



Natural Resources
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GROWTH AND INNOVATION: Rooted in Sustainable Forests

A Strategic Framework for Natural Resources
Canada's Canadian Forest Service





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Growth and Innovation: Rooted in Sustainable Forests

A Strategic Framework for Natural Resources Canada's Canadian Forest Service

Growth and Innovation: Rooted in Sustainable Forests is a new vision for the Canadian forest sector's future: *An innovative, globally competitive forest sector—rooted in sustainable forests—creating prosperity for Canadians.*

Recognizing that economic growth and environmental sustainability are two sides of the same coin, *Growth and Innovation* also sets out three strategic priorities to achieve the vision, each supported through science and technology:

- *Support forest sector competitiveness*
- *Optimize forest value*
- *Advance environmental leadership*

This new strategic framework will be used to guide program, science and policy initiatives in the coming years.

The Canadian Forest Service (CFS) is fortunate to already have a complement of scientists, economists, policy analysts, program managers and other professionals all working toward the common vision of sustainable forests underpinning the long-term competitiveness of the forest sector. Having this expertise within one organization with locations in every region of the country, supports NRCan-CFS's continuing efforts to better integrate science and policy expertise into management decisions that respond to pressing national forestry issues.

There are two other important aspects of this strategic framework. A greater commitment to:

- *Sharing information across the CFS, and*
- *Strengthening and expanding collaborative partnerships with other agencies, stakeholders and interests.*

A New Strategic Framework for an Evolving Canadian Forest Service

Growth and Innovation: Rooted in Sustainable Forests, sets out high-level directions for NRCan-CFS in the coming years.

This new vision is consistent with the Government of Canada's priorities of growth and innovation as critical pathways to national prosperity. The framework commits to working to: expand markets and global partnerships; innovate for competitiveness and environmental performance; unlock resource potential through responsible development; and leverage scientific and technological knowledge for safety and security.

In this way, NRCan-CFS's framework recognizes that forests are one part of a broader story that includes all of Canada's natural resources.

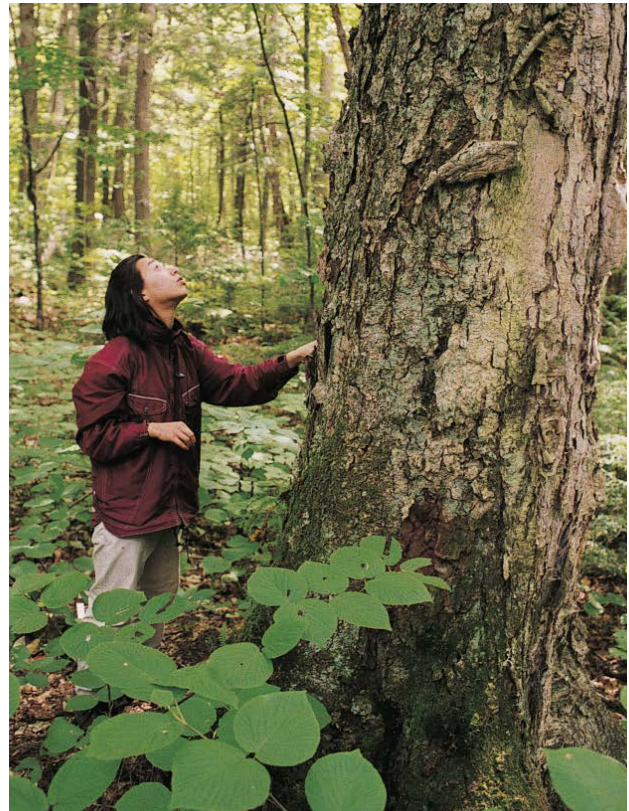
Emerging opportunities exist in innovative forest products, offshore and non-residential markets, and the bioeconomy, and all of these have their foundation in sustainable forests. This is at the heart of our vision: *An innovative, globally competitive forest sector—rooted in sustainable forests—creating prosperity for Canadians.*

NRCan-CFS is uniquely positioned to contribute its national level leadership in science, policy, environmental and economic aspects of the forest sector to support the transformation of the industry and the sustainable forests upon which the industry relies.

Facts about Canada's Forest*

- Forests cover 397 million hectares.
- The forest industry employs over 235,000 Canadians.
- Canada exports over \$25 billion in forest products annually.
- Forest product exports contribute over \$16 billion to the national balance of trade annually.
- Almost 150 million hectares of Canada's managed forests are certified as sustainably managed under one or more of three globally recognized certification systems.

