Doe Lake Netting 2017

Andrew Ivany

Fisheries Technician

Ministry of Natural Resources and Forestry

2018

Acknowledgements

Thank-you to Les and Angela Eliot at Daysprings Resort for the use of their launch and dock space.
Thank-you to Peter Kujala, Doug, and Jim Rowell for the docking and storage space provided.

This project could not have been completed without your help!

Located in the townships of Ryerson, Armour, Perry and McMurrich within the Parry Sound Management District, 1,187 hectare Doe Lake is classified provincially as a medium sized lake by the Ontario Ministry of Natural Resources and Forestry (OMNRF). The lake is comprised of two major basins (Big and Little Doe) connected by a narrower reach (Middle Doe). Easily accessed via several public and private access points, the lake is a popular fishing and summer holiday destination.

Doe Lake was one of a number of lakes from across the province that were selected by OMNRF Biodiversity and Monitoring Section in 2017 to evaluate the relationship between the catch of smallmouth bass in North American (NA) gill nets (fish-per-net) and the estimated density (fish-per-hectare), with the secondary objective to also opportunistically evaluate this relationship for walleye and northern pike. Development of these 'calibration' relationships will allow the OMNRF to better assess the health of fish populations in the province. North American gill nets are one of two gear types used in the Provincial inland lakes monitoring program that provides information to Fisheries Management Zone councils for use in the evaluation of management decisions.

Methods

The complex project involved the use of three gear types (below) and two time periods (spring and summer).

The gear used:

- Standard 6' trap nets with 100' leads
- Custom fyke nets with a gap of 3'x5' and a 50ft lead (Figure 1)
- North American gill nets (Figure 2)

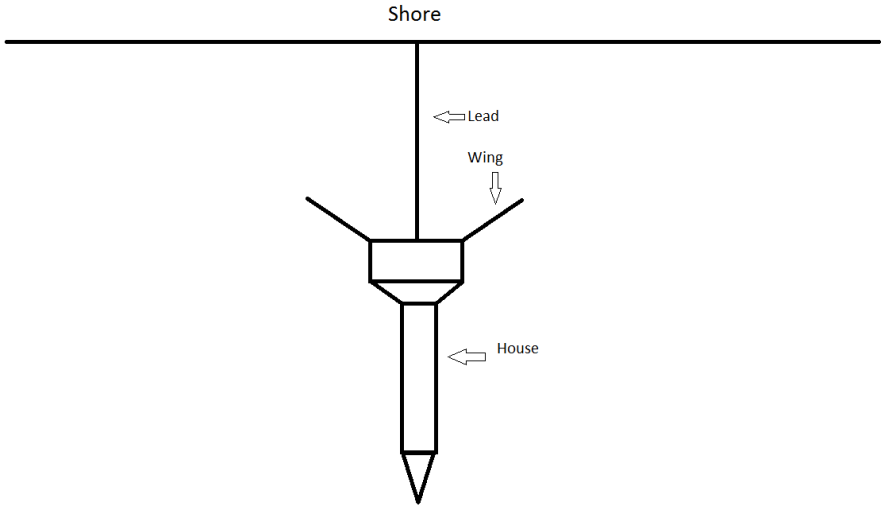


Figure 1. A simple diagram of a fyke net as seen from above. Fish traveling along the shoreline are collected by the "lead" and "wings" where they are captured and held in the "house" for processing. Trap nets work on the same principle, but are larger with the ability hold more fish.

