Early Vegetation Community Development and Dispersal in Upland Boreal Forest Reclamation

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Abstract

Re-establishment of appropriate vegetation communities is an important aspect of successful forest reclamation as they contribute to various ecosystem functions. In my research I explore how different coversoil materials (salvaged forest floor (FFM) and peat material), their placement depths, and underlying subsoil materials influence the early colonizing vegetation on an upland boreal forest reclamation site. Further, I investigated what effects the selection of tree species and their planting densities have on vegetation community development. As salvaged FFM contains propagules common of upland forests, it provided much higher richness and cover than when peat material was used as a coversoil. While material placement depth had little impact on vegetation, the type of subsoil material did play a role when placed beneath the coversoils, particularly with high phosphorous availability resulting in increased plant cover and species richness. Selection of tree species had little effect on the vegetation within the timeframe measured as seedlings were likely too small. Planting density had an impact early on with reduced vegetation cover in high density plots where seedling growth was high (in FFM). In a second study, I explored whether FFM islands would act as a nucleus for dispersal of forest vegetation throughout reclaimed landscapes. Vegetation egress and seed rain from the islands into adjacent peat material were examined to assess the dispersal mechanisms contributing to the egress. By the fourth growing season, species associated with FFM comprised a higher proportion of the vegetation cover than species associated with the receiving peat material up to 20m away from the island border. Although overall cover was low compared to in FFM areas, herbaceous, graminoid, and shrub species associated with the FFM were all present in the peat. Wind dispersed species were able to disperse further into the surrounding peat material than species which utilized other dispersal methods. Despite seeds successfully dispersing from FFM areas, poor seed bed conditions in the peat limited seed retention and germination. However, dispersal into peat with vegetative reproductive structures appears promising as a result of the material's high nitrate concentrations and water holding capacity.