

**DEFINING SUSTAINABLE FOREST MANAGEMENT
IN CANADA:
CRITERIA AND INDICATORS 2003**

Technical Supplement 2

**Links to the Original CCFM C&I, the Montréal Process C&I and Public
Values**

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This technical supplement is based on earlier documents prepared for the C&I Task Force by the Technical Working Groups (TWG) as part of their work for the CCFM C&I review. The TWG Chairs and the C&I Secretariat made some modifications based on input from potential users during the validation phase of the C&I review. The document was prepared to assist the C&I Task Force in better understanding the revised indicators in the CCFM C&I framework. It is considered a technical aid and has not been reviewed by the CCFM, nor is it an official document of the CCFM. The document is made available by the C&I Task Force so that users of the CCFM C&I framework may benefit from its content.

INTRODUCTION

This technical supplement to the Canadian Council of Forest Ministers' (CCFM) revised framework of Criteria and Indicators (C&I) 2003 describes the links between the 46 revised indicators in the CCFM C&I framework and the indicators in the original 1995 CCFM C&I, the Montréal Process C&I, and the values expressed by the focus groups for the CCFM C&I review in December 2001.

BACKGROUND

The Canadian Council of Forest Minister's (CCFM) Criteria and Indicators (C&I) Task Force, composed of representatives from the federal, provincial and territorial governments, guides the CCFM C&I process and led the framework review with support from the C&I Secretariat. In December 2001, in preparation for the review, the Canadian Forest Service, on behalf of the Task Force, commissioned a focus group study to help identify some of the specific values, issues and concerns held by Canadians with respect to the sustainable use of their forest. Focus groups, involving different sectors of society, were convened across the country.

In February 2002, the Task Force established six Technical Working Groups (TWGs), one for each criterion, to review the indicators in the C&I framework and recommend revised indicators to the Task Force. Task Force members, or alternates accepted by the Task Force, chaired each of the TWGs, which were comprised of experts from the federal, provincial and territorial governments, academia, the Aboriginal community, industry, and non-governmental organizations. Two academic experts also advised the TWGs.

On March 15th, 2002, five of the Technical Working Groups met for the first time via web conference. The objective of this meeting was to define the scope of the work to the TWG members and provide the necessary background information. Each Technical Working Group was assigned the task of refining the indicators under one of criteria 1, 2, 3, 5 or 6 in the CCFM C&I framework. At this meeting, members were asked to individually produce a preliminary list of indicators for their criterion.

On April 25th and 26th 2002, the same five Technical Working Groups met for the second time in Ottawa. The goal of this meeting was to sort through an initial list of draft indicators that each group had put together earlier in April and reduce the list to less than 20 potential indicators per criterion. Participants were given a list of attributes that each indicator should possess, and each group was asked to describe the rationale for the indicator and give measurement units.

The groups were also asked to try to provide additional information for each indicator, including approaches to measurement, interpretation, reference values, and links to other C&I processes. Some groups were able to provide more of this information than others. By the end of the meeting, each group had compiled a list of indicators with additional information.

During the summer, each of the five groups worked on their own, meeting several times by email or teleconference, to further refine their indicators. The groups came back together for a third and final time in Halifax from August 25th to 27th, 2002. The objective of this meeting was to finalize the list of recommended indicators for each criterion. While most TWGs did conclude their work at the meeting, some groups met by email or teleconference during the month following the Halifax meeting to finalize the details of their indicators. In September, each TWG Chair submitted their group's recommended set of indicators to the C&I Secretariat for compilation.

On October 7th & 8th, 2002, a sixth Technical Working Group, co-chaired by Tom Niemann and Rory Thompson, assembled in Edmonton, Alberta, to review the indicators under criterion 4. Criterion 4 deals with forest ecosystem contributions to global ecological cycles, but the indicators in the original framework mostly relate to the global carbon cycle. This TWG was able to take advantage of the large amount of work being carried out by federal and provincial agencies and committees on measuring forest contributions to the carbon budget, which allowed the TWG to meet just once to develop a revised set of indicators for this criterion.

