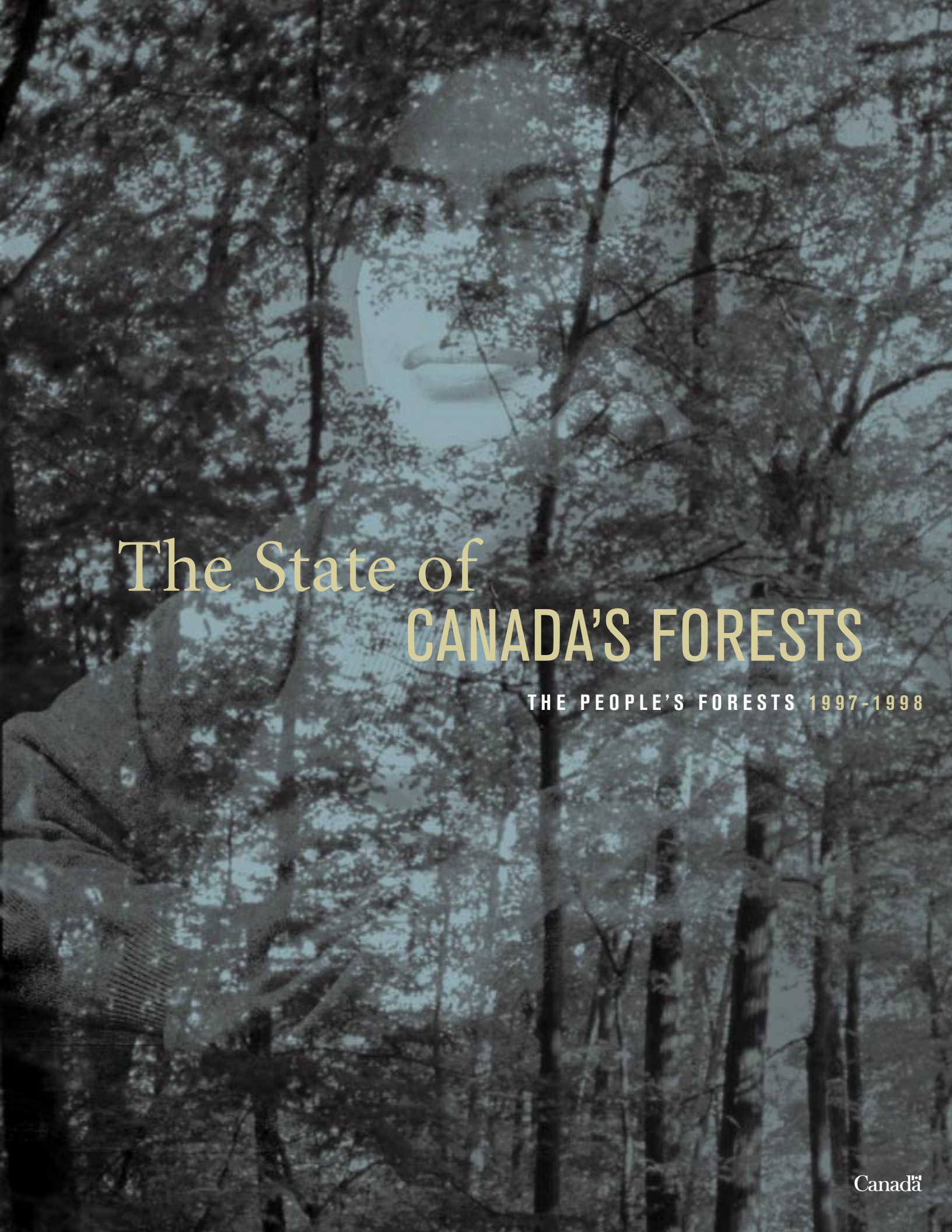

# The State of CANADA'S FORESTS

THE PEOPLE'S FORESTS 1997-1998

Canada

Cat. Fo1-6/1998 E
ISBN 0-662-26881- 4

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
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# The PEOPLE'S Forests

I am pleased to present to Parliament the eighth report on the state of Canada's forests. These reports provide Canadians, and indeed the world, with current and insightful information on the condition of Canada's forests and on the forest-related issues and opportunities important to us all.

Canada is blessed with one of the largest forest covers of any country on earth, and Canadians cherish this important natural resource. Throughout this report, which revolves around the theme "the people's forests," is evidence that together, we Canadians are demonstrating our resolve to manage our forests wisely for the benefit of all. After all, forests and their management unquestionably affect all of our lives: 94 percent of this country's 418 million hectares of forest land belongs to the public.

Just a few weeks ago, Canada renewed its commitment to ensuring the sustainability of its forests by adopting a new, five-year National Forest Strategy. Following months of intense consultation and consensus building with partners and interest groups, it was my privilege to endorse the Strategy by signing a new Forest Accord on behalf of the Government of Canada. The Accord is a strong example of flexibility and cooperation, and it reflects a broad-based sharing of visions, goals and principles across the country.

With the National Forest Strategy, Canada enters the next millennium with new approaches to forest resources management using the most advanced technologies built on the belief that information shared is more powerful than information held. Canada will be able to confidently face tomorrow's forestry challenges, including providing opportunities for our young people and for Aboriginal communities. At the same time, other challenges face us, including the effects of climate change, pest management and maintaining the biodiversity of our forests. In a competitive global economy, the development of innovative technologies and value-added industries will be the keys to our successes.

Over the years, Canada has gained international recognition not only as a responsible steward of 10 percent of the world's forests, but also as a leader in the development of progressive policies and protocols. Other countries have shown their confidence in us and are drawing on our strength.

As a nation, our goals are clear: to pursue and build upon Canadian commitments to sustaining our forests. We have already made considerable progress, and over the next few months, signatories to the new Forest Accord will build upon that progress.

I am encouraged by the prospects for Canada's forests, and I commend those who are so devoutly committed to ensuring sustained strength in the forestry sector.

*Ralph Goodale*
Minister of Natural Resources Canada

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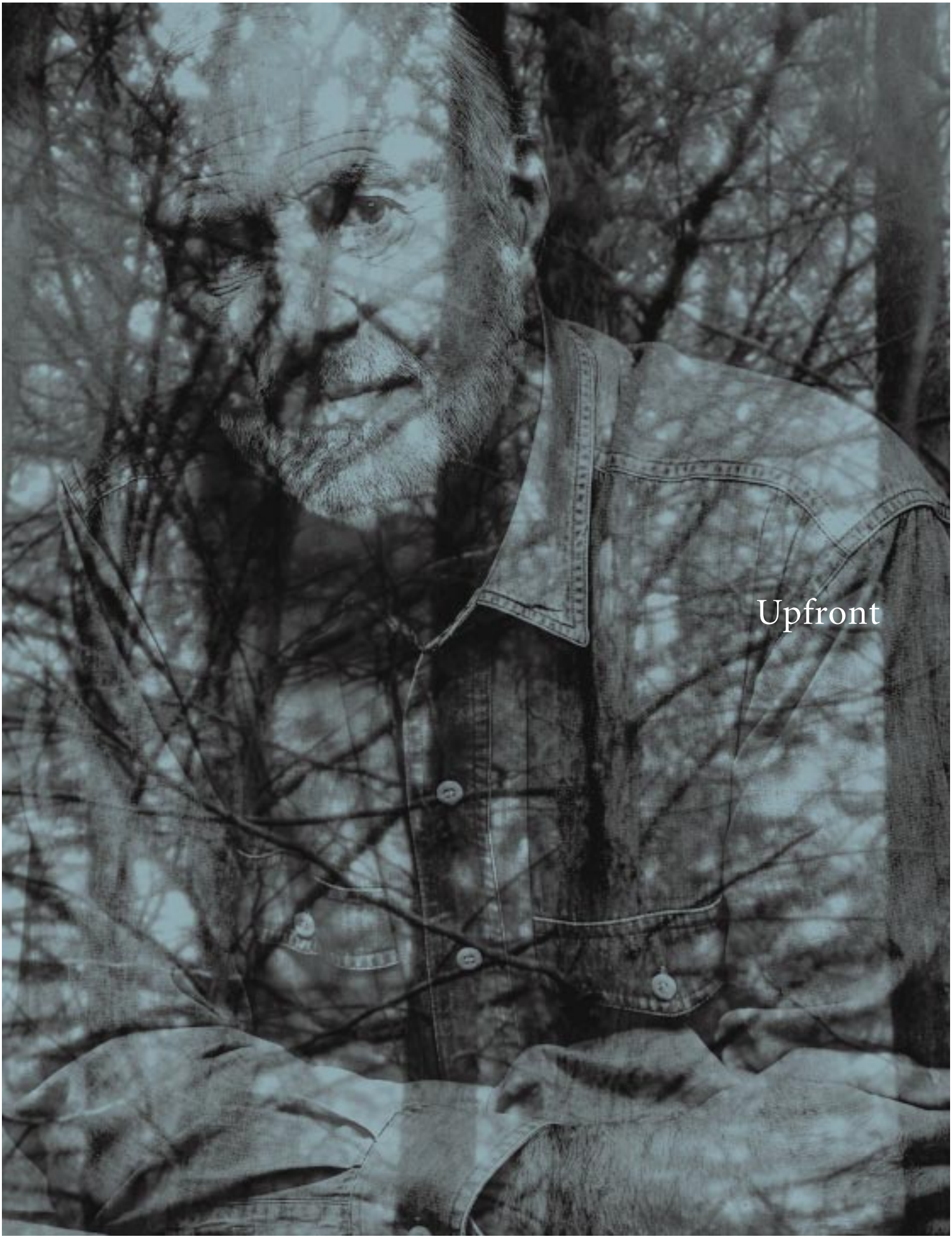
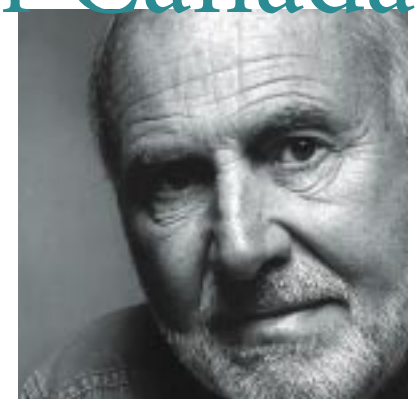


# Upfront

# AN OVERVIEW of Canada's Forests



CANADA IS A FOREST NATION. OUR FORESTS ARE CRITICAL TO MODERATING OUR CLIMATE AND PROVIDING CLEAN AIR AND WATER. AS WELL, OUR FORESTS ENRICH OUR SOIL AND PREVENT ITS EROSION, AND THEY REGULATE WATER FLOW.

OF CANADA'S 417.6 MILLION HECTARES OF FOREST–NEARLY HALF THE NATION'S LAND AREA–235 MILLION HECTARES ARE CONSIDERED COMMERCIAL FORESTS, CAPABLE OF PRODUCING TIMBER ALONG WITH A VARIETY OF OTHER BENEFITS, INCLUDING MAPLE PRODUCTS, CHRISTMAS TREES AND SPECIALTY CRAFT PRODUCTS. OF THESE, 119 MILLION HECTARES (28.5% OF THE TOTAL FOREST AREA) ARE CURRENTLY MANAGED PRIMARILY FOR TIMBER PRODUCTION, WHILE THE REMAINING HECTARES HAVE NOT BEEN ACCESSED OR ALLOCATED FOR TIMBER. (ROUGHLY 0.4% OF CANADA'S FORESTS ARE HARVESTED EACH YEAR.) THE NON-COMMERCIAL FOREST LAND IS MADE UP OF OPEN FORESTS COMPRISING NATURAL AREAS OF SMALL TREES, SHRUBS AND MUSKEG.

In 1997, forest products exports contributed $31.7 billion to the country's net balance of trade. The Canadian forest sector is the world's largest exporter of wood and paper products, and it accounts for at least $8 billion per year in wages. More than 1 in 17 Canadians work in the wood and paper industries or their allied organizations, and some 337 Canadian communities depend largely on forestry. *(See the tear-out map at the end of this report.)*

Under the Canadian Constitution, the provinces retain responsibility for forest management. In recognition of the broad spectrum of forest users, provincial government agencies seek public views and work closely with forest industries, Aboriginal groups and environmental organizations

to incorporate recreational, social, wildlife and economic values into forest management planning and decision making. Each province has its own legislation, regulations, standards and programs through which it allocates public forest harvesting rights and management responsibilities. In the Northwest Territories, the responsibility for forest management has been transferred from the federal government to the territorial government. A similar transfer is being finalized with the Yukon Territory. The federal government's direct or shared roles in forestry focus on science and technology, international relations, trade and investment, industrial and regional development, national statistics, Aboriginal affairs, environmental regulations and the management of federal lands.

**In 1997–1998, the Yukon Territory and Canada continued negotiations on the devolution of management responsibilities in the territory. (Indian and Northern Affairs Canada currently manages forest resources in the Yukon.) Those discussions laid the groundwork for the development of territorial legislation that will provide the Yukon with the statutory authority to manage its forest lands.**

As shown on the tear-out map at the end of this report, most Canadian forests (94%) are publicly owned, which makes the country unique among forest nations. Seventy-one percent of the forests are under provincial jurisdiction, 23% are under federal jurisdiction (some managed by or in cooperation with the territorial governments), and the remaining 6% are in the hands of an estimated 425 000 private landowners.

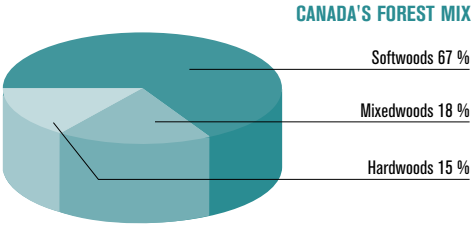
In ecological terms, there are eight forest regions in Canada, ranging from the towering coastal rainforests in British Columbia to the sparse and slow-growing forests at the Arctic tree line. Each region comprises a unique distribution of plant and animal species, as demonstrated by the estimated 180 species of trees that can be found across the country. Of Canada's forests, 67% are softwoods, 15% are hardwoods, and 18% are mixedwoods. Canada can be further described as having 15 terrestrial ecozones, 194 ecoregions and more than a thousand ecodistricts. This array of forest ecosystems provides diverse habitats for an estimated 140 000 species of plants, animals and micro-organisms.

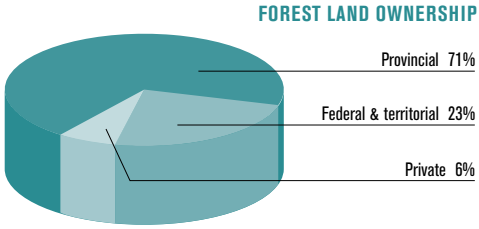
The average life span of Canada's forests decreases from west to east, with those living past 160 years common only in the west. These differences reflect natural variations in species longevity and disturbance frequencies. Most of our forests grow in even-aged stands that evolve as a result of major disturbances, such as fire or insect outbreaks. Approximately 0.5% of our forests succumb to these natural events each year.

Several silviculture and harvesting systems are used in Canada. Clearcut harvesting, which is used extensively in our boreal forest region, encourages natural regeneration and typically produces stands of light-demanding species, such as jack pine, lodgepole pine, black spruce, trembling aspen and white birch. New information and a better understanding of natural disturbances and diversity are contributing to changes in clearcutting practices to more closely emulate natural disturbance patterns and frequencies, and the stand and landscape characteristics that generally occur following these disturbances. Alternately, in forest regions where shade tolerant species readily regenerate, partial cutting or silvicultural systems such as shelterwood or selection cutting may be more appropriate.

**Eight Canadian universities offer forestry education programs. In addition, universities undertake forest research in a wide range of disciplines, such as biology, wood chemistry and the social sciences.**

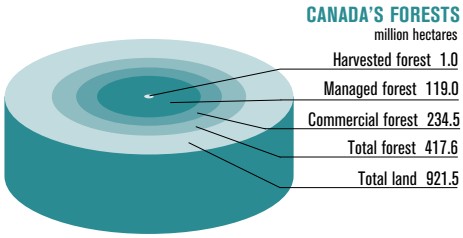
The Canadian Forest Service of Natural Resources Canada is the principal federal forest research organization in Canada, but a number of other federal departments and agencies (including the National Research Council, the Natural Sciences and Engineering Research Council, Environment Canada, Agriculture and Agri-foods Canada and Industry Canada) support research relevant to forestry.

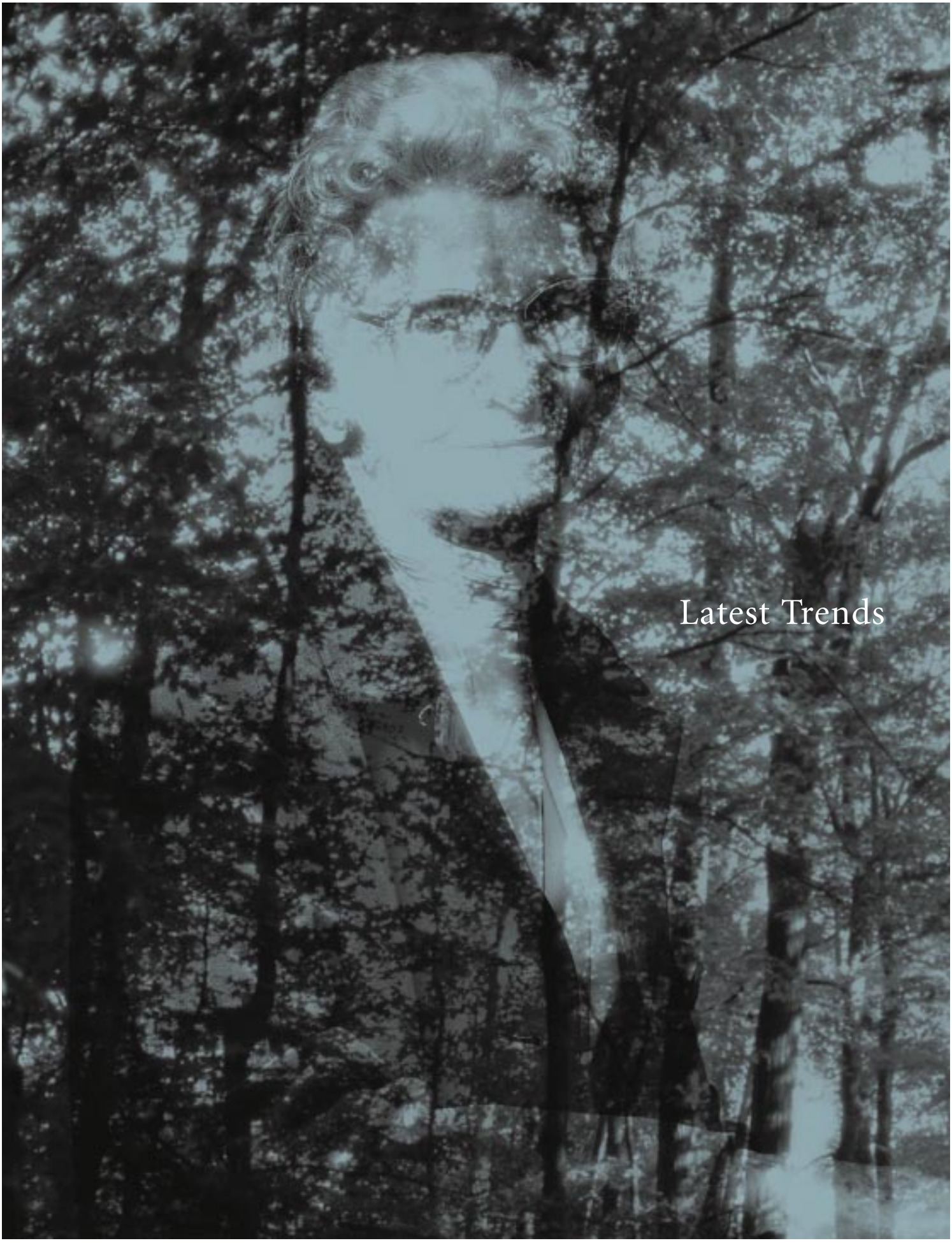


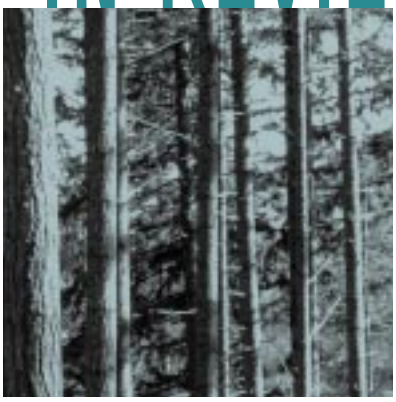

In addition, at the national level, there are three cooperative industrial forest research institutes in Canada. FERIC (Forest Engineering Research Institute of Canada), FORINTEK Canada Corporation and PAPRICAN (Pulp and Paper Research Institute of Canada) are responsible for research in forest engineering, solid wood products, and pulp and paper, respectively. A number of companies also undertake research. Provincial research activities are generally of an applied nature, concerned with solving forest management problems and applying new technologies in forest operations.

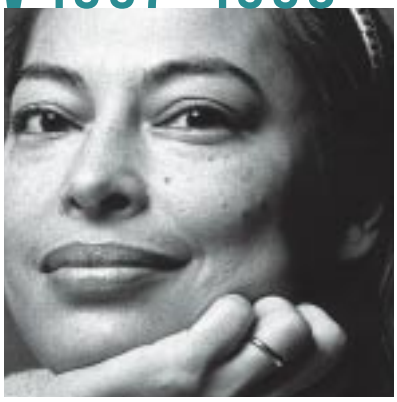
Each year, large numbers of visitors are drawn to Canada's forests for wilderness activities ranging from hiking and wildlife photography to hunting and camping. Other pastimes, such as bird-watching and mountain biking, are becoming more and more popular.




Latest Trends

# The Year IN REVIEW 1997–1998





THROUGHOUT 1997–1998, CANADA CONTINUED TO BUILD UPON ITS NATIONAL AND INTERNATIONAL COMMITMENTS TO SUSTAINABLY DEVELOP ITS FORESTS. IT DID SO BY CONSULTING WITH ITS CITIZENS TO DETERMINE THEIR PRIORITIES WITH RESPECT TO THE FUTURE OF THEIR FORESTS, BY ENCOURAGING THE SHARING OF IDEAS AND EXPERIENCE AMONG EXPERTS AND BETWEEN EXPERTS AND THE FOREST COMMUNITY, BY PASSING LEGISLATION TO PROTECT THE ENVIRONMENT AND BETTER REFLECT EVOLVING PUBLIC VALUES, AND BY SETTING ASIDE SPECIAL AREAS FOR THE ENJOYMENT OF FUTURE GENERATIONS. THESE INITIATIVES REFLECT THE ONGOING EFFORTS THAT ARE PART OF THE NEW ERA OF FOREST MANAGEMENT IN CANADA. ONE OF THE FACTORS THAT DISTINGUISHED THE PERIOD IN REVIEW, HOWEVER, WAS THE NUMBER OF ANNOUNCEMENTS MADE BY OR AFFECTING THE FOREST SECTOR: CLOSURES, MERGERS, TAKEOVERS AND EXPANSIONS. IN ADDITION, TWO COURT RULINGS WERE RENDERED ON THE ISSUE OF ABORIGINAL LAND CLAIMS.

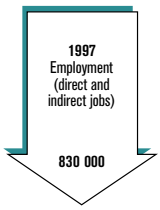
### CONSULTING THE PUBLIC

In October 1997, the Government of **Nova Scotia** released a position paper for public comment outlining its proposed strategy to promote sustainable forest practices on private and Crown lands.

In 1997, **Quebec**'s Department of Natural Resources announced its intention to review the organization of the forest sector from a comprehensive, long-term perspective. The Department's goal is to refocus its initiatives on the basic role of government (i.e., the development of policies, statutes and regulations) and to establish a flexible, independent administration responsible for the legal framework and for implementing government policy. The future structure should rely

on optimum public–private partnerships, ensure the involvement of interested groups, and carry out its mandate using a management-by-results approach. To meet those objectives, it should adopt high standards of effectiveness, efficiency and transparency. Furthermore, to enable all parties concerned about the future of forest resources to contribute to their management, the Department would like to create an advisory committee to advise the minister and make recommendations on forest management and the sustainable development of the forest sector. The committee will comprise forest industry representatives, private producers, municipalities and various groups involved in managing forest resources.

In 1997–1998, extensive consultations were conducted at the regional and provincial levels to spark dialogue and to guide the work of the committee charged with developing Quebec's inhabited forests policy—a policy intended to help revitalize local communities by promoting the sustainable development of forests in populated areas. The consultations involved representatives of municipal governments, Aboriginal communities and forest stakeholder organizations. The committee is expected to submit a draft policy to Cabinet for approval in 1998.




Under a comprehensive new planning process called "Lands for Life," the **Ontario** Ministry of Natural Resources is reviewing the use of Crown-owned natural resources. In February 1998, regional round tables comprising environmental groups, tourism operators, Aboriginal people, recreational users and representatives of resource-based industries finalized objectives that will guide the development of a series of land-use options for each planning region. The first phase of land-use strategies that will balance the protection and use of natural resources are expected to be available for public review later in 1998.

A provincial forest advisory committee comprising a broad cross-section of forest stakeholders was formed to advise **Saskatchewan**'s Minister of Environment and Resource Management on a wide range of forest management issues, including the preparation, approval, implementation, amendment and audit of any plan or of the Saskatchewan Forest Accord.

In October 1997, the Government of Saskatchewan launched public and industry consultations to assist in the development of the forest regulations needed to implement the Forest Resource Management Act passed in June 1996.

In January 1998, Spray Lake Sawmills Ltd. announced that it had agreed to strict controls on its cutting practices in Kananaskis country, **Alberta**, under a plan that includes input received over two years from environmentalists, nearby residents, government representatives and local business people. It is the first time an Alberta logging company has involved environmentalists and other interested groups in creating a logging plan. A number of special measures will be taken. For example, buffers between logging areas and streams will be widened to 100–200 m instead of 20–60 m, clearcutting will be carried out in a way that creates less fragmentation of wildlife habitat, and the edges of logged areas will be "feathered" to resemble natural forests.

In 1992, **British Columbia** introduced an open, democratic land-use planning process to resolve the difficult issues of land and resource use. By the end of 1997, land-use plans were approved or under development for more than 80% of the province. These plans have identified protected areas, as well as lands available for sustainable resource development, and they have improved the understanding between industry, environmental groups and government. The Province's approach to land-use planning has also received significant international interest.

Over the past year, much of the **Yukon Territory**'s efforts were directed toward developing an ecosystem-based approach to forest management. This consensus-building process involved other orders of government (including federal and First Nation governments), industry and conservation stakeholders, and the Renewable Resource Councils established under First Nation agreements.

In December 1997, Natural Resources **Canada** tabled its Sustainable Development Strategy in Parliament, describing the Department's approach to promoting the sustainable development of the nation's natural resources. The Strategy was developed through multi-stakeholder consultations with industry, environmental groups, academia and other key federal and provincial departments. It establishes a common set of goals, objectives and performance indicators for each

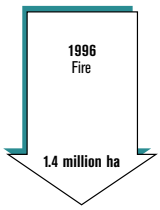
sector of the Department in reporting on sustainable development and science and technology.

#### MANAGING CANADA'S PUBLIC FORESTS

In February 1998, **Newfoundland and Labrador** released its 20-year Forest Development Plan (1996–2016). The Plan fulfills the Province's legal requirement to produce a report every five years on the state of the forest, informing the public about the condition of provincial forest ecosystems and the extent to which management objectives are being met.

**Two forest fires burned out of control in the central Alberta foothills in December 1997. Higher than average temperatures, lower than average snowfalls and high winds contributed to these rare December fires, which measured 500 and 1 500 hectares in size.**

**Quebec**'s Department of Natural Resources continued its efforts to update the forest regime. Surveys were conducted of timber supply and forest management agreement holders, regional county municipalities and regional offices of the Department. An assessment was made to determine whether the objectives of the regime had been met and to propose appropriate corrective measures. The steering committee on the update also documented new issues. A summary progress report was produced in the spring of 1998 and in the fall, the Department plans to hold public consultations on the directions to be taken and the changes to be made to Quebec's forest regime.




Quebec's Department of Natural Resources developed a program to monitor indicators of sustainable forest management and will phase it in over the next several years. The indicators were chosen through a process that involved scientists and administrators, as well as the private sector, and they reflect the environmental, economic and social conditions in the province's forest sector. The program is presented as a means of advancing forest management according to the principles of sustainable development. The public and private sectors will be responsible for implementing the program. The implementation plan includes development of related research, environmental monitoring and learning activities.

**Ontario** completed its Forest Resources Assessment Policy to ensure that forest ecosystems and productivity are maintained or enhanced. The policy provides direction for assessing Ontario's forest resources based on the following: describing the current forest condition, developing objectives for future forest conditions, considering management alternatives and impacts, using indicators of forest sustainability, and evaluating the results of forest practices against forecast forest conditions. The policy also provides direction for establishing a set of provincial indicators of forest sustainability.

Ontario's seed zones were revised in 1997 to improve their effectiveness in guiding artificial regeneration. The revised policy allows seeds to be planted across zones only if the origin of the seed lot is well documented and the environment of the seed's origin is similar to that of the planting site.

An annual report on forest management activities in the province was published by the Ontario government in 1997–1998.

Ontario's Independent Forest Audit Program was implemented in 1997. Audits were conducted of seven Sustainable Forest Licences, two Crown Management Units and Algonquin Park to measure the level of compliance with the forest management planning process and with licencing obligations, the planned versus actual forest management activities, and the effectiveness in achieving audit criteria and management objectives. Results of the audits are made public.

The Ontario Ministry of Natural Resources continued to transfer forest management responsibilities from the Crown to forest companies through Sustainable Forest Licences. Licence holders must receive government approval of their plans before operating in the forest; 40 plans had been signed by January 1998, with the remaining 17 units of Crown forest land expected to be approved by the middle of the year.

**Manitoba** initiated a new depletion and renewal tracking system (DARTS) to provide a user-friendly method of entering forest management activity maps and data into a computerized geographic information system. DARTS will provide the best available information to forestry staff for planning, analyzing and monitoring forest management activities.

### ICE STORM HITS CANADA'S FORESTS

The ice storm that hit eastern Ontario, southern Quebec and New Brunswick in January 1998 damaged or destroyed millions of trees. Hardwood species, in particular, sustained moderate to severe damage, with the loss of tree tops and large limbs. However, the extent and seriousness of the damage are difficult to predict with any accuracy in the longer term.

Ice storms are a hazard in all parts of Canada except the North, but are especially common from Ontario to Newfoundland. The storm of 1998, however, was the worst in recent memory. From January 5 to 10, the total water equivalent of precipitation (mostly freezing rain and ice pellets, with some snow) ranged from 73 to 108 mm. Previous major storms in the region deposited less than half that thickness. Although it did not rain continuously, the total number of hours of freezing rain and drizzle exceeded 80—nearly double the norm. The ice storm also hit one of the largest populated and urbanized areas of North America, leaving more than 4 million people shivering in the dark for hours, if not weeks.

The immediate effects of the storm were felt by maple sugar bush owners, who were weeks away from preparing for the spring sap flow. The 1998 crops of Christmas tree plantations were damaged as well, and future crops of fir and spruce are expected to be affected. The damage to older coniferous species was generally less severe, with white pine losing some large branches and red pine losing some tree tops. The condition of cedars varied greatly: some had minor breakage and others were broken in half or knocked down.

Following the ice storm, provincial and federal departments responsible for forestry conducted site visits and aerial surveys to assess the damage, and they provided the public with maps and other statistical information. They also set up special services for landowners to advise them on pruning or cutting damaged trees, and in the case of maple syrup producers, to advise them on the feasibility of operating their sugar bushes for the 1998 season.

In addition, Human Resources Development Canada (HRDC) established a storm assistance fund earmarked primarily to help the maple syrup industry clean up the damage and resume normal productions as soon as possible. Part of HRDC's Youth Initiative funds also may be used for silvicultural work. Under federal–provincial cost-sharing arrangements, Emergency Preparedness Canada is providing disaster assistance to eligible full-time farmers whose insurance would not cover the costs of the clean up (e.g., replacing maple sugar bush pipelines or repairing other assets damaged by the ice storm). Complementary programs offered by Agriculture and Agri-food Canada in Ontario and Quebec provide assistance to part-time farm enterprises, maple syrup producers, woodlot operators and Christmas tree growers not covered under the Emergency Preparedness Canada program. Another complementary program, offered by Canada Economic Development, provides temporary assistance to agri-food cooperatives and small- and medium-sized enterprises. Immediately after the storm, other federal and provincial agencies provided support in numerous ways, for example, by offering the use of temporary shelters, generators, labour, medical supplies, blankets, etc.

Photo credit: A. Simard

As eastern Canadians know, severe ice storms can affect many trees; however, less severe storms are fairly common and trees can be remarkably resilient. (In winter, trees are dormant, and further damage by insects or disease is less likely than if injury occurs during the growing season.) Recovery from January's ice storm will depend on the health of the tree and the extent of the damage. In time, healthy trees that did not suffer major structural damage (e.g., split trunks or broken tree tops) should recover, and the top of the tree may even appear normal after three to six years.

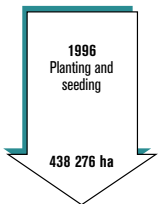
The Government of **Alberta** and the **Horse Lake First Nation** established a formal mechanism for ongoing consultation and cooperation on renewable resource and environmental matters. Under the cooperative management agreement, existing treaty and Aboriginal rights are recognized and respected, while the Province retains legislative and regulatory jurisdiction over natural resources and the environment.

In February 1998, the Government of **Alberta** released a framework for sustainable forest management, called the

"Alberta Forest Legacy." The framework reflects the public's desire to maintain its access to the wide range of economic, cultural and recreational benefits provided by sustainable forest ecosystems. Among other features, it expands the focus of forest land management to the landscape level, and it encourages Albertans to consider all resource values related to forest management decisions, ranging from wilderness preservation to economic development.

In 1997–1998, 24 traditional-use studies were underway in **British Columbia** to identify, record and assess areas important to the traditional, ceremonial and food gathering activities of Aboriginal groups. These studies, which are funded by the provincial government, assist in establishing consultation processes, help accommodate Aboriginal land values, and encourage Aboriginal participation in resource management.

In its Speech from the Throne in March 1998, the Government of British Columbia announced a number of measures to strengthen the province's economy by encouraging investment and creating jobs. One such measure is the community forest pilot project, which is a component of the province's Jobs and Timber Accord. The purpose of the community forest initiative is to develop a form of tenure specifically designed for community involvement in local forest lands and to pilot that tenure in three communities. It is expected that the new tenure structure will be flexible, long-term and area-based.




In 1997–1998, the Government of the **Northwest Territories** undertook inventory and forest mapping projects in the Gwich'in and Sahtu First Nation land-claim settlement areas, and it undertook similar projects in the South Slave and Deh Cho regions.

In January 1998, the **First Nation Forestry Program**—a partnership program between the federal government and First Nations—released its annual report for 1996–1997 at the Aboriginal Entrepreneurship Conference in Edmonton, Alberta. The report highlights the significant achievements of the Program in its first year of operation and provides examples of projects from each province and territory. *(See pages 80–83.)*

#### MANAGING CANADA'S PRIVATE FORESTS

The **Prince Edward Island** Round Table on Resource Land-Use and Stewardship released its final report to the public in September 1997. The report contains a number of recommendations regarding issues facing the province's private forest lands; most are intended to promote more biodiversity in Island forests and to encourage landowners, harvest contractors and forest managers to adopt a variety of silvicultural techniques and to take more responsibility for their actions. The Province, in cooperation with the Forest Partnership Council, reviewed and prioritized the recommendations and developed a plan of action for implementation.

Prince Edward Island's Forest Partnership Council, which represents woodlot owners, sawmillers, harvesting contractors and environmental groups, as well as government, began discussions on a regulated Code of Practice for the forest industry. In March 1998, the Province announced its support for this approach and its intention to amend the Forest Management Act to introduce regulations that will ensure the sustainable management of private land forests by October 1998.

In October 1997, the Government of **New Brunswick** announced a six-point policy framework for the sustainable management of the province's private woodlots. The proposals aim to promote investment in the sustainable management of private woodlots, to increase employment in the forest and in wood-using industries, and to help private forests attain their potential in providing economic, social and environmental benefits.

In December 1997, the Government of New Brunswick introduced conservation easement legislation to enable non-profit groups to carry out conservation protection activities on private property with the agreement of the landowner. The new legislation will make it possible for landowners to arrange conservation management of certain unique or natural features of their property while retaining ownership of the land.

In the fall of 1997, the National Round Table on the Environment and the Economy published a report on private woodlot management in the **Maritimes** that stated there is a clearly perceived need for tax reform among woodlot owners.

#### CHARTING NEW GROUND IN CANADA'S MODEL FOREST NETWORK

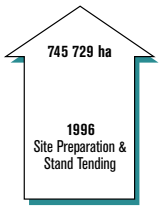
In February 1998, partners in **New Brunswick's Fundy Model Forest** announced an extension model forest project that will provide for the direct participation of Nova Scotia's landowners, industry, academics and government.

Roughly half of Nova Scotia's population lives within the boundaries of the new model forest, which includes approximately 450 000 hectares of forest land in the central portion of the province.

