

Exploring the effect of chloride from de-icing salts on heavy metal concentrations in urban soils: a case study in Halifax, Nova Scotia, Canada

VICTORIA M. DESJARDINS - *Department of Earth Sciences Dalhousie University, Halifax, Nova Scotia, B3H 4R2*

Established in 1749, Halifax, Nova Scotia, has long been home to various factories, extensive military activity and the largest ever non-nuclear explosion, and today remains an active port city. Halifax is rich with history, and so are the soils. A pilot study executed by the 2013/2014 Environmental Geoscience class at Dalhousie University sought to determine heavy metal concentrations in residential soils of the Halifax Peninsula. At each of over 30 residences on the Halifax Peninsula, three samples were obtained: dripline, roadside, and ambient. The samples were then dried, sieved to <1mm and analyzed using X-ray fluorescence. The metals of focus were Pb, As, Cr, Cu, Zn, Ba, V, Cd, Co, Se, Mo, and Sn. Dripline values of a number of metals were commonly greater than ambient values, which in turn were higher than roadside values in many cases. For example, 87% of dripline lead values exceeded the 140 ppm Canadian Council of Ministers of the Environment (CCME) guideline, versus 81% and 57% for ambient and roadside, respectively. One possible explanation for the lower roadside values is that they are attributable to mobilization by chloride from de-icing salts. The objective of this study is to explore the process of chloride leaching and its impact on metal mobility using a variety of soils from the Halifax Peninsula. Soils of various types from sandy to clay-rich, and from different depths, will be subjected to chloride leaching in the lab and will be analyzed before and after to determine whether metals have indeed been leached from the soils, and if so, to what extent.