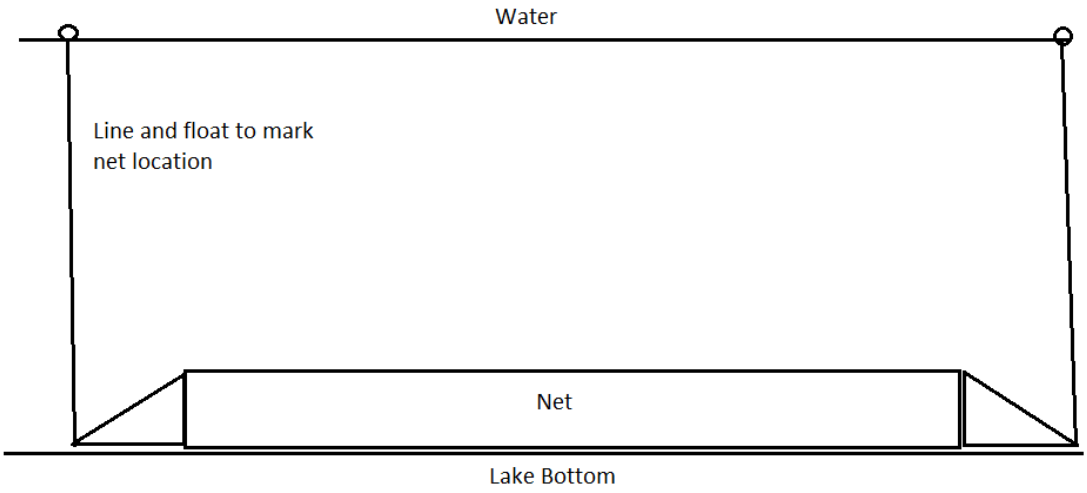


Figure 2. Simple diagram of a gill net as it fishes in the water. The net is approximately 25m long and 2m high. The net sits on bottom and is marked by a rope and float on each end. For the majority of the time, two nets are tied together, for a total length of 50m per set. Each net is comprised of 8 panels of different sized mesh; 1.5", 2.0", 2.5", 3.0", 3.5", 4.0", 4.5", 5.0". Nets are distributed at various depths covering all water from 1m to the maximum depth of the lake.

Trap and fyke nets were used in May, June, and July to capture the target species in Big, Middle and Little Doe reaches of the lake, and all target species were measured for fork length and tagged and/or marked. These fish were then allowed to mix with unmarked fish in the lake for approximately one month prior to the recapture phase of the study in mid- to late-August, which used North American (NA) gill nets. Two complete 24 site NA surveys were performed (Aug 15 –18 and Aug 22-24), for a total of 48 sites/sets. Nets are allocated around the lake in various strata: 1-3m, 3-6m, 6-12m, 12-20m, 20-35m, and equally applied based on surface area.

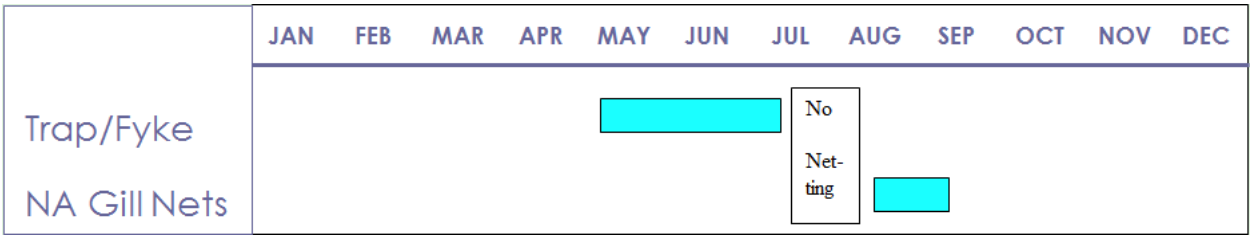


Figure 3. Netting timeframe.

Smallmouth bass >250mm fork length were tagged with a "T tag" inserted behind the dorsal fin (Figure 4). In addition, these fish were also given a secondary mark (clipped 3rd spine) to identify these fish in

the event the tag was lost. Bass smaller then 250mm were only marked by clipping the third spine of the dorsal fin. Tags were individually numbered and included a phone number, with the expectation that anglers would call if one was captured. As the program relies on knowing how many tagged fish are available at time of the recapture event, it was important to identify if angled fish were harvested or released. All other coarse species captured during the capture phase were released without measurement or mark.



Figure 4. Example of a tagged bass. Tags contain unique ID number and a phone number to notify MNRF.

Walleye and northern pike were also marked when time permitted, but as they were the secondary target, marking was less consistent.

