Using Technology Transfer to Support the Forest Sector

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Canadian Wood Fibre Centre

The Canadian Wood Fibre Centre (CWFC)

Our Vision

To be the national authority on the assessment, characterization, production and optimization of wood fibre in Canada.

Our Mission

To provide real-world and collaborative scientific solutions to improve the sustainability and competitiveness of Canada's forest sector and to provide evidence-based science for development of effective policies.

Our Goal

To develop and deploy targeted, effective, and environmentally responsible solutions to challenges faced by Canada's forest industries.

National Scope with Regional Delivery

- **CWFC staff working in all 6 Canadian Forest Service Centres and Petawawa Research Forest.**
- **15 Researchers and 40+ support staff**

Image credit: Rainer Lesniewski/shutterstock.com

Our Research Program

Identifying

trees that can grow faster, healthier and stronger under various conditions, making it easier for forest managers to match desired traits with certain landscapes or climates.

Exploring

pathways and developing technology and tools to strengthen enhanced forest inventory to support sustainable forest management practices.

Improving

forest stand growth and the next generation of trees to secure wood fibre supply.

CWFC Expertise

- **Evaluation of Wood Attributes**
- **Growth and Yield**
- **Adaptive Silviculture**
- **Tree Improvement / Genomics**
- **Digital Value Chain Optimization**
- **Enhanced Forest Inventory (EFI)**
- **Evaluation of Forest Biomass**
- **Technology Transfer and Science Communications**

CWFC Technology Transfer Program

What is Technology Transfer (TT)?

- A process of transferring (introducing) technology from the person or organization that owns it, holds it, or has access to it, to another person or organization that has a need.
- May occur between universities, businesses, governments, across geopolitical borders, both formally and informally, and both openly and secretly.
- Key objective is to share skills, knowledge, technologies, manufacturing methods, tools, and models among participants.
- Ensures that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials, policy or services.

CWFC Technology Transfer Program

Our Vision

To be a nationally recognised source of technology transfer for the Canadian forest sector.

