

APPENDIX A . THE MONTREAL PROCESS CRITERIA AND INDICATORS

In 1992 the United Nations sponsored a Conference on Environment and Development (UNCED), commonly referred to as the “Earth Summit,” in Rio de Janeiro, Brazil. At the Earth Summit, over 144 nations recognized the importance of sustainably managing all types of forests in order to meet the needs of present and future generations by adopting a nonbinding Statement of Forest Principles (Sitarz 1994).

The Montreal Process developed as a result of efforts following the Earth Summit. The United Nations Conference on Security and Cooperation in Europe sponsored an international seminar in Montreal, Canada, on sustainable development of temperate and boreal forests. This conference provided a forum for discussions on how to measure and track progress toward the goal of sustainability. These discussions provided the conceptual basis for subsequent regional and international initiatives to develop (1) criteria, which provide a large-scale reflection of public values, and (2) indicators, which provide a means of measuring forest conditions and tracking changes in ecological, social, and economic conditions.

In 1995, the United States endorsed a statement of political commitment to use criteria and indicators to track progress in sustainability. The signatory document, known as the “Santiago Declaration,” includes a comprehensive set of 7 criteria (3 of which have subcriteria) and 67 indicators for the conservation and sustainable management of temperate and boreal forests. The signatories to this nonbinding declaration are Argentina, Australia, Canada, Chile, China, Japan, the Republic of Korea, Mexico, New Zealand, the Russian Federation, the United States, and Uruguay. These 12 countries contain 90 percent of the world’s temperate and boreal forests, which account for 60 percent of all forests on the globe (Montreal Process Working Group 2001). They account for 45 percent of related world trade and 35 percent of the world’s population.

The United States issued *The First Approximation Report for Sustainable Forest Management: Report of the United States on the Criteria and Indicators for the Sustainable Management of Temperate and Boreal Forests* on June 6, 1997 (USDA Forest Service 1997). This report laid the foundation for an ongoing process to assess forest management and monitoring capability across the country. A consolidated report from all Montreal Process Working Group countries was presented to the Eleventh World Forestry Congress in Antalya, Turkey, in October 1997. The European countries decided it was important to work as a region under an existing Helsinki Ministerial Declaration. Their criteria and indicators effort is called the Helsinki Process or the Pan-European Process.

The following forest sustainability criteria and indicators were developed as a result of the Montreal Process and are called the Montreal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests.

The Montreal Process Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*

Criterion 1—Conservation of Biological Diversity

1.1 Ecosystem Diversity

- 1.1.a. Extent of area by forest type relative to total forest area
- 1.1.b. Extent of area by forest type and by age class or successional stage
- 1.1.c. Extent of area by forest type in protected area categories as defined by IUCN or other classification systems
- 1.1.d. Extent of areas by forest type in protected areas defined by age class or successional stage
- 1.1.e. Fragmentation of forest types

1.2 Species Diversity

- 1.2.a. The number of forest dependent species
- 1.2.b. The status (threatened, rare, vulnerable, endangered, or extinct) of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment

1.3 Genetic Diversity

- 1.3.a. Number of forest dependent species that occupy a small portion of their former range
- 1.3.b. Population levels of representative species from diverse habitats monitored across their range

Criterion 2—Maintenance of Productive Capacity of Forest Ecosystems

- 2.a. Area of forest land and net area of forest land available for timber production
- 2.b. Total growing stock of both merchantable and nonmerchantable tree species on forest land available for timber production
- 2.c. The area and growing stock of plantations of native and exotic species
- 2.d. Annual removal of wood products compared to the volume determined to be sustainable
- 2.e. Annual removal of nontimber forest products (e.g., fur bearers, berries, mushrooms, game), compared to the level determined to be sustainable

Criterion 3—Maintenance of Forest Ecosystem Health and Vitality

- 3.a. Area and percent of forest affected by processes or agents beyond the range of historic variation (e.g., by insects, disease, competition from exotic species, fire, storm, land clearance, permanent flooding, salinization, and domestic animals)
- 3.b. Area and percent of forest land subjected to levels of specific air pollutants (e.g., sulfates, nitrate, ozone) or ultraviolet that may cause negative impacts on the forest ecosystem
- 3.c. Area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g., soil nutrient cycling, seed dispersion, pollination) and/or

*No priority or order is implied in the numeric listing of the criteria and indicators.

ecological continuity (monitoring of functionally important species such as fungi, arboreal epiphytes, nematodes, wasps, etc.)

