WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fisheries Survey Report for Big Roche a Cri Lake, Adams County, Wisconsin 2021

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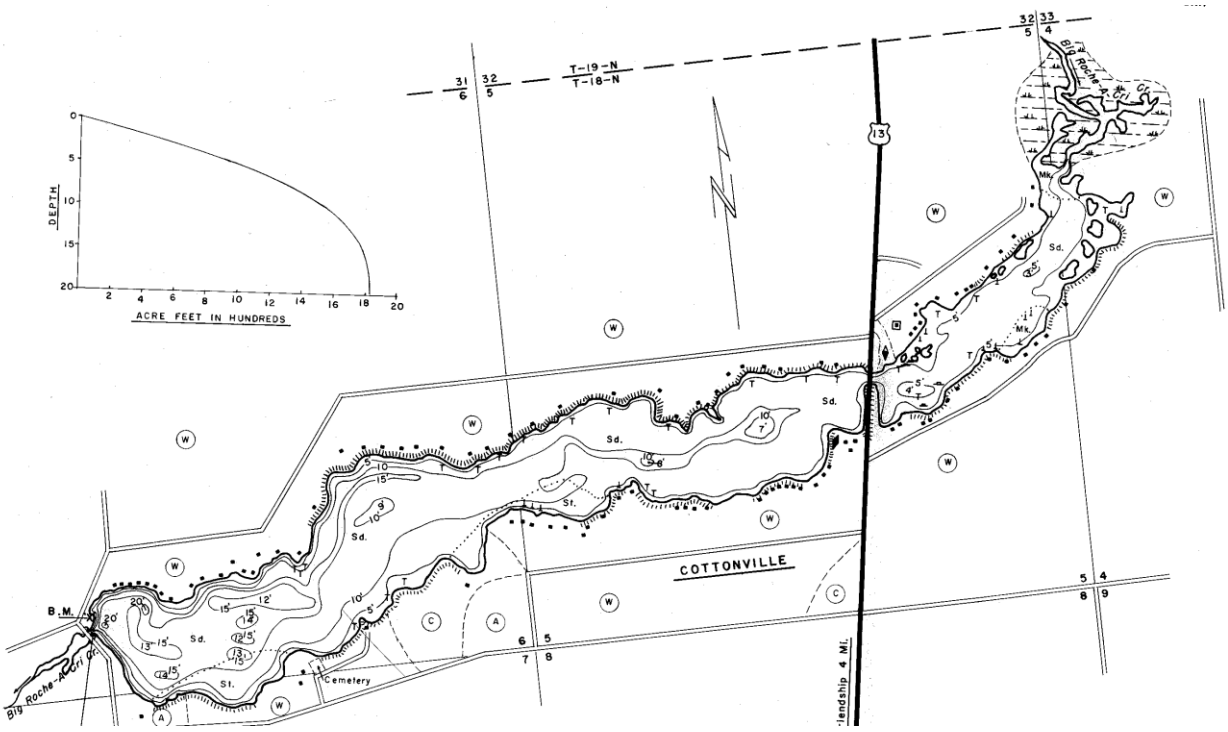

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Executive Summary

Big Roche a Cri Lake is a 216-acre reservoir in Adams County, WI has a good largemouth bass and bluegill fishery with northern pike, walleye, black crappie, pumpkinseed, yellow perch, and green sunfish. On the night of May 19, 2021, a late-spring electrotonizing survey took place to assess the largemouth bass and panfish populations. Bluegill were the dominant panfish species caught, relative abundance was high at 100 fish per mile and within the 75th percentile. Mean length was 6.1 inches and was the largest observed compared to past surveys. The largest bluegill caught was 8.3 inches. 61% of bluegills were 6 inches or larger and 2% were 8 inches or larger. Growth rate was the same as the average bluegill. Largemouth bass relative abundance was 45 fish per mile and is considered high (67-90th percentile) and not different from previous surveys. Size structure of largemouth bass has not changed significantly from past surveys, the mean length was 12.7 inches and largest was 17.1 inches. 87% of the largemouth bass were 12 inches or larger, 38% were 14 inches or larger and 15% were 15 inches or larger. Growth rate tapers off between age 6 and age 9 and is slower than the average largemouth bass. An early-spring electrofishing or fyke netting survey would be best for evaluating northern pike, walleye, black crappie and yellow perch. The lake would be a candidate for a 10 daily aggregate panfish bag limit if the objective was to improve the size structure of bluegill. Efforts to manage and protect the aquatic plant community in the littoral area of the lake and keep water quality in the good-to-excellent range is important.

