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# The State of Canada's Forests



sustaining forests at home and abroad



Natural Resources  
Canada  
Canadian Forest  
Service

Ressources naturelles  
Canada  
Service canadien  
des forêts

Canada

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Cat. Fo1-6/1996 E

ISBN 0-662-24425-7

ISSN 1183-353-X

Electronic versions (in Macintosh or IBM) and  
copies of this publication may be obtained free of charge from:

Natural Resources Canada  
Canadian Forest Service  
580 Booth Street  
Ottawa ON K1A 0E4  
Telephone: (613) 947-9097  
Fax: (613) 947-9038

Internet site: <http://nrcan.gc.ca/cfs/proj/ppiab/sof/sof.html>

A microfiche edition of this publication may be purchased from:

Micromedia Ltd.  
305 – 240 Catherine Street  
Ottawa ON K2P 2G8

*Également disponible en français sous le titre*

L'état des forêts au Canada 1995–1996



Printed on recycled paper

Cover Photo: Little Qualicum Falls — Vancouver Island, British Columbia  
by MALAK



# Message from the Minister

Global challenges require global action

**I** am pleased to table before Parliament the sixth report on the state of Canada's forests. Throughout Canada's history, forests have played a significant role in our evolution and have shaped our identity as a nation. Forests enrich the lives of all Canadians. They filter the air we breathe and the water we drink, and they offer a place of sanctuary and recreation. In addition, they support an economic sector that contributes substantially to the wealth of every province and territory, providing jobs for 880,000 Canadians.

The vast majority of the forests in Canada are the collective property of the Canadian public, held in trust by the federal, provincial and territorial governments. Those forests, and the six percent of forests that are privately owned, will continue to be crucial to Canada's development and to future generations of Canadians. An important goal is to ensure that our forests can integrate environmental, social and economic values. This goal and our appreciation of the multiple values of forests raise new challenges and have initiated a new era of forest management that focuses on sustaining the health and productivity of our forest ecosystems.

Canada's forests account for ten percent of the world's total forest land, and they are fundamental to the health of our planet and the welfare of all its citizens. As a major forest nation and a world leader in forest science and technology, our growing awareness of the importance of forests in the global environment creates new obligations. For example, Canada is participating in the United Nations Intergovernmental Panel on Forests, which is making promising gains in narrowing the gap between the views of developing and developed countries on global forest issues. Many of the international efforts underway to build consensus and bridge differences are described in this year's report. Given the economic importance of forests to Canada, the report also reviews changing patterns of trade in global forest markets and the new challenges facing our forest industries.

Canada has demonstrated that partnerships and collaborative efforts can produce national solutions. The challenge for the international community will be to develop an understanding of the complex political, environmental, economic and social dimensions of forests, and to build a common vision of sustainable forest management.



**A. Anne McLellan**

*Minister of  
Natural Resources Canada*

A handwritten signature in cursive script that reads "A. Anne McLellan".

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tear-out





**O**ur awareness of the importance of forests to the global environment is changing the nature of forest management around the world. At the same time, an increasing number of countries are viewing their forests as a source of economic wealth and development. This year's report highlights the evolution in the global dialogue on forests, as well as some of the new challenges facing Canadian forest industries in international markets.

## CANADA'S FORESTS

Canada has eight major forest regions; together, they are home to more than 200 000 species. Forests cover 417.6 million hectares or 45% of Canada's landbase. Some 37% of this area is open forest, composed of muskeg, marshes and sparse tree cover. Approximately 236.7 million hectares (57%) are considered commercial forests — capable of growing commercial trees within a reasonable length of time. However, only 119 million hectares are currently managed for timber production, while an estimated 50 million hectares are protected from harvesting by legislation or policy. Most of Canada's forests are publicly owned; provincial governments are responsible for managing 71%, and the federal and territorial governments manage 23%. The remaining 6% is the private property of more than 425 000 landowners.

## THE GLOBAL CHALLENGE

Over the past decade, forests have emerged as a major consideration in global discussions on sustainable development. Since the United Nations Earth Summit, held in Rio de Janeiro, Brazil, in 1992, remarkable progress has been made in advancing the worldwide consensus on addressing forest issues. The international community recognizes the multiple benefits and roles of forests. Given the wide disparities between countries in forest ecosystems and social and economic priorities, finding a common definition of what constitutes sustainable forest management is crucial. As a country that accounts for 10% of the world's forest land, Canada has assumed a leadership role in many of these global discussions. And as the largest exporter of forest products, Canada's forest community is also involved in developing standards for sustainable forest management to enable forest industries to assess their forest operations and demonstrate that their wood supply comes from well-managed forests.

## BILATERAL AND INTERNATIONAL LINKAGES

Canada is promoting sustainable forest management on a number of fronts, such as providing assistance to developing countries to help them strengthen their capacity to manage forests sustainably. For 30 years, Canada has been among the leading countries in providing forest development assistance through projects that emphasize the education and participation of local people. Canada is also a major player in global forest research. As a result of



the broader range of forest issues associated with sustainable development, the importance of international collaboration is growing. A promising initiative is the international model forest network, which is encouraging the exchange of knowledge and technological expertise among developed and developing countries.

## SUSTAINING CANADA'S FORESTS

Between 1979 and 1993, fire, insects and disease affected more area in the commercial forest than harvesting. On average, natural disturbances affected 0.6% of the forest annually, while 0.4% was harvested. During this 15-year period, there was a net increase of 4% in the volume of trees growing in Canada's commercial forest. On average, 163 million m<sup>3</sup> were harvested annually, compared with the 137 million m<sup>3</sup> consumed by fire, insects and disease. More than 4.8 million hectares were planted or seeded between 1979 and 1993. However, in 1993, commercial species were not yet growing on 2.49 million hectares of the commercial forest (1.06% ) more than 10 years after harvesting.

Although clearcutting is still the predominant harvesting system, the use of selection cutting is increasing. Moreover, the practice of clearcutting in Canada has changed considerably over the past 20 years. Recognition of the need to maintain wildlife habitat, protect soils, encourage natural regeneration, retain natural landscape patterns, and protect young trees in stands where mature trees are being harvested have led to substantial changes in guidelines on clearcutting. For example, the average size of clearcuts is declining, and their pattern and placement is being designed to reflect natural forest landscape patterns.

## CHANGING PATTERNS OF TRADE

Our nation has a proven track record in producing and delivering high-quality forest products on a consistent basis and at a competitive price. Canada remains the world's largest exporter of forest products, although our share of world exports has declined somewhat since the 1960s. This decline has been counterbalanced to some extent by the fact that our forest industries have been diversifying their exports in terms of markets and the mix of products. For example, Canada's share of the large U.S. market for newsprint and pulp has declined, while our exports of lumber to the Pacific Rim have increased. Promising gains have also been made in capturing a larger share of world trade in higher value-added printing and writing papers. The abundance of our forests and the desirable characteristics of our trees have enabled Canada to remain most competitive in wood pulp and wood-intensive grades of forest products. New competitors are entering these forest products markets, primarily from the Southern Hemisphere, and some of our traditional markets are becoming more self-sufficient. A challenge shared by traditional and emerging producers is the growing obligation to demonstrate that their forest products originate from sustainably managed forests.

## CONTINUED ECONOMIC RECOVERY

Canada's forest sector continued to rebound following the significant losses in revenue and employment that occurred during the global recession from 1989 to 1991. The value of forest products exports rose from \$20.6 billion in 1991, to \$32.4 billion in 1994 — an increase of 57%. For the second consecutive year, there was increase in both production and exports of lumber, pulp and newsprint. The most evident reversal of fortunes was in wood pulp, where the volume of production in 1994 surpassed the record set in 1988, and where the value of exports increased by 44.6% over 1993 levels. The renewed growth in the forest sector was reflected in a substantial increase in total capital and repair expenditures (23%, compared with an average increase of 9% over the past 10 years). In 1995, direct employment increased by 11 000 jobs, to a total of 369 000 direct jobs — the highest level in the past decade.

# Canada's Forests

## AN OVERVIEW

**F**orests are a dominant feature of Canada's landscape, covering 417.6 million hectares or 45% of the country. Our vast forest resource has been integral to the development of Canada as a nation and to our culture, traditions and history.

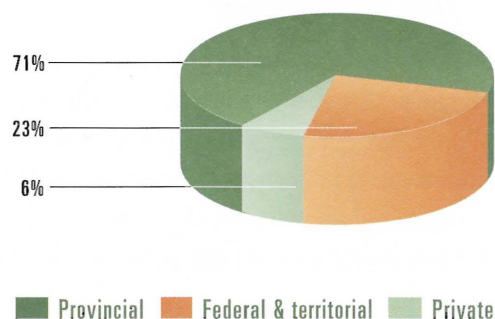
Canadians depend on their forests for a wide range of values and uses. Forests sustain the economies of hundreds of communities across the country, moderate our climate, prevent soil erosion, improve air and water quality, and provide habitat for countless species of plants and animals. They also offer a multitude of recreational

opportunities that are enjoyed by Canadians and visitors from abroad.

The forest landbase in this country is not only immense, it is also extremely varied. Canada's forests are essential to the survival of many plants, animals and other organisms. More than 200 000 species, representing two-thirds of all of the species found in Canada, are dependent on forest habitats. Our eight major forest regions (*see tear-out map*) are composed of distinct groupings and numbers of tree species.

Forty tree species are found within Canada's boreal forest, for example, whereas the Carolinian forest in southern Ontario contains twice that number. In total, there are approximately 165 tree species in Canada. The age

Forest land ownership

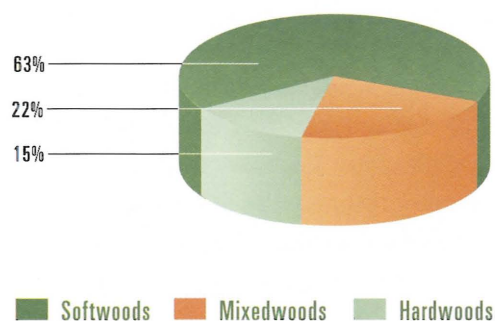


composition of our forests, however, is relatively uniform due to cyclical and widespread disturbances, such as fire and insect infestations.

Canada is unique in that the vast majority of its forests (94%) are publicly owned. On behalf of the public, provincial governments manage 71%, while the federal and territorial governments manage approximately 23%. The remaining 6% of the forests are privately owned — the property of more than 425 000 landowners.

Forest management in Canada is a matter of provincial jurisdiction, and each province has its own set of legislation, policies and regulations governing forest activities within its borders.

Forest types in the commercial forest





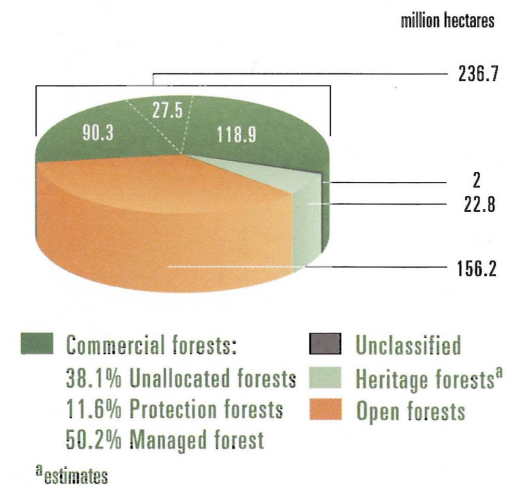
The same can be said of the Northwest Territories. In the Yukon Territory, however, the federal government oversees the management of forest lands through the Department of Indian Affairs and Northern Development. The federal government's role in forestry

focuses on trade and investment, national statistics, forest science and technology, Aboriginal affairs, environmental regulations and international relations.

*(The general framework for forest management planning in Canada is outlined on this page.)*

Canada is one of the few developed nations still richly endowed with large areas of natural forests. Of the 417.6 million hectares of forests in Canada, 57% are considered "commercial forests" — capable of producing a range of both timber and non-timber benefits. However, only half of these forests are currently accessible and managed for timber production. More than 12% (50 million hectares) of Canada's forests have been protected from harvesting by policy or legislation. (Heritage forests are protected by legislation, while protection forests are sensitive sites that are protected by policy.) This large area of protected forests is roughly equivalent in size to the total forest land in Finland, Norway, Germany, Switzerland and Austria, combined.

Canada's forests



## Forest management planning framework



## Year in Review

1995–1996



Over the past few years, many forest-related acts, standards and codes of practice were announced across Canada, ushering in a new era of forest management. During 1995–1996, several initiatives and projects were implemented to make this vision a reality. In addition, a number of forums were held to promote the exchange of ideas and the sharing of knowledge regarding forests.

### A NEW ERA OF FOREST MANAGEMENT

#### Implementing new practices in public forests

The Government of **Newfoundland** is encouraging the public to participate in the preparation of district ecosystem management plans. Each forest management district is to prepare a five-year plan that outlines better ways of protecting its forest ecosystems. In addition to ensuring that forests remain a renewable resource, the plans are intended to protect wildlife habitat, water quality, nutrient cycling and other aspects of forest ecosystems.

In April 1996, **Prince Edward Island** introduced new regulations under its Forest Management Act, designating a system of “Provincial Forests” to ensure that public forests across the province are managed to sustain a full range of values, including recreation, wildlife and wood fibre.

In **Nova Scotia**, a pilot project was initiated to develop an integrated resource management strategy for Crown lands in the north-central region of the province. The process includes extensive public consultation. After evaluation, this approach will be applied to Crown lands throughout Nova Scotia.

*Canada progressed toward its goal of sustainable forest management in October 1995, with the release of the Canadian Council of Forest Ministers' document entitled, "Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators."*



During the first year of its expanded Crown Land Silviculture Program, **New Brunswick** committed \$10.7 million in new funding to enable forest managers to almost double the area of forests receiving silvicultural treatments. Thinning was carried out on approximately 80% of the 33 500 hectares of commercial forests that were treated. The new program brings the level of hardwood silviculture up to the level currently practiced for softwood.

The forest resource enhancement plan, announced in May 1995, is the first of its kind in **Quebec**. Under the plan, the forest industry will be able to directly invest \$97.5 million — part of the amount it pays in stumpage fees — in the regions' economy over three years. This innovative plan will strengthen silvicultural efforts aimed at enhancing resources in public forests.

In November 1995, **Ontario** announced that it would gradually open up approximately 10 000 km<sup>2</sup> of the northeastern part of the province for economic development, following a court judgement that lifted a moratorium on development in the region. The old-growth forests in Temagami, located north of North Bay, have been at the centre of a land-title dispute for two decades. The government also announced its commitment to preserve areas of old-growth forests and Aboriginal sacred and cultural sites in the region.

Early in 1996, **Manitoba** released a long-term forest plan entitled "Toward Ecosystem-based Management." The plan recognizes the multiple uses and values of Manitoba's forests and will be used to guide their management into the next century. Partnerships between industry and other forest stakeholders will be strengthened through the process of developing forest plans that meet the ecological and forest management objectives of all stakeholders.

Companies wishing to obtain a forest management agreement in **Saskatchewan** will soon be required to submit their 20-year forest management plan to the provincial environmental impact assessment (EIA) process. For existing agreements, proposed legislation will require that 20-year forest management plans be subjected to the EIA process the first time the plans are updated after the new legislation comes into effect.

In June 1995, **British Columbia** (BC) brought into force the Forest Practices Code of British Columbia Act and 18 accompanying regulations. This new body of legislation governs all aspects of sustainable management in BC's public forests.

In 1995, BC placed large areas of Crown land in a reserve created under the Forest Land Reserve Act. The Province had

## New or revised legislation

### *Nova Scotia*

Environment Act  
1995

### *Ontario*

Crown Forest  
Sustainability Act  
1995

### *Quebec*

Regulation Respecting  
Standards of Forest  
Management for Forests  
in the Public Domain  
amended in 1995–1996

### *British Columbia*

Forest Practices Code of  
British Columbia Act  
1995

### *Yukon*

Yukon Land Claims  
Settlement Act  
1995

### *Federal*

Canadian Environmental  
Assessment Act  
1995

In July 1995, the **BC**  
**government** agreed to  
implement, in Clayoquot  
Sound, a new ecosystem-  
based approach to forest  
management promoted by  
an independent scientific  
panel. Harvest levels in the  
area will be determined  
through a watershed  
planning process.

The **Woodlot Association**  
**of Alberta** was formed in  
November 1995, to voice  
the collective concerns of  
the province's woodlot  
owners and to promote  
sound forest management  
practices on private lands.

introduced the Act in 1994, to help maintain forest land for sustainable resource use in the face of growing urban development and other pressures. The reserve already included a significant area of privately managed forest lands.

Faced with unprecedented demand for **Yukon's** timber in 1995, the federal Department of Indian Affairs and Northern Development (DIAND) implemented an interim forest policy to promote the sustainability of the territory's forest resource. Under the policy, a reforestation fee (\$5/m<sup>3</sup>) was introduced, the Edward Elijah Smith Reforestation Program was established, stumpage fees were increased from \$0.21/m<sup>3</sup> to \$5–10/m<sup>3</sup>, and the Yukon Forest Advisory Committee was formed. DIAND also imposed a 450 000-m<sup>3</sup> ceiling on harvesting carried out under commercial timber permits, and it is developing a comprehensive forest policy that will involve public consultation and be coordinated with initiatives of the Yukon government.

### Supporting forest management on private lands

In 1995, the Government of **Prince Edward Island**, and the province's private woodlot owners, forest contractors and sawmill industry agreed on a unique service-delivery partnership to ensure the sustainable development of the Island's forests. All parties will share in the cost of seedling production, reforestation and thinning on private woodlots. All program and activity planning will be coordinated by the Partnership Council, which has equal representation from woodlot owners, forest contractors and the sawmill industry, as well as minority representation from the Province. The Partnership Council has made a commitment to develop codes of practice for harvest contractors and woodlot owners that reflect the goals of sustainable forest management.

In **Nova Scotia**, the government has been working with the Coalition of Nova Scotia Forest Interests to develop a strategy to ensure the sustainability of privately owned forests. This new approach is expected to be the focus of public consultations in 1996.

Following the expiry of its federal-provincial forest resource development agreement, **New Brunswick** embarked on a \$4-million program for silvicultural improvements on private woodlots. Costs are being shared between the provincial government and the New Brunswick Federation of Woodlot Owners. The program supports thinning and spacing activities in natural stands, and the establishment and tending of plantations.



In May 1995, at the **Quebec Summit on Private Forests**, representatives from private woodlot owner associations, municipalities, the forest industry and the Quebec government reached a consensus on a new plan for protecting and enhancing private forest resources. One of the highlights of the Summit was the unanimous decision to create non-governmental cooperation and planning agencies to develop and implement private forest protection and enhancement initiatives.

### Sharing knowledge on forests

The **University of Alberta** was chosen in July 1995, to coordinate a sustainable forest management (SFM) network — 1 of 14 centres in the federal government's Networks of Centres of Excellence Program. The objectives of the SFM network partners are to preserve the ecological variability and biodiversity of Canada's forests and to maintain the nation's forest-based economy by developing new technologies and management strategies.

The **Canadian Forestry Association** co-sponsored the second Canadian Urban Forests Conference in Windsor, Ontario, in the summer of 1995. Two hundred professionals and volunteers came from across Canada to discuss the role of community support, volunteers and partnerships in sustaining urban forests. The many facets of tree care also were reviewed, as was the impact of municipal bylaws.

In April 1995, in Rome, the **Food and Agriculture Organization** (FAO) of the United Nations hosted the first international meeting of ministers responsible for forests. At the Ministerial Forestry Meeting, the 121 ministers endorsed the Rome Statement on Forestry, which emphasizes the need to develop national forest plans that address economic and social causes of deforestation, to develop and apply criteria and indicators for sustainable forest management, and to enhance international cooperation.

The 20th World Congress of the **International Union of Forestry Research Organizations** (IUFRO) met in Tampere, Finland, in August 1995. It was the biggest IUFRO Congress ever held, attracting more than 2 600 delegates, including 75 Canadians. Participants resolved to encourage research on topics ranging from forest products to harvesting technologies, and emphasized the need for expanded forest research programs in developing countries and for more policy-oriented research.

In September 1995, the governments of BC and Canada co-hosted an international forestry seminar under the auspices of the

### International forestry conferences



Working group on criteria and indicators for the conservation and sustainable management of temperate and boreal forests outside Europe: Canberra, Australia  
June 3-7, 1996  
Organizer/Sponsor: Montreal Process

Fourth global conference on paper and the environment: Paris, France  
June 9-11, 1996  
Organizer/Sponsor: Papercast

Implementing forest principles: promotion of national forest and land-use programs:  
Bonn, Germany  
June 17-21, 1996  
Organizer/Sponsor: Germany

Technical Committee 207 meeting re: certification process for sustainable forest management:  
Rio de Janeiro, Brazil  
June 18-23, 1996  
Organizer/Sponsor: International Organization for Standardization (ISO)

Expert meeting on afforestation, reforestation and restoration of degraded forest systems:  
Lisbon, Portugal  
June 24-28, 1996  
Organizer/Sponsor: Portugal/Senegal/Cape Verde

Seminar on forests, fire and global change: Krasnojarsk, Russian Federation  
August 5-9, 1996  
Organizer/Sponsor: ECE/Timber Committee

## International forestry conferences



**Certification of forest products and trade: Bonn, Germany**  
August 12–16, 1996  
Organizer/Sponsor: Germany/Indonesia

**Intergovernmental seminar of experts on criteria and indicators for sustainable forest management: Helsinki, Finland**  
August 19–23, 1996  
Organizer/Sponsor: Finland

**Third meeting of the UN Intergovernmental Panel on Forests: Geneva, Switzerland**  
September 9–20, 1996  
Organizer/Sponsor: UNCSD/IPF

**Timber Working Group meeting: Panama**  
October 7–11, 1996  
Organizer/Sponsor: CITES

**World conservation congress: Montreal, Canada**  
October 13–23, 1996  
Organizer/Sponsor: IUCN

**Third conference of the parties: Buenos Aires, Argentina**  
November 4–15, 1996  
Organizer/Sponsor: Secretariat to the Convention on Biological Diversity/ Argentina

**International workshop on the integrated application of sustainable forest management practices: Japan**  
November 25–29, 1996  
Organizer/Sponsor: Japan/Canada/FAO

**Expert consultation on criteria and indicators: Rome, Italy**  
mid-1997  
Organizer/Sponsor: FAO

**Economic Commission for Europe, the FAO and the International Labour Organization.** More than 200 delegates from 32 countries discussed sustainable forest management and ways of moving from policy to operational practice. For the first time in FAO history, representatives from developing countries joined in the discussions. In the final report, delegates called for an international, non-binding set of guidelines for codes of forest practice. The guidelines would serve as a framework for setting standards or drawing up codes of forest practice at the national, regional and local levels.

In October 1995, the governments of Canada and Quebec and the City of Quebec hosted commemorative activities to celebrate the 50th anniversary of the **FAO**, which was founded in Quebec City in 1945. A vision statement for the FAO, “The Quebec Declaration”, was agreed to at a ministerial meeting, and a symposium focused on partnerships and sharing knowledge to achieve food security through, for example, sustainable management practices in agriculture, forestry and fisheries.

## FORESTS AND THE ENVIRONMENT

Canada is responding to the growing public concern regarding forests and the environment, and has introduced legislation, policies and programs to protect and sustain the timber and non-timber values of our forests.

### Auditing environmental performance

An independent international review panel from the **Organization for Economic Cooperation and Development (OECD)** released an exhaustive assessment of Canada’s environmental performance in November 1995. The main conclusions on forests were generally very positive. “In quantitative terms, the renewal of Canada’s forests is secure as a result of government policies. Private companies have made substantial progress in reducing pollution and in adopting clean technology ... [and] ... the involvement of all social actors concerned in decision making is remarkable, and the degree of cooperation is particularly high.” Although the report indicated that “present methods of silviculture do not entail significant deterioration,” the OECD urged Canada to continue developing alternative silviculture methods for forest management in BC’s coastal forests. It also recommended the expansion of scientific knowledge on the biodiversity of Canada’s forest ecosystems. (Canada is the ninth OECD country to undergo an environmental audit since the program began in 1991.)



## Conserving biodiversity

In May 1995, **Wildlife Habitat Canada** (WHC) launched a new partnership venture — the WHC Forest Biodiversity Program. The Program was established, in part, to enable forest companies to meet certification standards for the biodiversity component of sustainable forest management. Under the Program, WHC will work with forest companies to help them set and meet objectives for biodiversity conservation through forest management. An assessment team will undertake a comprehensive evaluation of each forest operation to help the company define its conservation goals and objectives, select indicators for management, and determine its requirements in terms of inventories, decision-support tools, staff, etc. By April 1996, six companies had joined the Program.

## Monitoring forest disturbances

**Canada** recorded its second worst year for forest fires in 1995; 8 467 fires burned 7.25 million hectares of forest land. Fully two-thirds of the country was affected, from the territories all the way east to Quebec. Only the Maritimes and BC escaped relatively unscathed.

The hemlock looper caused considerable damage to the forests of **Newfoundland** in 1995; almost 58 000 hectares showed some degree of defoliation.

**Saskatchewan** recorded the summer of 1995 as the worst forest fire season in its history. More than 1.6 million hectares burned, mostly in the commercial forest zone, and \$90 million was spent on fire suppression efforts. In September 1995, the province began extensive salvage operations to recover 10% of the damaged and dead trees for lumber, pulp, fence posts and firewood. The 5 million m<sup>3</sup> that will be salvaged over the next three years is significant, as the average annual harvest for the province is 3.7 million m<sup>3</sup>. The end-product value of the salvaged wood is projected to reach \$500 million.

Dutch elm disease continued to spread in Saskatchewan in 1995, but was concentrated in the southeast corner of the province. Communities and the provincial government are undertaking clean-up and control measures to minimize the impact of the outbreak. In addition, the four-year epidemic of spruce budworm infestation continued, with 99 000 hectares severely defoliated. An aerial spray program using the biological agent *Bacillus thuringiensis* var. *kurstaki* (*Btk*) was successful in controlling 9 000 hectares of the outbreak.

The **Northwest Territories** recorded an outbreak of forest tent caterpillars for the first time in 1995. It also experienced its second

## Biological diversity

In the fall of 1995, Montreal, Quebec, was chosen as the location for the Secretariat of the **Convention on Biological Diversity**. The Convention, which was ratified by more than 140 countries, is intended to conserve ecosystem, species and genetic diversity. Canada was the first developed nation to sign the Convention at the Earth Summit in Rio de Janeiro, Brazil, in 1992, and it subsequently established a federal-provincial/territorial working group to develop a national biodiversity strategy — one of the key obligations under the Convention. The Canadian Biodiversity Strategy was released in the fall of 1995; it includes a series of goals and directions for ecological planning and management and for the sustainable use of biological resources (agricultural, aquatic and forested areas). Since then, Canada's provincial, territorial and federal governments have signed a statement declaring their commitment to use the Strategy as a guide for future actions.

## Forest Capitals of Canada



The following cities have been designated Forest Capitals of Canada by the Canadian Forestry Association:

- Meadow Lake, Saskatchewan (1995)
- Lunenburg County, Nova Scotia (1996)
- Grande Prairie, Alberta (1997)

Cities selected as Forest Capitals of Canada are assessed on their commitment to, and dependence on, the forest and on their celebration of the importance of forests to their community.

serious forest fire season — 3 million hectares burned. Fewer fires occurred than in 1994, but the drought conditions that prevailed over much of the western portion of the territory resulted in several very large fires. One fire exceeded a million hectares and two others were at least half that size. Last summer was the first year that fires caused significant losses of commercial timber, projected to surpass 1 million m<sup>3</sup>. (By comparison, the annual allowable cut in 1995 was 200 000 m<sup>3</sup>.) Efforts are underway in the Fort Simpson area to salvage some of the burned timber.

A total of 148 fires were reported in the **Yukon**, burning 260 530 hectares; an unprecedented number of fires were located near communities and highways. In the central portion of the territory, severe drought conditions escalated the fire hazard to extreme levels.

### Addressing climate change

The first conference of party nations to the **Framework Convention on Climate Change** was held in Berlin, Germany, in April 1995. One conclusion of the Berlin meeting was that the commitments of developed countries must be strengthened to achieve the overall objective of stabilizing atmospheric greenhouse gas concentrations. The 154 party nations agreed to a process that will lead to the adoption of new commitments in 1997. As a signatory to the Convention, Canada has launched its **National Action Program on Climate Change** (NAPCC) to stabilize greenhouse gas emissions at 1990 levels by 2000. Forest management practices are expected to contribute to this goal through enhancing and sustaining forests as sinks and reservoirs for atmospheric carbon. The **Voluntary Challenge and Registry Program** is a key element of Canada's NAPCC and is a joint initiative of federal, provincial and territorial governments. The challenge portion of the Program calls on Canadian organizations to limit or reduce net greenhouse gas emissions on a voluntary basis, while the registry component provides a public record of organizations' commitments, action plans, progress and results.

In April 1996, the **Canadian Pulp and Paper Association** (CPPA) released the findings of a five-year review of energy use in Canada. According to the CPPA, Canada's pulp and paper industry has reduced its use of non-renewable fossil fuels by 20% since 1990, as a result of a concerted effort to lower the carbon dioxide emissions responsible for global warming. This achievement was made possible by a \$20-billion upgrade program implemented to increase operational and environmental performance. Today, fossil fuels provide only a



quarter of the industry's total energy use; another 20% comes from electricity. Wood waste, such as tree bark and sawdust, now accounts for 53% of the energy used to manufacture pulp and paper.

### Preserving valued landscapes

There are now 13 ecological reserves in **New Brunswick**. Five new areas were reserved in 1995: a nesting area for osprey and great blue heron; a habitat for rare arctic plants and hibernating bats; a section of eastern hemlock forest, grassland and freshwater marshes; an even-aged stand of old balsam fir; and an open, old-growth black spruce forest.

In April 1995, **Ontario** announced that Wabakimi Provincial Park would be expanded from approximately 155 000 hectares to 891 500 hectares, making it the largest area of protected boreal forest in the province. The park will protect outstanding landscape features, world-class canoeing waters, woodland caribou habitat, and one of the largest concentrations of Aboriginal pictographs in Ontario. First Nations, government, the forest industry, tourism outfitters, and environmental and other interest groups all worked together on this initiative.

In June 1995, **Alberta** nominated two popular recreational destinations for protection: the 91 000-hectare Upper Elbow Sheep area in Kananaskis Country, and the 65 000-hectare Wild Kakwa area 200 km south of Grande Prairie. In August, the government proposed 26 natural areas for designation, including Bow Valley and Bow Flats. And in the fall, it amended the Willmore Wilderness Act to prohibit industrial development inside the 4 500 km<sup>2</sup> of pristine wildlands north of Jasper National Park. All told, the Special Places sites now cover more than 400 000 hectares.

The Government of **BC** is committed to doubling the area in parks and protected areas to 12% of the provincial landbase. More than 9% of the province (almost 9 million hectares) is currently protected. In July 1995, BC passed an amendment to the BC Parks Act, giving legal protection and drawing legal boundaries for all 106 provincial parks established since 1992.

In November 1995, BC protected the entire 107 000 hectares of the Stein Valley as a Class-A provincial park — a park with the highest level of protection possible. The park will be managed cooperatively by the provincial government and the Lytton First Nation. BC also protected important natural areas in and around the greater Vancouver region, more than tripling the urban green space.

*The governments of **Canada***

*and **BC** and the Nisga'a*

*First Nation have reached*

*an agreement in principle*

*that would give the Nisga'a*

*1 945 km<sup>2</sup> of land in*

*northwestern BC and*

*\$190 million, to be paid over*

*a period of years. Under the*

*agreement, the Indian tax*

*exemption for Nisga'a*

*citizens would be eliminated*

*after a transitional period of*

*8–12 years, and the Nisga'a*

*would agree to collect*

*stumpage fees and to meet*

*or exceed the BC Forest*

*Practices Code.*

*In February 1996, the **federal government** announced in the Speech from the Throne that it was prepared to withdraw from forestry and mining activities that are more appropriately the responsibility of the provinces and territories. The focus of the Canadian Forest Service now reflects the federal government's core responsibilities in the areas of international trade and investment, science and technology, Aboriginal matters, federal Crown lands, national statistics and environmental issues.*

## INDUSTRY COMPETITIVENESS

**Canada's** natural comparative advantage in terms of the quality and abundance of its forest resources cannot, by itself, ensure the competitiveness of its forest industries. Critical factors include the development of new technologies to improve environmental and economic performance, and the continued reduction of barriers to trade in international markets.

### Enhancing market access

In early 1995, **Canada** faced increased export tariffs when Sweden, Finland and Austria formally joined the European Union (EU), changing the regime under which Canadian forest products enter these three countries. As compensation, the EU agreed to accelerate implementation of the tariff reductions negotiated in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), concluded in February 1994. In the case of newsprint, the reduction down to zero will be advanced by two years, to 2002. For groundwood speciality papers, such as those used in telephone books, directories and paperbacks, the reduction to zero tariffs will be advanced by four years, to 2000.

In the spring of 1996, **Canada** and the USA reached a comprehensive agreement that addresses longstanding issues of concern to both countries regarding softwood lumber exports from Canada to the USA. The agreement is the result of a bilateral consultative process established in 1994 to address U.S. concerns regarding Canada's growing share of the U.S. market, and Canadian concerns regarding the repeated use of U.S. trade laws to limit our access to the U.S. market. The agreement applies only to the four major lumber-producing provinces: BC, Alberta, Ontario and Quebec. The agreement requires that the Government of Canada impose an export fee on U.S.-destined shipments of softwood lumber when the exports from these provinces exceed a total volume of 14.7 billion board feet/year. (The money collected will be returned to the provinces.) In exchange, the USA has agreed to suspend all retaliatory trade actions on softwood lumber for five years.

### Developing new technologies

Athena™ is an innovative software — launched by **Forintek Canada Corp.** in 1995 — that provides consumers, designers and builders with detailed environmental analysis on a wide range of commonly used wood, steel and concrete building materials and structural

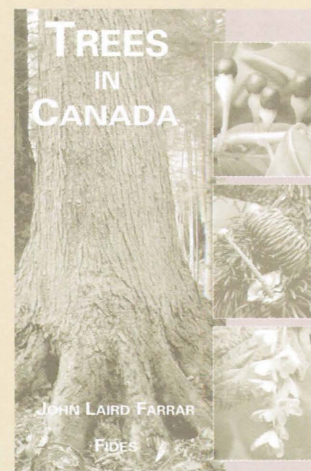


assemblies. This decision-support tool enables users to identify more environmentally responsible combinations of materials. Athena™ has the capability to perform life-cycle analysis, identifying the cumulative environmental impacts of the production, transportation, use and disposal of these materials. Manufacturers can use Athena™ to identify where a product imposes the greatest environmental burden, enabling them to alter production processes to reduce energy consumption and minimize waste.

Woodworks™ CONNECTIONS, a new software developed by the **Canadian Wood Council (CWC)**, was released in the fall of 1995 for distribution to architects, engineers and builders in the USA. (The American Wood Council found the Canadian version of the program easy to use and well-suited to wood designers, and it contracted the CWC to adapt the program to the U.S. market.) This unique software simplifies the most tedious and time-consuming part of wood engineering by designing the wood connections (e.g., rivets, bolts, nails and heavy-duty hanger connections) that are commonly used in buildings.

