



Sunfish were Abundant in Keller Lake, October, 2019

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## Fish Survey of Keller Lake (ID #19-002500), Dakota County, Minnesota in 2019

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Survey Dates: October 16-18, 2019

**MnDNR Permit Number: 29292**

Prepared for:  
Cities of Apple Valley and  
Burnsville and MnDNR



Prepared by:  
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December 2019

# Fish Survey of Keller Lake (ID #19-002500), Dakota County, Minnesota in 2019

## Summary

Keller Lake has been surveyed 4 times over the past 30 years. The MnDNR surveyed in 1980 and 1985 and Blue Water Science conducted fish surveys in 2016 and 2019. Results from all 4 surveys are shown in Table S1.

In 2019 the Keller Lake fish community was dominated by bluegill sunfish (Table S1). Largemouth bass, a good predator on bluegill sunfish, were present at regional ranges. It does appear they are able to keep bluegill sunfish under control. It is possible the high density of bluegill sunfish could contribute to elevated lake phosphorus concentrations and algae blooms.

**Table S1. Historical trapnet fish survey records.**

	Trapnet Results				
	Fish per net 1980 (MnDNR)	Fish per Net 1985 (MnDNR)	Fish per Net 2016 (BWS) (n=8)	Fish per Net 2019 (BWS) (n=8)	Normal Range (MnDNR)
Black bullheads	16	23	88	24	1.8 - 26.3
Black crappie	1.4	48	5.5	11	1.9 - 13.0
Bluegill sunfish	28	280	422	195	3.1 - 24.9
Golden shiner			1.1	1.8	NA
Green sunfish		0.2	0.6	2.3	0.2 - 12.4
Hybrid sunfish	0.6	1.4	2.6	7.6	NA
Largemouth bass	3.0		4.8	0.5	0.3 - 1.9
Northern pike		1.4			NA
Pumpkinseed	9.6	1.4	51	12	0.8 - 7.2
White sucker			0.4	0.9	NA
Yellow bullhead			5.8	39	NA
Turtles - painted			2.6	0.6	--
Turtles - snapping			0.1		--
TOTAL FISH	59	355	582	294	--
Number of Fish Species	6	7	10	10	--



2019 Keller Lake fish sampling crew included Caleb Ashling, City of Burnsville (left photo), Steve McComas, Blue Water Science, Connor McComas, Blue Water Science, and Linnea Wier, City of Burnsville (right photo)

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## Introduction

Keller Lake (ID: 19-002500) is a 55-acre shallow lake, located in Dakota County, Minnesota. In October 2019, the Cities of Apple Valley and Burnsville sponsored a fish survey conducted by Blue Water Science under permit number 29292 granted from the MnDNR. The objectives were to characterize the fish community in Keller Lake.

## Methods

Four standard trapnets were sampled for two days for a total of eight lifts to survey fish in Keller Lake. The trapnet was a MnDNR-style with a 4 x 6 feet square frame with two funnel mouth openings and 50-foot lead. Net mesh size was 3/8 inch. Four standard trap nets were set on Wednesday October 16, 2019. Four nets were fished for the following 2 days (October 17 and 18). Trapnet locations are shown in Figure 1 and pictures of a typical trapnet operation are shown in Figure 2.

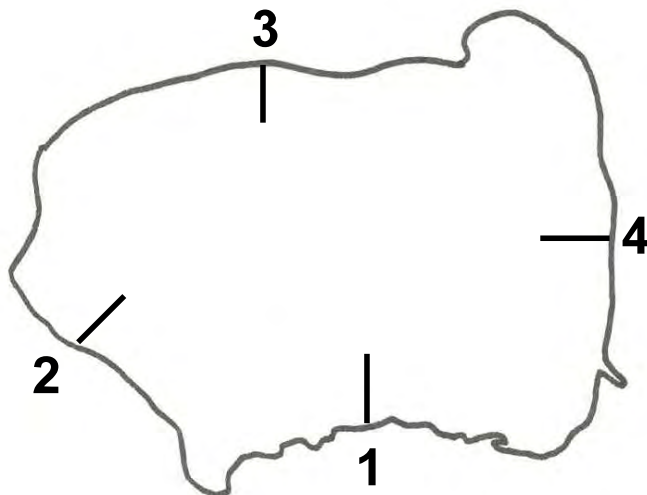


Figure 1. Map of trapnet sets in Keller Lake.





