Fish from Mooney Lake, September, 2011

Fish Survey of Mooney Lake (ID #27-107), Hennepin County, Minnesota in 2011

Survey Dates: September 21 - 22, 2011

MnDNR Permit Number: 17693

Prepared for:
City of Plymouth and
MnDNR

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Introduction

Mooney Lake (ID: 27-107) is a 100-acre shallow lake, located in Hennepin County, Minnesota. In September 2011, the City of Plymouth sponsored a fish survey conducted by Blue Water Science under permit number 17693 granted from the MnDNR. The objectives were to characterize the fish community in Mooney Lake.

Methods

Five standard trapnets were sampled for two days for a total of ten lifts to survey fish in Mooney Lake. The trapnet was a MnDNR-style with a 4 x 6 feet square frame with two funnel mouth openings and 50-feet lead. Net mesh size was 3/8 inch. Five standard trap nets were set on Tuesday September 20, 2011. Five nets were fished for the following 2 days (September 21 and 22). Trapnet locations are shown in Figure 1 and pictures of a typical trapnet operation are shown in Figure 2.

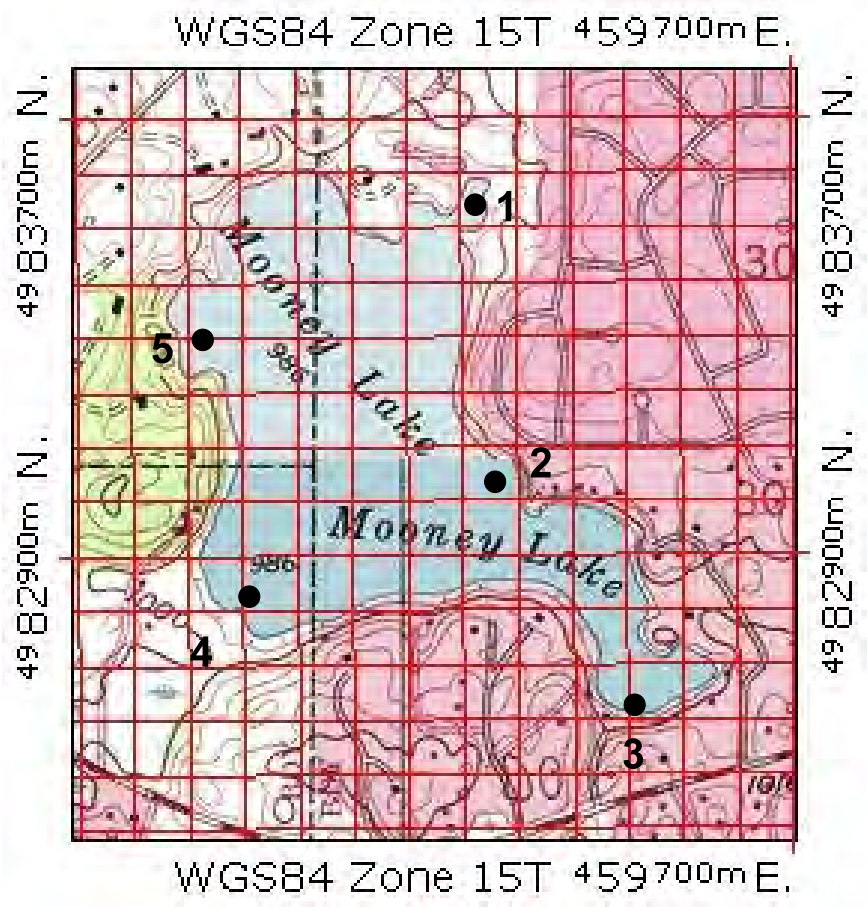

Figure 1. Map of trapnet sets in Mooney Lake.

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 Mooney Lake fish survey.

