



Fall 2021

**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. JadEco was contacted to assist with the data collection and to provide recommendations on the path forward for the fishery at Lake Summerset. Since beginning to collect data Fall 2019, we experienced a large-scale fish kill of black crappie of all size ranges. Concerns for the fishery were raised by members, and a follow up survey was performed to evaluate the remaining fish community and population structure in 2020. We also collected data in Fall 2021 to review the fish community and individual populations within that community to better understand the impact of the fish kill. This report provides information on the data collected by JadEco the past three seasons.

Daytime DC Electrofishing was conducted for a total of 74 minutes in various areas around the lake on November 8, 2021. Water clarity readings were upwards of 6 feet the day of the survey, and water temperature was at 50°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. A total of 1,608 fish were collected during the survey, with an overall CPUE effort of 21.73 fish per minute. Nearly 60% of our bass collection was between 6" and 10", and our largemouth bass collection was at 11.41 fish per minute. Our objective goal is 6 or more total fish per minute total and 1 to 2.5 fish per minute for bass.

A total of 8 species of fish were observed during this survey. Five species comprised valuable sport fish, consisting of largemouth (844) and smallmouth bass (11), bluegill (688), yellow perch (44), and northern pike (1). The remaining 3 species were bluntnose minnows (8), and silversides (11), and bullhead (1). The entire collection (excluding the one bullhead) was desirable species.

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:**

Once again, the Lake Summerset collection is dominated by large collections of largemouth bass and bluegill. Looking at the graphs, it is visible the high collection of smaller bass in the 6" to 8.9" range from 2020 have grown into a larger year class of bass in the 8" to 10.9" range this year. There was also a high collection of smaller bluegill (in the 3" to 4" range).

We did have a drop in Wr for many species of gamefish this year, and this needs to be monitored with further surveys. Largemouth bass, bluegill, smallmouth bass, yellow perch, and northern pike all had lower Wr in 2021, with smallmouth and yellow perch both being below objective goals.

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 in the 6" to 8.9" range. In 2020 we observed an abrupt drop in bass collection between 9" and 11.9", but these classes were readily present in the 2021 survey. Largemouth bass comprised 52% of the entire collection again this year and bluegill comprised nearly 43% again. 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. The largemouth bass population had good relative weights again in 2021, indicating the opportunity for growth and for anglers to catch relatively fat, largemouth bass during their angling outings.

We did not observe black crappie again during the 2021 survey, but we are receiving reports from anglers of larger, spawning crappie being caught at the lake. As stated in 2020, it may take a few years of strong year classes to get the fishery back.

Bluegill relative weights were low this survey at 91 (down from 96 in 2020) and there was decent distribution of larger bluegill in the survey with bluegill collected up to 8.9" in length.

We observed 11 smallmouth bass with a CPUE of 0.15 fish per minute. Relative weights for smallmouth dropped significantly in 2021 from 125 (2020) to 89. Smallmouth bass from 10.2" to 17.2" were collected.

We also collected one 24.2" northern pike, but no walleye were collected during this survey.

### **Largemouth Bass:**



The fall 2021 survey had a very high collection rate for largemouth bass again at 11.41 fish per minute. This is well above our objective range of 1-2.5 fish per minute, but Summerset has historically collected high numbers of bass and bluegill during fish surveys. Even with the high CPUE and dense fishery, relative weights were decent at 99 and within our objective range of 90 to 110. Wr ranged from 72 to 130. 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 24 in 2021, down from 74 in 2020. 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 20 and within our objective range of 10 to 20, and down from 50 in 2020. This means that of the bass collected that were larger than 8", 20% 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 this is skewed out of balance due to the low collection of the smaller size bass.

Average bass lengths were at 8.4" with a range from 3.1" young of the year to 19.5" 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 9.3 fish per minute with a total of 688 bluegill collected. The bluegill ranged from 1" to 8.9" in length and averaged 3.4". This is well above our objective range of 2 to 4.5 fish per minute.

The average relative weights were low at 91 for this collection, but still within our objective goals (90-110). The Wr ranged between 69 and 123.

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". The bluegill PSD was at exactly 15 again in 2021 (2020 at 15 and 2019 at 15), and was under our objective range of 20 to 40. Historically, we've collected large numbers of bluegill in the survey between 3" and 3.9", which causes the lower PSD numbers. 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.

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The RSD7 for bluegill was at 8 again in 2021, and RSD 8 was slightly lower than our previous survey (2020 was at 6) at 4. 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.

