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THE STATE OF CANADA'S FORESTS

ANNUAL REPORT 2008



Canada

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MINISTER'S MESSAGE



As Minister of Natural Resources, I am continually reminded of our nation's status as a leader in sustainable forest management. This reputation is a source of great pride to Canadians, and we have gained it through our resourcefulness and innovation. These and other qualities are very evident in the 2008 edition of *The State of Canada's Forests*, which illustrates how our forest sector continues to persevere even during these extremely difficult times.

Our Government recognizes the hardships that forest workers, communities and the industry as a whole are facing during this global economic downturn. Despite these challenges, the forest sector is finding opportunities through innovation, new technologies, and strategic forest management practices, as highlighted in this report.

We will continue to work closely with provincial and territorial governments, with communities and with the industry to face the forest sector's current challenges. This inclusive approach will help strengthen the sector's resilience, enable it to seize emerging opportunities and reinforce Canada's leadership in sustainable forest management.

An important outcome of this approach in 2007 was the conceptual groundwork for *A Vision for Canada's Forests: 2008 and Beyond*. Developed under the leadership of the Canadian Council of Forest Ministers with input from a broad range of interested parties, *A Vision for Canada's Forests* centres on the interconnected themes of climate change and forest-sector transformation. The vision highlights innovation and partnership as keys to addressing these issues.

The message of this year's *The State of Canada's Forests* is straightforward: while the forest sector faces challenges, it has the motivation, vision and ability to capitalize on the opportunities arising from these challenges.

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

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



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QUICK 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 forestry 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 2007, direct employment in the Canadian forest industry fell by 9.1% compared to 2006.
- » 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 2007.

Economy

- » Canada is the world's largest exporter of forest products.
- » The forest industry's contribution to Canada's gross domestic product is about 3%.
- » Secondary manufacturing of wood products has expanded in recent years, increasing economic benefits without increasing harvests.
- » The United States is by far the largest buyer of Canadian forest products.
- » Forest-based foods (such as berries and wild mushrooms) contribute an estimated \$725 million to the Canadian economy.

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 2008, almost 138 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.





A VISION FOR CANADA'S FORESTS:

2008 AND BEYOND

In Canada, responsibility for forests is shared by the federal, provincial and territorial governments. To coordinate the goals and efforts of these jurisdictions, Canada's forest sector has been guided since 1981 by a series of national strategies.

A Vision for Canada's Forests: 2008 and Beyond is the sixth and latest in that series. It is also the longest-term, spanning a full decade (2008–2018). The vision was developed under the leadership of the Canadian Council of Forest Ministers (CCFM) based on the views of many interested parties, including governments, Aboriginal groups, industry, academia, non-governmental organizations and the public.

Two Themes

Unlike previous forest strategies (see table on page 7), the new vision centres on two themes: forest-sector transformation and climate change. Positioned within the enduring goal of sustainable forest management, these issues have emerged as the most pressing for Canada's forest sector, now and in the coming decade.

The vision recognizes that both issues are long-term—requiring long-term solutions—and national, with the potential to influence every aspect of Canada's forests and forest sector. The issues are also intertwined: climate change is a catalyst for transformation, and transformation can help the sector deal with climate change.

For both themes, innovation is essential to create the new ideas, products, markets and processes that will carry the forest sector forward. Solid partnerships are also key, as the vision depends on collaboration among the different groups within the forest sector.

**Forest Sector
Transformation**

Canada's new vision sees producers of traditional wood and paper products continuing to play an important role in the economy. However, the forest sector can further transform through research and innovation to expand the array of forest products.

One opportunity arises from the demand for a renewable biomass industry built around products like bioenergy, bioplastics and biochemicals. Some of these products can be made using the residues from wood harvesting and processing. Other opportunities lie in the continued development of forest resources that are not timber based (see below).

SOME PRODUCTS AND SERVICES THAT COULD FEATURE SIGNIFICANTLY IN A TRANSFORMED FOREST SECTOR

Bioproducts

- » Antibiotics
- » Biochemicals
- » Bioplastics
- » Glues
- » Industrial enzymes
- » Insecticides
- » Plant-derived pharmaceuticals

Products from residues

- » Artificial flavours
- » Fertilizers
- » Renewable fuels, including ethanol

Non-timber products and services

- » Berries
- » Fishing
- » Hunting
- » Maple syrup
- » Mushrooms
- » Oils
- » Resins
- » Tourism

This transformation, or reinvention, of the forest sector will require creative changes in government policies as well as in the institutions that manage access to forest resources. It will also require a pool of workers with the right skills. That means recruiting effectively, improving access to education and technical training, and helping communities make the transition to a new kind of forest economy.

**Climate
Change**

Under the climate change theme, the vision addresses the forest sector's role in two areas: mitigating climate change and adapting to its effects.

Mitigation. Trees trap carbon dioxide, a major greenhouse gas, and store it. Forests are therefore a crucial part of the effort to control climate change. Carbon storage can be increased by planting trees on non-forested lands and by preventing deforestation. Sound forest management practices and policies can also help increase carbon storage. Using wood as an energy source can help by reducing the dependence on fossil fuels and lowering the country's greenhouse gas emissions. Substituting wood for steel, aluminum, plastic, concrete and other fossil fuel-intensive products would have positive effects as well.

According to the United Nations Intergovernmental Panel on Climate Change, forest management strategies that maintain or increase carbon sinks, while providing society with a sustainable supply of timber, fibre and energy, have the greatest potential to mitigate climate change.

Adaptation. A warming climate will affect Canada's forests. (See "Adapting to Climate Change through Innovation" in this report.) To address climate change mitigation and adaptation, the vision acknowledges the importance of helping forest-dependent communities adapt to climate change. Access to the best scientific information, sharing of best practices and stronger cooperation among local and regional groups will be crucial.

Achieving the Vision

Shared goals and voluntary, collective action are essential to put Canada's new vision into effect.

The CCFM will raise awareness of the vision. Through publications such as *Criteria and Indicators of Sustainable Forest Management* and *The State of Canada's Forests*, the CCFM will communicate progress to national and international audiences. The CCFM also plans to sponsor meetings of key forest-sector players every three years, to coincide with the review of the vision. As well, forest ministers will continue to work on cross-jurisdictional solutions to national issues (for example, the National Forest Pest Strategy and the Canadian Wildland Fire Strategy).

Indispensable to the vision's success are the efforts of individuals, organizations and governments. The CCFM encourages them to work independently and as partners to develop creative responses to current challenges facing forests and the forest sector.

Finally, the vision depends on public participation. The involvement of all forest users and decision makers is key to maintaining healthy, prosperous forests in Canada. More than anything, the new vision relies on this country's diversity of voices and approaches to accomplish its goals.

Sustainability: The Ultimate Vision

The two themes of Canada's new forest vision—sector transformation and climate change—are part of a broader vision of sustainable forest management. The vision makes it clear that economic, environmental and social considerations must be balanced in order to chart a responsible course for the future.

Canada is already a world leader in sustainable forest management. But the new vision aims higher, urging the country to become "the best in the world in sustainable forest management and a global leader in forest sector innovation."

Becoming the best is no easy effort. Each component of sustainability—healthy forests, vibrant communities and profitable forest-based businesses—depends on the others. The effort can succeed only if all members of Canada's diverse forest sector work together, keeping sustainable forests in view as the ultimate goal.

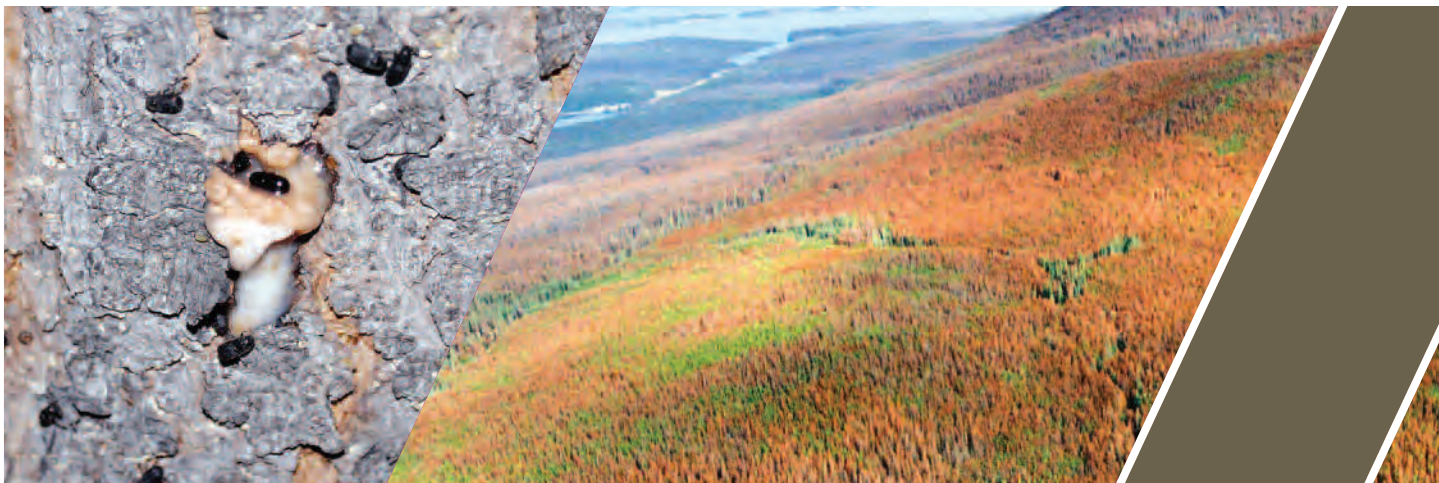
THEMATIC CONTENT OF NATIONAL FOREST STRATEGIES 1981–2003

1981	1987	1992	1998	2003
Wood supply	Forest management	Forest ecosystems Forest management	Forest ecosystems Forest management	Ecosystem-based management
Markets and market opportunities	Trade and investment	Forest industry Global forests	Forest industry Global view	Forest products benefits
Human resources	Employment	Forest communities	Forest communities	Sustainable forest communities
Research and development	Research and development	Forest science	Forest science	Knowledge and innovation
	Public awareness	Public participation	Public participation	The urban forest and public engagement
		Aboriginal peoples	Aboriginal peoples	Rights and participation of Aboriginal peoples
		Private woodlots	Private woodlots	Private woodlots Reporting and accountability

