Natural Resources Canada
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Canadian Forest Service

CANADIAN WOOD FIBRE CENTRE

Impact Story nº 3

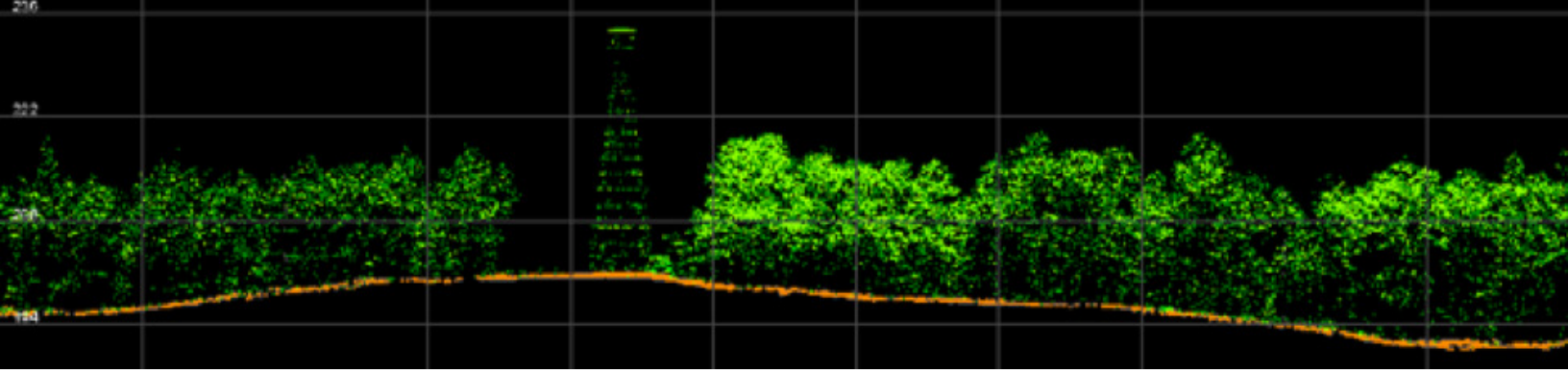
Enhanced Forest Inventory

Forests make up nearly 35%- 347 million hectares - of Canadian land. For the forest sector, that is a lot of inventory to manage and monitor. To run any successful business, inventory needs to be monitored, which is why researchers at the Canadian Forest Service's Canadian Wood Fibre Centre (CWFC) are enhancing current inventory systems to improve how forest managers, provincial governments and 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, such as LiDAR (Light Detection and Ranging), that can detect tree attributes such as height, volume, crown dimension and species.

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

Canada



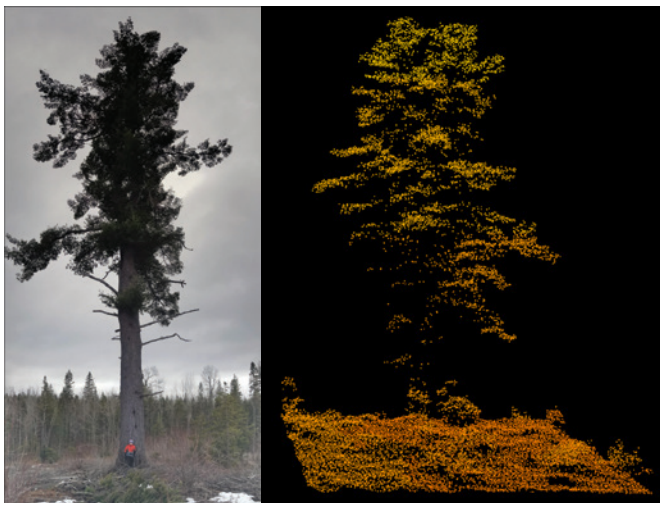
With critical concerns including habitat and biodiversity conservation as well as competitive wood supply, provinces and forestry businesses need solutions. EFI-created terrain models reduce planning, costs and labour associated with building roads to determine the inventory of remote forests.

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 budworm – a destructive, fir-eating insect – was reducing the availability of harvestable timber. 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 one per cent of substituted fir. With continued innovation, similar EFI applications can be scaled-up 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 the 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 wildland fires. Developments in EFI technology will supply the data that forest 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 CWFC's EFI progress. On more than 30 million hectares across Canada the latest EFI advances are being implemented . These innovations can transform traditional forestry practices and expand economic opportunities for the forest sector.



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

Learn more

Visit:

- https://www.nrcan.gc.ca/our-natural-resources/forests/sustainable-forest-management/measuring-and-reporting/forest-inventory/enhanced-forest-inventory-techniques/13421

For more information, please contact: nrcan.cwfc-ccfb.rncan@nrcan-rncan.gc.ca.

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