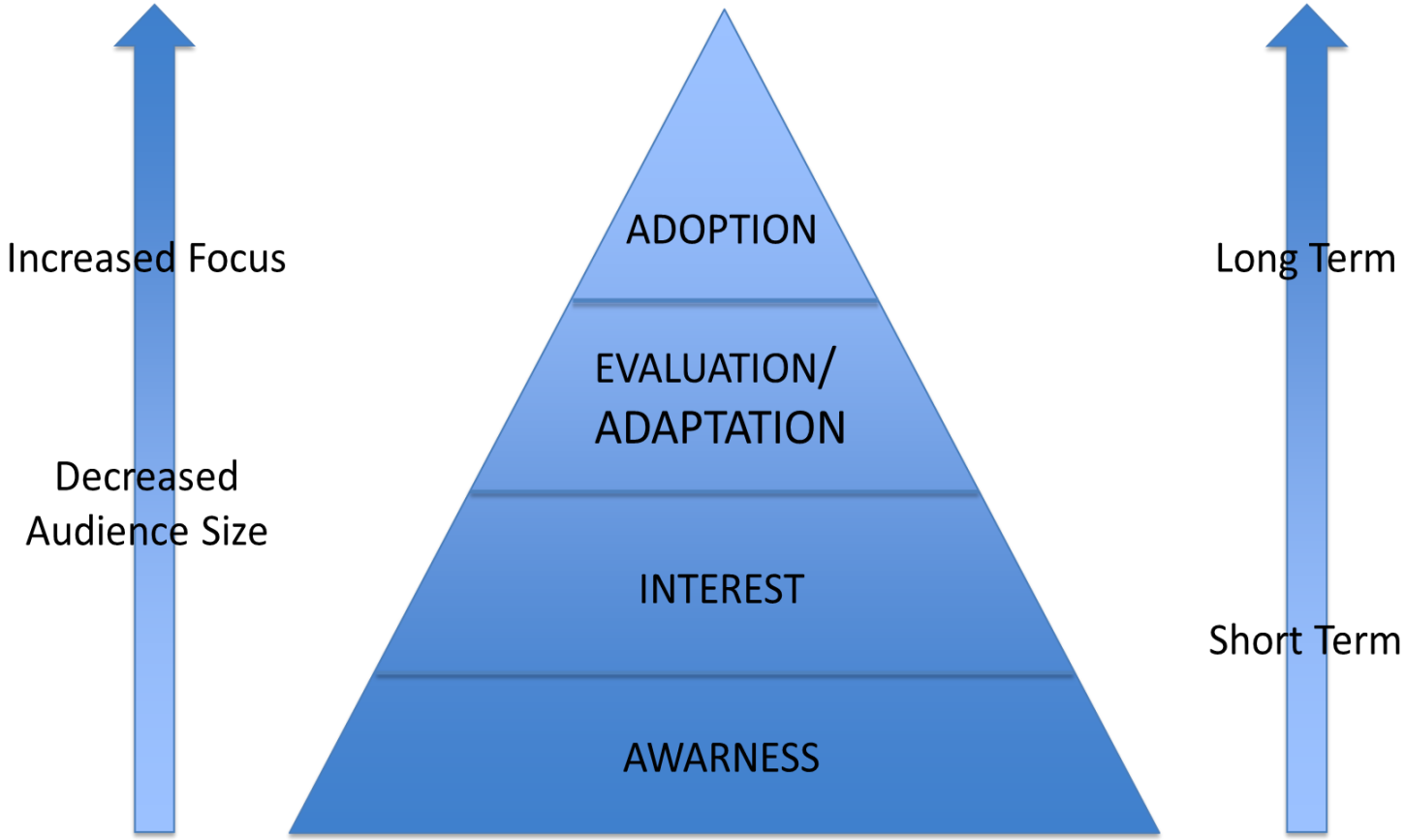
Our Mission

To facilitate the transfer of CWFC knowledge products to influence decisions and enable technology adoption using methods suited to today's forestry practitioners.

Our Goal

To be the connectors, facilitators, supporters, or enablers for the transfer of CWFC research innovations.

TT and the Innovation Adoption Process



CWFC Knowledge Products

- The output of Research and Development activities are considered “Knowledge Products”.

- A knowledge product can be characterised as information that will help the Canadian forest sector with their operations and decision-making efforts, including:
  - Peer reviewed articles (can also be considered a TT product)
  - Models or yield curves
  - Databases
  - Protocols/methods
  - New technologies
  - Operational or field guides
  - Decision support tools
  - Demonstration sites

  Etc…

Technology Transfer Products

- Knowledge products are further disseminated to forest practitioners through TT to enable technology adoption.
- The objective is to provide the right TT product/activity to the right audience at the right time to maximize innovation adoption.
- The TT team supports scientist in bringing their research to life through a portfolio of TT products and/or activities, including:

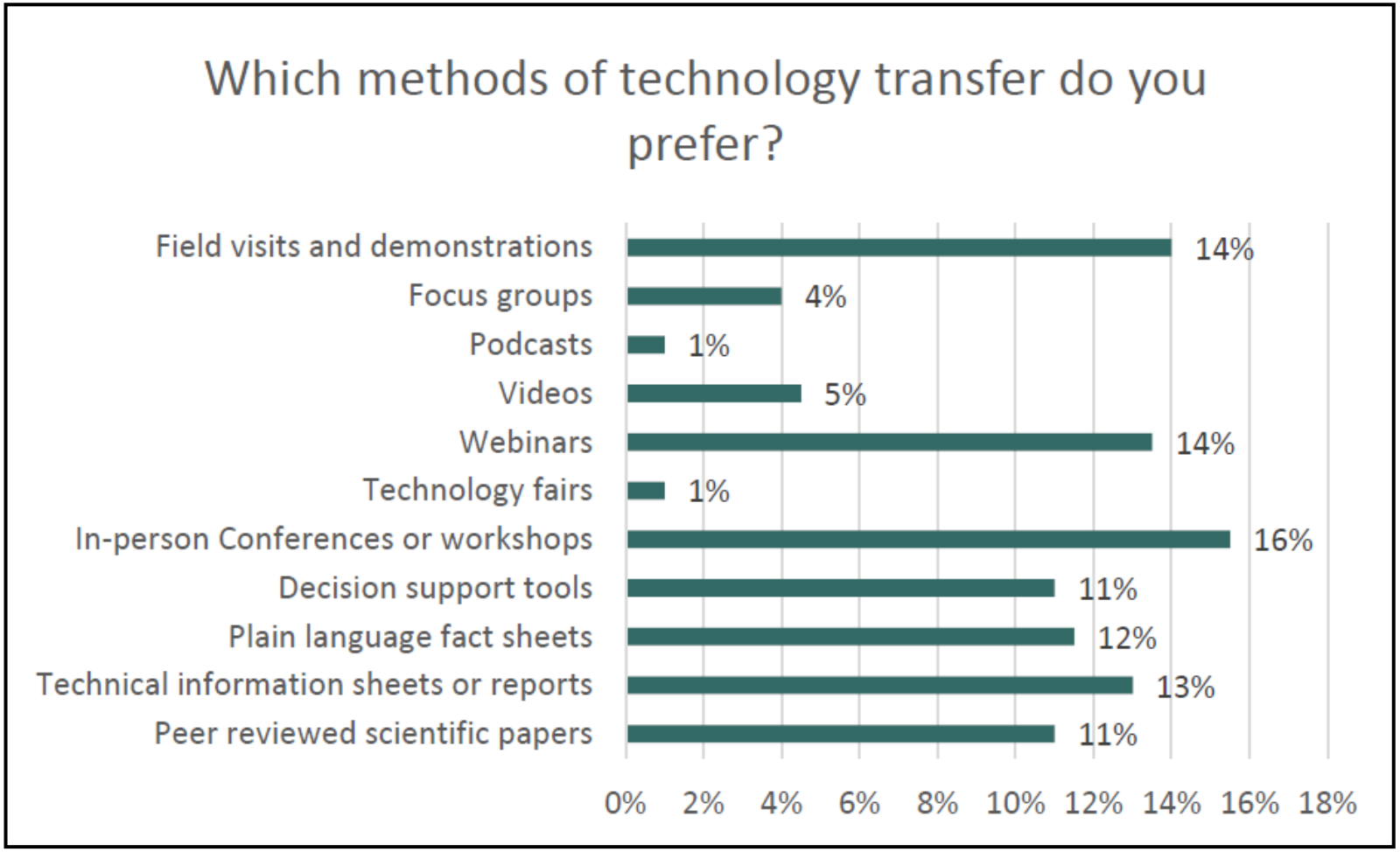
<u>Publications:</u>

- Fibre Facts (technical note),
- FI-X Information Reports,
- Posters or Infographics,
- Magazine/Newsletter articles, and
- Fibre Connect E-Bulletin.

<u>Activities:</u>

- Presentations/Webinars,
- Staff Engagement,
- Videos,
- Virtual Tours,
- Field Tours/Demonstrations,
- Working/Focus Groups, and
- Conferences.

CWFC Stakeholder Preferences



CWFC Fibre Facts

Acknowledgment

Hao Chen led the technical implementation for the supersite, supported by a team that included Sasha Nasonova, Andy Yang, Murray Woods, and Brian Low. We are indebted to many people who provided data and/or shared their knowledge of the Petawawa Research Forest and their expertise: Peter Arbour, Melissa Vekeman, Dave Hill, Guy Smith, Geordie Hobart, Dr. Don Leckie, and Dr. Francois Gougeon. Some data holdings have been generously shared by the Ontario Ministry of Natural Resources and Forestry and the AWARE project, with infrastructure support from the National Forest Information System (nfis.org).

For more information:

To access and search the data holdings available at the PRF, please visit:
http://opendata.nfis.org/mapserver/PRF.html

For more information about the supersite and to learn more about the datasets that are available, please refer to this Open Access publication:
https://doi.org/10.5558/tfc2019-024

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Aussi disponible en français sous le titre : Forêt expérimentale de Petawawa : supersite de télédétection

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Canadian Wood Fibre Center – Fibre Fact: 019. ISSN 1918-2562-PDF-E

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CANADIAN WOOD FIBRE CENTRE

Fibre Facts nº 19

Petawawa Research Forest : Remote Sensing Supersite

The Petawawa Research Forest (PRF) is Canada's oldest research forest, established in 1918, and recently celebrated 100 years of continuous forest science and operations. The PRF is located in the Great Lakes–St. Lawrence forest region of southern Ontario, and is characterized by a complex assemblage of coniferous and broadleaf tree species and varied forest management histories.