In 1997–1998, partners in **Canada's 11 model forests** focused increasingly on transferring research knowledge and new technology to the field. In particular, the model forest participants began a collaborative effort to develop local-level indicators to measure the effect of their work on sustainable forest management. Members of the Model Forest Network are also developing ways to enhance Aboriginal involvement in the model forests. In addition, each site is designing more effective ways of transferring their forest technology and knowledge while continuing to balance the extensive range of demands placed on Canada's forests.

#### SETTING ASIDE SPECIAL AREAS

In December 1997, **Nova Scotia** introduced the Wilderness Areas Protection Act, which includes provisions for the designation of 31 wilderness areas. The government also introduced a bill to amend the Forests Act to enable policy changes contained in the position paper regarding forest practices on private and Crown lands.




**Ontario** established a new Parks Board to provide for the best planning, management and development of provincial parks. Currently, 272 provincial parks cover an area of 7 million hectares or 7% of the province's landbase.

In 1997–1998, **Manitoba** gave protected areas status to 10 wildlife management sites, prohibiting industrial development.

In March 1998, the Government of **Manitoba,** the Assembly of Manitoba Chiefs and Manitoba Keewatinowi Okimakanak Inc. agreed to undertake a process of consultation to ensure that **First Nations** participate in the establishment and management of protected areas. Over the next three years, a working group consisting of First Nation and governmental officials will coordinate the consultation process to enable the Province to complete its network of protected areas by 2000.

**Alberta** designated two natural areas in 1997–1998 following extensive negotiations with local naturalists, governmental officials and affected industries. Holmes Crossing Sandhills Ecological Reserve preserves 1 983 hectares of jack pine- and lichen-covered sand dunes, and it includes one of the best examples of stabilized transverse dunes in Canada, as well as several small lakes. Yamnuska Natural Area preserves 1 492 hectares of exceptionally diverse terrain in the Bow Valley east of Canmore, including a number of rare plants.

In March 1998, the Government of Alberta named six sites as wildland parks, giving them environmental protection under its Special Places Program. The Program is aimed at preserving samples of the province's six regions: Canadian Shield, boreal forest, Rocky Mountain, grassland, parkland and foothills. The six sites, which are all clustered in the northeast corner of the province, are examples of Canadian Shield terrain and feature some of the world's oldest types of rocks. The sites include La Butte Creek, Colin-Cornwall Lakes, Fidler-Greywillow, Marguerite Crag and Tail, Richardson River Dunes and Maybelle River. In all, 173 800 hectares of Canadian Shield terrain have been designated for protection.

The Government of **British Columbia** announced in October 1997 that it will protect almost 1.2 million hectares of wilderness in the Northern Rockies in an area known as the "Muskwa-Kechika." The protected area is surrounded by a 3.2-million-hectare special management area. This decision brings the amount of fully protected land in the province to 10.2 million hectares (10.6%).

The **Yukon** government began developing a strategy that will define the goals, guidelines and processes associated with establishing protected areas in the territory. Federal and First Nation governments, stakeholders and the general public were consulted on the strategy, which is expected to be completed in summer 1998.

The Government of the **Northwest Territories** appointed a project working group to develop a protected areas strategy for the Northwest Territories.

#### PROTECTING CANADA'S BIODIVERSITY

In 1997–1998, **Newfoundland and Labrador** made significant strides toward the creation of a wildlife and ecological reserve in the Grand Lake area to protect and preserve unique, original forest and pine marten habitat. The reserve is expected to be legally established in 1998. The Province also unveiled proposed guidelines for the protection and provision of pine marten habitat that are

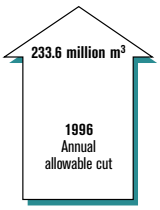
to be incorporated into the preparation of ecosystem management plans for the boreal forest. In addition, a recovery plan for the endangered pine marten was developed and is being reviewed prior to implementation.

In January 1998, the Government of Newfoundland and Labrador launched a series of meetings throughout the province to obtain public input regarding its proposed endangered species legislation.

Elk from Elk Island National Park in Alberta are being introduced into parts of their historic range in **Ontario**—from southern Ontario to north of Sudbury and from Atikoken to Kenora—where they disappeared in the late 1800s.

In March 1998, **Manitoba** announced that its provincial Endangered Species Act will protect seven additional species: the Eskimo curlew shorebird, the Great Plains ladies'-tresses plant, the Uncas skipper butterfly, the Dakota skipper butterfly, the western silvery aster, the pronghorn antelope and the Riding's satyr butterfly.

In 1997–1998, the **Canadian Forestry Association** developed a series of workshops to educate loggers and private woodlot owners in endangered species, wildlife and forest habitat. A pilot session was held in 1997 for select employees and contractors in southeastern Ontario. In 1998, the program will be expanded to Nova Scotia and Manitoba, and workshops will be available nationwide in 1999.




The threat to **Canada**'s forests from exotic pests is an ongoing problem largely associated with the importation of foreign goods. One common entry pathway for exotic pests is in or on the wooden packing materials used to secure and crate cargo in the shipping industry. This wood is usually of low quality and often has the bark attached. (Even small pieces of wood can carry insect adults or larvae.) Until recently, shipping ports were the site of most pest introductions. However, now that more goods are being shipped in containers that are not opened until they reach their destination, forests in all areas of Canada are at higher risk. Interceptions of potentially harmful pests associated with wood packaging were made throughout Canada in 1997. For example, the Asian long-horned beetle was intercepted in British Columbia and Ontario. This insect is established in New York state and poses a threat to the Canadian sugar maple industry and to hardwood forest species.

### SAFEGUARDING THE ENVIRONMENT

In November 1997, the Government of **Manitoba** announced a Wildfires Act that strengthens fire prevention and control measures. The new Act is based on stakeholder consultations and was developed with input from forestry officials, municipal organizations and railways.

In November 1997, **Alberta** joined the **federal and territorial governments** in responding to the recommendations of the Northern River Basin Study. The five-year, $12-million study examined the cumulative effects of development on the Peace, Athabasca and Slave river basins and presented governments with 24 recommendations for action.

In January 1998, the **Canadian Council of Ministers of the Environment** (CCME)—with the exception of Quebec—signed an accord designed to lead to improved cooperation and better environmental protection across Canada. Under the Constitution, both levels of government have jurisdiction over the environment; however, the provinces and business have indicated there is too much overlap. The Canada-wide Accord on Environmental Harmonization envisions governments working in partnership to achieve the highest level of environmental quality for all Canadians. Under the Accord, each government will retain its existing authorities, but will use them in a coordinated manner to achieve enhanced environmental results. Each government will undertake clearly defined responsibility for environmental performance and will report publicly on its results.

The CCME ministers also signed sub-agreements dealing with environmental assessment, inspection activities and the development of Canada-wide standards in such areas as air, water and soil quality. In addition, they approved a work plan that includes development of Canada-wide standards on particulate matter, ground-level ozone, benzene, mercury, dioxins and furans, and petroleum hydrocarbons in the soil.

In March 1998, the **federal government** introduced legislation to amend the 1988 Canadian Environmental Protection Act (CEPA) to safeguard the health of citizens from the threat of pollution and to strengthen environmental protection. The legislation controls the importation, sale and disposal of dangerous chemicals, including PCBs, dioxins and ozone-depleting substances. Under the

proposed CEPA, the focus of environmental protection would shift from clean-up to prevention. Input obtained from the provinces and territories, industry, environmental organizations and citizens is reflected in the proposed legislation, which calls for the increased recognition of voluntary efforts by industry, more cooperative action, improved consultation with the provinces and territories, and a strengthening of the bill's provisions on information gathering and publication.

### REPORTING ON CANADA'S FOREST INDUSTRIES

The Government of **Prince Edward Island**, in cooperation with the province's value-added wood products manufacturing sector, took steps to develop markets in the southern USA and to expand opportunities for the Island's wood products in other export markets. Further efforts were directed toward improving the furniture sector's market networks and manufacturing capabilities.

In January 1998, **Nova Scotia** passed regulations to create a registry of primary forest products buyers to improve the collection of statistics and other information regarding the harvest levels on all land tenures.

In October 1997, **Forintek Canada Corp.** announced funding for the expansion of its Quebec laboratory and the creation of a wood products value-added development group. Total funding for this initiative is $6.1 million, of which $1.5 million will be provided by Canada Economic Development, with the remainder shared between the Quebec ministries of Natural Resources and Municipal Affairs.

In November 1997, **Noranda Inc.**—Canada's largest natural resources conglomerate—announced its intention to transform itself into an international mining and metallurgical company, and to get out of the oil and gas and forestry businesses, which currently account for almost half the company's assets. Noranda Inc. is one of the largest forest companies in Canada (4th largest by 1996 sales).

After being forced to buy their newsprint facility four years ago when the owner decided to close it down, the employees of **Pine Falls Paper Company** in Manitoba were successful recently in negotiating its sale to **Tembec Inc.** of Montreal. The employees, who originally bought $5 shares in the plant in return for taking a 10% wage cut and a five-year wage freeze, were rewarded with an average earning of $83 000 on the sale.

### RULINGS ON ABORIGINAL ISSUES

In November 1997, a New Brunswick court ruled against the province's Department of Natural Resources and Energy in its charges against a MicMac Indian accused of illegally harvesting bird's-eye maple on Crown land. In his decision, the judge referred to the Dummer Treaty of 1725 and concluded that Indians in New Brunswick have the right to harvest trees on Crown land. (Almost half of New Brunswick's productive forests are owned by the Crown.) In April 1998, the New Brunswick Court of Appeal overturned the lower court decision and directed that a conviction be entered and a sentence be determined. The Court of Appeal determined that no Aboriginal right or treaty had been established that exempted the accused from the charge. In May, the government appointed two facilitators (an Aboriginal court judge and a retired Supreme Court judge) to consult with Aboriginal communities and stakeholders to develop recommendations on a long-term harvesting arrangement for Aboriginal people. The government also announced that, in cooperation with the province's forest industry and First Nation Band offices, it would provide employment opportunities for Aboriginal harvesters under the Crown Lands and Forests Act.

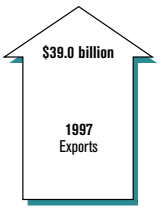
In December 1997, the Supreme Court of Canada ruled on an historic Aboriginal land claim in British Columbia. The Delgamuukw trial was based on a lawsuit brought against the provincial government in 1984 by hereditary chiefs of the Gitxsan and Wet'suwet'en First Nations, who asked the Court to recognize their ownership of 5.8 million hectares of land in the interior of the province. In its decision, the Supreme Court described the nature and scope of Aboriginal title, set out rules for proving its existence, and ruled that title is a constitutionally protected right. The Court found that Aboriginal title exists where a First Nation occupied lands before the Crown asserted sovereignty. The government may infringe upon Aboriginal title in cases where a compelling and substantial legislative objective is at issue (including economic development in such forms as forestry); however, it must consult with First Nation groups regarding the use of traditional lands and provide fair compensation if Aboriginal title is infringed. The Government of British Columbia is carefully studying the Supreme Court's decision, and it has stated that it will continue to consult in good faith with First Nations until a definitive interpretation of the issues raised by this ruling is available to interpret into operational policy. (Most of British Columbia is subject to land claims or issues regarding Aboriginal rights. Currently, 51 First Nations are involved in negotiations with the Province.)

Work was undertaken in 1997–1998 to arrive at an economic development strategy for **Saskatchewan**'s forest sector. The strategy will serve as a blueprint for the government's approach to wood supply development, value-added industries, northern business development and forest sector growth.

**According to figures released by the** Canadian Pulp and Paper Association, **approximately 17% of the pulp and paper industry's assets ($6 billion) changed hands in 1997.**

The Government of Saskatchewan initiated independent reviews of the 20-year forest management plans or environmental impact assessments of two forest companies—**Weyerhaeuser Canada Ltd.** and **Saskfor MacMillan Ltd.** These reviews focused on a number of key issues, including the companies' wood supply analysis, their approach to ecosystem management, and their approach to public consultation.

Momentum continued to build in the **Alberta Forest Products Association**'s FOREST*CARE* Program. By February 1998, teams of professional auditors and local community observers had conducted 42 formal independent audits of member company operations to validate their performance levels with respect to the forest, community and environment. A unique aspect of the Program will begin in 1998, as companies that were first audited three years ago are audited a second time to measure their progress.




**British Columbia**'s softwood lumber industry experienced a downturn in sales and profits in 1997. In January 1998, the provincial government announced a proposal to moderately reduce stumpage rates. In addition, the government streamlined the Forest Practices Code as part of a continuing process of refinement and updating. The goal is to maintain the environmental standards of the Code while making it practical, cost-efficient and easy to use. The industry will benefit from the streamlining to the extent that delivered wood costs will be reduced.

In January 1998, **MacMillan Bloedel Ltd.** announced plans to restructure by downsizing, narrowing its focus, and reducing its payroll by roughly one-fifth. (MacMillan Bloedel has been Canada's largest forest company, with sales of approximately $5 billion a year, and it is considered one of the most diversified operations in the industry). In April, the company announced the sale of its paper operations and stated its intention to focus on wood products, which currently account for almost 70% of its revenues.

In addition, MacMillan Bloedel Ltd. announced its intention to phase out its research and technology centre in Burnaby, British Columbia. The plan is to make some of the centre's research and development work part of the company's solid wood and sawmill operations. MacMillan Bloedel also said it would participate in industry-wide research and in cooperative work with universities.

In January 1998, the Government of Argentina signed an US$8.8-million deal with a **British Columbia consulting firm** to introduce Canadian expertise to the country's fledgling forest industry. Under the contract, the firm will conduct inventories of Argentina's forests that will serve as a baseline for the government in its development of environmental policies.

In November 1997, at the meeting of **Asia–Pacific Economic Cooperation countries** in Vancouver, British Columbia, members agreed to consider nine priority sectors, including forest products, for early trade liberalization. Proposed measures include the elimination of tariff and non-tariff barriers on forest products by 2004 and the harmonization of standards and building codes through such avenues as mutual recognition agreements. Canada will begin discussions with member countries in 1998 to reach agreement on how to achieve the agreed trade liberalization. Presently, discussions are underway to harmonize product and design standards, and meetings will be held later in 1998 to discuss the harmonization of building codes.

#### BRINGING THE EXPERTS TOGETHER

In October 1997, the Government of **Newfoundland and Labrador** hosted the annual meeting of the Canadian Council of Forest Ministers. At the meeting, the Ministers released Canada's progress reports on criteria and indicators of sustainable forest management and reaffirmed their unanimous resolve to pursue an international forest convention. They also agreed to develop a collaborative forest science and technology (S&T) course of action and called for the establishment of an S&T alliance to foster better communication and cooperation among Canada's forest community. Lastly, they announced their intention to review taxation policies related to private woodlots to

**RECENT MERGERS AND ACQUISITIONS–Forest Products Industry**

| DATE | COMPANIES INVOLVED | ACTION | LOCATION | COST (C$) |
|---|---|---|---|---|
| **July 1997** | Repap Enterprises Corp. to Consolidated Paper Inc. | Sale | U.S.A.: 1 paper mill | $926 million |
| | Pacific Forest Products Ltd. to Timber West Forest Holdings Ltd. | Sale | B.C.: timber, 2 sawmills | $573 million |
| **October 1997** | Domtar Inc. and Cascade Inc. | Merger | Canada: 25 plants<br>U.S.A.: 1 plant<br>France: 1 plant | Value of $1 billion |
| **November 1997** | Noranda Inc. to shareholders | Dividend transaction | not applicable | not available |
| **January 1998** | Harmac Pacific Inc. to Pope and Talbot Inc. | Hostile takeover | B.C.: 1 pulp mill | $87 million |
| **March 1998** | Avenor Inc. to Bowater Corp. | Takeover | N.B.: 1 paper mill<br>Que.: 1 paper mill<br>Ont.: 2 paper mills, 2 pulp mills<br>B.C.: 1 pulp mill<br>U.S.A.: 1 paper mill | $3.5 billion |
| | Champion International Corp. to Donohue Inc. | Sale | U.S.A.: 2 paper mills | $675 million |
| **April 1998** | MacMillan Bloedel Paper Ltd. to Goepel McDermid Inc. | Sale | B.C.: 2 mills | $850 million |
| **May 1998** | Stone Container Corp. to Jefferson Smurfit Corp. | Merger | Que.: 1 pulp mill, 1 liner board mill<br>1 corrugated mill<br>Other countries: not available | $6.37 billion |

determine their impact on sustainable management practices, and if appropriate, to recommend ways of improving these policies to encourage sustainable forest management.

In May 1998, the **forestry centre** in Corner Brook, Newfoundland, was opened for operation. The $5.7-million centre will provide an opportunity to integrate and enhance the research and planning activities of the federal and provincial governments, the forest industry and the education component of Memorial University.

**1997**
Forest products' contribution to balance of trade
**$31.7 billion**

In December 1997, the **Ontario Ministry of Natural Resources** (OMNR) and **Natural Resources Canada–Canadian Forest Service** (CFS) signed a Memorandum of Understanding (MOU) regarding federal–provincial cooperation in forestry. The MOU builds upon the Canadian Council of Forest Ministers' framework for Federal–Provincial/Territorial Cooperation in Forestry by establishing a mechanism to enable the CFS and the OMNR to address the challenges of sustainable forest management in a manner that uses resources and knowledge efficiently.

In 1991, the **Alberta Research Council** and a mechanical **pulp mill consortium** pooled resources to examine practical uses for their residual waste, which consists of wood fibre and micro-organisms that break the fibre down into pulp. In 1993, after environmental testing, the nutrient-rich dried pulp sludge was applied on forest plots south of Fox Creek, doubling the tree growth. In 1997–1998, testing was extended to U.S. locations. If all goes according to plan, the consortium hopes to build a commercial composting facility in Whitecourt later this year.

In 1997–1998, scientists at the laboratory of **Forintek Canada Corp.** and at the **Universities of British Columbia and Laval** teamed up to identify and study the fungi that cause sapstain in major commercial tree species in Canada. Samples have been taken from logs and timber across the country, and the scientists are now concentrating on ways to counter the growth of the fungi and the resulting pigmentation. (Kiln drying and chemical treatments currently are used to prevent this unsightly problem.)

The **Canadian Institute of Forestry** (CIF) and the **McGregor Model Forest Association** sponsored an annual meeting of the CIF in Prince George, British Columbia, in September 1997. The theme of the meeting, "Global Approaches to Sustainable Forest Management—Certification Systems and Criteria and Indicators Processes," attracted more than 300 delegates and guests from 16 countries.

Ottawa, Ontario, was the site of the **National Forest Congress**, held April 29–May 1, 1998. The Congress, co-sponsored by the Canadian Council of Forest Ministers

### CANADIANS WIN WALLENBERG PRIZE

The 1998 co-winners of the Marcus Wallenberg Prize are two Canadians–Dr. Keith Miles and Dr. Donald May. Dr. Miles is a senior research scientist at the Pulp and Paper Research Institute of Canada (PAPRICAN) in Montreal, Quebec. Dr. May is a retired researcher from Paprican who now teaches at McGill University and at the University of British Columbia.

The Marcus Wallenberg Prize is the most prestigious scientific award for the international forest industry. It was established in 1980 by STORA of Sweden, the largest pulp and paper company in the world, to honour Dr. Marcus Wallenberg, who was Chairman of the company's board for many years. The prize was instituted to recognize and stimulate research of a pioneering nature that significantly increases knowledge and technical progress in areas of concern to forest industries.

Drs. Miles and May received the Wallenberg Prize for their breakthrough in understanding the fundamental mechanisms of turning wood chips into fibre. The awards were announced in January 1998 during the Canadian Pulp and Paper Association's Paper Week Convention in Montreal. King Carl XVI Gustaf of Sweden will present the awards, which include 2 million Swedish kronor (C$360 000), to the winners at a formal ceremony in Stockholm in the fall of 1998.

Canadians have won this award five times since 1981. Previous winners include:

1994 - Gene Namkoong - for research into quantitative population genetics, forest tree breeding and management of genetic resources.

1987 - Derek Barnes and Mark T. Churchland - for the development of a process for the manufacture of a novel wood-based product of high strength and uniformity.

1982 - Ricardo O. Foschi - for devising mathematical models to predict the mechanical performance of wood structures.

1981 - Harry Hutchinson Holton - for his discovery that the use of antraquinone in alkaline pulp production can result in significant technical advantages in terms of cooking rates, wood consumption and environmental impacts.

and the Canadian Forestry Association, brought together 300 forest community representatives to discuss major issues of the day. The new five-year National Forest Strategy was unveiled, and the second Canada Forest Accord was signed by governmental and non-governmental forest community leaders, who confirmed their resolve to continue to pursue the goal of sustainable forests nationwide. (Signatories to the Accord will prepare their respective action plans in response to commitments before the end of 1998.) Topics discussed at the 1998 Congress that are being addressed under the new Strategy include private land forestry, measuring on-the-ground changes, mid-career training, protected areas, ecological classification, Aboriginal forestry, criteria and indicators, broadened inventories and public participation. The Congress was broadcast live on the Internet via the new Canada's Forest Network website (www.forest.ca).

The **World Forestry Congress**, which takes place every six years, is a focal point for the international forest community. The October 1997 meeting, held in Antalya, Turkey, centred on the theme "Forestry for Sustainable Development: Toward the 21st Century." The Canadian delegation at the Congress conveyed that Canada is now at the stage of implementing sustainable forest management and that this will be done in partnership domestically and internationally. At the end of the Congress, Canada put forward its candidacy to host the 2003 World Forestry Congress in Quebec City, Quebec.

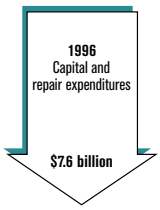
A first-ever international conference on sustainable development in the circumpolar region was held in May 1998 in Whitehorse, Yukon. Bringing together a wide range of stakeholders and business people, the **Circumpolar Conference on Arctic Sustainable Development** provided participants with an opportunity to discuss issues related to northern development, for example, using existing knowledge about sustainable development and methods for communicating it, and applying local knowledge and processes in decision making. At the end of the Conference, participants made recommendations for applying the principles of sustainable development in the following areas: community living, employment, trade and investment, and decision making and priority setting. Participants also discussed the opportunity to devise appropriate criteria and indicators for the sustainable development of northern forests, drawing from the Montreal Process and Helsinki Process criteria and indicators.

### ADVANCING FORESTRY KNOWLEDGE

The School of Forest Sciences at the **University of Moncton**, New Brunswick, increased its involvement in its Acadie–Haiti partnership project in 1997–1998 by offering a training program to Haitian peasant farmers on the use of agro-forestry techniques for soil conservation.

In September 1997, the School of Forest Sciences at the University of Moncton inaugurated a program of courses to enable professional foresters to respond more effectively to society's demands and to meet the new requirements of the Canadian Forestry Accreditation Board. Among the objectives of the program are to ensure a balance between the social, environmental, technological and scientific aspects of forestry and to strengthen the integration of these areas. The School of Forest Sciences also launched a five-year co-op program that integrates academic training and practical experience in the workplace, and it signed a cooperation agreement in forest research and education with the Université Catholique de Louvain-la-Neuve in Belgium.

The **University of New Brunswick** took a lead role in defining the abilities required by professional foresters. These definitions will serve as the basis for discussions regarding professional accreditation requirements across Canada. Related to this, research underway at the University's Applied Stand Dynamics and Management Group led to the development of software that can assess a forester's knowledge and problem-solving skills in the field.




The Faculty of Forestry at the **University of Toronto**, Ontario, established a new professional graduate program. The 16-month Master of Forest Conservation (MFC) attracts students with non-traditional forestry backgrounds (e.g., undergraduate degrees in environmental studies, botany, geography or economics).

In September 1997, **Alberta** Environmental Protection created a special introduction for schools on the Department's website, extending a "virtual" hand to students and teachers wanting to learn more about environmental matters. Features of the Internet site include environmental enforcement and education tips, as well as information on Alberta's wildlife, parks, air and water. The Internet is one avenue taken by the Department to help build the environmental awareness required for environmental stewardship.

Two new programs approved at the **University of Alberta** are unique in Canada: a four-year undergraduate program in Forest Business Management (BScFor.Bus.Man.) and a joint two-year Master of Business Administration (M.B.A.) and Master of Forestry (M.F.) program. The joint graduate program is designed to combine the basic managerial skills of the M.B.A. program with the specialized training required for management in a variety of forestry and industry settings.

In March 1998, the **Network of Centres of Excellence in Sustainable Forest Management** at the University of Alberta received a gift of $600 000 from Weyerhaeuser Canada Ltd. to help fund research programs. In addition, the Weyerhaeuser Foundation donated $450 000 to establish a professorship in Enhanced Forest Management.

The new Diploma in Forest Engineering was implemented at the **University of British Columbia** in 1997–1998, developed in collaboration with the Department of Civil Engineering and the Institute of Forest Engineering of British Columbia.

In 1997, **British Columbia** published a handbook and implemented a training program on the identification of culturally modified trees (e.g., trees that have been marked to designate territory or communicate other information, or trees from which some of the bark has been removed and used for clothing [e.g., capes and leggings]). These trees have been altered as part of First Nations' traditional use of the forest and may be eligible for protection under the Heritage Conservation Act. At least one site with these trees has been protected through its designation as a provincial heritage site.

In October 1997, **Natural Resources Canada –Canadian Forest Service** released *Indicator Plant Species in Canadian Forests*. This practical field guide introduces readers to the concept of forest plants as valuable indicators of the environmental conditions within Canada's forests, and it offers an alternative to the assessment of all species, which would be relatively labour-intensive and expensive.

# Canada's National FOREST STRATEGY 1998–2003

CANADIANS HAVE RENEWED THEIR COMMITMENT TO SUSTAINABLE FORESTS NATIONWIDE BY ADOPTING A NEW FIVE-YEAR STRATEGY AIMED AT BRINGING TOGETHER THE ECOLOGICAL, ECONOMIC, SOCIAL AND CULTURAL ASPECTS OF FOREST CONSERVATION AND USE. THE NATIONAL FOREST STRATEGY (1998–2003)–*SUSTAINABLE FORESTS: A CANADIAN COMMITMENT*–IS A COLLECTIVE ATTEMPT TO DEVELOP A WORKABLE FORMULA THAT RECONCILES THE RANGE OF EXPECTATIONS PLACED ON THE FOREST AND FOREST MANAGERS. ECONOMIC PURSUITS, THE RESILIENCE OF FOREST ECOSYSTEMS, AND THE NEEDS AND ATTITUDES WITHIN CANADIAN SOCIETY DEFINE THOSE EXPECTATIONS.

The new Strategy was unveiled in the spring at the eighth National Forest Congress held in Ottawa, Ontario, and is the result of extensive public consultations organized by the Canadian Council of Forest Ministers. *Sustainable Forests: A Canadian Commitment* involves governments, industries, non-governmental organizations, communities and interested individuals from across Canada.

The new Strategy provides a framework that will guide the policies and actions of Canada's forest community into the next millennium. It sets out nine strategic directions encompassing 31 objectives and 121 commitments to action. The strategic directions include:

- forest ecosystems: multiple values,
- forest management: practicing stewardship,
- public participation: many voices,
- the forest industry: a global competitor,
- forest science and technology management: a team approach,
- communities and the work force: living with change,

- Aboriginal people: issues of relationship,
- private woodlots: a growing opportunity, and
- the global view: Canada on stage.

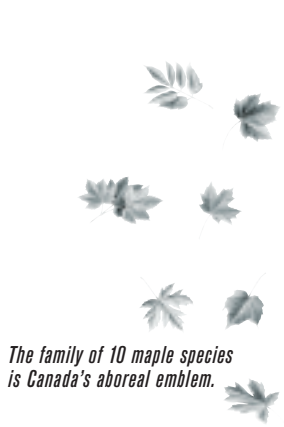
The new Strategy also addresses issues that have been identified as requiring special attention. In their final evaluation report of the 1992 Strategy, an independent panel identified eight such issues. Namely, there is a need to complete an ecological classification of forest lands, the scope of forest inventories must be broadened to include information on a wide range of forest values, the national framework of criteria and indicators of sustainable forest management requires objective measures for testing and demonstrating sustainability, and a network of protected areas that are representative of Canada's forests must be completed. Lastly, special attention must be focused on the issues of Aboriginal forestry, measuring on-the-ground changes, mid-career training and private-land forests.

In addition, the current Strategy builds on the many accomplishments of the 1992 Strategy. For example, most provinces now require forest companies to state, before they harvest, how their activities will affect the soil, wildlife and climate on Crown lands; the Canadian framework of criteria and indicators was developed to guide progress on sustainable development of forests; codes of practice that support sustainable forest management have been or are being adopted by governments, industries, labour and professional organizations; education and research institutions have shifted focus to apply the principles of sustainable forestry; more financial resources are being dedicated by government and industry to the development of environmentally sound forest technologies; and internationally, Canada is recognized as a leader in sustainable forest management.

At the National Forest Congress, the commitment to continue to pursue the collective goal of sustainable forests nationwide was also confirmed by the signing of the second Canada Forest Accord, this time by an even larger number of governmental and non-governmental forest community leaders. By the end of 1998, these signatories will be involved in preparing their respective action plans in response to commitments and will be encouraging others to do the same.

*Note: The Strategy and Accord, as well as information relating to the Congress and its results can be viewed on the Internet (http://www.nrcan.gc.ca).*

# Forest PROFILES



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


## CANADA (1997)

| | |
|---|---|
| Population | 30.4 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 71% |
| Federal | 23% |
| Private | 6% |
| **Forest type** | |
| Softwood | 67% |
| Mixedwood | 18% |
| Hardwood | 15% |
| Annual allowable cut[a] | 233.6 million $m^3$ |
| Harvest (volume) – industrial roundwood[b] | 177.5 million $m^3$ |
| Harvest (area) | 1.01 million ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 11.6 million ha 82% |
| Understocked | 2.6 million ha 18% |
| Insect defoliation[d] | 7.1 million ha |
| Forest fires | 1.4 million ha |

a, b, c, d, e *See page 29.*

## FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $39.0 billion |
| Softwood lumber | 32% |
| Wood pulp | 18% |
| Newsprint | 17% |
| Major export markets (1997) | |
| United States | 74% |
| Japan | 10% |
| European Union | 9% |
| Others | 7% |
| Balance of trade (1997) | $31.8 billion |
| Contribution to GDP (1997) | $18.1 billion |
| Value of shipments (1995) | $71.4 billion |
| Exported | 58% |
| Sold domestically | 42% |
| Number of establishments (1995) | 13 194 |
| Logging | 9 636 |
| Wood | 2 872 |
| Paper and allied | 686 |
| Employment (1997)[e] | 830 000 |
| Indirect jobs | 465 000 |
| Direct jobs | 365 000 |
| 1 job in 17 | |
| Wages and salaries (1995) | $11.1 billion |
| New investments (1996) | $7.6 billion |

## NEWFOUNDLAND AND LABRADOR

**Black spruce**
*(Picea mariana)*

| | |
|---|---|
| Population | 558 809 |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 99% |
| Private | 1% |
| **Forest type** | |
| Softwood | 91% |
| Mixedwood | 8% |
| Hardwood | 1% |
| Annual allowable cut[a] | 2.6 million $m^3$ |
| Harvest (volume)[b] | 2.1 million $m^3$ |
| Harvest (area) | 17 649 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 255 000 ha 80% |
| Understocked | 65 000 ha 20% |
| Insect defoliation[d] | 43 800 ha |
| Forest fires | 82 448 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $562.5 million |
| Newsprint | 98% |
| Major export markets (1997) | |
| United States | 54% |
| European Union | 23% |
| South and Central America | 15% |
| Balance of trade (1997) | $552.5 million |
| Value of shipments (1995) | not available |
| Number of establishments (1995) | 165 |
| Logging | 105 |
| Wood | 52 |
| Paper and allied | 8 |
| Employment (1997)[e] | 8 000 |
| Direct jobs | 5 000 |
| Indirect jobs | 3 000 |
| 1 job in 25 | |
| Wages and salaries | not available |
| New investments | not available |

## PRINCE EDWARD ISLAND

**Red oak**
*(Quercus rubra)*

| | |
|---|---|
| Population | 137 196 |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Private | 92% |
| Provincial | 7% |
| Federal | 1% |
| **Forest type** | |
| Softwood | 35% |
| Mixedwood | 35% |
| Hardwood | 30% |
| Annual allowable cut[a] | 0.5 million $m^3$ |
| Harvest (volume)[b] | 0.4 million $m^3$ |
| Harvest (area) | 2 787 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 | 196 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $12.2 million |
| Softwood lumber | 89% |
| Major export markets (1997) | |
| United States | 98% |
| Balance of trade (1997) | $11.9 million |
| Value of shipments (1995) | $34 million |
| Number of establishments (1995) | 49 |
| Logging | 36 |
| Wood | 10 |
| Paper and allied | 3 |
| Employment (1997)[e] | not available |
| Wages and salaries (1995) | $8.0 million |
| New investments | not available |

## NOVA SCOTIA

**Red spruce**
*(Picea rubens)*

| | |
|---|---|
| Population | 946 809 |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Private | 69% |
| Provincial | 28% |
| Federal | 3% |
| **Forest type** | |
| Softwood | 45% |
| Hardwood | 33% |
| Mixedwood | 22% |
| Annual allowable cut[a] | 5.3 million $m^3$ |
| Harvest (volume)[b] | 5.6 million $m^3$ |
| Harvest (area) | 59 053 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 170 000 ha 96% |
| Understocked | 6 300 ha 4% |
| Insect defoliation[d] | 12 226 ha |
| Forest fires | 642 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $637.9 million |
| Newsprint | 43% |
| Wood pulp | 31% |
| Major export markets (1997) | |
| United States | 51% |
| European Union | 23% |
| Balance of trade (1997) | $621 million |
| Value of shipments (1995) | $1.4 billion |
| Number of establishments (1995) | 540 |
| Logging | 452 |
| Wood | 77 |
| Paper and allied | 11 |
| Employment (1997)[e] | 18 000 |
| Direct jobs | 12 000 |
| Indirect jobs | 6 000 |
| 1 job in 22 | |
| Wages and salaries (1995) | $203 million |
| New investments | not available |

## NEW BRUNSWICK

**Balsam fir**
*(Abies balsamea)*

| | |
|---|---|
| Population | 760 906 |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Private | 51% |
| Provincial | 48% |
| Federal | 1% |
| **Forest type** | |
| Softwood | 47% |
| Mixedwood | 29% |
| Hardwood | 24% |
| Annual allowable cut[a] | 11.2 million $m^3$ |
| Harvest (volume)[b] | 10.8 million $m^3$ |
| Harvest (area) | 99 990 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 425 000 ha 96% |
| Understocked | 16 000 ha 4% |
| Insect defoliation[d] | 33 000 ha |
| Forest fires | 1 770 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $2.2 billion |
| Other paper and paperboard | 30% |
| Wood pulp | 22% |
| Newsprint | 15% |
| Major export markets (1997) | |
| United States | 77% |
| European Union | 7% |
| Japan | 5% |
| Balance of trade (1997) | $2.0 billion |
| Value of shipments (1995) | $3.9 billion |
| Number of establishments (1995) | 1 238 |
| Logging | 1 077 |
| Wood | 139 |
| Paper and allied | 22 |
| Employment (1997)[e] | 29 000 |
| Direct jobs | 19 000 |
| Indirect jobs | 10 000 |
| 1 job in 11 | |
| Wages and salaries (1995) | $511 million |
| New investments | not available |

## QUEBEC

**Yellow birch**
*(Betula alleghaniensis* Britton*)*

| | |
|---|---|
| Population | 7.4 million |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 89% |
| Private | 11% |
| **Forest type** | |
| Softwood | 58% |
| Mixedwood | 23% |
| Hardwood | 19% |
| Annual allowable cut[a] | 58.0 million $m^3$ |
| Harvest (volume)[b] | 35.9 million $m^3$ |
| Harvest (area) | 337 981 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 4.1 million ha 91% |
| Understocked | 400 000 ha 9% |
| Insect defoliation[d] | 12 544 ha |
| Forest fires | 243 816 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $10.3 billion |
| Newsprint | 31% |
| Other paper and paperboard | 27% |
| Softwood lumber | 19% |
| Major export markets (1997) | |
| United States | 82% |
| European Union | 10% |
| Balance of trade (1997) | $9.0 billion |
| Value of shipments (1995) | $18.8 billion |
| Number of establishments (1995) | 3 489 |
| Logging | 2 223 |
| Wood | 1 062 |
| Paper and allied | 204 |
| Employment (1997)[e] | 181 000 |
| Direct jobs | 104 000 |
| Indirect jobs | 77 000 |
| 1 job in 18 | |
| Wages and salaries (1995) | $2.9 billion |
| New investments (1996) | $2.1 billion |

## ONTARIO

**Eastern white pine**
*(Pinus strobus)*

| | |
|---|---|
| Population | 11.5 million |
| Total area | 106.9 million ha |
| Land area | 89.1 million ha |
| Forest land | 58.0 million ha |
| Provincial parks | 6.3 million ha |

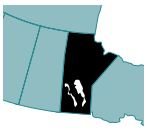
### FOREST RESOURCE (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 88% |
| Private | 11% |
| Federal | 1% |
| **Forest type** | |
| Softwood | 50% |
| Mixedwood | 27% |
| Hardwood | 23% |
| Annual allowable cut[a] | 0.4 million ha |
| Harvest (volume)[b] | 24.0 million $m^3$ |
| Harvest (area) | 211 829 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 3.2 million ha 85% |
| Understocked | 562 000 ha 15% |
| Insect defoliation[d] | 5.4 million ha |
| Forest fires | 448 812 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $7.3 billion |
| Other paper and paperboard | 38% |
| Newsprint | 18% |
| Softwood lumber | 13% |
| Major export markets (1997) | |
| United States | 96% |
| Balance of trade (1997) | $3.2 billion |
| Value of shipments (1995) | $15.0 billion |
| Number of establishments (1995) | 2 412 |
| Logging | 1 492 |
| Wood | 617 |
| Paper and allied | 303 |
| Employment (1997)[e] | 156 000 |
| Direct jobs | 86 000 |
| Indirect jobs | 70 000 |
| 1 job in 35 | |
| Wages and salaries (1995) | $2.6 billion |
| New investments (1996) | $1.6 billion |

