

Kranabetter, J.M. 2009. *Site carbon storage along productivity gradients of a late-seral southern boreal forest*. Canadian Journal of Forestry Research, in press.

Abstract

The quantity and distribution of carbon (C) storage in old-growth forests is a fundamental parameter needed to more accurately predict management effects on landscape C. Carbon accounting on a regional or national level is generally based on zonal ecosystems, but total ecosystem C can vary widely with soil productive capacity within landscapes. To illustrate this, I compared old-growth forests of contrasting plant associations reflecting typical soil productivity gradients of the southern boreal forest in British Columbia (Canada). Total ecosystem C of zonal sites (medium-Huckleberry plant association) averaged 309 Mg C ha⁻¹, while less and more productive forest types ranged from 120 to 725 Mg C ha⁻¹, respectively. On average, 62% of ecosystem C was in live trees, 20% in mineral soils (0-50 cm), 9% in forest floors, and 9% in coarse woody debris and snags. Positive linear correlations between total ecosystem C and soil nitrogen availability or asymptotic stand height confirmed the strong influence of site productive capacity on C storage. The results demonstrate how ecological site classification or direct measures of stand productivity could refine estimates of the upper limits in potential C storage.