### **Smallmouth Bass:**

Smallmouth bass were represented in the survey with 11 fish collected at a rate of 0.15 fish per minute. Smallmouth ranged in size from 10.2" to 17.2". The average bass collected was 13.5". We did observe a marked drop in Wr for smallmouth bass from 125 to 89, which is under our objective goals. Relative weights ranged from 80 to 106. We're not sure what would have caused this drop in Wr, but it is something that needs to be monitored.

### **Black Crappie:**

As previously stated, in 2019, we observed a high collection of black crappies with 92 individual fish collected with a CPUE of 1.31 fish per minute. There was good representation for multiple year classes of crappie and crappie were collected from 2.2" to 12" with an average size of 5.5". Nearly 33% of the crappie collected were larger than 9", and 13% were greater than 10". That collection indicated we should have expected an excellent season of crappie fishing in upcoming years.

However, a fish kill that targeted the crappie (all size ranges) started a mass die-off after ice out and continued into pre-spawn for the crappie. We did not observe crappie in this survey, but angler reports have been that some crappie have been caught this summer. Angler reports were coming in that larger (mature) crappie were being caught and the last survey indicated the importance of the 2021 spawning season. We did not observe crappie in the 2021 sample, but we are still receiving reports about larger crappie being caught, which should be spawning again in 2022.

### **Muskie and Northern Pike:**

One 24.2" northern pike was collected with a Wr of 91 and was within our objective range. We did witness another small northern during the survey but the netters were not able to collect the fish.

### **Yellow Perch:**

We collected a decent number of yellow perch (44) with a CPUE of over ½ fish per minute (0.59). They ranged in size from 4.3" to 11.3" with an average size of 5.9". Relative weights for yellow perch were, once again, very low with an average of 78 and ranging from 65 to 93.



### **Recommendations:**

Continue to conduct electrofishing surveys to follow trends in the fish population. By performing annual surveys, any changes in trends or concerns with the fishery can be rectified more quickly through creel and size limit changes and stocking programs. Previous data collection was too sparse to actively manage the fishery but Lake Summerset has been more active in monitoring the fishery the past few years. With the crappie kill observed before, consistent surveys can also help understand the changes that may occur with increased harvest pressure on other species (bluegill in particular), and spawning and recruitment of the crappie. Right now, largemouth bass numbers of midsized bass may need to be corrected through increased harvest. Fall data collection in 2022 will confirm if this is needed.

The largemouth bass fishery is doing well, and monitoring the abundance of bass in the 9" to 11.9" size ranges is needed. In 2020, there was a gap in this size class, and last year's recruitment has grown into this class in high numbers. In previous surveys, there has been a gap in this size range.

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.

### **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 requested 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>21f</i>	<i>20f</i>	<i>19f</i>	<i>21f</i>	<i>20f</i>	<i>19f</i>	
Largemouth Bass:	<b>844</b>	563	620*	<b>11.41</b>	6.26	8.86*	1.0-2.5
Bluegill:	<b>688</b>	466	203	<b>9.3</b>	5.18	2.9	2.0-4.5
Smallmouth Bass:	<b>11</b>	6	15	<b>0.15</b>	0.07	0.21	-----
Black Crappie:	----	----	92	--	--	1.31	0.2-0.8
Yellow Perch:	<b>44</b>	24	11	<b>0.59</b>	0.27	0.16	-----
Muskie:	----	----	1	--	--	0.01	-----
Northern Pike:	<b>1</b>	1	3	<b>0.01</b>	0.01	0.04	-----
Walleye:	----	1	---	--	0.01	--	-----
Channel Catfish:	----	----	---	--	--	--	-----
White Sucker:	----	4	3	--	0.04	0.04	-----
Bullhead:	<b>1</b>	----	1	<b>0.01</b>	--	0.01	-----
Common Carp:	----	----	---	--	--	--	Below 0.25
Bluntnose Minnow:	<b>8</b>	20	2	<b>0.11</b>	0.22	0.03	-----
Silverside:	<b>11</b>	4	55	<b>0.15</b>	0.04	0.79	-----
Total CPUE	<b>1,608</b>	1,089	1006	<b>21.73</b>	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 under 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>'21f</i>	<i>'20f</i>	<i>(19f)</i>	<i>Objective</i>
Largemouth Bass:	<b>24</b>	74	(76)	40-70
Bluegill:	<b>15</b>	15	(15)	20-60
Black Crappie:	---	---	(100)	30-60
Smallmouth Bass:	<b>82</b>	100	(83)	30-60
Yellow Perch:	<b>38</b>	31	(63)	30-60
Walleye:	---	100	(---)	30-60

Table 3: Relative Weight (Wr)

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



Table 4: Length Ranges by Species

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