*As of 2012



Vision

An innovative, globally competitive forest sector, rooted in sustainable forests, creating prosperity for Canadians.

To deliver on this vision, NRCan-CFS has identified three priorities:

- *Support forest sector competitiveness*
- *Optimize forest value*
- *Advance environmental leadership*

Mobilizing the conduct and application of science and technology within NRCan-CFS underpins the successful transformation of the forest sector and achievement of market competitiveness. As a result, science and technology are interwoven in each of the framework's three priorities.

To provide policy leadership at the national level, NRCan-CFS will ensure that it is focussing on the most pressing issues and those where it has a comparative advantage: transferring and translating knowledge to maximize the impact of NRCan-CFS investments.

Strategic Priorities

NRCan-CFS has developed three priorities to deliver on its vision:

- Support forest sector competitiveness
- Optimize forest value
- Advance environmental leadership



Supporting Forest Sector Competitiveness



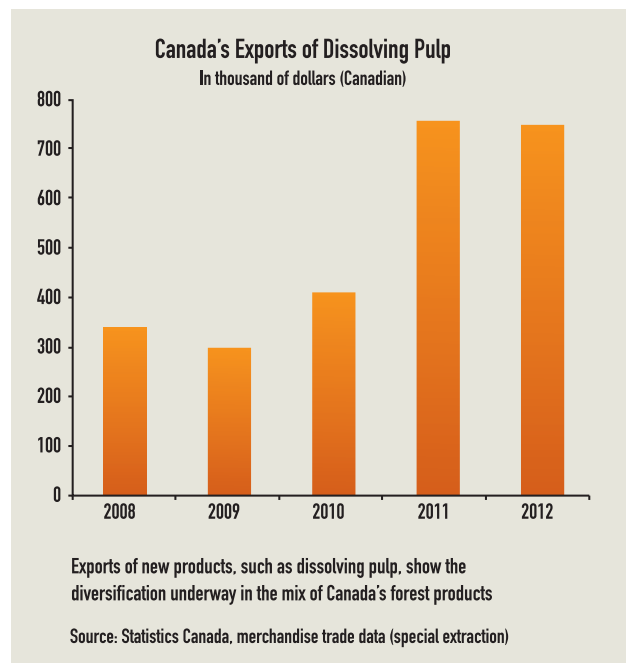
Supporting transformation through innovation and market expansion

The forest sector is an important force in the Canadian economy, contributing to economic prosperity across the country. The future success of Canada's forest industry demands that it build on its strong base of commodity production, make decisive investments in innovative new products and move into new markets.

Science and technology have long been significant contributors to the success of the forest sector. NRCan-CFS has played a leadership role in many initiatives, such as:

- NRCan-CFS was key in creating FPIInnovations, one of the world's largest non-profit forest research centres, and the FIBRE (Forest Innovation by Research & Education) networks—a model it has championed by redesigning, consolidating and coordinating the national forest innovation system. This work has raised the profile of forest sector innovation, improved multi-party collaborations and reinforced the foundational role of science and technology in innovative endeavours.
- Programs such as the Forest Innovation Program and the Investments in Forest Industry Transformation Program (IFIT), delivered by NRCan-CFS, are playing a key role in supporting the development and implementation of innovative technologies (e.g., waste-to-energy technology that creates green energy from pulp mill effluent).

- Market development activities, such as the Expanding Market Opportunities Program, have also been extremely successful, achieving, for example, significant growth in exports to China.
- The findings of the Bio-pathways Project—in which NRCan-CFS was a key partner—have been very influential in shaping the views of industry and policy-makers on forest sector transformation and the economic opportunities available to Canadian industry.



