Comings and Goings

We welcome a new employee to the Great Lakes Forestry Centre (GLFC).

Sean Lacroix started his position as Senior Program Manager for the Applied Wildland Fire Science Division in April. Welcome Sean!

Dr. Taylor Scarr receives Career Achievement Award

Congratulations to Dr. Taylor Scarr who received the Career Achievement Award at the Invasive Species Centre's Annual Forum.

On February 19, 2025, Taylor's career achievements were recognized at the Invasive Species Centre's (ISC) Annual Forum when he received their Career Achievement Award. His achievements include helping to establish the ISC and his colleagues and nominees highlighted his significance to the invasive species field: "Dr. Scarr always takes time to be a teacher, leader and mentor to those in his field and those not in his field. He has participated in formal mentoring programs for new scientists and is an informal mentor to those who need advice in navigating the next steps in challenging situations. His mentorship has helped craft the careers of many scientists and operational programs that have tried to minimize the impacts and even eradicate invasive species. Dr. Scarr always has a sympathetic ear and shows genuine care and compassion to those he works with" (InTREEguing, Vol. 16, No. 10).
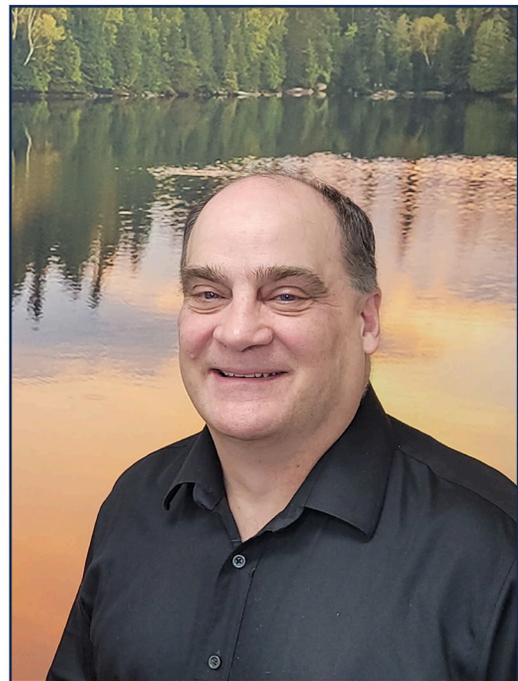
Dr. Taylor Scarr
Source: Invasive Species Centre

Dr. Robert Fleming honored for his contributions to Canada

Congratulations to Dr. Robert (Rob) LeSueur Fleming for receiving the King Charles III Coronation Medal for his exceptional contributions to Canada.

"Rob Fleming is as dedicated research scientist who recently celebrated 45 years with the Canadian Forest Service. He continues to make long-lasting and significant contributions at the international, national, provincial and community levels by providing scientific leadership and expertise in the field of forest management. One of his most notable achievements is his work on the Herbicide Alternative Project to provide alternatives to the use of herbicides in forest management, a key interest to Indigenous communities." (The Source, January 30, 2025)

A summary of Dr. Fleming's work will be presented in a future issue of the e-Bulletin.

Dr. Robert Fleming (right) holding his award and Danny Galarneau (Director General of the Great Lakes Forestry Centre).

Forest Soil Datasets in Ontario

A new information report summarizes 22 forest soil data sources and 94,650 data points collected in Ontario over the past 50 years.

This report "Forest Soil Datasets In Ontario" presents a compilation of forest soil datasets across Ontario, summarizing 22 forest soil data sources and 94,650 points collected over the past 50 years from research projects conducted by various agencies, industry, and universities primarily within the province's management forest region (Area of the Undertaking). Curating forest soil data is a key first step to advancing Digital Soil Mapping tools and creating products to map soils at higher resolution for use in forest resource inventory, operational forest management planning and decision-making. Next steps include data cleaning (quality checking) and standardization. A summary of the limitations of these data sets is provided, including the precision of geolocation information and varied methods for recording, collecting, and analyzing soil samples. Currently, these datasets are housed in different repositories but, as data-sharing agreements allow, they will be housed on a national soil data portal currently under development.

For more information contact Stephanie Nelson, or Dr. Kara Webster.

A History of Mountain Pine Beetle Outbreaks in Alberta and Saskatchewan, 1940-2007

Historical report discusses monitoring and detection methods, distribution figures and annual summaries for three outbreaks of mountain pine beetle over the period 1940 to 2007.

