RINGKASAN

DEVI DWI AGUSTINA. Hubungan Konsentrasi Fosfat di Air dan Sedimen terhadap Kerapatan Lamun di Perairan Desa Pengudang. Dibimbing oleh TRI APRIADI dan WINNY RETNA MELANI.

Ekosistem lamun di Perairan Desa Pengudang memiliki peran penting dalam menjaga keseimbangan ekosistem pesisir, antara lain sebagai habitat biota laut dan penstabil sedimen. Namun kondisi ekosistem lamun di wilayah ini menunjukan adanya indikasi penurunan yang diduga berkaitan dengan pengaruh aktivitas antropogenik seperti pembuangan limbah cair domestik, aktivitas perikanan, dan transportasi laut yang berpotensi meningkatkan masukan nutrien, khususnya fosfat. Penelitian ini bertujuan untuk mengetahui konsentrasi fosfat di air dan sedimen, kerapatan lamun, komponen utama yang memengaruhi kerapatan lamun, serta hubungan antara konsentrasi fosfat air dan fosfat sedimen dengan kerapatan lamun. Penelitian dilaksanakan pada bulan Juli-Desember 2025 di Perairan Desa Pengudang, Kabupaten Bintan. Metode penelitian menggunakan survei lapangan dengan teknik systematic random sampling yang dibagi ke dalam empat area pengamatan berdasarkan variasi kondisi habitat lamun. Area 1 dan 2 mewakili hamparan lamun yang luas dengan tekanan antropogenik rendah, sedangkan Area 3 dan 4 mewakili hamparan lamun yang lebih terbatas dan dipengaruhi aktivitas masyarakat pesisir. Alat yang digunakan meliputi GPS, *water quality sampler*, DO meter, transek kuadran 0,5 x 0,5 m, turbidimeter, sekop kecil, dan *sieve net*, sedangkan bahan berupa sampel air dan sedimen. Analisis fosfat dilakukan dengan metode *spektrofotometri*, sedangkan ukuran butir sedimen dianalisis menggunakan *sieve net*. Data dianalisis menggunakan *Principal Component Analysis* (PCA) dan uji korelasi. Hasil penelitian menunjukkan bahwa konsentrasi fosfat di air berkisar antara 0,034–0,081 mg/L dan telah melebihi baku mutu, sedangkan fosfat sedimen berkisar antara 11,53–28,92 mg/kg. Kerapatan lamun berkisar antara 44,00–272,36 ind/m², dengan kerapatan tertinggi pada Area 2 dan terendah pada Area 4. Hasil PCA menunjukkan bahwa kerapatan lamun lebih dipengaruhi oleh kondisi sedimen, terutama karakteristik substrat dan fosfat sedimen. Hasil uji korelasi menunjukkan nilai berkisar antara -0,565 hingga 0,360 yang tergolong sangat lemah hingga sedang, sehingga hubungan antara fosfat dan kerapatan lamun tidak selalu berbanding lurus.

Kata kunci: Fosfat, Kerapatan, Lamun, Nutrien, Sedimen

SUMMARY

DEVI DWI AGUSTINA. The Relationship Between Phosphate Concentration in Water and Sediment and Seagrass Density in the Waters of Pengudang Village. Supervised by TRI APRIADI and WINNY RETNA MELANI.

Seagrass ecosystem in the Waters of Pengudang Village plays an important role in maintaining the balance of the coastal ecosystem, including serving as a habitat for marine life and stabilizing sediments. However, the condition of the seagrass ecosystem in this area shows signs of decline, suspected to be related to the impact of human activities such as domestic wastewater disposal, fishing activities, and marine transportation that could increase nutrient input, particularly phosphates. This study aims to determine the concentration of phosphates in water and sediment, seagrass density, the main components affecting seagrass density, and the relationship between phosphate concentrations in water and sediment with seagrass density. The research was conducted from July to December 2025 in the Waters of Pengudang Village, Bintan Regency. The research method used field surveys with a systematic random sampling technique divided into four observation areas based on the variation in seagrass habitat conditions. Areas 1 and 2 represent extensive seagrass beds with low human pressure, while Areas 3 and 4 represent more limited seagrass beds influenced by coastal community activities. The tools used included GPS, water quality sampler, DO meter, 0.5 x 0.5 m quadrat transect, turbidimeter, small shovel, and sieve net, while the materials consisted of water and sediment samples. Phosphate analysis was carried out using the spectrophotometry method, and sediment grain size was analyzed using a sieve net. The data was analyzed using Principal Component Analysis (PCA) and correlation tests. The study results showed that phosphate concentrations in the water ranged from 0.034–0.081 mg/L and had exceeded the quality standards, while sediment phosphate ranged from 11.53–28.92 mg/kg. Seagrass density ranged from 44.00–272.36 ind/m², with the highest density in Area 2 and the lowest in Area 4. The PCA results show that seagrass density is more influenced by sediment conditions, especially substrate characteristics and sediment phosphate. The correlation test results show values ranging from -0.565 to 0.360, which are considered very weak to moderate, so the relationship between phosphate and seagrass density is not always directly proportional.

Keywords: Density, Nutrients, Phosphate, Seagrass, Sediment