



Fall 2022

Introduction:

Lake Summerset leadership understands the need to collect data to effectively manage the fishery and to maintain a level of fishing expected by the membership. They are active in monitoring and maintaining a quality fishery. To assist these efforts, JadEco was contacted to assist with the data collection and to provide recommendations on the path forward for the fishery at Lake Summerset. Since the first survey by JadEco in 2019, the lake has experienced a large-scale viral fish kill of black crappie, significantly reducing this panfish fishery. Subsequent surveys have been conducted and young of the year crappie have since been observed and we expect the fishery to begin to improve. With the changes in the fish community (fewer crappie), we intend to monitor the fishery for other changes (bluegill, largemouth bass) that may occur while the crappie niche is being refilled.

Some anglers have requested crappie stocking to quickly rejuvenate the fishery. However, the surviving crappie in Lake Summerset are ones that were immune to the viral infection and survived the fish kill while the rest of the population succumbed to the virus. By allowing the remaining crappie genetics to repopulate, we may not have this issue again in the future.

Daytime DC Electrofishing was conducted for a total of 84 minutes in various areas around the lake on October 31, 2022. Water clarity readings were upwards of 7 feet the day of the survey, and water temperature was at 55.9°F. The equipment was functioning well, and we observed a good survey.

We had two people netting in the main boat and a follow boat assisting with fish collection and picking up fish the main boat may have missed or floated up late.

To effectively evaluate the fishery, we utilize several standards established in scientific literature. These consist of analysis for catch per unit effort (CPUE) per species, total catch per unit effort, proportional stock density (PSD) on important game species, and relative weight (W_r) were analyzed. These metrics provide information on the gamefish population density and potential trends in the fishery. They also provide an understanding of the size structure of game species within the lake and provide information on length to weight relationships to better understand if your game fish are relatively fat, or relatively thin. Potential changes in the predator / prey relationships and available forage can be interpreted through these metrics.

Summary of Fisheries Data:

A total of 1,987 fish were collected during the survey, with an overall CPUE effort of 23.66 fish per minute. Once again, the Lake Summerset collection is dominated by



large collections of largemouth bass and bluegill. Our largemouth bass collection was at 14.25 fish per minute, and bluegill were at 8.67 fish per minute. These are VERY high collection for bass and bluegill. Our overall collection objective goal is 6 or more fish per minute total. Individual species goals for largemouth bass are at 1 to 2.5 fish per minute and bluegill are at 2 to 4.5 fish per minute.

A total of 9 species of fish were observed during this survey. Seven species comprised valuable sport fish, consisting of largemouth (1197) and smallmouth bass (15), bluegill (728), yellow perch (11), walleye (15), muskie (1), and Crappie (1). The remaining species were bluntnose minnows (8), and silversides (11). The entire collection was comprised of desirable species.

Large catches of bass in the 3" to 5" range were observed, and the overall bass distribution for larger fish was excellent. Bass proportional stock density (PSD) was at 27 and under our objectives again due to the high collection of smaller bass between 8" and 12" (mostly less than 11"). Bluegill size distribution was better in 2022 with a PSD of 27 and within our objective. We did see some improvement in the representation of larger bluegill, which is what we want to observe.

Relative weights improved or maintained for all species except the smallmouth bass. Smallmouth dropped from 89 to 88 from 2021 to 2022. The largemouth bass relative weights (Wr) maintained for 2022 and bluegill have begun to come back up.

Overall, the fishery at Lake Summerset continues to maintain an abundant population of largemouth bass, while still allowing quality pan fishing experiences. There continues to be high collection rates of younger largemouth bass but the overall Wr remains good at 99.

Largemouth bass comprised 60% of the entire collection this year and bluegill comprised nearly 37%. The largemouth bass population structure continues to be very good right now in Lake Summerset with a good distribution of bass in all size categories, and good representation of larger bass. Bass recruitment shows no signs of slowing down, and many of these smaller bass likely are cannibalized in this fishery or provide forage for other predators. Good relative weights for largemouth bass indicate the opportunity for growth and for anglers to catch relatively fat, largemouth bass during their angling outings.

We did observe young of the year crappie in 2022, and anticipate a stronger, growing population of crappie going forward. Utilizing the surviving crappie as the spawning stock allows the fishery to utilize genetics to reduce the risk of another viral outbreak for crappie in the future.



