

# Indicators of sustainable forest management: Review of potential indicators

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## References (Overall)

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Alyson McHugh, Angeline Gough, and John Innes

Sustainable Forest Management Laboratory  
Faculty of Forestry  
University of British Columbia

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## **Executive Summary**

This document is intended to serve as a reference document for use in the choice of indicators of sustainable forest management. It provides details, where available, of approximately 200 indicators that have been selected from a broader range of over 3000 indicators that have been proposed or put into practice.

The relationship of each indicator to the criteria and indicators scheme used by the Canadian Council of Forest Ministers (CCFM) is given, and this scheme is used as the framework for the current document. Not all CCFM indicators have been used, and a number of supplementary indicators, more appropriate to the questions being asked about the nature and extent of sustainable forest management in British Columbia are given.

Under each indicator, the rationale and a brief description of the indicator (where available) is given. Much of this material has been taken directly from the source material to avoid the risk of interpretative bias in this reference document. Examples are provided of the use of indicators, and also of where they have been actually reported. Any outstanding research questions or uncertainties related to the indicators are provided, as well examples of the scientific literature related to each indicator (this last section is still incomplete).

Following recommendations at a (non-representative) stakeholder workshop in February 2005, particular emphasis in this document has been placed on social and economic indicators. This is because in work on criteria and indicators to date, it is the social and economic indicators that have caused the greatest difficulty.

This working draft will be supplemented with comments received during a broader stakeholder review. Identified gaps will be filled through further research and through interviews with a number of forest managers with experience of the use of indicators of sustainable forest management.

## Table of Contents

Executive Summary

Table of Contents

Introduction

Indicators used in sustainable forest management<sup>1</sup>

Criterion 1: Biological diversity

Criterion 2: Ecosystem condition and productivity

Criterion 3: Soil and water

Criterion 4: Role of forests in global ecological cycles

Criterion 5: Economic and social benefits

Criterion 6: Society's responsibility

References<sup>2</sup>

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<sup>1</sup> Each report contains introductory material for context, plus a single chapter for review.

<sup>2</sup> References are also available as a separate file for information and review.

## Introduction

Since the 1992 United Nations Conference on Environment and Development, there has been increasing interest in the practice of sustainable forest management. Although by 1992 the International Tropical Timber Organization had already begun to develop criteria and indicators (ITTO 1992, 1993) and have subsequently done extensive work in this area (ITTO, 1998, 2003, 2005), it was the Forest Principles document<sup>3</sup> that set the scene for the development of a number of different international and national sets of criteria and indicators of sustainable forest management. While many continue to argue that the definition of sustainable forest management is elusive, it is the generally agreed criteria that define sustainable forest management. Canada is a member of the Montreal Process, and in the Santiago Declaration of 1995, agreed to a set of seven criteria that would define the environmental, economic and social values that in turn define sustainable forest management. Each criterion was accompanied by a suite of indicators that would enable reporting of progress towards sustainable forest management at an international level (Montreal Process, 1999).

While most signatory states of the Montreal Process follow and use the criteria and indicators as the basis for national reporting, Canada has adopted a slightly different approach. Through the Canadian Council of Forest Ministers, the provinces have developed a revised set of criteria and indicators, loosely based upon, but subtly different from, the Montreal Process criteria and indicators (Canadian Council of Forest Ministers 2003). Following direction from the steering group of the Common Ground project, this report is structured around the Canadian Council of Forest Ministers revised suite of criteria and indicators.

The international level (Montreal Process) and national level (Canadian Council of Forest Ministers) criteria and indicators provide a basis for reporting at the international and national scales. Reports to date have encountered considerable difficulties due to lack or unavailability of the necessary data, throwing into question the practical value of some of the indicators. In addition, reports at these scales cannot report on whether or not management of individual forestry operations is sustainable (Canadian Council of Forest Ministers, 2003). However, it is at the scale of the management unit that forest managers are facing increasing pressure from major customers, and this pressure is making forest managers re-evaluate their information collection and reporting processes. In addition, it is becoming increasingly recognized that for forest managers to continue to practice forestry, a 'social license' is required, whereby there is broad acceptance of forest practices by forest stakeholders. These stakeholders are asking for evidence that good (sustainable) forest management practices are being adopted.

When faced with the challenge to demonstrate that their forest management practices are sustainable, managers are faced with a number of options. They can seek third-party certification through one or more of the systems currently in use (the main ones in

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<sup>3</sup> Non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests. The full document can be accessed at: <http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm> .

Canada are the Canadian Z809 Standard, the Sustainable Forestry Initiative and the Forest Stewardship Council), but such certifications have been questioned as demonstrating sustainable forest management. They can rely on Government legislation, assuming that this legislation will ensure that they are within the boundaries of sustainable forest management. However, the current legislation in British Columbia is clearly inadequate in addressing the full range of values generally associated with sustainable forest management. They can produce a management plan, and argue that such plans demonstrate their commitment to sustainable forest management. However, these are plans only, and do not necessarily reflect what will happen, nor do they provide any guarantee that the values associated with sustainable forest management will be met.

