



Fish and Turtles from Schmidt Lake, August, 2011

Fish Survey of Schmidt Lake (ID #27-102), Hennepin County, Minnesota in 2011

Survey Dates: August 11 - 12, 2011

MnDNR Permit Number: 17693

Prepared for:
City of Plymouth and
MnDNR



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Introduction

Schmidt Lake (ID: 27-102) is a 37-acre shallow lake, located in Hennepin County, Minnesota. In August 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 Schmidt Lake.

Methods

Four standard trapnets were sampled for two days for a total of eight lifts to survey fish in Schmidt 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 August 10, 2011. Four nets were fished for the following 2 days (August 11, 12). Trapnet locations are shown in Figure 1 and pictures of a typical trapnet operation are shown in Figure 2.

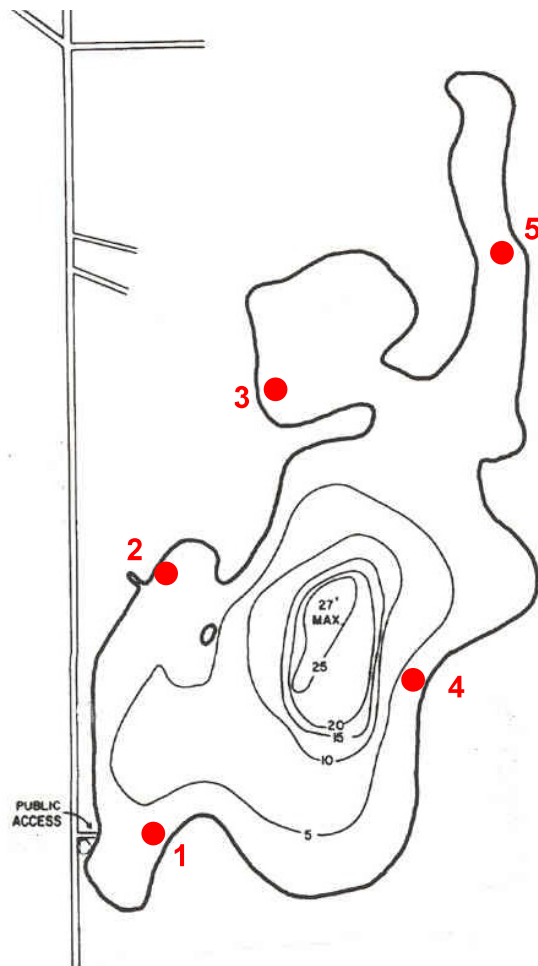


Figure 1. Map of trapnet sets in Schmidt Lake. Net number 2 was moved after the first sampling day to Net 5 location for the second sampling day.



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. The flag marks the end of the back hoop



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



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

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

Results

Fish Results: A total of six fish species were sampled in Schmidt Lake on August 11 and 12, 2011. Pumpkinseed sunfish were the most abundant species followed by black crappies. Nets 1 and 4, were the most productive (Table 1).

The average number of pumpkinseeds caught per net was moderate with the average haul of 3.3 fish per net (Table 1). Black crappies were found at moderate numbers and within a typical range for a lake like Schmidt, as defined by the MnDNR. Bluegill sunfish and black bullhead abundance was low based on standard ranges compiled by the MnDNR. However, 55 small bluegills at 3 inches or less were caught but not included in the catch statistics because the 3/8-inch net mesh size can trap young-of-the-year fish. The MnDNR does not typically record these fish. In addition, small black bullheads (15), black crappies (41), and pumpkinseed sunfish (10) were also captured but not included in the statistics. Northern pike had a moderate abundance with an average of 1.3 fish per net. Within this sample, two silver pike were caught. Silver pike are silver and rare and are a variant of northern pike. A 6-inch silver pike may represent a young-of-the-year fish and there is a potential they spawn in Schmidt Lake.

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

Table 1. Schmidt Lake trapnet results for the fish survey conducted in August 2011.