Bluegill relative weights were up some in 2022 (95 from 91 in 2021) but higher Wr would be expected to help the growth rates.

We observed 15 smallmouth bass with a CPUE of 0.18 fish per minute. Relative weights for smallmouth remain low in 2022. Smallmouth bass from 4.9" to 17.2" were collected, indicating natural reproduction continues to occur at Lake Summerset.

We also collected one large muskie and 15 walleyes during this survey.

Largemouth Bass:

The fall 2022 survey had a very high collection rate for largemouth bass again at 14.25 fish per minute. This is well above our objective range of 1-2.5 fish per minute, but Lake Summerset has historically collected high numbers of bass and bluegill during fish surveys. Even with the high CPUE and dense fishery, relative weights were good at 99 and within our objective range of 90 to 110. Wr ranged from 63 to 123. We would expect decent growth rates with these numbers but this can only be verified through an age and growth study. Anglers should be enjoying an excellent bass fishery at Lake Summerset.

We utilized a fisheries management tool known as the PSD or 'proportional stock density' metric to analyze the size structure of the bass population. This is a comparison of the stock (>8") to quality (>12") size bass in the sample. The objective range for largemouth bass PSD is 40-70. The largemouth bass PSD was at 27 in 2022, and consistent with the 2021 survey. This is due to the large collection of bass between 8" and 10.9". The RSD 14 (comparison of the stock size to bass greater than 14") was at 22 and slightly above our objective range of 10 to 20. This means that of the bass collected that were larger than 8", 22% of that group were over 14" in length. This is a good RSD with the high collection of smaller bass present in this survey. Again, I expect anglers are enjoying relatively good fishing at Lake Summerset for fat, healthy bass, but overall the largemouth bass fishery is skewed out of balance due to the higher collection of the smaller size bass under 12" in length.

Average bass lengths were at 7.3" with a range from 2.6" young of the year to 20.6" adults. These large year classes of smaller bass need to be monitored. It is possible the competition for food and space for this year class could end up stunting around 13" and increased harvest of these bass would be necessary to maintain the fishery.

Bluegill:

Catch per unit effort for bluegill was very high at 8.6 fish per minute with a total of 728 bluegill collected. The bluegill ranged from 1.1" to 8.2" in length and averaged 4.6". This is well above our objective range of 2 to 4.5 fish per minute.



The average relative weights improved from 91 in 2021 to 95 in 2022 and were within our objective goals (90-110). The Wr ranged between 63 and 133.

As with largemouth bass, we use the proportional stock density (PSD) metric to evaluate the size structure of the population. The PSD for bluegill evaluates all bluegill over 3" compared to the bluegill over 6". Historically, we've collected large numbers of bluegill in the survey between 3" and 3.9", which causes the lower PSD numbers. However, we had better representation of larger bluegill (5" to 7.9") in 2022 which helped to balance the bluegill fishery. The bluegill PSD was at 20 (up from 15 in 2020), and was within our objective range of 20 to 40. The RSD7 for bluegill was at 6 and RSD 8 was low at 1. By protecting these larger males with the creel limit changes, the bluegill fishery is expected to improve.

By following the recommended limit changes, we should observe an improvement in the bluegill fishery by protecting the larger males over time. This high-density bluegill fishery provides adequate forage for the bass fishery while still providing larger bluegill, making Lake Summerset one of the better bluegill fisheries in the area.

Smallmouth Bass:

Smallmouth bass were represented in the survey with 15 fish collected at a rate of 0.18 fish per minute. Smallmouth ranged in size from 4.9" to 17.2". The average bass collected was 11.2". Smallmouth maintained low Wr again in 2022 at 88, which is under our objective goals. Relative weights ranged from 73 to 100. This drop in Wr is something that needs to be monitored.

Black Crappie:

We did collect one young of the year crappie in 2022 at 2.3" in length. This indicates a successful spawn for crappie since the viral fish kill. We are receiving reports of larger (adult spawning size) crappie being caught on the lake and we expect the fishery to improve. The remaining crappie (post fish kill) likely have immunity from the virus since they survived the kill. These genetics repopulating the lake will likely help keep another virus of the same strain from decimating the population again in the future.

Muskie and Northern Pike:

No northern pike were collected during the survey, but pike were seen skirting the outer edge of the electrical field and the netters were not able to collect them. We did catch one large muskie (46") during the survey, indicating that Lake Summerset still has the ability to produce trophy muskie.



