



THE STATE OF
British Columbia's Forests

2004



Ministry of Forests

Cover photo – Coastal rainforest along the West Coast Trail on Vancouver Island. The large tree is a western redcedar, British Columbia’s official tree. This species has played a key role in the lives of West Coast aboriginal people and continues to be a valuable resource for the province.

Photo credit: Tom Ryan

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This is the first of three planned editions. Future editions are planned for the years 2005 and 2006.

Chief Forester's Message

This report on the state of British Columbia's forests is designed to inform both general and technical readers about our forests from a particular viewpoint – that of sustainability.

As chief forester, it is my role to advise government and inform the public on sustainable forest management. Currently, many sources provide factual information on parts of this complex topic, but few if any provide an overview that is both accessible and comprehensive. In addition to providing factual information, this report presents assessments of sustainability by Ministry of Forests staff.

I hope that both the facts and the assessments will encourage informed, constructive discussion. A periodic review of our forests, including environmental, economic, social and governance aspects, can show us how far we've come and help us decide where future actions would be desirable.

The report's framework of indicators, or measures, of sustainability is based on international and national frameworks for assessing sustainable forest management, with an emphasis on issues of particular importance to British Columbia. Six indicators are presented here. Future editions of the report will fill out the full framework of 24 indicators and provide updates on previously presented indicators.

Your feedback on this report's approach, format and level of information is welcomed and will help us improve subsequent editions.

With public ownership of 95% of all land in the province, British Columbians have a real opportunity to contribute to sustainable forest management. By using the best science-based information available to make informed decisions, we can ensure that the forests of British Columbia continue to provide their many benefits to future generations.

Jim Snetsinger, RPF
Chief Forester
Ministry of Forests

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Executive Summary

Forests figure prominently in the well-being of British Columbia's environment, economy and communities. Ensuring sustainable forest management is therefore vital to the province's health on many levels.

British Columbia's progress in achieving sustainable forest management is challenging to assess, not only because of the subject's complexity, but also because of the varying opinions and viewpoints people bring to the topic. An understanding of current conditions and of the adequacy of information to assess them will provide a basis on which to make informed decisions into the future.

This report is part of the Ministry of Forests' efforts to enable assessment of sustainable forest management across the province. The purpose is two-fold:

- To provide information and links to enable readers to assess for themselves the province's progress in achieving sustainable forest management.
- To provide the ministry's assessment of that progress.

The information and assessment provided in this report are for six of 24 indicators that merge national-level frameworks of indicators with issues important to British Columbia. The ministry is committed to publishing a second report in 2005 that will add 6 more indicators and a third report in 2006 that will cumulatively address all 24 indicators.

Summaries for the first six indicators covered in this report are presented below and in Figure 1.

Environmental Indicators

Information and the ministry's assessment are provided for 2 of 10 environmental indicators: [Ecosystem diversity](#) and [Protected forests](#).

British Columbia's rich natural resources include vast and diverse forests. In terms of forest types and ages, most of this diversity still exists 150 years after the start of European settlement.

A reasonably representative 10% of the province's forests are today protected in parks and other protected areas. These protected forests, along with other forest areas, provide large tracts of natural habitat for plants and animals, as well as undeveloped areas for scientific study and wilderness recreation.

Some forest types and their associated plants and animals are threatened by development.

Despite the substantial databases already assembled for these two indicators, information needs for assessing sustainable forest management in these areas are being only partially met.

Ministry's partial assessment based on these two indicators

Despite some concerns, the prospects for environmental sustainability in British Columbia's forests are positive.

Economic and Social Indicators

Information and the ministry's assessment are provided for 2 of 10 economic and social indicators: [Timber harvest](#) and [First Nations involvement](#).

Much of British Columbia's economic development in the 1800s and 1900s depended on the forest sector. After a century of rapidly increasing timber harvest, the level of cut stabilized in the 1990s and is forecast to be sustainable. However, significant decreases in some local timber supplies are expected and will require transition strategies for forest-dependent communities.

The involvement of First Nations people in the timber-based economy has increased in recent years and is expected to grow further. While First Nations participation in forest management has increased, many issues regarding aboriginal rights and title remain to be settled.