Source: Rayner, J. and M. Howlett. 2007. "The National Forest Strategy in comparative perspective." *The Forestry Chronicle*. Vol. 83: p. 651-657. Courtesy of the Canadian Institute of Forestry.



FPIInnovations is developing advanced methods for detecting preservative residues to facilitate recycling of wood treated with the next generation of preservatives. Photo courtesy of FPIInnovations.



MOUNTAIN PINE BEETLE ON THE MOVE:

ANALYZING THE RISKS

Scientists call it the most destructive insect pest in the pine forests of western North America. Many British Columbians would agree, having seen for themselves the devastation this tiny beetle can leave in its wake. Since the late 1990s, the mountain pine beetle has attacked more than 10 million hectares of lodgepole pine forests in the British Columbia Interior. If the trend continues, 80 percent of the province's mature pine forest will be killed by 2013.

Of concern now is the beetle's unprecedented appearance farther north and east in British Columbia and Alberta, outside its historical range. This spread is due to several factors: prevailing winds that have carried the beetle east across the Rockies; hot, dry summers that have made forests more vulnerable to attack; warmer winters that have enabled beetle broods to survive; and a high volume of older (so more susceptible) lodgepole pine.

Risk Assessment

The mountain pine beetle outbreak is on the move. How far will it travel? Does it pose a threat to Canada's boreal forest, with its vast expanses of jack pine? Could it spread to other pine species and attack the forests of eastern Canada? These are pressing questions, ones that scientists and policy makers are marshalling their best knowledge to answer.

Risk assessment, based on the most current and reliable scientific evidence, is one of the best ways to evaluate forest threats such as the mountain pine beetle. In 2007, the Canadian Forest Service (CFS) of Natural Resources Canada gathered federal and provincial forest managers and scientists for a risk assessment of the beetle's threat to the boreal and eastern pine forests. Their findings (on page 9) will help forest decision makers plan for and manage the risks of an expanded beetle infestation.

Key Findings

- » *No biological barriers to expansion.* It appears that the mountain pine beetle is already encroaching on the boreal forest, and there are no biological roadblocks in its way. The pine species that dominate boreal and eastern stands are just as susceptible to beetle attack as lodgepole pine. And the blue-staining fungi that accompany the beetle and actually kill the tree are similarly at home in boreal pine species.
- » *Climate will play a role.* The climate in regions east of the Rocky Mountains where the beetle is spreading is less favourable to the pest because of more frequent cold snaps that kill overwintering beetles. This should reduce the short-term risk of an outbreak flaring across the boreal. But it is already apparent that we cannot rely on weather to control the beetle. In the long term, if climate change brings conditions more favourable to the beetle, the situation could become epidemic.
- » *Forest structure may reduce the rate of spread.* Pine stands in the boreal zone are more fragmented, less dense and younger than pine stands in the British Columbia Interior. These traits should make boreal forests less susceptible to damaging infestations.

Potential Risks

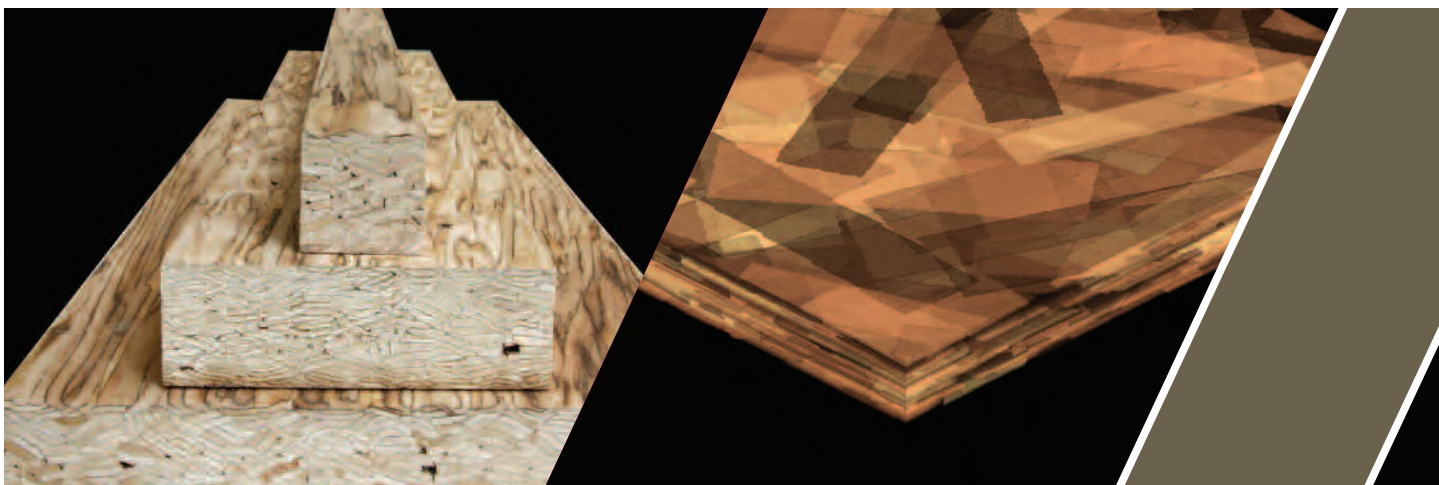
- » *Reduced timber supply.* If beetle outbreaks do happen in the boreal, reductions in timber supply will likely occur. However, the amount of timber lost should be less than in British Columbia. Even under outbreak conditions, average losses to individual stands should not exceed 40–60 percent of standing volume because of the different structure of the forest. Still, this is enough to disrupt the flow of fibre and make these forests less economically viable for timber supply. Forest-dependent communities are especially vulnerable to the economic consequences, although trends in other industries in the region, like oil and gas, could help some communities adapt.
- » *Threats to non-timber benefits.* Boreal and eastern pine forests provide ecological and social benefits ranging from water conservation to carbon storage and from cultural uses to aesthetic beauty. These forests are also a rich source of revenue from tourism, recreation and trapping. In some regions, the threats that the beetle poses to non-timber benefits may outweigh commercial threats, especially in the boreal forest where non-timber benefits are high on the list of values provided by the forest.
- » *Increased fire risks.* Stands that have been attacked and killed are more vulnerable to forest fire. When the warmer, drier conditions accompanying climate change are factored in, the potential for more unpredictable fire behaviour in affected regions increases.

Forest Risk Assessment: A Test Case

The 2007 risk assessment of the mountain pine beetle coincided with broader work that the CFS has been doing to develop a National Forest Pest Strategy. This strategy, an initiative of the Canadian Council of Forest Ministers (CCFM), will provide an integrated national response to the growing threat of invasive pests in Canada's forests.

The National Forest Pest Strategy will be based on a risk analysis approach. This involves estimating the level of risk, determining countermeasures and establishing a dialogue on the issue with stakeholders. Such an approach should make it easier to gather and combine the scientific and economic information needed to respond to forest pests.

The mountain pine beetle risk assessment, though not a full-scale risk analysis, was nonetheless an ideal opportunity to test-drive the approach the CCFM has in mind. This kind of risk assessment will occur more often when the National Forest Pest Strategy is implemented.



FPIInnovations developed a new veneer-strand lumber (VSL) product made from pine killed by the mountain pine beetle. Photos courtesy of FPIInnovations.

A new 3D computer simulation program for engineered wood products, resulting from cross-laboratory collaboration between Forintek and Paprican scientists.

TRANSFORMATIVE TECHNOLOGIES: REVOLUTIONIZING THE FOREST SECTOR

The Industrial Revolution in the late 18th and early 19th centuries was called a revolution for a reason. Inventions like the steam engine made commerce, labour, exploration and travel easier than ever and transformed how people lived and interacted with the world. A more recent technological revolution, brought about by the microchip and Internet, is causing a similar revolution in our lives today.

Technological revolutions begin at the industry level. The forest sector, for instance, is in the midst of an upheaval being felt around the globe. New products, processes and trading patterns, and even new commercial plant species, are transforming the sector in fundamental ways. In the midst of this transformation, the Canadian forest sector has a prime opportunity to reinvent itself by embracing transformative technologies.

