

Mutiara Artasasi NIM. 220341100086. Distribusi Spasial Habitat Bentik Menggunakan Citra Sentinel-2A Di Perairan Pulau Poteran, Kabupaten Sumenep. Dibawah bimbingan **Herlambang Aulia Rachman, M.Si**

ABSTRAK

Indonesia memiliki potensi ekosistem pesisir dan laut yang sangat tinggi dengan keanekaragaman hayati yang melimpah, namun wilayah ini rentan terhadap ancaman abrasi dan erosi akibat dinamika gelombang laut. Untuk menjaga keberlanjutan habitat bentik di wilayah pulau kecil, diperlukan pemantauan berupa pemetaan spasial guna meminimalkan tingkat kerentanan lingkungan tersebut. Pulau Poteran di Kabupaten Sumenep menjadi wilayah pengamatan yang relevan karena karakteristiknya sebagai pulau kecil dengan perairan dangkal (*Shallow water*) yang dikelilingi ekosistem penting. Penelitian ini menerapkan metode klasifikasi citra Sentinel-2A berbasis piksel (*pixel-based*) menggunakan algoritma *Random Forest* (RF) dan *Support Vector Machine* (SVM) untuk memetakan sebaran habitat bentik di perairan Pulau Poteran serta diikuti uji keakuratan menggunakan *confusion matrix* dan kappa. Hasil data citra menggunakan citra *masking* dan terkoreksi kolom air (DII) dengan akurasi yakni citra *Masking*-RF OA 69,81% dengan kappa 53,54%, DII-RF akurasi OA 66,51% kappa 49,27%, *Masking*-SVM 64,15% nilai kappa 46,74%, DII-SVM nilai OA 64,15% dan kappa 25,72% . Hasil akurasi yang didapatkan bahwa berdasarkan klasifikasi tingkat kesepatakn pulau poteran berada pada kriteria *moderate* (Sedang) - *substantial* (Baik).

Kata Kunci : Pulau Poteran, Habitat Bentik, Sentinel-2A, Koreksi Kolom Air, *Random Forest*, *Support Vector Machine*.

ABSTRACT

Indonesia possesses immense coastal and marine ecosystem potential characterized by rich biodiversity; however, these regions remain highly vulnerable to environmental hazards such as abrasion and erosion driven by ocean wave dynamics. To ensure the sustainability of benthic habitats in small island environments, spatial mapping-based monitoring is essential to mitigate coastal vulnerability. Poteran Island in Sumenep Regency serves as a critical study area due to its characteristics as a small island with shallow waters surrounded by vital marine ecosystems. This study applies a pixel-based classification method on Sentinel-2A imagery using Random Forest (RF) and Support Vector Machine (SVM) algorithms to map benthic habitat distribution, followed by accuracy assessments using a confusion matrix and Kappa analysis. The classification was evaluated across masked imagery and water column-corrected imagery using the Depth Invariant Index (DII). The results demonstrated that the Masking-RF model yielded the highest accuracy with an Overall Accuracy (OA) of 69.81% and a Kappa coefficient of 53.54%, followed by DII-RF (OA: 66.51%, Kappa: 49.27%), Masking-SVM (OA: 64.15%, Kappa: 46.74%), and DII-SVM (OA: 64.15%, Kappa: 25.72%). Based on these findings, the classification performance for mapping Poteran Island's benthic habitats falls within the moderate-to-substantial agreement criteria.

Keywords: Poteran Island, .Benthic habitat, Sentinel-2A, Depth Invariant Index, Random Forest, Support Vector Machine