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In Brief

from the Canadian Forest Service – Laurentian Forestry Centre

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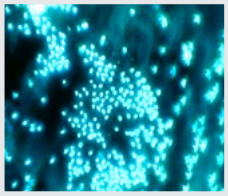


Fostering the growth of Indigenous forestry companies in Quebec

Photo: NRCan

A team of researchers from Université Laval, Université de Moncton and the Canadian Forest Service carried out a survey providing a portrait of 28 active Indigenous forest compa-nies in Quebec. The companies' operations depend on forest resources and offer various products and services to the forestry sector. The purpose of this survey was to explore their diversity, their business objectives, their management methods, and their needs.

The results show that these Indigenous forest companies play a major role in their respective communities. They generally employ fewer than 49 individuals, and most have been established for more than five years. Almost a third have drawn up a marketing plan in recent years and show an interest in training. However, they do little research and development and do not tend to establish regional networks. At the time of the survey, only one of the respondents held a five-year operating licence. Nonetheless, these companies want to increase their business volume, diversify their activities, and strike a balance between economic and community development and environmental protection.

A number of recommendations were made, including: (1) granting a greater proportion of timber rights on public lands; (2) establishing government programs that better respect the social and environmental objectives of the Indigenous forest companies in Quebec; (3) creating a network of companies in order to achieve economies of scale, and (4) strengthening skills in planning, internet use and innovation. The information gathered could promote the growth of these businesses and the development of business relationships with non-aboriginal partners.

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What are the effects of salvage cutting on soil nutrients after an insect outbreak?

Forest disturbances such as insect outbreaks or forest fires impact forest ecosystems significantly. These occurrences could increase as a result of climate change and invasions by exotic insects.

To minimize the loss of timber caused by these disturbances, forest managers practise salvage cutting. These harvesting activities raise concerns from an ecological point of view. Indeed, these operations could have an impact on the resilience of ecosystems, as this type of harvesting takes place immediately following a disturbance.

In this study, researchers from the Canadian Forest Service examined how salvage cutting following a hemlock looper outbreak affects the nutrients present in the soil, which are prone to leaching.

They compared the nutrients in the soil under 4 scenarios: after the looper had passed through, after cutting, after a looper outbreak followed by salvage cutting and, lastly, on a control site unaffected by any disturbance. The study focused on fir trees in the Laurentides Wildlife Reserve and Montmorency Forest.

The results obtained showed that the nutrient cycle recovered more quickly after salvage cutting than in unsalvaged stands that died from a looper infestation. During the 2 to 3 years following a salvage cut, soil conditions remained roughly the same as those in undisturbed stands. These results could be explained by the more abundant and rapid regeneration in harvested stands where more sunlight reaches the ground. The recovery of vegetation after salvage cutting seems to be the key to explaining the effects of harvesting on nutrients available in the soil.

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Forest productivity suffers a heat stroke!

For thousands of years, the climate has shaped the structure and composition of the vegetation cover. Since the forest industry in eastern Canada mainly relies on conifers, researchers from the Université du Québec à Montréal, the Université du Québec en Abitibi-Témiscamingue, the University of Montpellier, the ARVE Research Sarl, and the Canadian Forest Service attempted to assess the response of vegetation to climate change, as well as its impact on the productivity of dominant species in the boreal forest.

The study is based on simulations of effects produced by climate factors on changes in forest cover composition, on the productivity and availability of forest biomass, as well as on the frequency and severity of fires. The predictions cover the region spanning from Manitoba to Newfoundland for the period ranging from 1950 to 2099.

According to analyses, climate change could lead to a decrease in conifer forest cover in the southern area of the region studied. These changes are likely due to increased severity and frequency of drought episodes, which have a negative impact on conifer regeneration, thus promoting the establishment of hardwood trees. This new landscape composition would then lead to a decreased proportion of conifers in the forest biomass. In the northern area of the region studied, simulations predict the opposite, i.e. an increase in forest cover, forest biomass, and fire frequency. Increased forest productivity could be slowed down by forest fires, a consequence of increased conifer density.