Many of the information needs for assessing sustainable forest management are being met for these two indicators, but some gaps remain.

Ministry's partial assessment based on these two indicators

Despite some localized timber supply problems and the need to complete treaty negotiations with First Nations, the prospects for economic and social sustainability in British Columbia's forests are positive.

Indicators of Governance and Support

Information and the ministry's assessment are provided for two of four governance and support indicators: [Law](#) and [Certification](#).

British Columbia continues to develop new laws and policies to support sustainable forest management, and has done so since before the 1992 Earth Summit – the United Nations Conference on Environment and

Development (UNCED). Concerns about high operational and administrative costs were addressed through a recent redesign of the legal framework to improve economic competitiveness while maintaining high environmental standards. The province's legal framework includes compliance and enforcement activities, and public reporting by the independent Forest Practices Board. To enable continual improvement, the effectiveness of the law in achieving sustainable forest management is being systematically reviewed.

Forest certification led by non-government organizations complements the governance provided by British Columbia's legal framework. British Columbia's forest industry is a leader in forest certification in North America. It has pursued this course to maintain access to markets and demonstrate the province's high quality of forest management. Progress in achieving certification varies considerably by tenure type.

Many of the information needs for assessing sustainable forest management are being met for these two indicators, but information on the ultimate effectiveness of governance and support is still in an early stage of development.

Ministry's partial assessment based on these two indicators

The prospects for legal and other means to ensure governance and support for sustainability in British Columbia's forests are positive.

Conclusion

British Columbia has made substantial efforts to ensure sustainable forest management is carried out in the province, and these efforts have been largely successful. Overall, the prospects for sustainability are positive.



















Summary of Ministry of Forests' Partial Assessment			
Environmental Indicators	State	Trend	Information
Ecosystem diversity - underlies ongoing environmental, economic and social sustainability	 good	 mixed	 partial
Protected forests - provide natural habitats for plants and animals	 good	 improving	 partial
Economic and Social Indicators	State	Trend	Information
Timber harvest - supports a large part of the province's economy	 good	 mixed	 partial
First Nations involvement - recognizes their cultural and economic relationship with forests	 mixed	 improving	 adequate
Governance and Support Indicators	State	Trend	Information
Law - ensures the government's management objectives are enforced	 good	 improving	 partial
Certification - provides non-government verification of well-managed forests	 good	 mixed	 adequate

FIGURE 1. Summary of the Ministry of Forests' partial assessment, based on six indicators, of British Columbia's progress in achieving sustainable forest management.

About This Report



Rocky Mountain Trench – Wayne Erickson



Vancouver – Tom Ryan

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Purpose

Forests figure prominently in the well-being of British Columbia's environment, economy and communities.

The purpose of this report is two-fold:

- To provide information and links to enable readers to assess for themselves the province's progress in achieving sustainable forest management.
- To provide the Ministry of Forests' assessment of that progress.

Content

The first three parts following "About This Report" provide an overview of British Columbia's forests and society, and general discussions of sustainable forest management and indicators.

The indicators used to assess sustainable forest management form the main body of this report. These indicators are based on those found in national-level frameworks, but reflect an emphasis on issues of particular significance to British Columbia. The indicators are grouped into three broad categories: environmental, economic and social, and governance and support.

Six of 24 indicators are addressed in this first of three reports. In 2005, the second report will add 6 more indicators. The third report in 2006 will contain all 24 indicators.

For each indicator, the report provides summary information relevant to several questions, along with links to further information, maps, data, and related international and national indicators. Each indicator ends with the Ministry of Forests' assessment of what the indicator tells us about sustainable forest management.

Readers' independent assessments

The text under each indicator question includes some explanation of the information, but no assessment of implications for sustainability. This is intended to enable readers to make their own assessments of sustainability.

The Ministry of Forests' assessment

For each indicator, the ministry assessed the state, trend and adequacy of information, as follows:

- the **state** – whether conditions identified by the indicator suggest good, poor, mixed or fair progress towards sustainable forest management;
- the **trend** – whether those conditions are improving, deteriorating, mixed, uncertain or showing no change; and
- the adequacy of **information** – whether information available for the indicator is adequate, inadequate or partial.

