

2019 Normandale Fisheries Assessment

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During the summer of 2018 and 2019, the Riley-Purgatory-Bluff Creek Watershed District (RPBCWD) assisted Nine Mile Creek Watershed District in conducting a fisheries assessment of Normandale Lake. The fish surveys were based on research and methodology established by the University of Minnesota (UMN) in the Riley Chain of Lakes Carp Management Plan drafted in 2014 (Bajer, 2014), and the Purgatory Creek Carp Management Plan drafted in 2015 (Sorensen, 2015). Common carp populations within Normandale Lake were of specific concern due to the negative impacts large populations can cause within lakes in MN. The adult carp population was monitored by conducting, three, 20-minute electrofishing transects per lake, three times between late July and October. It has been established that if the total biomass estimate of carp is above 100kg/ha in lakes, significant water quality degradation can occur. Young of the year (YOY) carp were monitored by conducting five, 24-hour small mesh fyke net sets between July and September. If numerous YOY carp are captured during an assessment, successful recruitment has occurred which can lead to a more robust future carp population. Bluegill abundance was also important to assess because they are one of the main predators and can keep a carp population under control by consuming carp eggs during the spawn. In the case of both sampling techniques all other fish species were enumerated and summarized. The following document is an overall summary of the 2019 fish assessment results on Normandale Lake.

Fyke Netting

District staff completed a fyke net survey on Normandale Lake on August 8th, 2019. The results from this survey can be seen below in Table 1 which also includes the 2018 fish/net totals. The complete summary table for 2018 fyke netting can be seen in Appendix A. Between 2018 and 2019 bluegill numbers remained very similar (2018-57/net; 2019-69/net). Comparing bluegill abundance in Normandale Lake (69/net) to RPBCWD lakes indicates it had lower overall total numbers, however the overall size structure was good with fish from multiple year classes present. Other species that observed little/no change between 2018 and 2019 included northern pike, green sunfish, hybrid sunfish, pumpkinseed sunfish, and yellow bullhead. The number of turtles captured via fyke netting remained relatively unchanged from 2018 (19 painted, 5 snapping) to 2019 (13 painted, 9 snapping). Golden shiners (N=3) were an additional species captured via fyke nets in 2019 vs 2018, however they were common in both 2018 and 2019 electrofishing results.

Black bullhead (N=1616), common carp (N=866), and bluegill sunfish (N=347) were the most abundant fish species captured in 2019. Overall, the considerable increases seen in largemouth bass, black crappie, black bullhead, and carp between 2018 to 2019 can be attributed to an increase in the number of YOY present, potentially indicating that 2019 was a good recruitment year for said species. The number of black bullheads captured in 2018 was only 4 fish/net vs 323/net in 2019. Black crappie also increased from 6 to 23 fish/net. The largest change seen between 2018 and 2019 was the number of YOY common carp found in 2019. In 2018, only 2 carp were captured via fyke netting of which none were YOY (<150mm) indicating limited/no recruitment occurred. In 2019 however, 866 carp were captured with 97% considered YOY.



Figure 1: Staff setting a fyke net.

Table 1: 2019 Normandale Lake Fyke Net Results

Species	Number of fish caught in each category (inches)									Total	2019 Fish/Net	2018 Fish/Net
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+				
<i>black bullhead</i>	262	22	6							1616	323.2	3.6
<i>black crappie</i>	95	15	6							116	23.2	5.6
<i>bluegill sunfish</i>	209	96								347	69.4	57
<i>common carp</i>	392	12						1		866	173.2	0.4
<i>golden shiner</i>	2	1								3	0.6	0
<i>green sunfish</i>	21	7								28	5.6	7
<i>hybrid sunfish</i>	8	7								15	3	2.8
<i>largemouth</i>	19	1	1							21	4.2	0.2
<i>northern pike</i>				1						1	0.2	0.2
<i>pumpkinseed</i>	133	4								137	27.4	22.4
<i>yellow bullhead</i>	4	15	24	1						44	8.8	13.2
<i>painted turtle</i>										13	2.6	3.8
<i>snapping turtle</i>										9	1.8	1



Figure 2: Young of Year Common Carp.