The **Forest Engineering Research Institute of Canada (FERIC)** has focused much of its transportation and roads research on improving equipment design and utilization to decrease transportation costs. One of its significant projects in 1995 was the design of a lightweight trailer for shortwood (2.4 m) loads, developed in cooperation with Transport Canada, Concordia University and a trailer manufacturer. The trailer, which is being tested in New Brunswick, weighs 31% less than a regular trailer (approximately 6.2 tonnes, compared to the average 9 tonnes), but can carry the same load. The most noteworthy features of the new trailer include a lightweight suspension, light alloy rims and carbon-fibre retaining bars. These design concepts soon will be available to truck manufacturers.

Kraft pulp mills use chlorine dioxide to bleach pulp during the paper manufacturing process, generating large quantities of a by-product known as "spent acid." To address this problem, in 1995, the **Pulp and Paper Research Institute of Canada (PAPRICAN)** developed a generator acid purification (GAP) system that enables the acid to be separated and recovered. The potential to re-use the purified acid at the pulp mill site is a positive step toward system closure — a management technique that maximizes recycling of effluent to minimize discharges.



*Trees in Canada* is now available in bookstores. This useful and comprehensive publication builds on the eight editions of *Native Trees of Canada* that guided amateur naturalists and forest science professionals in tree identification for more than 75 years. The book describes over 300 tree species, both native and introduced, and includes colour photography, drawings of tree features, range maps, and keys for summer and winter identification.

# International Model Forests

THE CANADIAN NETWORK MOVES ONTO THE WORLD STAGE

In previous reports on the state of Canada's forests, we introduced Canada's Model Forest Program and highlighted some of the projects underway in the 10 model forest sites located across the country. Given that this year's report addresses the globalization of forest issues, it seems appropriate to describe the progress that has

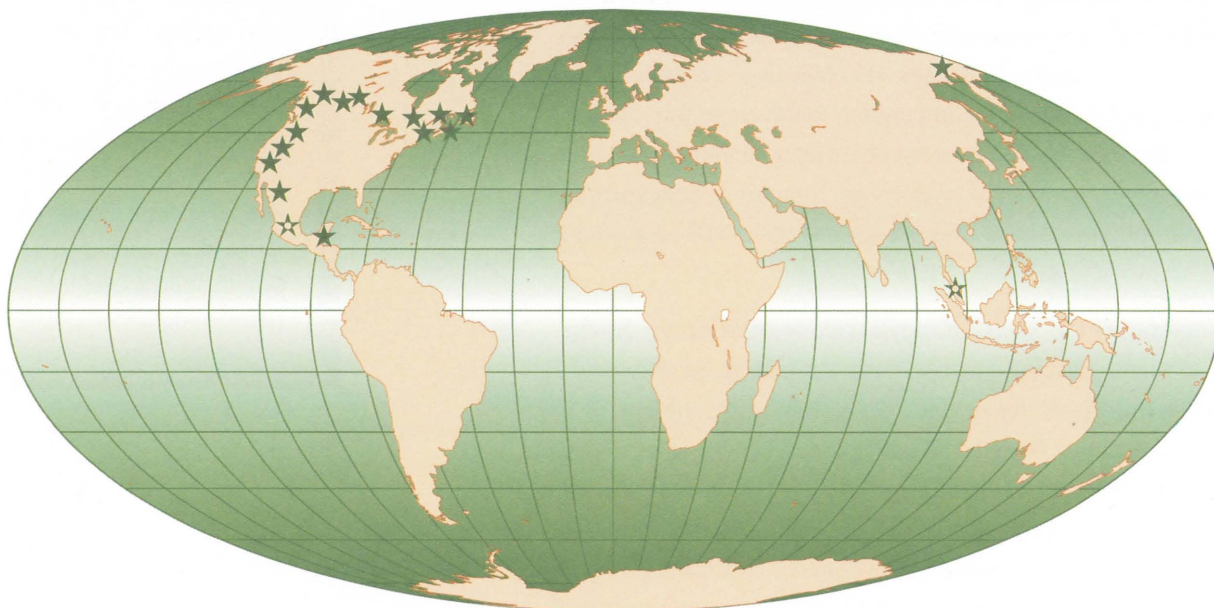
been made since Canada's Model Forest Program moved onto the world stage.

Since the establishment of the Canadian network, international interest in the model forest concept has continued to grow. The idea of a worldwide network of model forests came to be viewed as a way for developed and developing countries to

work toward a common definition of sustainable forest management — one that would take into account the different political, economic, social and cultural values of individual nations — and as a vehicle for countries to exchange knowledge and technological expertise.

Based on this vision, at the 1992 United Nations (UN)

## International Model Forest Network (1992–1995)



★ model forest

☆ site being considered for a model forest



“Earth Summit” in Rio de Janeiro, Brazil, Canada announced an initiative to expand the Canadian network.

Canada’s commitment was intended to encourage other countries to join in creating a self-sustaining and expanding global network of sites. The network has since grown to include 18 model forests that have either been established or are being considered: the 10 original sites in Canada, 3 in Mexico, 1 in Russia, 1 in Malaysia and 3 in the United States.

The priorities and projects of each model forest are unique. The common feature is the building of partnerships that encompass a broad range of interests and serve as the vehicle for developing local solutions to environmental and economic issues. Key criteria are that the sites be managed for multiple values, including wildlife and biodiversity, watersheds, recreation and traditional activities, and that the partners have a long-term commitment to sustainable development.

## CANADA

Canada’s Model Forest Program was established in 1991 to accelerate the implementation of new approaches to forest management based on shared decision making. The 10 model forests were strategically selected to represent the ecological diversity of the major forest regions of

Canada. The last site to join the Canadian network (in September 1994) was the Long Beach Model Forest, which is located in the Clayoquot Sound area of British Columbia and represents Canada’s temperate rainforest region.

*In addition to the countries currently participating in the model forest network, more than 25 others have expressed an interest in joining, including Malaysia, Chile, Poland, Japan, Ecuador, Argentina, Vietnam and Zimbabwe.*

The model forests groups in Canada have continued to expand their partnerships to include a wider array of interests. For example, with the joining of the Lheit-Lit’én Nation, the McGregor Model Forest in British Columbia now includes the participation of local Aboriginal peoples. Jasper National Park in the Canadian Rockies has increased its participation in



Alberta’s Foothills Model Forest, adding the park’s landbase to the model forest site.

In September 1995, management of the international component of the model forest network was transferred from the Canadian Forest Service to the International Model Forest Network Secretariat, which is located in the headquarters of the International Development Research Centre (IDRC). (The IDRC is an independent agency created in 1970 by the Government of Canada.) The Canadian Forest Service continues to provide coordination and support for the Canadian network, and it works closely with the International Model Forest Network Secretariat to facilitate linkages between the model forests in Canada and those in other countries.

## MEXICO

Mexico was the first country to join the international network. Initially, two model forests were established: Calakmul and



Chihuahua. A third site, the Mariposa Monarca, is being considered.

Each of the Mexican sites is involved in a “twinning” relationship with a Canadian counterpart. The twinings between the Calakmul and Eastern Ontario model forests and between the Chihuahua and Foothills model forests are formal arrangements where project funding for the Mexican site is administered through the Canadian twin. The Mariposa Monarca Model Forest would be twinned with the Manitoba Model Forest to facilitate technical linkages and the development of partnerships.

Much of Mexico’s forest and agricultural land is divided into “ejidos” — community-owned tracts of land. In many ejidos, the need for food and employment has increased activities that contribute to deforestation: slash-and-burn agriculture, land-intensive livestock farming, and conversion of forest land to low-productivity uses.

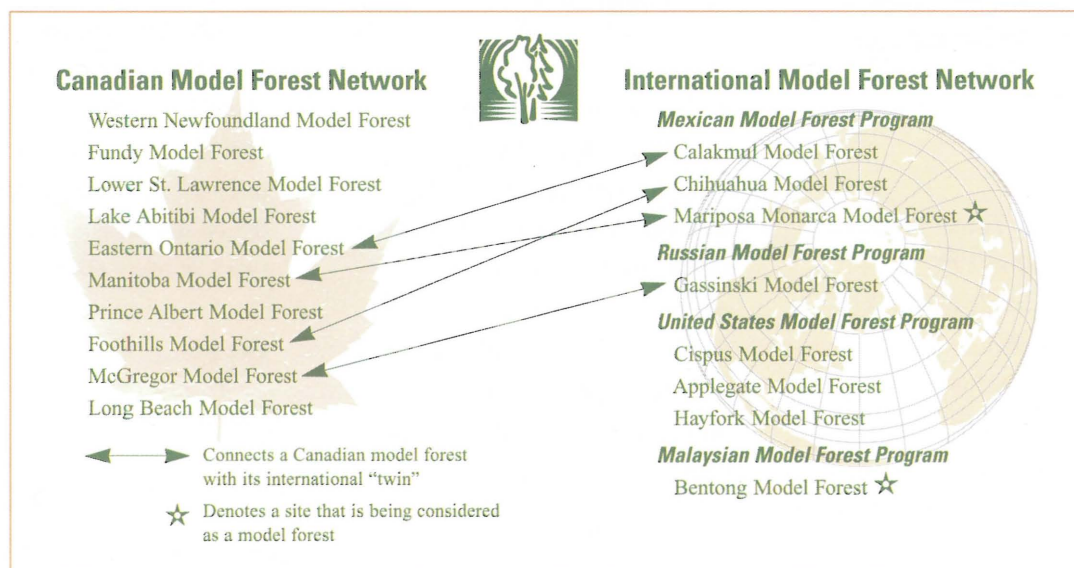
### Calakmul

The Calakmul Model Forest covers 380 000 hectares in a tropical forest region on the Yucatan Peninsula in the State of Campeche. Many of the difficulties associated with ejidos are especially true of this region. The local people, however, have recognized the need for sustainable economic development. In an effort to improve their long-term income and employment opportunities, they have formed a rural development association

to reduce deforestation and rehabilitate degraded areas.

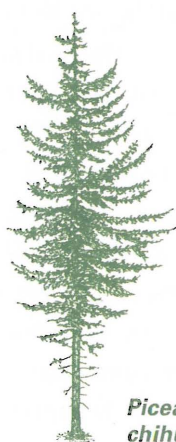
The Calakmul partners are working with the association to demonstrate to farming communities that environmental protection is compatible with their economic needs and traditional activities. For example, agroforestry is being introduced to conserve the forest while increasing agricultural productivity. In addition, young farmers in the area are being introduced to beekeeping — an ecologically sound and financially lucrative activity. As a secondary result, several small carpentry shops now are producing hives made entirely from local materials.

Through the use of aerial photography and geographic information system (GIS) technology, the partners are seeking a broader understanding of land-use changes and their impacts on the Yucatan Peninsula. Forest inventories are being improved and





will be used to develop sustainable forest management plans. Also, research will begin shortly into the management of natural allspice groves and the population dynamics of jaguars — a species that depends on a forest habitat and is classified by the Mexican government as endangered.



*Picea  
chihuahuana*

## Chihuahua

The 110 000-hectare Chihuahua Model Forest is located in the temperate forest region of the Sierra Madre Mountains, in the central part of the State of Chihuahua.

Forest degradation is a growing problem in the Chihuahua area. The main causes are the increasing population and the use of harvesting practices that favoured the removal of high-quality timber. Forestry and agricultural activities continue to dominate the local economy, although there is some small-scale fishing and hunting in the area, as well as an opportunity for increased tourism.

*The priorities of each model forest are unique. Partners in Mexico's model forests aim to increase the self-sufficiency of local residents and reduce their dependence on forests. The Russian partners' interest lies more in the introduction of scientific research and the application of technology to improve forest health and productivity.*

Priorities of the model forest partners include pollution control and protection of endangered species. For example, the work being done in Chihuahua on the *Picea chihuahuana* tree represents one of the first efforts in the area to address the problems facing this endangered species. Under the pollution control program, industrial and residential waste is being cleaned up, eliminating a number of eyesores and producing a noticeable improvement in the municipality of Bocoyna. On a different note, local residents and visitors soon will be able to savour rainbow trout cultivated in the aquaculture project.

## Mariposa Monarca

The Mariposa Monarca Model Forest, which is being considered as a third Mexican site, covers 477 000 hectares in the temperate forest region in the State of Michoacan. The area exemplifies the difficult issues faced when weighing local needs against global concerns. Each autumn, millions of monarch butterflies migrate south from Canada and the United States (USA) to overwinter in Michoacan. The model forest would be designed to help local residents conserve the monarch's winter habitat while diversifying their economy and maintaining their self-sufficiency.

The primary objectives of the model forest partners would be to implement integrated resource management, support activities that generate employment, increase the awareness of the importance of forests to regional development, and increase the productivity of local forest and agricultural resources.

## Russia

In November 1994, Russia — the nation with the largest forested area — became the second country to join the international network. Its first model forest was established in the boreal forest region in Siberia and is twinned with Canada's McGregor Model Forest.

Important objectives of the Russian partners are to increase



public understanding of the importance of sustainable development, to implement sustainable forest practices, to transfer their new knowledge and experience to other Russian territories. Following a workshop that was held in Moscow, in February 1996 the Russian government announced that it hopes to establish a second Russian site.

### Gassinski

Russia's 385 000-hectare Gassinski Model Forest is located in the far eastern territory of Khabarovsk Krai. The area's forests are managed primarily for timber production, although pine nut production also is an important economic activity. Unfortunately, intensive harvesting and insufficient efforts to protect and regenerate these forests have begun to impact on their health and productivity.

An indigenous peoples called the "Nanai" account for more than a third of the population in the six villages located in and around the Gassinski Model Forest. They

survive by fishing, hunting, trapping, picking berries and harvesting medicinal herbs. Conservation of the area's natural resources is essential if the traditional economy

of the Nanai is to be protected.

The Gassinski Model Forest has become a scientific base for developing and testing progressive forest practices, environmentally sensitive technologies, and improved forest inventories. For example, recently collected inventory data soon will be entered into a GIS to produce a series of thematic maps on ecological risk assessment, soils, and rare and endangered flora and fauna.

## UNITED STATES

In March 1995, the USA announced that one Adaptive Management Area (AMA) from each of the Pacific coastal states would join the international network: the Cispus in Washington, the Applegate in Oregon and the Hayfork in California. AMAs were established under the U.S. "Forest Plan for a Sustainable Economy and Sustainable Environment," and their challenges and goals are similar to those of the model forest network.

By joining the Canadian and Mexican model forests located along the Pacific Coast, these U.S. sites will help form a corridor of model forests within North America's temperate rainforest region.

### Cispus

The Cispus Model Forest, covering 60 000 hectares, lies between three volcanic peaks — Mt. Rainier, Mt. Adams and Mt. St. Helens. The area is characterized by rural communities that depend on the surrounding forest for tourism revenue and a variety of products (e.g., timber, edible mushrooms and craft materials, such as pine boughs and decorative grasses). The forest is also a favourite recreational destination for residents of metropolitan centres in Washington and Oregon.

Extensive public involvement is helping the model forest partners understand and appreciate the different needs and values they associate with this area. For example, teams composed of





U.S. Forest Service employees and members of the public have resolved some difficult choices in the face of declining budgets, such as deciding which roads to maintain for timber and recreational use. Their work has also led to forest restoration projects on decommissioned roads within the model forest and along the tributaries of the Cispus River.

## Applegate

The Applegate Model Forest is a 115 000-hectare area that lies within the Applegate watershed bordering southwestern Oregon and northern California. The Applegate partnership reflects a particularly broad range of interests, including residents, local colleges, forest companies, environmental groups, farmers and ranchers.

The primary goal of the partners is to maintain healthy communities and ecosystems. An interagency team concerned over the increasing numbers of dying trees has evaluated the health of the watershed and its fire risks. Federal agencies and private landowners now are thinning the forest to reduce the risks of fire and insect infestation. They have also collaborated to merge GIS databases containing information on state and private lands. (A non-profit group is working to increase community access to this information.) Several projects also have been undertaken to reduce water pollution. Other research and monitoring projects

include old-growth studies, a 50-year study of changes in forest structure and function, and research into landscape restoration at high elevations.

## Hayfork

The 203 000-hectare Hayfork Model Forest is located in northwestern California. The economy is based on tourism, recreation, small cottage industries and the forest sector. Almost 80% of the area included in the model forest is federally owned.

Several partnerships have formed between federal departments, and local colleges and community centres. These partnerships have produced a number of programs, including a retraining program for displaced timber workers, a geographic database compiled by local residents, and strategies for economic diversification and community stability. The U.S. Forest Service is focusing on projects to improve wildlife habitat, restore watersheds, improve forest health, and reduce the risks of forest fire.

## MALAYSIA

A major goal behind expanding the model forest network was to encompass all major forest zones — tropical, as well as boreal and temperate — and to consider the needs and priorities of all countries — developing, as well as developed. Malaysia's interest in the model forest network



continues a process of dialogue, initiated by Canada and Malaysia following the UN Earth Summit, to advance international consensus on approaches to sustainable forest management.

The District of Bentong in the State of Pahang is being considered as the site of a Malaysian model forest. The site covers 183 000 hectares of tropical evergreen rainforests that are rich in flora and fauna.

Approximately 100 000 people reside in this suburban area. Economic activities include tourism, aquaculture, mushroom and ginger farming, and forest and other natural resource industries (e.g., rubber and palm oil).

*(To obtain further information regarding the model forests, please see page 112.)*

# Sustaining Forests

Taking global action



One of the most challenging issues of our time is to balance the need to sustain forests for present and future generations with the global, national and local needs of an expanding world population. Forest types around the world vary widely, as do forest issues, which span the breadth of cultural, social, trade, development and environmental concerns.

## FORESTS: A GLOBAL RESOURCE

Forests touch each inhabitant of our planet in some way. Every day, hundreds of millions of people in the developing world — where three-quarters of the world's population resides — rely on forest resources to meet their basic needs, such as fuel for cooking and fodder for livestock. The cultural importance of forests is well documented in history and folklore, and forests remain an integral part of the daily life of many traditional societies. In numerous countries, forests provide a major source of employment and contribute significantly to local and national prosperity. Lastly, each of us is affected by the essential roles that forests play in producing oxygen and purifying our freshwater resources.

During the 1980s, a number of events had a profound impact on peoples' attitudes toward forests. These included satellite images of our planet and the findings of the United Nations (UN) World Commission on Environment and Development presented in *Our Common Future* (the "Brundtland report"). In Canada, the media frequently carried stories on the potential impacts of acid rain on our lakes and forests. Internationally, concerns over forests

*"The crucial task is to balance  
the need to exploit forests  
against the need to preserve  
them."*

— Our Common Future

*Brundtland Commission, 1987*

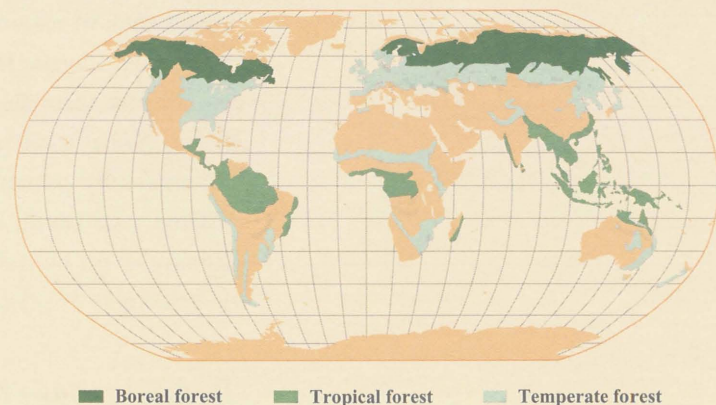


heightened with reports on the serious decline in the health of forests in Europe and the rapid pace of deforestation in tropical countries. Finally, new concerns arose with the recognition that forests play a number of critical roles in maintaining the global systems on which the health of our planet depends, notably by regulating the world's climate, by halting desertification and soil erosion, and by housing

## Global forest resources

- Approximately 40% of the Earth's land surface supports trees or shrub cover. Roughly 27% (3.4 billion hectares) is covered by forests, and 13% (1.67 billion hectares) is covered by open woodland and mixed vegetation.
- The largest concentrations of forest and other wooded areas are in the territories of the former USSR (942 million hectares), followed by North America (749 million hectares), Europe (195 million hectares), and the Pacific countries of Australia, Japan and New Zealand (178 million hectares). More than 50% of the Earth's forests are found within the borders of Canada, the United States, Russia and Brazil.
- Forests are classified within three major zones: temperate, boreal and tropical.
- In 1990, boreal and temperate forests occupied roughly 1.67 billion hectares, and tropical forests occupied 1.79 billion hectares. Forest plantations covered 100 million hectares, of which 30 million hectares were in tropical countries.
- In the temperate and boreal zones, forests are managed in a way that makes the distinction between natural forests and replanted forests of little significance. In the tropical zone, plantations are analogous to agricultural crops, with one or a few fast-growing species.
- Boreal forests, which consist predominantly of conifers, cover 920 million hectares and are located between the Arctic tundra and the temperate zone. Tropical forests are found 23° to the north and south of the equator, between the tropics of Cancer and Capricorn.
- During the 1980s, the area of tropical forests decreased by an average 15.4 million hectares annually.
- Developing countries account for the large majority of the world's tropical forests and for roughly 14% of temperate and boreal forests.
- It is estimated that 80% of terrestrial species are found in forests. The tropical forest is the most species-diverse ecosystem in the world. It contains more than 50% of all living species on our planet. For example, there are approximately 50 native tree species in northern Europe; in Malaysia, 830 tree species were found in an area of forest covering just 50 hectares; and in Peru, nearly 300 tree species have been recorded on a single hectare.
- In terms of human activities, temperate forests are threatened primarily by pollution. The main pressure on tropical forests is the clearing of land for agricultural needs.

Principal forest zones of the world



Source: Food & Agriculture Organization

80% of the world's known terrestrial species, including substances with undiscovered potential for improving human health.

As a result of this increasing awareness and growing scientific knowledge, forests are now understood to be complex ecosystems that fulfill multiple roles. Forest issues transcend political and sectoral boundaries. They are interconnected with policies on the environment, agriculture, trade, energy, science and technology, economic growth and development assistance. Often the line becomes blurred between issues that can be resolved at home and those that require international action.

There are few countries in the world where the imperative and challenges of sustainable forest management are as evident as in Canada. Canada is a major forest nation that has relied on forests for its development as a country. Forest products continue to be the single largest contributor to Canada's balance of trade, contributing almost \$28 billion in 1994. Canadians place a high importance on the recreational and tourism values of forests, and the majority of Canada's Aboriginal communities are located in productive forest areas. In public opinion polls, Canadians have consistently stated their belief that the sustainable management of Canada's forests is fundamental to national economic as well as environmental interests. In addition, Canada has important international obligations. As a country that accounts for 10% of the world's forest land and almost 20% of global trade in forest products, Canada's forest agenda is fundamentally connected to global economic and environmental systems. As a result, it is playing a significant role in international discussions on forests and is implementing, within its own borders, the principles of sustainable forest management.

## GLOBAL FOREST DIALOGUE

The international discussions to promote sustainable management of the world's forests — which take place among countries, international institutions and non-governmental organizations — are referred to as the "global forest dialogue." During the past decade, the scope of this dialogue has evolved to include a broader range of issues and the participation of a growing number of countries and interests.

The international community traditionally has dealt with forests in a segregated manner, through a variety of institutions or mechanisms, each with its own functions and priorities. Examples range from bilateral and multilateral cooperation agreements, to forest research organizations and international agencies, such as



the World Bank and the Food and Agriculture Organization of the United Nations (FAO).

Beginning in the 1970s, forests emerged as a priority in general debates regarding the future of the Earth's environment and its expanding population. The focus of concern was that pressures on forests would intensify as a result of urban and agricultural expansion and increased worldwide demand for timber, due to the growing affluence of a number of developing countries.

Originally, the focus was on the environmental repercussions of deforestation, primarily in the tropical forest zone. With the recognition of the multiple benefits and global roles of forests, there was a need to enlarge the framework of international discussions to embrace all forest types and values, whether for spiritual renewal, subsistence fuelwood or timber. The international community also began to recognize that deforestation was a symptom of a more fundamental conflict between human needs and the environment. In 1990, at the first of four preparatory committees for the UN Conference on Environment and Development (UNCED), Canada led the efforts to address forests in a way that would give balanced consideration to environmental, social and economic development dimensions, thereby broadening the scope of the dialogue beyond the issue of deforestation.

### UNCED forest commitments

The first concerted global effort to deal with forest issues took place at UNCED in Rio de Janeiro, Brazil, in June 1992. UNCED, also known as the "Earth Summit," proved to be particularly significant with respect to forests.

The UN-member countries agreed on a number of goals and strategies related to environmental conservation and economic development. National political leaders signed the Convention on Biological Diversity and the Framework Convention on Climate Change, both of which have implications for forest management. Recognizing that human existence is inseparably tied to other forms of life, the Convention on Biological Diversity seeks to conserve the diversity of our planet's biological and genetic resources and to ensure that the benefits derived from the use of these resources are shared equitably. The Framework Convention on Climate Change seeks to stabilize the concentration of greenhouse gases in the atmosphere. The role of forests, which absorb greenhouse gases by storing them in forest biomass, is recognized as an important factor.

### UNCED Forest Principles

The UNCED Forest Principles cover all types of forests and all major aspects of forest management. For example, they stress the ecological importance of forests and their value to indigenous peoples, as well as the importance of financial support for developing countries, the need for non-discriminatory rules for trade in forest products, and the need to integrate forest policies with other sectoral policies. The preamble to the UNCED Forest Principles states, among other things:

*All types of forests embody complex and unique ecological processes that are the basis for their present and potential capacity to provide resources to satisfy human needs, as well as environmental values. As such, their sound management and conservation is of concern to the governments of the countries to which they belong and are of value to local communities and to the environment as a whole.*

## Forest uses and products

- The estimated value of fuelwood and wood-based products to the world economy is US\$400 billion. The value of forest products exports is almost US\$100 billion (3% of world trade).
- The forest sector provides subsistence and wage employment equivalent to 60 million work-years worldwide, 80% of which is in developing countries.
- Forest-based recreation and ecotourism are becoming important uses of forests.
- Forests are important in regulating the quality and quantity of fresh water used for domestic purposes and agriculture.
- Global interest in forests is increasing the level of international involvement. International funding for forestry through official development assistance increased from US\$400 million per year in the mid-1980s, to more than \$1.3 billion in the early 1990s.
- Forests provide a wide range of products, including environmental goods, fuel, oils, medicinal plants, household furniture and building materials. Many forests are also direct sources of food, including fruits, mushrooms and honey. In more than 40 countries, wood accounts for the majority of national energy consumption.
- Between 1961 and 1990, global trade in forest products increased 3.5 times. Exports from developing countries grew at a more rapid pace than exports from developed countries; however, the developing countries' share of global trade in forest products remained relatively small (13% of total exports in 1990).

Source: Food & Agriculture Organization

*Through its development  
assistance programs and its  
scientific and technology  
transfer activities, Canada is  
helping developing countries  
to combat desertification.*

A third major outcome of UNCED was the agreement to adopt an ambitious program of action entitled "Agenda 21." It established several key goals for forests, including a commitment to negotiate a international convention to combat desertification and drought — problems that have resulted largely from the overexploitation of forests to meet the needs of growing populations in developing countries. Lastly, the global community agreed to a "Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests," commonly referred to as the "UNCED Forest Principles." Although the discussions did not achieve an agreement to undertake negotiations on a global forest convention, the outcome of these discussions marked an unprecedented worldwide consensus on forest issues. In combination with the other UNCED achievements, the Forest Principles laid the foundation for subsequent efforts to reach international agreement on what constitutes sustainable forest management.

Countries also agreed to establish the UN Commission on Sustainable Development (CSD) as a formal mechanism for monitoring progress in achieving the commitments made at UNCED. The CSD was instructed to meet once a year, for five years, to review activities and maintain the momentum at the highest political level. As part of its follow-up program, the CSD conducted an in-depth



review of forests. And in April 1995, the CSD established a two-year Intergovernmental Panel on Forests (IPF) to conduct the global forest dialogue within a single forum.

### **Toward global action**

The UNCED Forest Principles and Agenda 21 charted the beginnings of collective efforts to work toward the sustainable management of the world's forests. Following June 1992, much work remained to be done. Individual countries needed to implement changes in forest use and management within their own borders, to meet their international commitments. At the international level, there was limited consensus on how to define sustainable forest management and ensure equitable approaches that recognized the varying stages of development of different countries. The forest dialogue at UNCED revealed strong and divergent views between developed and developing countries, and between consumer and producer nations. These negotiations were among the most difficult, and the question of how to continue the global forest dialogue was left unresolved. Since that time, however, significant progress has been made.

In September 1993, the Conference on Security and Cooperation in Europe (CSCE) sponsored a meeting in Montreal to develop measurable criteria and indicators for the sustainable development of forests. Following this meeting, in June 1994, a working group known as the "Montreal Process" was formed in Geneva to advance the development of internationally agreed-upon criteria and indicators for the conservation and management of temperate and boreal forests outside Europe.

Also, as countries prepared for the CSD's in-depth review of forests, North-South partnerships were formed to address common concerns. In 1994, Canada and Malaysia, both of which had played important roles in the UNCED forest negotiations, joined forces to establish the Intergovernmental Working Group on Forests (IWGF). For the first time since UNCED, the IWGF brought together a number of countries to resume the dialogue on forests. The IWGF met in Malaysia in April 1994, and again in Canada in October of that same year. At the second meeting, technical and policy experts from 32 countries, 5 multilateral organizations and 11 non-governmental organizations developed a series of options for action under seven priority areas, with a view to presenting these options for consideration by the CSD. The success of the IWGF in narrowing the gap between the views held by developing and developed countries has been attributed, in part, to its open approach to deliberations.

*A major step forward in the global forest dialogue was achieved in 1994, with the successful outcome of the Intergovernmental Working Group on Forests (IWGF). The collective options presented by the participating developed and developing countries ultimately formed the basis of an in-depth review of forests by the CSD in April 1995. The IWGF's reports are also widely recognized as having laid the foundations for the mandate of the Intergovernmental Panel on Forests.*

## Intergovernmental Panel on Forests (1995–1997)

The IPF was established to review the progress made in implementing UNCED commitments on forests and to identify priorities for further action. In 1997, the IPF will submit its recommendations to the CSD on a series of forest issues under five general categories of work:

- implementation of UNCED decisions at the national and international level, including an examination of sectoral and cross-sectoral linkages;
- international cooperation in development assistance, including technology transfer and the mobilization of financial resources;
- scientific research, forest resource assessments, and criteria and indicators for sustainable forest management;
- examination of the interface between the environment and trade in forest products, including the role of certification; and
- linkages among legal instruments and multilateral and international institutions, including the potential need for new instruments or mechanisms.

Many of the non-governmental participants later referred to the IWGF as a model upon which future international dialogues should be based.

In March 1995, another key event occurred when the FAO convened the first-ever international meeting of ministers responsible for forests. The discussions culminated in a formal statement that emphasized the need to develop national plans to address economic and social causes of deforestation; to develop and apply criteria and indicators for the sustainable management of all types of forests; to increase the dialogue on trade in forest products; and to enhance international cooperation, including the mobilization of financial resources and the transfer of environmentally sound technologies.

The outcomes of both the Canada–Malaysia initiative and the international meeting of forest ministers were instrumental in the decision made by the CSD to establish the IPF, which is distinguished by its comprehensive and consensus-based approach to global forest issues. In addition to national governments, multilateral and non-governmental organizations are participating fully in the discussions.

The IPF held its first substantive session in Geneva, from March 11 to 22, 1996, and submitted an interim report to the CSD in April 1996. The IPF will conclude in early 1997 and submit a comprehensive report to the CSD. Many of the issues under review are of major importance to Canada with respect to domestic policies and to Canada's international role in forest development assistance and forest products trade.



## PRIORITIES FOR ACTION

As a country that depends on forests to sustain its natural environment and standard of living, Canada has much at stake in the emerging international resolutions on forests. In many instances, Canada has assumed a leadership role to continue the momentum following UNCED and to focus its efforts on improving sustainable forest management.

Of special importance to Canada is the challenge of finding a common definition of sustainable forest management, given the wide variations among countries in forest issues, forest ecosystems and forest practices. In view of Canada's role in forest products trade, non-discriminatory and multilaterally agreed-upon rules for trade and sustainable forest management are another priority. Within Canada's own borders, the focus is on continuing our progress in implementing our national and international commitments.

### Defining sustainable forest management

Of all the UNCED follow-up activities, the development and implementation of criteria and indicators for the conservation and sustainable development of forests are the most strategically important to Canada. International agreement on what constitutes sustainable forest management is needed to provide the basis for:

- formulating national policies;
- providing a common language for international dialogue;
- guiding bilateral and international cooperation in sustainable forest management, including development assistance;
- facilitating trade in forest products; and
- assessing progress at the local, national and global levels.

Efforts to overcome the divisions between countries, communities, interest groups and industries have been hampered by a lack of shared perspective on what constitutes sustainable forest management. Consensus can be reached only if there is a common understanding of the issues and objectives.

Quite naturally, people tend to judge the sustainability of forest practices on the basis of the forests and values most familiar to them — those within their own country. However, forest types vary greatly throughout the world. Definitions of ecologically sound forest practices are at least as numerous as the forest types to which they apply. Human needs, cultural activities and socio-economic

*Forest management is a dynamic process — one that is constantly evolving as our understanding of the complexities of forest ecosystems continues to improve. The challenge in defining sustainable forest management is to determine what elements are common to all types of forests, and what factors are unique to individual countries, regions and communities.*

priorities also vary widely between countries and communities, multiplying the breadth of forest issues.

There are significant differences, for example, between forest management in Canada and in Europe. Most European forests have been harvested and replanted over the centuries, while most of the forests in Canada are natural forests that have never been harvested. As a result, our forests contain far more native plant and animal species than the temperate and boreal forests in Europe. Thus, in terms of biological diversity alone, management of Canada's forests is more complex. The sheer magnitude of Canada's forests also precludes management on the intensive, small-scale basis practiced in most of Europe. Another difference is the variety of forest types (nine different types in British Columbia alone) and forest ecosystems found in Canada. All of these factors, combined with the high value of our forests in terms of recreation and tourism and their importance to Aboriginal peoples, result in forest issues that are distinctly Canadian — that differ significantly from issues in countries whose forest types and socio-economic priorities may be quite similar to ours.

Forest issues in Canada also contrast with those in other regions and forest zones. For example, in New Zealand, forest management is focused on plantation forests. Some environmental groups have raised concerns regarding the implications of the increase in plantation forests; however, they are important in countries where there is little forest cover or where there are strong pressures on the remaining reserves of natural forests.

There are many socio-economic and forest management issues in the tropical forest zone. For example, there is a pressing need for economic development and stability, the shallow soil hampers reforestation, and the tropical forest zone is the most species-diverse region in the world in terms of the numbers of indigenous plants, animals and other organisms.

### **Measuring sustainability**

In recent years, several initiatives have been undertaken to establish criteria for sustainable forest management. The International Tropical Timber Organization (ITTO) published guidelines for natural and plantation forests to encourage its members to move toward the sustainable management of tropical forests. In June 1993, the ministers responsible for forests in Europe adopted a general declaration as a joint response to UNCED, which led to the design of criteria and indicators for European forests (the "Helsinki Process").