These difficulties have led to increasing interest in a new approach that defines a locally-applicable set of indicators applicable at the level of the management unit and which can be used to measure progress towards sustainable forest management. The definition of such a set of indicators is extremely complex, as the indicators must be both meaningful, and practical.

This report builds on an earlier paper (Hickey and Innes, 2005) that examined the indicators that have been applied in various parts of the world. A total of over 3000 indicators were identified through a survey of the different criteria and indicators schemes in use around the world, combined with assessments of the indicators developed for certification schemes, planning exercises and best management practices. Using the Canadian Council of Forest Ministers framework to identify the questions that need to be asked to determine whether the elements within the Canadian Council of Forest Ministers criteria and indicators are being met, the set of 3000 indicators was reduced to a more manageable suite of 200 indicators. All 200 indicators were considered to be potentially appropriate for British Columbia, but there was clearly some overlap between indicators, and some appeared more relevant than others. At the same time, forest licensees in British Columbia indicated that the final indicator set should be very much reduced in order to make data collection economically feasible.

The Canadian Council of Forest Ministers, in their 2003 revision, adopted six criteria and 46 indicators. Some criteria were sufficiently complex to identify a number of sub-headings, these were termed elements. Thus, the criterion 'Biological diversity' contains three elements ('Ecosystem diversity', 'Species diversity' and 'Genetic diversity'), and the element 'Ecosystem diversity' contains two indicators 'Area of forest, by type and age class, and wetlands in each ecozone' and 'Area of forest, by type and age class, wetlands, soil types and geomorphological feature types in protected areas in each ecozone'.

In this report, we assess each of the 200 indicators, looking at the rationale behind the indicator, the methods used to collect the information, examples of who is currently using the indicator and who is reporting on it, and uncertainties related to the collection of the data or their interpretation, and its relevance to the Forest Resources Evaluation Programme. We have also completed a standardized literature search for each indicator, utilizing keyword searches in the CABI and Web of Science literature databases. The

Natural Resources Information Network database was also searched, but this was found to be less helpful, and much of the material indexed here is incomplete or without scientific review. The information provided is intended to provide a state-of-the-art assessment of our knowledge concerning each of the indicators. This knowledge can then be used to reduce the number of indicators being used in an assessment and to help define research priorities.

The work is not being undertaken in isolation. In Canada, the government of Newfoundland and Labrador is taking a strong interest in the work, as are a number of non-BC based forest companies. The project has received recognition from the Montreal Process as one of the most significant developments in work on criteria and indicators in recent years. Both the New Zealand and Australian regional governments have expressed interest in the work, with the latter now suggesting that they might be able to contribute financially to ensure continuation of the work. The European Commission has also expressed interest, particularly in collaboration over the next stages of the report.

The report is a planned stage in the development of a rational set of indicators to define sustainable forest management. Our next report will look at selected licensees to determine which, if any, of the indicators they are already collecting information for. It will include interviews with forest managers to determine the feasibility of collecting further information related to each of the indicators.

The next stage of this process is to determine how we use the information collected from the indicators to determine whether sustainable forest management is actually being achieved. This will involve a major research project on the thresholds for the indicators, and how these thresholds can be adjusted to ensure that an appropriate balance is achieved between environmental, economic and social values. The study, if funded by the Sustainable Forest Management Network of Centres of Excellence, will involve a series of locations across Canada, with current plans including one site each in British Columbia, Alberta, Ontario, and Newfoundland and Labrador. A letter of intent submitted to the BC Forest Sciences Programme, which would have increased the number of sites being studied in British Columbia and more closely tied the project to the BC Forest Resources Evaluation Programme and BC Forest Investment Account, did not generate an invitation to submit a full proposal.

## **Structure of the report**

The report follows the criteria developed by the Canadian Council of Forest Ministers. A standardized format has been adopted which should make it easier to locate particular criteria and elements from the Canadian Council of Forest Ministers framework.

The selected indicators consist of a subset of a much larger group of indicators identified as having been used or proposed in assessments of sustainable forest management. The key to reducing this larger set was to identify the questions behind the indicators being used by the Canadian Council of Forest Ministers. The full process is described by Hickey and Innes (2005).

Two types of indicators are distinguished. They are the current revised indicators adopted by the Canadian Council of Forest Ministers and potential additional or replacement indicators. The latter are labeled as potential indicators. The rationale for each indicator is given, as is a basic description of the indicator, and the question that it might contribute to answering. With both the rationale and the description, we have, where possible, directly quoted from published reports. This is because the document is intended to be a reference only, and the use of direct quotes minimizes any bias or subjectivity that might be introduced by us. In some cases, the rationale for using a particular indicator varies between users – we have simply included the differing rationales without including any value judgment as to which may be the more appropriate.

The basic information about each indicator is followed by a description of the methods used to collect the data, followed by some examples (where known) of who is actually using the indicator and where it has been reported. Finally, examples of reports that use or describe the indicator are cited. These are not intended to be exhaustive; rather the examples given are intended to be illustrative of the use of an indicator. There are quite a number of gaps in these sections, reflecting the fact that while many indicators are recommended, rather fewer are actually put into practice and reported upon.

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