



Forestland Disturbances Monitoring and Mapping for Sustainable Development Planning and Reporting Project

Sustainable Development Through Knowledge Integration

Natural and anthropogenic processes are constantly changing the state of Canada's forests. The *Forestland Disturbances Monitoring and Mapping for Sustainable Development Planning and Reporting* project is developing innovative approaches to monitoring and mapping forestland disturbances that will contribute to the faster delivery of consistent information about these changes thus supporting Canada's national and international commitments to sustainable forest management, climate change, biodiversity and conservation. This project is a joint initiative between the Canadian Forest Service (CFS) and the Earth Sciences Sector of Natural Resources Canada.

Assessing disturbance due to fires and insects

The combined annual depletion from pests and fires of the productive capacity of Canada's forests is larger than the annual harvest of all forest products. This project is implementing a system that estimates area burned in a consistent manner over time, using Earth observation (EO) imagery from multiple satellites. The estimation methods attempt to account for variability in burning conditions and to resolve discrepancies among products derived from different sources, such as ground and satellite observations.

Initial outputs – burn area vectors from one satellite image – were used operationally over three provinces to support field measurements of fuel consumption in targeted areas. The project has begun producing burned area maps and emission estimates generated from multiple data sources for a 2002 pilot area in Saskatchewan, as part of an interdepartmental test to account and report carbon emissions and to satisfy national Kyoto reporting requirements.

Canadian Wildland Fire Information System

The outputs from this EO-based monitoring system are important inputs for the Canadian Wildland Fire System (CWFFIS). This project is also responsible for three other aspects of this system:

- developing a system to optimize the selection of EO imagery from Landsat and other satellites for the mapping of large natural disturbances;
- implementing the National Forest Fire Facility (NFFF) to gather, manage, and archive geo-spatial data; and
- implementing an integrated CWFFIS Framework, so that data flows well between the various components and processes of the system.

The NFFF is located at CFS's Northern Forestry Centre in Edmonton. It is using the latest Web technologies to provide secure, public access to fire statistics. "Hot spots" monitoring products completed for the period 1994 to 2003 are to be integrated into this archive.

An innovative, Web-based system (DiMAPS) is being developed to enable easier monitoring of multiple EO databases over forestland disturbances and automated notification when a suitable image becomes available.

An analysis of the data required for the various models has been completed for the CWFFIS Framework, and data exchange and communication protocols are being designed. The infrastructure for this decision support system must be carefully implemented and the methods validated so that burn area and forest fire emissions can be delivered in a reliable and timely manner.

National forest carbon monitoring

This partnership project is building closer inter-sector ties and is helping to ensure that information from the Earth Sciences Sector is used effectively for monitoring the national carbon budget and forecasting the impact of Natural Resources Canada's sustainable development strategy in the forest sector. The National Forest Carbon Monitoring, Accounting and Reporting team and the Canadian Space Agency are both formally supporting the development of the CWFFIS and recognize its important role in fulfilling Canada's reporting commitments.

For more information

To learn more about the *Forestland Disturbances Project*:

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Project Highlights



Sustainable Development Through Knowledge Integration



Canadian Wildland Fire Information System

The Canadian Wildland Fire Information System (CWFIS) is a joint ESS – CFS initiative, which will contribute to national and international reporting of fire activity, burn areas and carbon emissions.

With this decision support system, foresters and managers can sit at an interactive workstation and search through a large archive of relevant data. Easy-to-use models and analysis tools enable them to query and graph data, generate and compare maps, calculate measurements, and produce reports.

Images from multiple satellites are acquired daily at four locations in Canada. From these satellite images, daily maps of “hot spots” and

smoke are generated, showing the locations of large fires across Canada. Regional maps, such as the one above for the 2003 fires in the Yukon Territory, are used to provide guidance for developing strategies to manage fires. More detailed mapping of the burned areas, using higher resolution satellite imagery, occurs soon after the smoke is gone .

These products are inputs to the CWFIS, and are being integrated into various models and reports such as Natural Resources Canada’s annual reports on the implementation of its sustainable development strategy and on the state of Canada’s forests. They are also contributing to Canada’s national report on climate change.