The symbols used to summarize the assessment are shown in Figure 2.

This report does not describe or assess the Ministry of Forests' activities, goals, targets or performance, as these are covered in the ministry's [service plans](#) and [annual reports](#). Similarly, it does not examine the activities or performance of individual forest companies. Information about these can be found elsewhere.










Assessment Symbols			
State	 good	 mixed or fair	 poor
Trend	 improving	 mixed, uncertain or no change	 deteriorating
Information	 adequate	 partial	 inadequate

FIGURE 2. Assessment symbols used in this report.

How to Use This Report

All parts of the report, individual maps and graphs, and related data tables are available in printer-friendly formats so that they can be used for overheads or illustrations for teaching and other applications. Copyright rules apply: be sure to obtain permission before using any of the material in other publications or making large numbers of copies for distribution. To obtain copyright permission, please see the appendix, [Contact](#).

Terms, such as “forest,” that have a technical meaning specific to this report are listed in the glossary and are highlighted the first time they occur within each indicator.

Your comments on the information and assessments presented in this report – and especially ideas for improving the report – are welcomed and will be considered as future editions are prepared. The appendix, [Reader Comments](#), suggests some topics for feedback.

Accountability

The information presented in this report was collected from a variety of sources, each accountable for the quality of the data it provided. Any errors in the presentation or interpretation of those data are, of course, the responsibility of the authors of this report.

Indicators of sustainable forest management cover a scope that is broader than that of the direct accountabilities of any individual government agency or company. While each organization is accountable for specific aspects of forest management, no one organization is necessarily wholly accountable for the states and trends shown by the indicators.

Turning Assessment into Action

An important goal of this report is to inform the ongoing development of forest policy and management – and thereby to support progress in achieving sustainable forest management.

British Columbia's Forests and Society: An Overview

It seems clear beyond possibility of argument that any given generation of men can have only a lease, not ownership, of the earth; and one essential term of the lease is that the earth be handed on to the next generation with unimpaired potentialities.

- Roderick Haig-Brown
(British Columbia conservationist and winner of a Governor General's Award. *Measure of the Year*, 1950. Toronto: Collins)

Sections:
[The Forests](#)
[The Society](#)

The Forests

At 95 million hectares, British Columbia is larger than any European country except Russia, about four times the size of the United Kingdom, and larger than the combined areas of the states of Washington, Oregon and California.

About two-thirds of the province is forested, as shown in Figure 3. This makes the province, on a global scale, as important as many forest nations.

