



Second National Symposium on Marine Environment

Proceedings



Blue Ocean Blooms Blue Economy

18th -19th November 2015 at Sri Lanka Foundation



Marine Environment Protection Authority

(Ministry of Mahaweli Development and Environment)

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Published by :

Marine Environment Protection Authority,

No. 758, Baseline Road,

Colombo 09, Sri Lanka.

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Second National Symposium on Marine Environment, Proceedings – 2015

ISBN 978-955-4826-02-1

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Assessment of water quality and pollution level at Kakaithivu Lagoon of Jaffna District, Northern Sri Lanka

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Abstract

The present study was carried out to investigate the water quality and pollution levels at Kakaithivu Lagoon of Jaffna district. Water samples were collected from 8 locations of the Kakaithivu Lagoon. Monthly samplings were made from October 2012 to March 2013 at different depths from ½ to 6½ Feet. The physicochemical and biological parameters for collected water samples were tested using standard methods. Temperature varied from 27 to 30 °C ($28.13 \pm 0.96^\circ\text{C}$), pH from 7.07 to 8.83 (7.99 ± 0.43), Electrical conductivity from 41900 to 68100 ($56435.42 \pm 7470.30 \mu\text{scm}^{-1}$), salinity from 25 to 40 ($33.67 \pm 5.43\text{ppt}$) and turbidity from 3.2 to 8.42 ($4.61 \pm 1.83 \text{NTU}$). The results obtained were compared with the general coastal water quality standards as per the literature. The Kakaithivu Lagoon water characterized significantly low amount of dissolved oxygen (1.3 to 3.9; $2.68 \pm 0.74 \text{mgL}^{-1}$), high amount of total dissolved solids (26816 - 43584; $36118.67 \pm 4780.99 \text{mgL}^{-1}$), high biological oxygen demand (2 - 21; $7.2 \pm 4.7 \text{mgL}^{-1}$), high phosphate (from undetermined to 5.01; $2.78 \pm 1.72 \text{mgL}^{-1}$) and high nitrates (6.00 - 14.00; $8.85 \pm 2.48 \text{mgL}^{-1}$), indicating nutrient pollution. Biological oxygen demand exceeded the recommended quality standard. MPN value of faecal coliforms (04 - 92; $26.88 \pm 25.55 \text{MPN}/100\text{ml}$) exceeded the recommended standards. The total

Dissolved solids, turbidity, phosphate content and fecal coliform were significantly different ($P < 0.05$) among the 8 locations throughout the study period. Dissolve oxygen and Biological oxygen demand were not significantly ($P > 0.05$) varied among the locations in the month of October and December while significantly different ($P < 0.05$) across the locations during the month of January, February and March. Nitrate content not varied significantly ($P > 0.05$) across the locations during the month of October and significantly varied ($P < 0.05$) across the locations during the month of November, December, January, February and March. Results of the present study revealed that the water quality of the Kaikaithivu Lagoon impacted by nutrient pollution and microbial contamination. Therefore awareness among the public has to be made and appropriate remedial measures has to be implemented to restore the present situation at the Kaikaithivu lagoon.

Key words : *Biological Oxygen Demand, Fecal coliforms, Jaffna, Kaikaithivu Lagoon, Nutrient Pollution*