Results

Fish Results: A total of eight fish species were sampled in Mooney Lake on September 21-22, 2011. Black crappies were the most abundant species followed by bluegill sunfish. Nets 3 and 4, were the most productive (Table 1). The number of black crappies caught per net was above average with a haul of 67 fish per net (Table 1). In addition, bluegills were found at above average numbers for a typical range for a lake like Mooney, as defined by the MnDNR. Also, it was noted, that golden shiner abundance was above average. Largemouth bass catch per net had an average of 1.2 fish per net which may reflect stocking in 2011. Pumpkinseed sunfish and adult black bullhead abundance was low based on standard ranges compiled by the MnDNR. However, black bullheads abundance could increase in the future. Young black bullheads were extremely abundant in the trapnet catches with an estimated 1,727 fish/net (Table 2). Young bullheads weight and numbers were recorded, but not included in the Table 1 statistics.

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

Table 1. Mooney Lake trapnet results for the fish survey conducted in September 2011.

	Fish Captured (September 21-22, 2011)										Total Catch	Fish per Net (n=10)	Normal Range (MnDNR)
	Net 1		Net 2		Net 3		Net 4		Net 5				
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2			
Black bullheads (*Ameiurus melas*)	16				8	18	4	6	1	4	57	5.7	12 - 133
Bluegill sunfish (*Lepomis macrochirus*)	74	22	19	3	53	18	34	29	47	21	320	32.0	1.2 - 20
Black crappies (*Pomoxis nigromaculatus*)	48	9	43	27	138	75	101	74	50	106	671	67.1	1.2 - 21
Golden shiner (*Notemigonus crysoleucas*)	2		4	9	8	3	62	76	10	21	195	19.5	0.2 - 1.1
Largemouth bass (*Micropterus salmoides*)	1						1	2	4	4	12	1.2	0.2 - 1.1
Pumpkinseed sunfish (*Lepomis gibbosus*)							1				1	0.1	0.8 - 5.3
White sucker (*Catostomus commersoni*)			1				3	3		1	8	0.8	
Yellow perch (*Perca flavescens*)	4		1	1	8	2	4	7			27	2.7	0.3 - 3.8
TOTAL FISH	145	31	68	40	215	116	210	197	112	157	1,291	129.1	--
Turtles - painted	14	2			8	6	8	11	30	8	87	8.7	--
Turtles - snapping	1				2				2		5	0.5	--
Crayfish					3		4	1			8	0.8	--

Table 2. Mooney Lake young-of-the-year (YOY) black bullheads. Average weight = 3.3 g/fish and average length = 2.4 inches.

	Young Bullheads Captured (September 21-22, 2011)										Total Catch	Fish per Net (n=10)
	Net 1		Net 2		Net 3		Net 4		Net 5			
	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2	Day 1	Day 2		
Black bullheads (*Ameiurus melas*)												
Number	32	2	1,380	33	4,002	2,484	4,140	5,106	79	7	17,265	1,727
Pounds	0.3	T	10	0.2	29	18	30	37	0.6	0.1	125	12.5

Fish Stocking in 2011: When ice came off Mooney Lake in spring of 2011, dead fish were observed and it was clear there had been a winterkill. However, the extent of the fish kill was not known and therefore stocking was considered an important project to replenish the bass and panfish population. A summary of fish stocking is shown in Table 3. Based on fish survey results, it appears stocking fish was a valid project and supplemental stocking could be considered in the future.

Table 3. Summary of fish stocking in Mooney Lake in 2011. On the April 30 stocking date, fish came from 10,000 Lakes Aquaculture (Osakis, MN) and on May 9, the fish came from Rademacher Ponds (Waconia, MN).

	Adults (10-12 inches)	Adults & Fingerlings Mix	Fingerlings (3-4 inches)
Largemouth bass	90 (April 30, 2011)	--	800 (May 9, 2011)
Bluegill sunfish	--	400 (May 9, 2011)	1,400 (April 30, 2011)
Black crappie	--	400 (May 9, 2011)	--

Fish Lengths: Fish lengths are shown in Figure 3 and Table 4. Bluegill sunfish lengths ranged were from 5 inches up to 8.5 inches with the majority of the population greater than 6-inches. Largemouth bass were present with lengths measured up to 11.5 inches, but the most common size was 6.5-inches. Some of the measured fish may have come from an earlier stocking. At these lengths, the bass population has the capacity to capture and ingest only small to medium-sized fish and may not be able to keep sunfish and bullheads from becoming overpopulated, resulting in stunted growth conditions.