Canada

CWFC Fibre Facts

The Petawawa Research Forest

Over the years, PRF has also been a hub of research focused on new and emerging remote sensing technologies, resulting in a large collection of data including airborne imaging systems, Light Detection and Ranging (LiDAR) data, and data from Earth Observation satellites such as Landsat and Sentinel. These data holdings, combined with permanent and temporary field sampling plots, legacy forest inventories, and management history records, provide important reference data for evaluating new tools and approaches for forest inventory and monitoring applications. To enable widespread access to these data for end users, a remote sensing supersite was established at the PRF in 2019.

What is a remote sensing supersite?

It is an observation hotspot that brings together cutting edge data acquisitions from state-of-the-art airborne and spaceborne instruments, combined with historical data acquisitions and comprehensive field reference data. Those data, which often include long-term observations such as permanent sample plots, are made openly available via a centralized data portal to support the science and applications communities.

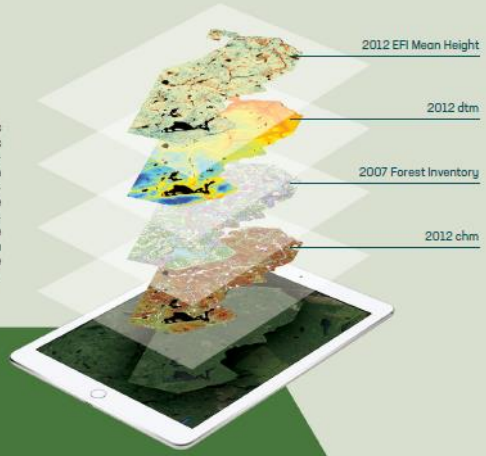


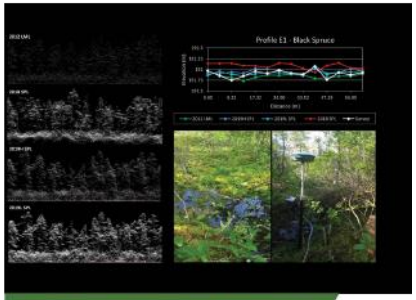
Photo of the oldest permanent sample plot in Canada (PSP1), located at the Petawawa Research Forest

By reducing economic and logistical barriers to accessing field reference and remotely sensed data, the supersite serves as an innovation incubator, allowing a broader range of end users to develop, test, and demonstrate their algorithms or data processing innovations. In this way, supersites are valuable for service providers and industry stakeholders, who may need to demonstrate the effectiveness of their approach or conduct proof-of-concept studies. In the same way, supersites provide valuable data for research and education purposes, providing access to curated data collections that can be used by students, or to develop courses or workshops. Supersites also allow legacy data to be leveraged in new ways in the future, to address questions that were not even thought of at the time of data acquisition.

Another key strength of the supersite is to enable the benchmarking of new technologies. At PRF, there are several acquisitions of LiDAR data that provide very accurate wall-to-wall characterizations of forest structure. These LiDAR data, combined with field reference data, allow for the rigorous and transparent testing of new remote sensing technologies and sensors and associated acquisition parameters. Undoubtedly, benchmarking is one of the key value propositions of a supersite, providing the required reference data to support investigations, while also reducing investment risk for stakeholders and service providers.

