

THE STATE OF CANADA'S FORESTS

learning from history



1996 - 1997



Natural Resources
Canada
Canadian Forest
Service

Ressources naturelles
Canada
Service canadien
des forêts

Canada

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Cat. Fo1-6/1997 E

ISBN 0-662-26146 1

The National Library of Canada has catalogued this publication as follows:

Main entry under title: State of Canada's Forests ...

Annual.

Description based on 1991 -

Issued also in French under title: L'état des forêts au Canada.

Bibliographic address varies: 1993- , Canadian Forest Service.

ISSN 1183-353-X

1. Forests and forestry – Canada – Periodicals.

2. Forest policy – Canada – Periodicals.

I. Canada. Forestry Canada.

II. Canadian Forest Service.

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) 947-7341

Fax: (613) 947-7396

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



Printed on recycled paper

Cover Background: National Archives of Canada/

Neg. no. NMC 6338

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Message from the Minister

Learning from History

It is an honour for me to present to Parliament the seventh report on the state of Canada's forests. These reports provide Canadians, and indeed the world, with current information on the condition of Canada's forests and discuss a range of important forest-related issues. Not only are forests vital to our health and environment, they are also key to the economic stability of hundreds of Canadian communities. More and more, forests are seen as integrated ecosystems with a wide range of features that are valued by the public.

As reflected throughout this year's report, Canada is moving rapidly into a new era in managing its forest heritage. Indeed, our interests, views and knowledge regarding forests have evolved dramatically over the past few centuries.

Today, collectively, provinces, territories and the federal government are pursuing various initiatives with the forest community to measure our progress toward sustainable forest management: provincial forest legislation has been strengthened, codes of practice have been developed, and more forested areas are being protected.

Canadians are being offered more opportunities to influence how their forests are managed. Through partnership with all of the provinces and territories, we have embarked on an initiative to define, measure and report on the values that are important to Canadians. We have extended the Model Forest Program for five years, established an Aboriginal model forest and are working with the Canadian Council of Forest Ministers to develop a successor to the National Forest Strategy. We are working to increase the participation of Aboriginal peoples in the sustainable forest management process.

Internationally, Canada has been a major participant in the global dialogue on key forest issues. With the support of all provinces and territories, industry and academia, and in partnership with many other countries, we are continuing to promote the need for an international forest convention as the best means of dealing with sustainable forest management in a comprehensive and balanced way.

As described in this report, Canada is truly committed to demonstrating that it is a responsible steward of 10% of the world's forests. Through our partnership approach, we are working together to sustainably manage our forests for the benefit of present and future generations.



Ralph Goodale
Minister of
Natural Resources Canada

A stylized, handwritten signature in dark ink, appearing to read 'R. Goodale'.

Ralph Goodale

Highlights

Canada's Forests

Canada is one of the few nations where the forest is predominately publicly owned. Forests cover 417.6 million hectares or 45% of Canada's landbase; 56% of these forests are capable of growing commercial tree species. However, only half of the commercial forest is currently managed for timber production, and more than 7.6% of forested areas are protected from harvesting by legislation. At least 140 000 species in Canada rely on forests for food and shelter.

Between 1980 and 1994, fire, insects and disease affected more area in the commercial forest than harvesting. Over the 15-year period, an average of 902 000 hectares were harvested annually, compared to the 1.26 million hectares disturbed by fire, insects and disease. Much of the forests in Canada are affected by fires on a regular basis. Each year, forest fires account for the loss of an average 70 million m³ of wood valued at \$1 billion. In 1996, 1.7 million hectares were burned by forest fires, an area lower than the annual average during the previous 10 years.

More than 20 million hectares regenerated naturally, and more than 5.59 million hectares were planted or seeded between 1980 and 1994. In 1994, commercial species were not yet growing on 3.03 million hectares of the commercial forest more than 10 years after harvesting. However, recent studies indicate that since 1993, the area not growing commercial species 10 years after harvesting is decreasing.

Although clearcutting is still the predominant method of harvesting in Canada, the use of selection cutting is increasing. Moreover, guidelines on clearcutting have changed substantially over the past 20 years to maintain wildlife habitat, protect soils and retain natural landscape patterns.

Depending on Forests

There are 337 forest dependent communities in Canada (i.e., where the forest sector accounts for more than 50% of the community's base income). These communities are changing rapidly, resulting in instability that affects their overall social conditions. Some communities are growing, others are declining, and many more are becoming less reliant on forest products industries.

Learning from Aboriginal Knowledge

Canada's Aboriginal communities have a unique relationship with forests and wildlife. Governments are recognizing that ecological knowledge is an important tool in managing forests. In many regions of Canada, Aboriginal ecological knowledge is being integrated into forest management planning activities.

Changing Needs Reflect on Employment...

In 1996, Canada's forests directly or indirectly employed 1 in 16 people (an estimated 842 000 jobs). New technologies and the requirement for increased knowledge of ecosystems are changing the very nature of forest sector jobs. In 1996, the federal and provincial governments provided substantial financial assistance for silviculture-related activities on private woodlots. The federal government also provided increased opportunities for First Nation communities to develop forest-related businesses.

...and on Forest Legislation

Over the past 100 years, the legislation and policies governing Canada's forests have evolved to reflect the changing social values of the nation. Since the first regulations were placed on the harvesting of logs destined for Britain's shipyards in the 18th Century, provincial and territorial governments have introduced laws and policies to conserve and manage forests for multiple uses. Some provinces have amended their forest legislation and regulations to address Aboriginal rights, and several provinces have passed heritage legislation to protect Aboriginal sites. With the increasing globalization of trade and the emergence of international obligations regarding forest management and trade, the federal government also is playing a key role in the sustainability of Canada's forests.

Defining and Measuring Forest Sustainability in Canada...

Faced with public concern about forest management, governments in consultation with the entire forest community, have developed a framework to measure the progress towards sustainable forest management. The framework identifies the many values Canadians want to sustain and enhance. Scientists are now working with policy-makers to develop the new tools and methodologies required to measure and report on forest sustainability by 2000.

...and Abroad

Canada is also playing a leadership role in international efforts to define and measure forest sustainability. Canada and 11 other countries have collaborated to develop national criteria and indicators for the conservation and sustainable management of boreal and temperate forests outside Europe (known as the "Montreal Process"). In addition, Canada has been promoting the need for an international forest convention that would level the playing field for the forests products trade by establishing common commitments for sustainability while recognizing the different forest ecosystems and needs of individual nations. Global stewardship of forests through a forest convention would help all nations enhance the capacity of their forests to respond to the increasing demands of a growing world population.

Voicing our Opinions

Today, governments and forest companies are providing citizens with increased opportunities to voice their views, interests and concerns regarding the use and management of their forests. Although public participation can be time consuming as well as costly, it allows individuals and interest groups to participate in decisions that will affect them on an economic, ecological or spiritual level. Many provinces and territories now have legislation that requires public participation to become a part of the forest management planning process.

Canada's Forests

An Overview

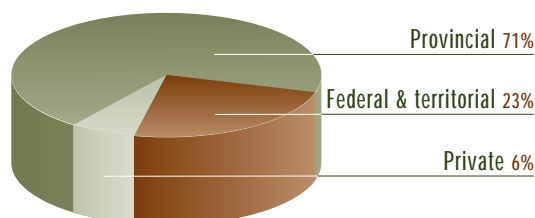
Canada has one of the largest continuous forested areas in the world. Our forests cover 417.6 million hectares and account for 10% of the world's total forest land. There are eight forest regions in Canada, ranging from the towering rainforests in coastal British Columbia, to the sparse and slow-growing forests found at the Arctic tree line. In addition, the 1996 National Ecological Framework divides Canada into 15 terrestrial ecozones, 194 ecoregions and more than a thousand ecodistricts. (*The location of the ecozones are shown in the tear-out map at the end of the report.*)

Canada's forests are composed of 63% softwoods, 22% hardwoods and 15% mixedwoods. Mostly, our forests are composed of even-aged stands that were established following major disturbances, such as fires and insect outbreaks. Clearcut harvesting, which is used extensively in our boreal forest region, mimics these natural disturbances to a great extent and encourages natural regeneration. These stands are dominated by species that grow in full sunlight: jack pine, lodgepole pine, black spruce, trembling aspen and white birch.

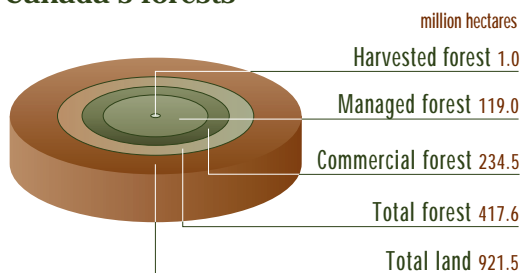
Canada is one of the few forested nations whose forests are mostly public property—71% of our forested land is owned by the provinces; 23%, by the federal and territorial governments; and the remaining 6%, by 425 000 private landowners.

Approximately 56% of our forest land can grow commercial species of trees; however, only half of this area is accessible and managed for timber production, and on an annual basis, less than one half of one percent of the commercial forest is harvested. Also, governments have set aside large portions of forests as protected areas. In 1995, some 7.6% of Canada's forest land was protected by legislation, in addition to the forests protected by provincial policies.

Forest land ownership

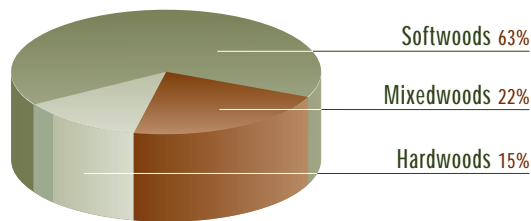


Canada's forests



Forest management is a provincial responsibility. Each province regulates forest activities within its jurisdiction and has developed comprehensive forest legislation and regulations. The use of short and long term planning frameworks are common to all jurisdictions. The Northwest Territories manage their own forest activities, whereas in the Yukon Territory, forest management is a responsibility of the federal Department of Indian Affairs and Northern Development.

Forest types in the commercial forest

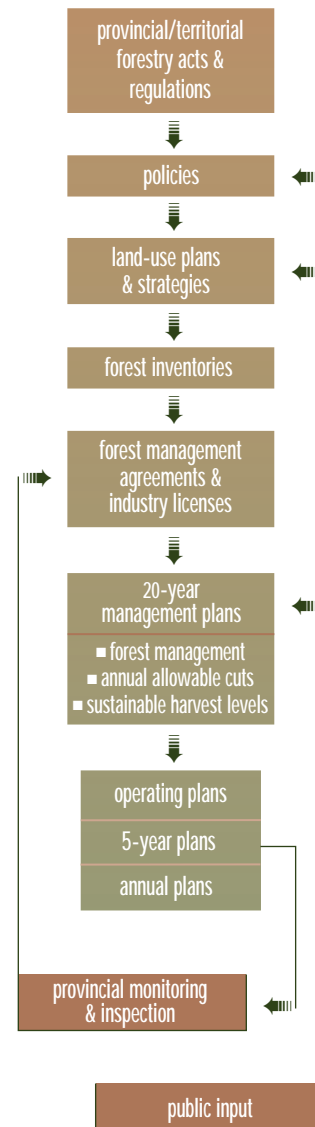


The federal government's role in forestry focuses on science and technology, international relations, trade and investment, national statistics, Aboriginal affairs and environmental regulations.

Canada's forests draw large numbers of visitors from home and abroad who enjoy wilderness activities ranging from hiking and wildlife photography to hunting and camping. Other pastimes, such as bird-watching and mountain biking, are becoming more and more popular.

Canada leads the way in bringing high-quality forest products to worldwide markets while taking into account the interests of a broad spectrum of forest users. Provincial government agencies are working closely with forest industries, Aboriginal groups and environmental organizations to incorporate recreational, social, wildlife and economic values into forest management plans. This cooperation is vital as 1 in 16 people is directly or indirectly employed in the forest sector, and forests are the mainstay of hundreds of communities across Canada. Many of these communities are experiencing shifts in traditional employment patterns. In order to remain competitive and provide employment, both federal and provincial governments are working together to create employment initiatives with private woodlot owners to ensure sustainable forest practices and create employment in rural areas.

Forest management planning framework



ONE

CHAPTER ONE

Year in Review

1996–1997

In the past several years, Canada has worked to promote sustainable forest management worldwide. Governments, Aboriginals, environmental groups and industries are collaborating to sustain economic growth, environmental health, while protecting cultural areas and wildlife habitat in Canada's forests.

CREATING OPPORTUNITIES

Employment at the Forefront...

Forest sector employment is changing, in part due to the increased mechanization of harvesting and other forest-related activities. In response, the federal and provincial governments are working with forest industries to expand opportunities in secondary manufacturing and alternative employment, including tourism and recreation.

In October 1996, the **federal** and **Newfoundland** governments announced a three-year, \$20-million program that will provide jobs for approximately 1 500 people, mostly in silviculture-related activities. In August 1996, the **federal** and **New Brunswick** governments announced a joint three-year, \$12-million initiative to support forest management activities, such as reforestation and thinning, on private woodlots. The agreement is expected to create more than 500 jobs. And in March 1997, the **federal** government and woodlot owner associations in the Lower St. Lawrence region of **Quebec** announced a \$15.8-million project to integrate non-timber activities involving wildlife, hydrology and landscape with silviculture operations on private forest land.

Over the past year, forestry surpassed tourism as **Alberta's** third largest primary economic sector next to agriculture and energy. More than 50 communities depend on Alberta's forest industry as a major source of employment and revenue. The Alberta Forest Products Association estimates that forest

companies spend approximately \$2 billion annually on salaries, construction, property taxes, energy costs, road construction, research and development, and woodlands operations.

Efforts to stop Dutch elm disease in **Alberta** were strengthened in March 1997, when the **federal** government announced a two-year, \$1.37-million job-creation grant. The grant will enable the Society to Prevent Dutch Elm Disease to hire as many as 75 full- and part-time workers to complete an inventory of the province's elm trees and to explore the benefits of supplying free firewood at campgrounds. (Beetle-infested firewood is one of the chief sources attributed to the spread of the disease.)

In October 1996, the Forest Renewal BC Value-Added Skills Centre opened in Abbotsford, **British Columbia** (BC), to help address the current and projected shortage of skilled workers. Touted as the first industry-led forestry training facility in the world, the Centre is the result of joint efforts by Forest Renewal BC and the BC Wood Specialties Group. Initially, training will be offered to 600 students over a five-year period.

In June 1997, **BC** announced a jobs and timber accord that is the next step in the Province's long-term plan to renew its forests and sustain the communities that depend on them. The accord commits government and industry to creating almost 40 000 direct and indirect jobs over the next four years. It will also put more value into the wood harvested and, through responsible investment, will increase the growth, yield and value of the available timber without compromising the Province's environmental standards.

IN 1996-1997, FOREST RENEWAL **BC** INVESTED \$396 MILLION IN THE PROVINCE'S FORESTS THROUGH ENHANCED SILVICULTURE, WATERSHED RESTORATION, IMPROVED RESOURCE INVENTORIES, ENVIRONMENTAL RESEARCH, VALUE-ADDED ACTIVITIES AND WORKFORCE ADJUSTMENT. THESE MEASURES WILL INCREASE COMMUNITY STABILITY AND CREATE 6 300 PERSON YEARS OF EMPLOYMENT.

Aboriginals Join in...

Most of Canada's Aboriginal communities are located in forested regions. Aboriginal peoples have a deep attachment to the forests in which they live and gather food. Governments, Aboriginals and industries are working together to provide forest-related employment for Aboriginal groups and to ensure the protection of hunting, fishing and ceremonial grounds.

In April 1997, MacMillan Bloedel Ltd. and the five Clayoquot Sound area Nuu-Chah-Nulth bands in **BC** agreed to form a joint venture forest company—as yet unnamed—that will be owned 51% by First Nations and 49% by MacMillan Bloedel. The company will operate in the northern portion of Clayoquot Sound, an area included in MacMillan Bloedel's current tree farm licence. The agreement addresses First Nation cultural, environmental and

economic aspirations, brings more certainty to Clayoquot Sound's economic future, and is expected to smooth the transition after the conclusion of the treaty making process.

Private Woodlots on the Public Agenda...

Private woodlots supply their owners with fuel, sawlogs, maple syrup and recreational opportunities, and they have always been an integral part of rural Canada. Governments are working with woodlot owners to ensure the long-term preservation and sustainability of private forest lands.

IN MAY 1996, **NOVA**
SCOTIA ANNOUNCED
\$6.4 MILLION IN FUNDING
FOR FOREST DEVELOPMENT
ON PRIVATE LANDS.
UNDER THE PROGRAM,
INCENTIVES WILL BE
AVAILABLE FOR WOODLOT
OWNERS TO HELP OFFSET
THE COST OF SITE
PREPARATION, PLANTING,
THINNING AND OTHER
SILVICULTURE TREATMENTS
UNDERTAKEN IN
1996–1997.

The decisions taken at the 1995 Quebec Summit on Private Forests were implemented in 1996. During the Summit, the **Quebec** government and representatives of the private sector (woodlot owners, wood manufacturers and municipalities) had agreed to put in place a forest resource development and protection regime for private forests as well as create regional forest development agencies. In June 1996, Quebec amended its Forest Act to include six sustainable forest management criteria, to enable the creation of private forest development agencies, and to provide assistance to private woodlot owners. Since then, 17 regional private forest development agencies have been established. It is estimated that Quebec, woodlot owners and industry will invest \$40 million per year to develop private woodlots (Quebec's share is \$24 million).

In January 1997, **Ontario** announced changes to the property tax system that will enable more than 100 000 woodlot owners to apply for a reduced tax rate after submitting a detailed plan outlining their forest management objectives. Currently, woodlots are taxed at the rate for residential land, and owners are eligible for a rebate of up to 75%. Under the new system, which will come into effect in 1998, woodlots will be assessed similarly to farmland and will be taxed initially at 25% of the residential rate. In addition, the minimum size for a woodlot to be considered eligible has fallen from 10.1 to 4.0 hectares.

Manitoba's Private Land Forests Program saw roughly 100 woodlot management plans completed during 1996; approximately 24 300 hectares of forested land are now under management. Tree planting remains a major woodlot activity across the province, with more than 88 000 seedlings planted in 1996–1997.

Technology Leads the Way...

Canada is one of the world's largest producers of lumber and pulp and paper products. To remain competitive in international markets, Canada will need to continue to find new ways of manufacturing these products in a cost-effective and efficient manner.

In 1996, **Stora Port Hawkesbury Ltd.** began construction of a \$750-million expansion in **Nova Scotia** and will become North America's first producer of SC-A paper (a white, uncoated magazine paper). In addition, three of the province's pulp and paper mills and one sawmill achieved certification under the ISO 9000 standard (a family of standards for quality management and quality assurance).

In 1996, the **Alberta Research Council** opened a forest products laboratory that will allow it to undertake a larger number and broader range of projects on behalf of industry. One of the important aspects of the new lab is its state-of-the-art production line that can produce full-size 4x8-foot panels on a continuous basis, enabling it to produce panels for test markets.

In October 1996, Canada's **pulp and paper industry** and the **federal** government unveiled a five-year, \$88-million research program to develop the concept of system closure. By finding efficient ways to re-use more water and other elements in the waste stream, the industry will reduce pollution at the source and operate paper mills that generate virtually no effluent. Added benefits of the program include lower energy and raw material costs, reduced effluent treatment expenditures, greater fibre yield and recovery, and less water usage in the manufacturing processes.

In December 1996, a U.S. Patent (No. 5 587 158) was issued to a **Natural Resources Canada–Canadian Forest Service** research team and assigned to the Crown for a fungus preparation that may be used in commercial thinning operations. More specifically, the invention describes a preparation of the fungus *Chondrostereum purpureum*, as well as methods of producing and applying this biological control agent.

In February 1997, the **federal** government announced a permanent annual allocation of \$47.4 million for an important building block of its science and technology strategy—the Networks of Centres of Excellence Program. The 14 centres retain world-class scientists and researchers and are aimed at encouraging applied research in areas considered critical to Canada's economic and social development. The centres of excellence are also helping develop innovative products and create new opportunities for local business. The Sustainable Forest Management Network is located at the University of Alberta.

Global Dialogue on Forest Issues...

Canada's forests account for 10% of the world's total forest land and are fundamental to the health of our planet. As a major forest nation and a world leader in science and technology, Canada is participating in international discussions on global forest issues.

Countries of the **Montreal Process on Criteria and Indicators (C&I) for the Conservation and Sustainable Management of Temperate and Boreal Forests** (Argentina, Australia, Canada, Chile, China, Japan, the Republic of Korea, Mexico, New Zealand, the Russian Federation, the United States and Uruguay), which together account for approximately 90% of the world's temperate and boreal forests each prepared a publication outlining their ability to report on the C&I.

In September 1996, more than 330 people from 18 countries came together in Victoria, BC, for the **International Conference on Sustaining Ecosystems and People in Temperate and Boreal Forests**. The general focus of the conference was on maintaining the integrity and productivity of ecosystems, including biological diversity and the human communities whose lives and livelihoods are involved.

In November 1996, heads of the forest services from Canada, Mexico and the United States met in Asheville, North Carolina, at the eighteenth session of the **North American Forest Commission**. The Food and Agriculture Organization, which hosted the meeting, described its North American initiatives and sought views on how the role of regional forestry commissions could be strengthened to improve sustainable forest management worldwide.

In March 1997, more than 500 delegates representing thousands of non-governmental organizations in 70 countries convened at the **Rio Plus Five Forum**, an environmental conference. The major objective of the conference was to conduct an independent review of Agenda 21—the global action plan for sustainable development launched at the 1992 Rio Earth Summit—and to produce proposals for world governments to promote its implementation.

In June 1997, world leaders met in New York for the 19th **Special Session of the United Nations General Assembly on Environment and Development** (UNGASS). At the meeting, they reviewed the progress made on sustainable development since the 1992 Rio Earth Summit and advanced the global agenda for promoting sustainable development. For example, they agreed to continue much of the work and momentum of the Intergovernmental Panel on Forests under the new Intergovernmental Forum on Forests, and they agreed to a four-year work plan for the Commission on Sustainable Development,

established to monitor the implementation of Agenda 21. Among other topics, the work plan will focus on freshwater, oceans, sustainable land resources.

MANAGING FOR THE FUTURE

Biodiversity is Key...

One of the principal goals of the 1992 Earth Summit was to conserve our planet's biological diversity. Forest management activities across Canada have changed in recent years to include practices that provide shelter, travel corridors and feeding areas for forest-dwelling species while allowing for commercial timber harvesting.

Introduced in 1996, **Nova Scotia's** endangered species legislation provides for the legal designation of species at risk; the establishment of recovery plans and a species-at-risk conservation fund; protection of critical habitat; and prohibition of the killing, disturbance, sale or trade of species at risk.

Ontario published forest management guidelines for the provision of marten habitat and required that they be used in the preparation of management plans for the boreal forest. Guidelines were also published for pileated woodpecker habitat in the Great Lakes–St. Lawrence forest. Habitat is protected through the retention of cavity trees, dead trees and downed woody debris.

In 1996, the **Canadian Pulp and Paper Association** established a forest biodiversity program to help member companies conserve biological diversity while achieving sustainable forest management. The four-prong program is managed by a full-time biologist and focuses on science, partnership, policy and communication.

In April 1996, **Quebec** announced that it would invest \$274.3 million over the next four years as part of its action plan on biodiversity and its strategy for implementing the Global Convention on Biological Diversity. Quebec will focus on implementing its Forest Protection Strategy; supporting private forest development agencies, forest inventories and forest research; applying the Regulations on Forest Management Standards; and developing forest management practices to safeguard the more fragile components of its forests. Funding activities related to the

IN OCTOBER 1996, **FEDERAL, PROVINCIAL AND TERRITORIAL** WILDLIFE MINISTERS AGREED IN PRINCIPLE TO A NATIONAL APPROACH FOR THE PROTECTION OF SPECIES AT RISK IN CANADA THAT WOULD INCLUDE THE IDENTIFICATION OF SPECIES AT RISK, AND THE PROTECTION AND RECOVERY OF THOSE WHOSE SURVIVAL IS MOST THREATENED. GOVERNMENTS WOULD ESTABLISH COMPLEMENTARY WILDLIFE-RELATED LEGISLATION AND PROGRAMS; AND A COUNCIL OF MINISTERS WOULD PROVIDE DIRECTION, REPORT ON PROGRESS, AND RESOLVE DISPUTES.

development of more efficient, diversified and less-polluting industrial processes also will be beneficial to biological diversity. In addition, Quebec has initiated a program to protect exceptional forest ecosystems and species at risk. And lastly, a study is underway to develop a new landscape management approach that takes into account the forest mosaic.

In October 1996, Montreal, Quebec, hosted the world's largest meeting of conservation experts since the Earth Summit in Rio. More than 3 200 people attended the **World Conservation Congress** (IUCN) and participated in almost 60 workshops and hundreds of informal meetings where they tackled some of the issues left unaddressed at the Earth Summit. Leading natural and social scientists, practitioners and political leaders met to compile and review the data on threatened species, assess the state of the world's protected areas, and address such issues as the impact of climate change on biodiversity.

Protected Areas Grow in Number...

To meet the requirements of international and national agreements, the provinces, territories and federal government are setting aside large tracts of land that are considered ecologically significant. The long-term goal of these initiatives is to preserve a network of protected areas that are representative of Canada's land and fresh water.

IN APRIL 1996, **NEW BRUNSWICK** ANNOUNCED THE CREATION OF ITS FIRST FIVE CONSERVATION AREAS AND ADDED GOVER MOUNTAIN AND LITTLE TOMOOWA LAKE TO ITS GROWING COLLECTION OF ECOLOGICAL RESERVES. THIS ANNOUNCEMENT BROUGHT TO 15 THE NUMBER OF UNIQUE FORESTS THAT WILL BE LEFT UNDISTURBED FOR FUTURE GENERATIONS, ADDED A NEW LEVEL OF PROTECTION ("CONSERVATION AREAS") TO THE PROVINCE'S FOREST MANAGEMENT SYSTEM, AND GAVE A HIGHER LEVEL OF PROTECTION TO 8 149 HECTARES OF WILD LAND.

Prince Edward Island (PEI) has made consistent efforts to protect significant natural areas on private and provincial Crown lands. For example, PEI announced its intention to establish a system of Provincial Forests designated for community-based, multiple-use management.

In February 1997, **Nova Scotia** adopted a strategy, action plan and interim management guidelines for 30 new protected areas. These areas encompass approximately 291 000 hectares (roughly 20%) of the province's Crown land and will be managed for the protection of ecosystem values.

In early 1997, **Ontario** announced the creation of 7 provincial parks and 19 conservation reserves, as well as the expansion of 6 parks by tens of thousands of hectares. For example, after successful negotiations with CN Rail, a 128-km railroad right-of-way was added to Algonquin Park's landbase, and Wabakimi Provincial Park was expanded from 155 000 to almost 900 000

hectares. Also, in 1996, Massasauga became the newest operating provincial park, with 135 interior camp sites, as well as sheltered bays and coves for overnight anchorage by boaters.

In August 1996, **Alberta** designated two more landscapes as protected spaces. Rumsey South, a 15 000-hectare area, is part of the largest remaining tract of aspen parkland in the world. It supports rare species such as the crowfoot violet, Cooper's hawk and prairie vole. Ross Lake, a 1 950-hectare area, is described as nationally significant and is the only large remaining area of Crown land that represents the foothills fescue natural region. It is also home to rare plants and animals, as well as several archaeological features.

In October 1996, **BC** created 23 parks and protected areas in the southwestern portion of the province. The 136 000 hectares of newly preserved land complete the Lower Mainland Protected Area Strategy and protect 14% of the most heavily populated region of BC. A wintering spot for bald eagles, a wilderness home for grizzly bears, and an old-growth forest of Douglas fir and western red cedars are among the sites protected. In February 1997, six protected areas encompassing a further 81 000 hectares were announced in the Vanderhoof region of northern BC. The total protected area now stands at almost 9.5% of the provincial landbase (equivalent to the size of New Brunswick or Scotland). BC has pledged to protect a total of 12% of its landbase.

In October 1996, the **federal** government announced that it had set aside land for two national parks in the **Northwest Territories**. The proposed parks—Wager Bay National Park on the western coast of Hudson Bay and Bathurst Island National Park near the magnetic North Pole—will be protected from mineral and other development until the federal government reaches an agreement with Aboriginal communities and the Government of the Northwest Territories. The Wager Bay area contains caribou calving grounds and polar bear denning areas. This announcement followed the creation of Tutut Nogait Park on the edge of the Arctic Ocean in June 1996.

Forest Management Focused on the Future...

Public concern over the environment in general and forest management in particular has for many years led to questions regarding the sustainability of Canada's forests. Governments are responding to these concerns by enacting more stringent legislation relating to forest management activities.

In February 1997, **Newfoundland** released a draft forest development plan for the province. This new 20-year plan shifts the emphasis from managing the forest as a timber

IN JANUARY 1997,
NOVA SCOTIA
COMPLETED A GIS
FORESTRY DATABASE
FOR THE PROVINCE'S
FORESTED AREA.

resource to managing it as an ecosystem. The plan also outlines a number of strategies to combat the short-to-mid-term wood supply deficit.

PEI established the Round Table on Resource Land-Use and Stewardship to conduct public hearings; to examine and make recommendations regarding the sustainable development of Crown and private forests; and to explore farm practices, erosion, pesticide use and other factors that affect the island, its people and its natural resources.

The Forest Partnership Council, which comprises groups representing woodlot owners, sawmillers and harvest contractors, as well as the **PEI** government, developed a code of practice for harvest contractors.

In February 1997, **Ontario** initiated a revised land-use planning system, Lands for Life, to address the demands of various users on provincial Crown land. Regional Round Tables will consult users and develop recommendations (including land-use allocations) to meet objectives related to resource-based tourism, forest management, and parks and protected areas.

In June 1996, **Saskatchewan** passed the Forest Resources Management Act, which replaces the 30-year-old Forest Act. The new Act is helping the province ensure that forest development is consistent with long-term environmental sustainability. For example, all large forest companies are now required to complete an environmental impact statement regarding the effect of their long-term forest operations, and every person licensed to harvest is required to pay a fee toward forest renewal.

In 1996, **Saskatchewan** recorded its most successful fire suppression season in 10 years—428 fires burned only approximately 14 000 hectares of forest land. Its success is attributed to a major reorganization of the province's fire management program, combined with timely rainfall over much of the Northern Provincial Forest.

The second annual report of the **Alberta Forest Products Association's** (AFPA) FORESTCARE Program, entitled *Continual Improvement*, was released in May 1997. The report highlights the efforts of the AFPA's members to improve their performance in three main areas: the forest, community and environment. The Program includes annual self assessments and formal independent audits conducted every three years by a team of professionals and an observer from the local community. By September 1997, the Program had completed 39 independent audits of AFPA members at various locations across Alberta.

In December 1996, **BC** completed its first legislated, province-wide review of harvest levels. As a result of the Timber Supply Review, the total allowable annual cut (AAC) for the province was decreased by 0.5%.

In August 1997, **BC** released its second annual report of compliance and enforcement statistics for the Forest Practices Code. The report showed that the industry achieved a compliance rate of approximately 94% in more than 34 000 inspections of forest operations. Roughly 28 000 industry employees and contractors underwent extensive training on the Code in 1996 and are credited for the high rate of compliance.

In January 1997, the **Yukon Territory** and 14 **First Nations** signed an umbrella agreement that serves as a template for land claims agreements. Four of the First Nations have since signed land claims treaties, giving them responsibility for oil and gas, forests, minerals, water and lands. A broad deadline of April 1999 was set for the transfer of these responsibilities from the **federal** government to all 14 First Nations, with completion by 2000.

In October 1996, Canada became the first country to adopt voluntary national standards for sustainable forest management. The **CAN/CSA-Z808-96** and **CAN/CSA-Z809-96 Standards for Sustainable Forest Management** are modeled after the ISO 14001/4 environmental management system. They are intended to assure the public that the timber harvested by Canadian companies comes from well-managed forests. Requirements under the new standards include broad public consultation, development of local forest management objectives, compliance with sustainable forest management criteria, and third-party audits of management systems and forest operations.