## The Santiago Declaration: Criteria and indicators for boreal and temperate forests

In February 1995, in Santiago, Chile, countries participating in the Montreal Process endorsed a statement of commitment known as the “Santiago Declaration,” along with a comprehensive set of 67 indicators for monitoring progress toward the conservation and sustainable management of temperate and boreal forests outside Europe. The indicators are grouped under the following seven criteria:

- conservation of biological diversity;
- maintenance of the productive capacity of forest ecosystems;
- maintenance of forest ecosystem health and vitality;
- conservation and maintenance of soil and water resources;
- maintenance of the forests’ contribution to global carbon cycles;
- maintenance and enhancement of multiple long-term socio-economic benefits to meet the needs of society; and
- development of legal, institutional and economic frameworks for forest conservation and sustainable management.

Most recently, the Amazonian countries in South America proposed a series of criteria and indicators that reflect the specific ecological characteristics of the tropical Amazon forest and the distinct social and cultural factors (the “Tarapoto Proposal”).

Canada has been active in most of these discussions, but has assumed a leadership role in promoting consensus on the sustainable management of temperate and boreal forests outside Europe. At a meeting held in Santiago, Chile, in February 1995, Australia, Canada, Chile, China, Japan, Korea, Mexico, New Zealand, Russia and the USA endorsed a common set of criteria and indicators for the conservation and sustainable management of temperate and boreal forests. Since that time, Argentina and Uruguay have joined the Montreal Process. These 12 countries represent 90% of the world’s temperate and boreal forests. Under the Montreal Process, current efforts are focused on implementing, at the national level, the criteria and indicators that were agreed to in Santiago, and on determining reporting processes and schedules.

The need for measurable criteria to assess the sustainable management of all types of forests was recognized in the UNCED Forest Principles, Agenda 21 and the Convention on Biological Diversity. The IPF will be examining and presenting recommendations to the CSD on the feasibility and appropriateness of a common set of criteria and indicators that could apply at the global level.

## World wood consumption

- Between 1961 and 1991, the volume of global wood consumption more than doubled.
- Developed countries consume most of their wood as forest products and only 16% as fuel, while developing countries consume more than 80% of their wood as fuel.
- Thirty percent of wood consumption in the world is in the form of forest products, such as paper, cardboard, panels, and timber for construction and furniture.
- Of the total amount of wood consumed in the world, 85% is used domestically, and only 15% is exported.
- On average, people in developed countries consume most of the world's wood-based products (300 m<sup>3</sup>/1 000 people) and paper (150 tonnes/1 000 people). By contrast, people in developing countries consume 90% less wood-based products (30 m<sup>3</sup>/1 000 people) and even less paper (12 tonnes/1 000 people).
- By 2010, it is estimated that an additional 50–100 million hectares of forests will be needed to meet the projected wood requirements of developing countries.

Source: Food & Agriculture Organization

*In developed countries, such as Canada, the consumption of wood is associated with industries, jobs and consumer products, such as paper, furniture, flooring and housing. In developing countries, almost all of the wood consumed is used for cooking, heat and shelter.*

## Markets, trade and sustainable forest management

The growing appreciation of the multiple values of forests and concerns over the growing level of consumption of forest products each have trade implications. While international, national and local initiatives to promote consensus on sustainable forest management have continued, some non-governmental groups — believing that markets are a stronger mechanism for change — have concentrated their efforts on forest products markets in terms of influencing both consumption and production.

In the early 1990s, the concerns over deforestation in the tropical forest zone led to support in some consumer countries for general import bans on tropical timber. Similar pressures have been applied by non-governmental groups in countries that are major consumers of Canadian forest products, primarily in Europe. These groups have called for boycotts or restrictions on imports of forest products from Canada. Pressures have also been exerted on other countries, including Sweden, Finland and Russia.

Market pressures do lead to change, but they may prove ineffective as a means of promoting the necessary fundamental action toward sustainable forest management on a global basis. The proposals to ban imports of tropical timber are a notable example. Many of these proposals were withdrawn, or found to be unsuccessful, when developing countries pointed out that the bans would be counterproductive. Impeding tropical timber exports would diminish the socio-economic value of forests to developing countries



and local communities, and thus, would only serve to accelerate deforestation and the conversion of tropical forest lands to alternative uses, such as livestock farming and agriculture.

A serious limitation of boycotts or import restrictions is their inability to deal with the fundamental social and economic aspects of forest use. The majority of wood in the world is consumed by developing countries to meet basic human needs. Only 15% of total wood consumption is in the form of products that enter international markets. Moreover, the majority of these products are produced by countries such as Canada that have implemented, or are developing, policies and legislation on sustainable forest management. Because import restrictions and boycotts cannot address environmental issues arising from the domestic or local use of forests, they will have a greater impact on patterns of trade than on wood consumption or forest practices.

Most recently, environmental groups have called for methods to identify forest products that have been produced in ways that do not degrade the environment. The rationale for these initiatives is that they may provide an economic incentive for change, by allowing purchasers to differentiate among similar products. In the absence of common principles, however, they could be based on criteria that reflect a particular view of how forests ought to be managed. There is concern that, in this event, such initiatives could be discriminatory.

Currently, efforts are focused on developing standards for sustainable forest management that will allow independent evaluations or audits by a third party. Some processes focus on certifying products, while others focus on forest management systems. In a number of forest nations, including Canada, Sweden and Malaysia, industry and non-governmental stakeholders are involved in efforts to develop credible certification processes.

The success of certification as a positive engine for change in forest management ultimately will depend on many factors, most notably on achieving global consensus regarding what constitutes sustainable forest management, and on ensuring that transparent, credible and scientifically based certification systems can be applied internationally. A number of groups and countries, including Canada, are advocating harmonization of the individual certification processes that are being developed around the world.

Certification may prove to be a useful means of increasing public awareness of forest management issues and accelerating sustainable

## Certifying sustainable forest management

The Canadian Sustainable Forestry Certification Coalition is promoting the development of an international system of forestry certification within the International Organization for Standardization's (ISO) Environmental Management System: ISO 14 000.

An international study group established to review the issue of sustainable forest management certification met early this year in London, England. The meeting was attended by representatives from 24 countries that collectively account for 63% of world forest products. The study group agreed to submit a proposal regarding ISO certification documents at the ISO 14 000 Technical Committee in June 1996.

forest management in countries producing forest products. However, much work remains to be done to achieve a workable model of certification in an industry that deals with ecological processes that are not easy to “standardize” across wide disparities of geographic, economic and social conditions.

### **Canada's forests — Implementing commitments to action**

In many respects, Canada has led the world during the past decade in developing and implementing new approaches to ensure the sustainability of forests. Initiatives range from establishing new models of public participation and community involvement, to integrating forest management and land-use planning and introducing legislation that stipulates the preservation of ecosystem values.

For the past two decades, Canadians have been reassessing their views of forests and forest practices. In some cases, the debate has evoked deep emotions and resulted in open confrontation. Nevertheless, over a relatively short period of time, the conflicts regarding forest development and preservation have translated into a widespread dialogue involving communities, governments and a range of interest groups at local, provincial and national levels. The basis for this dialogue is the consensus that forests have multiple values and that solutions can only be found through new partnerships that strive to recognize differences in needs and personal values.

## **Partners in sustainable forest development**

Provincial governments, non-governmental organizations, forest industries and Aboriginal peoples are important players in implementing Canada's commitments regarding sustainable forest management.

Provincial governments, which have responsibility for forest management on more than 70% of Canada's forest land, play a particularly important role. In recent years, they have introduced stringent legislation and enforcement measures to ensure the sustainability of forests and the protection of other resource values. Ontario's Crown Forest Sustainability Act and BC's Forest Practices Code are two examples of new legislation governing all aspects of forest practices on provincial forest land.

For its part, the forest industry has made sweeping changes to the way it operates. Examples include new forms of ecosystem management, silviculture programs, community involvement, and efficient engineering and processing techniques. New codes of practice have been adopted by many private forest owners and forest companies. Professional and industry associations, including the Canadian Institute of Forestry, the Ontario Forest Industries Association and the Alberta Forest Products Association, also have developed codes of ethics, forest principles and standards of practice.



The most notable example of this new approach is Canada's five-year National Forest Strategy, entitled *Sustainable Forests: A Canadian Commitment*. The Strategy was formally ratified in June 1992, with the signing of the Canada Forest Accord by federal, provincial and territorial ministers responsible for forests and by members of the Canadian forest community. It concluded a year of extensive, nationwide public consultations and has since been endorsed by forest industries, Aboriginal peoples, conservation and environmental organizations, tourism and consumer associations, labour groups, academia and individual Canadians. The strategy sets out 96 commitments under nine strategic areas, as well as a series of action plans for each stakeholder group. An independent panel has completed a mid-term progress evaluation, and a second independent evaluation will be conducted at the end of the Strategy's term in 1997.

Although it was developed prior to UNCED, Canada's National Forest Strategy is a blueprint for domestic implementation of UNCED commitments related to forests, such as protection of forest biodiversity, expansion of forest inventories and forest research, involvement of Aboriginal peoples, and development of internationally accepted principles and standards of forest management. Other supporting national programs and action plans include Canada's Biodiversity Strategy (released in the fall of 1995) and the National Action Program on Climate Change, which is investigating the role of forest management in mitigating global warming, as well as the potential impacts of climate change on the boreal forest.

An initiative of particular significance, taken in response to UNCED and Canada's National Forest Strategy, is the development of national criteria and indicators of sustainable forest management. In 1993, the Canadian Council of Forest Ministers (CCFM) established a steering committee to develop criteria and indicators in consultation with governments, academia, industry, Aboriginals and other interest groups. The resulting set of criteria and indicators was made public in October 1995. The information generated by these indicators will enable Canada to assess the health of its forests and to meet its international obligations — such as those under the Montreal Process — by reporting on its progress toward sustainable forest management. Current activities include compiling the available data and developing new data sources to enhance Canada's future ability to assess and report on the sustainability of its forests.

*“Canada's goal is to maintain and enhance the long-term health of forest ecosystems for the benefit of all living things, both nationally and globally, while providing environmental, economic, social and cultural opportunities for the benefit of present and future generations.”*

— Sustainable Forests:  
A Canadian Commitment  
Canadian Council of  
Forest Ministers, 1992

## CONTINUING THE DIALOGUE

There will be a turning point in the global forest dialogue in 1997, when the IPF submits its recommendations to the fifth session of the CSD.

The IPF is expected to make progress toward international consensus on all areas within its mandate. Although only a two-year process, the outcome will represent the culmination of a dialogue that has spanned a decade. The outcome of the IPF is not an end in itself, but a significant step toward greater global collaboration on sustainable forest management. Some of the issues may require only a reconfirmation of the consensus reached in other forums. Others may require considerable discussion and negotiation, such as the issues related to the interface between trade and the environment.

Canada would like to see concrete action to promote sustainable forest management around the world and is particularly active in the IPF. At UNCED, the global community agreed that the fundamental responsibility for sustainable development rests with each sovereign country. Canada's priorities are to reinforce its efforts at home, and to share its experience and knowledge with the world.

The challenge for the global community will be to develop a shared understanding of the complex political, environmental, economic and social dimensions of forests, and on this basis, to build a common vision of sustainable forest management. If such a vision can be developed, the national commitments of sovereign countries to sustain their forests will be strengthened by international action to sustain forests worldwide.



## Decade of dialogue

1987

■ The World Commission on Environment and Development publishes *Our Common Future* (the "Brundtland Report").

1990

■ At the First Preparatory Committee (PrepCom) for UNCED in Nairobi, the proposal on combatting deforestation is restructured under the title "Management, Conservation and Sustainable Forest Development" (August).

1991

■ The ITTO establishes guidelines for sustainable management of tropical forests. (Guidelines for plantation forests are published in 1994.)

■ At the Second PrepCom for UNCED in Geneva, participants agree on the need to formulate a set of guiding principles for the world's forests.

■ At the 10th World Forestry Congress in Paris, France, delegates call for renewed commitment to reforestation and sustainable development throughout the world (September).

1992

■ At UNCED, the global community adopts the Rio Declaration, the Framework Convention on Climate Change, the Convention on Biological Diversity, the Forest Principles and Agenda 21 (June).

1993

■ Indonesia hosts the Global Forest Conference in Jakarta and Bandung, involving 35 countries, to support global partnerships for sustainable forest development and the follow-up to Agenda 21 (February).

■ European ministers responsible for forests meet in Helsinki, Finland, to adopt a declaration and a series of resolutions as a collective response to UNCED (June).

■ The first meeting of ministers of the Forestry Forum for Developing Countries produces the Delhi Declaration on Forests, which calls for national action on forest conservation and development (September).

■ Canada hosts the Seminar of Experts on the Sustainable Development of Boreal and Temperate Forests in Montreal, sponsored by the CSCE. More than 40 countries discuss the development of measurable criteria and indicators for the sustainable development of forests, now known as the "Montreal Process" (September).

■ The 14th Commonwealth Forestry Conference in Kuala Lumpur, Malaysia, produces a series of recommendations to Commonwealth governments on implementing the UNCED Forest Principles (September).

1994

■ Malaysia hosts the inaugural meeting of the IWGF, bringing together developing and developed countries to resume the dialogue on forests (April).

■ India and the UK hold an international workshop in collaboration with the FAO to help prepare for the CSD review on forests (July).

■ Canada hosts a second meeting of the IWGF, which results in a series of options for action to present to the CSD (October).

1995

■ In Santiago, Chile, countries involved in the Montreal Process endorse a series of criteria and indicators for the conservation and sustainable management of temperate and boreal forests outside Europe (February).

■ The first-ever worldwide meeting of ministers responsible for forests, convened by the FAO, produces the "Rome Statement" (March).

■ The CSD conducts an in-depth review of forests and establishes the IPF as a global forum to continue the dialogue on forests (April).

■ The Amazonian countries publish a proposal on criteria and indicators for the sustainability of the Amazon forest following a meeting in Tarapoto, Peru, in cooperation with Canada, the FAO and the UN (September).

1996

■ Following its first substantive session in Geneva, the IPF submits its interim report to the CSD (April).

■ Finland hosts an intergovernmental seminar to discuss the national implementation and international compatibility of criteria and indicators for sustainable forest management (August).

1997

■ The IPF is scheduled to submit its recommendations to the fifth session of the CSD on priorities for future action.



# Forest Development Assistance

HELPING PEOPLE HELP THEMSELVES

Canada's official development assistance supports the efforts of developing countries to help their people achieve a higher standard of living and quality of life. Collaborative efforts to alleviate poverty in the developing world, to advance democracy, and to protect the environment benefit all countries by contributing to global health, prosperity and stability.

A fundamental goal of forest development assistance is to strengthen the developing country's capacity to sustainably manage its forests. Central to this task is working with the country's most important resource, its people.

Training and education are core activities in every CIDA forest project. In Peru, CIDA supported a program to

strengthen the Forestry Faculty at the Universidad de La Molina. In southern Africa, scientific training and networking are major components of the Tree Seed Centres project, which is focused on resolving the seed shortages and poor seed stock that are hampering reforestation efforts. And in Asia, the ASEAN Institute of Forest Management Project is focused on upgrading the skills of foresters and forestry-related professionals through scholarships, on-the-job training, and long-term internships in Canada and other forest nations.

Forest management has changed dramatically over the past 30 years. One of the most important new directions is community forestry, which recognizes the human and social issues surrounding the use of forests, and stresses the

involvement of local communities in all aspects of project planning and implementation.

The contribution of women in forestry also is being recognized internationally. CIDA requires that gender issues be considered an integral part of forest projects and that each project involve men and women equitably. In Senegal, for example, two community projects now involve larger numbers of women, whose life experiences and perspectives have proved invaluable to project managers. The women have also formed their own support groups and a network of extension workers.

## PROGRESS THROUGH PARTNERSHIPS

CIDA projects are realized in partnership with non-governmental organizations

## Canadian International Development Agency (CIDA)

CIDA was established by the Government of Canada in 1967 and is the principal agency coordinating Canada's official development assistance. CIDA programs are delivered through a variety of mechanisms and partnerships: directly, with the governments of developing countries (bilateral); indirectly, through international organizations such as the World Bank and the United Nations (multilateral); and in partnership with Canadian and local non-governmental organizations and private industry.



## CIDA's forest development program

Developing countries depend on Canada, as a major forest nation, for leadership and assistance in helping them find sustainable solutions to forest issues. For 30 years, Canada has been one of the leading nations in providing forest development assistance, with more than 150 projects underway at any given time. The guidelines for CIDA forest projects include:

- strong emphasis on local participation and ownership,
- improved knowledge and promotion of self-sustaining activities tailored to each local context, and
- more focused use of Canadian strengths to maximize the benefits to the host country.

(NGOs), universities and private firms, and some are delivered through other international agencies or Canadian departments.

Local NGOs are important partners in development. One example is the Tree Growers' Cooperative project in India, which is helping local people to reclaim wastelands by organizing profit-oriented tree growers' cooperatives. The local cooperatives assist villagers and their families to establish plantations and to organize ways of harvesting wood and non-wood products, such as fruits and nuts, which can be sold in urban centres.

An important objective of CIDA's forest projects is to encourage Canada's private sector to share its skills and experiences with partners in developing countries. Examples of goods and services provided by Canadian universities and research agencies include silviculture expertise, education, work exchanges and software (e.g., forest inventory and geographic information systems). Canadian companies can establish business partnerships with the host

country, bringing long-term benefits in the form of investment, technology transfer, job creation and new market opportunities.

### FOREST DEVELOPMENT PROGRAM

In the 30 years since CIDA's forest development program was established, CIDA has helped more than 90 countries increase their peoples' forestry knowledge and their ability to develop solutions to local forest issues.

Projects typically incorporate a range of activities, including forest resource assessment, community forestry, local industry development, the conservation of genetic diversity, and halting desertification.

The following three examples illustrate the variety of projects under CIDA's forest development program.

### Sustaining tropical rainforests in Honduras

Tropical rainforests are second only to oceans in terms of their capacity to replenish the world's oxygen supply and moderate our

climate. In addition to housing the majority of the world's terrestrial species, these forests are vital to the health of the world's oceans — they cleanse tropical rivers and serve as nurseries for much of the fish and animal life of the sea. Tropical rainforests, however, are found on shallow soil and are vulnerable to irreversible damage.

In 1974, in collaboration with the Honduran Forestry Department, CIDA embarked on a long-term project to halt the destruction of the remaining tropical rainforests in Honduras.

The Republic of Honduras encompasses 11.2 million hectares, of which 2.2 million hectares are covered by tropical rainforests. Each year, 60 000 to 80 000 hectares of these forests are irrevocably destroyed by subsistence farmers and cattle ranchers. Of serious concern is that the hot climate, high rainfall and infertile soils make these sites unsuitable for farming or ranching on a sustainable basis. The long-term social, economic and environmental costs of this deforestation are enormous.

*The success of the Honduras project stems from the recognition that forestry problems can be resolved only by addressing the needs of the people living in and near the forest.*

Under the CIDA project, efforts are concentrated on helping community groups in Integrated Management Areas — small watersheds up to 10 000 hectares in size that have both forestry and agricultural potential. Activities are directed toward improving forest management by introducing forest silviculture, developing forest inventories, monitoring harvesting, and improving land-use in the surrounding buffer zones.



Of particular importance is the assistance provided to groups of “pit-sawyers,” who harvest the forest using low-impact, manual methods and transport the cut

lumber to market by hand or mule, or by river. (Environmental organizations have endorsed tropical lumber harvested by this method.) The Honduras project focuses on the transfer of appropriate technologies and on providing marketing support to make pit-sawing more economically attractive.

The activities that are directed toward improving land-use in the buffer zones focus on increasing the communities’ standard of living and the productivity of their arable land by introducing agroforestry and sustainable agricultural practices. These activities are supported by land-use and socio-economic studies, soil surveys and market assessments of agroforestry products.

### **Sharing knowledge and expertise in China**

Canada has developed advanced methods of forest management, including forest inventory systems, forest practices that increase forest productivity and prevent soil damage, and modern processing technologies that minimize waste while yielding higher quality products. CIDA and its Canadian partners are introducing these methods to Heilongjiang Province in China — the site of China’s largest reserves of productive forest.

Deforestation is a serious problem in China. The high demand for timber and other

### **Activities of China’s Heilongjiang project**

- developing information and databases required for multiple-use forest management
- introducing a silvicultural program for the treatment and rehabilitation of the province’s forests
- testing and implementing environmentally sound harvesting methods on hilly terrain
- upgrading sawmill operations by installing new technologies and providing technical training

wood products has reduced the nation’s forests to less than 13% of its total land area. In 1984, the governments of Canada, China and Heilongjiang Province joined forces on a long-term project to reverse this trend. The main goals are to apply new forest management methods, maximize the efficient utilization of forest resources, balance the annual harvest with the rate of forest growth, and share the new technologies with the rest of China. The project is managed by the Langxiang Forest Bureau in northern China, where the forests are very similar to Canada’s boreal forest region.

From 1984 to 1989, the Heilongjiang project focused on developing forest inventory



## Southern Africa's agroforestry research network

- biophysical research: screening multipurpose tree species; testing the effects of agroforestry techniques on soil fertility; propagating indigenous fruit trees; developing germination techniques
- human resource development: training African scientists; conducting research workshops; organizing field demonstrations for farmers and obtaining their feedback.
- socio-economic research: studying land tenure, the role of women and factors affecting the adoption of agroforestry; marketing; integrating agroforestry into national research programs

systems, growth and yield modeling, and silvicultural and pathology programs. The second phase of the project is now nearing completion; the objective is to create a fully operational, integrated forest management model as the basis for introducing and adapting proven forest management practices and technologies in China.

### Improving food security in southern Africa

Inadequate food production is a major problem in southern Africa, the result of a growing population, limited arable land and recurrent droughts that devastate harvests. The land is under greater and greater pressure to yield more, accelerating the loss of forest cover and the degradation of soil and water resources.

One of the most promising alternatives to conventional farming is agroforestry. Farmers practicing agroforestry grow multipurpose trees and shrubs with their food crops and in their livestock pastures. The trees and shrubs improve soil fertility and create a favourable microclimate

for agricultural crops. In addition to enhancing agricultural productivity, agroforestry is used to produce fruits, nuts, animal feed, organic manure and fuelwood, and to improve the quality and flow of streams and rivers.

Agroforestry is an emerging discipline that requires continued scientific and farm-level research, new technologies, training of scientific personnel, and farm outreach programs. Since 1985, CIDA has supported an agroforestry research network in Malawi, Tanzania, Zambia and Zimbabwe. Land in the region is dominated by numerous small farms, the majority of which are managed by women. The network's long-term goal is to ensure the productivity and sustainability of arable land in southern Africa. Activities are focused on increasing the scientific knowledge-base and transferring practical know-how to the local farmers, who are involved in developing the agroforestry techniques.

In addition to reducing deforestation and soil erosion, the results of this research will improve food security and will

increase family incomes by the sale of agroforestry products. Women and children, in particular, benefit from the increased community stability and prosperity, as the result of improved access to schools, health care and employment opportunities.

The main partner organizations responsible for implementing the project are the International Council for Research in Agroforestry (ICRAF) and the national research agencies of the four host countries.

### CHALLENGES OF THE NEXT CENTURY

With the predicted growth in the world population in the 21st century, the pressures on forest resources will continue to increase. Of critical importance is the need to provide and expand assistance to developing countries in sustainable forest management. The essential ingredient is greater cooperation among national governments, communities, NGOs, and international research and donor institutions.

# Collaborative Research

LINKING NATIONAL AND INTERNATIONAL EXPERTISE

**F**orest research has become an international activity, and the importance of scientific collaboration is growing. Forest research agencies generally are faced with fewer dollars to cover the broader range of issues associated with sustainable development. Through collaborative research, countries can leverage their efforts and resources to address a wider spectrum of forest management issues.

Canada is a major player in global forest research. The nature of its international collaboration takes many forms, ranging from informal contact between scientists, to formal agreements with other countries. In all cases, the fundamental goals are to exchange research findings, access new technologies, and contribute Canada's expertise to the global pool of knowledge.

Many of the new directions for forest research are embodied in national and international commitments, such as preserving forest health and biodiversity, and developing criteria and

indicators to measure sustainable forest management.

The following examples illustrate the nature of Canada's collaborative research with other countries on three current forest issues: the interaction between the climate and the boreal forest, the effectiveness of biological agents in controlling insect infestations, and the use of decision-support technology for forest fire management.

## Climate and the boreal forest

Forests play an important role in the global carbon cycle, fluctuating between being a sink and source for CO<sub>2</sub>. They absorb and store CO<sub>2</sub> during growth cycles, and they release CO<sub>2</sub> to the atmosphere during respiration, decomposition and burning.

The boreal forest is one of the world's largest ecosystems and is the dominant forest region in Canada, Alaska and Russia. Canadian scientists are working with scientists from the United States (USA) and other countries to improve our understanding of the role of the boreal forest in

## Canada's collaborative research in forestry includes:

- bilateral science and technology (S&T) agreements that include a forest component (e.g., with the UK, Germany, France and Japan);
- bilateral forest agreements (e.g., with Russia, China, Mexico and the USA);
- participation in major international forest science programs (e.g., BOREAS)
- agreements and joint projects with other Canadian agencies and government departments to deliver forest development assistance;
- membership in international and bilateral forest research organizations (e.g., the International Union of Forestry Research Organizations and the North American Forestry Commission); and
- numerous scientist-level contacts (through visits, work terms, and exchanges of data and publications).



## Forest research agencies in Canada

Canada's forest research community is a large one. The Canadian Forest Service (CFS) is the lead agency in terms of strategic national and international research, including formal collaboration with other countries. The CFS, which was established in 1899, is the largest forest research organization in the country, operating out of five research centres across Canada. Provincial governments carry out applied research related to their operational forest management responsibilities. More broadly based federal and provincial research agencies, such as the National Research Council, the Science Council of British Columbia, and the Centre de recherche industrielle du Québec, undertake special forest-related projects. Canada's three industrial forest research agencies (FERIC, FORINTEK and PAPRICAN) conduct R&D in forest engineering, forest product development, and pulp and paper technology, respectively. Forestry faculties in Canadian universities, which work closely with government and industry scientists, also play an important role. Lastly, in-house research is conducted by Canadian forest companies and private woodlot associations. A national advisory board on forest research soon will be established to guide forest research priorities over the next decade. It will be composed of representatives from a broad range of interest groups.

the global carbon cycle and the interaction between forests and the Earth's climate.

The Boreal Ecosystem Atmosphere Study (BOREAS) is a cooperative international project involving the intensive study of 1 million km<sup>2</sup> in Saskatchewan and Manitoba. It is the largest experiment of its kind. Natural Resources Canada and the U.S. National Aeronautics and Space Administration are leading the study. It involves several hundred government, university and industry scientists working in 75 different teams with expertise in climatology, biology, remote sensing and forest ecology. Research includes intensive field experiments involving ground, aircraft and satellite observations, combined with computer-based modeling.

The location of the field plots within the BOREAS study

area offers a wide range of opportunities to investigate issues related to forest decline, changes in species composition, rates of regeneration, new insects and disease, and shifts in the range of tree and other forest species.

The results to date have already improved our understanding of the links between the world's climate and the boreal forest ecosystem, and they will greatly improve models of the global climate system. For example, the preliminary findings indicate that:

- the amount of solar energy absorbed by the forest is greater than expected;
- the amount of water that the forest absorbs from the soil and releases into the atmosphere ("evapotranspiration") is less than expected;
- the photosynthetic capacity of the boreal forest (and thus its ability to absorb carbon) is much

lower than that of the temperate-deciduous forest to the south; and

- mosses play an important, but little understood role in the moisture balance and carbon cycle of the forest.

BOREAS field tests and data collection activities will be concluded at the end of 1996, but analyses and modeling efforts will continue for several years. Discussions are underway among several agencies to utilize some of the BOREAS infrastructure to carry out long-term research and monitoring activities.

An important product of the BOREAS study is a computerized information system, called BORIS, which contains all of the field observations and modeling results from the study. When completed in 1998, BORIS will be the most comprehensive database of the boreal forest ecosystem in existence.

## Biological control of the gypsy moth

The gypsy moth, *Lymantria dispar*, was introduced accidentally from Europe into the USA in the late 19th century. By the 1970s, damaging infestations were occurring in southern Ontario and Quebec, and smaller infestations were reported on both the east and west coasts of Canada.

As a non-native insect that feeds on a wide variety of tree species, the gypsy moth represents a new threat to forest health in Canada. Oak trees are particularly susceptible to defoliation and decline. The presence of the gypsy moth can also lead to international trade restrictions on forest products originating from infested areas.

Initially, when there was a major outbreak of gypsy moths in Canada, European scientists would collect natural enemies of the moth during outbreaks in Europe and release them in Canada to reduce the high population of moths. This approach was used

for decades, yet outbreaks of the moth continued to occur.

Ten years ago, the Canadian Forest Service (CFS) and the International Institute of Biological Control in Switzerland initiated a novel biological control program. Rather than using control agents to suppress outbreaks of the moth, research was undertaken to identify an organism that was present in areas with low gypsy moth populations and that could be used to prevent major outbreaks from occurring. Scientists began searching in the moth's native habitat in Europe for areas where outbreaks did not occur. In southeastern France they discovered a little-known parasite, *Ceranthia samarensis*, which is particularly effective at killing the larva at low population levels of gypsy moth.

A new challenge arose when it became apparent that field collections could never provide the necessary numbers of the parasite for a control program. In response, the CFS developed

a laboratory-rearing method to breed colonies of the parasite in Canada. In the process, scientists gained critical insight into the biology of the parasite, its ability to reproduce and survive Canadian winters, and its potential impacts on non-target species.

The first controlled releases of *Ceranthia samarensis* were carried out in southeastern Ontario in 1992. Recently, the U.S. Department of Agriculture adopted the techniques developed by the Canadian and European scientists and purchased Canadian laboratory stock of *Ceranthia samarensis* for a U.S. biological control program.

## Forest fire management

Each year in Canada, fires consume almost as much wood as is harvested and pose serious threats to rural communities, where evacuation is the only recourse unless there is prolonged rain. Yet, the total suppression of forest fires is neither physically nor economically feasible. Nor is it ecologically desirable.

## Forest fire information systems

The development of methods for assessing forest fire danger has been a continuous activity of the CFS since the 1920s. Canada's current Forest Fire Danger Rating System, introduced in the 1980s, has gained international recognition. To date, it has been adapted for use in New Zealand and Alaska. Canadian scientists have also developed a lightning detection system that maps strikes instantaneously and sends the data to a central computer system, which is linked to hundreds of radar and weather stations. The current focus is on developing a national wildfire information network to automatically monitor, forecast and disseminate national and global fire information on a daily basis. An important objective is to make the information readily accessible. In April 1995, the Canadian Wildfire Information System (CWFIS) became available on the World Wide Web at <http://www.nofc.forestry.ca/fire.cwfis.html>



In recent years, efforts have focused on increasing our ability to predict the occurrence and behaviour of forest fires using advanced computer programs, GIS software, and comprehensive data on topography and forest biomass "fuel types." Fuel types are classified according to a number of variables, including forest floor cover (e.g., dry needles or moss), foliage moisture content, stand density and the composition of tree species.

Forest fires are a complex phenomenon. Canadian scientists are gathering empirical data on wildfires and conducting experimental fires to develop models of wildfire behaviour.

The Wildfire Information System — an integrated computer database — links all Canadian fire management agencies and produces statistical indices and coloured maps showing the daily risk and spread of forest fires.

The Wildfire Information System is a component of the Global Emergency Management Information Network (GEMINI). GEMINI is a pilot project of the G-7 Information Society that was approved by the leaders of G-7 industrialized countries in June 1995, at the Halifax Summit. The goal is to promote the development of an integrated global information network to support disaster and emergency management. The principles of the project include: recognizing that emergencies

are local, whereas support is global; promoting the use of information technology to assist emergency management in developing countries; and fostering international policies and collaboration to strengthen the exchange of information.

In October 1995, the CFS began developing a prototype demonstration system for the region of the Association of Southeast Asian Nations (ASEAN). Discussions are now being initiated to explore the possibility of establishing partnerships with ASEAN countries (Malaysia, Indonesia, Brunei, Thailand, Vietnam, Singapore and the Philippines) that may be interested in implementing the prototype system as part of their operational forest management programs. Officials from China, Russia, Chile and Florida have already expressed interest in establishing partnerships with the CFS to develop similar systems.

# Forest Products Trade

## Competing globally

### Globalization

- standardization
- economies of scale  
e.g., pulp

### International marketing

- product  
differentiation
- preferences  
e.g., softwood  
lumber

**C**anada has long been the leading exporter of forest products and currently accounts for almost 20% of world trade. In 1994, the total value of Canadian forest products exports was approximately \$32 billion. The direct and indirect economic benefits generated by this trade activity are substantial — trade revenues ripple through and stimulate the economies of Canada's major metropolitan areas and its smaller rural communities.

The global marketplace is extremely dynamic. Trade flows between countries are constantly evolving in response to the complex interaction of factors that define a country's comparative advantage. In general terms, a country's comparative advantage in producing a product is determined by its relative abundance of required inputs. The ability to trade means that a country does not have to be self-sufficient in producing the full range of goods and services that its citizens require, which enables the country to concentrate its resources (e.g., capital, labour and natural resources) on producing those goods that it can produce most efficiently, or at the least cost.

This chapter will focus on the evolving status of Canada in the global forest products market and the long-term trends in particular commodity products. The chapter also will review Canada's share of trade in our most important commodity markets and explore why that share has increased or decreased since the 1960s.

### GLOBALIZATION AND INTERNATIONAL MARKETING OF FOREST PRODUCTS

Increased trade activity in forest products is partly attributable to two trends: globalization and international marketing. "Globalization"



refers to a general harmonization or standardization of product specifications, grading standards and building codes between countries. "International marketing," on the other hand, refers to the efforts of firms to produce and deliver a product to foreign customers that is tailored to their needs or tastes.

**Globalization** is associated with production capacity becoming concentrated within fewer and larger multi-national firms. This trend is accelerated by the elimination or reduction of barriers to trade, such as differences in technical specifications, or tariffs erected by countries to encourage or protect domestic industries. Globalization of a particular market encourages specialization in countries that have a natural comparative advantage in producing that product. Because these countries are then able to achieve higher economies of scale (which increase their competitiveness in that product even more), globalization reinforces their comparative advantage. In a globalized market, competitiveness is determined primarily by the ability to deliver the product at a competitive price and on a reliable basis.

The global forest products market consists of a number of different commodities or "market segments." Each segment shows varying degrees of globalization and international marketing. In general terms, the pulp and paper market displays the greatest number of characteristics of a globalized market: product standards and specifications are fairly universal, trade between principal exporting and importing regions is active and balanced, foreign investment in wood pulp capacity in existing exporting regions has increased, and mergers and acquisitions are common. The trend toward an increasingly globalized wood pulp market is expected to continue in the future as new low-cost pulp mills come on stream in Indonesia and the Southern Hemisphere, and as higher capital requirements lead to mergers and acquisitions and a higher concentration of pulp production.

Unlike globalization, which leads to product standardization, **international marketing** requires a high level of product differentiation. Compared to the pulp and paper market, the softwood lumber market displays more characteristics of international marketing: most of the trade in this commodity is regionally concentrated; building codes, product dimensions and grades are highly variable between regions and countries; and the sector is composed of a large number of small, independent firms. There is little evidence to suggest that significant harmonization of softwood lumber standards — and thus globalization of this market — will occur in the near future.