Introduction

Big Roche a Cri Lake is a 217-acre reservoir with 6.7 shoreline miles in Adams County, Wisconsin (Figure 1). Maximum depth is 20 feet. The lake varies between being mesotrophic and eutrophic, averaging more towards upper mesotrophic (Barlament et al. 2022). Overall water quality is good-excellent based on chlorophyll-*a* concentration, Secchi disk depth and total phosphorous. There are five critical habitat designated areas within the lake totaling 54 acres, these areas were chosen due to the high quality of aquatic plants that are essential for fish and wildlife habitat and water quality. The Sensitive Area Designation was completed in 2006 and gives protection to these habitat areas from human disturbance (WDNR 2005) Aquatic plants can grow 14-15 feet deep (Barlament et al. 2022). The top four aquatic plant species in the littoral area of the lake within the 2019 survey were wild celery, coontail, water stargrass and common waterweed (Barlament et al. 2022). These are all important species for fish, wildlife and water quality. Native species richness was above the median value compared to other lakes in the state. Floating-leaved plants were found to be rare in a 2021 survey, only 0.2 acres (0.1% of the lake area) supported these types of plant communities, where shallow lakes similar to Big Roche a Cri Lake normally support 14-58% of a lake's area with floating-leaved plants (Barlament et al. 2022). Floating-leaved plants are essential for some fish species during their life cycle. Two invasive plant species were found, curly-leaf pondweed (<1%) and Eurasian watermilfoil (4%).

Big Roche a Cri Lake has a stocking of history. The lake was historically stocked with northern pike until 2017, stocking was discontinued due to lack of evaluation of the stockings and the ample amount of aquatic vegetation (spawning habitat) for natural reproduction. Walleye have historically been stocked in the lake as well, beginning in 2014 with the Wisconsin Walleye Initiative (The Wisconsin Walleye Initiative 2022) about 1,080 extended growth walleyes have been stocked on even years. Extended growth walleye are typically larger in size (6.5-6.8") and have a better chance of surviving. DNR fisheries staff have conducted fall electrofishing surveys to evaluate the walleye stockings, looking for any signs of natural reproduction and fish stocked in previous years. Big Roche a Cri Lake has had additional spring surveys as it is a reference lake for a study evaluating special panfish regulations that are in effect on other lakes (Panfishing in Wisconsin 2022).

SURVEY EFFORT

Fisheries surveys targeting largemouth bass and bluegill occurred on the lake in 2002, 2009, 2018 and 2021 and are helpful for examining changes overtime and status. Fishing regulations for the lake are the general statewide regulations.

Methods

A DNR standard electrofishing survey took place on the night of May 19, 2021. Water temperature was 64.8° F. This time and water temperature are within our standard protocol window for spring electrofishing surveys for bass and panfish, when the fish are on their spawning beds along the shoreline. In total, 3.5 miles of shoreline were surveyed. Two dippers collected fish. Fish were collected for 1 hour and 39 minutes, this does not include processing time for measuring fish. Panfish were collected for 2 miles and largemouth bass and other gamefish were collected for 3 miles of the shoreline. Pulsed direct current was

used with a pulse rate of 50%, duty cycle of 25, electrical output was 290 volts and 15 Amperes.

All fish captured were measured to the nearest 0.1 inch. Aging structures (otoliths) were collected for bluegill, yellow perch and largemouth bass. Five bluegill and five yellow perch per ½" inch group and largemouth bass between 13-14.9 inches were sacrificed. This subsample of fish were also weighed to the nearest 0.1 gram.

