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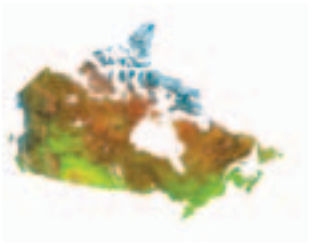

THE STATE OF CANADA'S FORESTS

ANNUAL REPORT 2009

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Fax: 613-740-3114
TTY: 613-996-4397 (teletype for the hearing-impaired)

Email: CFS-SCF@NRCan-RNCan.gc.ca
Website: canadaforests.nrcan.gc.ca

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MESSAGE FROM THE MINISTER OF NATURAL RESOURCES

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Canada's forest industry is continually evolving — both in its business practices as well as expanding in its efficiency and innovation. The current global economic downturn is the latest event spurring change within the sector. *The State of Canada's Forests 2009* highlights how the forest sector is transforming itself and meeting challenges by introducing new ideas and new products, while at the same time maintaining healthy, productive forests.

I have travelled across the country to speak to forest industry leaders and workers. One message that I have heard loud and clear is that to remain competitive, the forest sector needs to support innovation.

The Transformative Technologies Program, part of Canada's Economic Action Plan, is one way the Government of Canada is encouraging the forest sector to develop a new generation of products, processes and applications. Our Government is funding programs that are developing next-generation wood building solutions, renewable energy and fuel from forest biomass, and pulp and paper products.

Our Government is working with Canada's FPInnovations, the world's largest public–private partnership for forest products research, to lead the innovation agenda. Together, we are looking at the long-term future of the forest sector. This involves moving ideas from research to reality and developing new technologies that will help transform the forest products industry in Canada.

Canada's Economic Action Plan provides support to create pilot-scale demonstrations of promising new technologies and forest products of interest to consumers. These measures will help realize new business opportunities in the forest sector and attract new investments. This, in turn, will lessen the impact of market pressures and global competition on our forest sector.

While Canada's forest sector moves forward with innovation, it can draw on another advantage—a steady supply of wood from our vast, well-managed forests. Last year, with the release of the national forest strategy, *A Vision for Canada's Forests: 2008 and Beyond*, Canada renewed its pledge to sustainable forest management, first made in 1992 at the United Nations Conference on Environment and Development.

As leaders in sustainable forest management, Canadians know forest management practices must continually adapt to reflect current circumstances. This is why in Canada we use science-based tools to inform and assess forest management plans, laws and policies. Extensive public consultations also ensure that Canada's forests are managed in a sustainable manner that reflects a full range of values—environmental, economic and social.

Climate change and bioenergy are two examples of challenges and opportunities that will call for adaptation and innovation on the part of Canada's forest sector. As we take these on, Canada's record of leadership and effective sustainable forest management will continue to serve Canadians.

I trust you will find *The State of Canada's Forests 2009* interesting and informative, and I invite you to visit the report's complementary website at canadaforests.nrcan.gc.ca.

The Honourable Lisa Raitt, P.C., M.P.
Minister of Natural Resources

CONTENTS

EXECUTIVE SUMMARY:
2008—The year in review

Canada's forests and forest sector experienced unprecedented pressures on many fronts in 2008, brought on by cyclical and structural economic changes as well as environmental challenges. These pressures took their toll on the sector, with forest-dependent communities across the country bearing the brunt.

The global economic downturn hit the country's forest industry hard, and all forest commodities suffered. Canada saw a serious decrease in its markets for softwood lumber, primarily because of the collapse of the U.S. housing market. Eroding demand for newsprint and other forest products forced major adjustments on the supply side, including temporary or permanent mill closures across Canada. Growing competition from lower-cost forest producers in Asia and elsewhere further weakened Canada's traditional markets for forest products.

Adding to these pressures were environmental challenges, both existing and emerging. In particular, uncertainty about the potential long-term effects of climate change on Canada's forests has been complicating resource management, including decisions about what tree species to plant and what harvest schedules to adopt.

Canada is already facing more frequent and widespread natural disturbances, notably wildfire and pests. Although 2008 was a relatively quiet year for forest fires, thanks to wetter than normal weather, pest infestations remained a concern. The mountain pine beetle expanded into new areas of Alberta, the emerald ash borer spread further in Ontario and the eastern spruce budworm increased in Quebec and New Brunswick. The rate of mountain pine beetle spread is declining in British Columbia—mainly because there are fewer new trees left to infest, but also because some regions experienced cold winters. Yet pest infestations are expected to remain problematic in the short and long term.

The year was also marked by changing public expectations for how Canada's forests should be managed. Debate continued about how and for what purpose forested land should be managed, and there were further public calls to set aside more forest as parks and protected areas. This ongoing demand for alternative uses of the forest placed pressure on the industry to extract more economic value from a smaller area.

To address these and other forest sector issues in 2008, Natural Resources Canada and the Canadian Forest Service took many actions. A high priority for the Government of Canada was helping forest workers and communities adjust to closures and curtailments. To that end, the government established the $1-billion Community Development Trust in 2008 to, among other things, give provinces and territories funding for worker transition and retraining programs. Many of these regional programs are now well under way.

Natural Resources Canada was also instrumental in launching the $1-billion Community Adjustment Fund, designed to mitigate the short-term impacts of restructuring in communities. The fund supports activities that promote economic development and diversification.

More recently, the Pulp and Paper Green Transformation Program was announced. It provides $1 billion to pulp and paper companies in Canada for capital expenditures that will improve their environmental performance including energy efficiency. The new funding will help ensure that Canada's pulp and paper sector is both commercially and environmentally sustainable in the future.

In the longer term, there is a critical need for Canada to diversify its forest products mix and its geographic markets. Diversification is the key to renewing the country's globally competitive position. With that goal in mind, in 2008 Canada continued to push ahead with programs to promote and support new ways of doing business, new markets, new products, new technologies and new approaches to R&D. (See "Forest innovation: Up and running" on page 19.)

With the economy of Canada's major trading partner, the United States, struggling—and with it, Canada's export volumes—the search for new market opportunities has become more pressing than ever. One avenue has been to develop non-residential construction markets in the U.S., in effect "deepening" target markets there. Canada has also been working to expand its markets beyond the United States. A case in point is the effort under way in China's Szechuan province, where Canadian wood products and wood construction techniques are being used to rebuild schools, orphanages and other public buildings (originally made of concrete) destroyed during the 2008 earthquake.

Meanwhile, many new products being developed in Canada are showing great promise, among them composite building materials, specific-use pulps and papers, nano-crystalline cellulose, and biomass-sourced chemicals and fuels. Sophisticated, high-value-added products like these will go a long way to diversifying Canada's forest sector—and to renewing its competitive edge.

But developing new products and markets is only part of the story. Underneath the enduring success of Canada's forest sector is the country's solid commitment to sustainable forest management (SFM). Even in these turbulent economic times, Canada continues to adapt and improve its policies and practices so as to maintain all environmental, economic and social forest values, not just timber values. (See "Sustainable forest management in Canada: Making good on a Canadian commitment" on page 9.)

The SFM model is built on rigorous planning and management processes that are in place at all levels across Canada—national, provincial, territorial, regional. Integral to the model are wide public consultations, comprehensive assessment and monitoring networks, detailed reporting tools, and mechanisms to adapt practices based on new scientific information.

As the standard of practice across the country, SFM puts Canada in a strong position to tackle immediate problems such as pest and wildfire disturbances and the longer-term challenges of climate change. In 2008, for example, federal–provincial-territorial collaboration continued through the Canadian Wildland Fire Strategy and the National Forest Pest Strategy. These initiatives are looking for better ways to prevent and manage wildfires and are bringing agencies at all levels together to assess risks and responses related to native and alien pests.

Canada's SFM record is well supported by third-party forest certification. Today Canada has the largest area of independently certified forest in the world—some 146 million hectares in 2008. This achievement not only highlights how successfully Canadian forest companies have adopted SFM practices, but it also gives Canada's trading partners independent verification of the forest industry's commitment to doing business sustainably.

In the coming year, the economic, social and environmental challenges confronting Canada's forest sector will no doubt continue. However, with product innovation and market development under way, and a science-based SFM model that makes it easier to adapt to changing management conditions, Canada is charting a path for the future.

Near Lac-Mégantic, Quebec; photo courtesy of Petr Smetanka

KEY FACTS

Society

- Most of Canada's forest land (93%) is publicly owned—77% under provincial or territorial jurisdiction and 16% under federal purview.
- The rest is on private property belonging to more than 450 000 private landowners.
- The provinces and territories have legislative authority over the conservation and management of the forest resources on provincial/territorial Crown lands.
- The federal government is responsible for matters related to the national economy, trade and international relations, and federal lands and parks, and has constitutional, treaty, political and legal responsibilities for Aboriginal peoples.
- In 2008, direct employment in the Canadian forest industry fell by 6.9% compared with 2007.
- For about 300 communities, the forest sector makes up at least 50% of the economic base.
- About 80% of Aboriginal communities are in forested areas.
- Public participation is an important aspect of forest management planning in Canada.
- There were 13.1 million person-visits to Canada's national parks in 2008.

Economy

- Canada is the world's largest exporter of forest products.
- The forest industry's contribution to Canada's gross domestic product is about 1.9%.
- The United States is by far the largest buyer of Canadian forest products.

Environment

- Canada has 402.1 million hectares of forest and other wooded land, representing 10% of the world's forest cover and 30% of the world's boreal forest.
- About 8% of Canada's forest area is protected by legislation. About 40% of the total forest landbase is subject to varying degrees of protection such as integrated land-use planning or defined management areas such as certified forests.
- Annually, less than 1% of Canada's forests are harvested.
- By law, all forests harvested on Canada's public land must be successfully regenerated.
- About 50% of harvested areas on Crown land are regenerated naturally, while the remainder is regenerated through tree planting and direct seeding.
- By June 2009, almost 146 million hectares of Canada's forests were certified as being sustainably managed by one or more of three globally recognized certification standards.
- Bioenergy now constitutes more than 55% of the total energy used by the forest industry.

SUSTAINABLE FOREST MANAGEMENT IN CANADA:
Making good on a Canadian commitment

In 1992, at the historic United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Canada first declared its commitment to sustainable forest management. This approach to forest management strives to maintain the full range of values that Canadians attach to their forests—environmental, economic and social.

Since then, much hard work has gone into developing and evolving forest management practices across the country. Determined to make good on its commitment, Canada has put in place strategies, laws, policies, planning and assessment systems, and science-based tools, all with a single goal: to maintain a sustainable, healthy forest resource for generations to come.

In the process, Canada has risen to global prominence as a practitioner and promoter of sustainable forest management. This article looks at the country's progress to date, the current state of forest management and what lies ahead.

First the groundwork . . .

Canada's 1992 National Forest Strategy, the first to refer specifically to sustainable forest management (SFM), was pivotal in laying the groundwork for SFM in this country. In 1995 the Canadian Council of Forest Ministers, representing all provincial, territorial and federal agencies responsible for forest management in Canada, further endorsed the principles of SFM, underscoring their support for its broad adoption.

In every national strategy since 1992 (the most recent being *A Vision for Canada's Forests: 2008 and Beyond*), Canada has reaffirmed the pledge made at UNCED to manage its forests in a way that maintains and enhances their environmental, social and economic values.

The shift toward SFM (with its consideration of a broad range of values) and away from the previous approach (with its focus on sustained-yield timber) has been an ongoing journey. But the way has been greatly eased by the fact that Canada's overriding forest strategy has set the course for SFM, with policies to conserve ecosystem integrity, protect representative areas and support society's sustainable use of the forest resource.

. . . Now the practice

Sustainable forest management is, by its very nature, an ever-evolving goal, requiring constant adaptation to new circumstances. Social values shift, economic forces fluctuate, scientific advances lead to revised practices, and global influences such as climate change emerge. This need for constant adaptation means that as a country, Canada must step back periodically, assess how it's doing and ensure that it's on the right track.

The latest assessment, detailed in the rest of this article, shows that Canada is doing well. The SFM model is in place across the entire public land base. The provinces and territories, responsible for most of Canada's forests, have enshrined SFM in their policies, practices, regulation and legislation. Forest management planning is rigorous, comprehensive and—because public participation is an integral part of SFM planning—open. The tools, processes and science-based indicators that Canada has developed to measure and assess SFM results make it possible to track progress. Canada can show that it complies with international third-party standards thanks to forest certification. And the country relies on science-based knowledge and innovation in adapting its policies and practices.

Canada recognizes that its work toward sustainable forest management is by no means complete. However, its accomplishments to date in transforming SFM theory into practice give the country a strong base to keep improving on. These accomplishments have also created a robust system for responding to the current and emerging issues that face Canada's forest sector.

The sustainability equation includes three variables: environmental, economic and social values. In reporting on Canada's progress in this report, the focus is mainly on the environmental component. Information about Canada's SFM achievements in the economic and social areas can be found on Canada's Forests website (canadaforests.nrcan.gc.ca).

Planning for SFM: A rigorous, open process

Canadians expect a great deal from their forests. They expect economic support, since the forest industry continues to be a pillar of the national economy. They expect ecological values (such as healthy wildlife, water, soils) and social values (recreation, aesthetics, historical significance). To balance all of these expectations—for example, to ensure that trees can be harvested while non-timber benefits are maintained—governments across the country have established forest planning processes. These processes have grown more complex over time as Canada's values have changed and the country has learned more about how to successfully meet its sustainability goals.

In Canada, forest planning is based on strategic decisions about land use—decisions that are made by governments (with considerable consultation) and that guide the more operational levels of planning. The first step in the forest planning process is to develop a forest and resource inventory. Operational forest management plans are then drafted for review by provincial or territorial agencies.

There must be an approved forest management plan in place before harvesting can begin on Crown land in Canada. The plan, which outlines a strategic vision and a commitment to multiple forest values, projects over several decades and is revised every five or ten years. It lays out in detail the current state, and the desired future state, of forest values in the management unit, based on known science. It also describes the harvesting, renewal and other activities to be carried out in the unit to achieve the stated objectives for all values.

More detailed tactical plans (for example, to guide road building and harvest schedules) are drawn up for specific operating areas for a few years at a time. Annual operating plans identify the engineering requirements and silvicultural activities to be conducted at specific locations.

SOME DEFINITIONS

Forest sustainability: In ecological terms, the capacity of forests, ranging from stands to eco-regions, to maintain their long-term health, productivity, diversity and overall integrity in the context of human activity and use.

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

Sustainable forest management: Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things, while providing environmental, economic, social and cultural opportunities for present and future generations.

Forest management plans require careful scrutiny; there are no shortcuts to preparing them. Professional foresters, who must by law adhere to codes of ethics, carefully work through these involved undertakings. Across Canada, the multi-stage planning process, which involves meeting legislated standards at each stage, takes several years to unfold (see Canada's Forests website for more detail).