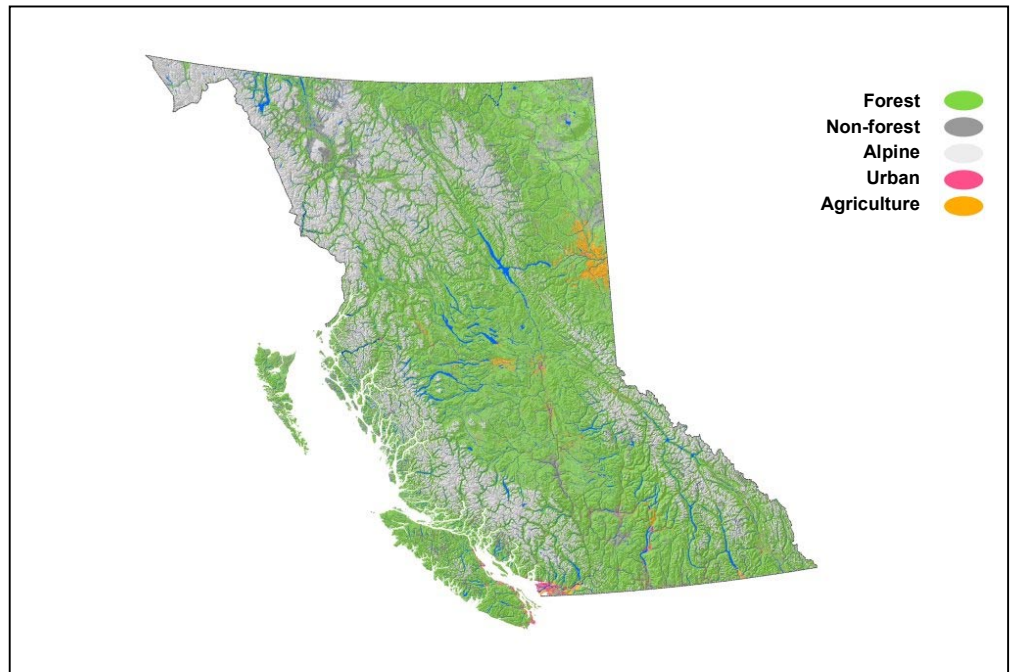


FIGURE 3. Forest land of British Columbia, 2000.

British Columbia is ecologically diverse

The province's mountainous terrain creates a range of distinct climatic zones. Along the Pacific coast, temperatures are mild and rainfall is abundant. The interior plateau, lying in the rain shadow of the Coast Mountains, has a dry continental climate. The northeast, which is part of North America's Great Central Plains, has an extreme continental climate with very cold winters.

This variety of climates, combined with the extensive and varied terrain, has resulted in a complex pattern of many distinct ecosystems. Among them are grasslands, oak parklands, temperate rain forests, dry pine forests, desert-like steppes, boreal black spruce muskegs, tundra and alpine meadows.

The many ecosystems have made British Columbia home to a great diversity of flora and fauna – in fact, a greater diversity than any other province in Canada. British Columbia has an estimated 2,790 species of native vascular plants, 1,000 mosses and liverworts, 1,600 lichens, 522 attached algae and more than 10,000 fungi. As well, 1,138 species of vertebrates have been identified, including 488 birds, 468 fish, 142 mammals, 22 amphibians and 18 reptiles. Invertebrate species are estimated to number between 50,000 and 70,000, including 35,000 insect species.

Three-quarters of Canada's mammal species are found in the province, 24 of which occur only in British Columbia. Some 162 species of birds that breed in British Columbia breed nowhere else in Canada.

The Society

British Columbia has been inhabited for about 10,000 years. When Spanish and British explorers first reached the province's coast in the late 1700s, they found thriving First Nations societies and cultures. Trading posts sprang up throughout the province during the early 1800s, soon giving way to more established towns and cities as settlers arrived in the new British colony from Europe, the United States, Asia and elsewhere.

Before the arrival of Europeans, about 40% of all the native people in Canada lived within the area that became British Columbia. Their population was probably over 80,000, but introduced diseases resulted in severe losses.

The population is concentrated in urban centres in the southwest

The province's total population expanded from 33,000 in 1867 to over 4 million in 2003 (see Figure 4). About half of the population now lives in the province's southwest corner (the Lower Mainland), in Vancouver, Surrey and other communities making up the Greater Vancouver Regional District.

Another 30% live on Vancouver Island (mainly in Victoria and Nanaimo) or in the southern Interior's Thompson-Okanagan region (Kelowna and Kamloops). The remaining 20% live primarily in smaller rural communities throughout the province.