Canadian Progress Measured...

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. An important goal is to ensure that our forest management integrates environmental, economic and social values.

The **Standing Senate Committee on Agriculture and Forestry** launched its study of Canada's boreal forests in November 1996 with a fact-finding tour in the Prairie provinces. The Committee intends to determine how quickly Canada's forest management practices are moving toward the national goals of sustainable forest management and protection of biodiversity, and to identify other steps that could be taken to meet Canada's domestic and international commitments in these areas.

In August 1997, an independent Blue Ribbon Panel released a report that will help Canadians assess how well they have met commitments and moved toward their goal of sustainable forests nationwide. The report, which was issued at the end of the **National Forest Strategy**'s five-year term, evaluates Canada's progress in implementing all 96 commitments under the Strategy (*see page 41*); it follows the mid-term evaluation of 47 commitments released by the Panel in 1994. A successor to the Strategy is being developed through consultations and is expected to be released in early 1998.

Continuous Learning...

Canada's Model Forest Program is one initiative that allows for open dialogue on issues relevant to environmental groups, Aboriginals, governments and industries so that consensus may be reached on forest-related issues.

In June 1996, **Quebec** tabled a report on the state of its forest activities from 1990 to 1994. The report describes the various natural and human factors affecting forests and the measures taken to conserve and develop them. Specific issues and management objectives are identified for each region of Quebec. The report also describes the studies undertaken to improve forest practices, and it presents the work started to develop a policy based on the concept of "forêts habitées" (living forests).

IN APRIL 1996,
GRANDE PRAIRIE,
ALBERTA, WON THE
1997 FOREST CAPITAL
OF CANADA DESIGNATION.

In October 1996, the association of **forest engineers of Quebec** marked its 75th anniversary by releasing a major scientific publication for decision makers, professional foresters and forest workers. The forestry manual, which includes practical as well as theoretical information on forest sciences, is the first French-language publication of its kind in North America.

According to **Saskatchewan's** new Forest Resources Management Act, passed in June 1996, a state of the forests report will be prepared every 10 years to inform the public about the condition of provincial forests and the extent to which management objectives are being met. Within two years of the report's release, a forest accord also will be prepared in consultation with Saskatchewan residents.

In November 1996, **Natural Resources Canada-Canadian Forest Service** hosted the first of six training workshops, led by **Forintek Canada Corp.**, linking wood quality attributes to forest management practices. (Most foresters design silviculture activities without fully understanding the impacts of their treatments on lumber grades and specific end products.)

In December 1996, **BC** and the **McGregor Model Forest Association** reached an agreement for the model forest to conduct a case study to develop landscape-level forest planning for a sustainable forest management plan for a Tree Farm License located near Prince George. This study is intended to test scenarios that may lead to the establishment of an adaptive management process, and it has tremendous potential for timber supply reviews and for showing impacts of the Forest Practices Code on specific landscapes.

In March 1997, the **World Resources Institute (WRI)** released its assessment of the state of the world's forests. The WRI is an environmental organization supported by the World Conservation Union and the World Wide Fund for Nature. *Last Frontier Forests: Ecosystems and Economies on the Edge* describes the main threats to the world's forests and the policy changes required to promote sustainable forest development. The report draws on the expertise of 90 forest experts and is part of a five-year initiative to promote stewardship of the remaining natural forests. Among the report's major findings are: almost half of the world's original forest cover is gone; and Russia, Canada and Brazil hold nearly 70% of the last natural forests.

The first Aboriginal-led model forest was announced in September 1997, bringing to 11 the number of model forest sites in Canada. The **Waswanipi Cree Model Forest**, a 209 000-hectare area located more than 600 km northwest of Quebec City, will provide Aboriginal people with the opportunity to develop approaches to sustainable forest management based on their values, beliefs and traditions.

CANADA RENEWS THE MODEL FOREST PROGRAM

Canada's Model Forest Program is based on partnerships of groups and individuals representing a broad range of forest values. Working together, each partner is dedicated to the shared goal of sustainable forest management.

In October 1996, Natural Resources Canada—Canadian Forest Service announced its renewed commitment to the Model Forest Program, allocating \$40 million for Phase II—a period extending from 1997 to 2002. During Phase II, the network of model forests will be further developed to demonstrate the leading edge of sustainable forest management. An exciting feature of Phase II is its emphasis on the development of local-level indicators to measure the condition of the forest and document progress toward sustainable forest management.

Wildland Fire in Canada

Canada's land mass of 921 million hectares includes 417.6 million hectares of forest. This represents about 10% of the world's forests.

The extent of wildland fire in Canada is proportional to its vast landscape. On average, 9 500 fires burn 3 million hectares annually. During the particularly severe 1994–1995 fire seasons, a total of 12.75 million hectares were burned. Fire management costs average \$425 million per year—18% of total forest management costs. Fires burn an average of 736 000 hectares of commercial forest annually (74% of the area harvested), resulting in a loss of about 70 million m³ of wood, with a value of about \$1 billion.

Although dozens of communities have been evacuated due to fires, structural and property losses have only averaged \$8 million annually.

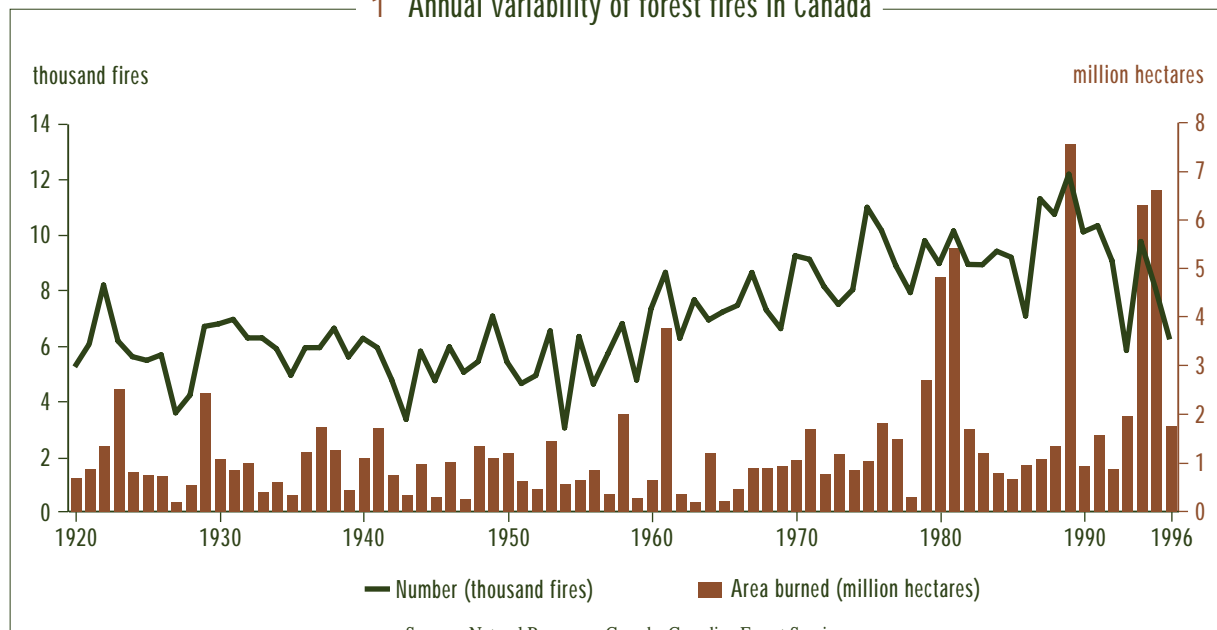
Canada's safety record is equally notable, with an average of two fatalities per year related to forest fires.

A fire in the northern forest can be awesome. With flames 50 metres high, a fire can generate energy equivalent to a nuclear explosion every 30 minutes; it can create its own weather, including hurricane-force winds, lightning and rain. It can outrun a person, consuming everything in its path. Great fires have shaped Canada's forests since the last ice age and will continue to be a significant feature of our complex ecosystems well into the future.

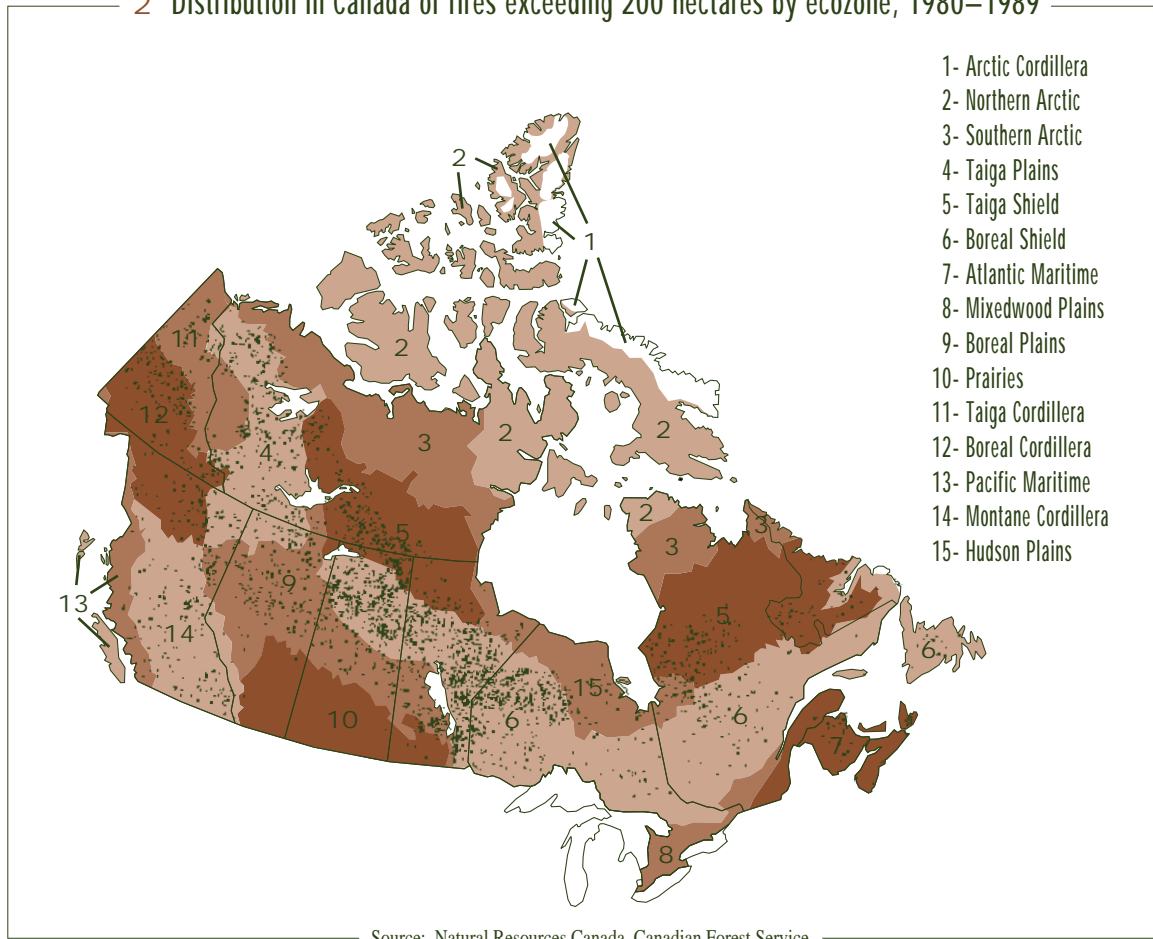
Fire Regimes

A fire regime (or pattern of fire activity) is characterized by attributes such as fire interval (years between fires on one site), average annual area burned, and fire severity. Fire regime changes only with significant shifts in climate or fire

1 Annual variability of forest fires in Canada



2 Distribution in Canada of fires exceeding 200 hectares by ecozone, 1980–1989



management policies, or when land-use patterns are altered.

Figure 1 shows the reported number of fires and area burned each year in Canada. Although fire activity appears to have increased in recent decades, the early fire record is incomplete. Before 1975, large forest fires outside protection zones (areas designated for full response of fire control measures) were neither reported nor suppressed.

Figure 2 shows the location of all fires exceeding 200 hectares during the 1980s. Using this information, we estimate that the large-fire interval varies from 100 to 10 000 years on any given site. One fire in 10 000 years is not a major factor in forest and ecosystem management, while one fire in 100 years is a dominant ecosystem disturbance.

In Canada, lightning causes 42% of all fires, while people account for 58%. Fires caused by people tend to occur in settled areas with easy access to the forest, whereas lightning fires tend to be in remote regions with difficult access. More importantly, lightning fires can occur in clusters of up to 400 per day, totally overwhelming firefighting agencies. As a result, lightning fires account for 85% of the total area burned in Canada.

The fire season in Canada runs from April through October. In a typical year, there is virtually no winter activity, a flurry of spring fires after snow melt, a decline as green-up progresses northward, a peak of lightning fires and area burned in mid-summer, and decreasing activity in the fall.

Fire is an integral part of the life cycle of many Canadian ecosystems. The history of Canada's boreal forest is one of destruction and renewal by fire. Although fire burns the boreal forest regularly, robust new trees quickly emerge to replace the aged forest. Even as fire kills a mature stand of jack pine, it also opens the seed cones, allowing the species to reproduce and survive. Completing the symbiosis, jack pine grows on dry sites and is highly susceptible to intensive fires.

Fire Management

Fire management in Canada is a provincial responsibility, except on federal lands. There are 14 agencies with differing fire policies, fire regimes, forest types, and values at risk. Organizations involved range from government agencies, to government-managed private contractors, to private enterprises. Funding may be through general tax revenues, timber sale revenue, or levies based on land ownership.

Extinguishing all wildland fires is not physically possible, economically feasible, nor ecologically desirable in much of Canada. Yet, fire cannot be allowed to run its natural course when it threatens lives, property, or valuable resources. Fire policies generally seek to balance suppression costs with values at risk and integrate the natural role of fire into managing the landscape.

One indicator of balanced fire management policies is the contrast between fires receiving full or modified responses. About 93% of fires are suppressed as quickly as possible (full response), and these account for 36% of the total area burned. In contrast, the 7% of fires that are judged not to pose significant threats to life, property or resources receive a "modified response". On average, these fires are 23 times larger than full response fires and account for 64% of the total area burned.

Overall, 91.5% of fires are controlled at less than 10 hectares, accounting for only

0.4% of the area burned. In contrast, only 1.4% of fires exceed 1 000 hectares in size, but these fires account for 93.1% of the total area burned.

Clearly, no agency or nation can be self-sufficient in fire management. In 1982, the Canadian Interagency Forest Fire Centre was established to facilitate the sharing of a national fleet of air tankers among fire agencies. National mobilization of all resources has now become fundamental to successful fire management in Canada. During the destructive 1995 season, an all-time record number of pumps, aircraft and crews were mobilized to six Canadian agencies with serious fire situations.

Fire Research

Scientific research has expanded our knowledge of wildland fires. Fire danger can now be automatically monitored and fire intensity predicted on a national scale. Systems can anticipate and meet resource requirements, optimize detection patrol routes, and allocate resources efficiently.

The natural role of fire in forest ecosystems is becoming increasingly understood. Fire management requires far more knowledge about fire and considerably more sophisticated decision making than does fire control. New knowledge and technologies are required to support effective fire management in an increasingly complex environment.

Canada is a world leader in fire management research. The Canadian Forest Service (CFS) Fire Research Network has established five research programs. **Fire environment** includes fire weather and extreme fire behavior. **Fire ecology** will focus on how fire affects ecosystems and landscape management. **Fire management** will develop information systems to monitor fire activity and support decision making. **Climate change** is concerned with atmospheric effects of fires and the effects of fire on the carbon cycle. Finally, **the role**

of fire in Canadian forests integrates models and systems from the other programs into sustainable forestry and transfers research products into practical applications.

The Network will foster partnerships among domestic and international wildland fire communities, including: other CFS research networks, the Model Forest Program, other federal agencies, universities, fire management agencies, the Canadian Interagency Forest Fire Centre, industry, research agencies in other countries, and international science initiatives.

Conclusions

Wildland fire has a major impact on the sustainability of many of Canada's forests. Fire policies attempt to balance suppression costs with values at risk, while recognizing the natural role of fire in managing the landscape. Many Canadian fire management agencies are implementing these balanced policies. The challenge of managing forest fires in Canada will continue to rely on technology to supplement increasingly limited resources. At the same time, the increasing complexity of fire issues and the incorporation of fire into sustainable forestry will require a deeper understanding of fire and the development of more effective management systems.

A History of Forest Legislation in Canada

The history of forest legislation in Canada reflects the evolution of forest policy, which in turn reflects the way our view of the country's seemingly endless forests has evolved through various periods of history. Changes in public values and attitudes result in changes in forest policy, which then become embodied in legislation. In this sense, changes in legislation can not be viewed in isolation from historical events or large-scale economic, social, environmental and political developments. This chapter outlines the stages of development of forest policy and legislation, and places them in historical context. Through a better understanding of our past, we can better understand our present and the importance of the work being done by our modern-day forest pioneers.

STAGES OF EVOLUTION OF FOREST POLICY AND LEGISLATION

AN IMPORTANT FACTOR
AFFECTING THE EVOLUTION OF
FOREST LEGISLATION IN CANADA
IS THAT 94% OF ITS FOREST
LAND IS PUBLICLY OWNED.

Forest policy and legislation in Canada have evolved through five stages. The first was a period of unregulated exploitation, followed by an era of regulation for revenue, a third stage of conservation, a fourth period of timber management, and a fifth and current era of sustainable forest management.

Unregulated Exploitation (up to mid-19th Century)

Few people realize that the timber trade was one of the most important influences on the British North America Act of 1867—it provided the basis for provincial jurisdiction over resources and revenues from Crown lands. But the influence of the timber trade on major historical events goes back much further than Confederation, to the colonization of North America in the 17th Century.

The first forest policy for North America was that of the British government, intended to preserve large timber (mainly white pine) for masts for the Royal Navy. The first recorded shipment of masts to Britain from New England took place in 1634, and within a hundred years, Britain would depend almost totally on that region to supply the Royal Navy with masts and other timber. There was a shortage of suitable timber in Europe, and numerous conflicts between Britain and other nations cut off established sources of supplies. Stories of limitless stands of timber in the New World generated great interest and helped speed the immigration of settlers.

At the same time, Britain's need for masts began to cause tension in the North American colonies. Initially the pioneers saw forests as a barrier to settlement, but they began to recognize the value of the timber for commercial lumber. Toward the mid-1600s—about the same time the mast trade was becoming established in New England—the sawmill industry was established and growing fast. The rapid expansion was based on domestic demand, as well as demand from other parts of the world that had depleted their own forests. This development did not sit well with Britain because the sawmills were cutting the very timber needed for masts. It made little difference to sawyers that the timber had been marked by agents of the Crown with the broad arrow or “crowfoot”—the mark of British government property reserving the timber for masts.

The American Revolution had an important impact on the timber trade in Canada. It ended Britain's assured supply of timber from New England, and the arrival of loyalists fleeing to eastern Canada hastened the exploitation of Canada's timber resources.

In 1806, during the Napoleonic wars, France closed the Baltic ports to British trade, causing an even greater British dependence on Canada for timber and giving a major boost to the colonial timber trade. By 1811, Canadian timber trade to Britain was well established, and the settlers were busy building communities and penetrating further westward. Apart from a few lone voices, there was little concern over the future of the forests because, in practical terms, they had hardly begun to exploit the vast resource and there was always more wood further inland or upriver. The only regulations that existed to this point involved the establishment of quality standards and sizes for export, and the appointment of officials to find sources of wood.

Regulation for Revenue (mid to late 19th Century)

As the timber trade expanded, Upper and Lower Canada began to recognize it as a potential source of revenue. In 1826, regulations

provided for the payment of timber dues on wood cut on Crown lands, specified minimum diameters of trees for cutting and permitted anyone to harvest Crown wood upon payment of a fixed scale of rates. Before this, only Royal Navy contractors or their licensees could harvest Crown timber, although this monopoly was frequently violated. Similar legislation was passed soon afterward in New Brunswick and Nova Scotia. It was this kind of legislation, which provided a secure and potentially bountiful source of revenue, that had such a strong influence on the drafting of the British North America Act of 1867; it provided an important basis for provincial control over resources and the retention of revenues from Crown lands.

By the mid-1800s, the lumber trade was a booming and profitable business, and competition to enter it was fierce. To bring a degree of organization to the development of Crown forests, the government of the United Provinces passed regulations in 1846 for the granting of licenses. This action spread quickly to the individual provinces. New Brunswick, Ontario and Quebec were among the first provinces to pass legislation granting tenure and licenses and introducing stumpage and ground rents (e.g., Ontario's first Crown Timber Act in 1849), whereas the remaining provinces and two territories waited until the latter part of the 19th Century (e.g., the Dominion Lands Act of 1872 for the prairies and the territories under federal jurisdiction, and the 1888 Land Act in British Columbia).

Despite increasing regulation of the timber trade, there were few limits on harvesting. The new legislation did not recognize or deal with the problems of settlement and exploitation. Then, on July 1, 1867, the Dominion of Canada was established by confederation of the British North American provinces.

Conservation (late 19th to mid-20th Century)

The voices of concern over the state of the forests began to grow in numbers and influence. A significant impetus to the conservation movement was provided with the formation of the American Forestry Association in 1875. A number of influential Canadians were persuaded to join, and in 1882, the American Forestry Congress was held in Montreal. The theme of the conference was the need to manage and conserve forest resources. Although the only immediate action taken was appointment of a federal forestry commissioner, it was becoming clear that forests required protection—particularly from fires—and that government action was needed to ensure the adequate regeneration of forests.

The rapidly developing pulp and paper industry influenced many of the changes in forest policy at this time. Its large-scale

and capital-intensive nature, combined with its need for large amounts of raw material and an efficient service infrastructure, required a different approach from the kind of support developed for the smaller-scale lumber industry.

SWEEPING CHANGES INTRODUCED

- Creation of forest reserves to protect forest land from other uses, primarily agriculture (Ontario's 1898 Forest Reserve Act, the federal 1906 Dominion Forest Reserves Act and British Columbia's 1912 Forest Act).
- Establishment of forest fire protection agencies—later to include protection against disease and insect damage.
- Establishment of reforestation programs, including provincial tree nurseries.
- Prohibition of wasteful harvesting practices.
- Allocation of area-based, long-term tenures providing secure timber supplies to companies that agreed to establish wood-processing facilities and abide by conservation regulations (the federal 1872 Dominion Lands Act, New Brunswick's 1913 Crown Timber Lands Act and Manitoba's 1930 Forest Act).

The conservation era also saw the establishment of the Canadian Forestry Association in 1900, largely to promote forest conservation and propagation. The new organization enjoyed strong support from the federal government and did much to spread forestry awareness across the country. Federal regulations promoted forest conservation, and the first National Forestry Convention, held in Ottawa in 1906, became an expression of awareness on the part of government, the forest industry and the public regarding the importance of forests and the need for their care and protection. This attitude was summed up by Prime Minister Sir Wilfred Laurier in his address to the convention:

...I desire every man in this audience as he goes away to his home and to his own avocation to become a missionary in the work of forestry. It is not sufficient that we should feel strongly upon this subject. We must interest the nation, interest the individual, the farmer, the settler, the lumberman, everybody in the great work which is involved in forestry...

It was a time of firsts. The next year, 1907, saw the establishment of the first school of forestry at the University of Toronto, followed soon after by forestry schools at the University of New Brunswick and Laval University in Quebec City. In 1908,

the Canadian Society of Forest Engineers (the forerunner of the Canadian Institute of Forestry) was formed by a group of foresters meeting in Montreal. The first provincial forest service was established in Quebec in 1909. In the same year, the federal government passed the Act to Establish a Commission for the Conservation of Natural Resources. Although short-lived, the Commission became a major research institution. The inventory it initiated in Nova Scotia in 1909 and 1910 became the first forest inventory of an entire province.

The Forest Products Laboratories of Canada were established in Montreal in 1913, and although the outbreak of World War I in 1914 diverted men and resources to the war effort, the federal Forest Products Laboratory in British Columbia got its start in Vancouver testing timbers suitable for airplane construction (research and development would later become one of the most significant federal roles in forestry). The age of scientific forestry had begun, and despite the intervention of the war, forest protection measures were in place, forestry practices were regulated, and detailed inventories were carried out.

Timber Management (mid-20th Century to late 1980s)

The next era witnessed some momentous historical events throughout the world, including the Great Depression of 1929; World War II beginning in 1939; the Korean war beginning in 1950; the birth of the Space Age with the Sputnik satellite in 1957; and the eventful Sixties with the Vietnam war, the dawn of the environmental movement with Rachel Carson's book *Silent Spring*, Woodstock and the Apollo moon landings. Technological and cultural changes were occurring at a frenetic pace, and forestry was swept along in the current.

In the 1930s, data collected in forest inventories made it clear that forest resources had been depleted under the traditional system of licensing, threatening the viability of the industry and the stability of communities dependent on forestry. Several provinces (Newfoundland and Labrador, New Brunswick, Ontario, Saskatchewan and British Columbia) responded by appointing Royal Commissions to look into the matter. The Commissions recommended adopting sustained-yield policies (i.e., managing for the continuous production of timber to achieve a balance between net growth and harvest) and amending the tenure system. A licensing system also was required for Crown lands that would provide sufficient incentive for industry to practice sustained-yield forestry while ensuring that governments received adequate royalties.

New Brunswick was the first province to impose—in 1937 and 1948 amendments to the Crown Timber Lands Act—specific

management responsibilities, requiring licensees to submit management plans with their applications for cutting permits. After World War II, similar legislation was introduced in other provinces (such as Ontario's 1947 Forest Management Act, British Columbia's 1947 amendment to the Forest Act, and Alberta's 1949 Forests Act). By the 1960s, most provinces had adopted an incentive-based tenure system in which long-term rights to Crown land were granted in exchange for a commitment to practice sustained-yield forestry. Licensees were required to submit and follow area-based management plans. Tenure reform continued and over time, more and more management responsibilities were shifted from the provincial forestry services to forest industry licensees. The policy model of granting extensive area-based licenses in return for forest management planning and silviculture remains largely in place today.

The forest management era also saw the development of legislation governing the forestry profession in several provinces. Foresters had begun to see the need to organize into self-regulating professions with legislative authority to regulate the practice of professional forestry. The first to establish this status was the Professional Corporation of Forest Engineers of Quebec in 1921. Then, after World War II, forestry schools became crowded with returning veterans. These professional foresters organized as the Association of British Columbia Professional Foresters in 1947, the Association of Registered Professional Foresters of New Brunswick in 1957, the Ontario Professional Foresters Association in 1958, and more recently, the Alberta Registered Professional Foresters Association in 1985. The codes of ethics and standards of practice adhered to by members of the professional associations play an important role in responsible forest management.

The roles of federal, provincial and territorial governments underwent significant changes during this era. In 1930 (during the Great Depression), the federal government returned jurisdiction over natural resources, including forests, to the three prairie provinces. Until then, control over these lands had provided the federal government with significant influence over forest management. After these Natural Resource Transfer Agreements, however, control over forests by a depleted federal forest service was restricted to the northern forests and to a small percentage of federal lands in the provinces (e.g., Indian reserves, national parks and military bases). During World War II, the federal government assumed control over the production and pricing of forest products, and after the war, it sought to encourage forest management and expansion of the industry indirectly—through the use of its spending power.

The Canada Forestry Act of 1949 enabled the federal government to enter into cost-shared conditional-grant programs with the provinces. The federal Department of Forestry, created in 1960 to strengthen the federal role, lasted only until 1966. The emphasis then shifted to cost-shared regional development programs, initially focusing on access road construction and mill modernization. It was not until the joint federal–provincial Canadian Council of Resource and Environment Ministers (CCREM) was formed in 1971 that federal efforts began to focus on forest management and regeneration, a focus reflected in subsequent federal–provincial agreements.

By 1981, several forestry initiatives launched by the federal government and CCREM (whose role was later assumed by the Canadian Council of Forest Ministers [CCFM]) resulted in a discussion paper entitled “A Forest Sector Strategy for Canada.” This, together with the 1987 National Forest Sector Strategy, outlined the federal role in areas within its jurisdiction (e.g., trade enhancement, public education, and forestry research and development). This focus was clear in 1986, when the federal government divested itself of forest-related administration in the Northwest Territories, transferring responsibility for forest management to the territorial government. A similar process is underway in the Yukon Territory.

Until the 1970s, most forestry in Canada was focused on the harvesting of mature stands, with little emphasis on regeneration and silviculture. But the National Forest Regeneration Conference held in Quebec City in 1977 brought to the forefront the problems related to forest renewal, including the backlog of cutover areas that were not adequately regenerated. Subsequent conferences, including the Canadian Forest Congress of 1980 in Toronto and the 1981 Banff Conference, emphasized the need to adopt forest management techniques. These efforts spurred a greater focus on the application of intensive forest management, which began to consider forest values other than timber.

Hand in hand with rising public awareness came growing challenges to the status quo and increasing restrictions on the forest industry. The sustained-yield framework of forestry was clearly inadequate to deal with the range of demands being placed on Canada’s forests. The 1980s brought the first attempts to broaden the scope of forest management to take into account multiple forest uses and functions.

Sustainable Forest Management (late 1980s to present)

Against the backdrop of a rising world population, unacceptable worldwide poverty levels, environmental degradation, forest

depletion and deforestation, the deterioration of the ozone layer, and fears over global warming, the United Nations Brundtland Commission report, *Our Common Future*, was released in 1987. That report alerted the world to the mounting problems and proposed the concept of “sustainable development.” Canada was one of the first countries to embrace the concept and is a world leader in applying it to forestry. This new approach has resulted in a shift of forest policy, with ecosystem sustainability becoming a major focus of forest management across the country.

CANADA’S CONSTITUTIONAL FRAMEWORK FOR FORESTS

Provincial Jurisdiction

The Constitution Act of 1867 grants ownership and legislative authority over most publicly owned forest lands to the provinces, which control 71% of Canada’s total forest land and 88% of Canada’s commercial forest land. Each province is given ownership of “lands, mines, minerals and royalties” (s. 109), as well as the power to legislate for natural resources and environmental management. This includes authority over the management and sale of public lands...and of the timber and wood thereon (s. 92[5]), local works and undertakings (s. 92[10]), property and civil rights in the province (s. 92[13]), and matters of a local or private nature (s. 92[16]). The exclusive provincial jurisdiction over forest resources was confirmed by a Constitutional Amendment in the Constitution Act of 1982 (s. 92A), which also enables the provinces to levy indirect taxation on natural resource revenues and provides them with significant control over the interprovincial export of resources and energy.

Federal Jurisdiction

The federal government’s jurisdiction over forestry is based on its ownership of 23% of Canada’s total forest land (mostly in the Yukon Territory and Northwest Territories) and 2% of Canada’s commercial forest land. Its constitutional authority also enables it to influence forest management indirectly. This authority includes powers related to trade and commerce (s. 91[12]); Indians and lands reserved for Indians (s. 91[24]); criminal law (s. 91[27]); the general power to make laws for the peace, order and good government of Canada (s. 91 opening paragraph); and the power to make and implement treaties (s. 132).

The federal government took the lead in promoting sustainable forestry in 1989 by passing the Canada Forestry Act, which established for the second time—but briefly—a full-fledged federal Department of Forestry. The new Act explicitly required the Minister of Forestry to promote sustainable development, which also became the cornerstone of the 1992 National Forest Strategy. This Strategy recognized the need to manage and sustain entire forest ecosystems, not only the timber resource—a need now acknowledged by all levels of government.

“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.”
—CANADIAN COUNCIL OF
FOREST MINISTERS,
*SUSTAINABLE FORESTS: A
CANADIAN COMMITMENT*, 1992

From the early 1990s, provincial forest policies have increasingly recognized ecological and social considerations. Although all levels of government now accept the need to manage forest resources sustainably, legislation is only beginning to reflect this change in focus. Three provinces have now established legislation based on the principles of sustainability, and a fourth has amended its legislation to reflect the same commitment (British Columbia’s 1994 Forest Practices Code Act, Ontario’s 1994 Crown Forest Sustainability Act, Saskatchewan’s 1996 Forest Resources Management Act, and Quebec’s 1996 amendment to its Forest Act).