Three mountain pine beetle (MPB), *Dendroctonus ponderosae* Hopk. (Coleoptera: Scolytidae), outbreaks are known to have taken place in Alberta and Saskatchewan in the last 67 years. The earliest recorded outbreak occurred from 1940 to 1044 within Banff National Park. The second outbreak occurred mostly between 1982 and 1987, encompassing approximately 37,090 ha in the Rock Mountains and Foothills forests. The third outbreak, also in Alberta, did not begin until 1997. As of March 2007, over 2.8 million pine trees were known to be infested in Alberta, with approx. 91% found in the Alberta Sustainable Resource Development's Smokey Forest District in northwestern Alberta. This was the most severe outbreak because MPB threatened to expand eastward into the lodgepole pine/jack pine hybrid zone, which provides a bridge into the pure jack pine stands that range all the way to Canada's Atlantic Provinces.

This historical report "[A History of Mountain Pine Beetle Outbreaks In Alberta and Saskatchewan, 1940-2007](#)" was written largely in the Spring of 2007, about the same time that the emergency assessment was undertaken evaluating the risk of MPB spread across the Canadian boreal forest. Historical monitoring and detection methods, distribution figures, as well as detailed annual summaries are provided for these outbreaks by administrative region.

Through the years 2006-2023, federal scientific expertise on MPB was devoted to studying the ongoing outbreak and advising provinces on the ongoing battle against the beetle.In 2024, when this review was undertaken, the MPB outbreak has finally subsided in all sectors of western Canada to a point where it is possible to report synthetically on the early history of the insect in the prairie provinces. It has been decided that this report, as a historical document, should be maintained in the form it had acquired in 2007, including the language and the reporting style of the original authors of that time.

For more information contact [Dr. Barry Cooke](#).

Rethinking the Rainbow 2.0: Through the eyes of a scientist

Small changes can have big impacts on accessibility to visual scientific data.

When it comes to the visualization of scientific data, making visuals accessible to those with impaired colour vision is an often-overlooked aspect.

Jason Leach, a research scientist in forest ecohydrology at the Great Lakes Forestry Centre, provides insight into the challenges and progress in this area. His experiences highlight how the evolution of scientific publishing and data visualization has shaped, and sometimes limited, accessibility for colour-blind scientists and audiences. When Jason began his career, scientific journals were still dominated by print media. In the early 2000s, a surcharge was regularly applied to articles to be published in colour. Back then, he recalls, "you really tried to ensure your figures were essentially greyscale" to avoid additional costs. This had the unintended but welcome benefit of making visuals more accessible.

Publishers soon transitioned to digital formats and colour surcharges were dropped, but the transition to colourful data representations created new accessibility challenges for colour-impaired individuals. This has gone largely unnoticed in the scientific community but for individuals with impaired colour visions, such as Jason, the challenges remain and what should be the simple task of reading online publications has become more difficult.

The issue of colour differentiation is compounded by the growing complexity of data. Colour is a useful element to include when displaying data, but without the use of accessible palettes or other distinguishing features, the meaning of the data is lost for colour-blind viewers.

A few, simple, thoughtful adjustments can increase inclusivity and ensure work can be properly accessed by as many people as possible, such as:
1. Switching to a colour-blind-friendly palette;
2. Using other elements like shapes, patterns or line styles;
3. Printing the figure in greyscale to see if the information is still clear;
4. Use freely available software tools, such as ColorBrewer, that mimic colour vision deficiencies; and
5. Using annotations and labels, on paper or in the field, to ensure key information is not lost.

These seemingly small steps toward accessibility can play a major role in the larger mission of eliminating barriers in science to make it more inclusive for all.

For more information contact Dr. Jason Leach.

Below ground chemical and microbial community responses to the addition of wood ash in a central Ontario hardwood forest

Study shows wood ash is a viable amendment to forest soils.

Wood ash may be useful as a forest soil amendment but its use remains restricted in many parts of Canada and is frequently landfilled. To better understand soil responses to wood ash, soil water chemistry was measured over three years following the application of wood ash at a hardwood stand in Ontario, after which soil microbial response was assessed using 16S rRNA gene and internal transcribed spacer sequencing. Metal concentrations were below provincial regulatory limits in the wood ash locally sourced from the operation of boilers used to generate heat for drying kilns at a local sawmill.

Concentrations of most metals in soil water either decreased or exhibited no significant change in response to wood ash. There was an increase in diversity and richness of soil prokaryotic groups in the FH horizon at the highest wood ash treatment that is most likely linked to the large increase in pH. This study indicates that wood ash has a strong ameliorative effect on soil and soil water chemistry without major changes to soil microbial communities and is a viable amendment to forest soils at dosages below 5 Mg $\cdot$ha^{-1}.

For more information please read the journal article "Below ground chemical and microbial community responses of wood ash addition to a hardwood forest in central Ontario".