Throughout the process, the draft management plan is subject to a series of checks and approvals that involve many considerations, including wildlife habitat, water and soils. And oversight doesn't stop once the plan is approved. Governments regularly monitor forest management plans to make sure companies comply with them, imposing penalties on any companies that don't.

One of the biggest changes to Canada's forest planning in the past 25 years has been the public's increasing interest in, and ability to participate in, forest decisions. Forest managers and policy makers are now required to consult with First Nations and an array of interested parties—including forest owners, other industries, environmental groups, academics, recreational forest users and community representatives—about forest plans, strategies and legislation. Conflict resolution is increasingly a part of this public involvement, to help all sides resolve their differences cooperatively. Regardless of the form it takes, public consultation is a way of ensuring that forest management planning reflects the input of all parties and governments affected by proposed operations—a key element of SFM.

Achieving SFM: Objective measurement and assessment

Measuring, monitoring and assessing the outcomes of forest plans, strategies and practices are critical to SFM. It's essential that Canada have methods to objectively determine whether it has met its targets. Such methods help the country learn and adapt, both key steps given the changing environment in which SFM takes place.

Across Canada many aspects of forest management are monitored, including the following:

- **performance**: to confirm that desired outcomes are being achieved
- **compliance and enforcement**: to confirm that laws are being complied with and to obtain accountability if contraventions occur
- **validation**: to confirm that the assumptions and models used in management are valid

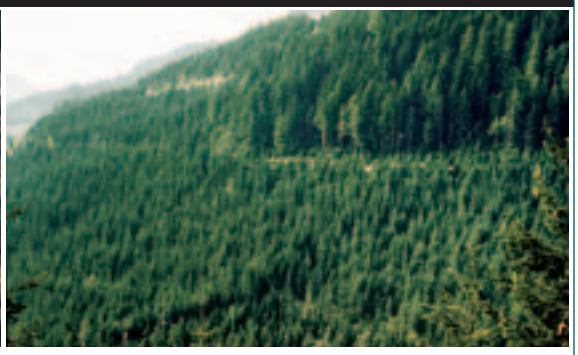
Forest plans and practices are assessed at various levels by accredited professionals, including foresters, engineers and biologists. As mentioned previously, an operator's forest management plan typically undergoes a formal review every five or ten years, with regular interim assessments and inspections for compliance during the life of the plan. Reviewers compare the actual outcomes with what was forecast, determine the reasons for any differences, review sustainable management goals and revise the plan as needed.

In addition, most provinces and territories prepare regular reports that measure and assess progress. Nationally, Natural Resources Canada publishes *The State of Canada's Forests* each year and works with provincial and territorial governments, through the Canadian Council of Forest Ministers, to produce periodic assessments such as Canada's criteria and indicators report. Many of these reports are available on public websites (see, for example, canadaforests.nrcan.gc.ca/indicator and nfdp.ccfm.org).

Independent forest interest groups as well as formally mandated organizations across the country also help protect forest values that range from water quality and wildlife habitat to archaeological values and scenic corridors. In British Columbia, for example, the Forest Practices Board is legally required to investigate and audit the forest practices of both government and industry. It also responds to public complaints about forest practices and enforcement of provincial regulations.

MONITORING FOREST LAND

Natural Resources Canada—Canadian Forest Service prescribed fire research site on Mission Tree Farm (T-12), 1970



Natural Resources Canada—Canadian Forest Service prescribed fire research site on Mission Tree Farm (T-12), 22 years after burn, 1992

Natural Resources Canada—Canadian Forest Service prescribed fire research site on Mission Tree Farm (T-8), 1968

Natural Resources Canada—Canadian Forest Service prescribed fire research site on Mission Tree Farm (T-8), 24 years after burn, 1992

Canada uses a variety of objective, science-based tools to measure and assess its progress toward SFM objectives. Here's a sampling:

– **Forest inventories and surveys**. Provincial and national inventories collect data on the condition and extent of forest land, including aspects such as vegetation, wildlife, riparian areas, fish stocks, slope stability and soils. Forest inventories, including the changes and trends they reflect, provide valuable information about SFM.

  Free-to-grow assessment surveys are another form of monitoring, this time at the stand level (see "Monitoring forest land" figure). Because the law requires all Crown land harvested in Canada to be regenerated, most provincial regimes require forest licensees, under their tenure agreements, to return a harvested stand to free-to-grow conditions within a specified time. (A stand is "free to grow" when the trees are determined to be free of competition and likely to grow into healthy forests containing commercially usable timber.) Assessment surveys, which are submitted to the province's regulator, help determine whether silvicultural treatments have been successful and licensees have met their obligations for forest renewal. Operators found not in compliance may face penalties.

– **Estimates of deforestation and forest disturbance**. Natural Resources Canada uses remote sensing to monitor the incidence of deforestation (the permanent removal of trees to permit other land uses such as agriculture or urban development). Using this tool, Canada has confirmed that, unlike many other countries, its annual net deforestation rate remains minor (deforestation affected less than 0.02% of Canada's forests in 2005). Given that deforestation is a large source of world greenhouse gas emissions, this finding bolsters Canada's position as a leader in SFM.

One reason Canada tracks forest disturbances is to help estimate carbon storage, carbon release and the greenhouse gas emissions associated with the nation's forests. Other assessment tools that support this task include carbon budget models, forest inventories and growth models. The results of these assessments, organized by causal factor and greenhouse gas emission level, are compiled nationally and reported internationally.

– **Criteria and indicators**. Besides being one of the first countries in the world to commit to SFM, Canada was among the first to adopt criteria and indicators (C&I) for assessing progress toward SFM. Criteria outline the forest values—environmental, economic and social—that Canadians want to sustain. Indicators are the scientific measures, supportable with data, used to assess each criterion. C&I show, for instance, that Canada consistently cuts at least 20% less timber than the amount estimated as available (based on annual growth rates) for sustainable harvest every year (see Canada's Forests website for more detail).

  C&I information is reported at many levels: locally, through certification (described below); provincially, in provincial C&I reports; nationally, in reports such as this one; and internationally, in, for example, reports from the UN Food and Agriculture Organization. Canada promotes C&I globally as a member of the Montréal Process, a 12-country initiative that, among other things, advances the use of C&I in temperate and boreal forest countries.

– **Third-party certification**. Third-party certification provides independent verification—on top of verification by government regulators—that a company's forest practices are conducted sustainably, according to globally recognized standards. A certified forest company can show the world, and the marketplace in particular, that its operations adhere to the full range of SFM standards, including planning for long-term sustainable harvests, protecting wildlife values and maintaining soil quality. Indicators and targets are monitored to make sure the company continues to comply. (For more about the three certification systems used in Canada, see Canada's Forests website.)

Third-party certification has been adopted rapidly in Canada, now home to 40% of the world's certified forest, an area more than twice the size of France. The forest industry has shown clear support for certification, with the Forest Products Association of Canada requiring that its members, who together manage about 75% of the country's working forest, become third-party certified. The fact that certification standards in many cases exceed government regulations only underscores the industry's commitment to SFM. (See the sustainability indicator on page 49 for more information.)

The adaptive nature of SFM: Evolution based on science

Canada is recognized around the world for embracing SFM and putting the model into action. And Canada remains committed to improving its SFM performance. SFM is, after all, an adaptive process; assessing and adjusting the country's approach to sustainability, based on sound science, is an ongoing and vital component.

Canadians expect forest ecosystems to be managed based on sound scientific principles and knowledge. To that end, research is under way across governments, as well as in industry, universities and certification agencies, to advance Canada's progress along its sustainability journey (see text box on page 16).

These days, Canada faces three science-related issues—climate change, biodiversity and bioenergy—that present challenges and opportunities for SFM. These issues are interrelated and need to be considered in decisions about forest management.

– **Climate change**. Climate change brings with it a dual challenge. First, it affects forest ecosystems in complex ways—for example, by altering the growth, competitive position and reproductive abilities of individual species. Natural disturbances (such as insects, diseases and fires) may become more frequent or severe, in turn affecting the risks projected in SFM plans. Such disturbances, because of their role in carbon dynamics, may also limit forests' ability to act as carbon "sinks." The degree to which Canada's forest ecosystems are affected by climate change will also determine the degree to which the goods and services from the forest are affected.

  The second challenge involves how to manage the forest to mitigate the effects of climate change. Examples include drawing carbon dioxide from the atmosphere, providing alternative fuels to replace fossil fuels, and offering renewable construction products in lieu of more energy-intensive equivalents such as concrete and aluminum. This is a complex area for researchers, who need long- and short-term data on the cumulative impacts of climate change in order to evaluate risks and develop adaptation strategies.

– **Biodiversity**. Science supports that forests are affected by the cumulative impacts of disturbances. The question for forest managers is what is the right level of biodiversity and how to maintain it in the face of such impacts.

  A current example is the introduction of invasive alien species—pests, diseases, insects and weeds found outside their natural range. While not all alien species damage trees and plants, they do change the biodiversity of local ecosystems by crowding out native species. As international trade grows, so does the potential for invasive species to enter Canada and cause ecological, commercial, and trade impacts. Canada must be able to predict these issues, improve interception and management tools and use the knowledge gained to inform regulatory process. To help, the federal government has introduced the Invasive Alien Species Strategy for Canada, which focuses on prevention, early detection and rapid response to invasive alien species in Canada's forests.

– **Bioenergy**. Forest biomass is being collected and converted into a growing range of products, including biofuels (see the article on forest innovation on page 19).

  Although using forest bioenergy in place of fossil fuels may have environmental and economic benefits, the matter is a complicated one for forest managers. They must ensure, for instance, that removing forest biomass for energy purposes is environmentally as well as economically sustainable. They must assess how actions such as cultivating more fast-growing trees for bioenergy, or removing more biomass through salvage logging, will affect the forest's genetic, species and ecosystem diversity. Canada needs to understand the implications of greater development and use of forest bioenergy and what it means for SFM.

Continuing to manage forests sustainably in the face of these three major issues will call for considerable effort, adaptation and innovation on the part of Canada's forest sector.

EXAMPLES OF HOW SCIENCE SHAPES FOREST MANAGEMENT IN CANADA

– Quebec's Ministry of Natural Resources, in partnership with forest company Tembec, is working on a large-scale project in forest ecosystem management. The aim? To develop a general plan for forest management in the province and a five-year program that sets the bar even higher than SFM—implementation of the conservation principles of ecosystem management.

– EMEND (Ecosystem Management Emulating Natural Disturbance) is a long-range forest ecology experiment in the northern boreal plains of Alberta. Led by the Canadian Forest Service of Natural Resources Canada and the University of Alberta, the project is looking for ways to manage Canadian forests economically, so as to remain competitive in the global forest products market while preserving forests' biological integrity and productivity. (See Canada's Forests website for more information.)

– In British Columbia, forest geneticists, climatologists and landscape ecology modellers with the Ministry of Forests and Range have developed high-resolution spatial climate data for use in running future scenario projections. Using these datasets, forest managers have been able to identify the most vulnerable forest resources and to find ways for forests to adapt to climate change.

– The Canadian Forest Service of Natural Resources Canada, collaborating with the Canadian Model Forest Network, developed the Carbon Budget Model of the Canadian Forest Sector. This stand- and landscape-level modelling framework can simulate the dynamics of all forest carbon stocks required under international agreements. By early 2009, more than 500 individuals from 42 countries had downloaded the model, and many had attended training sessions on how to use it. Users come from universities, the forest industry, NGOs, provincial governments and other areas.

Near Saint-Robert, Quebec; photo courtesy of Petr Smetanka

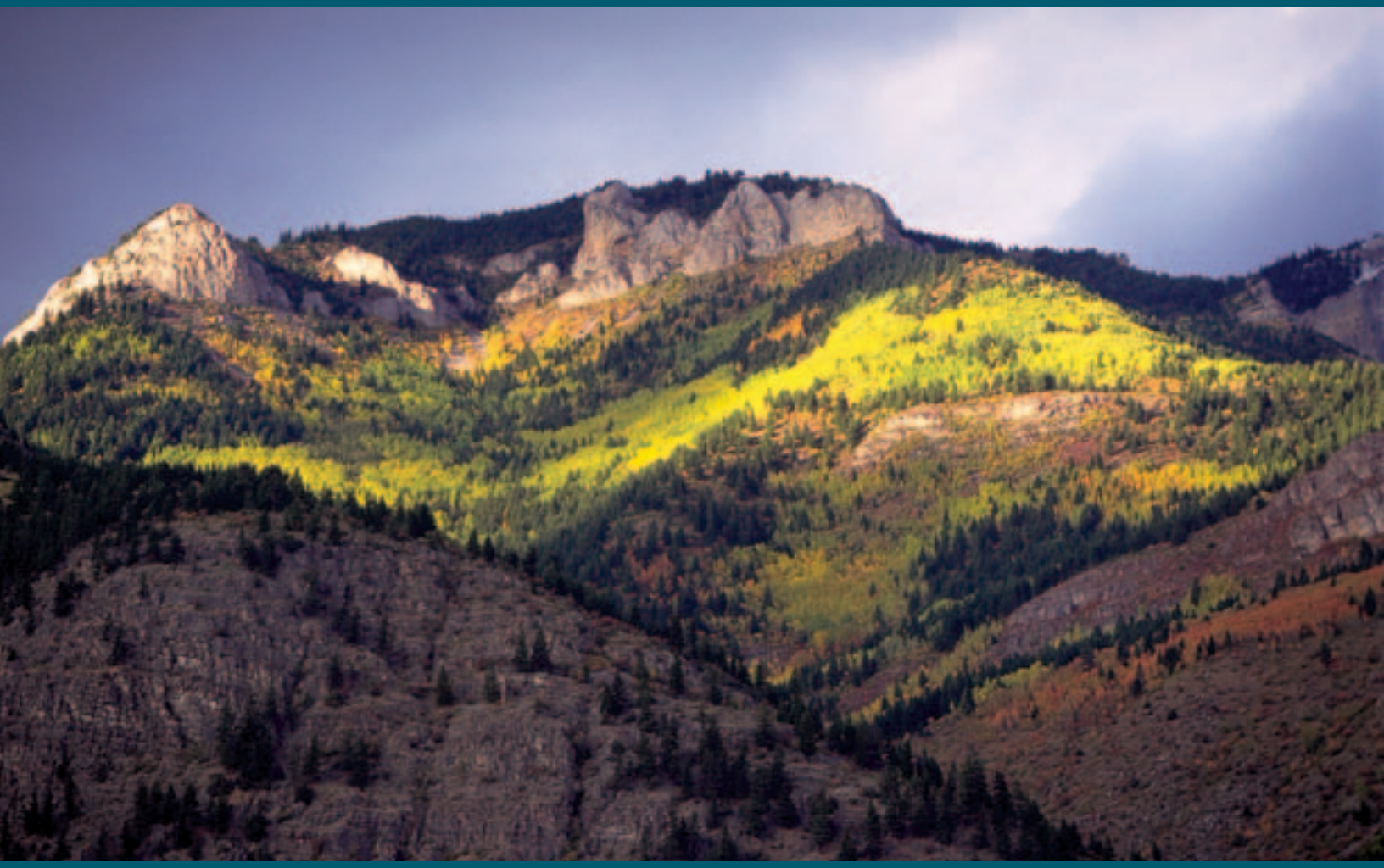
Readying Canada's forests for the future

When it comes to their forests, Canadians expect that ecosystem conservation and the wise use of resources for economic purposes are accepted principles. To that end, Canada has put in place a robust sustainable forest management system. The system features planning and management processes, which allow for public consultation; tools for monitoring and assessing progress; effective reporting frameworks, especially C&I; and ongoing science-based improvements.