On October 9th – 11th, 2002, the Technical Working Group Chairs met in Edmonton, Alberta, with the expert advisors, Dr. Peter Duinker and Dr. Vic Adamowicz, to assemble the six sets of indicator recommendations into a single framework. To build the separate recommendations into a single consistent framework, the Chairs started by combining or integrating similar indicators. For example, a number of TWGs recommended indicators on the total forest area; these were combined into a single indicator. In other cases, indicators may have been reworded for consistency, brevity or clarity. Indicators were also sometimes moved from one criterion to another in order to improve an indicator's contribution to the framework as a whole or to place the indicator with other closely related indicators. As expected, many indicators in the framework have links to more than one criterion and can be used to provide information on many aspects of sustainability. Finally, some indicators were not retained in the framework. The decision not to retain an indicator was based on whether or not the indicator: could be clearly linked to a criterion; was understandable by an informed public; provided information on an issue that is impacted by forest management practices; could be implemented on a national scale; or, provided new additional information not already captured in the framework.

On December 12th, 2002, the compiled and integrated indicators were circulated to the TWG members for comment. Many TWG members provided feedback, particularly in cases where they believed the original intent of their indicators had been lost. The Chairs and the Secretariat followed up on all of the comments to clarify issues and concerns and identify potential solutions. On January 17th, 2003, the TWG Chairs revised the documents based on comments received from the TWG members. This review process resulted in 53 indicators.

On February 22, 2003, the Technical Working Group recommendations were presented to the C&I Task Force. Throughout March and April, Task Force members reviewed the recommendations, seeking input from agencies and departments within their governments. On May 2, 2003, the C&I Task Force held a meeting with non-government users of the CCFM C&I framework to validate the revised framework. The Task Force modified the recommended indicators based on input received from both government and non-government users. On September 19, 2003, the CCFM released the revised C&I framework consisting of 6 criteria and 46 indicators.

LINKS TO ORIGINAL CCFM C&I FRAMEWORK

Criterion: 1 Biological Diversity

Element: 1.1 Ecosystem diversity

Indicator Name		Links to Original CCFM C&I			
1.1.1	Area of forest, by type and age class, and wetlands in each ecozone.	1.1.1	1.1.2		
1.1.2	Area of forest by type and age class, wetlands, soil types and geomorphological feature types in protected areas in each ecozone.	1.1.3	3.2.1	3.2.3	

Element: 1.2 Species diversity

Indicator Name		Links to Original CCFM C&I			
1.2.1	The status of forest-associated species at risk.	1.2.1			
1.2.2	Population levels of selected forest-associated species.	1.2.2	3.1.5	5.1.3	
1.2.3	Distribution of selected forest-associated species.	1.2.3	2.1.7	2.3.2	3.1.5
1.2.4	Number of invasive, exotic forest-associated species.	2.1.7			

Element: 1.3 Genetic diversity

Indicator Name		Links to Original CCFM C&I			
1.3.1	Genetic diversity of reforestation seed-lots.				
1.3.2	Status of in situ and ex situ conservation programs for native tree species within each ecozone.	1.3.1			

Criterion: 2 Ecosystem Condition and Productivity

Element: 2.0

Indicator Name		Links to Original CCFM C&I				
2.1	Total growing stock of both merchantable and non-merchantable tree species on forest land.	4.1.4				
2.2	Additions and deletions of forest area, by cause.	3.1.2	4.2.1	4.2.2	4.1.7	5.1.2
2.3	Area of forest disturbed by fire, insects, disease and timber harvest.	2.1.1	2.1.2	2.1.3	2.1.7	
2.4	Area of forest with impaired function due to ozone and acid rain.	2.1.4	2.1.5			
2.5	Proportion of timber harvest area successfully regenerated.	2.2.2				

Criterion: 3 Soil and Water

Element: 3.0

Indicator Name		Links to Original CCFM C&I			
3.1	Rate of compliance with locally applicable soil disturbance standards.	3.1.1			
3.2	Rate of compliance with locally applicable road construction, stream crossing and riparian zone management standards.	3.1.3	3.1.4	3.2.2	
3.3	Proportion of watersheds with substantial stand-replacing disturbance in the last 20 years.	3.1.4			