Response of stream habitat and microbiomes to spruce budworm defoliation: New considerations for outbreak management

High levels of defoliation can affect headwater stream microbiomes.

Eastern spruce budworm is one of the most important natural disturbances in Canadian boreal and hemi-boreal forests with annual area affected surpassing that of fire and harvest combined, and impacts are projected to increase in frequency, severity, and range under future climate scenarios. Deciding on an active management strategy to control outbreaks and minimize broader economic, ecological, and social impacts is becoming increasingly important. These strategies differ in the degree to which defoliation is suppressed, but little is known about the downstream consequences of defoliation and, thus, the implications of its management.

In this study "Response of stream habitat and microbiomes to spruce budworm defoliation: New considerations for outbreak management", a gradient of defoliation among 12 watersheds was experimentally manipulated during a spruce budworm outbreak. Several water-related indicators were then measured, including stream habitat and microbiome community structure and function indicators. It was found that cumulative defoliation resulted in increased stream flow rates and temperatures, and more aromatic dissolved organic matter. Cumulative defoliation also altered microbial community composition in ways that suggest that microbes are shifting their carbon use. These results demonstrate that high levels of defoliation can affect headwater stream microbiomes to the point of altering stream ecosystem productivity and carbon cycling potential, highlighting the importance of incorporating broader ecological processes into spruce budworm management decisions.

For more information contact Emily Smenderovac or Caroline Emilson.

Publications

Brett, R. D., Volney, W. J. A., Cerezke, H. F., Cooke, B. J. & Weber, J. D. (2025). A History of Mountain Pine Beetle Outbreaks In Alberta and Saskatchewan, 1940-2007. Information Report (GLFC - Sault Ste. Marie), GLC-X-39, 1-96.

Canadian Forest Service Fire Danger Group (2025). The 2025 Update to the FWI System: Structure, Changes and Interpretation. Information Report (GLFC - Sault Ste. Marie), GLC-X-42, 59. Natural Resources Canada.

Cooke, B. J. Canadian Forest Service (2024). On the characterization of patterning in spruce budworm time-series data. Canadian Journal of Forest Research, 54, 10, 1183-1197.

Johnston, J. M. & Dufour, D. Great Lakes Forestry Centre (2025). Canadian Space Agency WildFireSat - Mission Requirements Document. Information Report (GLFC - Sault Ste. Marie), GLC-X-41, 77. Natural Resources Canada.

Lu, P; Beaulieu, J.; Pedlar, J. H.; Parker, W. C. McKenney, D. W.; Benomar, L. (2024). Assessing assisted population migration (seed transfer) for eastern white pine at northern planting sites. Forest Ecology and Management. 572.

Mangal, V.; Lam, W. Y.; Emilson, E.; Mackereth, R. W.; Mitchell, C. P. J. (2024). The molecular diversity of dissolved organic matter in forest streams across central Canadian boreal watersheds. Environmental Sciences: Processes and Impacts, 26, 5, 942-956.

McCaig, M. L.; Kidd, K. A.; Smenderovac, E. E.; Perrotta, B. G.; Emilson, C. E.; Stastny, M.; Venier, L.; Emilson, E. J. S. Canadian Forest Service (2024). Response of stream habitat and microbiomes to spruce budworm defoliation: New considerations for outbreak management. Ecological Applications, 34, 7, 1-19.

Natural Resources Canada, Canadian Forest Service (2025). WildFireSat e-Bulletin, Issue 4. WFS e-Bulletin (GLFC - Sault Ste. Marie), 4, 4.

Pedlar, J. H.; McKenney, D. W. (2024). Assisted migration outcomes for oak species and seed sources in southern Ontario, Canada. Frontiers in Forests and Global Change, 7, 1-11.

Smith, E.; Basiliko, N.; Eimers, M. C.; Munford, K. E.; Hazlett, P. W.; Watmough, S. A. (2024). Below ground chemical and microbial community responses of wood ash addition to a hardwood forest in central Ontario. Canadian Journal of Forest Research, 54, 1-14.

Thompson, D. K.; de Jong, M. C.; Crowley, M. A.; Ansell, M.; Cantin, A. S.; Goetz, G.; Harvie, J.; MacPherson, L.; McFayden, C. B.; Oladipo, S.; Oliver, J.; Sloane, M.; Johnston, J. M. (2025). WildfireSat Science and Applications Plan. Information Report (GLFC - Sault Ste. Marie), GLC-X-38, 83. Natural Resources Canada.

Yanni, S. D. & Webster, K. (2025). Forest Soil Datasets in Ontario - Facts Sheets. Information Report (GLFC - Sault Ste. Marie), GLC-X-40E, 58. Natural Resources Canada.