Relative abundance, size structure and growth were evaluated. Relative abundance was indexed using catch per unit of effort (CPUE) which is the number of fish captured per unit of effort (miles). For largemouth bass, CPUE was indexed for those fish equal to or greater than 8 inches and for bluegill those equal to or greater than 3 inches. These CPUE values were compared to values for lakes that are similar to Big Roche a Cri Lake. Proportional Stock Density (PSD) is an index used to describe size structure of fish. PSD was calculated by dividing the number of quality or preferred size fish by the number of stock size fish for a given species. For largemouth bass, stock size = 8 inches, quality length = 12 inches and preferred size = 15 inches. 14 inches for largemouth bass is a common length for evaluating size structure too because of the fishing regulation (minimum length limit of 14 inches), Proportional Stock Density of 14-inch fish (PSD-14). Bluegill stock length = 3 inches, quality size is 6 inches, preferred size is 8 inches and memorable size is 10 inches. Growth was evaluated by evaluating the age a fish was for a given length and comparing to statewide growth information for that species.

Results

A total of 413 fish of nine different species were collected during the survey (Table 1). Bluegill and largemouth bass were the most caught species. Other fish species were observed during the survey but not collected, those were indexed as present, common or abundant. Golden shiner and yellow bullhead were noted as present and white sucker was noted as common. Three common carp were counted. 15 yellow perch were sacrificed for otoliths to examine growth with mean length-at-age, growth was found to be the same as the average yellow perch in Wisconsin (age 2= 4.5 inches, age 3= 5.6 inches and age 4= 7.3 inches).

BLUEGILL

During the 2021 survey, 199 bluegill were caught. The relative abundance of 3-inch and larger bluegills was 100 per mile. Compared to past surveys, this CPUE was the highest observed (Table 2) and is within the 75th percentile compared to similar lakes. Bluegill ranged in length from 2.6-8.3 inches with a mean length of 6.1 inches and the most often caught bluegill was 6.4 inches. The mean length was the largest observed over the years (Table 3; Figure 2). Size structure has improved over time with 61% of all bluegills caught being 6 inches or greater and 2% being 8 inches or greater (Table 3). In previous surveys, bluegills were not caught greater than 7.3 inches. Growth rate was the same as the average bluegill in Wisconsin (Figure 3) and appears to be a bit faster growth rate compared to 2009.

LARGEMOUTH BASS

During the 2021 survey, 150 largemouth bass were caught. The relative abundance of 8-inch and larger bass was 45 per mile. Compared to past surveys, this CPUE value is within the range of CPUEs of the past and has not significantly changed (Table 2). This CPUE value is high compared to similar lakes and is within the 67-90th percentile. Largemouth bass ranged in size from 4.3-17.1 inches with a mean length of 12.7 inches and most often observed length of 12.3 inches (Table 4 and Figure 4). Mean length has not significantly changed compared to past years, only 30 bass were caught during the 2009 survey and likely doesn't represent the bass population (Table 4). 87% of the largemouth bass caught were 12 inches and greater, which is the most observed compared to past surveys. This was not significantly different from 2018 yet is greater than 2002 (Table 4). 15% of bass were 15 inches or greater which is not significantly different from 2018. In 2002, 28% of the bass were 15 inches or greater. In 2021, 38% of largemouth bass were 14" or greater, which is not different from previous surveys (Table 4). 2018 was the only year a memorable size (20 inches) bass was caught. Mean length-at-age for 6-year-olds was 13.5 inches and is considered normal, growth also appears to be similar to the average bass in Wisconsin and has not changed overtime (Figure 5). Growth appears to taper off and be below the state average after age 6 and before age 9, growth within an age class is variable yet this could be due to a food limitation for these larger and older bass.

Discussion and Recommendations

Big Roche a Cri Lake is predominantly a largemouth bass and bluegill fishery; however, the survey did not target northern pike, walleye, crappie or yellow perch which anglers do enjoy. For "balanced" largemouth bass-bluegill fisheries, PSD values for largemouth bass range from 40-70, PSD-P 10-40, and PSD-M 0-10. Bluegill PSD for a balanced fishery ranges from 20-60 and a PSD-P of 5-20. 2021 was the first survey in history where the largemouth bass-bluegill populations are close to being in a balanced state. For largemouth bass the PSD was a bit high 87±5 and a PSD-P of 15. Bluegill PSD is within the upper range of 60, 61±6, and PSD-P was 2. Why did the bluegill population size structure improve over time? The reason is unknown. Research has shown that if bluegill growth is good, the only way to improve size structure on a population that receives a lot of harvest by anglers is to reduce bag limits, but no changes in fishing regulations have occurred.

