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Vertical Distribution and Flux of Nutrients in the Sediments of the Mangrove Reclamation Region of Muara Angke Kapuk, Jakarta

Anna Ida Sunaryo Purwiyanto^{1*}, Tri Prartono², and Alan Frendy Kropitan²

1. Department of Marine Science, Faculty of Mathematics and Natural Sciences, Universitas Sriwijaya, Palembang 30662, Indonesia

2. Department of Marine Sciences and Technology, Faculty of Fisheries Marine Sciences, Institut Pertanian Bogor, Bogor 16680, Indonesia

*E-mail: anna_ida_sunaryo@mipa.uinsri.ac.id

Abstract

The reclaimed mangrove estuary in Muara Angke Kapuk is a reclaimed area that has not evaded the impacted of pollution and waste in the areas surrounding Cengkareng, Jakarta. This is apparent from the fact that almost all sediments under the mangrove trees are buried under heaps of plastic trash. However, the reclaimed region still has variety of organism, which indicating that the region still has an internal carrying capacity, especially nutrients from sediment. The purpose of this research was to examine the condition of sediment nutrients in this mangrove reclamation region. The research was conducted by taking water samples using a modification of the stratified cup at a sediment depth of 0-15 cm with depth intervals of 2.5 cm, and taking sediment samples using the sediment ring. Pore water samples were measured for dissolved oxygen (DO) and concentrations of ammonia, nitrite, nitrate, and phosphate. Sediment samples were used to obtain porosity values. The data obtained is used to make vertical concentration profiles and analysis of vertical nutrient flux. Vertical nutrient flux analysis was performed with the aid of QUAL2K software version 2.11. The results showed different vertical distributions and flux of nutrients, where *influx* for ammonia and phosphate and an increase in line with increasing sediment depth, while nitrate *efflux* and a decreased concentration. The flux calculation of nitrite as transitory nutrient was not done, but the concentration decreased after a depth of 2.5 cm. This indicates that the high contamination on the surface does not prevent the natural chemical processes so the reclaimed region can still provide nutritional support for its organism.

Abstrak

Distribusi Vertikal dan Fluks Nutrien pada Sedimen Mangrove di Kawasan Reklamasi Muara Angke Kapuk, Jakarta. Kawasan reklamasi mangrove Muara Angke Kapuk merupakan kawasan reklamasi yang tidak lepas dari imbas pencemaran sampah dan limbah di sekitar Cengkareng, Jakarta. Hal tersebut terlihat dari hampir seluruh sedimen yang berada di bawah pohon mangrove tertutup oleh timbunan plastik. Meski demikian, kawasan reklamasi ini masih memiliki beragam biota, sehingga diduga lingkungan ini masih memiliki daya dukung internal, terutama nutrien dari sedimen. Tujuan penelitian adalah mengkaji kondisi nutrien pada sedimen kawasan reklamasi mangrove. Penelitian ini dilakukan dengan mengambil sampel air poros menggunakan modifikasi cawan berlingkat pada kedalaman sedimen 0-15 cm dengan interval kedalaman 2,5 cm, serta sampel sedimen dengan menggunakan ring tanah. Sampel air poros diukur Dissolve Oxygen (DO) dan konsentrasi amoniak, nitrit, nitrat, dan fosfat. Sampel sedimen digunakan untuk memperoleh nilai porositas. Data yang diperoleh digunakan dalam pembuatan profil konsentrasi secara vertikal, analisis fluks nutrien vertikal. Analisis fluks nutrien secara vertikal dilakukan dengan bantuan *software* QUAL2K version 2.11. Hasil penelitian menunjukkan distribusi vertikal dan fluks nutrien yang berbeda-beda, di mana amoniak dan fosfat mengalami *influx* dan peningkatan seiring dengan bertambahnya kedalaman sedimen, sedangkan nitrat mengalami *efflux* dan penurunan konsentrasi. Penghitungan fluks nitrit yang merupakan nutrien peralihan tidak dilakukan, namun konsentrasinya mengalami penurunan setelah kedalaman 2,5 cm. Hal tersebut mengindikasikan bahwa tingginya pencemaran di permukaan tidak menghalangi proses kimia alami sehingga kawasan reklamasi tersebut masih dapat memberi dukungan nutrisi bagi biota.

Keywords: fluxes, Muara Angke Kapuk, nutrient, porewater, sediment

1. Introduction

The mangrove ecosystem in the reclaimed region of Muara Angke Kapuk is an ecosystem which located at

the estuary of the Cengkareng channel. Although it is a reclaimed area, the ecosystem is cant be seperated from the wide range of external environmental pressures, especially pollution and waste from factories around

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