



Natural Resources  
Canada

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Canada

**Canada's forests  
provide solutions  
to a changing world.**

# **The State of Canada's Forests**

ANNUAL REPORT 2021

**Canada**

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# The State of Canada's Forests

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# TABLE OF CONTENTS

Message from the Minister of Natural Resources ..... 1

The 2021 State of Canada’s Forests Annual Report: An overview..... 2

Five ways COVID-19 affected forests and the Canadian forest sector ..... 4

Forested ecozones across Canada ..... 6

Finding solutions within Canada’s forests..... 8

Planting 2 billion trees: A natural climate solution .....10

Urban forests: A nature-based solution for Canada .....12

Mass timber buildings are sustainable, safe and healthy.....14

**How much forest does Canada have? .....18**

    Forest area .....21

    Deforestation and afforestation .....23

    Wood volume.....24

**Is timber being harvested sustainably? .....26**

    Forest area harvested .....29

    Forest regeneration.....30

    Volume harvested relative to the sustainable wood supply .....31

**How does disturbance shape Canada’s forests?.....32**

    Forest insects .....35

    Forest diseases .....37

    Forest fires .....38

    Forest carbon emissions and removals .....39





**HOW DOES  
DISTURBANCE SHAPE  
CANADA'S FORESTS?**

**PAGE 32**

**HOW IS THE  
FOREST SECTOR  
CHANGING?**

**PAGE 54**

<b>How do forests benefit Canadians?.....</b>	<b>42</b>
Forest sector employment.....	44
Forest sector average earnings .....	45
Forest communities.....	46
<b>How does the forest sector contribute to Canada's economy?.....</b>	<b>48</b>
Forest sector gross domestic product.....	50
Production of forest products .....	52
Exports of forest products .....	53
<b>How is the forest sector changing? .....</b>	<b>54</b>
Forest sector financial performance .....	56
Forest sector secondary manufacturing .....	57
Forest sector carbon emissions.....	58
Statistical profiles .....	60
Sources and information .....	68







# Message from the Minister of Natural Resources

Canada's forests play an essential role in the economy of this country and the lives of Canadians, including in Indigenous and rural communities. That has never been clearer than it is today.

The theme of this year's Report, *Canada's forests provide solutions to a changing world*, reflects the sector's resiliency and ingenuity in the face of new and emerging challenges – from the COVID-19 pandemic to global climate change. The forest sector and its workers continued to play an important role throughout the last year, providing critical products to Canadians and their families. From the vital role that forests have in the fight against climate change, to the good, green jobs created by the sector, Canada's forests are also poised to help transition our economy and reach net-zero emissions by 2050.

Finding solutions to a changing world requires creative thinking. That is why Canada has committed to [planting 2 billion trees by 2030](#). Natural climate solutions like this will help us achieve net-zero greenhouse gas emissions by 2050, all while improving human wellbeing and supporting biodiversity across the country.

We need not just creative thinking but solid estimates and understanding of how our forests can help address climate change. Natural Resources Canada scientists strive to ensure that the methodologies used to monitor and report on Canada's managed [forest carbon](#) balance reflect state-of-the-art science and the best available data. They are committed to continually improving their estimates.

Adaptability has also been key to meeting the challenges facing the forest sector. Through the [Investments in Forest Industry Transformation](#), Natural Resources Canada is investing in the bioeconomy, ensuring the sector remains at the forefront of innovation. For example, compostable bioplastics made from wood-based biomass and biodegradable masks are providing an environmentally friendly alternative to single-use plastics.

As Canada's forests face the realities of a changing climate and biodiversity loss, researchers are working to mitigate the effects of natural disturbances, such as [forest pests](#) and [wildland fires](#), to ensure the long-term protection of our environment. Research and innovative forest and land management practices will help protect our forests and the many benefits they provide to Canadians.



Finding solutions also means working with Indigenous communities and leaders so that forest management and conservation practices are informed by Indigenous knowledge systems. Through the [Indigenous Forestry Initiative](#), Natural Resources Canada is providing financial support to Indigenous-led projects in the forest sector – creating good jobs and supporting the stewardship of our forests.

As this report makes clear, Canada's forest sector is a key partner in the fight against climate change and biodiversity loss, and is playing an integral role in the sustainable management of one of our country's greatest natural resources.

The creativity of the sector is inspiring in the face of these new and emerging challenges. Working together, we will continue to ensure the prosperity of our forests now, and in the future.

The Honourable Jonathan Wilkinson  
Minister of Natural Resources

# The 2021 State of Canada's Forests Annual Report: An overview

**Canada's forests and their resources provide a vital source of long-term environmental, economic, social and cultural benefits for Canadians. Through careful monitoring and planning, Canada's forest sector manages for the long-term health of its forests, both safeguarding these benefits in the face of challenges and finding new opportunities in a changing world.**

*The State of Canada's Forests: Annual Report* is a science-based report that conveys trends, statistics and stories about Canada's forests, the people and communities that depend on them, and the forest sector. This annual report provides the information that Canadians, policy makers and decisions makers need to ensure forests across the country remain healthy for future generations.

