Results of a Broad-scale Monitoring Survey Conducted on Bluesky Lake, 2017

File Report

2017

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Bluesky Lake is located in Joly Township, Parry Sound District. The lake has an approximate surface area of 33 hectares and a mean depth of 4 meters. The maximum depth of the lake is 8 meters. Water clarity is low with a mean secchi disk reading of 2.2 meters. The lake is accessible directly off Kent's Mill Road. There is no identified boat launch, although there are multiple spots to launch a small boat off the main road. The lake is part of the Little North Magnetawan River system and there is no water regulation on the lake.

The lake is considered to support a native Brook Trout population but data supporting this idea, or the current composition of the fish community, is limited to dated angler reports. Located on-line of the Little North Magnetawan River, which supports Brook Trout, it is likely that they occur at least incidentally. Historically, Bluesky Lake has been stocked with Brook Trout, however, stocking was discontinued in 1974 as it was considered a marginal Brook Trout lake which was attributed to poor oxygen levels in the lake.

The purpose of the survey is to update the fish community of the lake and to evaluate the current status of the Brook Trout population.

Methods

The netting component of the Broad-scale Monitoring protocol was followed (Lester et al., 2010). Gear consisted of large mesh (NA-1) and small mesh (ON-2) gillnets. The large mesh gillnets target fish larger than 20cm in length, typically the size range of interest to anglers. The net has a length of 24.8 m consisting of 8 panels per gang which are 1.8 meters high. The mesh sizes, in inches, are 1.50", 2.00", 2.50", 3.00", 3.50", 4.00", 4.50" and 5.00". The small mesh gillnets target smaller fish and are intended to detect the presence of other species in the lake. It has a length of 12.5m, 5 panels and is 1.8m high. Its stretch measure, also in inches, is 0.50", 0.75", 1.00", 1.25" and 1.50" (Lester et al., 2010).

Nets were set between July 17, 2017 and July 20, 2017. The number of nets and allocation to depth stratum were done according to Broad-scale Monitoring protocol. Efforts were allocated over the depth strata 1-3 and 3-6+ meters. Nets were set overnight between the time frame of 16-22 hours.

The catch was counted and the fork length was recorded for all captured fish. Brook Trout were subjected to full scientific sampling, including length, weight, gender, gonad condition and stomach contents. Brook Trout also had scales, otiliths and tissue for genetic analysis (fin punch) collected. Tissue samples were only taken from a few Brook Trout as it was a late requirement of the sampling procedure.

A temperature-dissolved oxygen profiles were collected to determine how the lake was thermally stratified and the availability of oxygen.