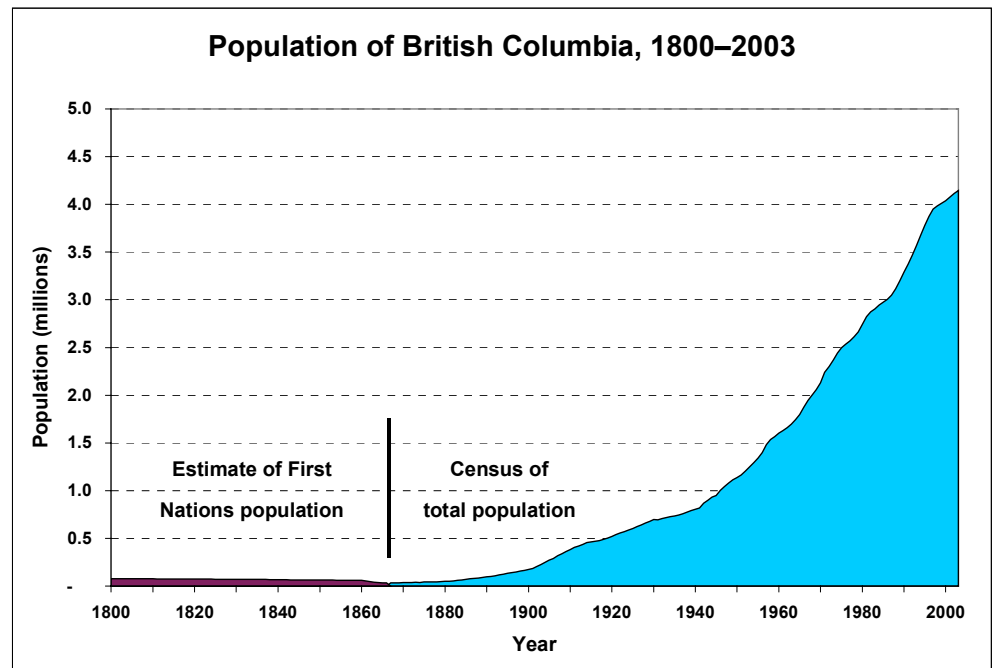


FIGURE 4. Population of British Columbia, 1800–2003.

The growing population has exerted considerable pressure on British Columbia's resources, not only timber, but also water, fish, wildlife, range, wilderness and others. This has often resulted in competing demands and conflicting public expectations for the use of forest resources (e.g., ecosystem and watershed protection vs. jobs and other economic benefits). It has also led to increasing risks of wildfires in the wildland/urban interface.

For thousands of years, aboriginal people depended on the forest for shelter, food, clothing, tools and medicine. The first European settlers also came to rely on the forest – primarily for timber, using the wood to construct buildings, ships and even roads and railway trestles. Industries and communities grew up around timber harvesting and processing, producing logs, lumber, pulp, paper and other products for export and domestic use. Recognition of the value of non-timber forest products and services, such as drinking water and wilderness recreation, is well established and growing.

Today, all communities in British Columbia, urban and rural, continue to have significant cultural, recreational and economic connections with the province's forests.

Forestry is the province's most important industry

The forest sector continues to be the foundation of British Columbia's economy, accounting for 14% of employment and 15% of all economic activity when indirect and induced economic activity are included. Although its significance has diminished as the economy has matured and diversified over the past few decades, the forest sector remains the most important employer in many rural communities.

Sustainable forest management is vital to British Columbians

With about 95% of the province in public ownership, the British Columbia government manages the land in the public interest, trying to balance environmental, economic and social issues.

The government and people of the province have many years of experience in developing and using tools and processes to enable balanced consideration of environmental, economic and social values. The Protected Areas Strategy, Land and Resource Management Planning, Forest Practices Code and Timber Supply Review are just a few of the initiatives begun in the 1990s that support sustainable forest management.

British Columbians, along with buyers of the province's forest products and tourists who come to see its great outdoors, have an interest in the sustainability of the province's forests, because their continuing use and enjoyment of the forests depend on the province's progress in achieving sustainable forest management.

About Sustainable Forest Management

Forestry isn't rocket science. It is much more complicated.

- Fred Bunnell
(Professor, University of British Columbia)

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The Concept

Forest practices have addressed aspects of sustainability for centuries, but “sustainable forest management” is a relatively recent concept. It is more comprehensive than earlier concepts such as “sustained yield of timber,” explicitly encompassing environmental, economic and social dimensions. Like the broader concept of sustainable development, sustainable forest management is widely supported and viewed as a global goal. However, exactly what sustainable forest management entails is (just as for sustainable development) somewhat contentious and not always clear.