In 1993, the federal Department of Forestry was restructured to form part of a broader natural resources department (as Natural Resources Canada–Canadian Forest Service [CFS]) and its overall size was reduced. Funding for federal–provincial forestry agreements ended in 1996–1997. Even some core federal activities in forest research and development were curtailed, further focusing the federal role in forestry on the delivery of science and technology programs within a national policy framework.

An important aspect of the sustainable forest management era is its international focus. The federal government, together with the provinces, is a leader in several major international initiatives related to forests. For instance, Canada is deeply involved in international efforts ranging from defining and measuring progress toward sustainable forest management, to promoting an international forest convention.

TRENDS AFFECTING FOREST LEGISLATION AND POLICY

The sustainable forest management era is still in its early stages. A number of trends have brought it into being and will influence its continued development well into the future.

Self Regulation

An intriguing development in this period is the degree of self-regulation that is occurring. Increasingly, forest industries and other private and quasi-public organizations are developing and enforcing their own codes of forest practices based on the principles of sustainable forest management. These initiatives assure the public, governments and consumers of forest products

that good forest practices are being followed. They are also a response to requests by public interest groups for predictability and transparency in the forest management decision-making process. Recent examples include the 1996 Code of Forest Practices developed by the Eastern Ontario Model Forest and British Columbia's Forest Practices Code.

TYPES OF RULES GOVERNING FOREST MANAGEMENT IN CANADA

FOREST LEGISLATION: Statutory law, the highest level, is passed by Parliament and provincial legislatures. Forest statutes define broad government objectives in forest use and management; and they prescribe the transfer of forest resource rights to private parties (i.e., the tenure system), the responsibilities of government officials, and the basic fiscal and managerial arrangements regarding forests.

REGULATIONS: Like statutes, regulations have the full force of law, but are passed by Cabinet rather than the legislature or Parliament. They define statutory provisions and their administration; and they lay out many of the rules for forest management (e.g., planning obligations, forest practices and stumpage payments).

COMMON LAW: Common law is based on past cases and court decisions, especially in matters of property rights, nuisance and contracts. Judicial decisions assist in the interpretation of statutes, regulations and contracts.

FOREST TENURE ARRANGEMENTS: The right to harvest timber from Crown lands is subject to terms and conditions outlined in tenure agreements. These agreements (e.g., Forest Management Agreements) are legally binding contracts that precisely define the obligations and responsibilities of the government and the private user or tenure-holder.

ADMINISTRATIVE RULES AND PROCEDURES: Many rules for forest use and management take the form of guidelines, manuals and standards adopted internally by the responsible forestry department or administration. Lacking the force of law, they provide direction to forest managers in their daily operations, but when they are incorporated into a tenure agreement or passed as regulations, they assume more formal legal significance.

Along similar lines, many forest industries and private landowners who depend on export markets are embracing the concept of forest certification—a system whereby an independent organization certifies products that originate from sustainably managed forests. Two major systems are being implemented in Canada. The first, developed under the auspices of the Canadian Standards Association (CSA), is consistent with the Environmental Management System of the International Organization for Standardization (ISO). The second is that of the Forest Stewardship Council, an international organization founded to promote environmentally appropriate, socially beneficial and

economically viable management of the world's forests. The trend toward certification responds mainly to environmental trade barriers and aims to provide consumers at home and abroad with assurances that our forests are being managed responsibly.

OTHER RECENT DEVELOPMENTS

- Specialists provided ever-expanding scientific knowledge to improve the use of the available resources. This created more pressure for legislation and policies to reflect sound forestry.
- Wood harvesting and processing equipment dramatically increased the speed and efficiency of use. This caused more pressure on forest resources and on systems of tenure and wood allocation to handle the increasing demands for wood.
- Markets for forest products expanded rapidly at home and abroad. This would lead to greater international influence on domestic forest policies.
- Canadians were becoming more aware of the important ecological role of forests, thanks largely to successful public education programs and the influential environmental movement.

Public Involvement

Also important in this era is the increased degree of public participation in forest management. Until recently, public pressure had little influence over the evolution of forest legislation. Today, concerns about the environment and human health, and more knowledge about resource issues, have led the public to insist on a greater role in monitoring and enforcing appropriate forest management practices. In response, a number of provinces have developed public consultation processes at the planning stage of forest operations to enable interested citizens to share their views with the people working directly with the resource. (*For more information, see pages 42–45.*)

Non-traditional Forest Values

A shift in public values is inherent in this period of sustainable forest management. During the timber management era, forest values centred on timber resources. Management focused on harvest levels, timber inventories, growth and yield, forest disturbances, and so on. Now, forest managers must also consider a much broader set of values, including those relating to environmental concerns (e.g., global warming and water quality), the ecological and biological diversity of flora and fauna, as well as recreation and spiritual values. Management approaches, and the tools needed to collect data and measure those values, are only now being developed.

The idea that forest resources must be managed solely to serve human needs is increasingly being challenged, particularly by the environmental movement, but with growing support from the general public. There is a resulting clash of values between groups favouring the continued exploitation of forests and those favouring restrictions on harvesting or the outright preservation of forests.

Increasing Globalization

International trade has always played a key role in shaping Canadian forest policy. Markets are now more global, large trading blocks are emerging, and the forest industry must respond and adjust accordingly. This development influences all aspects of the forest sector, ranging from forest practice regulations, to investment incentives and tenure arrangements. New technologies, better scientific information and the arrival of the information age only serve to escalate the changes.

Increasing Scientific Knowledge

The conservation era grew out of an understanding of the science of forestry. As forest research began in earnest in the early 1900s, scientific knowledge began to exert a stronger influence on forest legislation, leading to the sustained-yield policies of the timber management period. The present era of sustainable forest management is also rooted in science—in a greater understanding of the components of forest ecology and its interrelationships with the global ecology. This understanding is enabling scientists to develop criteria and indicators to assess progress toward the sustainability of forest ecosystems. As these concerns are incorporated into present-day forest legislation, there are direct impacts on how forest management is implemented in Canada, from landscape management, to alternative harvesting methods.

Fiscal Restraint and Deregulation

This is a time when governments and many other organizations are trying to balance budgets. The impact on forest policy is being felt already as restructuring takes place to accommodate reduced budgets. The CFS, for example, has reorganized its research program into science networks that are based on major areas of research, and it will carry out research projects in partnership with universities and other centres of expertise. The CFS will also place greater reliance on its existing initiatives (e.g., the Model Forest Network) for field experimentation and the transfer of technologies. Provincial governments and other organizations are going through similar exercises to make better use of limited resources.

As governments cut back expenditures and reduce staff, there is a corresponding need to harmonize regulations. As mentioned earlier, provincial governments are also placing more responsibility on forest industry licensees and other forest user groups for self-regulation, which will be simplified if requirements are similar in the various provinces.

Impact of Environmental and Land-use Legislation

Forest planning is increasingly only one component of integrated land-use plans. Foresters join multidisciplinary teams to prepare forest management plans, which tend to take a holistic ecological approach to forest operations. Adoption of an integrated approach to land and resource use is leading to new legislative developments. Quebec's forest legislation, for example, acknowledges the provincial land-use plan and requires forest management activities to be compatible with it. A similar approach is being developed in British Columbia, and in Saskatchewan, the new Forest Resources Management Act requires all management units to have integrated forest land-use plans. In Ontario, a comprehensive land-use planning process will provide direction for forest management planning and ecological land-use.

Since the 1960s, public environmental awareness has resulted in legislation geared toward preventing adverse environmental impacts. Environmental laws have a significant effect on forestry, often requiring permits that control activities such as the application of pesticides or the construction of forest access roads. In Ontario, under the Environmental Assessment Act, the Class Environmental Assessment for Timber Management on Crown Lands lasted from 1988 to 1993, making it the longest set of public hearings ever held in Canada on forestry matters. The decision contained numerous terms and conditions which are legally binding on the Ontario Ministry of Natural Resources. Aspects were incorporated into provisions of the Crown Forest Sustainability Act in 1994, as well as the Forest Management Planning Manual. Environmental assessments will continue to play a role in forestry. In Saskatchewan, for example, the Forest Resources Management Act requires an environmental impact assessment of long-term forest management plans.

Forest Preservation

In line with the public's concern for the preservation of biological and ecological diversity, the federal and provincial governments are setting aside certain forested areas. Some of these lands (e.g., critical wildlife habitat areas and old-growth forests) will be subject to various use restrictions, while others may be withdrawn completely from forest management.

Setting aside forested areas is not new. The conservation era saw the establishment of forest reserves to protect forest land from other uses while allowing for forest management. As early as 1893, Ontario's Algonquin Provincial Park was created to serve as a wildlife sanctuary and to protect the headwaters of five major rivers. The emphasis today in setting aside forest land, however, has shifted to the protection of forest ecology and biological diversity. Canada's National Forest Strategy asserts the intention of the federal, provincial and territorial governments to complete a network of protected areas by 2000 that are representative of the country's forests.

Aboriginal and Private Land Concerns

Aboriginal efforts to secure lands, manage the forest resources on reserves, and obtain rights to other forest resources are meeting with some success. Respect for Aboriginal rights is a key component of current international initiatives, and the federal government is committed to promoting Aboriginal involvement in forestry and to recognizing Aboriginal and treaty rights. Several provinces also are developing new approaches in this area. In addition, the certification systems discussed earlier encourage the integration of Aboriginal rights into forest management operations. (*For further information on the role of Aboriginals in forestry, see Chapter 3.*)

There is growing recognition of the role of private woodlots in timber supply, economic development and environmental benefits. In some provinces, notably Quebec, this is resulting in a trend toward the regulation of private forests at the municipal level. Although most private woodlots are located east of Manitoba, organizations representing private woodlot owners now exist in all provinces. Such organizations can play an important part in the development of forest policy. In New Brunswick, for example, woodlot owner organizations played an important role in one of the six field trials designed to test the CSA standard that took place in early 1996.

ONE OF THE CRITERIA FROM THE MONTREAL PROCESS MEASURES THE EXTENT TO WHICH THE LEGAL, INSTITUTIONAL AND ECONOMIC FRAMEWORK OF FOREST MANAGEMENT SUPPORTS THE GOAL OF FOREST CONSERVATION AND SUSTAINABILITY.

International Influences

Beginning in the 1970s, forests emerged as a priority in debates regarding the future of the Earth's environment and its growing population. As a result of urban and agricultural expansion and the increased worldwide demand for timber, pressures on forests intensified. 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 recreation, subsistence fuelwood or timber.

Since the late 1980s, Canada has led efforts to address forests in a way that would give balanced consideration to environmental, social and economic development dimensions.

IMPORTANT INTERNATIONAL DEVELOPMENTS

- Agenda 21 was adopted at the 1992 United Nations Conference on Environment and Development (UNCED)—also known as the “Earth Summit.” This program of action set out key goals for forests and included a non-binding statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests.
- The Convention on Biological Diversity, which Canada was the first to ratify at the Earth Summit, committed nations to conserving biological diversity. Each country pledged to develop a national strategy in this area. In 1995, the Canadian Biodiversity Strategy reaffirmed the 1992 National Forest Strategy commitment to complete a network of protected areas by 2000 that are representative of Canada’s natural regions.
- In 1995, the Santiago Statement on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (also known as the “Montreal Process”) was signed by Canada and 11 other countries. In the same year, Canada began implementing its own parallel criteria and indicators process.
- Also at UNCED, countries agreed to the establishment of the UN Commission on Sustainable Development. The Commission conducted an in-depth review of forests with the assistance of the Intergovernmental Working Group on Forests formed by Canada and Malaysia. An Intergovernmental Panel on Forests was established in 1995 and made its recommendations to the fifth session of the Commission in 1997. A decision was made to establish an Intergovernmental Forum on Forests with a mandate to identify possible elements of a forest convention.

CONCLUSION AND SUMMARY

It has been only 130 years since Confederation. In this brief span of time, forestry in Canada has undergone changes that are as far-reaching as those experienced by society at large. In fact, the pace of change is increasing. We have gone from being hewers of wood in a colonial outpost to becoming one of the most advanced nations in forest management. Today, Canada leads the way in advancing the promise of sustainability, and we serve as a worldwide model in the practical application of sustainable forest management.

From the first era of unregulated exploitation, concerned only with minimum size requirements and a supply of suitable wood, we have seen how shifting values can influence the evolution of forest legislation. The era of regulation for revenue began with

the realization that commercial demand for timber from public lands could provide a secure source of revenue for government. This idea resulted in legislation introducing stumpage and ground rents, as well as tenure and licensing systems. Alarm over wasteful practices and rapidly diminishing forests led to the conservation era, with legislation promoting forest conservation. As the depletion of forest resources continued, however, Royal Commissions in several provinces recommended the use of tenure arrangements that required licensees to practice sustained-yield forestry based on the continuous production of timber. This brought on the timber management era, with legislation providing for incentive-based, long-term tenure systems and long-term forest management planning. Increasing public awareness and concern over global environmental issues led to the Brundtland Commission report, *Our Common Future*, which ushered in the current era of sustainable forest management.

Forest legislation in this period is attempting to embody and implement a completely new paradigm of thought—one embracing the full range of forest values based on principles of sustainable development that are still evolving.

SELECTED KEY EVENTS AND IMPACTS



1634 FIRST RECORDED SHIPMENT OF MASTS FROM NEW ENGLAND TO BRITAIN British policy to preserve large timber for masts; implementation of size and quality standards; appointment of officials to find suitable timber.	1867 CONFEDERATION OF CANADA Federal–provincial division of powers; provincial ownership of Crown land and resources.	1930s PROVINCIAL COMMISSIONS RECOMMEND SUSTAINED YIELD AND AMENDMENTS TO TENURE SYSTEMS.	1987 BRUNDTLAND COMMISSION REPORT International endorsement of <i>Our Common Future</i> principles of sustainable development.
1721 MARKING OF WHITE PINE IN NOVA SCOTIA FOR MASTS FOR BRITAIN	1882 AMERICAN FOREST CONGRESS, MONTREAL	1937 NEW BRUNSWICK AMENDS CROWN TIMBERLANDS Act to impose management responsibilities on timber licensees.	1989 CANADA FORESTRY ACT Federal Department of Forestry established.
1775 AMERICAN REVOLUTION, INFLUX OF LOYALISTS British reliance on Canada's timber.	1850s+ ESTABLISHMENT OF PULP AND PAPER INDUSTRY Allocation of area-based, long-term tenures.	1949 CANADA FORESTRY ACT Federal–provincial cost-shared grant programs enabled.	1992 NATIONAL FOREST STRATEGY AND CANADA FOREST ACCORD
1806 FRENCH CLOSING OF BALTIC PORTS TO BRITISH TRADE Increased British reliance on Canada's timber.	1900 ESTABLISHMENT OF CANADIAN FORESTRY ASSOCIATION Increased forestry awareness leads to federal regulations promoting forest conservation.	1971 FORMATION OF CANADIAN COUNCIL OF RESOURCE AND ENVIRONMENT MINISTERS Focus on forest management and regeneration.	1994 PROVINCIAL FOREST LEGISLATION BEGINS TO INCORPORATE PRINCIPLES OF SUSTAINABLE DEVELOPMENT
1826 REGULATIONS FOR PAYMENT OF TIMBER DUES	1909 FEDERAL ACT TO ESTABLISH A COMMISSION FOR THE CONSERVATION OF NATURAL RESOURCES	1980s INCREASING PUBLIC AWARENESS OF ENVIRONMENTAL ISSUES Broadening scope of forest management to consider multiple forest uses and functions.	1995 CANADIAN COUNCIL OF FOREST MINISTERS (CCFM) RELEASED A FRAMEWORK OF CRITERIA & INDICATORS Framework will assist in measuring and reporting on forest sustainability in Canada.
1846 REGULATIONS FOR GRANTING LICENSES Beginning of forest tenure and licensing policies.	1930 PRAIRIE PROVINCES ASSUME JURISDICTION OVER FORESTS		1997 CCFM RELEASES A REPORT ON THE CRITERIA & INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT

NATIONAL FOREST STRATEGY— EVALUATING CANADA'S PERFORMANCE

The Strategy

In 1992, after a year of public discussions, the Canadian Council of Forest Ministers (CCFM), along with organizations representing the interests of naturalists, wildlife, Aboriginals, foresters, labour, private forest landowners, academics and forest industries, released a strategy that contained a common vision and action plan to manage and protect Canada's forests in a sustainable manner. The Strategy, entitled *Sustainable Forests: A Canadian Commitment*, contained 9 strategic priorities and 96 commitments intended to help implement Canada's sustainable forest development policies and programs over the period 1992–1997.

The Strategy's objective was to ensure that Canada's approach to forest management includes a range of both timber and non-timber values, while protecting the integrity, health and diversity of our forest ecosystems. The CCFM agreed to act as trustee of the Strategy for its five-year term and assume overall accountability for its implementation. A National Forest Strategy Coalition agreed to oversee its implementation and evaluate and communicate its progress.

The Evaluation

In 1997, the Coalition evaluated the degree of Canada's success in meeting all 96 commitments. The review was undertaken by making direct inquiries to 66 organizations with responsibilities for meeting the commitments. The evaluation concluded that: "There is reasonable evidence that Canada is moving toward sustainable forest management... Canada is not there yet and progress is uneven across the country but, the Strategy has provided a framework for action."

The evaluation revealed that while the participants have done what they said they would do, the degree to which their activities have brought them to where they wanted to be is not clear. Much more work is required in the areas of completing an ecological classification of forest lands, completing a network of protected areas representative of Canada's forests, establishing forest inventories that include information on a wide array of forest values, and developing a system of national indicators of sustainable forest management.

The evaluation recommended that future attention be given to addressing four issues related to sustainable forest management:

- designing forestry training, employment and business programs for First Nations;
- testing the recent on-the-ground changes in forest practices;
- establishing intensive mid-career training for practising foresters, technicians and senior managers; and
- encouraging private woodlot owners to more fully embrace sustainable forest management.

Planning for the Future

Building on the success of the 1992 Strategy, the CCFM has embarked on a process to once again consult with the nation's forest community regarding the design of a new national forest strategy. With the conclusion and recommendations of the evaluation as a backdrop, the CCFM's approach is similar to the one used to develop the 1992 Strategy. The new Strategy is expected to be ready for release at a National Forest Congress to be held in Ottawa, Ontario, in February 1998.

Public Participation

in Forest Management in Canada

The people must take a greater interest in the welfare of the forest. Under our democratic system it is the privilege of every citizen to participate actively...it is the duty of those familiar with forest values to express public opinion for the guidance of governments. (Canadian Forestry Association, 1943).

These words, written more than 50 years ago, demonstrate that public participation is not a new phenomenon in Canada. The Canadian Forestry Association (CFA), the pioneer of forest conservation in Canada, has been advocating greater public involvement in forest decision making since its founding in 1900.

Public interest in forest conservation was stronger earlier in this century than it was as little as 10 years ago. For example, in the 1920s, hundreds of thousands of Canadians attended local CFA conservation lectures in a single year. People flocked to the touring CFA–Canadian Pacific Railway car in western Canada, and to the small town churches, town halls and theatres in the east when the conservation evangelists made their annual circuit armed with pamphlets and films. By mid-century—perhaps as Canadians were becoming more urbanized—this sense of resource stewardship had largely waned.

Rise of Public Participation

By the 1960s decisions about land use and forest management on Crown land had become virtually the exclusive domain of the forest industry and provincial governments. People have suggested that this was some sort of clandestine, behind-closed-doors arrangement. It wasn't. Rather it was that forestry companies were working

to secure their long-term timber supply, keep their mills operating, and make a profit; and governments wanted to generate royalties, derive tax revenue, ensure employment and community stability, and maintain a minimal level of control over the resource they were elected to oversee. The public, preoccupied elsewhere, was generally apathetic. The welfare of our forests was taken for granted.

Forest management was much simpler then—the objective was a sustained yield of timber and, to a lesser extent, conservation of a few wildlife species valued for hunting. There was little or no talk of biodiversity, ecosystem management, endangered species, protected areas, sacred Aboriginal lands or old-growth forests. These concepts were not part of the vocabulary of either foresters or the general public. They are now.

The phenomenon of public participation has come to the fore for a number of reasons—reaction against government centralization and the isolation of decision-makers from local realities; the rise of the consumer revolution, and the peace, civil rights and environmental movements; the higher level of education among the general public; the pervasiveness and influence of the mass media; and in the forest management arena, the recognition that forests provide many values and benefits other than timber.

In eastern Canada, public interest began with reaction to the aerial application of insecticides in the 1970s. Spraying of chemicals on roads, waterways and wildlife, as well as forests, created a realization that things were being done to our forests over which the public had little input or control. And the perception was that some of these things might not be beneficial.

Also, forest roads allowed public access to previously inaccessible areas, particularly on the west coast. Mountainside clearcuts were seen by a growing number of people where majestic forests had once stood—a shock to their aesthetic sense.

The attitude of Canadians underwent a dramatic transformation. They began to question the complete trust they had placed in technology, big business and government. They became more critical. They began to demand explanations of the options before decisions were made. They wanted evidence that decision makers had considered all the social, cultural, economic and environmental issues, not just the business and political issues, before reaching their decisions. Ultimately, they demanded to become decision makers themselves.

Out of these concerns evolved a movement, as part of the North American environmental movement that unfolded in the wake of the 1960s counterculture and exposés such as Rachel Carson's book, *Silent Spring*. The message was clear: These are our forests. We as Canadians own them. We want to have a say in what happens to them. We want to participate in the decision-making processes.

And governments responded. Curiously, the somewhat radical and generally dismissed “power to the people” youth anthem of the 1960s has become legitimized today in government “empowerment” of the people. This represents a major transition from a minority-held view to a commonly accepted, politically correct principle, in less than 30 years; it is also a shift from representative democracy toward participatory democracy.

Benefits and Costs

The benefits to be derived from public participation are:

- More insightful decisions that reflect a broader range of public concerns, interests and values.
- Reduction or avoidance of conflict and confrontation resulting from decisions, and public support for and ownership of the decisions taken.
- Increased credibility of the forest management planning process.
- Education of all parties involved.

Disadvantages:

- The time and money required to undertake a valid process (although

FOUR CORNERSTONES OF EFFECTIVE PUBLIC PARTICIPATION

1. Equitable representation of all interests, encompassing a full range of values. The ultimate outcome is partnerships rather than conflict. This implies trust, absence of hidden agendas and commitment to equitable solutions.
2. Access to economic, ecological, social, cultural and other relevant information, such as health and safety.
3. Acceptance by all participants that the process is fair, open and effective, with recognition of the principles of democratic participation, respect for diversity of opinion and agreed-upon conflict resolution through dialogue, negotiation and compromise.
4. Informed participants, reflecting the tenet that informed decision makers will make informed decisions. Education of all parties is key.

the value of the resource may far outweigh expenses related to making better informed decisions).

- The uncertainty of success in a relatively new area of experimentation.
- For those traditionally responsible for forest management decisions, a loss of control over the outcome, and the need to compromise in fulfilling their own objectives.

Examples

Today, a variety of public participation processes are in operation. Responding to specific situations, they represent varying degrees of public involvement, from simple one-way communication from industry to the public, to consultation, to true cooperative and shared decision making, to citizen control. Some examples may be helpful as illustrations.

In the Miramichi region of New Brunswick, Repap Paper started a consultation process in 1991 as part of the five-year update of its long-term forest management plans, which are required for tenure on Crown land. In one year the company held four one-day town-hall meetings, and invited a cross-section of interested groups to take part. The participants listed seven values they wished to be derived from the forest, including an ethic of respect for forests, jobs and easily accessible information. Company personnel and government foresters evaluated their own performance in satisfying these values, found themselves lacking in some areas, and set out to remedy the situation. A key to the success of the process was a series of company-conducted woodlands tours, which over five years brought 4 000 citizens into the forest. In 1997 Repap is repeating the process, as their new five-year plan is publicly reviewed.

In Quebec, a rather novel concept was initiated in the early 1990s. The “Forest to Inhabit” movement has three objectives: social,

economic and environmental. A series of “territorial contracts” transfers some control over public forests near populated areas to the citizens, through municipal or regional structures. The emphasis is on social stability in the region, multiple use, and sustainability of forest health. The movement empowers citizens to make decisions on the future of the forest territory and to participate in implementing the decisions. It has been described as a social movement to reclaim forests for the benefit of the people who live in the region. Local residents are seen as having the greatest stake in making sustainable forestry work, since they have the most to lose in terms of jobs and financial security, as well as the way of life.

In British Columbia, the government has been struggling with public participation since the 1970s. In 1992 the Commission on Resources and Environment (CORE) was created to develop a land-use strategy for the province. By 1996, when it was dissolved, CORE had set up four regional planning processes with representatives of youth, conservation, industry, labour, tourism, local government and other groups, aimed at achieving decision making by consensus. Although the attempt was not successful in any of the four regions, the system firmly established public participation as an integral part of land-use and forest-management planning in the province. Currently 60% of the forest is managed using such processes.

Conclusion

In the 1990s and beyond, public participation is no longer an option, it is a reality. In Canada, more than 90% of the forests belong to the people. Canadians are exercising their right to determine how their forests are managed. Collectively they own them, and ownership brings responsibilities. To have input into how forests are managed, citizens must make sure they are well informed. And forest managers must be able to manage forests for more uses

and values than the traditional extraction of timber. A two-way dialogue is essential to the success of the process.

Under these conditions, better and more enlightened decisions will be reached, conflict will be avoided or reduced, a more holistic management of our forests will evolve, and the result will be a scenario of land use and forest management that will achieve both the economic and ecological objectives necessary for sustainable development of the forest resource.

This article is based on a paper presented by Glen Blouin, Executive Director of the Canadian Forestry Association, at an international symposium in China.

THREE

CHAPTER THREE

Traditional Ecological Knowledge

of Aboriginal People

When pioneers explored western Canada in the late 1850s, the lush, apparently natural grasslands they saw were in fact the result of centuries of Aboriginal land-use management. What they probably did not know was that Aboriginal people periodically burned the prairies to increase forage for bison and other ungulates—a working example of their traditional ecological knowledge.

Traditional Ecological Knowledge of Aboriginal People

Today, roughly 1 million Aboriginal people live in Canada, the great majority belonging to one of some 600 First Nations (Indian bands). The Métis population represents 200 000 persons, and the Inuit in the Arctic account for 30 000. Each of these groups (with their subgroups) has its own culture, territory and system of governance.

Some 80% of Aboriginal people live in areas covered by boreal or temperate rainforests. From their land-use practices, they have developed a unique cultural and spiritual connection with the land and an intimate knowledge of the forest and other ecosystems. Their traditional way of life is based on the idea of using and managing a resource so that it will last in perpetuity. It stands to reason, therefore, that their ecological knowledge can contribute to sustainable forest management practices.

What is Traditional Ecological Knowledge?

The traditional ecological knowledge of Aboriginal people consists partly of local, site-specific knowledge regarding the natural environment (e.g., knowing where to find medicinal plants and berries, local fish-spawning sites and moose-calving areas). It also involves understanding the relationships between life-forms, for instance, between soil types and plants, or between trees and animals. It can include knowing the medicinal properties of local

weeds, shrubs and trees; whether to use the fruit, flowers, leaves, stalks or roots of these plants; and the season or time of day to gather them. Traditional ecological knowledge can also include equally detailed information regarding animals, weather and other natural phenomena.

In short, traditional ecological knowledge is the knowledge that Aboriginal people have accumulated over generations of intimate contact with all aspects of local ecosystems, including plants, animals and natural phenomena. It includes knowledge of animal behaviour, seasons and cycles, and the interrelationships that exist among life-forms.

USING FIRE—A PRACTICE VALUED IN TRADITION AND SCIENCE

Aboriginal people used fire in the forests as well as grasslands, modifying the structure of Canada's temperate and boreal forests. In the 17th Century, the Acadian region was dominated by deciduous (hardwood) forests. These stands of red and sugar maples, birch, ash and oak were regularly burned to create clearings for shrubs and herbs, as well as browsing areas for moose. Burning also removed conifers (softwoods) from the hardwood stands that the Aboriginal people used to make houses, canoes, baskets and tools. The people also collected medicines from these forests.

Today, large tracts of Acadian forests are composed of spruce and fir trees. The gradual change in forest structure from hardwoods to softwoods reflects a change in management style—from Aboriginal fire management to commercial logging.

Setting controlled fires is a complex forest management technology. The fires set by Aboriginals were seasonally timed. Determining which species would be removed and which ones would regenerate depended on the intensity of the fire (controlled by how often the tract of land was burned), as well as the temperature and humidity of the tract when it was burned. Some Aboriginal elders still recall traditional models for determining where, when and how to set fires.

Recently, a consensus has been evolving among professional foresters on integrating fire into forest management. Wildfires are now seen as a natural means of renewing specific types of forests (e.g., Jack pine, which needs heat to release seeds from cones), and they are sometimes allowed to burn. In other cases, fires are set to remove the large amounts of forest debris that could fuel a severe fire—also a traditional Aboriginal practice.

Observing, Experiencing and Experimenting

Traditional knowledge is acquired and passed on in subtle ways. An apprentice hunter travels the land with an experienced older hunter, learning by observation rather than instruction what cues to use in forecasting the seasonal and daily movements of wildlife to be able to intercept them reliably and with the least effort.

Many factors, such as the time of day, temperature, humidity, distribution of forage plants and movements of other species, are experienced until the pupil begins to think, subconsciously, like the prey. At the same time, stories are told that explain symbolically, perhaps in terms of kinships and alliances, the ecological relationships between the prey and other species. Eventually, the young hunter travels alone and begins to notice new connections, either because they were not observed by previous generations, or because they result from changes in the ecosystem.

In such ways, individuals gain knowledge through observation, direct experience and experimentation. This information is passed from one person to another, one generation to another, and one group to another. The tradition of Aboriginal ecological knowledge is not static—rather it is evolving. Typically, elders are the repository of this knowledge.

Cultural Laws

The unwritten cultural laws by which Aboriginal people live add another dimension to their traditional ecological knowledge. These laws are based on a set of principles that help community members understand their place in the natural order of the world. Humans, other animals and plants are all seen to be connected. That being so, hunters and gatherers must show respect for the plants and animals they harvest.

Convergence of Traditional Ecological Knowledge and Sustainable Forest Development

International Recognition

The United Nations World Commission on Environment and Development has played a key role in linking traditional ecological knowledge with sustainable development. In its 1987 Brundtland report, entitled *Our Common Future*, the Commission called for a new global commitment to sustainable development. The report also referred to Aboriginal communities as “repositories of vast accumulations of traditional knowledge and experience.”

Later, at the Earth Summit in Rio de Janeiro in 1992, traditional ecological knowledge was recognized as critically important to the development and cultural survival of indigenous people. Furthermore, it was acknowledged that use of this knowledge can contribute to the conservation of biodiversity and the sustainable management of forests.

In 1996, the National Aboriginal Forestry Association presented a paper on forest-related Aboriginal knowledge and practices at the UN Intergovernmental Panel on Forests (IPF).

The paper, entitled “Aboriginal Forest-based Ecological Knowledge in Canada,” was part of Canada’s contribution to international discussions on sustainable forest management, and this chapter is drawn from it.

Canadian Attitude Shift

In Canada, attitudes toward forests and Aboriginal involvement in forest management are shifting. More and more, forests have come to be regarded as integrated ecosystems with a wide range of values. Canada’s 1992 National Forest Strategy and the Canada Forest Accord enshrined our commitment to sustainable development and recognized the unique perspective of Aboriginal people toward forests.

More recently, the Canadian Council of Forest Ministers (CCFM) released a national framework of criteria and indicators for measuring forest sustainability. The need to recognize Aboriginal and treaty rights and to consider Aboriginal land use in forest management planning is included in this framework.