Thus equipped, Canada is in a strong position to respond adeptly and resourcefully to whatever the future holds in store for its forests. Canada's SFM system will enable the country to:

- measure, assess and report on the coming changes to forests and the environment, and report on the country's progress in meeting its targets
- quickly incorporate the concept of SFM into policies and strategies on future issues
- capitalize on Canada's networks for collaboration among all levels of government, the public and public agencies
- use the country's scientific capacity to investigate, understand and develop solutions to the challenges that accompany changing climates and population growth, and the demands such phenomena make on the forest

These will be significant accomplishments, but no more significant than those that have brought Canada this far. It's been 17 years since forests emerged as a key item on the international agenda at UNCED. Since then, Canada's forest management record has shown that the country is making good on its commitment to sustainability. With frameworks in place to deal with current and future challenges, Canada will continue to play a leadership role internationally as a responsible forest steward.



FOREST INNOVATION:
Up and running

Innovation means more than creating new things; it means creating new ideas. Here's an intriguing idea . . .

> *Canada's forest sector is applauded around the world as a model of sustainable development for its healthy, renewable forests and light environmental footprint. The industry offers an array of sought-after products and services to the global market, from eco-friendly building solutions to biofuels, from special reactive papers to products made from lignin. The forest supplies renewable energy to rural communities and manufacturing sectors across Canada. Because the forest sector leads the new bioeconomy, it attracts highly qualified workers and visionary researchers. Canada's forest sector has entered a new era—environmentally progressive, adaptable, profitable, vibrant.*

If this sounds like a distant—even fictional—future, think again. It could be Canada's forest sector as soon as 2015 if the country's forest innovation efforts proceed as planned.

Innovation—The key to industry transformation

For years now, the Canadian forest industry has struggled through difficult times. Even before the economic downturn that currently grips the globe, the industry saw its competitors grow, its market share slip and its profit margins shrink. The present economic climate, characterized by falling housing starts in the United States and soft commodity markets, has only exacerbated the situation. Across Canada, the forest industry has seen processing facilities shut down and tens of thousands of people out of work.

Although the current economic situation is bleak, particularly in segments of the industry that have seen serious declines, the longer-term prospects are positive, as the world economy is expected to improve. In the meantime, one message has rung loud and clear: innovation must be part of the road back to competitiveness. New ways of doing business, new markets, new products, new technologies, new approaches to R&D—all can transform the forest industry and help it thrive again.

Photo courtesy of FPInnovations

The infrastructure for change

The first step for the forest sector has been to create a crucible in which innovation can take place. In the past, forest innovation in Canada was hindered by a fragmented R&D community. Research was conducted by three national institutes—Feric, Forintek and Paprican—and by scientists scattered among government, university and industry labs. Research occurred and developments emerged, but because programs and objectives weren't coordinated, the impact on the sector was at times diluted.

In 2003, to address the forest sector's innovation needs and to ensure collaboration among all research players, the Canadian Forest Innovation Council (CFIC) was formed. This group of senior government and industry officials laid the foundation for a national forest innovation strategy. It also gave Canada its research crucible. On CFIC's recommendation, in 2007 the three national research institutes amalgamated with the newly formed Canadian Wood Fibre Centre (see text box) to form FPInnovations. The merger was supported through the federal government's Forest Industry Long-Term Competitiveness Initiative.

Today FPInnovations is the largest public–private forest products research partnership in the world. Funded in part by dues-paying forest companies, the institute represents the industry's main investment in R&D and pre-competitive research. FPInnovations is truly national, with labs in Québec City, Montréal and Vancouver, and technology transfer offices across the country. It employs more than 600 people, has a $90-million budget and is led by a board that represents forest companies and governments.

The breadth of FPInnovations, together with its ability to partner with universities and other research groups, means innovation can now be tackled in a continuum: from tree genetics in the forest, through harvesting and manufacturing processes, and on to the global marketplace.

With the first step taken, and a supportive infrastructure in place, the next step has been to shape innovation itself. Here, Canada's forest innovation efforts have been guided by three objectives:

- Rethink how the forest industry does business
- Develop the next generation of forest products and processes
- Remodel the way forest research is conducted and applied

CANADIAN WOOD FIBRE CENTRE

When it joined the three forest research centres to form FPInnovations, the newly created Canadian Wood Fibre Centre (CWFC) filled a research gap identified by the Canadian Forest Innovation Council: the need for "upstream" research—research that focuses on the forest itself, with an emphasis on managing fibre for sustainable competitive advantage.

Creating the CWFC involved building a virtual centre, not a bricks-and-mortar facility. The Canadian Forest Service of Natural Resources Canada looked within itself for people whose competencies matched FPInnovations' research priorities, then assigned those people to the CWFC. No new infrastructure was needed and no staff were relocated. By design, the CWFC is a unique and efficient federal government contribution to forest research and to the collaborative model that FPInnovations is built on.

Rethinking how the forest industry does business

In today's global economy, the Canadian forest industry is facing business challenges it has never seen before. A traditional reliance on commodities—pulp, paper, lumber and other building supplies—has left Canadian companies vulnerable to price pressures and stiff competition from global producers.

This situation has led Canada's forest industry to rethink how it does business. While traditional forest products will continue to be an important part of their product mix, producers recognize that they need to develop a broader portfolio of new fibre-based products. To go head to head with the competition, the Canadian industry is looking to identify and capitalize on the features of the forest base that are uniquely Canadian, and is aiming to use forest fibre more efficiently and to be more discerning in choosing which fibre to use for which product.

The sector's rethinking is moving along three lines.

1. There's a growing desire to develop more specialty products so that the industry sits on a solid, competitive base of value-added products. In the past, the forest industry has been successful in manufacturing products like 2x4s. In the future, the focus will be more on determining what customers need, then providing fully formed solutions, such as building systems and assemblies, that meet those needs.

   Becoming solutions-oriented involves assessing individual customers' needs, developing specific manufacturing processes and creating tailored solutions that make the most of Canada's specialized resources. Under a new business model, market research and client management are as important as harvesting and production.

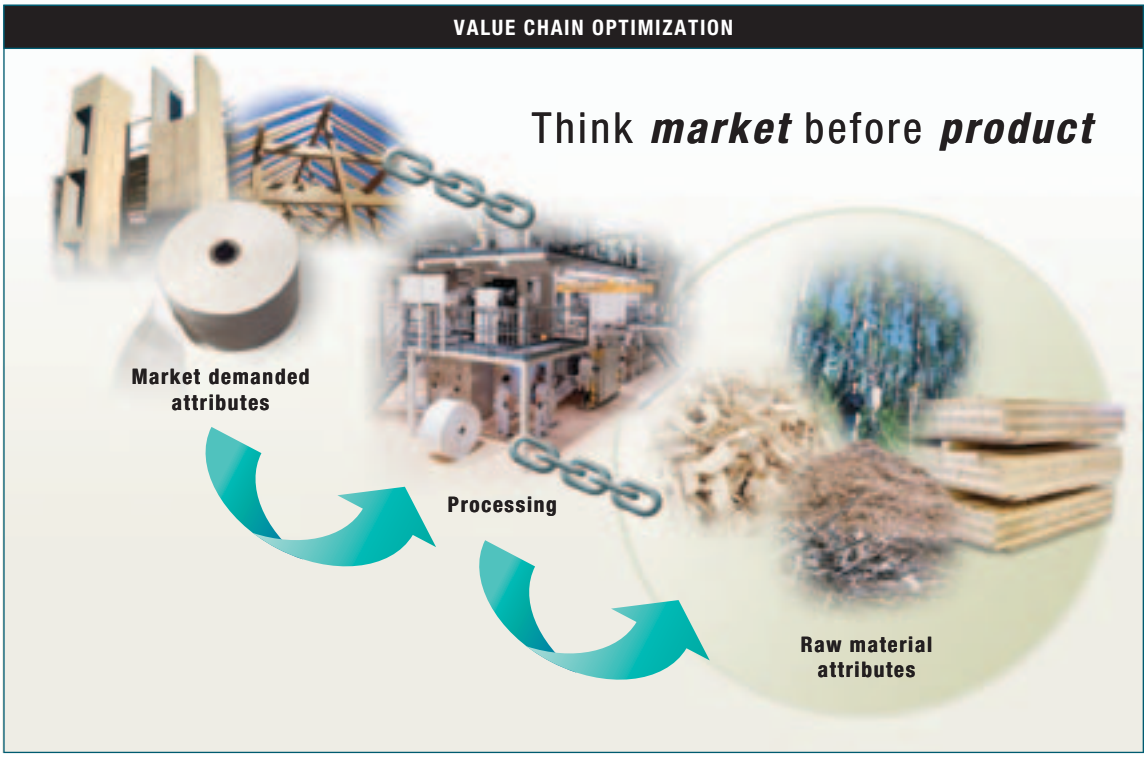


Figure courtesy of FPInnovations

2. Putting customers' needs first means that decisions about what to produce, and how to produce it, begin with the market. Once market demand is clear, the industry can then follow the so-called value chain back to the raw material, identifying which forest resource has the attributes the market wants, and which manufacturing process is best suited to that resource and that market solution.

   Thinking of business as a value chain and making the best matches along the chain—matches between market needs, processing methods and the raw resource—increases the value of forest products and the value of the resource they draw upon. The goal is to apply innovative thinking all the way along the chain, examining each point through the compound lens of economic, environmental and social considerations so that the right resource is used for the right product.

3. In an era when consumers care about environmental stewardship and a low-carbon footprint, Canada's forest sector is in a strong position. It already sets a world standard for sustainable forest management, with 40% of the world's independently certified forest area (see the article on sustainable forest management on page 9). Across the country, forest processing leaves an increasingly light environmental footprint thanks to smarter technologies and energy recovery. In fact, the Forest Products Association of Canada has pledged that the forest industry will become Canada's first carbon-neutral industrial sector (without offsets) by 2015.

   There's little doubt that renewable bioresources will play a big role in tomorrow's economy. Canada, with abundant renewable feedstocks in its forests and a focused research community, is poised to become a leading supplier of this new bioeconomy. Coming up with novel ways of meeting the growing demand for environmentally friendly products and services is a priority for forest innovation.

Developing the next generation of forest products and processes

Forest sector innovation is key to developing a different business model. But this model can't work unless the industry can produce new value-added solutions, match resources to market needs and develop new technologies for the bioeconomy.

The federal government has taken a large role in spurring the forest sector on to develop a new generation of products, processes and applications. Through the Transformative Technologies Program (funded through Canada's Economic Action Plan), the government is supporting FPInnovations and cooperating universities to move forest science ahead. The program supports ventures that will transform the forest industry, diversify product lines and develop emerging technologies.

Photo courtesy of FPInnovations

The five themes of the Transformative Technologies Program represent Canada's best bets for rejuvenating the forest products sector.

THEME 1—NEXT-GENERATION BUILDING SOLUTIONS

Aim: Apply new technologies, engineering and design to traditional and emerging wood-based materials to create sustainable building solutions (e.g., systems and assemblies) for residential and non-residential uses.

Six-storey building in Quebec; photo courtesy of Gilles Huot, architect

Potential: Wood is a long-lasting insulator (great for energy efficiency) and has promising earthquake resistance. Of interest are processes to make wood more fire resistant, technologies to speed up construction while lowering costs, new systems for non-residential buildings such as schools, and solutions that meet public policy needs (e.g., affordable and emergency housing, carbon-neutral buildings).

Example: Three new designs are in the works for non-residential and multi-storey construction: (1) a design for six-storey wood frame construction, (2) a hybrid post-and-beam and concrete system and (3) the jumbo plywood known as X-Lam. All three designs introduce wood to end uses traditionally met by concrete and steel. (See "Building with wood: Next-generation projects" on Canada's Forests website.)

THEME 2—NEXT-GENERATION PULPS AND PAPERS

Aim: Combine the unique attributes of Canadian fibre with innovative manufacturing to create value-added pulps and papers.

Potential: Mixing long, strong Canadian fibre with inexpensive fillers results in lightweight printing and writing papers that can compete, in quality and price, with alternatives from tropical producers. New types of pulp (wood and agricultural fibres) can be used for high-performance packaging and for specialty papers that feature built-in security measures, anti-microbial properties and moisture resistance. Emerging green chemistry could lead to pulping processes that produce more environmentally friendly papers.

Example: Processes to make highly filled papers using mechanical pulp (whose fibres can compete with fibres from short-rotation plantations) are near or at the commercialization phase. (See "Next-generation papers: Capitalizing on high-quality Canadian fibre" on Canada's Forests website.)

THEME 3—ENERGY AND CHEMICALS FROM FOREST BIOMASS

Aim: Find economically feasible methods of gathering forest biomass and converting it to new products such as fuels and chemicals.

Biomass trial conducted in the Eastern Ontario Model Forest in 2008; photo courtesy of FPInnovations

Potential: Once considered waste, forest biomass is a renewable, eco-friendly source of heat and electricity that reduces dependence on fossil fuels. The forest sector is already the largest producer of bioenergy, with the pulp and paper industry meeting about 57% of its own energy needs with biomass. There's interest in developing this potential further, possibly making the forest sector a net contributor to the energy grid. As well, technology can transform biomass into fuels, chemicals and other products currently made from non-renewable resources. Exploring biorefineries and launching a demonstration gasification facility are key objectives.

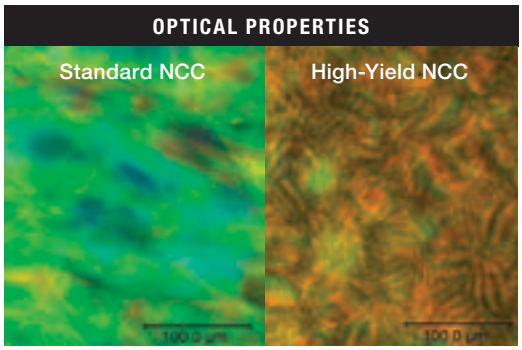
Example: Designs are in the works for a biomass gasification unit that will initially replace fossil fuel use in a kraft pulp mill, then later demonstrate processes for creating fuels and chemicals from biomass. (See "Novel uses for forest biomass" on Canada's Forests website.)

THEME 4—NOVEL BIOPRODUCTS

Aim: Convert wood into new cellulose-based materials and explore uses for nano-crystalline cellulose (NCC) to supply profitable niche markets.

