

# Forest Landscapes and Global Change

New Frontiers  
in Management,  
Conservation  
and Restoration

Abstracts

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**Forest Landscapes and Global Change**  
**New Frontiers in Management, Conservation and Restoration**

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**Poster Session Monitoring landscape change PMo 10**

**LANDSCAPE CHANGE AND CARBON SEQUESTRATION: THE CASE OF THE DEILÃO PARISH,  
NORTHEASTERN PORTUGAL**

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We estimated carbon stocks at the landscape level over the last 48 years in the Deilão Parish (4200 ha), Bragança District, Northeastern Portugal, with the purpose of analyzing carbon sequestration dynamics in this changing landscape. We created land use GIS coverages from digitized and orthorectified aerial photographs from 1958, 1968, 1980, 1992 and 2006 based on the COS2005 (IGP) land use/land cover classification system. Below- and aboveground carbon stocks for each land unit were estimated based upon published biomass equations and inventory data. Combining patch level data with GIS coverages we estimated biomass and carbon in the landscape for the 5 dates above. The Deilão parish presented symptoms of abandonment such as a decrease in agriculture (53% of the area in 1958 to 37% in 2006) and an increase in forest plantations (0.8% in 1958 to 32% in 2006). Shrublands also decreased from 46% to 30% of the area within the same period. Sequestered carbon in Deilão increased 360% during the 48 period of time under consideration, from 20,572t in 1958 to 75,449t in 2006. This corresponds to a mean annual sequestration rate of 0.27t/ha/year. Changes in carbon stocks are due mainly to land use change and vegetation growth described above, most noticeably the expansion and growth of newly planted forest stands.

**Poster Session Patterns and processes PP 4**

**IMPACT OF TIMBER HARVESTING ON SOIL MICROBIAL DIVERSITY, ENZYME ACTIVITY AND  
NITROGEN FLUXES IN FIELD SITES OF THE BOREAL PLAIN, ALBERTA, CANADA**

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Timber harvesting causes changes to the entire forest ecosystem, especially soil processes. The Forest and Watershed Riparian Disturbance (FORWARD) project is investigating the impact of tree harvesting and fire disturbance on boreal forest watersheds. The objective of this component of FORWARD was to monitor changes in community structure and diversity of soil microorganisms, enzyme activity and bioavailable nitrogen (N) fluxes in disturbed soils over 18 years post-harvest. Soil forest litter (LFH) and mineral (Ae) horizons were sampled from harvested cutblocks at various stages of regrowth (1, 2, 3, 4, 5 & 18 yrs). Samples were analyzed for phospholipid fatty acid profiles, enzyme activity and bioavailable N flux. Preliminary results show that soil microbial diversity differed ( $p < 0.01$ ) between cutblocks at various stages of regrowth and between LFH and Ae horizons. Enzyme activity and N fluxes appeared to be higher in the more recently cut sites. This study suggests that landscape changes due to forest harvesting alter soil microbial processes enzymatic activity, and N fluxes in the years following the disturbance. Over time, forest soil microbial processes within this study generally re-stabilize as the ecosystem reaches a new state of quasi-equilibrium.