## MANITOBA



**White spruce**
*(Picea glauca)*

| | |
|---|---|
| Population | 1.1 million |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 94% |
| Private | 5% |
| Federal | 1% |
| **Forest type** | |
| Softwood | 59% |
| Hardwood | 21% |
| Mixedwood | 20% |
| Annual allowable cut[a] | 9.7 million $m^3$ |
| Harvest (volume)[b] | 2.1 million $m^3$ |
| Harvest (area) | 15 342 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 220 000 ha 94% |
| Understocked | 12 900 ha 6% |
| Insect defoliation[d] | 71 985 ha |
| Forest fires | 125 328 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $425.4 million |
| Other paper and paperboard | 26% |
| Newsprint | 22% |
| Major export markets (1997) | |
| United States | 91% |
| Balance of trade (1997) | $168 million |
| Value of shipments (1995) | $860 million |
| Number of establishments (1995) | 209 |
| Logging | 121 |
| Wood | 64 |
| Paper and allied | 24 |
| Employment (1997)[e] | 12 000 |
| Direct jobs | 8 000 |
| Indirect jobs | 4 000 |
| 1 job in 46 | |
| Wages and salaries (1995) | $158 million |
| New investments | not available |

## SASKATCHEWAN

**White birch**
*(Betula papyrifera)*

| | |
|---|---|
| Population | 1 million |
| 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 (1996)

| | |
|---|---|
| **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] | 4.0 million $m^3$ |
| Harvest (area) | 21 379 ha |
| Status of harvested Crown land (1995)[c] | |
| Understocked | 258 000 ha 68% |
| Stocked | 123 000 ha 32% |
| Insect defoliation[d] | 156 774 ha |
| Forest fires | 9 703 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $622.5 million |
| Softwood lumber | 30% |
| Wood pulp | 20% |
| Fine paper | 16% |
| Major export markets (1997) | |
| United States | 79% |
| European Union | 10% |
| Japan | 4% |
| Balance of trade (1997) | $552 million |
| Value of shipments | not available |
| Number of establishments (1995) | 258 |
| Logging | 204 |
| Paper and allied | 48 |
| Wood | 6 |
| Employment (1997)[e] | 8 000 |
| Direct jobs | 6 000 |
| Indirect jobs | 2 000 |
| 1 job in 57 | |
| Wages and salaries | not available |
| New investments | not available |

## ALBERTA

**Lodgepole pine**
*(Pinus contorta)*

| | |
|---|---|
| Population | 2.9 million |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 87% |
| Federal | 9% |
| Private | 4% |
| **Forest type** | |
| Softwood | 44% |
| Hardwood | 33% |
| Mixedwood | 23% |
| Annual allowable cut[a] | 24.0 million $m^3$ |
| Harvest (volume)[b] | 20.0 million $m^3$ |
| Harvest (area) | 55 830 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 506 000 ha 63% |
| Understocked | 295 000 ha 37% |
| Insect defoliation[d] | 337 784 ha |
| Forest fires | 1 961 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $2.3 billion |
| Wood pulp | 43% |
| Softwood lumber | 33% |
| Waferboard | 9% |
| Major export markets (1997) | |
| United States | 65% |
| Japan | 17% |
| Balance of trade (1997) | $2.2 billion |
| Value of shipments (1995) | $4.5 billion |
| Number of establishments (1995) | 682 |
| Logging | 446 |
| Wood | 202 |
| Paper and allied | 34 |
| Employment (1997)[e] | 38 000 |
| Direct jobs | 23 000 |
| Indirect jobs | 15 000 |
| 1 job in 38 | |
| Wages and salaries (1995) | $595 million |
| New investments (1996) | $0.5 billion |

## BRITISH COLUMBIA

**Western red cedar**
*(Thuya plicata)*

| | |
|---|---|
| Population | 3.9 million |
| 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 (1996)

| | |
|---|---|
| **Ownership** | |
| Provincial | 95% |
| Private | 4% |
| Federal | 1% |
| **Forest type** | |
| Softwood | 89% |
| Mixedwood | 8% |
| Hardwood | 3% |
| Annual allowable cut[a] | 71.6 million $m^3$ |
| Harvest (volume)[b] | 72.1 million $m^3$ |
| Harvest (area) | 190 000 ha |
| Status of harvested Crown land (1995)[c] | |
| Stocked | 2.6 million ha 73% |
| Understocked | 974 000 ha 27% |
| Insect defoliation[d] | 479 910 ha |
| Forest fires | 14 952 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $14.6 billion |
| Softwood lumber | 54% |
| Wood pulp | 21% |
| Newsprint | 6% |
| Major export markets (1997) | |
| United States | 59% |
| Japan | 21% |
| European Union | 10% |
| Balance of trade (1997) | $13.5 billion |
| Value of shipments (1995) | $25 billion |
| Number of establishments (1995) | 4 140 |
| Logging | 3 468 |
| Wood | 601 |
| Paper and allied | 71 |
| Employment (1997)[e] | 181 000 |
| Direct jobs | 102 000 |
| Indirect jobs | 79 000 |
| 1 job in 10 | |
| Wages and salaries (1995) | $3.8 billion |
| New investments (1996) | $2.1 billion |

## YUKON TERRITORY

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

| | |
|---|---|
| Population | 31 383 |
| Total area | 48.3 million ha |
| Land area | 47.9 million ha |
| Forest land | 27.5 million ha |

### FOREST RESOURCE (1996)

| | |
|---|---|
| **Ownership** | |
| Federal | 100% |
| **Forest type** | |
| Softwood | 79% |
| Mixedwood | 19% |
| Hardwood | 2% |
| Annual allowable cut[a] | 0.5 million $m^3$ |
| Harvest (volume)[b] | 0.38 million $m^3$ |
| Harvest (area) | 1709 ha |
| Status of harvested Crown land (1995)[c] | |
| Understocked | 4 800 ha 57% |
| Stocked | 3 600 ha 43% |
| Insect defoliation[d] | 59 000 ha |
| Forest fires | 106 176 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $2.4 million |
| Softwood lumber | 87% |
| Balance of trade (1997) | $2.4 million |

## NORTHWEST TERRITORIES

**Jack pine**
*(Pinus banksiana)*

| | |
|---|---|
| Population | 67 373 |
| Total area | 342.6 million ha |
| Land area | 329.3 million ha |
| Forest land | 61.4 million ha |

### FOREST RESOURCE (1996)

| | |
|---|---|
| **Ownership** | |
| Territorial | 100% |
| **Forest type** | |
| Mixedwood | 58% |
| Softwood | 33% |
| Hardwood | 9% |
| Annual allowable cut[a] | 236 500 $m^3$ |
| Harvest (volume)[b] | 182 900 $m^3$ |
| Harvest (area) | 650 ha |
| Status of harvested Crown land (1993)[c] | |
| Understocked | 2 600 ha 85% |
| Stocked | 440 ha 15% |
| Insect defoliation[d] | 489 317 ha |
| Forest fires | 371 545 ha |

### FOREST INDUSTRY

| | |
|---|---|
| Value of exports (1997) | $4.0 million |
| Softwood lumber | 99% |
| Balance of trade (1997) | $4.0 million |

## NOTES

### DATA SOURCES

The main sources for the data are Statistics Canada, Environment Canada, the Canadian Pulp and Paper Association, Natural Resources Canada–Canadian Forest Service and the National Forestry Database. Most of the information was collected by provincial and territorial natural resource ministries. At the time of publication, data for annual allowable cut, forest fires, harvesting (area and volume) and insect defoliation were preliminary. As data are finalized, they will be available in the National Forestry Database on the Internet.
(http://www.nrcan.gc.ca/cfs/proj/iepb/nfdp).

### 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 22 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 can not be calculated by simply adding the provincial and territorial AACs.

- The **national** AAC figure that appears on page 22 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 **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 2.2 million $m^3$. Harvesting figures on federal lands are not included.

- Although the AAC for **British Columbia** does not include all private lands, they are included in the harvest figure. 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 access roads 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.

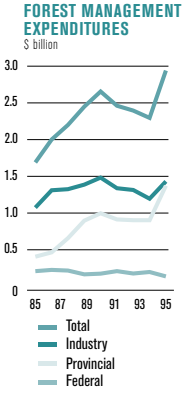
### FOREST INDUSTRY

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.

# FOREST STATISTICS

## 10-YEAR TRENDS




**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 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 10-year period, provincial spending on forest management increased by 9.7%, industry spending rose by 17.9%, while federal government expenditures rose by only 1.1%.

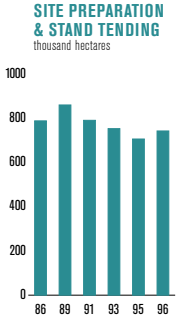
| 1995(AVERAGE) | $ BILLION | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Total expenditures | 2.9 | +28.1% | +9.7% |
| Industry | 1.4 | +52.1% | +17.9% |
| Provincial | 1.4 | +19.7% | +7.1% |
| Federal | 0.1 | -30.4% | +1.1% |

*new data was not available at the time of printing

Sources: Canadian Pulp & Paper Association; National Forestry Database

### SITE PREPARATION AND STAND TENDING (1996)

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 per year. The area of site preparation and stand tending rose 8.5% in 1996, to 745 729 hectares.

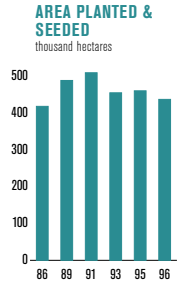



| 1996(AVERAGE) | HECTARES | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Site preparation & stand tending | 745 729 | +8.5% | +1.6% |

Source: National Forestry Database

### AREA PLANTED AND SEEDED (1996)

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, and they have been successful in reducing the backlog of understocked sites. These activities decreased by 4.9% in 1995 and 4.5% in 1996.

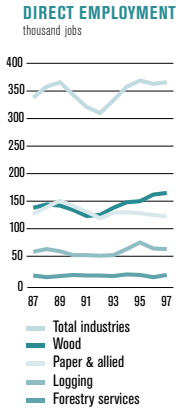



| 1996(AVERAGE) | HECTARES | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Area planted & seeded | 438 276 | -4.5% | +3.1% |

Source: National Forestry Database

### DIRECT EMPLOYMENT (1997)

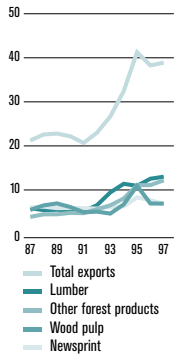
Continued strong economic growth since 1992 has led employment levels upward to a peak of 369 000 in 1995. Since then, employment levels have fallen slightly to 366 000 in 1997. Employment in the wood industries posted an increase of 3 000 over 1996, and forestry services employment levels increased by 4 000 to return to 1995 levels. Tempering these increases were declines in the paper and allied industries and in logging, with job losses of 3 000 and 1 000, respectively. Total direct and indirect employment in the forest sector currently accounts for 1 in every 17 jobs in Canada.




| 1997(AVERAGE) | DIRECT JOBS | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Total industries | 366 000 | +0.8% | +0.9% |
| Wood | 165 000 | +1.9% | +2.0% |
| Paper & allied | 122 000 | -2.4% | -0.2% |
| Logging | 63 000 | -1.6% | +1.4% |
| Forestry services | 16 000 | +33.0% | +2.2% |

Source: Statistics Canada

**FOREST PRODUCTS EXPORTS**
$ billion




## FOREST PRODUCTS EXPORTS (1997)

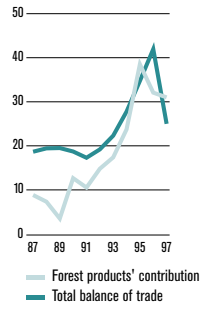
The value of Canada's total forest exports increased by 1.7% to $38.9 billion from 1996 levels. Lumber exports were up 3.7% to $13.0 billion, although on a volume basis they were down as a result of the Asian economic crisis. Higher than average prices in 1997 accounted for the higher value. Wood pulp exports were down marginally, to $6.9 billion. Newsprint experienced a significant drop of 12.0% in its value of exports due to much lower prices.

| 1997(AVERAGE) | $ BILLION | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Total exports | 38.9 | +1.7% | +6.8% |
| Lumber | 13.0 | +3.7% | +9.4% |
| Other forest products | 12.2 | +10.2% | +12.7% |
| Wood pulp | 6.9 | -0.3% | +5.9% |
| Newsprint* | 6.8 | -12.0% | +1.7% |

* Includes some writing and other printing papers

Source: Statistics Canada

**BALANCE OF TRADE**
$ billion



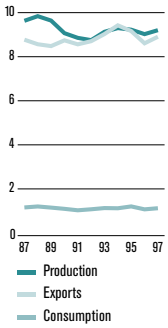

## BALANCE OF TRADE (1997)

In 1997, forest products contributed $31.7 billion to Canada's balance of trade. This represents a 1.2% decrease from the previous year and an overall increase of 6.1% over the past decade. The majority of this contribution was attributed to sales of forest products to the United States ($28.6 billion), Japan ($3.8 billion) and the European Union ($3.3 billion). Although exports to the USA were up, they were offset by declines to Japan and the European Union. Canada imported $7.3 billion worth of forest products in 1997.

| 1997(AVERAGE) | $ BILLION | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Forest products' contribution | 31.7 | -1.2% | +6.1% |
| Total balance of trade | 25.4 | -39.4% | +30.1% |

Source: Statistics Canada

**NEWSPRINT**
million tonnes




## NEWSPRINT (1997)

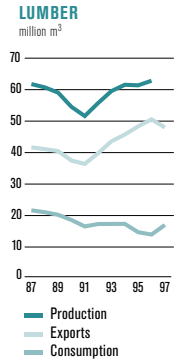
Growing demand and increasing prices due to a lack of new capacity in North America contributed to increased production, exports and consumption of newsprint in 1997. Production was up by 2.0% from 1996 levels, to 9.2 million tonnes. Exports were 8.9 million tonnes, 3.5% higher than in 1996, and consumption was 1.1 million tonnes, 4.8% higher than in 1996. Continued increases in production, exports and consumption may be constrained by increased competition from the broadcast media, electronic communication and the Internet.

| 1997(AVERAGE) | MILLION TONNES | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Production | 9.2 | +2.0% | -0.4% |
| Exports | 8.9 | +3.5% | +0.2% |
| Consumption | 1.1 | +4.8% | -0.1% |

Sources: Canadian Pulp & Paper Association; Natural Resources Canada–Canadian Forest Service

## LUMBER (1997)

In 1997, Canada's lumber production and consumption were up over 1996 levels by 1.6% and 27.6%, respectively. Exports on a volume basis were down 3.6%, to 48.7 million $m^3$. Stronger than expected housing starts in Canada and the USA drove lumber production to a record level of 64.8 million $m^3$ in 1997 and consumption to a seven-year high of 17.8 million $m^3$. Exports were down from 1996 levels due to increased production from the U.S. South and a drop in demand from Japan and other Asian countries experiencing an economic crisis.

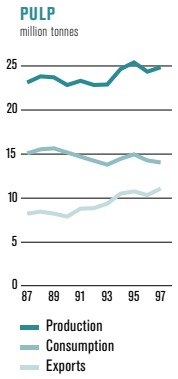



| 1997(AVERAGE) | MILLION $m^3$ | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Production | 64.8 | +1.6% | +0.6% |
| Exports | 48.7 | -3.6% | +1.7% |
| Consumption | 17.8 | +27.6% | -1.4% |

Source: Statistics Canada

## PULP (1997)

Wood pulp production and exports both increased in 1997 over their 1996 levels. Production rose by 2.0% to 24.9 million tonnes, and exports rose by 7.4% to 11.1 million tonnes. Canadian consumption was down by 1.7%, to 14.0 million tonnes. Production and exports were up due to increased demand in the USA and Europe and declining pulp inventories.

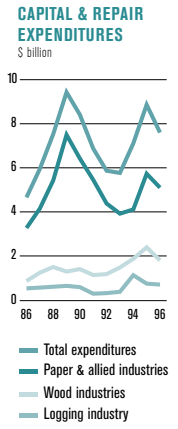



| 1997(AVERAGE) | MILLION TONNES | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Production | 24.9 | +2.0% | +0.8% |
| Consumption | 14.0 | -1.7% | -0.7% |
| Exports | 11.1 | +7.4% | +3.2% |

Sources: Statistics Canada; Natural Resources Canada–Canadian Forest Service

## CAPITAL AND REPAIR EXPENDITURES (1996)

Capital and repair expenditures were down in all sectors of the forest industry for 1996 when compared to 1995 levels. Total expenditures declined by 13.8%, to $7.6 billion. The wood industries had the largest decline, at 22.6%, while the paper and allied industries and logging industry were down by 11.2% and 5.3%, respectively. Increasing expenditures in the wood industries over the past few years can be attributed to spending on oriented strand board (OSB) and medium density fibreboard capacity. The current decline in expenditures in the wood industries is due to a slowdown in the addition of OSB capacity. Paper and allied industries expenditures have declined somewhat after recovering from a severe downturn in the early 1990s. The recovery in expenditures is due to a resurgence in company profits. This rising trend reversed in 1996 as earnings fell and companies focused on their financial condition. In the logging industry, expenditures have continued their downward trend since the large expenditures of 1994.

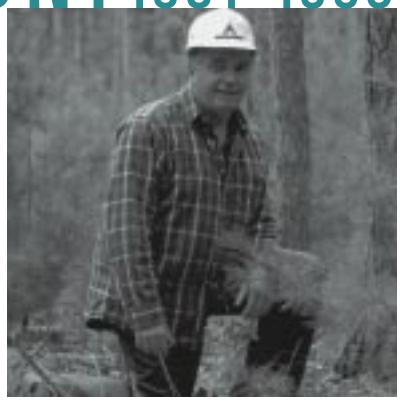



| 1996(AVERAGE) | $ BILLION | CHANGE | |
|---|---|---|---|
| | | 1-year | 10-year |
| Total expenditures | 7.6 | -13.8% | +6.8% |
| Paper & allied industries | 5.1 | -11.2% | +6.9% |
| Wood industries | 1.8 | -22.6% | +10.2% |
| Logging industry | 0.7 | -5.3% | +15.2% |

Source: Statistics Canada

# Commercial FOREST ACCOUNT 1981-1995





THE COMMERCIAL FOREST ACCOUNT PRESENTS A BROAD OVERVIEW OF FORESTRY ACTIVITIES THAT OCCURRED OVER A 15-YEAR PERIOD IN CANADA'S TIMBER-PRODUCTIVE FORESTS ("COMMERCIAL FORESTS") BETWEEN 1981 AND 1995. 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, AN AREA REPRESENTING 28% OF CANADA'S LANDBASE, ARE CONSIDERED IN THE ACCOUNT.

In preparing Canada's State of Forests report, Natural Resources Canada–Canadian Forest Service strives to provide information that is not only accurate, but also encompasses forest values beyond those of timber. The Commercial Forest Account to date has been estimated from a variety of data sources. Future State of Forests reports will not include a Commercial Forest Account until such time as improved and more comprehensive information and estimation techniques are developed. Components of the data provided in this account (e.g., fire and harvesting statistics) will, however, be integrated into other components of future State of Forests reports as appropriate.

### VOLUME

Over the 15-year period, there was a net increase of 937 million $m^3$ in the volume of trees growing in Canada's commercial forests. Between 1981 and 1995, the volume of seedling-stage trees increased

from 0.33 billion $m^3$ to 0.46 billion $m^3$ (this figure also includes volumes of residual trees left on harvested areas), while young forests decreased slightly—from 7.13 billion $m^3$ to 6.93 billion $m^3$. The volume of mature, old or mixed-aged forests increased from 17.42 billion $m^3$ to 18.42 billion $m^3$ during the same period. Depletions in forest volume (i.e., on the area harvested, burned, or affected by forest insects and diseases) totalled 4.79 billion $m^3$ between 1981 and 1995.

#### Highlights

The net volume of trees growing in Canada remained relatively stable during the period 1981–1995, increasing by 3.8%. The volume of seedling-stage trees increased by 41.2%, 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%.

### AREA

This account assumes that the 234.53 million hectares of commercially timber-productive forests remained constant over the 15-year period. The account does not factor in forests that have changed status (i.e., from forest land to farm land, or vice versa).

The total area affected by fire, harvesting, forest insects and diseases from 1981 to 1995 was 32.69 million hectares (an annual average of 2.2 million hectares). Over the 15-year period, 13.91 million hectares were harvested, an average of 927 000 hectares per year; 12.21 million hectares were burned (more than 6.6 million hectares of total forest land were burned in 1995 alone); and 6.57 million hectares were affected by insects and diseases. Overall, a total of 34.03 million hectares of forest were affected by natural and human disturbances.

More than 20 million hectares regenerated naturally, and more than 5.86 million hectares were planted or seeded. An additional estimated 5.45 million hectares regenerated following fire or insect damage.

During the period 1981–1995, the area of forested land at the seedling stage rose from 30.89 million to 35.96 million hectares; the area of young forest decreased from 91.89 million to 81.68 million hectares; and the area of mature, old and mixed-aged forests decreased from 103.87 million to 102.23 million hectares. The areas regenerating following fire or forest insect damage rose from 6.23 million to 11.67 million hectares, and the area not growing commercial forests rose from 1.65 million to 2.99 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.)

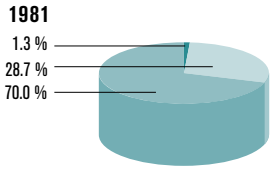
Recent studies indicate that since 1993, the area not growing commercial species has been slightly reduced. This area does not contain sufficient quantities of commercial trees; however, it has regenerated with a rich variety of plants, shrubs and trees (e.g., alder and willow) that provide food and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

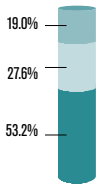
#### Highlights

The total area harvested annually was equal to 0.4% of the total commercial forest, while the area depleted by fire and forest insects was 0.5%. During the same period, the area of forested land at the seedling stage rose by 16.4%, and the area of young forest dropped by 11.1%.

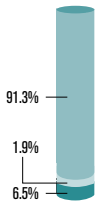
There were 1.64 million hectares less of mature, old and mixed-aged forests during the same period. Areas regenerating following fire or insect damage rose by 5.45 million hectares, while the area not growing commercial species 10 years after harvesting increased by 1.34 million hectares.

## COMMERCIAL FOREST VOLUME (1981–1995)*

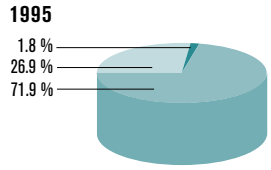



1981-1995
DEPLETIONS




1981-1995
ADDITIONS




BILLION $m^3$

| 1981 | |
|---|---|
| Seedling stage | 0.33 |
| Young forest | 7.13 |
| Mature, old or mixed-aged forests | 17.42 |
| **Total** (does not add due to rounding) | **24.87** |

CHANGES (1981–1995)

| **Depletions** | |
|---|---|
| Volume harvested | 2.55 |
| Volume burned | 1.32 |
| Volume lost to insects or disease | 0.91 |
| **Total** (does not add due to rounding) | **4.79** |

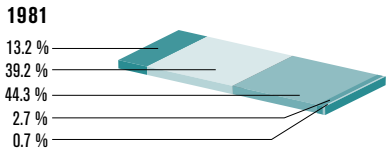
| **Additions** | |
|---|---|
| Volume in naturally regenerated areas | 0.39 |
| Volume in planted or seeded areas | 0.11 |
| Growth in standing timber | 5.22 |
| **Total** | **5.72** |

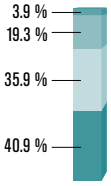
| 1995 | |
|---|---|
| Seedling stage | 0.46 |
| Young forest | 6.93 |
| Mature, old or mixed-aged forests | 18.42 |
| **Total** | **25.81** |

| | |
|---|---|
| **Net volume increase** | **0.94** |

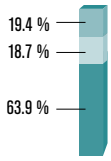
*all numbers are rounded

# COMMERCIAL FOREST AREA (1981–1995)*

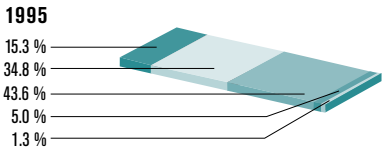



1981-1995
DEPLETIONS




1981-1995
ADDITIONS




| | MILLION HECTARES |
|---|---|
| **1981** | |
| Seedling stage | 30.89 |
| Young forest | 91.89 |
| Mature, old or mixed-aged forests | 103.87 |
| Area regenerating following fire or insects | 6.23 |
| Area not growing commercial species 10 years after harvesting | 1.65 |
| **Total** | **234.53** |
| CHANGES (1981–1995) | |
| **Depletions** | |
| Area harvested | 13.91 |
| Area burned | 12.21 |
| Area affected by insects or disease | 6.57 |
| **Sub-total** (does not add due to rounding) | **32.69** |
| Area not growing commercial species 10 years after harvesting | 1.34 |
| **Total** | **34.03** |
| **Additions** | |
| Area regenerated naturally | 20.04 |
| Area planted or seeded | 5.86 |
| Area regenerating following fire or insects | 5.45 |
| **Total** | **31.35** |
| **1995** | |
| Seedling stage | 35.96 |
| Young forest | 81.68 |
| Mature, old or mixed-aged forests | 102.23 |
| Area regenerating following fire or insects | 11.67 |
| Area not growing commercial species 10 years after harvesting | 2.99 |
| **Total** | **234.53** |

*all numbers are rounded


# Features

# Canada's PRIVATE FORESTS

CANADIAN FORESTS ARE "THE PEOPLE'S FORESTS" IN THE MOST LITERAL SENSE: THE PEOPLE OF CANADA, THROUGH THEIR PROVINCIAL AND FEDERAL GOVERNMENTS, OWN 94% OF ALL FORESTED LAND IN THE COUNTRY. BECAUSE SO MUCH OF OUR FOREST IS SO CLOSELY ASSOCIATED WITH GOVERNMENT-REGULATED LANDS, IT IS EASY TO OVERLOOK CANADA'S OTHER FOREST OWNERS–THE INDIVIDUALS, FAMILIES, COMMUNITIES AND FOREST COMPANIES THAT OWN THE REMAINING 6% OF THE NATION'S TREED LAND.

Blanketing over 45% of Canada's land mass, forests are one of the key defining features of our country. In fact, Canada's forests make up 10% of the world's forest cover. An equally defining feature, and one that sets Canada apart from other western industrialized nations, is the extent to which these forest lands are publicly owned.

But these area holdings do not tell the whole story. Private landowners may own just 6% of Canada's total forest land, but their forests are generally productive and of high quality. In fact, private owners hold 10% of all forest land capable of producing commercial timber. As well, the extent to which private woodlands supply the forest products industry, and thus contribute to the overall economy, is far greater than suggested by their area.

In many parts of the country, the forests that belong to these owners are the most visible and accessible. They are the forests in and around rural communities, urban centres and agricultural zones; the forests that produce maple syrup and Christmas trees; the forests that bring nature, beauty and tranquility into the lives of those around them.

Private forest owners are hardly a homogeneous group. Their reasons for owning forest land, and their values in managing that land, are as individual and wide-ranging as the owners themselves. But

**FOREST LAND OWNERSHIP–An International Comparison (million ha)**

| | CANADA | EUROPEAN UNION | FINLAND | GERMANY | NEW ZEALAND | NORWAY | SWEDEN | UNITED STATES |
|---|---|---|---|---|---|---|---|---|
| Private | 25.1 | 89.7 | 14.0 | 7.1 | 2.0 | 6.4 | 19.6 | 202.6 |
| Public | 392.5 | 28.3 | 6.0 | 3.7 | 5.5 | 0.6 | 8.4 | 95.4 |
| Total forest land | 416.7 | 118.0 | 20.0 | 10.8 | 7.5 | 7.0 | 28.0 | 298.0 |

looking at them as a group reveals some interesting characteristics of private forests, and helps explain how and why such a small percentage of forest land has such a large impact on the nation.

Privately owned forests are the source of 19% of all industrial roundwood (which includes logs, bolts and pulpwood) harvested in the country. They are even more central to other forest products sectors, furnishing 77% of Canada's maple products, 79% of our fuelwood and firewood, and virtually all of the nation's Christmas trees.

### BEYOND THE NUMBERS

The overall importance of private forests goes far deeper than economics. As the poet W.H. Auden once said, "A culture is no better than its woods," an observation that Canadians in particular, as citizens of a forested nation, can take to heart. Healthy woods mean a healthy lifestyle and a culture in balance with nature for the millions of Canadians who look to the forest for their recreation, their scenery, and their peace of mind.

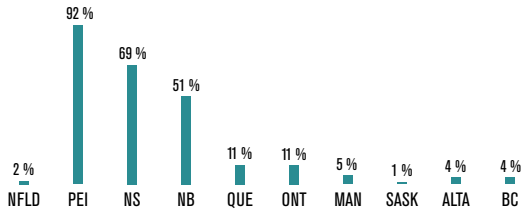
As well, it is becoming increasingly evident to most Canadians that forest land does much more than satisfy human needs. Forests, whether public or private, are complex ecosystems, home to wildlife, plants, fish, waterways and bogs. They serve as vital carbon sinks, absorbing carbon dioxide from the air and releasing oxygen into the atmosphere. They improve soil quality, prevent or slow erosion, and shelter non-forested land. Privately owned forest land is some of the richest and most diverse forest land in the country, supporting plant species and unique tree stands, harbouring abundant fish and game, and protecting and enriching agricultural land.

Finally, private forests are significant to their owners. An estimated 425 000 individual Canadians own forested land, as do an unknown number of municipalities, institutions, small businesses and forest companies. Different owners value different things about their forests. Some care about timber value; some care about family legacy. Some need firewood and lumber; some need agricultural shelterbelts. Some are focused on silviculture; some just enjoy the view from the kitchen window. But no matter what their values, forest owners are property owners. Their property has meaning for them, and they enjoy the right to choose what that meaning is.

### WHERE ARE CANADA'S PRIVATE FORESTS?

Privately owned forest land is by no means distributed evenly throughout the country: fully 80% of all privately owned forested area spreads east of Manitoba. In addition, the proportion of privately owned forest to Crown forest varies greatly from region to region. (*Refer to the tear-out map at the end of this report.*) The Maritime provinces have by far the highest concentration of private forests, while the Prairies, British Columbia and Newfoundland have the lowest. There is no private forest in the Yukon or the Northwest Territories; all forested areas in the territories are publicly owned.

**PERCENTAGE OF PRIVATE FOREST LAND**




This uneven distribution is largely a result of history—the history of Canada's settlement and the history of land ownership in different regions. Colonization of North America in the 17th Century began on the east coast. The Maritime provinces were the first areas to be settled extensively by Europeans, followed soon after by portions of central Canada. As an incentive to settlement, significant tracts of land in the eastern regions were granted outright to settlers, resulting in a relatively high proportion of private property from the outset. On the other hand, in the Prairies, which were settled much later, in British Columbia and in Newfoundland, the Crown retained a much greater share of the land, including the forested land. In addition, the growing timber demand in England, the domestic lumber needs of new settlers, and a booming shipbuilding industry in the Maritimes all combined to make

### GROWING CHRISTMAS TREES

In December 1781, when German-born Baron Friederick von Riedesel brought a balsam fir into his Sorel, Quebec, home and decorated it with white candles, he could hardly have known that he was launching a new Canadian tradition. But over the next century, the German custom of having a decorated Christmas tree in the house spread across the country. Until the 1930s, virtually all Christmas trees in Canada were harvested from the forests and abandoned fields where they grew naturally. However, as demand for Christmas trees increased, so did interest in cultivating them. Today, almost all of Canada's Christmas trees are grown as a specialty crop, and almost all are grown on privately owned land.

The "big three" Christmas tree producers–Quebec, Nova Scotia and Ontario, in that order–together account for 80% of Canada's trees. Roughly half of the annual harvest is exported, mainly to the United States, but also to the Caribbean and Central America. Ironically, Canada has found a new market in Germany, home of the Christmas tree tradition. Canadian exports to Germany increased 380% between 1995 and 1997.

Christmas tree growers cultivate their trees differently, varying largely by region. In Quebec and Ontario, growers usually plant agricultural fields with seedlings, creating true tree "farms." In Nova Scotia, however, planting is rare. Instead, most growers cultivate trees in natural stands, relying on regeneration to sustain their crops.

Both growing methods have pros and cons. Pruning, tending and harvesting are far easier on planted farms because the trees are more accessible than in natural stands. However, the start-up labour and costs associated with farms are high compared to natural stand cultivation. As well, Christmas trees grown on farms often require more pesticides than those in natural stands. With both methods, it takes about 10 years for most species (including balsam fir, the most popular) to grow to market size.

Growers agree that producing Christmas trees is hard work–work that can all too easily be wiped out by the elements, as growers in Quebec and eastern Ontario were reminded during this year's ice storm. But many consider Christmas tree farming more than just a business, pointing to the environmental and social benefits of what they do. In addition, Christmas tree farms provide a stable habitat for wildlife, often near large urban centres, at no cost to taxpayers. And the scenic, park-like layout is appealing to people, whether they admire Christmas tree plantations from afar, walk around them during open-house visiting periods, or make a special trip in December to choose and cut down their own tree.

the forest industry a key ingredient in the early economy of most of eastern Canada.

Despite its early European settlement, Newfoundland was the exception in the east. Because fishing was the predominant industry there, settlers clustered along the coastline, turning their attention toward the ocean rather than toward the land. Most early residents placed little value on land use and ownership, the result being that the province developed with relatively little private land ownership and without significant forest activity.

As for Canada's west, although settlers in the Prairies and British Columbia benefited from land grant systems as well, the Crown retained the vast majority of forested land. Unlike in the east, forest land was of limited value to western settlers, the vast majority of whom were farmers and ranchers and therefore more interested in cleared land. When the forest industry took hold in British Columbia in the late 19th Century, because the Crown owned most of the region's woodlands, the bulk of logging took place on public lands, which is still the case today.

### WHO OWNS CANADA'S PRIVATE FORESTS?

Private forest land falls into two broad categories: private woodlots (sometimes known as "non-industrial private forest land," or NPFL) and industrial freehold. Private woodlots are forested properties owned by individuals, families or joint owners, as well as by municipalities, churches, institutions and companies. Industrial freehold is forest land owned by large corporate industries for commercial forestry purposes.

As seen in the following table, the proportion of private woodlots to industrial freehold varies markedly from province to province, with the share of industrial freehold ranging from none in Prince Edward Island and the Prairie provinces to 42% (1.3 million hectares) in New Brunswick. Once again, settlement history and traditional land use help explain the divergence.

**OWNERSHIP OF PRIVATE FOREST LAND (MILLION HECTARES)**

| | NFLD | PEI | NS | NB | QUE | ONT | MAN | SASK | ALTA | BC |
|---|---|---|---|---|---|---|---|---|---|---|
| Private woodlots | 0.16 | 0.27 | 1.8 | 1.8 | 8.1 | 5.6 | 1.3 | 0.29 | 1.5 | 1.7* |
| Industrial freehold | 0.07 | 0 | 0.9 | 1.3 | 1.1 | 0.8 | 0 | 0 | 0 | 0.7* |
| Total private forest land | 0.23 | 0.27 | 2.7 | 3.1 | 9.2 | 6.4 | 1.3 | 0.29 | 1.5 | 2.4* |

*These are estimated figures, based on a combination of numbers reported by representatives of both industry and private woodlot owners and a study of British Columbia landowners. There is a lack of hard data on the area and ownership status of private forest land in British Columbia. In part, this is because only a portion of the province's private forest cover—likely between one-half and one-third—is classed and assessed as "forest land." The remaining one-half to two-thirds is classed under agricultural, rural residential or other categories. Most of this "unofficial" forest land is believed to be owned by private woodlot owners.

The history of short-line railways in the earliest-settled provinces also influenced industrial forest ownership. Once so crucial to local economies, short lines in the Atlantic provinces, Quebec, Ontario and British Columbia were eventually abandoned or partially amalgamated into Canada's east-west railway system. Many short-line companies eventually offered their lands for sale, freeing up large tracts that were often more attractive, not to mention more affordable, for forest companies than for individuals. Private forest ownership in Prince Edward Island was unaffected by these historical influences because the forest industry was not a presence in that province.

In British Columbia, as mentioned earlier, the availability of former railway holdings enabled some forest companies to acquire property to supplement their Crown land harvest. It is important to note, however, that the estimated proportion of industrial freehold shown in the previous table is a rough estimate, based on holdings recently reported by the largest companies.

Those knowledgeable about the forest sector in British Columbia point out that thousands of privately owned wooded areas are not included in the count of private woodlots. The reason for this appears to be largely financial. Because official classification as "forest land" in British Columbia carries with it higher taxes than classification as "agricultural land," many private woodlot owners who are farmers or ranchers do not classify the forested portions of their land as "forest land." The existence of such a large number of "unofficial" woodlots therefore makes it difficult to arrive at an accurate breakdown of the province's private forest ownership.