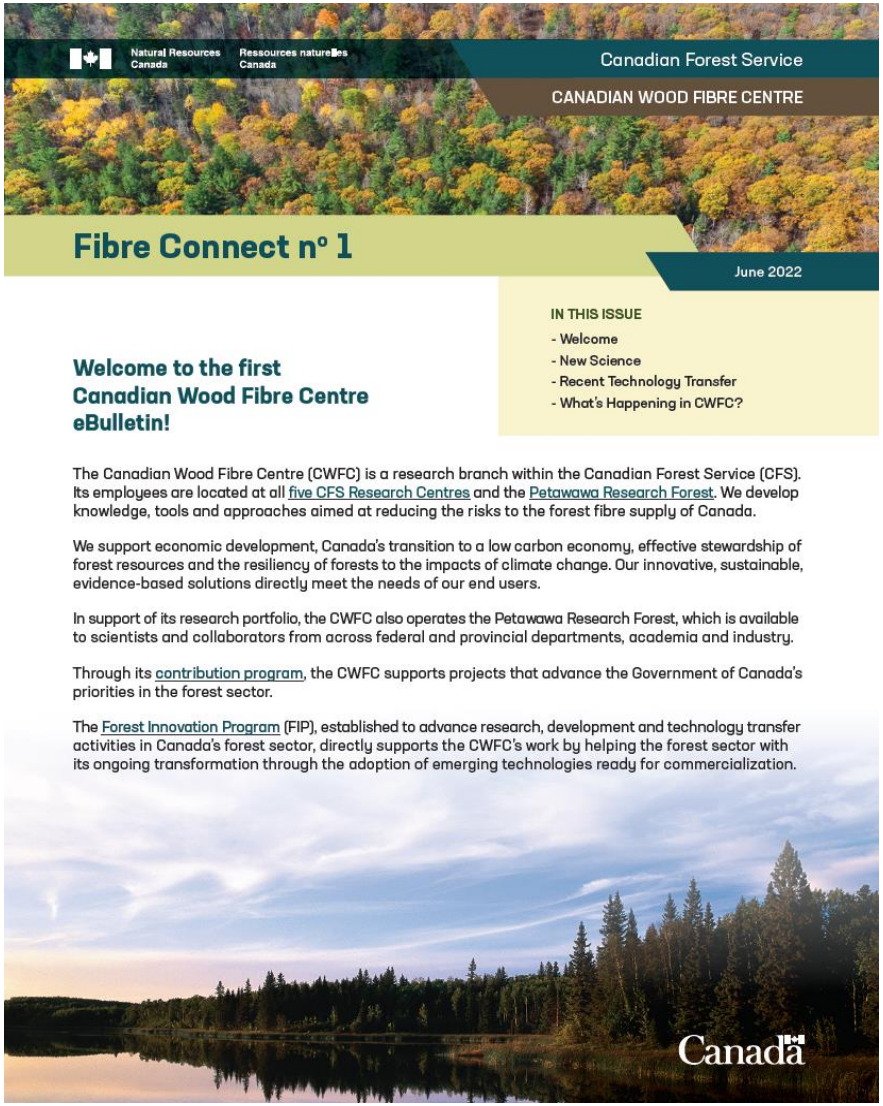
Supersites can also foster increased collaboration, providing a research hub where industry and scientific stakeholders can share resources towards the development of remote sensing applications. In a Canadian context, the supersite concept could be particularly beneficial to provinces and territorial forest management agencies by providing a focus area for research investment and collaboration to address questions of common interest related to new and emerging forest inventory technologies.

For the Canadian Wood Fibre Centre, which manages the PRF, the supersite provides a mechanism for a clear and consistent data sharing policy, and allows investments in public data to be fully realized. The PRF remote sensing supersite is part of Canada's National Forest Information System (NFIS; nfis.org), and is dynamic with new data holdings being added as they become available. While datasets can be directly downloaded, they can also be linked to directly through various Web Map Services (WMS) and Web Coverage Services (WCS) that are supported by most GIS software packages.



Example of LiDAR data combined with field reference data

CWFC Fibre Connect – E-bulletin



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CANADIAN WOOD FIBRE CENTRE

Fibre Connect nº 1

June 2022

IN THIS ISSUE

- Welcome
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Welcome to the first Canadian Wood Fibre Centre eBulletin!

The Canadian Wood Fibre Centre (CWFC) is a research branch within the Canadian Forest Service (CFS). Its employees are located at all five CFS Research Centres and the Petawawa Research Forest. We develop knowledge, tools and approaches aimed at reducing the risks to the forest fibre supply of Canada.

We support economic development, Canada's transition to a low carbon economy, effective stewardship of forest resources and the resiliency of forests to the impacts of climate change. Our innovative, sustainable, evidence-based solutions directly meet the needs of our end users.

In support of its research portfolio, the CWFC also operates the Petawawa Research Forest, which is available to scientists and collaborators from across federal and provincial departments, academia and industry.

Through its contribution program, the CWFC supports projects that advance the Government of Canada's priorities in the forest sector.

The Forest Innovation Program (FIP), established to advance research, development and technology transfer activities in Canada's forest sector, directly supports the CWFC's work by helping the forest sector with its ongoing transformation through the adoption of emerging technologies ready for commercialization.

