

**A comparative study of plankton composition and water
quality of coastal waters in some selected coastal locations of
Sri Lanka**

By

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Thesis submitted to the University of Sri Jayewardenepura as a partial
requirement for the award of the degree of Master of Science in Fisheries
and Aquatic Resources Management

Memorandum

The work described in this thesis was carried out by me under the supervision of Dr. Ajantha de Alwis and a report on this has not been submitted to any University for another degree

.....

Date

A handwritten signature in blue ink, appearing to read 'P. Dissanayake', written over a dotted line.

(Dissanayake D.M.P.S)

Certification

“ We certify that the work of Dissanayake D.M.P.S on “a comparative study on plankton composition and water quality of coastal waters in some selected coastal locations of Sri Lanka” was carried out for the degree of M.Sc. in the Faculty of Science at the University of Sri Jayewardenepura. ”

We feel that the candidate’s work is complete and suitable for submitting to the University for the purpose of evaluation.

Date: 30.09.2009

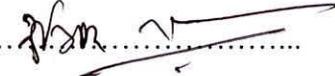

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List of Abbreviations

- APHA - American Public Health Association
- BOD - Biological Oxygen Demand
- COD - Chemical Oxygen Demand
- DO - Dissolved Oxygen
- EC - Electrical Conductivity
- FC - Faecal Coliform
- GPS - Geographical Positioning System
- H' - Shannon Weiner's Diversity Index
- MPN - Most Probable Number
- NTU - Nephelometric Turbidity Unit
- TC - Total Coliform
- TN - Total Nitrogen
- TP - Total Phosphate
- TSS - Total suspended solids

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considered as the main source of pollution in the Negombo site. The latter (Negombo) has been a long identified site with views pertaining to polluting for which remedies are already sought. As for the other sites, sources of pollutants, particularly, the sources of organic pollution have to be identified through further observations.

Chapter 1

Introduction

Pollution in its wider perspective could be interpreted in many different ways. The National Environmental Act of 1980 defines pollution as “Any direct or indirect alteration of the physical, thermal, chemical, biological or radioactive properties of any part of the environment by the discharge, emission or the deposit of wastes so as to affect any beneficial use adversely or to cause a condition which is hazardous to public health, safety or welfare of animals, birds, wildlife, aquatic life or to plants of every description.”

The problems of water pollution in Sri Lanka’s coastal region have been growing over the past few decades. Ocean waters, coastal surface waters- comprising rivers, streams, estuaries and lagoons and ground water in coastal areas receive high pollution loads from development activities and human settlements located in and outside the Coastal Zone. The main factors underline water pollution in the coastal region is the high human population densities particularly in the areas where industrial and tourism related activities are predominant. Coastal waters are polluted mainly due to the release of untreated or partially treated wastewater and toxic substances from industries, tourist resorts and shrimp farms, the dumping of solid waste in coastal areas, the receipt of raw sewage and contamination with waste oil released from fishing boats, ships, coastal service stations and oil spills. These waters also receive fertilizer and agro-chemical run-off from agricultural lands, and waste from squatter settlements and other domestic sources. The amount and type of pollution is site specific. For example, the Lunawa Lagoon has been severely affected by industrial effluents. The Negombo estuary has been affected due to industrial effluents, sewage, oil from fishing crafts, boat repair

stations and fuel supply stations along the bank; the Kelani estuary is polluted with industrial effluents and sewage; and the Valaichchenai and Walawa Ganga estuaries are polluted due to wastes received from state owned paper factories (Anon, 2009).

The impacts of pollution on the coastal and marine ecosystems and their resultant biological as well as socio-economic implications are many and varied. There are strong indications that the cost of coastal water pollution in Sri Lanka is on the rise. For example, the cost to human health from coastal water pollution in the Colombo Metropolitan Area is estimated to have increased from SLRs. 2 million in 1992, to SLRs. 4 million in 1997 and SLRs. 14 million in 2002 respectively (MOFE, 2001). There are also losses associated with decreased biological diversity, reduced aesthetic, recreational, cultural and archaeological value; declining land prices and reduced revenue from tourism, fisheries and other development activities. There are also some definite links between increasing levels of pollution and loss of coastal land values and fishery productivity. For example, the estimated annual loss of income from fish sales in the Lunawa lagoon due to pollution is approximately SLRs 1,963 million and the total annual land value decline in the area is estimated to be SLRs 712 million (UDA,1992b;UDA, 1994a). These factors emphasize the point that the benefits expected from coastal waters in Sri Lanka are substantial, thus reducing water pollution in the coastal region is of paramount importance. This calls for an urgent sustainable pollution management programme and monitoring the water quality parameters and identification of a suitable indicator to determine the level of pollution have been identified as priorities in such a programme.