

# An overview of forest research across Canada

Forest research in Canada is dynamic and carried out from coast to coast to coast. The research is done by and through partnerships within federal, provincial and territorial governments, not-for-profit organizations, and educational institutions like colleges and universities.

Over the past century, research across diverse fields has deepened our understanding and developed tools to enhance sustainable forest management (SFM) and forest conservation. Forest research has also provided crucial insights to help address challenges like climate change.

The following pages highlight a selection of forest research facilities and initiatives which illustrate the diversity of forest research that is conducted throughout Canada. The map shows Natural Resources Canada's (NRCan) research facilities. NRCan conducts forest research in different regions through forestry centres and research forests that are managed by the Canadian Forest Service (CFS). The locations of these facilities are shown on the map, along with short descriptions of their main research areas.

1

**Pacific Forestry Centre, Victoria, BC**

**Priorities:**

- Forest entomology and pathology
- Wildfire science and research
- Forest inventory and monitoring
- Climate change
- Economic and market research

2

**Northern Forestry Centre, Edmonton, AB**

**Priorities:**

- Boreal ecosystem ecology
- Climate change and forest research
- Land reclamation
- Wildfire science and research

3

**Great Lakes Forestry Centre, Sault Ste. Marie, ON**

**Priorities:**

- Forest pests
- Climate change
- Wildfire science and research
- Forest ecosystem research

4

**CFS office, National Capital Region**

5

**Laurentian Forestry Centre, Québec, QC**

**Priorities:**

- Forest pests
- Ecosystem dynamics
- Forest productivity
- Ecogenomics
- Wildfire science and research
- Managing the Valcartier Forestry Research Station

**5a Valcartier Forestry Research Station, located 35km north of Québec, QC**

Established in 1934, this station has 25 active experimental facilities. The three main research areas include forest genomics, climate change and forest biomass.

6

**Atlantic Forestry Centre, Fredericton, NB and Corner Brook, NL**

**Priorities:**

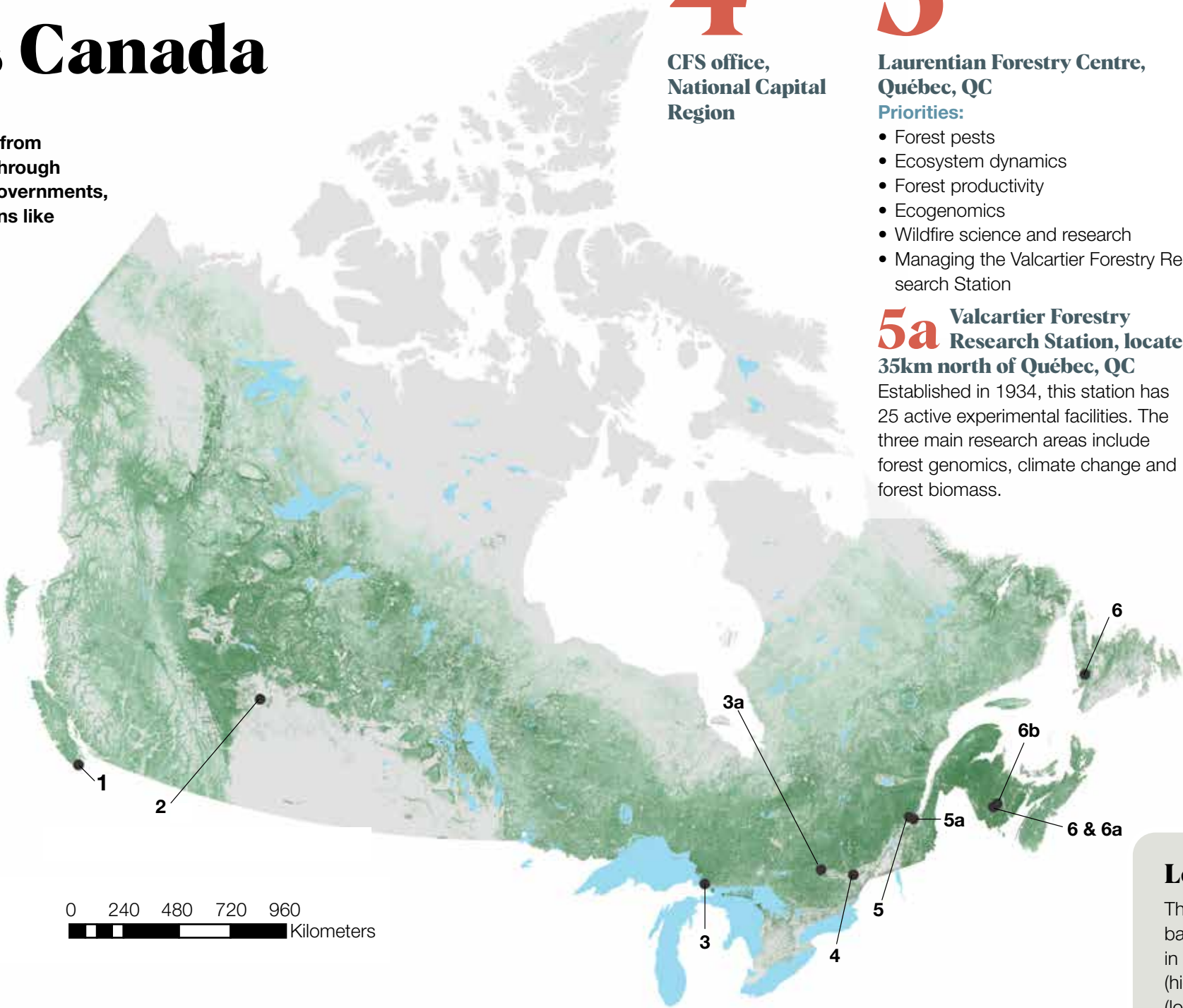
- Native and alien forest pests
- Forest inventory and ecosystem-based management
- Climate change risk and adaptation
- Forest genetic resources and biodiversity
- Wildfire science and research
- Managing the National Tree Seed Centre and the Acadia Research Forest