Compared to the fall surveys, eight walleye were caught in the 2021 spring survey (2.7 fish per mile). Fisheries staff completed fall electrofishing surveys in 2014-2016, 2018 and 2020 before the stocking of extended growth walleye, looking for any signs of natural reproduction and survival of stocked walleye. Walleye were not observed in 2014 and 2016. In 2015 and 2020, one walleye was observed (0.24 fish per mile) and in 2018 four walleye were captured (1.1 fish per mile). During the 2020 survey, staff indexed fish species as being present, common or abundant. Black crappie and pumpkinseed were present. Bluegill, yellow perch, minnow species and white sucker were abundant. Northern pike were common, leaning towards abundant. Largemouth bass were common. An earlier spring electrofishing survey or a netting survey might be better to evaluate the walleye population and effectiveness of stockings.

Big Roche a Cri Lake has good-to-excellent water quality, and overall, a diverse aquatic plant community in the littoral area of the lake. The lake is lacking floating leaved aquatic vegetation. Continuing to manage and protect the aquatic plant community in the littoral area of the lake and efforts to keep water quality in the good-to-excellent range is important.

Acknowledgements

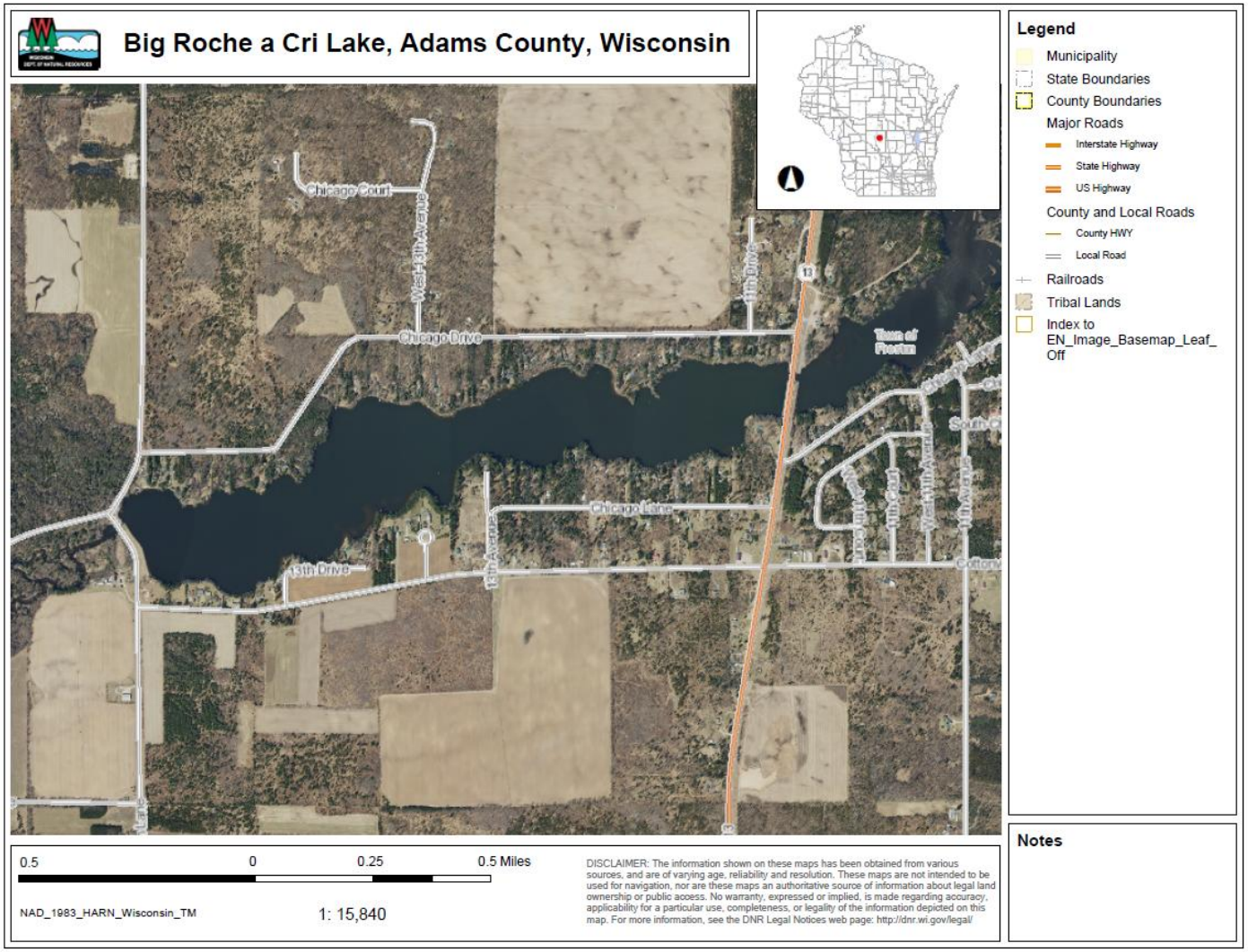
The data collected for this report would not have been possible without many DNR staff over the years. Jake Thompson, Advanced Fisheries Technician, processed and estimated age from all the otoliths collected for the 2021 survey and was electrofishing boat operator for a survey. Former Fisheries Technicians, Trevor Raatz and Chengla Xiong, assisted with otolith collection and age estimation for the 2021 survey. Jason Spaeth, Advanced Fisheries Technician, was electrofishing boat operator for most of the surveys and recorded and entered data into the statewide database. Colton Wolosek, former Fisheries Technician, processed all the fish sacrificed for otolith collection and was a dipper during four surveys. Other former Fisheries Technicians that were dippers on surveys included: Pete Kleinschmidt, Dave Osier, Dale Kufalk (retired, boat operator) and Catlin Brillowski. Taylor Hasz, former Water Resources Biologist, was a dipper as well during a survey.

