/15	07/10	6/19	07/09	06/16	07/17	07/06	09/12	06/09	09/08
Walleye										
CPUE	25.0	15.0	10.9	17.2	12.9	12.3	16.8	41.6	21.1	1.7
Min Size	5.0	5.7	9.5	5.5	4.5	7.5	5.5	7.5	4.5	17.0
Max Size	10.4	12.4	22.4	18.9	21.4	22.4	24.9	25.9	25.4	17.4
Mean Size	8.3	-	-	-	-	-	14.2	14.9	12.2	-
n	50	30	20	43	45	37	121	74	114	3
PSD (% ≥15")	-	-	-	-	-	-	67	40	22	-
PSD-P (%≥20")	-	-	-	-	-	-	24	17	5	-
PSD-M(%≥25")	-	-	-	-	-	-	0	1	1	-
Largemouth Bass										
CPUE	20.0	21.0	29.5	17.2	8.3	21	16.8	24.4	7.8	14.9
Min Size	1.0	7.0	6.5	3.0	3.5	2.2	5.5	3.0	3.0	3.0
Max Size	9.4	15.9	17.4	14.9	19.4	17.4	24.9	19.4	19.4	18.9
Mean Size	-	-	11.5	-	-	6.7	14.2	9.6	-	-
n	40	42	54	42	29	63	131	57	42	26
PSD (%≥12")	-	-	33	-	-	-	46	54	-	-
PSD-P (%≥15")	-	-	22	-	-	-	19	24	-	-
RSD-14(%≥14")	-	-	27	-	-	-	21	31	-	-
Bluegill										
CPUE	61.0	39	234	15.2	14.9	74	31.7	83	144.5	106.3
Max Size	6.4	7.4	7.3	7.9	8.4	6.5	9.3	7.7	7.3	6.6
Mean Size	5.7	5.8	5.0	-	4.4	3.9	5.3	5.1	4.4	4.9
n	122	78	217	38	52	74	228	83	318	186
PSD (%≥6")	33	54	15	-	4	6	28	35	12	6
PSD-P (% ≥8")	0	0	0	-	4	0	1	0	0	0
Pumpkinseed										
CPUE	78.5	39	208	9.2	8.5	39	5.6	14	36	7.4
Max Size	5.2	6.2	6.5	5.8	5.7	6.3	6.7	6.0	6.5	6.1
Mean Size	4.6	5.8	5.4	4.2	4.5	4.3	4.6	5.3	4.4	4.9
n	157	57	93	23	30	117	40	14	80	13
PSD (%≥6")	0	5	15	-	-	8	-	-	3	-
PSD-P (%≥8")	0	0	0	-	-	0	-	-	0	-
Yellow Perch										
CPUE	24.5	234	16.3	1250	56.6	57.3	20.2	47	24.5	8.5
Max Size	6.7	8.2	8.0	9.9	10.4	7.2	10.5	8.8	9.5	10.0
Mean Size	-	6.0	-	3.7	4.2	4.8	5.5	4.5	4.8	-
n	49	234	30	531	127	172	146	47	54	15
PSD (%≥8")	-	1	-	27	21	0	1	-	7	-
PSD-P (%≥10")		0		0	14	0	1	-	0	-

*Table 2 continued. – CPUE (number per hour), minimum size (inches), maximum size (inches), mean size (inches), sample size (n), and size structure indices (PSD is the %≥ of quality, preferred size, or memorable lengths) for gamefish and panfish species caught during nighttime electrofishing surveys conducted on Camelot Lake, Adams County on various dates from 1972 until 2022. *NA indicates a species was not collected. A "- "indicates that the sample size was less than 50 to calculate mean length or PSD values.*