## Uruguay Round

The General Agreement on Tariffs and Trade (GATT)\* is a comprehensive international trade agreement that was signed in the late 1940s, following World War II. The agreement focuses on reducing barriers to trade (e.g., the elimination of tariffs and import quotas), serves as a basis for standardizing domestic trade legislation (e.g., countervailing duty laws), and provides a mechanism for resolving trade disputes.

In 1994, 125 countries concluded seven years of multilateral negotiations under the GATT. One of the major achievements of the negotiations, known as the "Uruguay Round," was the agreement to eliminate tariffs and non-tariff barriers to trade in pulp and paper products across all industrialized countries.

Although tariffs on wood and wood products will not be eliminated, they will be reduced substantially. For example, over the five-year phase-in period ending in January 1999, Japan's tariff on SPF (spruce-pine-fir) lumber will be reduced from 8% to 4.8%, helping Canada to compete with U.S. exports of hemlock lumber, which enter the Japanese market duty-free. Korea's duty on Canadian softwood lumber imports will be reduced from 20% to 10%.

*\*Now administered by the new World Trade Organization in Geneva.*

## CANADA'S FOREST SECTOR

The combined industry groups commonly referred to as “Canada’s forest sector” include the logging industry, solid-wood industries (e.g., lumber, plywood and panelboard manufacturers) and paper and allied industries (e.g., pulp mills, newsprint mills, and producers of fine paper and paperboard products) (Figure 3.1). More than half the total production of these three industry groups is exported.

These industries are an important source of jobs in rural areas, where alternative employment opportunities often are limited. At least 330 Canadian communities rely on the forest sector to sustain their local economy. Indeed, forest industries are important to the economy of each province and territory. Of the total number of direct jobs created by the forest sector in 1995, 29% were located in British Columbia (BC), 28% in Quebec, and 24% in Ontario. The remaining 19% were distributed throughout the rest of Canada, from the Atlantic provinces to the Northwest Territories.

### 3.1 Canada's forest industries (1994)

Industry	Establishments	Total value added \$ billion
Logging	7 447	3.8
Solid wood	2 861	10.0
Paper & allied	668	10.7
Total	10 976	24.5

Source: Statistics Canada

## Factors affecting Canadian forest products trade

The interaction of many factors determines the competitiveness of Canada’s forest sector, and the level and direction of Canadian forest products exports.

- price of Canadian forest products on export markets
- real exchange rate trends
- resource endowment
- reduction in transaction costs through advances in telecommunications and information technologies
- globalization of capital markets
- profitability and ability to attract new investment capital
- entry of non-traditional suppliers into North American and Pacific Rim markets
- creation of European Union, and changing political situation in former Eastern Block countries
- emergence of environmental issues as a determinant of market access
- demographic and economic growth trends
- tariffs, quotas and other trade barriers
- harmonization of building codes, product grading standards and other product specifications, such as recycled-content requirements
- substitution of non wood-based construction materials for traditional wood-based materials in importing countries
- development and marketing of new products, such as engineered wood products and wood-based composites
- rates of innovation in processing and process-control technologies by Canadian producers, relative to the rates of foreign competitors



## Canada's comparative advantage

Canada's ability to compete in foreign markets is due primarily to its mix of native tree species, the abundance of its forests, and the proven ability of Canadian producers to reliably and consistently deliver a high-quality product at a competitive price. The characteristics of the trees species growing in our northern forests are an important source of Canada's natural comparative advantage in world markets. Our cool northern climate is characterized by a short growing season with long daylight hours — conditions that produce trees whose fibres are long and light in colour. Wood products processed from these trees have many desirable attributes. For example, Canadian softwood lumber is easy to work with and light in colour, and has a high strength-to-weight ratio that makes it ideal for light framing in housing and other construction projects. Similarly, market pulp produced from Canadian softwood species is strong and bright — characteristics highly favoured by papermakers and publishers.

Our abundant supply of timber has also translated into a comparative advantage for Canada in the production and export of products that require larger amounts of roundwood input. For example, Canada has been more competitive in producing market pulp than fine papers, partly because market pulp requires a higher percentage of roundwood input. (However, recent improvements in technology now allow for increased use of wood waste in the pulping process.) Another factor is that trade in fine papers has been governed, in recent years, by the high tariffs established by foreign governments to protect domestic industries that are producing higher value-added, less wood-intensive products. (Figure 3.2 illustrates differences in the amount of roundwood input per \$1 000 of sales for a number of different products.)

## Contribution to world trade

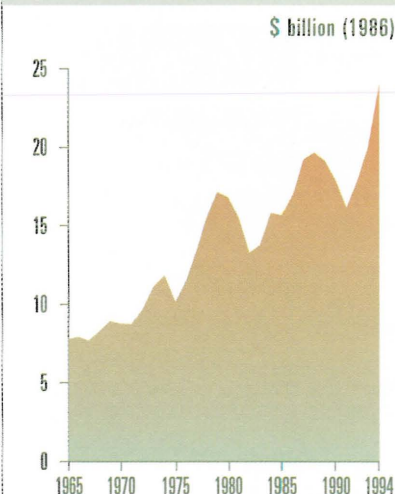
Canada contributes more to total world exports of forest products than any other country. In 1994, the total value of world forest products exports amounted to more than \$155 billion. Exports from Canada accounted for nearly 20% of this amount. In terms of the value of Canadian exports, our principal export commodity is softwood lumber. In 1994, Canada exported more than \$11 billion of softwood lumber, or 46% of the total value of world trade in this commodity. The value of Canada's newsprint exports was \$5.5 billion, or 53% of world trade, and the value of our pulp exports was \$6.7 billion, or 34% of world pulp exports.

### 3.2 Roundwood input (1989–1993 average)

m <sup>3</sup> /\$1 000 sales (1990\$)	
Particleboard	9.5
Fibreboard	8.8
Softwood market pulp	8.8
Hardwood chemical pulp	7.8
Softwood lumber	6.5
Mechanical pulp	6.0
Kraft paperboards	5.2
Newsprint	4.6
Softwood plywood	4.2
Uncoated papers	4.0 – 5.0
Coated papers	2.5 – 2.9

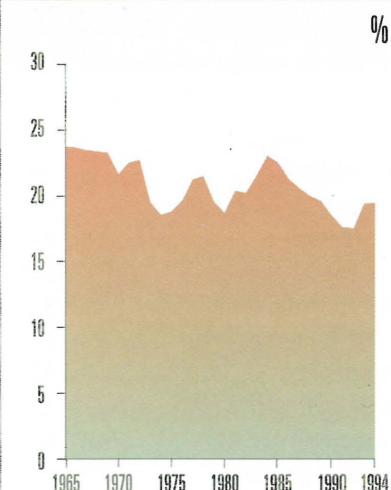
Sources: Canadian Forest Service/  
Food & Agriculture Organization

### 3.3 Long-term trend in the value of Canadian forest products exports



Sources: Food & Agriculture Organization/  
Canadian Pulp & Paper Association

**3.4** Canada's share of global forest products exports



Sources: Food & Agriculture Organization/  
Canadian Pulp & Paper Association

The value of Canadian exports of forest products has increased steadily since the 1960s (Figure 3.3). However, our share of total global exports declined from roughly 25% in 1961, to approximately 20% in 1981. Essentially, the rapid growth in global forest products trade over this period exceeded the rate of growth in Canadian exports. Since 1981, Canada's share of global trade in forest products has continued to decline, but at a far less rapid rate (Figure 3.4).

The product mix of Canadian exports is becoming more diversified. For example, Canada has improved its export performance in higher value-added products, such as printing and writing papers and some paperboards. Nevertheless, the majority of Canadian exports continue to be newsprint, softwood lumber and wood pulp.

### CHANGING PATTERNS OF TRADE

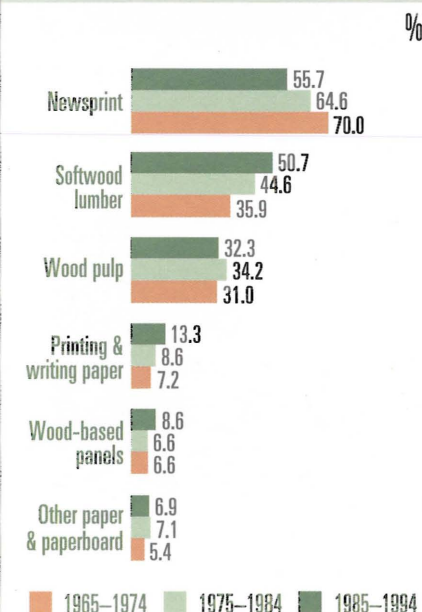
Canada's loss of global market share over the past 30 years suggests that the overall competitiveness of the Canadian forest sector has declined marginally. However, to better understand the change in Canada's competitiveness, it is necessary to examine the individual commodity markets that make up the global market for forest products. The commodities include softwood lumber, wood-based panel, market pulp, newsprint and higher value-added paper. Canada's share of each of these markets shifted significantly between 1965 and 1994 (Figure 3.5). The most substantial changes occurred in the newsprint and softwood lumber markets. In terms of volume, Canada's share of world newsprint exports dropped from 70% to 56%, while our share of trade in softwood lumber increased from 36% to close to 50%. Our share of the world pulp market remained relatively constant. Lastly, Canada made small, but promising gains in the higher value-added printing and writing paper market.

As described in the previous section, significant structural changes have occurred over the past 30 years in the global forest products market. This section provides a more detailed analysis of evolving patterns of trade for Canada's major forest products exports: softwood lumber, wood pulp and newsprint. It also reviews trade flows between Canada and the USA, which remains Canada's most important export market in terms of forest products.

#### Softwood lumber

The United Kingdom (UK), Europe, the USA and Japan are highly dependent on imports of softwood lumber (Figure 3.6). Between 1965

**3.5** Trends in Canada's share of world exports (volume)



Sources: Food & Agriculture Organization/  
Canadian Pulp & Paper Association

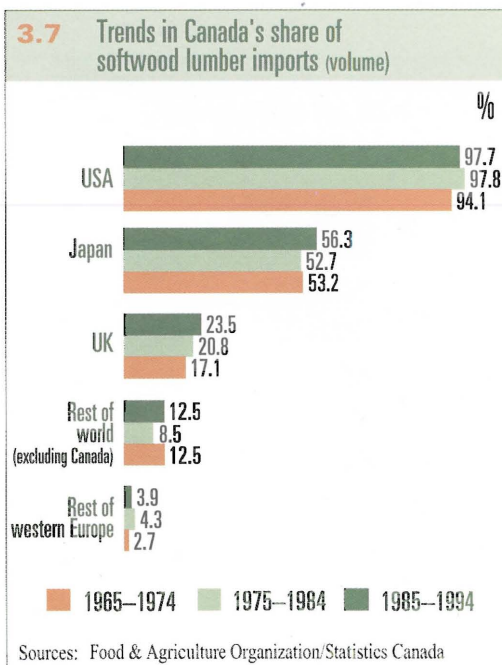
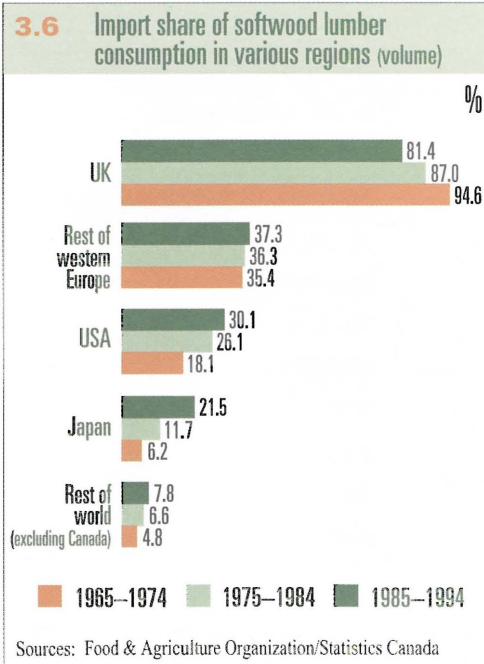


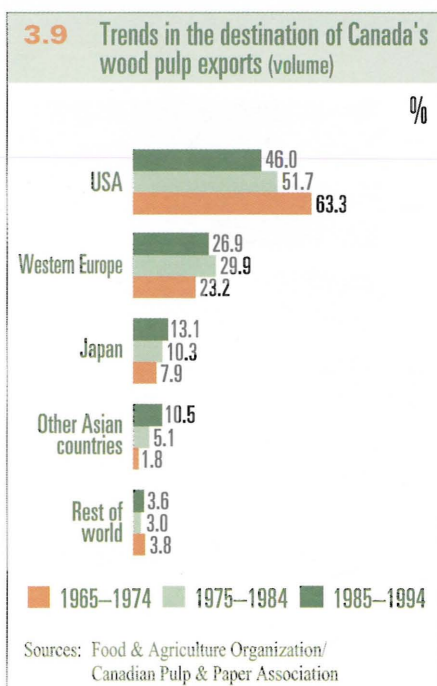
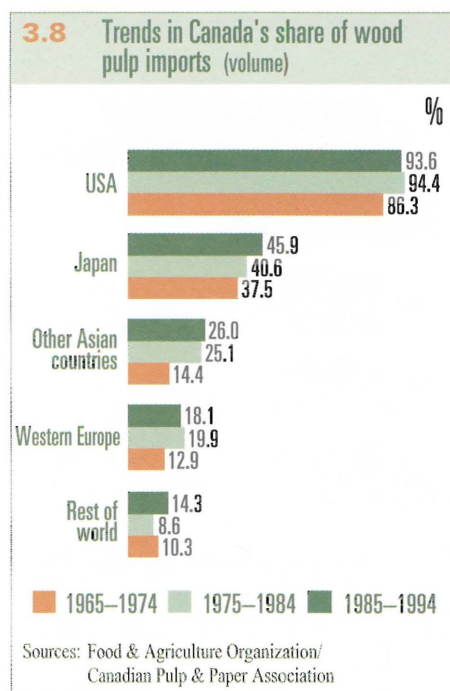
and 1994, the USA and Japan increased their dependence on softwood lumber imports, whereas the UK's dependence declined. The degree to which these countries depend on Canadian imports varies widely (Figure 3.7). Canada supplies almost 100% of the U.S. import demand for softwood lumber, but only 23% of the demand in the UK. With the exception of trade with the Pacific Rim, most trade in softwood lumber tends to be regionalized. Canada supplies most of the import demand in the U.S. market, while producers in Sweden, Finland and Russia dominate the European market.

The softwood lumber market in North America is highly cyclical and competitive. Historically, regions with large-diameter logs, such as the U.S. Pacific Northwest and coastal BC, had a significant advantage in producing softwood lumber. However, their advantage diminished with the introduction of new technologies developed in the mid-1970s. The new machines are well-suited to processing smaller-diameter softwoods, such as spruce-pine-fir (SPF) and southern yellow pine. In addition, lumber produced from these species has become the preferred choice of builders for light framing applications. Producers in the forest regions of eastern Canada, Alberta, the BC Interior and the U.S. South invested heavily in these technologies in the late 1970s and early 1980s. Their ability to consistently deliver a quality product at a competitive price resulted in a shift in the distribution of softwood production capacity from the Pacific coastal forests of the USA and Canada, to eastern Canada, the BC Interior and the U.S. South.

While Canada has been exporting more softwood lumber to the USA, U.S. producers have been increasing their offshore exports — from 4% of domestic production in the mid-1960s, to almost 8% in the 1990s. U.S. producers are now exporting higher priced and higher valued-added structural lumber, such as large-dimension Douglas-fir, hemlock, western red cedar and white pine, and importing from Canada the lower priced, light-framing construction lumber grades, such as eastern and western SPF.

Japan is another major market for Canadian softwood lumber. Japan's dependence on imports of softwood lumber increased from 6% of domestic consumption in the mid-1960s, to an average 21% of annual consumption between 1985 and 1994. In terms of volume, Canada presently supplies approximately 60% of total Japanese softwood lumber imports. Growth of the Japanese economy, combined with an increased dependence on imports, have provided Canada with substantial new export opportunities. Our principal competitor in the Japanese market is the USA.





## Wood pulp

The principal importing regions for Canadian market pulp are Japan, other Pacific Rim countries, western Europe and the USA (Figure 3.8). Canada's share of the wood pulp market has remained relatively constant over the past 30 years, accounting for more than 30% of total world trade. However, the destination of Canadian wood pulp exports has shifted dramatically (Figure 3.9). In the 1960s, the USA accounted for more than 60% of Canadian exports; over the past decade, it has accounted for less than 46%. The current trend toward a more balanced distribution of Canadian exports to the USA, Europe and Pacific Rim reflects the globalization of the wood pulp market.

As the economy and population of the Pacific Rim region grow, the region's dependence on imports of wood pulp also is growing. Our country is a major competitor in this increasingly important trading zone. Canada has consistently accounted for approximately 35% of the growing Japanese import market and has been able to capture a larger share of the total imports of other Asian economies, such as Korea and Thailand.

Between 1985 and 1994, the USA imported less than 10% of its wood pulp requirements; Canada supplied approximately 86% of these imports. Our large share of the U.S. wood pulp import market is due to three main factors: Canada's proximity to the U.S. market, the fact that many Canadian mills are owned by U.S. multinational corporations that transport pulp produced in Canada to their paper mills in the USA, and Canada's ability to produce high-quality pulp at a competitive price.

Western Europe imports a high percentage of wood pulp. Sweden and Finland are its principal suppliers; a significant, but relatively small percentage of its import requirements are met by Canada.

## Newsprint

As a result of a decline in the competitiveness of Canadian newsprint producers and a restructuring of the global newsprint market, Canada's share of this market has decreased substantially over the past 30 years.

Canada's loss of market share can be attributed partly to an increase in the self-sufficiency of countries in which Canada has historically been a major supplier. For example, the USA's dependence on newsprint imports declined from almost 70% of total consumption between 1965 and 1974, to less than 60% between



1985 and 1994. Similarly, Latin America's dependence on imports declined from almost 80% of consumption in the mid-1960s, to less than 50% in the 1990s (Figure 3.10). Increased domestic capacity in these regions displaced imported newsprint, most of which originated from Canada.

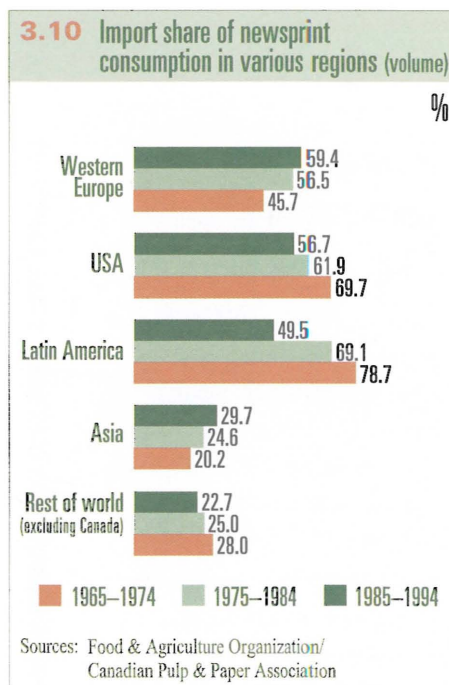
The declining competitive situation of Canada's newsprint manufacturers can be attributed largely to the fact that, during this period, our newsprint industry was unable to attract the capital required to invest in new technology and upgrade older mills. In other countries, new mills were being constructed that were considerably more efficient than the average Canadian mill. Moreover, as discussed later, the recycled-content legislation introduced by many U.S. states presented an additional challenge to Canadian newsprint producers.

### Canada-U.S. trade

With a population that exceeds 250 million, the USA is the world's largest market for forest products. Canada has become its most important trading partner. The high volume of trade between the two countries is reflected in the per capita consumption of forest products (Figure 3.11).

Our principal competitor in the U.S. market is the U.S. domestic forest sector. However, despite the immense size and efficient infrastructure of the U.S. industry, Canada has been successful in competing in certain market segments.

The pattern of trade flows between the two countries is constantly changing in response to various factors, such as reductions in the U.S. commercial timber supply, fluctuations in exchange rates and tariffs, and shifts in the efficiency of U.S. producers relative to foreign suppliers. Long-term structural changes are the result of



### 3.11 Per capita consumption of forest products (1994)

Region	Softwood lumber m <sup>3</sup> / 1 000 people	Wood-based panels m <sup>3</sup> / 1 000 people	Paper & paperboard tonnes/ 1 000 people	Population million
Western Europe	168	88	170	391.4
Germany	196	142	200	81.6
Canada	558	134	202	29.5
USA	420	135	325	263.2
Japan	255	104	232	125.1

Sources: United Nations/Food & Agriculture Organization

## North America's consumption of forest products

Canada and the USA consume significantly more forest products on a per capita basis than do countries in Europe and the Pacific Rim. The following are some of the factors that account for this difference:

- North America possesses huge forest areas, which make wood fibre abundant and easily accessible. As a result, wood has a significant price advantage over more costly building materials, such as cement and steel.
- Wood fibre has desirable insulation features that make it particularly well-suited for use as a building material in northern climates.
- Because timber is a renewable and recyclable resource, wood products have less of an impact on the environment than alternative materials, such as concrete and steel. For example, life-cycle analyses have indicated that the carbon dioxide emissions from the extraction, processing and disposal of steel-based walls are three times higher than from walls produced from timber.

### 3.12 Production levels (1994) and growth (1961–1994)

Product	Canada		USA	
Wood pulp million tonnes	24.7	234%	59.8	263%
Newsprint million tonnes	9.3	153%	6.3	340%
Softwood lumber million m <sup>3</sup>	60.6	327%	77.2	125%

Source: Food & Agriculture Organization

technological advances, evolving societal values and policies, changing consumer tastes, and changes in the availability of raw materials and other production costs (e.g., energy, labour, capital, overhead and transportation).

An important development that has influenced trade patterns between Canada and the USA is the new processing technology adopted by the pulp and paper industry in the U.S. South. This new technology has permitted the utilization of trees species that had previously been in demand only by the lumber industry. Historically, sawlog and pulpwood markets were clearly defined in terms of preferred species and timber size — with limited competition for supply between U.S. lumber producers and pulp and paper producers. Technological change has helped reduce the technical barriers that separated the two markets and has allowed the U.S. pulp and paper industry to compete with the U.S. lumber industry for an increasingly scarce supply of timber, particularly in the U.S. South. The outcome has been an increase in the proportion of U.S. roundwood consumed by pulp, paper and newsprint producers, and a corresponding decline in the proportion consumed by sawmills.

The structural changes that occurred in these three industries in Canada and the USA between 1961 and 1994 are indicated in **Figure 3.12**. Over the 30-year period, the increase in the production of wood pulp and newsprint was significantly higher in the USA, while the increase in the production of softwood lumber was significantly higher in Canada.

Technological change appears to have resulted in a simultaneous shift in the comparative advantage of Canada and the USA in terms of the production of pulp and paper and solid wood products. The competitiveness of Canadian producers of softwood lumber improved, while there was a decline in the competitiveness of Canadian producers of pulp and paper and newsprint. The result was



a reduction in Canada's share of the U.S. newsprint and wood pulp market between 1965 and 1994, and an increase in Canada's share of the U.S. softwood lumber market.

Another development affecting Canada–U.S. trade in forest products is the legislation introduced in some states that requires newspapers to contain a minimum amount of recycled content. Because the majority of Canada's newsprint is exported, Canadian producers must rely on imports of old newspapers from the USA to be able to continue to fill orders in these states. The heavily populated states in the northeastern USA are the principal source of old newspapers. Newsprint producers are concentrated in eastern Canada and the U.S. South and are located approximately the same distance from that source. Therefore, over the short term, the new legislation is not expected to have a significant impact on their relative costs, nor on the distribution of production capacity. However, in the longer term, mills that are more efficient and have lower costs will capture a larger share of the newsprint market. In addition, if new U.S. mills are established close to the supply of old newspapers, which is also the main consumer market for newsprint, the market share of Canadian producers may decline.

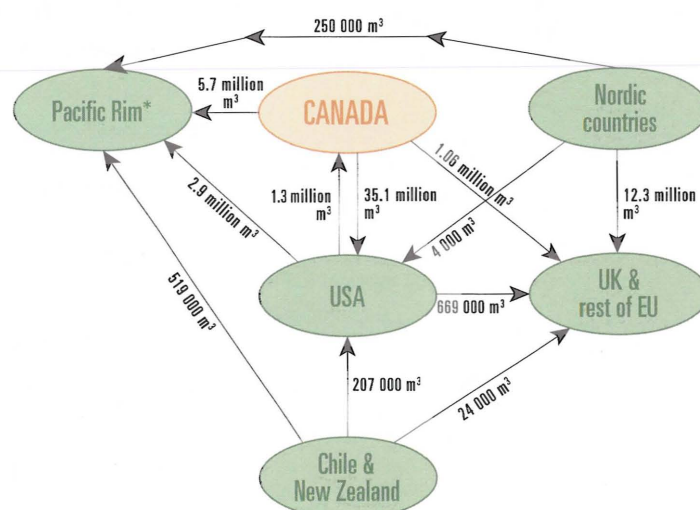
## MAJOR COMPETITORS

### Nordic countries

Canada's northern boreal forest is very similar to the northern boreal forests of Sweden, Finland and Norway, as are its forest product types and grades. (Sweden and Finland account for the large majority of exports from the Nordic countries.) Canada and the Nordic countries compete most actively in the UK and European markets. In recent years, softwood lumber and newsprint from Sweden and Finland have displaced some of the imports from Canada. The Nordic countries export insignificant volumes of softwood lumber, newsprint and wood pulp to the USA and Pacific Rim, where Canada remains the dominant supplier of imports.

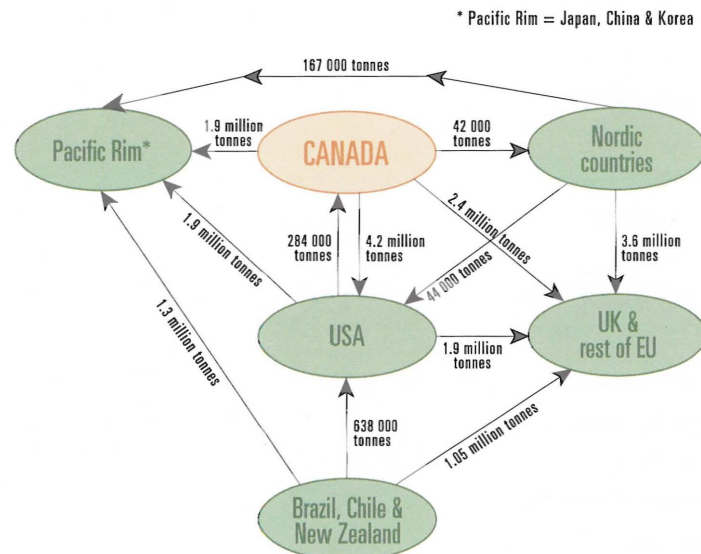
### 3.13 Trade of softwood lumber (1993)

\* Pacific Rim = Japan, China & Korea



Source: Food & Agriculture Organization

### 3.14 Trade of wood pulp (1993)



Source: Food & Agriculture Organization

Europe is Canada's third most important destination for softwood lumber exports (Figure 3.13), and the majority of that softwood lumber is imported by the UK. The Nordic countries are Canada's principal competitors in the European market. Canadian exports of softwood lumber to the UK and the European Union (EU) have been highly variable over the past nine years. For example, Canadian exports grew significantly between 1985 and 1987, peaking at an all-time high of almost 3 million m<sup>3</sup> in 1987. The Nordic countries chose to concentrate on developing their pulp and paper sector during that period, which facilitated Canada's access to the European market. Canadian exports to the UK subsequently started to decline and reached an all-time low of 500 000 m<sup>3</sup> in 1993, mainly as a result of the imposition

of European restrictions on imports of green softwood lumber from North America. (Europe requires that all imported lumber be kiln-dried because it fears that pinewood nematode may spread into its forests.)

Canada also competes with Sweden and Finland in the wood pulp market, principally in western Europe (Figure 3.14). Northern bleached softwood kraft pulp (NBSKP) is a high-quality grade of pulp produced by both Canada and the Nordic countries. Between 1965 and 1993, Canada's share of European imports of wood pulp remained constant.

After the USA, Europe is Canada's second most important market destination for newsprint. Canada exported almost 800 000 tonnes of newsprint to Britain and other EU countries in 1993 (Figure 3.15). Canada's principal competitors in the European market are the Nordic countries. The EU has imposed quotas on Canadian imports of newsprint that can enter the market duty-free, while the Nordic countries — which are now members of the EU — have unrestricted access. The tariff reductions agreed to during the Uruguay Round will result in the elimination of newsprint tariffs by 2003.



## United States

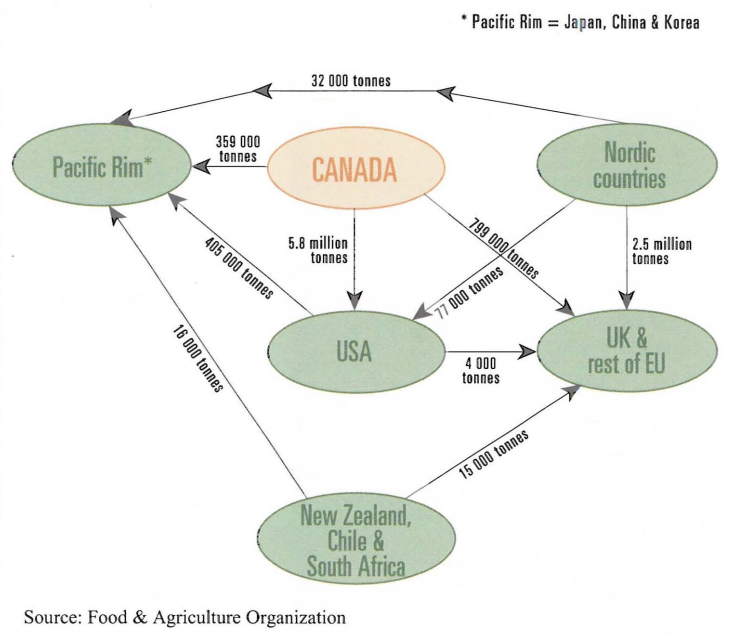
The relationship between producers in Canada and the USA in the U.S. market was reviewed in the previous section. This section will focus on Canada's competition with U.S. producers in the offshore markets of Europe and the Pacific Rim.

Canada and the USA each exported substantial volumes of softwood lumber to the Pacific Rim between 1965 and 1994. Although the volume of exports from Canada to the Pacific Rim was approximately double the volume from the USA, the value of exports from the two countries was similar (Figure 3.13). This is due to the fact that the U.S. exports included a greater proportion of higher priced structural lumber, while the Canadian exports consisted primarily of lower priced framing lumber.

The USA is also one of Canada's major competitors in wood pulp, competing in both the European and Pacific Rim markets. In 1993, the volume of exports to these markets from Canada and the USA was relatively equal (Figure 3.14). Canada's market share, however, has declined during the past two decades. The average U.S. share of global wood pulp exports increased from approximately 15% between 1975 and 1984, to almost 20% between 1985 and 1994. During the same two periods, Canada's share of global wood pulp exports declined from 34% to 32%. This change in relative market share coincides with a higher level of investment in wood pulp capacity in the USA, compared with the level in Canada.

Factors that may have contributed to changes in the relative competitive position of Canadian and U.S. producers include differences between the two countries in government regulations and in corporate investment priorities for environmental protection. Over the past five years, for example, the Canadian pulp and paper industry has made substantial investments in environmental control technologies, which significantly reduced the level of dioxin emissions and the discharge of organic materials into water systems,

### 3.15 Trade of newsprint (1993)



## Factors encouraging Canada — U.S. trade in forest products

Several factors have combined to create a robust environment for trade in forest products between Canada and the USA, including:

- proximity to each other's markets,
- similar construction methods and consumer tastes,
- a high degree of integration between parent firms and subsidiaries in Canada and the USA,
- Canada's reliable and cost-efficient production and transportation infrastructure,
- relatively limited trade barriers in the form of quotas and tariffs, and
- Canada's ability to consistently supply quality products.

but which also incurred high capital costs. In the future, it is uncertain if differences in environmental standards between the two countries will be a significant determinant of the relative cost-competitiveness of Canadian and U.S. pulp and paper producers. The U.S. Environmental Protection Agency is developing a comprehensive set of integrated air- and water-quality regulations, known as the "Cluster Rule," that are expected to come into force in 1996. The anticipated effect of these new regulations will be a set of generally equivalent environmental standards governing producers in both countries.

Between 1991 and 1993, declining world demand and overcapacity in supply resulted in a period of depressed international prices and major financial losses in the Canadian pulp and paper industry. In financial terms, the U.S. industry significantly outperformed the Canadian industry, recording an overall profit while Canadian firms incurred losses. (*See Indicator 8 on page 85.*) Financial analysts have suggested that the main factor that prevented a greater number of bankruptcies in the Canadian industry was the unexpected infusion of significant amounts of new equity capital, possibly due to a general scarcity of stocks in Canadian equity markets and thus limited investment options. The infusion of equity capital in the early 1990s was accompanied by a significant amount of corporate restructuring through mergers, acquisitions and strategic repositioning of product lines. The future of the Canadian pulp and paper industry is now more promising. Prices for market pulp doubled in 1994–1995, although they retreated somewhat in early 1996. The limited expansion in world capacity in recent years, the anticipated growth in global demand, and the leaner cost structure of the Canadian industry suggest that Canada is well positioned to compete with the USA in the world pulp market in the coming years.

## Newly emerging competitors

Attention has focused recently on the potential of new competitors to capture trade opportunities from traditional suppliers in North America and Europe. Emerging competitors include Brazil, Chile, New Zealand, Indonesia, Malaysia, Spain and Portugal. Their comparative advantages generally include large areas of natural forests, high-productivity plantation sites, significant areas of plantations that are approaching maturity, and lower labour costs. Another important factor is the availability of new technologies, which have diminished the grade differences between products produced from northern coniferous forests and those from



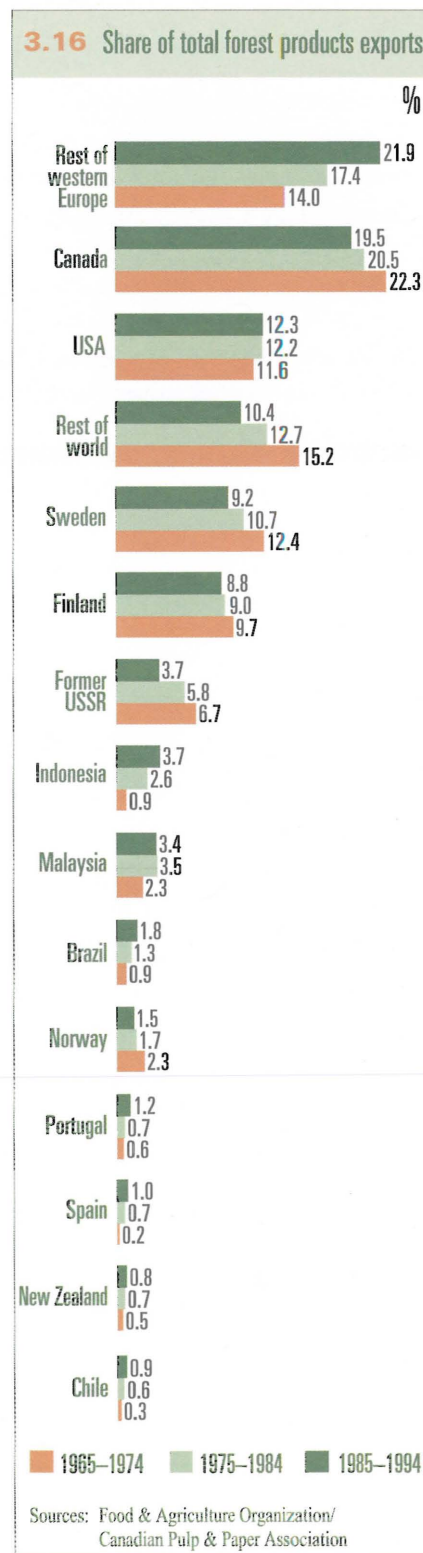
fast-growing plantations in the Southern Hemisphere. Some of the new suppliers, nevertheless, face a number of potential disadvantages: lack of access to investment capital, lower consistency in product quality, less reliability regarding delivery schedules, a less skilled and productive labour force, concerns over deforestation, questions regarding the impacts and productivity of plantations on shallow tropical soils, and in some regions, political instability. A major challenge shared by traditional and emerging suppliers is to demonstrate that their products are produced from sustainably managed forests.

