Results of a Fish Community Assessment of Shoe Lake Using Broad-scale Monitoring Gear, 2013

File Report

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This report presents results of a fish community assessment of Shoe Lake. A previous assessment of the lake trout population using Summer Profundal Index Netting (SPIN) was completed in 2012 (Scholten (2013). A recommendation in that report was that Shoe Lake be no longer stocked with or managed for lake trout. Initial consultation with lake residents raised concerns about the intensity of the 2012 survey; therefore supplemental netting was done in 2013.

Methods

Aspects of the Broad-scale Monitoring (BsM) protocol were used (Sandstrom et al 2013). Gear consisted to two types of multi-mesh gill net gangs; large mesh (NA1) and small mesh (ON2). Large mesh gangs were comprised of eight, 3.1 m panels with mesh sizes ranging from 38 to 127 mm, randomly arranged. Small mesh gangs were comprised of five, 2.5 m panels, with mesh sizes ranging from 13 to 38 mm. Typically, two gangs are joined to form one strap, but individual gangs may be set in some circumstances, such as if large catches are anticipated or strata are very small.

This survey did not follow the stratum boundaries and allocation of net sets to different strata that are prescribed in the BsM manual. Only two strata were used (< 6 m and > 6 m), which roughly corresponded, respectively, to the littoral area where warm water species occur and the thermocline and deeper where lake trout were expected to occur at the time of the survey. As lake trout were the primary target species, most nets were set in the >6 m stratum. A small number were set in the <6 m stratum to detect other species in the fish community.

Nets were set over night for approximately 20 hours. Captured fish were measured for fork length. Lake trout were sampled in more detail, including total length, presence of fin clips, and collection of ageing structures.

Results

Netting occurred from August 14-16, 2013. At the time, useable lake trout habitat (<15 ^{o}C and > 4 mg/l dissolved oxygen) occurred from approximately 6-11 m deep (Table 1).

Twelve net sets were completed. Three sets were completed in the shallow stratum (2 small mesh, 1 large mesh). Nine sets were completed in the deep stratum (4 small mesh, 5 large mesh) (Table 2, Figure 1)

Table 1 Temperature and dissolved oxygen profile, Shoe Lake, August 14, 2013.

Depth (m)	Temp (°C)	D.O. (mg/l)
0.5	23.0	7.9
1	22.3	8.0
2	22.1	8.1
3	21.8	8.1
4	21.6	8.2
5	19.6	10.3
6	15.0	9.5
7	12.5	8.0
8	10.5	7.7
9	9.1	7.0
10	7.9	6.0
11	7.0	4.3
12	6.3	2.1
13	5.7	1.1
14	5.3	0.4

Table 2 Net set details, Broad-scale Monitoring, Shoe Lake, 2013.

Set	Easting	Northing	Set Date	Set Time	Lift Date	Lift Time	Gear	Gangs	Start Depth (m)	Mid Depth (m)	End Depth (m)
1	663886	5008203	08/14/2013	14:20	08/15/2013	10:25	2	2	1	4	6
2	663769	5007958	08/14/2013	14:30	08/15/2013	10:50	1	2	7	8	10
3	664229	5008143	08/04/2013	14:45	08/15/2013	10:55	1	2	7	10	13
4	664186	5008291	08/14/2013	14:55	08/15/2013	11:05	2	2	8	10	12
5	664766	5008464	08/14/2013	15:00	08/15/2013	11:25	2	2	8	10	10
6	664833	5008260	08/14/2013	15:10	08/15/2013	11:40	1	1	1	4	6
7	663499	5008054	08/15/2013	13:00	08/16/2013	9:50	2	2	1	1	1
8	663782	5008105	08/15/2013	13:20	08/16/2013	10:10	1	2	7	10	11
9	663920	5007978	08/15/2013	13:30	08/16/2013	10:15	2	2	8	10	12
10	664120	5008184	08/15/2013	13:35	08/16/2013	10:20	1	2	6	9	13
11	664677	5008412	08/15/2013	13:55	08/16/2013	10:55	1	2	9	9	8
12	664347	5008261	08/15/2013	14:00	08/16/2013	11:00	2	2	6	8	10

The catch was comprised of six lake trout, 11 rock bass, 5 pumpkinseed, 13 smallmouth bass and 7 yellow perch (Table 3). In addition, one largemouth bass was captured using a backpack electro-fisher.

