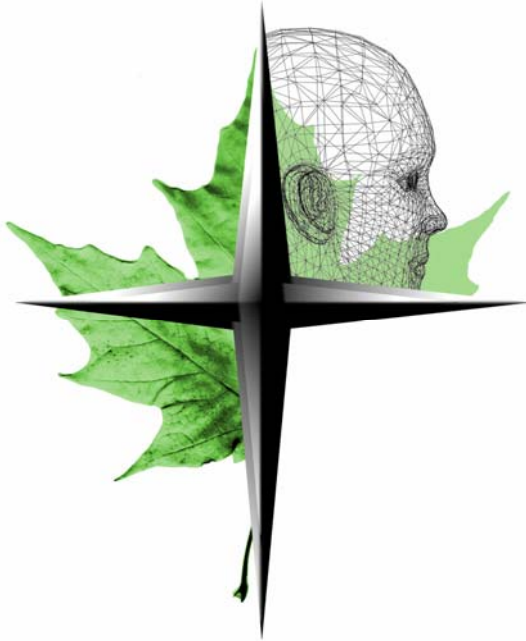


C A S E S T U D Y

F O R E S T P L A N N I N G W I T H R E M S O F T[®]

Canadian Forest Service helping foresters track carbon stock changes



From helping to understand forest carbon dynamics, to Kyoto Protocol compliance, the need for a carbon accounting tool for Canada's forests is as important as ever.

The Canadian Forest Service Carbon Accounting Team (CFS-CAT), in partnership with the Canadian Model Forest Network, has a mandate to provide just that.

The partnership seeks to develop and deliver a detailed, scientifically rigorous, forest carbon accounting tool to help forest analysts and researchers fully understand the role of Canadian forests in the global carbon cycle, and to determine how forest management practices can reduce carbon sources and increase sinks.

Counting carbs

Elevated carbon dioxide levels in the atmosphere, resulting primarily from the burning of fossil fuels and deforestation, have led to increased levels of carbon dioxide in the atmosphere. Many scientists predict this will lead to climate related changes including increases in global temperatures.

"Climate change is expected to have significant impacts on global environments and plant and animal species, especially those that cannot adapt quickly, such as those in arctic environments," says Stephen Kull, Carbon Accounting Liaison Officer with the CFS-CAT.

Carbon storage in forests starts when carbon dioxide is removed from the atmosphere through photosynthesis and is incorporated into plant or tree biomass. At the same time, carbon may be released back to the atmosphere through plant or tree respiration, decomposition of litter and soil dead organic matter, or through disturbances like forest fires. The amount of carbon stored by a forest during a given period represents the net balance between these processes.

"Forest carbon accounting involves the estimation of past, present or future exchanges of carbon between the atmosphere, above and below ground biomass, dead organic matter and soils in forest ecosystems, in order to determine carbon stocks and carbon stock changes," explains Kull.



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Modeling the ecosystem

The Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) is an aspatial, landscape-level model of forest ecosystem carbon dynamics that can be used to assess forest carbon stocks and stock changes. Formerly a research model, this operational-scale version has been built on over a decade of scientific research and practice.

Although primarily used to assess carbon dynamics at the operational scale, the model can also be used to explore carbon dynamics for smaller areas, including single stands. The model can be used to assess past carbon stock changes, evaluate future changes resulting from scenarios of management actions and natural disturbances, and account for carbon stocks and stock changes in aboveground and belowground biomass, dead wood, litter and soil pools.

To perform these calculations, the model incorporates forest inventory, growth and yield data, natural disturbance and land-use change information, and a schedule of forest-management activities. Through a variety of specialized import tools, many of which are designed to accept data from specific timber supply or forest management models, users can import these data and information.

Users have the option to run their timber-supply scenario or to build additional scenarios, and run one or more different simulations (containing, for example, different management scenarios) to determine the impact on carbon stocks and stock changes. Simulation results can then be viewed in a results exploration tool or exported for further analyses.

Since model parameters can be viewed and modified for local application, foresters and researchers are also using this model to account for forest carbon stock and stock changes in countries other than Canada.

For users of the Remsoft Spatial Planning System, including international users, linking to the CBM-CFS3 just became a whole lot easier.

“The CFS-CAT began consulting with Remsoft in 2003 in order to determine the best way to build a tool for the CBM-CFS3 to import forest management data coming from Woodstock users,” says Kull. “Remsoft programmers designed and developed a Spatial Woodstock feature that exports files specifically formatted for the CBM-CFS3.” Developers from the CFS-CAT built the tool to import these Woodstock output files into the CBM-CFS3.

“We provided in-kind contributions to develop this linkage to make it easier for users of our software who also use the CBM-CFS3,” says Remsoft Vice President of Research and Development Ugo Feunekes, lead developer of Remsoft software. “The result is a quick and efficient way to transfer data between the two systems.”

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