

**A STUDY OF THE NEGOMBO LAGOON WITH RESPECT TO THE  
SALINITY VARIATION AND POLLUTION OF THE LAGOON  
WATER AND EFFECTS OF PROPOSED DREDGING ACTIVITIES**

By

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**Master of Science**

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## Abstract

Negombo Lagoon is a shallow basin estuary, located on the West coast of Sri Lanka, serving important functions including fishing and tourism. It drains water carrying nutrients and organic matter from the heavily populated catchment area and has faced the threat of the degradation of water quality. The objectives of this research are to study the seasonal and diurnal variation of salinity in the estuary, study the pollution status of the estuary; study the effects of dredging on the water quality and to recommend remedial measures.

17 sampling locations were selected for the study, which included points in the estuary and fresh water feeders. A Sampling programme of 6 days which covered both wet and dry weather as well as the spring and neap tidal periods was carried out. Salinity, nutrients and COD were measured at the flood and ebb tides.

According to the salinity measurements, in the dry period, the estuary is fully mixed. Stratified conditions occur when the fresh water flow rate increases. Chl *a* measurements were used to assess the trophic state of the estuary and fresh water feeders. The estuary is eutrophicated both in the wet and dry periods and some locations are even hypertrophic. Out of the fresh water feeders, Hamilton canal is mesotrophic and has faced the threat of eutrophication. According to the literature, limiting potential of the tropical estuaries has been found to shift from N to P with higher fresh water flow rates and results of this study agree well with the above finding. Limiting P inflows is a remedial measure to improve the water quality. Where the loads of DIN and TN are concerned, Dandugam-Oya was found to bring the highest loads irrespective of the climatic conditions. Where the Phosphate loads are concerned, Ja-ela brings significant, constant loads on rainy season, while Dandugam-Oya brings the highest load with the highest flow rate. Out of the 7 dredging options studied, option 6 is the most feasible one.



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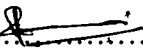


## List of Abbreviations

<b>Abbreviation</b>	<b>Name</b>
<b>BOD</b>	<b>Biochemical Oxygen Demand</b>
<b>CEA</b>	<b>Central Environmental Authority</b>
<b>Chl <i>a</i></b>	<b>Chlorophyll <i>a</i></b>
<b>Chl <i>b</i></b>	<b>Chlorophyll <i>b</i></b>
<b>Chl <i>c</i></b>	<b>Chlorophyll <i>c</i></b>
<b>COD</b>	<b>Chemical Oxygen Demand</b>
<b>DIN</b>	<b>Dissolved Inorganic Nitrogen</b>
<b>DIP</b>	<b>Dissolved Inorganic phosphorus</b>
<b>DON</b>	<b>Dissolved Organic Nitrogen</b>
<b>DOP</b>	<b>Dissolved Organic Phosphorus</b>
<b>HDPE</b>	<b>High Density Poly Ethylene</b>
<b>IRMP</b>	<b>Integrated Resource Management Programme</b>
<b>LHI</b>	<b>Lanka Hydraulic Institute</b>
<b>N</b>	<b>Nitrogen</b>
<b>P</b>	<b>Phosphorus</b>
<b>PON</b>	<b>Particulate Organic Nitrogen</b>
<b>POP</b>	<b>Particulate Organic Phosphorus</b>
<b>PP</b>	<b>Particulate Phosphorus</b>
<b>SD</b>	<b>Secchi Depth</b>
<b>SE</b>	<b>Standard Error</b>
<b>TN</b>	<b>Total Nitrogen</b>
<b>TP</b>	<b>Total Phosphorus</b>
<b>UOM</b>	<b>University of Moratuwa</b>

## Declaration

This thesis is a report of research work carried out in the department of Civil engineering, University of Moratuwa, Sri Lanka, between February 2002 and April 2003. The work included in the thesis in part or whole has not been submitted for any other academic qualification at any institution.

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