The role of NRCan-CFS

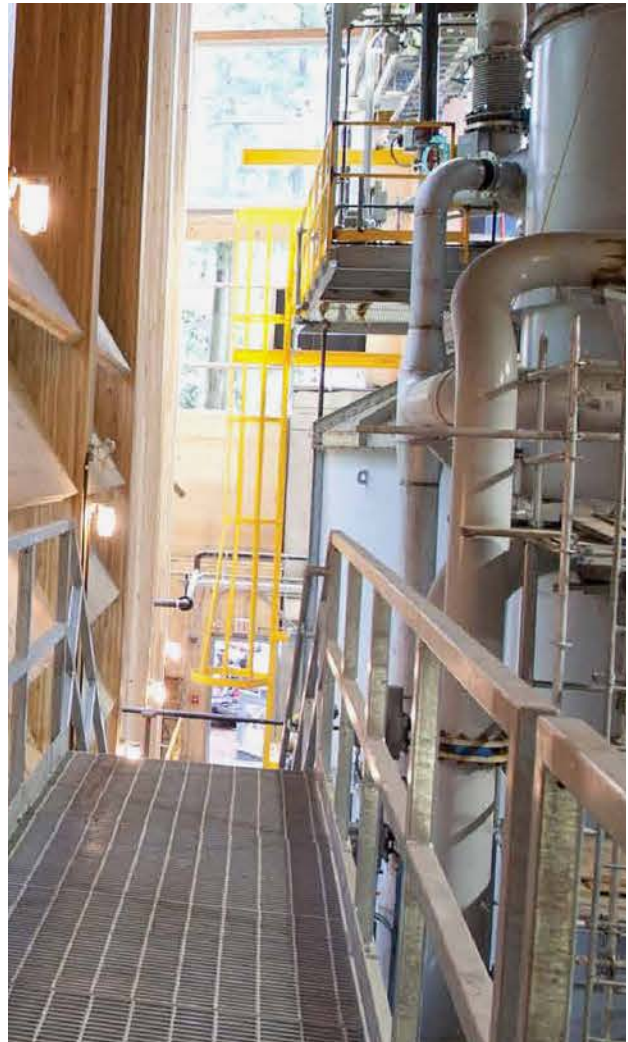
In the short term, NRCan-CFS will work to deliver on the government's strategic investments in forest industry transformation, including those in market development and access, innovation through science, and the implementation of new technologies.

Over the longer term, NRCan-CFS will seek to make major in-roads in growing markets for forest products such as in India. NRCan-CFS will also collaborate with partners to develop opportunities for using wood in commercial and mid-rise housing developments in North America, and will continue improving collaborative efforts to raise the profile of innovation in the forest sector.

Cross-Laminated Timber

Cross-laminated timber (CLT), a multi-layer wooden panel made of lumber, is a good example of a new and innovative product that can benefit the Canadian forest sector. CLT is manufactured by stacking layers of wood perpendicularly to each other and gluing them all together using a hydraulic or vacuum press.

While CLT is widely used in Europe, the Canadian construction industry is only now becoming aware of its many advantages in light and heavy frame construction. Ideal for non-residential and mid-rise construction, CLT has proven to be resistant to fire and earthquakes and has a number of environmental advantages on a lifecycle basis. NRCan-CFS has supported research on the development of this new product since 2007.



Optimizing Forest Value

Optimizing the socioeconomic benefits from forests to industry and communities

Canada's forests offer both timber and non-timber values, such as carbon storage, water cycling and recreational use, and have a significant connection to Canada's national identity and heritage. Nevertheless, both the forests and the forest sector are undergoing change due to a complex array of factors; in the future, optimizing forest value will require not only new knowledge and tools but a willingness to question norms in the face of new realities.

Climate change and its effects on productivity and disturbance patterns (e.g., fires, forest pests) are expected to challenge the ability to innovate, adapt and continue to manage forests sustainably. Coupled with the cumulative impacts of other land-use decisions, these factors pose significant risks to forests, fibre supply and the economic and social benefits they provide to Canadians. Understanding and adapting to changing fibre quality and availability will be important to the forest sector's efforts to maximize fibre values through the development of new high-value products, processes and market opportunities. To optimize value for communities and industry, it will be crucial to ensure that the right amount and type of fibre are available at the right place and at the right time. Achieving this will require a detailed science-based understanding of the resource, including knowledge about the state of Canada's forests and how they are changing over time, as well as an understanding of the non-timber values that impact the sector's social license and long-term sustainability.

NRCan-CFS analysis incorporating the various values will be used to inform policy decisions and program design related to the forest sector. As our knowledge evolves, so too will our concept of sustainable forest management (SFM), leading to the continuous improvement of our SFM practices. Currently, NRCan-CFS conducts research and disseminates its findings—for example, on fire, invasive alien species and tree disease—to decision-makers and stakeholders who use this information to develop policies and programs in support of forest management and sector transformation. Examples include:

- NRCan-CFS's work in areas such as light detection and ranging technology (LiDAR) and individual tree classification is resulting in more detailed and more accurate forest inventories, enabling better decision-making by forest managers and optimizing the value of wood along the value chain.
- Research on native and alien forest pests conducted by NRCan-CFS, together with its work with key partners, has led to development of the international phytosanitary standard (ISPM 15), which in turn limits the spread of forest pests across borders.
- NRCan-CFS was instrumental in developing the Canadian Forest Fire Danger Rating System which is used by forest fire managers across Canada and in many other countries to decide daily how to best protect forests and communities from wildfires.