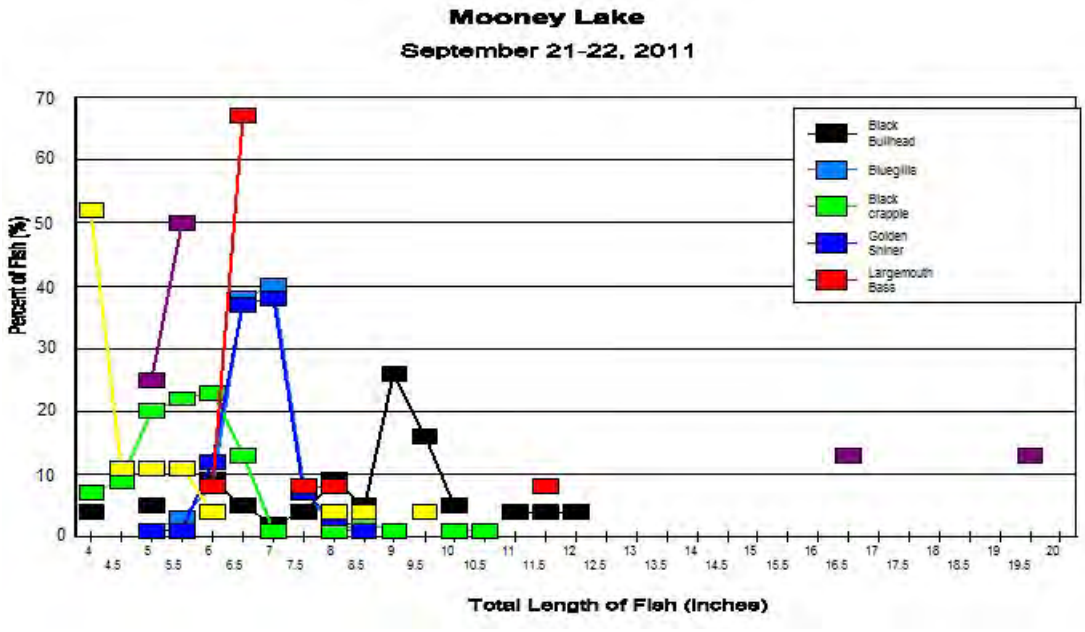

Figure 3. Length distribution of fish from the September 2011 survey in Mooney Lake.

Table 3. Length frequency of fish species (as total length) for the Mooney Lake fish survey.

Size (inches)	Black Bullhead	Bluegills	Black crappies	Golden Shiner	Large-mouth Bass	Pumpkin-seed	White Sucker	Yellow Perch
<3	17,265*							
3.5								
4	2 (4%)		45 (7%)			1 (100%)		14 (52%)
4.5			62 (9%)					3 (11%)
5	3 (5%)	3 (1%)	134 (20%)	1 (1%)			2 (25%)	3 (11%)
5.5		10 (3%)	150 (22%)	2 (1%)			4 (50%)	3 (11%)
6	5 (9%)	26 (8%)	158 (24%)	25 (13%)	1 (8%)			1 (4%)
6.5	3 (5%)	122 (38%)	90 (13%)	72 (37%)	8 (67%)			
7	1 (2%)	127 (40%)	5 (1%)	75 (38%)				
7.5	2 (4%)	27 (8%)		13 (7%)	1 (8%)			
8	5 (9%)	3 (1%)	1 (1%)	6 (3%)	1 (8%)			1 (4%)
8.5	3 (5%)	2 (1%)	11 (2%)	1 (1%)				1 (4%)
9	15 (26%)		4 (1%)					
9.5	9 (16%)							1 (4%)
10	3 (5%)		9 (1%)					
10.5			2 (1%)					
11	2 (4%)							
11.5	2 (4%)				1 (8%)			
12	2 (4%)							
12.5								
13								
13.5								
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14.5								
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15.5								
16								
16.5							1 (13%)	
17								
17.5								
18								
18.5								
19								
19.5							1 (13%)	
20								
Number of fish caught	57	320	671	195	12	1	8	27

*small bullheads, less than 3 inches were likely young-of-the-year and are not included in the statistics for fish per net.

