Round Lake Tagging Project 2019

Andrew Ivany

Ministry of Natural Resources and Forestry

2020

Background

In 2008, the Ministry of Natural Resources and Forestry (MNRF) initiated the Broad-scale Monitoring (BsM) program as the new provincial standard for fisheries assessment. It is a key component of MNRF's Ecological Framework for Fisheries Management. Calibration of the BsM protocol occurs on an ongoing basis to ensure it is working as designed and to refine the techniques used. In the summer of 2019, Round Lake was one of over a dozen lakes chosen from across the province to develop an understanding of the relationship between the number of bass caught in our provincial monitoring gear and the actual number of bass in the lake (estimated by way of a mark-recapture experiment). This relationship will allow us to better manage our provincial inland resource and evaluate both the requirement for and success of our regulatory actions. Secondary targets were walleye and northern pike.

Round Lake is located in McMurrich Township. It was chosen due to its low cottage density, ease of access, appropriate size, presence of smallmouth bass, and proximity to the Bracebridge MNRF office where the project was based. Work was performed by staff of the Biodiversity and Monitoring Section of the Science and Research Branch of MNRF.

Round Lake has a surface area of 195 ha and a maximum depth of 21 metres.

Methods

The program consisted of two major components – a spring project where trap and fyke nets were used to live capture and tag fish, and a summer project using North American standard mono-filament mesh nets of the Broad-scale Monitoring program to test their effectiveness on the known tagged population.

Trap and fyke nets are live capture devices of a similar principle. Fish are funneled into a holding area and held for processing. They are similar in concept to a "minnow trap", but significantly larger.

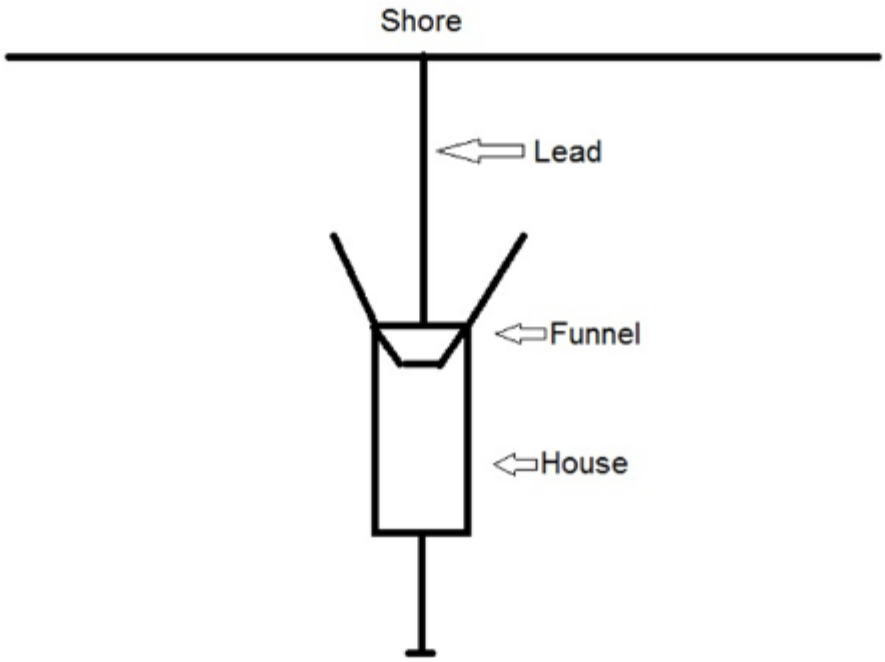


Figure 1. A simple diagram of a trap net as seen from above. Fish traveling shore are directed into the net by the lead and wings, then held in the house until processed. Fyke nets are similar in concept but typically much smaller and usually used in circumstances where water depth is shallower.

For the purposes of this project all smallmouth bass more than 200mm were tagged with a floy tag or had the third dorsal spine clipped. Fish that had tags applied were also clipped as a secondary mark as some tag loss does occur. Additionally, larger individual walleye, largemouth bass, northern pike, and black crappie were also marked either with a tag or a dorsal spine clip. The tags used have a unique ID number and a phone number to report its capture to MNRF technicians. All “marked” fish were released back into the lake at a central location and allowed to disperse. Fish captured that already possessed marks were noted and released.