**A trapnet is a live fish trap. Fish run into the 50-foot lead net and follow it back through a series of hoops with funnel mouths. Fish end up in the back hoop.**



**A dip net is used to remove the fish from the back pocket of the trapnet.**



**Fish are transferred to tubs, then they are counted, measured, and released.**

**Figure 2. Trapnet set and fish sampling in the Keller Lake fish survey.**

## Results

**Fish Results:** A total of 10 fish species were sampled in Keller Lake on October 17-18, 2019. Bluegill sunfish were the most abundant species followed by yellow bullheads. Nets 1 and 4, were the most productive (Table 1). The number of bluegills caught per net was above average with a haul of 195 fish per net (Table 1). Bluegills less than 3.5 inches and considered to be young of the year fish were abundant but not included in the catch per net statistics. Largemouth bass catch per net had an average of 0.5 fish per net which is within the normal range compiled by the MnDNR. Pumpkinseed sunfish were also above the normal range which is somewhat rare in metro lakes.

**Turtle Results:** Painted turtles were also sampled in the trapnets and were common in Keller Lake. Painted turtles likely do well because there is a fair percentage of a natural shoreline area.

**Table 1. Keller Lake trapnet results for the fish survey conducted in October 2019. Fish less than 3.5 inches were excluded from the statistics.**

	Fish Captured (October 17-18, 2019)								Total Catch	Fish per Net (n=8)	Normal Range (MnDNR)
	Net 1		Net 2		Net 3		Net 4				
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2			
Black bullheads ( <i>Ameiurus melas</i> )	1	5			37	85	3	57	188	24	1.8 - 26.3
Black crappies ( <i>Pomoxis nigromaculatus</i> )	24	22	4	3	15	13	2	5	88	11	1.9 - 13.0
Bluegill sunfish ( <i>Lepomis macrochirus</i> )	296	452	143	116	90	178	215	511	2001	195	3.1 - 24.9
Golden shiner ( <i>Notemigonus crysoleucas</i> )	2	2		1	5	1	2	1	14	1.8	NA
Green sunfish ( <i>L. cyanellus</i> )	3	3	10	1			3	5	25	2.3	0.2 - 12.4
Hybrid sunfish ( <i>L. sp</i> )	5	16	9	4	5	4	4	14	61	7.6	NA
Largemouth bass ( <i>Micropterus salmoides</i> )	1	1					1	1	4	0.5	0.3 - 1.9
Pumpkinseed sunfish ( <i>Lepomis gibbosus</i> )	7	9	23	16	3	6	24	31	119	12	0.8 - 7.2
White sucker ( <i>Catostomus commersoni</i> )	1	3			2			1	7	0.9	NA
Yellow bullhead ( <i>A. natalis</i> )	44	90	3	3	19	11	13	127	310	39	NA
<b>TOTAL FISH</b>	<b>384</b>	<b>603</b>	<b>192</b>	<b>144</b>	<b>176</b>	<b>298</b>	<b>267</b>	<b>753</b>	<b>2817</b>	<b>352</b>	<b>--</b>
Turtles - painted		1	1			1	1	1	5	0.6	--

**Fish Lengths:** Fish lengths are shown in Table 2. Bluegill sunfish lengths ranged from <3.5 inches up to 7.5 inches with the majority of the population in the 5.5-6-inch range. Young bluegill were abundant indicating successful spawning conditions.

Black bullhead lengths were dominated with the 8-inch length.

Largemouth bass were sampled at levels within the normal MnDNR range for lakes like Keller Lake with lengths up to 17.5 inches long. However, the biggest bass in the lake would not be able to capture 6-inch bluegills which are the dominant size class. Fish predation on the bluegills and bullheads is minor.