Between 1965 and 1994, virtually all of the new competitors increased their share of global trade in forest products, while the proportion of trade accounted for by Finland, Sweden and Canada declined. However, the combined global market share of these new competitors is still relatively small compared with that of traditional suppliers (Figure 3.16).

Recent trends may not be representative of the longer-term impact of these new competitors in forest products markets. For example, substantial new capacity in pulp and paper production has recently come on line, or is nearing completion, in non-traditional supply regions where significant plantations of eucalyptus and radiata pine are approaching maturity. If these new producers can demonstrate their ability to reliably and consistently deliver products to clients in the major import markets of developed countries, they have the potential to partially displace imports from traditional suppliers.

In Southeast Asia, the countries showing the most promise are Indonesia and Malaysia; New Zealand also has substantial growth potential. Demand for forest products in Southeast Asia is expected to grow at an above-average rate. Consequently, production increases in these countries may be directed toward satisfying the growing demands of the Southeast Asian market and would be less likely to displace traditional suppliers to the U.S. and European markets.

Brazil and Chile are the major emerging competitors in Latin America. Already, they are exporting a substantial volume of wood pulp to the Pacific Rim, Europe and the USA (Figure 3.14). Increased production in these countries has the potential to displace some Canadian imports in the future.



## Russia — A potential supplier of forest products

Canada's forest types are similar to the types of forests found in Russia. With more than 20% of the world's forests and a harvest rate well below the annual growth of its forests, Russia has significant potential as a supplier of forest products. Despite these natural advantages, Russia currently accounts for only 2% of the total value of world forest products exports. Its ability to compete in global markets is hindered by an artificially high exchange rate, inefficient machinery and high energy costs. These factors limit the ability of Russia's forest sector to attract the capital needed to modernize and improve productivity. However, foreign investment in Russia's forest sector is increasing, and there have been several joint ventures between Russian and Japanese firms. In the longer term, the forests of eastern Russia and Siberia offer the greatest development potential, and the Pacific Rim is the most likely destination for exports from these regions.

Spain and Portugal also are emerging as suppliers of wood pulp. The probable market destination for their supply is western Europe. New capacity that is coming on line in these two countries may displace some imports from North America and the Nordic countries.

## SUMMARY AND CONCLUSION

Canada has a proven track record in producing and delivering high-quality forest products on a consistent basis and at a competitive price. These abilities have established Canada as the world's leading exporter of forest products. However, our overall position of dominance in the global marketplace has diminished somewhat in recent years, largely due to a general decline in our share of the U.S. pulp and newsprint markets. To some extent, this decline has been counterbalanced by improvements in the competitiveness of Canadian exporters of softwood lumber into the USA and Japan, and by a general improvement in our exports of market pulp, wood-based panel products, and printing and writing papers to other offshore destinations. Canadian producers are most competitive in wood pulp and in the wood-intensive commodity grades of forest products, such as the SPF lumber used in light framing applications. Promising gains have also been made recently in capturing a larger share of world trade in higher value-added printing and writing papers.

The USA remains Canada's most important market for forest products, due to a combination of factors that provide Canada with a comparative advantage over other exporters. Canada's major competitor in the U.S. market is the U.S. domestic forest sector. In the future, dramatic reductions in timber supply from public lands in the USA will have significant implications for the distribution of U.S. market share between Canadian and U.S. producers.



The UK and western Europe also are important traditional markets for Canadian exports. However, these countries are becoming more self-sufficient in meeting their forest products requirements, and substantial growth of Canadian exports to these markets is unlikely. The main challenge for Canadian producers will be to retain their share of these markets in the face of increasing production in Spain and Portugal, competition from the Nordic countries, and growing pressures to demonstrate that their products originate from sustainably managed forests.

The Pacific Rim market offers substantial export opportunities for Canadian producers; however, competition for this market will be intense as non-traditional suppliers emerge in Indonesia, Malaysia, Chile, Brazil and New Zealand. The competition will be strongest in wood-intensive commodity products, such as market pulp and light framing lumber, which have been the traditional foundation of Canada's forest products exports. A disadvantage facing Canadian producers is that the cost structure of the emerging competitors is typically lower, due to the high productivity of their forest areas and plantations, and their comparatively low wood and labour costs.

The growing Pacific Rim market and the scheduled tariff reductions under the Uruguay Round both create opportunities for Canadian producers to diversify into higher value-added products, such as printing and writing papers and engineered wood products. Assuming that the role of non-traditional suppliers of commodity-grade forest products continues to increase in the global market, it is expected that the mix of Canadian forest products exports will evolve from wood-intensive, low value-added commodity products, to more high value-added products.

As we approach the next century, Canadian exporters will face new trade opportunities and challenges. Changing social values regarding the use and allocation of North American forests will continue to be reflected in land-use and other public policies that affect the availability of timber, the cost of wood, and the competitiveness of Canadian and U.S. producers. Timber-supply constraints and higher wood costs in North America can be expected to translate into higher final product prices and reduced consumption, changes in the distribution of harvesting between private and public lands, continued advances in technology to maximize fibre recovery, and possibly, increased substitution of non-wood building materials, such as aluminum, brick, vinyl and cement.

*A significant development in global forest markets is the emergence of new competitors whose comparative advantages, such as high-productivity plantation sites and lower labour costs, differ significantly from those of traditional suppliers. A major challenge faced by both traditional and emerging producers is the growing obligation to demonstrate that their products originate from sustainably managed forests.*



Public concerns about forests and forest practices have led to growing support from within the industry for independent assessments of forest operations. The aim is to provide purchasers with a form of guarantee that the forest products they buy come from areas that are being managed according to the principles of sustainable forest management.

In early 1994, 23 national and provincial industry associations, representing Canada's entire forest sector, came together as a coalition to ask the Canadian Standards Association (CSA) to develop standards for sustainable forest management in Canada. Work began in June 1994, when the CSA established the Technical Committee on Sustainable Forest Management (SFM). The Committee is made up of 32 representatives from forest companies, governments, academia, science agencies, Aboriginal associations, woodlot

owners, and environmental and other public interest groups.

After consulting with non-governmental organizations across Canada, the CSA released the draft reports of the SFM Technical Committee for public comment. Pilot audits also were conducted to test whether the draft standards were feasible and auditable. The CSA is expected to publish its final report by the end of 1996.

Canada expects to be the first country in the world to establish certification standards for SFM. No other natural resource sector has attempted such a process.

We have interviewed representatives from provincial governments, the forest sector and the public who have

been involved with the SFM certification process. Their different perspectives provide valuable insight into this challenging process.

## PROVINCIAL GOVERNMENTS

### British Columbia

*Don Wright is an Assistant Deputy Minister of British Columbia's (BC) Ministry of Forests. Forests have been crucial to the province's economic and social well-being for more than a century. The BC forest sector provides 200 000 jobs and export revenues that exceed \$14 billion.*

Don Wright supports certification, but feels it should not be viewed as the total solution, nor as the most important element of the solution in terms of achieving world-wide acceptance and implementation of sustainable forestry. An impediment to all certification systems is that there is no universally accepted definition of sustainable forest management — in Canada or



elsewhere. "Everyone is working in good faith to promote sustainable forest management around the world, but the science of conservation ecology and ecosystem management is relatively new. As well, because of wide differences among societies, there are a number of sustainable futures to choose from. The one a particular society chooses to pursue will be based on values, as much as on science." The question of scale adds to the problem of defining sustainability. Some view certification in relation to sustainable ecosystems or large areas, while a number of certification initiatives are looking at individual forest stands. "I do not believe it is an either-or situation." Certification should be applied at all levels, including the level of individual operations or management systems.

Since no one can definitely say what sustainable forest management is, it would be inappropriate to make any certification process mandatory. Certification should be voluntary and market-driven. "Let consumers decide if they are willing to insist on certification and in turn, to pay a premium." On this basis, "The process should not distinguish between products for domestic and international markets, nor between natural and plantation forests, since all forests contribute to global processes." Moreover, certification may be of value only in a few markets where purchasers

demand that imports be certified, and thus need apply only to producers competing in those markets. If certification is market-driven, the question of allowing developing countries and smaller producers additional time to meet new standards becomes less relevant. Consumers in particular forest products markets would become the main factor directly or indirectly influencing those countries or producers.

Mr. Wright believes that governments should not be the driving force behind these efforts, and that they must deal fairly with all prospective certification schemes. The main role of governments should be to help establish common criteria that could provide a foundation to support the



validity and equivalency of different certification programs. Otherwise, there is a risk that certain programs would make it impossible or more difficult for some forests to be certified.

Of particular importance is to avoid the potential to discriminate against poorer countries or countries that have preserved more of their natural forests, and "... to respect the aspirations of the people who live in or near the forest area that may be certified." Mr. Wright also does not want to see a certification program that might work against the broader policy objectives of individual governments. For example, in the past five years, BC has undertaken a major forest-policy reform initiative centered on land-use planning and the development of BC's forest practices code. "We would be very concerned if a certification scheme tried to undo any of that, or if it led forest management in BC in a different direction from what it has already achieved at considerable cost."

## Quebec

*Jacques Robitaille, Associate Deputy Minister of the Quebec Ministry of Natural Resources, has been active in his province's efforts to keep its forest economy strong. A number of large Canadian forest companies are located in Quebec, as are a significant proportion of the private woodlots used for wood and fibre production.*

Jacques Robitaille believes the main factors that incited the certification process in Canada were commercial. But regardless of the original purpose, "I think the final result will be improved forest practices in Canada and a sense of increased responsibility on the part of the industry."

He recognizes the need for agreement on what constitutes sustainable forest management. He also feels that there is much cause for optimism and that the international community is close to achieving consensus. "International initiatives, such as the Earth Summit, the Helsinki Process and the Montreal Process, have started the ball rolling. Even if there are a number of different processes underway to define sustainable forest management, I would say there is a common thread in all of them." Developing an acceptable and practical certification system is a challenge, but one that can be met. Mr. Robitaille emphasizes the

importance of keeping in mind that it is an evolving process, and that it must be allowed to continue to evolve. "We must avoid, at the beginning, developing an overly sophisticated system, one that covers every possible aspect. It would be better to develop a simpler system that focuses on the most important criteria or standards. If we try to do too much too soon, we will diminish our chances of success."

In terms of the role of governments in the process, Mr. Robitaille feels that governments must provide the necessary technical support and must be participants. "It is important that the system be based on consensus and be agreed to by all forest stakeholders — one of which will always be government." He is concerned over what he feels are differences in perspective between the provinces and some of the participants involved in developing the certification

program in Canada. In his view, "It seems clear that certification should not apply only to land areas — which has been advocated by some people — as most of Canada's forest land is a provincial responsibility." He would like to see certification of companies, their forest management practices, as well as the land they are operating on.

He strongly urges that all forest areas in the world be eligible for certification. "It is not the type of forest that is important, but the commitment of the people managing the forest. Certification is basically an agreement to improve forest management — to use practices that are acknowledged as being sustainable according to recognized criteria. When you talk of certification, it is a commitment to the future." Certification may not be applicable to all countries at the beginning, but it should become universally accessible over time. As such, it should recognize

## Canadian Standards Association registration process

Since the Canadian Standards Association (CSA) was established almost 80 years ago, it has developed standards and certification programs in more than 35 fields. Efforts to establish a national framework for registration of Sustainable Forest Management (SFM) began in 1994. Unlike eco-labeling programs, the standards being developed do not apply to consumer products at the retail level. Once forest areas and operations are registered as meeting the SFM specifications, manufacturers will be able to verify and demonstrate that their wood supply is from well-managed forests. One feature of the SFM standards is that they will be consistent with the International Organization for Standardization (ISO) 14 000 Environmental Management System. The SFM committee has gone beyond the ISO 14 000 standards to include requirements for public participation, local level indicators, and field evaluations of management performance. A key requirement will be third-party audits. The basis of the SFM system is the six Canadian criteria for sustainable forest management that were adopted in 1995 by the Canadian Council of Forest Ministers.



that even the poorest countries — as well as the smallest producers of forest products — should try to improve their forest practices. Whether they are allowed a phase-in period will depend on how the various certification systems develop. “However, those who make the effort to be certified are going to want to be recognized right away.”

## FOREST SECTOR

*Paul Perkins is Vice-President of Marketing and Corporate Planning for one of Canada's largest forest companies, Weyerhaeuser of Canada Ltd. The company has manufacturing operations in BC, Alberta and Saskatchewan, and sells approximately 75% of its production as exports. Weyerhaeuser has been actively supporting the CSA certification process, as have many other Canadian forest companies.*

Paul Perkins emphasizes the industry's support of the CSA process. “We need to give the world a sense of confidence that we are doing a good job.” The industry perceives certification as a trade issue, although it will not necessarily lead to more fair or open trade. “The pursuit of a level playing field at the international level is sort of like the Holy Grail, but this is one step we can take that will help.” Mr. Perkins feels that many people in the industry realize

that certification alone will neither improve credibility nor create a better understanding of Canadian forest practices. But certification can certainly contribute to this process. “One of its main contributions may be as a further step in the evolution of public involvement in forest management.” Although it is a daunting task, he believes it is imperative to define sustainability at the level of individual communities, “... to allow local residents to decide which values will carry weight. I don't think it is well understood that this is what we should be working toward.”

An important starting point is agreement on what the core elements should be. He thinks that core measurable elements, such as soil and water quality and the preservation of biological diversity, can be applied to all forests. If certification is accomplished in the way Canada is heading — toward internationally agreed-upon elements tailored to local values — then the process need not discriminate against developing countries or small producers. “The process of certification should also be flexible, to allow the weight assigned to non-core values or targets to change over time. A developing country could place more weight on social or economic standards for the first 30 years, and gradually shift the balance of its focus in later years.” With respect to Canada, Mr. Perkins

## CSA pilot studies

The CSA specifications that are being developed by the SFM Technical Committee require independent audits of field performance. Recently, the CSA Technical Committee undertook six pilot studies to test the practicality of the draft standards. The sites (one each in BC, Alberta, Ontario and New Brunswick, and two in Quebec) were chosen to reflect the various forest types found in Canada and the different forest operations. For example, the pilot study in New Brunswick dealt specifically with private woodlots. Each site was evaluated by six auditors. The results of these pilot studies, along with the comments obtained from the public review process that was completed in March 1996, will be incorporated into the Committee's final draft report to the CSA.

believes that governments must be fully involved in the process for a number of reasons: they manage more than 90% of Canada's forest land, they regulate forest practices, and they are the main players in trade discussions and international relations.

Mr. Perkins emphasizes that the goal of the CSA process is to certify management practices, not products. “Placing claims on forest products is not where we want to go.

The answer is in demonstrating to the public that we really are managing forests against broad principles and that we're doing it well. That is where the third-party audit — the actual process of certification, which is not tied to a product — can provide an answer." Moreover, product labeling is fraught with theoretical and practical problems. "If we start certifying forest products, then we should look at all the other competing products, such as steel and aluminum, and apply the same criteria to those products. Certification should not apply just to forest products."

A condition for success is that common, fundamental principles must be adopted by all systems of certification. "If there are too many competing approaches, you will not be seeking continuous improvements or better science; you will turn it into another way of seeking commercial advantage." Mr. Perkins identifies high standards for the auditing teams as another factor that is necessary for the success of certification — to ensure they are composed of highly qualified professionals with the right mix of expertise, including water and soil experts and biologists. "The sphere of technical knowledge to be applied will be significant and should not be taken lightly. It is too important to the long-term success of certification."

He cautions that we must approach this challenge with patience. Patience is needed to ensure that the standards reflect good science, resource values that each community recognizes, and worldwide acceptance. "It is a process that is constantly evolving. A standardized system cannot be achieved overnight."

## CONSUMERS

*Jenny Hillard is the consumer representative on the CSA Technical Committee on Sustainable Forest Management. Ms. Hillard is a champion for consumer interests regarding sustainable development and environmental practices. She has chaired committees under the Manitoba Round Table on the Environment and Economy, and has served on a number of task forces under the National Round Table on the Environment and Economy.*

Jenny Hillard feels that certification offers considerable promise. "In the international arena, it can hopefully correct a lot of the misinformation that is out there on Canadian forestry, and it will encourage change in Canada in areas where companies are not carrying out the best practices."

Ms. Hillard does not think the end result of the CSA process should lead to the development of consumer labels at the retail level.

## International Organization for Standardization

The International Organization for Standardization (ISO) was established in 1947. ISO is a worldwide federation of national standards bodies from 90 countries. Its principle aim is to improve the exchange of goods and services between countries. As is the case with CSA process, the ISO has also developed standards concerned with systems rather than products. The best known is ISO 9000 (quality management systems). Recently, ISO published a new standard for environmental management systems known as 14 000.

"I don't think anyone could make a claim at this time that would be verifiable and meaningful for the consumer. If you start making claims that are in any way questionable, you destroy the possibility of establishing a good system in the future." The usefulness of certification is at the wholesale level, for sales or exports of pulp to a paper producer, for example. In this case, the claim that the pulp comes from a forest area that has been registered as being sustainably managed could be verified. She underlines that the immediate emphasis must be on ensuring that the certification system is



credible and verifiable, and not on its possibilities as a marketing tool. "I would hate to see forest products involved in the same hodgepodge of competing claims that are made by so many of the products on our grocery shelves. The CSA system has to lead to something that people can count on."

Another reason why she would like to see the focus of the CSA program kept at the wholesale level is the evidence indicating that many consumers are skeptical of environmental labeling and disregard these claims. Also, you cannot label a product until the chain of custody — the ability to trace the origin of the product — has been resolved. From a consumer viewpoint, a second issue involves the environmental life-cycle of the product. "The sum of the environmental impacts of the product before it reaches the consumer is what is important."

A major concern is what she believes is the misuse of the term "certification" to describe the CSA and similar processes. She believes that the term is a misnomer and is creating confusion. "Certification" is a term commonly applied to product labeling, whereas the CSA process is working toward establishing a registration system. Under this system, forest management operations can apply to be registered as having met the CSA requirements. "I am

concerned that the international environmental community is misinterpreting the process and objectives of certification because of the tendency to equate 'certification' with 'product labeling'."

Jenny Hillard acknowledges that the current process of developing a credible certification program is very difficult. "We're going to be criticized and mistakes will be made." She adds that the process is to be commended nonetheless. "This is the first natural resource industry to attempt anything like this. It's a tremendous task. People in cities often can be critical, and they don't always understand how much we depend on our resource industries or realize what would happen without the forest industries."

## PRIVATE FORESTS

*Peter deMarsh is the President of the Canadian Federation of Woodlot Owners and is an associate member of the CSA Technical Committee on SFM. The Federation represents woodlot owners, as well as nine provincial associations. A considerable portion of timber from private woodlots is sold to processors for pulp or lumber production.*

Mr. deMarsh highlights the fact that there are 450 000 woodlot owners across Canada and that the use of their woodlots varies

widely. Many of these woodlots are used primarily for producing timber, while others are mainly of aesthetic, conservation or recreational value. Woodlot owners also hold widely different opinions on certification. "Some perceive it as an intrusion into their personal decision making, an unwelcome challenge that will have to be responded to; others view it as a very positive opportunity that will reinforce their current efforts to improve their forest practices."

Mr. deMarsh senses that across the country, "Woodlot owners are increasingly regarding their forest practices in light of their broader responsibility to the community." He does not believe that market or trade benefits should be the driving

## Forest Stewardship Council

The Forest Stewardship Council (FSC) is an international non-governmental organization that was established in 1993 with the support of the World Wildlife Fund. The goal of the FSC is to provide consumers with information about forest products and their sources through certification. Members include representatives of environmental groups, indigenous peoples, certification organizations and other non-governmental groups from 25 countries.

force behind certification. The end goal of woodlot owners is not only the outcome of certification itself, but the improvements made in pursuit of certification.

A factor that will affect the level of participation of woodlot owners in certification programs is the scale of their operations. "We operate differently than forest companies, and if we are to be audited against the same standards, there must be some flexibility." It is usually not possible to determine sustainable harvest levels on a small stand, and there are values (e.g., biodiversity and wildlife habitat) that cannot be applied to small properties. Mr. deMarsh is pleased that the SFM standards being developed in Canada will allow woodlot owners who want to apply for certification to be grouped by regions for the purposes of auditing. He identifies other compelling reasons for a regional approach to the certification of woodlots. "Across eastern Canada, processors buy from thousands of woodlot owners. If these processors state that they will be purchasing certified timber as of a particular date, there simply will not be enough auditors to meet the demand. In addition, the cost to the individual woodlot owners will be prohibitive."

Mr. deMarsh believes that certification must be awarded on the basis of forest regions or

ecological areas, combined with the forest management system used by the applicant. However, from the perspective of private woodlot owners, "We need assurance that government agencies will provide a supporting role in these areas, such as in fire management and wildlife conservation, as is the case on Crown lands." While these larger issues must be addressed in any certification system, woodlot owners do not have the required resources.

Although Mr. deMarsh supports the CSA process, he believes that worldwide agreement on the basic criteria for sustainable forest management is a prerequisite. If no agreement can be reached, a chaotic situation of competing claims and standards will develop, which will not serve anyone's purpose.

Mr. deMarsh does not know if there is strong evidence to support the idea that consumers will pay higher prices for certified forest products. But he feels there is inadequate awareness among consumers — most of whom live far from rural communities — that there are costs associated with certification. "While one may wholeheartedly support the environmental objectives, we would like the public to recognize that it costs money, it's not free." He hopes that educating the urban consumer to this fact will be part of the process.

## CHURCHES AND CORPORATE RESPONSIBILITY

*James Sullivan is the Research Associate responsible for environment and forest issues with the Task Force on Churches and Corporate Responsibility. The Task Force is a national research and advocacy coalition whose membership includes the major denominations in Canada and many smaller church organizations. Mr. Sullivan is also a member of the CSA Technical Committee on SFM, and serves on the Board of Directors of the FSC.*

Mr. Sullivan views timber certification as workable, but cautions that it will not provide a universal solution. "It will not resolve all of the environmental issues related to forestry, only some. We will have to use other mechanisms to solve the others." When asked if he believes there is an accepted definition of sustainable forest management on which to base certification standards, Mr. Sullivan replied that it would be premature to equate certification with the term "sustainable." "Sustainable is a measure of performance, one that we can only assess once the data is in. While there is general agreement on the steps we have to take, we may have to wait possibly one, six or ten rotations of the forest before



we'll know whether these practices are truly sustainable."

Mr. Sullivan believes that international labeling schemes for forest products are possible, pointing out that the FSC has recently put labeled forest products on the market that meet FSC standards. Certification systems, however, need to be developed in a way that facilitates tracing a product. "I think that tracing the chain of custody of a product from the source to the consumer is a difficult challenge. But I think it's absolutely necessary."

Certification should occur "... at the corporate level — the level of ownership and control — because that is where most of the management decisions are taken." Certification should also be open to anyone who requests it, and it should apply to all forests — boreal

forests or rainforests, Crown land forests or private woodlots. In his view, the federal government should be able to apply for certification for Banff National Park if it wanted to. "For any certification system to function well, it must be voluntarily applicable in any part of the world and to any type of forest." The goal should be to certify the largest volume of products under a global system that sets common performance levels in every country, taking into account ecological and social differences. If countries and organizations establish their own standards, it will be a recipe for trade barriers. "A fundamental basis is to be able to know that when you're buying a certified product, wherever it came from, it's meeting the same minimum benchmarks."

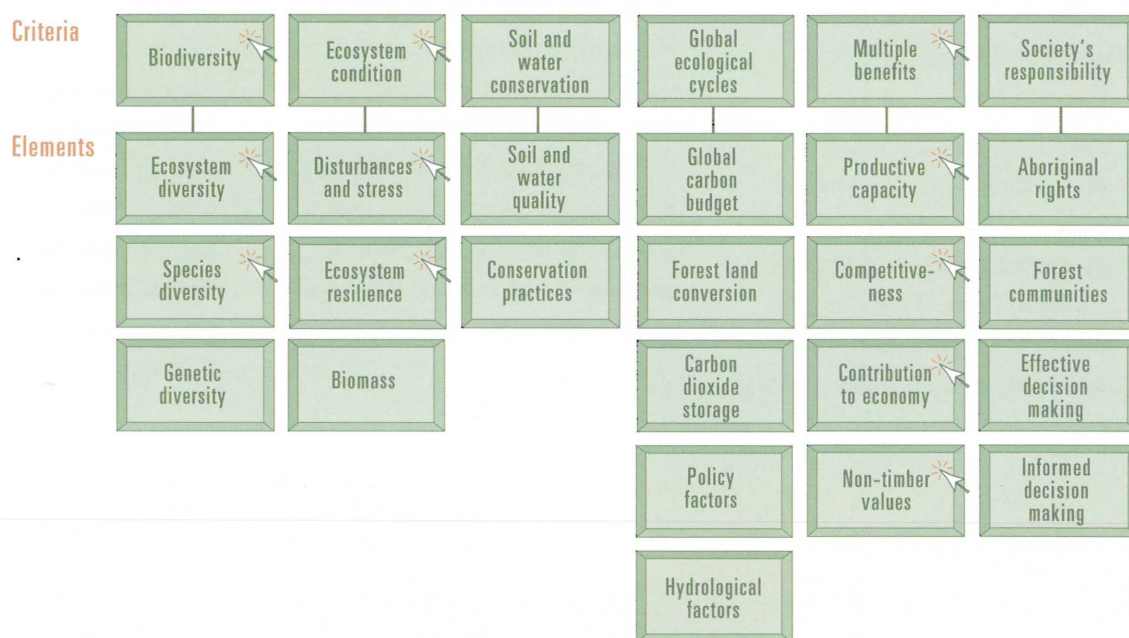
For a certification system to be successful, Mr. Sullivan stressed that it should not be an environmental labeling program, but rather a dynamic system that includes performance-based environmental, social and economic criteria that reflect the effects on the forest, the surrounding community and the economy. "Then we'll be able to move on to what we call 'sustainability' in the future." Mr. Sullivan further emphasized the importance of ensuring a balanced representation of interests in setting standards for sustainable forest management. "It's essential to have the participation of as many of the affected parties as possible. We can't assume that this will happen, or that those voices will be listened to, unless we put in place systems that require that they be listened to."

## CSA and FSC


There are important similarities between the objectives and approaches of the CSA and FSC. The processes of both organizations promote better forest management and require third-party audits. There are also notable differences. The FSC process focuses on product labeling and the tracking of forest products to their origin — the so-called chain of custody. The CSA registration program involves the assessment of a company's ability to manage in an environmentally sound manner. It includes performance indicators tailored to specific sites and does not involve tracing products. Another difference is the basis for FSC certification, which is a series of principles that were developed independently by the FSC to apply to all forests (tropical, temperate and boreal). The CSA SFM system is based on the Canadian criteria for sustainable forest management and ISO 14 000, and concerns itself with the quality of management systems, not the quality of products per se. Recently, members of the CSA Technical Committee met with FSC representatives at their head office in Oaxaca, Mexico, to discuss the potential for alignment between the two processes.

# Measuring Forest Sustainability

The Canadian approach



The Canadian Criteria and Indicators Framework identifies six principal sustainable forest management criteria. Each criteria is divided into a number of elements, which are then subdivided into indicators.

An  indicates the topics covered in this year's report.

# F

our years ago, in *The State of Canada's Forests 1991*, we introduced a series of preliminary indicators to help track the nation's progress in achieving sustainable development. In 1995, the Canadian Council of Forest Ministers (CCFM) approved a national framework of criteria and indicators that had been developed through a comprehensive process of consultation involving representatives from governments, industry, environmental organizations, Aboriginal groups, academia and other interest groups. A science panel was created to ensure that the indicators are scientifically based and reflect the best knowledge available. Canada's framework identifies the factors to be measured to determine forest sustainability.



This chapter presents a series of performance indicators based on the Canadian framework. It is not possible to report on all of the indicators at this time because the data for some do not yet exist. The CCFM will be developing an implementation plan to identify gaps in the data and to set priorities for collection. The indicators in *The State of Canada's Forests* fall into two categories: indicators that are reported on annually, and indicators that do not lend themselves to annual measurement — referred to as “theme indicators.”

The theme indicators vary from year to year. Last year's report focused on environmental aspects of sustainable forest development. This report features selected economic indicators, and next year's report will concentrate on some of the social dimensions.



## CONSERVING BIODIVERSITY

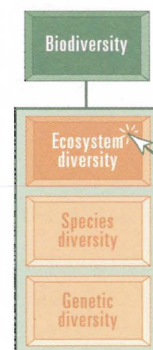
*Conservation of biological diversity is important to ensure the viability, resiliency and sustainability of ecosystems. Biodiversity conservation generally is considered at three separate levels: ecosystem diversity, species diversity and genetic diversity.*

### 1 PROTECTED AREAS (ANNUAL INDICATOR) *Are representative areas of Canada's forests being preserved?*

“Ecosystem diversity” refers to the variety, type, age and condition of forests across the landscape. One means of measuring ecosystem diversity is to consider the extent of protected areas.

Federal and provincial governments have pledged to set aside 12% of the country's total area. Over the past three decades, the protected area in Canada has almost quadrupled — from 22.1 million hectares in 1960, to the current figure of 78.8 million hectares. Protected areas now account for more than 7.9% of Canada's total land and fresh water.

The National Forest Strategy commits the federal, provincial and territorial governments to working toward completing a network of protected areas by 2000 that are representative of Canada's forests. Within the forested regions of Canada, an estimated 22.8 million hectares are protected by law from harvesting. In addition, many



*Canada has assumed a leadership role in international discussions to promote consensus on the sustainable management of temperate and boreal forests. Under the “Montreal Process,” efforts are underway to implement criteria and indicators within individual countries.*

*In recent years, innovative approaches to wildlife management have been developed and are being tested in many regions across Canada.*

forests on shallow or rocky soil, on steep slopes, or along lakes and waterways are excluded from harvesting by provincial policy. The total area of the “protection forests” within Canada’s commercial forests is estimated at 27.5 million hectares. All told, more than 50 million hectares of forest land (12% of Canada’s total forest land) are protected by either policy or legislation.

*The Endangered Spaces Progress Report 1995–1996*, published by the World Wildlife Fund (WWF), provides a comprehensive summary of the status of Canada’s protected areas. In the opening message of its report, the WWF states, “The good news: we saw more improvement in 1995–1996 than we have seen since this 10-year campaign was launched in 1989. The bad news: at this rate, we’ll still never reach our goal.”

## World Wildlife Fund report on endangered spaces

### Federal government

- The national parks system is 56% complete, with 22 of 39 regions represented; 17 regions remain unrepresented. Less than 10% of provincial/territorial natural regions are adequately represented by protected areas.

### Provincial governments

- Over the past year, significant advancements have been made in **Nova Scotia, Alberta** and **British Columbia**.
- No new protected areas were designated over the past year in **Prince Edward Island, New Brunswick** and **Manitoba**. However, Prince Edward Island’s protected areas system is now considered to be approximately one-third complete.
- **Newfoundland and Labrador** — One new ecological reserve (Baccalieu Island) was created, and a significant jack pine site received provisional ecological reserve status.
- **Nova Scotia** — With the designation of 31 sites recommended by a public review committee, more than one-third of Nova Scotia’s natural regions were adequately or moderately represented in 1995. Several more were considered partially represented, including many of the larger regions. The 31 sites will increase the protected area from 2.5% to 8% of the province’s landbase.
- **Quebec** — Protected sites created during the past year include the expansion of Pointe-Heath Reserve, Mont-Valin Provincial Park, Grand-Lac-Salé, Boisé-des-Muir, Fernald and Pointe-Platon ecological reserves.
- **Ontario** — In March 1995, 18 sites (amounting to 733 236 hectares) were approved for protection, but have yet to be regulated under the Parks and Public Lands Act. The Rouge River Valley (east of Toronto) has been set aside as Canada’s largest urban park.
- **Saskatchewan** — The provincial government has identified the development of a Representative Areas Network as a top priority. The province’s Wildlife Habitat Protection Act provides for science-based assessments to be conducted to determine the ecological representation of protected areas. Initiatives are underway to identify and negotiate potential sites in the forested areas in the boreal lowland and boreal transition ecoregions.

*(continued on page 75)*



## World Wildlife Fund report on endangered spaces *(continued from page 74)*

- **Alberta** — The Willmore Wilderness Park Act was amended to prohibit industrial development within the park's boundaries, and two new wilderness parks — the Wild Kakua and Elbow Sheep — were created. Overall, 688 443 hectares were added to the protected areas network in Alberta.
- **British Columbia** — Since 1992, BC has created more than 160 provincial parks, protecting 2.9 million hectares. Sites protected in 1995–1996 include the Skagit Valley, Tetrahedron, the Stein Valley, and a system of Lower Mainland parks that quadruple the area protected in the region surrounding Vancouver.

# 2

## FOREST WILDLIFE

(ANNUAL INDICATOR)

### What is the status of plant and animal species in Canada's forests?

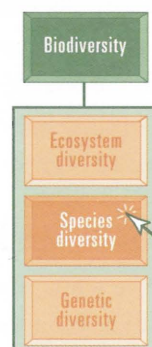
There is growing recognition of the importance of maintaining biodiversity — the total variety of living things on Earth. This vast web of organisms has enabled our forests to evolve over thousands of years and adapt to such disturbances as fires, insects and disease.

As we indicated in last year's report, keeping track of the estimated 200 000 species found in Canada's forests is almost impossible. Not only because of the sheer number of species, but also because most inventories concentrate on plants, animals and fish, and do not include insects, fungi and other microorganisms.

Occasionally, something happens to disturb the balance between different species, triggering a ripple effect in the forest ecosystem and putting species at risk. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the status of Canada's wildlife and assigns the species to one of the following categories: vulnerable, threatened, endangered, extirpated or extinct. In 1994–1995, three forest-dependent species were added to COSEWIC's list of species at risk: the Queen Charlotte goshawk, white wood aster and cryptic paw lichen. *(Figure 4.2.1 on page 77 shows the total number of forest-dependent species at risk.)*

### Queen Charlotte goshawk (vulnerable)

The Queen Charlotte goshawk is darker in colour and slightly smaller than its close neighbour, the northern goshawk. The Queen Charlotte goshawk is very rare. Three nest sites have been reported on the



“Approximately 100 protected areas were established in Canada in 1995–1996, totalling 2.5 million hectares. These new areas improved the ecological representation in approximately 60 natural regions of the country.”