Figure 2. A smallmouth bass with a T type (floy) tag applied. Also note the 3rd dorsal spine has been clipped as a backup mark to the tag. The membrane between the dorsal spines will quickly regrow and will not permanently damage the fish or effect it in any significant manner.

The target was to mark approximately 10% of the fish in the lake. This figure can be roughly estimated using a simple formula. For example, assume 100 fish are captured, marked, and released into the lake. If, in another netting event in which 100 fish are captured, 10 marked fish are recaptured, you can extrapolate that you have marked 10% of the population and that the population would be 1000 individuals. This is a very simple example and there are more variables to consider, but it is a rough approximation of the process.

Following the “mark” period of the project, the “recapture” phase began after a short pause to allow marked and unmarked fish to randomly mix together. Using large mesh “North American” standard mono-filament mesh nets, three recapture projects were completed in late June, late July, and late August.

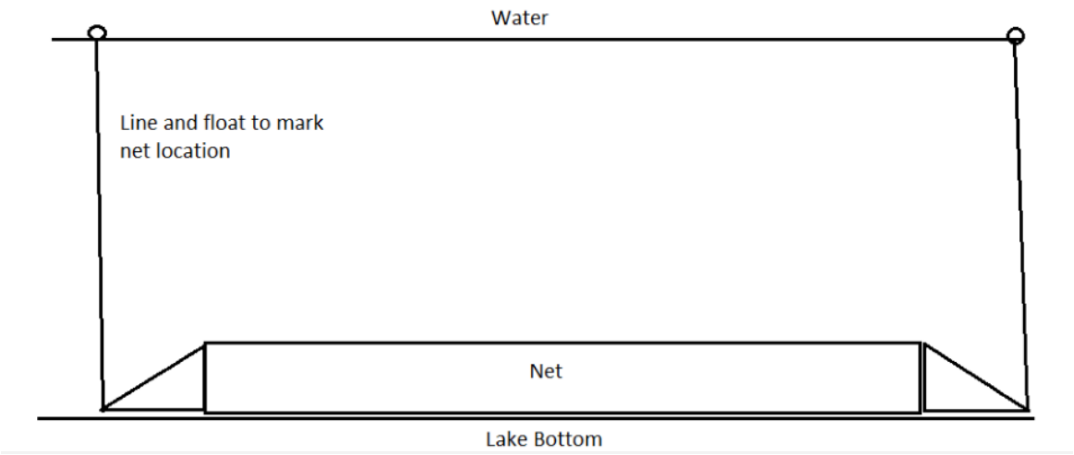


Figure 3. A simple diagram of a mono-filament mesh net as it fishes in the water column. The net is approximately 25m long and 2m high. Typically, two nets are tied together for a length of approximately 50m. Each net is comprised of 8 panels of mesh of different sizes - 1.5”, 2.0” 2.5”, 3.0”, 3.5”, 4.0”, 4.5”, 5.0”. Nets are distributed around the lake at randomly chosen locations covering depth ranges from a minimum of 1m to the maximum depth of the lake.

The results of the recapture projects were then used to analyze the effectiveness of North America mono-filament mesh nets in capturing a population of smallmouth bass with an estimated abundance. The same project was completed on multiple lakes around Ontario to offer a large sample size to develop a better understanding of this relationship. This information can then be applied to other lakes in the Broad-scale Monitoring program without abundance estimates to infer the number of fish in those lakes based solely on the average number of fish caught in a net.

Results

During the marking portion of the project 891 fish were marked, as shown in Table 1 below.

Table 1. Number of fish marked, by species. Additional species captured via trap or fyke net but not marked included pumpkinseed, common white sucker, and brown bullhead.

Northern Pike	104
Smallmouth Bass	285
Largemouth Bass	13
Black Crappie	129
Walleye	360
Total	891

During the recapture portion of the project 48 mono-filament mesh net sets were completed, spread out over three time periods: June 24-26 – 16 nets, July 31-Aug 01 – 11 nets, and August 22-27 - 21 nets.

The total capture of all three netting periods is shown in the chart below. Lake whitefish and walleye represented the majority of the catch. It is important to note that the values shown are not proportionate to the populations present in the lake. Several factors determine a species level of catchability in a net. North American style nets also do not capture small fish (generally less then 100mm). Smaller fish will be underrepresented in the survey. Some other factors effecting catchability include the physical shape of the fish and their movement patterns.