### PRIVATE WOODLOT OWNERS

Private forest lands are critical to Canada's economic, ecological and spiritual health. As the principal owners of private forest land in every province, and the sole owners in Prince Edward Island, Manitoba, Saskatchewan and Alberta, woodlot owners are the guardians of some of the most productive and accessible forest land in the country. Most Canadian woodlot owners (67%) live in Quebec and Ontario, another 19% reside in the Atlantic provinces, and the remaining 14% live in the west.

### WHO ARE PRIVATE WOODLOT OWNERS?

Individual Canadians own forested property for a myriad of reasons. For some, woodlots represent a long-term investment, a kind of retirement savings plan. For others, woodlots are peaceful places for solitary walks and personal reflection. Some woodlot owners use their forested land for hiking, cross-country skiing and snowshoeing. Some make maple syrup, gather mushrooms, and pick berries. Some hunt and trap game, while others photograph it. For certain woodlot owners, forested land has little definable value of its own—it just happens to be part of their farm, ranch or rural residence. And for a significant number, especially in the eastern region, woodlots are an important source of supplementary income; for them, selling wood, growing Christmas trees, or producing maple syrup may make the difference between a comfortable income and a financial struggle.

This general portrayal of woodlot owners across the country is a portrayal of most woodlot owners in most provinces. In Ontario, for instance, 45% of woodlot owners are farmers and 37% harvest wood for their own domestic use. A majority of Ontario owners take a holistic view of their forest land, valuing wildlife, environment, recreation and timber values equally, says the Ontario Woodlot Association. Also, many are motivated by their desire to leave high-quality woodlands to their heirs. Similarly, woodlot owners in British Columbia, 50% to 60% of whom are farmers and ranchers, place a high value on the spiritual and personal benefits of their

### PRIVATE FORESTS AND THE MAPLE SYRUP INDUSTRY

For many eastern and central Canadians, spring is not complete without a trip to the sugar bush. Starting in mid-March, when the sap begins to run, many maple producers open their premises to the public, offering tours of the maple stands, syrup-making demonstrations, pancake meals, sleigh rides and other special events. In most cases, visiting a sugar bush means visiting a private woodlot, as over 77% of maple products come from privately owned forests.

Many woodlot owners still collect sap the old-fashioned way, by letting it drip into buckets hung from spouts, or "spiles," that are tapped into the tree trunks. If the operation is large and modern, it is more likely to use a system of plastic tubing that, with the help of gravity or a vacuum pump, transports sap from the spiles to the sugar "shack." There, once the sap is pooled, it is run through a fuel-fired evaporator, which boils off the excess water. In some cases–especially in Quebec, which produces nearly 90% of Canada's maple syrup–operators have adopted the labour-saving technique of reverse osmosis to remove most of the water from the sap before boiling it. Either way, it takes 40 litres of sap to make 1 litre of maple syrup.

Maple syrup has long been one of Canada's most renowned products. In fact, Canada is responsible for over 75% of the world's supply (the United States produces the rest). About 65% of Canadian maple syrup is exported each year to the United States, Europe, Asia and Australia. World maple production rose by almost 50% in the past decade, largely because of a jump in Canadian production due to improved technology.

Maple syrup is also one of the forest's most naturally renewable products. Sap, which is present in the tree all year, flows through it every spring. Tapping, if done according to established guidelines, removes less than one-tenth of a mature tree's sap, and thus interferes little with its nourishment. Some Canadian maples have been tapped for over a century and are still strong and healthy.

While maple syrup production is a big business for some woodlot owners, there are still many small, family-run operations that produce syrup mainly for local consumption. Because their focus is not on bulk sales, many of these operations turn out specialty products like maple candies, butters, creams, and coated nuts and popcorn. As well, there are still plenty of woodlot owners who tap just a few maples each year for their own consumption. Whether the operation is large or small, maple syrup production is a longtime tradition in this country, a tradition carried on by owners of private forest land.

forests. According to representatives from the Federation of British Columbia Woodlot Associations, owners feel strongly about their forest lands and are highly protective of them. Across the Prairies as well, where many owners are farmers who harvest the woods for their own needs, personal enjoyment and a strong link to the land explain why owners value their woodlots. In certain provinces, however—especially in Newfoundland and the Maritimes, and to a lesser degree in Quebec—woodlot owners differ somewhat from this general profile.

#### NEWFOUNDLAND

In Newfoundland, the province with the fewest number of woodlot owners, most proprietors are not active on their forest land. Their lack of activity stems from the low commercial value of much of the province's forest cover. As a result, few owners attach much economic value to their woodlands. Moreover, the relative neutrality of many woodlot owners toward their forests is to some extent consistent with Newfoundland's historical dependence on the fishery, and the tendency among residents to value the ocean more than the land.

#### THE MARITIME PROVINCES

According to *Private Woodlot Management in the Maritimes*, a report issued in 1997 by the National Round Table on the Environment and the Economy (NRTEE), "In the Maritime provinces more than anywhere else in Canada, privately owned forest resources are critical to the viability of the region's economy and ecology."

On the economic side, exact figures are not available on how much of the Maritimes' provincial wood supply comes from private woodlots, but estimates suggest roughly one-quarter in New Brunswick, one-half in Nova Scotia and nearly all in Prince Edward Island. What is borne out by hard data is the fact that woodlot owners in the Maritimes own a much larger share of timber-productive forest land than their counterparts in other provinces. The combination of productive land and a strong forest products industry in the region provides incentive

**NUMBER OF WOODLOT OWNERS PER PROVINCE (THOUSANDS)**

| NFLD | PEI | NS | NB | QUE | ONT | MAN | SASK | ALTA | BC |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 12 | 28 | 35 | 120 | 150 | 13.5 | 15 | 7.5 | 20* |

*This is an estimated number. The true figure may be higher, as there are many farmers and ranchers in the province who may not have classified the wooded portions of their land as forest land and therefore may not be included in the estimate of private woodlot owners.

for Maritime woodlot owners to view their forests in terms of dollars and cents. Even for those not currently harvesting, a woodlot represents a potential source of cash that can be tapped if necessary. In the Maritimes, where unemployment has historically been an issue, the potential income of a woodlot is no small matter.

The NRTEE report, which was issued after a series of consultations with forest stakeholders in the Maritimes, addresses the issue of sustainable management on private woodlots in the region. The report points out that three overriding problems characterize Maritime woodlots: over-cutting of a dwindling resource, lack of sustainable management practices, and lack of knowledge about and incentives for investing in sustainability. These problems were generally acknowledged by those consulted during the Round Table's study. In effect, the study spells out the dilemma confronting Maritime woodlot owners: the economic importance of woodlots has led to unsustainable harvesting, yet that same economic importance must lead to its end, and to the adoption of sustainable management in its place to assure future yield.

### QUEBEC

The evolution and influence of the marketing board system in Quebec has resulted in a wood production regime that is different from that in any other province. Regional marketing boards negotiate prices and sales contracts with wood-using industries on behalf of woodlot owners and producers within the region. Furthermore, Quebec law stipulates that publicly owned forests are a residual source of supply. Clearly, this makes private woodlot owners indispensable to the wood supply equation in Quebec—a role far more important than suggested by simple statistics (they own 13% of the timber-productive forest and supply 20% of provincial industrial roundwood).

Besides being represented in the marketing pools, the majority of harvesting Quebec owners belong to one of the province's 44 forest management groups, known as "OGCs" (organismes de gestion en commun). These joint management groups, the first of which was set up in 1971, are really small businesses whose aim is to develop privately owned forests utilizing the principles of sustainable management. The OGCs were established by woodlot owners. Membership is voluntary and members have the added advantage of becoming shareholders in the companies. The total number of OGC members has mushroomed over the years, from 15 000 woodlot owners in 1994 to 22 000 in 1998. Through the OGCs, and through cooperation and advocacy, Quebec woodlot owners who manage their woodlots collectively have achieved a level of visibility and influence that is unmatched anywhere else in the country. They comprise a kind of community of forest owners, with similar objectives and expectations for their woodlots.

Yet it must be emphasized that this "community" constitutes only one-quarter of the province's woodlot owners. According to the Regroupement des sociétés d'aménagement forestier du Québec (RESAM), the umbrella group for the OGCs, 50% of owners in Quebec own and enjoy their woodlots for reasons not related to timber values. These reasons are generally personal and include recreation, conservation, aesthetics and the desire to leave land to their children. In short, these woodlot owners fit the general Canadian profile, and they may have more in common with forest owners in Ontario or British Columbia than they do with their woodlot-owning neighbours.

Clearly, then, woodlot owners constitute a diverse sector, but they can be divided into a few broad categories according to who they are and what they do with their land. The two largest groups of woodlot owners are

**ESTIMATED AVERAGE SIZE OF PRIVATE WOODLOTS (HECTARES)**

| NFLD | PEI | NS | NB | QUE | ONT | MAN | SASK | ALTA | BC |
|---|---|---|---|---|---|---|---|---|---|
| 27 | 18 | 50 | 40 | 50 | 27 | 32 | 59 | 124 | N/A* |

*There is no reliable estimate of the average size of a privately owned woodlot in British Columbia as woodlot holdings are extremely diverse, ranging from 20 to 15 000 hectares.

### MARKETING BOARDS

#### An Eastern Phenomenon

Marketing boards, created to bargain for and/or sell products on behalf of a collection of private producers, are familiar structures within Canada's agricultural industry. They are also features of the forest industry in two provinces: Quebec and New Brunswick.

The marketing board system is highly evolved in Quebec, where it has been in place since 1956. The province has 15 boards, all created under provisions of Quebec's Agriculture Products Marketing Act. Under the provincial legislation, all privately produced wood that is sold to the forest industry must be sold through the marketing boards, which are most active in handling roundwood destined for sawmills and pulpwood. Besides negotiating sales contracts with industry, the marketing boards set annual quotas for their members, thus ensuring a fair share of the harvest for all private producers. They also administer a system of price averaging in their respective jurisdictions by pooling members' transportation costs; this means that producers located away from the mills have an equal incentive to harvest wood. A levy on each cord of wood covers the cost of staffing and operating the 15 marketing boards. Coordination of the boards on a provincial level is through the Fédération des producteurs de bois du Québec.

In New Brunswick, the first marketing board was established in 1962. Six more followed in the 1970s, after woodlot owners voted overwhelmingly in favour of the concept in public meetings across the province. The boards in New Brunswick do not have exclusive rights to sell wood, which leaves industry free to purchase fibre from private woodlots outside the marketing board contract. By choice, about 60% of all private wood supply in New Brunswick is marketed through the boards.

In Nova Scotia, while there is legislation aimed at marketing private wood and provision for an agency to oversee the activity, no true marketing boards exist. There is one registered bargaining agent for pulpwood producers, but it covers only those who supply Stora Port Hawksbury Inc.

farmers and retired workers; the remainder hold diverse occupations ranging from teaching to tourism, from fishing to nursing, and from law to mechanical repair. Most woodlot owners are Canadian residents who live on or near their property. Some of them (especially in Quebec, Ontario and Nova Scotia) grow Christmas trees; some (especially in Quebec and Ontario) produce maple syrup. A greater number harvest their woodlots to supply wood to the forest industry, while even more (many of them farmers) harvest on an "as needed" basis for firewood, fence posts and domestic building materials.

### WOODLOT OWNERS' ASSOCIATIONS

There are woodlot owners' associations in all provinces but Newfoundland, where one may soon emerge. The size, influence and mandate of these associations vary from province to province, but the principle behind their formation is the same regardless of location: the belief that individuals with common interests will more likely achieve their goals if they cooperate.

For all of the provincial associations, representing the interests of woodlot owners with government is a primary role. Whether lobbying for tax reform and silviculture incentives, participating in round-table consultations, or helping shape forest programs and policies, woodlot associations are an official conduit for their members' views. Their impact often extends beyond their membership; in their advocacy role, the associations often affect all private woodlot owners in their jurisdiction by raising the sector's profile, by bringing about reform that touches all owners, and by putting forward a common front on behalf of their members to get fair market prices for wood products.

In addition to advocacy, every woodlot association cites education of woodlot owners as a key goal. Using seminars, leaflets, reports, technical bulletins, demonstrations and videos, the associations keep owners updated on harvesting innovations; expose them to alternative uses of forest land such as specialty crops and maple syrup production; clarify for them issues of regulation, taxation and legislation; and inform them of markets and value-added opportunities. Promoting the principles and practices of sustainable management is another focus of every woodlot group. Many associations offer walk-through services, on-site consultations and other extension services for owners to help them define their woodlot goals and then manage their property to

meet those goals. Associations frequently assist woodlot owners in writing forest management plans (official or unofficial), and some even draft the plans for the owners. As well, a number of associations have formulated codes of practice and other land management standards to guide their members. One example is the voluntary code of practice developed by the New Brunswick Federation of Woodlot Owners.

The provincial woodlot owners' associations are represented at the national level by the Canadian Federation of Woodlot Owners, which was founded in 1989 to serve as a liaison between woodlot owners and the federal government. Since its creation, the Federation has provided input to the nation's National Forest Strategies (both old and new), has been a signatory to the Canada Forest Accord, and has participated in the Forest Round Table of the National Round Table on the Environment and the Economy. The Federation also helped develop forest products certification standards by sitting on the Canadian Standards Association's Technical Committee. In addition, the Federation represents Canadian woodlot owners at international meetings and conferences of forest owners.

### INDUSTRIAL FOREST OWNERS

Together, forest companies own just over 1.5% of the country's wooded land. Provincially, the greatest area of industrial freehold is in New Brunswick, where forest companies own almost 1.3 million hectares. New Brunswick also has the highest proportion of industrial forest land in the private forest mix: 42% industrial freehold to 58% private woodlot owners. The only other provinces in which industry owns more than one-quarter of the private forest land are Nova Scotia (33%) and Newfoundland and British Columbia (an estimated 30% in each). At the other end of the spectrum, four provinces—Prince Edward Island, Manitoba, Saskatchewan and Alberta—report no industrial freehold at all.

### INDUSTRIAL HOLDINGS

A number of factors contribute to the different size and distribution of industrial freehold forest across the country. As noted earlier, history explains some of the irregularity. More extensive industrial holdings in New Brunswick and Nova Scotia are largely a result of settlement through land grants (leaving less Crown land for timber licences), an early forest industry, and the availability of additional land after the demise of short-line railways. Several British Columbia forest companies purchased former railway land as well, creating some industrial freehold in that province. Similarly,

### PRIVATE FORESTS

#### Seeing Beyond the Timber

Unlike industrial owners of forest land, most private woodlot owners place little emphasis on the timber value of their forests. In fact, surveys show that the majority of Canadian woodlot owners do not harvest any wood from their land. Instead, they own and value their forested property for a range of reasons that have little to do with timber.

Many woodlot owners simply enjoy the scenic beauty of their surroundings. Some prefer their forests' natural state, while others groom and cultivate portions of their woodlots. In fact, professional woodlot landscaping is a growing business in some regions.

Numerous woodlot owners use their forests for recreation. Some maintain trail systems for horseback riding, snowmobiling, skiing, snowshoeing and hiking. Others fish, hunt and trap on their property for leisure or for extra food and income. Numerous woodlot owners take pleasure from the birds and wildlife on and around their forests. Some actively manage their woodlots to attract wildlife by creating brush piles for animal shelter, by building nesting boxes for birds, and by protecting the plants, fruits and berries that wild animals feed on.

Woodlot owners who also farm often create shelterbelts from their treed land. By carefully managing their woodlots, farmers can improve the quality and fertility of their soil, minimize erosion, and trap and spread snow more evenly on their agricultural lands.

In addition, more and more private forest owners across the country are recognizing the value and marketability of certain specialty forest products. The following provides a sampling of some of the non-timber products being harvested.

Food products: wild mushrooms, berries, fiddleheads, woods for smoke flavourings, essential oils

Medicinal/pharmaceutical products: wild herbs, barks, medicinal plants and roots, essential oils for the cosmetics industry

Floral and greenery products: green mosses and ferns for floral arrangements, evergreen boughs for wreath-making, cones, birch tops for making artificial trees

Craft products: birch bark for baskets and vases; willow branches for twig wreaths and baskets; wood modified by disease or insects, including burls and diamonds, for canes, lamps, bowls and furniture

### WOODLOT ASSOCIATIONS

#### Something Old, Something New

Founded in 1968, the New Brunswick Federation of Woodlot Owners is one of the oldest woodlot associations in the country. It was formed by a collection of county associations, all united in the belief that their market share, especially for pulpwood, was being squeezed by forest companies' wide access to Crown land in the province. In the years following its organization, the Federation worked to extend the size and influence of the province's fledgling marketing board system. Now New Brunswick is covered by seven regional boards, marketing 60% of all wood from private woodlots.

But market share was not the only issue preoccupying woodlot owners in 1968. According to the minutes of the Federation's first meeting, another topic discussed was how best to fund silviculture–an issue which, 30 years later, is still on the Federation's agenda.

Today, the New Brunswick Federation is grappling with an array of issues of concern to local woodlot owners, including external regulation of woodlots, expropriation of land for highway construction and increased trespassing by hunters, snowmobilers and "tippers" –individuals who cut off tree tips and branches and sell them to wreath-makers and others.

In Saskatchewan, even though private forests make up a mere 1% of the provincial total, there are nevertheless 15 000 private woodlot owners–more than in any other prairie province. The Farm Woodlot Association of Saskatchewan was created in 1989 to promote woodlot management to these owners, about 90% of whom are farmers and ranchers who may be more concerned with clearing and cultivating land for agriculture than managing it for forest values. From the beginning, an important goal of the Association has been to change owners' attitudes through education.

The Saskatchewan Federation promotes woodlot management as a means to a number of ends. Most woodlot owners in the province harvest their woodlots to some extent, most often to produce firewood, fence posts or building logs for their own use. But besides sustainable yield, the Federation emphasizes other benefits of a managed woodlot: better soil quality and reduced farm inputs, better habitat for wildlife, and increased recreational potential. By offering woodlot owners educational and technical information, woodlot walk-through services and management planning assistance, the Federation is striving to preserve what is left of the province's privately owned forest land.

the sole industrial forest owner in Newfoundland purchased much of its land from a local railway company—a purchase that tipped the balance of private ownership a little further toward industrial in that province. In the provinces with no industrial holdings, the absence of any significant forest industry is the most obvious explanation. And in Ontario and Quebec, where the industrial share of private forest land is virtually the same (13% and 12% respectively), extensive Crown retention of forest land has meant less forest available for industry to purchase.

In every province that encompasses industrial freehold forest, the vast majority of that forest is held by two or three companies. These proprietors usually own scattered tracts of forest land, often clustered in one or more regions of the province, with the exception of a few companies whose principal holdings are in large blocks. All of the major industrial forest owners but one (Bowater Mersey Paper Company Ltd. in Nova Scotia) hold timber licences on Crown land in addition to their freehold property, and for the vast majority of these owners, the harvest from Crown land outweighs that from freehold.

The exceptions to this pattern are nearly all located in Nova Scotia and New Brunswick. In Nova Scotia, the major industrial owners harvest little if any Crown land—a fact that helps explain why in this province, private forest lands combined account for an overwhelming 88% of the industrial roundwood supply. The picture is similar for some of the industrial owners in New Brunswick, though the largest industrial freehold owner in the province, J.D. Irving, Ltd., harvests from Crown-licenced and freehold lands about equally. Another exception to the Crown–freehold balance is Timber West Forest Holdings Ltd., the largest industrial forest owner in British Columbia, which obtains roughly 42% of its harvest from Crown lands.

### BENEFITS OF INDUSTRIAL FOREST OWNERSHIP

Most industrial forest owners agree on the main advantages of owning private forests over operating solely on Crown land. The most often cited benefit is flexibility. On their private forest land, industrial owners can set their own objectives and plans, can revise objectives and plans quickly in response to shifting supply/demand and market opportunities, and can operate more efficiently, with a minimum of bureaucracy. Moreover, many owners value the ability to innovate, especially to experiment with

different silviculture and harvesting techniques to find the mix that will maximize sustainable yield. As well, some owners enjoy the freedom of establishing their own environmental protection policies, which in certain cases they make more stringent than government regulations.

Another benefit underscored by most industrial forest owners is security—both security of fibre supply in the long term and, more importantly, security to invest in sustainable forest management and development with the knowledge that they will receive a return on their investment. The absence of stumpage fees is another advantage for private landowners, though this is offset to some degree by the requirement for capital investment in, for example, forest protection, the costs of amortization and forest renewal costs. Nonetheless, industrial forest owners make these investments willingly because they are assured of a return in the long run.

All of the major owners have long-term sustainable management plans in place for their private lands. Most of those who operate on both private and public lands simply apply the Crown's management standards and environmental protection criteria equally to both, though a few companies have developed distinct and detailed private forest policies. The one principal forest owner that does not operate on Crown land, Bowater Mersey Paper Company Ltd. in Nova Scotia, has also established a long-term plan for its forests, one that includes a sustainable harvest level, investment in forest management, and allowances for the protection of wildlife, habitat and unique areas. Overall, the consensus among industrial owners from coast to coast is that by sustainably managing their private lands, they are not only being sound environmental stewards, they are also maximizing their forests' growth and yield.

Even though industrial forest owners' interests are primarily commercial, centered on managing woodlands for sustainable yield and profitable operations, virtually all use and manage their forests for other goals and purposes as well. Especially in the east, there is extensive cooperation between industrial forest owners and conservation, wildlife and environmental groups to ensure that unique ecological zones and environmental features located on freehold forest land are preserved and protected. Recreation also is high on the list of alternative uses for industrial forest owners. Nearly all of them open their forest lands to the public for hunting and fishing, in most cases at no charge and in some cases for a nominal access fee. The vast majority permit hiking, cross-country skiing, snowmobiling and mountain biking within their lands, and some maintain trail systems specifically for these purposes. Several industrial owners operate parks and nature centres, and encourage school tours and other educational projects on their woodlands. One major industrial owner in Ontario and another in Nova Scotia are managing portions of their land for Christmas tree production, and one Quebec forest company has a productive maple syrup operation on the premises of its seedling nursery.

#### INDUSTRIAL AND PRIVATE WOODLOT OWNERS–COMMON GROUND?

At first glance, the private forest owners in these two broad categories may seem to have little in common beyond their deeds to forest land. All industrial owners focus on the timber yield and harvest of their forest lands; most private woodlot owners do not. All industrial owners invest heavily in detailed management plans, forest models, silviculture and other forest development; most private woodlot owners can not afford this. The majority of private woodlot owners keep forest lands for personal reasons: to beautify their property, to enhance their recreation, or to leave as a family inheritance; industrial owners do not share these reasons. In many respects, these two groups could not be more different in their values and motivations.

Yet owning forest land does carry with it a set of preoccupations that bridge this gap. Chief among them is the desire to live, work and operate freely on one's own land—in short, basic property rights.

#### FOREST OWNERS AND PROPERTY RIGHTS

Canadian forest owners, whether industrial or non-industrial, are vocal about their property rights. Whether trying to prevent trespassing on private woodlots, working to harmonize conflicting municipal bylaws that affect their forests, or criticizing policies that restrict how they use their lands, private forest owners are engaged in seemingly the same endeavour: promoting and defending private property rights.

This endeavour is gathering momentum in the forest sector just now, for the above reasons and for others. Zoning, for instance, is becoming an increasing worry for private forest owners, especially those in the vicinity of urban centres. With urban sprawl comes the need for more land, the desire to set aside "green belt" space, and

### CERTIFICATION

#### Taking the Pulse of Forest Owners

When the prospect of certification of forest management practices arose several years ago, it quickly commanded a spotlight on the forest industry stage. The concept raised many questions. Would certification become a must for exporters? Would domestic consumers demand wood products that were certified? How much would certification cost? Would purchasers willingly pay extra for certified wood?

Today there are still no definite answers to these questions, although there has been steady progress toward certification. Here in Canada, the Canadian Standards Association has developed sustainable forest management standards–standards that a number of industrial owners and marketing boards are preparing to meet. As well, a Canadian initiative of the international Forest Stewardship Council is developing a number of regionally-based certification standards.

A good number of industrial landowners are still uncertain whether the market will bear the increased costs associated with certification, or how great the demand will be for certified wood products. As one industrial spokesperson put it, "We're waiting to see how certification works on the ground." As a result, most industrial forest owners are examining the different systems and investigating their pros and cons. Most large forest industries and many smaller, private operators are preparing for certification through enhanced planning, development of indicators of sustainability, creation of public participation processes and numerous other steps that will provide flexibility and leave them poised to follow the certification approach they choose. The vast majority of private woodlot owners who actively harvest are worried about cost, and thus prefer to wait for a strong sign that certification will be a market necessity before investing heavily in the process.

All forest owners are quick to point out that they support the intent of certification–namely, to assure consumers that the forest products they buy come from sustainably managed forests.

the consequent rezoning of forest tracts for different land use. With rezoning generally comes a new package of regulations and bylaws, which can often restrict how forest owners—families and industries alike—use their land. In the words of one industrial freehold representative, such decisions could be interpreted as a kind of "disguised expropriation" of forest land.

The increasing complexity and stringency of regulations and legislation related to the environment, forest practices and sustainable management also are of concern to owners of private forests. Industrial forest owners and woodlot associations state often and clearly that they support the objectives of such regulation. As owners of forested land, they are concerned about the health of the country's forests, and they stand to benefit from sound stewardship even more than the general public does. Generally speaking, private forest owners support responsible and sustainable land management, but do not wish to have regulations imposed on them. Industrial owners value their private lands because they can manage them responsibly, and can apply to them sound business practices as well as strong stewardship, without the burdens of bureaucracy and without paying the extra costs that can accompany regulation. For their part, woodlot owners appreciate the flexibility of being free to manage their lands for individual or family goals, without having management requirements inflicted upon them or goals dictated to them. The criticism often voiced by private forest owners in both groups is that onerous regulation does not facilitate forest management—it impedes it, by seemingly making management more complicated, more time-consuming and more expensive.

Self-regulation is the path preferred, and currently followed, by most woodlot associations and owners of industrial freehold. As noted above, industrial forest owners are establishing management plans and actively following them; they develop their forests in a way that maximizes yield while respecting the environment and accommodating the recreational and other values of surrounding communities. As well, several woodlot associations have developed codes of practice for their members, and all associations are educating woodlot owners about responsible stewardship and helping them to put those principles into action.

Informed regulation is the outcome most private forest owners would like to see. If proposed regulation is well researched and well thought out, if it factors in the needs and concerns of all stakeholders, then it has a much greater chance of acceptance among woodland owners. The subject of regulating private land management is further discussed in the Points of View section of this report *(see pages 96-103)*.

### FOREST OWNERS AND THE ECONOMICS OF FOREST MANAGEMENT

Another area in which the interests and concerns of industrial owners and woodlot owners intersect is sustainable management of wood-producing forest land and, more specifically, how to cover the costs.

In the case of industrial forest owners, cost is not always a direct issue; considering profit margins, access to capital financing and corporate tax status, forest companies do not face insurmountable financial barriers to investing in silviculture. But cost is a serious obstacle for private woodlot owners, many of whom can not generate enough income from their woodlots to pay for intensive forest management. The income–cost equation is exacerbated by the inability of many woodlot owners to claim forest management expenses for income tax purposes, and by the long lag time (from 20 to 60 years) between investment in silviculture and realization of profit. Because financing intensive forest management is an economic impossibility for so many private woodlot harvesters, the question of how to ensure long-term fibre supply from private woodlots is a pressing one.

In 1996, 17 regional agencies were formed in Quebec with the aim of promoting silviculture investments on private forest land. The agencies, which are co-funded by the Quebec government, the forest industry and private woodlot owners, invest more than $50 million per year in private forest development. The agencies determine, in consultation with those affected (including regional municipal governments), how the funding should be used in each region.

This financial cooperation between woodlot owners and their industrial counterparts in Quebec mirrors the interdependence of the two groups of forest owners on a national scale. While they own forests for different reasons, industrial owners and private woodlot owners are both parts of the same formula—a formula that should result in healthy forests in Canada.

### INDUSTRIAL FORESTS

#### More than Just Timber Values

Here is a sampling of how some industrial forest owners are involved in conservation, education and the preservation of unique areas.

In Nova Scotia, Kimberly-Clark Corp., the largest industrial forest owner in the province, actively works with Ducks Unlimited, the Nature Conservancy of Canada, a local wetlands habitat program and other environmental groups to ensure sound ecological treatment of sensitive areas. Bowater Mersey Paper Company Ltd. has been recognized by the Canadian Council on Ecological Areas for its role in preserving the Panuke Lake Special Place, which houses an important stand of old-growth Acadian forest.

In New Brunswick, J.D. Irving, Ltd. has established an extensive Unique Areas Program, which also has been recognized by the Canadian Council on Ecological Areas. Under the Program, which applies to the company's holdings in Nova Scotia and Maine as well, over 270 areas are protected, among them several bogs containing the fringed orchid and a number of historic grave sites near St. George. Fraser Papers Inc. also has an orchid reserve on its lands, preserved in cooperation with the Nature Trust of New Brunswick.

In Quebec, Avenor Inc. operates the Harrington Nature Centre, an educational facility on the Rouge River that shares space with a working seedling nursery and a maple syrup operation. The centre is open year-round to those interested in touring the facility and viewing forestry-related exhibits and demonstrations.

In Ontario, in conjunction with the Eastern Ontario Model Forest, Domtar Inc. maintains the McKinnon Forestry Centre, just north of Cornwall. The Centre is designed to educate visitors about sustainable forest practices and to highlight the area's natural environment.

# People and Industry IN PARTNERSHIP

FOREST LAND IN CANADA IS LARGELY PUBLIC–NEARLY 90% OF THE COUNTRY'S COMMERCIALLY PRODUCTIVE FOREST IS THE RESPONSIBILITY OF THE PROVINCIAL GOVERNMENTS. YET THAT LAND IS HARVESTED ALMOST EXCLUSIVELY BY PRIVATE FOREST COMPANIES, THROUGH LEASE AGREEMENTS WITH THE PROVINCIAL GOVERNMENTS. THESE LEASES PERMIT FOREST COMPANIES TO CUT TIMBER, BUT ONLY WITHIN CERTAIN PARAMETERS. WHILE THE EXACT TERMS VARY DEPENDING ON THE PROVINCE AND THE DURATION OF THE LEASE, TENURE AGREEMENTS GENERALLY IMPOSE STRICT REQUIREMENTS ON FOREST COMPANIES–REQUIREMENTS THAT ATTEMPT TO BALANCE THE COMMERCIAL GOALS OF INDUSTRY WITH THE BROADER GOALS OF GOVERNMENT AND THE PUBLIC. IN ESSENCE, THE PARTNERSHIP BETWEEN GOVERNMENT AND INDUSTRY IS A SIMPLE ONE: INDUSTRY AGREES TO MANAGE PUBLIC FOREST LANDS IN EXCHANGE FOR THE RIGHT TO HARVEST THEM. IN REALITY, HOWEVER, THE PARTNERSHIP IS COMPLEX AND CHANGING, AFFECTED BY MARKET FORCES, ENVIRONMENTAL CONDITIONS, GOVERNMENT INITIATIVES, INTERNATIONAL TRENDS AND ABOVE ALL, BY THE CHANGING ATTITUDES AND VALUES OF THE CANADIAN PUBLIC. PUBLIC INTEREST HAS HELPED SHAPE FOREST LEGISLATION AND MANAGEMENT THROUGHOUT CANADA'S HISTORY, AND IT CONTINUES TO DO SO TODAY, MORE DIRECTLY THAN EVER BEFORE.

## CANADA'S FORESTS

Nearly half of Canada's land mass is forested, but the species mix, age, productivity and overall quality of the forest vary greatly from region to region. Just over half of Canada's forested land is classified as "commercial" or "timber productive," meaning it is capable of producing commercial tree species within a reasonable length of time.

### Public Ownership, Private Management

The vast majority of Canada's productive forest land is publicly owned, and most activity on that land is conducted by commercial forest companies. Virtually all timber harvesting of public forests is carried out by private industry according to levels set by provincial governments—annual allowable cuts (AACs). As well as being the chief harvesters, private companies are also the most active managers of public forests. Crown timber leases, which grant companies harvesting rights, generally require that the companies carry out some kind of forest management. The degree of management varies according to the province and the length of the lease, but most long-term leases now require companies to tend and regenerate the forest land, build roads, guard against fire and pests, protect wildlife and habitat, and take into account non-timber factors such as Aboriginal hunting grounds, heritage sites and recreational use.

### The Evolution of Public Forest Land Management

It is difficult, if not impossible, to trace the evolution of public forest management in Canada without considering the history of forest legislation (described in detail in *The State of Canada's Forests 1996–1997*). Since Confederation, though the particulars of forest legislation have differed from province to province, the general policy directions have been similar. As a result, public forest management in the provinces has evolved at a more or less consistent pace. This is not surprising given that all forest lands in Canada have been subject to similar economic, political, international and societal influences.

Long before Confederation, governments recognized the potential of Crown forest lands as important sources of public revenue. As early as 1826, Upper and Lower Canada had introduced a system of dues payable on timber harvested from Crown land. By the middle of the 19th Century, Ontario, Quebec and New Brunswick had enacted legislation granting exclusive licences to harvest Crown timber in exchange for payment of royalties and ground rents. Similarly, on the Pacific coast, an 1865 land ordinance in the Crown Colony of Vancouver Island established the custom of granting rights to harvest Crown forests through timber leases, a practice that expanded once Vancouver Island and British Columbia unified in 1866. Then with Confederation, the Constitution Act of 1867 granted the provinces ownership and legislative control over most publicly owned forests. For the remainder of the century, the provinces developed and refined their own Crown forest tenure systems. By 1900, all provinces had some kind of forest administration in place.

For much of the first half of the 20th Century, forest policy was driven by two imperatives: revenue generation and economic development. Thanks to expanding domestic, continental and offshore markets for timber, the forest industry in Canada flourished, becoming increasingly capital-intensive and integrated. Forest companies needed an extensive timber supply to meet demand, and the system of Crown forest tenures offered them this supply as long as they agreed to pay dues and meet certain regulations, such as establishing wood-processing facilities.

During this period, however, the rate of harvesting was unregulated and reforestation, largely a Crown responsibility, was inadequate. As the century progressed, it became clear that Crown licencing systems were leading to depleted forest inventories. Several provinces established royal commissions to study the situation, and their recommendations—the adoption of sustained-yield harvesting and a new incentive-based tenure system that would transfer responsibility for sustained-yield management to licensees—in effect ushered in the era of forest management. By delegating forest management to industry, provinces were able to harness the capital and entrepreneurial skills of the private sector to further the public goal of orderly resource development. By the early 1960s, most provinces had such arrangements in place.

No sooner did forest management emerge as a goal than its direction began to change, largely in response to shifting public attitudes. Beginning in the 1960s, the new environmental movement turned its attention to the forest sector, and people began to question the industry's impact on its surroundings. Furthermore, rising populations and

### REGULATORY STRUCTURES

Private forest companies that operate on Crown lands in Canada work within multi-layered, complex regulatory structures. These structures are in place primarily to ensure that public forests are managed responsibly and that forest companies, in pursuing their commercial goals, remain accountable to the people of Canada for their operations in public forests.

The primary responsibility for regulatory control lies with the provinces. The main categories of regulatory provisions include:

- Forest legislation This is the highest level of regulatory control. The provinces' individual forest acts define the general structure of forest tenure systems under which the Crown transfers to private parties the right to use certain forest resources in exchange for their agreement to manage the land. Legislation also sets out the various responsibilities of private parties and government (generally concerning forest management and harvesting) that are associated with the transferred rights.
- Forest regulations Controls over forest management also are contained in forest regulations. Like forest legislation, regulations have the full force of law, but they are approved by provincial cabinet rather than by the legislature or parliament. Regulations specify many of the conditions that must be adhered to in harvesting and reforestation.
- Tenure agreements Further regulatory and contractual conditions are contained in the individual tenure agreements between the Crown and private companies. Tenure agreements set out specific responsibilities, procedures and practices for harvesting and forest management. They also define the planning and reporting requirements of companies and government.
- 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.

incomes led to greater public interest in forests for their non-timber values, especially their recreational potential. As a result, the people of Canada became increasingly aware of forests and forest management, particularly because while non-timber values were emerging, timber harvests were increasing to meet the demand in Europe and North America. This growing public interest in forests led the provinces, in the 1970s, to assume responsibility for providing a range of non-timber forest products and services. Multiple use, within the general framework of sustained timber production, became the goal of public forest management, and additional management responsibilities were delegated to the private sector through Crown tenures.

The 1980s saw environmentalism become a topic of mainstream public debate. In 1987, the publication of *Our Common Future*, the report of the Brundtland Commission, introduced the concept of sustainable development to the world. Canada quickly took the lead in promoting sustainable forestry. The 1989 Canada Forestry Act explicitly required the Minister to "have regard to the integrated management and sustainable development of Canada's forest resources." Public input strongly influenced the content of Canada's new sustainable forest policies. In 1992, after a year of public forums and discussions, Canada unveiled its National Forest Strategy, which underscored that forest management must include both timber and non-timber values while protecting the integrity, health and diversity of forest ecosystems. The Strategy was revised in early 1998. (*See pages 20-21.*)

This high-profile political activity, combined with the increasing strength of the environmental movement, brought about major changes in provincial forest policies. More Crown land was protected from timber harvesting, and Crown tenure systems subjected licensees to more comprehensive and stringent planning and operational procedures that were designed to address environmental concerns, aesthetics, and spiritual and heritage values. In British Columbia, for example, the 1992 Protected Areas Strategy committed the government to expanding the area protected from commercially extractive activities from 6% of the provincial landbase to 12% by 2000. The Ontario Crown Forest Sustainability Act (1994), the Forest Practices Code of British Columbia Act (1996), Saskatchewan's Forest Resources Management Act (1996) and Quebec's 1996 amendments to its Forest Act all introduced a new paradigm for forest management—one that recognizes sustainable management of the forest for a

broad spectrum of economic and social values within the context of protecting biodiversity and ecosystems for future generations.