Growing Recognition in Academic and Research Communities

Respect for Aboriginal knowledge is growing in the academic community, and some universities now have faculty who specialize in traditional ecological knowledge and native studies. The scientific community also is beginning to see the value of this knowledge. For example, the 1995 scientific panel for sustainable forest practices in Clayoquot Sound made an effort to demonstrate the scientific validity of Aboriginals’ ecological knowledge (*see page 54*).

Traditional ecological knowledge has made the greatest headway in the area of human health. For example, elders with expertise in medicinal plants and other healing methods are increasingly accepted as professionals in hospitals and clinics. Many weeds, shrubs and trees are used for a variety of ailments, from earaches to respiratory problems.

Loss of Traditional Knowledge

Ironically, just as the value of traditional ecological knowledge is beginning to be recognized outside the Aboriginal community, many Aboriginal people are losing it. This loss is attributed to the loss of Aboriginal lands, languages and lifestyles. As industrial activities have developed in the North, the Aboriginal landbase has given way to new towns, land flooded for hydroelectric power, access roads for forest harvesting, and many other developments.

In addition, the traditional lifestyle itself is losing ground. Wildlife stocks are dwindling and the opportunity for Aboriginal people to pursue other occupations is sometimes hard to resist. Children are spending much less time on the land than in previous

generations, so they learn less about the environment and the traditional way of life. As the lifestyle disappears, so too, with each passing elder, does the knowledge.

As television and other influences make their presence felt, Aboriginal youths are losing command of their languages. Of the 50 or so Aboriginal languages in Canada, only three—Inuktitut, Ojibway and Cree—are thought to have an excellent chance of surviving as first languages. To capture the sophisticated information associated with traditional knowledge, well-developed Aboriginal language skills are essential.

Ownership of Knowledge

The fact that the traditional ecological knowledge of Aboriginal people is dying is of serious concern. Another major concern is the issue of who owns this knowledge, how it is used, and who benefits from its use. These are critical issues for Aboriginal people, some of whom look to the Convention on Biodiversity, which implies there is a need to deal with their traditional ecological knowledge as a kind of intellectual property.

In short, Aboriginal people want recognition that they own their traditional ecological knowledge and they want it shared according to their principles.

Aboriginal Involvement in Forestry

The Aboriginal view of the forest is similar to current concepts of stewardship—caring for the forest—and the forester’s creed. Aboriginal people aim to protect forests in perpetuity.

A good example is the Gitx̱san people in northwestern British Columbia who have extracted forest resources for thousands of years in a sustainable way. They have used natural products from shrubs for medicines, food, crafts and trade, and have employed “prescribed burning” to improve shrub growth and attract wildlife. Berry-picking and medicinal plant use continue today in a subsistence and barter economy, aided by oral traditions that indicate berry sites and management techniques. The Gitx̱san also harvest timber for subsistence and commercial use, and they allocate and monitor resource extraction through their family and clan system (*described on page 56*).

Since time immemorial, Canada’s forests have met the cultural, spiritual and material needs of Aboriginal people—the first stewards of those forests. The Aboriginal land ethic is deeply rooted in their beliefs, which hold that the land and forests should be viewed as a whole. This ethic embodies the concept that the land and its resources must be protected out of respect for past,

present and future generations. The knowledge Aboriginal people have gained through their enduring relationship with the land can bring a special perspective to sustainable forest management.

A Mohawk Tradition—The Use of Black Ash

For as long as the Mohawks have lived on the lands of the Akwesasne Reserve, near Cornwall, Ontario, they have made baskets from black ash trees. Traditionally, these light-weight baskets were used to carry supplies such as food and clothing. Some, tightly woven, could even hold water. Today, articles made in this centuries-old tradition are sold to the public.

The black ash plays several important roles in the lives of the Mohawk people. It is culturally significant. And the basket industry supplies a good economic base, bringing roughly half a million dollars each year to Akwesasne residents (this figure could increase if more black ash were available). In addition, the black ash, which grows in environmentally sensitive areas, is a good indicator of a healthy environment.

USES OF BLACK ASH

- A log is carefully pounded until its annual rings can be separated into thin layers called “splints.”
- The splints are then woven into baskets of all sizes and shapes, from large backpacks to tiny sewing baskets.
- Fancy baskets are often interwoven with sweetgrass, which adds beauty and fragrance. When picking sweetgrass, many Mohawk people leave sacred tobacco as an offering.
- Black ash is also used to make snowshoe frames, barrel hoops, canoe ribs and hand-drum frames.
- Even the inner bark and ashes have a purpose. The first is used as a medicine, the second to remove hair from hides.

Currently, there are no usable black ash trees at Akwesasne. Most of the traditional lands were flooded for a dam project in the 1830s, construction of the St. Lawrence Seaway in the 1950s and other hydroelectric projects. Over the past 10 years, however, the Mohawk people have set up a number of plantations, some in partnership with the Eastern Ontario Model Forest. Based on the elders’ knowledge, black ash is being planted in areas where slippery elm is found, since the two species grow on similar sites.

The Mohawks are also collecting black ash seeds from a number of areas with various growing seasons. It is hoped that the trees from these seeds will provide basket-makers with a wide variety of splints, from coarse to fine. The longer-term goal is to establish a gene pool that will meet the needs of coming generations.

Collecting Data

Before Aboriginal people's forest-based ecological knowledge can be applied to forest management, it needs to be collected and recorded systematically.

Data collection usually begins with studies that trace and record the traditional patterns of Aboriginal travel, wildlife harvesting and other resource use. Some examples include the location of prime hunting and fishing areas, medicinal plant sites, berry-picking sites, fish-spawning and moose-calving areas, sacred areas and family burial grounds. Recent studies have made use of geographic information systems (GIS).

Other studies collect information on such topics as Aboriginals' understanding of local seasonal cycles and weather conditions. Yet others document geophysical features, soils, forest types, and classes of flora and fauna.

Collection of Aboriginals' forest-related knowledge has accelerated in recent years for many reasons. There is a need to record the information before it is lost forever. Also, the information is vital for Aboriginal people to assert their rights over traditional territories, especially where there is conflict over forest land use. This body of data provides not only proof of Aboriginal people's long-standing use and occupancy of the land, but also baseline data for future management purposes.

Applying Traditional Knowledge to Forest Management

In the 1990s, incorporating Aboriginals' knowledge of forest ecology into forest management is still in its early stages. However, some advances are being made. (*For details regarding the following examples and others, see pages 54–63.*)

- In British Columbia, the government has accepted the recommendations of a scientific panel mandated to develop world-class standards for sustainable forest management in the Clayoquot Sound region of Vancouver Island. The panel included members of the Nuuchahnulth nations.
- In northwestern British Columbia, the Gitksan are gathering and documenting their own site-specific information, which enables them to better analyze government and industry forest plans. This process also gives them a firmer footing on which to lobby for alternative forest practices.

- In northern Alberta, mapping significant Aboriginal sites (e.g., burial grounds, sacred places, trails and medicinal plant areas) helps forest companies plan around these areas and safeguard them from logging.
- In Quebec, the Algonquins of Barriere Lake are helping draft a management plan that would maintain the forest characteristics important to their land-based way of life.

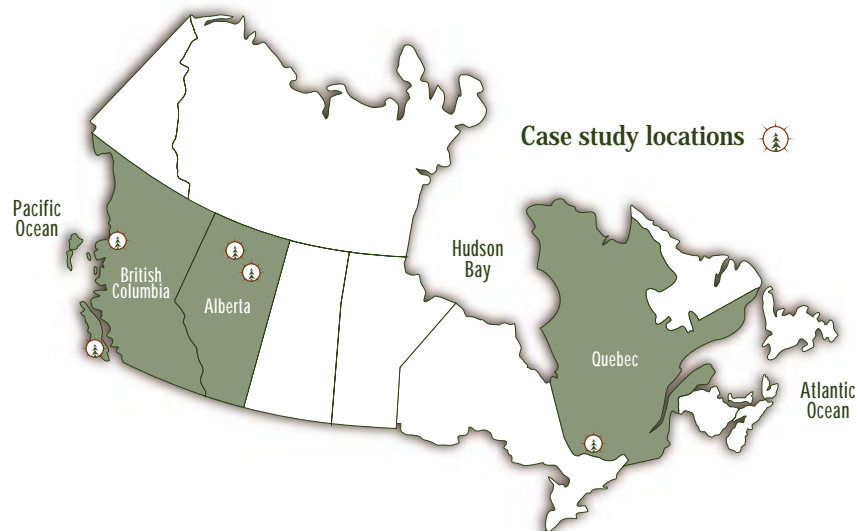
The next steps in applying traditional ecological knowledge to forest management planning involve putting the knowledge into practice. Above all, Aboriginal people want to be part of the decision-making process to ensure that their interests and values are safeguarded. And they do not want their interests interpreted on their behalf by other parties.

Managing the Traditional landbase

Much of First Nations' traditional landbase—areas where they hunt, fish, trap and gather food—is located outside Reserve boundaries, beyond their control.

In response to growing demands by Aboriginal people to be involved in managing forests on traditional lands outside Reserve boundaries, many provinces are entering into cooperative agreements where Aboriginal communities share some management responsibilities over certain areas. Recently, British Columbia addressed Aboriginal rights in its forest policy, while other provinces have adopted consultation processes in recognition that forest operations do affect Aboriginal rights.

The forest industry also is developing joint ventures with Aboriginal companies, ranging from full partnerships to limited employment agreements. Some of these ventures take into account Aboriginal people's traditional land use and knowledge. The following case studies demonstrate how Aboriginal knowledge is being applied in particular circumstances.



FOREST MANAGEMENT AT CLAYOQUOT SOUND

The Nuu-Chah-Nulth nations have lived for thousands of years on the west coast of Vancouver Island in the Clayoquot Sound region. The area, which contains large stands of old-growth forests, has been the scene of numerous anti-logging demonstrations, particularly in the early 1990s.



In 1993, the Government of British Columbia announced its Clayoquot Sound land-use decision: although harvesting in the area would continue, logging practices would be tightly regulated and would reflect the highest standards for sustainable forest practices. To this end, the Government established a scientific panel whose mandate was to develop world-class standards for sustainable forest management. The panel included scientific experts, Nuu-Chah-Nulth elders and experts in their traditional ecological knowledge.

The scientific panel recognized that current forest management standards reflected only limited understanding of the nature and scope of the First Nation's traditional knowledge and interests. Existing standards focused mainly on timber production and the maximum allowable cut for particular blocks of forest, rather than on the health of the forest ecosystem.

Integrating Aboriginal and Scientific Knowledge

To integrate Nuu-Chah-Nulth knowledge and scientific knowledge related to sustainable forest management, the panel worked on two fronts. The decision-making process had to be acceptable to Aboriginal as well as non-Aboriginal panel members, and the actual technical standards had to reflect Aboriginals' ecological knowledge as well as scientific knowledge.

The panel adopted the Nuu-Chah-Nulth's traditional group process, emphasizing respect for each member, respect for different values, and respect for data originating from scientific and lived experience. All members participated in identifying the issues and discussing them. The aim was to develop consensus decisions that reflected the collective wisdom of the group.

The panel established a number of general principles based on how it would view the forests of Clayoquot Sound; how people relate to Clayoquot Sound; and the nature of human knowledge and values, and their application to resource management.

Setting a New Framework

Based on these general principles, the panel made a number of recommendations, including the following, which set out a new framework for forest ecosystem management.

- Adopt an ecosystem approach to planning. An annual allowable cut would no longer be considered in local forest management planning. That volume-based approach would be replaced with an approach based on the area of commercial forest and the rate of timber harvesting.
- Use the watershed and groups of watersheds, rather than administrative units, as the basic unit for planning.
- Use practices that represent the best application of scientific and traditional knowledge and local experience. Baseline information on the biophysical and cultural forest resources and values would be collected and used to assess ecological responses to change.
- Engage the Nuu-Chah-Nulth and other local people in all phases of planning and managing the land, freshwater and marine resources in the Clayoquot Sound region.
- Monitor the Clayoquot Sound ecosystem to understand the effects of plans and to guide future adjustments.

The panel recognized that decisions based on ecosystem management principles should be the responsibility of those most closely affected by the decisions made. The panel also recognized that Nuu-Chah-Nulth traditions regarding decision making were relevant to forest management planning.

The scientific panel identified the need to gather information based on the Nuu-Chah-Nulth's ecological knowledge. One priority was to map the areas in which Nuu-Chah-Nulth hereditary chiefs traditionally exercised authority over people, land and resources. Other priorities included mapping culturally important areas and plant and animal habitats, and identifying areas for archeological investigation.

Interim Agreement and Recommendations

While the scientific panel was developing its recommendations, an Interim Measures Agreement was signed between the Nuu-Chah-Nulth and the Government of British Columbia. This 1994 agreement sets out a joint resource-management process through a central region board composed of provincial and Nuu-Chah-Nulth representatives. The board is responsible for making recommendations to the Ministry of Forests regarding the approval, rejection or modification of logging licenses. Board decisions must have a majority vote by the Nuu-Chah-Nulth representatives.

In July 1995, the British Columbia government accepted all of the scientific panel's recommendations.

Although a system has not yet been established to carry out the integration of Nuuchah-Nulth ecological knowledge, the implementation team's plan is to involve Nuuchah-Nulth elders in all aspects of forest inventories (including ecological/ environmental and cultural/spiritual site data). This would ensure that Aboriginals' traditional ecological knowledge and scientific knowledge both will contribute to forest management in Clayoquot Sound.

Creating a Paradigm Shift

Considerable progress still needs to be made, but a dramatic change has already been achieved in the way forest management is carried out in Clayoquot Sound. In the past, forest management plans were prepared by forest companies and laid out for the Nuuchah-Nulth nations to examine. Today, each First Nation has qualified people involved on the technical side who are able to assess and explain these plans to their communities. The central region board also ensures that the plans meet the approval of the Nuuchah-Nulth at a regional level.

The activities of the past few years in Clayoquot Sound have begun to create a shift in forest management from "maximum allowable cut" toward "health of the forest." It is recognized that such a change in perspective will take considerable time to implement fully.

GITXSAN WORLD VIEW AND FOREST RESOURCE MANAGEMENT



The Gitksan live in northwestern British Columbia in a land dominated by dense coniferous forests. Their traditional territory—roughly 30 000 km²—contains 12 watersheds and sits at the headwaters of two main river systems, the Skeena and the Nass. The Gitksan are a river-based, matrilineal culture with their own language and laws.

Managing Traditional Territories

Through their families and clans, the Gitksan have a complex system of allocating and monitoring resource extraction. To understand the Gitksan approach to land management, it is necessary to understand their approach to life, which is based on an important social unit referred to as the "house."

Each Gitksan belongs to a house of relatives on the mother's side of the family. A typical house may consist of, perhaps, 90 members divided into several biological lines. Each house claims jurisdiction over a certain amount of territory bordered by natural features, such as creeks and heights of land. The traditional system of land management is based on these house territories.

Each house has managed its territory for thousands of years. House members are responsible for reporting where they take a particular resource (e.g., trees or berries). The information is stored in a central “inventory” system, and problems and decisions regarding how much of a resource to extract are dealt with during feasts.

Protecting Habitat

The Gitx̱san approach to forest management also is house-based—each house has its own strategies to manage its lands. But all houses share a common element: an emphasis on protecting fish and animal habitats, as well as areas that contain medicinal plants.

Medicinal plants are especially important to the Gitx̱san. The roots or leaves of particular plants, or the fungus growing on aspen trees, may have different medicinal properties. For example, one plant may work as a local anaesthetic; another, to relieve headaches.

Today, much of the traditional Gitx̱san territory is scattered throughout areas under five-year forest license agreements set up between the Province and major forest companies. Although the Gitx̱san have no direct say in how government and industry carry out forest management practices on these lands, they are consulted regarding the licenses.

Gathering and Using Traditional Knowledge

In recent years, the Gitx̱san have set up their own training program for forestry technicians and technologists. These specialists now make up the Gitx̱san Statistical Watershed Analysis Team (SWAT) mandated to document their traditional ecological knowledge.

Because they live in the area and observe it so closely, the Gitx̱san have a good sense of the health of the watersheds. Gathering and documenting site-specific information enables them to better analyze government and industry forest plans, and gives them a firmer basis on which to argue for altering forest practices. For example, timber harvesting is currently based on the annual allowable cut (AAC). The Gitx̱san want an AAC based on what each house territory can sustain, rather than a clearcut of one house’s territory while another’s is left untouched. With the Gitx̱san approach, the house territory system is left intact; house members can use their own territory without violating Gitx̱san laws, such as encroaching on other house territories.

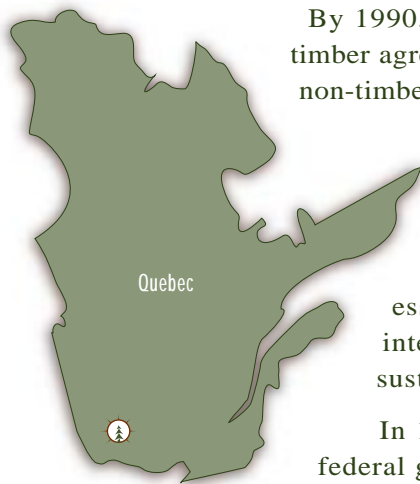
SWAT has conducted baseline inventories and assessed resources within the traditional territory. For each house territory, the team records the various bioclimatic zones, plants and animals, and compares clearcut areas with ones that have not been logged. SWAT also lists locations of Gitx̱san villages, camps, bridges and

trails, and vision-quest and healing areas. Often SWAT uses GIS to produce accurate forest cover maps.

The Gitksan believe that resource management in their traditional territory has the potential to benefit everyone. Under their model of forest management, they would maintain local management and control. And they would have greater authority and responsibility for the resources.

BARRIERE LAKE TRILATERAL AGREEMENT

The Algonquins of Barriere Lake are situated in La Vérendrye Wildlife Reserve, Quebec, where they pursue a land-based way of life. Much of their traditional landbase—the land they use to hunt, trap and fish—is subject to logging, recreational hunting and fishing, and hydroelectric development.



By 1990, the Quebec government was signing 25-year timber agreements with forest companies that did not include non-timber forest values, potentially affecting the biodiversity among the plants and animals the Algonquins wanted to maintain. After some 18 timber agreements had been signed, the Algonquins saw the need for a conservation strategy that would maintain the forest characteristics they deemed essential. They sought to negotiate trilaterally for interim protection measures and for a longer-term sustainable development strategy.

In 1991, the Algonquins and the provincial and federal governments negotiated the Barriere Lake Trilateral Agreement. As an integral part of the Agreement, the Algonquins proposed a model of sustainable development patterned after concepts of the 1987 Brundtland Report of the World Commission on Environment and Development.

Reconciling Forestry and Traditional Lifestyles

Under the Agreement, the Barriere Lake Algonquins are to have a clear say in forest management planning for a major portion of their traditional lands—an area of 10 000 km². The agreement seeks to reconcile forest operations with the Algonquins' environmental concerns and traditional ways of life.

The agreement called for Quebec and the Algonquins to prepare a draft integrated resource management plan (IRMP) that takes into account the needs of the Algonquin subsistence economy. Because this process was expected to take several years, a special interim management regime was established.

Identifying and Protecting Sensitive Zones

Before discussions could begin, all three parties—the federal and Quebec governments and the Algonquins—had to understand what resources the Algonquins use and why those resources are important to them. An immediate goal, therefore, became to identify sensitive zones and recommend ways to protect them. Sensitive zones included critical wildlife habitat and important Algonquin sites—moose yards, maple bush stands, sacred areas, areas containing medicinal plants, and riparian zones (shorelines and riverbanks).

To protect sensitive riparian zones, the Algonquins recommended establishing wider buffer zones along rivers, lakes and streams. The Algonquins maintained that animals needed wider buffer zones (which at the time were 20 m wide). Moreover, in wider zones, fewer trees would blow down. And lastly, the Algonquins themselves, who travelled along the shorelines, needed wider buffer zones.

Completing Baseline Research

Since 1994, the Algonquins and the Quebec government have focused on completing baseline research and preparing a draft IRMP for the territory. Major tasks included analyzing existing data and information, compiling new inventories and information on renewable resource use, and monitoring the impacts of development activities in the area. The result was an Algonquin classification system and database for geophysical features, soils, forest types, and classes of flora and fauna.

Information from Place Names

Part of the baseline research also included projects to document the ecological and social knowledge of the Algonquins so that this information could be incorporated into the IRMP.

One study concentrated on the use of place names. The study not only shows what areas the Algonquins use, but also provides insight into how they view the land. For example, many names include the word “trout,” an indication that this fish is important to them. The practice of naming sites descriptively can also provide information on environmental changes over time. The name Big Trout Lake, for example, implies that at one time—if not now—large trout were common there.

The Algonquin approach to the seasons offers another interesting perspective on ecological knowledge. The Algonquins recognize at least six seasons, and their approach to determining the start of a season is flexible. For example, their “moon of the goose” season—the period when geese fly north in the spring—is marked by the event itself: when the geese actually appear.

Completing the Final Phase

The final phase of the Barriere Lake Trilateral Agreement calls for recommendations on how to carry out the draft IRMP. However, legal difficulties have delayed the process, and the draft plan has not yet been finalized. Regardless of the delays, the Algonquin case study illustrates that when sufficient time, funding, commitment and organizational structure are provided, Aboriginal people and governments can form successful partnerships.

ABORIGINAL ECOLOGICAL KNOWLEDGE IN NORTHEASTERN ALBERTA

In 1991, the Alberta government and Alberta–Pacific Forest Industries Inc. (Al–Pac) signed a Forest Management Agreement (FMA) that opened up 60 000 km² of the province’s northern hardwood forests for logging and pulp production. With the signing, the Athabasca Native Development Corporation (ANDC) became concerned about negative impacts the company’s activities might have on Aboriginal people in the area.

Although the FMA provided for public involvement, ANDC negotiated another agreement through the Parallel Aboriginal Process. This agreement called for employment and contracting opportunities for Aboriginal communities affected by Al–Pac’s forest operations, dealt with issues related to sustainable forest practices, and covered compensation for trappers whose traplines were affected by logging activities.

Cultural Land-use Studies

The Parallel Aboriginal Process became the forum to integrate information from cultural land-use studies into Al–Pac’s detailed forest management plans. ANDC worked with Al–Pac to initiate these studies and apply their findings to the planning process.

Cultural land-use studies aim to identify sites (e.g., trails, cabins, historical sites, family grave sites and sacred places) that are significant to Aboriginal people in the region so that forest operation planning can take those sites into account. Other important sites include areas where medicinal and food plants grow, and areas of special significance for animals (e.g., salt licks), fish and birds.

Outcomes and Challenges

Cultural land-use studies have led to several positive outcomes. Forest management planners now know the locations of sensitive areas, such as ancestral grave sites, and can plan forest operations accordingly. The studies also bring forward knowledge before it is lost—knowledge formerly held only by the older generation. In addition, Aboriginal values are being integrated into the science



of natural resource management. For example, the information generated through the cultural land-use studies is being used by a network of universities and scientists doing innovative research in sustainable forest management. Finally, Al-Pac management and staff are now more sensitive to Aboriginal ways.

The issue of intellectual property has posed a challenge to forest managers, the scientific community and First Nations alike. For example, much of the information is considered sensitive (e.g., the location of salt licks). Although the parties agree that Aboriginal communities own the information, details are still being discussed regarding how it can be managed and how it can best be shared with the variety of industries operating in the region.

A final assessment of the success of this case study will depend on how effectively logging operations take into account the information derived from the cultural land-use studies, and how the knowledge of Aboriginal people is integrated into sustainable forest management practices. Al-Pac has not yet developed a monitoring program to ensure that sensitive sites are protected appropriately. But the first major step—identifying these areas—has been taken.

INTEGRATING ABORIGINAL AND SCIENCE-BASED KNOWLEDGE IN NORTHWESTERN ALBERTA

The Little Red River and Tall Cree First Nations in northwestern Alberta are involved in a cooperative management process that covers some 30 000 km² of forest in, and west of, Wood Buffalo National Park. Under the process, the two First Nations have an agreement with the Alberta government and Daishowa Marubeni International (DMI) Ltd. to develop an ecosystem-based forest management plan for 20 000 km² of provincial forest land.

Currently, the two First Nations hold timber rights in half the area—that is, in three management units. DMI has similar rights in the other half. The First Nations' long-term goal is to manage their three units themselves, or to manage all six units jointly with DMI under an ecosystem-based management plan approved by the Alberta government.

Central to the cooperative agreement is a research component that integrates the ecological knowledge of elders and the science-based knowledge of researchers. To date, seven forest research projects have been undertaken, and elders are involved in deciding what is to be studied, what type of information to collect, and how to study it.

Elders bring to the projects an understanding of the relationships between different features of the ecosystem. For example, in a study



on the relationship between lichen and caribou, an elder's ecological knowledge became the bridge between the different specializations of the plant and animal scientists.

Managing for Wildlife and Timber

In the lichen–caribou study, approximately 20 caribou were fitted with radio collars to track their movements into an area of old-growth spruce in northwestern Alberta. This important logging area also provides critical winter habitat for caribou, which feed on the forest's various lichens. To protect the caribou and their habitat, it was necessary to know exactly when the animals frequented the spruce habitat and what they ate there. Visiting the sites, an elder was able to tell the lichen specialist and the biologist which of the lichen types the caribou were eating, and at what time of year. Based on this type of information, the First Nations make recommendations through the cooperative management process on how to minimize the impact of logging and protect caribou and their habitat.

Another research project involves bison management within Wood Buffalo National Park and on provincial forest land west of the park. The federal and provincial governments have been working for the past 10 years to develop a plan for addressing the health risks associated with bison—bovine tuberculosis and brucellosis. Bison are enormously significant in the spiritual and cultural worlds of Aboriginal people. In recent years, the Little Red River Cree and the Tall Cree First Nations have proposed to these governments a process for eliminating the diseases in a way that is spiritually sound—to stop the diseases, but save the bison.

Shared knowledge will enable forest managers to design operations that may help prevent the spread of the diseases. For example, with this information, forest managers would avoid opening new logging roads in areas where the roads could allow diseased bison to wander closer to farmlands to the west, transferring the disease to domestic cattle.

Creating an Aboriginal Forest Centre

The Little Red River Cree and the Tall Cree First Nations are also creating an Aboriginal forest centre that would allow them to incorporate Aboriginal knowledge more easily into science-based knowledge. Through the centre, the First Nations would:

- set up an advisory group of elders to act as a resource for the researchers;
- run a two-year training program in ecosystem technology combining Aboriginal ecological knowledge and science;

- pursue research projects with 12–15 university graduates each year who would work with elders and technology trainees.

Under such a plan, the trainees would receive grounding in Aboriginal ecological knowledge and understand the forest from a traditional perspective. In addition, researchers would develop a better understanding of Aboriginal forest-based knowledge. As the numbers of researchers sensitive to Aboriginal issues grow, Aboriginal-based approaches to the forest ecosystem would be integrated with science-based approaches.

FIRST NATION FORESTRY PROGRAM

In April 1996, Natural Resources Canada–Canadian Forest Service and Indian and Northern Affairs Canada signed a memorandum of agreement aimed at improving the economic conditions in status Indian communities. The First Nation Forestry Program is a partnership program with First Nations. It provides participants with the experience and skills to manage their forest resources better, provides opportunities to enhance knowledge of forestry through training initiatives and on-site practical experience, and enhances the capacity of First Nations to operate and participate in forest-based businesses on- and off-reserve.

Management Committees are established in each province/ territory and are comprised of representatives from the federal government, First Nations, provincial/ territorial government and industry. These committees assume overall responsibility for program administration and delivery.

The \$24.9 million program will run until March 31, 2001. By that time, it is expected that participating First Nation communities will be in a position to carry on independently with their forestry activities.

Science and Technology

Forest Research Forum

In October 1996, the Canadian Council of Forest Ministers (CCFM) agreed to hold a National Forest Science and Technology (S&T) Forum the following spring to outline a strategic national forest S&T agenda to lead Canada into the 21st Century.

The Forum, which was held June 2 and 3, 1997 in Toronto, Ontario, brought together representatives of government, industry and academia. The result was the identification of six broad issues that form a preliminary agenda to guide the actions of the forest science community. The six issues are discussed below.

Developing Indicators

Forum participants recognized the need to identify the critical elements of an S&T strategy to build on the work already carried out in developing criteria and indicators (C&I) of sustainable forest management, strengthening the linkages with the scientific base, and identifying key indicators and significant gaps in our knowledge. They agreed to work together to develop an integrated strategy based on existing infrastructure, organizations and case studies. Using working groups, Internet discussion groups and a website, they will “network the networks” for knowledge transfer and exploitation.

Integrating Socioeconomic Factors

The Forum called for the recognition and higher ranking of social and economic factors in forest management models. Participants agreed that to accomplish this, partnerships, including those with Aboriginal groups, must be identified and more networking must be carried out for knowledge sharing. In addition,

“socioeconomics” within sustainable forestry models must be defined and indicators designed. Finally, links to the Model Forest Network should be improved.

Integration of Operational and Biological Knowledge

The Forum highlighted the need to practice and teach sustainable forest management and to develop and implement the best forest practices that are cost-effective and conserve forest biodiversity and ecosystem integrity. To do this, participants suggested that gaps in knowledge be filled through partnerships among academia, industry and governments, that best forest practices be developed, and that front-line workers be trained in sustainable forest management.

Understanding Ecosystems

Forum participants agreed that there must be improved understanding of how practices affect users and cause “significant” change in forest ecosystems. This will require predictive mechanisms and research that are ecosystem-based (e.g., relationships between wildlife habitat and biological productivity). Consensus should also be developed among stakeholders regarding priorities at national and regional scales, and long-term monitoring programs should be established for forest ecosystems.

Increasing Industrial Efficiency and Forest Capacity

The Forum highlighted the importance of maintaining and enhancing the competitive position of industry while respecting social and environmental values. Participants recommended that a certification process or accreditation system be established for

workers and that a policy framework be developed to build the high-technology components of the sector. In addition, opportunities should be developed to bring researchers and practitioners together and create investment incentives. Finally, participants called for a planning system to allow optimal harvesting and to a commitment to innovation in the industry.

A draft National Forest S&T agenda will be discussed at the CCFM meeting in October 1997. The document will then be refined and finalized for presentation and approval at the National Forest Congress planned for February 1998. A coalition of stakeholders will be brought together to sign an S&T accord underscoring their commitment to the S&T agenda.

Organizing to Manage Better for Tomorrow

The Forum called for research and technology at a level commensurate with Canada's development objectives for sustainable forest management; for more effective and efficient operations; and for ways to improve the management of S&T. To do this, the participants suggested the development of new and better measuring tools that take into account direct benefits and indirect societal costs, as well as training to better apply new and existing tools. They also called for efforts to demonstrate the return on investment for short- and long-term research; to demonstrate effectiveness and efficiency in using funds; and to broaden the scope of traditional partners contributing funds and resources.

