Potential Toxic Effects of Algal Blooms in the Smelt of Muskrat Lake

Katharine van der Jagt, Melissa Meneghetti, Jori Baldwin

Project Intent:

The main focus of this project is the rainbow smelt population located in Muskrat Lake (Cobden, Ontario). Specifically, we are concentrating on two environmental factors that could be influencing the population of the fish:

1) Water samples collected at the lake revealed unexplained anomalies in the amount of dissolved oxygen in the water. These levels dipped drastically at a depth of 12m, while at a depth of 24m they were higher than average. (These samples were collected at one site in the month of September only.) It is felt that the high level of algae present may be a factor in these readings. Cyanobacteria, particularly, are of concern since some species are known to produce toxins and it is not known if these toxins can accumulate in fish. High levels could be detrimental to fish populations and are also known to result in beach closures.
2) The Ministry of Natural Resources has been stocking Muskrat Lake with lake trout. There is local concern that the trout may be interfering with the smelt and that the trout populations may themselves, be impacted by the decreasing oxygen levels.

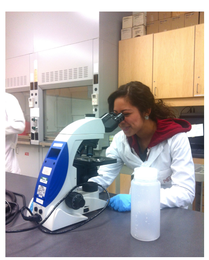
Field Procedure:

To properly ascertain if these two factors were influencing the smelt population, we decided to catch a sampling of smelt with the following field procedure:

- Locate deep portions of the Muskrat where smelt are most likely to be found, as they are a deep water species
- Obtain 100 smelt using fishing lines and live minnows – obtained with an approved MNR permit for out-of-season fishing
- When fish are caught, place in specimen bag and label with specimen number, location (UTM) and date
- Obtain water samples to identify any algal species present in the lake to assist with pathology during laboratory analysis

Laboratory Procedure:

- Following protocol provided by the MNR, Otoliths are removed to age the fish
- Length and weight measurements are taken
- Livers are removed and then sent to Woodroffe campus for toxicological analysis (this portion of the project is proposed to be started during our summer course)

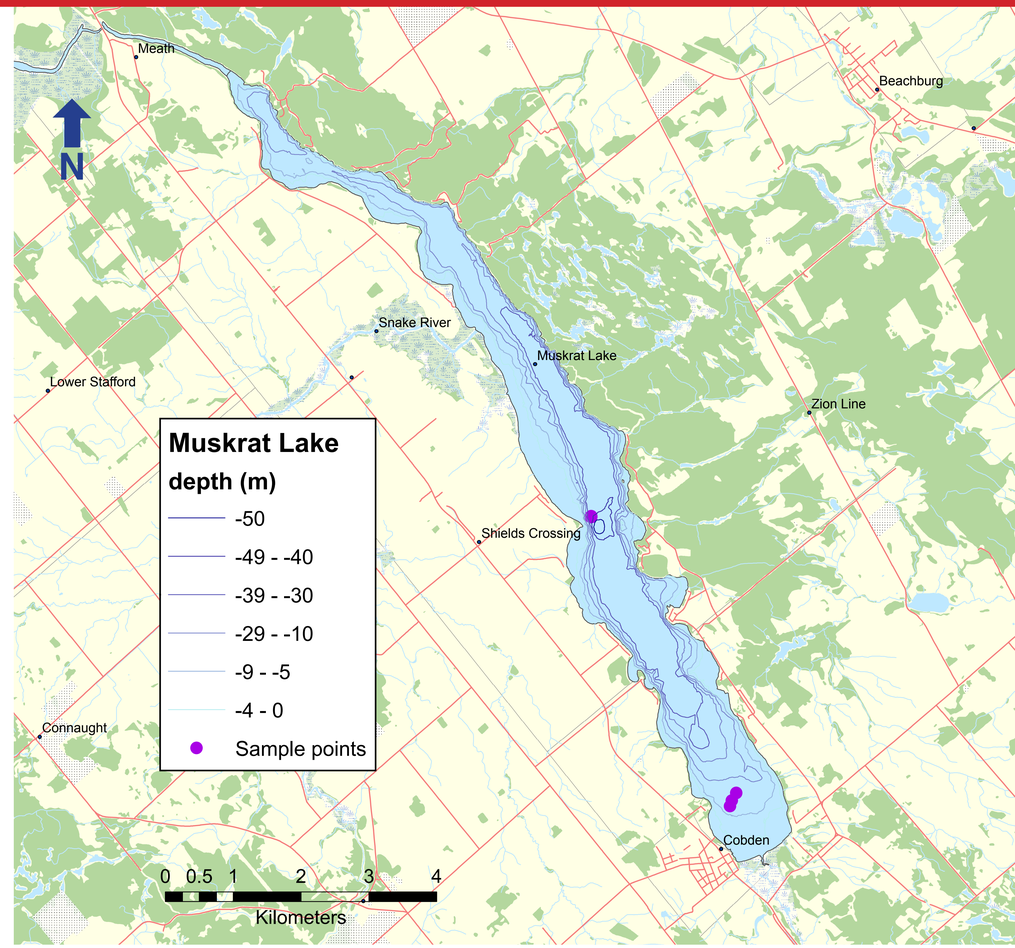


Traditional smelt fishing techniques were applied.

Live minnow baitfish.

Water samples were collected at the smelt sampling site.

Our second attempt at fishing.



Two rainbow smelt were collected in Mid-February

Conclusion and Next Steps:

Unfortunately, we were only able to garner two rainbow smelt. This was too small of a sample to properly conclude anything. Come the spring, we plan to catch smelt using a net. Hopefully this will produce a larger sample and we can better analyze what is happening with the rainbow smelt in Muskrat Lake.