— World Wildlife Fund report



**Queen Charlotte goshawk**

Queen Charlotte Islands and six on Vancouver Island. The goshawk prefers to nest in large, unfragmented stands of mature forests with closed canopy cover. The dense vegetation in such stands offers ideal breeding habitat by providing cover and protection from predators, as well as milder climatic conditions. This species also prefers moderate-to-gentle slopes with a northeastern exposure; nesting sites generally are found on the lower third of these slopes. Its diet includes crows, red squirrels, Steller's jays, varied thrushes, hairy woodpeckers and blue grouse.

The British Columbia (BC) Ministry of Environment has added the Queen Charlotte goshawk to the provincial "red list." It is threatened by human disturbance, poaching, pesticides, declines in the abundance of prey, and loss of suitable nesting trees and foraging habitat due to timber harvesting. A status of "vulnerable" was assigned to the goshawk in 1995.

#### **White wood aster (threatened)**



**White wood aster**

The white wood aster is a perennial herb 20–100 cm high. The species is common throughout the Appalachian Mountains in the USA, but Canada is the northern limit of its range. It currently is known to grow in only five sites in Quebec and three in Ontario. The Quebec sites fall within the Upper St. Lawrence forest section of the Great Lakes–St. Lawrence forest region. The dominant forest cover in these sites is sugar maple and American beech, interspersed with red maple, yellow birch, basswood, white ash, largetooth aspen and various species of oak. The Ontario sites are in the Niagara Peninsula area of Canada's deciduous forest region, in the Carolinian forests.

The white wood aster has declined in recent decades, largely due to the habitat loss that has resulted from human disturbances and natural changes in the forest ecosystem. COSEWIC designated the Canadian population of the white wood aster as a "threatened" species in 1995.

#### **Cryptic paw lichen (vulnerable)**



**Cryptic paw lichen**

The cryptic paw lichen measures approximately 3–7 cm in diameter and is found only at elevations below 1 200 m. The North American distribution of the cryptic paw lichen is limited to old-growth forests in the coastal western hemlock and interior cedar-hemlock zones of Canada and the western United States. On the coast, the lichen generally is found high up in old trees on medium-sized branches. In inland sites, it usually is found within 2–3 m of the ground. To date, 28 sites have been identified in North America; 21 of these sites are



#### 4.2.1 Forest dwelling species at risk\*

	Mammals	Birds	Plants
<b>Endangered</b>	Wolverine Eastern cougar Vancouver Island marmot	Northern bobwhite Northern spotted owl Acadian flycatcher Whooping crane Kirtland's warbler	Large whorled pogonia Wood poppy Small whorled pogonia Cucumber tree Heart-leaved plantain Pink milkwort Spotted wintergreen Hoary mountain-mint Small white lady's slipper Furbish's lousewort Southern maidenhair fern
<b>Threatened</b>	Woodland caribou <i>(Gaspé population)</i> Wood bison Newfoundland pine marten	Marbled murrelet Hooded warbler Yellow-breasted chat <i>(Okanagan population)</i> White-headed woodpecker	Red mulberry Purple twayblade Kentucky coffee tree Nodding pogonia Bird's-foot violet Blunt-lobed woodsia Sweet pepperbush Ginseng Golden seal Round-leaved greenbrier Deerberry Mosquito fern American chestnut van Brunt's Jacob's ladder Blue ash <b>White wood aster</b>
<b>Vulnerable</b>	Fringed myotis bat Spotted bat Keen's long-eared bat Pallid bat Southern flying squirrel Nuttall's cottontail rabbit <i>(Okanagan population)</i> Gaspé shrew Eastern mole Grey fox Grizzly bear Woodland caribou <i>(Western population)</i>	Cerulean warbler Prairie warbler Ancient murrelet Flammulated owl Prothonotary warbler Cooper's hawk Louisiana waterthrush Great grey owl Yellow-breasted chat <i>(Eastern population)</i> <b>Queen Charlotte goshawk</b>	Phantom orchid Wild hyacinth Shumard oak Western silver-leaf aster Swamp rose mallow Broad beech-fern False rue-anemone Few-flowered club-rush Green dragon Hop tree American columbo <b>Cryptic paw lichen</b>

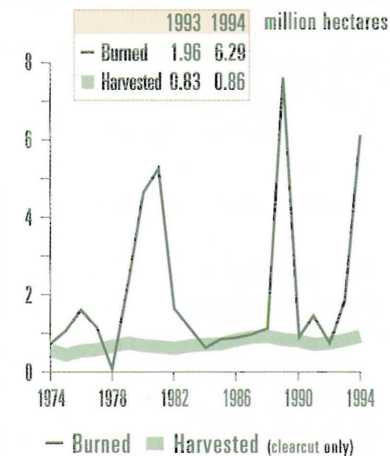
\* Species added to the list in 1995 are in bold.

Source: Committee on the Status of Endangered Wildlife in Canada (COSEWIC)

in BC. The total area colonized by this species is currently estimated at 100 hectares.

As a result of its restricted distribution in North America, its specialized ecological requirements, and the risk of a further decline in its population levels due to logging, COSEWIC designated the cryptic paw lichen as “vulnerable” in 1995.

#### 4.3.1 Areas burned and harvested



Source: Canadian Forest Service



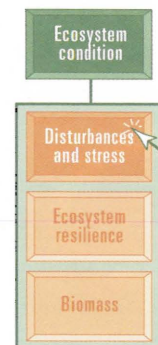
### MAINTAINING ECOSYSTEM HEALTH

Healthy forest ecosystems maintain their integrity, resiliency and productive capacity. The integrity of ecosystems involves sustaining a wide range of ecological processes whereby plants, animals, microorganisms, soil, water and air are constantly interacting. These processes form soils, recycle nutrients, store carbon, clean water, and fulfill other functions essential to life. The natural resiliency of an ecosystem enables it to adapt to and recover from disturbances and stress. The “productive capacity” of an ecosystem refers to its ability to produce and sustain life.

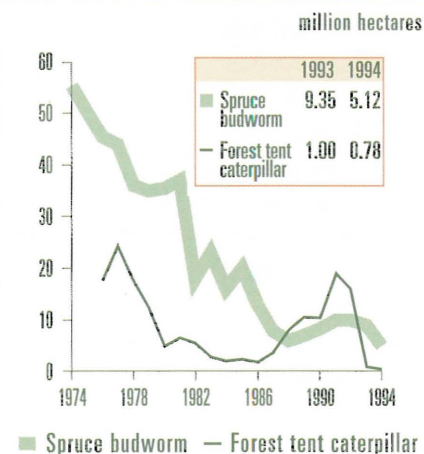
## 3 RATES OF DISTURBANCE (ANNUAL INDICATOR) Are the natural dynamics of forests changing?

Forests are the product of thousands of years of evolution and adaptation to disturbances and stress. Significant changes in the level or pattern of natural disturbances may reflect a change in the health of ecosystems. Natural disturbances include fire, wind, insects, disease and extreme weather conditions. But forest ecosystems must also adapt to human activities, such as harvesting, urbanization and recreational use, and to other pressures, such as pollution, that result from human activities.

Healthy ecosystems are able to tolerate periodic disturbances; the renewal of some forests, such as the boreal, depends on these disturbances. Fire and insects remain the dominant causes of disturbance in most of Canada’s forests. However, there are significant regional variations. Insects are the major disturbance in most forests of eastern Canada; fire is the most important disturbance



#### 4.3.2 Areas infested with spruce budworm and forest tent caterpillar



Source: Canadian Forest Service



in the western boreal forest; and harvesting is the predominant form of disturbance in BC's coastal forest.

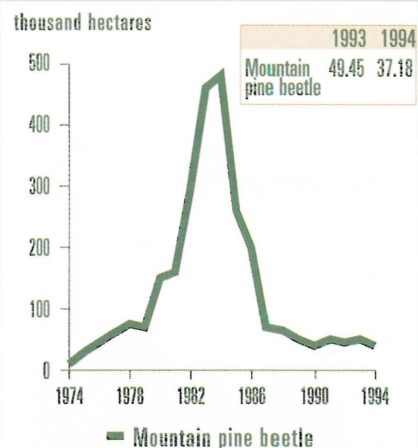
The area burned by forest fires varies greatly each year. For example, the area burned in 1994 (6.3 million hectares) was more than double the annual average recorded over the past 10 years (2.5 million hectares) (Figure 4.3.1). During the 1995 fire season — the second worst year on record — 7.25 million hectares of forest burned. Several factors were cited, including extremely dry conditions, fuel build-up in the forest, as well as limited fire suppression in remote areas.

The predominant insect pests in Canada's forests are spruce budworm, jack pine budworm, hemlock looper, mountain pine beetle, gypsy moth and forest tent caterpillar. The population dynamics of these species varies greatly, as does the extent and nature of their impacts on forests. Figure 4.3.2 shows the area affected by moderate-to-severe defoliation by spruce budworm and forest tent caterpillar. Spruce budworm occurs predominantly in the forest regions east of the Manitoba-Ontario border. The area with moderate-to-severe defoliation in 1994 (5.1 million hectares) was approximately 4 million hectares smaller than the area defoliated in 1993. In fact, it was the smallest area to be affected in 21 years (1974–1994).

One of the more prevalent insects in western Canada is the mountain pine beetle. Its principal host is mature lodgepole pine in even-aged stands in the montane forest regions of BC and Alberta. Unlike the spruce budworm, the mountain pine beetle does not defoliate trees — it kills them by laying eggs under their bark and depositing a fungus that clogs the trees and blocks the flow of sap. Figure 4.3.3 shows that the area with significant mortality from mountain pine beetle attacks in 1994 (37 000 hectares) was at least 12 000 hectares smaller than the area reported in 1993.

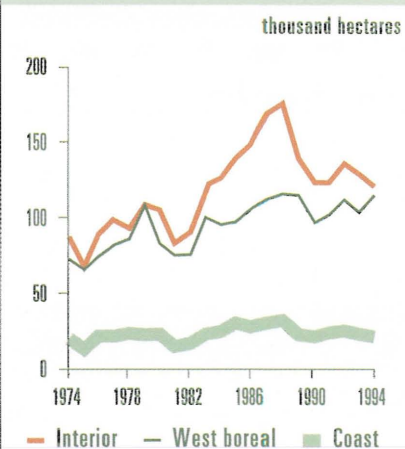
Generally, there is more annual variation in the area affected by natural disturbances than in the area harvested (Figure 4.3.1). Overall, the area affected by clearcut harvesting in 1994 increased by 35 000 hectares over 1993 levels, to 860 000 hectares. Figures 4.3.4 and 4.3.5 show the distribution of the harvest on a regional basis. The area clearcut continued to decline in the BC coast and Interior regions, but increased in the eastern and western boreal forest regions, the Great Lakes – St. Lawrence forest region and the Acadian forest region. The increase in the area harvested reflects increased demand for Canadian forest products by domestic and foreign consumers. The reduction in the area harvested in BC reflects changes in forest policies, withdrawals of land from the commercial forest landbase, and reductions in the annual allowable cut.

#### 4.3.3 Area infested with mountain pine beetle



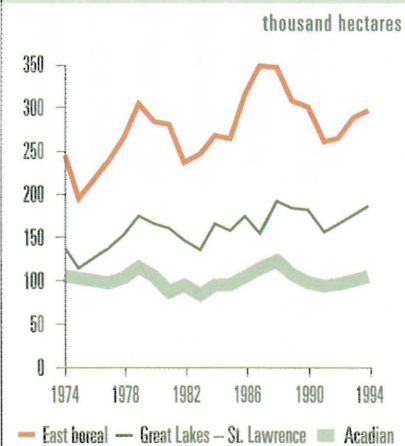
Source: Canadian Forest Service

#### 4.3.4 Clearcut harvest by region



Source: Canadian Forest Service

#### 4.3.5 Clearcut harvest by region

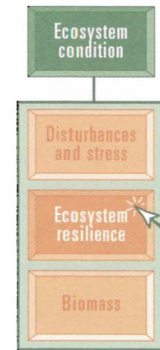


Source: Canadian Forest Service

# 4

## REGENERATION (ANNUAL INDICATOR)

### Are harvested lands regenerating?



The regeneration of forests after harvesting is an important public issue and is one indicator of the capacity of forest ecosystems to recover from disturbances. No new regeneration data are available for this year's report. Instead, we describe the trends in the area harvested and the types of harvesting systems used on provincial Crown lands.

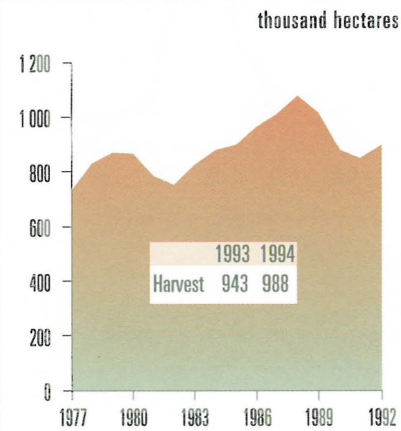
Figure 4.4.1 shows that, over the past two decades, there has been a trend toward a slight increase in the area harvested annually. For example, during the recession of the mid-1970s, the annual area harvested was approximately 700 000 hectares. During the early 1990s, the area harvested annually from Crown lands averaged roughly 900 000 hectares.

Harvesting systems have changed dramatically over the past two decades. Figure 4.4.2 shows that, although clearcutting is still the predominant system of harvesting, the use of selection cutting is increasing. Selection cutting is commonly used in forest stands that contain trees of different sizes and ages. This method of harvesting enables forest managers to create or maintain stands with diverse age-class structures, containing trees of different sizes.

Although the use of selection cutting is increasing, it is not expected to completely replace clearcutting. Much of Canada's northern coniferous forests comprise species that regenerated on a site following a major disturbance, such as fire, and then grew to form stands of a uniform age. Clearcutting is the most cost-effective method of harvesting these stands, and it creates open areas that provide the conditions that promote the regeneration of certain tree species.

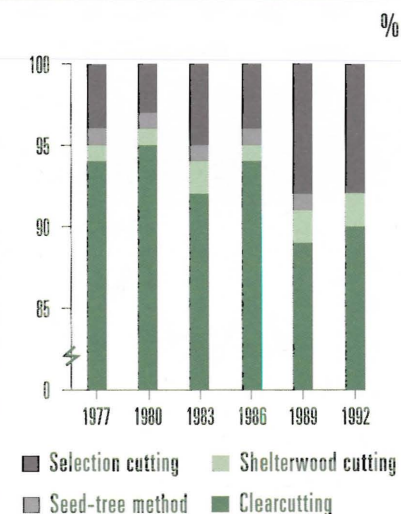
In Canada, the practice of clearcutting has changed considerably over the past 20 years. Recognition of the need to maintain wildlife habitat, protect soils, encourage natural regeneration, retain natural landscape patterns, and protect young trees in stands where mature trees are being harvested have led to substantial changes in guidelines on clearcutting. For example, the average size of clearcuts is declining, and their pattern and placement is being designed to reflect natural forest landscape patterns.

4.4.1 Harvest levels



Source: Canadian Forest Service

4.4.2 Harvesting systems in Canada



Source: Canadian Forest Service





## PROVIDING MULTIPLE BENEFITS

Canada's forests provide many benefits, and Canadians want to ensure that their forests continue to meet their needs. Canada's forest industries must demonstrate an ability to earn profits, remain competitive and continue to contribute to the nation's economy.

In addition to being an important source of exports and employment, forests support a number of other values, including tourism, wildlife, recreational use, wilderness experiences and natural scenery. Although not easily measured in economic terms, all of these values are important in assessing our progress on sustainable development.

## 5 SUSTAINABLE HARVESTS (ANNUAL INDICATOR) Are we overcutting Canada's forests?

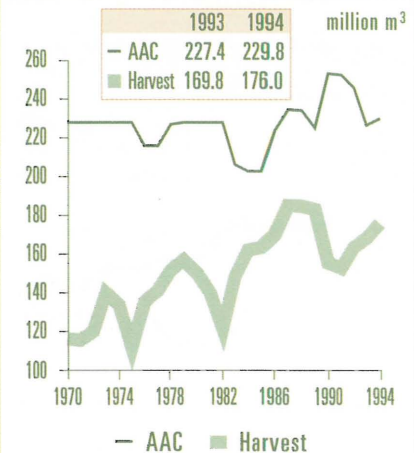
In the context of harvesting, "productive capacity" refers to the forest's ability to produce different products over the long term. "Products" include not only wood for industrial processing and firewood, but also activities such as camping, hunting, trapping, fishing, and gathering mushrooms, nuts and berries.



The sustainability of some of the economic benefits that Canadians derive from wood processing may be measured by comparing the annual allowable cut (AAC) to the annual harvest rate. The AAC is the maximum volume of harvesting that is permitted annually for a specific area. Figure 4.5.1 shows that Canada's AAC has remained relatively stable over the past 20 years. However, several provinces are reviewing their AACs, and since 1994, some have reduced them in certain regions to accommodate other land-use requirements, namely protected areas, wildlife habitat and Aboriginal land claims. Nationally, the total harvest remains 23% below the AAC.

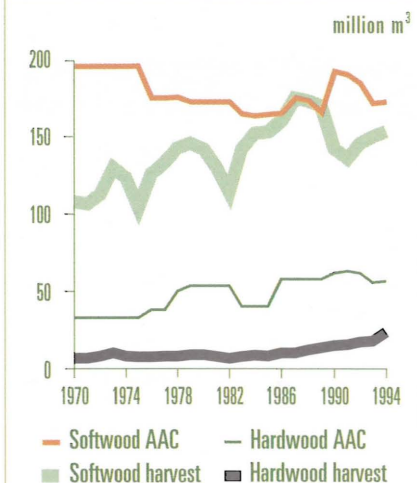
Figure 4.5.2 shows the trends in softwood and hardwood AAC and harvest volumes, and the changes that occurred in 1994. The most significant change was in the volume of hardwoods harvested, which rose 20% in 1994. This increase can be attributed to greater use of hardwoods, such as poplar, in the production of panel products (e.g., oriented strandboard) and pulp products

### 4.5.1 Total AAC and harvest



Source: Canadian Forest Service

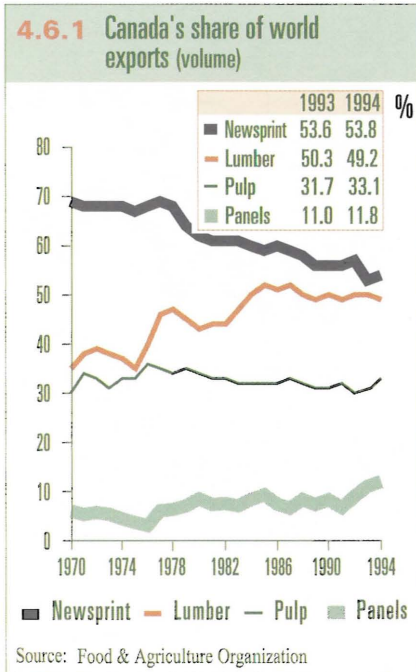
### 4.5.2 Softwood and hardwood AACs and harvests



Source: Canadian Forest Service

(e.g., chemi-thermomechanical pulp). Little change occurred in AAC levels between 1993 and 1994.

## 6 GLOBAL MARKETS (ANNUAL INDICATOR) Can Canada's forest industries continue to compete in the global marketplace?



Trends in Canada's share of global markets provide a useful indication of how well Canadian forest industries have been able to sell their products abroad. Forest products exports are important to Canada's standard of living. In 1994, our balance of trade (the value of exports minus the value of imports) in forest products was \$27.8 billion. By comparison, that same year, our balance of trade in farm products was \$640 million; in fish products, \$1.8 billion; in energy, \$15 billion; and in metals and minerals, \$11.7 billion.

Figure 4.6.1 shows the long-term trends in Canada's share of world exports for various forest products and the annual data indicating the changes that occurred between 1993 and 1994. The most substantial change in 1994 was in the market pulp sector. Canada's share of global trade in this sector rose from 31.7% in 1993, to 33.1% in 1994, largely due to increased demand in the U.S. market. In 1994, consumption of wood pulp in the USA grew 2.9%; U.S. companies were unable to satisfy the increased demand and turned to Canadian suppliers to meet their additional requirements.

### 4.6.2 Global softwood lumber exports

Region	1993 Volume		1994 Volume	
	million m <sup>3</sup>	%	million m <sup>3</sup>	%
Canada	42.9	50.3	44.80	49.2
USA	5.4	6.3	4.90	5.4
Europe	25.9	30.4	29.50	32.4
Oceania	0.9	1.2	1.04	1.2
Former USSR	7.1	8.4	7.60	8.4
World	85.3	100	91.10	100

Source: Food & Agriculture Organization

Canada's share of world trade in softwood lumber declined 1% in 1994. However, between 1993 and 1994, Canadian exports of softwood lumber to the USA increased by 2.36 million m<sup>3</sup>, and Canada's share of the U.S. market rose to 33%. Figure 4.6.2 provides data on softwood lumber exports and on the respective global market share for major exporting regions. Although the volume of Canadian exports increased by 1.9 million m<sup>3</sup>, softwood lumber exports from European countries grew twice as much, resulting in an overall increase in Europe's share of global trade in lumber.



# 7

## CANADA'S COMPETITORS

(THEME INDICATOR)

Which nation is becoming more competitive in forest products trade?

The revealed comparative advantage (RCA) index is a standard economic indicator of industrial competitiveness. It demonstrates the ability of the forest industry to attract capital and labour resources from other domestic sectors (e.g., manufacturing or agriculture) to produce forest products for the export market. When the forest sector is able to out-compete other industrial sectors for capital and labour, its contribution to the Gross Domestic Product (GDP) increases, indicating that the country's comparative advantage in forest products is growing. When other sectors of the economy become more competitive in export markets, capital and labour flow out of the forest sector, and its relative contribution to the GDP declines. The RCA index provides a way of measuring and comparing changes in the comparative advantage of Canada's forest sector and its principal competitors.



### RCA index

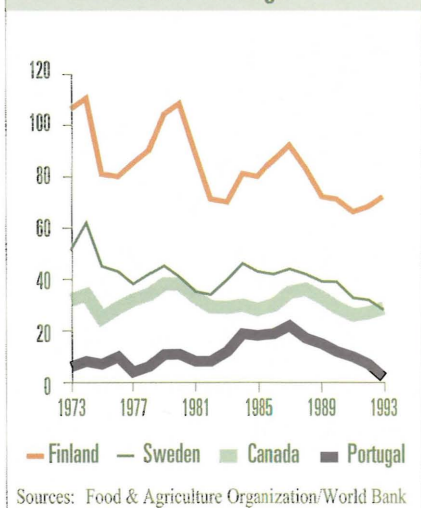
Net exports  
(value of exports  
minus value  
of imports)  
divided by GDP

Figure 4.7.1 shows the trends in RCA index for Canada, and for two traditional competitors (Finland and Sweden) and one emerging competitor (Portugal). Forest products trade is a critical component of the Finnish economy; however, the comparative advantage of the Finnish forest sector is declining due to timber supply constraints. The annual harvest in Finland has been very close to the AAC for a number of years, limiting expansion of the domestic forest industry. Therefore, as the Finnish economy grew, the value of net exports remained constant and Finland's RCA index declined.

In Canada, net trade remained at approximately 30% of GDP between 1970 and 1993. The value of net exports by the Canadian forest industry increased at about the same rate as the growth in GDP. The relatively flat nature of the RCA trend line means that Canada's comparative advantage in forest products trade has been constant. However, as discussed in Chapter 3, we are becoming more competitive in some products (e.g., lumber) and less competitive in others (e.g., newsprint).

Portugal could displace Canadian exports of pulp and paper in the European market because of its extensive eucalyptus plantations. However, the comparative advantage of the Portuguese forest industry has declined over the past six years. A substantial rate of growth in its economy has contributed to a decline in its RCA index.

4.7.1 RCA index for Finland, Sweden, Canada and Portugal



#### 4.7.2 Growth in the economy of various countries

Country	1987–1992
New Zealand	1.3%
Sweden	2.9%
USA	9.1%
Canada	6.3%

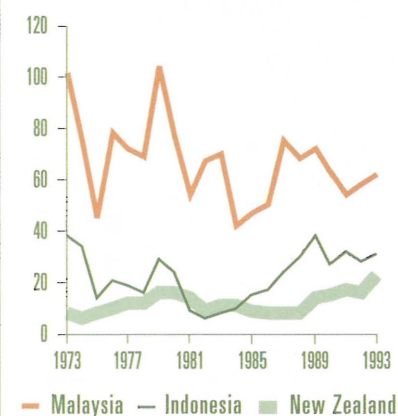
Source: Food & Agriculture Organization/  
World Bank

The Portuguese economy grew by approximately 17% (after inflation) between 1987 and 1992, one of the most substantial increases in all of the major forest products exporting countries (Figure 4.7.2). The combined effect of an expanding economy and reduced net exports of forest products indicates that the comparative advantage of the Portuguese forest industry declined significantly between 1987 and 1993, while other sectors of its economy increased their comparative advantage.

Figure 4.7.3 shows the trends in the RCA index for other important emerging forest products competitors: Malaysia, Indonesia and New Zealand. Forest products trade accounts for a high percentage of Malaysia's national income. However, the contribution of forest products trade to its economy was highly unstable, particularly between 1970 and 1984. There are two principal reasons for this instability. Malaysia was a high-cost supplier in the global market, and as such, it was the first to be pushed out of the market when demand declined and the last to enter the market during recovery periods. Also, the product mix of Malaysia was oriented toward product lines with highly variable prices (e.g., roundwood exports), particularly during the 1970s and early 1980s.

The RCA for New Zealand is on a clear upward trend, reaching its highest level in 1993. This trend has resulted from significant growth in the capacity of New Zealand's forest industry and reflects a steady increase in the comparative advantage of its forest sector. In 1993, approximately 16 million m<sup>3</sup> of industrial roundwood were produced; domestic consumption was roughly 5 million m<sup>3</sup>. The balance of 11 million m<sup>3</sup> was either exported directly, or processed into forest products and then exported. Extensive radiata pine plantations, established over the past 20 years, are providing the timber supply for this new capacity. Between 1989 and 1991, investment was concentrated in the pulp and paper sector; between 1992 and 1994, it was focused on solid wood products. The value of softwood lumber exports from New Zealand increased from \$54 million in 1987, to \$271 million in 1994.

4.7.3 RCA index for Malaysia, Indonesia and New Zealand



Sources: Food & Agriculture Organization/World Bank

Figure 4.7.4 shows the trends in the RCA index for two other emerging forest products exporting countries, Brazil and Chile. The RCA index for Chile has increased dramatically since 1970. Chile's forest products trade accounts for the same proportion of GDP as Canada's. The principal difference is that the Canadian RCA index was flat between 1970 and 1988, while the Chilean index was on a clear upward trend. Although the RCA index for Chile has increased over the long term, it has declined slightly since 1988, mostly as a



result of phenomenal growth in the national economy. Between 1987 and 1992, real GDP (adjusted for inflation) rose by 42%. Despite the fact that net exports of forest products from Chile increased over this period, the national economy grew at a faster pace. Therefore, in terms of their contribution to the economy, net exports of forest products declined in importance and the RCA index decreased.

## 8 PROFITABILITY OF CANADIAN FIRMS (THEME INDICATOR)

### Are Canadian forest firms profitable?

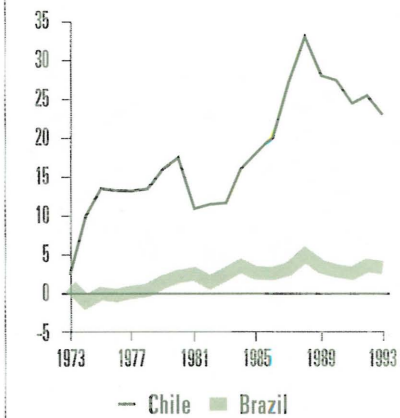
Measures of profitability are indicators of the financial performance of individual firms within an industry. Canada's forest products sector is traditionally a cyclical industry. In the past, firms tended to invest in new mills when profits were high. However, by the time the new capacity came on stream, market demand often had dropped and producers were faced with weak demand and excess supply, leading to depressed prices and financial losses. Sustained losses by firms over a number of consecutive years can result in a high level of corporate bankruptcies and the closure of unprofitable mills.



Figure 4.8.1 shows the profit performance of Canada's forest sector between 1988 and 1992. The bar graphs indicate the high variability in profits experienced by companies over short periods of time. The financial losses of forest companies in the early 1990s were abnormally high. Forest industry analysts have suggested that, under normal circumstances, these losses would have resulted in bankruptcies and numerous mill shutdowns. However, while Canadian forest industries were experiencing significant financial losses, large amounts of equity capital entered the market. The combination of an anticipated recovery in demand for forest products, low stock prices for forest companies, and a general scarcity of stocks on equity markets led investors to direct large amounts of capital into failing forest companies. This infusion of new equity capital allowed many firms to survive the period of low profitability.

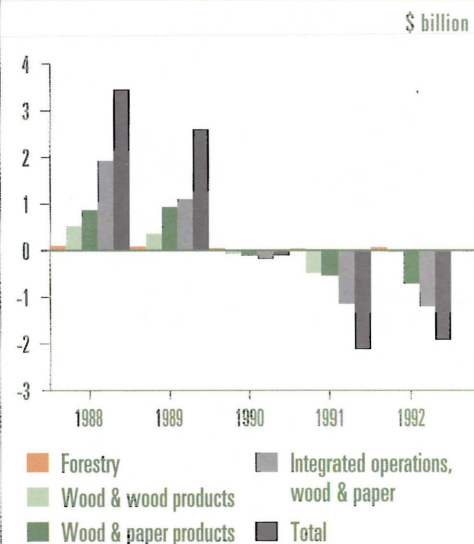
Chapter 3 describes the U.S. forest products market as highly competitive. Canadian companies are in direct competition with U.S. companies for market share. Therefore, comparing the profitability of U.S. and Canadian firms is an indicator of the ability of Canada's industries to compete with U.S. firms in delivering products to U.S. consumers.

### 4.7.4 RCA index for Chile and Brazil



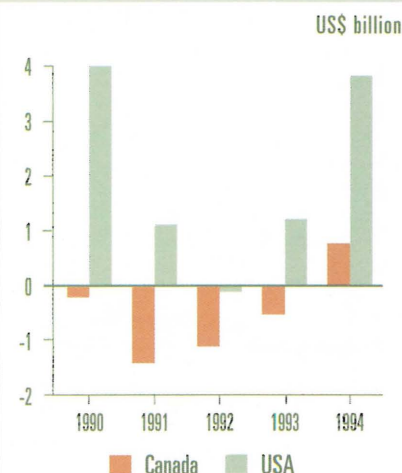
Sources: Food & Agriculture Organization/World Bank

### 4.8.1 Profits in Canada's forest industries



Source: Statistics Canada

#### 4.8.2 Net earnings and losses in the forest sector



Source: Price-Waterhouse

## 9 GROSS DOMESTIC PRODUCT (ANNUAL INDICATOR)

### Is the forest industry contributing to Canada's economy?

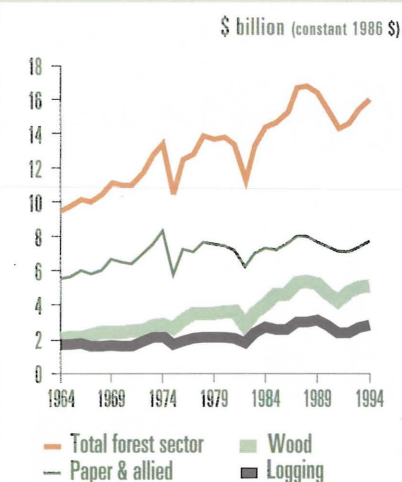
Gross domestic product (GDP) is a measure of national income — the amount paid to Canadians in terms of salaries, wages, profits, taxes and royalties for the sale of natural resources. An industry's contribution to the GDP generally can be measured by the amount of value it adds to the goods and services it purchases, known as the "value added."



Figure 4.9.1 shows the forest industries' contribution to Canada's real GDP. Though erratic, it has increased since 1964. The pulp and paper industry makes the largest contribution to the GDP, although the wood industries have shown the largest gain.

The change in the forest industries' contribution to Canada's GDP between 1993 and 1994 is indicated in Figure 4.9.1. In 1994, Canada's forest industries increased their contribution by 4% or \$620 million (constant 1986 dollars). As discussed in the previous indicator, after four consecutive years of losses, Canada's forest industries saw a return to profits in 1994. More than half the increase in their contribution to GDP resulted from growth in the paper and allied industries, where shipments (production less inventory) and prices both increased. For example, Canadian shipments of pulp increased by roughly 18% in 1994, and the price of bleached softwood kraft pulp (delivered to the USA) increased by 27%.

#### 4.9.1 Contribution to GDP



Source: Statistics Canada

	1993	1994
Total forest sector	15.5	16.08
Paper & allied	7.43	7.63
Wood	5.02	5.18
Logging	2.60	2.74



# 10 RECREATIONAL OPPORTUNITIES

(ANNUAL INDICATOR)

## What roles do forests play in meeting the recreational needs of Canadians?

Forests offer Canadians many benefits in addition to traditional economic values. For example, Canadians participate in a wide variety of outdoor recreation activities, such as hiking, camping, canoeing, hunting, fishing, cross-country skiing and bird watching.

Canadians have always had access to forests for recreational use, because the vast majority of our forests are under public ownership. With continued population growth, the value of wilderness will increase worldwide. As Canada evolves to a more urban society and a more service-based economy, it is expected that the recreational use of forests will continue to grow.

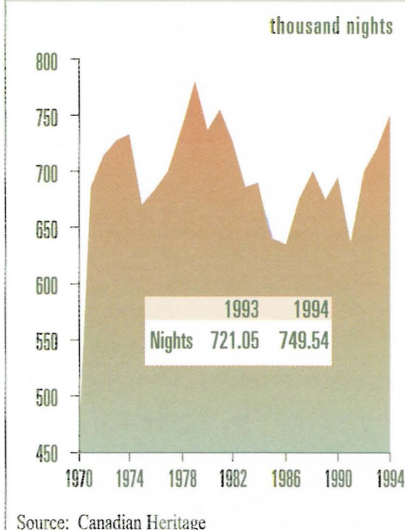
Data on the use of Canada's national parks are presented as an indicator of the demand for outdoor recreational opportunities.

Figure 4.10.1 shows the trend in the number of nights spent at campsites. Generally, camping declines during recessionary periods and increases during recovery periods. Camping in Canada's national parks declined from 1979 to 1986; fluctuated between 1986 and 1991; and increased from 1991 to 1994. In 1994, approximately 750 000 campsites were occupied overnight. Camping in national parks increased by 4% between 1993 and 1994. This increase is attributable to two factors: continued recovery in the Canadian economy from the previous recession; and improved weather conditions in 1994, compared to 1993. In 1994, the number of visits to national parks increased by 7.6% over 1993 levels — to almost 30 million visitors (Figure 4.10.2), many of whom were from foreign countries. Banff National Park had the largest number of visitors, with more than 7.6 million visits.