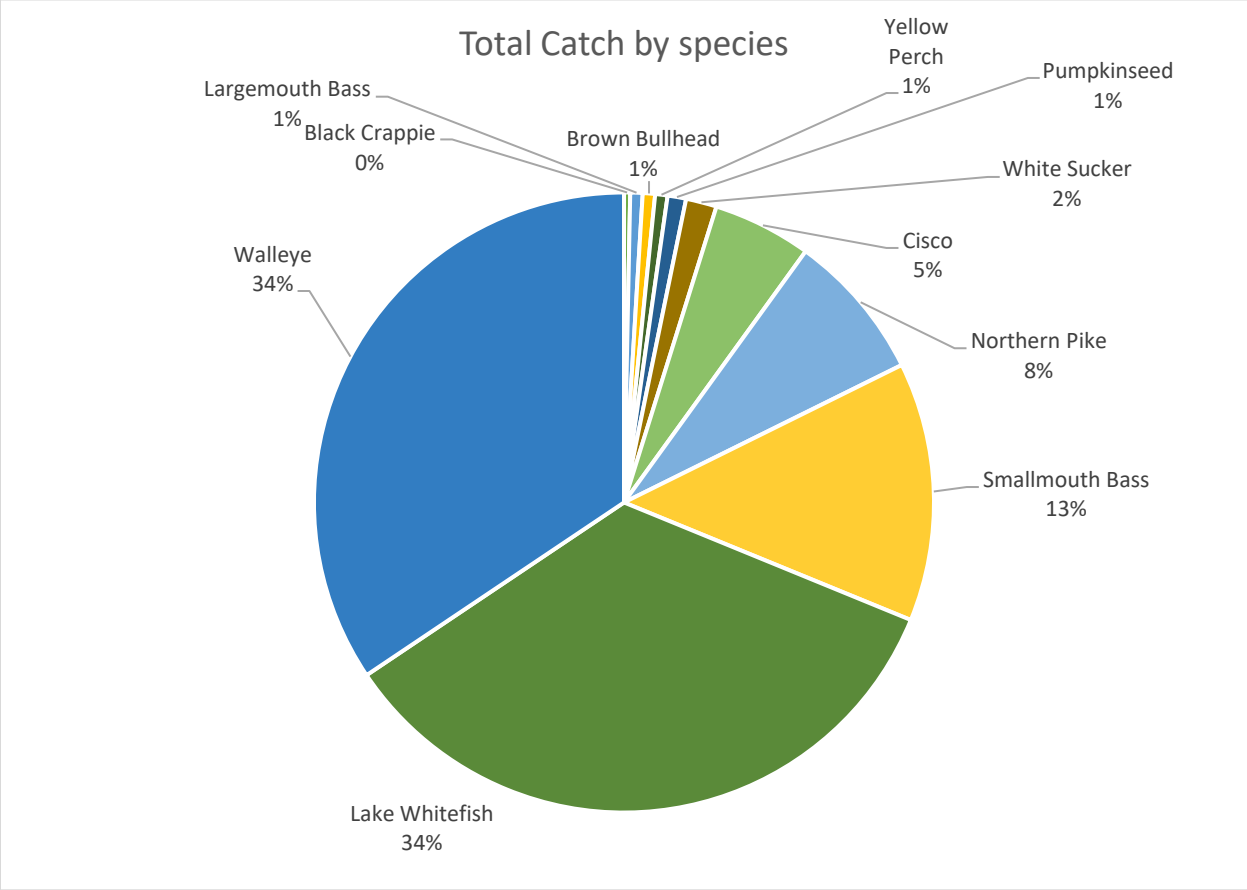


Figure 4 – All species by percentage of catch through three mono-filament mesh net projects using North American style nets (48 sets) Black crappie was represented by 1 individual, rounded to 0%.

During the recapture period, a total of 23 pike greater than 200mm were captured, with 8 of them showing marks or tags. A total of 101 walleye greater than 200mm were captured with 51 showing marks or tags. A total of 35 smallmouth bass were captured

with 22 showing marks or tags. No tagged largemouth bass or black crappie were captured.

