



Soil nutrient cycling in reclamation and natural boreal forest soils using ^{15}N labeled aspen leaf litter

Charlotte Norris, Sylvie Quideau, and Simon Landhäuser

Renewable Resources, University of Alberta, Edmonton, Canada (charlotte.norris@ualberta.ca)

A region of the boreal forest, located north of Fort McMurray, Alberta, is currently being disturbed by oil sands mining. Conditional to the allowance of mining is the requirement that the land be returned to an equivalent land capability. One method to determine if the equivalent capability has been met is to know if the reconstructed sites are self sustaining in terms of central ecosystem processes such as nutrient cycling. This study set out to compare nutrient cycling among the litter and live vegetation on reconstructed, harvested and undisturbed forest sites. All sites were dominated by an aspen tree canopy (*Populus tremuloides* Michx.). Nutrient cycling was monitored through the addition of ^{15}N labeled aspen leaf litter to the forest floor over four sampling periods (0, 4, 12 and 16 months) and testing key soil response variables such as nutrient supply, microbial community, and organic matter composition. Over the entire collection period the soil microbial biomass for harvested and reconstructed soils was similar in quantity while the undisturbed forest soil was always three times greater in biomass. With the addition of ^{15}N labeled leaves, the $\delta^{15}\text{N}$ of microbial biomass increased across the incubation for all sites and the harvested site showed the greatest response. Furthermore the increased concentration of ^{15}N in the live vegetation indicates that nutrient cycling was occurring on all sites.