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Silviculture Laboratory

Research Agenda

Meadow Lake, Saskatchewan

Management for productivity and diversity: Applying ecosystem concepts to understand forest dynamics in response to forestry practice in the boreal spruce-aspen woodland of Saskatchewan

A collaborative study has been initiated between foresters from MISTIK management Ltd. (Roger Nesdoly, Mike Martell), faculty from the School of Forestry and Environmental Studies, Yale University (Robert Mendelsohn, Bruce Larson, Oswald Schmitz, Mark Ashton, Paul Barten, Xhui Lee, Graeme Berlyn), and faculty from the University of Saskatchewan, Department of Soil Science (Ken van Rees).

Forest industry must address issues related to forest regeneration to remain sustainable, so we are addressing the following research questions: 1) What factors limit the species composition and growth of regeneration ? and 2) Can wood fiber production be increased by managing these factors in ways that more closely emulate natural forest ecosystem dynamics ?

To accomplish these goals we have established an experimental "field laboratory" to study forest regeneration in the aspen-spruce forest of the MISTIK forest management license area. We have focused our work on the aspen-spruce forest type as this is the most economically important and problematic in satisfactorily regenerating the spruce as a component of the forest mixture. We have been studying the germination, sprouting and establishment of regeneration across a range of microenvironments within the natural forest context. Our studies have been designed in order to identify: i) the disturbance thresholds that alter the nature of floristic composition and therefore ii) potentially useful site treatments for the control of vegetation. The experimental research base is designed to integrate factors that in the past have been investigated separately. We are studying the whole environment with its array of interacting factors (including the physical effects of soil moisture and light, and the biotic effects of herbivory) on the dominant tree species of the aspen-spruce type. The basic physiological responses of individual trees are being studied to the extent that the stand level responses can be understood as the trees are exposed to variations in the physical and biotic environment.



Figure 1: Aerial view of spruce-aspen with black spruce-tamarack bog and open marsh



Figure 2: Canopy shot of Jack pine and spruce



Figure 3: Aerial view of study site before the start of the silvicultural treatments



Figure 4: Measuring the forest understory before silvicultural treatments



Figure 5: A feller-buncher in the process of creating the experimental treatments



Figure 6: Setting up the enclosure treatments



Figure 7: Regeneration treatments across strip openings after one year of growth



Figure 8: Setting up irradiance, soil moisture and soil temperature sensors across the strip openings