What are Transformative Technologies?

Some technologies are developed to reduce costs and provide continuous product improvements within an industry. Transformative technologies go further. They create core changes rather than marginal ones. In the forest sector, transformative technologies promote novel and strategic uses for wood fibre and its many products and derivatives. Such technologies, industry observers agree, are the key to extracting more value from the forest resource.

Various forces are pushing transformative technologies to the forefront of the forest sector:

- » competitiveness of the forest sector
- » climate change and its ramifications for the sector (see “Adapting to Climate Change through Innovation” in this report)
- » the need for continuous improvement in sustainable land use
- » the limited supply of non-renewable fossil fuels
- » growing demand for products that have a low environmental impact.

All of these forces are linked. For instance, if we are to become less dependent on fossil fuels, we need to develop renewable energy alternatives. This presents opportunities to use wood fibre differently which may, in turn, suggest changes to how we manage our forests.

Transformative technologies can impact traditional products, such as lumber and pulp and paper, by producing, using and packaging these products in new ways. They can also shift focus to non-traditional products and new markets.

Traditional Products

Traditional wood products are still mostly destined for residential construction. But wood can be used in broader applications such as commercial and industrial construction, particularly if it is combined in new ways with other building products. Wood products can also be used in different ways to create buildings that have a minimal environmental footprint and can be modified to increase their performance and value relative to these other building products.

Similarly, the pulp and paper manufacturing sectors provide many grades of paper for publishing, packaging and consumer products. These products are now under competitive pressures from low-cost producing countries, which means that the Canadian industry must develop new uses and grades of pulp and paper that are globally competitive while maximizing the value of Canada's superior fibre resource.

Here are four examples of transformative technologies that could be adopted in the next 10 years:

- » sensors in wood-based materials to measure wood quality, facilitating new, specialized uses for wood
- » wood connection technologies that increase wood use in multi-residential and institutional construction
- » coatings and surface treatments based on nanotechnology that give the appearance of high-grade finishes and prevent discolouration from sunlight
- » new paper grades for publishing using high mineral content and for high-performance packaging.

Non-traditional Products

Then there are the technologies that will create new products such as biofuels, biochemicals and biopolymers (i.e., bioplastics) that will usher the forest sector into a new era.¹

New processes are being developed to combine wood fibre with plastics like polyvinyl chloride (PVC) and polypropylene (PP) to produce new materials with enhanced durability and strength. The North American market for these wood-plastic composites in decking and railings alone is growing quickly and could reach \$2 billion by 2010.

Researchers are also exploring possible uses of fibre-bioplastic composites. These novel composites, created entirely from renewable resources, are suitable for a variety of applications and could serve as renewable alternatives to wood fibre-plastic composites. The development of renewable products will create new opportunities for the forest sector to improve competitiveness while at the same time lowering our dependence on fossil fuels and reducing greenhouse gas emissions. FPInnovations, Canada's main forest research institute, and its partners are exploring these new composites along with other emerging products (see box below).

Transformative technologies can also create new applications for forest-derived products. Lignin, for example, is being considered as an innovative replacement for carbon black, a petroleum product used in making car tires. Lignin, a by-product of the wood pulping process, was successfully tried as a substitute for carbon black in the 1950s. But at the time, petroleum was less expensive and the substitution was uneconomical. Now times have changed. The rising cost of petroleum could mean a new market for lignin and new revenues for the forest sector, not to mention less costly tire manufacturing. Work is underway at Ontario's Lakehead University, supported by Goodyear Canada Inc. and FPInnovations, to develop the necessary technologies.

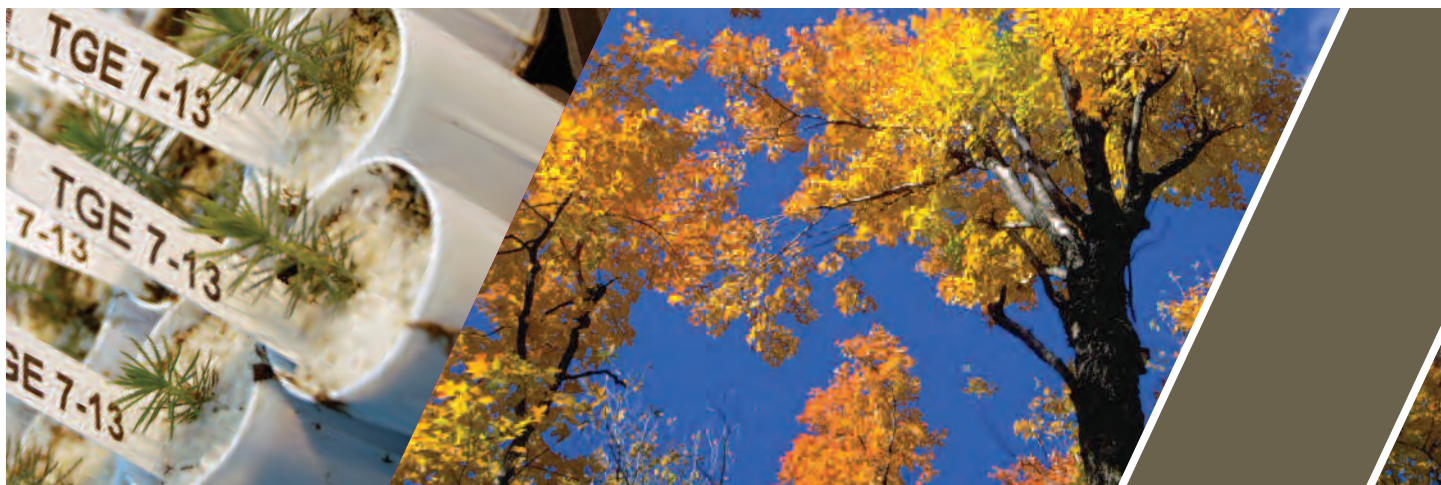
These and other transformative technologies are in various stages, from early research to commercialization. What does it take for a new idea to make it through these stages? Several factors make the progression easier: strong R&D and innovation, potential market opportunities, increased investment, and collaboration through existing partnerships and new alliances with other industries.

Partners in Transformation

FPInnovations is a unique research partnership that is leading the transformation of Canada's forest sector. In 2007, to capitalize on forest innovation, Canada's leading forest research institutes—Forintek, FERIC and Paprican—joined to form FPInnovations, the largest private, not-for-profit forest research institute in the world. The Canadian Wood Fibre Centre (part of Natural Resources Canada) was created to work with FPInnovations to improve forest productivity and increase the value of Canada's wood resources.

A key part of FPInnovations' research is the Transformative Technologies Program, which brings together governments, industry and academia to conduct research along the forest "value chain." The objective is to come up with innovative products and to increase investment in a higher-value-added forest sector. Looking ahead, FPInnovations expects to form more partnerships with academia, financial institutions and other research groups both in Canada and abroad.

¹ Bioplastics are a form of plastic derived from renewable biomass sources, such as vegetable oil or corn starch, rather than traditional plastics which are derived from petroleum. They are used either as a direct replacement for traditional plastics or as blends with traditional plastics.



ADAPTING TO CLIMATE CHANGE THROUGH INNOVATION

Canada's climate is expected to change over the next 50 years and beyond. Because our forests are sensitive to climate and take a long time to mature, climate change has become an important issue facing Canada's forest managers.

The effects of climate change are already evident across Canada and have impact on forest ecosystems, forest industries and forest-dependent communities. Among these impacts are insect and disease outbreaks and melting permafrost in the North. As well, warmer temperatures have shortened the winter harvest season in the boreal forest, increasing harvest costs and requiring more permanent roads to be built instead of temporary winter roads of snow and ice.

Warmer temperatures and changes in the amount and timing of precipitation may, depending on location and species, affect growth in positive ways.

Planning for Unprecedented Change

Efforts to mitigate climate change—to reduce emissions of the greenhouse gases that are causing it—can reduce the degree of climate change but cannot prevent it from happening.

This leaves forest managers and policy makers in uncharted waters as they struggle to understand the implications of climate change and how best to adapt to them. Trees can live for well over 100 years. How do we plan for the trees we plant now when we are not sure how the climate will change or how the changes will affect our forests?

A complex and uncertain environment is not all that decision makers will have to deal with in managing the forests of the future. Their job will be complicated further by the challenges of a more dynamic and competitive global marketplace and changing public values.

Adapting and Innovating

In the face of such change, adaptation is a key strategy. Adapting to climate change means reducing the negative impacts it creates and taking advantage of the new opportunities it presents.

Adapting to climate change is a process, one that involves a variety of actions:

- » assessing vulnerability
- » strengthening adaptive capacity
- » identifying and implementing no-regret options
- » mainstreaming (incorporating climate change into decisions as a matter of course)
- » considering climate change in long-term visions and plans
- » sharing knowledge
- » conducting and monitoring operational trials.

Many of these actions are based on the ability, and the willingness, to innovate—to approach forest management in new ways that take into account new realities. Innovation is a key ingredient in keeping the forest sector resilient and able to adapt to changing conditions.