A crucial component of this new paradigm is public involvement. As forest management has evolved, so too has the degree of public involvement in and knowledge of management issues. Numerous interest groups, ranging from academics to trappers, foresters to fishers, and unions to naturalists, have demanded and been granted more input into regional and local forest management decisions.

As well, the past decade has witnessed rising concern for traditional and treaty Aboriginal rights, increasing respect for Aboriginal people's traditional forest-related ecological knowledge, and a growing desire among First Nations to share in the management of forest resources and in the wealth they generate. Aboriginal people's rights and concerns have been supported by the courts and are becoming important components of forest policy in several provinces.

The consumer of forest products has emerged as another public stakeholder with the potential to affect

### FOREST TENURES

The various agreements that define the roles of government and private companies as they operate in forested lands can be termed "Crown forest tenures." Though these tenures vary in detail from province to province, they do share a number of characteristics:

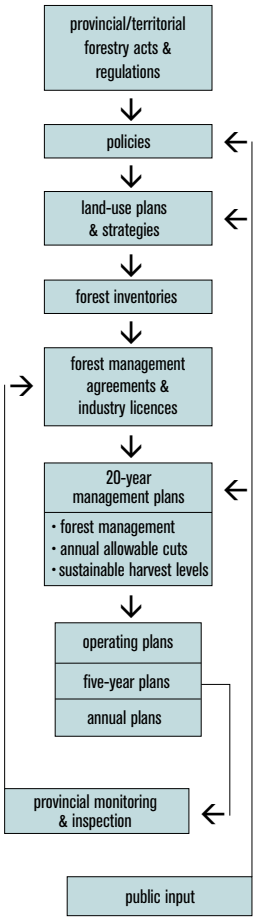
- Rights Crown forest tenures generally confer exclusive but not highly comprehensive rights. The rights are exclusive in that forest companies are granted individual title to harvest certain forest resources, usually timber. The rights are not comprehensive because there are usually forest resources that companies do not have rights to, including land, water, mineral, wildlife and recreational resources.
- Allotment types Forest companies are normally granted harvesting rights under one of two allotment types. Area allotments allow tenure holders to harvest timber within a designated land area and in return require them to formulate management plans for that area. Volume allotments confer the right to harvest a certain volume of timber from a broadly defined area, but other licensees hold similar rights within the same area, and the provincial forest service is responsible for management planning.
- Transferability Crown forest tenures normally carry some degree of transferability, which refers to the ability to freely sell either the products derived from Crown forest resources or the private rights to Crown forest resources. Generally the products derived from Crown forests (i.e., the logs harvested) must be processed within the province. As for the rights to resources, most forest tenures may be sold with ministerial consent, but some provinces forbid such transfers or impose penalties in the form of reduced AACs when tenures are sold.
- Fees Tenure holders must pay different types of fees to the Crown. These include fees for harvesting the timber, known as "stumpage fees," as well as holding or rental charges and protection or management fees.
- Operational stipulations Forest tenures usually contain operational stipulations that restrict three areas: harvesting, management and processing. Harvesting stipulations invariably require that harvests be conducted on a sustained-yield basis in compliance with established AACs. Harvesting is further affected by numerous restrictions that protect non-timber resources and productivity while promoting the efficient use of harvested trees. Management stipulations include measures for reforestation and resource protection. Under smaller tenures the provincial forest service is usually responsible for these measures, but under larger tenures the responsibility lies with the forest companies. Processing stipulations frequently require harvesters to own and operate wood-processing facilities.
- Operational controls Operational controls are a crucial component of forest tenures, as they ensure that operational stipulations are followed. Controls may include field audits, penalties for failure to perform, and requirements to report regularly on harvesting and management operations.
- Duration The duration of Crown forest tenures may vary, but it is always limited. Larger tenures are usually granted for 20 to 25 years; smaller tenures cover shorter periods–often as little as one year or less. Larger tenures are generally eligible for renewal or replacement, sometimes before the entire term has expired; smaller tenures are often limited to a single term.

forest management. Environmental groups have successfully launched consumer campaigns—particularly in European markets—against Canadian forest products they claim originate from mismanaged, unsustainable forests. Partly in response to these events, the forest industry has been exploring forest certification, a process by which wood products can be certified as originating from forests that meet standards verified by an accepted independent organization. Because forest certification is still in its preliminary stages in Canada, it is difficult to predict the direction it will take and how it will affect industry and governments.

As noted above, while Crown forest tenures across Canada share these general characteristics, the specifics of tenures vary greatly within and between provinces. Within a single province, there may be a number of large area-based tenures of relatively long duration, which frequently supply large investments in wood processing, as well as some smaller, shorter tenures with less private management responsibility. There are also variations in the way tenure characteristics are expressed. For example, in Ontario, sustained-yield regulations for all tenures are stated in terms of hectares harvested, not volumes of timber cut—the measure used for most tenures in other provinces.

Because the regulatory structures that govern private management of public forest land are so complex and varied, it is difficult to form a general picture of exactly how forest management is regulated and conducted from coast to coast. However, a detailed look at forest management in two forest-intensive provinces, New Brunswick and British Columbia, provides valuable insight into how industry and government together care for Canada's forests.

**FOREST MANAGEMENT PLANNING FRAMEWORK IN CANADA**




### FOREST MANAGEMENT IN NEW BRUNSWICK

As is the case in most of Canada, management of public forests in New Brunswick is primarily carried out by private companies operating under a Crown timber licencing system. New Brunswick has a long history of involving forest companies in managing the public land they harvest. In fact, it was the first province—through legislative amendments in 1937 and 1948—to impose clear management responsibilities on timber licensees, requiring them to submit management plans with their applications for cutting permits. Since then, forest management in New Brunswick has grown into a comprehensive regime, keeping abreast of economic, political, scientific and social changes affecting the forest sector.

In New Brunswick, a Crown timber licence may be issued to any person or company that owns or operates a wood-processing facility and is willing to enter into a forest management agreement (FMA) with the government. The FMA sets out the specific responsibilities of both the government and the tenure holder for using Crown forest land. The initial agreement grants the private company harvesting rights to designated species of timber for 25 years. In New Brunswick, forest management agreements contain an "evergreen" clause that requires the government to revisit the agreement every five years, review the tenure holder's performance, and decide whether to renew the FMA for another five-year period. The evergreen clause is a common feature of long-term forest tenures across Canada, largely because it enables forest companies to work within a long-term (25-year) plan, while ensuring that the Crown is not committed for more than five years to contractual conditions that no longer reflect public policy. Such arrangements are integral to responsible forest management in these times of rapidly changing demands on, and public attitudes toward, forest resources.

In New Brunswick, licensees are required to issue sub-licences to other private parties to harvest specified volumes of timber within the licence area. Like the licensees, sub-licensees must own or operate a wood-processing facility to receive an allocation of Crown timber. Harvesting rights are granted to sub-licensees for a five-year period and must be extended by the licensee

by one year, every year if requested by government. Under the FMAs, licensees accept prime responsibility for managing forest lands, but sub-licensees must cooperate with them and provide any information needed to fulfill the terms of the licence.

Broadly speaking, New Brunswick's FMAs place licensees in charge of managing the forest area covered by the agreement based on clearly defined government objectives. But the government plays a large role as well: it retains responsibility for overseeing the development, use, protection and integrated management of Crown forests. Many of the specific responsibilities of the private and public sectors are spelled out in the planning and reporting requirements of the FMAs. In total, licensees must prepare and submit three kinds of plans—management plans, operating plans and industrial plans—as well as annual activity reports. Sub-licensees submit industrial plans only. For its part, the government establishes forest management planning objectives and then reviews the detailed management and operating plans and reports before approving them. Overall, this system ensures that forest management is a transparent process—a process that can be guided and scrutinized by government and also by members of the public, who are free to review most forest management information and to participate in the development of companies' management plans.

#### Management Plans

In a sense, a management plan describes the "big picture" for an area of public forest under licence. It sets out how, over a 25-year period, the licensee will manage silviculture, harvesting, forest protection, road construction and maintenance, recreation, fish and wildlife, and watershed protection.

In New Brunswick, the government's role in developing management plans is to establish—with input from the public—forest management goals, objectives and standards. These include such aims as providing and maintaining employment, promoting quality hardwood stands through uneven-aged management, providing wildlife and aquatic habitat, protecting water quality, maintaining biodiversity, maintaining and enhancing recreational opportunities, and protecting ecological reserves and unique sites. The licensee's role is to come up with strategies to meet these broad aims, and to draft its management plan accordingly. For instance, in the area of silviculture, licensees first analyze the government's overall objectives, then propose particular areas and treatment levels, and identify the species and quantities of seedlings required.

Besides considering the government's overall objectives, licensees are required to consult the public when developing management plans. To this end, forest companies hold public forums so that interested individuals can see what is being planned for the licenced area and can discuss any concerns, proposals or objections. These forums may be attended by a wide range of affected parties, including representatives from fish and wildlife groups, First Nations, environmental groups, and forest and mill workers. Public consultation is integral to helping licensees formulate strategies for non-timber values that are influenced by public opinion. For instance, in response to public concerns, a forest company may establish non-timber values as the primary management focus for some areas. Accordingly, the company's management plan would designate areas to be set aside or to receive spacing or selective cutting.

Drafting a management plan requires huge amounts of data. The government provides provincial forest inventory data to licensees. However, licensees must gather and analyze the rest of the data required to develop (and later implement) their management plans, including information on age, vigour, species composition, growth and yield.

Once it is drafted, a licensee's management plan is reviewed by the government to ensure that it conforms to requirements outlined in the government's forest management manual and is consistent with government policies and directives. The government must also check and approve details such as harvest block location and scheduling. Once the government is satisfied that the management plan meets all requirements and is realistic for on-the-ground conditions, it approves the plan. The management plan then becomes a public document, available for interested parties to examine.

After management plans are approved, the government is responsible for making sure they are implemented as planned. Licensees have to update their management plans and objectives every five years—at the same time their FMAs are up for renewal—at which time the management plans go through government review and approval again. In a parallel process, the government

revises its forest management manual and forest management objectives and standards every five years—prior to the period for renewing FMAs.

#### Operating Plans

Operating plans cover a one-year period and describe how forest operations will be carried out—how much wood will be cut, where and by whom (licensee or sub-licensee), and which silvicultural treatments will be applied. Licensees are responsible for developing operating plans, but they are required to include sub-licensees in the process. As well, licensees must develop operating plans that comply with sub-licensee allocations.

To receive government approval, operating plans need to be consistent with government standards and with licensees' forest management plans. Operating plans are revised and updated annually, and each revision must be approved by the government. Like management plans, operating plans are public documents once they are approved.

#### Industrial Plans

Industrial plans cover a 10-year period and provide details of projected wood-processing operations, including dollar amounts invested, plant capacities, employment and production levels, anticipated wood sources, and where the wood products will be marketed. Because licensees and sub-licensees operate their wood-processing facilities independently, essentially in competition with each other, they are required to submit separate industrial plans to the government. These plans are revised and reviewed every five years, at the same time as management plans.

Industrial plans are the only forest management plans in New Brunswick that are not accessible to the public. They remain confidential because they contain sensitive, mill-specific information that could skew competition if made public.

#### Annual Reports

In addition to outlining their plans for public forests, licensees must report on their actual activities. Licensees' annual reports describe all of their operations on Crown forest lands within the past year, including full details on harvesting activities. These reports are reviewed by the government to ensure that standards are met and regulatory requirements are respected. Once they are verified for accuracy, annual reports are made available to the public, enabling individuals and groups to examine in detail what forest companies are doing on public lands. Annual reports are also an important source of information for provincial record keeping and planning.

#### Monitoring and Enforcement

The planning and reporting processes outlined above are instrumental in helping the government assess forest companies' activities and regulatory compliance at regular intervals. In addition to these processes, the government monitors companies' ongoing field operations—an important method for comparing licensees' performance with their stated objectives. Forest companies generally self-monitor to a large extent; for instance, as part of their silvicultural operations, licensees are required to assess harvested blocks and plantations and take remedial action where required. But the government must oversee this self-monitoring; in the case of silviculture, there are government checks to ensure compliance with standards and to assess remedial treatments. Likewise, the government monitors harvesting and road-building activities to verify that they comply with provincial standards and approved operating plans.

To enforce compliance, the New Brunswick government has established a schedule of penalties, which lists fines payable for various infractions. Examples of possible infractions include failing to flag a harvesting block according to the operating plan, and cutting outside an approved block boundary. During the 1997 operating year, 166 penalties were issued to licence holders for a total of approximately $55 000 in fines.

The government summarizes the results of its monitoring and enforcement every five years to coincide with the formal five-year reviews of management plans, industrial plans and FMAs. If a licensee's overall performance has been satisfactory, the licence may be renewed for another five-year period. If the licensee has failed to meet the standards of the FMA, the Act or the Regulations, the renewal may be withheld or the licence cancelled. To date, no licences have been cancelled in New Brunswick.

Although a five-year review of licensees was conducted in 1997, the last period for which results are available is 1987–1992. That review revealed that all licensees had met government-set standards for completing management plans, scheduling harvesting activities, conducting basic

silviculture and remedial treatments, integrating harvesting and silvicultural operations, and protecting wildlife habitat. In all, one licensee failed to meet one criterion: only 92.7% of watercourse crossings had been installed to acceptable standards, instead of the expected 95%. Since that review, however, the government has raised its compliance standards and performance expectations, making them more difficult to meet. The effect this has had on compliance rates will not be known until the 1997 results are released.

### FOREST MANAGEMENT IN BRITISH COLUMBIA

In British Columbia, where approximately 96% of the forest is publicly owned (95% by the provincial Crown), the Forest Act specifies 10 forms of agreement or tenure under which Crown timber may be sold or harvested. The principal tenure forms are tree farm licences, which account for 57% of the province's AAC; forest licences, which account for another 24% of the AAC; and timber sale licences, which fall within the province's Small Business Forest Enterprise Program and contribute 14% of the AAC. The remaining tenures together account for only 5% of the AAC.

Some tenures—for example, tree farm licences and timber sale licences—grant exclusive rights to harvest timber within a specified area. These are commonly referred to as "area-based tenures" or "area allotments." Other tenures convey the right to an annual volume of timber from a management unit known as a "timber supply area," within which other licensees hold similar rights. Such arrangements are known as "volume-based tenures" or "volume allotments."

#### Duration of Licences

British Columbia's tree farm licences, like New Brunswick's forest management agreements, are granted for 25 years, but are replaceable every five years for additional 25-year terms. At the five-year point, licensees are offered a new agreement, which may contain updated provisions consistent with current Crown policies. If the new agreement is accepted, it replaces the existing one. If it is declined, the existing licence runs until the end of its 25-year term and then expires. Forest licences contain similar five-year replacement conditions, but cover 15-year periods.

#### FOREST PRACTICES CODE

British Columbia's Forest Practices Code came into effect in June 1995. The Code and the accompanying 18 regulations carry the force of law and govern all aspects of the sustainable management of the province's public forests.

The Code is designed to evolve as new knowledge and technologies emerge. The public, industry, environmental groups, First Nations and forest workers review the Code on a continual basis, and their comments are reflected in the refinement of existing forest management standards and the addition of new ones.

Timber sale licences are typically granted for terms ranging from six months to 10 years, with most being five years or less. They are not replaceable. Most timber sale licences are issued following competitive bidding among companies registered in the province's Small Business Forest Enterprise Program.

#### Forest Management Roles

Holders of major forest tenures in British Columbia, including tree farm licences and forest licences, must meet numerous forest management obligations set out in the Forest Act, the Forest Practices Code and contract documents. Tree farm licences confer on the private sector the most comprehensive responsibilities, including management of resource inventories, strategic planning, operational planning, road building and reforestation. Holders of forest licences are responsible only for operational planning, road building and reforestation. Under the shorter-term timber sale licences, the Ministry of Forests is responsible for forest management activities, including operational planning, road building and reforestation.

Tenure holders given responsibility for forest management must make certain that their objectives and strategies are consistent with what are known in the province as "higher-level plans." Higher-level plans can take several forms and emerge from different processes, but all serve a common purpose: to establish broad objectives for managing forest resources within a given area so as to attain the government's social and economic goals. Under the Forest Practices Code, higher-level plans can be designated and approved as such only by the provincial cabinet or by a tribunal composed of the Minister of

Forests, the Minister of Environment, Lands and Parks, and the Minister of Employment and Investment.

Although higher-level plans are mandated and legislated by government, they are largely the products of the people. Throughout much of British Columbia, regional multi-stakeholder committees (representing a spectrum of interest groups ranging from industry to Aboriginal people and from environmental groups to trappers) prepare land and resource management. The objectives specified in these plans may eventually be designated as higher-level plans. Not only are higher-level plans developed by a broad range of forest users, they are also subject to public scrutiny and comment before adoption.

In British Columbia, where the forest industry is a dominant economic force, the people have a large say in how Crown forests are managed. Besides public input into higher-level plans, provisions for public participation and/or review exist at almost every stage of major tenure holders' forest planning and cutting permit processes. Because of public influence, private managers of public forests must now account for a wide array of values, both timber and non-timber, in their management practices.

#### Management Plans

A holder of a tree farm licence, the major tenure form in British Columbia, must prepare a management plan at least once every five years. This plan includes a comprehensive inventory of timber, recreation, fisheries, range, wildlife and cultural heritage resources within the licence area. It also sets out the licensee's forest management objectives and the strategies for achieving them. Strategies must be devised for an array of forest resources: timber resources (including a long-term timber supply analysis, short-term harvesting projections and methods); various non-timber resources (including visual quality, biological diversity, soil, water, recreational resources, cultural heritage sites, range land, and wildlife and fish habitats); forest fire prevention and suppression; forest health; silviculture; and road construction, maintenance and deactivation. Management plans must be wholly consistent with the objectives of relevant higher-level plans approved under the Forest Practices Code.

Under the terms of tree farm licences, before being approved, management plans must be made available for public review and comment and must be referred to Aboriginal people and to other licenced resource users, such as trappers and guide outfitters. Similarly, at least 28 months before a licensee's existing management plan is due to expire, public comment must be invited on the licensee's performance under the plan.

#### Forest Development Plans

Forest development plans are landscape-level tactical plans that link higher-level plans and silvicultural prescriptions. A holder of a tree farm licence or forest licence must have an approved development plan (and an approved silvicultural prescription) in place before a cutting permit can be issued. Development plans, which cover a period of at least five years and are updated annually, detail the timing of proposed timber harvesting; the size, shape and location of proposed cutblocks; harvesting methods and silvicultural systems to be used; plans for road construction, maintenance and deactivation (including access roads); and measures that will be taken to protect all forest resources. Development plans must be consistent with any higher-level plan in effect for the subject area. As well, under the Forest Practices Code, they must be advertised and made available for public review and comment prior to approval.

#### Silvicultural Prescriptions

Silvicultural prescriptions outline the silvicultural systems that licensees plan to use on the Crown lands under licence. These prescriptions specify the licence holder's harvesting methods and any silvicultural treatments intended to produce a free-growing stand. They also describe how harvesting will be carried out, how roads will be built and deactivated, how soil disturbance will be minimized, and how landings and skid trails will be rehabilitated where soil disturbance exceeds allowable limits. Silvicultural prescriptions must be consistent with both higher-level plans and forest development plans, and they may be reviewed by interested members of the public upon request. Holders of tree farm licences and forest licences can not legally cut timber until their silvicultural prescriptions are approved.

#### Cutting Permits

In British Columbia, holders of most timber sale licences are authorized by the licence document itself to harvest designated timber. However, for major tenure holders—those with tree farm licences and forest licences—the

authority to log a block of timber comes only with a cutting permit, which is granted by the forest district manager. These tenure holders can receive cutting permits only after they have followed a number of rigorous application and approval procedures required by the Forest Practices Code, including approval of a forest development plan and a silvicultural prescription. In specified areas (e.g., community watersheds), joint approval of the Forest Development Plans by both the district manager and the desginated environment official is required. Furthermore, before a cutting permit is issued, it may (depending on the location, the circumstances and the judgement of the district manager) be referred for review to Aboriginal people, other licenced resource users and other members of the public affected by the permit.

#### Enforcement and Penalties

To support the forest planning and operational requirements in the Forest Practices Code, the Forest Act, the Range Act and accompanying regulations, the Province has entrenched a comprehensive enforcement regime in the Forest Practices Code of British Columbia Act. This regime gives the provincial government numerous tools to help enforce forest management regulations, including search and seizure powers, the ability to issue administrative orders (e.g., stop-work orders and remediation orders), and the power to impose fines (which can also be levied by the courts for more serious offences). Maximum penalties include fines of up to $1 million or imprisonment for up to three years, or both. Under the Forest Practices Code, forest companies are directly liable for administrative penalties arising from the actions of their contractors and employees, and they may also be held directly liable for court-imposed fines. However, a company may defend itself by showing that it exercised due diligence to prevent the offence.

The day-to-day monitoring of licence holders' performance and administrative activities is carried out by staff from both the Ministry of Forests and the Ministry of Environment, Lands and Parks. In addition, the Forest Practices Code has established an independent body—the Forest Practices Board—that audits the forest practices of government and licensees alike and investigates complaints from the public. The Board has extensive powers to obtain information when conducting an investigation.

Lastly, to handle any appeals of administrative decisions, the Forest Practices Code provides for the standing Forest Appeals Commission. Decisions of this Commission may be appealed to the Supreme Court on questions of law and jurisdiction.

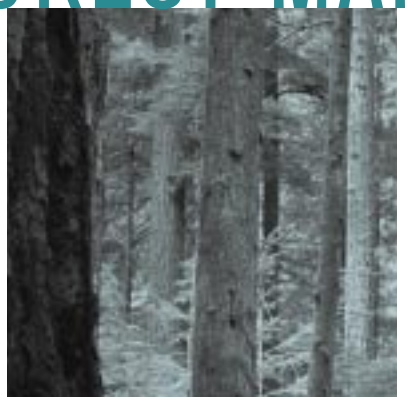
### FUTURE CHALLENGES IN FOREST MANAGEMENT

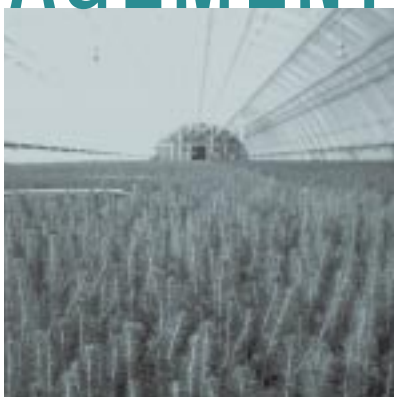
Canada has embarked on a new approach to forestry that considers ecological, social and economic values. Through processes such as criteria and indicators, policy makers and scientists are trying to define or further refine what "sustainable forest management" means to Canada.

Our science is focusing on learning more about entire forest ecosystems and the diversity of flora and fauna within them. Public input into forest management planning is now part of our way of doing business. We need to ensure that our consultative and decision-making processes are effective and efficient. We need to continue to expand our knowledge, adapt our science, develop innovative solutions for managing our forests in partnership, test new forest management techniques, and monitor our progress on sustainable development.

Canada's forest management practices and processes will need to adapt to new knowledge and new demands. One of the key challenges will be to balance the wishes of the public with the "needs" of forest ecosystems while maintaining Canada's standard of living and economic livelihood. And global discussions on forest issues such as climate change will ultimately impact how we view and manage forests in Canada.

# Measuring Sustainable FOREST MANAGEMENT





RECENT ISSUES OF *THE STATE OF CANADA'S FORESTS* HAVE REPORTED INFORMATION ON SELECTED CRITERIA AND INDICATORS. IN 1997 BOTH A TECHNICAL REPORT, *CRITERIA AND INDICATORS OF SUSTAINABLE FOREST MANAGEMENT IN CANADA,* AND A VERSION TARGETED AT A WIDER AUDIENCE, ENTITLED *CRITERIA AND INDICATORS OF SUSTAINABLE FOREST MANAGEMENT IN CANADA: PROGRESS TO DATE*, WERE RELEASED. AS WELL, THE CANADIAN COUNCIL OF FOREST MINISTERS (CCFM) APPROVED AN IMPLEMENTATION PLAN TO REPORT ON 49 CORE INDICATORS IN 2000. IN LIGHT OF THESE DEVELOPMENTS THIS YEAR'S REPORT WILL TAKE A DIFFERENT APPROACH, FOCUSING ON THE ROLE OF SCIENCE IN THE MEASUREMENT OF SUSTAINABLE FOREST MANAGEMENT.

Criteria and indicators (C&I) are tools for assessing trends in the state of forests and for promoting sustainable forest management. They provide a common basis for international cooperation in working toward sustainable development worldwide. More than 100 countries are currently involved in various C&I initiatives *(see map on page 64)* grouped in broad geoclimatic zones and relating to global, regional, national, subnational or forest management unit levels. As we move into a new millennium, the use of C&I can be a leading innovation in the way we look at forests.

## CONCEPT OF SUSTAINABLE FOREST MANAGEMENT

The advancement of the concept of sustainable development is a reflection of the changing values and attitudes of society. A keystone event in that concept's evolution was the United Nations (UN) Conference on the Human Environment in Stockholm in 1972, where states began to consider the protection and conservation of the global environment as a matter of common concern, and attitudes started to shift from simple utilization toward an ecological orientation. In *Our Common Future* (the UN-endorsed 1987 Brundtland Report of the World Commission on Environment and Development), sustainable development was characterized as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition embodies two fundamental issues: the priority of addressing human needs, and the reality that there are limits to the Earth's ability to meet those needs.

A major step toward sustainable development occurred in 1992 at the UN Conference on Environment and Development in Rio de Janeiro, Brazil, where by approving Agenda 21, world governments undertook to promote sustainable development nationally and to cooperate internationally. Agenda 21 provided the political guidance for initiating and shaping post-Rio processes for implementation of sustainable development. The Conference revealed unprecedented interest in forests, and subsequent activities in part reflected world concern over deforestation. One such outcome was the "Statement of Forest Principles," which helped shape an international vision of the state of the global forest and solidify concepts of how forests should be managed. As a result of its lead role in the forest dialogue at Rio, Canada initiated establishment of science-based, national C&I of sustainable forest management and participated in the advancement of sustainable forest management on a global scale.

## INTERNATIONAL INITIATIVES

In 1993, Canada held the Seminar of Experts on Sustainable Development of Boreal and Temperate Forests in Montreal, Quebec, under the auspices of the Conference on Security and Cooperation in Europe (CSCE). This meeting of 40 countries, plus invited organizations, was the first in-depth, multinational discussion of C&I of sustainable forest management. The resulting Montreal Process has evolved into a working group of 12 member countries representing 90% of the world's boreal and temperate forests outside Europe plus some tropical forests. Its purpose is to develop and promote a framework of internationally agreed-upon C&I for the conservation and sustainable management of temperate and boreal forests, and to define what constitutes "sustainable forest management." The 12 members are Argentina, Australia, Canada, Chile, China, Japan, Mexico, New Zealand, Republic of Korea, Russian Federation, United States of America and Uruguay, with Canada providing the liaison office. Seven criteria and 67 indicators are included in this framework.

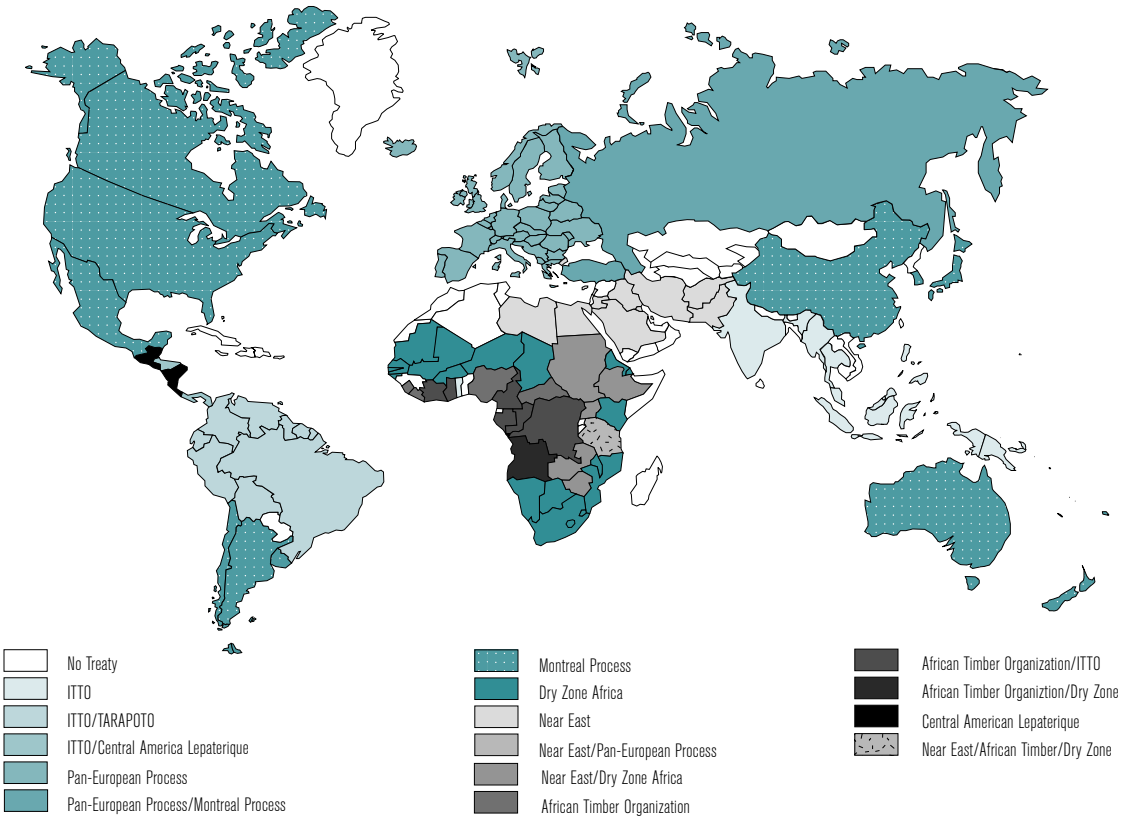
In Europe, 32 countries are engaged in the Pan European ("Helsinki") Process, named after the 1994 conference that listed quantitative C&I to follow the principle of sustainable management of European forests. (Canada is an observer in the process.) Six criteria and 20 quantitative indicators have been adopted.

The International Tropical Timber Organization (ITTO) consists of 52 member countries, 25 of them producers of tropical wood and 27, consumers. In 1992, ITTO's pioneering work on *Criteria for the Measurement of Sustainable Tropical Forest Management* identified 5 criteria and 27 possible indicators, focused primarily on the legal and institutional inputs needed to promote sustainable forest management, with emphasis on timber-producing forests rather than multiple forest benefits.

In the same period, the Amazonian countries started to formulate C&I for sustainable development of the Amazon forest. A workshop held in Tarapoto, Peru, in 1995 recommended adoption of 7 national criteria and 47 indicators as part of the Tarapoto proposal.

Initiatives are also underway in Africa and the Near East. A 1995 meeting of experts hosted by the Food and Agriculture Organization (FAO) and the UN Environment Programme (UNEP) in Nairobi, Kenya, involved 27 sub-Saharan countries and began development of 7 national-level criteria and 47 indicators for forests in dry-zone Africa. A similar FAO/UNEP meeting in Cairo, Egypt, proposed 7 national-level criteria and 65 indicators for sustainable forest management of the Near East region. The African Timber Organization (ATO), composed of 13 member states representing 87% of the African forest cover, is identifying C&I through field tests in forest management. Field tests in Côte d'Ivoire (1995)

REGIONAL AND INTERNATIONAL INITIATIVES ON CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT




and Cameroon (1996) have identified 28 ATO criteria and 60 indicators for sustainable forest management and the timber trade; these are undergoing further testing.

The FAO and the Central American Commission for Environment and Development met in 1977 to develop C&I for the Commission's seven member countries. Eight criteria and 52 indicators at the national level, and 4 criteria and 40 indicators at the regional level were proposed for the Central American Process of Lepaterique.

### FOREST VALUES

An initial step in measuring sustainable forest management is to establish a set of values. This value system evolves over time, as values are replaced or new ones are added. The clearing of forests for settlement, pasture and farming has been practiced since the Neolithic Age. Increasing human populations brought additional pressures on forest lands, and management based on timber harvesting for human consumption was applied to control soil erosion and habitat loss. The concept of sustainability—addressing human requirements while protecting the resource base—has a long tradition in forest management. As early as 1795, the German forester Hartig expressed the concept of sustained yield, by which he meant that for wood supply to be continuous over generations, harvests should not exceed growth. This idea formed the backbone of modern forestry in Europe and North America. Forest values additional to the economic ones related to sustained yield have now gained importance with the acceptance in principle of sustainable forest management. These values include the ecological, social, cultural and spiritual roles of forests.

Commercial values can be separated into forest industry activities such as timber and pulp and paper production, and non-industry activities such as hunting and tourism. The latter activities can be assigned a monetary equivalent, but may require management approaches that

differ from those of timber production and may support different values. For example, fishing and hunting in forested environments provide economic returns to local communities, as well as personal enjoyment to citizens and tourists.

Other values that need to be considered in determining sustainable forest management are non-commercial (non-timber) values. These values are not easily measured or quantified in dollar equivalents. Examples are intrinsic, spiritual, ecological, community and existence values, sometimes referred to as "passive-use values."

An *intrinsic value* is an attribute of the forest itself, independent of its value to any other being, although it underpins social, cultural and economic aspects.

*Spiritual values* include the special relationship and cultural identity that Aboriginal people have with the forest, the aesthetic response to the forest, religious feelings associated with the forest, and the concept of the forest as an archetype.

*Ecological values* are attached to forest stewardship, and ecosystem and human survival. Forests provide ecological functions such as oxygen production, carbon storage, mineral and water cycling, soil and water protection, and climate regulation. Trees store carbon, filter solids from the air, absorb nitrogen from rain and air, and provide shade and other benefits. The quality of water flowing from and through forest ecosystems is highly valued, and the impacts from variations in water temperatures, nitrate levels and suspended sediments are important. Water quality along stream banks, where removal of overhanging branches can raise water temperatures enough to hamper fish survival, is of special concern.

Biological diversity is another valued ecological component of forests. Biodiversity is the variation among living organisms in their genetic makeup and in the ecological complexes of which they are a part. It helps forest systems recover from disturbances and remain productive. Forests have enormous diversity in their types and structures, and they provide homes for a great many species of plants, animals and other organisms in addition to trees. These include wildlife game species and threatened or endangered species. Many agricultural plants and domesticated animals originated from wild relatives that still inhabit forested lands. Maintaining biodiversity entails examining ecosystems at many levels of organization and at different scales of time and space. Potential threats are the fragmentation of habitats through reductions in area, the alteration of microclimates, and the increasing isolation of populations or the invasion of non-native species.

*Community values* are associated with the community's cohesion and quality of life and it's self-identity. Forest communities possess important values in local knowledge attained through years of trial-and-error experimenting, and in consensus-based decisions developed through community participation. Forests provide non-industry commercial opportunities for communities through tourism and recreation. As well, non-timber species may provide communities with food (e.g., wild game, berries, mushrooms, maple syrup and honey),

### ABORIGINAL VIEW OF FORESTS

Approximately 1 million Aboriginal people live in Canada, the majority belonging to one of some 600 First Nations. More than 80% of Aboriginal communities are located in the productive forest zones of Canada. The knowledge that Aboriginal people have gained through their enduring relationship with the land can bring a special perspective and contribute to our understanding of sustainable forest management.

Four components have been used to describe the attitude of respect for the land that shapes Aboriginal culture: community, connectedness, seventh generation and humility. The community comprises all beings and their spirits. All have their proper roles and obligations to others. "Connectedness" refers to the effect that an action on one part of the environment will have on all the other parts. All species are considered part of the whole; none is ranked as more or less desirable. Each species has a reason to exist, even if humans do not understand the reason. The concept of seventh generation supports the belief that land should be sustained and that it is the duty of the present generation to maintain the legacy left by past generations, not only for their children but also for the next seven generations. Aboriginals view the natural world as powerful and complicated. Connectedness may not always be obvious, but it is important when considered over the time scale of seven generations. Stewardship rather than management might be a more appropriate way to describe the idea of interaction with the land, where humans need to be humble in taking any action.