Yellow Perch:

We collected yellow perch at a rate of 0.13 fish per minute (11). They ranged in size from 2.8" to 10.3" with an average size of 7". Observing smaller perch in the survey is an indicator of another successful perch spawn and recruitment effort in 2022. Relative weights for yellow perch were higher than the previous sample but, once again, very low with an average of 83 and ranging from 77 to 87.

Recommendations:

Continue to conduct electrofishing surveys to follow trends in the fish population. By performing periodic surveys, any changes in trends or concerns with the fishery can be rectified more quickly through creel and size limit changes and stocking programs. Lake Summerset continues to be more active in monitoring the fishery. With the crappie kill observed before, consistent surveys can also help us to understand the changes that may occur with increased harvest pressure on other species (bluegill in particular), and spawning and recruitment of the crappie.

Maintain the recommended bluegill limits to allow the harvest of only 5 over 8" daily. The remaining limit can be kept, but under 8". We want to protect big males to improve this fishery. Educate your membership on this management goal for better support.

Fish Habitat:

The Lake Summerset Association should work to place quality fish habitat throughout the lake. Placement of both shallow and deep structure would benefit the fishery, and in particular the bass fishery. Many association lakes require structure be placed only in deep water due to swimming and boating concerns so any volunteers should be working with the Association prior to placement of any structures in the lake.

Along with placement of structure, the aquatic plant management program is important to the fishery. Aquatic plants provide oxygen to living organisms, nurseries to young fish, and a food supply of aquatic invertebrates to bolster the food chain for these growing fish. The Association leadership is working towards MANAGING, not eradicating aquatic plants. This includes chemical control of invasive non-natives (curly leaf pondweed), harvesting native plants, and now an optional treatment program offered to the membership.

Development of this plant management program or strategy will benefit the fishery to ensure the plants are *managed to improve the fishery* while continuing to *maintain recreational use* of the lake.



Size and creel limits:

Continue the bluegill harvest limits of only 5 over 8" daily. This will improve the bluegill fishery by protecting these larger males that are regulating the bluegill spawning. The Association should also encourage the release of larger bluegill by anglers during the spawning season to improve the size distribution of bluegill.

Continue to educate the membership as to *why* this is beneficial. We can assist by providing articles for publication, if requested. By starting an educational program, a level of acceptance can be created in the event it is needed to mandate this change.

Stocking:

Stocking is always subjective to budgetary constraints, and all recommendations may not be able to be met. Stocking recommendations should always be re-evaluated based on subsequent fish population sampling.

- 1) If walleye is a desired species for the anglers, annual (or every other year) stockings of walleye can be done to ensure fishing opportunities for walleye continue. These should be stocked in the fall of the year at 6"-8" in size. With the forage density that is present, stocking densities could be as high as 10 per acre, but 5 per acre is a good number for maintenance supplemental stocking. If budget is a concern, the per acre quantity can be adjusted between 5 and 10 fish per acre.
- 2) If channel catfish are desired by the membership, an annual, or every other year, stocking can be done at an 8"-10" size range. The larger the catfish, the better their stock survival. Please note that a MINIMUM of 8" stock size is required. Fish smaller than 8" are more likely to be consumed by other sport species as prey. Stocking densities of 10 fish per acre is a good guideline. We are not seeing catfish in our surveys at this time.
- 3) Muskie is a sought-after sportfish at Lake Summerset, and periodic stocking of muskie is necessary to maintain a muskie fishery. Previous recommendations were to stock 140 muskie every third year. While this recommendation is fine, I prefer to stock annually or every other year to reduce the gaps in size structure. Stocking up to 45 every year or 90 every other year would be recommended.
- 4) ***If there is a request to perform any stocking beyond these recommendations between this report and any future surveys, JadEco should be contacted for discussion and opinion.***



If budgetary constraints are a problem, stocking every other year may be an option, keeping in mind limited year-class strength and size gaps in the fish that may be observed by fisherman and their creel.

