



Natural Resources
Canada

Ressources naturelles
Canada



Bulletin
46

FRONTLINE EXPRESS

Canadian Forest Service – Great Lakes Forestry Centre

Global Early Warning System for Wildland Fire

INTRODUCTION

Globally, wildland fires burn several hundred million hectares annually. Close to 80% of fires occur in grasslands and savannas, while the remaining 20% are forest fires. Although not all fires are documented, it is known that over the last few decades fire activity has increased in many different global regions. This increase is due to a number of factors including climate change, rural-urban population shifts, and land use change, which all affect vegetation and fuel conditions. Every year, many fires around the world burn as uncontrolled wildfires, of which a small number have disastrous social, environmental, and economic impacts. It is particularly important to manage risk when fire may threaten people and communities.

Any wildland fire that overwhelms fire suppression capacity to the point that human life, property, and livelihood cannot be protected is considered to be a disaster fire. To minimize the occurrence and impact of such fires, managers require early warning of extreme fire danger conditions, which provides them with time to implement fire prevention, detection, and pre-suppression action plans, including mobilization and pre-positioning of fire fighting resources to key critical areas. Early warning of potentially dangerous situations also allows for timely sharing of fire fighting equipment and personnel between different agencies, which is an important component of a fire management strategy. In Canada for example, the Canadian Interagency Forest Fire Centre (CIFFC) coordinates the sharing of fire suppression resources among all the provinces and territories, and between Canada and the United States, and other countries.

Disaster fires occur in every global region and no individual country has the ability to control all fires every year. Greater international cooperation will help all countries to better handle the problems of increasing fire activity and disaster fires. In 2006, the United Nations (UN) Food and Agriculture Organization adopted a *Strategy to Enhance International Cooperation in Fire Management* to help address this issue. Around the same time, the UN Secretary General proposed the development of a Global Multi-Hazard Early Warning System under the auspices of the UN International Strategy for Disaster Reduction. As a result, the Global Early Warning System for Wildland Fire (Global EWS-Fire) is currently being developed by a consortium of international experts.

GREAT LAKES FORESTRY CENTRE (GLFC) ROLE

International reputation

GLFC fire scientists Bill de Groot and Tim Lynham are key members of the international group working on the establishment of the Global EWS-Fire. Natural Resources Canada, Canadian Forest Service has

maintained an internationally recognized fire research program since the mid-1920s, which has resulted in Canada becoming a world leader in forest fire research and management. The Canadian Forest Fire Danger Rating System (CFFDRS) is one of the most highly advanced and most widely applied fire danger rating systems in the world.

A forest fire danger rating system provides qualitative or numeric indices of fire potential based on factors such as weather and fuel conditions, and predicts the expected ease of ignition and difficulty of control. Many forest fire management agencies use the CFFDRS as a decision-aid tool. Currently, two subsystems of the CFFDRS: the Canadian Forest Fire Weather Index (FWI) System and the Canadian Forest Fire Behavior Prediction (FBP) System are being used throughout Canada, and applied internationally.

Characteristics of the Early Warning System

The Global EWS-Fire will present a composite picture of early warning data from several fire danger rating systems; the Canadian FWI System will be used as the common global metric because of its wide international acceptance. The Global EWS-Fire provides fire danger ratings based on daily weather parameters such as humidity, temperature, precipitation and wind speed. Fire danger rating systems normally provide a 4 -6 hour warning of the highest fire danger for the day using the daily weather forecast. However, by using forecasted conditions from advanced weather models, warnings as early as 1-2 weeks in advance can be provided.

One of the goals of the Global EWS-Fire was to link the many independent systems that countries already have in place. For countries where national fire danger rating systems exist, the Global EWS-Fire will provide additional long range warning information. In countries where no national system currently exists, early warnings from national to local levels will be provided from actual and forecasted weather collected by the World Meteorological Organization (WMO) network. Countries with limited fire management capacity will also be assisted in the local use and application of this fire danger and early warning information.

Early warning products will be enhanced using satellite data such as global hotspots, which indicate current fire activity, and landcover data to interpret vegetation, fuels, and seasonal vegetation green-up and curing. Other remotely sensed data that will be incorporated in the future include spatial weather parameters such as rainfall distribution, temperature and relative humidity, fire radiative energy, which indicates fuel consumption and emissions, and biomass, which can be used to determine fuel load, fire behavior and emission estimates.

