

KARAKTERISTIK EKOSISTEM MANGROVE PADA KAWASAN TERUSIK DI KAWASAN HUTAN MANGROVE OELUA, PULAU ROTE

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INTISARI

Ekosistem mangrove berperan penting dalam menjaga stabilitas pesisir dan keanekaragaman hayati di pulau-pulau kecil, namun semakin tertekan oleh aktivitas manusia. Penelitian ini bertujuan mendeskripsikan karakteristik habitat mangrove di Kawasan Hutan Mangrove Oelua pada kawasan terdampak antropogenik dan kawasan referensi, mengidentifikasi perbedaan karakteristik ekosistem antara keduanya, serta menentukan variabel lingkungan yang menjelaskan variasi komposisi komunitas vegetasi, plankton, dan makrobentos. Penelitian menggunakan desain komparatif dengan pendekatan *Impact-Reference*. Data vegetasi, plankton, dan makrobentos dianalisis melalui kombinasi uji univariat dan multivariat, termasuk ordinasi NMDS, PERMANOVA, PERMDISP, dan *Canonical Correspondence Analysis* (CCA) untuk menilai peran variabel lingkungan sebagai filter ekologis.

Hasil penelitian menunjukkan adanya dua kondisi habitat mangrove yang kontras di Oelua. Habitat referensi mempertahankan karakter muara alami dengan sedimen lumpur yang dalam dan fluktuasi salinitas yang berperan sebagai filter lingkungan, sedangkan kawasan terdampak antropogenik mengalami pendangkalan dan perubahan substrat akibat aktivitas pemanfaatan. Perubahan fisik ini berdampak pada seluruh komponen biotik, ditandai oleh hilangnya vegetasi zona distal, penurunan kepadatan plankton, dan dominasi makrobentos oleh spesies toleran terhadap gangguan.

Pada tingkat komunitas, plankton merespons perubahan lingkungan melalui pergantian spesies, vegetasi mangrove mengalami penyederhanaan struktur dan fragmentasi zonasi, sementara makrobentos menunjukkan kecenderungan homogenisasi biotik. Analisis lingkungan menunjukkan bahwa ketebalan lumpur dan salinitas berperan penting dalam membentuk keragaman vegetasi, sedangkan plankton lebih dipengaruhi oleh kondisi perairan dan makrobentos oleh faktor mikrohabitat. Secara keseluruhan, tekanan antropogenik menyebabkan penyederhanaan struktur ekosistem dan melemahkan fungsi ekologis mangrove di Hutan Mangrove Oelua, menegaskan perlunya pengelolaan mangrove berbasis ekologi di pulau-pulau kecil.

Kata Kunci: Ekosistem mangrove, Dampak antropogenik, Beta Diversitas, Filter Lingkungan, *Impact-Reference*.

CHARACTERISTICS OF MANGROVE ECOSYSTEMS IN DISTURBED AREAS OF THE OELUA MANGROVE FOREST, ROTE ISLAND

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ABSTRACT

Mangrove ecosystems play a crucial role in maintaining coastal stability and biodiversity on small islands, yet they are increasingly under pressure from human activities. This study aims to describe the characteristics of mangrove habitats in the Oelua Mangrove Forest in both anthropogenically impacted and reference areas, to identify differences in ecosystem characteristics between the two, and to determine the environmental variables that explain variation in the composition of vegetation, plankton, and macrobenthos communities. The study employed a comparative design using an Impact–Reference approach. Vegetation, plankton, and macrobenthos data were analyzed using a combination of univariate and multivariate methods, including NMDS ordination, PERMANOVA, PERMDISP, and Canonical Correspondence Analysis (CCA) to assess the role of environmental variables as ecological filters.

The results revealed two contrasting mangrove habitat conditions in Oelua. The reference area retains the characteristics of a natural estuarine system with deep muddy sediments and wide salinity fluctuations acting as environmental filters, whereas the anthropogenically impacted area has experienced sediment shallowing and substrate modification due to human use. These physical changes affect all biotic components, as indicated by the loss of distal-zone vegetation, reduced plankton abundance, and the dominance of disturbance-tolerant macrobenthos species.

At the community level, plankton responded to environmental change through species turnover, mangrove vegetation exhibited structural simplification and zonation fragmentation, and macrobenthos showed a tendency toward biotic homogenization. Environmental analyses indicated that sediment thickness and salinity play key roles in shaping mangrove vegetation diversity, while plankton is more strongly influenced by water quality conditions and macrobenthos by microhabitat factors. Overall, anthropogenic pressure has simplified ecosystem structure and weakened ecological functions in the Oelua Mangrove Forest, underscoring the need for ecologically based mangrove management on small islands.

Keywords: Mangrove ecosystem, Anthropogenic impact, Beta Diversity, Environmental Filtering, Impact-Reference.