Improving Wildland Firefighter and Public Safety Through Fire Behavior Research and Development

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The need to accurately appraise potential wildland fire behavior is embedded in nearly every fire management decision.

And, because of potentially adverse impacts to wildland firefighter safety, the public-at-large, and other values at risk, particular emphasis needs to be devoted to the *prediction* of extreme or severe fire behavior.

In addressing these significant wildland fire safety needs, the wildland fire behavior research and development activities at the Canadian Forest Service's Northern Forestry Centre have two broad objectives:

- To conduct fundamental and applied research to develop mathematical models and operational guidelines for predicting the characteristics of the various phenomena associated with extreme fire behavior; and
- To ensure that fire managers and other clients are aware of the current state of knowledge regarding wildland fire dynamics.

Particular emphasis needs to be devoted to the *prediction* of extreme or severe fire behavior.

In recent years, the centre's focus and accomplishments have occurred in four key areas:

- Applications of fire behavior knowledge and the Canadian Forest Fire Danger Rating System directly to wildland firefighter safety and community fire protection (such as the "Grassland Fire Behavior Pocket Card" and other media, including posters).
- Wildland fire behavior training course delivery and development at the national level (including the Canadian Interagency Forest Fire Centre's Advanced Wildland Fire Behavior and Wildland Fire Behavior Specialist training courses) and several CD-ROM based courses *(Principles of Fire Behavior, Intermediate Wildland Fire Behavior, Wildland Fire–Safety on the Fireline, and*

Marty Alexander, the article's author, underburning for an experimental fuel treatment effectiveness study in a low-pruned and partially thinned 75-year-old jack pine stand in the Northwest Territories, Canada. Photo: R.A. Lanoville, June 2005.

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This article is adapted from a summary associated with a scientific poster presentation made at the XII World Forestry Conference held September 2003 in Quebec City, Quebec. Copies of the poster are available for downloading at: <http://nofc.cfs.nrcan.gc.ca/wfc_pdfs_northern/alexander.pdf>.

Understanding the Fire Weather Index System).

- Development of new, generic models for predicting extreme fire behavior (such as the initiation and spread rate of crown fires, maximum spotting distance from crown fires).
- The International Crown Fire Modelling Experiment that has provided new insights into the nature of crown fires and the opportunity to test and evaluate several fuel management theories.

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These activities of the Northern Forestry Centre's wildland fire behavior research and development efforts have been accomplished with the assistance of numerous regional, national, and international partners. A strong sense of social responsibility for ultimately benefiting the environment and all of its inhabitants is a common theme that is weaved into all of these research and development undertakings.

An updated list of the publications (Alexander 2003) pertaining to this work is available upon request (e-mail Marty Alexander: malexand@nrcan.gc.ca).

Reference

Alexander, M.E. 2003. Wildland fire behavior research at the Northern Forestry Centre. Edmonton, Alberta: Canadian Forest Service, Northern Forestry Centre <http://www.ciffc.ca/whatsup/NoFC-XIIWFC-handout (E).pdf>. ■

Web sites on Fire*

The Canadian Forest Fire Danger Rating System

The Canadian Forest Fire Danger Rating System (CFFDRS) is Canada's national system for rating forest fire danger. It was developed by the Canadian Forest Service (CFS) in cooperation with the provincial, territorial, and federal fire management agencies in Canada.

The CFFDRS includes decision aids—both existing and planned—for the evaluation of forest fire danger, description of fire occurrence, and prediction of fire behavior characteristics.

The CFS fire research group has developed a Web site to provide a source of up-to-date technical information that describes the development, structure, and application of the four subsystems or modules that comprise the CFFDRS:

- The Fire Weather Index System,
- The Fire Behavior Prediction System,
- The Fire Occurrence Prediction System, and
- The Accessory Fuel Moisture System.

Currently, the CFFDRS Web site also includes a list of selected publications and information on computer software.

A current, comprehensive summary of the CFFDRS can be found in: Taylor, S.W.; Alexander, M.E. 2006. Science, technology, and human factors in fire danger rating: The Canadian experience. International Journal of Wildland Fire. 15: 121–135. (This and other CFFDRS publications can be downloaded from the FIREhouse Web site: <http://depts.washington.edu/nwfire/>.)

Found at **<http://fire.cfs.nrcan.gc.ca/research/environment/cffdrs/cffdrs_e.htm>.**

* Occasionally, *Fire Management Today* briefly describes Web sites brought to our attention by the wildland fire community. Readers should not construe the description of these sites as in any way exhaustive or as an official endorsement by the Forest Service. To have a Web site described, contact the managing editor, Paul Keller, at 503-622-4861, pkeller@fs.fed.us (e-mail).