References

Barlament, J., B. Butterfield, and T. Hoyman. 2022. Draft Big Roche a Cri Lake aquatic management plan update. February 2022. Onterra LLC, De Pere, WI.

Wisconsin Department of Natural Resources (WDNR). 2005. Designation of sensitive areas in Big Roche a Cri Lake, Adams County. Eau Claire, WI.

Figure 1. Map of Big Roche a Cri Lake



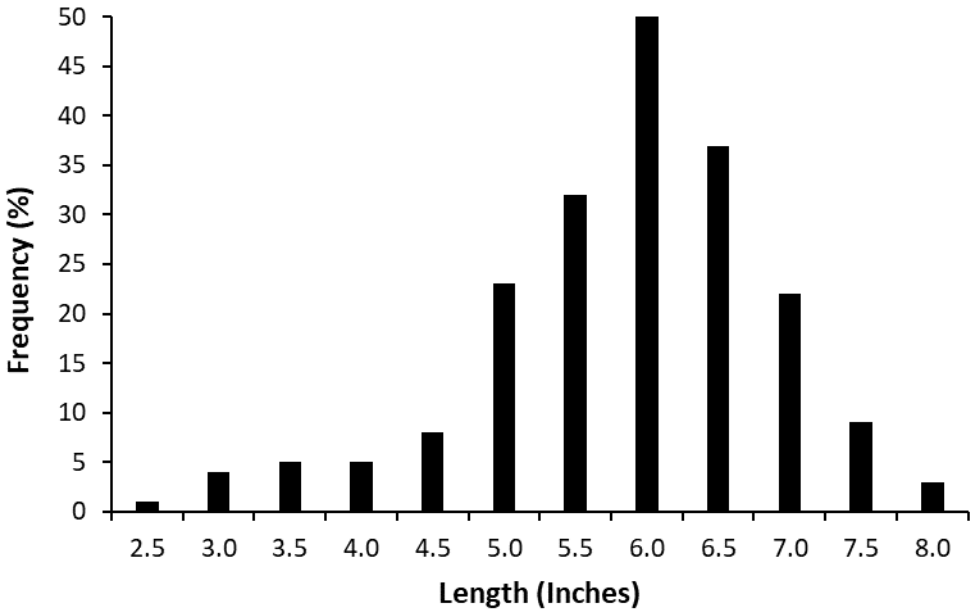


Figure 2. – Length frequency of bluegill captured in Big Roche a Cri Lake, 2021 (n=199).

