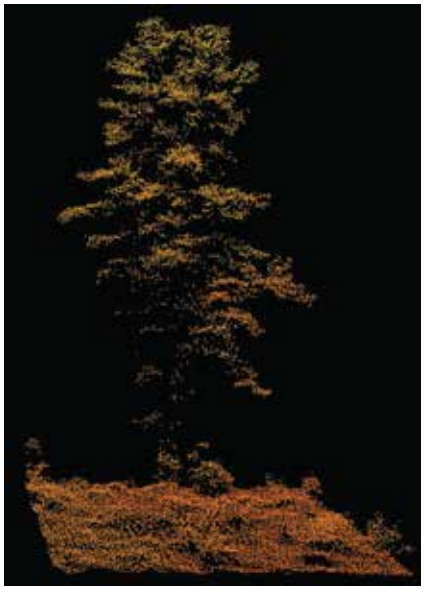
Enhanced forest inventory

Forests make up nearly 35 per cent – 347 million hectares – of Canadian land. For the forest sector, that's a lot of inventory to manage and monitor. To run any successful business, inventory needs to be monitored. That's why researchers at the Canadian Wood Fibre Centre (CWFC) are enhancing current inventory systems to improve how forest managers, provincial governments, and other communities across Canada manage forests.

Modern-day forest management needs accurate inventory for precise harvesting, road mapping, forest renewal, and watershed protection. Enhanced forestry inventory (EFI) systems use ground-based, aerial, and satellite technologies, like LiDAR (Light Detection and Ranging), that can detect tree attributes such as height, volume, crown dimension and species.



Last spring, Adam Dick used EFI to find the tallest tree in the Acadia Research Forest!

LiDAR is a remote sensing technique that uses laser to pinpoint location data, mapping objects like trees in incredible detail. Aerial LiDAR uses the laser technology with airplanes, creating precise images of forest stands. These EFI innovations, led by CWFC's Jean-François Côté, Adam Dick, and Olivier van Lier and their research partners, improve our understanding of Canadian forests and help the forest sector work more efficiently.

With critical concerns like habitat and biodiversity conservation and competitive wood supply, provinces and forestry business need solutions. EFI-created terrain models reduce planning, costs, and labour associated with building roads to take inventory of remote forests.

In a case study, a Newfoundland mill was searching to lower transportation costs with a closer source of their desired wood. Meanwhile, an outbreak of spruce budworms – a destructive, fir-eating insect – was reducing the availability of harvestable fir. In the project, researchers used EFI to locate healthy, high quality fir close to the mill. The new technology has the potential to reduce the mill's costs by $230,000 a year for every 1 per cent of substituted fir. With continued innovation, we can scale up similar EFI applications to a national level and modernize forest management.

In 2018, Forestry Futures Trust Ontario awarded funding to Dr. Joanne White - who collaborated with the Canadian Institute of Forestry and the Ontario Ministry of Natural Resources and Forestry - to conduct a two-year project that studied the potential of single photon LiDAR to collect forest inventory data and characterize the terrain. The Petawawa Research Forest, which CWFC manages, was an ideal location to test out the technology because of its various forest types and its impressive collection of historical data.

Other opportunities for applying EFI technology are modelling habitats, advancing the bioeconomy, adapting to climate change, carbon accounting, and managing forest fires. Developments in EFI technology will supply the data that industries across the country need to support modern forest management decisions. EFI technologies can even be used to find the tallest trees in different parts of Canada.

Ten years of CWFC leadership on EFI has led to this point. Collaborative, cross-country research projects with various provinces, industries and schools, plus more than 40 journal papers testify to the scale of the Centre's EFI progress. More than 30 million hectares across the country are implementing the latest EFI advances. These innovations can transform traditional forestry practices and expand economic opportunities for forest industries.

Learn more

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