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Northern Notes

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Last issue on "The Labs of NoFC" series. See also Northern Notes Issue #4, and Insights Issue #s 5, 6 & 7.

The Northern Forestry Centre Analytical Services Laboratory (ASL)

Figure 1: NoFC Analytical Lab (Photo: Joe Crumbaugh)

The Northern Forestry Centre Analytical Services Laboratory (ASL) is a centre of excellence providing services in the form of consultation and analytical chemistry to clients primarily based in the Prairie and Northern Region of Canada. The Laboratory performs a variety of analyses on soil, plant and water following methods outlined and described in the *Methods Manual for Forest Soil and Plant Analysis*.

The ASL's analytical capabilities include assessing the physical and chemical properties of soil, plant nutrition and water quality. The ASL is well equipped with inductively coupled plasma optical emission spectrophotometer (ICP OES) for elemental assessment; carbon nitrogen sulphur analyzer (CNS); segmented flow analyzer for nutrient determination; ion chromatography system; FTIR, gas chromatograph mass spectrophotometer (GCMS) for trace level analysis of organic compounds and ICP MS for low level elemental determination.

"Since the Canadian Forest Service first established it in 1967, the Analytical Laboratory has maintained up-to-date technology", says Joe Crumbaugh, Analytical Laboratory Manager at the Northern Forestry Centre. "For example, the Lab was one of the first to use Atomic Absorption and Inductively Coupled Plasma Spectroscopy for forest related research in the country."

Computers also changed everything in the instrumentation world. Digital acquisition of data meant lower detection limits, higher sample throughput, and less labor. Traditionally the Lab's analytical requests centered on physical and chemical attributes of soil as they pertained to forest nutrition. The acquisition of more sophisticated equipment allowed for a broader scope of analyses on a wider number of complex matrices.

"We provide a comprehensive range of analytical testing services to our researchers, such as sample characterization and nutritional analysis along with hydrocarbon and trace metal evaluation", adds Crumbaugh, "but we also work with external clients, such as the Government of Alberta and the University of Alberta, on project-based analysis. We have high benchmarks for quality control, and will adapt our methodology to meet our researchers' and external clients' needs."

For more information on the ASL, contact: Joe Crumbaugh (joe.crumbaugh@canada.ca)

The Northern Forestry Centre (NoFC) Herbarium

The Northern Forestry Centre (NoFC) in Edmonton, Alberta houses one of four herbaria used by researchers at the Canadian Forest Service. The facility opened 1970, and today houses over 30,000 vascular plant specimens, 5,000 bryophytes and 4,000 lichens, making it a rich source of western and arctic Canada plant information and history, which many researchers and authors tap into to support their work. Specimens at the NoFC Herbarium are often sought by Canadian, US and international taxonomists who are describing new species and untangling the evolutionary relationships among them. Sometimes, these plant collections can produce valuable disease specimens. Such was the case in 2000 when Pat Crane, a post-doctoral research fellow at NoFC, carried out some taxonomic research on spruce rust fungi of the Chrysomyxa ledi complex, for which she required specimens from a wide range of localities. In her quest for material, she checked through Ericaceae samples in the NoFC Botanical Herbarium. In so doing, she discovered new locations for the species C. cassandrae. Subsequent field collections extended the known distribution of this rust on spruce to the Prairie Provinces for the first time. She also found a Chrysomyxa infection with unusual spores on a specimen of Rhododendron housed in the herbarium. This turned out to be a new species as well, which she described as Chrysomyxa reticulata.

Figure 2: Sample specimen at NoFC Herbarium (Photo: Ray Darwent, 2018)

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"Our collections also provide essential support for diagnostic work", says Greg Pohl, Insect/Disease Identification Officer at NoFC. "Getting a correct identification on a sample brought into the lab can be critical; an incorrect species determination can result in costly pest management actions being applied in error to a non-pest species, or in failing to detect a new outbreak in the early stages."

