

The Canadian Model Forest Network: *In Situ* Laboratories for Development, Testing and Implementation of New Approaches to Sustainable Forest Management

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Abstract

Canada's Model Forest Program was established in 1992 by Natural Resources Canada's, Canadian Forest Service as an experiment to develop innovative approaches to sustainable forest management that integrate economic, environmental and social objectives. Each of the 11 model forests represents the diversity and complexity of a major forest region of Canada. Phase I of the Model Forest Program (1992-1997) was dedicated to forming partnerships. Phase II of the Program (1997-2002) focused on the establishment of processes for the development, testing, application and monitoring of local level indicators of sustainable forest management. Model forests evolved as a primary mechanism for developing sub-national indicators, becoming *in situ* laboratories for C&I development and testing. Each model forest, using the definition of sustainable forest management endorsed by the Canadian Council of Forest Ministers, with its six criteria as the framework, developed their own set of local level indicators. A database of the local level indicators developed and used by the various model forests is available at www.modelforest.net. Phase III of the Model Forest Program (2002-2007) proposes to focus on the work initiated in earlier phases of the program and to extend implementation of the Local Level Indicators and Enhanced Aboriginal Involvement in Sustainable Forest Management Initiatives beyond the boundaries of the model forests. In addition, model forests are being used as pilots for operational testing and eventual seeding of national or regional programs, such as carbon accounting, or for the development of tools to monitor and model afforestation activities. The Model Forest Network has successfully brought together government, industry, Aboriginals and private landowners and operators to develop and showcase innovative approaches to sustainable forest management. Ideas generated through model forests are shared not only within the Canadian forest community and public but also throughout a network that is spreading around the world.

Keywords

sustainable forest management indicators, model forest, carbon accounting

1. Sustainable Forest Management Policy

The Canadian Council of Forest Ministers (CCFM), established in 1985 to allow the 14 federal, provincial and territorial ministers responsible for forests to cooperate closely in national and international matters, sets the overall direction for forest stewardship and stimulates the development of policies and initiatives in the Canadian forest sector. The vision for the 1992 National Forest Strategy, *Sustainable Forests: A Canadian Commitment* described the

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management of Canada's forests for multiple values while protecting the integrity, health and diversity of forest ecosystems. Part of the implementation plan, was the development of a set of national indicators to monitor forest condition and sustainable development. In response to this commitment in the strategy, the CCFM released a framework of six criteria and 83 indicators (CCFM 1995) that reflects an approach to sustainable forest management that integrates the:

- need to manage forests as ecosystems in order to maintain their natural processes;
- recognition that forests simultaneously provide a wide range of environmental, economic and social benefits to Canadians;
- view that an informed, aware and participatory public is important in promoting sustainable forest management; and,
- need for forest management to evolve to reflect the best available knowledge and information.

At approximately the same time, the Montréal Process Working Group released its framework of seven criteria and 67 indicators and signed the *Santiago Declaration Statement on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests* (Montréal Process Working Group 1997).

A recent evaluation of the CCFM criteria and indicators (C&I) framework (CCFM 2003) reduced the number of indicators to 46. Thirty-six of the new indicators are considered as core indicators relating to values, issues or concerns of great importance to Canadians. The criteria, which are consistent with criteria one to six of the Montréal Process C&I framework, remain essentially the same as the 1995 framework. Canada reports on the Montréal Process through the CCFM national initiative. The criteria are as follows:

- Criterion 1: Biological Diversity;
- Criterion 2: Forest Ecosystem Condition and Productivity;
- Criterion 3: Soil and Water;
- Criterion 4: Role in Global Ecological Cycles;
- Criterion 5: Economic and Social Benefits;
- Criterion 6: Society's Responsibility.

2. The Canadian Model Forest Network

Canada's Model Forest Program was established in 1992 by Natural Resources Canada's, Canadian Forest Service as an experiment to develop innovative approaches to sustainable forest management that integrate economic, environmental and social objectives. Because individual forests are at a management level scale (ranging from 100,000 hectares to more than two million hectares) it is possible to test new methods and assess impacts on biodiversity, production costs, productivity and other factors. Each of the 11 model forests represents the diversity and complexity of a major forest region of Canada. For example, the Waswanipi Model Forest was created to explore the effectiveness of a framework where Aboriginals have the leadership role and to develop approaches to sustainable forest management based on Aboriginal values. In addition, five model forests include national parks within their boundaries allowing for comparisons between lands managed for timber production and lands managed primarily for heritage and conservation values.

Phase I of the Model Forest Program (1992-1997) was dedicated to forming partnerships. Although this may have appeared to be a long and tedious process, the reliance on partnerships of diverse interests to guide and lead management has also contributed to the success of the

program. A shared approach to decision making allows all interested parties to be involved. Participation by a diversity of stakeholder interests encourages the contribution of valuable information from a range of perspectives and can increase awareness of and commitment to sustainable forest management. Involvement from the beginning improves the credibility of any plan and facilitates the transition to implementation (von Mirbach 2000).

