

Changes in Carbon Pools 50 Years after Reversion of a Landscape Dominated by Agriculture to Managed Forests in the Southeastern Atlantic Coastal Plain

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The landscape of the upper coastal plain of South Carolina in the late 1940's was typified by rural agricultural communities and farms comprising cleared fields and mixed-use woodlots. Approximately 80,000 ha of that landscape was appropriated by the US Government in the early 1950's to form the Savannah River Site which is now managed by the US Dept. of Energy. The US Forest Service was engaged to reforest the agricultural parcels, 40% of the tract, and to develop sustainable management practices for the woodlots and restored areas. We've used those inventories in conjunction with soil resource data to assemble a carbon balance sheet encompassing the above and belowground carbon pools over the 50 year period. We've also employed inventories on forest removals, forest burning and runoff to estimate fluxes from the landscape over the same period. There was a net sequestration of 5,486 Gg of C in forest vegetation over the 50 yr. period (1.5 Mg ha⁻¹ yr⁻¹), with carbon density increasing from 6.3 to 83.3 Mg ha⁻¹. The reforestation of the agricultural land and the increased density of the former woodlots was the cause of the gain. The forest floor increased by 311 Gg carbon. Fluxes in the form of harvested wood and oxidation from burning were 24% and 10% respectively of the net gain in vegetative biomass. These findings document real changes in carbon storage on a landscape that was changed from mixed agricultural use to managed forests, and they suggest responses that should be similar if reforestation for biofuels production is expanded.