Potential: Research into commercial applications of nanomaterials, especially NCC, is concentrating on pulp and paper and wood products. Examples include advanced coatings for papers and boards, paper fillers, papers with more strength and moisture resistance, decorative iridescent films, and intelligent papers with built-in biosensors to detect and destroy pathogens and toxins. In the longer term, NCC is of interest to other industries for use in lightweight, high-strength composites.

Example: A process has been developed to produce NCC in a dry, easy-to-disperse form so that it can be used in commercial applications. (See "Nano-crystalline cellulose—Not your average wood product" on Canada's Forests website.)



Images illustrating the comparative optical properties of standard and high-yield nano-crystalline cellulose; photo courtesy of FPInnovations

THEME 5—INTEGRATED VALUE MAXIMIZATION

Aim: Apply new technologies that optimize the entire value chain by matching fibre attributes to manufacturing processes and market needs, thus getting the highest value and best return from the forest resource.

Potential: This research theme cuts across the other four and should see results in the shorter term. In development are information technologies, tools and numerical models to map the traits of forest resources and link those traits to the best manufacturing processes and markets. Other technologies will improve forest planning and make it easier to manage the value chain, from forest to market, in an integrated way.

Example: A large demonstration project in British Columbia is working to maximize the value of "hem-fir," a plentiful but underused forest resource. (See "Maximizing value: Test case on the BC Coast" on Canada's Forests website.)

As it develops the next generation of forest products and processes, Canada can draw on a number of advantages. The nation's forests are vast and well managed, assuring a steady supply of commercial and environmental services. The resources in those forests are naturally diverse, ideal for an industry that needs a variety of tree species to develop new products. And Canada has the infrastructure in its research centres, universities, industry facilities and government labs to help industry adopt advanced technology.

Despite present difficulties, the long-term outlook for global forest product demand is bright. If Canada continues to invest in R&D and innovation, the forest industry will soon have a more diversified suite of products and processes to offer the world.

Remodelling the way forest research is conducted and applied

The success of forest innovation is closely linked to the way in which knowledge and technologies are generated and applied. In the new research model that the sector is moving toward, value comes from transferring technology and ensuring that the scientific community works together toward common goals.

The forest sector has already made considerable progress in adopting this new partnership style of research by forming FPInnovations. This move has enabled the sector to become more involved with universities, which in turn are increasingly harmonizing their work with the Transformative Technologies Program.

This harmonization got a boost with the recent commitment of $9 million a year from NSERC (Natural Sciences and Engineering Research Council) to the Forest Sector R&D Initiative. This money funds university research that aligns with the forest sector's innovation priorities and focuses on transformative technologies. NSERC, Natural Resources Canada and FPInnovations work together to determine which projects are the most relevant and valuable to the industry.

There are already a number of university networks that support the forest sector's innovation goals. Partnerships such as PAPIER, Sentinel and ArboraNano are making headway in their respective areas (see text box on page 27). The next step is to attract more partners, and to ensure that research efforts are integrated and the pathways to application are clear and short.

The federal government acknowledged the key role of demonstration in its 2009 budget, providing $40 million to develop pilot-scale demonstrations of new forest products to move toward commercial applications more quickly.

Working together, forest researchers, policy makers and industry all have a vital role to play in the future of Canada's forest sector. They must stimulate innovation and direct it toward the solutions that most benefit the sector. They must do their part to turn innovative ideas into innovative realities. And they must ensure that forest innovations continue to balance economic, social and environmental priorities, advancing at all times the goal of sustainable forest management.

INNOVATIVE RESEARCH NETWORKS

PAPIER (the Canadian Pulp and Paper Network for Innovation in Education and Research, papiernet.ca) brings together some 100 university faculty members who teach and conduct research for the pulp and paper industry. A director and administrative support are provided by FPInnovations.

One of PAPIER's biggest developments was to create, in 2008, the Canadian University Forest Biorefinery Network. CUFBNet, as it's known, gives industry and government a single point of access to university research on biorefineries. The network is also a medium for sharing biorefinery research (including with international networks) and for developing other partnerships.

PAPIER in turn provided administrative support to help create **Sentinel** (the Bioactive Paper Network, bioactivepaper.ca). Based at McMaster University, Sentinel is a network of 11 universities, plus government agencies and business partners, developing bioactive papers that can detect, capture and even deactivate pathogens. The specially treated yet inexpensive paper products (e.g., medical masks, filters, test strips, food wrappers) could combat SARS, listeriosis and a variety of diseases; could detect contaminated food and water; and could provide affordable, on-the-spot results from medical tests.

Sentinel has made Canada a world pioneer in the development of bioactive paper. Commercial products, though still some years off, are more likely all the time.

Universities are not the only leaders of forest research networks. **ArboraNano** is a business-led centre of excellence created with federal funding in February 2009. Managed by FPInnovations, ArboraNano (meaning nanomaterials from trees) aims to turn the forest sector into a supplier of high-value, renewable nanoproducts. These products are of interest to many sectors, including the aerospace, automotive and medical industries. Nanomaterials can be used to enhance chemicals, composite materials, cosmetics, pharmaceuticals, coatings, forest products and other applications.

ArboraNano brings together Canadian scientists and engineers from the industries most likely to benefit from its research, and draws on university and government labs as well. If it succeeds, ArboraNano will serve as a model for how to combine basic and applied research with private sector innovation to make the most of Canada's forest resource.

FORESTRY STATISTICS AND TRENDS

Statistical profiles

Maple

Canada

Population (Jan. 1, 2009)
33 504 680

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	211 417
Capital and repair expenditures (dollars) (2007)	**5 743 400 000**
Forestry and logging industry	544 400 000
Paper product manufacturing industry	2 873 700 000
Wood product manufacturing industry	2 325 300 000
Contribution to GDP (constant 2002) (dollars) (2008)	**23 179 000 000**
Forestry and logging industry	4 386 000 000
Wood product manufacturing industry	9 388 000 000
Paper product manufacturing industry	9 405 000 000
Contribution to GDP (current) (dollars) (2008)	**28 023 411 000**
Forestry and logging industry	5 302 674 000
Paper product manufacturing industry	11 370 645 000
Wood product manufacturing industry	11 350 092 000
Direct jobs (number) (2008)	
Direct jobs (LFS)	273 700
Direct jobs (SEPH)	231 451
New investments (dollars) (2008)	**2 180 900 000**
Forestry and logging industry	218 400 000
Paper product manufacturing industry	1 098 500 000
Wood product manufacturing industry	864 000 000
Revenue from goods manufactured (dollars) (2007)	**68 450 942 000**
Logging industry	11 967 705 000
Paper product manufacturing industry	29 659 676 000
Wood product manufacturing industry	26 823 561 000
Wages and salaries (dollars) (2007)	**11 482 209 000**
Logging industry	2 207 150 000
Paper product manufacturing industry	4 345 449 000
Wood product manufacturing industry	4 929 610 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	18 599 523
Area planted (hectares) (2007)	451 318
Area seeded (hectares) (2007)	34 429
Fire – area burned (hectares) (2008)	1 701 377
Fires – number (2008)	6 036
Forest area certified (hectares) (2008)	145 748 861
Harvest area (hectares) (2007)	733 760
Harvest volume (cubic metres) (2007)	162 792 000
Afforestation – forest area (kilohectares) (2005)	9.4
CO_2e emissions due to deforestation (megatonnes) (2007)	16
CO_2e removals from the atmosphere due to afforestation (megatonnes) (2007)	-1
Deforestation – forest area (kilohectares) (2007)	47.8
Net carbon sequestered (CO_2e/yr) (megatonnes) (2007)	39.3

FOREST PRODUCTS	
Domestic consumption	
Lumber – hardwood (cubic metres) (2008)	3 585 689
Lumber – softwood (cubic metres) (2008)	25 442 492
Newsprint (tonnes) (2008)	907 427
Printing and writing paper (tonnes) (2008)	1 816 000
Structural panels (plywood and oriented strandboard) (cubic metres) (2008)	3 172 366
Wood pulp (tonnes) (2008)	11 013 916
Production	
Christmas trees (dollars) (2007)	34 259 000
Christmas trees (number) (2007)	1 926 000
Low-bush blueberries (dollars) (2007)	89 305 000
Low-bush blueberries (tonnes) (2007)	42 293
Lumber – hardwood (cubic metres) (2008)	1 110 900
Lumber – softwood (cubic metres) (2008)	56 139 400
Maple products (dollars) (2007)	167 449 000
Maple products (litres) (2007)	23 339 240
Newsprint (tonnes) (2008)	6 004 000
Printing and writing paper (tonnes) (2008)	5 239 000
Structural panels (plywood and oriented strandboard) (cubic metres) (2008)	6 592 505
Wildlife pelts (minus sealskins) (number) (2006)	1 056 286
Wood pulp (tonnes) (2008)	20 300 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	402.09
Total area (million hectares)	979.08
National parks area (million hectares)	27.6
Forest and other wooded land ownership	
Federal	16%
Private	7%
Provincial	77%
Forest type	
Hardwood	12%
Mixedwood	22%
Softwood	66%

TRADE	
Balance of trade (dollars) (2008)	20 066 882 178
Value of exports (dollars) (2008)	**30 236 406 328**
Primary wood products	731 158 004
Pulp and paper products	20 359 604 740
Wood-fabricated materials	9 145 643 584
Value of imports (dollars) (2008)	**10 169 524 150**
Primary wood products	514 621 991
Pulp and paper products	6 805 991 154
Wood-fabricated materials	2 848 911 005

Western Redcedar

British Columbia

Population (Jan. 1, 2009)
4 419 974

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	34 250
Direct jobs (number) (2008)	
Direct jobs (LFS)	64 900
Direct jobs (SEPH)	58 372
New investments (dollars) (2008)	**356 600 000**
Forestry and logging industry	96 700 000
Paper product manufacturing industry	150 400 000
Wood product manufacturing industry	109 500 000
Revenue from goods manufactured (dollars) (2007)	**20 337 674 000**
Logging industry	5 331 064 000
Paper product manufacturing industry	5 763 515 000
Wood product manufacturing industry	9 243 095 000
Wages and salaries (dollars) (2007)	**3 400 090 000**
Logging industry	946 415 000
Paper product manufacturing industry	794 534 000
Wood product manufacturing industry	1 659 141 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	12 689 356
Area planted (hectares) (2007)	185 580
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	11 939
Fires – number (2008)	1 817
Forest area certified (hectares) (2008)	54 133 295
Harvest area (hectares) (2007)	168 160
Harvest volume (cubic metres) (2007)	75 448 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	64.25
Total area (million hectares)	94.55
Provincial parks area (million hectares)	13.5
Forest and other wooded land ownership	
Federal	1%
Private	3%
Provincial	96%
Forest type	
Hardwood	5%
Mixedwood	13%
Softwood	82%

TRADE	
Balance of trade (dollars) (2008)	8 440 846 112
Value of exports (dollars) (2008)	**9 952 277 220**
Primary wood products	479 867 718
Pulp and paper products	4 699 274 715
Wood-fabricated materials	4 773 134 787
Value of imports (dollars) (2008)	**1 511 431 108**
Primary wood products	71 294 709
Pulp and paper products	708 849 778
Wood-fabricated materials	731 286 621

Lodgepole Pine

Alberta

Population (Jan. 1, 2009)
3 632 483

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	28 967
Direct jobs (number) (2008)	
Direct jobs (LFS)	23 200
Direct jobs (SEPH)	18 782
New investments (dollars) (2008)	**210 900 000**
Forestry and logging industry	43 700 000
Paper product manufacturing industry	65 100 000
Wood product manufacturing industry	102 100 000
Revenue from goods manufactured (dollars) (2007)	**5 419 677 000**
Logging industry	757 751 000
Paper product manufacturing industry	1 758 408 000
Wood product manufacturing industry	2 903 518 000
Wages and salaries (dollars) (2007)	**963 248 000**
Logging industry	178 943 000
Paper product manufacturing industry	210 403 000
Wood product manufacturing industry	573 902 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	3 537 554
Area planted (hectares) (2007)	64 911
Area seeded (hectares) (2007)	658
Fire – area burned (hectares) (2008)	20 644
Fires – number (2008)	1 695
Forest area certified (hectares) (2008)	21 402 911
Harvest area (hectares) (2007)	54 981
Harvest volume (cubic metres) (2007)	20 513 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	36.39
Total area (million hectares)	65.44
Provincial parks area (hectares)	220 707
Forest and other wooded land ownership	
Federal	8%
Private	3%
Provincial	89%
Forest type	
Hardwood	30%
Mixedwood	17%
Softwood	46%
Unclassified	7%

TRADE	
Balance of trade (dollars) (2008)	1 863 406 911
Value of exports (dollars) (2008)	**2 165 644 752**
Primary wood products	27 011 474
Pulp and paper products	1 609 272 977
Wood-fabricated materials	529 360 301
Value of imports (dollars) (2008)	**302 237 841**
Primary wood products	3 451 205
Pulp and paper products	154 543 715
Wood-fabricated materials	144 242 921

White Birch

Saskatchewan

Population (Jan. 1, 2009)
1 023 810

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	6 792
Direct jobs (number) (2008)	
Direct jobs (LFS)	3 600
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**677 591 000**
Logging industry	221 973 000
Paper product manufacturing industry	196 694 000
Wood product manufacturing industry	258 924 000
Wages and salaries (dollars) (2007)	**101 699 000**
Logging industry	25 661 000
Paper product manufacturing industry	20 832 000
Wood product manufacturing industry	55 206 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	151 352
Area planted (hectares) (2007)	15 293
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	1 130 179
Fires – number (2008)	599
Forest area certified (hectares) (2008)	3 869 964
Harvest area (hectares) (2007)	13 000
Harvest volume (cubic metres) (2007)	2 412 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	24.26
Total area (million hectares)	65.19
Provincial parks area (million hectares)	1.2
Forest and other wooded land ownership	
Federal	4%
Private	6%
Provincial	90%
Forest type	
Hardwood	16%
Mixedwood	37%
Softwood	47%

TRADE	
Balance of trade (dollars) (2008)	196 853 382
Value of exports (dollars) (2008)	**264 794 576**
Primary wood products	4 367 359
Pulp and paper products	206 741 174
Wood-fabricated materials	53 686 043
Value of imports (dollars) (2008)	**67 941 194**
Primary wood products	1 882 605
Pulp and paper products	33 315 015
Wood-fabricated materials	32 743 574