Criterion: 4 Role in Global Ecological Cycles

Element: 4.1 Carbon cycle

Indicator Name		Links to Original CCFM C&I		
4.1.1	Net change in forest ecosystem carbon.			
4.1.2	Forest ecosystem carbon storage by forest type and age class.	4.1.1	4.1.2	4.1.5
4.1.3	Net change in forest products carbon.	4.1.8		
4.1.4	Forest sector carbon emissions.	4.3.2	4.3.1	4.1.9

Criterion: 5 Economic and Social Benefits

Element: 5.1 Economic benefits

	Indicator Name	Links to Original CCFM C&I
5.1.1	Contribution of timber products to the gross domestic product.	5.3.1
5.1.2	Value of secondary manufacturing of timber products per volume harvested.	5.3.1
5.1.3	Production, consumption, imports and exports of timber products.	
5.1.4	Contribution of non-timber forest products and forest-based services to the gross domestic product.	5.3.1
5.1.5	Value of unmarketed non-timber forest products and forest-based services.	5.3.4

Element: 5.2 Distribution of benefits

	Indicator Name	Links to Original CCFM C&I
5.2.1	Forest area by timber tenure.	5.1.2 6.2.5
5.2.2	Distribution of financial benefits from the timber products industry.	5.2.1

Element: 5.3 Sustainability of benefits

	Indicator Name	Links to Original CCFM C&I
5.3.1	Annual harvest of timber relative to the level of harvest deemed to be sustainable.	5.1.1
5.3.2	Annual harvests of non-timber forest products relative to the levels of harvests deemed to be sustainable.	5.1.1
5.3.3	Return on capital employed.	5.2.1
5.3.4	Productivity Index.	
5.3.5	Direct, indirect and induced employment.	5.3.2
5.3.6	Average income in major employment categories.	

Criterion: 6 Society's Responsibility

Element: 6.1 Aboriginal and treaty rights

	Indicator Name	Links to Original CCFM C&I
6.1.1	Extent of consultation with Aboriginals in forest management planning and in the development of policies and legislation related to forest management.	
6.1.2	Area of forest land owned by Aboriginal peoples.	6.2.4

Element: 6.2 Aboriginal traditional land-use and forest-based ecological knowledge

	Indicator Name	Links to Original CCFM C&I
6.2.1	Area of forest Crown land with traditional land use studies.	6.2.2

Element: 6.3 Forest community well-being and resilience

	Indicator Name	Links to Original CCFM C&I
6.3.1	Economic diversity index of forest-based communities.	6.3.1 6.3.2
6.3.2	Education attainment levels in forest-based communities.	
6.3.3	Employment rate in forest-based communities.	
6.3.4	Incidence of low income in forest-based communities.	

Element: 6.4 Fair and effective decision-making

	Indicator Name	Links to Original CCFM C&I
6.4.1	Proportion of participants who are satisfied with public involvement processes in forest management in Canada.	6.4.1 6.4.2 6.4.3
6.4.2	Rate of compliance with sustainable forest management laws and regulations.	4.4.5

Element: 6.5 Informed decision-making

Indicator Name	Links to Original CCFM C&I
6.5.1 Coverage, attributes, frequency and statistical reliability of forest inventories.	6.5.1 4.4.4
6.5.2 Availability of forest inventory information to the public.	
6.5.3 Investment in forest and timber products industry research and development, and education.	6.5.2 6.5.3
6.5.4 Status of new or updated forest management guidelines and standards related to ecological issues.	

