



Northern Notes

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The Northern Forestry Centre – 45 Years of Forest Science Research

2016 marks the 45th anniversary of the [Northern Forestry Centre \(NoFC\)](#) in Edmonton, Alberta. Built in 1970, it is one of five such physical research centres of the [Canadian Forest Service \(CFS\)](#) across Canada. In the course of its history, NoFC has contributed greatly to the CFS' forest science research in several areas, including wildland fire, climate change, boreal system ecology and, more recently, land reclamation.

This issue of Northern Notes highlights some of the unsung heroes supporting the researchers who endeavour to find solutions to forest related challenges and opportunities – the laboratories, greenhouses and collections of NoFC. Please also see [Insights issue #5 The Northern Forestry Centre \(NoFC\) Tree-Ring Lab](#).



The Northern Forestry Centre, Edmonton, Alberta
(Photo: Ray Darwent)

The Northern Forestry Centre (NoFC) Fungal Herbarium

The Northern Forestry Centre's (NoFC) Fungal Herbarium and culture collection is one of the research centre's little known gems. Established in 1952, the collection comprises over 22,000 fungi and plant specimens representing over 630 species. Over the years, other



herbaria also contributed specimens, some dating as far back to the early 1900s. The bulk of the collection contains specimens from Alberta, Saskatchewan and Manitoba, as well as the Northwest Territories and the national parks in the Rocky Mountains and eastern British Columbia. The culture collection includes over 2,400 living culture specimens representing over 500 species.



Figure 2: Black Gall is a common growth defect that occurs on Aspen (top), and fruiting body (conk) of *Fomitopsis pinicola* common on stems of dead conifers (bottom) (Photos: Ray Darwent)

approximately 60 years. A rough estimate would suggest that from its creation the NoFC collection is worth approximately \$5 million and it contains type specimens that are invaluable to global scientific knowledge. As more and more institutions close their collections those that are maintained by the CFS are becoming more valuable. The collection also serves as a knowledge transfer and learning tool for forest pathologists everywhere," adds Ramsfield. "This herbarium could also be thought of as collections of DNA that are housed within expertly identified specimens."

Hard-to-find collections, like NoFC's fungal herbarium, have other uses as well. For example, they can be used as an educational resource for post-secondary students. The specimens also include information on geographic location, collection date and host of forest pathogens and thus contribute to our knowledge of the biodiversity of Canada's forests. This data can be used to understand the distribution of forest pathogens in Canada and is also useful in identifying invasive organisms and knowledge associated with organisms that are of importance in international trade. NoFC's fungal herbarium is listed on the New York Botanical Garden's Index Herbarium (<http://sweetgum.nybg.org/science/ih/>), increasing its reach to researchers world-wide. Enter the international herbarium code "CFB" to access detailed information on NoFC's Fungal Herbarium.

"While *virtual* collections and photographs can make these collections widely accessible through the world wide web", concludes Ramsfield, "there is no substitute for examining preserved specimens under a microscope for a holistic perspective on their unique forms and structures."

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Figure 1: Dr. Tod Ramsfield and visiting researcher Sharmin Gamiet inspect fungal collection samples (top), and a small example of fungal herbarium collection list available (bottom) (Photo: Ray Darwent)

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The Northern Forestry Centre (NoFC) Fire Lab

When the Northern Forestry Centre (NoFC) was built in 1971, it included a lab designed for indoor, small-scale burning tests. The fire lab, as it is commonly referred to, comes equipped with a combustion room as well as facilities to condition fuels to the desired moisture content. The lab was created in answer to fire scientists' challenge to predict forest fire behaviour under field conditions. The fire lab allows researchers to scale down environmental conditions such as fuel variation, topography and weather, and so, better analyze and predict fire behaviour. With the controlled environment chamber, for example, researchers can test fuels, such as grass, shrubs, twigs, or larger pieces of wood from different species of trees, to simulate moisture regimes that occur throughout the fire seasons.



Figure 1: Researchers studying how smouldering peat fires transition from dry peat to wetter peat using infrared cameras and air temperature sensors able to operate in the hot air above a smouldering fire. The smouldering fire is seen at the top of the block of peat moving at no more than 1 centimetre per hour (Photo: Dan Thompson)

pose hazards to human health. "Understanding fire behaviour is critical to predict when a forest fire will occur and how long it may last", explains Dan Thompson, a Forest Fire Research Scientist with the Canadian Forest Service (CFS). "With that knowledge, fire-fighting and emergency responders can better determine what resources they would need to fight a fire, to reduce damage to nearby communities, undertake evacuations, or provide air quality alerts."

The NoFC fire lab is currently undergoing renovations under the [Government of Canada's](#) Accelerated Infrastructure Program to modernize its ventilation and lighting systems. These upgrades will allow for more advanced quantification of fire behaviour and smoke constituents of ground fuels that contribute significantly to the initiation and spread of wildfires in Canada.



Figure 2: Dr. Dan Thompson (far right) showcases NoFC's Fire Lab to NAIT forestry students (Photo: Ray Darwent, 2014)

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