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Carbon Sequestration in an Aggrading Forest Ecosystem in the Southeastern USA

Thomas G. Huntington *

Abstract

An analysis of C pools at the Panola Mountain Research Watershed (PMRW) near Atlanta, GA, indicates that aggrading forests in the U.S. Southeast are an important regional C sink. The forests in this area were cut in the early 1800s and the land was cultivated until the early 1900s, when farming was abandoned and forest regeneration began. Cultivation resulted in extensive erosion, which depleted soil C pools. The rate of soil C sequestration during the 70-yr period of forest regeneration was estimated to be between 0.34 (standard error [SE] = 0.12) and 0.79 (SE = 0.19) Mg C ha⁻¹ yr⁻¹. There is a large potential for continued C accumulation in the soil at PMRW based on the difference between current measured soil C pools of 82 Mg C ha⁻¹ at PMRW and 122 Mg C ha⁻¹ at the nearby "undisturbed" Fernbank Forest in Atlanta, GA. The rate of C sequestration in biomass at PMRW was 1.47 Mg C ha⁻¹ yr⁻¹ for the regeneration period, bringing the ecosystem total to between 1.81 and 2.26 Mg C ha⁻¹ yr⁻¹. Carbon sequestration in temperate forest ecosystems partially mitigates the effects of increased atmospheric loading of CO₂.

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