Contacts: Greg Pohl, Insect/Disease Identification Officer
greg.pohl@canada.ca

Ruth Errington, Peatland Technician
ruth.errington@canada.ca

Canadian Forest Service (CFS) Field Research Installations

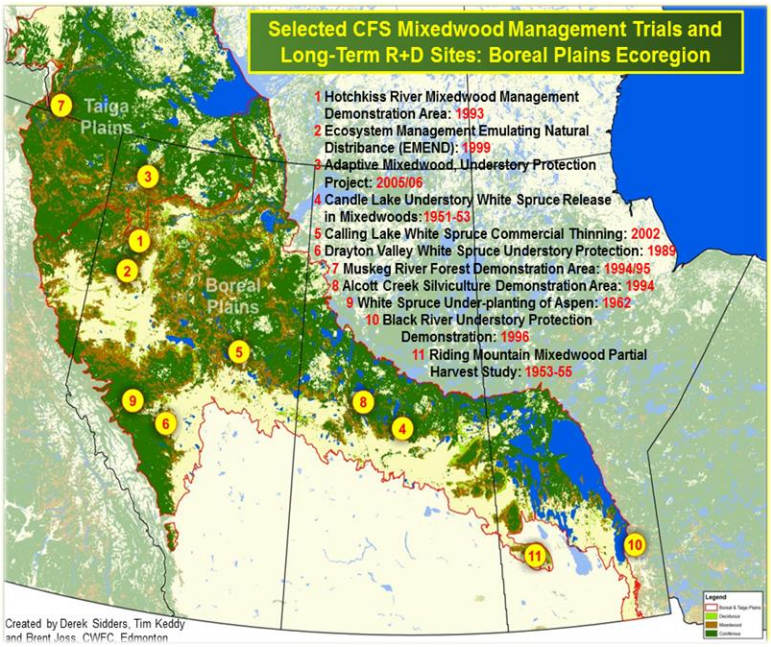

Figure 3: Map detailing key forest research field installations in Western Canada. The dates shown are the dates of installation. All of the field installations are currently active. (Source: Derek Sidders, CWFC, April 2018).

Forest field research installations are invaluable research tools that help address the primary forest sector issues of the day; these include a wide range of topics such as, fire behaviour, forest pest and pathogen monitoring and experimentation, forest harvest and regeneration practices, technical development and management applications. The CFS designs and installs field installations in collaboration with provincial governments and industry, who have responsibility for managing Crown forests and lands. These historic or long-term research study sites are the backbone of an integrated forest research program, which provide specific data for each site over time. For example, CFS researchers at the Northern Forestry Centre (NoFC) manage field installations going as far back as the early 1900s and covering the three Prairie Provinces and NWT. The four other CFS research centres have similar installations spread throughout their geographic regions. Forest field research installations can range in size from less than a hectare to several hundred hectares. "The CFS has a unique role in forest research in Canada", says Derek Sidders, Program Manager, Technology Development, for the Canadian Wood Fibre Centre (CWFC) in Edmonton, Alberta. "It's the only organization in Canada that undertakes forest science research from ocean to ocean to ocean, and is committed to the forest on the whole rather than selected areas across Canada.

Figure 4: CWFC Program Manager of Technology Development, Derek Sidders (right of centre holding clipboard) leads a field tour during the Calling Lake, Alberta, White Spruce Commercial Thinning Workshop, 2003 (Source: Derek Sidders).

The field sites are central to Canadian forest science research, technology development and transfer, and our goal to deliver science-backed solutions to our forest sector and to Canadian citizens. Field installations are a tangible way to showcase the results of our research to stakeholders, and why they fully support field test sites, and seek to collaborate and partner with our unique expertise to help advance Canadian forest management and commercial forest production.

Contact: Derek Sidders (derek.sidders@canada.ca)

Aussi en française

To subscribe to *Northern Notes*, please contact:
Ray Darwent, Natural Resources Canada, Canadian Forest Service,
Northern Forestry Centre, Edmonton, AB, Canada
780-435-7279 • nrcan.nofc-cfn.rncan@canada.ca• www.nrcan.gc.ca/forests

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