Criterion 4—Conservation and Maintenance of Soil and Water Resources

- 4.a. Area and percent of forest land with significant soil erosion
- 4.b. Area and percent of forest land managed primarily for protective functions (e.g. watersheds, flood protection, avalanche protection, riparian zones)
- 4.c. Percent of stream kilometers in forested catchments in which stream flow and timing has significantly deviated from the historic range of variation
- 4.d. Area and percent of forest land with significantly diminished soil organic matter and/or changes in other soil chemical properties
- 4.e. Area and percent of forest land with significant compaction or change in soil physical properties resulting from human activities
- 4.f. Percent of water bodies in forest areas (e.g., stream kilometers, lake hectares) with significant variance of biological diversity from the historic range of variability
- 4.g. Percent of water bodies in forest areas (e.g., stream kilometers, lake hectares) with significant variation from the historic range of variability in pH, dissolved oxygen, levels of chemicals (electrical conductivity), sedimentation, or temperature change
- 4.h. Area and percent of forest land experiencing an accumulation of persistent toxic substances

Criterion 5—Maintenance of Forest Contribution to Global Carbon Cycles

- 5.a. Total forest ecosystem biomass and carbon pool, and if appropriate, by forest type, age class, and successional stages
- 5.b. Contribution of forest ecosystems to the total global carbon budget, including absorption and release of carbon (standing biomass, coarse woody debris, peat and soil carbon)
- 5.c. Contribution of forest products to the global carbon budget

Criterion 6—Maintenance and Enhancement of Long-term Multiple Socio-economic Benefits to Meet the Needs of Societies

6.1 Production and Consumption

- 6.1.a. Value and volume of wood and wood products production, including value added through downstream processing
- 6.1.b. Value and quantities of production of nonwood forest products
- 6.1.c. Supply and consumption of wood and wood products, including consumption per capita
- 6.1.d. Value of wood and nonwood products production as a percentage of GDP
- 6.1.e. Degree of recycling of forest products
- 6.1.f. Supply and consumption/use of nonwood products

6.2 Recreation and Tourism

- 6.2.a. Area and percent of forest land managed for general recreation and tourism, in relation to the total area of forest land
- 6.2.b. Number and type of facilities available for general recreation and tourism, in relation to population and forest area
- 6.2.c. Number of visitor days attributed to recreation and tourism, in relation to population and forest area

6.3 Investment in the Forest Sector

- 6.3.a. Value of investment, including in forest growing, forest health and management, planted forests, wood processing, recreation, and tourism
- 6.3.b. Level of expenditure on research and development, and education
- 6.3.c. Extension and use of new and improved technologies
- 6.3.d. Rates of return on investment

6.4 Cultural, Social, and Spiritual Needs and Values

- 6.4.a. Area and percent of forest land managed in relation to the total area of forest land to protect the range of cultural, social, and spiritual needs and values
- 6.4.b. Nonconsumptive use forest values

6.5 Employment and Community Needs

- 6.5.a. Direct and indirect employment in the forest sector and forest sector employment as a proportion of total employment
- 6.5.b. Average wage rates and injury rates in major employment categories within the forest sector
- 6.5.c. Viability and adaptability to changing economic conditions of forest dependent communities, including indigenous communities
- 6.5.d. Area and percent of forest land used for subsistence purposes

Criterion 7—Legal, Institutional, and Economic Framework for Forest Conservation and Sustainable Management

7.1 Extent to which the *legal framework* (laws, regulations, guidelines) supports the conservation and sustainable management of forests, including the extent to which it:

- 7.1.a. Clarifies property rights, provides for appropriate land tenure arrangements, recognizes customary and traditional rights of indigenous people, and provides means of resolving property disputes by due process
- 7.1.b. Provides for periodic forest-related planning, assessment, and policy review that recognizes the range of forest values, including coordination with relevant sectors
- 7.1.c. Provides opportunities for public participation in public policy and decision making related to forests and public access to information
- 7.1.d. Encourages best practice codes for forest management
- 7.1.e. Provides for the management of forests to conserve special environmental, cultural, social, and/or scientific values

7.2 Extent to which the *institutional framework* supports the conservation and sustainable management of forests, including the capacity to:

- 7.2.a. Provide for public involvement activities and public education, awareness and extension programs, and make available forest-related information
- 7.2.b. Undertake and implement periodic forest-related planning, assessment, and policy review including cross-sectoral planning and coordination
- 7.2.c. Develop and maintain human resource skills across relevant disciplines
- 7.2.d. Develop and maintain efficient physical infrastructure to facilitate the supply of forest products and services and support forest management
- 7.2.e. Enforce laws, regulations, and guidelines

7.3 Extent to which the *economic framework (economic policies and measures)* supports the conservation and sustainable management of forests through:

- 7.3.a. Investment and taxation policies and a regulatory environment which recognize the long-term nature of investments and permit the flow of capital in and out of the forest sector in response to market signals, nonmarket economic valuations, and public policy decisions in order to meet long-term demands for forest products and services
- 7.3.b. Nondiscriminatory trade policies for forest products

7.4 Capacity to *measure and monitor* changes in the conservation and sustainable management of forests, including:

- 7.4.a. Availability and extent of up-to-date data, statistics, and other information important to measuring or describing indicators associated with criteria 1–7
- 7.4.b. Scope, frequency, and statistical reliability of forest inventories, assessments, monitoring, and other relevant information
- 7.4.c. Compatibility with other countries in measuring, monitoring, and reporting on indicators

7.5 Capacity to *conduct and apply research and development* aimed at improving forest management and delivery of forest goods and services, including:

- 7.5.a. Development of scientific understanding of forest ecosystem characteristics and functions
- 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
- 7.5.d. Enhancement of ability to predict impacts of human intervention on forests
- 7.5.e. Ability to predict impacts on forests of possible climate change

Source: Montreal Process Working Group 1999