Adaptable Organizations

When we assess organizations that have stayed resilient, or even prospered, during uncertain times (including the current period of economic challenges facing the forest sector), it is clear that a capacity to adapt is essential. But what determines that capacity?

Organizations that are able to adapt, be they governments, companies or communities, share a number of characteristics:

- » strong, forward-looking leadership that champions innovation and risk taking while remaining financially responsible
- » the ability to assess risk
- » a skilled, educated and experienced workforce
- » a strong scientific capacity
- » access to knowledge and tools to guide decision making
- » strong human networks within and between organizations and high levels of trust between people
- » access to capital and investment funding and the flexibility to adjust asset portfolios
- » an operating and institutional environment that fosters innovation.

Organizations in the forest sector, both public and private, are already taking steps to adapt to climate change. So are communities. (See next page.) In the most successful cases, decision makers are recognizing that they need to consider climate change alongside the other factors that affect the forest sector. Strategies intended to transform the sector, to meet both climate change and economic challenges, must be comprehensive. They must also be forward-looking. And they must acknowledge the increasing complexity and uncertainty of the future planning environment.

Canada's forest sector has always had a longer planning horizon than most other sectors, because of how long it takes a tree to grow and how important it is to ensure the long-term sustainability of the resource. Now, with the future much harder to forecast, it is all the more important to build adaptation and innovation into forest planning and management. Doing so will require ground-breaking ideas, including new science-based approaches to making decisions under uncertainty. It will require dialogue and debate among forest stakeholders. And it may require some fundamentally new ways of managing the forest.

Moving Ahead with Climate Change Adaptation

- » *In the public sector:* British Columbia has launched several initiatives to learn more about how climate change is affecting the forest and how the sector can adapt. The province created the Future Forest Ecosystem Initiative to tailor B.C.'s forest and range management framework to a changing climate. It has upped competitive research funding for studies into vulnerability and adaptation. And it is working with stakeholders to find the best ways of preparing the province's forest sector for increasing social, economic and environmental change.
- » *In the private sector:* When Alberta's Millar Western Forest Products put together its latest detailed forest management plan, the company took the extra step of researching and analyzing how climate change and other major influences (like petroleum development) might affect its ability to sustainably manage the forest. In the process, the company discovered that its current methods of determining forest sustainability are questionable if the impacts of climate change are ignored. This has led Millar Western to review its forest practices. The company is also establishing a network of sample plots that it will measure every five years to monitor the effects of its practices.
- » *In the community:* Vanderhoof, British Columbia, is one forest-based municipality that is facing the need to adapt to climate change. For the full story, visit Canada's Forests web site (canadaforests.nrcan.gc.ca) and click on "People and Communities."



Millar Western lumber and pulp mill site, Whitecourt, Alberta. Photo courtesy of Millar Western Forests Products Ltd.



POINTS OF VIEW:

ENVIRONMENTAL PERFORMANCE VERSUS ENVIRONMENTAL REPUTATION

In 2004, a Yale University study rated Canada's forest regulations among the most stringent in the world. Our forest industry leads the world in forests certified to audited, independent management standards. We also boast the world's largest area of protected forests.

Yet despite this strong track record, international campaigns continue to be critical of Canada's forest policies and practices. Their negative messages have created a gap between our strong environmental credentials and the way we are perceived among consumers and major buyers of forest products. This gap only compounds the economic pressures already facing the industry.

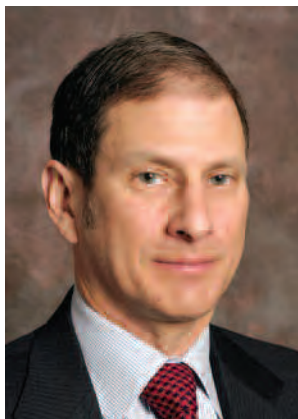
So how are we really doing? To find out, we spoke with a representative from each of three forest interest groups—industry, researchers and environmentalists. We asked them how trends in environmental performance are influencing our reputation; how improved environmental performance affects social and economic conditions; and how certification and innovation are changing things. We also asked about success stories in the past decade and areas we should focus on in the decade to come.

Not surprisingly, our interviewees expressed a variety of views. But the overall message is clear: the environmental performance of Canada's forest industry has improved in some areas, but there is still work to do in others.

Industry

As head of the organization representing the largest Canadian producers of forest products which together are responsible for 75 percent of the country's working forests, Avrim Lazar sees the environmental record of Canada's industry as positive—and getting better.

Canadian and global consumers are slowly but profoundly awakening to the importance of buying products with strong environmental values, Lazar says. Besides asking the traditional questions about cost and quality, buyers of paper, lumber and other wood products have added a third question: what is the environmental impact? "Canadian producers have always been able to compete on quality, we compete well on cost in some areas, and we are now well-positioned to compete on environmental impact," he says, adding that now the trend is to turn environmental virtue into a market advantage.



Avrim Lazar is President and CEO of the Forest Products Association of Canada (FPAC).

This change in the marketplace is helping to transform sustainable development from a concept that is difficult to apply, since social, economic and environmental values compete with each other, into something that can actually be done. "The social, economic and environmental threads are being woven together into a single cloth," notes Lazar, "as environmental credentials translate into market advantage, which translates into jobs."

Certification is key to market advantage. Consumers are demanding it, and FPAC has made it a requirement of membership. "Independent scrutiny says to the marketplace that a product is a) legal and b) harvested according to the best available ecosystem practices," Lazar says. But the biggest impact of certification has been to shift the culture of the industry—not only toward continuous improvement, but also to staying ahead of the curve.

FPAC members had reduced greenhouse gas emissions in paper mills by 44 percent—seven times the Kyoto requirement—before the federal government's greenhouse gas emission regulations were introduced in 2008. Mills now use 60 percent renewable fuels and put 40 percent less waste into landfills. That's all good, Lazar maintains, but the real news is the shift in the business model, which he sees as the industry's environmental success story of the decade. This shift enabled FPAC to set the unprecedented target of industry-wide carbon neutrality, without carbon offsets, by 2015. Meeting this target will be a prime focus of environmental performance over the next decade.

"We've been doing our homework in Canada," he concludes. "While we're not perfect, we're quite a bit better than most, and getting better every day."





Research

Peter Duinker sees good news and bad news in the environmental reputation of Canada's forest industry. He believes that while our domestic reputation is improving, our international reputation is not. Many environmental groups within Canada are working with industry to make change happen, but key international groups are working against these efforts, he says, spreading misinformation about how Canadian forests are managed. "Broadly speaking, Canadian forests are as well managed as forests in any country worldwide," he maintains. "Many European countries receive little criticism for their forest management regimes, yet every one of them practises even-aged management and clearcutting on a broad scale."



Peter Duinker is a professor at the School for Resource and Environmental Studies at Dalhousie University, and Research Area Leader in the Sustainable Forest Management Network.

Duinker thinks certification has meant more for perceived environmental improvement than for real improvement in the woods. For example, no certification scheme prohibits clearcutting, and few ban pesticides, but many people assume that they do. "If you took a layperson into three randomly selected non-certified forests and three forests certified under the different schemes, that person would likely be unable to tell the difference by what he or she saw in the woods," he says. "Indeed, most professional foresters would be in the same predicament."

Innovation is a better bet for improving environmental performance. Promising innovations include biomass as a source of energy, pulping methods that make use of micro-organisms, and composite products that combine wood-based and other materials.

Another innovation, variable-retention timber harvesting, is the environmental success story of the last decade, according to Duinker. Practised to different degrees across the country, this approach leaves biomass on the site after a timber harvest, providing habitat for wildlife and reducing the impact of the harvest on water flows. Carbon budgets also benefit from less removal, Duinker adds, at least in the short term.

Unfortunately, biomass is being removed for energy production, a practice Duinker sees as a chief concern over the next decade. Twigs and foliage, the most nutrient-dense parts of a tree, should be left at the harvest site, he says. So should stumps and roots; taking them out disrupts the ground, raises energy costs and affects carbon removal. "In my view, the use of forest biomass for energy production should extend no further than to trunks and branches," Duinker says. "I am quite prepared to see the conventional forest products industry and the bioenergy industry compete for the same material."

Environment The environmental reputation of Canada's forest industry is influenced by two major trends, says Steven Price. The first is greater attention to green values, with Canadian, U.S. and overseas markets increasingly interested in products from well-managed forests. The second is the view that carbon is a currency that needs to be accounted for, managed and conserved. "Because of climate change," Price says, "there is tremendous interest in forests as a reservoir of carbon, with the ability to capture more if managed well, or to convert more captured carbon into greenhouse gases if managed poorly."



Steven Price is Senior Director of Conservation Science, Policy and Planning for World Wildlife Fund Canada (WWF-Canada).

While Canada likes to claim that all its forests are managed well, some producers perform better environmentally than others. Price hopes that eventually the market will reward the higher environmental performers with more value and more sales. Certification is key, he says. "What certification can offer is credibility, based on independent verification that environmental performance meets an internationally recognized standard."