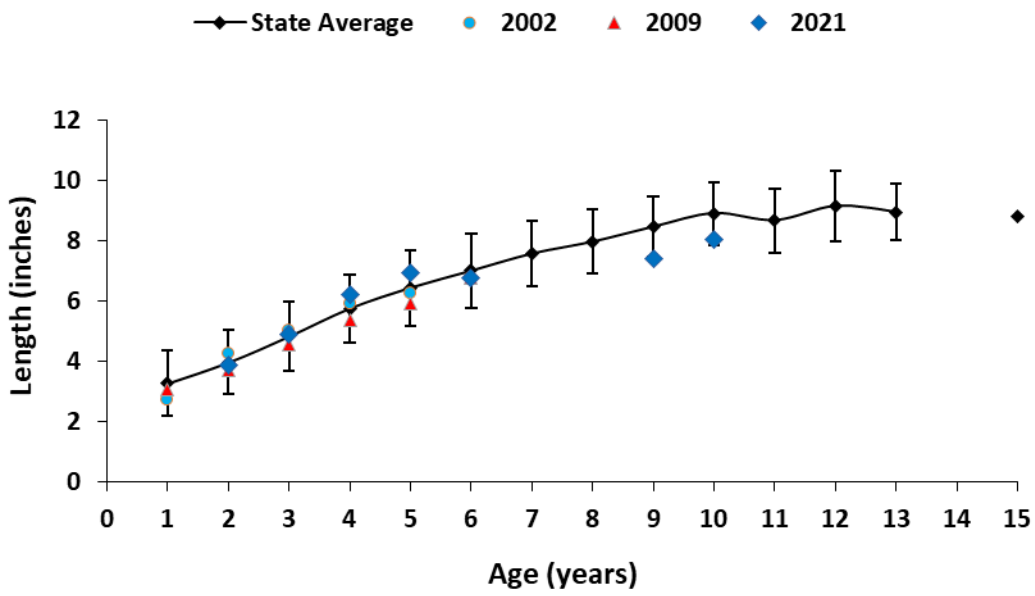


Figure 3. – Mean length at age of bluegill captured in Big Roche a Cri Lake in 2002, 2009 and 2021 compared to the statewide average bluegill.

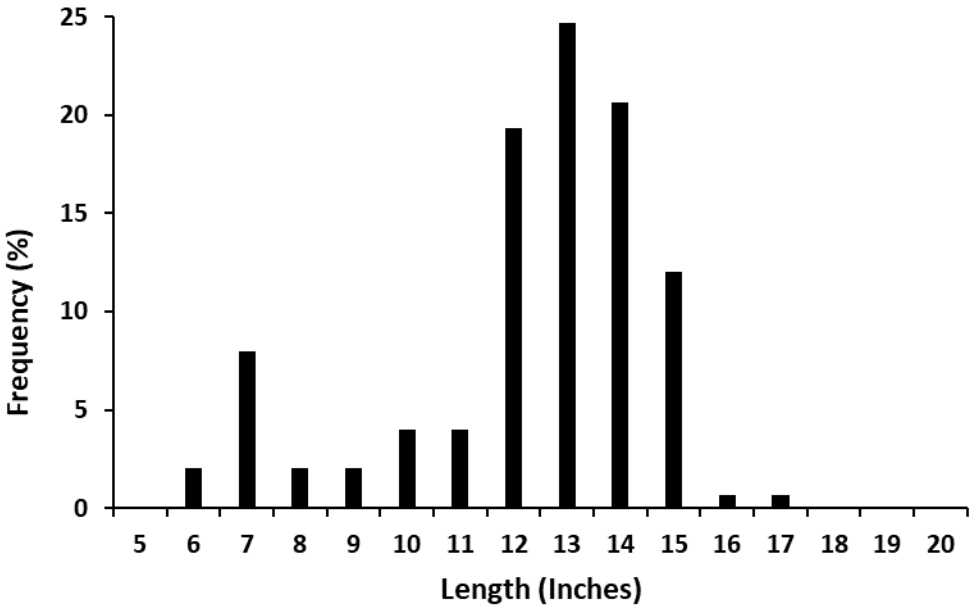


Figure 4. - Length frequency of largemouth bass captured in Big Roche a Cri Lake, 2021 (n=150)