3. Local Level Indicators Initiative

Phase II of the Program (1997-2002) focused on the establishment of processes for the development, testing, application and monitoring of local level indicators of sustainable forest management. Model forests evolved as a primary mechanism for developing sub-national indicators, becoming *in situ* laboratories for C&I development and testing. Each model forest, using the definition of sustainable forest management endorsed by the CCFM, with its six criteria as the framework, developed their own suite of local level indicators. A database of the local level indicators developed and used by the various model forests is available at www.modelforest.net. *A User's Guide to Local Level Indicators for Sustainable Forest Management* (Natural Resources Canada 2000) describes the process of indicator development for each model forest. Although the starting point was a common set of guidelines, model forests across Canada adapted local level indicators to their particular individual situations with widely different results: improving knowledge and understanding of sustainable forest management; using indicators as part of an adaptive approach to management in communications, outreach and knowledge transfer; and, for application outside the boundaries of the model forest. Several model forests have initiated state-of-the-forest reporting on their indicator sets. Most of the model forests have research components and some of the reporting is being done through scientific or technical publications.

The Local Level Indicators Initiative facilitated the participation of all model forests in sharing experiences, expertise and information. It resulted in indicator sets that linked to the national framework and were also tailored to the needs of each region. Some model forests have provinces as one of their partners. In Newfoundland, Manitoba and Alberta these partner provinces are using and supporting the model forest local level indicator process in the development of regional and provincial indicators. Model forest partner forest industries (at Manitoba, Fundy and Foothills Model Forests) are adopting model forest local level indicator approaches into their management planning and linking these to certification requirements.

Phase III of the Model Forest Program (2002-2007) proposes to focus on the work initiated in earlier phases of the program and to extend implementation of the Local Level Indicators and Enhanced Aboriginal Involvement in Sustainable Forest Management Initiatives beyond the boundaries of the model forests. In addition, model forests are being used as pilots for operational testing and eventual seeding of national or regional programs, such as carbon accounting, or for the development of tools to monitor and model afforestation activities.

4. Operational Scale Modelling of Forest Carbon Stocks

Building on a decade of research and development by Kurz and Apps (1996, 1999) and Apps et al. (1999) on the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS2), the Canadian Forest Service is collaborating with the Model Forest Network to develop this scientific

research model into an operational tool to assist forest managers in the assessment of their management actions on carbon stocks and stock changes on their land base. The CBM-CFS2 is a landscape level forest carbon accounting framework that estimates over a given period of time, carbon dynamics of above-ground and below ground biomass, soils, and products and the effects using data derived from forest inventories, temporary and permanent sample plots, a system of growth and yield and timber planning models and other government and industry statistics. The effects of disturbances (wildfires, insect attacks and harvesting) on forest age structure and on C releases to the atmosphere and forest floor are also calculated.

Development and testing of the forest carbon accounting model for application at the operational scale will be done in two model forests, the Western Newfoundland Model Forest and the Lake Abitibi Model Forest. Further development and application will be tested in multiple model forests. Development and transfer of technology through the model forest network will empower forest managers to include considerations of the impacts of the planned activities on forest carbon stocks and ultimately increase the potential use of forests and forest management activities to contribute towards a greenhouse gas emission reduction strategy (Kurz et al. 2002).

5. Feasibility Assessment of Afforestation for Carbon Sequestration

With an operational tool to monitor the dynamics of forest carbon stocks, it then becomes possible to assess the impact of afforestation activities on carbon budgets. As part of the government of Canada's framework for action on climate change, the Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS) national policy development initiative is compiling and assessing information to respond to stakeholders needs relating to afforestation in Canada and to build capacity to meet Kyoto Protocol requirements. The main components of the initiative include: i) a compilation of past afforestation efforts and carbon sequestration impacts; ii) the development of an afforestation module as a component of the national carbon budget model; iii) the establishment of a network of pilot sites across the country to test the interest and participation of private landowners in afforestation; and, iv) development of reporting information systems and carbon accounting tools.

Several model forests in partnership with other agencies are participating as pilots in this initiative. The emphasis on participatory decision making processes and the sharing of information, expertise and experiences that are common elements of all model forests provide a solid platform for focus sessions addressing the definition of a practical set of economic incentives, stewardship, land availability, willingness of rural landowners to participate and risks associated with afforestation as a climate change mitigation measure.

6. Conclusions

The Model Forest Network has successfully brought together government, industry, Aboriginals and private landowners and operators to develop and showcase innovative approaches to sustainable forest management. Ideas generated through model forests are shared not only within the Canadian forest community and public but also throughout a network that is spreading around the world. By sharing knowledge, research results and management techniques, forest managers can make a difference, helping to ensure the conservation and sustainable use of

forests while providing all the goods and services that forests supply today and for future generations.

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