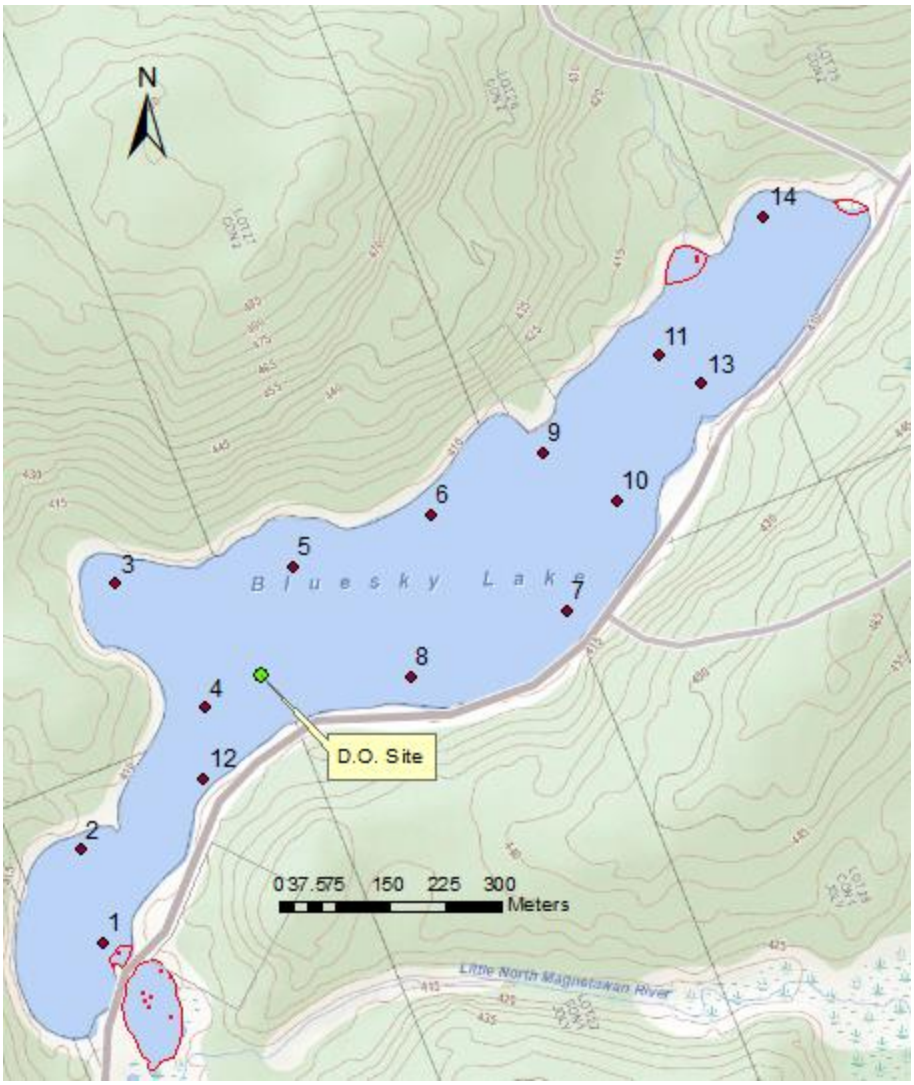


Figure 1 Net set and water chemistry site locations on Bluesky Lake, 2017

Results

Netting efforts occurred over four days July 17, 18, 19 and 20th. Overall, 8 single gang large mesh nets and 6 single gang small mesh nets were set as indicated by Figure 1, Table 1.

Table 1 Net set details, Bluesky Lake 2017.

Effort	Easting	Northing	Set Date	Set Time	Lift Date	Lift Time	Gear	Total Gangs	Stratum	Depth Start	Depth End
1	641365	5067329	2017-07-17	14:22	2017-07-18	10:30	2	1	03 - 06 m	3.2	3.9
2	641334	5067455	2017-07-17	14:30	2017-07-18	10:40	1	1	01 - 03 m	1.1	3.1
3	641382	5067815	2017-07-17	14:50	2017-07-18	10:52	2	1	01 - 03 m	1.7	2.5
4	641503	5067647	2017-07-17	15:00	2017-07-18	11:05	1	1	03 - 06 m	5.3	4.8
5	641621	5067838	2017-07-17	15:06	2017-07-18	11:22	1	1	03 - 06 m	3.8	4.6
6	641809	5067909	2017-07-17	15:15	2017-07-18	11:45	2	1	03 - 06 m	4.2	5.2
7	641992	5067778	2017-07-17	13:25	2017-07-18	12:20	1	1	03 - 06 m	3.8	4.3
8	641781	5067690	2017-07-18	15:30	2017-07-19	10:40	1	1	03 - 06 m	4.8	5.8
9	641960	5067993	2017-07-18	15:43	2017-07-19	11:00	1	1	03 - 06 m	3.8	4.6
10	642060	5067927	2017-07-18	15:50	2017-07-19	11:10	1	1	01 - 03 m	1.0	2.7
11	642118	5068124	2017-07-18	16:00	2017-07-19	11:30	1	1	03 - 06 m	4.2	4.7
12	641500	5067551	2017-07-19	13:10	2017-07-20	11:20	2	1	03 - 06 m	3.8	4.5
13	642174	5068086	2017-07-19	13:15	2017-07-20	11:30	2	1	03 - 06 m	4.2	4.5
14	642258	5068313	2017-07-19	13:25	2017-07-20	12:20	2	1	01 - 03 m	1.7	2.6

The catch summary (Table 2) is as follows: White Sucker 167, Brown Bullhead 34, Yellow Perch 735, Common Shiner 105, Brook Trout 9, Burbot 2 and Lake Chub 11. Lake Chub and Yellow Perch were not previously documented in the lake.

