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In Brief

from the Canadian Forest Service – Laurentian Forestry Centre

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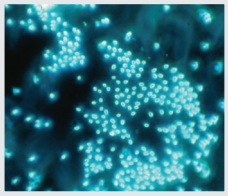


Forest fires: can we reduce supply shortages through salvage logging?

In the boreal forest, fires can cause significant losses in woody material, as well as affect allowable cuts and wood supply for the industry. Climate change will affect fire regimes and, consequently, forest managers may need to adapt silvicultural practices to this new reality.

By studying a model, researchers from the Université du Québec à Montréal, Université Laval and the Canadian Forest Service have shown that periodic wood supply shortages caused by forest fires can be reduced, although not eliminated, through salvage logging and by greater tolerance to shortages among forest managers.

Salvage logging reduces the impact of forest fires on wood supply; however, even a 100% salvaging rate could not entirely compensate for the wood losses caused by fires and eliminate resulting periodic shortages. Forest managers must therefore increase their tolerance to shortages, and ultimately integrate fire risks into their wood supply calculations in order to reduce the frequency of shortages. The actual decline in wood supply brought about by including forest fires in calculations will be minimal since shortages are both frequent and significant.

For more information: Pierre Bernier, pierre.bernier2@canada.ca

Global warming: how does it affect the hemlock looper?

The hemlock looper is an important pest in the forests of eastern Canada. It can kill trees after only one year of heavy defoliation. In eastern Canada, the main host of the hemlock looper is balsam fir, while the hemlock is its preferred host in the western provinces.

Photo: NRCan

The purpose of the study conducted by researchers from Université Laval, the University of Applied Sciences in Switzerland and the Canadian Forest Service was, among other things, to assess whether climate warming could affect the level of risk associated with the hemlock looper. Researchers studied the effect of fall heat waves, which are becoming more frequent with climate change. They assessed whether such heat waves disrupt the insect's metabolism and make it more vulnerable to low winter temperatures. Results show that fall heat waves reduce the winter survival capacity of hemlock looper eggs in temperate regions. However, this is not the case for populations in boreal regions, where most of the epidemics are observed and where the risk remains high. Indeed, in boreal regions, in addition to being less affected by natural enemies, looper populations are well adapted to the cold.

For more information: Christian Hébert, christian.hebert@canada.ca

Dead but still healthy black spruces have different mechanical properties

In old boreal forests, the cold humid climate contributes to fire cycles of up to 500 years, which is longer than the typical lifespan of a black spruce. This explains why many dead and but still healthy trees can be found in such regions. These trees constitute a significant source of wood supply for the logging industry. In fact, they represent up to 17% of the merchantable volume of harvested stands.

However, the use of these trees to supply factories is criticized as they are perceived to be of lesser quality and value, which could result in the interruption of transformation processes.

This study conducted by researchers from Université Laval and the Canadian Forest Service showed that the mechanical properties of saw timber from dead but still healthy black spruce are inferior when compared with those of live black spruce. The wood is also more brittle, which is an important factor to take into account for processing purposes. However, such wood does meet the technical requirements for producing structural lumber.

Moreover, wood chips produced by sawing dead trees have lower humidity levels than those produced by sawing live trees, and lower humidity levels can be problematic for the pulp and paper industry.

For more information: Isabelle Duchesne, isabelle.duchesne@canada.ca

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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Jack pine originating from fires: No pre-commercial thinning before 7 years!

Following a fire, jack pine regeneration density can reach up to 200,000 stems per hectare. Pre-commercial thinning is the silvicultural treatment most widely used to reduce this density and promote stand growth.

The study conducted by researchers from the Université du Québec à Montréal, Concordia University and the Canadian Forest Service shows that pre-commercial thinning in jack pine stands originating from fires or salvage cutting should be practiced when the stand is between 7 and 10 years old.

When thinning is done before the 7-year mark, the lower living branches of jack pine continue to grow. The tree can develop up to four stems from these branches after thinning. Therefore, rather than being reduced to promote the growth of residual trees, stand density increases dramatically.

If thinning is done after 7 years, lower branches will have begun to die due to lack of light and will not be able to continue growing. Researchers also recommend cutting trees 10 to 13 cm above the ground in order to remove lower branches.

For more information: Sylvie Gauthier,
sylvie.gauthier2@canada.ca

Balsam woolly adelgid and spruce budworm

The balsam woolly adelgid, native to Europe, and the spruce budworm (SBW), an indigenous insect, are both present in the fir forests of eastern Canada. They feed on different parts of the tree and do not attack simultaneously. However, the adelgid appears to have an effect on spruce budworm survival.

Researchers with the University of New Brunswick, Université Laval and the Canadian Forest Service found that balsam woolly adelgid attacks could slow the growth of SBW populations.

Photo: NRCan

Indeed, adelgid attacks cause a swelling and distortion of fir shoots known as "gout." Gout has a negative impact on food quality for the SBW, resulting in a decrease in the weight and fertility of adult SBWs.

The cumulative effect of these two insects should therefore be taken into account when studying SBW population dynamics and developing control strategies.

For more information: Lucie Royer,
lucie.royer@canada.ca

Anticosti Island: Does shelterwood cutting promote white spruce forest regeneration?

Before the arrival of deer on Anticosti Island, gap disturbance was the dominant regime in the area. This regime maintained a forest cover dominated by mature fir, as well as white spruce and white birch. It also ensured the strong understory regeneration of fir.

Due to preferential browsing of fir seedlings by deer, the composition of the island's stands began to change as fir slowly gave way to white spruce. Numerous white spruce stands then underwent clearcutting, a technique which did not leave behind enough seed trees to ensure adequate regeneration.

The purpose of the study conducted by researchers from Université Laval, the ministère des Forêts, de la Faune et des Parcs du Québec and the Canadian Forest Service was to assess whether white spruce stands could regenerate despite the cumulative effects of browsing and cutting. To do so, they studied white spruce regeneration according to seed availability and sites that are favourable to germination. They also analyzed the effect of browsing on stand composition change.

In order to mitigate the issue of low white spruce regeneration, the researchers recommend shelterwood cutting rather than clearcutting in order to preserve seed trees.

For more information: Louis De Grandpré,
louis.degrandpre@canada.ca

For more information about the series:

Natural Resources Canada
Canadian Forest Service
Laurentian Forestry Centre
1055 du P.E.P.S.
P.O. Box 10380, Stn. Sainte-Foy
Québec, QC G1V 4C7
418 648-5789

cfs.nrcan.gc.ca/publications/series/read/2

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