

## Abstract

Polycyclic Aromatic Hydrocarbons (PAHs) are Persistent Organic Pollutants (POPs). Due to their chemical structure, PAHs are quite resistant to degradation. In addition to being long lived, PAHs build up within fatty tissue of animals and humans. This bio-accumulation can have health repercussions as many PAHs are either suspected carcinogens or known carcinogens.

The objective of this experiment was to investigate what if any PAHs, were contaminating the soil at an industrial site along the Fraser River in Vancouver, B.C. The sites sampled along the Fraser River have historically been home to industrial plants and commercial manufacturing.

Three different sites were sampled, each sample was analyzed twice for a total of six extractions. Extraction of the PAHs from their soil matrix was carried out with a Soxhlet Extractor using approximately 200 mL of an Organic Solvent, hexane. The resulting solution was concentrated to a volume of 8-12 mL with a macro-distillation apparatus. 1 uL of sample was injected then analyzed with a Hewlett-Packard Gas Chromatograph/Mass Spectrometer. Quantification of the concentrations was carried out in two ways: An internal standard of Deuterated Anthracene was injected into the soil sample before the extraction was carried out. An external standard containing sixteen PAHs was analyzed and used to quantify the concentrations.

The levels of PAHs in Site 1 were found to exceed the B.C. Ministry of Environment (B.C.M.O.E.) Contaminated Site Regulations for Commercial/Industrial sites for all PAHs analyzed. Many of the PAHs exceeded the regulations by 20 times. In samples from Site 2, only one PAH exceeded the B.C.M.O.E. Regulations for Commercial/Industrial sites. Methyl Anthracene with a concentration of 52 ppm exceeded the regulations of 50 ppm dry weight. In the samples from Site 3, near a rail line, the concentrations of Fluorene, Phenanthrene, Anthracene and Methyl Anthracene exceeded the B.C.M.O.E. Regulations for Commercial/Industrial sites.

This experiment confirmed that site 1 was severely contaminated with PAHs, and that the remediation of the site was justified. While site 2 only exceeded the regulations for Commercial/Industrial for one PAH, the site exceeded the stricter (B.C.M.O.E.) Regulations for Residential/Urban Park for many of the PAHs analyzed. Concentrations of PAHs from site 3 exceeded the regulations for at least four PAHs, and if further sampling and analysis confirmed these results, the site should be remediated.