Next Steps

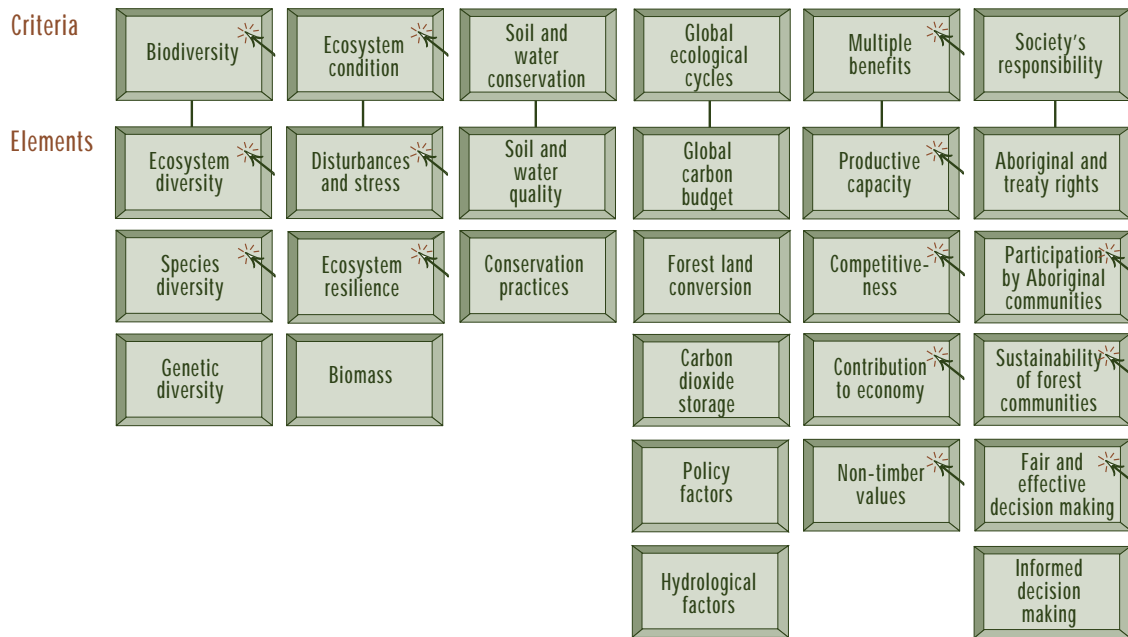
The CCFM is committed to building on the work of the Forum and developing an S&T agenda that will move Canada into the next century. This agenda will be used as the foundation for the S&T component of the renewed National Forest Strategy (the successor to the five-year Strategy developed in 1992) and the C&I initiatives. Regional consultations on the successor were held in September and included representation from the science community. The issues identified during the June Forum and the actions developed for the S&T agenda will both be assimilated into the Strategy.

FOUR

CHAPTER FOUR

Measuring Forest Sustainability

The Canadian Approach



In The State of Canada's Forests 1991, we introduced a set of preliminary indicators that would help track our country's progress toward sustainable forest development. In 1995, the Canadian Council of Forest Ministers (CCFM) approved a national framework of criteria and indicators (C&I) that were created through consultations with representatives of governments, industry, environmental organizations, Aboriginal groups, academia and other interest groups. A panel of scientists helped ensure that the indicators were scientifically based and reflected the best knowledge available. The framework (outlined above)

identifies the values that Canadians want to sustain and protect. (The first CCFM report on C&I was published recently. Research is underway to enable Canada to produce another report in 2000 on our progress toward forest sustainability).

This chapter presents a series of indicators based on the Canadian framework. The indicators in this report fall into two categories: some that are reported on annually, and others that do not lend themselves to annual measurement—referred to as “theme indicators.” Two years ago, the theme indicators focused on environmental aspects of sustainable forest development. Last year’s report featured selected economic indicators, and this year’s theme indicators will concentrate on social dimensions of sustainability. (Given the current efforts to produce a comprehensive report on C&I in 2000, the next report on the state of Canada’s forests will not include a comprehensive chapter on C&I.)



CONSERVING BIODIVERSITY

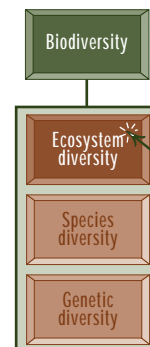
Conservation of biological diversity is important to ensure the viability, resiliency and sustainability of ecosystems. Generally, it is considered at three separate levels: ecosystem diversity, species diversity and genetic diversity.

1 PROTECTED AREAS

(annual indicator)

Are representative areas of Canada’s forests being preserved?

The National Forest Strategy commits governments to completing, by 2000, a network of protected areas representative of Canada’s forest types. These areas provide ecological benchmarks so that biodiversity in undisturbed ecosystems can be compared with that in areas managed for forest products. Protected areas also provide wilderness experiences, habitat for species at



risk, environmental services (e.g., watershed protection), recreation benefits, and preservation of special areas and species diversity for future generations.

According to Environment Canada's Canadian Conservation Areas Database, in 1995, approximately 7.6% of Canada's forest land was protected by legislation—an increase of 11% since 1985. In addition, many forests on shallow or rocky soil, on steep slopes, or along lakes and waterways are excluded from harvesting by provincial policy. Many policies and programs to conserve biodiversity also are being implemented through codes of forest practice and alternative harvesting methods. However, because of discrepancies in data and definitions, we can not yet accurately determine the number, location and size of all protected forested areas in Canada.

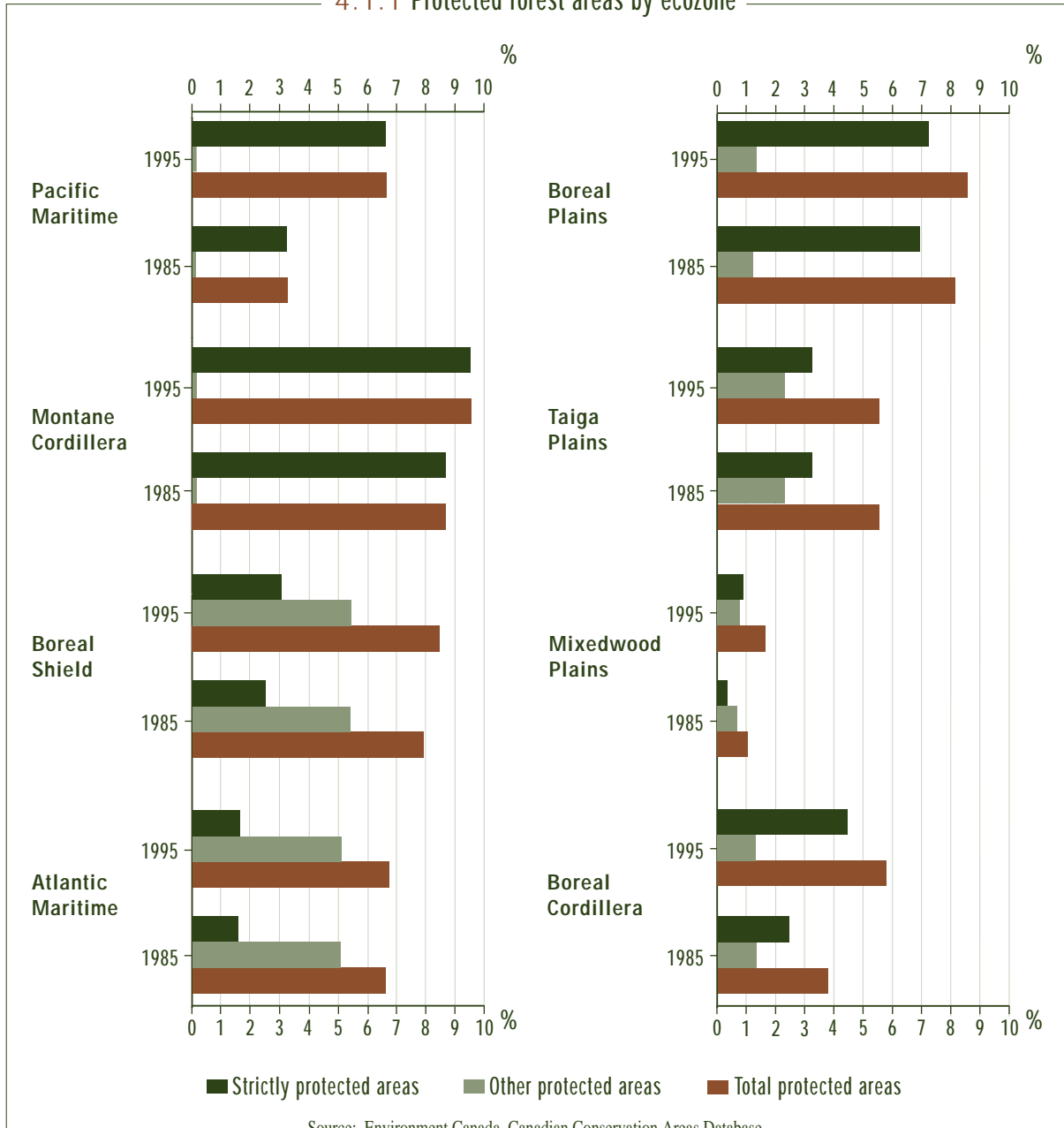
Figure 4.1.1 shows trends between 1985 and 1995 for the forest area protected in eight ecozones that are predominately forested. Increases have been greater in some ecozones than in others. In the Pacific Maritime ecozone, for example, the protected forest area more than doubled between 1985 and 1995—to 6.6% of the total forest area—and almost all of this area is strictly protected (i.e., no logging is permitted). In the Boreal Shield and Atlantic Maritime ecozones, however, less than half the protected area is strictly protected.

Policies and programs are also being set up to conserve biodiversity in forests outside protected areas—not only in publicly owned (Crown) forest lands under timber licenses, but also in private forest lands, which are common in such ecozones as the Mixedwood Plains or Atlantic Maritimes.

The Endangered Spaces Progress Report, published by the World Wide Fund for Nature (WWF), provides a yearly update on the status of Canada's protected areas. In its 1996–1997 report, the WWF states:

The portion of Canada's lands permanently dedicated to nature grew measurably between March 1996 and February 1997... Each and every park or reserve accounting for this annual growth is special, worthy of celebration for whatever distinctive piece of our ecological fabric it is intended to safeguard in a natural state. Yet if you step back and look at them all together on a map of Canada, they show far less progress than is needed to fulfill a commitment made by the federal, provincial and territorial governments in 1992. They pledged to ensure that examples of all of Canada's natural regions are set aside in protected areas by 2000.

4.1.1 Protected forest areas by ecozone

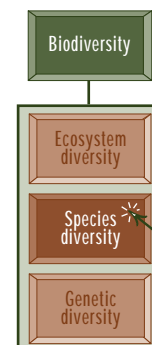


2 FOREST WILDLIFE

(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.

Keeping track of the estimated 140 000 species found in Canada's forests is almost impossible—not only because of sheer numbers, but also because most inventories concentrate on common plants, animals and fish, and do not include plants with limited distributions or insects, fungi and other microorganisms.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the status of species and assigns each one to a category: vulnerable, threatened, endangered, extirpated or extinct. In 1996, nine forest-dependent species (described below) were added to COSEWIC's list of species at risk, and two forest birds were no longer considered at risk. (**Figure 4.2.1** on page 71 shows the total number of forest-dependent species at risk.)

Deltoid Balsamroot (endangered)

Deltoid balsamroot is a large (20–100 cm) perennial herb with large triangular leaves and a large bright yellow head containing both disk and ray flowers. It occurs on the west coast of North America, south from Vancouver Island to the Sierra Nevada in California. Globally the species is not at risk, but in Canada it is rare and threatened with extirpation. It grows only in southeastern Vancouver Island between Campbell River and Victoria and is now present on only five sites—one near Campbell River with 1 700 plants and the others with fewer than 100 plants each. Deltoid balsamroot prefers very dry sites with shallow soils that are exposed or are partly shaded by individual trees, particularly the Garry oak. The prognosis for this species is not good. The main threats to its survival are development and aggressive competition from other species in the same habitat. The species was designated as endangered in 1996.



Prairie Lupine (endangered)

The prairie lupine is a multi-stemmed perennial herb (20–45 cm) with pea-like blue flowers. It is common in Washington and Oregon, but in Canada occurs only in the Victoria region. The species grows on sites from grass-dominated meadows to steep rocky slopes with scattered clumps of Douglas-fir, arbutus and shore pine. It has been identified at seven sites in British Columbia (BC) since 1900, but the plants no longer exist at three of them, and their presence at the other four is uncertain. The prognosis for the species is unfavourable because of a loss of habitat to residential and agricultural development and the introduction of aggressive European species.



4.2.1 FOREST-DWELLING SPECIES AT RISK*

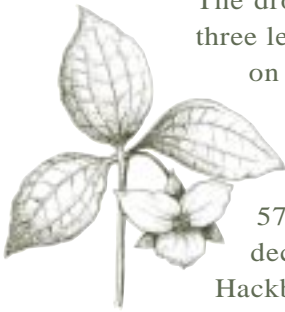
	Mammals	Birds	Plants	Reptiles
Endangered	Wolverine (<i>eastern population</i>) Cougar Vancouver Island marmot Newfoundland pine marten	Spotted owl Kirtland's warbler Prothonotary warbler Acadian flycatcher	Spotted wintergreen Cucumber tree Heart-leaved plantain Large whorled pogonia Small whorled pogonia Wood poppy Drooping trillium Prairie lupine Seaside centipede Deltoid balsamroot	Blue racer snake
Threatened	Woodland caribou (<i>Gaspé pop.</i>) Wood bison	Marbled murrelet Hooded warbler Yellow-breasted chat (<i>montane pop.</i>) White-headed woodpecker	Yellow montane violet Blunt-lobed woodsia Deerberry Ginseng American chestnut Blue ash Kentucky coffee tree Red mulberry Bird's-foot violet Golden seal Nodding pogonia Purple twayblade Round-leaved greenbriar White wood aster White-top aster	Eastern Massasauga rattlesnake Blanding's turtle (<i>Nova Scotia pop.</i>)
Vulnerable	Grizzly bear Wolverine (<i>western pop.</i>) Ermine (<i>Queen Charlotte Island's pop.</i>) Pallid bat Spotted bat Nuttall's cottontail Southern flying squirrel Gaspé shrew Woodland caribou Fringed myotis bat Keen's long-eared bat	Flammulated owl Cerulean warbler Yellow-breasted chat (<i>carolinian pop.</i>) Queen Charlotte goshawk Prairie warbler Louisiana waterthrush Red-headed woodpecker	Phantom orchid Broad beech fern Green dragon Shumard oak Common hop tree Dwarf hackberry American columbo False rue-anemone Few-flowered club rush Wild hyacinth Cryptic paw lichen Old growth specklebelly lichen Seaside bone lichen	Pacific giant salamander Wood turtle

* Species added to the list in 1996 are in bold.

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

COSEWIC added the prairie lupine to its list of endangered species in 1996.

Drooping Trillium (endangered)



The drooping trillium is a perennial 15–60 cm high, topped by three leaves up to 20 cm long and broad. A single flower is borne on a straight stem rising from the middle of the leaf whorl.

This species is relatively common in the eastern United States (USA), but its range just reaches into Canada's Carolinian forest. The two known sites contain only 575 flowering plants. The drooping trillium grows in moist deciduous woodlands, usually associated with watercourses.

Hackberry, white elm, blue ash, and silver, sugar and black maples are the main canopy species. Habitat loss to urban development and uncontrolled recreation are the primary threats. The Canadian population of this species was declared endangered in 1996.

Seaside Centipede Lichen (endangered)

Seaside centipede lichen is semi-erect and forms cushions averaging 2 cm across. It appears to be unique to Canada.



Only two sites have been reported, both in the very wet maritime subzone of the Coastal Western Hemlock Zone of Vancouver Island, colonizing a total area of less than 2 m². The species grows on twigs of Sitka spruce in the lower canopy of seaside old-growth forests in somewhat sheltered localities. In recognition of its highly restricted global distribution, specialized ecological requirements and extreme vulnerability to habitat destruction, COSEWIC designated the seaside centipede lichen as endangered in 1996.

White-top Aster (threatened)



The white-top aster is an erect perennial plant 10–30 cm tall. It occurs in the U.S. Pacific Northwest where it is considered rare or uncommon, and susceptible to large-scale disturbances. In Canada, the white-top aster has been confirmed on 12 sites in southern Vancouver Island. The plant occupies very dry sites with shallow soils, exposed or partially shaded by individual trees such as Garry oak and arbutus. The greatest threat to the species is habitat destruction and competition from aggressive shrubs.

It was classified as threatened in 1996.

Red-headed Woodpecker (vulnerable)



The red-headed woodpecker breeds and winters exclusively in North America. In Canada, it breeds in southern Saskatchewan, Manitoba and Ontario and in southwestern Quebec; in thinly treed deciduous forests; edges of woodlands and fields; areas with dead trees, urban parks and farmyards; along rivers and roads; and in

marshy areas. Though considered secure globally, the species has declined throughout this century as its nesting habitat is destroyed by firewood cutting, forest clearing and “urban cleansing” (removing dead trees and branches), and as other species are introduced and compete for nest sites. The Ontario population, for example, declined at an average rate of 11.3% per year between 1980 and 1994. The red-headed woodpecker was designated as vulnerable in 1996.

Wood Turtle (vulnerable)

The wood turtle is medium sized, the average adult measuring 12.5–20 cm. Its range is from Nova Scotia to Virginia and as far west as Minnesota and Iowa. U.S. populations are declining due to habitat loss, declining habitat quality, and collection for the pet trade and by outdoor recreationists. In Canada, the largest known population is in southern Ontario. In 1984, the wood turtle was given full protection under Ontario’s Game and Fish Act against harvesting or commercial collection. The wood turtle is typically associated with streams, creeks and rivers, but also chooses a variety of other habitats. Because it appears sporadically and its population is declining, the wood turtle was designated vulnerable in 1996.



Old Growth Specklebelly Lichen (vulnerable)

The old growth specklebelly lichen is a large, broad-lobed, loosely attached leaf lichen averaging 5–12 cm across that is native to the U.S. Pacific Northwest and the west coast of BC. It occurs in fairly sheltered sites in humid old-growth forests at low to moderate elevations. In Canada, six populations were documented in the Coastal Western Hemlock Zone, but only one could recently be verified. It colonizes a variety of trees and shrubs, though it is most frequent on conifers. It can become locally abundant over time in some U.S. old-growth forests. Because of its rarity, its very low reproductive success in Canada, and its vulnerability to habitat destruction, the species was designated vulnerable in 1996.



Seaside Bone Lichen (vulnerable)

The seaside bone lichen is semi-erect, averaging 5–8 cm across. This lichen is endemic to the Pacific Northwest, but in Canada it occurs only in a narrow 10-km strip of coastline on the southern tip of Vancouver Island. It is restricted to conifers, especially in younger stands of shore pine, in rather exposed seaside areas. Because it is situated in a regional park (East Sooke Park) for which no further development is planned, its survival seems secure. The lichen was designated as vulnerable in 1996.





MAINTAINING ECOSYSTEM HEALTH

The “productive capacity” of an ecosystem refers to its ability to produce and sustain life. 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 a healthy ecosystem enables it to adapt to and recover from disturbances and stress.

3 RATES OF DISTURBANCE

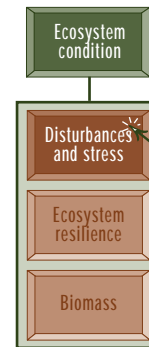
(annual indicator)

Are the natural dynamics of forests changing?

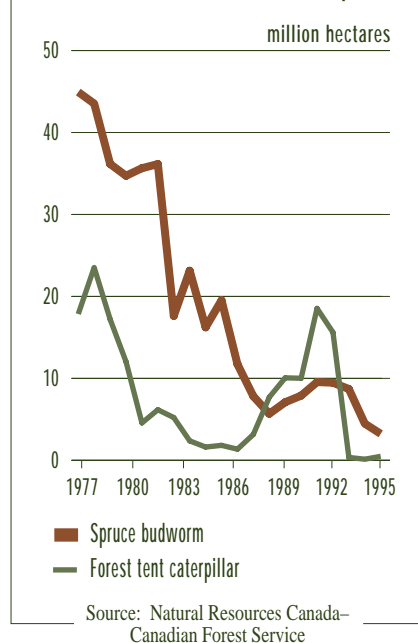
Forests are the product of thousands of years of evolution and adaptation to disturbances and stress. Significant changes in the level or pattern of natural disturbances may reflect the health of ecosystems. Natural disturbances include fire, wind, insects, disease and extreme weather conditions. But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

Healthy ecosystems are able to tolerate periodic disturbances and may even depend on them for renewal—as does the boreal forest. Fire and insects remain the dominant causes of disturbance in most of Canada’s forests: fire in the western boreal forest and insects in eastern Canada, whereas harvesting is the predominant form of disturbance in BC’s coastal forest.

The area burned by forest fires and the number of forest fires vary greatly from year to year. For example, the area burned in 1996 (1.7 million hectares) was lower than the annual average in the previous 10 years (2.96 million hectares). During the 1995 fire season—the second worst year on record—6.6 million hectares of forest burned. Several reasons were cited, including extremely dry conditions and limited fire suppression in remote areas.



4.3.1 Areas infested with spruce budworm and forest tent caterpillar

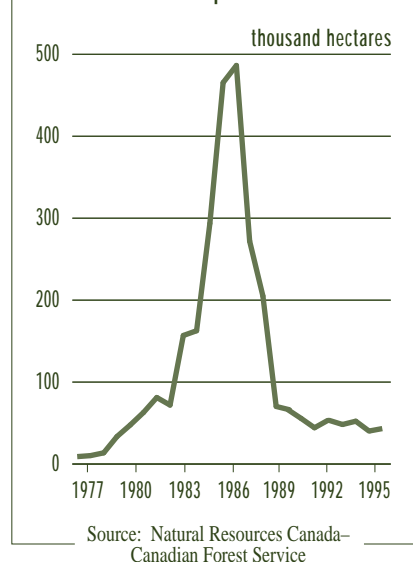


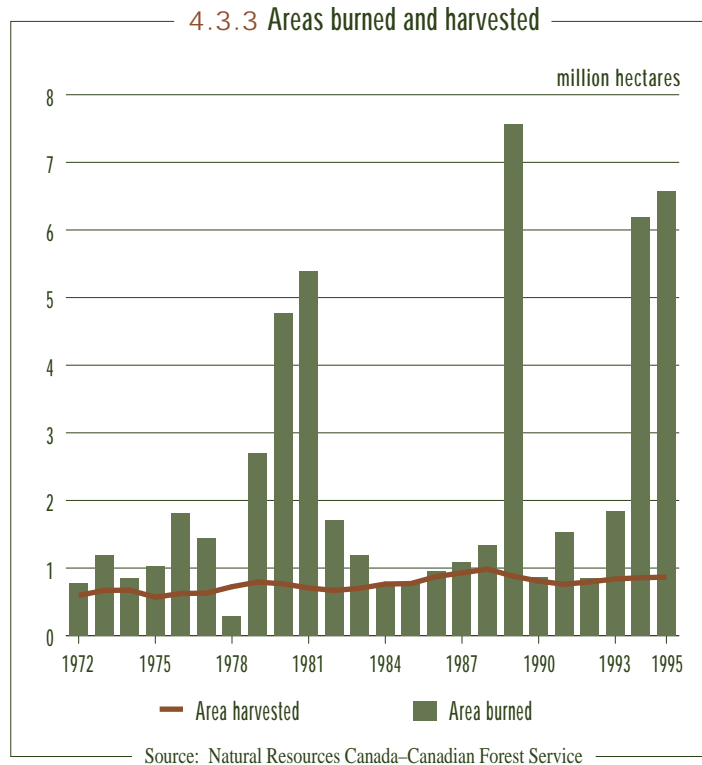
Since 1960, the number of forest fires and the area burned have both increased dramatically—the number of fires recorded between 1960 and 1995 was 60% higher than the total for 1920–1960, perhaps reflecting mounting pressures from our population growth. Although the area burned appears to have jumped substantially since 1980, statistics prior to that date did not include all fires. (The response to forest fires ranges from full suppression, in which adequate resources are allocated to suppress the fire quickly, to modified suppression, in which fewer resources are allocated.)

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 vary greatly, as does their impact on forests. **Figure 4.3.1** shows the area affected by moderate-to-severe defoliation by spruce budworm and forest tent caterpillar from 1977 to 1995. Spruce budworm outbreaks occur mainly east of the Manitoba–Ontario border. The area affected in 1995 (3.9 million hectares) was less than one-third the area defoliated in 1994—the smallest area affected in 22 years (1974–1995).

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,

4.3.2 Areas infested with mountain pine beetle





the mountain pine beetle does not defoliate trees—it kills them by laying eggs under their bark and depositing a fungus that blocks the flow of sap. **Figure 4.3.2** shows that the area with significant mortality from this insect’s attacks in 1995 (40 000 hectares) was slightly larger than the area reported in 1994. But in 1984, the area affected by mountain pine beetle was 483 000 hectares.

Generally, there is more annual variation in the area affected by natural disturbances than in the area harvested (**Figure 4.3.3**). Overall, the area affected by clearcut harvesting in 1995 increased by approximately 10 000 hectares over 1994 levels, to 866 000 hectares. The area burned in 1995 was 6 569 000 hectares.

4 REGENERATION

(annual indicator)

Are harvested lands regenerating?

The regeneration of forests after harvesting is an important policy goal and is one indicator of the capacity of forest ecosystems to recover from disturbances. The data for this annual indicator are obtained from the National Forestry Database Program’s REGEN project.

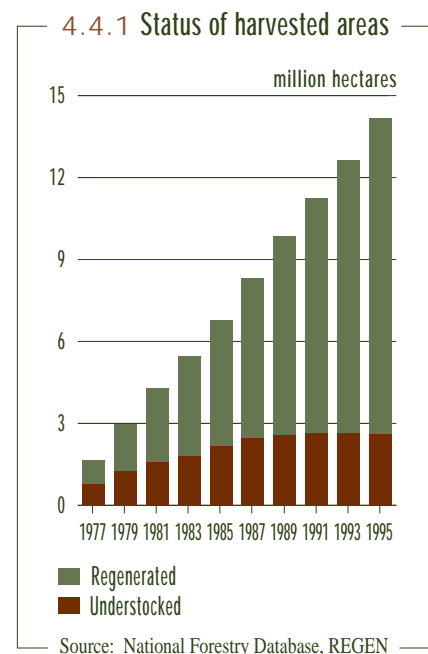


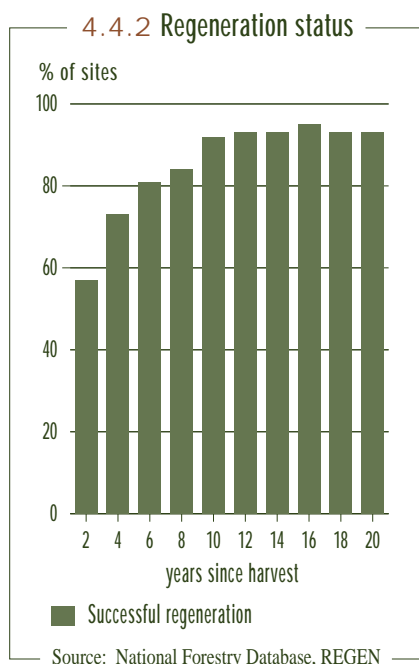
The most widely used silvicultural system in Canada is clearcut harvesting, which creates open environments that favour seedling growth. Most of our forests are even-aged and comprise species that regenerate after major disturbances, such as fire and clearcut harvesting.

Guidelines on clearcutting have changed substantially over the past 20 years in 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. The average size of clearcuts is declining, and their pattern and placement are being designed to reflect natural forest landscape patterns. One of the most notable changes is the use of harvesting systems that both encourage natural regeneration and protect growth already occurring in the understory (termed “advanced growth”). In Ontario, for example, careful logging around young trees in the understory is an increasing practice. In Quebec, the protection of existing regeneration was mandated by the 1987 Forest Act. In that year, techniques protecting young trees were used on 22% of the area harvested under even-aged management—in 1995, the figure was 84%.

In Canada, 60% of harvested areas regenerate naturally (sometimes with the help of scarification or modified harvesting methods). Planting and seeding are required on the remaining 40% of the areas to ensure that the sites are adequately regenerated. Regeneration programs increased substantially in the 1980s, peaking in 1990 at 513 000 hectares of Crown land. In the early 1990s, when the backlog of treatable understocked sites started diminishing, several provinces began scaling back their programs. In 1995, 462 000 hectares were planted or seeded in harvested areas and in those disturbed by fires and other causes.

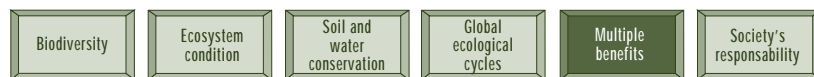
Figure 4.4.1 updates the information on regeneration status provided in *The State of Canada’s Forests 1994*. It is important to note that the data presented in this graph are cumulative totals. Also, the information is based on areas harvested under even-aged management systems (including clearcut, seed tree and shelterwood systems) on Crown lands. For example, the bar for 1995 represents the total area of provincial Crown land harvested since 1975—some 14.1 million hectares. Of this total, 82% was successfully regenerated





as of 1995. In the most current analysis, the total area not regenerated started to decline in 1993. That trend continued in 1994 and 1995.

A significant proportion of recently harvested areas will always be reported as understocked because it takes time for an area to regenerate after harvesting. This time lag is demonstrated in **Figure 4.4.2**, which illustrates the percentage of successful regeneration at increasing intervals of time after the year of harvest. It shows that more than 90% of harvested areas are successfully regenerated within 10 years of harvesting.



PROVIDING MULTIPLE BENEFITS

Canada's forests provide many benefits, and Canadians want to ensure that their forests continue to meet their diverse needs. 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?

"Productive capacity" refers to the forest's ability to produce different products over the long term. A wide variety of products are extracted from the



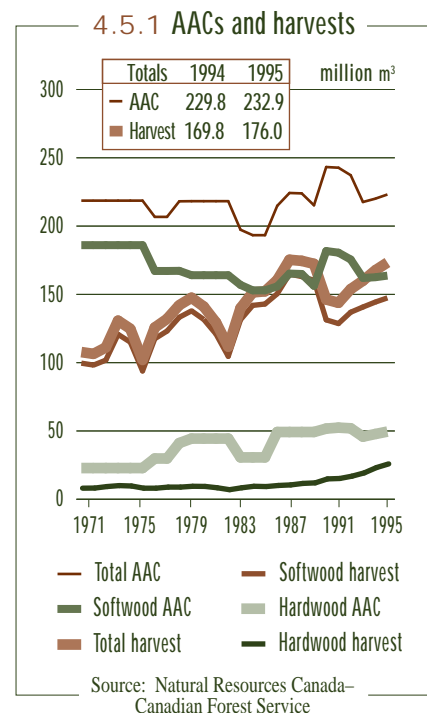
forest annually, including timber and many non-timber products, such as firewood and fuelwood, pelts, game, foods (e.g., mushrooms and berries), and various botanical medicines and craft materials.

The harvest rate for timber on provincial and territorial Crown lands is determined by annual allowable cuts (AACs), which dictate the maximum volume of timber that can be harvested annually from an area over a period of time. The AAC is set by the provinces and territories based on a range of economic, social and environmental considerations, including the desire to provide a sustained-yield of timber for future generations. AACs do not include timber in parks, wilderness areas and other types of reserves.

The national AAC is arrived at by adding the total provincial and territorial AACs to the estimated harvest potential of federal and private lands. Over the past 20 years, Canada's AAC has remained relatively stable; however, it may decline in future as a result of factors such as fewer clearcuts and wider buffer strips. Also, provinces regularly review their AACs and since 1994, some have reduced them to accommodate other land-use requirements, such as protected areas, wildlife habitat and Aboriginal land claims. In other regions, improved inventory information and a better understanding of the rate of growth has enabled the provinces to increase local AACs. In 1995, the national AAC increased by 1.3% .

Figure 4.5.1 compares the national AAC with the national harvest from 1971 to 1995. The methodology for calculating the national AAC was revised in 1990 to incorporate harvesting figures for private lands, which explains the large increase that year. Nationally, the total harvest remains below the AAC.

The productive capacity of Canada's softwood and hardwood forests differs, as do the market conditions for the products from these two species groups, so it is useful to look at their national AACs and harvests separately. Figure 4.5.1 shows the trends in softwood and hardwood AACs and harvest volumes, and the changes that occurred in 1995. The annual harvest of softwood species has increased since 1970, and by 1995, the harvest was close to—but still below—the national AAC. The most significant change (on a percentage basis) was in the volume of hardwoods harvested. The hardwood harvest increased by 11.6% in 1995, to its highest recorded level. 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 (e.g., chemi-thermomechanical pulp).

6 GLOBAL MARKETS

(annual indicator)

Can Canada's forest industries continue to compete in the global marketplace?