Results

A total of 573 smallmouth bass (>250mm) were tagged during the marking phase of the project, and 134 examined for marks during the summer recapture phase, of which 31 were found to have a tag and/or clipped spine. Insufficient northern pike (157 captured) and walleye (134 captured) were marked and/or examined to permit reasonable estimation of density via mark-recapture procedures. Figure 5 shows the relative species composition of NA catch observed in the recapture phase.

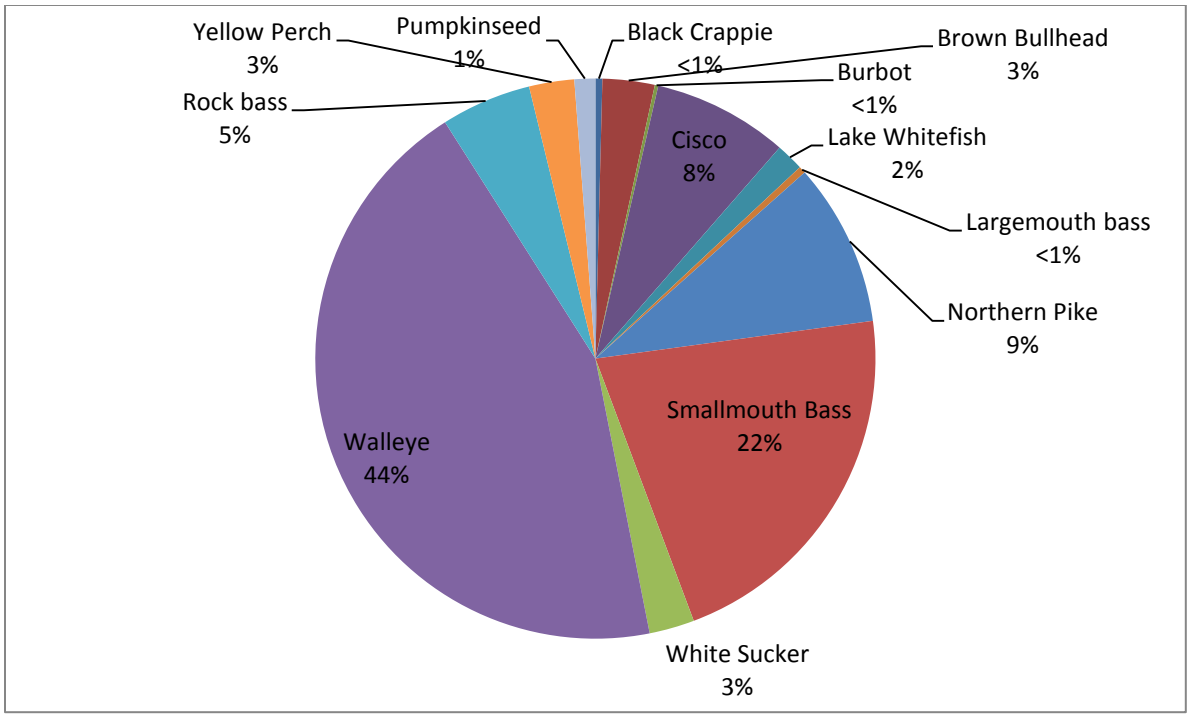


Figure 5. Proportion by species captured in North American gill nets in Doe Lake, late August 2017.

The population estimate of smallmouth bass for Doe Lake was determined to be approximately 2,500 fish greater then 250mm (10”). Using all of the above numbers, it can determine that a standard NA survey would capture approximately 3% of the population of smallmouth bass greater than 250mm in a lake.

The population estimate for walleye in Doe Lake can be approximated using provincial NA calibration values and is estimated to be in the order of 3,000 fish greater then 350mm (13.75”). This figure is an estimate based on the results of four NA surveys performed on Doe Lake in 2008, 2013, and the two projects in 2017 (Table 1). The catch-per-unit-effort (CUE) of a netting program is defined as the average number of walleye (>350mm) caught in a net.

