

ABSTRACT

Metal Pollution in Hunts Bay, Jamaica

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This study examined the loading of eighteen elements to Hunts Bay, Kingston Harbour – a eutrophic, urban, tropical estuary. Metal concentrations were quantified in surficial and cored sediment by instrumental neutron activation analysis (Al, Ca, Cl, Dy, Eu, K, Mg, Mn, Na, Ti and V) and in surficial sediment by atomic absorption spectroscopy (Cr, Cu, Fe, Mn, Pb and Zn) utilizing sequential extraction and acid extraction techniques (AETs). Results obtained from sediment analyses indicate that: (a) Cr, Cu and Pb concentrations were highest in the north-eastern section of the Bay, (b) the remaining elements were within the normal range reported in the literature, (c) the depth profiles of Cu, Cr, Pb and Zn showed peaks for most sites in the upper 40cm of sediment cores, which correspond to sediment deposited since the mid 1980s during which there was significant expansion of the Industrial Belt (Three Miles) and Portmore (dormitory community), located north and south of the Harbour respectively, and

Elemental concentrations of atmospheric deposition (Pb) and street dust samples (Al, Ca, Cu, Fe, Pb Mg, Mn, Rb, Sr, Ti and V) collected within the environs of the Bay were also determined by Energy Dispersive X-Ray Fluorescence (EDXRF). This data, though preliminary in nature, suggest that there is some contribution from these sources to the metal budget of the Harbour. Of particular interest were the high lead concentrations of samples collected at sites impacted by industrial activity and high traffic densities. Leaded petrol was identified as the principal source of lead to the terrestrial environment of the Harbour.

Water quality data (pH, salinity, dissolved oxygen) revealed that anoxic conditions exist within the Bay. There are two distinct compartments within the water column with respect to salinity, an overlying rapidly moving low saline water (<25ppt) and an underlying slowly moving dense saline water (>30ppt).

The results of the study are reinforced by the literature of water flow movements in the Bay and indicate that the sub-environment is poorly flushed resulting in stagnant conditions in some areas, particularly the south-western and northern sections of the Bay.

Keywords: Gillian Angella Guthrie; Metal Pollution; Surficial and core sediment; Hunts Bay, Kingston Harbour.