The simulations suggest that forest land management strategies will have to be adapted with respect to individual geographic areas in order to permit sustainable forest industry activities.

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This publication is part of a series that presents popularized summaries of scientific articles written in whole or in part by Laurentian Forestry Centre researchers.

Canada

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Performing forest inventory using remote sensing?

Remote sensing has proven itself as an efficient tool for monitoring the forest environment by producing data at various resolutions. The processing of these data are commonly done by empirical and statistical modelling due to the complexity of forests' three-dimensional structure. Field-collected data have led to the development of several models to estimate forest attributes. However, in order to take more precise measurements (branches, crowns, etc.) for the purpose of estimating total biomass among other things, some cutting is occasionally necessary. In addition, accessing the sampling areas is difficult and time-consuming.

In this study, researchers from the Université de Sherbrooke and the Canadian Forest Service demonstrated how remote sensing can facilitate the characterization of forest inventory structural attributes.

The biomass, height, and vertical distribution of the forest structure are now more easily and more accurately measured by remote sensing. Indeed, terrestrial lasers enable the compilation of a large quantity 3D data on fine tree structure without the need to cut them. The use of models to measure tree architecture simplifies the interpretation of tree structure data and allows for better representation of mature trees in their natural environment. These various tools facilitate the creation of replacement plots for inventory purposes, thus reducing the number of sample plots required to be processed in the field. They provide improved knowledge of forest attributes, leading to more accurate estimates of total forest biomass.


Photo: NRCan

This way of producing "virtual" replacement plots represents a significant advance in our ability to estimate a wide range of forest structure attributes..

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Grading hardwood trees to better estimate stands value

Hardwoods are an ecologically and economically important forest type in eastern North America. In Quebec, they represent 16.3% of all productive forest land and 22.5% of the total gross merchantable volume. Forest managers therefore need efficient tools to estimate pre-harvest stand value and to guide them in their silvicultural investment decisions.

In the Duchesnay Forest near Quebec City, researchers from the Quebec ministère des Forêts, de la Faune et des Parcs and the Canadian Wood Fibre Center of the Canadian Forest Service evaluated the performance of two different tree classification methods used to predict the volume of sawn products by NHLA (National Hardwood Lumber Association) grade, pulpwood, sawdust, and residues: one method based on the quality of standing trees (four grades) and the other based on products at risk (three grades of risk of mortality). For this study, researchers selected sugar maple, yellow birch, and American beech.

The results show that the tree quality classification method provides a better estimate of volumes by product grade, which then makes it possible to better estimate stand value. The researchers therefore recommend using this method. In order to simplify operations, they also suggest reducing the number of tree quality grades from four to two: trees with high lumber potential and trees with low potential. This method should facilitate the production of high-quality lumber while reducing forest inventory costs.

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What is causing the openings in jack pine stands within the boreal forest?

In the boreal forest, the coexistence of closed and open canopy jack pine stands suggests the presence of two distinct stages. The rapid increase in open jack pine stands in eastern Canada over the past 50 years indicates a transition from one stage to another.

Researchers suspect that several factors may explain this phenomenon. For example, it could be the effect of several successive disturbances or of predisposing factors in the environment, such as topography, soil type, or forest succession dynamics.

In this study, researchers from the Université du Québec en Abitibi-Témiscamingue, the Université du Québec à Montréal, the University of Clermont Auvergne and the Canadian Forest Service attempted to better understand the causes of openings in jack pine stands. Their twofold study explored the relationships between regeneration, tree growth, site productivity, the degree of canopy opening, and water availability on the one hand, and the influence of environmental variables (such as disturbances, precipitations, temperature, and nutrients) on the other.

The researchers found that the opening of jack pine stands is the result of poor regeneration and a growth deficit, both of which appear very early in the life of a stand. The reduction in growth is not primarily caused by water stress. The level of nutrient availability, including a low cation reserve, could be a predisposing factor.

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