

ABSTRACT

Deska Ferizza Ramadhani. 24020122140212. Carbon Stock Estimation in Mangrove Biomass and Necromass Based on Stations and Zones in Kemujan Island, Karimunjawa Islands. Ecology and Biosystematics Laboratory, Biology Study Program, Department of Biology, Faculty of Science and Mathematics, Diponegoro University. Supervised by Jumari and Fuad Muhammad.

*Kemujan Island in the Karimunjawa Archipelago has a mangrove ecosystem that plays a vital role in coastal carbon storage. This research aims to analyze the composition of mangrove species and estimate biomass and necromass carbon stocks based on stations, zones, and total carbon reserves on Kemujan Island. The study was conducted from June to October 2025 at four observation stations: Station 1 in the Karimunjawa Mangrove Forest Lookout Tower area, Station 2 in the northern part, Station 3 in the northeast near the lagoon, and Station 4 in the northwest. Each station was divided into three zones: Zone A as the front zone near the coastal waters, Zone B as the middle zone, and Zone C as the back zone near the land. Data collection was performed using 10 m × 10 m plots through non-destructive methods. Biomass was calculated based on trunk diameter using allometric equations, while necromass was calculated using a volumetric approach on dead trees and wood. The results showed that dominant species varied by location: *Lumnitzera racemosa* at Station 1, *Xylocarpus granatum* at Station 2, *Rhizophora apiculata* at Station 3, and *Excoecaria agallocha* at Station 4. Based on zones, the dominant species were *Rhizophora apiculata* in Zone A, *Excoecaria agallocha* in Zone B, and *Xylocarpus granatum* in Zone C. The estimated biomass carbon stock reached its highest at Station 2 with 210.34 Mg C/ha and its lowest at Station 1 with 37.85 Mg C/ha. The highest estimated biomass carbon by zone was found in Zone A at 169.07 Mg C/ha and the lowest in Zone C at 61.38 Mg C/ha. Estimated necromass carbon stocks ranged from 0.11 to 0.35 Mg C/ha across stations and 0.15 to 0.36 Mg C/ha across zones. Based on the Friedman test, statistical analysis showed that biomass and necromass carbon stocks had no significant differences across both stations and zones ($p > 0.05$). The total estimated carbon stock reached 135.57 Mg C/ha, indicating the high carbon storage potential of mangroves on Kemujan Island.*

Keywords: mangrove, carbon, biomass, necromass, Kemujan Island