**Table 2. Length frequency of fish species (as total length) for the Keller Lake fish survey. Blue shading indicates young-of-the-year (YOY) fish and were not used in statistics.**

<b>KELLER LAKE</b>	Black bullhead	Black crappie	Bluegill	Golden shiner	Green sunfish	Hybrid sunfish	Largemouth bass	Pumpkinseed	White sucker	Yellow bullhead
<3.5		1	445		7			27		1
3.5		1	15		2	4		19		
4			15		9	3		26		
4.5			20		2	5		17		
5			67		2	13		14		3
5.5	3	5	139	2	1	13		9		22
6	2	11	240	3	1	7		3		25
6.5	3	15	50	1		8		2		21
7	15	22	3	7		4				40
7.5	6	7	3	1		1				12
8	53	14				1				6
8.5	54	5								8
9	23	5								9
9.5		1								5
10	1									5
10.5		1					1			1
11										5
11.5							1			1
12										2
12.5										
13										
13.5										
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14.5										
15							1			
15.5									2	
16									1	
16.5										
17									1	
17.5							1			
18									1	
18.5										
19									1	
19.5									1	
20										
<b>Measured</b>	<b>160</b>	<b>88</b>	<b>997</b>	<b>14</b>	<b>24</b>	<b>59</b>	<b>4</b>	<b>117</b>	<b>7</b>	<b>166</b>
<b>Counted</b>	28	0	1004	0	1	2	0	2	0	144
<b>TOTAL</b>	<b>188</b>	<b>88</b>	<b>2001</b>	<b>14</b>	<b>25</b>	<b>61</b>	<b>4</b>	<b>119</b>	<b>7</b>	<b>310</b>
<b>TOTAL without YOY</b>	<b>188</b>	<b>87</b>	<b>1556</b>	<b>14</b>	<b>18</b>	<b>59</b>	<b>4</b>	<b>92</b>	<b>7</b>	<b>309</b>
fish/ net (8 nets)	24	11	195	1.8	2.3	7.6	0.5	12	0.9	39

# Representative Fish Species Sampled in Keller Lake



**Black Crappie**



**Bluegill**



**Largemouth Bass**



**Pumpkinseed**



**White Sucker**



# Historical Trapnet Fish Survey Records for Keller Lake

Keller Lake has been surveyed infrequently over the past 30 years. The last MnDNR survey was from 1985 and Blue Water Science conducted a fish survey in 2016 and 2019 and results from all 4 surveys are shown in Table 3.

**Table 3. Historical trapnet fish survey records.**

	Trapnet Results				
	Fish per net 1980 (MnDNR)	Fish per Net 1985 (MnDNR)	Fish per Net 2016 (BWS) (n=8)	Fish per Net 2019 (BWS) (n=8)	Normal Range (MnDNR)
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**Figure 3. This tub of fish was dominated by bluegills and pumpkinseed sunfish from Keller Lake in 2019.**



## Discussion

**General Findings In This Survey:** Keller Lake has the potential for good panfish fishing based on the size of bluegills found in this survey.

Adult yellow bullheads had a range of lengths with the 3.5 to 12 inches but the 7-inch length was the most common. Few small bullheads were captured in this survey. This could be the result of the largemouth bass controlling them. It is probable that a partial winterkill reduced the predator piscivore population while not having much impact on the hardier bullheads.



**Figure 4. Sunfish were abundant in Keller Lake in 2019. The most abundant was bluegill sunfish.**

## Discussion - concluded

**Gamefish Control to Prevent Bluegill Stunting:** The existing fish community in Keller Lake may not have adequate piscivore pressure (the dominant piscivore in Keller Lake is largemouth bass) to prevent the development of stunted sunfish and bullhead populations. Based on theoretical piscivore lengths and converting fish length to gape width (Figure 6) it is apparent that the piscivore lengths in Keller Lake, when converted to gape widths, will likely not exert enough predation pressure to prevent stunted bluegill (typical around 4-inches) or black bullhead populations.



Figure 5. Gamefish (piscivores) usually select prey that can be swallowed, which is a function of the piscivore gape versus the prey body depth. This 24-inch northern pike from White Bear Lake made a mistake. It attempted to ingest a seven inch bluegill. The 24-inch pike has a 2.0 inch gape, but a 7-inch bluegill has a body depth of 2.3 inches. This pike was found floating and basically choked on the bluegill.