White Spruce

Manitoba

Population (Jan. 1, 2009)
1 213 815

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	5 550
Direct jobs (number) (2008)	
Direct jobs (LFS)	7 800
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**1 143 384 000**
Logging industry	72 511 000
Paper product manufacturing industry	472 349 000
Wood product manufacturing industry	598 524 000
Wages and salaries (dollars) (2007)	**233 983 000**
Logging industry	17 759 000
Paper product manufacturing industry	83 128 000
Wood product manufacturing industry	133 096 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	174 480
Area planted (hectares) (2007)	7 001
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	150 673
Fires – number (2008)	397
Forest area certified (hectares) (2008)	11 713 509
Harvest area (hectares) (2007)	13 648
Harvest volume (cubic metres) (2007)	2 000 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	36.35
Total area (million hectares)	63.62
Provincial parks area (million hectares)	3.4
Forest and other wooded land ownership	
Federal	2%
Private	3%
Provincial	95%
Forest type	
Hardwood	15%
Mixedwood	11%
Softwood	74%

TRADE	
Balance of trade (dollars) (2008)	29 034 870
Value of exports (dollars) (2008)	**472 783 870**
Primary wood products	1 104 849
Pulp and paper products	288 993 780
Wood-fabricated materials	182 685 241
Value of imports (dollars) (2008)	**443 749 000**
Primary wood products	3 525 148
Pulp and paper products	319 859 878
Wood-fabricated materials	120 363 974

Eastern White Pine

Ontario

Population (Jan. 1, 2009)
12 986 857

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	75 567
Direct jobs (number) (2008)	
Direct jobs (LFS)	63 300
Direct jobs (SEPH)	53 585
New investments (dollars) (2008)	**430 500 000**
Forestry and logging industry	17 800 000
Paper product manufacturing industry	320 600 000
Wood product manufacturing industry	92 100 000
Revenue from goods manufactured (dollars) (2007)	**14 885 073 000**
Logging industry	1 886 528 000
Paper product manufacturing industry	8 282 146 000
Wood product manufacturing industry	4 716 399 000
Wages and salaries (dollars) (2007)	**2 706 998 000**
Logging industry	363 544 000
Paper product manufacturing industry	1 410 701 000
Wood product manufacturing industry	932 753 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	1 945 195
Area planted (hectares) (2007)	74 861
Area seeded (hectares) (2007)	33 079
Fire – area burned (hectares) (2008)	1 314
Fires – number (2008)	338
Forest area certified (hectares) (2008)	26 287 730
Harvest area (hectares) (2007)	183 985
Harvest volume (cubic metres) (2007)	14 725 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	68.29
Total area (million hectares)	107.48
Provincial parks area (million hectares)	7.9
Forest and other wooded land ownership	
Federal	1%
Private	8%
Provincial	91%
Forest type	
Hardwood	16%
Mixedwood	26%
Softwood	58%

TRADE	
Balance of trade (dollars) (2008)	-92 939 662
Value of exports (dollars) (2008)	**5 413 480 928**
Primary wood products	65 444 818
Pulp and paper products	4 171 014 935
Wood-fabricated materials	1 177 021 175
Value of imports (dollars) (2008)	**5 506 420 590**
Primary wood products	78 066 840
Pulp and paper products	4 222 404 046
Wood-fabricated materials	1 205 949 704

Yellow Birch

Quebec

Population (Jan. 1, 2009)
7 782 561

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	47 925
Direct jobs (number) (2008)	
Direct jobs (LFS)	85 100
Direct jobs (SEPH)	72 576
New investments (dollars) (2008)	**872 000 000**
Forestry and logging industry	38 100 000
Paper product manufacturing industry	326 300 000
Wood product manufacturing industry	507 600 000
Revenue from goods manufactured (dollars) (2007)	**19 935 449 000**
Logging industry	2 562 436 000
Paper product manufacturing industry	9 937 655 000
Wood product manufacturing industry	7 435 358 000
Wages and salaries (dollars) (2007)	**3 140 678 000**
Logging industry	474 734 000
Paper product manufacturing industry	1 389 101 000
Wood product manufacturing industry	1 276 843 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	Not available
Area planted (hectares) (2007)	63 564
Area seeded (hectares) (2007)	589
Fire – area burned (hectares) (2008)	1 481
Fires – number (2008)	222
Forest area certified (hectares) (2008)	18 900 314
Harvest area (hectares) (2007)	164 610
Harvest volume (cubic metres) (2007)	29 365 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	84.58
Total area (million hectares)	151.89
Provincial parks area (excluding wildlife reserves) (hectares)	754 600
Forest and other wooded land ownership	
Private	11%
Provincial	89%
Forest type	
Hardwood	11%
Mixedwood	16%
Softwood	73%

TRADE	
Balance of trade (dollars) (2008)	7 214 122 554
Value of exports (dollars) (2008)	**9 252 415 631**
Primary wood products	95 488 423
Pulp and paper products	7 152 400 157
Wood-fabricated materials	2 004 527 051
Value of imports (dollars) (2008)	**2 038 293 077**
Primary wood products	282 175 776
Pulp and paper products	1 225 114 818
Wood-fabricated materials	531 002 483

Balsam Fir

New Brunswick

Population (Jan. 1, 2009)
748 319

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	4 175
Direct jobs (number) (2008)	
Direct jobs (LFS)	12 800
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**Not available**
Logging industry	797 581 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	1 040 100 000
Wages and salaries (dollars) (2007)	**Not available**
Logging industry	127 198 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	190 523 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	Not available
Area planted (hectares) (2007)	22 289
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	143
Fires – number (2008)	168
Forest area certified (hectares) (2008)	4 086 472
Harvest area (hectares) (2007)	72 248
Harvest volume (cubic metres) (2007)	8 944 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	6.21
Total area (million hectares)	7.31
Provincial parks area (hectares)	24 913
Forest and other wooded land ownership	
Federal	2%
Private	50%
Provincial	48%
Forest type	
Hardwood	25%
Mixedwood	31%
Softwood	44%

TRADE	
Balance of trade (dollars) (2008)	1 189 019 962
Value of exports (dollars) (2008)	**1 424 421 999**
Primary wood products	18 126 216
Pulp and paper products	1 089 735 582
Wood-fabricated materials	316 560 201
Value of imports (dollars) (2008)	**235 402 037**
Primary wood products	74 213 449
Pulp and paper products	112 726 958
Wood-fabricated materials	48 461 630

Red Spruce

Nova Scotia

Population (Jan. 1, 2009)
939 531

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	4 267
Direct jobs (number) (2008)	
Direct jobs (LFS)	9 600
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**Not available**
Logging industry	196 199 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	537 740 000
Wages and salaries (dollars) (2007)	**Not available**
Logging industry	46 438 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	87 678 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	20 000
Area planted (hectares) (2007)	10 260
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	2 720
Fires – number (2008)	247
Forest area certified (hectares) (2008)	1 615 023
Harvest area (hectares) (2007)	43 758
Harvest volume (cubic metres) (2007)	5 249 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	4.35
Total area (million hectares)	5.53
Provincial parks area (hectares)	31 000
Forest and other wooded land ownership	
Federal	3%
Private	68%
Provincial	29%
Forest type	
Hardwood	13%
Mixedwood	29%
Softwood	58%

TRADE	
Balance of trade (dollars) (2008)	894 136 115
Value of exports (dollars) (2008)	**946 850 805**
Primary wood products	39 581 569
Pulp and paper products	804 025 936
Wood-fabricated materials	103 243 300
Value of imports (dollars) (2008)	**52 714 690**
Primary wood products	11 142
Pulp and paper products	18 005 266
Wood-fabricated materials	34 698 282

Red Oak

Prince Edward Island

Population (Jan. 1, 2009)
140 402

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	692
Direct jobs (number) (2008)	
Direct jobs (LFS)	900
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**Not available**
Logging industry	8 621 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	34 074 000
Wages and salaries (dollars) (2007)	**Not available**
Logging industry	2 003 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	8 798 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	Not available
Area planted (hectares) (2007)	759
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	8
Fires – number (2008)	3
Forest area certified (hectares) (2008)	357
Harvest area (hectares) (2007)	2 110
Harvest volume (cubic metres) (2007)	570 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	0.27
Total area (million hectares)	0.58
Provincial parks area (hectares)	2 100
Forest and other wooded land ownership	
Federal	1%
Private	91%
Provincial	8%
Forest type	
Hardwood	29%
Mixedwood	47%
Softwood	24%

TRADE	
Balance of trade (dollars) (2008)	2 981 532
Value of exports (dollars) (2008)	**3 081 724**
Primary wood products	88 841
Pulp and paper products	825 917
Wood-fabricated materials	2 166 966
Value of imports (dollars) (2008)	**100 192**
Primary wood products	0
Pulp and paper products	21 738
Wood-fabricated materials	78 454

Black Spruce

Newfoundland and Labrador

Population (Jan. 1, 2009)
508 990

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (SAAR) (2008)	3 233
Direct jobs (number) (2008)	
Direct jobs (LFS)	2 600
Direct jobs (SEPH)	Not available
New investments (dollars) (2008)	**Not available**
Forestry and logging industry	Not available
Paper product manufacturing industry	Not available
Wood product manufacturing industry	Not available
Revenue from goods manufactured (dollars) (2007)	**Not available**
Logging industry	129 732 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	55 829 000
Wages and salaries (dollars) (2007)	**Not available**
Logging industry	23 755 000
Paper product manufacturing industry	Not available
Wood product manufacturing industry	11 670 000

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	71 300
Area planted (hectares) (2007)	6 743
Area seeded (hectares) (2007)	53
Fire – area burned (hectares) (2008)	5 140
Fires – number (2008)	139
Forest area certified (hectares) (2008)	3 739 256
Harvest area (hectares) (2007)	16 999
Harvest volume (cubic metres) (2007)	2 050 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	20.07
Total area (million hectares)	40.3
Provincial parks area (hectares)	20 551
Forest and other wooded land ownership	
Private	1%
Provincial	*99%
Forest type	
Hardwood	1%
Mixedwood	6%
Softwood	93%

TRADE	
Balance of trade (dollars) (2008)	328 817 038
Value of exports (dollars) (2008)	**340 028 366**
Primary wood products	21 475
Pulp and paper products	337 279 170
Wood-fabricated materials	2 727 721
Value of imports (dollars) (2008)	**11 211 328**
Primary wood products	0
Pulp and paper products	11 135 589
Wood-fabricated materials	75 739

*Timber and property rights for 69% of the Crown land on the island of Newfoundland have been conveyed to pulp and paper companies through 99-year licences issued under the 1905 *Pulp and Paper Manufacturing Act* and 1935 *Bowater Act*. Therefore, the province's financial and legal system treats this licensed land as private property.

Subalpine Fir

Yukon

Population (Jan. 1, 2009)
33 442

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	10 286
Area planted (hectares) (2007)	50
Area seeded (hectares) (2007)	50
Fire – area burned (hectares) (2008)	18 846
Fires – number (2008)	67
Forest area certified (hectares) (2008)	Not available
Harvest area (hectares) (2007)	210
Harvest volume (cubic metres) (2007)	22 000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	22.79
Total area (million hectares)	48.49
Territorial parks area (hectares)	Not available
Forest and other wooded land ownership	
Federal	100%
Forest type	
Hardwood	2%
Mixedwood	19%
Softwood	79%

TRADE	
Balance of trade (dollars) (2008)	478 691
Value of exports (dollars) (2008)	**501 784**
Primary wood products	55 262
Pulp and paper products	5 288
Wood-fabricated materials	441 234
Value of imports (dollars) (2008)	**23 093**
Primary wood products	1 117
Pulp and paper products	14 353
Wood-fabricated materials	7 623

Tamarack

Northwest Territories

Population (Jan. 1, 2009)
42 940

FOREST MANAGEMENT	
Area defoliated by insects and beetle-killed trees (hectares) (2007)	Not available
Area planted (hectares) (2007)	7
Area seeded (hectares) (2007)	Not available
Fire – area burned (hectares) (2008)	353,852
Fires – number (2008)	241
Forest area certified (hectares) (2008)	Not available
Harvest area (hectares) (2007)	51
Harvest volume (cubic metres) (2007)	24,000

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	33.35
Total area (million hectares)	128.12
Territorial parks area (hectares)	13 667
Forest and other wooded land ownership	
Federal	100%
Forest type	
Mixedwood	47%
Softwood	53%

TRADE	
Balance of trade (dollars) (2008)	80 362
Value of exports (dollars) (2008)	**80 362**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	80 362
Value of imports (dollars) (2008)	**0**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	0

Nunavut

Population (Jan. 1, 2009)
31 556

INVENTORY	
Area classification	
Forest and other wooded land (million hectares)	0.94
Total area (million hectares)	200.6
Territorial parks area (hectares)	Not available
Forest and other wooded land ownership	
Federal	100%
Forest type	
Mixedwood	48%
Softwood	52%

TRADE	
Balance of trade (dollars) (2008)	44 311
Value of exports (dollars) (2008)	**44 311**
Primary wood products	0
Pulp and paper products	35 109
Wood-fabricated materials	9 202
Value of imports (dollars) (2008)	**0**
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	0

Source and information

The data are derived from a number of sources which are identified under each data type. Where necessary, they have been edited for accuracy and consistency. All data are subject to revision.

In most cases, the data represent the year before the reporting period. However, when they are gathered from several sources, it takes longer to analyse and produce them; in these cases, the numbers reflect results from two or three years before the reporting period.

While most of the figures are calculated for the calendar year, some are based on the federal government's fiscal year (April 1 to March 31). Numbers are rounded off; in the case of employment data, they are rounded to the nearest hundred.

It may not be possible to accurately compare the data from the various sections with each other, as they emanate from several sources and these sources may gather and calculate their statistics differently.

DOMESTIC ECONOMIC IMPACT

Canadian housing starts—seasonally adjusted annual rate (SAAR)

A rate adjustment used for economic or business data that attempts to remove the seasonal variations in the data. Most data will be affected by the time of the year. Adjusting for the seasonality in data means more accurate relative comparisons can be drawn from month to month all year. The SAAR is calculated by dividing the unadjusted annual rate for the month by its seasonality factor and creating an adjusted annual rate for the month. These adjustments are more often used when economic data is released to the public.

Source: Canada Mortgage and Housing Corporation.

Capital and repair expenditures

Capital expenditures include the cost of procuring, constructing and installing new durable plants, machinery or equipment, whether for replacement of worn or obsolete assets, as additions to existing assets or for lease or rent to others. Also included are all capitalized costs such as feasibility studies and architectural, legal, installation and engineering fees; the value of capital assets put in place by firms either by contract or with the firm's own labour force; and, capitalized interest charges on loans for capital projects. Repair expenditures include costs to repair and maintain structures, machinery and equipment.

Source: Statistics Canada, Capital and repair expenditures, by sector and province, annual (dollars), CANSIM Table 029-0005 and Capital and repair expenditures, industry sectors 31-33, manufacturing, annual (dollars), CANSIM Table 029-0009, February 2009.

Contribution to gross domestic product (GDP)

The total unduplicated value of the goods and services produced in an economic area such as a country or region during a given period. ("Unduplicated value" means that the intermediate costs of producing an item or service have been deducted.) Figures are in current and constant dollars and only available for Canada. The current dollars are based on value, prices or cost at the time surveys are conducted or assessments are made. The constant dollars are used to measure variations in the dollar's real value over time. The constant dollar is the real value of a current dollar compared with a dollar's value in a specific reference year. Expressing GDP in terms of constant dollars makes it possible to measure real growth by removing the effect of inflation.