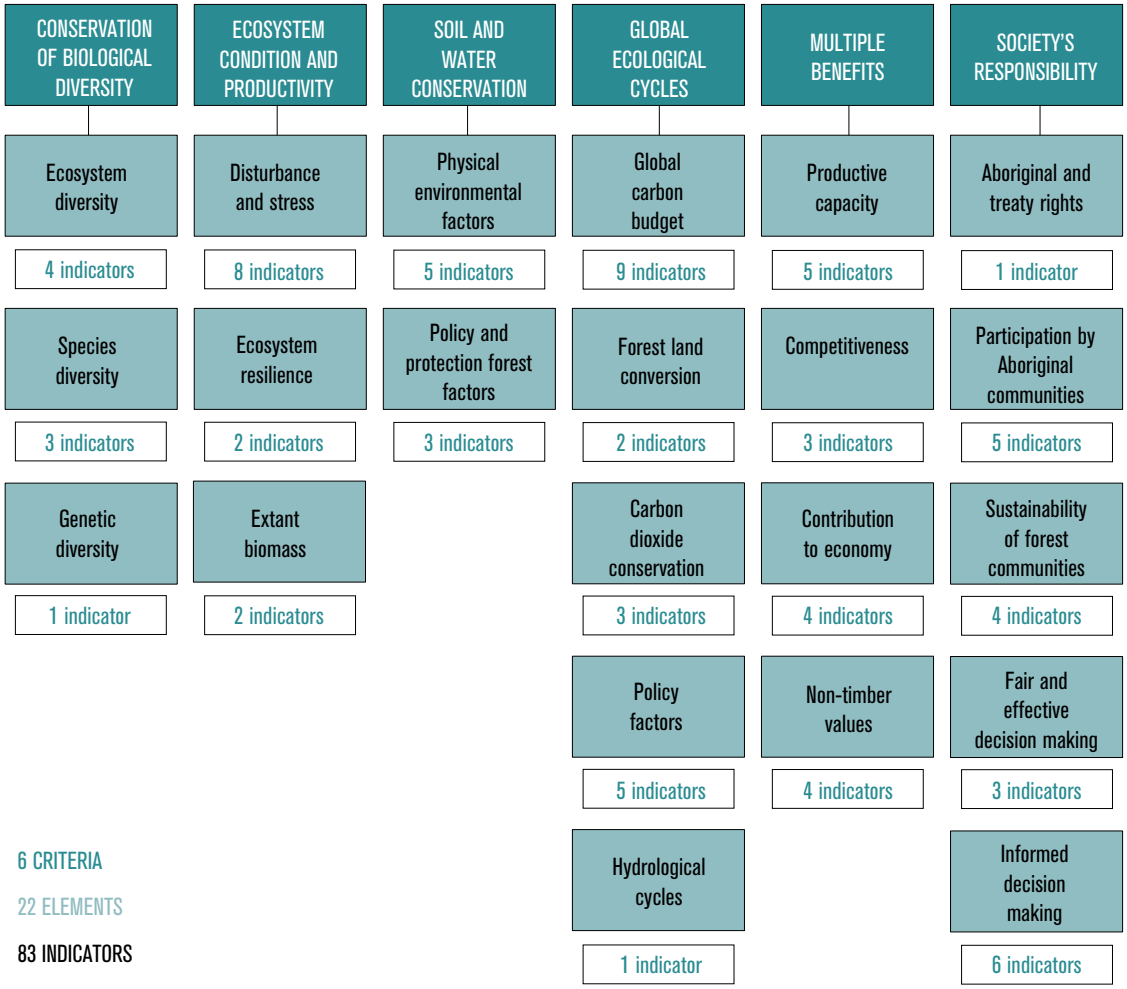
medicine, various other raw industrial and decorative materials, and fodder for animals, in addition to contributing to commercial activities.

People like to know that forests exist and will continue to be available for future generations. The satisfaction derived from this knowledge is considered an *existence value.* Adherence to the Aboriginal seventh generation concept—supporting the intergenerational distribution of benefits—might also be included as an example of an existence value.

### THE CANADIAN PROCESS

Canada's commitment to sustainable forest management was formalized in 1992 with the CCFM's publication of the National Forest Strategy, *Sustainable Forests: A Canadian Commitment.* With this five-year action plan, Canada became the first forest nation to commit to striving toward sustainable forests at a national level. The Strategy also led to the Canada Forest Accord, signed by governments, conservation and wildlife organizations, forestry and industry associations, and Aboriginals. These

**CANADIAN CRITERIA AND INDICATORS FRAMEWORK**



activities predated the Rio "Earth Summit" by several months and enabled Canada to participate at the Summit with a national voice and vision recognizing the importance of sustainable forest management. Formulation of a Canadian vision was the initial step on a long road to achieving sustainable forest management.

In 1993, the CCFM (the public trustee of the National Forest Strategy) launched a public, open process to define science-based C&I of sustainable forest management. The process to develop a framework of indicators involved scientists and officials from the federal, provincial and territorial governments, experts from the academic community, industry, non-governmental organizations, the Aboriginal community and other interest groups, with Natural Resources Canada–Canadian Forest Service designated as the secretariat. The publication of *Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators* resulted from this process.

The framework of C&I thus developed reflects an approach to forest management that recognizes forests as ecosystems providing a wide range of environmental, economic and social benefits to Canadians. Six criteria of sustainable forest management have been identified.

Criterion 1: Conservation of Biological Diversity
Criterion 2: Maintenance and Enhancement of Forest Ecosystem Condition and Productivity
Criterion 3: Conservation of Soil and Water Resources
Criterion 4: Forest Ecosystem Contributions to Global Ecological Cycles
Criterion 5: Multiple Benefits of Forests to Society
Criterion 6: Accepting Society's Responsibility for Sustainable Development

Each criterion is divided into elements (22 in total) and within those elements, 83 indicators track progress in achieving sustainable development.

The second cycle of the National Forest Strategy (1998–2003) was unveiled at the National Forest Congress, held in Ottawa, Ontario, in May 1998. This new Strategy presents a program agenda to address interactions among ecological, economic, social and cultural aspects of sustainable forest conservation and use. The Strategy adopts the CCFM's C&I framework and action plans for reporting on progress in 2000 and on a regular basis thereafter. *(see pages 20-21.)*

#### A CRITERIA AND INDICATORS FRAMEWORK

The establishment of criteria brings to light values that are important in sustainable forest management, such as the vital functions and attributes of forest ecosystems, which highlight ecological values such as biodiversity and forest health; or the multiple socioeconomic benefits of forests, which point to values such as timber (commercial), recreation (non-industry commercial) and culture (passive-use). Indicators are then identified that focus on variables that can be used to measure the criterion. Examples are measuring the availability and use of recreational opportunities to report on multiple benefits of the forest, or using reports of the area and severity of insect attacks and disease infestations to evaluate ecosystem condition and productivity. Indicators may be quantitative, such as the percentage and area of land covered by forest, or qualitative, such as indicators related to forest planning, public participation, and investment and taxation policies. Both are necessary to assess sustainable forest management at the national level. No single criterion or indicator stands alone as a measure of sustainable forest management. It is the full complement of C&I that, when measured together over time, enables assessment of the state of the country's forests and describes trends toward sustainable forest management.

The framework of C&I provides a common understanding and implicit definition of sustainable forest management in terms of national policy and its implementation. The framework positions the potential measures of process and effect, and identifies gaps that need to be filled. The starting point is the existing information. Activities are identified that are not yet measured but could be in the future, including activities for which the means of measurement are not yet obvious. The democratic process can create difficulties for determination of what constitutes sustainable forest management at the national level. Most of Canada's forests are publicly owned, and citizens can influence the way they are managed. Since public perception may shift over time, the framework should include a blending of public values with science-based observations. Such an approach will enable the continual evaluation and consideration of new information as it becomes available.

It is important to emphasize that C&I are not performance-level standards or measures, although to use them, a strategy is needed for measuring performance. This can be achieved by establishing standards and acceptable

or threshold limits. Standards of performance are quantitative or qualitative descriptions of the expected level of performance. Indicator measurements represent a range, not a single point. Acceptable limits are descriptions of the upper and lower limits between which performance, as evaluated by the indicators, should fall. If an indicator does not have thresholds or targets, it is not possible to infer from the data whether a trend is positive or negative, or whether a particular quality of forest management is sustainable. Forest indicators, theoretically, can serve the same kind of functions as economic indicators such as inflation, employment or interest rates, which many countries use to indicate the overall health of national economies and to stimulate policy adjustments to achieve economic objectives. The use of C&I should greatly improve the quality of information about forests and the impacts of forest management practices. This information, made available to decision makers and the public, could lead to new policies and programs and provide for more informed debate on forestry issues at local, national, regional and international levels. The Canadian (CCFM) C&I national framework is intended to:

- clarify sustainable forest management and provide a framework for description and assessment at a national level;
- provide a reference point for the development of policies on the conservation, management and sustainable development of forests;
- provide a scientific and policy basis for the clarification of issues related to environment and trade, including product certification;
- provide concepts and terms to facilitate a meaningful domestic and international dialogue on sustainable forest management; and
- improve the information available to the public and decision makers.

#### NATIONAL, SUBNATIONAL AND LOCAL SCALES

Appropriate C&I can be used for assessment at any scale: global, regional, national, subnational or local. Assessment at the national level evaluates the progress of a nation toward sustainable forestry in the management of all its forests. At the forest management unit level, the quality of management can be assessed in relation to the particular objectives of management for the area (e.g., production, protection, multiple purpose or others). Most criteria and many indicators are appropriate at various levels, but some are used uniquely at the national or local level.

National C&I may ultimately be most useful if they are broken down to lower levels for validation. Field testing can identify C&I that are objective, cost-effective and relevant to the sustainable management of specific forest types. Canada's 11 model forests, covering more than 6 million hectares of land, represent the diverse ecologies of the major forest regions of Canada. They serve as field laboratories, providing unique opportunities for testing and validating C&I at a local level.

#### TECHNOLOGICAL ADVANCES IN FOREST SCIENCE

Through the use of a C&I framework, incorporating diverse types of information from various sources, it should be feasible to understand sustainable forest management in a way that is not possible based on a single definition. Forest databases and other related information systems already contain vast amounts of information. This information may not be used to its potential if separated from its original application, or if not available in the right form. To be effective, the development and implementation of C&I should be supported by the best available experts and the full range of stakeholders, and aim to produce widely accessible and user-friendly information. The implementation of C&I may encourage renewed efforts to bring order into the collection, storage and dissemination of existing data and information. The C&I framework can be thought of as a toolbox containing concepts and measures to describe sustainable forest management. Identification of information gaps will allow resources to be directed toward the acquisition of priority information, which may lead to the definition of new research priorities where it is evident that essential data or appropriate methodologies for the accurate assessment of sustainable development are not available.

Recent advances in forest science have greatly improved the potential to report on C&I. A critical mass of information can now be accumulated without a huge financial investment. Electronic communications and the Internet give scientists rapid access to information, and research institutes, libraries, abstracting services, governments and other agencies are distributing information on CD-ROM. High-quality remotely sensed imagery dealing with forests and natural resources is now much

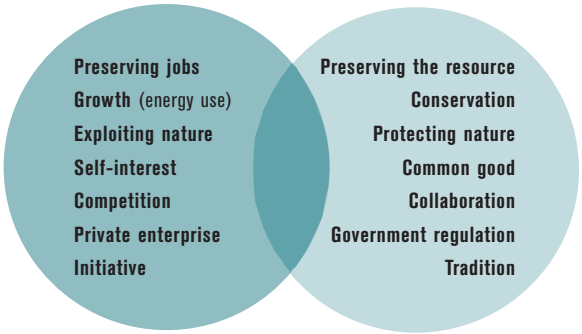
more advanced. The development of the capacity to interpret this information digitally and the advent of widely available radar images covering the forests of the world are leading to a situation in which information on at least some attributes of forests will be easily available worldwide in a form that permits time-series comparisons. This is of great importance to C&I, because the ability to measure the direction of change and to compare measurements over time is essential for determining progress toward sustainable management. Information that might previously have been generated in separate localities from estimates derived by extrapolation (rather than actual field measurement) may now be produced by a few centres of excellence that can efficiently treat large amounts of data and disseminate the results with ease.

The introduction of Geographic Information Systems (GIS) in forestry applications has opened up new possibilities for analyzing data, particularly multi-source information. This is of importance from global to local levels. The Geo-Positioning Systems (GPS) technology, valuable for plot location, has been adapted for routine use in some applications, although for others it is just being introduced. Establishing a Forest Information System (FIS) as part of a GIS can bring advantages to planning management and decision making, and to the control, execution and coordination of applications. An FIS based on ecosystem management, social and economic stability, and sustained yield of forest products can provide evaluation methods that handle multiple criteria and can examine various alternatives, including conflicting criteria and objectives. Although technology is increasing exponentially, there is a risk that policies may become too dependent on it. For example, GIS and computer models make many implicit assumptions that may be based on little evidence. An FIS dealing with the impacts of management practices and environmental pressures on forest ecosystems should be constructed on a solid foundation based on an appreciation of biological processes.

### A NEW VISION OF FOREST SCIENCE TO EVALUATE SUSTAINABLE FOREST MANAGEMENT

Knowledge is gaining importance as a determinant of the economic importance of a nation. Originating as data, it becomes information, which in turn may be passed on as knowledge. Knowledge obtained and tested through scientific methods becomes science. Science associated with

**POTENTIAL VALUE CONFLICTS IN SUSTAINABLE FOREST MANAGEMENT**




separate disciplines often gives rather diverse forms of knowledge, data and perspectives. One of the strongest needs in policy related to C&I implementation is to be able to integrate a diverse set of scientific information into a product or set of conclusions that are accurate and understandable to decision makers and to public interest groups.

In theory, science is the pursuit of knowledge. Exercising science demands open-ended inquiry while striving to be as objective as possible. Science alone can not reconcile opposing points of view that are based on values, because science was not designed to be judgmental or to deal with emotions. Through scientific study we have learned that ecosystems are interactive, interconnected and interdependent systems in which the whole is expressed through the functioning of its parts, not by the parts themselves. To learn about forests using an ecosystem approach requires that the knowledge acquired through scientific experiments be evaluated and equally weighted with other types of knowledge.

This shift in forest science, from working with individual components of forest systems to a more eclectic approach, is essential in considering the three major interrelated components of sustainable forest management: natural systems, sociopolitical systems and economic systems. From this perspective, the decision to cut or plant a tree, or to introduce or eliminate a species in the forest will also affect the people working in the forest, the local community, local businesses depending on the forest for other products, the ecological functioning of the forest, and so on. When all these implications are considered, the need to understand the causal links

between ecological, economic and human factors of sustainable forestry becomes apparent.

To evaluate our performance in sustainable forest management, we need not only obtain more and better scientific knowledge, but also adapt the culture of science as applied to forests and expand the universe of forest science and forest policy. This will allow for a better understanding of the implications of multi-stakeholder decision making on forests, the relationships between people and forests at the local community level, and the way these connections affect global forest practices. An ecosystem approach to forest management reveals that many aspects of forest production are governed by non-scientific factors, such as political and social developments, human conflicts, fiscal policies, agricultural and trade policies, or resettlement claims.

Much of forest research was traditionally concerned with improving productivity for timber—the genetic resources of trees, site management, silvicultural treatments, inventories and monitoring at the forest stand level. To function with a multi-value approach to sustainable forest management driven by many stakeholders, forestry has expanded to include fields such as sociology, anthropology, law and ethics. Research priorities also have changed. The new scientific culture in forest research includes investigation of extra-sectoral influences, social interactions and the environment. It also needs to understand the relationships between interventions at different scales and to adapt management objectives to changes in stakeholder perceptions and requirements. This approach may simply consist of viewing elements in a new perspective, such as finding ways of incorporating elements of Aboriginal culture, community traditions or ecological practices into forest management plans.

### CHALLENGES IN THE IMPLEMENTATION OF CRITERIA AND INDICATORS

Where environmental, sociopolitical and economic values are included in decisions about sustainable forest management and utilization, such as the ways to meet future consumption demands, or the multiple benefits that will best satisfy the needs and desires of various users or stakeholders, it is inevitable that sometimes values will appear to conflict. An example of such a situation would be a decision on the economic development or preservation of a forest where the values of community sustainability and resource sustainability are in apparent conflict. If not resolved, conflicts can be debilitating; effective mechanisms for conflict management or dispute resolution must be included in the framework and the process. Conversely, conflict can also stimulate progress. The challenge in trying to resolve conflicting issues is not to view competing values and demands as conflicts, but as dynamic balances. With such a philosophy it may be possible to arrive at innovative solutions that harmonize the competing values to an extent that permits long-term survival. Economic analyses have shown that products that reconcile seemingly opposing values have often outperformed conventional products developed under systems incorporating fewer values.

Another challenge to implementing C&I is selecting appropriate methods for measurement of non-commercial and passive-use values. One approach is the use of surveys or other similar methods of measuring or mapping to quantify the value that people attribute to something. These methods have been suggested as a way of enabling decision makers to analyze a broad range of diverse types of information and may enable decisions on non-timber values to be based on quantitative information. The drawback of such a method, however, is that it ignores the degree to which a decision is based on the information available, rather than recognizing the essential role of judgement in assessing the relative strengths of various values.

With respect to non-timber values, issues requiring attention are a context and consultation process for dealing more adequately with the interrelationships of commercial and non-commercial forest values, information on the range and importance of non-commercial forest values, and forest accounting frameworks that incorporate qualitative data on values and methodologies for factoring in intergenerational liabilities.

The development of acceptable methods to measure biodiversity has been stressed as a major gap in ecological values. Terms such as "old-growth forest," "keystone species" and "fragmentation" all have significant policy implications. Validated methods suitable to satisfy the needs of policy makers and conservation groups while maintaining scientific rigor are required.

### SCIENCE AND TECHNOLOGY CAPACITY TO EVALUATE SUSTAINABLE FOREST MANAGEMENT

Because of the complexity of forestry issues and the limits on resources available for forest research in Canada, no single agency can address all issues. Research partnerships and alliances between governments, private institutes, the academic community and other outside agencies are being formed to fill the needs created by this challenge. Many organizations and agencies are involved in forest science and technology, and the science community is forming multidisciplinary teams.

The Canadian Forest Service of Natural Resources Canada is the largest forest research agency, with 10 national science and technology networks delivering the program from five research centres located across the country. Many of the provincial governments support forest research programs related to jurisdictional responsibilities. Seven Canadian universities have forestry faculties, and many other Canadian colleges and universities contribute to forest-related science and technology from fields such as engineering, biology, chemistry, mathematics, computer science, physics and the social sciences. These fields probably will expand to reflect the new holistic vision of forestry, with representation from additional faculties such as political science, systems analysis, philosophy, anthropology, native studies, recreation and more. Three national research institutes support the forest industry in Canada. The Forest Engineering Research Institute of Canada (FERIC), Forintek Canada Corp. and the Pulp and Paper Research Institute of Canada (PAPRICAN) conduct research and development in forest engineering, wood product development, and pulp and paper technology, respectively. Some of Canada's larger forest companies have their own research facilities or conduct applied research and development in cooperation with the national institutes.

### THE NATIONAL SCIENCE AND TECHNOLOGY PLAN OF ACTION

To ensure that Canada's forest policies and practices integrate environmental, social and economic values, the forest science and technology community met to draft the National Forest Science and Technology Course of Action. This action plan was incorporated into the CCFM's National Forest Strategy to meet the need for the sustainable development of the forest, the forest industry and forest-based communities, and to advance C&I for sustainable forest management. Participants at the

National Forest Science and Technology Forum agreed that more and better information is needed to measure and report on progress toward sustainable forest management, and that answers are required for two important questions: will the C&I, which reflect public values, clearly define sustainable forest practices, and can the broad range of indicators be properly measured? The three following areas were identified as priorities:

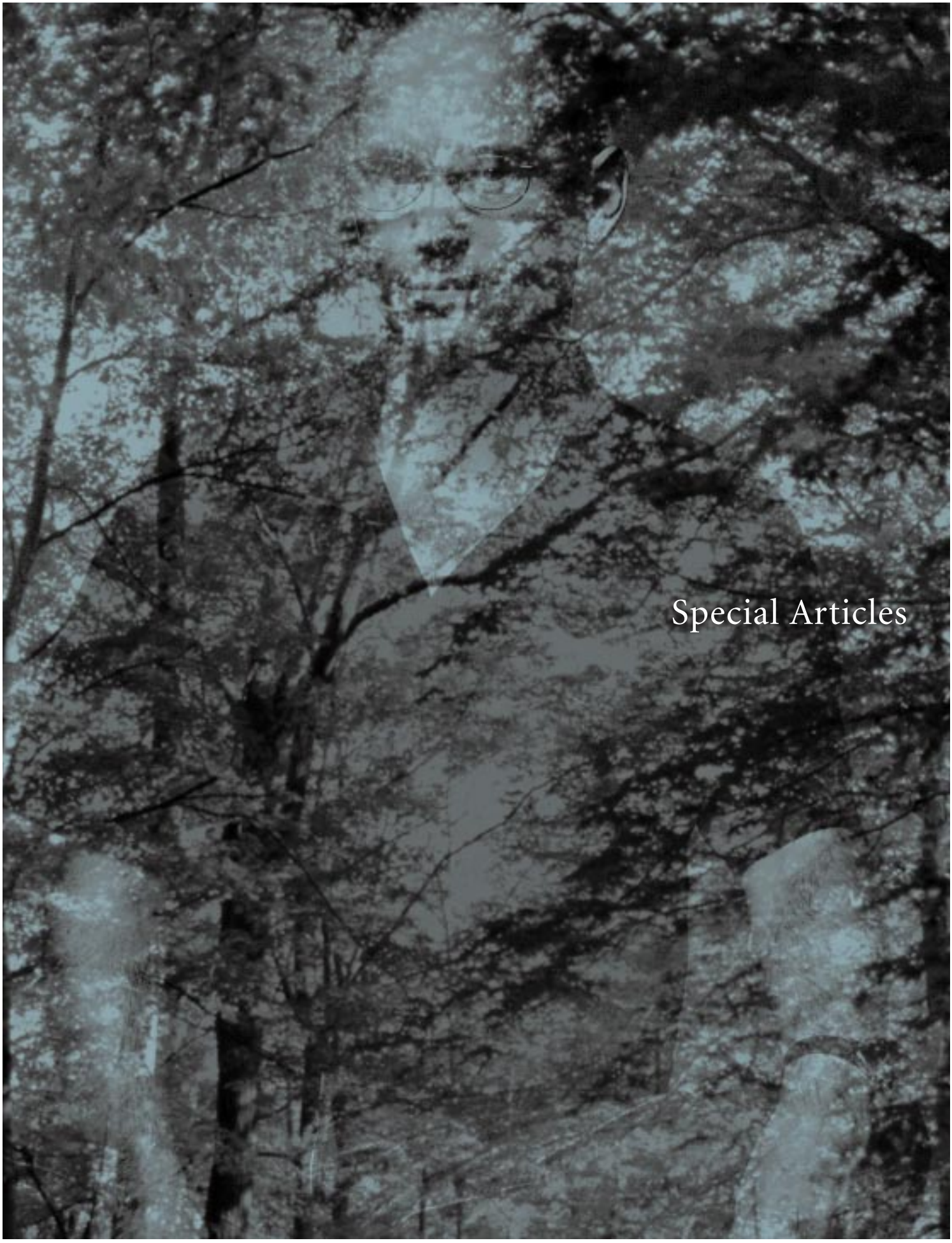
- setting technical and scientific standards or thresholds of change that would enable better gathering and interpreting of information;
- determining whether an indicator is useful and significant at a global, national or management level; and
- determining what constitutes sustainable forest management from the socioeconomic perspective.

### THE PATH FORWARD

Current forest policy gives priority to environmental, sociopolitical and economic values. This tendency supports preservation of the integrity of forest ecosystems, encouragement of citizens' involvement in the policies and programs that affect their values, and promotion and maintenance of regional identity. C&I are the tools that can be used to conceptualize, evaluate and implement multiple-value systems in sustainable forest management. This approach may require several years of monitoring to acquire trend data. In addition, human needs and values are numerous, diverse and evolving, and sometimes may be competitive. Ecosystems are large, complex and highly variable in time and space, bringing elements of risk and uncertainty to decisions

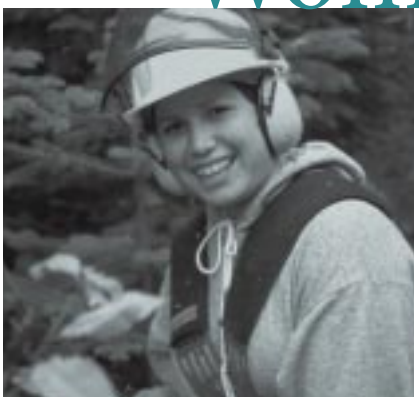
on forest management and policy, because complete knowledge of ecosystems and their response to management will never exist.

The use of a proper set of C&I enables evaluation of performance and assists in understanding what sustainable forest management means. The realization of sustainability, however, will remain an ongoing dynamic process. Policies like the C&I framework are experiments from which we can learn. C&I are meant to represent the best state of current knowledge and are open to constant revision and improvement in the light of increased knowledge. As knowledge of forest processes and uses expands, concepts of sustainable forest management and the components of national well-being also will change.



# Special Articles

# Women IN FORESTRY



*THE STATE OF CANADA'S FORESTS* REPORT LOOKS AT SIX WOMEN, FROM CANADA'S FIRST FEMALE TIMBER PATHOLOGIST TO TODAY'S FORESTERS AND BUSINESS LEADERS, WHO HAVE EARNED A PLACE IN THE MALE-DOMINATED FIELD OF FORESTRY. THIS HANDFUL OF SPECIALISTS REPRESENTS A GROWING AND IMPRESSIVE GROUP OF WOMEN MAKING THEIR MARK IN FORESTRY.

THE EARLY DAYS OF FORESTRY WERE DOMINATED BY THE SHANTY BOYS CUTTING CANADA'S ENDLESS FORESTS. IT WAS NO PLACE FOR A WOMAN. GRADUALLY THE EMPHASIS SHIFTED FROM MINING TREES TO MANAGING THEM, FROM NEEDING BRAWN TO USING BRAINS. AS A RESULT, FORESTRY PROFESSIONALS WERE ON THE INCREASE, AND WOMEN BEGAN ENTERING THE FIELD.

The first wave of women to enter the field of forestry were research scientists working in laboratories. Beginning in the 1920s and 1930s, women such as Clara Fritz, Mildred Nobles and others were conducting forest-related research.

For many years, lab work remained one of the few areas open to women. Even in the mid-1950s, when Thérèse Sicard graduated as a professional forester, women were not welcome in the woods.

Today, more doors are open to female foresters. Francine Dorion, for example, is about to become the chief forester of a major company. But even so, women in her field are far from commonplace, for females make up only 5–8% of foresters.

Women in Canada's corporate boardrooms are another minority. But more than 20 years ago, Guylaine Saucier was making a name for herself as president and CEO of a forest company. Today Diana Blenkhorn, president and CEO of a lumber bureau, is doing much the same thing.

Slowly women are fanning out through all forestry occupations, from planting trees and fighting fires, to teaching in universities and forming policy in government departments. However, their numbers are small. Many of the women in decision-making positions are still relatively young, and their time has yet to come.

### CLARA FRITZ 1889–1974

#### Canada's first female timber pathologist

In 1889, Clara Fritz was born into a family that produced female non-traditionalists. While Clara went on to become Canada's first female timber pathologist, her younger sister, Madelaine, was a well-known geologist.

Clara was 36 when she joined the Forest Products Laboratories of Canada in 1925, in Montreal. After the laboratories were moved to Ottawa in 1927, the first project she undertook was to tackle the problem of *Fomes pini*. This fungus, known to attack jack pine, produces a white pocket rot that destroys the tree's tissue, rendering it unsuitable for the lumber used by railway companies as ties. After selecting a random sample of infected ties directly from an Ontario mill, Clara treated some of them with creosote. It was found that the untreated ties were attacked by many secondary organisms, which caused more rapid decay. In the treated ties, very little secondary infection was found, and the *Fomes pini* did not develop and cause pocket rot. As a result, the railway companies were able to accept much of the wood that previously would have been discarded, leading to an estimated savings of up to $2 million a year.

Although Clara recognized the importance of the jack pine work, she enjoyed collecting cultures of wood-rotting fungi and identifying them. The cultures were made by taking small fragments of decayed material and imbedding them in a jelly. After a few days, a characteristic growth would appear on the surface of the jelly. "When I was at the University of Toronto studying for my doctorate, I found that each fungus had a characteristic growth, so that if we compared one culture to another, we could establish its identity if we had a culture from a fruit body to which it would correspond."

Another scientist—Mildred Nobles—who worked on trees rather than lumber products would soon extend and develop Clara's research.

### MILDRED NOBLES 1903–1993

#### An icon in mycology and forest pathology

Fresh out of Queen's University in 1929, Mildred Nobles, then 26, went to Ottawa looking for work. There she met a mycologist at Agriculture Canada, Irene Mounce, who whetted Mildred's appetite for forest pathology. Irene is said to have made the field sound so interesting that Mildred was ready to work for free. After a summer working for Irene, Mildred went back to university to obtain a PhD in her chosen area.

Rejoining Agriculture Canada in 1935, Mildred went on to become a world authority in the field of wood-decaying fungi. She retired from the Department in 1969, having extended and developed the research of Irene Mounce and Clara Fritz. Her work helped solve many decay problems in tree stands. For example, it enabled foresters to better manage tree stands and to harvest trees at the optimum time.

Fungi are plant-like organisms that can not produce their own food. They depend on other organisms—trees, for instance—for food. In the 1940s and 1950s, there was a great push at Agriculture Canada to study decay in forest stands. Mildred's lab became the support centre for those investigations.

So little was known about these fungi that they could be identified only when they reached their fruiting stage. For example, a mushroom is the fruit or reproductive part of a particular fungus. The rest of the fungus, hidden from the naked eye, is a tangled bunch of slender white threads called "mycelium." It was Mildred's task to identify fungi at the slender white thread stage—its non-fruiting stage.

Her approach was to compare the known with the unknown. She would start with cultures from fungus fruiting bodies that were identifiable. Cultures of decays from affected trees could then be identified and classified. If cultures displayed shared characteristics, such as color, microscopic features, rate of growth, similar patterns of growth (e.g., bands fanning out across the petri dish) and other reliable criteria, the two cultures were accepted as the same species of fungus.

Each feature was assigned a number. A particular series of features would therefore correspond to a particular series of numbers. This numeric code became known as the "Noble's Species Code." Today her system is used internationally.

Mildred was well known for running a tight ship and took meticulous care with her cultures. There was no other way with up to 3 000 cultures waiting to be compared annually.

To the unobservant eye, her cultures looked like little bits of fuzz. But to Mildred these cultures provided many answers, and sometimes, more riddles. But with an indefatigable spirit, Mildred marched on, knowing there was a light at the end of the tunnel.

## THÉRÈSE SICARD

### Laval University's first female forester

Thérèse Sicard's family tree contains a healthy undergrowth of foresters: her father, her husband, herself, her daughter, and her son- and father-in-law. This 4:2 male–female ratio is a far cry from Thérèse's early days as a forester.

When she joined Laval University's forestry program in 1952—the first female to do so—she was the only woman among 100 students. "I was their 'little sister'," she explains. "The boys watched to make sure I did things right." Others watched too. One day as her class surveyed the campus, the Dean received a phone call warning him that a girl was accompanying his students.

Such was the mind-set in the early 1950s. And in some ways, Thérèse bought into it too. "My image of a forester was the same as everyone else's—a man in a lumberjack shirt, wearing big boots, living deep in the woods for months, and sleeping in a tent."

It was Laval's Dean of Forestry at the time—a friend of her father's—who made her think twice about the profession. "If I were a boy," Thérèse told him, "I'd go into forestry." Actually, she had no desire to work in the woods, but she was interested in studying science, particularly physics, chemistry and biology. Instead of laughing at her joke, the Dean persuaded Thérèse to look seriously at forestry. Before long, she was convinced. In this field she could follow her passion for science, she could carry out research in labs, and she liked the challenge of doing something no one else had done.

#### The search for the right word

After raising a family, Thérèse returned to a unique aspect of forestry: researching forestry terminology in French. "There were at least five different French terms to describe a feller buncher. Practitioners in

the field needed to know the specific term to eliminate confusion." Another typical problem was that a piece of equipment was often labelled by its company name, which caused confusion when the company introduced another machine.

Her search for the "appropriate" French equivalent grew into a three-volume dictionary/vocabulary of terms that Thérèse considers her greatest forestry achievement. The three volumes focus on terms related to forest mechanization, biomass and sawmilling. Two volumes were jointly funded by the Forest Engineering Research Institute of Canada (FERIC) and Quebec's Office de la langue française. The latter funded and published all three volumes between 1982 and 1992. More than a dictionary, these works list the English and French words, supply a definition, and provide many explanations. The three volumes are available in hard copy and are also part of a huge database on French terminology.

The essential ingredients that enabled Thérèse to perform this kind of work are intellectual curiosity, followed by patience and perseverance. Whether she is working on a project for others or reading for pleasure, Thérèse is never far from a dictionary or encyclopedia. "Whenever I come across a new term, I have to know the right meaning."

In 1996, the Ordre des ingénieurs forestiers du Québec recognized Thérèse for her exceptional services.

## GUYLAINE SAUCIER

### Forest company flourished under Guylaine Saucier

Shortly after Guylaine Saucier took over a Quebec lumber company in the 1970s, she jumped from the frying pan into the fire. But like the phoenix, she rose renewed from her ashes.

In 1975, after four years as comptroller of her father's forest company, Guylaine became President and CEO of Le Groupe Gérard Saucier Ltée. But the price was high—her father had died in an accident. She was 29 years old.

Two weeks later, she received another blow: a strike in the pulp and paper industry. It wiped out the wood chip market—25% of the company's total sales.

"I had to learn fast," she recalls. So she turned to her employees. "Oh, I understood financial statements and figures, after all I was a chartered accountant. But for the rest, I was very much ready to listen and to learn. I met with my people regularly to discuss our successes, our problems, how to handle a crisis. We built a trustworthy relationship. Even in hard times I could talk to them and get their support." The situation was quite the reverse elsewhere. "To say that there was industry skepticism is an understatement," she recalls. "Shortly after I became president, a competitor called to congratulate me. Then he said it would be a miracle if I lasted six months." His remark triggered the tenacious side of Guylaine's nature. "I will be there," she told herself.

But her motivation ran deeper than the desire to prove her competitor wrong. "I was responsible for my family's welfare." The company had been left to Guylaine and her five younger siblings. "Our entire family fortune was in the company. That's a heavy responsibility for a 29-year-old."

At the time, the company was at a cross-roads—involved in logging and sawmilling, but with no finished products or marketing capabilities. She boldly chose expansion. From 1975 to 1988, the company bought other sawmills and built a dry kiln facility and a planing mill. The number of employees rose from 400 to 1 100, and annual sales climbed from $17 million to $85 million.

Tagged by competitors and industry watchers as "la femme des bois," Guylaine sold the family business in 1988. The following year she became a Member of the Order of Canada for her exceptional civic-mindedness and her significant contribution to the business world. Today Guylaine is Chair of the Board of Directors of the Canadian Broadcasting Corporation.

## FRANCINE DORION

### Abitibi Consolidated Inc. chooses Francine Dorion as next Chief Forester

Francine Dorion, Abitibi Consolidated Inc.'s Chief Forester as of January 1999, is a person who needs to be outdoors. "I developed a love for forests as a child during family camping trips. Later, I was drawn to people in the field of forestry because they're open, good people."

When she assumes her new position, Francine will be responsible for 12 million hectares of public land and 500 000 hectares of private land. Currently Divisional Forester of the company's Saguenay/Lac St. Jean region, she is responsible for the forest management of 4 million hectares of public and private land.

Undaunted by the responsibilities that face her, Francine jumps into the heart of the real issues. "Forests are a major resource, so how we manage them is important." Francine is adamant that while the provincial government is responsible for managing overall policy, foresters and the forest industry need more latitude. "We all agree on the objective—sustainable management—but we want the latitude to accomplish it efficiently."

Francine seems to gobble up challenges as though they were tempting appetizers. She looks forward to implementing one company policy across Abitibi Consolidated's operations in Ontario, Quebec and Newfoundland. "Yes, there's a different context with different provinces, but there's lots of room for synergy, to exchange different aspects, and to improve our way of doing things."

"For me, it's a question of management style. I'm a team person. I rely on input from the people I work with. And I respect people who work in the bush; they really know the forest." She believes in delegating responsibility to others. "It's surprising how innovative people become when they take on responsibility."

The challenges of the changing forest do not alarm her either. "Twenty years ago, industry was almost alone in the bush, there weren't problems with a sustainable timber supply, and public participation wasn't a major concern. Things have changed. Now we're working on redeveloping sustainable and environmental aspects," she says.

"My personal challenge is to develop a new way to do forestry. We need to include Aboriginals, other forest users and communities. We have to bring in public concerns, ecology, all of the economic, environmental and social aspects of sustainable forest management."

Nicknamed "Mrs. Pilot Project" for her repeated use of the phrase "just to test," Francine is trying to develop a way to work efficiently with other stakeholders. "By law in Quebec, forest companies are required to consult the public after a forest management plan is developed. We've started a pilot project to consult people beforehand. People aren't used to this pre-consultation process, but it's the new way."

Getting people used to the new way is a role she is familiar with. With few females holding high-profile positions in forest companies, she is often the only woman in a forest of men. A director once told her, "We've learned to see you as a person, not a woman." Francine admits that for the first 10 years, she felt she had to prove herself. "But once you're known," she says, "it's okay. After all, it's a big change for men."

Early in her career, Francine became aware of how big that change can be. "My supervisor and I had gone to see an operation in the bush. It was lunch time when we arrived, so everyone was in the cookhouse eating. When my supervisor opened the door, all the men turned to stare. Every guy kicked his neighbour under the table until they were all watching me. But there wasn't a sound. Just silence."

In the 20 or so intervening years, Francine has lived by a simple code that can be applied to the many levels of her job, whether she is working with staff or other stakeholders. "Make things clear

from the beginning. Define your principles, develop a vision, and go forward. Once the principle is settled, it's easy to work out problems."