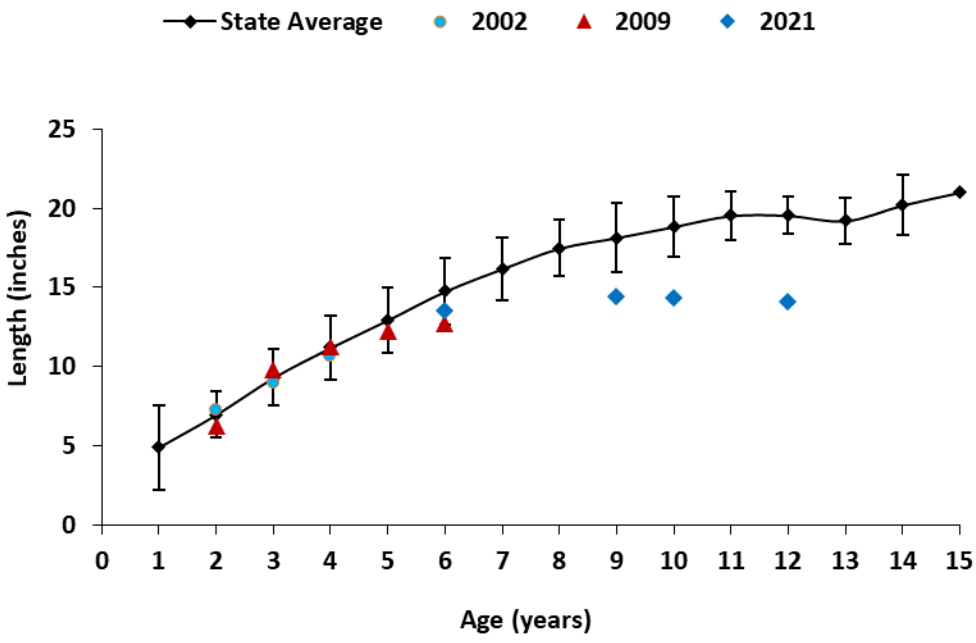


Figure 5. – Mean length at age of largemouth bass captured in Big Roche a Cri Lake in 2002, 2009 and 2021 compared to the statewide average largemouth bass.

Table 1. – Total number of fish caught by species in the 2021 in Big Roche a Cri Lake.

	2021			
Common name of fish	Number	Percent	Length Range (Inches)	Mean Length (Inches)
Black Crappie	7	1.7	5.2-10.3	9.1
Bluegill	199	48.2	2.6-8.3	6.1
Common Carp	3	0.7	-	-
Green Sunfish	1	0.2	5.2	-
Largemouth Bass	151	36.6	4.3-17.1	12.7
Northern Pike	6	1.5	19.4-29.4	24.0
Pumpkinseed	16	3.9	3.8-7.9	5.2
Walleye	7	1.7	5.7-23.1	12.1
Yellow Perch	23	5.6	4.1-10.7	5.8
Total	**413**	**100.0%**		

Table 2. – Relative abundance (CPUE; number of fish per mile) of bluegill and largemouth bass for Big Roche a Cri Lake in 2002, 2009, 2018 and 2021.

Common name of fish	2002 CPUE	2009 CPUE	2018 CPUE	2021 CPUE
Bluegill	31	79	68	100
Largemouth Bass	50	13	41	45

Table 3. – Size Structure of bluegill for Big Roche a Cri Lake in 2002, 2009, 2018, and 2021.

Stock, Quality, Preferred (3.0, 6.0, 8.0 Inches)	Total	Mean Length	Length Range	PSD - Q	PSD-P
2002	56	5.1±0.2	2.9-7.1	9±10	-
2009	158	5.1±0.1	3.0-7.2	15±7	-
2018	69	4.5±0.2	3.0-7.3	9±9	-
2021	199	6.1±0.1	2.6-8.3	61±6	2

Table 4 – Size Structure of largemouth bass for Big Roche a Cri Lake in 2002, 2009, 2018, and 2021.
**Sample size of 50 is necessary to represent the population.*

Stock, Quality, Preferred, Memorable (8.0, 12.0, 15.0, 20.0 Inches)	Total	Mean Length	Length Range	PSD-Q	PSD-P	PSD-M	PSD-14”
2002	96	12.5±0.6	6.0-18.5	66±11	28	-	38
2009*	30	11.1±1.4	5.3-18.5	35±24	19	-	32
2018	124	13.1±0.4	6.1-20.1	75±9	14	1	36
2021	135	12.7±0.4	4.3-17.1	87±5	15	-	38