

#### **4.1 Assemblages of macro-invertebrates in the Negombo estuarine ecosystem in relation to the locations of drainage outlets**

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#### **ABSTRACT**

Estuarine ecosystems have long been subjected to industrialisation and urbanisation. It is only recently that the biological functioning of those ecosystems has been studied in relation to anthropogenic threats. The present study was carried out to determine the distribution of macrobenthos in Negombo estuary (7°6' - 7°12' N; 79°49' - 79°53' E), in relation to the drainage outlets of land based activities. Benthic samples were obtained from eight sampling sites subject to pollution resulting due to shrimp farms, hotels, industries, agriculture, municipal drainage and domestic waste. Sampling was done at monthly intervals from April 2005 to January 2006. At each sampling site, line transects which were 200 m in length were laid perpendicular to the shore of the estuary. Triplicate samples of benthos were taken at every 50m intervals throughout the transect using a Peterson grab and location of each point was recorded using a hand held GPS. The macrobenthos were separated by wet sieving and identified as much as possible. Depth, salinity, temperature, pH and dissolved oxygen contents at each sampling site were also measured. The sea grass and mangrove cover at each site were noted and their abundance was recorded using an arbitrary scale.

The diversity and evenness of macrobenthos were determined using Shannon-Wiener and Pielou's index respectively. The similarities among the macrobenthic communities at different sampling points were determined using Bray-Curtis similarity coefficient and ordinations of Non-metric Multidimensional Scaling (MDS). The BIO-ENV function of PRIMER-5 software package (Version 5.2.2) was used to relate the multivariate community structure to environmental variables and to determine the most responsible variables for the inter-site variability of the benthic community. Thirty-eight species of invertebrates were recorded in the macrobenthic community during the present study. Among them were 16 species of polychaetes, 3 species of gastropods, 8 species of bivalves and 11 species of crustaceans. The ranges of salinity, depth, pH and dissolved oxygen content of water were 0 - 35 g/kg, 0.1 - 2.5 m, 6 - 10 and 1 - 9 mg/l respectively. In all sampling sites diversity of macrobenthos was low or zero at the points closer to the drainage outlets. Results of Bray-Curtis similarity coefficient and MDS ordinations of the sampling transects indicated that there were significant relationship between the distribution of macrobenthos and water quality parameters resulting probably due to land based pollution.