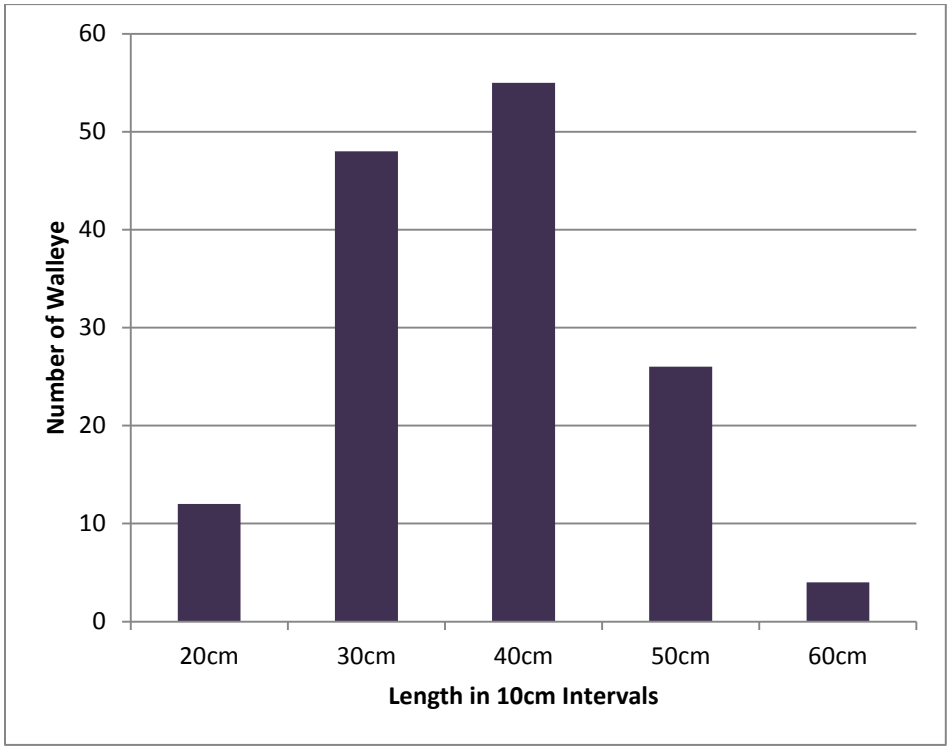
Year	CUE
2008	1.42
2013	1.15
2017(1)	1.04
2017(2)	1.4

Table 1. Walleye (>350mm) catch-per-unit-effort (CUE) from the four North American gill net projects performed on Doe Lake since 2008. As between year and between surveys within year show similar variation in CUE, it is likely that this is due more so to sampling variability and not actual fluctuations in the population; hence, it appears from results that the walleye population is stable in this lake. Variation can be caused by many factors including weather, crew experience and time of year.

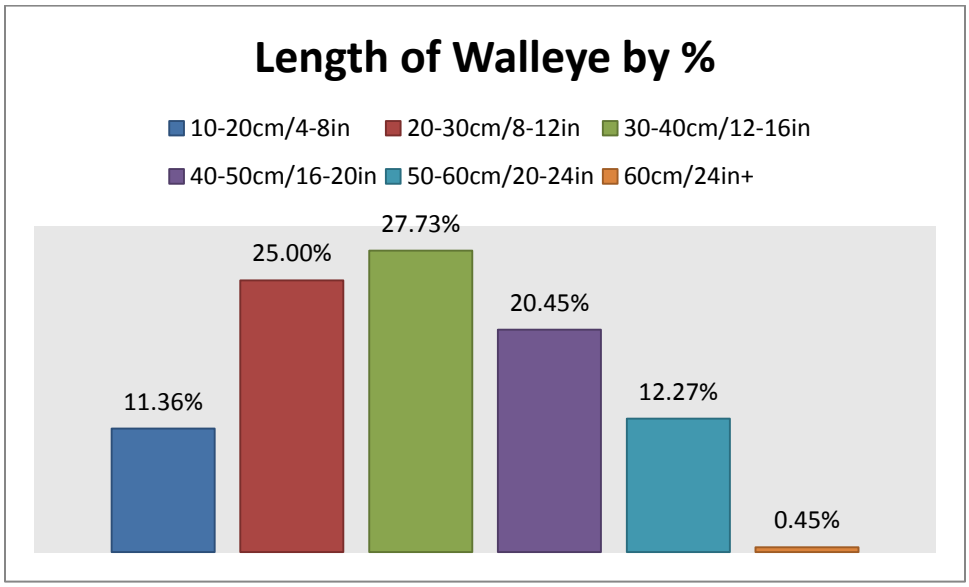
Conclusions

The results of our tagging program were beneficial for continued development of our understanding of the effectiveness of North American nets (used in Ontario's Provincial fisheries monitoring program) for the estimation of density (health) of important game species, like smallmouth bass. This understanding will be refined over future years as OMNRF conducts similar projects on different types of lakes and on more species.