The concept of sustainable development, first given prominence by the Brundtland Commission’s 1987 report, “Our Common Future,” emphasizes the interdependence of environmental integrity and economic development in meeting the needs of current society and future generations. This interdependence is often portrayed with one of the two models illustrated in Figure 5. The first is a “three-legged stool” with legs representing the

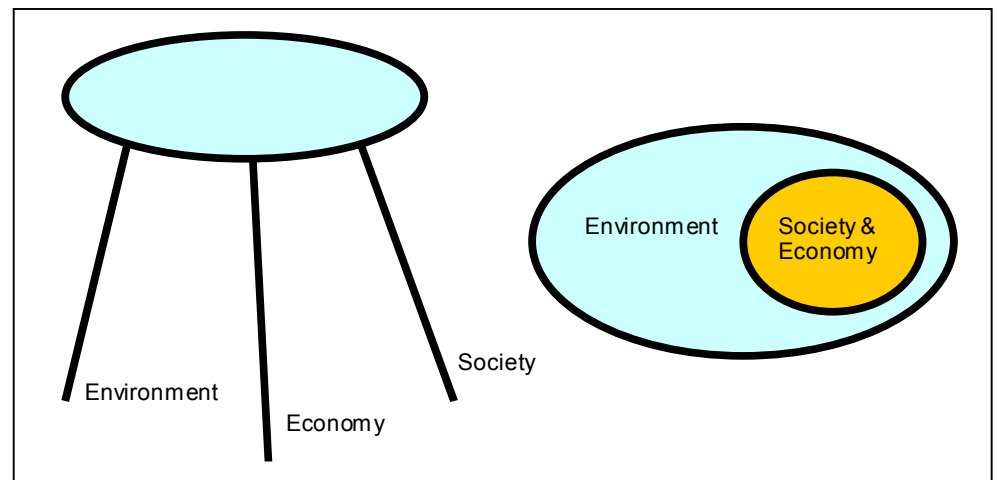


FIGURE 5. Sustainable development models.

environment, economy and society, and all three legs needing to be sound to prevent the stool from falling over. The second is an egg – society and the economy being the yolk surrounded by the egg white of environment, illustrating that humans act within, and depend on, the environment.

Concepts of sustainable development are being applied in numerous industries and are sometimes referred to in a business context as the “triple bottom line” or “the three Ps” of people, place and profit.

Definition

This report uses the vision statement in Canada’s National Forest Strategy as its definition of sustainable forest management:

The long-term health of Canada’s forest will be maintained and enhanced, for the benefit of all living things, and for the social, cultural, environmental and economic well-being of all Canadians now and in the future.

– National Forest Strategy Coalition,
[National Forest Strategy, 2003–2008](#)

Criteria, Indicators and Forest Certification

Sustainable forest management gained prominence at the 1992 Earth Summit, or United Nations Conference on Environment and Development (UNCED), in both the [Forest Principles](#) and in [Chapter 11: Combating Deforestation](#) of the conference’s programmes for the 21st century, called Agenda 21.

Two streams of global action followed from UNCED:

1. governments committed themselves to developing and using indicators to define, assess and promote progress towards sustainable forest management at the national level; and
2. non-government organizations (NGOs) – some of them dissatisfied with government-led efforts to address forestry – developed forest certification systems to promote sustainable forest management at the operational forestry level.

Both streams use indicators to measure or describe aspects of sustainability and their trends (for more details, see the section [About Indicators](#)).

Governments have typically grouped indicators into categories, referred to as criteria of sustainable forest management.

Criteria and indicators have been developed by nine regional groups of nations that contain most of the world's forests. One of these groups, known as the [Montréal Process](#), involves 12 nations including Canada. Its goal is to define and promote the conservation and sustainable management of temperate and boreal forests. In 1995, the Montréal Process published its framework of 67 indicators, grouped under seven criteria that address the environment, economy, society, and institutional and other frameworks that support sustainable forest management. The framework was re-issued in 1999 with a new numbering of the indicators ([MP 1999 indicators](#)). Some of the member countries have published national reports based on these criteria and indicators.

The [Canadian Council of Forest Ministers](#) (CCFM) also developed a framework of criteria and indicators to reflect the unique aspects of Canadian forests and values of particular concern to Canadians. This framework of six criteria and 83 indicators was also published in 1995 ([CCFM 1995 indicators](#)). The first full report based on these indicators was published in 2000. A revised framework of 46 indicators was published in 2003 ([CCFM 2003 indicators](#)), reflecting experience from use of the framework and advances in scientific knowledge.

This report, *The State of British Columbia's Forests – 2004*, cross-references relevant indicators of the Montréal Process (1999), CCFM (1995) and CCFM (2003) for the convenience of readers.

