

Silviculture Systems Analysis

INTRODUCTION:

Through the processes of experimental design, statistical analysis, modelling, and inference, this study contributes to increased understanding of the functional and temporal interactions between site, management practices, and vegetation succession. Various aspects of this systems analysis are applied to a wide range of silvicultural projects at both national and provincial levels. Study goals include determining the impacts of silvicultural treatments on the quality and quantity of wood produced, uncovering new technologies for stand tending and vegetation management, examining the biological and silvicultural requirements for plantation forestry, vegetation management, weed control, and site preparation, and developing silvicultural options to mitigate pest impacts. This study also tests and compares silvicultural practices to identify those that lessen impacts on specific habitats and diversity. Current investigations include modelling the interaction between silvicultural practices and vegetation succession and the intensity and severity of diseases such as hypoxylon canker and white pine blister rust. The impacts of vegetation management options on crop tree biomass and stem quality are also being evaluated.



Releasing conifers from competition with herbicide.

LOCATION/SITE:

This study has addressed silviculture problems in a number of regions across Canada, drawing upon data collected from British Columbia, Alberta, Ontario, and New Brunswick.

MANAGEMENT IMPLICATIONS:

Results from this study are numerous, so only a few are summarized here. The study has significantly contributed to the development of several silvicultural strategies and tactics. For example, results from long-term growth

studies have shown that early control of competing vegetation, in combination with minimal site disturbance during and after harvesting, can promote excellent crop growth. Recommendations have been formulated for early crop establishment and herbaceous vegetation control on Boreal sites, allowing forest managers to potentially reduce excessive site preparation, shorten regeneration periods, reduce herbicide use and costs, and minimize site disturbance (Ref. 1, 2).

Results of several comparative investigations have provided decision-makers with objective data on vegetation succession; data that are currently being used to evaluate the integrity of silvicultural practices and support forest certification (Ref. 3, 4, 5). For example, the use of vegetation control measures for the promotion of conifer dominance and growth has been questioned due to perceptions of incompatibility with biodiversity and wildlife objectives. Study results have shown that conventional herbicide application does not create a single-species, single canopied forest and is the only treatment of a number tested that may fully achieve the objective of maintaining conifer dominance on some sites.

Collaborative work with research personnel from the provinces has also

been instrumental in providing forestry and rights-of-way managers with non-herbicide alternatives to vegetation control. Examples include a national evaluation of the biological tool *Chondrostereum purpureum* for the control of resprouting woody species following cutting (Ref. 6); optimization of the season and stump height for minimizing coppice growth of cut aspen (Ref. 7); and comparison of manual cutting to other vegetation management alternatives (Ref. 3, 6, 8).



Current efforts are providing forest managers with the tools needed to manage aspen for optimum piece size and volume. Models constructed from long-term data collected from several thinning trials will allow managers to predict future losses due to Hypoxylon canker and adjust early stand density to produce the products desired (D. Pitt et al personal communications).



Black spruce 10 years after release from competition.

SOURCES OF RELEVANT INFORMATION:

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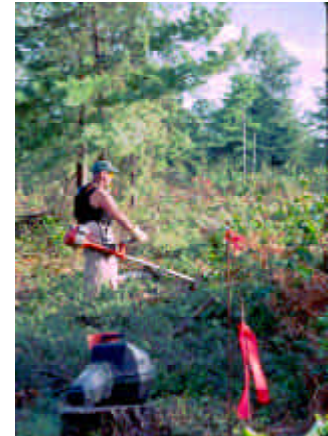
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Manual tending with a brush saw.

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ISSN 1496-7847

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