Year	1998	2004	2011	2014	2015	2017	2019	2021	2022	2022
Location	Unk	Lower	Lower	Both	Both	Both	Both	Lower	Both	Both
Date	5/21	10/04	10/18	9/23	09/09	09/19	09/16	05/24	04/25	05/23
Walleye										
CPUE	5.5	5.2	0.6	3.2	0.8	4.7	3.4	29.0	35.7	11.9
Min Size	16.0	6.7	19.2	10.5	11.0	10.0	12.9	9.6	7.3	6.4
Max Size	19.4	25.2	-	19.5	15.0	24.0	17.9	19.5	22.4	20.6
Mean Size	-	-	-	-	-	-	-	-	15.8	12.4
n	6	12	1	11	3	11	11	15	169	55
PSD (%≥15")	-	-	-	-	-	-	-	-	57	-
PSD-P (%≥20")	-	-	-	-	-	-	-	-	2	-
PSD-M(%≥25")	-	-	-	-	-	-	-	-	0	-
Largemouth Bass										
CPUE	77.2		18.0					135		68.4
Min Size	7.2		10.0					6.3		4.0
Max Size	18.4		15.5					17.9		18.8
Mean Size	13.1		-					11.8		12.0
n	90		44					80		317
PSD (%≥12")	71							61		64
PSD-P (%≥15")	33							7		8
RSD-14 %≥14")	39	NA		NA	NA	NA	NA	24	NA	19
Bluegill										
CPUE	61.8		189					428		189
Max Size	6.2		6.8					8.3		8.0
Mean Size	4.7		4.7					5.3		5.3
n	68		85					421		258
PSD (%≥6")	3		8					38		50
PSD-P (%≥8")	0	NA	0	NA	NA	NA	NA	1	NA	0.4
Pumpkinseed										
CPUE			2.2					78		85.6
Max Size			5.2					7.4		8.2
Mean Size			-					5.6	NA	6.2
n								77		117
PSD (%≥6")								34		64
PSD-P (%≥8")	-	-	-	NA	NA	NA	NA	0		2
Yellow Perch										
CPUE	3.6	25	20					19.3		19.0
Max Size	6.4	8.3	7.0					6.1		7.8
Mean Size	-	-	-					-		-
n	4	10	9					19		26
PSD (%≥6")	-	-	-	NA	NA	NA	NA	-	NA	-

Table 3. – Total number and catch per unit of effort (CPUE, number per net-night) of fish caught by species in the 2022 fyke-netting surveys for Camelot Lake (Both) and upper and lower parts of the lake.

Section of Lake	Upper		Lower		Both	
Common name of fish	Number	CPUE	Number	CPUE	Number	CPUE
Black Bullhead	11	0.4	2	0.03	13	0.1
Black Crappie	21	0.8	96	1.4	117	1.3
Bluegill	48	1.9	220	3.3	268	2.9
Golden Shiner	0	0	2	0.03	2	0.02
Largemouth Bass	0	0	48	0.7	48	0.5
Northern Pike	58	2.3	154	2.3	212	2.3
Pumpkinseed	4	0.2	17	0.3	21	0.2
Walleye	131	5.2	121	1.8	252	2.7
White Sucker	1	0.04	36	0.5	37	0.4
Yellow Bullhead	84	3.4	533	8.0	617	6.7
Yellow Perch	7	0.3	31	0.5	38	0.4

Table 4. – Minimum, maximum, and average length (inches) of fish caught by species and their size structure indices (PSD is the %≥ of quality, preferred size, or memorable lengths) in the 2022 fyke-netting survey for Camelot Lake (Both) and the upper and lower parts separately. A "- "indicates that the sample size was less than 50 to calculate mean length or PSD values.

Section of Lake	Upper		Lower		Both	Both	Both	Both
Common name of fish & PSD; PSD-P; PSD-M lengths	Min	Max	Min	Max	Ave	PSD	PSD-P	PSD-M
Black Crappie (%≥8"; 10"; 12")	5.6	10.3	4.4	11.7	8.7	79	23	0
Bluegill (%≥6"; 8"; 10")	3.8	7.7	3.5	8.2	6.2	61	3	0
Largemouth Bass	-	-	7.0	21.1	13.3	-	-	-
Northern Pike (%≥21"; 28";34")	10.5	28.4	14.5	33.9	22.0	69	6	0
Pumpkinseed (%≥6"; 8"; 10")	7.0	7.7	3.9	7.9	-	-	-	-
Walleye (%≥15"; 20"; 25")	12.5	22.0	7.3	22.4	16.3	68	8	0
White Sucker	18.4	18.4	11.0	21.9	-	-	-	-
Yellow Perch	6.3	7.7	5.2	7.7	-	-	-	-