Enhanced Forest Inventory Systems

Many forest inventories in Canada are over 20 years old and cannot support today's needs for accuracy, spatial detail and timely updates. An innovative research project through the Canadian Wood Fibre Centre is developing enhanced forest inventory systems that use aerial and ground technologies to achieve greater estimate accuracy. This improved understanding of the resource base gives forest companies and resource managers tools that allow them to find the best use of wood fibre.

As a good understanding of forest characteristics is key to allocating timber to its best end use, this NRCan-CFS work is having a real impact. Associated terrain models generate additional cost savings in road construction and transportation. This project relies on collaboration with provinces/territories, industry, academia and the geomatics sector.

The role of NRCan-CFS

The research conducted by NRCan-CFS, working with industry, academia, and provincial/territorial researchers, will continue to be a significant means of collecting and disseminating scientific information to decision-makers and stakeholders about hazards such as fire, invasive alien species, insect outbreaks and tree disease; and of informing the development of long-term mitigation, prevention and adaptation strategies. These challenges are not unique to Canada's forests but are shared across the world's temperate and boreal forests. NRCan-CFS will therefore continue to advance its understanding of forest health issues by maintaining and promoting knowledge-based partnerships and collaborations with international partners.

Work through the Canadian Wood Fibre Centre also supports improved competitiveness of the forest sector through efforts to optimize the efficiency of forest operations, including research efforts on enhanced forest inventory systems and more desirable fibre attributes.

In the short term, NRCan-CFS will continue to collaborate with research networks at home and abroad to deliver high-quality science that responds to both sector and government priorities. This work includes identifying risks, vulnerabilities and opportunities posed by forest disturbances, and shifting to an integrated pest-management approach that considers risk in the context of changing climate.

Throughout its collaborative efforts, NRCan-CFS will continue working to enhance science-policy integration to better address the increasingly complex policy questions arising from forest sector transformation. This includes looking at ways to take a more integrated approach, and finding ways of managing and analysing increasingly large volumes of data and information. Devising new approaches to bring together economic, ecological and social knowledge is critical to better understanding changing forest systems and the policy implications of those changes. Also important is paying attention to how similar challenges are being tackled by other countries and organizations.

Advancing Environmental Leadership



Creating competitive advantage through strong environmental performance

Increasingly, domestic and international consumers are demanding forest products with solid environmental credentials. The development of environmental criteria such as Life Cycle Analysis (LCA) and Leadership in Energy and Environmental Design (LEED) are responses to heightened public concerns over environmental issues that are creating both challenges and opportunities to natural resource sectors. As an environmentally responsible producer of natural resources, Canada continues to be a world leader in sustainable forest management. This includes maintaining our strong track record of demonstrating environmental performance and continuing to contribute to international fora and initiatives such as the Criteria and Indicators Framework.

Nevertheless, to remain competitive in a global market that is increasingly demanding environmental credentials, Canada's forest sector must be able to continually improve and articulate its excellent performance record.

Maintaining a competitive edge in the international marketplace today means demonstrating that forest products come from well-managed forests, and presenting consumers with science-based information on those forest products. As the global forest sector adopts new processes and facilities that are more efficient and have a smaller environmental footprint, the environmental performance bar will continue to rise across the sector. This will require having not only robust, reliable scientific information on how forest ecosystems function but also an ongoing commitment to developing and implementing

technologies and forest practices that improve environmental performance. International markets, as well as consumers in local communities, will look to the Canadian forest sector to show leadership in this direction.

Canadian companies will need to be positioned to respond to this trend, maintaining and expanding market share and improving community relations through a reduction (where new technologies permit) in the environmental footprint of the industry. An extensive body of forest science puts the sector in a strong position to have answers to questions about the impact of forest practices and climate change on forest ecosystems. Key information on topics such as ecosystem integrity, carbon and water footprints, and lifecycle analysis—topics that connect directly to fibre supply, markets and innovation—are critical to support this response.

NRCan-CFS currently supports Canada's environmental leadership and the sustainability of its forests by providing key science on ecosystem dynamics, forest carbon, forest biodiversity, and climate change analysis and readiness. NRCan-CFS science and policy leadership helps those responsible for forest management to make better decisions. By generating evidence, NRCan-CFS science is also supporting Canada's strong environmental credentials. Indeed, with growing international policy discussions and negotiations on issues of forest health, climate change, biodiversity and many other issues, Canada's ability to bring its knowledge to such forums is critical to ensuring that balanced and workable policy options are fully considered.