While many governments were developing criteria and indicators, several NGOs and a few nations developed forest certification systems to encourage companies to practise sustainable forestry at the operational level. These systems share many aspects of the governmental criteria and indicators frameworks. Both are based on the concepts of sustainable development: both use indicators to report on progress and trigger appropriate actions; and both share the goal of sustainable forest management.

The two streams of action have interacted in several ways. The use of criteria and indicators has spread from the national level to the operational level, NGOs and governments have advised each other on indicators, and some governments have obtained certification for their forest management. For example, the CCFM's 1995 criteria and indicators were the basis for the Canadian Standards Association's forest certification system published in 1996 and revised in 2002. This and other forest certification systems are now used widely in British Columbia, as discussed in the indicator on [Certification](#).

Reporting on Sustainable Forest Management

Reporting on sustainable forest management is challenging.

Sustainable forest management is not just about trees. It involves other plants, as well as wildlife, soil and water, air quality and greenhouse gases; all economic activities that depend on the forests; the communities that depend on those economic activities; and other social and cultural activities and values related to forests.

For these reasons, the scope of reports on sustainable forest management is typically broader than that of the direct accountabilities of a single government agency or the actions of individual forest industry operators.

Ensuring relevance and credibility

The Montréal Process and CCFM criteria and indicators offer a good starting point for selecting relevant indicators for any jurisdiction in Canada, since they were developed through consultation with experts on all aspects of sustainable forest management. To be locally relevant, however, reporting must also reflect the unique aspects of the nature, history and culture of a jurisdiction and its forests.

The credibility of reporting depends on the use of the best science-based information available and the inclusion of both positive and negative findings. Credibility is further supported by identifying knowledge gaps and, where possible, using information from public sources.

Challenges in reporting

Several factors pose practical challenges to finding and presenting relevant, useful information and data on the indicators. This report attempts to address and balance all of these challenges:

- *Cost* – The cost of detailed inventories of all forest resources is high and data may be unavailable.
- *Time* – Assembling and analyzing extensive datasets to provide meaningful information is time-consuming, making presentation of recent information difficult.
- *Technical/scientific* – Exactly what to measure and how to measure it are the subjects of technical debate, and all of the potential approaches have different technical merits and problems.
- *Administrative* – Access to information, as well as permission to report on it, is sometimes limited by proprietary concerns (e.g., information related to commercial interests and private land) or the sensitivity of information (e.g., rare ecosystems that might be threatened by vandals or nature lovers if their locations were made public).

Assessing Sustainable Forest Management

Assessing sustainable forest management is difficult because of the complex and intertwined nature of its many aspects. Nonetheless, questions about sustainability need to be asked, and answered, to help inform future actions.

The conditions of forests and societies continually change, as do interactions between the two. Perceptions of what is sustainable or unsustainable change over time.

An indicator may be assessed relative to historical conditions, technical or scientific thresholds, and desired targets. Where these reference values are unknown, unclear or disputed, meaningful assessment of the indicator is difficult.

Assessment of several indicators collectively is conceptually even more problematic. First, indicators that use different units of measure cannot simply be added together unless they are converted to a common unit. Conversion may be technically problematic or wholly inappropriate. Second, the relationships between indicators are often complex, making interpretation of their interactions unreliable. Third, because the importance of any one indicator relative to another depends on the values and perspective of the assessor, even experts have trouble developing a consensus on overall assessments.

While various approaches have been developed to assess multiple indicators collectively, no one approach is entirely satisfactory.

About Indicators

Not everything that can be counted counts, and not everything that counts can be counted.

– Albert Einstein

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The Concept

The indicators in this report provide information that enables people to assess aspects of forest management. A meaningful assessment usually requires more than one indicator.

Definition

An indicator is defined in this report as follows, based on the definition used in the [Montréal Process](#):

A quantitative or qualitative variable used to describe a state or condition. When observed periodically, it shows a trend. It provides information that is factual, usually for a specific time and place.

Indicators of Sustainable Forest Management

Indicators are central to any report on the state of forests. They are used at all strategic and operational levels of forest management – global, national, provincial or state, forest management unit, and specific plot of land – to describe the state of forests and human interactions with forests.

