Lake Trout Stocking Assessment of Smyth (Surprise) Lake using Summer Profundal Index Netting (SPIN), 2007

File Report

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Smyth Lake is a large (168.7 ha), relatively deep (maximum depth 23.6 m) lake found in Ballantyne and Laurier Townships. It is accessed by travelling up Forestry Road east of the town of Trout Creek to Hinsburger Lake. Turn left after Hinsburger Lake and go right at the first intersection and follow road to a Ontario Hydro Dam site. Ontario Hydro does operate the dam and the lake water level has the potential to fluctuate about 4 m.

The Bracebridge Area lake files indicate that it was stocked with brook trout (*Salvelinus fontinalis*) and lake trout (*Salvelinus namaycush*) between the years of 1949 to 1965 and then rainbow trout (*Oncorhynchus mykiss*) from 1988 to 2004. It was first assessed in 1967 (Sinclair and Hatson, Bracebridge Area Lake files) who found a fish community of brook trout, chub, suckers, cisco, and reportedly lake trout. In June 1970, a second survey was conducted (R. E. Loblaw and R. J. Cawthorn, Bracebridge Area Lake files) confirmed the presence of lake trout, brown bullhead (*Ameiurus nebulosus*), common white sucker (*Castostomus commersoni)* and yellow perch (*Perca flavescens)* which was likely an introduction. This 1970 survey recommended the lake be managed as a lake trout fishery and to discontinue stocking of brook trout due to the presence of yellow perch. Subsequent late summer water chemistry surveys identified an oxygen deficiency issue in the lake starting in 1976. A 1983 netting operation to collect fish for contaminant analysis captured clipped and non-clipped (possibly natural recruitment) lake trout and common white suckers. A voluntary creel census in 2000 by the Commanda and Area Anglers and Hunters indicated the rainbow trout stockings were successful with fish up to 43 cm in length being caught.

A netting assessment was initiated in 2007 to determine presence, abundance and population characteristics of lake trout.

Methods

A Summer Profundal Index Netting (SPIN) program (Sandstrom and Lester, 2007) was used to complete the assessment. Nets were set perpendicular to shore for a period of 120 minutes to minimize fish mortality. Two nets were set overnight when the day sets failed to catch any lake trout.

All captured sport fish were sampled for length, weight, and ageing structures collected. All other captured fish were sampled for length. A temperature and dissolved oxygen profile was also conducted to determine suitable habitat areas.

Results and Discussion

Sampling occurred on September 13th and 14th 2007. The surface temperature was approximately 20° C. The temperature and D.O. profile was recorded in the deepest section of the lake. The lake was thermally stratified and dissolved oxygen declined after 6 m (Table #1, Temperature Oxygen Profile of Smyth Lake September 25, 2007, 1200 HRS).

Table #1, Temperature Oxygen Profile of Smyth Lake September 25, 2007, 1200 HRS.

Depth in meters	Temperature in Celsius	Dissolved Oxygen (mg/L)
0.1	20.0	9.2
1.0	20.0	9.2
2.0	20.1	9.4
3.0	20.0	9.3
4.0	20.1	9.3
5.0	20.0	9.3
6.0	19.8	9.2
7.0	16.5	1.2
8.0	13.0	1.9
9.0	11.3	2.4
10.0	10.1	1.3
11.0	9.1	2.2
12.0	8.6	2.2
13.0	8.0	2.6
14.0	7.6	2.9
15.0	7.4	2.8
16.0	7.1	2.3
17.0	6.3	0.8
18.0	6.2	0.6
19.0	6.2	0.5
20.0	5.9	0.5

A total of five daytime net sets were completed, and two overnight sets (see Appendix A, Smyth Lake Field Forms for set data and location map). The daytime and overnight sets did not catch any lake trout but was successful in catching 143 common white suckers (254-440 mm fork length) and 5 smallmouth bass (*Micropterus dolomieu*) (252-415 mm fork length). The later represents the first record of smallmouth bass from the lake. They were presumably established through an intentional but unauthorized stocking.

It appears the population of lake trout has declined or is absent in Smyth Lake. The lake trout habitat in Smyth Lake is limited by oxygen deficiency and the relative temperatures at the depth in which the oxygen is not suitable. Recent studies suggest that the optimum lake trout habitat is temperature less than 10 degrees Celsius with dissolved oxygen greater than 6 mg/L (Ontario Ministry of the Environment and Ontario Ministry of Natural Resources 1986; Dillon Et al. 2003). Lake trout in various stages of life may inhabit waters beyond the above limits and the lower limit for dissolved oxygen could be as low as 5mg/L (Sellers et al. 1998). The past history of the temperature / oxygen profiles recorded for Smyth Lake (see Table #2, Smyth Lake Oxygen Deficiency Records), is far outside the optimum habitat requirements.

It is recommended that Smyth Lake no longer be considered a viable lake trout lake and be managed as a smallmouth bass fishery and continue as a “put and take” rainbow trout fishery through stocking.

Table #2, Smyth Lake Oxygen Deficiency Records

Year Surveyed	Maximum depth in meters where oxygen did not declined below 5 p.p.m.	Temperature in Celsius at this depth.
1976	4.5	17.5
1990	4	19.8
1993	5	16.3
2001	6	18.5
2004	5	18.9
2007	6	19.8

References

Dillon, P.J., B.J. Clark, L.A. Molot, and H.E. Evans. 2003. Predicting the location of optimal habitat boundaries for lake trout (*Salvelinus namaycush*) in Canadian Shield lakes. Can. J. Fish. Aquat. Sci. 60: 959-970

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Sandstrom, S. J. and N. Lester. 2007. Summer Profundal Index Netting Protocol; a Lake Trout Assessment Tool. Ontario Ministry of Natural Resources. Peterborough, Ontario. Version 2007.2. 25p. + appendices.

Sellers, T. J., B. R. Parker, D. W. Schindler, and W. M. Tonn. 1998. Pelagic distribution of lake trout (*Salvelinus namaycush*) in small Canadian Shield lakes with respect to temperature, dissolved oxygen, and light. Can. J. Fish. Aquat. Sci. Vol. 55: 170-179.

Appendix A
Smyth Lake Field Forms

Smyth Lake 2007 SPIN Net Set Location Map.