The role of NRCan-CFS

In the short-term, NRCan-CFS will work to improve the understanding of the implications of natural resource development on land use and ecosystem integrity. It will also continue to work with partners to leverage the Canadian forest sector's strong environmental credentials.

Over the longer term, NRCan-CFS will promote the environmental benefits of Canadian forest products to secure market opportunities for the transformative products of the future. It will also work with partners to advance, through the generation of knowledge, advice and tools, Canadian environmental leadership and sustainable management of forests. This will include delineating the impacts of resource development on forest ecosystems, promoting continuous improvement of Canada's approach to forest management, and offering approaches to restoring or reclaiming forest lands (see text box re-creating sustainable forests).

Re-creating sustainable forests after land disturbances

Land reclamation restores a landscape to a productive state after it has been disturbed by industrial operations such as mining and oil and gas extraction. Reclamation involves many steps, can take many years, and requires expertise in many areas—from landform creation (e.g., hills) to healthy forest re-establishment.

With its partners, NRCan-CFS is developing new knowledge and tools to improve the re-establishment of sustainable forests on reclaimed land. For example, new practices for revegetation and silviculture can help produce forests that more closely resemble the natural boreal forest. Environmental leadership in reclamation contributes to responsible development of Canada's natural resources.



Strategic Partnerships



The vision and priorities of NRCan-CFS's new strategic framework align with those of its many other forest sector partners, including industry associations, provincial and territorial governments, and academia, in a joint effort to advance sector transformation.

Innovative partnerships are critical, particularly during a period in which governments and industry are looking for new ways to maximize their efficiency and effectiveness with limited resources. Developing these partnerships involves NRCan-CFS deepening its collaboration with the United States Forest Service, increasing its engagement in significant international issues, and expanding its contributions to advisory boards.

The forest sector can expect to see NRCan-CFS broadening the horizon of collaborative relationships—that is, collaborating not only with stakeholders that are closely linked to forest sector transformation but also with stakeholders in other fields such as energy and chemistry.

Exploring new research partnership opportunities will usher in an exciting period of collaboration and innovation in forest sector renewal.

With Provinces and Territories

As managers and owners of the forest resource, provinces and territories are key partners in advancing innovation in the forest sector and the sustainable management of the forest. Provinces and territories are also key users of the scientific projects, methods and tools developed by NRCan-CFS, and of the results of its research efforts carried out at various scales.

The Canadian Council of Forest Ministers is a central venue for intergovernmental dialogue on the forest sector, and NRCan-CFS will continue to play an important role within this forum.

Within the Government of Canada

Delivering on the vision and priorities for NRCan-CFS will require continued coordination and collaboration between government departments and agencies. NRCan-CFS will seek to enhance its strategic relationships, as well as develop new ones, with an increasingly diverse range of federal departments and agencies on a highly varied list of subject areas.

With Industry

Industry has been making important strides in transforming its business. NRCan-CFS is a key partner in helping industry bridge gaps to enhance innovation, by engaging companies directly through programs and providing support to FPInnovations.

NRCan-CFS will continue this work, supporting change through policy and program leadership, encouraging private sector investment, and enabling the development of new products, processes, markets and business models.

With Canadians

NRCan-CFS will work to better connect with Canadians who are close to the forest, including Aboriginal groups and communities, so that they share in the prosperity and the wide range of benefits provided by sustainable forests and a competitive forest sector. Aboriginal groups are playing an increasing role in forest management, the labour force and Aboriginal-owned businesses.

Promoting economic renewal through the transformation of the forest sector, the development of non-timber forest products, and the provision of expertise on forest disturbances (fire, invasive species and pests, climate change) are all avenues through which NRCan-CFS will work to increase its relevance to Canadians.

NRCan-CFS will also seek to better connect with Canadians who live in urban communities. The quality of life for those Canadians depends, in part, on a healthy environment that includes urban forests. NRCan-CFS provides science and policy leadership on matters relevant to urban forests across the country.



Photo by Wood WORKS!

Going Forward



The Canadian forest sector is at a turning point, when many of the norms of the 20th century are under significant pressure to change. NRCan-CFS plays a key role in directing this change toward a future that will see a competitive forest sector rooted in sustainable forests and well regarded, domestically and internationally, for its strong environmental reputation. By supporting the competitiveness of the forest sector, optimizing the value of the forest, and advancing environmental

leadership, NRCan-CFS can work to ensure that the natural wealth of responsibly managed forests continues to build the prosperity of Canadians.

Growth opportunities for the forest sector are substantial and change is already underway. NRCan-CFS's collaboration with partners and stakeholders will be key to helping the Canadian forest sector realize its potential.

