

With this sophisticated but user-friendly software tool, users apply their own stand- or landscape-level forest management information to calculate carbon stocks and stock changes for the past (monitoring) or into the future (projection). Users can also create, simulate, and compare various forest management scenarios in order to assess impacts on carbon.



Tools in the model assist users with importing required data from common timber supply models such as Spatial Woodstock™ or from user-developed data files.

The model contains graphic user interfaces to help prepare data, define scenarios, perform analyses, and examine results.

Results of analyses can be used for various types of forest ecosystem carbon reporting requirements. In Canada, many jurisdictions

require forest management plans to report on criteria and indicators in order to comply with sustainable forest management guidelines. CBM-CFS3 results can also be used to report on carbon to acquire forest certification (for example, certification under the Canadian Standards Association Sustainable Forest Management Program).

The CBM-CFS3 is also the central model of Canada's National Forest Carbon Monitoring, Accounting and Reporting System. It is used for international reporting of the carbon balance of Canada's managed forest.

A user's guide, several tutorials, and technical support are available to assist forest analysts with the use of the model.

The model contains a set of default ecological parameters appropriate for Canada, which users can modify for the application of the model outside Canada. The model has been used for forest carbon analyses in over 30 countries. The model and supporting documentation are freely available in English, French, and Spanish; support for other languages is under development.

#### MODEL AVAILABILITY

The CBM-CFS3 and user's guide are publicly available, free of charge. To obtain the latest version of the CBM-CFS3, for technical support, or for more information about the project, training workshops and publications, visit:

<http://carbon.cfs.nrcan.gc.ca>

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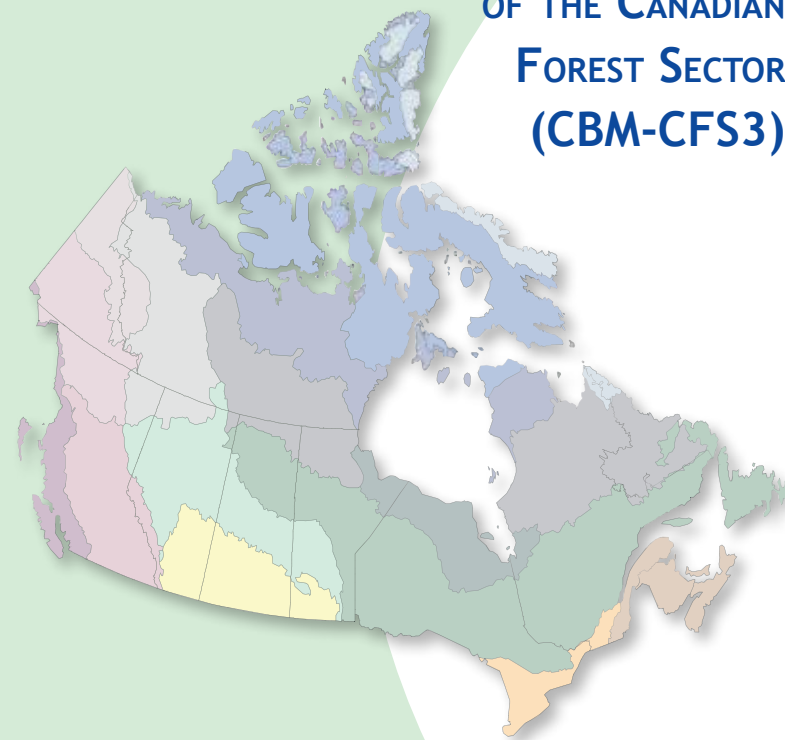
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## THE OPERATIONAL-SCALE CARBON BUDGET MODEL OF THE CANADIAN FOREST SECTOR (CBM-CFS3)



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Canada



## FORESTRY AND CLIMATE CHANGE

Forests play an important role in the global carbon cycle by storing and releasing carbon. Forest management actions influence the net carbon balance of Canada's forests, and forest managers need a scientifically credible tool to assess the potential impacts of alternate management strategies on carbon stocks and stock changes on their land base. Such a tool would enable forest managers and analysts to report the carbon implications of proposed management plans and devise strategies to reduce carbon sources and increase carbon sinks.