For Price, the environmental success story of the decade is Canada's rise to having the most Forest Stewardship Council (FSC)-certified land in the world. "Canada now has 25 million hectares of forests meeting the highest environmental standard in the world," he says, "and 25 percent of the world total." FSC certification is independently verified, performance based and internationally recognized. Its standards are set by four key stakeholder groups: industry, First Nations, environmental organizations and labour.

But there is still much to do, says Price. Moving the sector to carbon neutrality and protecting more forest types will require particular attention over the next 10 years. "We've done reasonably well in the last decade at getting more protected areas," he says, "but more than half of the different forest types in Canada still do not have adequate protection."

In the end, stronger environmental performance is the basis for long-term sustainability, which Price likens to a three-legged stool—part social, part economic, part environmental. "Managing forests more sustainably is the best thing we can do to guarantee more jobs and communities that don't suffer the ebbs and flows of unsustainably harvested natural resources," he says. "People take tremendous pride in achieving a higher environmental standard in forestry, in doing the right thing not only for their own communities and the forest but arguably for the market too. They also earn a great deal of respect from others for taking bold steps in the right direction."





Photo courtesy of Millar Western Forest Products Ltd.

Photo courtesy of FPIInnovations.

PERFORMANCE INDICATORS

The Canadian Council of Forest Ministers' *Criteria and Indicators of Sustainable Forest Management* provide a science-based framework to define and measure Canada's progress in the sustainable management of its forests. Developed through a process of broad consultation, the criteria represent the forest values that Canadians want to enhance or sustain, while the indicators identify scientific factors to assess the state of the forests and measure progress over time. No single criterion or indicator alone is an indication of sustainability; they must be considered as a whole to provide an accurate measure. The following is a sample of the criteria and indicators, along with the most recent information indicating how Canada's forests are doing in those areas.



CRITERION: **BIOLOGICAL DIVERSITY**

Biological diversity, or biodiversity, makes it possible for organisms and ecosystems to respond and adapt to environmental change. 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 populations of selected species is an indicator of how well the species-recovery policies and practices of governments, companies, non-governmental organizations, 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 risk of disappearing.
- » When COSEWIC changes a species' category to a higher or lower level of threat, it does not always mean that the species' population has improved or deteriorated. It may also be the result of new information.

What has changed?

- » Of the 31 species assessed or reassessed by COSEWIC in April 2008, 17 are considered forest-associated, including 10 newly assessed species. Canada now has 331 forest-associated species at risk, representing 59 percent of COSEWIC-listed species at risk.
- » The 2008 COSEWIC assessment listed habitat loss, climate change, predation, competition and invasive alien species as some of the threats affecting species at risk.

FOREST-ASSOCIATED SPECIES

reassessed by COSEWIC since 1999*
as of April 2008

%	Change in status
43	same
20	higher risk category
2	lower risk category

*35% were newly assessed

CRITERION: **ECOSYSTEM CONDITION AND PRODUCTIVITY**

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

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 human pursuits such as logging, road construction, oil and gas ventures, and other 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 their practices facilitate natural regeneration and recovery of ecosystem productivity following disturbance.

What has changed?

INSECTS

- » In 2006, the forest area either defoliated by insects or containing beetle-killed trees increased to 19.5 million hectares from 15.9 million hectares in 2005.
- » 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 forest tent caterpillar between 1975 and 2004.
- » Other insect outbreaks occur as a result of food availability and favourable weather. The mountain pine beetle infestation in western Canada, for example, is the result of a high volume of susceptible lodgepole pine and recent hot, dry summers and warmer winters, which have favoured the survival and spread of the insect.

DISEASE

- » Tree diseases are caused by either a living organism (biotic agent) or an environmental condition (abiotic agent) which induces changes in the tree's natural growth, form or physiology. Disease symptoms usually develop as a result of a complex interaction between the susceptible tree, predisposing environmental conditions and a living, infectious agent such as a fungus. An awareness of the interaction of living and non-living agents enables greater insight into the dynamics behind diseases.
- » Living organisms that can cause a disease are fungi, bacteria and viruses. Beech bark disease, for example, which has been introduced to North America and has spread through the Maritime provinces and into Quebec and Ontario, has (as of 2004) ravaged 3500 hectares of forest and affected 30 250 cubic metres of beech wood. This disease is caused first by an insect—the beech scale insect—which attacks the bark of the tree, followed by a fungus which enters the tree through the wound. The fungus causes large cankers—more every year—until the tree dies or is too deformed for economic purposes.
- » Environmental agents include pollution, weather extremes and soil problems. These agents can make the tree more susceptible to insects and pathogenic fungi and reduce its growth or kill it. Windthrow, for example, was responsible for blowing down trees across 21 000 hectares in Quebec and 13 000 hectares in Ontario in July 2006. Old forests with tall trees (over 22 metres) on thin soil are more susceptible to windthrow.

FIRE

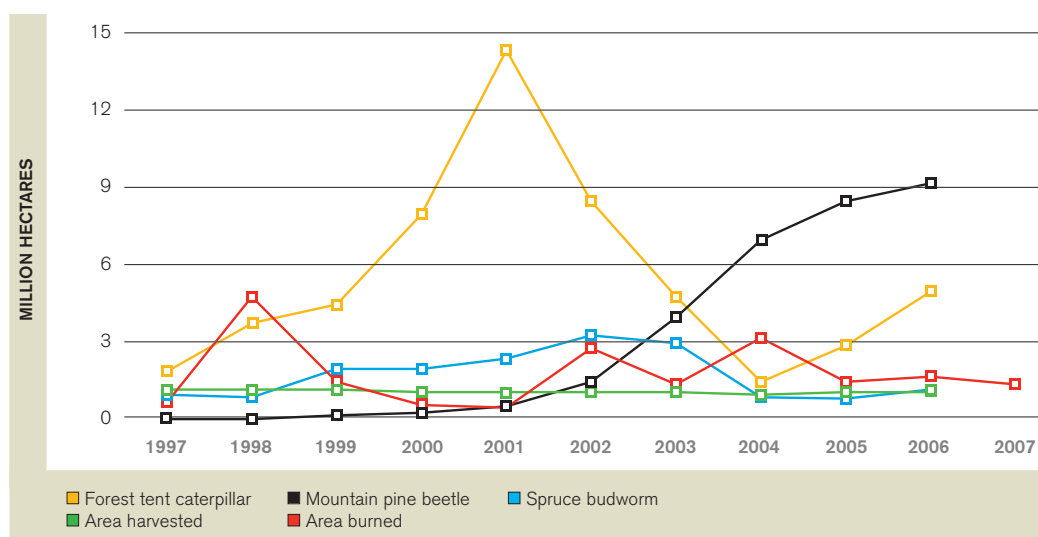
- » More than 6000 forest fires were reported across Canada in 2007, 19 percent fewer than the 10-year average (1997–2006). About 1.66 million hectares were burned, 19 percent less than the 10-year average. At least 27 communities were evacuated during the fire season, affecting more than 3800 people.

- » The 2007 fire season started early in the east, with Atlantic Canada and Quebec seeing fire activity in late April and early May, while the west experienced a late spring beginning to its fire season.
- » Over the summer, fire activity increased in the west. The Boyer's Rapids complex fire burned more than 200 000 hectares in Wood Buffalo National Park in June and was just one of several large fires in northern Alberta and Northwest Territories.

TIMBER HARVEST

- » Harvesting of Canada's commercial 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 one third of one percent of Canada's commercial forest is harvested (slightly more than 1 million hectares) annually. Of the 1 million hectares of forest harvested each year, 53 percent is regenerated naturally, 45 percent is replanted and 2 percent is direct seeded. Harvesting represents slightly more than 0.7 percent of Canadian forests that are accessible and are most likely to be subject to forest management activities.

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	Percentage change over previous 10 years
Area defoliated by major insects (2006)			
Forest tent caterpillar	5.1	77.8	-0.6*
Mountain pine beetle	9.2	5.8	300.4*
Spruce budworm	1.1	54.2	-37.8*
Area harvested (2006)	1.0	-4.3	-0.5*
Area burned (2007)	1.7	-19.2	-19.0**

* 1996–2005
 ** 1997–2006 (based on 10-year average)

Sources: Canadian Interagency Forest Fire Centre and National Forestry Database

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 the causes of these fluctuations may produce 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 deletions and additions affect soil and water conservation. As well, because forest ecosystems act as carbon sinks and sources, it is critical to track changes in 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. The main causes of deforestation in Canada are the conversion of forest land to agriculture, industrial development, resource extraction and urban expansion. Harvesting, when it is followed by regeneration, is not deforestation. Afforestation is the establishment of new forests on previously non-forest land.

What has changed?

- » In 2006, an estimated 86 000 hectares of forest were converted to other land uses, up from 67 000 hectares in 1990.
- » In 2006, deforestation resulted in a net emission of 16 million tonnes of CO₂e (carbon dioxide equivalent), down from 27 million tonnes in 1990.
- » On average, almost 9000 hectares of trees are planted each year in Canada, primarily on farmland.
- » Planting rates for afforestation were higher than average from 1990–1996 and from 2002–2004, coincident with the availability of public funds to support the practice of converting lands to forest.