Table 1: Catch Per Unit Effort (CPUE) by species

<i>Species:</i>	<i>Number:</i>				<i>Fish / Minute</i>				<i>Obj. (fish/min)</i>
	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	
Largemouth Bass:	1197	844	563	620*	14.25	11.41	6.26	8.86*	1.0-2.5
Bluegill:	728	688	466	203	8.67	9.3	5.18	2.9	2.0-4.5
Smallmouth Bass:	15	11	6	15	0.18	0.15	0.07	0.21	-----
Black Crappie:	1	----	----	92	0.01	--	--	1.31	0.2-0.8
Yellow Perch:	11	44	24	11	0.13	0.59	0.27	0.16	-----
Muskie:	1	----	----	1	0.01	--	--	0.01	-----
Northern Pike:	----	1	1	3	--	0.01	0.01	0.04	-----
Walleye:	15	----	1	---	0.18	--	0.01	--	-----
Channel Catfish:	----	----	----	---	--	--	--	--	-----
White Sucker:	----	----	4	3	--	--	0.04	0.04	-----
Bullhead:	----	1	----	1	--	0.01	--	0.01	-----
Common Carp:	----	----	----	---	--	--	--	--	Below 0.25
Bluntnose Minnow:	9	8	20	2	0.11	0.11	0.22	0.03	-----
Silverside:	10	11	4	55	0.12	0.15	0.04	0.79	-----
Total CPUE	1,987	1,608	1,089	1006	23.66	21.73	12.1	14.36	6.00 plus

*Under 7" sampled only first run. Very high numbers of bass under 7" fall 2019. Excluding all bass unde 8" from CPUE would provide CPUE for largemouth bass at 2.17 fish per minute, and a total CPUE of all fish at 7.67 fish per minute.

Table 2: Proportional Stock Density (PSD)

<i>Species:</i>	<i>'22f</i>	<i>'21f</i>	<i>'20f</i>	<i>(19f)</i>	<i>Objective</i>
Largemouth Bass:	27	24	74	(76)	40-70
Bluegill:	26	15	15	(15)	20-60
Black Crappie:	---	---	---	(100)	30-60
Smallmouth Bass:	73	82	100	(83)	30-60
Yellow Perch:	50	38	31	(63)	30-60
Walleye:	80	---	100	(---)	30-60

Table 3: Relative Weight (Wr)

<i>Species:</i>	<i>Wr (Ave)</i>				<i>Range:</i>				<i>Objective</i>
	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	
Largemouth Bass:	99	99	101	101	63-123	72-130	78-147	80-120	90-110
Bluegill:	95	91	96	99	63-133	69-123	64-141	61-145	90-110
Black Crappie:	--	--	--	103	-----	-----	-----	91-135	90-110
Smallmouth Bass:	88	89	125	129	73-100	80-106	117-132	110-149	90-110
Yellow Perch:	83	78	81	81	77-87	65-93	72-96	76-86	90-110
Northern Pike:	--	91	100	95	-----	91	100	91-97	90-110
Walleye:	92	--	75	--	69-105	-----	75	-----	-----



Table 4: Length Ranges by Species

<i>Species:</i>	<i>Length:</i>				<i>Average:</i>			
	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	<i>22f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>
Largemouth Bass:	2.6"-20.6"	3.1"-19.5"	2.2"-20.5"	2.6"-19.4"	7.3"	8.4"	8.0"	6.5"
Bluegill:	1.1"-8.2"	1"-8.9"	1.4"-9.6"	1.4"-8.7"	4.6"	3.4"	4.2"	3.9"
Smallmouth Bass:	4.9"-17.2"	10.2"-17.2"	3.5"-16.9"	4.1"-16.7"	11.2	13.5"	9.1"	8.8"
Black Crappie:	2.3"	----	----	2.2"-12"	2.3"	--	--	5.5"
Yellow Perch:	2.8"-10.3"	4.3"-11.3"	2.8"-11.7"	4.4"-11.5"	7"	5.9"	6.8"	7.7"
Muskie:	46"	----	----	33.9"	46"	--	--	33.9"
White Sucker:	----	----	11"-22.1"	16"-19.1"	--	--	17.2"	17.9"
Walleye:	7.3"-24.4"	----	27.6"	----	14.7"	--	27.6"	--
Northern Pike:	----	24.2"	31.1"	13.1"-29.1"	--	24.2"	31.1"	18.7"
Bluntnose Minnow:	2.4"-3.3"	1.6"-3.4"	2.2"-3.7"	2.4"-3.3"	3"	2.6"	3.5"	2.9"
Silverside:	2"-2.8"	2"-2.9"	1.9"-3.0"	2"-3.6"	2.4"	2.5"	2.5"	2.9"
Bullhead:	----	10.3"	----	10"	--	10.3"	--	10"