Five of the six lake trout were caught in the main, central basin; 3 in one large mesh gang, and one in each of two small mesh gangs. One lake trout was caught in a small mesh gang in the east basin.

The five lake trout caught in the central basin were all adult-sized individuals ranging from 488 to 670 mm fork length (Table 4). All were fin clipped, indicating that they had been stocked. Based on the fin clips, they were determined to be 4 (n=2), 8 (n=2), and 10 (n=1) years old. The sixth lake trout was a small individual (177 mm FL) with no fin clips that was caught in the east basin. The absence of a fin clip, size of the fish and time since the most recent stocking event (2010) indicate that this fish was a result of natural reproduction. All of the lake trout appeared to be in good condition. The invertebrate *Mysis*, a quality food source, was found in the stomachs of two fish which died in the nets.

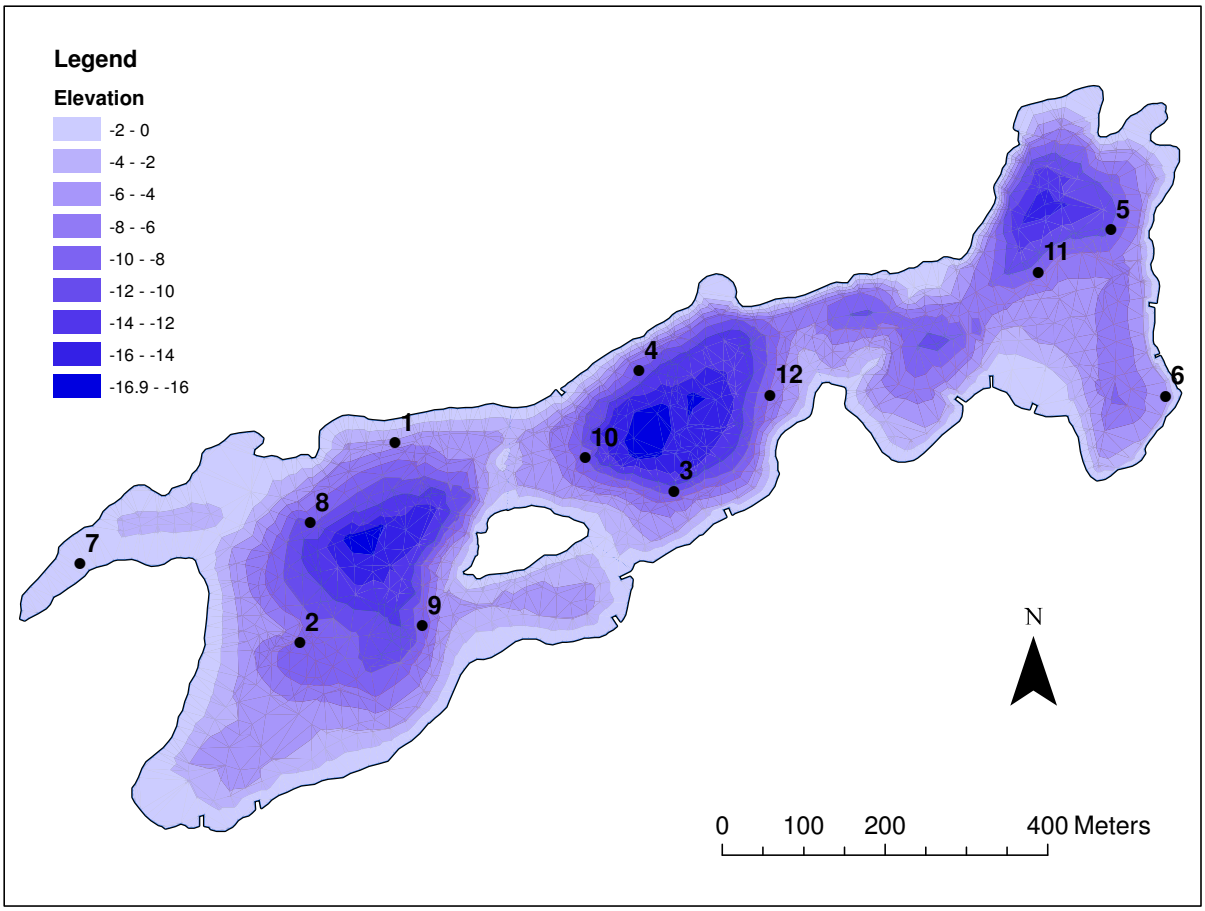


Figure 1 Map of Shoe Lake showing net set locations, Broad-scale Monitoring, 2013. Depths in metres.