	August 11-12, 2011								Total Catch	Number per Net (n=8)	Normal Range (MnDNR)
	Net 1		Net 2	Net 3		Net 4		Net 5			
	Day 1	Day 2	Day 1	Day 1	Day 2	Day 1	Day 2	Day 2			
Black bullheads (<i>Ameiurus melas</i>)	1	1	0	0	0	0	0	0	2	0.3	1.1 - 25
Bluegill sunfish (<i>Lepomis macrochirus</i>)	3	4	4	0	0	0	0	1	12	1.5	4.9 - 50
Black crappies (<i>Pomoxis nigromaculatus</i>)	7	6	0	1	1	5	3	0	23	2.9	1.2 - 4.8
Hybrid sunfish	0	0	0	0	0	0	1	0	1	0.1	NA
Northern pike (<i>Esox lucius</i>)	2	1	0	0	1	2	1	3	10	1.3	NA
Pumpkinseed sunfish (<i>Lepomis gibbosus</i>)	10	7	3	0	0	4	2	0	26	3.3	1.7 - 10
TOTAL FISH	23	19	7	1	2	11	7	4	74	9.3	--
Turtles - painted	0	0	2	4	4	1	1	15	27	3.4	--
Turtles - snapping	0	0	2	1	0	2	0	0	5	0.6	--

Fish Lengths: Fish lengths are shown in Figure 3 and Table 2. Bluegill and pumpkinseed sunfish lengths ranged from 2 inches up to 8.5 inches with the majority of the population 6 inches or greater. The bluegills 3-inches or less were not included in the statistics. The small fish indicate bluegills are spawning in Schmidt Lake. Northern pike were present with lengths measured up to 25 inches. At these lengths, the northern pike population has the capacity to capture and ingest small to medium-sized fish and should keep sunfish and bullheads from becoming overpopulated and producing stunted growth conditions. At this time, black bullheads are scarce, with the two adults caught measuring over 10-inches. The small bullheads captured that were 3-inches long indicate adult black bullheads are spawning in Schmidt Lake (Table 2).

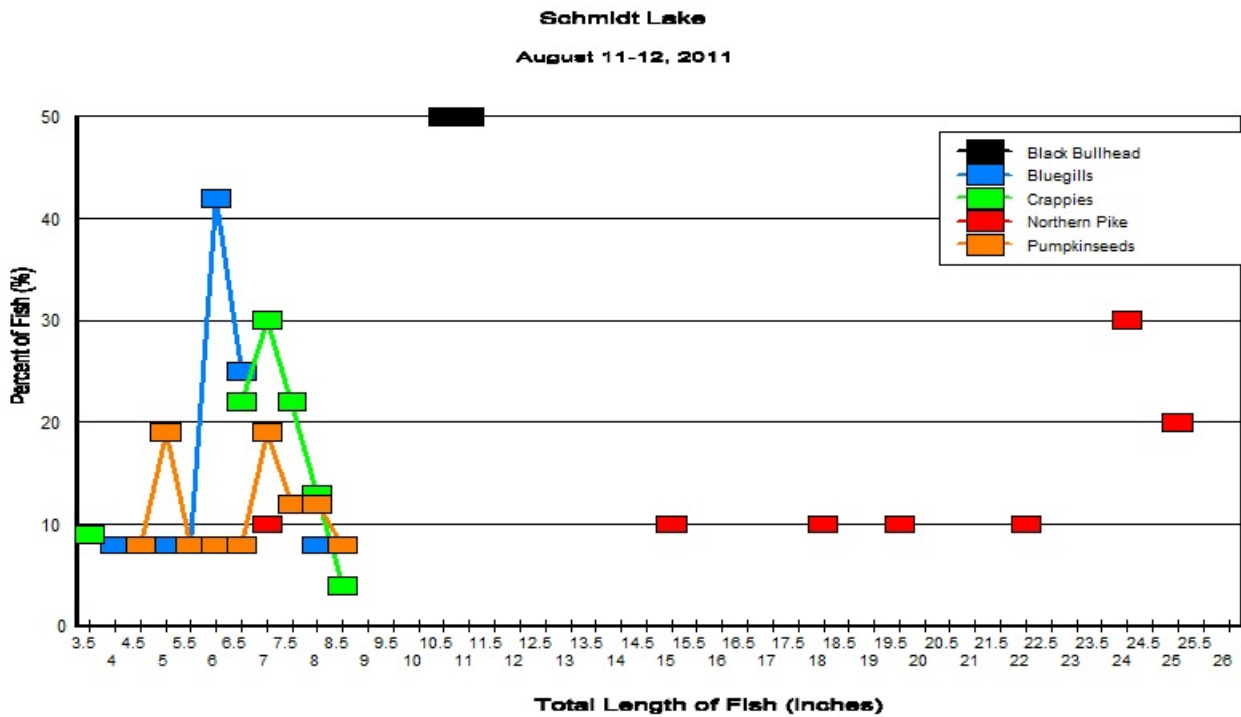


Figure 3. Length distribution of fish from the August 2011 survey in Schmidt Lake.

