

Below the surface of fire and harvesting effects

Comparison of soil properties among harvested, burned, and post-fire salvage-logged stands within the first year following disturbance (Figures 1-3) has indicated differences in soil organic matter, nitrogen, phosphorus, and base cations among disturbance types (Kishchuk, in preparation). Harvesting and wildfire resulted in divergent changes relative to the undisturbed control for a number of soil properties. Effects of fire and the multiple disturbances of salvage-logging also differed for some properties. Nutritional status of regenerating aspen foliage was determined (Figure 4).

These results indicate that the initial effects of fire, harvesting, and salvage-logging on soil properties and foliar nutrients in the boreal mixedwood forest are not consistent. This study has provided baseline information about the effects of these disturbance types on soil and regenerating vegetation after disturbance on the same land base. Whether these changes are sustained over the long term, and their impact on site productivity must be followed through long-term monitoring.



Figure 1. Burned site in the Chisholm fire study area.



Figure 2. Harvested site in the Chisholm fire study area.



Figure 3. Salvage-logged site in the Chisholm fire study area.

Two additional studies are ongoing to determine relationships among soil surface properties and biota following disturbance and the biological mechanisms for nutrient dynamics in these disturbance types. We are further exploring relationships among woody debris, bryophyte communities, invertebrate assemblages, and nutrient availability.

The first of these studies was established in 2002 and is continuing into 2004 (Figure 5). The study was established to determine the influence of the four disturbance treatments on decomposition rates and net accumulation or loss of nutrients in fine woody debris. The study involves the placement, weight, nutrient determination, and labeling of fine woody debris on the soil surface, *in situ* incubation, and recovery of the samples after 1 and 2 years.



Figure 4. Regenerating aspen on a burned mixedwood site.



Figure 5. Plot showing labeled fine woody debris.



Figure 6. Establishing a low-moss treatment.

The second study was established in July 2003 in a burned spruce plot (Figure 6). The objective of this study is to determine the effects of moss cover and beetle populations on decomposition rates of fine woody debris. Plots containing four treatments were established in this area with high or low moss cover and added or absent fine woody debris. Beetle populations are being monitored in the treatments. Fine woody debris decomposition rates, soil chemical and physical properties, beetle species present, moss species present, and percent moss cover are being determined.

Literature Cited: B.E. Kishchuk. *Initial comparison of soil properties under wildfire, harvesting, and salvage-logging in the boreal mixedwood forest of Alberta*. Manuscript draft in preparation. Photo credits: B. Kishchuk and M. Blank, Canadian Forest Service