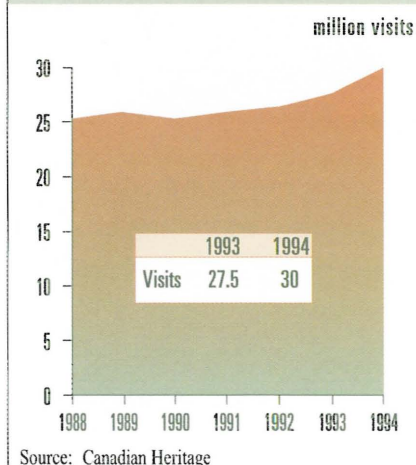
The value of the Canadian dollar against foreign currencies is a factor influencing the number of foreign visitors to our national parks. In 1994, for example, the Japanese yen strengthened by 6.4% against the Canadian dollar, compared to 1993 exchange rates. A stronger Japanese yen increased the purchasing power of Japanese tourists in Canada and improved the attractiveness of Canada as a tourist destination. Surveys indicate that visits to national parks and the opportunity to view Canada's natural landscape are highly valued by Japanese tourists.



### 4.10.1 Camping in national parks



### 4.10.2 Visits to national parks in Canada's forests



# Commercial Forest Account



## Seedling stage

trees less than 1.3 m high



## Young forest

trees more than 1.3 m high



## Mature forest

timber ready to be harvested

The Commercial Forest Account presents a broad overview of the changes that occurred in Canada's commercial forest between 1979 and 1993. Last year's account presented the changes that occurred over the 15-year period between 1978 and 1992. Therefore, the data presented in this year's report will not reflect significant variations from the data presented last year. Fire, insects, disease and harvesting are the only disturbances recorded in the commercial forest. The account distinguishes between natural and human-caused disturbances. Fire, insects and disease are part of a forest's natural cycle of renewal. Timber harvesting is the principal human activity affecting forests that is reported in this account. It is important to note that only half of the commercial forest landbase (28% of Canada's total forest land) is currently under forest management. There are an additional 2.2 million hectares of forest for which the age class has not yet been determined. Lands that may have changed status (i.e., from forests to farm lands, or from farm lands to forests) are not included in this account.

## AREA

The area account assumes that the total commercial forest landbase remained constant at 234.53 million hectares. Over the 15-year period, a larger area was affected by fire, insects and disease than by harvesting. These natural disturbances affected an average 1.13 million hectares per year; the average area harvested was 887 000 hectares per year (0.4% of the commercial forest landbase).

More than 4.8 million hectares were planted or seeded, representing 36% of the area harvested. The remaining harvested area was left to regenerate naturally, usually after some form of preparatory site treatment. Most of the area affected by fire, insects and disease also was left to regenerate naturally. (To help maintain the natural diversity of the forest and reduce costs, there is a trend toward natural regeneration.) Not all of the harvested area regenerated successfully. Over the 15-year period, 1.1 million hectares (approximately 75 000 hectares per year) were added to the backlog of area that has not regenerated with commercial species.



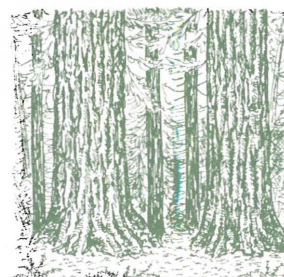
Over the 15-year period, the area of forest land at the seedling stage increased by 5.79 million hectares (20%), reflecting the increased efforts to regenerate forests after harvesting or natural disturbances. The area regenerating naturally following fire, insects or disease rose from 7.2 million to 12.13 million hectares, an increase of 68% over the 15-year period. As the young forest matured or was affected by natural disturbances, such as fire, the area of this class of forest decreased by 10.21 million hectares (11%). There was also a slight decrease — 1.6 million hectares (1.6%) — in the area of mature, old or mixed-aged forests. Nevertheless, older forests still accounted for 44% of the commercial forest in 1993.

The area growing non-commercial species more than 10 years after harvesting increased from 1.36 million to 2.5 million hectares — roughly 1% of the total commercial forest landbase. This area does not contain sufficient quantities of commercial trees to be considered successfully regenerated for timber purposes; however, it has regenerated with a rich variety of plants, shrubs and trees, such as alder and willow, which stabilize the soil and provide food and shelter for wildlife. With time, commercial forest species eventually will be reestablished in most of this area. To speed up this process, some form of silvicultural treatment, such as weeding or thinning, likely would be required.

It is difficult to capture the dynamics of Canada's commercial forest in this account. Young forests grow; some forests are burned or killed by insects or disease; some mature forests are harvested; and the cycle begins again with newly regenerated stands of seedlings.

## VOLUME

Over the 15-year period, there was a net increase of 940 million m<sup>3</sup> (4%) in the volume of trees growing in Canada's commercial forest. On average, the annual harvest was 163 million m<sup>3</sup>, compared with the 137 million m<sup>3</sup> consumed annually by fire or other natural disturbances. The volume of wood at the seedling stage increased by 140 million m<sup>3</sup>. At the young forest stage, the volume of wood decreased by 210 million m<sup>3</sup>, mirroring the reduction in the area of this class of forest. The volume of wood in mature, old or mixed-aged forests increased by 1 billion m<sup>3</sup>. (Although older forests grow slowly, because they make up almost half of the commercial forest, they account for most of the increase in volume.)



### Old forest

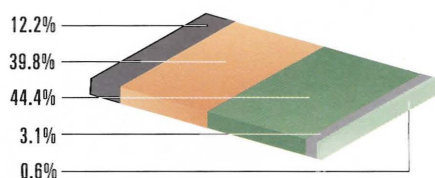
trees that have grown past the age of maturity (varies for each species — from 80 years for jack pine, to 200 years for subalpine fir)



### Mixed-aged forest

forests in which trees differ markedly in age (usually more than 20 years)

## COMMERCIAL FOREST AREA (1979–1993)



### 1979

million  
hectares

Seedling stage .....	28.63
Young forest .....	93.25
Mature, old or mixed-aged forests .....	104.09
Area regenerating following fire or insects .....	7.20
Area not growing commercial species .....	1.36
10 years after harvesting .....	
<b>Total .....</b>	<b>234.53</b>

### Changes 1979–1993

#### Depletions

Area harvested .....	13.30
Area burned .....	10.14
Area affected by insects or disease .....	6.80
<b>Total .....</b>	<b>30.24</b>

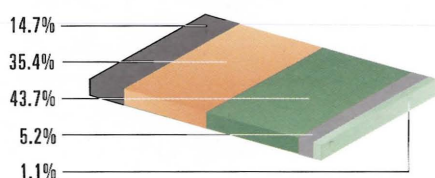
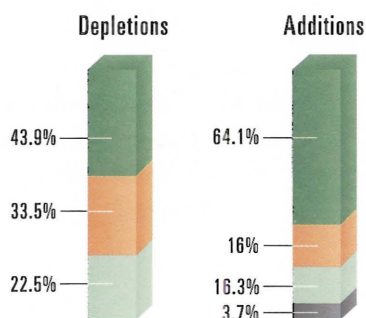
#### Additions

Area regenerated naturally .....	19.37
Area planted or seeded .....	4.81
Area regenerating following fire or insects .....	4.93
<b>Sub-total .....</b>	<b>29.11</b>

Area not growing commercial species 10 years after harvesting .....	1.13
<b>Total .....</b>	<b>30.24</b>

### 1993

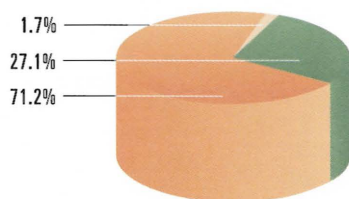
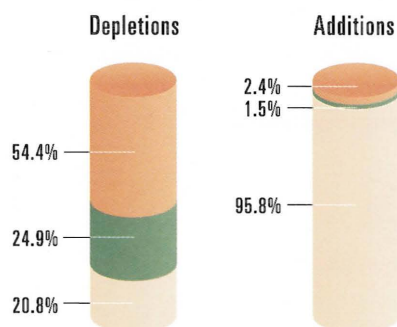
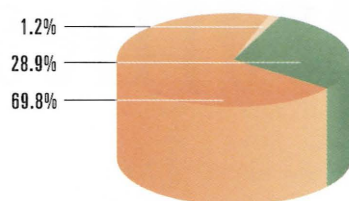
Seedling stage .....	34.42
Young forest .....	83.04
Mature, old or mixed-aged forests .....	102.45
Area regenerating following fire or insects .....	12.13
Area not growing commercial species 10 years after harvesting .....	2.49
<b>Total .....</b>	<b>234.53</b>



## Highlights

- Between 1979 and 1993, fire, insects and disease affected more area in the commercial forest than harvesting. On average, natural disturbances affected 1.3 million hectares (0.6%) of the commercial forest annually, while harvesting depleted 887 000 hectares (0.4%).
- More than 4.8 million hectares were planted or seeded between 1979 and 1993. However, there was a net increase of 1.1 million hectares (approximately 75 000 hectares per year) in the area not growing commercial species more than 10 years after harvesting.





## COMMERCIAL FOREST VOLUME (1979-1993)

billion m<sup>3</sup>

### 1979

Seedling stage	0.30
Young forest	7.16
Mature, old or mixed-aged forests	17.28
<b>Total</b>	<b>24.74</b>

### Changes 1979-1993

#### Depletions

Volume harvested	2.45
Volume burned	1.12
Volume lost to insects or disease	0.94
<b>Total</b>	<b>4.50</b>

#### Additions

Volume in naturally regenerated areas	0.13
Volume in planted or seeded areas	0.08
Growth in standing timber	5.22
<b>Total</b>	<b>5.45</b>

### 1993

Seedling stage	0.44
Young forest	6.95
Mature, old or mixed-aged forests	18.28
<b>Total</b>	<b>25.68</b>

**Net volume increase**.....0.94

## Highlights

- Between 1979 and 1993, there was a net increase of 4% in the volume of trees growing in Canada's commercial forest.
- Harvesting accounted for more than 54% of the volume depleted from the commercial forest. On average, 163 million m<sup>3</sup> were harvested annually, compared to the 137 million m<sup>3</sup> consumed by fire, insects and disease.

# Forest Profiles



In the spring of 1996, the family of 10 maple species was proclaimed as Canada's arboreal emblem. One or more of these maple species grows in each province and territory of Canada.

## CANADA (1995)

Population	29.7 million
Total area	997.0 million ha
Land area	921.5 million ha
Forest land	417.6 million ha
National parks	21.7 million ha
Provincial parks	22.9 million ha

## Forest resource (1994)

Ownership	Provincial	71%
	Federal	23%
	Private	6%
Forest type	Softwood	64%
	Hardwood	15%
	Mixedwood	21%
Annual allowable cut <sup>a</sup>		229.8 million m <sup>3</sup>
Harvest (volume) – industrial roundwood <sup>b</sup>		176.0 million m <sup>3</sup>
Harvest (area)		988 960 ha
Status of harvested Crown land (1992) <sup>c</sup>		
Stocked	11 191 837 ha	82%
Understocked	2 487 167 ha	18%
Insect defoliation <sup>d</sup>		11.6 million ha
Forest fires		6 292 021 ha

## Forest industry

Value of exports (1994)	\$32.4 billion
Softwood lumber	34%
Wood pulp	21%
Newsprint	19%
Major export markets (1994)	
United States	70%
Japan	12%
European Union	9%
Others	9%
Balance of trade (1994)	+\$27.8 billion
Contribution to GDP (1994)	+\$19.8 billion
Value of shipments (1993)	\$49.3 billion
Sold domestically	46.0%
Exported	54.0%
Number of establishments (1993)	12 144
8 586 logging	
2 894 wood	
664 paper and allied	
Employment (1995) <sup>e</sup>	880 000
369 000 direct jobs	
511 000 indirect jobs	
1 job in 15	
Wages and salaries (1993)	\$10.0 billion
New investments (1994)	\$7.1 billion

a, b, c, d, e See pages 99-100.



## NEWFOUNDLAND AND LABRADOR



Black spruce (*Picea mariana*)

Population	573 600
Total area	40.6 million ha
Land area	37.2 million ha
Forest land	22.5 million ha
Provincial parks	439 400 ha

### Forest resource (1994)

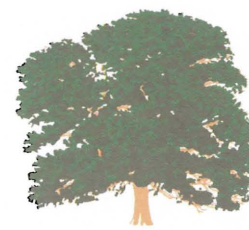
Ownership	Provincial	99%
	Private	1%
Forest type	Softwood	94%
	Hardwood	1%
	Mixedwood	5%
Annual allowable cut <sup>a</sup>	3.0 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	1.8 million m <sup>3</sup>	
Harvest (area)	20 650 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	488 921 ha 78%
	Understocked	136 433 ha 22%
Insect defoliation <sup>d</sup>	12 900 ha	
Forest fires	110 629 ha	

### Forest industry

Value of exports (1994)	\$497 million
	Newsprint 100%
Major export markets (1994)	
	United States 35%
	European Union 33%
	South and Central America 21%
Balance of trade (1994)	\$+487 million
Value of shipments (1993)	\$538 million
Number of establishments (1993)	121
	82 logging
	33 wood
	6 paper and allied
Employment (1995) <sup>e</sup>	9 000
	6 000 direct jobs
	3 000 indirect jobs
	1 job in 22
Wages and salaries (1993)	\$120 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.

## PRINCE EDWARD ISLAND



Red oak (*Quercus rubra*)

Population	136 900
Total area	0.57 million ha
Land area	0.57 million ha
Forest land	0.29 million ha
Provincial parks	1 500 ha

### Forest resource (1994)

Ownership	Provincial	7%
	Federal	1%
	Private	92%
Forest type	Softwood	37%
	Hardwood	28%
	Mixedwood	35%
Annual allowable cut <sup>a</sup>	0.5 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	0.3 million m <sup>3</sup>	
Harvest (area)	3 107 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	27 018 ha 86%
	Understocked	4 364 ha 14%
Insect defoliation <sup>d</sup>	38 704 ha	
Forest fires	22 ha	

### Forest industry

Value of exports (1994)	\$1.4 million
	Softwood lumber 44%
Major export markets (1994)	
	United States 99%
Balance of trade (1994)	\$1.3 million
Value of shipments (1993)	\$33 million
Number of establishments (1993)	34
	18 logging
	13 wood
	3 paper and allied
Employment (1995) <sup>e</sup>	not available
Wages and salaries (1993)	\$9.0 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.

## NOVA SCOTIA



Red spruce (*Picea rubens*)

Population	940 500
Total area	5.6 million ha
Land area	5.3 million ha
Forest land	3.9 million ha
Provincial parks	21 800 ha

### Forest resource (1994)

Ownership	Provincial	28%
	Federal	3%
	Private	69%
Forest type	Softwood	46%
	Hardwood	31%
	Mixedwood	23%
Annual allowable cut <sup>a</sup>	5.3 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	4.7 million m <sup>3</sup>	
Harvest (area)	47 646 ha	
Status of harvested Crown land (1992) <sup>c</sup>		
	Stocked	740 101 ha 81%
	Understocked	177 161 ha 19%
Insect defoliation <sup>d</sup>	210 ha	
Forest fires	243 ha	

### Forest industry

Value of exports (1994)	\$483 million
	Newsprint 44%
	Wood pulp 43%
Major export markets (1994)	
	United States 54%
	European Union 26%
Balance of trade (1994)	\$+467 million
Value of shipments (1993)	\$855 million
Number of establishments (1993)	422
	336 logging
	74 wood
	12 paper and allied
Employment (1995) <sup>e</sup>	16 000
	10 000 direct jobs
	6 000 indirect jobs
	1 job in 24
Wages and salaries (1993)	\$192 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.

## NEW BRUNSWICK



Balsam fir (*Abies balsamea*)

Population	760 500
Total area	7.3 million ha
Land area	7.2 million ha
Forest land	6.1 million ha
Provincial parks	24 900 ha

### Forest resource (1994)

Ownership	Provincial	48%
	Federal	1%
	Private	51%
Forest type	Softwood	45%
	Hardwood	27%
	Mixedwood	28%
Annual allowable cut <sup>a</sup>	10.9 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	9.2 million m <sup>3</sup>	
Harvest (area)	92 702 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	431 798 ha 93%
	Understocked	41 548 ha 7%
Insect defoliation <sup>d</sup>	392 216 ha	
Forest fires	854 ha	

### Forest industry

Value of exports (1994)	\$1.7 billion
	Wood pulp 28%
	Other paper and paperboard 25%
	Newsprint 21%
Major export markets (1994)	
	United States 71%
	European Union 12%
	Japan 9%
Balance of trade (1994)	\$+1.5 billion
Value of shipments (1993)	\$2.3 billion
Number of establishments (1993)	852
	698 logging
	131 wood
	23 paper and allied
Employment (1995) <sup>e</sup>	27 000
	17 000 direct jobs
	10 000 indirect jobs
	1 job in 12
Wages and salaries (1993)	\$437 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.



## QUEBEC



Yellow birch (*Betula alleghaniensis*  
Britton)

Population	7 349 600
Total area	154.1 million ha
Land area	135.7 million ha
Forest land	83.9 million ha
Provincial parks	7.1 million ha

### Forest resource (1994)

Ownership	Provincial	89%
	Private	11%
Forest type	Softwood	67%
	Hardwood	14%
	Mixedwood	19%
Annual allowable cut <sup>a</sup>	56.0 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	36.1 million m <sup>3</sup>	
Harvest (area)	332 933 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	3 769 565 ha 92%
	Understocked	336 736 ha 8%
Insect defoliation <sup>d</sup>	9 055 ha	
Forest fires	116 041 ha	

### Forest industry

Value of exports (1994)	\$7.8 billion
	Newsprint 35%
	Other paper and paperboard 19%
	Softwood lumber 18%
Major export markets (1994)	
	United States 84%
	European Union 9%
Balance of trade (1994)	+\$6.9 billion
Value of shipments (1993)	\$12.7 billion
Number of establishments (1993)	3 347
	2 039 logging
	1 102 wood
	206 paper and allied
Employment (1995) <sup>e</sup>	185 000
	103 000 direct jobs
	82 000 indirect jobs
	1 job in 17
Wages and salaries (1993)	\$2.6 billion
New investments (1994)	\$1.9 billion

<sup>a, b, c, d, e</sup> See pages 99-100.

## ONTARIO



Eastern white pine (*Pinus strobus*)

Population	11 162 500
Total area	106.9 million ha
Land area	89.1 million ha
Forest land	58.0 million ha
Provincial parks	6.3 million ha

### Forest resource (1994)

Ownership	Provincial	88%
	Federal	1%
	Private	11%
Forest type	Softwood	56%
	Hardwood	18%
	Mixedwood	26%
Annual allowable cut <sup>a</sup>	0.4 million ha	
Harvest (volume) <sup>b</sup>	23.8 million m <sup>3</sup>	
Harvest (area)	209 700 ha	
Status of harvested Crown land (1992) <sup>c</sup>		
	Stocked	2 820 438 ha 84%
	Understocked	558 004 ha 16%
Insect defoliation <sup>d</sup>	8.4 million ha	
Forest fires	83 477 ha	

### Forest industry

Value of exports (1994)	\$5.9 billion
	Newsprint 22%
	Other paper and paperboard 22%
	Softwood lumber 22%
Major export markets (1994)	
	United States 96%
Balance of trade (1994)	+\$3.3 billion
Value of shipments (1993)	\$10.4 billion
Number of establishments (1993)	2 429
	1 483 logging
	657 wood
	289 paper and allied
Employment (1995) <sup>e</sup>	169 000
	90 000 direct jobs
	79 000 indirect jobs
	1 job in 31
Wages and salaries (1993)	\$2.4 billion
New investments (1994)	\$1.1 billion

<sup>a, b, c, d, e</sup> See pages 99-100.

## MANITOBA



White spruce (*Picea glauca*)

Population	1 138 600
Total area	65.0 million ha
Land area	54.8 million ha
Forest land	26.3 million ha
Provincial parks	1.5 million ha

### Forest resource (1994)

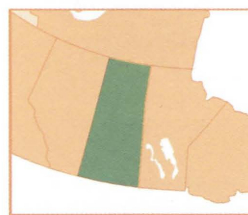
Ownership	Provincial	94%
	Federal	1%
	Private	5%
Forest type	Softwood	67%
	Hardwood	19%
	Mixedwood	14%
Annual allowable cut <sup>a</sup>	7.9 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	1.7 million m <sup>3</sup>	
Harvest (area)	12 652 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	189 511 ha 85%
	Understocked	32 928 ha 15%
Insect defoliation <sup>d</sup>	53 000 ha	
Forest fires	1 428 754 ha	

### Forest industry

Value of exports (1994)	\$278 million
	Softwood lumber 34%
	Wrapping paper 29%
Major export markets (1994)	
	United States 93%
Balance of trade (1994)	+\$107 million
Value of shipments (1993)	\$595 million
Number of establishments (1993)	230
	146 logging
	63 wood
	21 paper and allied
Employment (1995) <sup>e</sup>	13 000
	8 000 direct jobs
	5 000 indirect jobs
	1 job in 41
Wages and salaries (1993)	\$140 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.

## SASKATCHEWAN



White birch (*Betula papyrifera*)

Population	1 017 600
Total area	65.2 million ha
Land area	57.1 million ha
Forest land	28.8 million ha
Provincial parks	908 000 ha

### Forest resource (1994)

Ownership	Provincial	97%
	Federal	2%
	Private	1%
Forest type	Softwood	56%
	Hardwood	24%
	Mixedwood	20%
Annual allowable cut <sup>a</sup>	7.6 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	4.8 million m <sup>3</sup>	
Harvest (area)	24 221 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	150 475 ha 34%
	Understocked	288 397 ha 66%
Insect defoliation <sup>d</sup>	215 600 ha	
Forest fires	994 892 ha	

### Forest industry

Value of exports (1994)	\$305 million
	Wood pulp 59%
	Other paper and paperboard 16%
	Softwood lumber 10%
Major export markets (1994)	
	United States 46%
	European Union 23%
	Japan 15%
Balance of trade (1994)	+\$256 million
Value of shipments (1993)	\$580 million
Number of establishments (1993)	208
	155 logging
	47 wood
	6 paper and allied
Employment (1995) <sup>e</sup>	9 000
	6 000 direct jobs
	3 000 indirect jobs
	1 job in 51
Wages and salaries (1993)	\$123 million
New investments (1994)	not available

a, b, c, d, e See pages 99-100.



## ALBERTA



Lodgepole pine (*Pinus contorta*)

Population	2 757 800
Total area	66.1 million ha
Land area	64.4 million ha
Forest land	38.2 million ha
Provincial parks	1.25 million ha

### Forest resource (1994)

Ownership	Provincial	87%
	Federal	9%
	Private	4%
Forest type	Softwood	43%
	Hardwood	37%
	Mixedwood	20%
Annual allowable cut <sup>a</sup>	23.0 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	17.9 million m <sup>3</sup>	
Harvest (area)	52 445 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
	Stocked	204 019 ha 75%
	Understocked	68 256 ha 25%
Insect defoliation <sup>d</sup>	354 200 ha	
Forest fires	29 700 ha	

### Forest industry

Value of exports (1994)	\$1.3 billion
	Wood pulp 61%
	Softwood lumber 13%
	Waferboard 12%
Major export markets (1994)	
	United States 43%
	Japan 26%
Balance of trade (1994)	\$+1.2 billion
Value of shipments (1993)	\$2.7 billion
Number of establishments (1993)	516
	317 logging
	167 wood
	32 paper and allied
Employment (1995) <sup>e</sup>	40 000
	23 000 direct jobs
	17 000 indirect jobs
	1 job in 34
Wages and salaries (1993)	\$496 million
New investments (1994)	\$0.6 billion

a, b, c, d, e See pages 99-100.

## BRITISH COLUMBIA



Western red cedar (*Thuja plicata*)

Population	3 798 600
Total area	94.8 million ha
Land area	93.0 million ha
Forest land	60.6 million ha
Provincial parks	8.26 million ha

### Forest resource (1994)

Ownership	Provincial	95%
	Federal	1%
	Private	4%
Forest type	Softwood	83%
	Hardwood	5%
	Mixedwood	12%
Annual allowable cut <sup>a</sup>	72.4 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	75.1 million m <sup>3</sup>	
Harvest (area)	190 244 ha	
Status of harvested Crown land (1992) <sup>c</sup>		
	Stocked	2 245 763 ha 69%
	Understocked	1 002 536 ha 31%
Insect defoliation <sup>d</sup>	1.7 million ha	
Forest fires	30 309 ha	

### Forest industry

Value of exports (1994)	\$14.1 billion
	Softwood lumber 54%
	Wood pulp 25%
	Newsprint 8%
Major export markets (1994)	
	United States 55%
	Japan 23%
	European Union 11%
Balance of trade (1994)	\$+13.5 billion
Value of shipments (1993)	\$18.5 billion
Number of establishments (1993)	3 970
	3 297 logging
	607 wood
	66 paper and allied
Employment (1995) <sup>e</sup>	198 000
	107 000 direct jobs
	91 000 indirect jobs
	1 job in 9
Wages and salaries (1993)	\$3.5 billion
New investments (1994)	\$2.8 billion

a, b, c, d, e See pages 99-100.

## YUKON TERRITORY



*The Yukon Territory  
has not officially  
adopted a tree.*

Population	30 800
Total area	48.3 million ha
Land area	47.9 million ha
Forest land	27.5 million ha

### Forest resource (1994)

Ownership	Federal	100%
Forest type	Softwood	75%
	Hardwood	2%
	Mixedwood	23%
Annual allowable cut <sup>a</sup>	0.01 million m³	
Harvest (volume) <sup>b</sup>	0.39 million m³	
Harvest (area)	2 056 ha	
Status of harvested Crown land (1992) <sup>c</sup>		
Stocked	3 269 ha	67%
Understocked	1 634 ha	33%
Insect defoliation <sup>d</sup>	32 730 ha	
Forest fires	411 231 ha	

### Forest industry

Value of exports (1994)	\$3.0 million
Softwood lumber	3.5%
Balance of trade (1994)	+\$3.0 million

*a, b, c, d See pages 99-100.*

## NORTHWEST TERRITORIES



Jack pine (*Pinus banksiana*)

Population	66 000
Total area	342.6 million ha
Land area	329.3 million ha
Forest land	61.4 million ha

### Forest resource (1994)

Ownership	Federal	100%
Forest type	Softwood	29%
	Hardwood	5%
	Mixedwood	66%
Annual allowable cut <sup>a</sup>	0.30 million m <sup>3</sup>	
Harvest (volume) <sup>b</sup>	0.14 million m <sup>3</sup>	
Harvest (area)	604 ha	
Status of harvested Crown land (1993) <sup>c</sup>		
Stocked	244 ha	7%
Understocked	3 422 ha	93%
Insect defoliation <sup>d</sup>	370 300 ha	
Forest fires	3.0 million ha	

### Forest industry

Value of exports (1994)	\$0.05 million
Softwood lumber	13%
Balance of trade (1994)	+\$0.04 million

*a, b, c, d See pages 99-100.*



## NOTES

### Data sources

The main sources for the data are Statistics Canada, Environment Canada, the Canadian Pulp and Paper Association, the Canadian Forest Service and the National Forestry Database. Most of the information was collected by provincial and territorial natural resource ministries.

### Provincial trees

An illustration of the tree species that has been designated or officially adopted as the arboreal emblem of Canada and of each province and territory is included in the profiles on the preceding pages. The Yukon has not officially adopted a tree.

### Forest land

The data regarding Canada's forest land are based on the 1991 Canada Forest Inventory. The map on page 100 shows the forest land boundary.

### Provincial parks

New data has been provided by British Columbia. It includes Class-A, B and C parks, as well as recreation areas, environmental and land-use designations, and ecological reserves. Revised data for all provinces should be available next year. The national total will be adjusted when the new provincial totals are included.

### Forest resource

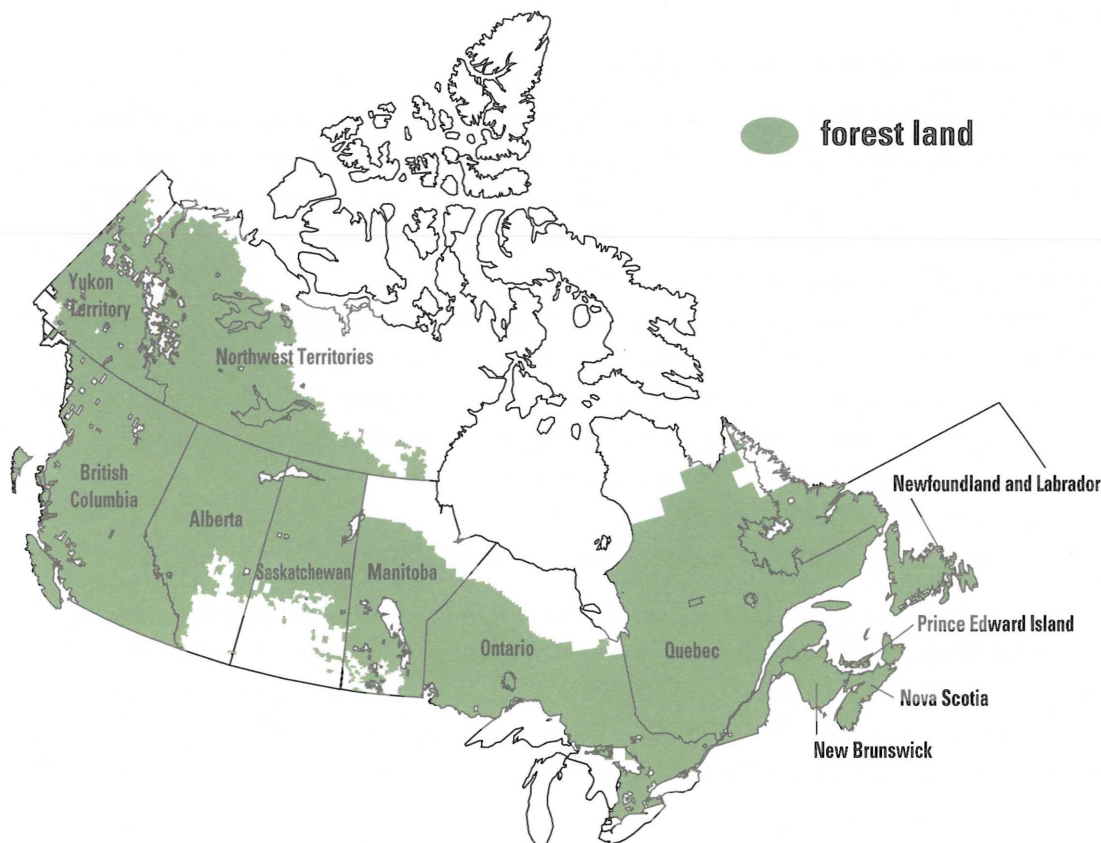
Ownership data are provided for the total forest land.

- <sup>a</sup> Annual allowable cut:* The level of harvest set by the provinces and territories for a certain length of time is called the “annual allowable cut” (AAC). AAC figures include data for both softwoods and hardwoods. The AAC figures for Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Manitoba include federal, provincial and private lands. Given the differences outlined below, a national AAC cannot be calculated by simply adding the provincial and territorial AACs.
- The national AAC figure that appears on page 92 was arrived at by estimating some data for private and federal lands, and converting the Ontario area figures into volume figures.
  - Ontario provides figures for AAC (which it refers to as the “maximum allowable depletion”) in hectares only.
  - Saskatchewan, Alberta and Ontario do not include figures for private lands in their AACs.
  - British Columbia does not include all private lands in its AAC.
  - The Yukon's AAC only includes federal lands.
  - The Northwest Territories' AAC includes territorial and federal lands.
- <sup>b</sup> Harvesting:* The national and provincial figures for harvesting volume include data for industrial roundwood only. Provincial harvest levels for fuelwood or firewood may range as high as 2.3 million m<sup>3</sup>.
- Although the AAC for British Columbia does not include all private lands, the harvest figure does include them. The yearly harvest rate for British Columbia may fluctuate, and in some cases, it may exceed the AAC. Over a five-year period, however, the harvest figure would be equal to or lower than the AAC.

- c* **Status of harvested Crown land:** No new data are available for this year's report. Data for private lands are not included. The term "stocked" refers to land where the forest cover meets certain timber-production standards established by forest management agencies in each province and territory. The term "understocked" refers to harvested land that requires forest management treatments, such as site preparation, planting, seeding or weeding, to meet established standards. This category also includes land that has not yet been surveyed and areas, such as roads and non-forestry developments, that have no timber production objective.
- d* **Insect defoliation:** The data relating to insects were provided by provincial and territorial agencies, and include moderate-to-severe defoliation only. Defoliation does not always imply mortality; for example, stands with moderate defoliation often recover and may not lose much growth. Defoliation is mapped on an insect-by-insect basis, and a given area may be afflicted by more than one insect at a time. This may result in double and triple counting in areas affected by more than one insect, exaggerating the extent of the total area defoliated.

## Forest industry

- e* **Employment:** The **national** employment figure includes both direct and indirect jobs in the forest sector. The total indirect jobs provided for each province will not add up to the national total, because the **provincial** figures do not include the indirect jobs created outside the province.
- The limited number of forestry jobs in **Prince Edward Island** are not reported by Statistics Canada.





# Forest Statistics

10-Year Trends\*

## ANNUAL ALLOWABLE CUT (1994)

229.8 million m<sup>3</sup> ↑

## HARVESTING (1994)

988 960 hectares ↑

## FIRE (1995)

7.25 million hectares ↑

## PLANTING AND SEEDING (1994)

487 840 hectares ↑

## SITE PREPARATION AND STAND TENDING (1994)

744 207 hectares ↓

## FOREST MANAGEMENT EXPENDITURES (1994)

\$2.3 billion ↓

## EMPLOYMENT (1995)

880 000 direct and indirect jobs ↑

## WAGES AND SALARIES (1993)

\$10.0 billion ↑

## EXPORTS (1994)

\$32.4 billion ↑

## VALUE OF SHIPMENTS (1993)

\$49.3 billion ↑

## FOREST PRODUCTS' CONTRIBUTION TO BALANCE OF TRADE (1994)

\$27.8 billion ↑

## CAPITAL AND REPAIR EXPENDITURES (1994)

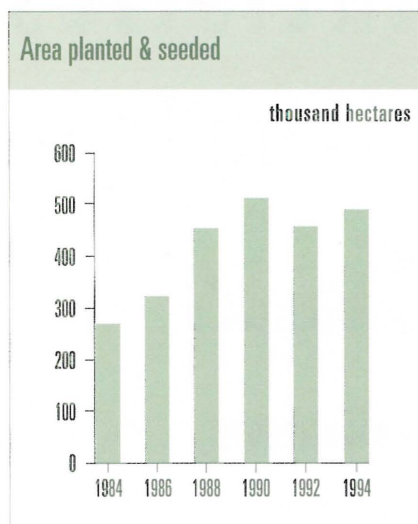
\$7.1 billion ↑

\* Some of these statistics are detailed on the following pages.

↑ indicates an increase over the previous year.

↓ indicates a decrease over the previous year.