**6a National Tree Seed Centre, located at the Atlantic Forestry Centre**

The centre is home to more than 13,000 unique seed collections from 200 tree and shrub species. It is the only national seed bank preserving the genetic diversity of Canada's forests.

**6b Acadia Research Forest, located 20 km northeast of Fredericton, NB**

Established in 1933, it is one of the oldest and longest-running research forests still operating in Canada. It is a demonstration, training and education facility dedicated to applying SFM principles, managing timber resources, and protecting wildlife habitats and species at risk.



**Legend**

The background map displays Canada's forest cover based on the most recent data. Forests are represented in a gradient of green, going from darker for denser forests (high canopy closure) to lighter for more open forests (low canopy closure).

**Forest areas**

High (100%)	Non-forested areas
Low (10%)	CFS research facilities

# Spotlight on selected non-federal forest research facilities and initiatives over Canada

Other organizations across the country contribute significantly to forest research and are active in all forested provinces and territories. Below are some examples of facilities and initiatives that help advance the knowledge on forest ecosystems, their dynamics, conservation, sustainable management and much more.

## Pan-Canadian



### FPInnovations

FPInnovations is a not-for-profit organization with offices in several provinces. Experts carry out research in the areas of forest operations, pulp and paper, wood products and bio-sourced products. They provide solutions and technologies such as:

- Developing technologies to protect wood products against weathering, mould, decay and insects
- Characterizing pulp and paper mill bioproducts and developing applications in various sectors, such as agriculture
- Providing advice on best practices to ensure a high-quality biomass supply
- Developing automated interactive tools for tracking and reporting the status of forest regeneration

## British Columbia



### Faculty of Forestry, University of British Columbia

Researchers of this faculty develop scientific knowledge that helps improve the conservation of forest ecosystems and forest management practices. Their research focuses on:

- SFM and applied conservation science
- Communities and Indigenous Knowledge
- Ecosystems and climate change
- Urban forestry and green infrastructure
- Wood products, forest bioproducts and the bioeconomy
- Human dimensions of the environment
- Technology and innovation

### John Prince Research Forest

This research forest was established in 1999 and results from a collaboration between Tl'azt'en First Nation and the University of Northern British Columbia. Researchers combine First Nations' Traditional Knowledge and western scientific approaches to develop knowledge on:

- The impact of forest management on wildlife
- The habitat, ecology and behaviour of forest-associated wildlife
- Criteria and indicators for SFM
- Co-management practices

## Alberta

### **Ecosystem Management Emulating Natural Disturbance (EMEND) project**

The EMEND project is a large-scale variable retention harvest experiment aiming to test the effects of residual forest structure on ecosystem integrity and forest regeneration (e.g. by leaving live single trees and large patches of uncut forests within harvested areas). This project began in 1998 and is planned to run for about 80 to 100 years. It is the result of a collaboration between the University of Alberta, research agencies, provincial and federal governments, as well as northwest Alberta forest companies.