Table 3 Catch summary, Broad-scale Monitoring, Shoe Lake, 2013.

Set	lake trout	rock bass	pumpkin-seed	small-mouth bass	yellow perch
1		6	1	13	
2					
3					
4	1				
5	1				
6		5			
7			4		7
8					
9					
10	3				
11					
12	1				
Total	6	11	5	13	7

Table 4 Individual fish characteristics of lake trout, Broad-scale Monitoring, Shoe Lake, 2013.

Effort	Gear	Fish	Fate	FLEN	TLEN	RWT	CLIPC	AGE
4	2	1	D	670	741	4020	RP	8
5	2	1	D	177	191	55	NC	
10	1	1	R	515			LP	4
10	1	2	D	590	644	3020	RP	8
10	1	3	D	488	527	1060	LP	4
12	2	1	R	635	681		LV	10

The largemouth bass and rock bass that were caught were the first records of these species occurring in the lake. Their origin is not known, but they were almost certainly stocked intentionally, albeit without authorization. Their presence has negative implications for the lake trout population as additional competitors for limited food and potential predators of small lake trout. Largemouth bass and rock bass will probably have a smaller impact than smallmouth bass because of the earlier introduction and pre-existing dominance of smallmouth bass.

The number of nets set in the lake trout habitat represents an intensive amount of fishing effort relative to the small amount of habitat. The capture of six lake trout was probably a significant proportion of the population. The general conclusion reached following the 2012 survey remains; the lake trout population is very small and of low density. However, the individuals that were caught were robust specimens. In the absence of defined criteria for the management of put-grow-take fisheries, continued stocking of lake trout could be considered.

Conversely, similar or better fishing opportunities might be realized by stocking splake, if fish large enough to escape initial predation by bass could be reliably obtained. Recent experience in several other lakes in the District has demonstrated much improved returns of splake when stocked in the fall at a larger size.

References

Sandstrom, S, M. Rawson and N. Lester. 2013. Manual of Instructions for Broad-scale Fish Community Monitoring; using North American (NA1) and Ontario Small Mesh (ON2) Gillnets. Ontario Ministry of Natural Resources. Peterborough, Ontario. Version 2013.2 35 p. +appendices.

Scholten, S. 2013. Results of a Summer Profundal Index Netting (SPIN) Survey Conducted on Shoe Lake in 2012. Ontario Ministry of Natural Resources, Bracebridge, Ontario.

Appendix Individual fish data, excluding lake trout, Shoe Lake, 2013.

Effort	Gear	Gang	SPC	Fish	FLEN
1	2	1	311	12	130
1	2	1	311	13	100
1	2	1	311	14	126
1	2	1	311	15	132
1	2	2	311	19	171
1	2	2	311	20	86
6	1	1	311	1	168
6	1	1	311	2	155
6	1	1	311	3	164
6	1	1	311	4	161
6	1	1	311	5	155
1	2	1	313	16	54
7	2	2	313	3	74
7	2	2	313	4	71
7	2	1	313	10	110
7	2	1	313	11	83
1	2	1	316	1	407
1	2	1	316	2	161
1	2	1	316	3	153
1	2	1	316	4	160
1	2	1	316	5	70
1	2	1	316	6	70
1	2	1	316	7	68
1	2	1	316	8	69
1	2	1	316	9	70
1	2	1	316	10	70
1	2	1	316	11	70
1	2	2	316	17	161
1	2	2	316	18	71
7	2	2	331	1	134
7	2	2	331	2	134
7	2	1	331	5	152
7	2	1	331	6	160
7	2	1	331	7	55
7	2	1	331	8	56
7	2	1	331	9	60