Table 2. Length frequency of fish species (as total length) for the Schmidt Lake fish survey.

Length (inches)	Black Bullhead	Bluegill Sunfish	Black Crappies	Hybrid Sunfish	Northern Pike	Pumpkinseed Sunfish
1.5						
2		9				
2.5						
3	15	46	41			10
3.5			2 (9%)			
4		1 (8%)		1 (100%)		
4.5						2 (8%)
5		1 (8%)				5 (19%)
5.5		1 (8%)				2 (8%)
6		5 (42%)				2 (8%)
6.5		3 (25%)	5 (22%)			2 (8%)
7			7 (30%)		1 (10%)	5 (19%)
7.5			5 (22%)			3 (12%)
8		1 (8%)	3 (13%)			3 (12%)
8.5			1 (4%)			2 (8%)
9						
9.5						
10						
10.5	1 (50%)					
11	1 (50%)					
11.5						
12						
12.5						
13						
13.5						
14						
14.5						
15					1 (10%)	
15.5						
16						
16.5						
17						
17.5						
18					1 (10%)	
18.5						
19						
19.5					1 (10%)	
20						
20.5						
21						
21.5						
22					1 (10%)	
22.5						
23						
23.5						
24					3 (30%)	
24.5						
25					2 (2%)	
Number of fish caught	2 (+ 15 yoy)	12 (+ 55 yoy)	23 (+ 41 yoy)	1	10	26 (+ 10 yoy)

Representative Fish Species of Schmidt Lake



Rare silver pike from Schmidt Lake



Typical northern pike



Bluegill sunfish



Black bullhead



Black crappie



Pumpkinseed sunfish

Historical Trapnet Fish Survey Records for Schmidt Lake

The last fish survey conducted on Schmidt Lake was in 1990 (Table 3). Nearly the same fish species are represented comparing 1990 to 2011. In both surveys the total fish number per net was relatively low. It would appear that partial winterkills probably occur occasionally. Northern pike continue to be present in low to moderate numbers based on survey results from 1990 and 2011. Largemouth could be present in Schmidt Lake, but were not sampled in 2011.

Table 3. Historical trapnet fish survey records.

	Trapnet Results		
	Fish per Net 1990	Fish per Net (n=8) 2011	Normal Range (MnDNR)
Black bullheads*	5.0	0.3	1.1 - 25
Bluegills	19.8	1.5	4.9 - 50
Crappies	7.0	2.9	1.2 - 4.8
Hybrid sunfish	0.2	0.1	NA
Largemouth bass	0.2	0	0.3 - 1.3
Northern pike	1.8	1.3	NA
Pumpkinseeds	1.6	3.3	1.7 - 10
White sucker	0.2	0	0.3 - 1.5
TOTAL FISH/NET	35.8	9.3	--
Turtles - painted	--	3.4	--
Turtles - snapping	0.2	0.6	--

* Black bullhead gillnet catch: 225.0 fish/net



Figure 4. Trapnet set in Schmidt Lake in 2011.

Discussion

General Findings In This Survey: The overall catch per net was low, indicating there was likely a partial winterkill over the 2010-2011 winter. Lake water quality should have been good in 2011, based on the low fish density.

Northern pike, including silver pike, may be spawning in Schmidt Lake and are able to sustain a population (Figure 5).

Largemouth bass may be in Schmidt Lake, even though they were not sampled in the fish survey, but their numbers are probably low.

Schmidt Lake offers fair fishing opportunities based on the sizes of bluegills, pumpkinseeds, and northern pike found in this survey. Fishing should get better in future years as natural reproduction continues.



Figure 5. [left] Northern pike young of the year. The top fish is the normal coloration of a northern pike and the bottom fish appears to be a silver pike. [right] Young of the year bluegill sunfish, black crappies, and black bullheads. The forage base in Schmidt Lake appears to be sufficient to sustain a healthy gamefish population.

Discussion - concluded

Gamefish Control to Prevent Bluegill Stunting: The existing fish community in Schmidt Lake has fair piscivore pressure (piscivores in Schmidt Lake are primarily pike) which may prevent the development of stunted sunfish and bullhead populations. Based on theoretical piscivore lengths and converting their length to mouth gape width (Figure 7) it is apparent that the piscivore lengths in Schmidt Lake, when converted to gape widths, should exert predation pressure and prevent stunted bluegill (typical around 4-inches) or black bullhead populations. This type of fish community structure is a benefit for fishing and for water quality.



Figure 6. 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.