### DIANA BLENKHORN

#### Long list of "firsts" for lumber bureau president, Diana Blenkhorn

Diana Blenkhorn remembers a winter scene of her grandfather yarding logs with a big grey workhorse. "By the time he was 80, the horses were gone, but he was still active on his woodlot surveying what needed to be done."

President and CEO of the Maritime Lumber Bureau (MLB), Diana has built up close to a quarter-century of experience with the Bureau. And coming from a family of private woodlot owners and sawmillers, perhaps—as a former secretary once claimed—Diana does have sawdust in her veins.

Diana's list of forest-sector achievements is extensive: first woman to be appointed CEO of a certified lumber-grading agency in North America, first woman elected MLB "Man of the Year," first woman appointed President of Canada's National Lumber Grades Authority, first Canadian to serve on the American Lumber Standards Committee, and recipient of a Canada 125 medal for her efforts in forest management.

Over the years she has earned the reputation as someone who does her homework. "I'm analytical. I weigh the pros and cons, and anticipate my opponent's point of view." Add a photographic memory, and it is hard to challenge her research.

In terms of her own success, Diana credits her commitment and tenacity as the personal qualities that have got her where she is. "I see myself as someone who pays tremendous attention to detail. And I want to get issues resolved."

Diana has been front and centre in resolving situations that are critically important to her industry. The area that interests her most is market access.

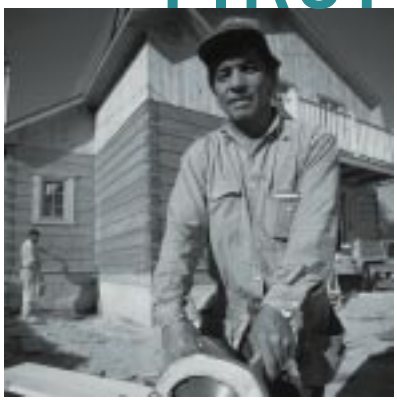
She was instrumental in securing a 1995 lumber agreement with the United States. Diana considers this agreement, which guarantees the Maritime provinces unrestricted access to the United States market, to be her greatest forestry achievement. "The 1995 agreement covering the Atlantic provinces records why our situation is different from the rest of Canada," she explains. "It gives us a legally defensible position that we can refer to in the future."

Diana's attention to detail and her need to resolve issues have paid off on another front. For 25 years, Canada's National Lumber Grades Authority asked for a voice on the American Lumber Standards Committee. Two years ago, it was Diana's turn to present Canada's case to the Americans. Since then, she has become Canada's first full-voting member on the Committee. "With a fair share of our lumber exports going to the States—28%—it was appropriate that we have a voice in setting standards," she says.

Not one to mince words, Diana voices her views on another set of standards. As a top female executive, she has witnessed one obstacle that she deplores: female tokenism. "When it comes to committee appointments, I always ask, 'Do you want me because I'm female or because I'm qualified?'" A woman's technical and industry abilities better be among the best, otherwise Diana will readily launch into her "soap-box routine," criticizing tokenism in political equality policies. However, she is a strong advocate of equality in the work force.

Being among the best and staying strong as an industry are top priorities for the MLB. That is why Diana's long-term goal is to keep unity in the lumber industry in Atlantic Canada. "It's important that we keep operating as a region, not as individual provinces and individual producers." Her motivation is as personal as it is professional. "In the Maritimes, sawmilling continues to be an established tradition and way of life. Success ensures the viability of our industry and our way of life."

# In Partnership with FIRST NATIONS



TRADITIONALLY, THE FOREST HAS PLAYED AN IMPORTANT ROLE IN THE SOCIAL, SPIRITUAL AND CULTURAL LIVES OF FIRST NATION PEOPLES. BUT FORESTS ALSO CONTRIBUTE TO THE ECONOMIC DEVELOPMENT OF FIRST NATIONS.

ALMOST 80% OF FIRST NATIONS LIVE WITHIN THE BOREAL AND TEMPERATE FOREST REGIONS OF CANADA. THE TOTAL AREA OF THE APPROXIMATELY 2 300 FIRST NATION RESERVES EXCEEDS 3 MILLION HECTARES, OF WHICH 1.4 MILLION HECTARES ARE SUITABLE FOR SUSTAINABLE, CONSUMPTIVE, RESOURCE-USE INITIATIVES SUCH AS TIMBER MANAGEMENT, HUNTING, TRAPPING, FISHING, AND GATHERING HERBS AND MEDICINAL PLANTS. AS WELL, THESE FORESTS ARE USED FOR NON-CONSUMPTIVE FOREST ACTIVITIES SUCH AS RECREATIONAL, SPIRITUAL AND CULTURAL USES.

Although forest lands on many reserves are too small to support large-scale, long-term commercial forestry, they offer a foundation upon which First Nations can build technical capacity, develop on- and off-reserve business partnerships, maintain their spiritual and cultural connection with the land, and continue to carry on traditional uses of the landbase.

The First Nation Forestry Program (FNFP), a partnership program between First Nations and the federal government, was introduced in April 1996. The Program is aimed at improving economic conditions in status First Nation communities by promoting increased First Nation involvement in the forest sector.

The five-year Program is designed to create jobs, encourage financially viable forestry operations, and enhance First Nation forest management skills. The objectives of the Program are:

- to enhance the capacity of First Nations to operate and participate in forest-based businesses, and to increase the number of long-term jobs in forestry for First Nation members;
- to increase First Nation cooperation and partnership;
- to investigate the feasibility of trust funds, capital pools, or similar mechanisms for financing First Nation forestry development; and
- to enhance the capacity of First Nations to sustainably manage reserve forests.

The FNFP involves First Nation communities presently active in the forest sector, as well as those becoming more interested in the opportunities related to forestry activities both on- and off-reserve. The benefits to the community are numerous. Community youth and workers benefit by combining traditional skills with new concepts and technologies. Communities benefit as First Nations start up new businesses or enter into joint ventures. Forest managers, First Nations and others recognize the value of forest management approaches that integrate First Nation traditional knowledge and use of the forest.

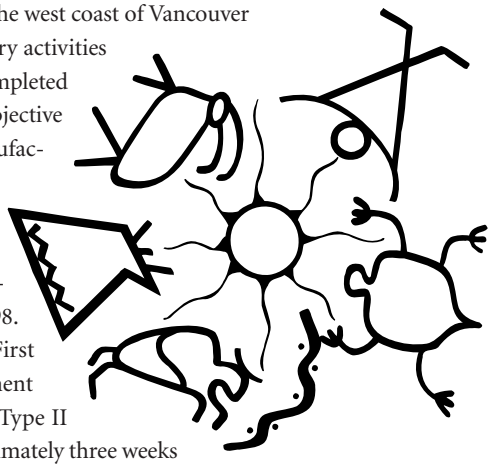
Federal funding allocated to the FNFP for the five-year term is $24.9 million. During its first two years of operation, the FNFP attracted country-wide interest. In 1996–1997, 329 proposals were submitted for consideration; of these, 175 were funded. The federal government, First Nations and other partners shared in project costs of almost $12 million. In 1997–1998, approximately 275 projects were submitted, of which 180 were approved. Total expenditures by the federal government, First Nations and other partners approached $19 million.

The FNFP achievements over the past two years have been encouraging. The major players, First Nations and the federal government, are demonstrating their commitment to ensuring that the successes, lessons learned and experiences captured are shared and continued over the next three years to help meet First Nation aspirations for greater involvement in Canada's forest sector.

#### A SPIRIT OF ENTREPRENEURSHIP

These are but a few examples of the many projects undertaken by First Nations across Canada. The projects reveal the diversity of First Nations' interests, and their choices for economic development reflect what they feel is important for their communities today and in the future.

The Ditidaht First Nation is a small, isolated community located on the west coast of Vancouver Island, British Columbia, that has always been on the periphery of forestry activities in its territory. With funding from the FNFP, the Ditidaht First Nation completed a business plan for a joint venture with Rebco Wood Products Ltd. The objective of the project is to develop a successful wood manufacturing and remanufacturing business in a partnership arrangement between the band and Rebco Wood Products Ltd. An important aspect of the project is to create jobs for band members with the construction of a sawmill by the Ditidaht First Nation. Total estimated costs are $2.8 million for the development and construction of the facility, which is scheduled for completion in summer 1998.



A new fire-fighter training program provided Alberta's Alexander First Nation members with the skills necessary to acquire more stable employment in the forest sector, and to obtain better pay. The Wildland Fire-fighter Type II Program is an intermediate-level training program that consists of approximately three weeks of intense instruction covering both fire fighting and forestry worker skills training, as well as a variety of safety-related components. Prior to commencing training, all potential trainees had to pass a

rigorous physical endurance test. With FNFP funding assistance, the Alexander First Nation contracted the training instruction, enabling 18 First Nation members to undertake the new fire-fighting training program. Fire-fighting skills are in high demand during fire season, particularly this year, with sizeable fires burning throughout Alberta. With the training combination offered, participants are further qualified to work in the forest industry after the fire season.

Saskatchewan's Mistawasis First Nation developed a project that provides a chance for elders to proudly share their traditional culture with residents and visitors alike. Visitors to Mistawasis's Cultural Village will be able to spend the night in a teepee, make bannock, hike, canoe and take part in an annual four-day powwow. With FNFP funding in 1996–1997 and in 1997–1998, hiking trails and a cultural site were created. The Cultural Village enables this First Nation to share a touch of its history and culture in the beauty of its natural surroundings.

The Berens River First Nation members in Manitoba received FNFP funds to conduct a log-building training course on their reserve. The houses are made of locally obtained material, white spruce, peeled and sanded to achieve a special hand-crafted style. Students are taught how to complete the structure, including the electrical wiring and plumbing. The project, which began in the summer of 1997, resulted in two houses being partially completed by December of that year. More than 30 students worked on the project at various phases of construction, generating over 400 person-weeks of training and employment. New job prospects have been created for a number of students interested in log-building careers. Interest in the training project has been expressed by other First Nations from Manitoba, Saskatchewan and Quebec. Other partners in the project included the Lac St. Martin First Nation, Indian and Northern Affairs Canada, and the Canada Mortgage and Housing Corporation.

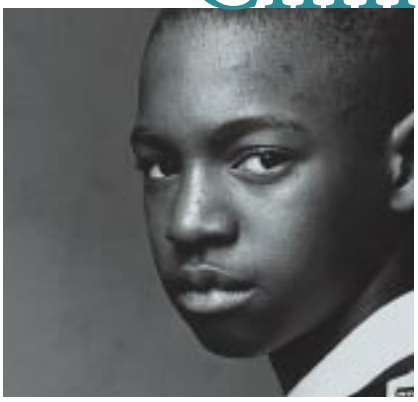
The Makwa Community Development Corporation of the Algonquins of Golden Lake First Nation received FNFP funding to prepare a business and training plan for the establishment and operation of a nursery at the Petawawa Research Forest located in Chalk River, Ontario. The establishment of the Corry Lake Nursery will enable the Golden Lake First Nation to participate in a commercial business venture growing tree seedlings for sale to private landowners and local forest industries. The nursery now employs a permanent staff of four. On a seasonal basis, it will employ other community residents to help sell trees, prepare the nursery seedling beds for spring planting, and undertake weeding during the summer. By 2001, the nursery is expected to attain its maximum two-year production cycle of 1.5 million trees, including red and white pine, and possibly some jack pine and white spruce.

These days, if you visit the Tiaweró:ton territory in the Laurentian region of Quebec, a territory that the Kahnawake and Kanesatake communities have been sharing for nearly 150 years, you might find it particularly animated. The Kahnawake community, in agreement with its neighbor, Kanesatake, is planning to establish what could become one of Quebec's largest maple sugar bush operations. The FNFP provided contribution funds to complete a feasibility study and forest management plan, including forest inventories, under Phase I of this project. Consultations with the

ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec have convinced the project managers that, once underway, this project should foster economic development and job opportunities for both communities.

*More information on the FNFP is available on the Internet (http://www.fnfp.gc.ca).*

# Climate CHANGE



THE PROSPECT OF CLIMATE CHANGE AND GLOBAL WARMING IS A MAJOR ISSUE FACING CANADA AND THE WORLD. AS FOSSIL FUELS CONTINUE TO BE BURNED, MORE CARBON DIOXIDE ($CO_2$) AND OTHER GREENHOUSE GASES ARE RELEASED INTO THE ATMOSPHERE; INCREASED CONCENTRATIONS OF THESE GASES HAVE BEEN LINKED TO CLIMATE CHANGE.

### CANADA'S FOREST CARBON

Forests play an important role in global ecological cycles by recycling the Earth's water, carbon, oxygen and other life-sustaining substances. The global carbon cycle is the most important natural process linking forests with climate change. Understanding as much as possible about this role is important if we are to ensure that our forests—and the demands placed on them—are sustainable. Furthermore, the long life and high carbon content of forests make them a key factor in attempts to reduce human impacts on climate.

Trees and other vegetation absorb carbon via photosynthesis and store it in all of their parts (above and below ground and in the surrounding soil). When they are young, trees have a limited reservoir of carbon; however, the amount they absorb is substantial and increases each year. (Several decades of growth usually are required before trees reach their maximum annual rate of carbon absorption.) As trees mature, their carbon reservoir increases, but their absorption rate falls. Eventually, trees reach a stage at which their annual absorption of carbon is very small and the amount contained in their reservoir is fairly constant. This dynamic relationship between a tree's age and its

carbon storage and absorption rate has a tremendous impact on the amount of carbon contained in Canada's 417.6 million hectares of forests.

#### CARBON BUDGET MODEL

To develop a better understanding of Canada's forest carbon, what influences it, and how it has changed over time, scientists employed by Natural Resources Canada–Canadian Forest Service (CFS) have worked with other experts to develop a carbon budget model. The model incorporates the data and interactions required to measure the carbon budget of Canada's total forest land (including the stock of carbon in trunks, branches, leaves, roots and soils) as well as the exchange of carbon between these forest components. In addition, it estimates the annual transfer of carbon between forests and the atmosphere through plant photosynthesis, respiration and decomposition; the effect of natural disturbances (e.g., wildfires and insects); and the effect of forest products manufacturing. The carbon budget is not constant, but changes over time in response to a number of factors that affect forest productivity, including forest management practices, fires, insects and diseases.

#### BOREAL ECOSYSTEM ATMOSPHERE STUDY

The boreal forest is one of the world's largest ecosystems and represents a considerable storehouse of carbon. It is the dominant forest region in Canada (82%), Alaska and Russia. However, little data is available in Canada on the northern portions of this region, as they are not included in existing forest inventories, in part due to their remote location and current inaccessibility. (Most of the forestry data currently available was collected on land considered relevant for commercial uses—the "timber-productive" forest.)

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

To increase our understanding of this forest region and to develop more accurate predictions of weather and the effects of global change, Natural Resources Canada, the National Aeronautics and Space Administration (NASA) and other agencies undertook the Boreal Ecosystem Atmosphere Study (BOREAS). In the largest land experiment ever (1000 $km^2$), ground, airborne and satellite data on carbon dioxide, wind, temperature, humidity and radiation were collected at two test sites in Manitoba and Saskatchewan and in the surrounding region.

After four years of collecting data, 80 research teams comprising scientists from five countries are now using this information to create improved computer models of the interaction between the boreal forest and its surroundings. Their aim is to compile all of the field, aircraft and satellite measurements in a comprehensive data set that describes the behaviour of the ecosystem in detail and allows for innovative analysis and modelling.

The questions being addressed by BOREAS relate to the way the forest exchanges water, carbon, energy and gases with the atmosphere. The results to date have already improved our understanding of the links between the world's climate and the boreal forest ecosystem. For example, it is now thought that the boreal forest may be the site of at least some of the so-called "missing carbon"—the carbon from burned fossil fuels that does not remain in the atmosphere and has not been found elsewhere on land or in the ocean. However, the photosynthetic capacity of the northern boreal forest, and thus its ability to absorb carbon, is found to be much lower than that of the temperate deciduous forest to the south.

### EFFECTS OF CLIMATE CHANGE ON FORESTS

Changes in climate as indicated by temperature and moisture are major factors determining the sustainability of Canada's forests. They affect the growth and productivity of forests and the range of tree species, as well as the range and frequency of natural disturbances (e.g., fires, insects and diseases).

Over the past century, average temperatures have been increasing. The Northeastern Forest, which includes much of the Canadian Shield as well as the Hudson Bay Lowlands, has recorded an overall warming trend of approximately 0.5°C. The Northwestern Forest stretches from the northern boundary of the Prairies to the Mackenzie District, and from the foothills of the Rocky Mountains to the Manitoba–Ontario border; it has recorded an increase of 1.4°C. The Mackenzie District, which takes in a major portion of the Mackenzie River drainage basin, including the Great Bear and Great Slave lakes, has recorded an overall warming trend of approximately 1.7°C.

According to the latest report by the Intergovernmental Panel on Climate Change, the Earth's climate is likely to warm considerably over the next century. Forests may respond to these changes in different ways. Some areas may benefit from the effects of global warming (e.g., a longer growing season or frost-free period may increase the growth rate of some forests), while others may be negatively affected (e.g., melting of the permafrost in poorly drained forest areas may cause permanent flooding).

The greatest impacts of warming temperatures are expected at the northern latitudes, raising concern over impending changes in the global boreal ecozone. Tree growth in this ecozone is limited by drought in the south, but there may be multiple climatic factors influencing growth further north (e.g., moisture, snow cover, soil temperature and growing season). This complexity presents numerous challenges for science.

**An international crown fire modelling experiment was launched in the Northwest Territories in 1997–1998 to research fire behaviour modelling in the northern boreal forest and emissions of greenhouse gases from forest fires.**

Each forest ecosystem in Canada has its own set of species adapted to regional climate, habitat type and disturbance patterns. For example, the boreal forest regularly experiences major fires and insect outbreaks, and the species that grow in this ecosystem have adapted to these natural disturbances. Other sources of disturbance and stress include diseases, pollutants, ozone and the influx of forest pests not native to Canada.

Evolution has enabled trees to adapt to changes in their environment when those changes have occurred at a slow pace. Now, however, the changes may occur at unprecedented rates (in modern times) and could outpace the natural rates of adaptation. For example, atmospheric $CO_2$ concentrations are predicted to double during the next century. Higher levels of $CO_2$ have been shown to affect seedlings in many ways, for example, by increasing their growth rates. In addition, elevated $CO_2$ is predicted to influence climate by altering patterns of precipitation and temperature—key factors governing species distribution. If the boundaries of different forest types in Canada change as a result of global warming, the result may be a decline in the total area covered by trees. For example, the expansion of the boreal forest into the northern tundra may be retarded by poor soil conditions and permafrost.

Among the various impacts of global warming, the changes in forest fire activity are expected to be the most rapid and significant. Drier conditions in the boreal forest may lead to more and larger boreal fires, and less time between fires in the same area. This in turn may result in younger forest age-class distributions and a smaller carbon reservoir. As part of BOREAS, databases of all of the large boreal fires that have occurred since 1980 are being developed for Canada, Russia and

Alaska. The spatial and temporal distribution of these fires is being analyzed and the carbon emissions estimated.

### CLIMATE CHANGE CONVENTIONS

Climate change was first recognized as a serious problem in 1979 at the World Climate Conference at which scientists explored how climate change might affect human activities. Since then, a number of intergovernmental conferences have focused on climate change, helping to raise international concern about the issue, and mobilizing government policy makers, scientists and environmentalists.

In 1992, Canada signed the Framework Convention on Climate Change at the United Nations "Earth Summit" in Rio de Janeiro, Brazil. The framework was intended to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human-caused interference with the climate. Developed countries that signed the convention agreed to adopt national policies and measures on climate change. (In 1995, the 154 party nations agreed to a process that would lead to the adoption of strengthened commitments in, Japan, Kyoto, in1997 [described below].)

**On average, forest insects and diseases in Canada destroy 62 million $m^3$ of commercial timber each year (fires burn approximately 89 million $m^3$). If the predicted climate changes occur, disturbance patterns may be altered, particularly for the many insects whose occurrence and range are limited by climatic factors.**

In 1995, the federal, provincial and territorial governments in Canada prepared the National Action Program on Climate Change (NAPCC), which encourages all sectors to explore cost-effective actions to reduce greenhouse gas emissions. The forest sector, for example, has decreased its greenhouse gas emissions in recent years by adopting energy-efficient processes and shifting to less carbon-intensive fuels.

The NAPCC also encourages research and development on climate change issues. To date, Canada's forest scientists have participated in research with the international community in reviewing and assessing our knowledge regarding biomass burning, the global carbon cycle and the socio-economic impacts of climate change on forestry.

### KYOTO PROTOCOL

In December 1997, the Parties to the United Nations Framework Convention on Climate Change adopted a protocol in Kyoto, Japan, designed to limit the emissions of gases that trap heat in the atmosphere. Upon entry into force, the Protocol will establish legally binding commitments to reduce greenhouse gas emissions; the Protocol sets Canada's target at 6% below 1990 levels in 2008–2012.

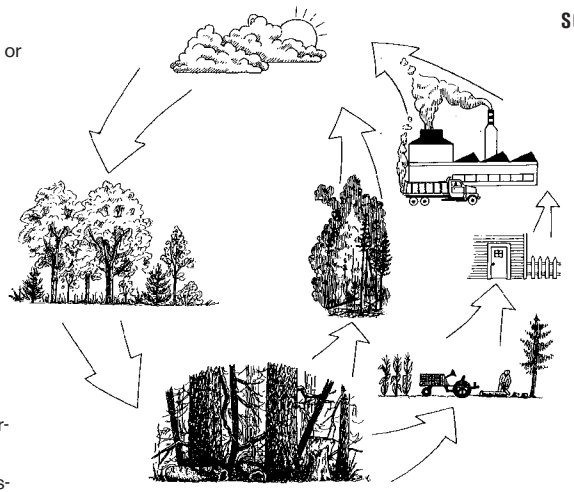
**In December 1997, the federal government released the results of a survey that suggests most Canadians (87%) believe climate change will have serious negative effects on the environment and economy within 10 years if nothing is done to reduce greenhouse gas emissions. The poll also found that the majority of Canadians are willing to make lifestyle changes to help reduce the emission of gases linked to global warming.**

The Kyoto Protocol is the result of a two-and-a-half-year negotiating process initiated in 1995 by the first Conference of the Parties to the United Nations Framework Convention on Climate Change. The Protocol is meant to further the objective of the Convention, which is "to achieve…stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human] interference with the climate system."

Most of the commitments in the Framework Convention relate to greenhouse gases emitted to the atmosphere as a result of energy production and consumption, industrial processes and other

### FORESTS AND THE ATMOSPHERIC CARBON CYCLE

**SINK**
Any process, activity or mechanism that removes greenhouse gases or precursors of those gases from the atmosphere. The principal natural mechanism is photosynthesis, a process by which $CO_2$ is absorbed by plants, with subsequent storage of the carbon in plant tissue and emission of the oxygen.



**SOURCE**
Any process or activity (e.g., forest fires or conversion of forest land to agricultural or urban uses) that releases greenhouse gases or precursors of those gases into the atmosphere. Even after trees are harvested and processed, carbon continues to be stored in the resulting forest products. However, as trees and forest products decompose or burn, they release carbon in the form of $CO_2$.

**RESERVOIR**
Component of the climate system in which greenhouse gases or precursors of those gases are stored (e.g., soils, peat, forests, other vegetation, streams, oceans and lakes).

activities. (Globally, approximately 7 billion tonnes of carbon are released into the atmosphere each year as a result of these activities.) However, the removal of these gases from the atmosphere (by "sinks") and the storing of carbon (by "reservoirs") also can be important. For this reason, countries accepted another commitment under the Convention—to conserve and enhance greenhouse gas sinks and reservoirs.

**In February 1998, following its commitments in Kyoto, the federal government tabled a budget allocating $50 million per year for the next three years to help lay a strong foundation for early action on climate change.**

The impacts for Canada of the Kyoto Protocol are as follows:

- It establishes a commitment for Canada to reduce its gross emissions of greenhouse gases between 2008 and 2012 to 6% below the level recorded in 1990. (Commitments for subsequent periods will be decided during future negotiations.)
- It allows gas emissions and removals that occur between 2008 and 2012 and result from reforestation, afforestation and deforestation activities undertaken since 1990 to be used in meeting Canada's commitment.

- It requires Canada to show, by 2005, that it has made progress in achieving its commitments.
- It allows for negotiations to determine what other direct activities related to agricultural soils, land-use changes and forestry could be used to meet national emission reduction commitments for 2008–2012 and for later commitment periods.

There is concern that Canada's current forest and forest carbon measurement systems may not be able to satisfy the measurement needs arising from the Kyoto Protocol. Work is needed to clearly define these needs and to establish the most cost-effective means of satisfying them. An expanded forest inventory approach almost certainly will be needed, and close cooperation with all forest sector stakeholders will be essential.

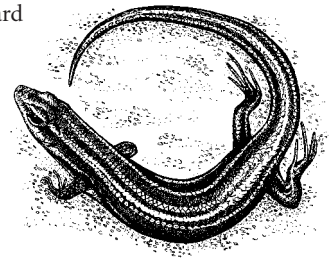
# Forest-dwelling SPECIES AT RISK

THERE IS GROWING RECOGNITION OF THE IMPORTANCE OF MAINTAINING BIODIVERSITY–THE TOTAL VARIETY OF LIVING THINGS ON EARTH. THE 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.

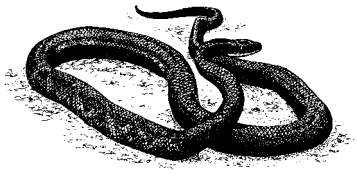
THE COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA (COSEWIC) ASSESSES THE STATUS OF SPECIES AND ASSIGNS EACH ONE TO A CATEGORY: VULNERABLE, THREATENED, ENDANGERED, EXTIRPATED OR EXTINCT. IN 1998, SIX FOREST-DEPENDENT SPECIES WERE ADDED TO COSEWIC'S LIST OF SPECIES AT RISK. (*SEE PAGE 93 FOR THE FULL LIST OF FOREST-DEPENDENT SPECIES AT RISK*.)

#### FIVE-LINED SKINK



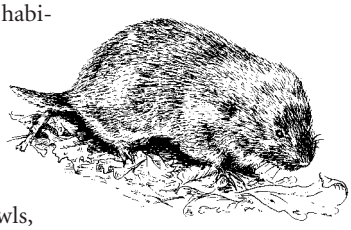
The five-lined skink inhabits woodlands, sandy areas and bedrock crevices and is the only lizard native to Ontario. Its black body measures 15–20 cm and is marked by five length-wise, light-coloured stripes. Juveniles are distinguished by their bright blue tail. The skink is uncommon, but its range includes the southern edge of the Canadian Shield in central Ontario, the eastern shore of Georgian Bay and a few isolated areas in southwestern Ontario. Its populations have been declining in some areas, in part due to widespread collecting for the pet trade. It was classified by COSEWIC as "vulnerable."

#### BLACK RAT SNAKE



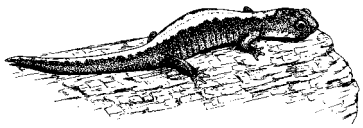
The black rat snake, at 100–200 cm in length, is Canada's largest snake. It is almost entirely black, with faint blotching and a whitish throat and lips. The pattern on younger snakes is brighter, but fades with age. The snake's habitat includes open woodlands, fields and abandoned buildings. Its range is confined to small areas in southeastern Ontario—in the counties of Lanark and Leeds–Grenville. The southern Ontario populations are very restricted and isolated. The black rat snake is threatened by persecution, the loss of hibernation habitat, and its long life cycle, which makes it especially susceptible to even small increases in the mortality rates of adults (e.g., as a result of road kill). It was classified by COSEWIC as "threatened."

#### WOODLAND VOLE



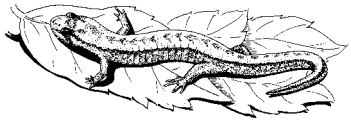
The woodland vole is one of the smallest rodents in North America, measuring just 10–13 cm in length and weighing 20–37 g. It has a short tail that is unicoloured or barely bicoloured and is slightly darker on top. Its soft, dense mole-like fur is mostly a chestnut brown tinged with black, although its underparts are gray mixed with some yellow or cinnamon. Juveniles are dark gray tinged with chestnut. The vole rarely appears above ground. Its preferred habitat includes woodlands, brushy habitats and forest edges, where it tunnels, nests and burrows in soft, sandy soil just beneath tree roots and leaf litter. It feeds on berries, nuts, bark and roots. The occurrence of the vole in Canada is highly unpredictable; it is limited to areas of temperate deciduous forests within the Carolinian forest zone of southwestern Ontario and to areas of temperate deciduous forests in the Eastern Townships of Quebec, from 30 km southeast of Montreal to just north of the Quebec–Vermont border. Predators of the vole include short-tailed shrews, barn owls, hawks, gray foxes, opossums, mink and weasels, as well as domestic cats and dogs. The woodland vole was classified by COSEWIC as "vulnerable."

#### COEUR D'ALENE SALAMANDER



The coeur d'Alene salamander is a relatively short and stocky species of salamander. Unlike some other salamanders, it has only one colour phase. Its dark body is characterized by a sometimes blotchy yellow throat and a narrow yellowish, reddish or greenish dorsal stripe with conspicuously ragged edges. The stripe sometimes breaks into patches on its head and at the extreme tip of its tail, and there may be no stripe of colour at the base of its legs. Its hind feet are slightly webbed. Juveniles have a short body and are black or dark grey, with a bright yellow or salmon pink/orange dorsal stripe. Their throat too has yellowish patches. In Canada, the range of the coeur d'Alene salamander is restricted to 1 000 km$^2$ and includes southeastern British Columbia, where it appears to adapt fairly well to the presence of humans. It lives on stream banks or on moist, north-facing rocky habitats in forested areas, and its nests are found under mossy stones or inside logs located near streams. The salamander was classified by COSEWIC as "vulnerable."

#### MOUNTAIN DUSKY SALAMANDER



The mountain dusky salamander occupies a broad range of habitat types and can be terrestrial or semi-aquatic. During the warmer months especially, it often may be found far from water under logs, bark or stones. In colder weather, however, it moves to springs or wet rock faces at high elevations, where it hides in the saturated ground beneath stones, old logs, moss or leaves. In addition, it can be partly tree-dwelling and has been observed almost 1 m above the ground. In Canada, the range of the mountain dusky salamander is very restricted—it can be found only in 20 km$^2$ of southern Quebec. It was classified by COSEWIC as "vulnerable" because any change in the land or water use in that region could be detrimental to the entire population.

#### COASTAL WOOD FERN

The coastal wood fern, also known as the "coastal shield-fern," is an evergreen plant that has chestnut-coloured scales on the underside of its leaf blades. It occurs along North America's west coast, from southeastern Vancouver Island in British Columbia to Baja, California. The Canadian populations are limited to southeastern Vancouver Island and several adjacent Gulf Islands. The coastal wood fern's habitat includes coastal wooded slopes and rocky coastal outcrops, where it is found primarily on southerly exposures. It is an important species in coastal Douglas-fir forests because it plays a role in reducing the erosion that may occur on the steep slopes it favours. The survival of this species is impacted by land clearing for development on private lands, recreational use of provincial parks, sun and wind exposure, and soil erosion on rocky outcrops. It was listed by COSEWIC as "vulnerable."

## FOREST-DWELLING SPECIES AT RISK*

| CATEGORY | MAMMALS | BIRDS | PLANTS | REPTILES |
|---|---|---|---|---|
| Endangered | Wolverine (*eastern population*) | Spotted owl | Spotted wintergreen | Blue racer snake |
| | Cougar | Kirtland's warbler | Cucumber tree | |
| | Vancouver Island marmot | Prothonotary warbler | Heart-leaved plantain | |
| | Newfoundland pine marten | Acadian flycatcher | Large whorled pogonia | |
| | | | Small whorled pogonia | |
| | | | Wood poppy | |
| | | | Drooping trillium | |
| | | | Prairie lupine | |
| | | | Seaside centipede | |
| | | | Deltoid balsamroot | |
| Threatened | Woodland caribou (*Gaspé pop.*) | Marbled murrelet | Yellow montane violet | Eastern Massasauga rattlesnake |
| | Wood bison | Hooded warbler | Blunt-loped woodsia | Blanding's turtle (*Nova Scotia pop.*) |
| | | Yellow-breasted chat (*montane pop.*) | Deerberry | **Black rat snake** |
| | | White-headed woodpecker | 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 | |
| Vulnerable | Grizzly bear | Flammulated owl | Phantom orchid | Pacific giant salamander |
| | Wolverine (*western pop.*) | Cerulean warbler | Broad beech fern | Wood turtle |
| | Ermine (*Queen Charlotte Island's pop.*) | Yellow-breasted chat (*Carolinian pop.*) | Green dragon | **Five-lined skink** |
| | Pallid bat | Queen Charlotte goshawk | Shumard oak | **Coeur d'Alene salamander** |
| | Spotted bat | Prairie warbler | Common hop tree | **Mountain dusky salamander** |
| | Nuttall's cottontail | Louisiana waterthrush | Dwarf hackberry | |
| | Southern flying squirrel | Red-headed woodpecker | American columbo | |
| | Gaspé shrew | | False rue-anemone | |
| | Woodland caribou | | Few-flowered club rush | |
| | Fringed myotis bat | | Wild hyacinth | |
| | Keen's long-eared bat | | Cryptic paw lichen | |
| | **Woodland vole** | | Old growth specklebelly lichen | |
| | | | Seaside bone lichen | |
| | | | **Coastal wood fern** | |

* Species added to the list in 1998 are in bold.

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

CANADIAN ATTITUDES TOWARD

# Natural RESOURCE Issues

IN 1993, ENERGY, MINES AND RESOURCES CANADA COMMISSIONED A NATIONAL STUDY TO MEASURE PUBLIC OPINION ON KEY ENERGY AND RESOURCE ISSUES. IN 1997, AFTER MERGING WITH FORESTRY CANADA, THE DEPARTMENT REPEATED THE STUDY TO MEASURE HOW PUBLIC OPINION HAD CHANGED OR NOT CHANGED OVER TIME. THE RESULTS OF THE 1997 NATURAL RESOURCES CANADA SURVEY ARE OUTLINED BELOW.

At a time when so much attention is focused on the emergence of knowledge-based industries, the Canadian public continues to identify the resource sector as contributing most to the economy, both nationally and in most cases, provincially. Over the four-year period, the perceived economic contribution of resource industries remained stable or increased, and there was a general expectation that the sector would grow in importance over the next decade. The forest industry continues to command the highest profile among Canada's resource industries, but it also retains more of a "low-tech" image that is at odds with the emerging economy.

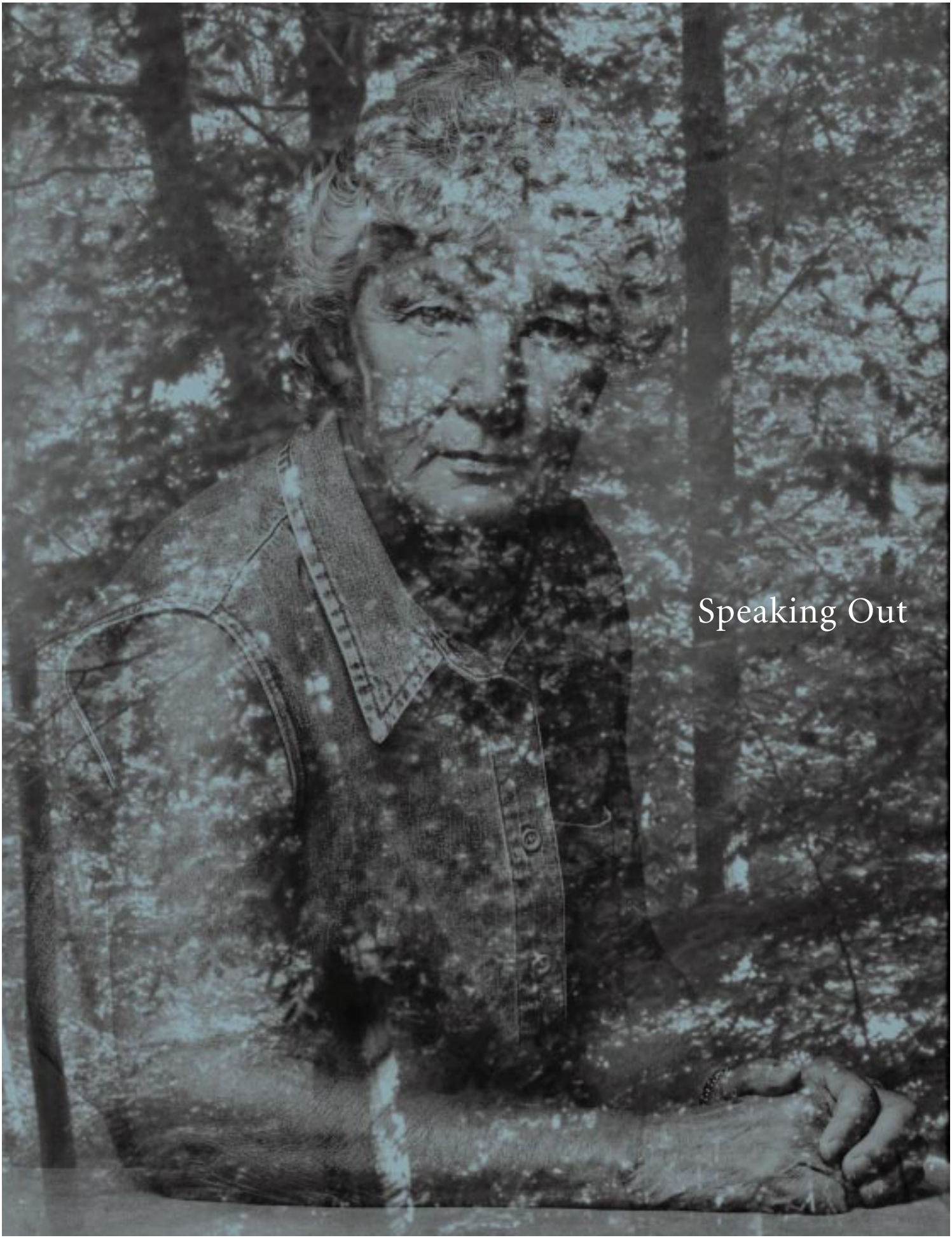
Opinions about the future importance of particular industries are generally stronger in regions where those industries are most prominent, with the notable exception of forestry. As in 1993, forestry was least apt to be viewed as an industry for the future in regions where it is most significant (e.g., British Columbia and Quebec) and by Canadians with the most education and income (i.e., the country's opinion leaders). Despite this view, the public perceives forestry as one of the industries most successful in selling its products abroad.