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CANADIAN FOREST SERVICE - CANADIAN WOOD FIBRE CENTRE

Fibre Connect

SERVICE CANADIEN DES FORÊTS - CENTRE CANADIEN SUR LA FIBRE DE BOIS

Branché sur la fibre

Welcome to the first Canadian Wood Fibre Centre e-bulletin!

Bienvenue au premier bulletin électronique du Centre canadien sur la fibre de bois!

Click the button below to access our latest e-bulletin.

CWFC e-bulletin

Bulletin électronique du CCFB

Cliquez le bouton ci-dessus pour accéder à notre dernier bulletin électronique.

What you will find in this edition of our e-bulletin:

What's new in our science

- **Thirteen** new scientific articles published

Recent Technology Transfer

- **Sixteen** new technology transfer products

What's happening in CWFC

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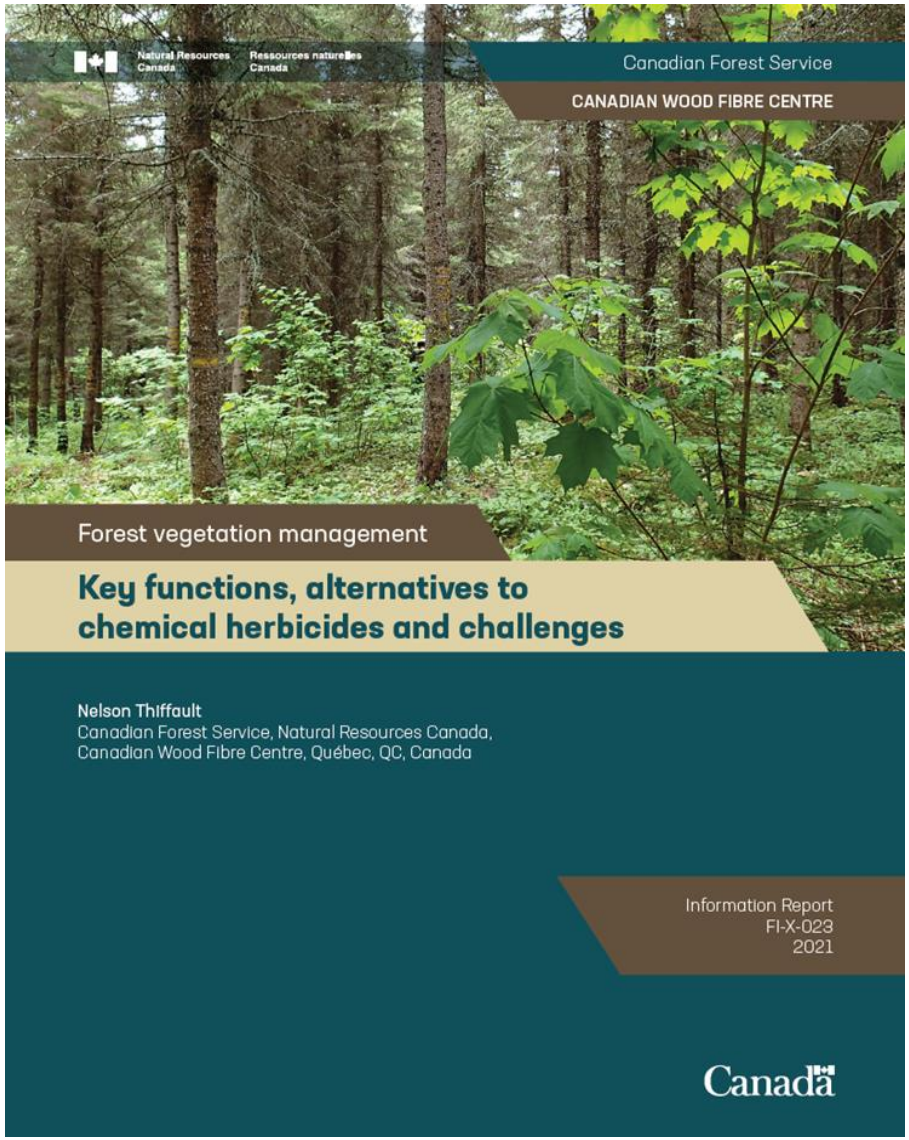
FI-X Information Reports



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  https://www.nrcan.gc.ca/science-and-data/research-centres-and-labs/forestry-research-centres/canadian-wood-fibre-centre/13457

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