Indicators in the original CCFM C&I framework which are not reflected in the revised CCFM C&I framework:

- 1.1.4 Level of fragmentation and connectedness of forest ecosystem components
- 2.1.6 Crown transparency in percentage by class
- 2.1.8 Climate change as measured by temperature sums
- 2.3.1 Mean annual increment by forest type and age class
- 4.1.3 Percentage of canopy cover
- 4.1.6 Soil carbon pool decay rates
- 4.3.3 Percentage of forest sector energy usage from renewable sources relative to total sector energy requirement
- 4.4.1 Recycling rate of forest wood products manufactured and used in Canada
- 4.4.2 Participation in the climate change conventions
- 4.4.3 Economic incentives for bioenergy use
- 4.5.1 Surface area of water within forests
- 5.1.4 Management and development expenditures
- 5.1.5 Availability of habitat for selected wildlife species of economic importance
- 5.2.2 Trends in global market share
- 5.4.1 Availability and use of recreational opportunities
- 5.4.3 Membership and expenditures in forest recreation-oriented organizations and clubs
- 6.3.3 Diversity of forest use at the community level
- 6.3.4 Number of communities with stewardship or co-management responsibilities
- 6.5.4 Percentage of forest area under completed management plans/programs/guidelines which have included public participation
- 6.5.5 Expenditure on international forestry
- 6.5.6 Mutual learning mechanisms and processes

LINKS TO THE MONTRÉAL PROCESS C&I

Criterion: 1 Biological Diversity

Element: 1.1 Ecosystem diversity

Indicator Name		Links to Montréal Process C&I				
1.1.1	Area of forest, by type and age class, and wetlands in each ecozone.	1.1.a	2.a	1.1.b		
1.1.2	Area of forest by type and age class, wetlands, soil types and geomorphological feature types in protected areas in each ecozone.	1.1.d	4.b	7.1.e	7.5.a	7.5.d
		1.1.c	6.4.a			

Element: 1.2 Species diversity

Indicator Name		Links to Montréal Process C&I				
1.2.1	The status of forest-associated species at risk.	1.2.b				
1.2.2	Population levels of selected forest-associated species.	1.3.b				
1.2.3	Distribution of selected forest-associated species.	1.3.a				
1.2.4	Number of invasive, exotic forest-associated species.	3.a	2.c			

Element: 1.3 Genetic diversity

Indicator Name		Links to Montréal Process C&I				
1.3.1	Genetic diversity of reforestation seed-lots.					
1.3.2	Status of in situ and ex situ conservation programs for native tree species within each ecozone.					

Criterion: 2 Ecosystem Condition and Productivity

Element: 2.0

Indicator Name		Links to Montréal Process C&I				
2.1	Total growing stock of both merchantable and non-merchantable tree species on forest land.	2.b				
2.2	Additions and deletions of forest area, by cause.	3.a	3.c	4.d	4.e	
2.3	Area of forest disturbed by fire, insects, disease and timber harvest.	3.a				
2.4	Area of forest with impaired function due to ozone and acid rain.	3.b	4.h			
2.5	Proportion of timber harvest area successfully regenerated.	2.c				

Criterion: 3 Soil and Water

Element: 3.0

Indicator Name		Links to Montréal Process C&I				
3.1	Rate of compliance with locally applicable soil disturbance standards.	3.c	4.a	4.d	4.e	
3.2	Rate of compliance with locally applicable road construction, stream crossing and riparian zone management standards.	4.a	4.b	4.c	4.f	4.g
3.3	Proportion of watersheds with substantial stand-replacing disturbance in the last 20 years.	4.c				

Criterion: 4 Role in Global Ecological Cycles

Element: 4.1 Carbon cycle

Indicator Name		Links to Montréal Process C&I				
4.1.1	Net change in forest ecosystem carbon.	5.b	7.5.e			
4.1.2	Forest ecosystem carbon storage by forest type and age class.	5.a	7.5.e			
4.1.3	Net change in forest products carbon.	5.c	7.5.e			
4.1.4	Forest sector carbon emissions.	7.5.e				

Criterion: 5 Economic and Social Benefits

Element: 5.1 Economic benefits

Indicator Name		Links to Montréal Process C&I		
5.1.1	Contribution of timber products to the gross domestic product.	6.1.a	6.1.d	
5.1.2	Value of secondary manufacturing of timber products per volume harvested.	6.1.a		
5.1.3	Production, consumption, imports and exports of timber products.	6.1.c		
5.1.4	Contribution of non-timber forest products and forest-based services to the gross domestic product.	6.1.b	6.1.d	
5.1.5	Value of unmarketed non-timber forest products and forest-based services.	6.1.b	6.1.f	

