

Summary of Trent U-SON Ecotoxicological Study of Owen Sound Harbour – October 2018

The Saugeen Ojibway Nation Environment Office (SON-EO) is a technical body of the Saugeen Ojibway Nation Chiefs and Councils with a mandate to provide expertise and support for the Joint Chiefs and Councils on matters that have the potential to impact the lands, waters and/or the Aboriginal and Treaty rights of the SON People across the SON Territory. In order to meet these obligations, the SON-EO has been collaborating with Trent University to investigate the ecotoxicological hazards associated with contaminants present in the sediments in the inner harbour of Owen Sound Bay. This is the final report from Trent University to SON EO related to this three-year collaborative study, conducted from 2016 to 2018.

Phase I of the project addressed the information gaps identified upon review of the report by Dillon Consulting (2010) on contaminants in the harbour, including an evaluation of contaminant levels in the water column above the sediments. Phase II of the project focused on further characterizing the extent of contamination of the sediments and addressed the need to evaluate the potential ecotoxicological impacts of disturbing the sediments. In addition, workshops were held with SON community members, during which, the study results were shared and individuals were asked to share their Ecological and Cultural Knowledge (“Traditional Knowledge”) about the region and their concerns related to contamination of Owen Sound Bay.

The results from sampling in the harbour showed that there are:

- High concentrations of some organic contaminants in the sediment at levels that exceed Canadian guidelines for the protection of aquatic life
- High concentrations of some organic and inorganic contaminants in the water at levels that exceed Canadian guidelines for the protection of aquatic life.
- Elevated concentrations of polynuclear aromatic hydrocarbons (PAHs) in the sediments that are consistent with the concentrations of these compounds in some Areas of Concern in the Great Lakes and are above Canadian human health guidelines for PAHs in soils.

The following results were observed in experiments with fish:

- Swollen yolk sacs (i.e. yolk sac edema) that developed in embryos and fry of one of two fish species that were exposed to organic contaminants isolated from the water column in Owen Sound inner harbour.
- Elevated levels of stress (i.e. oxidative stress) in juvenile lake whitefish that were exposed to water that was filtered through sediment from Owen Sound harbour, mimicking sediment disturbances.

The Community knowledge workshop results revealed that there are:

- Locations in and around the harbour that are important habitat for lake whitefish, indicating that the fishery may be at risk.
- Multiple areas in and around the harbour that are traditional camps, former fishing areas, etc., suggesting that community members may frequent the area that is contaminated and may also be at risk of exposure.

After considering all the lines of evidence, we conclude that there are ecotoxicological hazards associated with contamination of Owen Sound Harbour that pose a risk to the fishery, aquatic life and ecosystem functions in the region, and there are potential risks to human health that require further evaluation. In addition, we conclude that disturbing the contaminated sediments would increase the risks of ecotoxicological effects and should not be conducted without a full evaluation of those risks by qualified experts. Trent University will continue to work on the remaining aspects of this study and will keep SON apprised of the findings, as this may contribute to future decision making.