INDICATOR: PROPORTION OF TIMBER HARVEST AREA SUCCESSFULLY REGENERATED

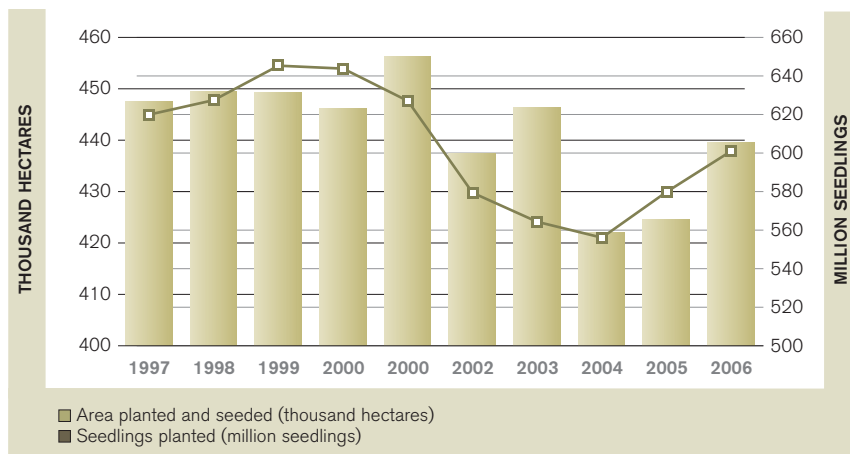
Why is this important?

- » Planting and seeding are a reliable means of regenerating forests disturbed by harvesting or other factors when advanced or natural regeneration are not options for a particular site.
- » The proportion of area planted and seeded may change from year to year depending on factors such as the nature of the disturbance (e.g., harvesting vs. wildfire), species composition, age and structure of the forest, the success of natural and artificial regeneration, and government policies.
- » 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?

- » Slightly more provincial Crown land was planted/seeded in 2006 than in 2005, although the difference is within the range of variation noted over the past 10 years.
- » In future, the mountain pine beetle epidemic in western Canada and mill shutdowns and curtailments resulting from poor market conditions may significantly affect not only the amount of area harvested but the amount and type of forest regeneration techniques used.

AREA AND NUMBER OF SEEDLINGS PLANTED ON PROVINCIAL CROWN LAND



Area and number of seedlings planted on provincial Crown land	2006	Percentage change from previous year	Percentage change over previous 10 years*
Area planted and seeded (thousand hectares)	439	-1.9	-0.1
Seedlings planted (million)	601	3.7	0.0

*1996–2005

Source: National Forestry Database

CRITERION: **ROLE IN GLOBAL ECOLOGICAL CYCLES**

Forests play an important role in the 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 the role of forests 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 the managed forest provide an important indication of the contribution of these forests to the global carbon cycle, as well as an indication of the ever-changing impacts of natural processes.
- » It is important to monitor trends in carbon emissions and removals so that the future role of Canada's forests in the global carbon cycle can be anticipated and the success of the sector's mitigation activities can be tracked.

What has changed?

- » Canada's managed forests have acted as net carbon sinks in 11 of the 17 years from 1990–2006. It is difficult however to discern an overall trend, as forest carbon emissions and removals vary considerably from year to year, largely due to wildfires and, to a lesser extent, insect epidemics.
- » In 1992, a season of relatively few fires, *removals* of CO₂e were as high as 155 million tonnes. In 1995, when more than 2 million hectares were burned, *emissions* of CO₂e reached 146 million tonnes.
- » During 1990–2006, annual wildfire emissions ranged from a high of 290 million tonnes of CO₂e in 1995 to a low of 11 million tonnes in 2000.

CRITERION: 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: FOREST PRODUCT MARKETS

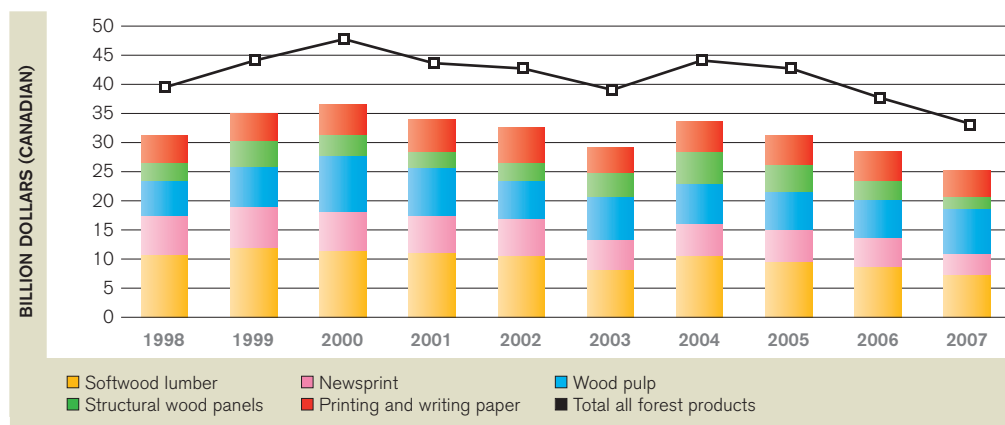
Why is this important?

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

What has changed?

- » The value of Canada's forest product exports fell to \$33.6 billion in 2007 from \$38.3 billion in 2006, a decline of 12.1 percent. This was primarily due to a 17.2 percent decrease in the value of forest product exports to the U.S.
- » The main reasons for the decline were the weak U.S. housing market, which reduced demand, and the rise of the Canadian dollar, which reduced levels of Canadian-denominated revenues from U.S. markets.

FOREST PRODUCT EXPORTS



Source: Statistics Canada, merchandise trade data, monthly

Forest product exports	Billion dollars 2007	Percentage change from previous year	Percentage change over previous 10 years*
Softwood lumber	7.1	-19.3	-3.5
Newsprint	4.0	-18.6	-3.0
Wood pulp	7.1	9.4	-0.6
Structural wood panels	2.4	-33.0	6.7
Printing and writing paper**	4.9	9.0	1.3
Other forest products	8.1	-18.7	3.6
TOTAL ALL FOREST PRODUCTS	33.6	-12.1	-0.2

* 1997–2006

** Estimate calculated by the Canadian Forest Service based on data for the past five years from the Pulp and Paper Products Council

Source: Statistics Canada, merchandise trade data, monthly

INDICATOR: FOREST INDUSTRY EMPLOYMENT

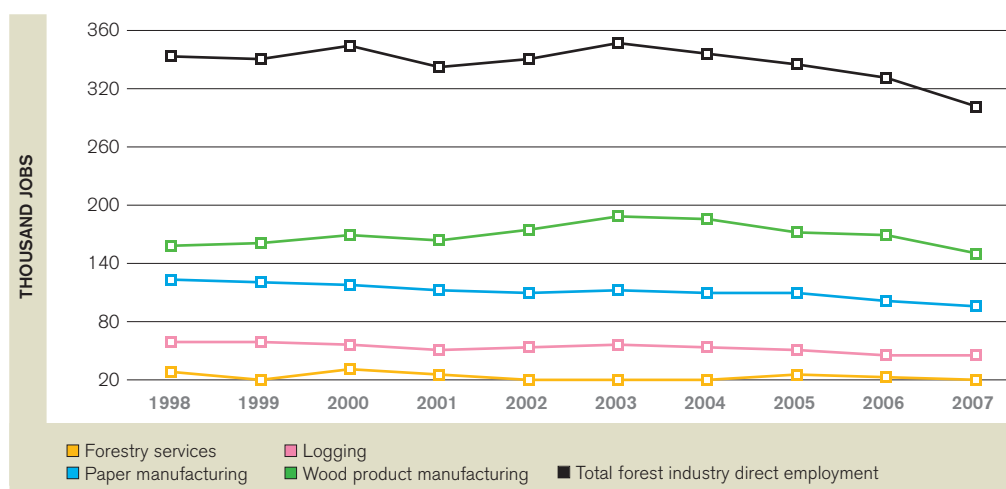
Why is this important?

- » The Canadian forest industry is an important source of employment opportunities nation-wide, particularly in many rural communities where forest industry-related work is the primary source of income.

What has changed?

- » In 2007, direct employment in the Canadian forest industry fell by 9.1 percent compared to 2006.
- » Employment in the wood products manufacturing industry declined by 12.0 percent compared to 2006, due to the soft U.S. housing market, which continued to weaken demand for Canadian wood products.
- » Employment in paper manufacturing dropped by 7.4 percent in 2007. The decline was driven largely by lower demand for newsprint in North America, reflected in the shift in advertising revenue from newsprint to alternative media such as online sources.