Using the above noted statistics, the population of pike greater than 200mm is estimated to be 256 individuals. The population of walleye greater than 200mm is estimated to be 699 individuals, and the population of smallmouth bass greater than 200mm is estimated to be 453 individuals.

Walleye in excess of the 46 cm (18.1”) size limit for FMZ15 represented about 50% of the total walleye captured during the recapture portion of the project. According to the Ontario Recreational Fishing Regulations Summary (2020), an angler with a sport fishing license has a limit of 4 walleye, one of which may exceed 46cm(18.1”).

Lake whitefish were not tagged or marked, so no population estimate can be ascertained from the available data. The average weight of lake whitefish captured was 1108g (2.5 lbs) and the average length was 472mm (18.6”). The largest individual weighed 2500g (5.5 lbs).

Conclusions

The program on Round Lake was a success in contributing to our understanding of the Broad-scale Monitoring program results and its use throughout Ontario. From an angling perspective it has a healthy population of several key sport fish, and an unexpected find of a healthy population of lake whitefish, which were not documented in our historic records to this point. If tagged fished are captured in the future, anglers are encouraged to call 705-646-5543 to report. MNRF staff can provide details on the fish at its time of capture as thanks for doing so.

Additional Information

Size statistics of sport fish captured in North American style mono-filament mesh nets

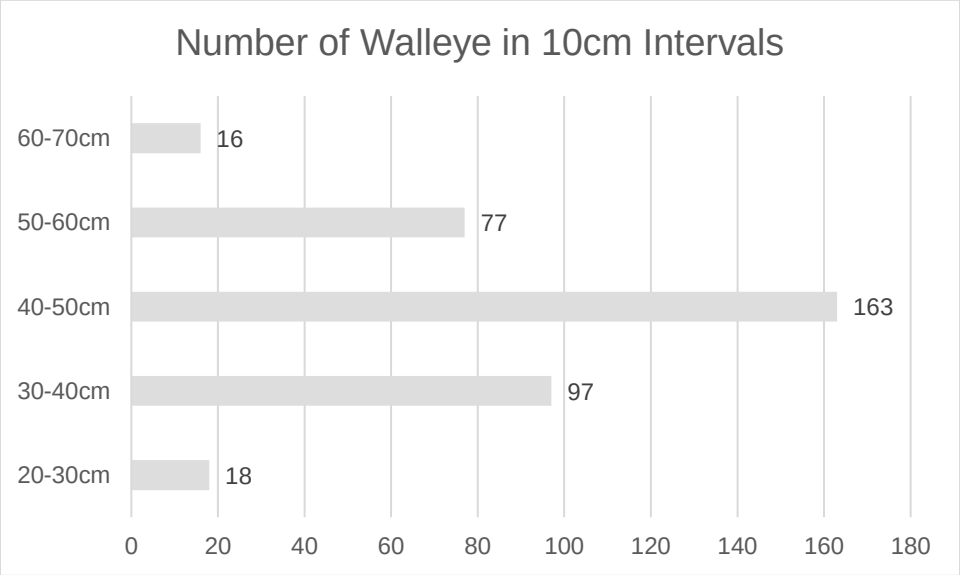
Species	Maximum Length	Minimum Length	Average Length
Walleye	665mm 26.2”	150mm 5.9”	426mm 16.8”
Northern Pike	750mm 29.5”	350mm 13.7	513mm 20.2”
Lake Whitefish	520mm 20.5”	230mm 9”	472mm 18.6”
Smallmouth Bass	460mm 18.1	160mm 6.3”	354mm 14”