They are used to:

- help explain the context or background situation;
- clarify management goals (by the choice of performance indicators);
- check for compliance with regulations and policies;
- check the implementation of plans;

-
- assess overall outcomes and effectiveness of management efforts; and
 - improve understanding of how forests and societies function.

Tracking an indicator over time is called monitoring. The above uses of indicators are referred to, respectively, as background monitoring, performance monitoring, compliance monitoring, implementation monitoring, effectiveness monitoring and improvement monitoring. The last includes validation monitoring – checking the validity of assumptions and models used in management.

These different types of monitoring are most helpful when used in combination. For example, monitoring that confirms full compliance with laws is reassuring to a certain extent, but more meaningful when combined with effectiveness monitoring that confirms compliance is achieving desired outcomes.

Sustainable forest management requires continual improvement and adjustment based on the monitoring of indicators. Reports on the state of forests may draw from several types of monitoring, but typically emphasize the assessment of overall outcomes to assist decision-making about future directions.

Types of Indicators

The indicators in this and other similar reports can be grouped into several complementary types:

- *Quantitative, qualitative* – Of the two, quantitative indicators are generally preferred. However, qualitative (descriptive) indicators are sometimes all that is available. This report mostly uses quantitative indicators.
- *Input, process, output, outcome* – Inputs and processes are used in management systems to achieve desired outputs and outcomes. For example, inputs of money, workers and time are applied to activities (processes) such as planting and tending trees. This results in outputs of areas planted with different species and, over time, outcomes such as habitat for animals and economic activities related to timber harvesting and milling. Indicators are used to track all of these stages. This report emphasizes outcome indicators, with output indicators used as surrogates where necessary. Input and process indicators may also be used to monitor activities that support sustainability.
- *Pressure, state, response* – Problem management can be informed by knowledge about a problem's cause or driving force (pressure), its

effect (state) and the actions undertaken to address both cause and effect (response). For example, growing human populations (pressure) tend to cause loss of wildlife habitat and reduced wildlife populations (state), leading to the need for corrective measures such as protection of critical habitat (response). Trends of all three types of indicators help to show if a problem is being resolved. In this report, the relationships between indicators are described in terms of pressure, state and response.

- *Environmental, economic, social, institutional* – Environmental, economic, social and institutional indicators must be considered together, in a balanced way. Overemphasis or omission of one or more of these types of indicators is likely to lead to a lack of sustainability. In this report, the more descriptive phrase “governance and support” is used in place of “institutional.”

Selection of Indicators

Given the complexity of sustainable forest management, selecting a list of indicators that is sufficiently comprehensive for the topic, yet also limited to a useable number that readers can comprehend, is challenging.

The selection of indicators for this report was guided by the attributes of good indicators used for the development of the CCFM’s 2003 criteria and indicators ([Background Information on the CCFM C&I Review](#), scroll down and click on “Description of TWG Review Process”). A good indicator is one that:

- is relevant,
- is measurable,
- is understandable,
- can be forecast, and
- has reference values.

An indicator must be relevant to an important aspect of sustainable forest management, sensitive to changes in the environment and human activities, and appropriate for the spatial scale being assessed. It should be a variable that is necessary (and, if possible, sufficient) to illustrate that aspect of forest management and to inform decisions.

A measurable indicator is one for which it is technically and financially feasible to obtain timely, reliable data and, ideally, for which there is sufficient historical information to provide meaningful trends. Qualitative indicators must be sufficiently precise in their descriptions to permit meaningful comparisons over time.

Intended audiences must readily understand the information conveyed by an indicator, and be able to use it to form their own assessments.

Indicators that can be forecast using science-based predictions of the effects of management choices and other factors are particularly useful for assessing future sustainability.

Reference values – for instance, historical baselines, technical or scientific thresholds and desired targets – provide a context for assessment of states and trends.

The indicators selected for this report satisfied the above five attributes more completely than did other candidate indicators. While keeping the same indicators over a long period enables assessment of trends, experience in the use of the indicators and changes in scientific knowledge over time make rethinking the list of indicators periodically necessary.