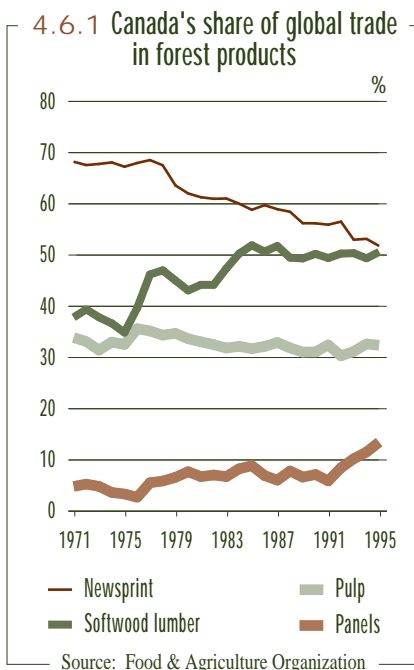
Trends in Canada's share of global markets can indicate how well our forest industries have been selling their products abroad. Forest products exports are important to Canada's standard of living. In 1996, our balance of trade (the value of exports minus the value of imports) in forest products was \$32.1 billion. By comparison, that same year, our balance of trade in farm products was \$7.2 billion; in fish products, \$1.6 billion; in energy, \$18.0 billion; and in metals and minerals, \$15.4 billion.

Canada is the world's major forest products exporter, accounting for almost 20% of the total value of global forest products trade. Our success stems from the consistently high quality of our products, delivered at competitive prices.

Figure 4.6.1 shows the long-term trends in Canada's share of world exports by volume for various forest products, and the annual changes that occurred between 1994 and 1995. The greatest

change in 1995 was in our share of the wood-based panels trade, which rose from 12.1% in 1994, to 14.0% in 1995, largely due to continued growth in the production and export of particleboard and waferboard.

Canada's share of world trade in softwood lumber increased 1.5% in 1995, to 51.1% of the total global volume traded, but our share in newsprint declined by 2.2%. Most Canadian exports in both these product categories go to the U.S. market; therefore, changes in our share of global trade tend to be the result of developments within the U.S. forest products market. The decline in newsprint continues a long-term trend that has been evident since 1970. The main reason is the growth in U.S. domestic capacity in newsprint production, which increased by 82% between 1975 and



1996, while Canadian capacity increased by only 8.8%. Although growth in U.S. newsprint capacity has reduced the demand for Canadian imports, the situation in the North American softwood lumber market has been the exact opposite. Canadian lumber capacity increased 49% between 1977 and 1996, while U.S. lumber capacity increased 6%. These trends point to a structural change in the North American market, where the newsprint sector captured a significant share of capital investment in the USA, while the softwood lumber sector captured most of Canada's forest industry investment.

7 GROSS DOMESTIC PRODUCT

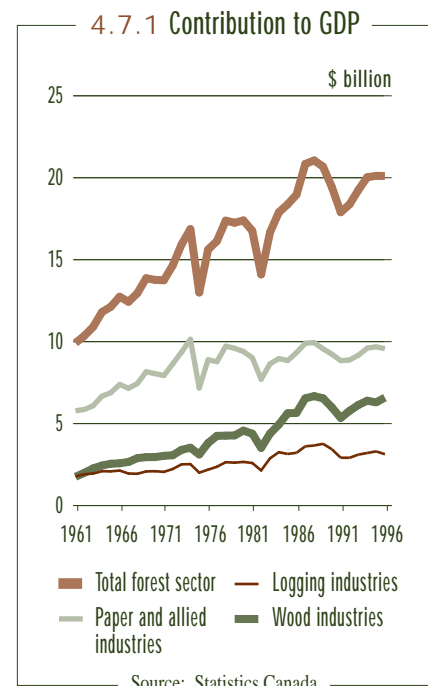
(annual indicator)

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 salaries, wages, profits, taxes and royalties. 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 4.7.1 shows the forest industries' contribution to Canada's real GDP since 1961. Though erratic, their contribution has increased since that year.

Canada's forest sector makes a significant contribution to the national GDP—some \$20.6 billion of the total \$680.9 billion in 1996. The pulp and allied industries made the largest contribution—\$9.85 billion. Wood industries contributed \$6.5 billion; the logging industry, \$3.5 billion; and forestry services, \$0.5 billion.

Increases in the contribution to GDP have come mainly from relatively low-value-added commodity products, such as lumber and wood pulp. Therefore, although total value-added has increased, the amount of value-added per cubic metre of wood harvested has remained somewhat constant. Also, the logging, wood, and paper and allied sectors have adopted more capital-intensive production technologies that have reduced the number of jobs created for each cubic metre harvested. Many observers have concluded that



if the Canadian forest industry is to remain competitive while continuing to provide jobs, incomes and taxes, it must diversify its product mix and extract more value-added from the annual harvest.

Some provinces are developing policies aimed at improving the amount of value-added per unit of wood harvested. New Brunswick, for example, has adopted a new “Value-added Forest Policy.” This policy framework (described below) is an example of the increasing importance that provinces place on obtaining the highest possible amount of value-added from the forest resource through efforts to influence industrial development.

NEW BRUNSWICK’S VALUE-ADDED FOREST POLICY

- All new Crown timber allotments will be awarded to value-added mills.
- Allotments may be moved from low-value-added mills to higher value-added mills
- Companies that create the most jobs and use fibre wisely will benefit the most.
- Evaluations will be based on long-term viability, volume and quality of fibre required, market trends, and product value per cubic meter of fibre.
- Value-added products manufactured by sawmills include specialty items, wood components, composite materials, turnings, mouldings, flooring, laminated beams, fencing and fence material, bevelled siding, fire-retardant shingles, pallets, boxes, crates, etc.
- Value-added products manufactured by pulp and paper mills include tissue paper, coated paper, cardboard containers and construction paper.

8 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 commercial economic values. We participate in a wide variety of outdoor recreational activities, such as hiking, camping, canoeing, hunting, fishing, cross-country skiing and bird-watching. We have always had access to forests for recreation because, for the most part, they are under public ownership. With continued population growth, the value of wilderness will increase worldwide. And as

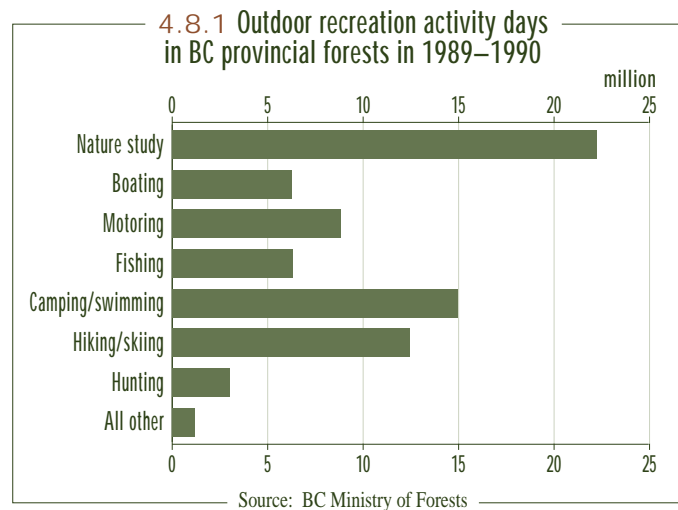


Canada evolves to a more urban society and a more service-based economy, it is expected that the recreational use of forests will continue to grow.

In last year's report, data on the use of Canada's national parks was presented as an indicator of the demand for outdoor recreational opportunities. Updated information is not available this year and there is no alternative source of information at the national level. This gap will be addressed next year with the publication of results of a national survey, "Importance of Nature to Canadians," currently being conducted by Statistics Canada. But for this year's report, several case studies are provided to illustrate the types of outdoor recreation and levels of participation, the methods of inventory for recreation resources, and the economic value of outdoor recreation.

Participation in Outdoor Recreation

Outdoor forest recreation includes a wide range of activities. In 1989–1990, the BC Ministry of Forests conducted a survey among the province's residents regarding their level of participation in outdoor recreation on provincial forest lands outside provincial and national parks. [Figure 4.8.1](#) shows that activities related to nature study were the dominant type of use.



Changes over time in the demographic and socioeconomic makeup of Canadian society are changing public priorities and expectations regarding the use and management of forest resources. Information such as that provided by the BC survey not only illustrates the importance of forests for recreation, but also provides essential information to policy-makers and resource managers that assists them in managing forest and recreation resources.

Economic Value of Camping

The Foothills Model Forest (FMF) is one of 10 model forests established across Canada in 1992. In 1995, Natural Resources Canada–Canadian Forest Service (CFS) conducted a study to determine the economic value of camping activity in the FMF. The study develops and applies an economic model relying on the concept that campers provide an indirect measure of the value they place on camping, based on the amount of money they spend to travel from their residence to the camping site. The study provides information not only on the economic value of camping in the FMF, but also on the characteristics of campers.

Figure 4.8.2 highlights the main findings of the CFS study. In 1995, a total of 7 510 camping trips were noted in the FMF, with an average economic value per trip of \$58.14. The total

4.8.2 ECONOMIC VALUE OF CAMPING IN THE FOOTHILLS MODEL FOREST

Total camping trips	8 732
Total number of campers	24 115
Total number of nights	16 352
Total number of camping trips from Alberta	7 510
Total economic value per trip	\$58.14
Total value	\$436 631.00

Source: McFarlane, B.L., Boxall, P.C. 1996. An overview and economic valuation of camping in the Foothills Model Forest. Nat. Res. Can., Can. For. Serv., North. For. Cent., Edmonton, Alberta. Inf. Rep. (forthcoming)

economic value of camping that year was \$436 631. The study also concludes that campers in the area are more likely than not to be from households with a higher income and to have a university degree. Resource managers can use this type of information to determine the best use of the forest when developing integrated land-use plans, and to guide or determine the appropriate level of budget for managing the area for recreation. This information can also provide insights into how values may change in future years, and

it can be used to target specific social groups and activities to maximize the social benefits provided by forests.

The information provided in this section reflects the value of outdoor recreation by registered campers at designated sites in the FMF in 1995. It does not include or reflect other activities, such as hunting, day-use, cross-country skiing, etc. Neither does it include or reflect passive-use values held by non-users. Passive-use values include the value people place on knowing that wildlife and forests continue to exist in an area; people do not need to visit or use a particular area to hold those values.

9 PARTICIPATION BY ABORIGINAL COMMUNITIES IN SUSTAINABLE FOREST MANAGEMENT

(theme indicator)

What is the nature of the relationship between Aboriginal peoples and forest resources, and are these values considered in decision making?

Aboriginal people have unique, close and distinctive relationships with the land, the forests and its wildlife. This year's report discusses at length Canada's growing recognition of the value of the traditional ecological knowledge held by Aboriginal people (*see Chapter 3*).

In addition to their spiritual and cultural connection for Aboriginal people, forests provide significant economic opportunities for Aboriginal communities and their residents. Special efforts are needed so that Aboriginal communities can capitalize fully and sustainably on these opportunities.

More than 80% of Aboriginal communities lie in the timber productive forest zone of Canada. However, in many cases, the existing landbase on reserves is too limited to provide even small-scale sustained employment and financial returns from harvesting and processing forest products. Increased access to land and forest resources would benefit Aboriginals and their communities. It would offer stability to Aboriginal enterprises and to forest industries. Already, a new feature of forest management in Canada is the emergence of partnerships between Aboriginal people and the private sector, as well as governments. Through these agreements, Aboriginal community leaders become directly involved in decision making, so that resource management reflects local circumstances and responds to needs defined by the community. Increased cooperation among Aboriginal communities, private forest companies and governments is essential to achieve the goal of sustainable forests.

It is not possible to quantify the relationships of Aboriginal people with forest resources or the extent of their inclusion in decisions regarding resource management and economic development. However, this report can focus on the actions being taken to incorporate Aboriginal values and needs into forest management. The items that follow are only a sample of the initiatives and activities being undertaken by federal and provincial governments and the private sector in cooperation with Aboriginal leaders.



The 1992 National Forest Strategy

In the 1992 National Forest Strategy, one of the key strategic directions focuses on Aboriginal people. The strategy (currently being revised) sets out guiding principles for forest policy, recognizing that because Aboriginal people rely on forests for their livelihood, community structure and cultural identity, their rights should be provided for in forest management practices. To become economically self-sufficient, Aboriginal communities need better access to resources and business development support. The role of Aboriginals is integral in planning and managing forest resources in their areas of traditional use. Also, a cooperative resolution of land claims and Aboriginal self-government is required to create a stable environment for long-term sustainable forest management.

Protection of Traditional Aboriginal Rights

Some provinces have amended their forest legislation, regulations and practices to address Aboriginal rights. For example, British Columbia has instituted the Protection of Aboriginal Rights Policy, which requires consultation with Aboriginal communities affected by resource activities on Crown lands. Logging has been deferred on 614 000 hectares of operable commercial forests (2.4% of the province's operable landbase) as a result of outstanding Aboriginal issues. Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Nova Scotia all recognize the Aboriginal right to fish, trap and hunt for food year-round. However, the right to log commercial forests is generally not recognized.

Economic Development

In April 1996, the federal ministers of Natural Resources and of Indian Affairs and Northern Development launched a new First Nation Forestry Program (FNFP). The FNFP is a national program designed to promote forest-based economic development in First Nation communities.

Development of forests in reserve communities can assist First Nations in developing technical and business expertise. Forest management can also provide the basis for partnerships with provinces, territories, industry and other independent private-sector organizations for forest-based economic development.

Participation in Decision Making

Many Aboriginal communities have carried out land-use studies to define their areas of traditional use. Among these people are the Innu of Labrador, the Gitksan and Wet'suweten of northern British Columbia, and the Dene of the Northwest Territories. In Alberta, Aboriginal communities worked with Alberta-Pacific Forest Industries (Al-Pac) to map their traditional areas and incorporate

this information into the company's forest management plans (see Chapter 3).

Some provincial legislation recognizes the Aboriginal use of forest resources. Saskatchewan's new Forest Resources Management Act, for example, allows Aboriginal people to gather medicinal plants and fallen wood for personal or family use without requiring a license.

Several provinces have passed heritage legislation to protect Aboriginal sites, while others rely on forest management legislation. In British Columbia, for example, provincial forest legislation requires the cataloguing of Aboriginal sites (under the Traditional-Use Study Program); archaeological sites are protected under the British Columbia Heritage Conservation Act. Ontario has a system in place entitled "Timber Management Guidelines for the Protection of Cultural Heritage Resources," while in the Yukon Territory and Northwest Territories, land claim agreements include provisions for the protection of culturally significant Aboriginal sites.

Resolution of land claims in forested areas

Recent land-claim settlements and modern treaties have addressed Aboriginal rights to lands and resources. For example, the Agreement in Principle between the Nisga'a and the Province of British Columbia includes rights to access natural resources within the claim area. Land-claim agreements in the Yukon Territory and Northwest Territories also have incorporated Aboriginal access to renewable resources.

10 FOREST-BASED COMMUNITIES

(theme indicator)

Are changes occurring in the level and nature of the contribution of the forest industry to Canada's rural economy?

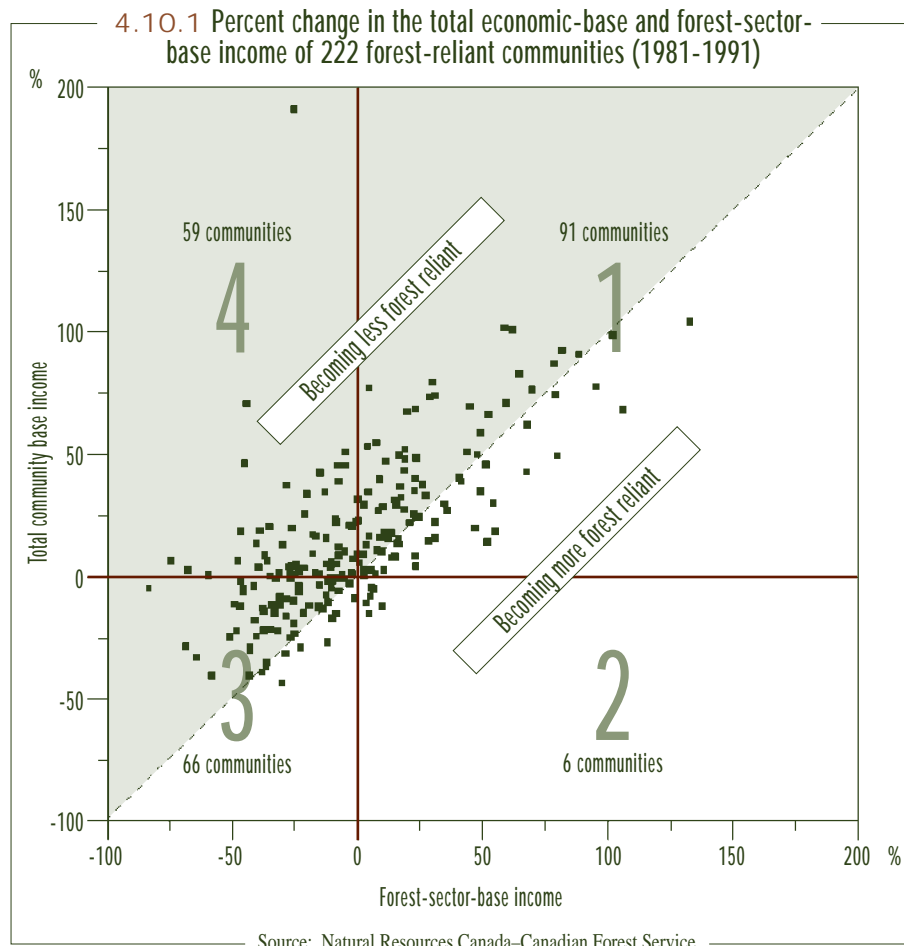
Forest resources play a significant role in the development of rural communities across Canada. In 1991, for example, there were 337 communities where most income originated from the forest industry. Often, small single- or dual-industry communities face challenges that more diversified communities do not. For example, they are more vulnerable to short-term changes in product prices and to longer-term changes in the structure of their industry. Often their prosperity depends on the financial performance of a few firms. If a firm becomes unprofitable or technologically out of date, it may fail, leaving few other job possibilities for local residents. Also, poor



management of the local resource base can threaten the long-term survival of the community. If the resource is allowed to become depleted, the industry supporting the community will leave, seeking new sources of raw material. Small, undiversified rural communities also tend to be less able to adapt or respond to economic change. Globalization, urbanization and the “new economy” generally favour urban economies and structures.

This indicator quantifies and evaluates changes that occurred in forest-reliant communities between 1981 and 1991. The information provides insights into the direction and degree of change in these communities, and the changes in the role of the forest sector in rural economies.

Figure 4.10.1 shows the performance of 222 communities that relied economically on the forest sector in 1981. In that year, each community had a population of more than 1 000 persons, and at least half of its base income was provided by the forest products sector. The performance of each community was measured by the change in its total economic-base income between 1981 and 1991, and the change in its forest-sector-base income over the same 10-year period.



Three key findings are evident in Figure 4.10.1. First, even in the short period from 1981 to 1991, significant changes occurred in forest-reliant communities. There was rapid growth in some cases and decline in others; and in many communities, there was a considerable change in the economic role of the forest-products sector. These changes show that forest-reliant communities may be much more unstable than larger urban areas, and their instability has significant implications for the social structure of forest-based communities and the welfare of their residents.

The second key finding is that there were more forest-reliant communities with a decreasing income from the forest sector (125 communities) than with an increasing income (97 communities). The overall contribution of the forest sector to the Canadian economy increased between 1981 and 1991 (*see Figure 4.7.1*), so it is unlikely that the decline was caused by the national forest sector economy. It more likely reflects a shift of production capacity from some forest-reliant communities to others.

The third main finding is that the role of the forest industry in these communities is changing. Of the 222 communities studied, 176 (or 79%) became less reliant on the forest sector. Communities located above the diagonal line in Figure 4.10.1 are becoming less forest-reliant over time. They are diversifying their economic base by attracting new economic activity. (Communities above the diagonal line are ones whose total economic base grew faster than their income from forestry, or ones whose economic base declined, but more slowly than their forestry base. The diagonal line is where the change in the economic base and the change in forestry income are equal.)

Figure 4.10.2 provides details regarding the communities situated in each of the four sections of Figure 4.10.1. The communities in the two sections with increasing economic bases had higher average populations in 1981 than the 72 communities with declining bases. Thus, larger communities performed better than smaller communities over the 10-year period. It is interesting to note that the average income per person was lower in communities that performed well than in communities that performed poorly. This could be partly the result of regional differences in wages and in the amount of work performed. However, communities with lower wage rates may have been more successful in attracting new businesses than communities with higher wages.

Certain social problems and challenges are inherent in rural forest-reliant communities. The communities are changing rapidly, resulting in instability that affects their social conditions. Also, the performance of forest-reliant communities varies widely. Some are growing rapidly, others are declining, and most are becoming less

4.10.2 FOREST-RELIANT COMMUNITIES

	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4	Total
Change in community-base income	increasing	decreasing	decreasing	increasing	
Change in forest-sector-base income	increasing	increasing	decreasing	decreasing	
Number of communities ¹	91	6	66	59	222
% of communities	41.0	2.7	29.7	26.6	100.0
Average population (1981)	4 708	3 269	4 296	6 920	5 134
Average per-capita income (1981)	\$5 216	\$5 729	\$6 380	\$5 255	\$5 586
Average % of forest-sector-base income in the paper and allied sector (1981)	40.9%	41.9%	29.9%	39.1%	37.7%

¹These communities were selected on the basis of the following criteria: a) the forest sector accounted for at least 50% of the base income in the community in 1981; b) the minimum population of the community in 1981 was 1 000 persons; c) there is a reasonably direct match in the community boundaries between 1981 and 1991; and d) income data was available for each community for each period.

reliant on the forest products sector over time. More information and a better understanding of the implications of dependency for the residents of forest-reliant communities are required to understand the unique challenges facing the communities and to develop flexible programs for the communities at greatest risk.

11 PUBLIC PARTICIPATION

(theme indicator)

What is the degree of public participation in forest policy development and resource management decision making?

More than 90% of Canada's forest lands are publicly owned; the public has both a right and a responsibility to make its wishes for forest management known. The growth of public interest in this area is the subject of a special article in the present report (*see pages 42—45*).

From the perspective of forest-management agencies and professionals, public participation is a vital component of decision making. Finding the right mix of benefits to satisfy all forest users and the general public is impossible without their direct involvement in the planning process.

Public participation compliments the experience of resource managers in the decision-making process. It is a source of new information for decision-makers, and it provides forums in which diverse forest users can exchange their views and develop a common



understanding of the issues. There are many different degrees and forms of public participation.

VITAL ROLES FOR PUBLIC PARTICIPATION

- To assist managers in determining the socially desirable management directions they should be striving for.
- To set the bounds for choices in forest-management practices, strategies and policies.
- To bring local knowledge and insights into decision making (e.g., traditional ecological knowledge of Aboriginal people, and local knowledge of other forest users, such as recreationists and tourism outfitters).
- To provide forums for citizens learning about forest ecosystems, the views and positions of other stakeholders, and management options and alternatives.
- To provide a forum for addressing and resolving conflicts and attempting to develop consensus.

A list of representative kinds of forest decision-making processes is presented with examples of public participation (*see page 93*). The examples are chosen from scores of instances where public participation has been a key element of the decision-making process.

Currently, the Canadian public is active in provincial and national forest-policy discussions and debates, as well as local planning exercises for forest management on public lands. The following two case studies provide examples of recent efforts to involve local stakeholders constructively in decision making.

Case study 1: District no. 1 (Avalon Peninsula) Ecosystem Strategy—Newfoundland

In response to problems in the environmental assessment of forest-management plans, the Newfoundland Forest Service proposed a new adaptive-management approach incorporating proactive public participation. A public advisory group was to assist the forest planning team in all phases of its work. The approach was first applied when an advisory group of more than 30 individuals was formed to develop a forest ecosystem strategy for the Avalon Peninsula using consensus-based decision making. The group reviewed and commented on several drafts of the strategy, and all members but one signed off the document in April 1997. In addition, the group received numerous submissions, both written and oral, from other stakeholders.

A strong spirit of achievement and cooperation is apparent in the forest ecosystem strategy document. The participants seem to

have fulfilled the final element of the group's vision statement: "Management of the Avalon forest ecosystems includes the involvement of local citizens who demonstrate a sense of stewardship and responsibility for management of and maintaining the forest ecosystems through a respect for all values."

Case study 2: Wabakimi Park Boundary Committee—Ontario

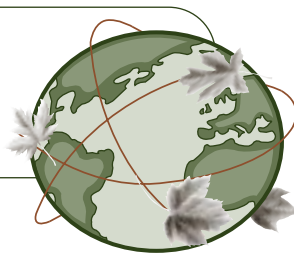
The Wabakimi Park Boundary Committee was formed in 1992 to recommend a new boundary for the Wabakimi Provincial Park north of Thunder Bay. The park, established in 1983 on 155 000 hectares, was considered by many to be too small and to have left out several key landscape features nearby. The 16 local and regional people on the committee represented the full spectrum of interests in the Wabakimi landscape. They met for more than two years in a facilitated process before reporting in January 1995 that consensus was not possible. They identified a core area of some 600 000 hectares, but several members were insistent that the new boundary should encompass about a million hectares.

Despite the lack of full consensus on a new boundary, committee members reported general satisfaction with the process. Officials of the Ontario Ministry of Natural Resources continued negotiations with several key groups, and in April 1995, the Minister announced that Wabakimi Provincial Park would be expanded to just under 900 000 hectares.

FOREST DECISION-MAKING PROCESSES

• National policy frameworks	the 1992 National Forest Strategy and the National Forest Round Table.
• Forest-management certification schemes	the Canadian Standards Association's Sustainable Forest Management System Standard, and the Forest Stewardship Council's Principles and Criteria for Natural Forest Management
• Legislation and regulations	the Crown Forest Sustainability Act of Ontario (1994), and the Forest Practices Code Act of BC (1994)
• Provincial and territorial forest policy	the work of New Brunswick's Forest Sectoral Committee, Ontario's policy framework for sustainable forests, the workbook approach to policy on sustainable forest development in Manitoba, the work of Alberta's expert review panel on forest management, and the Yukon Territory's forest-policy initiative
• Land-use strategies and allocations	the work of the BC Commission on Resources and Environment, Ontario's "Lands for Life" land-use planning exercise and the expansion of Wabakimi Provincial Park (<i>see case study</i>)
• Conservation and ecosystem-management strategies	Prince Edward Island's conservation strategy, the Banff-Bow Valley study and Newfoundland's new ecosystem approach to forest planning (<i>see case study</i>)
• Environmental assessments	the Class Environmental Assessment for Timber Management on Crown Lands in Ontario and the environmental assessment processes for forest-management plans in Newfoundland, Manitoba and Saskatchewan
• Forest-management plans	public participation in the forest management planning process for publicly owned forests in all provinces
• Model forests	a partnership organization that engages in considerable public participation
• Community forests	public participation in decision making in community-based forest management

Point of View



Concern has been mounting in the international community over the continuing loss and degradation of many of the world's forests. Progress toward sustainable forest management on a global scale has been slow, which has stimulated a call from some countries for a legally binding international forest convention. These supporters believe it would promote practical solutions to forest problems by establishing a global plan of action. They would like a convention to address all forests and all values in a comprehensive manner—integrating social, economic and environmental objectives.

The Earth Summit held in Rio de Janeiro in 1992 stimulated a desire for a convention. This forum resulted in three legally binding conventions—on biodiversity, climate change and desertification—and a set of non-binding principles for the sustainable development of forests, commonly called the “UNCED Forest Principles.” Although the Principles did not go as far as some had hoped, they did lay the foundation for subsequent discussion and action.

One of the follow-up actions was the establishment of the United Nations (UN) Commission on Sustainable Development (CSD) to monitor progress on the Rio agreements. The CSD in turn established the Intergovernmental Panel on Forests (IPF) in 1995. For the past two years, the IPF has been overseeing the global forest dialogue. Recently its mandate ended, and it released a set of recommended actions for governments and stakeholders to pursue.

In June 1997, at the special session of the UN General Assembly, world leaders agreed to continue the momentum generated

by the IPF process by creating the UN Intergovernmental Forum on Forests (IFF). Under the auspices of the CSD, the IFF will focus on implementing the IPF recommendations, monitoring national progress toward sustainable forest management, promoting consensus on matters pending from the IPF (e.g., finance and technology transfer issues), and promoting the need to augment the international legal regime for forests (e.g., by negotiating a forest convention). The IFF's final report is due in 1999.

In this year's Point of View, interviews were conducted with representatives from federal and provincial governments, the forest sector, and environmental, Aboriginal, labour and international development groups to obtain their views on what could be accomplished if an international, legally binding forest convention could be agreed upon. Although their viewpoints often differ, they all agree that the issues continue to be complex and interconnected, and that reaching a consensus will be challenging.

Harry Bombay is Executive Director of the National Aboriginal Forestry Association (NAFA), and **Peggy Smith** is NAFA's Policy Advisor. NAFA promotes increased Aboriginal involvement in forest management and the forest industry. It is committed to sustainable development so that the forest will be able to meet a multitude of community needs.

Although NAFA supports an international forest convention, Mr. Bombay and Ms. Smith have mixed feelings on whether it will achieve sustainable forest management. The success of a convention will depend on its content, the involvement of Aboriginal people at key

decision-making points, the integration of social, economic and environmental issues with indigenous peoples' rights, and the extent to which the convention becomes a basic underlying principle of sustainable forest management.

A convention would standardize practices worldwide, put signatory countries on a level economic playing field, and achieve consensus on the meaning of "sustainable forest management." Further benefits would depend on Aboriginal participation and rights being recognized. For example, it would help avoid situations in which a forest company might do business with a country that does not recognize Aboriginal rights.

On the other hand, a signatory country could be at an economic disadvantage compared to a country that does not practice sustainable forest management. For a convention to work, it must include all countries, but it should not impose standards.

A convention would help indigenous peoples throughout the world accomplish their objectives because it would recognize that their lives and concerns are intimately linked to natural resource issues (e.g., their access to natural resources, the use of their own management systems and knowledge, and the land tenure required to manage those resources).

However, many indigenous groups lack the capacity to participate in decision making, often because they do not have the institutional capability to respond in an informed and responsive way. They need support from national governments to develop that capacity. Governments could also present an alternative to a convention through strong leadership. "It's now time to set an example for other countries to follow. Set the example, and others will follow."

A convention could only foster traditional ecological knowledge if it is negotiated with the full and equal participation of indigenous peoples. Mr. Bombay and Ms. Smith caution that safeguards, such

as a mechanism to protect intellectual property, must be in place regarding the use of, and benefits from, traditional knowledge.

They conclude: "It's time to stop talking, to make a stronger commitment so that the content is not watered down, and to include Aboriginal issues."

Wally Vrooman is Vice-President, Environment, of Avenor Inc.—one of North America's largest manufacturers of post-consumer recycled-content newsprint and a leading exporter of market pulp. Avenor believes in "taking the environmental initiative wherever possible."

Mr. Vrooman strongly believes that the world needs a legally binding forest convention. The main benefits would be sustainable forest management, control over worldwide forest decline, enhanced ability to maintain timber uses of all kinds, and creation of a regulatory body to oversee binding commitments—all on a global basis.

He feels that most major Canadian corporations are emphasizing improved forest management and are working at a significant pace to achieve the goals they set for themselves. "The convention will allow us to communicate that forest management is being done on a professional basis and that sustainability is the goal."

The most important component would be the ability to coordinate international institutions responsible for forest management, especially when collecting data and comparing information. A database would be important in efforts to educate stakeholders, refute erroneous claims, and provide facts regarding the state of Canada's forest areas. Another major component would be a mechanism to enforce the convention's standards. Industry, Mr. Vrooman emphasizes, would request that the body overseeing the convention—perhaps a strengthened UN institution—possess the required expertise, responsibility, time, and administrative capacity and ability.

As well, a convention would protect Canada against trade embargoes and allow for free trade, which could increase forest products trade. We would see improvements not only in the sustainability and capacity of our forests and the quantity of fibre, but also in the management of fibre.

An international forest convention would affect industry's forest practices and manufacturing methods. If enough countries support a convention, better management techniques would result, leading to sustainability. A convention would enable developing countries and those already working toward sustainability to progress at a greater pace and probably achieve their goals at an earlier stage. He also notes that industry is aware that a convention might increase administrative costs (e.g., when reporting a company's performance to an international body).