### **fRI Research**

fRI Research, a not-for-profit organization established in 1992, conducts research to improve land and resource management. Researchers study the impact of human and natural disturbances on ecosystems and wildlife (e.g., large mammals, water and fish, landscape change) and share knowledge and tools with governments, industry, academics, non-governmental organizations and communities.



## Saskatchewan

### **Saskatchewan Research Council (SRC), Forestry Services**

SRC is a Treasury Board Crown Corporation and was established in 1947. Experts offer forestry services in the following areas:

- Implementation of SFM
- Impact of climate change and adaptation in forest management
- Forest ecosystem monitoring and modelling
- Applied forest ecology and silviculture research
- Forest management planning
- Forest carbon management

### **Sustainability-Led Integrated Centres of Excellence (SLICE), Saskatchewan Polytechnic**

SLICE has four centres of excellence, including one on forestry and environment. This centre partners with industry and communities to improve forestry management by providing forestry research with equipment, such as LiDAR-equipped remotely piloted aircraft systems and augmented and virtual reality.



## Manitoba

### **Manitoba Model Forest (MBMF)**

MBMF, established in 1992, encompasses 1 million ha of boreal forest and is adjacent to Lake Winnipeg to the west and the province of Ontario to the east. Activities that take place in MBMF relate to:

- SFM and wildlife, including endangered species such as woodland caribou
- Community development, Indigenous involvement, and youth education and training
- Climate change
- Non-timber forest products

### **Centre for Forest Interdisciplinary Research (C-FIR)**

C-FIR was established in 1998 and is part of the University of Winnipeg. Research conducted in C-FIR seeks to understand forest ecosystem changes and the link between society and forests to promote their sustainable use.



## Yukon

### **Gunnar Nilsson and Mickey Lammers Research Forest**

The research forest was established in 1964 and covers about 248 ha. It is located 19 km north of downtown Whitehorse. Research has been carried out since the 1970s on topics such as:

- Trials on forest productivity, thinning, assisted migration adaptation, genetic and provenance. Provenance trials assess the adaptability to environmental conditions of plants from different geographic origins planted in common gardens.
- Community ecosystem project



## Northwest Territories

### **Partnership between the Wilfrid Laurier University and the Government of Northwest Territories**

This partnership was established in 2010 and allows researchers to conduct research activities in 400 million ha of boreal forest and tundra. Research activities range from monitoring, modelling, predicting to making policy recommendations in areas such as wildfires, wildlife, Indigenous Knowledge, greenhouse gases, forest dynamics and much more.



## Ontario

### **Centre for Northern Forest Ecosystem Research**

This Government of Ontario's centre is located in Thunder Bay. The areas of research are:

- Boreal forest stand ecology (e.g., effects of climate change on black spruce and jack pine forests)
- Boreal silviculture (e.g., ways to monitor forest development with remote sensing)
- Effects of forest management on boreal aquatic systems (e.g., effects on water temperature and brook trout)
- Northern mammal ecology (e.g., effects of human and natural disturbances on woodland caribou)
- Relationship among people, forests and forest management (e.g., assessments of cumulative effects of human and natural disturbances)

### **Ontario Forest Research Institute**

This Government of Ontario's Research Institute is located in Sault Ste. Marie. Experts carry out research in areas such as:

- Forest carbon (e.g. carbon storage in various pools, such as wood products)
- Forest genetic diversity (e.g. adaptation of tree populations under different climatic conditions)
- Forest growth and yield
- Forest health and invasive diseases (e.g. improved survey techniques for forest pests)
- Forest management in boreal mixed woods and in Great-Lakes–St. Lawrence forests
- Wetlands and peatlands (e.g. vulnerability to climate change)
- Terrestrial systems ecology, forest landscapes and disturbance (e.g. shifts in forest composition caused by climate change and forest disturbances)



## Nova Scotia

### School for Resource and Environmental Studies, Dalhousie University

Researchers at Dalhousie University's School for Resource and Environmental Studies carry out their work in forest-related areas, such as biodiversity conservation and SFM.