Table 2 Summary of Catch, Bluesky Lake 2017.

Species	large	Small	Total
White Sucker	91	76	167
Brown Bullhead	4	30	34
Yellow Perch	12	723	735
Common Shiner	3	102	105
Brook Trout	7	2	9
Burbot	2	0	2
Lake chub	0	11	11

The species composition of the lake indicates Yellow Perch being the dominant species in the lake making up 69% of the total catch by number (Figure 2).

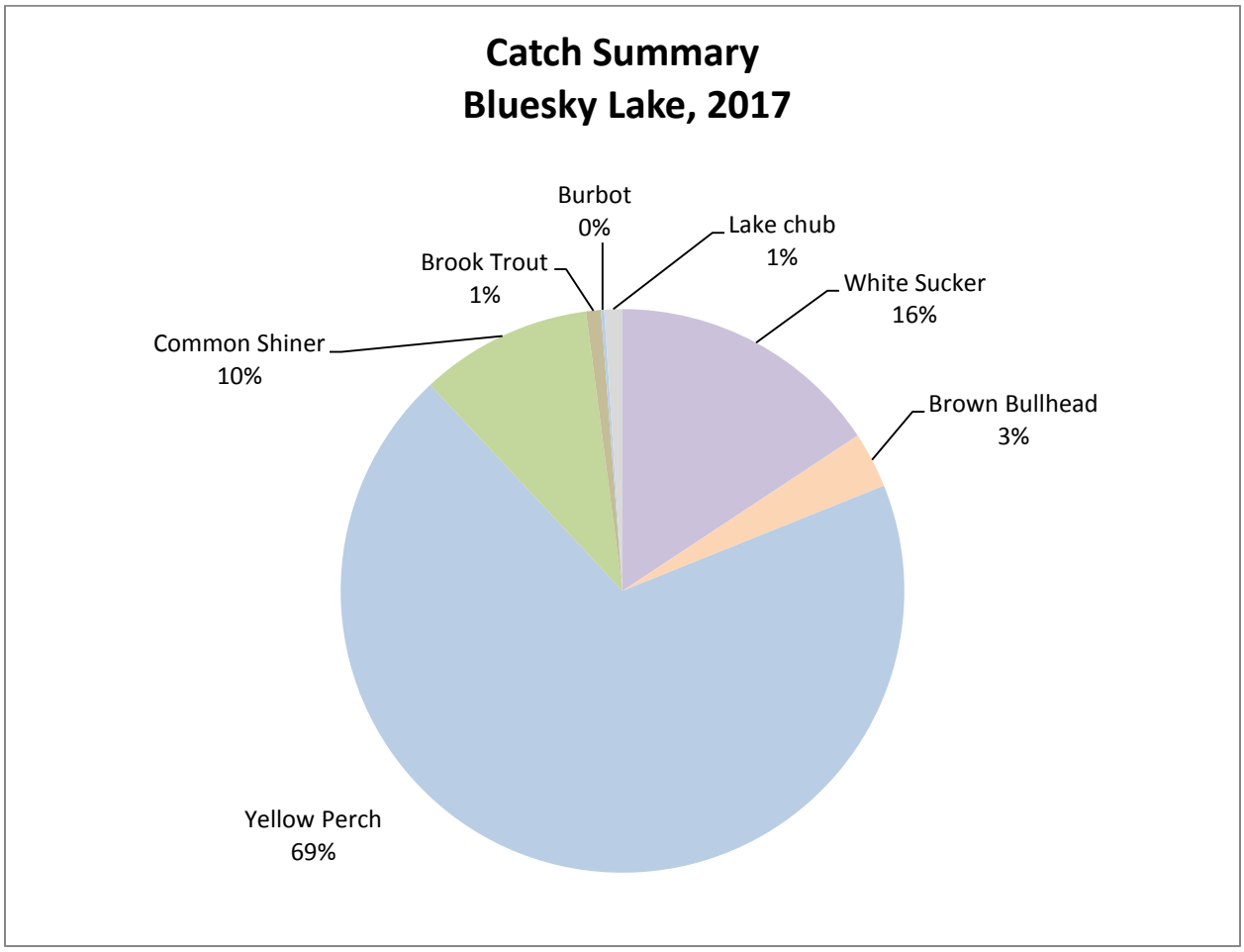


Figure 2 Summary of catch on Bluesky Lake, 2017.