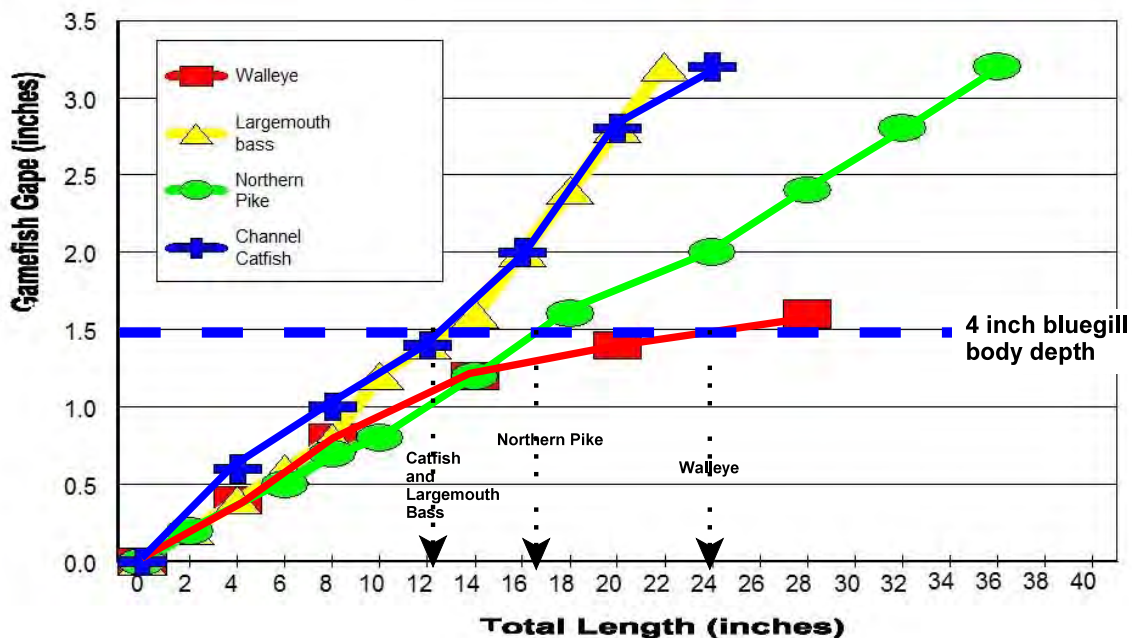


Figure 6. Gamefish gape increases as a function of its total length. The gape determines the size of the prey fish that can be swallowed. For example, a 4-inch bluegill has a body depth of 1.5 inches. To ingest a 4-inch bluegill it would take a 12-inch bass that has a gape of 1.5 inches. There are few bass in Keller Lake that could ingest a 4-inch bluegills.

## Conclusions and Recommendations

The trapnet survey in 2019 found the fish community was composed of 10 species. The bluegill abundance were above average for trapnet catches.

Recommendations and future considerations include the following:

- Keller Lake is shallow enough that occasional winterkills will occur. Typically, there will be partial winterkills, meaning fish sensitive to low oxygen will die first. Low-oxygen tolerant fish such as bullheads will almost always make it through and then dominate the fishery.
- Winter aeration is a way to sustain fish through the winter but there are operation and maintenance issues and the liability of open water conditions in winter to consider.
- Stocking adult largemouth bass to control young bullheads and bluegills could be considered.
- Because bullhead and several species of sunfish currently spawn in the lake, the young fish should produce a forage base for largemouth bass on an annual basis.
- Reducing the abundant adult bullhead and bluegill population could result in better lake water quality.
- In two to three years another fish survey should be conducted to evaluate conditions and re-evaluate recommendations.

# Appendix A

## Minnesota DNR Fish Survey Notification

**From:** Steve McComas [mailto:mccomas@pclink.com]  
**Sent:** Tuesday, October 15, 2019 8:33 AM  
**To:** DeBates, TJ (DNR); Capt. Jason Peterson  
**Cc:** Daryl Jacobson; Caleb Ashling; Linnea Wier (Linnea.Wier@burnsvillemn.gov); Jessica Schaum  
**Subject:** Fish survey on Keller Lake, Dakota County

Hello all,

Blue Water Science will be conducting a fish survey in Keller Lake (MN ID 19-002500), Dakota County, starting on Wednesday, October 16, 2019. We will set 4 standard trap nets in the lake. The nets will be monitored daily on Thursday and Friday and all fish will be weighed, measured, and returned to the lake. The nets will be removed from the lake on Friday, October 18, 2019. The fish survey is sponsored by the Cities of Burnsville and Apple Valley with the objectives of characterizing the existing fish community structure and assessing potential impacts of fish on water quality.

This survey is being conducted under the permit number: 29292.

Thank you,

**Steve McComas**

**BLUE WATER SCIENCE**

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