

ABSTRACT

Zooplankton Abundance and Community Structure in Kingston Harbour, a Polluted Tropical Embayment.

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The purpose of this study was to investigate the numerical abundance, biomass and distribution of the zooplankton communities of Kingston Harbour as well as provide a new baseline of conditions, the previous study being conducted in the 1970's. Routine sampling was conducted monthly at twenty-four stations in the Harbour from December, 1993 to February, 1995. The abundance and community structure of the zooplankton populations was examined using several indices as well as physical and chemical parameters. These indices were evaluated for their appropriateness in defining the zooplankton communities and characterising water masses. The indices included species composition, abundance and biomass.

A total of seventy-three taxa were identified of which the copepods were most important numerically (thirty-eight species). Mean numbers for the area were high ranging from 3,662 animals m^{-3} in Hunts Bay to 80,464 animals m^{-3} in the Inner Harbour. This maximum value was more than three times the maximum figure reported by Grahame (1976) (25,248 animals m^{-3}). However, like Grahame, maximum numbers were found close to the new airport runway (Station 8). Values for most of the parameters examined were

higher in the Inner Harbour identifying this zone as the most productive in the Harbour. The monthly fluctuation (%C.V.) in abundance at each station was high usually >100%. Biomass values for Kingston Harbour were similarly high (maximum 0.095 gm^{-3}), much higher than previously reported for the area. There was some seasonal variation in the zooplankton communities but it was more significantly displayed by individual species rather than by the overall abundances.

Penilia avirostris although still very important was not the most dominant species (numerically) as reported by Grahame (1976). Instead, *Temora turbinata* was found to be very important in the Upper Basin, *Lucifer faxoni* and *Penilia avirostris* in the Inner Harbour, *Paracalanus crassirostris* in the Outer Harbour and *Acartia tonsa* in Hunts Bay. In fact, these species may be used as indicator of the respective zones. Other important taxa were the Chaetognatha and the Harpacticoida which, although not numerically dominant, displayed a distinct distribution pattern.

It was suggested from the community similarity index (PSC) that there are four zones: Upper Basin (stations 1 to 6), Inner Harbour (stations 7 to 12), Middle Harbour (stations 13, 14, 15 and 17), Outer Harbour (stations 16 and 18 to 23) with the middle zone being a transition zone. Hunts Bay (station 24) was not included in any of these zones.

Based on the zooplankton communities observed in the present study there has been a significant decline in the water quality of Kingston Harbour. The Inner Harbour, Upper Basin and Hunts Bay have all displayed a decline in

water quality since Grahame (1976) while the Outer Harbour has shown marginal improvement in conditions. Hunts Bay is by far in the worst condition exhibiting minimal values of all indices examined.

Although the indices examined could identify different zones or water masses in the Harbour each varied in their ability to indicate the water quality of these zones. PSC and number of species were the best indices for identifying the different zones in the Harbour while number of species in conjunction with the total numbers was the best for determining the water quality of these zones. The number of individual species was also an important index in indicating the water quality of the zones.