An international forest convention could enhance, and must be woven into, other conventions, such as those on biodiversity and climate change. "Industry does not want to include forestry only under biodiversity because the focus would be on the environment instead of being on the economy, society and environment equally.

A forest convention cannot stand on its own without proper linkages."

Carole St. Laurent is Director, Forest Instruments, of the World Wildlife Federation (WWF). The WWF was established in 1961 to conserve wildlife and wild places through preserving biodiversity, ensuring sustainable use of natural resources, and reducing pollution and waste.

Ms. St. Laurent firmly believes that a legally binding international forest convention is not needed to attain sustainable management of forests worldwide. Governments should take immediate action on their forests and work with existing agreements. Negotiating an international forest convention at this point

would cause years of costly and unnecessary negotiations, delay seriously needed action, and allow governments to postpone acting by saying they are negotiating an agreement.

In her opinion, international conventions do not mean as much as they used to. This may be because the issues addressed in current agreements are much more complicated than those drafted in the past for single-issue international agreements, or because it has become easier to "weasel out" of commitments.

The WWF prefers that countries negotiate binding protocols under existing agreements (e.g., the Biodiversity, Climate Change or World Heritage conventions, the Convention to Combat Desertification or the European Union's Habitats Directive); implement the IPF's proposals; and report their progress yearly to the UN CSD. For example, Agenda 21 already includes commitments to establish, expand and manage protected area systems, to maintain and expand the existing vegetative cover, and to rehabilitate degraded forests.

The WWF would also like to see countries establish networks of ecologically representative protected forest areas by 2000 as part of national forest action plans. She notes that Canada has done this better than many other countries; however, it still needs to establish national action plans that will ensure sustainable forest management outside protected areas.

Another immediate way to act would be through forest certification. However, Canada must find a way through the "log jam" that exists between the industry-driven Canadian Standards Association (CSA) process and the programs proposed by environmental groups.

The WWF wants to see the following substantive forest issues addressed: national land-use programs (including networks of protected areas); trade (including illegal trade); investment, subsidies and incentives; regulation of transnational corporations and

concessions; multilateral-development bank funding and official aid; innovative sustainable funding systems; illegal logging; rights and interests of indigenous peoples and local communities; climate change and pollution; and multi-stakeholder initiatives to promote environmentally and socially sustainable consumption, production and trade.

Cliff Henderson is the Assistant Deputy Minister of Alberta's Environmental Protection, Land and Forest Service. Forestry in that province accounts for \$1.9 billion in exports and 1 job in 40.

Mr. Henderson believes that the forest community must strengthen the international forest sector and ensure a level playing field through forest management practices and sustainable forests. An international legally binding forest convention, especially one placed on an equal standing with other international legally binding agreements, would be a good means to do just that.

Although he believes many key elements are contained in the UNCED Forest Principles, a convention would set goals, establish priorities, monitor activities, consider all forest values, and allow for a comprehensive and balanced approach. Above all, a convention would provide an internationally agreed-upon scientific definition of sustainable forest management, as well as the commitment needed to achieve that objective. It would also create a permanent forum to deal with forest issues; support enhanced governance; coordinate the mandates of international forest organizations; and treat forests comprehensively, rather than in the piecemeal fashion used today.

An international forest agreement would also help protect Canada's environmental and trade interests, as Canada could then be evaluated under terms appropriate to our own forest practices, rather than those suited to another country.

An internationally accepted definition of sustainable forest management would go a long way, in Mr. Henderson's opinion, toward helping Canada's provinces, particularly in "recognizing that provincial priorities reflect the objectives of each jurisdiction." He would like to see provincial governments work with the federal government to ensure that Canada's position respects provincial and territorial concerns and responsibilities.

The disadvantages of negotiating a convention centre around different countries' concerns regarding a legally binding agreement, which might take a long time to settle. He also fears that a convention might reflect the lowest common denominator, and thereby create weak commitments, which would defeat the goal of a level playing field. Institutional arrangements (e.g., the need for a secretariat, funding and technology transfer requirements) also might take considerable negotiation. However, Alberta's forest management policies, practices and regulations support sustainability, so "only minor adjustments will occur when implementing a convention."

Mr. Henderson does not see many alternatives to an international forest convention. Nor would it be acceptable to tag one onto an existing international agreement, such as the Convention on Biodiversity, because the forest sector would not have the say it should have over its resources, and dealing with the issues would still be ad hoc.

John Fraser is Canada's Ambassador for the Environment. He acts as the nation's representative abroad, participates in environmental fora, and promotes compliance with environmental measures worldwide.

As Canada's Ambassador for the Environment, over the past three years, Mr. Fraser has played an active role in promoting Canada's interests on forest issues, both domestically and internationally. In this context, he has seen first hand that current efforts and voluntary agreements have not been successful in addressing the problems facing the

world's forests. "We continue to be faced with diminishing forest land and an increasing demand for forest products."

From a historical context, Ambassador Fraser believes it is important to understand that Canada is committed to achieving sustainable forest management, both nationally and globally. In fact, "Canada was one of the first countries to call for a legally binding international agreement on forests. This has been Canada's position since the Rio Earth Summit of 1992, and it continues to be an important element of our foreign policy."

The most comprehensive and holistic agreements affecting forests are the non-legally binding Agenda 21 and Forest Principles from the UNCED process. According to Ambassador Fraser, an international forest convention would be the next logical step needed to harness political commitment at the highest levels. It would ensure that all countries accept the same forest management standards; the process would be transparent; and sustainable forest management would be universally defined.

Canada's statement to the fifth session of the CSD provided a clear and strong rationale for a forest convention. Prime Minister Jean Chrétien spoke forcefully in favour of a convention at both the Denver G-7 Summit and at the Special Session of the UN General Assembly in June 1997. While agreement to establish a forest convention was not reached at these meetings, the Ambassador was encouraged by the decision to continue the dialogue on this issue through the establishment of an ad hoc open-ended IFF under the aegis of the CSD.

He believes Canada, as a forest nation and the world's largest exporter of forest products, would benefit from a forest convention in a number of ways. It would level the playing field for our forest industries by establishing common commitments applicable to all nations. It would also promote our environmental stewardship and enhance our

social stability by promoting employment in forest-related sectors (e.g., tourism and recreation), addressing Aboriginal concerns, and maintaining the livelihood of the 340 forest-dependent communities in rural Canada.

"The promotion of sustainable trade is one important aspect of Canada's global stewardship role; however, achieving sustainable forest management worldwide is far more complex than solely considering international trade in forest products," he explained. "We must acknowledge that the greatest pressures on forests are not induced by trade." Globally, 85% of wood products are produced and used domestically. In addition, the use of forests for fuelwood accounts for more than half the world's annual harvest and 90% of the timber production of developing countries. In tropical countries, deforestation is mainly due to such factors as large economic development programs and the conversion of forests to agriculture.

He predicts that a mix of policy tools will be needed to achieve sustainable forest management at the global level, and describes a convention as the comprehensive international legal foundation required to support the development and implementation of those tools.

"The importance of this framework of rules will increase with time as the world's forest nations address the need to enhance the capacity of forests to respond to the increasing demands from a growing world population," he concluded. "The challenge is to craft a set of rules that are applicable and effective throughout the world."

Dave Haggard is President of the Industrial Wood and Allied Workers of Canada (IWA-Canada), a national trade union. The IWA has fought for more than 60 years to improve the wages, working conditions and retirement security of Canadian wood workers.

Mr. Haggard states that IWA–Canada supports a legally binding convention because it would help to create commitments for sustainably managing forests, especially in developing countries. IWA–Canada believes negotiating a convention would give labour the opportunity to include the rights of workers and unions that would be applicable worldwide.

Although the main benefit would be the development of worldwide sustainability standards, another advantage would be the balancing of economic, social and environmental concerns. “Environment and ecology are all very nice if you can pay for them, but I don’t think you can do one at the expense of another because you could end up creating major economic upheaval in a developing country, for example, or—if you lean too heavily toward the economic end—you could end up with major environmental degradation.”

Mr. Haggard would also like to see the convention include minimum standards for biodiversity, working conditions and economic benefits. If they are not included, he believes it will fail. And he definitely does not want a bureaucracy to grow out of the convention; he views it as a way to continue dealing with important issues without becoming bound up in bureaucratic red tape.

Mr. Haggard emphatically states that labour’s role is very important in constructing a convention and that management should not speak on its behalf in this instance. In his opinion, there is no question that labour has been left out of discussions in the past. For example, it was not invited to the Earth Summit as a full participant.

A properly established convention will help labour accomplish its goals. “Without a convention, we’ll keep stumbling along and creating the problems we have now, for example, the international boycotts we have here, there and everywhere.” Nor does Mr. Haggard want the forest industry to be

governed by the Convention on Biodiversity, because it does not adequately address forest-related problems.

An international forest convention could help raise working standards in developing countries, which would in turn help workers in Canada. He feels a convention would make the international forestry “playing field” a lot more level and would allow cross referencing or cross checking, as well as the participation of forest-industry workers around the world. He also cautions that labour must guard against those who might try to use a convention against workers. “However, I think the benefits far outweigh the negatives.”

John Martin is Chief Executive Officer of the Unitarian Service Committee (USC). Founded in 1945, the USC fosters international development through programs on environmental protection, food security, community development, and training and education.

Mr. Martin views an international forest convention as a beginning rather than an end, as a mechanism to stimulate nations to think about the issue, and as a medium to bring people into the debate. The key to creating an effective convention is industry’s involvement. “More and more, countries have less say regarding what transnational companies do or what global economy is emerging, and less control over some of their resources.”

He believes that conservation and livelihood are closely linked and that issues surrounding livelihood will dominate the discussions. Because of this, he is not sure that relying on governments to design and implement a convention is the right way to proceed. Governments change, as do ministers. “To do this kind of work, ministers, politicians and others must have a clear vision of what’s happening. I doubt that many politicians have that. Their response will depend largely on the political agenda.”

However, a convention could provide a way to “push” a signatory country on forest-related issues. If major countries do not sign a convention, it could create divisions, and it would not have much of a “bite.” That being said, he does not see many alternatives.

A forest convention must distinguish between industrial use of forests and peoples’ use. Although the poor are blamed for using too much wood for fuel, he observes that people living intimately with the land take good care of their environment, and that organized exploitation is what destroys the forest. The way to ensure sustainable use is to involve the local population in protecting their forests.

To illustrate this point, he described a USC forest conservation program in Mali where the Africans have actively conserved their forests. The benefits have been many: more crops, better moisture retention and more animal fodder. “There are a lot of positive livelihood spin-offs from managing the forest well. That dimension of positive use and practical participation has to be in a convention; otherwise it is not worth much.”

Canada benefits from the efforts made by Third World peoples to sustain their local environment. “A lot of what we talk about, such as biodiversity, environmental protection and maintenance, is happening in the Third World much more than it is here. And by supporting those efforts, we are maintaining those forests in a global sense.”

Magella Morasse is President-Director General of the Ordre des ingénieurs forestiers du Québec (OIFQ). Established in 1921, the OIFQ has a membership of 2 000 Quebec foresters. The organization ensures that the regulations related to the practice of professional forestry in Quebec are respected,

Magella Morasse believes that an international forest convention is necessary

because forest resource users need a framework on which to base their decisions. As well, because the world’s forests are so important and the consequences of such activities as deforestation are global, common rules must be established and international activities must be coordinated to promote sustainable forest management.

An international convention would promote dialogue among nations and enable them to agree on protecting and developing their respective resources, and it would make those responsible for enacting and management laws and regulations accountable. Establishing common rules would help establish trade regulations. In this regard, it is essential to be able to compare forest practices against common commitments.

Mr. Morasse believes that for a convention to be effective, its commitments should not be too general. He would not want it to become a smokescreen for countries not meeting their commitments to hide behind. In that case, follow-up and development of criteria to measure the attainment of objectives could pose a problem.

A few key elements must be in place: first, everyone must agree on the meaning of sustainable development. The convention must include the international Convention on Biological Diversity, and it must also contain sustainable development criteria and indicators that could be used to objectively measure the performance of each signatory country. An international convention should also contain agreements that promote free trade. Ideally, a convention would also ensure that the commitments of various levels of government could be relied upon, and that criteria development and follow-up mechanisms would be established to ensure the continuous improvement of sustainable forest management practices. An international convention would also help establish the necessity of using professionals to implement the convention and it would

require them to adhere to codes of professional practice and ethical principles regarding sustainable forest management.

It is critical that competent and responsible experts implement sustainable development, because most professional foresters' training focuses on a wide range of sustainable development issues. "An international convention," Mr. Morasse states, "would be perfectly in keeping with the OIFQ's mandate and would strengthen the accountability of our members to the public. However, a convention should also be flexible enough to allow us to choose the best techniques and methods to achieve sustainable development."

FIVE

CHAPTER FIVE

Forest Profiles

The family of 10 maple species
is Canada's arboreal emblem.



● forest land

CANADA (1996)

Population	30.1 million
Total area	997.0 million ha
Land area	921.5 million ha
Forest land	417.6 million ha
National parks	32.4 million ha
Provincial parks	22.9 million ha

Forest resource (1995)

Ownership	Provincial	71%
	Federal	23%
	Private	6%
Forest type	Softwood	67%
	Hardwood	15%
	Mixedwood	18%
Annual allowable cut ^a		232.9 million m ³
Harvest (volume) – industrial roundwood ^b		183.1 million m ³
Harvest (area)		1 011 328 ha
Status of harvested Crown land (1995) ^c		
Stocked	11 562 000 ha	82%
Understocked	2 599 000 ha	18%
Insect defoliation ^d		12.8 million ha
Forest fires		6 569 416 ha

Forest industry

Value of exports (1996)	\$38.3 billion
Softwood lumber	33%
Wood pulp	18%
Newsprint	20%
Major export markets (1996)	
United States	71%
Japan	11%
European Union	9%
Others	9%
Balance of trade (1996)	\$32.1 billion
Contribution to GDP (1996)	\$20.6 billion
Value of shipments (1994)	\$58.7 billion
Sold domestically	44%
Exported	56%
Number of establishments (1994)	
7 447 logging	
2 861 wood	
668 paper and allied	
Employment (1996) ^e	842 000
363 000 direct jobs	
479 000 indirect jobs	
1 job in 16	
Wages and salaries (1994)	\$10.4 billion
New investments (1995)	\$8.9 billion

a, b, c, d, e See pages 109-110.

NEWFOUNDLAND AND LABRADOR



Black spruce (*Picea mariana*)

Population	568 237
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 (1995)

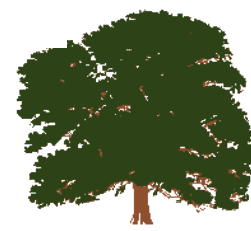
Ownership	Provincial	99%
	Private	1%
Forest type	Softwood	91%
	Hardwood	1%
	Mixedwood	8%
Annual allowable cut ^a	3.0 million m ³	
Harvest (volume) ^b	2.2 million m ³	
Harvest (area)	19 731 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	255 000 ha 80%
	Understocked	65 000 ha 20%
Insect defoliation ^d	27 583 ha	
Forest fires	794 ha	

Forest industry

Value of exports (1996)	\$617 million
	Newsprint 100%
Major export markets (1996)	
	United States 37%
	European Union 32%
	South and Central America 15%
Balance of trade (1996)	\$607 million
Value of shipments (1994)	\$603 million
Number of establishments (1994)	111
	78 logging
	26 wood
	7 paper and allied
Employment (1996) ^e	8 000
	5 000 direct jobs
	3 000 indirect jobs
	1 job in 25
Wages and salaries (1994)	\$121 million
New investments (1995)	not available

a, b, c, d, e See pages 109-110.

PRINCE EDWARD ISLAND



Red oak (*Quercus rubra*)

Population	137 649
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 (1995)

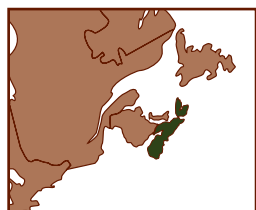
Ownership	Provincial	7%
	Federal	1%
	Private	92%
Forest type	Softwood	35%
	Hardwood	30%
	Mixedwood	35%
Annual allowable cut ^a	0.5 million m ³	
Harvest (volume) ^b	0.4 million m ³	
Harvest (area)	3 131 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	19 700 ha 82%
	Understocked	4 200 ha 18%
Insect defoliation ^d	not available	
Forest fires	36 ha	

Forest industry

Value of exports (1996)	\$4.9 million
	Softwood lumber 85%
Major export markets (1996)	
	United States 99%
Balance of trade (1996)	\$4.8 million
Value of shipments (1994)	\$28 million
Number of establishments (1994)	31
	17 logging
	11 wood
	3 paper and allied
Employment (1996) ^e	not available
Wages and salaries (1994)	\$7.0 million
New investments (1995)	not available

a, b, c, d, e See pages 109-110.

NOVA SCOTIA



Red spruce (*Picea rubens*)

Population	944 283
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)

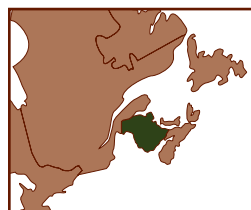
Ownership	Provincial	28%
	Federal	3%
	Private	69%
Forest type	Softwood	45%
	Hardwood	33%
	Mixedwood	22%
Annual allowable cut ^a	5.3 million m ³	
Harvest (volume) ^b	5.2 million m ³	
Harvest (area)	49 968 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	170 000 ha 96%
	Understocked	6 300 ha 4%
Insect defoliation ^d	14 288 ha	
Forest fires	405 ha	

Forest industry

Value of exports (1996)	\$689 million
	Newsprint 46%
	Wood pulp 35%
Major export markets (1996)	
	United States 49%
	European Union 25%
Balance of trade (1996)	\$678 million
Value of shipments (1994)	\$1.0 billion
Number of establishments (1994)	350
	265 logging
	74 wood
	11 paper and allied
Employment (1996) ^e	16 000
	11 000 direct jobs
	5 000 indirect jobs
	1 job in 23
Wages and salaries (1994)	\$194 million
New investments (1995)	not available

^{a, b, c, d, e} See pages 109-110.

NEW BRUNSWICK



Balsam fir (*Abies balsamea*)

Population	762 346
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)

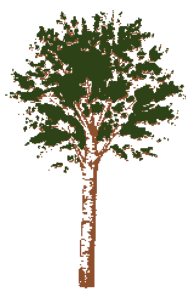
Ownership	Provincial	48%
	Federal	1%
	Private	51%
Forest type	Softwood	47%
	Hardwood	24%
	Mixedwood	29%
Annual allowable cut ^a	11.2 million m ³	
Harvest (volume) ^b	10.0 million m ³	
Harvest (area)	98 000 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	425 000 ha 96%
	Understocked	16 000 ha 4%
Insect defoliation ^d	440 304 ha	
Forest fires	416 ha	

Forest industry

Value of exports (1996)	\$2.0 billion
	Wood pulp 25%
	Other paper and paperboard 30%
	Newsprint 20%
Major export markets (1996)	
	United States 69%
	European Union 13%
	Japan 6%
Balance of trade (1996)	\$1.9 billion
Value of shipments (1994)	\$2.9 billion
Number of establishments (1994)	1 111
	957 logging
	132 wood
	22 paper and allied
Employment (1996) ^e	26 000
	17 000 direct jobs
	9 000 indirect jobs
	1 job in 12
Wages and salaries (1994)	\$464 million
New investments (1995)	not available

^{a, b, c, d, e} See pages 109-110.

QUEBEC



Yellow birch (*Betula alleghaniensis* Britton)

Population	7 394 534
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 (1995)

Ownership	Provincial	89%
	Private	11%
Forest type	Softwood	58%
	Hardwood	19%
	Mixedwood	23%
Annual allowable cut ^a	57.8 million m ³	
Harvest (volume) ^b	39.5 million m ³	
Harvest (area)	357 443 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	4 051 000 ha 91%
	Understocked	400 000 ha 9%
Insect defoliation ^d	7 417 ha	
Forest fires	195 576 ha	

Forest industry

Value of exports (1996)	\$10.1 billion
	Newsprint 34%
	Other paper and paperboard 20%
	Softwood lumber 19%
Major export markets (1996)	
	United States 82%
	European Union 10%
Balance of trade (1996)	\$9.0 billion
Value of shipments (1994)	\$15.1 billion
Number of establishments (1994)	2 972
	1 673 logging
	1 094 wood
	205 paper and allied
Employment (1996) ^e	181 000
	103 000 direct jobs
	78 000 indirect jobs
	1 job in 18
Wages and salaries (1994)	\$2.7 billion
New investments (1995)	\$2.1 billion

a, b, c, d, e See pages 109-110.

ONTARIO



Eastern white pine (*Pinus strobus*)

Population	11 294 932
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 (1995)

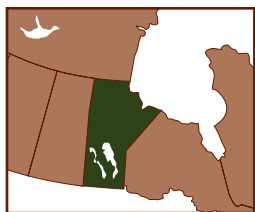
Ownership	Provincial	88%
	Federal	1%
	Private	11%
Forest type	Softwood	50%
	Hardwood	23%
	Mixedwood	27%
Annual allowable cut ^a	0.4 million ha	
Harvest (volume) ^b	24.6 million m ³	
Harvest (area)	211 660 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	3 174 000 ha 85%
	Understocked	562 000 ha 15%
Insect defoliation ^d	11.0 million ha	
Forest fires	612 437 ha	

Forest industry

Value of exports (1996)	\$7.2 billion
	Newsprint 21%
	Other paper and paperboard 25%
	Softwood lumber 15%
Major export markets (1996)	
	United States 95%
Balance of trade (1996)	\$3.6 billion
Value of shipments (1994)	\$12.0 billion
Number of establishments (1994)	2 152
	1 213 logging
	648 wood
	291 paper and allied
Employment (1996) ^e	163 000
	89 000 direct jobs
	74 000 indirect jobs
	1 job in 33
Wages and salaries (1994)	\$2.4 billion
New investments (1995)	\$2.1 billion

a, b, c, d, e See pages 109-110.

MANITOBA



White spruce (*Picea glauca*)

Population	1 144 710
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 (1995)

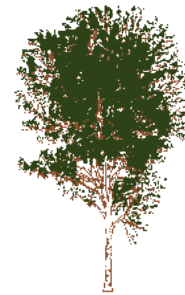
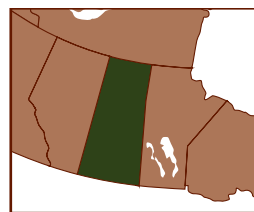
Ownership	Provincial	94%
	Federal	1%
	Private	5%
Forest type	Softwood	59%
	Hardwood	21%
	Mixedwood	20%
Annual allowable cut ^a	9.7 million m ³	
Harvest (volume) ^b	1.9 million m ³	
Harvest (area)	14 176 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	220 000 ha 94%
	Understocked	12 900 ha 6%
Insect defoliation ^d	55 800 ha	
Forest fires	889 248 ha	

Forest industry

Value of exports (1996)	\$374 million
	Newsprint 29%
	Paper and paperboard 27%
Major export markets (1996)	
	United States 91%
Balance of trade (1996)	\$153 million
Value of shipments (1994)	\$702 million
Number of establishments (1994)	215
	130 logging
	62 wood
	23 paper and allied
Employment (1996) ^e	14 000
	9 000 direct jobs
	5 000 indirect jobs
	1 job in 38
Wages and salaries (1994)	\$152 million
New investments (1995)	not available

a, b, c, d, e See pages 109-110.

SASKATCHEWAN



White birch (*Betula papyrifera*)

Population	1 024 165
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 (1995)

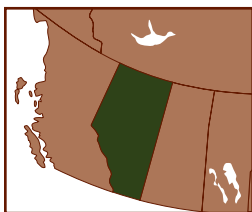
Ownership	Provincial	97%
	Federal	2%
	Private	1%
Forest type	Softwood	39%
	Hardwood	36%
	Mixedwood	25%
Annual allowable cut ^a	7.6 million m ³	
Harvest (volume) ^b	4.2 million m ³	
Harvest (area)	21 907 ha	
Status of harvested Crown land (1995) ^c		
	Stocked	123 000 ha 32%
	Understocked	258 000 ha 68%
Insect defoliation ^d	215 600 ha	
Forest fires	1 386 929 ha	

Forest industry

Value of exports (1996)	\$399 million
	Wood pulp 46%
	Fine paper 12%
	Softwood lumber 28%
Major export markets (1996)	
	United States 74%
	European Union 10%
	Japan 6%
Balance of trade (1996)	\$329 million
Value of shipments (1994)	\$714 million
Number of establishments (1994)	283
	231 logging
	46 wood
	6 paper and allied
Employment (1996) ^e	7 000
	5 000 direct jobs
	2 000 indirect jobs
	1 job in 63
Wages and salaries (1994)	\$124 million
New investments (1995)	not available

a, b, c, d, e See pages 109-110.

ALBERTA



Lodgepole pine (*Pinus contorta*)

Population	2 802 430
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 (1995)

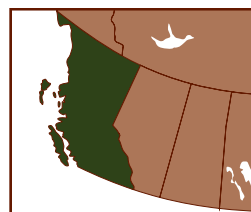
Ownership	Provincial	87%
	Federal	9%
	Private	4%
Forest type	Softwood	44%
	Hardwood	33%
	Mixedwood	23%
Annual allowable cut ^a		22.1 million m ³
Harvest (volume) ^b		20.3 million m ³
Harvest (area)		44 371 ha
Status of harvested Crown land (1995) ^c		
	Stocked	506 000 ha 63%
	Understocked	295 000 ha 37%
Insect defoliation ^d		494 000 ha
Forest fires		342 610 ha

Forest industry

Value of exports (1996)	\$1.9 billion
	Wood pulp 41%
	Softwood lumber 34%
	Waferboard 10%
Major export markets (1996)	
	United States 61%
	Japan 20%
Balance of trade (1996)	\$1.8 billion
Value of shipments (1994)	\$3.4 billion
Number of establishments (1994)	537
	328 logging
	175 wood
	34 paper and allied
Employment (1996) ^e	35 000
	21 000 direct jobs
	14 000 indirect jobs
	1 job in 40
Wages and salaries (1994)	\$537 million
New investments (1995)	\$0.9 billion

a, b, c, d, e See pages 109-110.

BRITISH COLUMBIA



Western red cedar (*Thuja plicata*)

Population	3 879 982
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 (1995)

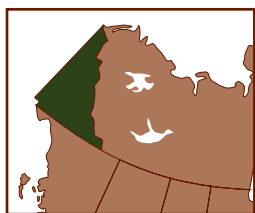
Ownership	Provincial	95%
	Federal	1%
	Private	4%
Forest type	Softwood	89%
	Hardwood	3%
	Mixedwood	8%
Annual allowable cut ^a		71.6 million m ³
Harvest (volume) ^b		74.5 million m ³
Harvest (area)		189 608 ha
Status of harvested Crown land (1995) ^c		
	Stocked	2 614 000 ha 73%
	Understocked	974 000 ha 27%
Insect defoliation ^d		454 050 ha
Forest fires		48 080 ha

Forest industry

Value of exports (1996)	\$14.9 billion
	Softwood lumber 52%
	Wood pulp 23%
	Newsprint 9%
Major export markets (1996)	
	United States 56%
	Japan 24%
	European Union 9%
Balance of trade (1996)	\$14.0 billion
Value of shipments (1994)	\$22 billion
Number of establishments (1994)	3 203
	2 543 logging
	594 wood
	66 paper and allied
Employment (1996) ^e	184 000
	101 000 direct jobs
	83 000 indirect jobs
	1 job in 10
Wages and salaries (1994)	\$3.6 billion
New investments (1995)	\$2.7 billion

a, b, c, d, e See pages 109-110.

YUKON TERRITORY



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

Population	31 651
Total area	48.3 million ha
Land area	47.9 million ha
Forest land	27.5 million ha

Forest resource (1995)

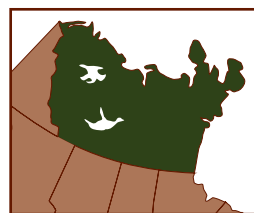
Ownership	Federal	100%
Forest type	Softwood	79%
	Hardwood	2%
	Mixedwood	19%
Annual allowable cut ^a	0.01 million m ³	
Harvest (volume) ^b	0.19 million m ³	
Harvest (area)	833 ha	
Status of harvested Crown land (1995) ^c		
Stocked	3 600 ha	43%
Understocked	4 800 ha	57%
Insect defoliation ^d	not available	
Forest fires	258 403 ha	

Forest industry

Value of exports (1996)	0.2 million
	Softwood lumber 67%
Balance of trade (1996)	\$0.2 million

a, b, c, d See pages 109-110.

NORTHWEST TERRITORIES



Jack pine (*Pinus banksiana*)

Population	66 646
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	33%
	Hardwood	9%
	Mixedwood	58%
Annual allowable cut ^a	0.24 million m³	
Harvest (volume) ^b	0.11 million m³	
Harvest (area)	500 ha	
Status of harvested Crown land (1993) ^c		
Stocked	440 ha	15%
Understocked	2 600 ha	85%
Insect defoliation ^d	59 500 ha	
Forest fires	2 827 400 ha	

Forest industry

Value of exports (1996)	\$1.1 million
	Softwood lumber 99%
Balance of trade (1996)	\$1.1 million

a, b, c, d See pages 109-110.

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.

Arboreal Emblem

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 102 shows the forest land boundary.

Forest Resource

Ownership data are provided for the total forest land.

- a 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 102 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.
- b Harvesting:*** The **national** and **provincial** figures for harvesting volume include data for industrial roundwood only. The harvest level for fuelwood or firewood for a single province may range as high as 2.3 million m³.
- 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:*** These data reflect the cumulative area harvested since 1975. 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. A

significant proportion of recently harvested areas will always be reported as understocked because of the time lag between harvesting and observable results of subsequent treatments. The small percentage of the area harvested each year that is devoted to roads for access is not included in these data.

- 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.

Commercial Forest Account

The Commercial Forest Account presents a broad overview of forestry activities that occurred over a 15-year period in Canada's timber productive forest (commercial forests) between 1980 and 1994. Only harvesting, fire, forest insects and diseases are recorded as disturbances; natural disturbances (e.g., fire, forest insects and diseases) are distinguished from human-caused disturbances (e.g., harvesting). It should be noted that only the commercial forests are considered in the account, an area representing 28% of Canada's landbase, and that forests that have changed status (i.e., from forested to farm land, or vice versa) are not included in the account.

AREA

This account assumes that the 234.53 million hectares of commercially timber-productive forests remained constant over the 15-year period. The total area affected by fire, harvesting, forest insects and diseases from 1980 to 1994 was 33 million hectares (an annual average of 2.2 million hectares).

Over the 15-year period, 13.53 million hectares were harvested, an average of 902 000 hectares per year; 12.26 million hectares were burned (more than 6.1 million hectares were burned in 1994); and 6.72 million hectares were affected by insects and disease. Overall, a total of 34.40 million hectares of forest were affected by natural and human disturbances.

More than 20 million hectares regenerated naturally, and more than 5.59 million hectares were planted or seeded (representing 41% of the area harvested). An estimated 4.80 million hectares regenerated following fire or insect damage.

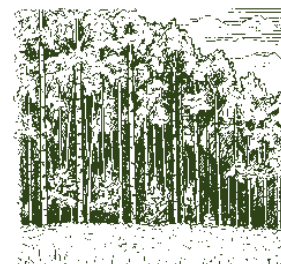
During the period 1980–1994, the area of forested land at the seedling stage rose from 29.75 million to 35.22 million hectares; the area of young forest decreased from 92.57 million



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



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)

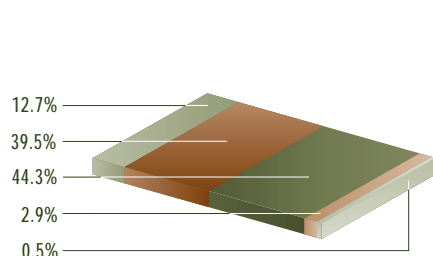
to 82.36 million hectares; and the area of mature, old and mixed-aged forests decreased from 103.98 million to 102.34 million hectares. The areas that regenerated following fire or forest insect damage rose from 6.79 million to 11.58 million hectares, and the area not growing commercial forests rose from 1.45 million to 3.03 million hectares—roughly 1.3% of the commercial forest landbase. (Estimates for private lands were added for the period, accounting for some of the increase.)