Source: Statistics Canada, Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars), CANSIM Table 379-0027, February 2009 and Selected economic indicators, provincial economic accounts, annual, CANSIM Table 384-0013, April 2009.

Direct jobs

Persons employed directly in the following industries: forestry and logging, industries involved in support activities for forestry, and paper manufacturing and wood product manufacturing.

The data are sourced from Statistics Canada's Labour Forces Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH). All these data are not comparable because the methodologies are different.

Source: Statistics Canada, Labour Force Survey (LFS), January 2009 (special extraction) and the Survey of Employment, Payrolls and Hours, unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System (NAICS), monthly (persons), CANSIM Table 281-0023, March 2009.

New investments

All expenditures made on buildings, engineering, construction, machinery and equipment (including imports of used machinery and equipment) for the current time period. Investment in buildings includes transfer costs on the sale of existing assets (for example, real estate commissions).

Source: Statistics Canada, Capital and repair expenditures, by sector and province, annual (dollars), CANSIM Table 029-0005 and Capital and repair expenditures, industry sectors 31-33, manufacturing, annual (dollars), CANSIM Table 029-0009, February 2009.

Revenue from goods manufactured

Revenue from the sale of goods manufactured using materials owned by the establishment as well as from repair work, manufacturing service charges and work contracted to others.

Source: Statistics Canada, Annual Survey of Manufactures and Logging (ASML): Logging industries, principal statistics by North American Industry Classification System (NAICS), annual, CANSIM Table 301-0007 and Annual Survey of Manufactures and Logging (ASML): Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual, CANSIM Table 301-0006, 2004-2007.

Wages and salaries

The earnings, in cash or in kind, of Canadian residents for work performed before deduction of income taxes and contributions to pension funds, employment insurance and other social insurance schemes.

Source: Statistics Canada, Annual Survey of Manufactures and Logging (ASML): Logging industries, principal statistics by North American Industry Classification System (NAICS), annual, CANSIM Table 301-0007 and Annual Survey of Manufactures and Logging (ASML): Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS), annual, CANSIM Table 301-0006, 2004-2007.

FOREST MANAGEMENT

Area planted and seeded

Source: Canadian Council of Forest Ministers, National Forestry Database.

Carbon emissions/removals

The deforestation and afforestation figures reflect annual rates, while the figures for CO_2e emissions and removals reflect the current year plus the previous 20 years. Thus, the figures for CO_2e emissions include residual emissions from areas deforested over the past 20 years and the figures for CO_2e removals include ongoing removals by areas afforested over the past 20 years. Emissions and removals exactly match the most recent greenhouse gas inventory figures submitted to the United National Framework Climate Change Convention. Emissions always bear a positive sign, while removals bear a negative sign.

Fire

Area burned includes areas within all of Canada's forests. All figures for the most current year are sourced from the Canadian Interagency Forest Fire Centre. Data for all previous years were provided by the provinces/territories and are available from the Canadian Council of Forest Ministers, National Forestry Database.

Forest area certified

If a forest area has been certified to more than one of the three sustainable forest management standards (Canadian Standards Association [CSA], Sustainable Forestry Initiative [SFI] and Forest Stewardship Council [FSC]), the area is counted only once; hence, the total certifications for SFM standards may be less than the sum of the individual totals for these standards.

Source: Canadian Sustainable Forestry Certification Coalition.

Harvest (volume)

The national and provincial/territorial figures for harvesting volume include data for industrial roundwood, fuelwood and firewood. Although the allowable annual cut (AAC) for British Columbia does not include all private lands, these lands are included in the harvest figures. The yearly harvest rate for British Columbia may fluctuate and, in some cases, may exceed the AAC. Over a five-year period, however, the harvest figure would be equal to or lower than the AAC.

Source: Provincial and territorial forest management agencies available from the Canadian Council of Forest Ministers, National Forestry Database.

Insect defoliation and beetle-killed trees

The data relating to insects were provided by provincial and territorial agencies, and they include areas in which there is tree mortality and moderate to severe defoliation. Defoliation does not always imply mortality; for example, stands with moderate defoliation often recover and may not lose much growth. Also, defoliation is mapped on an insect-species basis, and a given area may be afflicted by more than one species at a time. This may result in double or triple counting in areas affected by more than one species, exaggerating the extent of the total area defoliated.

Source: Canadian Council of Forest Ministers, National Forestry Database.

FOREST PRODUCTS

Domestic consumption

The consumption figures for these products were calculated by the Canadian Forest Service of Natural Resources Canada. This information is available only at the national level.

Production

Christmas trees
The production quantity and value are based on estimates calculated by the Canadian Forest Service of Natural Resources Canada.

Source: Statistics Canada and Canadian Council of Forest Ministers, National Forestry Database.

Low-bush blueberries
Source: Agriculture and Agri-Food Canada, Canadian Horticulture Sector, Performance Overview, 2007 Crop Year, Table 5-12.

Lumber
Source: Statistics Canada, Sawn lumber production and shipments, monthly (cubic metres dry), CANSIM Table 303-0009. April 2009.

Maple products
Source: Canadian Council of Forest Ministers, National Forestry Database.

Newsprint, printing and writing paper, wood pulp
The production and consumption are based on the Pulp and Paper Products Council data.

Structural panels
The production and consumption data of structural panels—plywood and oriented strandboard—are from the APA–The Engineered Wood Association.

Wildlife pelts (minus sealskins)
Source: Statistics Canada, Number and value of pelts produced, annual, CANSIM Table 003-0013. October 2008.

INVENTORY

Source: Canada's Forest Inventory (Canfi) 2001.

TRADE

Balance of trade

The difference between the value of the goods and services that a country exports and the value of the goods and services that it imports. If a country's exports exceed its imports, it has a trade surplus; if imports exceed exports, the country has a trade deficit.

Source: Statistics Canada, merchandise trade data (special extraction), monthly data.

SUSTAINABILITY INDICATORS

Sustainable forest management can be monitored by applying a set of indicators, which are objective measures that can be supported by data.

Indicators are practical, science-based tools that give governments, industry, the public and others a consistent way to track national progress over time and to identify where improvements can be made. However, no single indicator alone is a sign of sustainability. For accurate measurement, the whole range of indicators must be considered.

The following is a sample of the indicators for sustainable forest management, along with the most recent information on how Canada's forests are doing in each area.

Biological diversity

Biological diversity, or biodiversity, is responsible for a wide range of life-sustaining ecosystem services. For example, biodiversity plays a role in regulating the climate. It also helps organisms and ecosystems respond and adapt to environmental change and threats such as diseases. Biodiversity conservation is therefore crucial to ensuring that forests are sustainably managed.

Indicator: Status of forest-associated species at risk

WHY IS THIS IMPORTANT?

- Tracking changes in the population of selected species indicates how well the species-recovery policies and practices of governments, companies, NGOs, Aboriginal peoples and others are working.
- In Canada, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) identifies the wild species that are in some degree of danger or are at risk of disappearing.

FOREST-ASSOCIATED SPECIES REASSESSED BY COSEWIC SINCE 1999* AS OF APRIL 2009

%	Change in status
42	same
19	higher risk category
2	lower risk category

**37% were newly assessed*

WHAT HAS CHANGED?

- Of the 27 species assessed or reassessed by COSEWIC in April 2009, 10 are considered forest-associated. Of these, 8 were reassessed at the same at-risk level, 1 was newly assessed as being at risk, and 1 was reassessed in a lower-risk category. Canada now has 338 forest-associated species at risk, representing 58% of the COSEWIC-listed species at risk.
- The 2009 COSEWIC assessment listed habitat loss, climate change, predation, competition and invasive alien species as some of the threats affecting species at risk.
- When COSEWIC changes a species' category to a lower or higher level of threat, it does not always mean that the species' population has improved or deteriorated. The change may also be due to new information.

Ecosystem condition and productivity

Canada's forest ecosystems must be resilient so that they can cope with and recover from natural and human disturbances and maintain their ecological functions and processes.

Indicator: Additions and deletions of forest area

WHY IS THIS IMPORTANT?

- It is important to know how and why the forest resource fluctuates over time, especially when these fluctuations may cause more or less permanent additions or deletions to Canada's forest base.
- Because forests provide ecological services, such as clean water and erosion control, permanent additions and deletions affect water and soil conservation. As well, because forests act as carbon sinks and sources, it is critical to track forest additions and deletions to help gauge Canada's ability to meet its climate change–related commitments.
- Deforestation is the permanent conversion of forest to other land uses. Deforestation in Canada is mainly caused by the conversion of forest land to agriculture, industrial development, resource extraction and urban expansion. Harvesting, when followed by regeneration, is not deforestation. Afforestation is the establishment of new forests on previously non-forested land.

WHAT HAS CHANGED?

- Overall, deforestation in Canada is on the decline, with the annual rate dropping from nearly 95 000 hectares in 1980 to some 50 000 hectares now. However, large hydroelectric projects have been responsible for spikes in this trend, upping the area deforested in Canada in 1983, 1995 and 2006 in particular.
- In 2007, deforestation resulted in net emissions of 16 million tonnes of CO_2e, down from 25.8 million tonnes in 1990.
- The area afforested annually in Canada has fluctuated from a high of nearly 12 000 hectares in 1990 to a low of 6400 hectares in 2002, rising again to 9400 hectares in 2005.

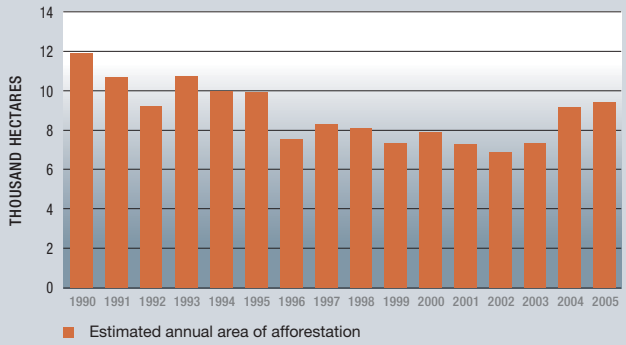
ESTIMATED AREA OF DEFORESTATION (1000'S HECTARES) BY SECTOR

	Year					
Sector	1980	1983	1990	1995	2006	2007
Agriculture	70.6	70.6	44.7	26.2	26.2	26.2
Forestry*	5.5	4.9	5.7	6.7	5.9	5.9
Municipal	5.8	5.8	5.2	4.7	4.7	4.7
Hydro**	4.1	117.1	3.3	35.3	29.5	1.3
Industry and transportation	8.0	7.0	7.6	8.2	8.8	8.7
Recreation	0.8	0.8	0.8	0.9	0.9	0.9
Total	**94.8**	**206.2**	**67.3**	**82.0**	**76.0**	**47.7**

** Resulting from the creation of permanent forest access roads*
*** Includes deforestation due to hydro infrastructure and hydro reservoirs*

Source: Environment Canada. 2008. National Inventory Report 1990—2006: greenhouse gas sources and sinks in Canada

ESTIMATED ANNUAL AREA OF AFFORESTATION



Source: Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS) initiative

Indicator: Area of forest disturbed by fire, insects, disease and harvesting

WHY IS THIS IMPORTANT?

- Forests are constantly exposed to and modified by natural disturbances such as fire, insects and diseases. They are also disturbed by pursuits such as logging, road construction, oil and gas ventures and other human activities.
- Foresters want to understand both natural and human disturbances to gain a better understanding of how forest ecosystems change.
- Forest managers increasingly look to natural events when planning forest harvesting. They want to ensure that their practices facilitate natural regeneration and recovery of ecosystem productivity following disturbance.

WHAT HAS CHANGED?

Fire

- More than 6000 forest fires were reported across Canada in 2008, which is 29.8% less than the 10-year average (1998–2007). About 1.7 million hectares were burned, 21.5% less than the 10-year average. At least 9400 people from 31 communities were evacuated because of wildland fires.
- The quiet fire season of 2008 was the fourth-lowest in number of fires reported and the tenth-lowest in area burned since 1982.
- Saskatchewan and the Northwest Territories saw the bulk of Canada's fire activity in 2008, with nearly 70% (1.2 million hectares) of the total area burned being in Saskatchewan and 20% (0.35 million hectares) in the Northwest Territories.

Insects

- In 2007, 18.6 million hectares of forest were defoliated by insects or contained beetle-killed trees, down from 19.5 million hectares in 2006.
- From 1998 through 2008, the mountain pine beetle killed an estimated 620 million cubic metres of pine in British Columbia—almost half (46%) of the province's saleable pine.
- Some insect outbreaks tend to be cyclical, with peak populations occurring periodically in particular regions of the country. For example, there is evidence of spruce budworm outbreaks in eastern Canada at 35-year intervals, and there have been three outbreaks of the forest tent caterpillar in Canada between 1975 and 2004.

Disease

- Tree diseases are caused by either a living organism or an environmental condition that changes the tree's natural growth, form or physiology. Disease symptoms usually result from a complex interaction between the tree, its environmental conditions and a living infectious agent such as a fungus. Being aware of the interactions between living and non-living agents provides insight into the dynamics behind disease.
- Living organisms that can cause disease are fungi, bacteria and viruses. In Canadian ecosystems, there exists a balance between the most common native diseases and the native trees. Exotic pests are typically more destructive. For example, butternut canker, first detected in 1990, has spread throughout the butternut's distribution area in Quebec and is also present in Ontario and New Brunswick. According to Canadian Forest Service research, it was found in 9 out of 20 federal forest areas recently inventoried. European poplar rust is also more prevalent, now attacking 45 hybrid poplar clones in Quebec forest nurseries, up from 17 in 2003.

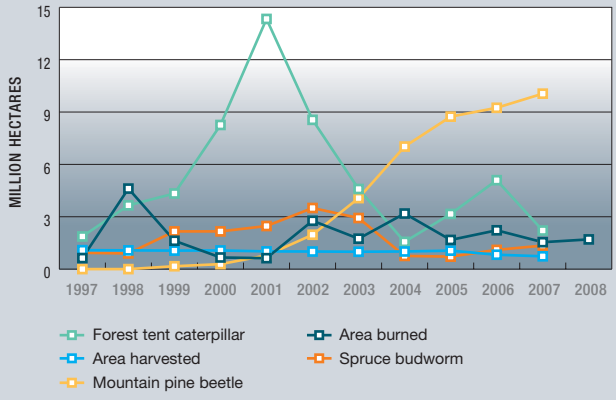
– Environmental agents, such as pollution, extreme weather and soil problems, can make a tree more susceptible to disease-causing organisms and insects, and can reduce the tree's growth or kill it. Wind, for example, blew down trees across 21 000 hectares in Quebec and 13 000 hectares in Ontario in July 2006. In 2007, wind that affected only 400 hectares in Quebec nonetheless blew down 82 000 cubic metres of wood. Also in Quebec, forest stand mortality due to ice storms rose from 1.02% in 1975–1987 (0.08% per year) to 2.42% in 1998–2002 (0.54% per year) following the 1998 ice storm.

