Natural Resources Canada | Ressources naturelles Canada

Canadian Wood Fibre Centre

Realizing the economic potential of hardwood forests today and into the future

The Canadian Wood Fibre Centre (CWFC) has developed a high-speed optimization tool to help forest managers take advantage of value-enhancing opportunities while increasing economic potential and long-term sustainability of eastern hardwood forests.

Need

Hardwood forests are economically important to industries and communities throughout eastern Canada. With high-value species and favourable growth rates, these forests supply wood fibre for a range of end products including fuel, pulp and paper, lumber, furniture, cabinetry and flooring. However, the potential value of eastern hardwood stands has not been fully realized, in part because past practices were designed to produce high volume rather than high value.

Forest managers prescribe partial harvesting treatments to ensure the sustainability of eastern hardwoods, which typically grow in unevenly aged stands. The challenge is to apply treatments that capture economic value while assuring ecological sustainability. Managers need tools to plan the right partial harvesting interventions to maximize economic opportunities within today's value chain, and to capture the long-term value of a sustainable hardwood resource.

Approach

A decision-support system developed by the CWFC enables managers to evaluate eastern hardwood stands and optimize harvests for maximum long-term value. The system provides optimal calculations for the number of trees to be harvested and retained to maximize revenue for the entire supply chain over a 100-year period. The system can be linked to the newest forest inventory methods being developed by the CWFC and its partners while also providing critical guidance to FPInnovations' partial harvesting systems.

Benefits

Economic analysis shows that using the decision-support system has advantages over the current application of selection cutting prescriptions:

- increased revenue ($500 per hectare for each harvesting entry)
- more even revenue over successive cutting cycles

Field application of the optimized prescriptions in the Hautes Laurentides region of Quebec showed an immediate 7 percent increase in harvest volume and an expected 7 percent increase in timber value projected 30 years into the future.

"The work conducted by the Canadian Wood Fibre Centre is critical to the revitalization of the forest industry in our region. It contributes to the development of essential tools for the optimization of the value network. The results have a significant impact on the profitability of hardwood sawmills. They are a concrete example of effective collaboration that led to tangible results for the industry."

Denise Julien, Director-General,
Signature Bois Laurentides

The new system provides a high-speed optimization algorithm, which should significantly reduce the costs of planning. Forest managers will be equipped to make informed decisions based on long-term economic projections. Partial cutting prescriptions will be adapted with greater attention to local forest stand structure and condition. And decisions will be made taking prevailing market opportunities into account.

Competition and challenges

Simulation models offer another approach to making decisions at the stand level. Such models typically provide conventional silvicultural solutions.

The CWFC system is based on mathematical optimization that provides planning solutions in just minutes, while it would take days with existing simulation tools. An added advantage is that the system takes into account the economic value of trees.

Continued demonstration of the system's operational and biological feasibility will provide forest managers with the confidence level needed to increase use of the tool and develop innovative solutions to managing hardwood stands for long-term value.

Revised August 2012