Representative Fish Species of Mooney Lake

Largemouth Bass

Yellow Perch

Bluegill

Golden Shiner

Pumpkinseed

White Sucker

Black Crappie

Black Bullhead

Historical Trapnet Fish Survey Records for Mooney Lake

Mooney Lake has been surveyed infrequently over the past 20 years. The last survey was from 1992 and both surveys (1992 and 2011) are shown in Table 4. Minor shifts may have occurred over the last 20 years. Bass were found in 2011 but not in 1992 whereas northern pike and carp were found in 1992, but not in 2011. Bluegill sunfish, black crappies, and golden shiners were more abundant in 2011 than in 1992.

Table 4. Historical trapnet fish survey records.

	Trapnet Results		
	Fish per net 1992 (MnDNR)	Fish per Net (n=10) 2011 (BWS)	Normal Range (MnDNR)
Black bullheads*	21.8	5.7*	12 - 133
Bluegills	0.4	32.0	1.2 - 20
Common carp	1.2	0	1.0 - 5.5
Crappies	18.6	67.1	1.2 - 21
Golden shiner	0.4	19.5	0.2 - 1.1
Green sunfish	0.6	0	0.2 - 1.9
Largemouth bass	0	1.2	0.3 - 1.2
Northern pike	0.6	0	NA
Pumpkinseed	0	0.1	0.8 - 5.3
White sucker	0	0.8	NA
Yellow perch	0.2	2.7	0.3 - 3.8
Turtles - painted	0	8.7	--
Turtles - snapping	0.8	0.5	--
Crayfish	0	0.8	--
TOTAL FISH	43.8	129.1	--
Number of Fish Species	8	8	--

* 1,727 yoy/net - not included in statistics

Figure 4. Blue Water Science fish survey crew and Kevin Springob, City of Plymouth (middle), standing behind a standard trapnet.

Discussion

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

Adult black bullheads had a range of lengths with the 9 to 9.5-inch length the most common. Adult bullheads were probably not stunted since a community of 6-8-inch bullheads are typically associated with stunting. However, thousands of young-of-the-year (YOY) bullheads were captured in trapnets. It appears there is a potential for a surge in the bullhead population in the near future. It is probable that a partial winterkill reduced the predator piscivore population while not having much impact on the hardier bullheads. Without the predation pressure, the YOY bullhead survival was good and they have thrived. If that population continues to flourish, it may have adverse impacts on water quality.

Largemouth bass in the 3-4 inch range were likely stocked in the spring of 2011.

Discussion - concluded

Gamefish Control to Prevent Bluegill Stunting: The existing fish community in Mooney Lake may not have adequate piscivore pressure (the dominant piscivore in Mooney 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 7) it is apparent that the piscivore lengths in Mooney 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 6. Gamefish (piscivores) usually select prey that can be swallowed, which is a function of the piscivore gape verses 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.