FOREST INDUSTRY DIRECT EMPLOYMENT



Source: Statistics Canada, Labour Force Survey, January 2008 (special extraction)

Employment	1999	2007
Direct employment	351 300	294 100
Indirect and induced employment	541 500	453 400
Direct, indirect and induced employment	892 800	747 500

Direct employment	Person-years 2007	Percentage change from previous year	Percentage change over previous 10 years*
Wood product manufacturing	146 500	-12.0	1.8
Paper manufacturing	87 100	-7.4	-2.1
Logging	39 700	-4.3	-3.3
Forestry services	20 800	-3.3	-1.0
TOTAL	294 100	-9.1	-0.4

*1997-2006

Source: Statistics Canada, Labour Force Survey, January 2008 (special extraction)

INDICATOR: **FINANCIAL PERFORMANCE**

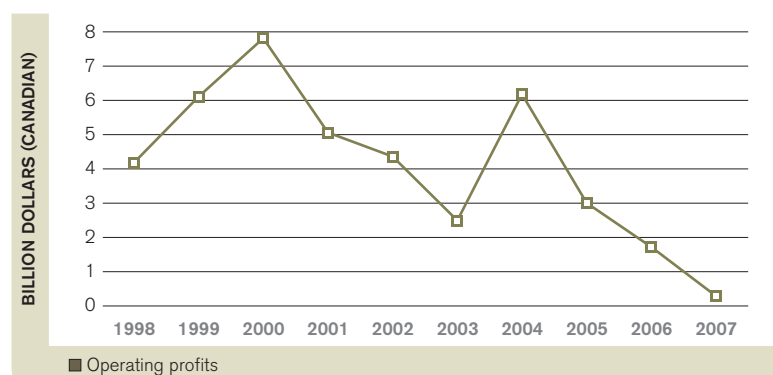
Why is this important?

- » Canada's forest industry contributes significantly to the nation's economy. It is particularly important in many rural communities where jobs tend to be scarce.
- » Key indicators of the forest industry's financial performance include operating profit and return on capital employed. While high levels of industry operating profit 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 the sale of their products in 2007, causing operating profits to fall to \$364 million—the industry's lowest operating profit since 1992. The industry's return on capital employed, at 2.2 percent, was the lowest since 1993.
- » The main drivers behind these declines were a decrease in U.S. demand for a number of residential construction and paper products, the fall in wood product prices and the appreciating Canadian dollar.

OPERATING PROFITS



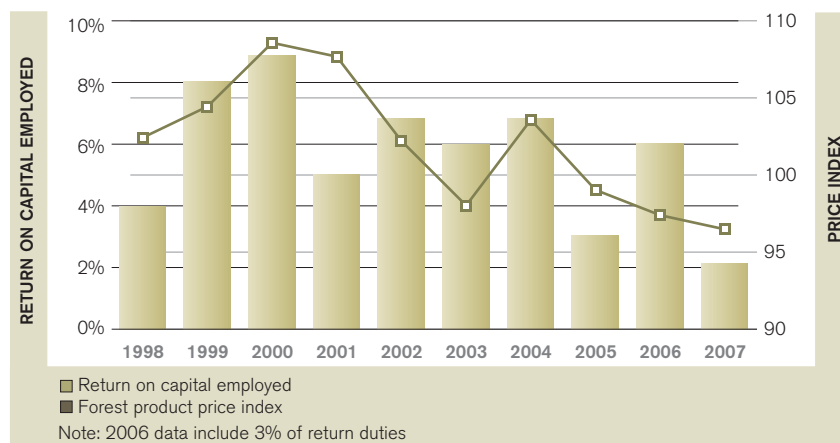
Source: Statistics Canada, Quarterly Survey of Financial Statistics for Enterprises, CANSIM table 187-0002

Operating profits	Billion dollars 2007	Percentage change from previous year	Percentage change over previous 10 years*
Wood and paper manufacturing	0.4	-81.0	-5.0

*1997–2006

Source: Statistics Canada, Quarterly Survey of Financial Statistics for Enterprises, CANSIM table 187-0002

RETURN ON CAPITAL EMPLOYED AND FOREST PRODUCT PRICE INDEX



Source: Statistics Canada, Quarterly Survey of Financial Statistics for Enterprises, CANSIM table 187-0002

Return on capital employed	1997	2006*	2007
	4.0%	6.5%	2.2%

*2006 data include 3% of return duties

Source: Statistics Canada, Quarterly Survey of Financial Statistics for Enterprises, CANSIM table 187-0002



INDICATOR: CERTIFICATION

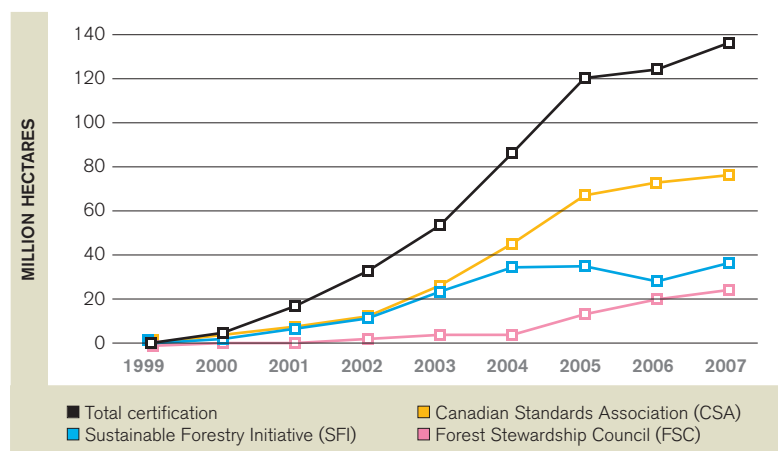
Why is this important?

- » Third-party certification tells buyers that the forest products they purchase 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—Canadian Standards Association (CSA), Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI)—are used in Canada.

What has changed?

- » As of December 2007, Canada had 137.9 million hectares of forest certified to one of the three certification systems, up from 123.8 million hectares in 2006.
- » Canada has the largest area of certified forest in the world. An important reason for this is the achievement of the Forest Products Association of Canada (FPAC) commitment that all of its members would be certified under one of the three certification systems by the end of 2006.
- » FPAC represents the largest Canadian producers of forest products; together they manage 75 percent of Canada's working forests. FPAC now requires that companies be certified in order to become a member of the association—a world first.

CERTIFICATION



Source: Canadian Sustainable Forestry Certification Coalition

Certification	Million hectares 2007	Percentage change from previous year	Percentage change over previous 8 years*
Total	137.9	11.4	119.8

*1999–2006

Source: Canadian Sustainable Forestry Certification Coalition

INDICATOR: ANNUAL HARVEST OF TIMBER RELATIVE TO THE LEVEL OF HARVEST DEEMED TO BE SUSTAINABLE

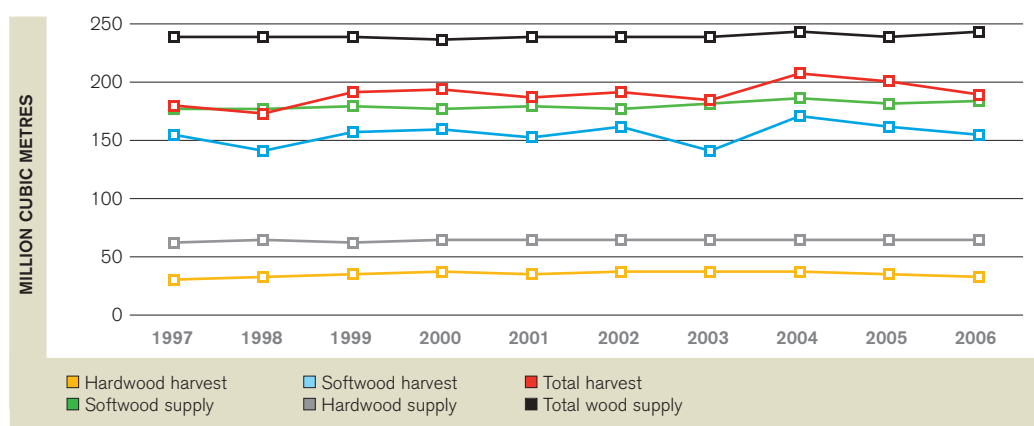
Why is this important?

- » 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 evaluate the compliance of harvest levels to regulated amounts.
- » Harvest levels on provincial Crown lands are regulated by provincial governments and are usually specified in terms of an allowable annual cut (AAC). An AAC is the annual level of harvest allowed by a province 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 must balance out over the regulation period.
- » Although there is no AAC determined for Canada, it is possible to compare the aggregation of the AACs across the country to the harvest from the same Crown land base.

What has changed?

- » Canada's aggregate AAC in 2006 was 203 million cubic metres, made up of 159 million cubic metres of softwoods and 44 million cubic metres of hardwoods.
- » Hardwood harvests have steadily increased since 1990 reaching 25 million cubic metres in 2006 but still well below the AAC.
- » Softwood harvests on provincial Crown lands have remained relatively constant over the past decade at about 130 million cubic metres per year.
- » Private, territorial and federal lands contributed another 10 million cubic metres of hardwoods and 25 million cubic metres of softwoods to the total volume of timber harvested in 2006.

ESTIMATED WOOD SUPPLY AND HARVEST LEVELS



Source: National Forestry Database

Estimated wood supply and harvest levels	Million cubic metres 2006	Percentage change from previous year	Percentage change over previous 10 years*
Softwood supply	186	1.4	0.4
Hardwood supply	60	-1.3	0.1
Softwood harvest	154	-6.5	0.9
Hardwood harvest	35	-0.4	2.8

*1996–2005

Source: National Forestry Database

CRITERION: **SOCIETY'S RESPONSIBILITY**

Forest practices should also reflect social values since operations often take place on publicly owned lands, and many rural communities depend on the forest for their economic, social and cultural well-being.

