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Spatial and temporal patterns of carbon storage and species richness in three South Carolina coastal plain riparian forests

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Abstract

The distribution of organic matter within a floodplain is a controlling factor affecting water quality, habitat, and food webs. Accordingly, development of vegetation in the riparian zone can be expected to influence ecosystem functions, and organic matter storage patterns are believed to be indicators of functional recovery in disturbed riparian zones. Our objective was to compare the distribution and allocation of organic matter among microsites within the floodplain and with temporal changes (successional status) associated with community development. Three third order streams in the upper coastal plain of South Carolina were selected. Measurement transects were established across three floodplains of varying successional status, Meyer's branch; a mature riparian hardwood forest; Fourmile branch; a mid-successional riparian forest; and Pen Branch, an early successional riparian forest. Overall, measurements of aboveground biomass, soil carbon, and stand structure indicate that the early and mid successional stands are becoming more similar to the mature stand and that microsite differences within the braided, riparian stream systems are small.

Keywords: Carbon; Disturbance; Forest succession; Riparian; Wetland restoration

1. Introduction

In the last 15-20 years, riparian forests have become recognized as important components of the landscape and serve as a vital link between the aquatic environment and upland ecosystems. Riparian forests are especially critical to maintaining stream health and water quality, and providing the aquatic ecosystem with organic carbon, habitat, bank stabilization, and shade (Mitsch and Gosselink, 1993). Riparian forests also protect waterways from sediment, nutrients, and other surface and groundwater pollutants. Accordingly, maintenance of riparian vegetation or restoration

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