

RINGKASAN

MIFTAKHUL MAGHFIROH. Hubungan Kandungan Karbon pada Sedimen Ekosistem Lamun di Perairan Desa Pengudang terhadap Ukuran Butir Sedimen dan Biomassa Lamun. Dibimbing oleh WINNY RETNA MELANI dan TRI APRIADI.

Ekosistem lamun berperan penting dalam menjaga keseimbangan ekosistem pesisir serta berfungsi sebagai penyerap dan penyimpan karbon (*blue carbon*). Perairan Desa Pengudang di Pulau Bintan memiliki padang lamun yang cukup luas, namun mengalami tekanan akibat aktivitas antropogenik yang berpotensi memengaruhi kondisi lamun dan karakteristik sedimen. Kandungan karbon sedimen diduga berhubungan dengan ukuran butir dan biomassa lamun. Penelitian ini bertujuan mengukur biomassa lamun, mengidentifikasi ukuran butir dan kandungan karbon sedimen, serta menganalisis hubungan antara kandungan karbon sedimen dengan ukuran butir sedimen dan biomassa lamun di Perairan Desa Pengudang. Penelitian dilaksanakan pada bulan Juli 2025 hingga Juni 2026 di Perairan Desa Pengudang, Kabupaten Bintan. Metode yang digunakan adalah metode survei dengan teknik *systematic random sampling*. Lokasi penelitian ditentukan secara *purposive sampling* berdasarkan keberadaan habitat lamun yang diinterpretasikan dari peta dan kemudahan akses. Area 1 dan Area 2 memiliki sebaran lamun yang lebih luas, sedangkan Area 3 dan Area 4 memiliki sebaran yang lebih terbatas. Alat dan bahan yang digunakan meliputi transek kuadrat $0,5 \times 0,5$ m, oven, *furnace*, *sieve net*, GPS, timbangan, serta sampel lamun dan sedimen. Biomassa lamun dianalisis menggunakan metode berat kering, ukuran butir sedimen menggunakan metode pengayakan, karbon sedimen menggunakan metode *Loss on Ignition* (LOI), dan hubungan antarvariabel dianalisis menggunakan uji korelasi Spearman. Hasil penelitian menunjukkan bahwa biomassa lamun tertinggi terdapat pada Area 2 sebesar 427,05 gr/m² dan terendah pada Area 4 sebesar 78,42 gr/m². Ukuran butir sedimen pada seluruh area didominasi oleh fraksi pasir, dengan dominasi pasir sedang pada Area 1 (38,30%), Area 2 (35,38%), dan Area 3 (34,24%), sedangkan Area 4 didominasi oleh pasir sangat halus (45,12%). Kandungan karbon sedimen tertinggi ditemukan pada Area 4 sebesar 7,03% dan terendah pada Area 2 sebesar 0,97%. Hasil uji korelasi menunjukkan bahwa karbon sedimen umumnya memiliki hubungan lemah dengan ukuran butir sedimen dan biomassa lamun. Hubungan yang signifikan hanya ditemukan antara karbon sedimen dengan fraksi kerikil sangat halus pada Area 1 serta lanau sangat kasar pada Area 2. Biomassa lamun tidak menunjukkan hubungan yang signifikan dengan karbon sedimen, sehingga variasi karbon sedimen lebih dipengaruhi oleh karakteristik ukuran butir sedimen dibandingkan biomassa lamun.

Kata kunci: Biomassa lamun, Karbon sedimen, Pengudang, Ukuran butir sedimen

SUMMARY

MIFTAKHUL MAGHFIROH. The Relationship Between Carbon Content in Seagrass Ecosystem Sediments in the Waters off Pengudang Village and Sediment Grain Size and Seagrass Biomass. Supervised by WINNY RETNA MELANI and TRI APRIADI.

Seagrass ecosystems play an important role in maintaining the balance of coastal ecosystems and serve as significant blue carbon sinks. The waters of Pengudang Village, Bintan Island, support extensive seagrass meadows but are subject to anthropogenic pressures that may affect seagrass conditions and sediment characteristics. Sediment carbon content is presumed to be related to sediment grain size and seagrass biomass. This study aimed to measure seagrass biomass, identify sediment grain size and sediment carbon content, and analyze the relationship between sediment carbon content, sediment grain size, and seagrass biomass in the waters of Pengudang Village. The study was conducted from July 2025 to June 2026 in the waters of Pengudang Village, Bintan Regency. A survey method combined with a systematic random sampling technique was employed. Sampling locations were selected using purposive sampling based on the distribution of seagrass habitats interpreted from maps and site accessibility. Areas 1 and 2 had relatively wider seagrass distribution, whereas Areas 3 and 4 had more limited distribution. The equipment and materials used included 0.5×0.5 m quadrats, an oven, a furnace, a sieve net, a GPS, a balance, and seagrass and sediment samples. Seagrass biomass was determined using the dry weight method, sediment grain size was analyzed by sieve analysis, sediment carbon content was measured using the Loss on Ignition (LOI) method, and the relationships among variables were analyzed using Spearman's correlation test. The results showed that the highest seagrass biomass was recorded in Area 2 (427.05 g/m^2), while the lowest was found in Area 4 (78.42 g/m^2). Sediments in all study areas were dominated by sand fractions, with medium sand dominating Areas 1 (38.30%), 2 (35.38%), and 3 (34.24%), whereas Area 4 was dominated by very fine sand (45.12%). The highest sediment carbon content was recorded in Area 4 (7.03%), while the lowest was found in Area 2 (0.97%). Spearman's correlation analysis indicated that sediment carbon generally had weak relationships with sediment grain size and seagrass biomass. Significant correlations were only observed between sediment carbon and very fine gravel in Area 1 and very coarse silt in Area 2. Seagrass biomass showed no significant relationship with sediment carbon across all study areas, indicating that variations in sediment carbon were more strongly influenced by sediment grain size characteristics than by seagrass biomass.

Keywords: Pengudang, Seagrass Biomass, Sediment Carbon, Sediment Grain Size