INDICATOR: **FOREST-DEPENDENT COMMUNITIES IN CANADA**

Why is this important?

- » Forests support about 300 rural communities (2001 census). Sustainable forest management is particularly important to these communities because they are more likely than larger urban centres to suffer the potential costs of unsustainable practices, market fluctuations and environmental change. Assessing the economic impact of the job losses in the industry is one way to measure this indicator.

What has changed?

- » Approximately 16 400 jobs were lost in the forest industry from April 2007 to April 2008. This brings the total forest industry layoffs since 2003 to 38 428. Recent losses have been mostly in the wood sector; earlier losses were primarily in the pulp sector.
- » Several factors contributed to these layoffs. They include the stronger Canadian dollar, offshore competition, decreased U.S. housing starts and the mountain pine beetle infestation.
- » Many of these forest-dependent communities will diversify their economic base into other forest-associated areas—such as recreation (including ecotourism), bioenergy and non-timber products—as well as other economic sectors.



TABLES:

SELECTED FORESTRY STATISTICS

FORESTS

Several factors, both natural and human, affect forest ecosystems. Natural factors include, for example, fire and insects. Human factors include, for instance, tree harvesting, other economic pursuits and human-induced atmospheric changes such as climate change. Both natural and human factors affect the forest in positive and negative ways.

	2005	2006	2007
Area defoliated by insects and beetle-killed trees (hectares)	15.9 million	19.5 million	N/A ²
Fire – area burned ¹ (hectares)	1.9 million	2.1 million	1.7 million
Fires – number	7865	9713	6324
Area planted and seeded (hectares)	456 862	466 664	N/A
Area harvested (hectares)	1.1 million	1.0 million	N/A
Volume harvested (m ³)	203.3 million	188.2 million	N/A
Forest area certified (hectares)	119.8 million	123.8 million	137.9 million
Net carbon sequestered ³ (CO ₂ e/yr) ⁴ (tonnes)	17 million	23.8 million	N/A
Deforestation – forest area (hectares)	56 000	86 000	N/A
Afforestation – forest area (hectares)	9000	0 ⁶	N/A
CO ₂ e emissions ⁵ due to deforestation (tonnes)	21 million	16 million	N/A
CO ₂ e removals ⁷ from the atmosphere due to afforestation (tonnes)	1 million	1 million	N/A

¹ All of Canada's forests

² Not available

³ Managed forest only (230 million hectares)

⁴ Equivalents per year

⁵ In 20 years (this estimate includes immediate emissions from deforestation this year, plus residual emissions from deforestation that occurred in the 20 previous years)

⁶ Although no afforestation is reported in Canada in 2006, it is likely that some occurred. No afforestation monitoring statistics for that year are available.

⁷ Removals from the atmosphere by all afforested lands since 1990

Sources: National Forestry Database; Canadian Interagency Forest Fire Centre; National Forest Carbon Monitoring, Accounting and Reporting System, and National Inventory Report, 1990–2006

INDUSTRY

The forest industry provides many benefits to workers, communities and businesses, and to Canadians as a whole.

Industry	Contribution to gross domestic product (GDP) in constant dollars		Contribution to gross domestic product (GDP) in current dollars		Revenue from goods manufactured		Capital and repair expenditures		
	2006	2007	2006	2007	2005	2006	2005	2006	
Forestry and logging	\$5.9 billion	\$5.3 billion	\$6.7 billion	\$6.2 billion	\$14.6 billion	\$13.7 billion	\$0.8 billion	\$0.7 billion	
Paper product manufacturing	\$10.6 billion	\$10.2 billion	\$11.9 billion	\$11.9 billion	\$32.1 billion	\$30.2 billion	\$3.4 billion	\$3.0 billion	
Wood product manufacturing	\$12.3 billion	\$11.0 billion	\$13.9 billion	\$12.8 billion	\$33.8 billion	\$31.3 billion	\$3.0 billion	\$2.8 billion	
Support activities for forestry	–	–	–	–	–	–	–	–	
TOTAL	\$28.8 billion	\$26.5 billion	\$32.5 billion	\$30.9 billion	\$80.5 billion	\$75.2 billion	\$7.2 billion	\$6.5 billion	

Source: Statistics Canada: Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars), CANSIM table 379-0027, February 2008 and selected economic indicators, provincial economic accounts, annual, CANSIM table 384-0013, April 2008

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, 2004-2006

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), table 029-0009, February 2007

Source: Statistics Canada, Labour Force Survey (LFS), January 2008 (special extraction) for direct employment

New investments		Direct employment		Wages and salaries	
2006	2007	2006	2007	2005	2006
\$0.3 billion	\$0.3 billion	41 500	39 700	\$2.7 billion	\$2.4 billion
\$1.3 billion	\$1.3 billion	94 100	87 100	\$5.0 billion	\$4.6 billion
\$1.5 billion	\$1.6 billion	166 500	146 500	\$5.4 billion	\$5.3 billion
–	–	21 500	20 800	–	–
\$3.1 billion	\$3.2 billion	323 600	294 100	\$13.1 billion	\$12.3 billion

PRODUCTS

The forest industry produces a range of products such as dimensional lumber, wood pulp, paper and value-added products, and helps support a variety of service-based industries.

The key wood products are softwood lumber, structural panels and engineered wood products. Value-added wood products such as millwork (for example, doors and windows) also make up a significant portion of Canada's wood manufacturing (approximately 20 percent of total shipments).

The chief pulp and paper products are newsprint, printing and writing papers, and market pulp. Pulp and paper products also include other papers (for instance, tissue) and packaging, although these represent a relatively small portion of Canada's pulp and paper production.

Selected forest products	Production		Imports	
	Volume		Volume	
Wood products	2006	2007	2006	2007
Softwood lumber	79.2 million m ³	70.6 million m ³	0.7 million m ³	0.7 million m ³
Structural panels	12.4 million m ³	10.2 million m ³	0.28 million m ³	0.33 million m ³
Hardwood	1.6 million m ³	1.4 million m ³	1.0 million m ³	1.1 million m ³
Paper products				
Wood pulp	23.4 million tonnes	22.1 million tonnes	312 000 tonnes	708 000 tonnes
Newsprint	7.1 million tonnes	6.6 million tonnes	51 000 tonnes	75 000 tonnes
Printing and writing paper	6.1 million tonnes	6.0 million tonnes	1.3 million tonnes	1.3 million tonnes
Value-added wood products				
Framing products	not available	not available	not available	not available
Doors and windows	not available	not available	7.5 million	15.7 million
Prefabricated buildings	not available	not available	19 000	19 000
Non-timber forest products	2005	2006	2005	2006
Maple products	28.1 million litres	27.0 million litres	895 000 litres	1.1 million litres

¹ Based on value

² Harmonized System (HS) 2002 codes have changed to HS 2007 (definitions are different from 2006 data to 2007 data). Also, the HS 2007 excludes bamboo products.

Sources: National Forestry Database; Pulp and Paper Products Council; APA—The Engineered Wood Association

Source: Statistics Canada: Sawn lumber production and shipments, monthly (cubic metres dry), CANSIM table 303-0009, March 2008 and merchandise trade data (special extraction), monthly data

Exports						
Volume of exports		Value of exports		Major export market United States ¹		
2006	2007	2006	2007	2006	2007	
52.6 million m ³	44.9 million m ³	\$8.8 billion	\$7.1 billion	82%	78%	
9.3 million m ³	8.8 million m ³	\$2.8 billion	\$2.4 billion ²	97%	91% ²	
1.1 million m ³	0.8 million m ³	\$0.5 billion	\$0.4 billion	56%	45%	
10.9 million tonnes	10.6 million tonnes	\$6.5 billion	\$7.1 billion	42%	42%	
6.7 million tonnes	6.0 million tonnes	\$4.9 billion	\$4.0 billion	72%	66%	
5.0 million tonnes	4.8 million tonnes	\$4.5 billion	\$4.9 billion	89%	95%	
not available	not available	\$1.1 billion	\$0.8 billion	98%	97%	
not available	not available	\$0.6 billion	\$0.5 billion	97%	96%	
not available	not available	\$0.5 billion	\$0.4 billion	60%	56%	
2005	2006	2005	2006	2005	2006	
24.7 million litres	27.3 million litres	\$0.2 billion	\$0.2 billion	72%	72%	

EXPORTS

Canada is the world's largest exporter of forest products, accounting for 14 percent of the world trade. The major contributors are softwood lumber, newsprint and wood pulp.

Product group	Export market value		Major export market United States		Balance of trade	
	2006	2007	2006	2007	2006	2007
Primary wood products ¹	\$1.0 billion	\$1.0 billion	60%	57%	–	–
Pulp and paper products ²	\$20.9 billion	\$20.1 billion	72%	68%	–	–
Wood-fabricated materials ³	\$16.4 billion	\$12.5 billion	87%	83%	–	–
TOTAL	\$38.3 billion	\$33.6 billion	78%	74%	\$28.1 billion	\$23.4 billion

¹ Logs, pulpwood, chips, etc.

² Wood pulp, newsprint, paper, etc.

³ Lumber, plywood, oriented strandboard, etc.

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