### Acadia University

Acadia University, located in Wolfville, NS, conducts research on insect chemical ecology to develop and commercialize insect pheromones and semiochemicals to benefit forestry in Canada.



## Québec

### Government of Québec's Forestry Research Directorate

The Government of Québec, through the work carried out by researchers at the Forestry Research Directorate, acquires and disseminates knowledge on SFM. The areas of research are:

- Forest ecology and genetics
- Ecosystems and environment
- Modelling forest growth and yield
- Production of seeds and plants
- Silviculture and yield of natural forests and plantations
- Forestry work

Different experimental facilities are available to government researchers and their partners, such as:

- 531 experimental forests on public land in deciduous, mixed and boreal forests. These forests are reserved for research and experimentation in forest science.
- 17 teaching and research forests on public land to promote practical teaching and applied research in forestry. These forests are often managed by secondary, college or university establishments.
- An organic and inorganic chemistry lab to support forestry research, which offers soil, plant tissue and water characterization services.

### Centre for Forest Research (CFR)

CFR was established in 2006 from the merge of the Centre for Research in Forest Biology and the Inter-University Forest Ecology Research Group. CFR is composed of 75 regular researchers from 11 universities in the province, in addition to associate researchers, graduate and post doctorate students and research professionals. Researchers in CFR aim to understand the functioning and dynamics of forest ecosystems and the interactions between their components. Their work focuses on areas such as:

- Genetics, molecular biology and ecophysiology
- Ecology of populations, communities and conservations biology
- Functioning and dynamics of forest ecosystems
- New silvicultural approaches and strategies for SFM



## New Brunswick

### Faculty of Forestry and Environmental Management, University of New Brunswick (UNB)

UNB's Department of Forestry has professors, scientists, and undergraduate and graduate students researching:

- Forest and wildlife ecology (e.g., genetics, soils, natural disturbances, species at risk, ornithology)
- Environmental social science (e.g., forest governance systems, forest socio-economic values)
- SFM and climate change (e.g., ecosystem services, silviculture, impacts of disturbances)
- Environmental precision technologies (e.g., inventory techniques, geographic information systems, remote sensing)
- Wood science and technology
- Water and watershed management (e.g., ecohydrology, Indigenous Knowledge)

### Northern Hardwood Research Institute (NHRI)

A partnership between the forest sector, governments, and academia, the NHRI conducts research to produce knowledge and tools to manage northern hardwood and mixed forests. This includes work on:

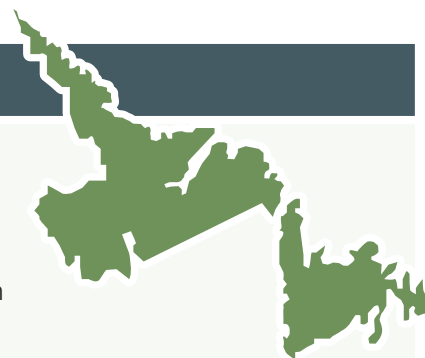
- Resource characterization (e.g., improving inventory, predicting volume by species, characterizing tree quality)
- Climate change: using silviculture as a climate change adaptation and mitigation tool
- Efficient forest operations, wood supply and analytics



## Newfoundland and Labrador

### Centre for Research and Innovation

The Centre for Research and Innovation, located in Corner Brook, NL, is a collaborative effort between Grenfell Campus - Memorial University of Newfoundland, the College of the North Atlantic and Corner Brook Pulp and Paper Limited. The centre aims to support local and regional economic growth through innovation, research, and training.



## Prince Edward Island

### Provincial forest demonstration woodlots

The Government of Prince Edward Island manages six demonstration woodlots where private woodland owners and people can learn about forest management and silviculture. The sites provide examples of good forest management practices, as well as information on natural history, cultural history, wildlife management and forest ecology.