## AREA PLANTED AND SEEDED (1994)

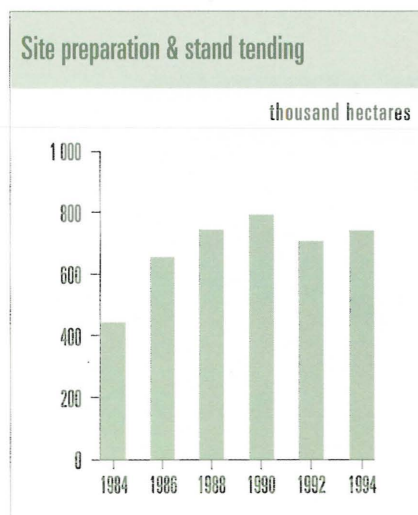


Despite efforts to promote natural regeneration, competing vegetation and other natural factors can cause seedling mortality or inhibit seedling growth, preventing the regeneration of some forest stands. Planting and seeding programs concentrate on sites that have failed to regenerate several years after natural disturbances or harvesting. They have been successful in eliminating most of the backlog of understocked sites. An increase in planting and seeding activity was recorded in 1994, for the first time since 1990.

1994	Hectares	Change	
		1 year	10-year average
Area planted and seeded	487 840	+7.9%	+6.4%

Sources: Canadian Forest Service/National Forestry Database

## SITE PREPARATION AND STAND TENDING (1994)



Thinning, fertilizing and pruning recently planted forests improves the growth and quality of young trees. Commercial thinning becomes important as older stands of hardwoods and mixedwoods grow to maturity. During the past several years, the level of site preparation and stand tending has been relatively stable, at 700 000 – 800 000 hectares per year. The number of hectares treated in 1994 was slightly lower than in 1993. New forestry practices are expected to continue to improve the condition of the regenerating forest stands.

1994	Hectares	Change	
		1 year	10-year average
Site preparation and stand tending	744 207	-1.8%	+6.1%

Sources: Canadian Forest Service/National Forestry Database



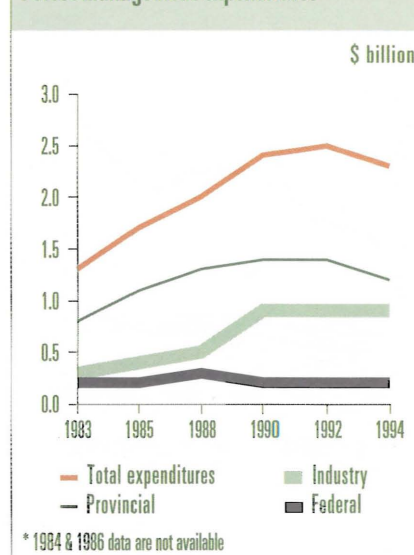
## FOREST MANAGEMENT EXPENDITURES (1994)

Between 1983 and 1994, the federal and provincial governments spent more than \$13.1 billion on forest management programs that were highly successful in regenerating backlog areas. Federal expenditures increased by \$36.7 million between 1993 and 1994, partly due to forest resource development agreements that have since expired. Forest companies are required to regenerate publicly owned land that they harvest under tenure. On average, industry expenditures grew by 14% annually over 10 years.

1994	\$ billion	Change	
		1 year	10-year average
<b>Total expenditures</b>	<b>2.3</b>	<b>-5.1%</b>	<b>+7.7%</b>
Provincial	1.2	-11.8%	+5.6%
Industry	0.9	0.0%	+14.1%
Federal	0.2	+21.9%	+5.5%

Sources: Canadian Pulp & Paper Association/  
Canadian Forest Service/National Forestry Database

### Forest management expenditures



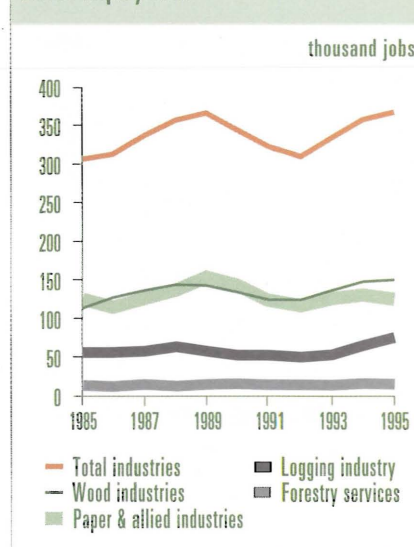
## DIRECT EMPLOYMENT (1995)

Beginning in the 1980s, the restructuring in Canada's forest sector and the introduction of less labour-intensive technologies led to a decline in the number of forest sector jobs. Total direct employment fell to 310 000 in 1992, reflecting the added impacts of the global recession. Since that time, employment levels have increased steadily, and in 1995, the forest sector provided 369 000 direct jobs. Increases occurred in the logging industry (12 000) and wood industries (2 000). In 1995, direct and indirect employment in the forest sector accounted for 1 in every 15 jobs in Canada.

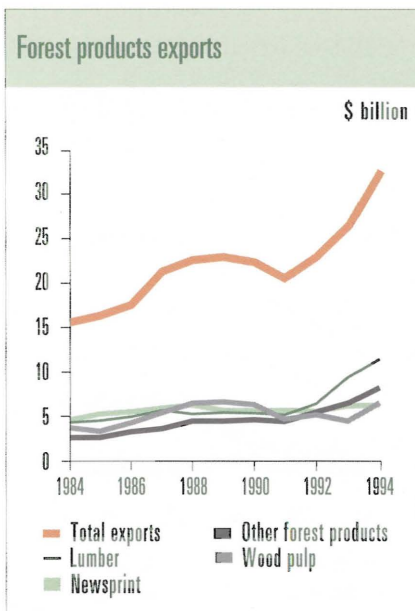
1995	Direct jobs	Change	
		1 year	10-year average
<b>Total industries</b>	<b>369 000</b>	<b>+3.1%</b>	<b>+2.0%</b>
Wood	150 000	+1.4%	+3.1%
Paper & allied	128 000	-1.5%	+0.4%
Logging	75 000	+19.1%	+3.2%
Forestry services	16 000	-5.9%	+4.2%

Source: Statistics Canada

### Direct employment



## VALUE OF EXPORTS (1994)



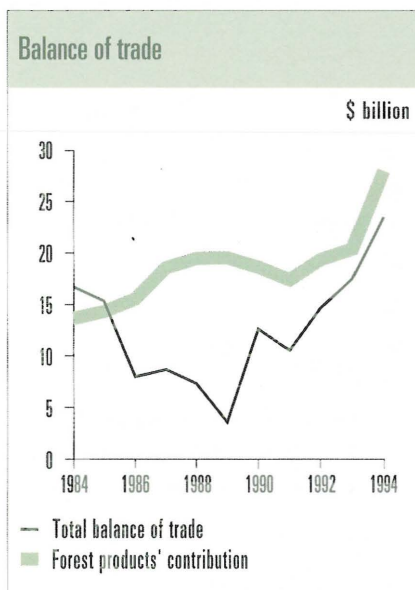
Canadian exports of forest products continued their upward trend in 1994, following the major slump that occurred between 1989 and 1991. The value of exports rose from \$20.7 billion in 1991, to a record \$32.4 billion in 1994. This increase was attributed to the cost efficiencies realized by Canadian companies and the worldwide growth in demand for forest products. The most significant annual increase was recorded by the wood pulp industry (\$2.1 billion), followed closely by the lumber industry (\$1.9 billion). Prices of lumber and other forest products remained high, whereas newsprint markets continued to experience depressed prices.

1994	\$ billion	Change	
		1 year	10-year average
<b>Total exports</b>	<b>32.4</b>	<b>+21.5%</b>	<b>+7.9%</b>
Lumber	11.4	+20.5%	+11.3%
Newsprint *	6.3	+3.0%	+2.8%
Other forest products	8.1	+23.7%	+11.5%
Wood pulp	6.7	+44.6%	+7.4%

\* Includes some writing and other printing papers

Source: Statistics Canada

## BALANCE OF TRADE (1994)



In 1994, forest products contributed \$27.8 billion to Canada's balance of trade. The majority of this contribution was attributed to Canada's surplus in forest products trade with the USA (\$18.5 billion), Japan (\$3.9 billion) and the European Union (\$2.9 billion). Canada imported less than \$5 billion of forest products, primarily in the form of timber and pulp from the USA. During the past 10 years, Canada's net exports of forest products have been critical to its ability to maintain a positive trade balance, particularly during the global recession. On average, the contribution of forest products to Canada's balance of trade increased by 7.2% annually. In the absence of net exports of these products, a \$4.5-billion deficit would have been recorded in Canada's balance of trade in 1994.

1994	\$ billion	Change	
		1 year	10-year average
<b>Total balance of trade</b>	<b>23.3</b>	<b>+34.0%</b>	<b>+0.4%</b>
Forest products' contribution	27.8	+24.5%	+7.2%

Source: Statistics Canada



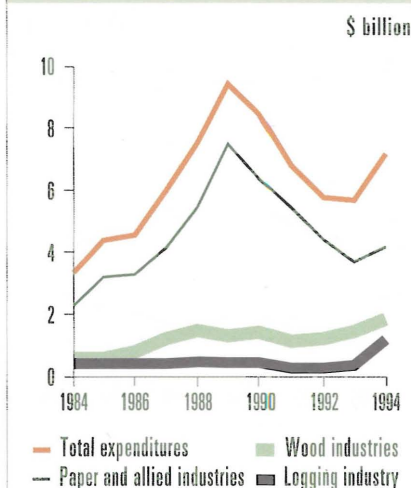
## CAPITAL AND REPAIR EXPENDITURES (1994)

Following a series of reductions in total expenditures from 1989 to 1993, Canada's forest industries increased their capital and repair expenditures in 1994, when most of them experienced a return to profits. The level of expenditures reported by the wood industries in 1994 reflects increased sales of lumber and panel products. And the logging industry recorded huge increases (\$0.7 billion) in equipment maintenance and repair — work that had not been attended to during the period of low profits or losses.

1994	\$ billion	Change	
		1 year	10-year average
<b>Total expenditures</b>	<b>7.1</b>	<b>+23.2%</b>	<b>+9.1%</b>
Paper & allied industries	4.1	+4.8%	+8.9%
Wood industries	1.9	+26.8%	+11.9%
Logging industry	1.1	+202.3%	+18.9%

Source: Statistics Canada

### Capital & repair expenditures



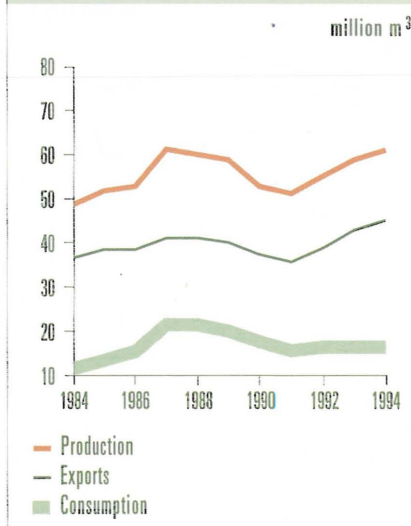
## LUMBER (1994)

In 1994, Canadian lumber production and exports increased for the third consecutive year, although at a less rapid pace. The much higher increase in the value of lumber exports (20.5%), compared to the increase in the volume of these exports (4.8%), reflects the continuing high lumber prices. In 1994, Canadian lumber exports amounted to 74% of production. Softwood lumber exports to the USA accounted for 82% of all Canadian lumber exports in 1994, up from 80% in 1993. There was a marginal decrease in the domestic consumption of lumber in 1994. During the past 10 years, however, the volume of lumber consumed domestically has increased significantly. On average, domestic consumption grew by 3.7% annually, outpacing the annual increase in exports recorded over the same period.

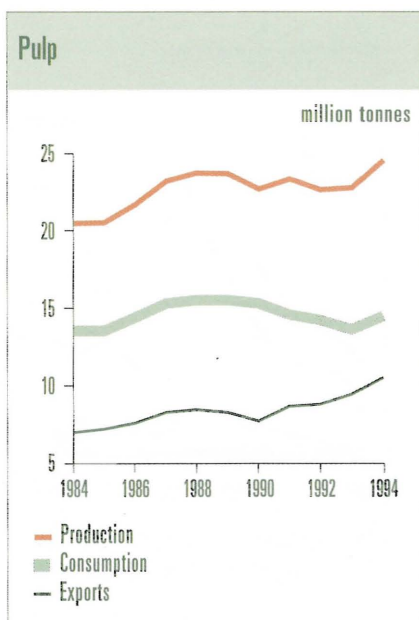
1994	Million m <sup>3</sup>	Change	
		1 year	10-year average
<b>Production</b>	<b>61.5</b>	<b>+3.3%</b>	<b>+2.5%</b>
Exports	45.7	+4.8%	+2.2%
Consumption	17.4	-0.9%	+3.7%

Source: Statistics Canada

### Lumber



## PULP (1994)

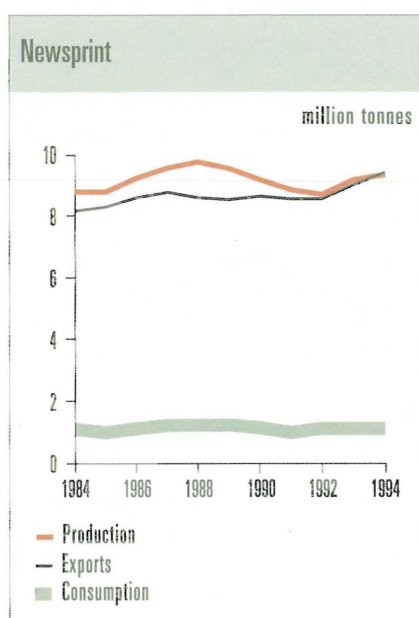


In 1994, higher production levels were reported in lumber, newsprint and pulp. The pulp industry recorded the most significant increase — 1.7 million tonnes, or a 7.6% increase over the previous year. The level of production in 1994 surpassed the record set in 1988. Canada is the world's largest exporter of wood pulp. The volume of Canadian pulp exports has increased steadily since 1991; the increase recorded in 1994 (and the dramatic 44.6% increase in the value of these exports) was attributed to a rebound in world pulp prices and demand. In 1994, domestic consumption rose by 0.7 million tonnes, while exports increased by 1.1 million tonnes.

1994	Million tonnes	Change	
		1 year	10-year average
Production	24.6	+7.6%	+2.0%
Consumption	14.5	+5.2%	+0.7%
Exports	10.5	+11.4%	+4.2%

Sources: Statistics Canada/Canadian Forest Service

## NEWSPRINT (1994)



On average, annual newsprint production has remained stable in Canada during the past 10 years, having increased by a modest 80 000 tonnes or 0.5% annually. Domestic needs account for a very small proportion of production. In 1994, almost 60% of Canadian production was exported to the USA, where many states now require a minimum recycled content in newsprint. For the second consecutive year since the 1980s, Canadian production and exports of newsprint both increased in 1994. Production rose by 0.2 million tonnes, and exports increased by 0.4 million tonnes. Newsprint prices have continued to increase gradually since 1992, when they hit their lowest level in 13 years.

1994	Million tonnes	Change	
		1 year	10-year average
Production	9.3	+2.0%	+0.5%
Exports *	9.4	+4.1%	+1.5%
Consumption	1.1	-0.8%	+0.7%

\* The 1994 increase in exports over production is attributed to the use of existing inventory.

Sources: Canadian Pulp & Paper Association/Canadian Forest Service



# Glossary

**Adaptive Management Area**

**(AMA):** Stands or forest types that require similar management practices and are grouped as one unit for the purposes of silviculture management.

**Agroforestry:** A collective name for land-use systems and practices in which trees and shrubs are deliberately integrated with non-woody crops and/or animals on the same land area for ecological and economic purposes.

**Annual allowable cut (AAC):** The amount of timber that is permitted to be cut annually from a particular area. AAC is used as the basis for regulating harvest levels to ensure a sustainable supply of timber.

***Bacillus thuringiensis* var. *kurstaki* (Btk):** A biological insecticide developed in Canada. This natural bacterium, which occurs in soils, is sprayed on forests to combat damaging insects.

**Biodiversity (biological diversity):** Refers to the variety of life on three different levels: the variety of ecosystems (ecosystem diversity), the variety of species (species diversity) and the variety within species (genetic diversity).

**Biomass:** The dry weight of all organic material, living or dead, above or below the soil surface.

**Boreal forest:** One of three main forest zones in the world; it is located in northern regions and is characterized by the predominance of conifers.

**Buffer:** A strip of land where disturbances are not allowed, or are closely monitored, to preserve aesthetic and other qualities adjacent to roads, trails, waterways and recreation sites.

**Chain of custody:** The process of monitoring the production and distribution of goods from the forest to the end-product, i.e., tracing the origin of the product.

**Clearcutting:** A forest management method that involves the complete felling and removal of a stand of trees. Clearcutting may be done in blocks, strips or patches.

**Coniferous:** Refers to a forest stand or category of trees or bush that is popularly called “evergreen.” The wood of conifers is commercially known as “softwood.”

**Crown land:** Public land that is managed by the national or provincial/territorial government.

**De-inking:** A process that removes the inks, coatings and other contaminants from waste papers so that the fibres can be recycled into new products.

**Desertification:** The transformation of once-productive arid and semi-arid areas into deserts through prolonged drought or continued mismanagement of land and water resources.

**Ecosystems:** A dynamic system of plants, animals and other organisms, together with the non-living components of the environment, functioning as an interdependent unit.

**Endangered species:** Species that are threatened with imminent extinction; includes species whose numbers or habitats have been reduced to critical levels.

**Even-aged forest:** A forest stand or type in which relatively small age differences (10–20 years) exist between individual trees.

**Extirpated species/extirpation:** Refers to the local extinction of a species that is no longer found in a locality or country, but exists elsewhere in the world.

**Forest type:** A group of forest areas or stands whose similar composition (species, age, height and density) differentiates it from other such groups.

**Gross Domestic Product (GDP):**

A measure of national income — the amount paid to Canadians in terms of salaries, wages, profits and taxes.

**Hardwood(s):** Trees that lose their leaves in autumn; also refers to the wood produced by these trees. Hardwoods belong to the botanical group angiospermae and are the dominant type of tree in the deciduous forest.

**Heritage forests:** Proposed name for the highly protected sites within Canada's forest land. These sites, designated by federal and provincial agencies, are classified according to the World Conservation Union categories and are protected by legislation from commercial harvesting.

**Integrated resource management:**

A holistic approach to resource management that entails the management of two or more resources (e.g., water, soil, timber, pasture, wildlife and recreation) and that integrates the values of the community into the design of policies or projects to use and sustain these resources in perpetuity.

**Lichen:** An algae and a fungus growing in symbiotic association on solid surfaces such as rocks or tree bark.

**Light framing lumber:** Lumber that is 5–10 cm thick and 5–10 cm wide. It is used in a large variety of general construction applications.

**Old-growth forest:** A stand dominated by mature or overmature trees that has not been significantly influenced by human activity. The stand can contain various ages and species of vegetation.

**Pest:** An organism capable of causing material damage. Forest pests include insects, tree diseases and noxious fungi.

**Pictograph:** An ancient or prehistoric drawing or painting on a rock wall.

**Plantation:** A stand of trees that has been grown through direct seeding or by planting seedlings.

**Protected area:** An area protected by legislation, regulation or land-use policy to control the level of human occupancy or activities. Categories of protected areas include protected landscapes, national parks, multiple-use management areas, and nature (wildlife) reserves.

**Protection forests:** Proposed name for forests protected from harvesting by policy. These forests usually protect sensitive sites, such as watersheds and steep slopes.

**Pulp:** Wood chips that have been ground mechanically into fibres and are used for the production of inexpensive paper, such as newsprint, or that have been chemically treated to remove the lignin and are used to manufacture higher quality papers.

**Reforestation:** The reestablishment of trees on denuded forest land by natural or artificial means, such as planting and seeding.

**Regeneration:** The continuous renewal of a forest stand. Natural regeneration occurs gradually with seeds from adjacent stands or with seeds brought in by wind, birds or animals. Artificial regeneration involves direct seeding or planting.

**Roundwood:** Round sections of tree stems with or without bark, such as logs and bolts.

**Seed-tree method:** A method of regenerating a forest stand that involves removing all of the trees from an area in a single cut, except for a small number of seed-bearing trees. The objective is to create an even-aged stand.



**Selection cutting:** Annual or periodic cutting of trees in a stand in which the trees vary markedly in age. The objective is to recover the yield and maintain an uneven-aged stand structure, while creating the conditions necessary for tree growth and seedling establishment. Differs from selective cutting, in which the most valuable trees are harvested without regard for the condition of the residual stand.

**Shelterwood cutting:** A method of harvesting that involves two cuts: the first cut leaves trees at intervals to provide the canopy and species required for natural regeneration; the second cut harvests the resulting new crop of trees (which are fairly even-aged).

**Silviculture:** The theory and practice of controlling the establishment, composition, growth and quality of forest stands. Can include basic silviculture (e.g., planting and seeding) and intensive silviculture (e.g., site rehabilitation, spacing and fertilization).

**Softwood(s):** Cone-bearing trees with needles or scale-like leaves; also refers to the wood produced by these trees. Softwoods belong to the botanical group gymnospermae and are the predominant tree type in coniferous forests.

**SPF (spruce-pine-fir):** Canadian woods of similar characteristics that are grouped as one lumber type for production and marketing purposes. SPF species range in colour from white to pale yellow.

**Stumpage fees:** The fees paid by an individual or company for the right to harvest timber from public forests or privately owned forest land.

**Succession:** Changes in the species composition of an ecosystem over time, often in a predictable order. In forests, it refers to the sequence of one community of plants gradually replacing another.

**Temperate forest:** The woodland of rather mild climatic areas; composed mainly of deciduous trees.

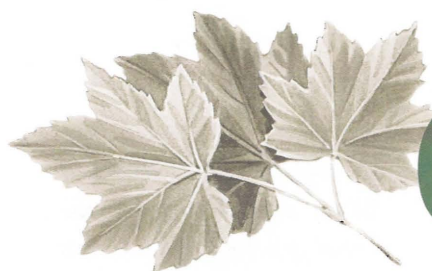
**Thinning:** A partial cutting or spacing operation made in an immature forest stand to accelerate the growth of the remaining trees.

**Threatened species:** A species that is likely to become endangered if certain pressures are not reversed.

**Tropical forest:** A tropical woodland with an annual rainfall of a least 250 cm; marked by broad-leaved evergreen trees forming a continuous canopy.

**Vulnerable species:** A species that is considered at risk because it exists in low numbers or in restricted ranges, due to loss of habitat or other factors.

**Watershed:** An area of land that is drained by underground or surface streams into another stream or waterway.



# Contacts

The following organizations can provide you with more information about Canada's forest resources and commitment to achieving sustainable forests.



## NATIONAL FOREST STRATEGY COALITION

### Secretariat

#### National Forest Strategy Coalition

Sir William Logan Building  
8th floor, 580 Booth Street  
Ottawa ON K1A 0E4  
Phone: (613) 947-9087  
(613) 947-7371  
Fax: (613) 947-9038

#### Alberta Forest

##### Products Association

200 – 11738 Kingsway Avenue  
Edmonton AB T5G 0X5  
Phone: (403) 452-2841  
Fax: (403) 455-0505

#### Association of University Forestry Schools of Canada

c/o Office of the Dean  
Faculty of Forestry and Geomatics  
Room 1151, Abitibi-Price Hall  
Laval University  
Ste-Foy QC G1K 7P4  
Phone: (418) 656-2116  
Fax: (418) 656-3177  
Electronic mail:  
claude.godbout@ffg.ulaval.ca

#### Association of University Forestry Schools of Canada

c/o School of Forestry  
Lakehead University  
955 Oliver Road  
Thunder Bay ON P7B 5E1  
Phone: (807) 343-8511  
Fax: (807) 343-8116

#### Canadian Federation of Woodlot Owners

88 Prospect Street West  
Fredericton NB E3B 2T8  
Phone: (506) 459-2990  
Fax: (506) 459-3515

#### Canadian Forest Service

Natural Resources Canada  
8th floor, 580 Booth Street  
Ottawa ON K1A 0E4  
Phone: (613) 947-7400  
Fax: (613) 947-7395

#### Canadian Forestry Association

203 – 185 Somerset Street West  
Ottawa ON K2P 0J2  
Phone: (613) 232-1815  
Fax: (613) 232-4210

#### Canadian Institute of Forestry

606 – 151 Slater Street  
Ottawa ON K1P 5H3  
Phone: (613) 234-2242  
Fax: (613) 234-6181  
Electronic mail:  
103741.553@compuserve.com

#### Canadian Nature Federation

520 – 1 Nicholas Street  
Ottawa ON K1N 7B7  
Phone: (613) 562-3447  
Fax: (613) 562-3371  
Electronic mail: cnf@web.net

#### Canadian Pulp and Paper Association

19th floor, Sun Life Building  
1155 Metcalfe Street  
Montreal QC H3B 4T6  
Phone: (514) 866-6621  
Fax: (514) 866-3035  
Electronic mail: cppacda@ibm.net

#### Canadian Silviculture Association

c/o Brinkman and Associates  
Reforestation  
520 Sharpe Street  
New Westminster BC V3M 4R2  
Phone: (604) 521-7771  
Fax: (604) 520-1968  
Electronic mail:  
brinkman@mindlink.BC.com

#### Canadian Wildlife Federation

2740 Queensview Drive  
Ottawa ON K2B 1A2  
Phone: (613) 721-2286  
Fax: (613) 721-2902  
Internet site:  
<http://www.toucan.net/cwf-fcf/cwfhome.html>

#### Council of Forest Industries

1200 – 555 Burrard Street  
Vancouver BC V7X 1S7  
Phone: (604) 684-0211  
Fax: (604) 687-4930

#### Gouvernement du Québec

Ministère des Ressources naturelles  
10<sup>e</sup> étage  
880, chemin Sainte-Foy  
Québec QC G1S 4X4  
Phone: (418) 643-3987  
Fax: (418) 646-4335

#### Government of Alberta

Department of Environmental  
Protection  
9915 – 108 Street  
Edmonton AB T5K 2C9  
Phone: (403) 427-3542  
Fax: (403) 422-6068  
Internet site:  
<http://www.gov.ab.ca/~env/>



**Government of British Columbia**

Ministry of Forests  
4th floor, 595 Pandora Avenue  
Victoria BC V8W 3E7  
Phone: (604) 387-1285  
Fax: (604) 387-6267

**Government of Manitoba**

Department of Natural Resources  
327 Legislative Building  
Winnipeg MB R3C 0V8  
Phone: (204) 945-3785  
Fax: (204) 948-2403

**Government of New Brunswick**

Department of Natural Resources  
and Energy  
P.O. Box 6000  
Fredericton NB E3B 5H1  
Phone: (506) 453-2501  
Fax: (506) 453-2930

**Government of Newfoundland  
and Labrador**

Department of Forest Resources  
and Agrifoods  
P.O. Box 8700  
5th floor, Confederation Building  
West Block  
St. John's NF A1B 4J6  
Phone: (709) 729-4720  
Fax: (709) 729-2076  
Electronic mail:  
hstanley@dnr.gov.nf.ca

**Government of the  
Northwest Territories**

Department of Renewable Resources  
600, 5102 – 50th Avenue  
Yellowknife NT X1A 3S8  
Phone: (403) 873-7420  
Fax: (403) 873-0114

**Government of Nova Scotia**

Department of Natural Resources  
P.O. Box 698  
2nd floor, Founder's Square  
1701 Hollis Street  
Halifax NS B3J 2T9  
Phone: (902) 424-4121  
Fax: (902) 424-7735  
Internet site:  
<http://www.gov.ns.ca/natr/>

**Government of Ontario**

Ministry of Natural Resources  
Whitney Block  
99 Wellesley Street West  
Toronto ON M7A 1W3  
Phone: (416) 314-2150  
Fax: (416) 314-2159

**Government of  
Prince Edward Island**

Department of Agriculture,  
Fisheries and Forestry  
P.O. Box 2000, Jones Building  
11 Kent Street  
Charlottetown PE C1A 7N8  
Phone: (902) 368-4830  
Fax: (902) 368-4846  
Electronic mail:  
rmfrancis@gov.pe.ca

**Government of Saskatchewan**

Department of Environment  
and Resource Management  
3211 Albert Street  
Regina SK S4S 5W6  
Phone: (306) 787-2930  
Fax: (306) 787-2947

**Government of Yukon**

Department of Renewable Resources  
P.O. Box 2703  
Whitehorse YT Y1A 2C6  
Phone: (403) 667-5634  
Fax: (403) 667-2438

**Industrial, Wood and Allied  
Workers of Canada (IWA)**

500 – 1285 West Pender Street  
Vancouver BC V6E 4B2  
Phone: (604) 683-1117  
Fax: (604) 688-6416

**Maritime Lumber Bureau**

P.O. Box 459  
Amherst NS B4H 4A1  
Phone: (902) 667-3889  
Fax: (902) 667-0401

**National Aboriginal  
Forestry Association**

875 Bank Street  
Ottawa ON K1S 3W4  
Phone: (613) 233-5563  
Fax: (613) 233-4329

**National Round Table on the  
Environment and the Economy**

1500 – 1 Nicholas Street  
Ottawa ON K1N 7B7  
Phone: (613) 995-7519  
Fax: (613) 992-7385  
Electronic mail:  
admin@nrtee-trnee.ca

**Ontario Forest Industries  
Association**

1700 – 130 Adelaide Street West  
Toronto ON M5H 3P5  
Phone: (416) 368-6188  
Fax: (416) 368-5445  
Electronic mail:  
73573.2032@compuserve.com

**Prince Edward Island Nature Trust**

P.O. Box 265  
Charlottetown PE C1A 7K4  
Phone: (902) 892-7513  
Fax: (902) 628-6331  
Electronic mail: intrust@isn.net

**Wildlife Habitat Canada**

200 – 7 Hinton Avenue North  
Ottawa ON K1Y 4P1  
Phone: (613) 722-2090  
Fax: (613) 722-3318



**MODEL  
FOREST  
NETWORK**

### Canadian model forests

#### **Eastern Ontario Model Forest**

P.O. Bag 2111  
Concession Road  
Kemptville ON K0G 1J0  
Phone: (613) 258-7403  
Fax: (613) 258-5664

#### **Foothills Model Forest**

P.O. Box 6330  
1176 Switzer Drive  
Hinton AB T7V 1X6  
Phone: (403) 865-8329  
Fax: (403) 865-8266

#### **Fundy Model Forest**

R.R. #4  
Aiton Road  
Sussex NB E0E 1P0  
Phone: (506) 432-2806  
Fax: (506) 432-2807

#### **Lake Abitibi Model Forest**

P.O. Box 550  
1 Park Street  
Iroquois Falls ON P0K 1E0  
Phone: (705) 258-4278  
Fax: (705) 258-4089

#### **Long Beach Model Forest**

P.O. Box 1119  
243 Main Street  
Ucluelet BC V0R 3A0  
Phone: (604) 726-7263  
Fax: (604) 726-7269

#### **Lower St. Lawrence Model Forest**

284, rue Potvin  
Rimouski QC G5L 7P5  
Phone: (418) 722-7211  
Fax: (418) 723-6045

#### **Manitoba Model Forest**

P.O. Box 10  
Mill Road  
Pine Falls MB R0E 1M0  
Phone: (204) 367-8895  
Fax: (204) 367-8897

#### **McGregor Model Forest**

P.O. Box 9000  
6677 Indian Reserve Road  
Prince George BC V2L 4W2  
Phone: (604) 962-3549  
Fax: (604) 962-3364

#### **Prince Albert Model Forest**

P.O. Box 2406  
77 – 11th Street West  
Prince Albert SK S6V 7G3  
Phone: (306) 992-1944  
Fax: (306) 763-6456

#### **Western Newfoundland Model Forest**

89 West Valley Road  
Corner Brook NF A2H 2X4  
Phone: (709) 634-6383  
Fax: (709) 634-0255

### Malaysian model forest

#### **Bentong Model Forest\***

Forestry Department Headquarters  
Peninsular Malaysia 50660  
Kuala Lumpur, Malaysia

### Mexican model forests

#### **Calakmul Model Forest**

Consejo Regional de X'Pujil  
Domicilio Conocido  
Zoh Lajuna, Campeche Mexico

#### **Chihuahua Model Forest**

Ave. Ocampo 411-A  
Col. Centro  
Chihuahua, Chihuahua  
CP31000 Mexico

#### **Mariposa Monarca Model Forest\***

Comision Promotora para el  
Desarrollo de la Region de la  
Mariposa Monarca  
Madero Pte. 1110  
Morelia, Michoacan  
CP58000 Mexico

### Russian model forest

#### **Gassinski Model Forest**

Khabarovsk Forestry Administration  
71 Frunze str.  
Khabarovsk, 680620 Russia

### United States model forests

#### **Applegate Model Forest**

Bureau of Land Management  
Medford District  
3040 Biddle Road  
Medford OR 97504 USA

#### **Cispus Model Forest**

USDA Forest Service  
Randle Ranger District  
P.O. Box 670  
Randle WA 98377 USA

#### **Hayfork Model Forest**

Weaverville Ranger District  
P.O. Box 1190  
Weaverville CA 96093-1190 USA

*\* These sites are being considered  
for model forests.*

## INTERNATIONAL DEVELOPMENT ASSISTANCE

#### **Canadian International**

#### **Development Agency (CIDA)**

CIDA Forestry Advisers Network  
200, promenade du Portage  
Hull QC K1A 0G4  
Phone: (819) 997-6586  
Fax: (819) 953-3348  
Electronic mail:  
<http://www.dowco.com/designnet/cfan>



# Forest Regions of Canada

 Natural Resources Canada  
 Ressources naturelles Canada  
 Canadian Forest Service  
 Service canadien des forêts



# Canadian Forest Service

## National Science and Technology Networks



### **HQ CFS Headquarters**

580 Booth Street  
Ottawa ON K1A 0E4  
Phone: (613) 947-7341 Fax: (613) 947-7396

### **① CFS – Atlantic Forestry Centre**

P.O. Box 4000  
Regent Street  
Fredericton NB E3B 5P7  
Phone: (506) 452-3500 Fax: (506) 452-3525  
*Lead centre for the biodiversity and forest health networks. Associated with this Centre is a research unit in Newfoundland.*

### **② CFS – Laurentian Forestry Centre**

1055 du P.E.P.S. Street  
P.O. Box 3800  
Sainte-Foy QC G1V 4C7  
Phone: (418) 648-5850 Fax: (418) 648-5849  
*Lead centre for the tree biotechnology and advanced genetics network. Co-lead for the ecosystem processes network.*

### **③ CFS – Great Lakes Forestry Centre**

P.O. Box 490  
1219 Queen Street East  
Sault Ste. Marie ON P6A 5M7  
Phone: (705) 949-9461 Fax: (705) 759-5700  
*Lead centre for the pest management methods network.  
Co-lead for the ecosystem processes network.*

### **④ CFS – Northern Forestry Centre**

5320 – 122 Street  
Edmonton AB T6H 3S5  
Phone: (403) 435-7210 Fax: (403) 435-7359  
*Lead centre for the fire management, climate change and socio-economics networks.*

### **⑤ CFS – Pacific Forestry Centre**

506 West Burnside Road  
Victoria BC V8Z 1M5  
Phone: (604) 363-0600 Fax: (604) 363-0775  
*Lead centre for the landscape management and effects of forestry practices networks.*

**Note: Lead centres have responsibility for the corporate leadership and management of the science and technology networks denoted.**