

Abstract

The Hamilton Canal is a manmade canal which connects Kelani River mouth with Negombo Estuary and located parallel to the western coast line of Sri Lanka. This canal forms the western boundary of a wetland known as Muthurajawela marsh.

A master plan has been prepared for the development of Muthurajawela marshes together with the Negombo Lagoon. Even though the environmental profile of the entire area was studied, comprehensive data on the status of the water quality in the Hamilton Canal and factors affecting the same are not available. It was recorded that the water which flows through the marsh ultimately reach the Hamilton Canal due to the pattern of drainage in the area. The water exchange between Hamilton Canal and the marsh takes place depending on the daily tidal variations. The implementation of the project will result in variable alteration in the marsh and connected water ways. The present study was initiated to establish baseline data regarding the water quality of Hamilton Canal, so that these can be used as a basis to assess any effect on the water quality after the implementation of the development project.

Seven sampling locations were selected along the canal considering water movement and human activities and selected water quality parameters were studied. The study was carried out for a period of nine months from 14.06.91 to 27.03.92 and eight sampling visits were made. For the purpose of evaluating the effects of spring/neap and daily high/low tides and rainy/dry seasonal effects, sampling dates were selected covering above events.

The results revealed that turbidity, nitrate nitrogen, nitrite nitrogen, phosphate, biochemical oxygen demand and faecal coliform bacteria were significantly higher while salinity, electrical conductivity, and chlorophyll a levels were significantly lower during the rainy season. The reason could be the enrichment and dilution effect of rains. Variations of salinity, turbidity, suspended solids and faecal coliforms along the canal were statistically significant. These variations could be due to the site specific sources ie. human activities and influence of the sea. The spring/neap and daily high/low tidal influence was not clearly evident from the results. This could be due to the specificity of the location of canal.



The differences of the levels in high/low tide samples were studied in the stations where water exchanges with the marsh. The high tide low tide variations of suspended solids and turbidity at station 4 were found to be statistically significant. The reason could be the pollutant absorption and transformation processes in the marsh. Chromium was found in all stations but a concentration gradient was not observed. The level of sewage pollution showed reduction towards the Negombo Lagoon as shown by the reduction of faecal coliforms.

The important relationships among the parameters have been observed when the data were subjected to correlation analysis. Effect of rainfall was evident by the positive correlation with suspended solids and turbidity at station 1. Similarity in enrichment patterns were shown by the positive correlation between phosphates and ammonia. The negative correlation showed by nitrates, nitrites phosphates BOD and faecal coliforms with salinity indicates that the pollution is low when there is sea water intrusion. The biological uptake of nutrients was indicated by the negative correlation of chlorophyll a with nitrites and phosphates.

The results were compared with the proposed Sri Lankan Standards for inland surface waters as well as for coastal waters. Except for faecal coliforms other parameters in general conformed to the minimum water quality standard. Therefore it is clear that the concentrations of pollutants in the Hamilton Canal have not reached the maximum levels. Although the Master Plan proposes proper mitigatory measures, changes in water quality is expected after the project implementation. The data presented in this study will therefore be useful to evaluate the degree of alteration, if any.