Figure 3: Golden Shiner



Figure 4: Largemouth Bass



Figure 5: Northern Pike

Electrofishing

Boat electrofishing was conducted across three dates on Normandale Lake in 2019. Similar to 2018, two surveys included netting all fish captured and one was targeting and netting common carp only. Fish captured via electrofishing mirrored that which was captured within the fyke nets (Table 2). The complete summary table for 2018 electrofishing can be seen in Appendix A. Fathead minnows (N=8) was an additional fish species captured via electrofishing vs fyke netting in 2019, and an additional species from the 2018 results. The abundance of fish captured electrofishing declined across most species between 2018 and 2019, which is the opposite of what was seen in the fyke netting results (increase in abundance from 2018 to 2019). One possible explanation to the overall reduction in numbers captured electrofishing could be the lack of thick lily pads and filamentous algae which covered a major portion of the lake in 2018. This vegetation allowed fish to be trapped and/or made them feel sheltered so they could be more easily collected. In 2019 the predominant vegetation was various native submerged vegetation that allowed fish to see the electrofishing boat more easily and may have caused fish to remain deeper water.

Table 2: 2019 Normandale Lake Boat Electrofishing Results

Species	Number of fish caught in each category (inches)									2019 Fish/Hour	2018 Fish/Hour
	0-5	6-8	9-11	12-14	15-19	20-24	25-29	30+	Total		
<i>black bullhead</i>	12	5	7						24	12	14.1
<i>black buffalo</i>										0	0.5
<i>black crappie</i>	4		1						5	2.5	1.9
<i>bluegill sunfish</i>	7	5							12	6	26.2
<i>common carp</i>	87	1			1	5	19	1	114	38	9.2
<i>fathead minnow</i>	8								8	4	0.0
<i>golden shiner</i>	18								18	9	18.0
<i>green sunfish</i>	2								2	1	3.4
<i>hybrid sunfish</i>										0	4.4
<i>largemouth</i>	13								13	6.5	5.8
<i>northern pike</i>		1	1						2	1	1.0
<i>pumpkinseed</i>	4								4	2	20.9
<i>yellow bullhead</i>	2	1							3	1.5	6.8

In 2019, common carp were the most abundant fish captured via electrofishing (N=114). Bluegill sunfish were the most abundant fish captured (N=54) in 2018, which was reduced to 12 total fish in 2018. A total of 26 adult carp were captured in 2019 compared with 28 in 2018. Unfortunately, a large number of YOY (N=87) were captured in 2019 in addition to the large number captured fyke netting, indicating recruitment occurred. Adult biomass estimates were similar between 2018 and 2019 with 163.78 kg/ha and 158.13 kg/ha respectively (Table 3). The biomass estimates suggest most adult carp either remained in the Normandale over the winter or migrated back before the sampling occurred.

Table 3: 2018-2019 Common Carp Biomass Estimates for Normandale Lake

Year	Fish per Hour	Density per Hectare	Average Weight (kg)	Carp Biomass (kg/h)	Threshold (kg/h)
2018	9.16	46.16	3.55	163.78	100
2019	8.67	43.86	3.61	158.13	100

Summary

Overall, the fish sampled in Normandale Lake are similar to what can be found across shallow lakes in the Twin Cities metro area. The drawdown which occurred during the winter of 2018-2019 did not seem to have an impact on the number of fish species present in Normandale. The number of bluegill and the overall size structure indicates that the past winter drawdown did not result in a complete winterkill. The large number of YOY fish found in 2019 indicates that recruitment of largemouth bass, black crappie, and black bullhead may have been enhanced by the drawdown. Common carp may have benefitted from the drawdown as the number increased from 30 total fish in 2018 to 980 fish in 2019. The number of YOY common carp indicate a significant recruitment event within Normandale Lake in 2019. The number of adults remained relatively similar between both years which was above the 100kg/ha threshold. This coupled with the large number of YOY carp will most likely yield an increase in future carp population which may ultimately reduce water quality in Normandale Lake.

References:

- Sorensen, P., P. Bajer, and M. Headrick. 2015. Development and implementation of a sustainable strategy to control common carp in the Purgatory Chain of Lakes. Prepared for Riley Purgatory Bluff Creek Watershed District. University of Minnesota, Saint Paul, MN. Accessed online from: http://rpbewd.org/files/6414/9382/4422/SorensenBajerandHeadrick2015_Development_of_carp_control_in_the_Purgatory_Creek_Chain_of_Lakes.pdf
- Bajer, P.G., M. Headrick, B.D. Miller, and P.W. Sorensen. 2014. Development and implementation of a sustainable strategy to control common carp in Riley Creek Chain of Lakes. Prepared for Riley Purgatory Bluff Creek Watershed District. University of Minnesota, Saint Paul, MN. Accessed online from: http://rpbewd.org/files/3414/3561/7194/Carp_management_report_2014.pdf