Element: 5.2 Distribution of benefits

Indicator Name		Links to Montréal Process C&I		
5.2.1	Forest area by timber tenure.	2.a	6.4.a	7.1.a
5.2.2	Distribution of financial benefits from the timber products industry.	7.3.a		

Element: 5.3 Sustainability of benefits

Indicator Name		Links to Montréal Process C&I		
5.3.1	Annual harvest of timber relative to the level of harvest deemed to be sustainable.	2.d		
5.3.2	Annual harvests of non-timber forest products relative to the levels of harvests deemed to be sustainable.	2.e		
5.3.3	Return on capital employed.	6.3.d		
5.3.4	Productivity Index.			
5.3.5	Direct, indirect and induced employment.	6.5.a		
5.3.6	Average income in major employment categories.	6.5.b		

Criterion: 6 Society's Responsibility

Element: 6.1 Aboriginal and treaty rights

Indicator Name		Links to Montréal Process C&I		
6.1.1	Extent of consultation with Aboriginals in forest management planning and in the development of policies and legislation related to forest management.	7.1.a		
6.1.2	Area of forest land owned by Aboriginal peoples.	7.1.a	6.4.a	

Element: 6.2 Aboriginal traditional land-use and forest-based ecological knowledge

Indicator Name		Links to Montréal Process C&I		
6.2.1	Area of forest Crown land with traditional land use studies.	7.1.a	7.1.e	

Element: 6.3 Forest community well-being and resilience

Indicator Name		Links to Montréal Process C&I		
6.3.1	Economic diversity index of forest-based communities.	6.5.c		
6.3.2	Education attainment levels in forest-based communities.	6.5.c	7.2.c	
6.3.3	Employment rate in forest-based communities.	6.5.a	6.5.c	
6.3.4	Incidence of low income in forest-based communities.	6.5.c		

Element: 6.4 Fair and effective decision-making

Indicator Name		Links to Montréal Process C&I		
6.4.1	Proportion of participants who are satisfied with public involvement processes in forest management in Canada.	7.1.c	7.2.a	
6.4.2	Rate of compliance with sustainable forest management laws and regulations.	7.1.b	7.2.e	7.1.d

Element: 6.5 Informed decision-making

Indicator Name		Links to Montréal Process C&I				
6.5.1	Coverage, attributes, frequency and statistical reliability of forest inventories.	7.4.b				
6.5.2	Availability of forest inventory information to the public.	7.2.a	7.4.a			
6.5.3	Investment in forest and timber products industry research and development, and education.	6.3.b	7.2.a	7.2.c	7.5.a	7.5.e
6.5.4	Status of new or updated forest management guidelines and standards related to ecological issues.	7.1.b	7.1.d	7.5.a		

Indicators in the Montréal Process C&I framework which are not reflected in the revised CCFM C&I framework:

- 1.1.e Fragmentation of forest types
- 6.1.e Degree of recycling of forest products
- 6.2.a Area and percent of forest land managed for general recreation and tourism, in relation to the total area of forest land-(a or b);
- 6.2.b Number and type of facilities available for general recreation and tourism, in relation to population and forest area-(a or b);
- 6.2.c Number of visitor days attributed to recreation and tourism, in relation to population and forest area-(b).
- 6.3.a Value of investment, including investment in forest growing, forest health and management, planted forests, wood processing, recreation and tourism
- 6.3.c Extension and use of new and improved technologies
- 6.4.b Non-consumptive use forest values
- 6.5.d Area and percent of forest land used for subsistence purposes
- 7.2.b Undertake and implement periodic forest-related planning, assessment, and policy review including cross-sectoral planning and coordination
- 7.2.d Develop and maintain efficient physical infrastructure to facilitate the supply of forest products and services and support forest management
- 7.3.b Non-discriminatory trade policies for forest products
- 7.4.c Compatibility with other countries in measuring, monitoring and reporting on indicators
- 7.5.b Development of methodologies to measure and integrate environmental and social costs and benefits into markets and public policies, and to reflect forest-related resource depletion or replenishment in national accounting systems
- 7.5.c New technologies and the capacity to assess the socio-economic consequences associated with the introduction of new technologies