**A MODEL SOLUTION**

In the late 1980s, researchers at Natural Resources Canada's Canadian Forest Service began developing computer models for forest



carbon accounting. The Carbon Budget Model of the Canadian Forest Sector (CBM-CFS2), a research tool designed to account for carbon stocks and stock changes in forest ecosystems, was used throughout the 1990s to assess the role of Canada's forests in the global carbon cycle. It also helped researchers quantify how natural disturbances, forest management, and growth and decomposition rates affect forest carbon stocks at the stand and landscape levels.

In 2002, the carbon accounting team of the Canadian Forest Service (CFS-CAT) and the Canadian Model Forest Network (CMFN) responded to the forest industry's need for an operational carbon accounting tool. The tool would help managers meet criteria and indicator reporting requirements for sustainable forest management as well as reporting requirements for forest certification. It would help managers understand how their actions affect the net carbon balance of their forest estate.

The goal of the partnership between the CFS-CAT and the CMFN was to develop a user-friendly operational-scale carbon accounting tool that would build on the science of the CBM-CFS2.

## THE OPERATIONAL-SCALE CARBON BUDGET MODEL OF THE CANADIAN FOREST SECTOR

The CBM-CFS3 is a stand- and landscape-level modeling framework that simulates the dynamics of all forest carbon stocks required under the United Nations Framework Convention on Climate Change. It is compliant with the carbon estimation methods outlined in the Good Practice Guidance for Land use, Land-Use Change and Forestry (2003) report published by the Intergovernmental Panel on Climate Change.

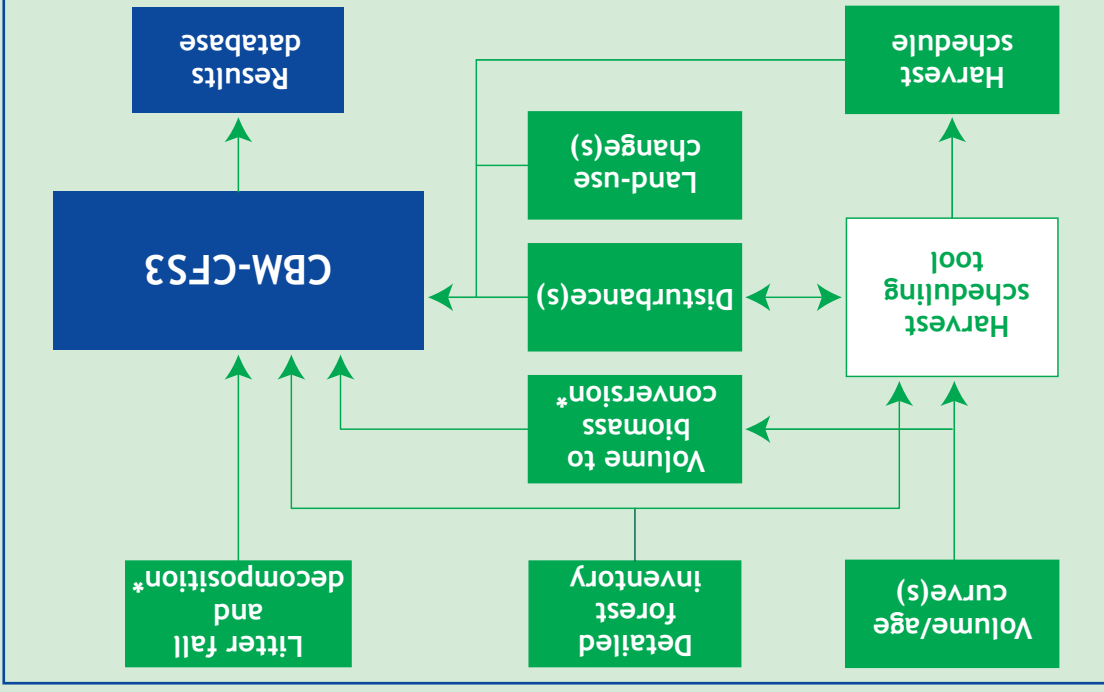


Figure 1. Data inputs (green boxes) required by the CBM-CFS3. \*Default parameters for Canada are provided with the model, and can be modified by users to meet their needs.

The model requires much of the same information used for forest management planning activities (e.g., forest inventory data, tree species, growth and yield curves, natural and human-induced disturbance information, forest harvest schedule and land-use change information), supplemented with information from national ecological parameter sets and volume-to-biomass equations appropriate for Canadian species and forest regions (see Figure 1).