

Baseline Survey of Sediments from Galle Harbor Basin

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Galle Harbor has been operating as one major economic harbor in Sri Lanka since 1873. Long-term contamination of sediments due to harbor operations may pose a great threat to marine biota. Baseline assessment of sediment quality is important to record the sediment state. The aim of the study was to investigate the sediment quality of Galle Harbor basin. Thirteen sediment samples were collected from Galle Harbor with three replicates, covering both inner and outer harbor areas. Air dried samples were sieved using mechanical sieve set and grain size distribution curves were plotted, followed by particle size analysis and coefficient of uniformity (C_u) and coefficient of curvature (C_c) were calculated. Samples were digested in Kjeldhal digestion system and Pb, Ni, Cu, Zn concentrations were determined using Atomic Absorption Spectrometer. The concentration of heavy metals was assessed against the Background Assessment Concentrations (BACs) and Effects Range Low/Effects Range Median (ERL and ERM) concentrations. Sediment organic matter content was determined by using loss on ignition (LOI) method according to the CRIMP protocol. According to the results, all samples were composed of a major portion of silt, very fine sand and fine sand. Sediment particle in all samples, were poorly graded ($C_u < 4$ and $C_c \sim 1$). Zn was the most prominent trace metal in majority of sampling stations. Except Ni in some stations, metals did not exceed the Effective Range Median concentration. Sediment organic matter percentage was not significantly ($P > 0.05$) varied between inner harbor and outer environments and it ranged between $1.6 \pm 0.3\%$ to $41.0 \pm 2.8\%$. According to the standards of US EPA, all sediment samples were in intermediate to high organic carbon levels. Overall results highlighted that the marine environment in Galle Harbor basin is exposed to low and moderate contamination levels of assessed metals and intermediate to high organic matter.

Keywords: Sediments, metal, Organic matter, Galle Harbor