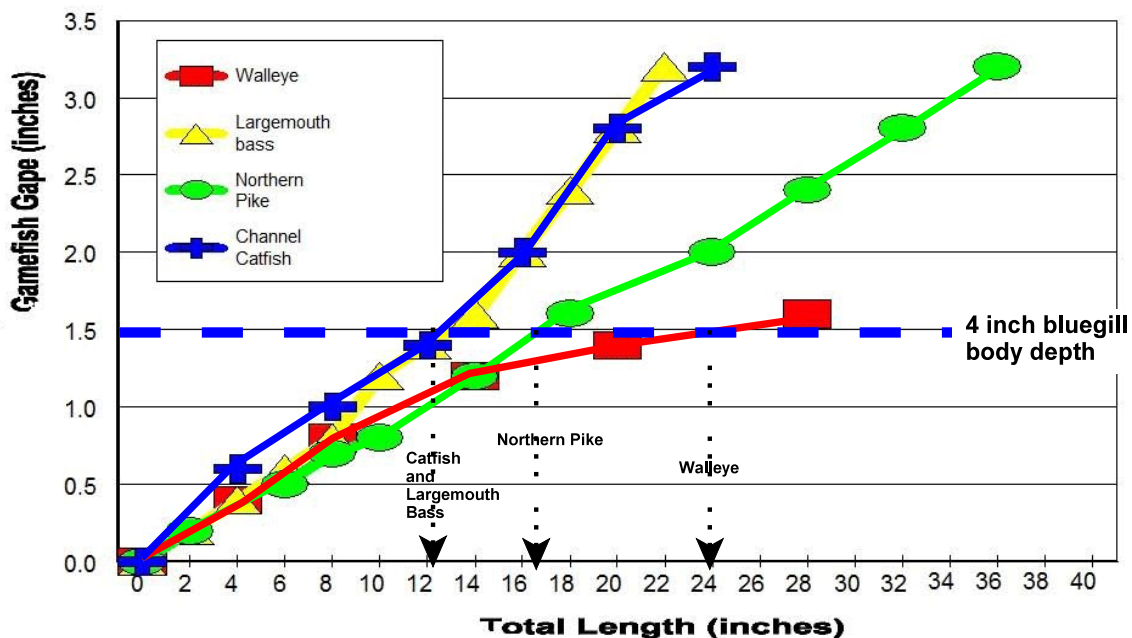


Figure 7. Gamefish gape increases as a function of its total length. The gape determines the size of the prey fish that can be swallowed. For example, a 4-inch bluegill has a body depth of 1.5 inches. To ingest a 4-inch bluegill it would take a 12-inch bass that has a gape of 1.5 inches. There are northern pike in Schmidt Lake that should be able to ingest 4-inch bluegills or smaller.

Conclusions and Recommendations

The trapnet survey in 2011 found the fish community was composed of six species. The bluegill sunfish abundance were below average for trapnet catches in 2011, but could improve in the future. Bluegills and black bullheads are not stunted indicating there is some control from the piscivores. The northern pike population has a wide size range and several year classes of the fish species indicate reproduction may be occurring.

Recommendations and future considerations include the following:

- In Schmidt Lake, northern pike are the dominant gamefish.
- Because sunfish currently spawn in the lake, the young fish should produce a forage base on an annual basis. Generally, stocking forage fish is not a long term solution to sustain gamefish and stocking forage fish is not recommended at this time. The carrying capacity of Schmidt Lake should be established naturally which is a good long-term management strategy.
- Partial winterkills occur occasionally. Winter aeration could keep fish alive over winter but is not critical. The fish community is somewhat kept in check with an occasional winterkill.
- Water quality remains good in Schmidt Lake and fishing has the potential to be good for panfish and northern pike. In three to four years another fish survey should be conducted to evaluate conditions and re-evaluate recommendations.



Figure 8. Two young fishermen are examining the results of a trapnet catch.

Appendix A

Minnesota DNR Fish Survey Notification

From: Steve McComas [<mailto:mccomas@pmlink.com>]
Sent: Tuesday, August 09, 2011 2:56 PM
To: Ellison, Daryl G (DNR); Johnson, Gerald J (DNR); Salo, Gregory (DNR)
Cc: Kevin Springob
Subject: Fish survey in Schmidt Lake, City of Plymouth

Hello all,

Blue Water Science will be conducting a fish survey in Schmidt Lake (MN ID 27-102) (City of Plymouth), Hennepin County, starting on Wednesday August 10. We will set 4 fyke nets on Wednesday. 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 Friday, August 12. 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.

Regards,

Steve McComas

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