Overall nine Brook Trout were caught throughout the survey; individual measurements are summarized in Table 3. One of the nine fish had a damaged left pectoral clip and no adipose while the remaining fish had no clips. The fish ranged between a fork length of 269-378 mm.

Table 3 Individual sampling measurements of Brook Trout.

Waterbody_Name	Effort	Gear	Gang	SPC	FISH	FATE	FLEN	TLEN	RWT	SEX	GON	CLIP_C	AST	STOM	COMMENT
Bluesky	4	1	1	80	1	D	280	294	250	M	22	NC	A	1	
Bluesky	4	1	1	80	2	D	345	360	450	F	22		A	1	Large unspent eggs
Bluesky	5	1	1	80	3	D	276	289	210	F	22	NC	A	2	7000 - unknown fish
Bluesky	6	2	1	80	4	D	269	280	210	F	22	NC	A	2	2000 - aquatic inverts.
Bluesky	6	2	1	80	5	D	280	295	270	M	22	NC	A	1	
Bluesky	7	1	1	80	6	D	378	391	680	F	22	?	A	2	7000 - 331 fish, LP damaged/No adipose
Bluesky	7	1	1	80	7	D	282	294	310	F	23	NC	A	1	
Bluesky	8	1	1	80	8	D	345	355	420	F	22	NC	A	1	Fin punch
Bluesky	8	1	1	80	9	D	355	360	525	F	22	NC	A	1	Fin punch

The dissolved oxygen/temperature profile (Figure 3) of the lake indicates a moderate oxygen level until 3 meters where it begins to decline rapidly. The higher oxygen level near the surface can be attributed to surface water mixing with the atmosphere. The thermocline begins at 3 meters and continues until the bottom of the lake and, in this regard, the lake does not have a typical hypolimnion layer.

