

ANALISIS SPASIO-TEMPORAL MORFOLOGI DASAR LAUT DI PERAIRAN TELUK PANGPANG KABUPATEN BANYUWANGI

Oleh:

Yadug Restuaji

21/473548/GE/09480

INTISARI

Teluk Pangpang merupakan kawasan konservasi dan budidaya perikanan yang terletak di Kabupaten Banyuwangi. Pemantauan fungsi kawasan melalui dinamika morfologi dasar laut dengan data batimetri. Studi morfologi dasar laut perlu diperdalam untuk mendukung pengelolaan pesisir, khususnya di Teluk Pangpang. Penelitian ini bertujuan menemukenali perubahan spasio-temporal batimetri perairan Teluk Pangpang tahun 1984, 2021, dan 2024 dan memetakan sebaran spasial klasifikasi morfologi dasar laut di perairan Teluk Pangpang tahun 2024. Data yang digunakan berasal dari peta laut dan survei batimetri. Perubahan batimetri dianalisis dengan interpolasi spasial untuk membentuk model 3D, kemudian dibandingkan kondisi sebelum dan sesudah dengan *cut and fill*, transek melintang, dan deteksi perubahan kedalaman. Pemetaan dilakukan dengan skala umum dan detail dengan mengacu klasifikasi morfologi dasar laut dari International Hydrographic Association dan Dove dkk (2020). Hasil perubahan volume menunjukkan sedimentasi periode 1984—2021 lebih tinggi $580.630,07 \pm 91.551,20$ m³ dibandingkan periode 2021—2024, sementara erosi periode 2021—2024 lebih banyak sebesar $6.811.950,01 \pm 372.259,48$ m³ dari periode 1984—2021. Perlu dicatat bahwa nilai perubahan volume material tidak terlalu akurat karena adanya perbedaan skala data. Asumsi apabila skala data sama, maka keberadaan jaringan sungai yang lebih rapat dan kawasan mangrove yang lebih luas di bagian barat berpotensi menyuplai dan menahan sedimen lebih banyak di bagian barat. Proses sedimentasi di bagian barat mengakibatkan penyempitan, kecepatan dan turbulensi arus berpotensi menggerus di sisi timur hingga membentuk lembah “V”. Hasil



pemetaan sebaran spasial klasifikasi morfologi dasar laut secara umum menghasilkan morfologi *plane*, *slope*, dan *escarpment*. Klasifikasi morfologi secara detail menghasilkan morfologi *plane*, *slope*, *escarpment*, *break in slope*, *bank*, *sill*, *depression*, dan *gully*. Kenampakan unit morfologi dasar laut di perairan Teluk Pangpang menunjukkan adanya perbedaan bentuk dan ukuran yang lebih kecil.

Kata Kunci: Morfologi Dasar Laut, Batimetri, Erosi, Sedimentasi, Interpolasi Spasial

SPATIO-TEMPORAL ANALYSIS OF SEABED MORPHOLOGY IN PANGPANG BAY BANYUWANGI REGENCY

By:

Yadug Restuaji

21/473548/GE/09480

ABSTRACT

Pangpang Bay is a conservation and aquaculture area located in Banyuwangi Regency. Monitoring the functional dynamics of this area can be carried out through seabed morphology using bathymetric data. A more in-depth study of seabed morphology is needed to support coastal management, particularly in Pangpang Bay. This study aims to identify the spatio-temporal changes in bathymetry of Pangpang Bay waters in 1984, 2021, and 2024, and to map the spatial distribution of seabed morphology classification in 2024. The data used were obtained from nautical charts and bathymetric surveys. Bathymetric changes were analyzed using spatial interpolation to construct a 3D model, followed by comparison of pre- and post-conditions using cut and fill analysis, cross-sectional transects, and depth change detection. Mapping was conducted at both general and detailed scales, referring to seabed morphology classification by the International Hydrographic Association and Dove et al. (2020).

The results of volume change analysis show that sedimentation during the 1984–2021 period was $580,630.07 \pm 91,551.20 \text{ m}^3$ greater than that of the 2021–2024 period, while erosion in the 2021–2024 period was $6,811,950.01 \pm 372,259.48 \text{ m}^3$ greater than that of 1984–2021. It should be noted that the accuracy of volume change values is limited due to differences in data scale. Assuming the data scales are consistent, the denser river networks and wider mangrove areas in the western part likely contribute to greater sediment supply and retention. Sedimentation in the west has led to channel narrowing, and the increase in current velocity and turbulence may have triggered erosion on the eastern side, resulting in the formation



of a “V”-shaped valley. General-scale mapping of seabed morphology revealed the presence of plane, slope, and escarpment types, while detailed classification identified plane, slope, escarpment, break in slope, bank, sill, depression, and gully. The seabed morphological units in the waters of Pangpang Bay exhibit variations in form and smaller-scale dimensions.

Kata Kunci: Seabed Morphology, Bathymetry, Erosion, Sedimentation, Spatial interpolation