

ABSTRACT

Aprilia Dwi Arini. 24020124410003. Carbon Stocks of Riparian Vegetation and Sediment and Their Storage Potential in the Hanjalutung Lake Ecosystem, Central Kalimantan. Under the supervision of Jumari and Tri Retnaningsih Soeprbowati

Hanjalutung Lake is an oxbow lake in Palangkaraya, Central Kalimantan, with high potential for organic carbon storage. However, it faces degradation from deforestation and forest fires, which risk reducing this capacity. This study aims to analyze the carbon stocks of riparian vegetation biomass (*Above-Ground Carbon*, AGC), (*Below-Ground Carbon*, BGC) and sediment (*bulk density* and *soil organic carbon* (SOC) concentration). Sampling locations were selected via *purposive random sampling* at four stations: outlet, blackwater zone, middle zone (near the floating house), and inlet. Vegetation was analyzed using quadrat plots (10m x 10m for trees), (5m x 5m for saplings), and (1m x 1m for seedlings). Tree biomass was estimated using allometric equations based on *diameter at breast height* (DBH). Sediment cores were collected using a Russian corer up to a depth of 100 cm at intervals of 15, 30, 50, and 100 cm, then analyzed using the *Walkley-Black* method. The results identified 21 species from 15 families of riparian vegetation. The tree stratum was dominated by *Shorea balangeran* at Station 3 (267.60%) and Station 2 (104.32%), and *Syzygium* sp.1 at Station 1 (123.74%) and Station 4 (135.30%), indicating structural adaptation to anoxic conditions. The diversity Shannon-Wiener index (H') ranged from 0.45 to 1.66 (low-to-moderate category), and the dominance index (D) ranged from 0.27 to 0.69 (low-to-high category), showing that the riparian ecosystem is less stable. The highest total vegetation carbon stock was at Station 3 (middle zone) with a value of $(413.42 \pm 287.23 \text{ Mg C ha}^{-1})$ due to the dominance of large diameter trees, while the lowest was at Station 4 (inlet) with $(46.52 \pm 15.58 \text{ Mg C ha}^{-1})$, dominated by small-diameter young stands. The total ecosystem carbon stock reached $711.12 \pm 173.37 \text{ Mg C ha}^{-1}$, primary contributed by sediment (SOC) at 64%, followed by AGC (26%) and BGC (10%). Hanjalutung Lake holds a physical carbon storage contribution of (21% Mg C) with an equivalent CO_2 sequestration (79% Mg CO_2e). These findings demonstrate the long-term effectiveness of Hanjalutung Lake in accumulating organic matter. This study reinforces the strategic role of this ecosystem in climate change mitigation efforts in Central Kalimantan, highlighting the critical need for sustainable conservation and management practices.

Keywords: *Carbon Stock, Riparian Vegetation, Sediment Carbon, Oxbow Lake, Hanjalutung Lake, Wetlands.*