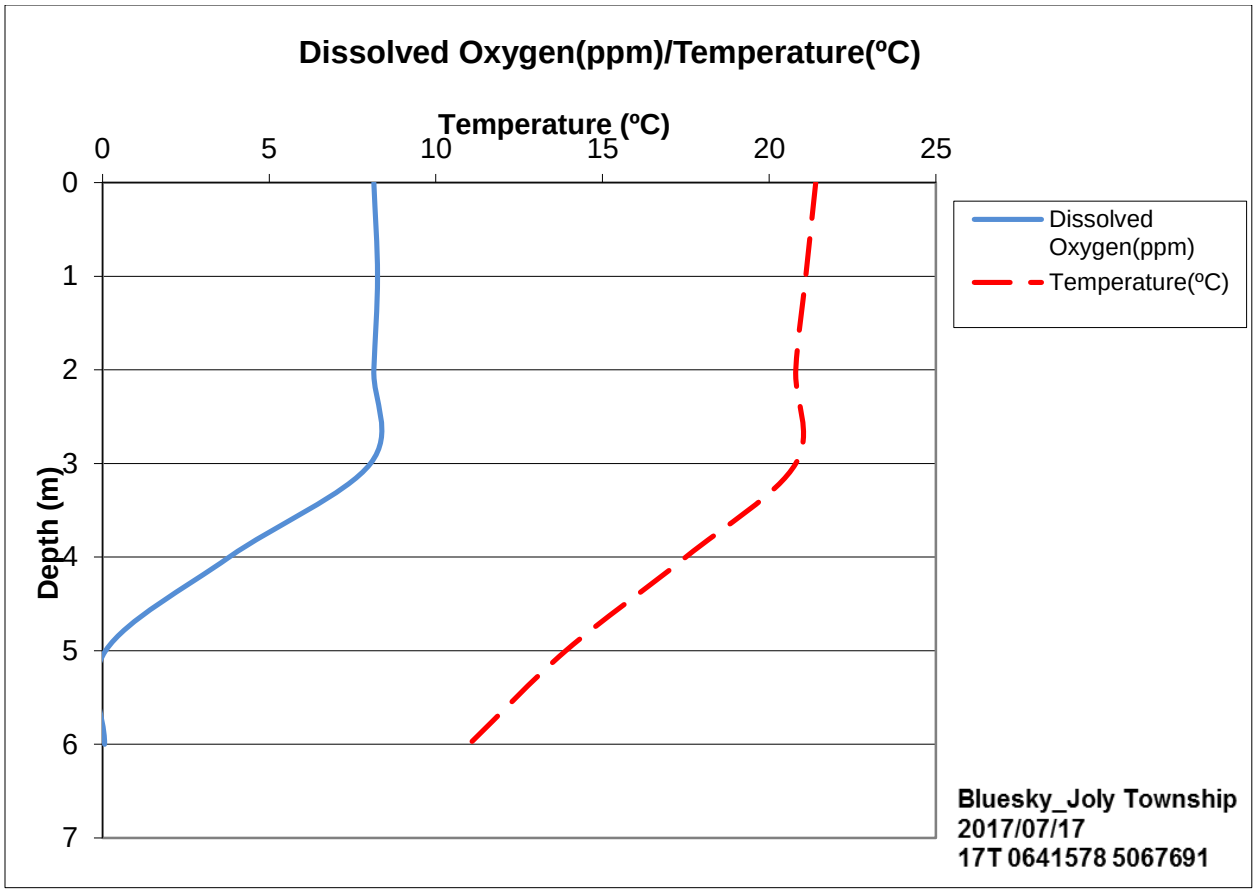


Figure 3 Dissolved oxygen and temperature profile, Bluesky Lake 2017.

Discussion

Brook Trout have not been stocked into Bluesky Lake since 1978. The origin of the Brook Trout (9) caught in this survey is currently unknown. Anecdotal reports from anglers suggest that Brook Trout have been caught in Bluesky Lake over the years, which would suggest a natural population does exist in the lake. With natural populations of Brook Trout known to reside throughout the Magnetawan River system it would be reasonable to assume that a natural, even if remnant, population still does exist in Bluesky Lake.

The uncertainty of the origin of fish caught in this survey is due to Wolf Lake, upstream of Bluesky Lake, having been recently stocked with Brook Trout. In 2014, the lake received 1500 fall Brook Trout with no clip and in 2015 it was stocked with a further 1900 Brook Trout with a left pectoral clip. The section of the North Little Magnetawan that connects these two lakes is passible by fish, in the downstream direction, and consists of an approximate 1600m section of stream.

The Brook Trout that were caught in the survey ranged between a length (fork) of 269-378 mm. This size range could be consistent with growth from the 2014 stocking in Wolf Lake. Due to the

absence of a clip these fish could not represent fish from the 2015 stocking. One Brook Trout was reported to have a damaged LP clip which could be a poor clip from the 2015 stocking, however, this was the largest Brook Trout caught in the survey which would seem like an improbable amount of growth over the two year period. Genetic analysis should clarify the origin of these fish.

Oxygen in the lake is not ideal and rapidly declines after 3m. Brook Trout generally require dissolved oxygen greater than 5 parts per million and prefer water temperature cooler than 20^{o}C. This could severely limit the useable habitat that is available to Brook Trout. All Brook Trout that were caught in the survey were in the 3-6m strata and all within proximity to the deepest part of the lake. This could also be a consequence of Yellow Perch now dominating the littoral zone of the lake triggering a shift in Brook Trout to move into deeper water and less competition.

With yellow perch comprising of 69% of the total catch it is likely that the introduction of this spiny ray fish will prevent Bluesky Lake from supporting a significant natural or reproducing Brook Trout population. Depending on the origin of Brook Trout caught in this survey, the lake should be either continued to be managed as a self-sustaining Brook Trout lake or be recommended for supplemental stocking of Brook Trout similar to Wolf Lake upstream.



Picture of developed eggs in body cavity of brook trout

Sandstrom, S, M. Rawson and N. Lester. 2010. Manual of Instructions for Broad-scale Fish Community Monitoring; using Large Mesh Gillnets and Small Mesh Gillnets. Ontario Ministry of Natural Resources. Peterborough, Ontario. Version 2010.1-34 p. + appendices