Canadians clearly understand and appreciate the economic benefits flowing from Canada's forests in the form of jobs, economic growth and valuable materials; however, this is not what they say is most important. The public continues to value forests most for the environmental and ecological benefits they offer (e.g., protecting the water, air and soil; balancing the climate and global ecosystems; providing habitat for wildlife; and preserving wilderness). Recreational opportunities rank last in importance.

The public continues to see resource industries as damaging the environment, and they remain divided about whether such damage can be justified when weighed against the economic benefits the sector provides. Canadians recognize that the industry can not operate without some disruption to the environment; nevertheless, there is an emerging consensus that pollution reduction, in particular, makes sound business sense.

Overall, the perceptions of forest industry impacts have remained constant, although such issues as clearcutting are no longer as contentious nationally as they were several years ago. Canadians are more critical, however, of industry management practices that are perceived as out-of-step with their own values, and they view those practices as the greatest threat to the country's forest resources compared to such external threats as acid rain and forest fires.

Canadians recognize science and technology as having a number of critically important roles for the future of the country—contributing to economic prosperity and to the sustainable development of natural resources, and improving the overall quality of life. Universities and corporations are now identified as the leading contributors to innovation, with government and small businesses playing a supporting role. The public has become noticeably more positive in comparing Canada to other industrialized nations in terms of science and technology innovation. One-quarter place their country among the leading nations, and most of the remainder believe it is close behind.



# Speaking Out

# POINTS OF VIEW

## SHOULD THE MANAGEMENT OF PRIVATE FORESTS BE REGULATED?

IT HAS BEEN ESTIMATED THAT THERE ARE 425 000 PRIVATE WOODLOT OWNERS IN CANADA. WOODLOTS ARE AN INTEGRAL PART OF THE SOCIOECONOMIC ENVIRONMENTS IN SOME PROVINCES AND PROVIDE ECONOMIC, ENVIRONMENTAL, RECREATIONAL AND AESTHETIC BENEFITS. FOR EXAMPLE, A SIGNIFICANT AMOUNT OF COMMERCIAL HARDWOOD, MAPLE PRODUCTS, CHRISTMAS TREES, SAWLOGS AND FIREWOOD ARE PRODUCED ON PRIVATE WOODLOTS. THESE SAME WOODLOTS PROVIDE WILDLIFE HABITAT AND FARM SHELTERBELTS, AND ARE MAJOR FACTORS IN SOIL AND WATER CONSERVATION. THEY ALSO PROVIDE PLACES TO HIKE, SNOWMOBILE AND ENJOY NATURE.

Private woodlots are a vital part of Canada's forest industry. This vitality may become even more significant in the near future as industry dependance on private woodlots increases as a result of mounting public pressure to protect public lands from harvesting. In the past few years, concern has been expressed about the management of some private woodlots, especially with respect to harvesting practices and their impact on the sustainability of wood supplies. This issue is of particular significance in eastern Canada, where private woodlots' contributions to the wood supply are most significant. The increasing awareness of the need and international demand for sustainable forest management also has coloured the view of current management practices. These concerns have prompted suggestions of regulation.

Although it can be difficult to analyze private woodlots and their management because of their range and diversity across Canada, there are a few issues that transcend the country. Taxation: most taxation policies (federal, provincial, municipal) do not provide immediate financial incentives for the sustainable development of woodlots. In most cases, woodlots are not assessed differently from other property because there is no clear definition of a woodlot. Is a woodlot considered an industrial use? Is a woodlot to be treated like farm land or private land? Harvesting: statistics indicate that many woodlots are currently being overharvested due to many factors: fear of government expropriation, fear of tax reprisals, desire to take advantage of high market prices, etc. Owners' rights: does regulation infringe on the rights of individuals?

All these issues are touched on in our interviews, which were conducted with private woodlot owners, as well as representatives from organizations, provincial and municipal governments, and federal agencies. From their responses, it is clear that regulation, whether through legislation, incentive or voluntary participation, is a contentious topic. However, the people interviewed all agree that there is little public understanding or awareness of the issues and concerns surrounding private woodlot management.

**PETER DEMARSH is past President of the New Brunswick Federation of Woodlot Owners, current President of the Canadian Federation of Woodlot Owners (CFWO) and a woodlot owner himself. (The CFWO is an umbrella organization representing owners across Canada in nine provincial associations.)**

Mr. deMarsh began by posing the questions: "Why regulate? What goal is society trying to achieve? Once the goal is decided, we can look very carefully at how to achieve that goal in terms of the least cost and the best results. Woodlot management is already subject to some regulation—we are not starting from a blank slate."

According to Mr. deMarsh, the general feeling of most woodlot owners across the country is that regulation should be a last resort. It is usually the least effective of the three options—regulation, voluntary participation and tax incentives. He suggests that regulation is the most expensive and has the least buy in from those who must comply. "It is a big, crude, expensive and divisive tool."

Voluntary participation is the most popular, according to Mr. deMarsh: "I believe that most landowners most of the time want to and are willing to do the right thing. They do not look for the quick fix. Sit down with the people who control the land, and seek a consensus solution to the problem."

Financial incentives are the next most effective. Under regulation, landowners must do things in the public interest at their own cost. Society should assume some responsibility to compensate those who comply with regulations enacted to sustain the country's wood supply. "One of the most obvious steps is for the federal government to help fix the problems associated with the transfer of property and the treatment of woodlots with respect to capital gains treatment under the income tax law."

Regulation has often been shown to be counterproductive. "There are lots of cases in the United States of legislation put in place to protect endangered species that has led to increased damage to wildlife, such as shooting endangered birds."

There have been examples of water course protection legislation that was drawn up without consulting landowners. "It was badly designed, did not reflect how people used the land, and set limits that have no relationship to currently available harvest methods or other available options. The law lacked credibility. The worst failing of all is that the government was not in position to enforce it, so a lot of land was clearcut. People felt that their land was being expropriated, and that they were never going to be free to harvest it."

Most agree clearcutting is not beneficial from the economic or environmental points of view. Some think that woodlot owners are greedy and want to cash in on a market at its peak. However, society's definition of success is being smart enough to cash in your assets when the market is at a peak. Overharvesting, however, is usually not caused by greed, but often a financial crisis in the family.

Overharvesting in the Maritimes is a complex issue. "First of all, we often overlook the fact that the amount of wood being harvested is in response to consumer demands for forest products—so is it a problem of overharvesting or overconsumption? Has industry expanded its capacity to more than the resource can support? Overharvesting is an issue that does not apply to individual woodlots, but to regions. This must be clear. The issue needs to addressed in a collective way."

**VICTOR BRUNETTE is Director of the Fédération des producteurs de bois du Québec, an organization composed of 14 marketing boards representing 120 000 woodlot owners. The Federation is a a provincial organization that represents the overall interests of producers at the provincial and federal levels.**

In Quebec, producers have accepted some degree of woodlot regulation, which Mr. Brunette characterizes as the ground rules governing how land is to be used. The right to produce is an important right for Quebec producers. However, these regulations reflect the difference between the regulatory systems for public forests and for private forests, because the property rights of the individual must be respected. There are municipal by-laws governing forest practices, and a provincial law that gives regional county municipalities the power to establish interim control regulations over an entire region. Under this, municipalities can adopt specific by-laws based on interim regulations. In fact, Quebec has mechanisms specifically designed to provide at least a minimum level of protection for woodlands. He prefers to see regulations applied at the local level because producers can participate in developing appropriate regulations for their regional needs.

Although private woodlot owners prefer incentives, Mr. Brunette believes it is essential to strike a balance between regulations and incentives. "Maybe what we need are voluntary codes of conduct, maybe government programs and financial incentives for development, or programs sponsored by the industry or by customers, such as certification programs. For example, certification is not a law, nor is it a regulation. We are not required to certify that our woodlots are properly managed. But if we do not do it, we might be denied access to some markets."

To create effective controls or regulations, whether they originate from municipalities, area residents, urban dwellers, industry or government, a threshold must be set. The bottom line is that controls or regulations must make economic sense and contribute to a positive business climate. If controls are so oppressive that being a woodlot owner is a hardship and a profit can not be made, producers will not be prepared to contribute to sustainable development. They might convert their woodlots to other uses.

The current Canadian property and income tax systems are not conducive to operating a business growing trees for lumber. Both systems must be changed to help the producer. Programs that provide incentives for development also are needed. Such programs have been developed elsewhere, for example, in France, where a special national fund is supported to protect producers' investments in the event of a natural disaster. Another example is in Vermont, where trust funds are used to compensate owners. Owners sell their land to the trust, but continue their woodlot development. They are not allowed to clearcut or mismanage the woodlot, or turn it into a shopping centre or grain field for example. It remains a woodlot. The community also accepts that taxes will be frozen below those of other owners who retain full rights to use their land as they please.

In the end, he noted that without regulations, perhaps there would be no sustainable development. However, he also stated that further steps, other than regulations, need to be taken to ensure

sustainable development: "An inventory of forest resources is the crucial first step on the path to sustainable development."

**DAVID MACFARLANE is Assistant Deputy Minister of Renewable Resources in the New Brunswick Department of Natural Resources and Energy.**

Mr. MacFarlane does not want to see private woodlots regulated because such regulation impinges on the traditional right to own land. Private landowners must be able to manage their land based on their own objectives, as long as they are not causing harm to another sector of society. If private landowners are provided with factual information on the benefits of sustainable management, in the long run, they will make logical, valid decisions themselves without government, or some other group, telling them what to do.

Regulation is a very complex, emotional issue that often implies that societal values are more important than the individual's values. "If we agree to this, then how far down that road do you want to go—regulate all land whether it is a city lot or a woodlot in the country?"

It behooves government, if it views sustainable management of private lands to be a benefit, to provide the necessary information to woodlot owners. Woodlot associations and industry also should play a role if they are concerned about the long-term sustainable supply of wood from woodlots. Voluntary courses containing this information could be provided by government or associations or through the media.

Tax breaks are very powerful incentives. New Brunswick, along with the National Round Table on the Environment and the Economy, is recommending that the Income Tax Act be reviewed to treat woodlots similarly to farm land. Farm land, for example, can be passed on to a son or daughter without capital gains. "This might give longevity to woodlots that is not there now. It might lead to a more stewardship approach, not just something to liquidate if it is going to cost your heirs money."

Regulation would only be necessary if it could be demonstrated that current private woodlot management is having a major negative impact on economic or environmental conditions. "That's when we have to bite the bullet on the issue. But I do not think this has been demonstrated in New Brunswick or other parts of Canada so far."

New Brunswick considered regulation, but instead developed a voluntary approach to the problem of overharvesting. It has developed an education program and has assisted some private woodlot owners to renew their woodlots by offering training courses in conjunction with provincial marketing boards.

Mr. MacFarlane concluded by saying, "If we go to regulation, we must proceed gradually—it will not happen overnight, and it will not happen without significant support from woodlot owners themselves."

**TAXATION OF PRIVATE WOODLOTS**

In its 1997 report *Private Woodlot Management in the Maritimes*, the National Round Table on the Environment and the Economy made income tax reform its first recommendation to the federal government. The report also made the following observation about tax reform:

*Currently, the federal tax system operates as a powerful disincentive to sustainability. Most woodlot owners are considered farmers by Revenue Canada; however, their tax treatment differs. Stakeholders agree that federal and provincial inconsistencies, ambiguity and gaps in coverage make forest management difficult. Ironically, it is sometimes possible to obtain a greater tax benefit by prematurely clearcutting a woodlot than by managing it sustainably.*

**MARTIN PAULETTE is a consultant in forest and wildlife development for the Groupement faunique du Triangle de Bellechasse. He is also the owner of a private woodlot.**

The Groupement faunique du Triangle de Bellechasse is the result of three southern Quebec villages coming together to find a remedy for their chronic economic downturn. They have concentrated their economic development efforts on the resources that they hold in common, namely, the forest and forest wildlife.

Eighty-five private woodlot owners got together and began to manage their wildlife resources in addition to operating their woodlots to produce wood. By pooling their properties, they created a hunting zone (mainly for deer, grouse, hare and woodcock) totalling 75 $km^2$, albeit not contiguous. They also took measures to foster the growth of their animal populations. A joint management agency, the Pourvoirie du Triangle de Bellechasse, was put in charge of managing the wildlife resource for hunting. Because of the high cost of supervision and customer services, owners receive only 10% to 25% of the revenues derived from hunting.

Martin Paulette discussed the regulation issue as it relates to wildlife habitats on private lands, which he feels are very poorly protected in Quebec. "In large part, diminished biodiversity and the destruction of wildlife habitat are the result of mistakes or lack of knowledge on the part of owners." Now we focus on raising awareness of the importance of preserving and protecting habitat. Mr. Paulette considers this strategy very effective. "But with habitat preservation, unlike the campaign against drunk driving, for instance, education and incentives are generally not enough. We need regulations to protect wildlife habitats. A number of municipalities have established regulations, but they are inconsistent and have no scientific basis."

Mr. Paulette believes the existing regulations protecting wildlife habitat on public land, which he considers minimal, should also apply to private woodlots. "Private ownership of woodlands, in addition to bestowing the right to use the property, also entails stewardship of a part of the collective ecosystem and all its associated responsibilities. One possibility is a transitional phase of financial and/or fiscal incentives, followed by a more regulatory phase."

When he starts developing and operating his own woodlot, he intends to apply much higher standards for habitat protection than those now in effect for forest product companies operating on public lands. Mr. Paulette plans to regulate his own operation, and he expects he will be able to readily meet any eventual regulatory requirements for habitat protection on private woodlots.

**HARLAN REDDEN has been a private woodlot owner in Nova Scotia for nearly 22 years. He is also manager of a group venture organization, Conform. (A group venture organization is a private company owned by woodlot owners who manage a group of woodlots cooperatively and market the wood.) Conform's principal products are pulp wood and sawlogs.**

Mr. Redden believes that we should have a combination of regulation and incentives to encourage people to properly manage their woodlots. "Given human nature, we need a combination of the carrot and the stick."

In Nova Scotia, there are voluntary wildlife guidelines that do not allow cutting near streams and encourage wildlife corridors, etc. However, they can be ignored because they are not binding. "That is why I am in favour of some legislation to protect water, wildlife and the cutting of immature stands."

Regulation by law would be beneficial if it was flexible, unbureaucratic and something landowners could live with. Therefore, everyone must be involved in consultations: private landowners, the Crown and industry. If a law is brought in that no one wants to cooperate with, then no one will.

Laws should cover everything—small private land, large industrial land and Crown land. In Nova Scotia, for example, the Province leases Crown land mainly to large industry. Industry can clearcut if they want to. Therefore, until the Province begins regulating what happens on this land, it will not convince small woodlot owners not to do something different on their own property.

Owners should be encouraged to better manage their woodlots through tax incentives based on a management plan. If the owners cut only according to the plan, and then could claim some of the costs on their taxes, or the costs of replanting the lot, they would be more inclined to look after the woodlot.

At the present time, "we have lots of land owned by senior citizens that should be cut, but if they cut it, they must pay lots of income tax. Owners are almost penalized. So we are wasting a resource that is overmature and might fall down."

In Nova Scotia, group venture associations, the Federation of Woodlot Owners and other woodlot operator associations have been making presentations to both provincial and federal governments for changes to the tax structure.

Certification may begin to colour the regulation issue. Industry is a major player in this issue—if industry said that it would only purchase certified wood, it would be a strong incentive for sustainable management. "In this area, government has to play the role of the policeman. We can not have private bodies doing their own policing for certification or any kind of regulation."

"In Nova Scotia," he concluded, "we are getting the message that something must be done, or we are going to go the same way as the cod industry."

**ROSS RISVOLD is the mayor of Hinton, Alberta, is Chairman of the Board of Directors of the Foothills Model Forest, is working on a project on sustainable resource-based communities with West Yellowhead Community Futures Development Corporation, and is Chair of the Forest-based Communities of Alberta, a provincial ad-hoc group.**

Mr. Risvold does not believe that woodlot management should be regulated, except when necessary to protect air and water. This type of legislation is already in force in Alberta. Timber is a commodity that landowners have the right to harvest as they do any other commodity on private land. "In Alberta, if you have land and want to turn it into agricultural land, you can do so. Some people say you should not be able to do that for trees. This is a conflict. It does not make sense that you can do the one, but not the other."

In some rural areas, city people move to the country and treat their land as hobby farms or hobby woodlots, without having to depend on the income from this land. This urban–rural conflict sometimes drives regulations. "I don't believe that is it fair to woodlot managers to have urban people say that you can not harvest your woodlot."

Woodlot owners should be encouraged, and trained, to sustain the diversity in their ecosystems by government and wood product companies, because many landowners do not have this background. "We feel people will do the right thing if they have the knowledge." This knowledge should be delivered through short courses, or by electronic means, such as CD-ROMs.

This type of training is not being done as part of the program at Foothills Model Forest, but other model forests, which have a significant woodlot component, are doing training. These other model forests should be sharing this new knowledge with woodlot owners through technology transfer.

If tax incentives were to become part of the solution to encourage sustainable management of woodlots, Mr. Risvold would not like to see the emphasis at the municipal level. Municipalities do not receive personal tax revenues if people harvest their forests. "Tax breaks should be given by the other two levels of government, who eventually get benefits from this revenue generation through taxes. The federal government should be encouraged to come up with a better tax system

to encourage sustainability of woodlots. Municipalities should give some consideration to woodlots being taxed as agricultural land."

**DR. STUART SMITH is Chair of the National Round Table on the Environment and the Economy (NRTEE), a federal agency. The NRTEE recently published *State of the Debate: Private Woodlot Management in the Maritimes*, a study that resulted from multistakeholder consultations on this environmental and economic issue.**

Although Dr. Smith began by stating that woodlots should be regulated, he noted that conventional regulation is not the answer. "We will get more by improving motivation and giving incentives to good management, than by setting up a rule about how many trees a person is allowed to cut, and then having to police the properties, and fine and punish those who do not comply."

The degree of regulation should depend on land management. It is better to have a self-regulating system where certified owners would have to implement a management plan. An independent auditor should attest to its continued implementation. Thus, owners who have proper plans and stick to them could receive tax rebates or pay lower taxes. "Actually, these are not so much breaks, as they are fair treatment, like farm land. Farm land is treated much more generously than woodlots on this tax issue of reasonable expectation of profit. My feeling is that a properly run woodlot can make a case for managing intelligently in the long term."

Financial incentives are excellent ways to encourage good management. "Our concern has been that those who make the effort to manage the woodlot properly must be able to take expenses off income for tax purposes." The NRTEE has held discussions with the federal Minister of Finance concerning "reasonable anticipation of profit" under the Income Tax Act. However, the federal government is worried that it will have to forgo revenues on a wide variety of activities that may not be of any commercial benefit. "The government is not prepared to subsidize an environmental benefit." The NRTEE is also reviewing tax incentives linked to intergenerational transfer. However, the government claims that the forgone revenue would be huge.

Owners need to be given an alternative that allows them to see that with proper management of their woodlot, they will make more money in the long term and receive reasonable tax help in the short term. As well, the forest industry ought to be more concerned about where it buys its fibre—it should make a point of not buying from improperly run woodlots.

Dr. Smith ended by noting that NRTEE's main focus is on silviculture; it wants to see woodlots produce trees so that the owners will have merchantable timber for the future. The NRTEE also recognizes the other roles woodlots play in society and in the environment that may need protecting.

**IOLA WEDMAN is the owner of a small private woodlot in Black Creek, British Columbia. She has run a woodlot since 1988 in conjunction with a reforestation nursery, Sylvanvale Nursery. Sawlogs are the main product.**

Ms. Wedman first thought, no, we do not need more regulations, more paper and more taxes, but then she thought, as a person who manages land, she does consider the long-term consequences of, say, gravelling a road. She then thought that there should be laws to protect the overall integrity of the landbase. In British Columbia, some of these laws are already in place, for example, for habitat protection.

First of all, she would like a land-use management strategy to be established to see if regulation on private land is really needed. The strategy should address the main problem: government regulations usually treat a specific parcel rather than an entity. For example, a woodlot owner may own land on which a small portion contains significant wildlife winter habitat. The owner is restricted to

managing this portion according to the habitat regulation, but has free reign on what to do on the remaining property. A land-use strategy would treat the entire property. "The problem lies with bureaucratic-type regulations. Their creators do not often incorporate flexibility into the where, what and how type of regulation that we often end up with, rather than a broader, commonsense approach to a land-use strategy."

In British Columbia, under the B.C. Forest Practices Code, there has been somewhat of a shift to "paper" forestry, rather than what is really happening on the land. There is the attitude: let's just manage this block to meet the regulations. "In the long run, I do not think that is healthy for everybody or for the land. When looking at a broad-based land-use strategy, we must have a good sense of what we're trying to protect: soil erosion, wildlife habitat, etc." In B.C., a private woodland organization has been looking into these issues already and has made recommendations on common practices.

Setting a strategy is only the first step, after that it can be decided if regulation is called for. "It's like setting a speed limit. We can not just have laws for one type of driver. So, we can not have laws just for private forest land and not for a 5 000-acre ranch. Speed limits apply to all of us."

Setting regulations would depend on what the regulations were, and what the rationale would be for the regulations. If they were for economic reasons—to create a more flourishing business environment—then tax incentives would be the way to do it.

"I think somewhere along the line, we have to get past regulations. Regulations make us afraid to jump in and be part of the solution. This is a broader issue. We need to be more focused as a nation, move beyond "paper" business... need get back to a more grassroots, collective approach."

# GLOSSARY

**AFFORESTATION**
The establishment of a tree crop on an area from which it has always or very long been absent. Where such establishment fails and is repeated, the latter may properly be termed "reafforestation."

**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.

**ANTHROPOGENIC EMISSION**
Emission caused by human activities (e.g., burning fossil fuels or setting fires to clear forest land for agricultural purposes).

**ANTHROPOGENIC REMOVAL**
Removal resulting from human activities (e.g., planting trees).

**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."

**CONVENTION**
A legally binding agreement, often among many parties.

**CROWN LAND**
Public land that is managed by the federal or provincial/territorial government.

**DEFORESTATION**
Clearing an area of forest for another long-term use.

**ECODISTRICT**
A part of an ecoregion characterized by distinctive geologic, soil, water, fauna and land use.

**ECOLOGICAL LAND CLASSIFICATION**
A process of delineating and classifying ecologically distinctive areas based on geologic, landform, soil, vegetative, climatic, wildlife, water and human factors. This holistic approach to land classification can be applied incrementally, from site-specific ecosystems to very broad ecosystems. This system provides for seven levels of generalization; ecozones, ecoprovinces, ecoregions, ecodistricts, ecosections, ecosites and ecoelements.

**ECOREGION**
A part of a province characterized by distinctive regional ecological factors, including climate, physical geography, vegetation, soil, water, fauna and land use.

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

**ECOZONE**
An area of the Earth's surface that is representative of a broad-scale ecological unit characterized by particular abiotic (non-living) and biotic (living) factors.

**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 REGIONS CLASSIFICATION**
A process of delineating large geographic areas according to landform and climate, associated with broad variations in overall forest composition.

**FOREST TYPE**
A group of forest areas or stands whose similar composition (i.e., 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 $CO_2$ and other gases that 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 purpose, such as planning, purchasing, evaluating, managing or harvesting.

**MANAGEMENT PLAN**
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, Quebec. 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 ($O_3$) 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.

**PHOTOSYNTHESIS**
Formation of carbohydrates in the chlorophyll-containing tissues of plants exposed to light.

**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.

**PROTOCOL**
A legally binding sub-agreement of a framework convention or treaty.

**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.

**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.

**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.

**TREATY**
A legally binding agreement, often between two parties.

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

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

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

# CONTACTS

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

## NATIONAL FOREST STRATEGY COALITION

**National Forest Strategy Coalition Secretariat**
Sir William Logan Building
8th floor, 580 Booth Street
Ottawa ON K1A 0E4
Phone: (613) 947-9087
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**
Dr. Clark S. Binkley
Faculty of Forestry
2nd floor, Main Mall
University of British Columbia
Vancouver BC V6T 1Z4
Phone: (604) 822-2467
Fax: (604) 822-8645
E-mail: binkley@unixg.ubc.ca

**Canadian Federation of Woodlot Owners**
180 St. John Street
Fredericton NB E3B 4A9
Phone: (506) 459-2990
Fax: (506) 459-3515
E-mail: nbfwo@nbnet.nb.ca

**Canadian Forestry Association**
203 - 185 Somerset Street West
Ottawa ON K1A 0J2
Phone: (613) 232-1815
Fax: (613) 232-4210
E-mail: 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
Internet site: www.cofi.org

**Gouvernement du Québec**
**Ministère des Ressources naturelles**
5700, 4e Avenue Ouest
Accueil central
Charlesbourg QC G1H 6R1
Phone: (418) 627-8600
Fax: (418) 644-7160
Internet site: 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
Internet site: www.gov.ab.ca

**Government of British Columbia**
**Ministry of Forests**
P.O. Box 9525
Station Provincial Government
Victoria BC V8W 9C3
Phone: (250) 387-1285
Fax: (250) 387-6267
Internet site: www.for.gov.bc.ca

**Government of Manitoba**
**Department of Natural Resources**
327 Legislative Building
Winnipeg MB R3C 0V8
Phone: (204) 945-3785
Fax: (204) 948-2403
Internet site: www.gov.mb.ca

**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
Internet site: www.gov.nb.ca/dnre

**Government of Newfoundland and Labrador**
**Department of Forest Resources and Agrifoods**
P.O. Box 8700
5th floor, Natural Resources Building
50 Elizabeth Avenue
St. John's NF A1B 4J6
Phone: (709) 729-4720
Fax: (709) 729-2076
Internet site: www.gov.nf.ca/forest

**Government of the Northwest Territories**
**Forest Management Division**
Resources, Wildlife and Economic Development
P.O. Box 7, 149 McDougal Road
Fort Smith NT X0E 0P0
Phone: (867) 872-7700
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Internet site: www.gov.nt.ca

**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
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Internet site: www.gov.ns.ca/natr

**Government of Ontario**
**Ministry of Natural Resources**
Room 6643, Whitney Block
99 Wellesley Street West
Toronto ON M7A 1W3
Phone: (416) 314-2150
Fax: (416) 314-2159
Internet site: www.mnr.gov.on.ca

**Government of Prince Edward Island**
**Department of Agriculture and Forestry**
P.O. Box 2000
Jones Building
11 Kent Street
Charlottetown PE C1A 7N8
Phone: (902) 368-4830
Fax: (902) 368-4846
Internet site: www.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
Internet site: www.gov.sk.ca/govt/environ

**Government of the Yukon Territory**
**Department of Renewable Resources**
P.O. Box 2703
Whitehorse YT Y1A 2C6
Phone: (867) 667-5460
Fax: (867) 393-6213
Internet site: www.gov.yk.ca

**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
E-mail: iwa@bc.sympatico.ca

**Maritime Lumber Bureau**
P.O. Box 459
Amherst NS B4H 4A1
Phone: (902) 667-3889
Fax: (902) 667-0401
E-mail: mlb@ns.sympatico.ca

**National Aboriginal Forestry Association**
875 Bank Street
Ottawa ON K1S 3W4
Phone: (613) 233-5563
Fax: (613) 233-4329
Internet site: www.sae.ca/nafa

**National Round Table on the Environment**
**and the Economy**
200-344 Slater Street
Ottawa ON K1R 7Y3
Phone: (613) 995-7519
Fax: (613) 992-7385
E-mail: admin@nrtee-trnee.ca

**Natural Resources Canada**
**Canadian Forest Service**
8th floor, 580 Booth Street
Ottawa ON K1A 0E4
Phone: (613) 947-9054
Fax: (613) 947-7395
Internet site: www.nrcan.gc.ca

**Ontario Forest Industries Association**
1700 - 130 Adelaide Street West
Toronto ON M5H 3P5
Phone: (416) 368-6188
Fax: (416) 368-5445
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**Prince Edward Island Nature Trust**
P.O. Box 265
Charlottetown PE C1A 7K4
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Fax: (902) 628-6331
E-mail: intrust@isn.net

**Wildlife Habitat Canada**
200 - 7 Hinton Avenue North
Ottawa ON K1Y 4P1
Phone: (613) 722-2090
Fax: (613) 722-3318
E-mail: receptio@whc.org

## CANADIAN MODEL FOREST NETWORK

**Eastern Ontario Model Forest**
P.O. Bag 2111
Kemptville ON K0G 1J0
Phone: (613) 258-8241
Fax: (613) 258-8363
E-mail: eomf@storm.ca

**Foothills Model Forest**
P.O. Box 6330
1176 Switzer Drive
Hinton AB T7V 1X6
Phone: (403) 865-8329
Fax: (403) 865-8331
Internet site: www.fmf.ab.ca

**Fundy Model Forest**
181 Aiton Road
Sussex East NB E4G 2V5
Phone: (506) 432-2800
Fax: (506) 432-2807
Internet site: www.umoncton.ca/fundy/mf

**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
Internet site: www.lbmf.bc.ca

**Lower St. Lawrence Model Forest**
284, rue Potvin
Rimouski QC G5L 7P5
Phone: (418) 722-7211
Fax: (418) 721-5630
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
E-mail: bdube@mb.sympatico.ca

**McGregor Model Forest**
P.O. Box 9000
6677 Indian Reserve Road
Prince George BC V2L 4W2
Phone: (250) 962-3549
Fax: (250) 962-3364
E-mail: bruce@mcgregor.bc.ca

**Prince Albert Model Forest**
P.O. Box 2406
Prince Albert SK S6V 7G3
Phone: (306) 922-1944
Fax: (306) 763-6456
Internet site: www.pamodelforest.sk.ca

**Western Newfoundland Model Forest**
P.O. Box 68
University Drive
Forest Centre
Sir Wilfred Grenfell College
Corner Brook NF A2H 6C3
Phone: (709) 634-6383
Fax: (709) 634-0255
Internet site: www.wnmf.com

**Waswanipi Cree Model Forest**
Waswanipi QC J0Y 3C0
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## INTERNATIONAL MODEL FOREST NETWORK

**International Model Forest Network Secretariat**
13th floor, 250 Albert Street
Ottawa ON K1G 3H9
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Fax: (613) 234-7457
E-mail: imfns@idrc.ca

### Chilean Model Forest

**Chiloé Model Forest**
Aldunate 475
Castro - Chiloé
Chile
Phone: 56 65 638384
Fax: 56 65 638385

### Mexican Model Forests

**Calakmul Model Forest**
Consejo Regional de X'Pujil
Domicilio Conocido
Zoh Laguna, Campeche
Mexico
Phone: (52) 983-23207
Fax: (52) 983-23207

**Chihuahua Model Forest**
Ave. Ocampo 411-A
Col. Centro
Chihuahua, Chihuahua
CP 31000 Mexico
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Fax: (52) 141-58706
E-mail: bmchihme@mail.interred.net.mx

**Monarch Butterfly Model Forest**
Av. Revolucion Sur No. 34
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CP 61500 Mexico
Phone: (52) 715-35456
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E-mail: bmmonarc@evonet.com.mx

### Russian Model Forest

**Gassinski Model Forest**
Khabarovsk Forestry Administration
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Khabarovsk, 680620
Russia
Phone: (7-4212) 23 5036/33 5498
Fax: (7-4212) 23 5036
E-mail: admaa@fa.khabarovsk.su

### United States Model Forests

**Applegate Model Forest**
Bureau of Land Management – Medford District
3040 Biddle Road
Medford OR 97504 USA
Phone: (503) 770-2248
Fax: (503) 770-2400

**Cispus Model Forest**
USDA Forest Service - Randle Ranger District
P.O. Box 670, Randle
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Fax: (360) 497-1102

**Hayfork Model Forest**
Weaverville Ranger District
P.O. Box 1190
Weaverville CA 96093 USA
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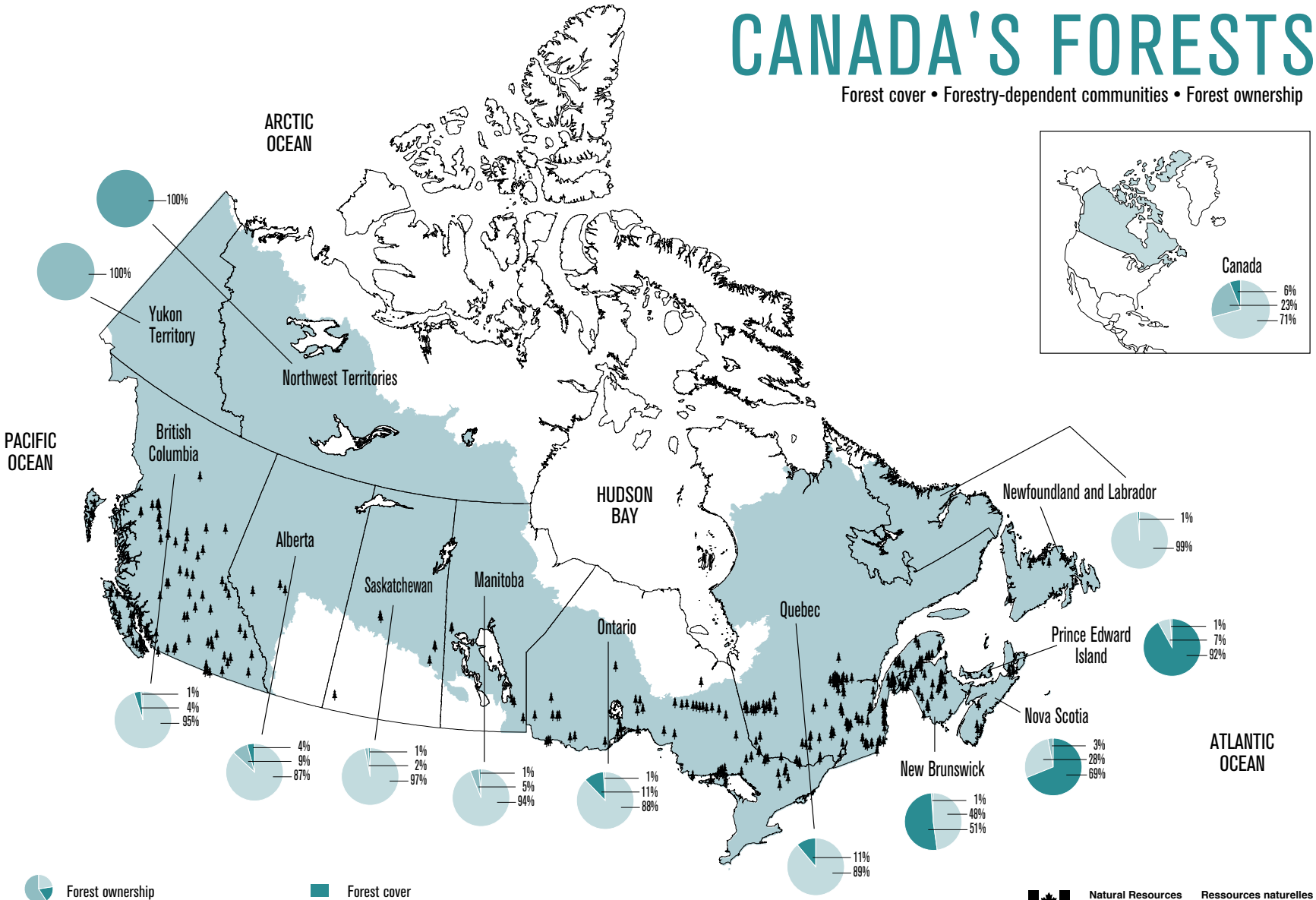
# CANADA'S FORESTS

Forest cover • Forestry-dependent communities • Forest ownership



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## CANADIAN FOREST SERVICE

**National Science and Technology Networks**


### 1 CFS–ATLANTIC FORESTRY CENTRE

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### 2 CFS–LAURENTIAN FORESTRY CENTRE

1055, rue du P.E.P.S.
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Sainte-Foy QC G1V 4C7
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*Lead centre for the tree biotechnology and advanced genetics network. Co-lead for the forest ecosystem processes network.*

### 3 CFS–GREAT LAKES FORESTRY CENTRE

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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 forest 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 socioeconomics research networks.*

### 5 CFS–PACIFIC FORESTRY CENTRE

506 West Burnside Road
Victoria BC V8Z 1M5
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