Recent studies indicate that since 1993, the area not growing commercial species is on a downward trend. This area does not contain sufficient quantities of commercial trees; however, it has regenerated with a rich variety of plants, shrubs and trees (e.g., alder and willow) that provide food and shelter for wildlife. With time, commercial species will grow back in most of these areas.

VOLUME

Over the 15-year period, there was a net increase of 936 million m³ (14%) in the volume of trees growing in Canada's commercial forests. Between 1980 and 1994, the volume of seedling-stage trees increased from 0.32 billion m³ to 0.45 billion m³ (this figure also includes volumes of residual trees left on harvested areas), while young forests decreased slightly—from 7.14 billion m³ to 6.94 billion m³. The volume of mature, old or mixed-aged forests increased from 17.35 billion m³ to 18.35 billion m³ during the same period. Depletions in forest volume (area harvested, area burned, and area affected by forest insects and disease) were 4.8 billion m³ between 1980 and 1994.

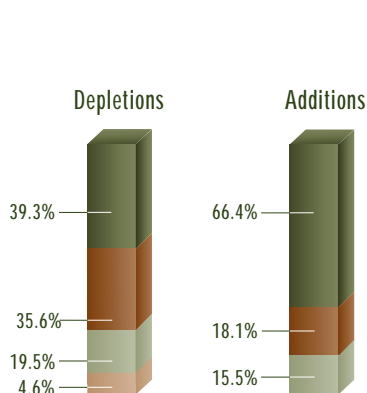
COMMERCIAL FOREST AREA (1980–1994)



	million hectares
1980	
Seedling stage	29.75
Young forest	92.57
Mature, old or mixed-aged forests	103.98
Area regenerating following fire or insects	6.79
Area not growing commercial species	1.45
10 years after harvesting	
Total (does not add due to rounding)	234.53

Changes (1980–1994)

Depletions

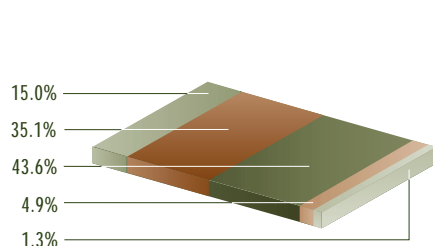


Area harvested	13.53
Area burned	12.26
Area affected by insects or disease	6.72
Sub-total (does not add due to rounding)	32.52
Area not growing commercial species	1.58
10 years after harvesting	
Total	34.40

Additions

Area regenerated naturally	20.55
Area planted or seeded	5.59
Area regenerating following fire or insects	4.80
Total	30.94

1994



Seedling stage	35.22
Young forest	82.36
Mature, old or mixed-aged forests	102.34
Area regenerating following fire or insects	11.58
Area not growing commercial species	
10 years after harvesting	3.03
Total (does not add due to rounding)	234.53

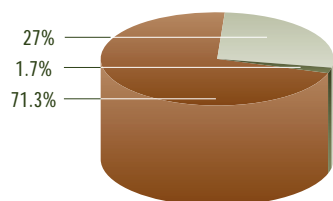
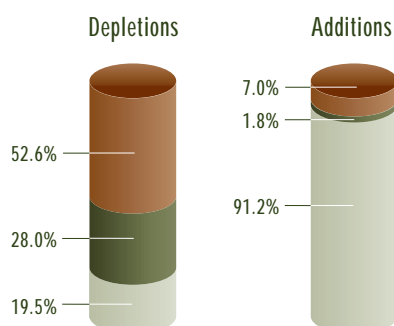
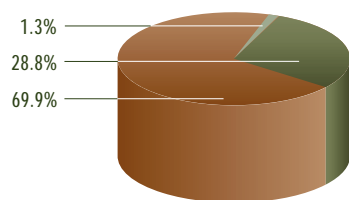
HIGHLIGHTS

The total area harvested annually was equal to 0.38% of the total commercial forest, while the area depleted by fire and forest insects was 0.54%. During the same period, the area of forested land at the seedling stage rose by 18.39%, and the area of young forest dropped by 11.03%.

There were 1.64 million hectares less of mature, old and mixed-aged forests during the same period. Areas regenerating following fire or insect damage rose by 4.79 million hectares, while the area not growing commercial species 10 years after harvesting increased by 1.58 million hectares.

COMMERCIAL FOREST VOLUME (1980–1994)

billion m³



1980

Seedling stage	0.32
Young forest	7.14
Mature, old or mixed-aged forests	17.35
Total	24.81

Changes (1980–1994)

Depletions	
Volume harvested	2.52
Volume burned	1.34
Volume lost to insects or disease	0.93
Total	4.79

Additions	
Volume in naturally regenerated areas	0.40
Volume in planted or seeded areas	0.10
Growth in standing timber	5.22
Total	5.73

1994

Seedling stage	0.45
Young forest	6.94
Mature, old or mixed-aged forests	18.35
Total	25.74

Net volume increase.....0.94

HIGHLIGHTS

The net volume of trees growing in Canada remained relatively stable during the period 1980–1994, increasing by 3.8%. The volume of seedling-stage trees increased by 42.0%, while the volume of young forest decreased by 2.8% during the same period. The volume of old, mature and mixed-aged forest increased slightly during the 15-year period, by 5.8%. The total volume of depletions was 18.6% from 1980 to 1994.

Forest Statistics

*10-year Trends**

ANNUAL ALLOWABLE CUT (1995)

232.9 million m³ ↑

EMPLOYMENT (1996)

842 000 direct and indirect jobs ↓

HARVESTING (1995)

1 011 328 hectares ↑

WAGES AND SALARIES (1995)

\$11.1 billion ↑

FIRE (1995)

6.6 million hectares ↑

EXPORTS (1996)

\$38.3 billion ↓

PLANTING AND SEEDING (1995)

461 551 hectares ↓

VALUE OF SHIPMENTS (1995)

\$71.4 billion ↑

SITE PREPARATION AND STAND TENDING (1995)

708 792 hectares ↓

FOREST PRODUCTS' CONTRIBUTION TO BALANCE OF TRADE (1996)

\$32.1 billion ↓

FOREST MANAGEMENT EXPENDITURES (1995)

\$2.9 billion ↑

CAPITAL AND REPAIR EXPENDITURES (1995)

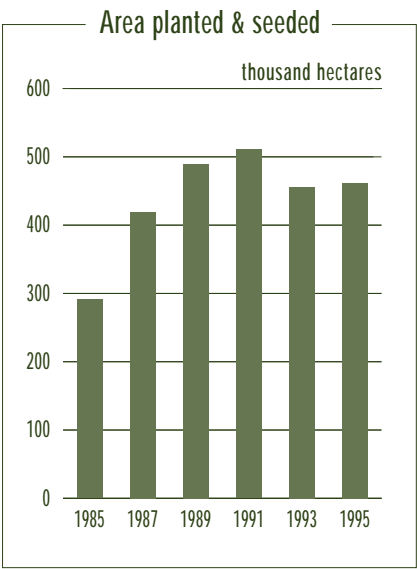
\$8.9 billion ↑

* 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 (1995)

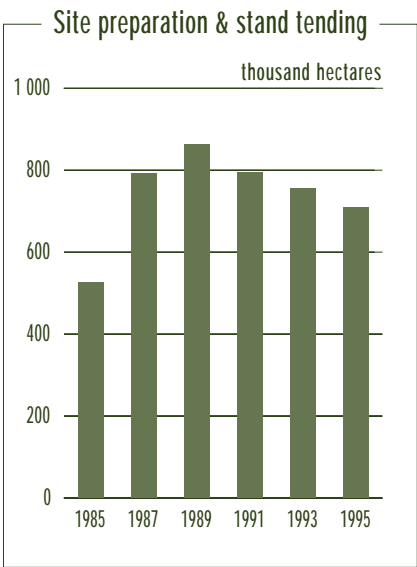


Despite efforts to promote natural regeneration, competing vegetation and other natural factors can cause seedling mortality or inhibit seedling growth, preventing the regeneration of some forest stands. Planting and seeding programs concentrate on sites that have failed to regenerate several years after natural disturbances or harvesting. Planting and seeding have been successful in reducing the backlog of understocked sites. Planting and seeding activities decreased by 4.9% in 1995 due to reduced expenditures.

1995	Hectares	Change	
		1-year	10-year average
Area planted and seeded	461 551	- 4.9%	+5.1 %

Source: Canadian Forest Service–National Forestry Database

SITE PREPARATION AND STAND TENDING (1995)



Thinning, fertilizing and pruning recently planted forests improves the growth and quality of young trees. Commercial thinning becomes important to prevent crowding as older stands of hardwoods and mixedwoods grow to maturity. Since 1991, site preparation and tending activities have ranged from 699 715 to 793 601 hectares. Overall, expenditures on these activities declined in 1995.

1995	Hectares	Change	
		1-year	10-year average
Site preparation and stand tending	708 792	-1.5%	+3.7%

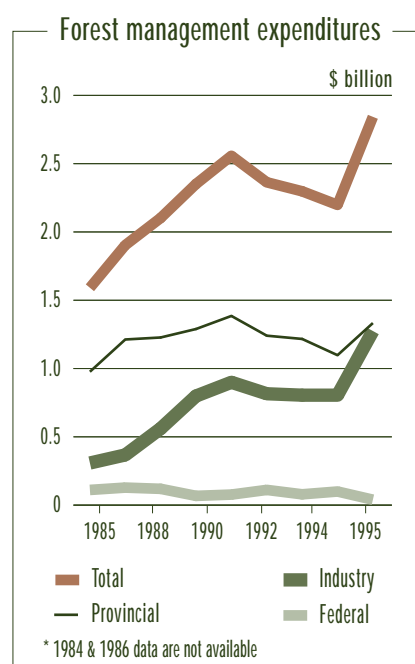
Source: Canadian Forest Service–National Forestry Database

FOREST MANAGEMENT EXPENDITURES (1995)

Between 1985 and 1995, federal and provincial governments, and the forest industry, spent more than \$23.6 billion on forest management programs to regenerate forest areas that were harvested or damaged by fire or insects. After three years of decline, provincial governments and industry have increased spending on forest management activities by 33.9% from 1994 to 1995. In recent years, forest management responsibilities have shifted from the provinces to industry. Over the past 10 years, provincial spending on forest management has increased by 9.7%, industry spending rose by 17.9%, while the federal government expenditures rose by only 1.1%.

1995	\$ billion	Change 1-year	Change 10-year average
Total expenditures	2.9	+28.1%	+9.7%
Provincial	1.4	+19.7%	+7.1%
Industry	1.4	+52.1%	+17.9%
Federal	0.1	-30.4%	+1.1%

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

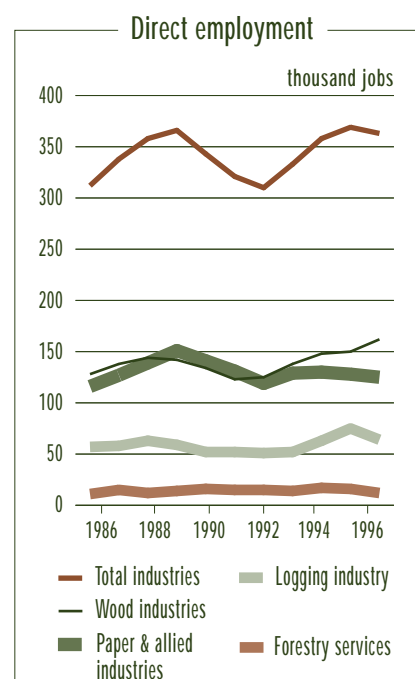


DIRECT EMPLOYMENT (1996)

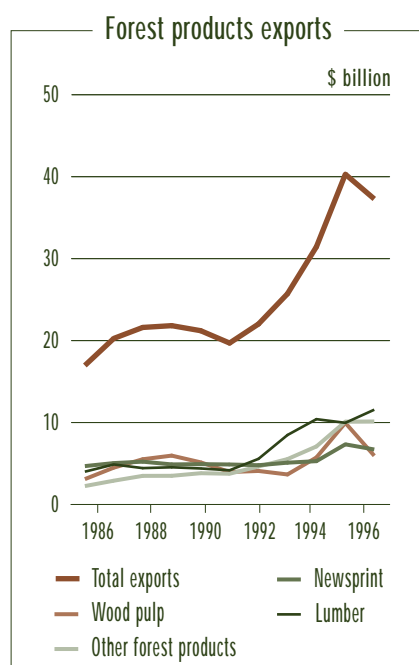
Restructuring in Canada's forest industries and the introduction of less labour-intensive technologies have led to a decline in the number of forest sector jobs. In 1996, total direct employment fell by 1.6% (a decrease of 6 000 jobs) after three years of steady increases. Wood industries posted an increase of 12 000 jobs over 1995, whereas other industries experienced declines. Paper and allied industries lost 3 000 jobs; logging, 11 000 jobs; and forestry services, 4 000. Increases in the solid wood industries are due to strong growth in the softwood and hardwood export markets.

1996	Direct jobs	Change 1-year	Change 10-year average
Total industries	363 000	-1.6%	+1.7%
Wood	162 000	+8.0%	+2.6%
Paper & allied	125 000	-2.3%	+1.0%
Logging	64 000	-14.7%	+1.8%
Forestry services	12 000	-25.0%	+2.5%

Source: Statistics Canada



VALUE OF EXPORTS (1996)



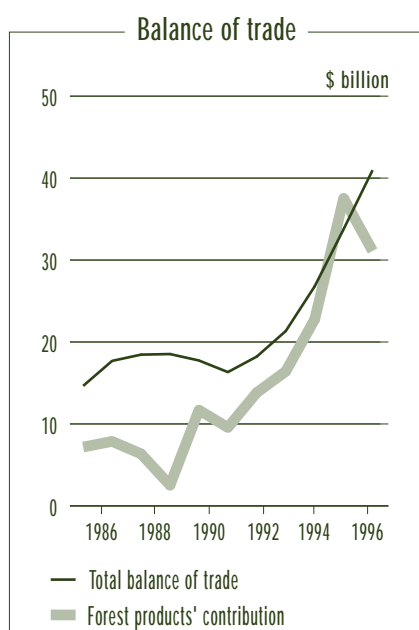
The value of Canada's total forest exports decreased by 7.3% to \$38.3 billion in 1996. This drop followed several years of successive gains. The value of wood pulp declined by 36.7%, followed by newsprint (7.5%). However, the value of lumber exports increased by 14.7%. This increase is attributed to low interest rates, which contributed to new home construction in the United States. Decreases in the export of newsprint and pulp are attributed to recycling efforts and lower demand.

1996	\$ billion	Change	
		1-year	10-year average
Total exports	38.3	-7.3%	+8.5%
Lumber	12.5	+14.7%	+10.8%
Other forest products	11.1	+0.2%	+13.8%
Newsprint *	7.7	-7.5%	+3.6%
Wood pulp	6.9	-36.7%	+9.4%

* Includes some writing and other printing papers

Source: Statistics Canada

BALANCE OF TRADE (1996)



In 1996, forest products contributed \$32.1 billion to Canada's balance of trade. This represents a decrease of 7.7% from the previous year and an overall increase of 8.2% over the past decade. The majority of this contribution was attributed to sales of forest products to the United States (\$27.3 billion), Japan (\$4.2 billion) and the European Union (\$3.5 billion). Canada imported less than \$7.0 billion of forest products in 1996, primarily in paper products and wood-fabricated materials. Canada's net exports of forest products have been crucial to its ability to maintain a positive trade balance, particularly during the global recession.

1996	\$ billion	Change	
		1-year	10-year average
Total balance of trade	41.9	+8.9%	+34.9%
Forest products' contribution	32.1	-7.7%	+8.2%

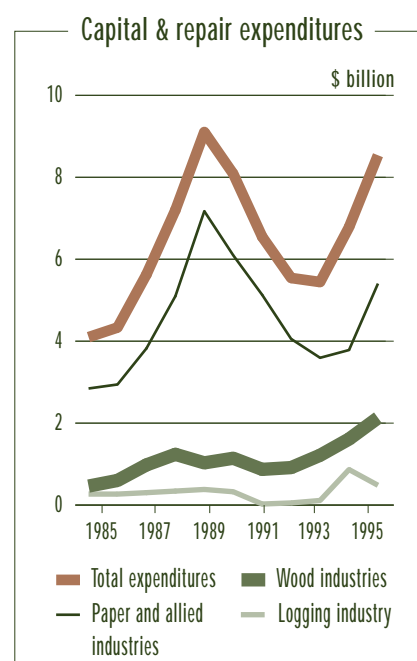
Source: Statistics Canada

CAPITAL AND REPAIR EXPENDITURES (1995)

In 1995, with increasing profits, Canada's forest industries spent a total of \$8.9 billion in capital and repair expenditures. Paper and allied industries spent \$5.7 billion on upgrading and maintaining equipment, an increase of 39.5% from the previous year. Wood industries spent \$2.4 billion—an increase of 27.7%. Logging industries reduced spending in 1995 following huge capital and repair investments in 1994.

1995	\$ billion	Change	
		1-year	10-year average
Total expenditures	8.9	+24.7%	+8.7%
Paper & allied industries	5.7	+39.5%	+8.4%
Wood industries	2.4	+27.7%	+14.3%
Logging industry	0.7	-34.1%	+15.7%

Source: Statistics Canada

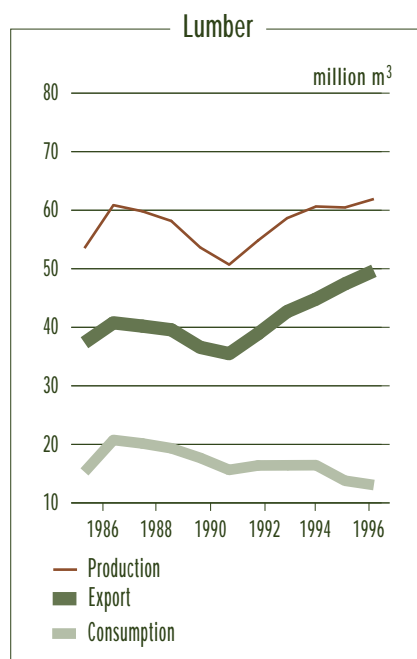


LUMBER (1996)

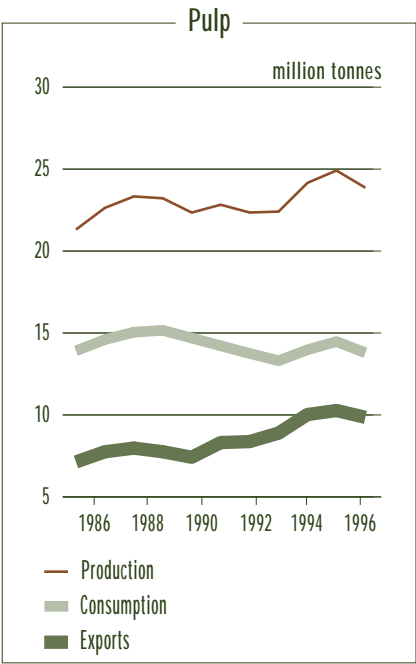
In 1996, Canada's lumber production and exports increased for the fourth consecutive year. Annual production and exports increased to 62.8 million m³. Exports alone rose by 4.6% to 50.6 million m³ from 1995, while domestic consumption dropped by 5%. The USA is a major market for Canadian light-framing construction lumber grades such as SPF and the growing Japanese economy is providing substantial exports opportunities for Canada's lumber.

1996	Million m ³	Change	
		1-year	10-year average
Production	62.8	+2.4%	+1.9%
Exports	50.6	+4.6%	+3.0%
Consumption	14.0	-5.0%	-0.8%

Source: Statistics Canada



PULP (1996)

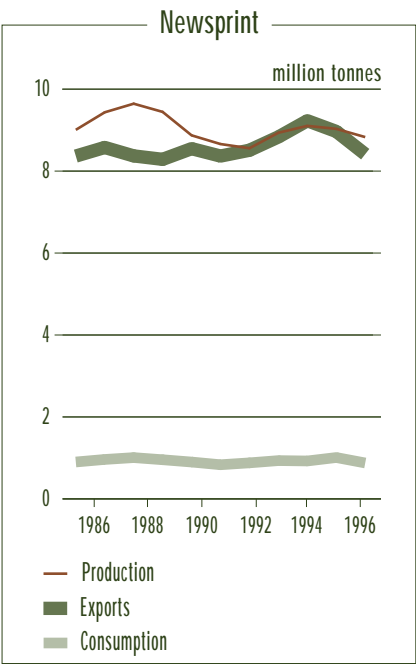


Canada's share of the wood pulp market has remained relatively constant over the past decades accounting for more than 30% of world trade. However, the destination of our pulp has shifted, decreasing in the USA while increasing in Japan and other Asian countries. Canada's production, consumption and exports of pulp declined in 1996 for the first time since 1991.

1996	Million tonnes	Change 1-year	Change 10-year average
Production	24.4	-4.1%	+1.2%
Consumption	14.3	-4.6%	-0.02%
Exports	10.3	-3.9%	+3.3%

Sources: Statistics Canada; Canadian Forest Service

NEWSPRINT (1996)



Canada's share of the newsprint market has been decreasing over the past decades as a result of a restructuring of the global newsprint markets. Many countries that were once dependent on our newsprint are now self-sufficient. Domestic needs for newsprint account for only a small portion of our production. In 1996, almost 60% of Canadian production was exported to the United States, where many states now require a minimum recycled content in newsprint. Newsprint prices peaked in 1995, decreasing slightly in 1996.

1996	Million tonnes	Change 1-year	Change 10-year average
Production	9.0	-2.2%	-0.1%
Exports	8.6	-6.1%	+0.1%
Consumption	1.1	-11.0%	-0.04%

Sources: Canadian Pulp & Paper Association; Canadian Forest Service

Glossary

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.

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).

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.

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.

Commercial forest: Forest land that is able to grow commercial timber within an acceptable time frame.

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.

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.

Environmental assessment: A process designed to contribute pertinent environmental information to the decision making process of forest management and other resource projects and programs.

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.

Fauna: A general term for all forms of animal life characteristic of a region, period, or special environment.

Flora: A general term for all forms of plant life characteristic of a region, period, or special environment.

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

Global warming: The rise in temperature of the Earth’s atmosphere due to the greenhouse effect (the retention of the sun’s energy by the atmosphere due to the build-up of carbon dioxide and other gases which are the bi-product of industrial activities).

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.

Inventory (forest): A survey of a forest area to determine such data as area condition, timber, volume and species for a specific purposes such as planning, purchase, evaluation, management or harvesting.

Lower Canada: The southern part of present-day Québec, existing as a separate British province from 1791 to 1840.

Management plans: A detailed long-term plan for a forested area. It contains inventory and other resource data.

Model forest: A forest or designated area including forests and woodland for which an integrated management plan is created and implemented to achieve multiple objectives on a sustainable basis.

Montreal Criteria & Indicators (C&I) Process: This global initiative was so named because the first meeting sponsored by the Conference on Security and Cooperation in Europe was held in Montreal. Currently, 12 countries representing 90% of the world's boreal and temperate forests have agreed to collaborate to develop national C&I for the conservation and sustainable management of all boreal and temperate forests.

Multiple forest use: A system of resource use where the forest resources in a given land unit serve more than one user.

Non-commercial tree species: A tree species for which there is currently no market.

Ozone layer: A form of oxygen (O₃) formed naturally in the upper atmosphere by a photochemical reaction with solar ultraviolet radiation and a major agent in the formation of smog.

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

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.

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.

Shelterwood systems: 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.

Sustainable (forest) development: The development of forests to meet current needs without prejudice to their future productivity, ecological diversity or capacity for regeneration.

Sustained-yield forestry: The yield of defined forest products of specific quality and in projected quantity that a forest can provide continuously at a given intensity of management.

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.

Upper Canada: The predecessor of modern Ontario, came into existence when the British Parliament passed the Constitutional Act, 1791, dividing the old province of Québec into lower Canada and Upper Canada along the present-day Québec-Ontario boundary

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
E-mail: afpinfo@compusmart.ab.ca

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
E-mail: claudie.godbout@ffg.ulaval.ca

Association of University Forestry Schools of Canada

Lakehead University
955 Oliver Road
Thunder Bay ON P7B 5E1
Phone: (807) 343-8511
Fax: (807) 343-8116

Canadian Federation of Woodlot Owners

180 St. John's Street
Fredericton NB E3B 4A9
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) 947-9054
Fax: (613) 947-7395

Canadian Forestry Association

203 – 185 Somerset Street West
Ottawa ON K2P 0J2
Phone: (613) 232-1815
Fax: (613) 232-4210
E-mail: e-cfa@cyberus.ca

Canadian Institute of Forestry

606 – 151 Slater Street
Ottawa ON K1P 5H3
Phone: (613) 234-2242
Fax: (613) 234-6181
E-mail: cif@cif-ifc.org

Canadian Nature Federation

606 – 1 Nicholas Street
Ottawa ON K1N 7B7
Phone: (613) 562-3447
Fax: (613) 562-3371
E-mail: cnf@cnf.ca

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
E-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
E-mail: brinkman@brinkman.ca

Canadian Wildlife Federation

2740 Queensview Drive
Ottawa ON K2B 1A2
Phone: (613) 721-2286
Fax: (613) 721-2902
Internet site:
www.cwf-fcf.org

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
5700, 4e Avenue Ouest,
accueil central
Charlesbourg QC G1H 6R1
Phone: (418) 646-2727
Fax: (418) 644-7160
Internet site:
<http://www.mrn.gouv.qc.ca>

Government of Alberta

Department of Environmental
Protection
10th floor, South Petroleum Plaza
9915 – 108 Street
Edmonton AB T5K 2G8
Phone: (403) 427-6236
Fax: (403) 427-0923

Government of British Columbia

Ministry of Forests
4th floor, 595 Pandora Avenue
Victoria BC V8W 3E7
Phone: (250) 387-1285
Fax: (250) 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,
50 Elizabeth Ave.
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**

Resources, Wildlife & Economic
Development
Box 7
149 McDougal Rd.
Fort Smith NT X0E 0P0
Phone: (403) 872-2077
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
Web site: <http://www.gov.ns.ca/natr/>

Government of Ontario

Ministry of Natural Resources
Whitney Block, Rm 6643
99 Wellesley Street West
Toronto ON M7A 1W3
Phone: (416) 314-2150
Fax: (416) 314-2159

**Government of
Prince Edward Island**

Department of Agriculture
and Forestry
P.O. Box 2000, Jones Building
11 Kent Street
Charlottetown PEI 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 the Yukon Territory

Department of Renewable Resources
P.O. Box 2703
10 Burns Road
Whitehorse YT Y1A 2C6
Phone: (867) 667-5460
Fax: (867) 393-6213

**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

**Prince Edward Island
Nature Trust**

P.O. Box 265
Charlottetown PEI 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
Kemptonville 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) 432-2800
Fax: (506) 432-2807
E-mail: fundyfor@nbnet.nb.ca
Web site:
<http://www.umoncton.ca/fundymf/>

Lake Abitibi Model Forest

P.O. Box 550
1 Park Street
Iroquois Falls ON P0K 1E0
Phone: (705) 258-4278
Fax: (705) 258-4089
E-mail: lamf@emr.ca

Long Beach Model Forest

P.O. Box 1119
243 Main Street
Ucluelet BC V0R 3A0
Phone: (250) 726-7263
Fax: (250) 726-7269

Lower St. Lawrence Model Forest

284, rue Potvin
Rimouski QC G5L 7P5
Phone: (418) 722-7211
Fax: (418) 723-6045
E-mail: fmodbsl@quebectel.com

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: (250) 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
E-mail: wnmodfor@thezone.net
Web site:
<http://home.thezone.net~wnmodfor/>

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

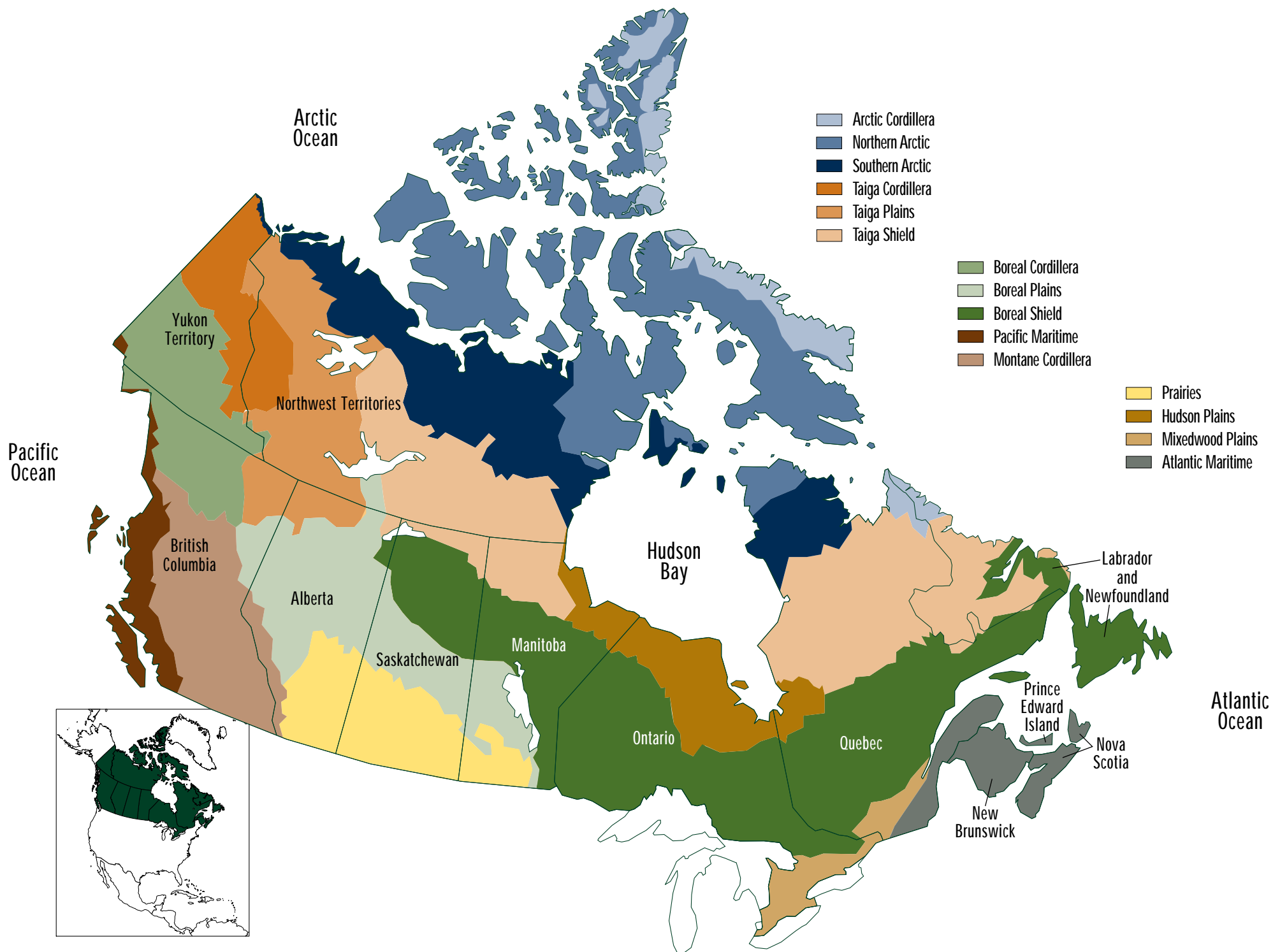
Cispus Model Forest

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.*



Canadian Forest Service

National Science and Technology Networks



HO 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) 648-3957 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: (250) 363-0600 Fax: (250) 363-0775
Lead centre for the landscape management and effects of forestry practices networks.

Note: Lead centres have responsibility for the management of the science and technology networks denoted.