Once the Global EWS-Fire becomes activated as a daily operational website, global early warning products will be distributed via the WorldWideWeb. These will include 1-14 day forecasts of fire danger as well as current global fire danger, generated by linking the various national fire danger rating systems. Development of the global system will soon be completed and can be viewed at <http://www.fire.uni-freiburg.de/gwfews>.

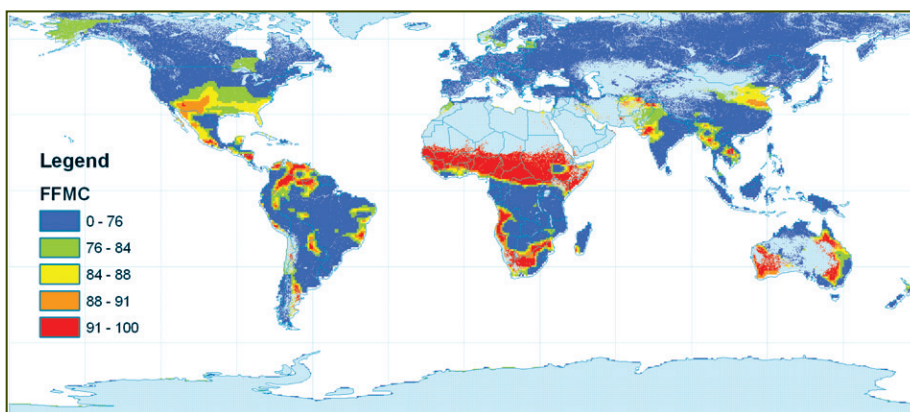
Putting the system into practice

Countries with an existing fire danger rating system will continue to determine current fire danger by collecting data from national fire weather station networks once or twice daily. Those countries also often calculate a 1-3 day fire danger forecast. For countries without a national system in place, current daily fire danger and forecasts can be received from the Global EWS-Fire. All countries will receive a 2-week fire danger forecast from the Global EWS-Fire, which will allow for enhanced fire management planning and resource-sharing within and between countries. At the local level, communities can collect local fire weather data and calculate daily or hourly fire danger, as necessary. This information will be used to determine daily fire prevention, detection, and suppression activities by the community. Forecast fire danger (1-14 days) will also be available to the local level for extended fire management planning.

The Global EWS-Fire Project will provide knowledge transfer and technical training in the application of early warning information for operational fire management, which will be offered through various programs and agencies including the United Nations University. A key component of technology transfer will be community workshops to assist in the development of local fire management decision-aids.

CONCLUSION

When completed, the Global Early Warning System for Wildland Fire will help minimize the impacts of wildfire disaster through advanced preparation in fire prevention, detection and suppression preparedness. The Global EWS-Fire will further enhance fire management capacity in countries that have an existing fire danger rating system. It will also provide a fire danger rating system for the many countries that do not have a system of their own. The Global EWS-Fire will benefit national and international wildland fire and disaster management organizations in the development and implementation of resource sharing agreements during times of extreme fire danger.



Example of Global Fire Danger (January 12, 2010). The Fine Fuel Moisture Code (FFMC) of the Canadian Forest Fire Weather Index System is an indicator of potential fire ignitions. The map indicates areas ranging from low (blue) to extremely high (red) potential for new fires.

COLLABORATORS

- Global Observation of Forest Cover and Global Observation of Landcover Dynamics (GOFC-GOLD) – Fire Implementation Team
- The Global Fire Monitoring Center, Max Planck Institute for Chemistry
- University of Maryland, Department of Geography
- NOAA/NESDIS Center for Satellite Applications and Research
- European Commission - DG Joint Research Centre, Institute for Environment and Sustainability
- Centre for Australian Weather and Climate Research
- Reforestation and Forest Management Division, International Tropical Timber Organization (ITTO)

CONTACT INFORMATION

Bill de Groot
Great Lakes Forestry Centre,
1219 Queen St. East,
Sault Ste. Marie, Ontario P6A 2E5
Tel: 705-705-949-9461
Fax: 705-541-5700
<http://cfs.nrcan.gc.ca/regions/glfc>
E-mail: GLFCWeb@NRCan-RNCan.gc.ca