LINKS TO PUBLIC VALUES

In December 2001, The Canadian Forest Service, on behalf of the Canadian Council of Forest Ministers, commissioned a Focus Group study asking Canadians from various sectors of society to describe why Canada's forests are important to them. The final report from this study was given to the Technical Working Groups to aid in reviewing the Criteria and Indicators for Sustainable Forest Management. The table below summarizes the most common values expressed by participants in the study and the related indicators in the revised C&I framework.

<i>Value</i>	<i>Related Indicators in Revised C&I set</i>
Criterion 1: Conservation of Biodiversity	
• Provide animal shelters; wildlife habitat	1.1.1, 1.1.2, 1.2.1, 1.2.2, 1.2.3
• Reservoir of vast animal and plant diversity	1.1.2
• Lungs of our planet; provide oxygen	4.1.1, 4.1.2
Criterion 2: Ecosystem Condition and Productivity	
• For maintaining ecosystem	2.1, 2.2, 2.3, 2.4, 2.5
• For environment and animals	1.1.1, 1.1.2, 1.2.2, 1.2.3
• Are a renewable resource	2.1, 2.2, 2.3, 2.4, 2.5, 5.3.1, 5.3.2
• Clean air, provide oxygen	4.1.1, 4.1.2
• For spiritual, emotional value; a place where you want to live	1.1.2, 6.4.1
• Shelter and home to animals and people	1.1.1, 1.1.2, 1.2.2, 1.2.3
• Control water flow and therefore many ecosystems	3.2, 3.3
Criterion 3: Soil and Water Conservation	
• Because roots stabilize soil; to prevent soil erosion	3.1, 3.2, 3.3
• Limit damages in case of natural disasters	2.3, 3.3
• Water filter against pollution	3.2, 3.3
• Essential to health of land, water, air	1.1.1, 1.1.2, 3.1, 3.2, 3.3, 4.1.1, 4.2.2
• Protect water streams	3.2, 3.3
• Regulate water runoffs; quantity	3.2, 3.3
• Conservation of swamps (resource for both animals and people)	1.1.1, 1.1.2
• Source of medicine	5.1.4, 5.1.5, 6.2.2

Criterion 4: Global Ecological Cycles

- Important for ecology in general; balanced environment: air/water/soil 1.1.1, 1.1.2, 3.1, 3.2, 3.3, 4.1.1, 4.1.2, 4.1.4
- Lungs of Canada/the planet 4.1.1, 4.1.2, 4.1.4
- Carbon sink; de-pollution 4.1.1, 4.1.2
- Help prevent global warming 4.1.1, 4.1.2, 4.1.3, 4.1.4
- Role in large climatic changes 4.1.1, 4.1.2, 4.1.3, 4.1.4
- Are a vital link to my children's future; a way of life criteria 5 and 6

Criteria 5: Multiple Benefits to Society

- For the economy: hunting, fishing, forestry, tourism; supports our economy through taxes, revenues criteria 5 and 6
- For its spiritual value: calming, replenishing, peace of mind, etc. 5.1.5
- Renewable resource: significant portion of Canada's economy criterion 5
- Source of employment; people's livelihoods 5.3.5, 5.3.6, element 6.3
- Regional economic stability criteria 5 and 6
- For tourism 5.1.4, 5.1.5
- For ecotourism 5.1.4, 5.1.5
- For the beauty 5.1.4, 5.1.5
- For recreational activities 5.1.4, 5.1.5
- Provide environment for learning about nature 6.5.3

Criterion 6: Society's Responsibility

- Because they are owned by the public; common property; public ownership 1.1.2, 5.2.1, 6.1.2
- Source of interesting and fun recreation 5.1.4, 5.1.5

Un-Categorized

- Sustain the economic growth; create/sustain employment elements 5.1 and 5.3
 - For Canada's future and strong economy globally element 5.1
 - Important to future generations many indicators under criteria 5 and 6
-