Harvesting

– Harvesting of Canada's forests is strictly controlled by provincial and territorial regulations, and all harvested areas must be reforested. Each province and territory sets an allowable annual cut based on the sustainable growth rate of the particular forest area. The goal is to maintain biological diversity while considering economic and social factors.

– About 900 000 hectares of forest is harvested annually in Canada (accounting for approximately 0.22% of all forest and other wooded land). In 2007, about 425 000 hectares were replanted and 34 000 hectares were seeded.

AREA OF FOREST DISTURBED BY FIRE, INSECTS AND HARVESTING

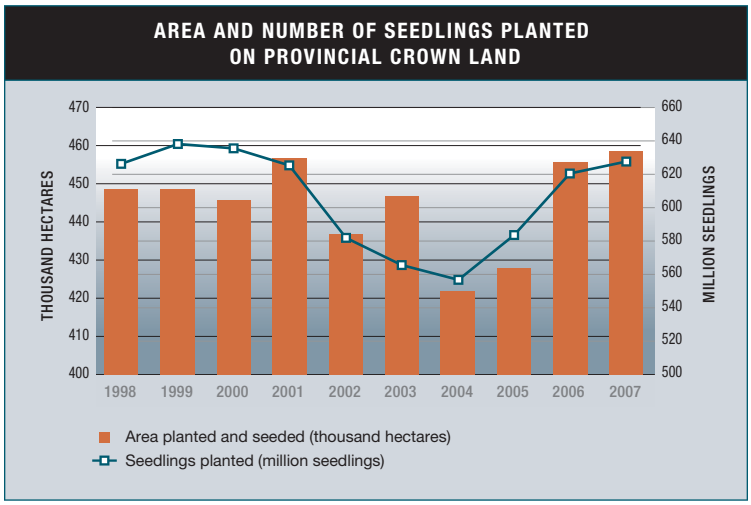


Sources: Canadian Interagency Forest Fire Centre and National Forestry Database

Area of forest disturbed	Million hectares	Percentage change from previous year
Area burned (2008)	1.7	10.3
Area defoliated by major insects (2007)		
Forest tent caterpillar	2.2	-56.6
Mountain pine beetle	10.1	8.7
Spruce budworm	1.4	22.2
Area harvested (2007)	0.7	-10.9

Sources: Canadian Interagency Forest Fire Centre and National Forestry Database

Indicator: Proportion of timber harvest area successfully regenerated



Source: National Forestry Database

Area and number of seedlings planted on provincial Crown land	2007	Percentage change from previous year	Percentage change over previous 10 years*
Area planted and seeded (thousand hectares)	459	0.7	0.2
Seedlings planted (million)	628	1.1	0.0
**1997–2006*			

Source: National Forestry Database

WHY IS THIS IMPORTANT?

- Planting and seeding are reliable means of regenerating forests disturbed by harvesting or other influences when advanced or natural regeneration is not an option for a site.
- The proportion of area planted and seeded may change from year to year depending on the nature of the disturbance (for example, harvesting versus wildfire), species composition, age and structure of the forest, success of natural and artificial regeneration, government policies and other factors.
- The means of regeneration is less important than the end result—the long-term function, condition and productivity of the forest ecosystem.

WHAT HAS CHANGED?

- The proportion of provincial Crown land planted/seeded in 2007 increased by approximately 3% compared to that planted/seeded in 2006. This difference is within the range of variation noted over the past 10 years.
- The number of seedlings planted has been increasing steadily since 2004, which corresponds with an increase in harvest area since 2002. Planting lags harvesting by one to two years to allow for site preparation and the production of seedlings.
- In future, economic conditions resulting in mill shutdowns and curtailments will significantly affect not only the amount of area harvested but the amount and type of forest regeneration techniques used.

Role in global ecological cycles

Forests play an important role in global ecological cycles. They depend on and contribute to self-regulating processes responsible for recycling carbon, water, nitrogen and other life-sustaining elements. Forest management can impact forests' role in the carbon cycle.

Indicator: Carbon emissions/removals in Canada's managed forests

WHY IS THIS IMPORTANT?

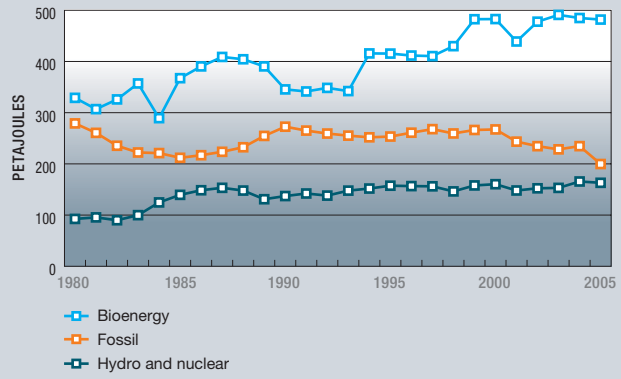
- Management activities aimed at increasing carbon stocks in Canada's forest ecosystems could play a role in mitigating climate change.
- Carbon emissions and removals from managed forests are an important indication of the contribution these forests make to the global carbon cycle and of the ever-changing impacts of natural processes.
- Monitoring trends in carbon emissions and removals is important for anticipating the future role of Canada's forests in the global carbon cycle and for tracking the success of the forest sector's mitigation activities.

WHAT HAS CHANGED?

- Canada's managed forests have acted as net carbon sinks in 11 of the 18 years from 1990 to 2007. However, it is difficult to discern an overall trend because forest carbon emissions and removals vary considerably from year to year as a result of wildfires and, to a lesser extent, insect epidemics.
- In 1992, a year of relatively few fires, net removals of CO_2e were 101 million tonnes. In 1995, when more than 2 million hectares were burned, net emissions of CO_2e reached 182 million tonnes.
- During the period 1990–2007, annual gross emissions directly from wildfire ranged from a high of 291 million tonnes of CO_2e in 1995 to a low of 11 million tonnes in 2000.

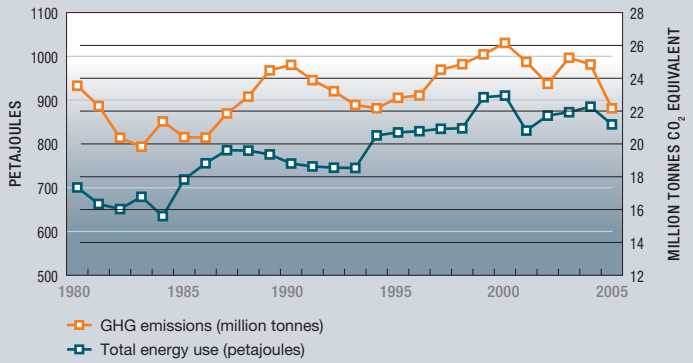
Indicator: Forest sector carbon emissions

ENERGY SOURCES IN THE FOREST SECTOR



Source: Natural Resources Canada, Energy Sector, Office of Energy Efficiency

FOSSIL FUEL GHG EMISSIONS AND TOTAL ENERGY USE IN THE FOREST SECTOR



Source: Natural Resources Canada, Energy Sector, Office of Energy Efficiency

WHY IS THIS IMPORTANT?

- Many experts agree that there is a strong link between global warming and the burning of fossil fuels, an activity that results in emissions of greenhouse gases (GHGs) such as carbon dioxide, which in turn increase the concentration of GHGs in the atmosphere.
- The forest sector uses large amounts of energy in harvesting, transporting and processing wood. In fact, it is one of the largest industrial users of energy in Canada.
- The forest sector has significant GHG emissions. However, the sector's share of total industrial emissions is considerably lower than its share of total industrial energy use because of its use of bioenergy.
- The sector's GHG emissions include direct emissions, which result from fossil fuel burned directly by the sector, and indirect emissions, which result from fossil fuel burned in producing electricity purchased by the sector.
- Monitoring the forest sector's GHG emissions is a necessary first step in improving the sector's emissions record. As well, tracking emissions in the forest sector helps Canada track its national emission levels and meet its commitments to reduce GHG emissions.

WHAT HAS CHANGED?

- From 1980 to 2005, the forest sector's use of fossil fuels, which include coal, refined petroleum products and natural gas, fell by 28%, while its use of bioenergy, hydro and nuclear power rose by 53%.
- Because of this switch in fuel types, the sector's overall GHG emissions (direct and indirect) from fossil fuels decreased 6% from 1980 to 2005, despite a 21% increase in energy use.
- The forest sector substantially cut its use of refined petroleum products between 1980 and 2005, contributing to a 46% decrease in direct emissions. However, in the same period the sector increased its use of fossil fuel electricity, almost doubling indirect emissions from this source and offsetting some of the reduction in direct emissions.

Economic and social benefits

Sustainable forest management ensures that forests provide a broad range of goods and services over the long term, offering significant economic and social benefits.

Indicator: Annual harvest of timber relative to the level of harvest deemed to be sustainable

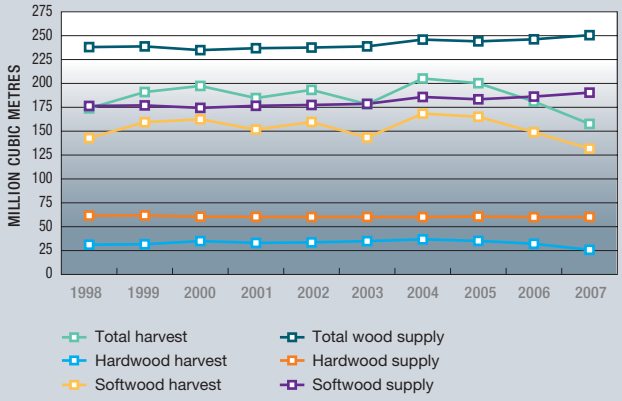
WHY IS THIS IMPORTANT?

- Regulating the amount of wood that can be harvested is central to forest management strategies. Tracking the amount of wood harvested allows forest managers to determine whether harvest levels comply with regulated amounts.
- Harvest levels on provincial Crown lands are regulated by provincial governments. Governments usually specify an allowable annual cut (AAC), which is the annual level of harvest allowed on a particular area of Crown land over a specified number of years. In practice, annual harvest levels may be above or below the AAC, but they must balance out over the regulation period.
- Although no AAC is determined for Canada as a whole, it is possible to compare the aggregation of the provincial AACs across the country with the aggregated harvest from the same provincial Crown land base.
- Harvest levels on private, federal and territorial lands are generally unregulated. It is therefore difficult to determine the level of harvest deemed to be sustainable on these lands.

WHAT HAS CHANGED?

- Canada's aggregate AAC in 2007 was 207 million cubic metres, made up of 163 million cubic metres of softwoods and 44 million cubic metres of hardwoods.
- Hardwood harvests on provincial Crown lands increased steadily from 1990, peaking at 27 million cubic metres in 2004, well below the AAC. Since then the harvests have declined, falling to 19 million cubic metres in 2007.
- Softwood harvests have remained relatively constant over the past decade, at about 130 million cubic metres per year. However, they also declined in 2007, reaching 111 million cubic metres.
- Private, territorial and federal lands contributed an additional 21 million cubic metres of softwoods and 7 million cubic metres of hardwoods to the total volume of timber harvested in 2007.

ANNUAL HARVEST VS. SUPPLY DEEMED SUSTAINABLE FOR HARVEST

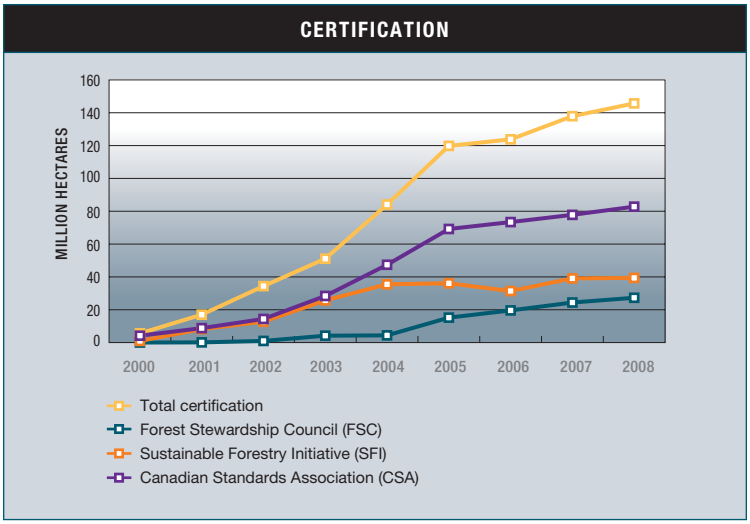


Source: National Forestry Database

Annual harvest vs. supply deemed sustainable for harvest	Million cubic metres 2007	Percentage change from previous year	Percentage change over previous 10 years*
Softwood supply	190	2.2	6.2
Hardwood supply	60	0.3	-0.9
Softwood harvest	132	-11.5	-15.3
Hardwood harvest	26	-19.6	-22.5
**Average 1997-2006*			

Source: National Forestry Database

Indicator: Certification



Source: Canadian Sustainable Forestry Certification Coalition

Certification	Million hectares 2008	Percentage change from previous year	Percentage change over previous 9 years*
Total	145.7	5.7	86.7
*1999–2007			

Source: Canadian Sustainable Forestry Certification Coalition

WHY IS THIS IMPORTANT?

- Third-party certification assures buyers that the forest products they purchase are legal and come from sustainably managed forests. It demonstrates the rigour of Canada's forest management laws and the sustainability of its forest management practices.
- Three internationally recognized certification systems are used in Canada: Canadian Standards Association (CSA), Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI).

WHAT HAS CHANGED?

- As of December 2008, Canada had 145.7 million hectares of forest certified to one of the three certification systems, up from 137.9 million hectares in 2007.
- Canada has the largest area of certified forest in the world.
- The CSA and SFI standards are endorsed by the international umbrella organization PEFC (Programme for the Endorsement of Forest Certification Schemes).
- Canada has more than half the world's PEFC-endorsed certifications, and over one-quarter of the world's FSC certifications.

Indicator: Contribution of timber products to gross domestic product

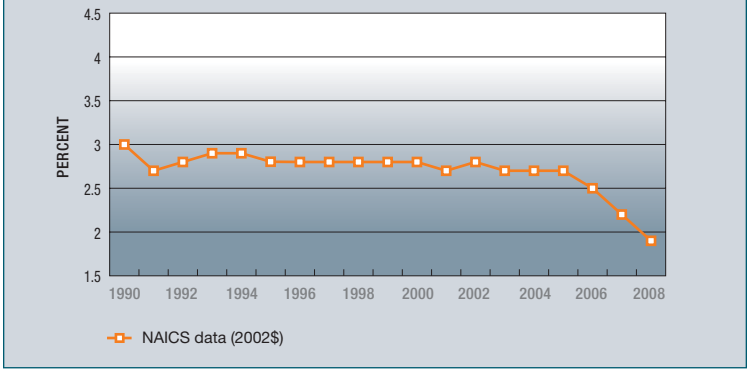
WHY IS THIS IMPORTANT?