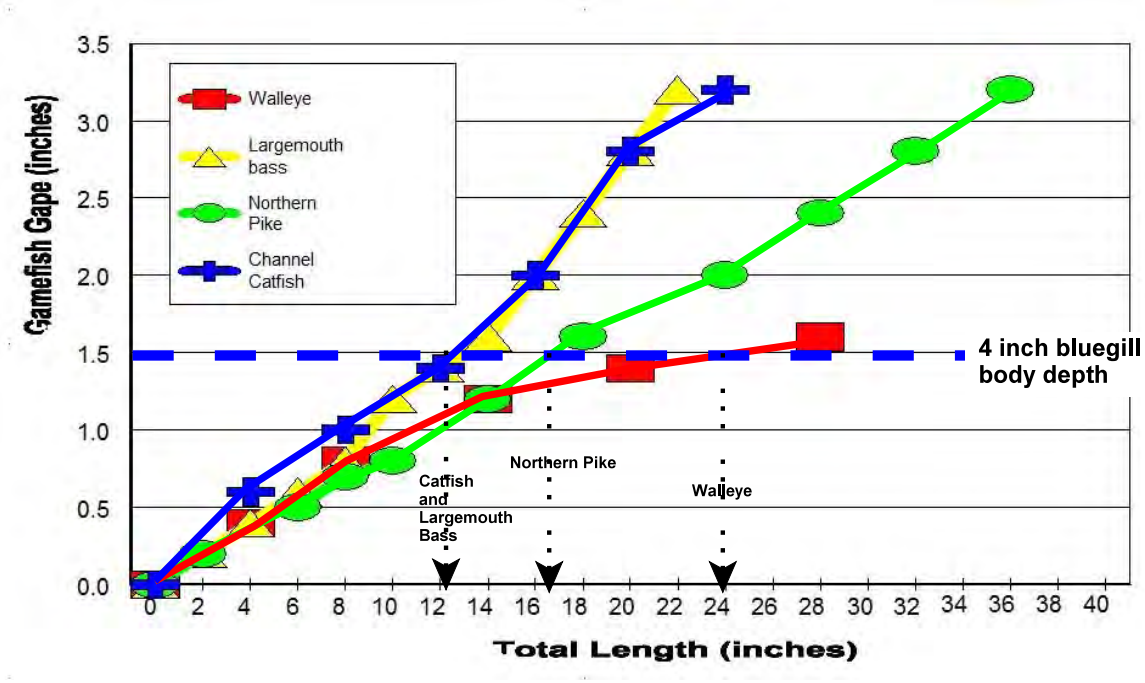

Figure 7. Gamefish gape increases as a function of it's total length. The gape determines the size of the prey fish that can be swallowed. For example, a 4-inch bluegill has a body depth of 1.5 inches. To ingest a 4-inch bluegill it would take a 12-inch bass that has a gape of 1.5 inches. There are few bass in Mooney Lake that could ingest a 4-inch bluegills.

Conclusions and Recommendations

The trapnet survey in 2011 found the fish community was composed of eight species. The crappie and bluegill abundance were above average for trapnet catches. Bluegills and adult black bullheads are not stunted indicating there was some control from the piscivores in the past.

Recommendations and future considerations include the following:

- Mooney 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.
- 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.
- Because sunfish and golden shiners currently spawn in the lake, the young fish should produce a forage base on an annual basis. Stocking forage fish is not necessary at this time. The carrying capacity of Mooney Lake should be established naturally which is a good long-term management strategy.
- Stocking adult largemouth bass could possibly help control bullheads, otherwise another option is to hire a commercial fisherman to remove the bullheads.
- In three to four years another fish survey should be conducted to evaluate conditions and re-evaluate recommendations.

Tub of fish with numerous black crappies and young black bullheads.

Appendix A

Minnesota DNR Fish Survey Notification

From: Steve McComas [mailto:mccomas@pclink.com]
Sent: Thursday, September 15, 2011 3:47 PM
To: Daryl Ellison; Greg Salo
Cc: Kevin Springob; Ed Cannon
Subject: Fish survey notification

Hello all,

Blue Water Science will be conducting a fish survey in Mooney Lake (MN ID 27-134), Hennepin County, starting on Tuesday, September 20. We will set 5 fyke nets on Tuesday. The nets will be monitored daily and all fish will be weighed and measured and returned to the lake. The nets will be removed from the lake on Thursday, September 22. The fish survey is sponsored by the City of Plymouth with the objective to examine possible winterkill effects from last winter on the fish community structure.

This survey is being conducted under the permit number: 17693

Best regards,

Steve McComas
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