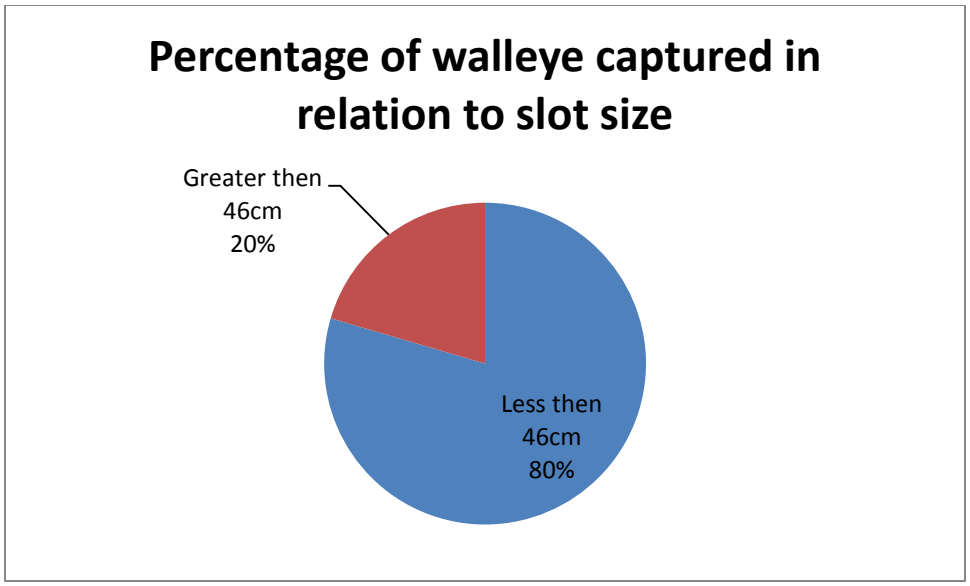
Additional Information



Length distribution of walleye marked in spring using fyke and trap nets



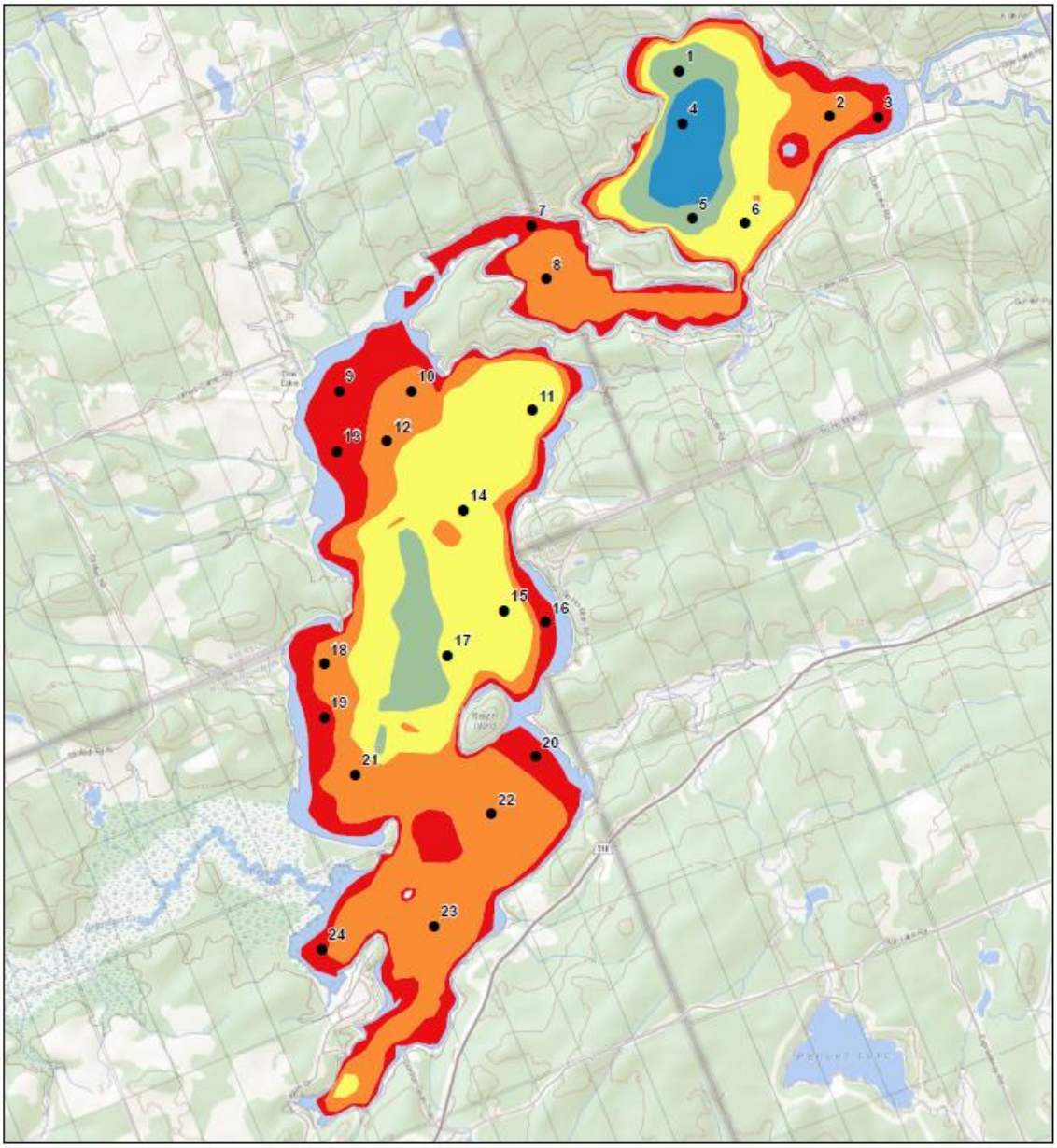
Proportion of walleye length captured in North American gill nets (10cm intervals)



Percentage of walleye in relation to slot size. According to the Ontario Recreation Fishing Regulations Summary (2017), an angler with a sport fishing license has a limit of 4 walleye, one of which may exceed 46cm/18.1”.

Fish Species	Maximum Length	Minimum Length	Average Length
Walleye	670mm(26.5")	170mm(6.5")	355mm(14")
Northern pike	890mm(35")	186mm(7")	541mm(21.5")
Smallmouth bass	485mm(19")	130mm(5")	378mm(15")
Lake whitefish	530mm(20.5")	335mm(13")	385mm(15")

Catch statistics of notable game fish captured in the NA gill nets. Also note, several pike were captured in trap nets in excess of 40”.



Site Numbers

Stratum	•	Total
1-3m	3, 7, 9, 13, 16, 19, 20, 24	8
3-6m	2, 8, 10, 12, 18, 21, 22, 23	8
6-12m	6, 11, 14, 15, 17	5
12-20m	1, 5	2
20-35m	4	1
Total		24

Doe 17-6239-50430 and Little Doe 17-6262-50471
SA: Doe - 862.32 ha, Little Doe - 357.53 ha,
Max Depth: Doe - 16.2 m, Little Doe - 25.6 m

N

Net • Stratum: 1-3m, 3-6m, 6-12m, 12-20m, 20-35m

1 cm = 385 meters

Example of a netting map that MNRF staff would use for a project. The sampling points are **randomly** chosen so as not to bias the catch results.

References

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

Ontario Ministry of Natural Resources and Forestry. 2017. Recreational Fishing Regulations Summary. Ontario Ministry of Natural Resources and Forestry. Peterborough, Ontario. 96 P.