- The gross domestic product (GDP) is the total value of all goods and services produced annually in all sectors of the economy.
- Comparing the GDP of the timber product sector with that of the entire Canadian economy provides insight into the contribution of Canadian timber products to the Canadian economy.
- The Canadian timber product sector includes three subsectors: wood (building products such as lumber and wood panels), logging (forest protection, regeneration and timber extraction) and pulp and paper.

WHAT HAS CHANGED?

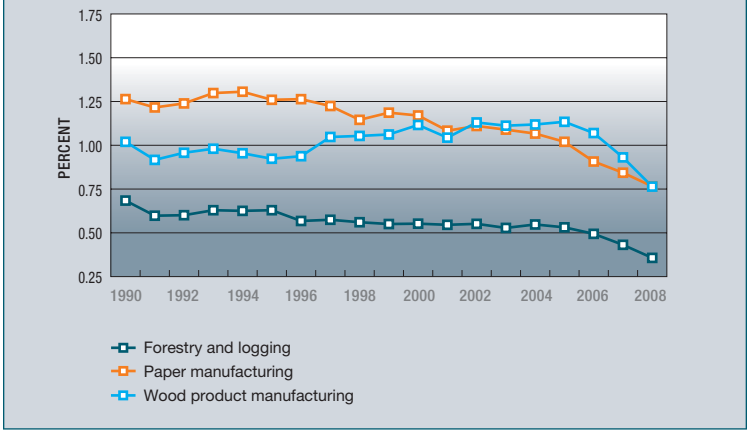
- From 1990 to 2008, the timber product sector's share of the GDP has dropped significantly.
- In 2008, the timber product sector's contribution to the GDP fell to a record low of 1.9%. Reasons included shifting global demand, the downturn in the U.S. housing market and the world economic slowdown.
- Over the last two decades, the contribution of the wood subsector has remained relatively stable, while that of logging and paper has declined. Since 2004, however, the wood subsector's contribution to GDP has decreased, despite its increased importance within the forest sector.
- Provincial and federal programs have made good progress in diversifying the market opportunities for Canadian timber products. Quebec, Ontario, Newfoundland and Labrador, British Columbia and the federal government all announced funding to address forest product markets in 2009.

CONTRIBUTION OF TIMBER PRODUCT SECTOR TO CANADA'S GDP



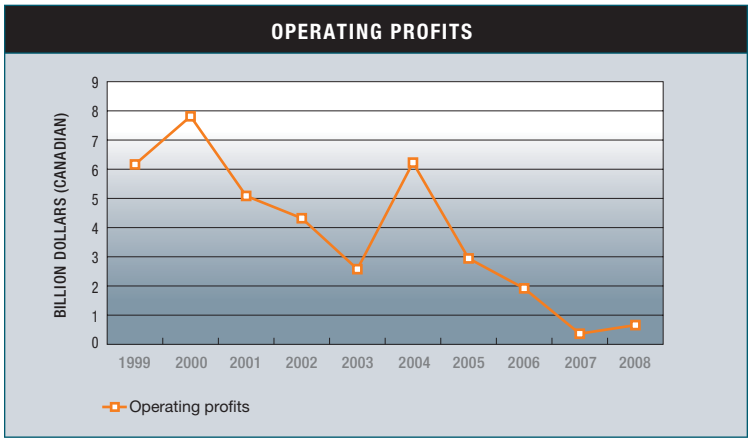
Source: Statistics Canada, Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS 2002)

CONTRIBUTION TO GDP BY SUBSECTOR



Source: Statistics Canada, Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS 2002)

Indicator: Financial performance

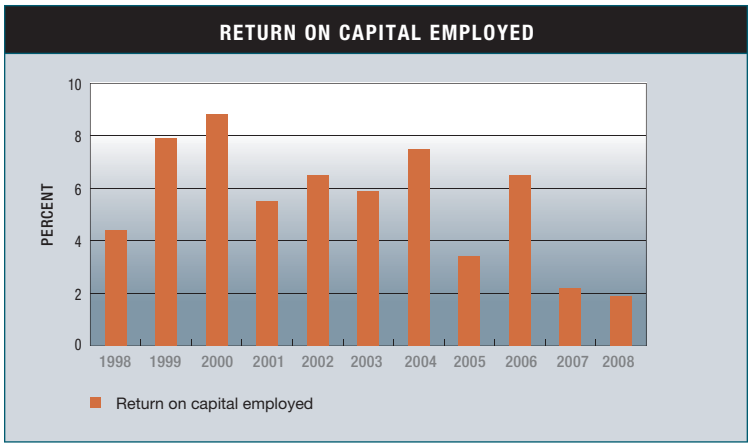


Source: Statistics Canada, quarterly survey of financial statistics for entreprises, CANSIM Table 187-0002

Operating profits	Billion dollars 2008	Percentage change from previous year	Percentage change over previous 10 years*
Wood and paper manufacturing	0.7	81.0	-21.8

**1998–2007*

Source: Statistics Canada, quarterly survey of financial statistics for enterprises, CANSIM Table 187-0002



Note: 2006 data include 3% of return duties

Source: Statistics Canada, quarterly survey of financial statistics for entreprises, CANSIM Table 187-0002

Return on capital employed	1998	2007	2008
	4.4%	2.2%	1.9%

Source: Statistics Canada, quarterly survey of financial statistics for enterprises, CANSIM Table 187-0002

WHY IS THIS IMPORTANT?

– Canada's forest industry contributes significantly to the nation's economy. It is particularly important in many rural communities where other jobs tend to be scarce.

– Key measures of the forest industry's financial performance include operating profits and return on capital employed. While high operating profits indicate that the industry's core business activity is in good health, return on capital employed is an important measure of how efficiently the industry is using its capital.

WHAT HAS CHANGED?

– Producers received relatively low returns on their product sales in 2008, keeping operating profits near historical lows, at $659 million—the industry's second-lowest profit since 1992. The industry's return on capital employed, at 1.9%, was the lowest since 1993.

– The main reasons for the poor financial performance were the soft U.S. housing market and the related fall in wood product prices, as well as low demand for paper products and a relatively strong Canadian dollar.

Indicator: Forest industry employment

WHY IS THIS IMPORTANT?

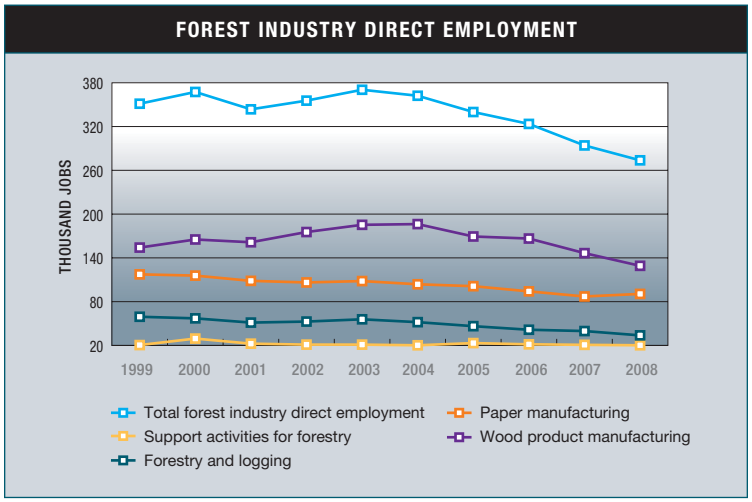
– The Canadian forest industry is an important provider of employment opportunities nationwide, particularly in many rural communities where work related to the industry is the main source of income.

WHAT HAS CHANGED?

– In 2008, direct employment in the Canadian forest industry fell by 6.9% compared with 2007.

– The primary areas of decline were wood products manufacturing (-11.9%); forestry and logging and support activities for forestry (-10.7%).

– The main short-term factors in the decline of forest industry employment were the soft U.S. housing market, which decreased demand for Canadian wood products, and the global economic recession, which decreased demand for Canadian pulp and paper products and reduced jobs in the forest industry as a whole.



Source: Statistics Canada, Labour Force Survey, January 2009 (special extraction)

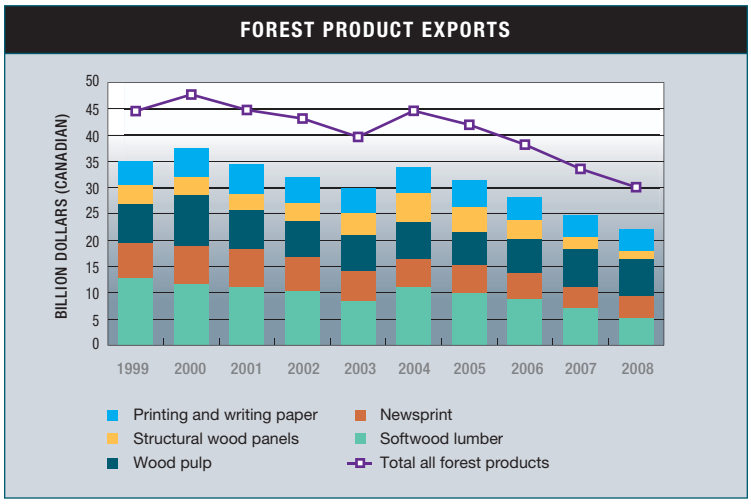
Employment	1999	2008
Direct employment	351 300	273 700
Indirect and induced employment	541 600	422 000
Direct, indirect and induced employment	892 900	695 700

Direct employment	Person-years 2008	Percentage change from previous year	Percentage change over previous 10 years*
Wood product manufacturing	129 100	-11.9	-0.1
Paper manufacturing	90 600	4.0	-3.3
Forestry and logging	33 800	-14.9	-4.1
Support activities for forestry	20 200	-2.9	-1.2
Total	273 700	-6.9	-1.8

**1998–2007*

Source: Statistics Canada, Labour Force Survey, January 2009 (special extraction)

Indicator: Forest products



Source: Statistics Canada, merchandise trade data, monthly

Forest product exports	Billion dollars 2008	Percentage change from previous year	Percentage change over previous 10 years*
Softwood lumber	5.1	-28.0	-4.4
Newsprint	4.3	6.8	-5.1
Wood pulp	7.0	-1.8	0.6
Structural wood panels	1.6	-33.8	-1.1
Printing and writing paper**	4.2	0.6	-0.6
Other forest products	8.0	-9.7	0.8
Total all forest products***	30.1	-10.4	-1.7

* *1998–2007*
** *Estimate calculated by the Canadian Forest Service based on data for the past five years from the Pulp and Paper Products Council*
*** *Excludes non-timber forest products except Christmas trees*

Source: Statistics Canada, merchandise trade data, monthly

WHY IS THIS IMPORTANT?

– Canada is the world's leading exporter of softwood lumber, panels, pulp and newsprint, and the third-largest exporter of printing and writing paper.

WHAT HAS CHANGED?

– The value of Canada's forest product exports fell to $30.1 billion in 2008 from $33.6 billion in 2007, a decline of 10.4%. This was primarily due to a 14% decrease in the value of forest product exports to the U.S.

– The main reasons for the decline were the sharp decreases in demand and price associated with the weak U.S. housing market and the global economic recession.

GLOSSARY*

Biodiversity
The variety and variability within and between living organisms from all sources, such as terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part.

Bioeconomy
An economy where the basic building blocks for industry and the raw materials for energy are derived from plant/crop-based (i.e., renewable) sources.

Bioenergy
The kinetic energy released from biomass when it is eaten, burned or converted into fuel, or the potential energy embodied in biomass.

Biofuel
A fuel that is derived from plant biomass, by chemical or geological processes.

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

Carbon neutrality
When the amount of carbon released into the atmosphere equals the amount sequestered or offset.

Climate change
An alteration in measured quantities (for example, precipitation, temperature, radiation, wind and cloudiness) within the climate system that departs significantly from previous average conditions and is seen to endure, bringing about corresponding changes in ecosystems and socio-economic activity.

Forest management
The branch of forestry concerned with the overall administrative, economic, legal and social aspects of forestry, as well as its essentially scientific and technical aspects, especially silviculture, protection and forest regulation.

Silviculture
The art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Sustainable forest management
Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social and cultural opportunities for present and future generations.

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.

**For additional definitions, please refer to the glossary on the Canada's Forests website.*

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READER FEEDBACK

Was the information in this year's report useful to you?

- ❍ Very useful
- ❍ Useful
- ❍ Somewhat useful
- ❍ Not useful

Did you consider the information factual and credible?

- ❍ Very
- ❍ Somewhat
- ❍ Not at all

Which sections of the report interested you the most?

- ❍ Executive summary
- ❍ Key facts
- ❍ Feature articles
- ❍ Statistical profiles
- ❍ Sustainability indicators

Which category best describes your affiliation?

- ❍ Provincial/territorial government
- ❍ Federal government
- ❍ General public
- ❍ Industry
- ❍ Education
- ❍ International
- ❍ Other

Do you intend to consult the Canada's Forests* website that complements this report?

- ❍ Yes
- ❍ Maybe
- ❍ No

Additional comments or suggestions:

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*At **canadaforests.nrcan.gc.ca**, you can find out more, including

- comprehensive statistical data
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ABOUT NATURAL RESOURCES CANADA—
Canadian Forest Service

Forests and forest resources are integral to Canadian life. The Canadian Forest Service is a science-based policy organization within Natural Resources Canada, a Government of Canada department that helps shape the natural resources sector's important contributions to the economy, society and the environment.

For more than a century, the Canadian Forest Service has conducted research on the health of Canada's forests to ensure that our nation's forest sector needs are met without compromising the ability of future generations to meet their own needs. Today, using scientific data and economic analysis, the Canadian Forest Service plays a leadership role in advancing a new model for the forest sector, focused on two key areas: sustainability and competitiveness.

In its work related to sustainability, the Canadian Forest Service uses knowledge of natural and human-caused forest disturbances to develop models, tools and advice for forest practitioners, as well as adaptation options for addressing climate change. It also ensures that policy decisions related to resource development and sustainability are based on sound research.

In its work on competitiveness, the Canadian Forest Service aims at increasing economic opportunities for the Canadian forest sector; adding economic value to the forest sector through innovation; integrating innovation efforts and institutions into a more effective national system; and addressing challenges and building on new opportunities for forest-based communities.

Made up of research scientists, technicians, economists, policy analysts and other dedicated professionals, the Canadian Forest Service develops and shares knowledge about forests and brings together stakeholders to address regional, national and global forest issues. Whether conducting research in the field, performing tests in the lab or analyzing information and data, Canadian Forest Service staff are working to ensure a healthy forest and a strong forest sector for Canada.