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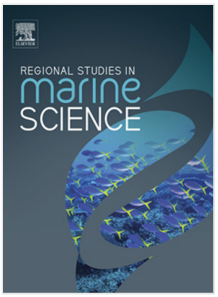

Ecosystem analysis of the degrading Vembanad wetland ecosystem, the largest Ramsar site on south west coast of India – Measures for its sustainable management

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PII: S2352-4855(16)30099-8
DOI: http://dx.doi.org/10.1016/j.rsma.2016.06.003
Reference: RSMA 149

To appear in: *Regional Studies in Marine Science*

Received date: 15 December 2015
Revised date: 15 June 2016
Accepted date: 16 June 2016

Please cite this article as: Asha, C.V., Retina, I.C., Suson, P.S., Nandan, S.B., Ecosystem analysis of the degrading Vembanad wetland ecosystem, the largest Ramsar site on south west coast of India – Measures for its sustainable management. *Regional Studies in Marine Science* (2016), http://dx.doi.org/10.1016/j.rsma.2016.06.003

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Ecosystem analysis of the degrading Vembanad wetland ecosystem, the largest Ramsar site on south west coast of India – Measures for its sustainable management

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Abstract

Vembanad wetland ecosystem- the largest Ramsar site on the south west coast of India, located in the most populous coastal segments of Kerala, serves as the rice bowl of the state that forms a major hotspot of biological diversity. Alterations in natural hydrologic regime of Vembanad wetland started with the commissioning of Thanneermukkom barrage (TMB) across the backwater system in 1976, to prevent saline water intrusion, which adversely affected the eco-biology of the water body. The study was conducted during March 2011 to February 2012 on a monthly basis to evaluate the eco-hydrological status of this multifunctional ecosystem. Reclamation of estuarine areas for agriculture and other interventions has led to drastic decline in water holding capacity (2.4 km^3 to 0.6km^3) and depth (av. 4.02m) of the estuary over the years. Water quality on an average reflects a neutral (7.11) and well oxygenated (7.4 mg/l) nature; the salinity varying from 0.01 to 31.8 ppt. TMB plays a crucial role in influencing the salinity pattern of Vembanad wetland; with an oligohaline (0.5-5 ppt) in southern whereas meso and polyhaline (5-18 ppt) condition prevailing in northern stations. The estuary is nutrient rich with nitrate-nitrogen and phosphate-phosphorus ranging between 0.05 – 5.9 µmol/l and 0.13 – 6.49 µmol/l respectively. Trophic index (TRIX value 6.39 ± 0.75) indicated an impacted water quality condition leading to an accelerated eutrophication in the system. Bacillariophyceae (83.55%), Chlorophyceae (8.98%), Cyanophyceae (6.92%) and Zygnemophyceae (0.55%) were the major phytoplankton. Zooplankton community was composed of calanoids (63%), rotifers (22.5%), copepodites (2%), amphipoda (2%), crustacean naupli (1.5%) and cladocerans (1.2%) showing a declining trend in post barrage phase. Benthic polychaetes like Spinonidae and Capitilidae were opportunistic bio-indicators of organic enrichment. Decline in fishery diversity and production (4387.31 t), reflects considerable ecological impacts on lower trophic levels. Thus the study presents an over view on a degrading coastal wetland system of India and signifies the need for enhanced restoration programmes for long term management and conservation objectives.

Key words: Vembanad estuary, Ramsar Site, Thanneermukkom barrage, Ecological degradation.

1. Introduction

Estuaries are facing threats of degradation from multiple human impacts such as sewage discharge, pollution from pesticides, fertilizers and municipal wastes, conversion of land for agriculture, land reclamation for tourism activities etc. As the carbon flux between terrestrial and

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