Maximum size statistics of notable sport fish captured in trap or fyke nets

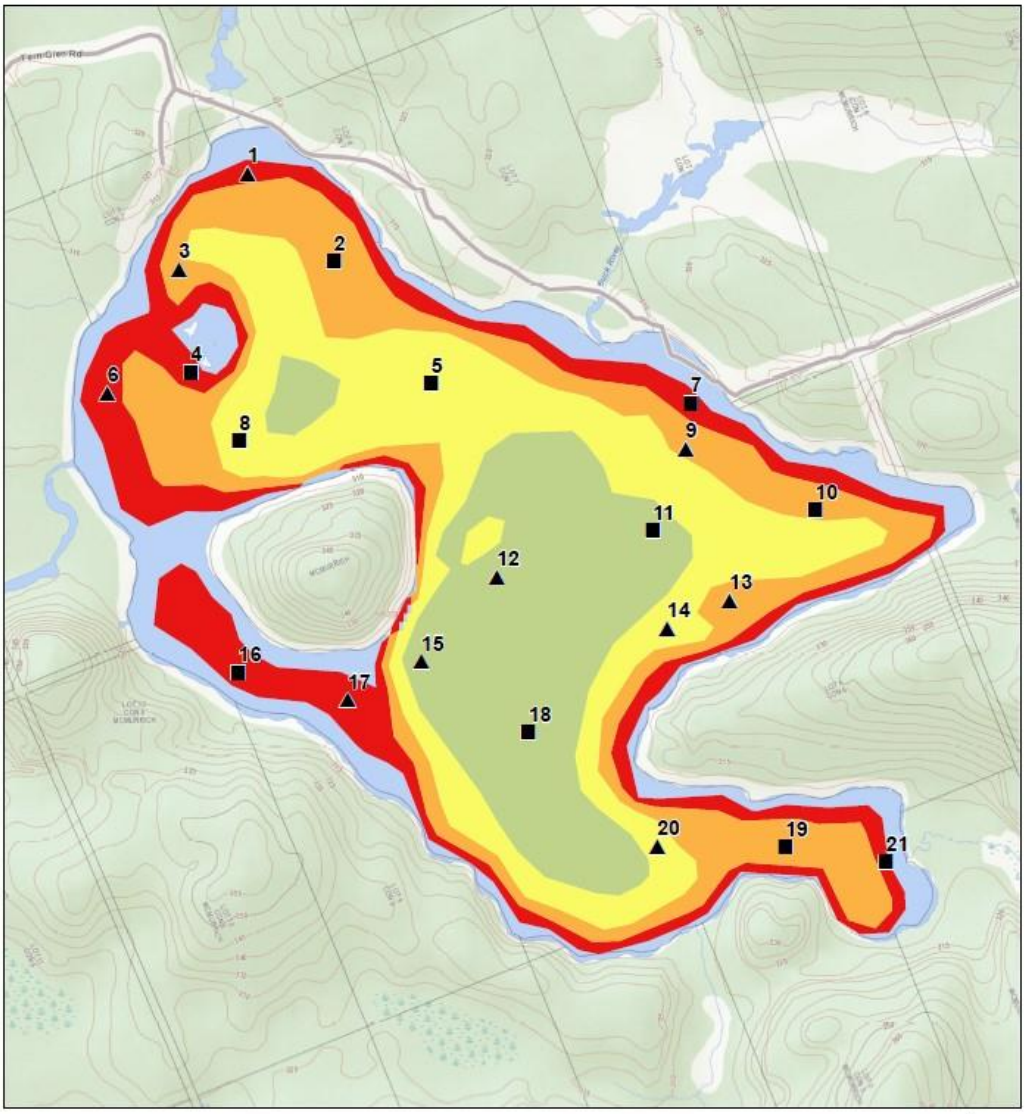
Walleye – 670mm or 26.4”

Northern Pike – 990mm or 38.9”

Smallmouth Bass – 490mm or 18.9”



Number of walleye captured in trap and fyke nets in 10cm intervals



Site Numbers

Stratum	Large Mesh	Small Mesh	Total
1-3m	4, 7, 16, 21	1, 6, 17	7
3-6m	2, 10, 19	3, 9, 13	6
6-12m	5, 8	14, 20	4
12-20m	11, 18	12, 15	4
Total	**11**	**10**	**21**

Round 2 17-6247-50356
FMZ 15 2019
SA: 192.7 ha, Max Depth: 21.5 m

N

Mesh
LG
SM

Stratum
1-3m
3-6m
6-12m
12-20m

1 cm = 115 meters

An example of a site map that MNRF staff use when performing a netting program. The sites are randomly chosen so as not to bias the catch. For the purposes of this project “SM – small mesh” gear was not used.

Links of Interest

Description of Ontario Broad-scale Monitoring Program

https://www.ontario.ca/page/broad-scale-monitoring-program

Guide to Eating Ontario Fish

https://www.ontario.ca/environment-and-energy/eating-ontario-fish

Ontario Fishing Regulations Summary

https://www.ontario.ca/document/ontario-fishing-regulations-summary