In this 31st edition of *The State of Canada's Forests*, the theme is Canada's forests provide solutions to a changing world. The report highlights how the integrated social, environmental and economic fabric of Canadian forests and forest resources provide a deep source of resilience for Canadians.

The previous year presented many challenges, both for Canadians and for the forests they depend on. While the total impact of the COVID-19 pandemic on the Canadian forest sector cannot yet be quantified in its entirety, businesses, employees and consumers alike have

In Canada, 40% of the land area is forested, which is about 7% greater than the global average. This situation contributes to the deep connections Canadians have with our forests and underpins the importance of Canada's strong commitment to sustainable forest management.

undeniably felt the ramifications. From the scarcity of accessing building materials, to the volatility in market price for lumber, the impacts are just beginning to be assessed. Throughout the year, the forest sector and its workers were deemed essential and continued providing critical products to Canadians. Additionally, global climate change continues to create ever-present and evolving challenges to forest ecosystems and the good and services they provide.

In the face of these challenges, Canada's 362 million hectares of forest area provide a significant and reliable resource to help mitigate the arrays of present and future effects. They are an essential part of the solution in the face of global changes and continue to serve an integral role on the global stage. Canadian forests also provide renewable products and energy; support high-paying jobs; offer opportunities to support physical and mental health; help to conserve biodiversity and species at risk; and contribute to a greener economy.

## Monitoring and reporting

Monitoring and reporting increases awareness and supports a sustainable future for the forest sector. To ensure the long-term sustainability of Canada's forests and forest sector, comprehensive data and transparent reporting is critical. The sustainability indicators in *The State of Canada's Forests: Annual Report* provide data and analysis about the past, current, and future trends in Canada's forests and forest sector.

When measured over time, sustainability indicators:

- provide essential information about the state of, and trends in, Canada's forests
- highlight areas for improvement in forest management policies and practices
- supply reliable information for discussions and initiatives related to environmental performance and trade

The sustainability indicators in *The State of Canada's Forests: Annual Report* are comparable to those published by other countries participating in the Montréal Process. This international working group of 12 nations measures progress toward the conservation and sustainable management of 90% of the world's boreal and temperate forests. Canada also uses some of these indicators to report on the United Nations Sustainable Development Goals as well as the United Nations' Global Forest Goals.





The sustainability indicators in *The State of Canada's Forests: Annual Report* support:

- United Nations' Sustainable Development Goal 15 – Life on Land
- United Nations' Global Forest Goals
- Reverse forest cover loss
- Improve forests benefits and livelihoods
- Protect forest and use sustainable forest products
- Mobilize resources



### **Innovation and adaptation drive Canada's forest sector**

*The State of Canada's Forests: Annual Report* also provides context about Canada's forest sector through feature stories that highlight how the forest sector is adapting and transforming. This year's report includes stories on how:

- COVID-19 has made an impact in the forests and the Canadian forest sector
- mass timber buildings contribute to low-carbon construction and on the many ways the buildings are sustainable, safe and healthy
- planting 2 billion trees will reduce greenhouse gas (GHG) emissions, make our communities greener, improve human well-being and support biodiversity

These stories provide a snapshot of some of the opportunities and solutions found within Canada's forests and forest sector and provide insight into where the future may lead.

### **An authoritative report with trusted information**

Canada has been sustainably managing its forests for many years and is proud to present this report. As it has been for over 30 years, *The State of Canada's Forests: Annual Report* will continue to be a transparent, comprehensive and authoritative source for information on the social, economic and environmental state of Canada's forests and forest sector.

*The State of Canada's Forests* report is designed to be as informative and user-friendly as possible, and we welcome your feedback. Contact us at [scfs-stateoftheforests-etatdesforests-scf@nrcan-rncan.gc.ca](mailto:scfs-stateoftheforests-etatdesforests-scf@nrcan-rncan.gc.ca), and let us know what you think.

# Five ways COVID-19 affected forests and the Canadian forest sector

COVID-19 has had an impact on the lives and livelihoods of people all around the globe. Canada is no exception – Canadians, the country's forests, and the forest sector were also affected. Deemed essential to the well-being of Canadians, most forest sector workers continued to supply key sanitary household products and inputs necessary for many important products throughout the pandemic. At the same time, while physical distancing measures kept us apart, forests provided a haven for outdoor activity.

## 1. COVID-19 created challenges for employment and working conditions in the forest sector



Disruptions in forestry and manufacturing activities resulted in employment uncertainty and impacted forest sector jobs.



New health and safety measures caused operational changes, both in harvesting and manufacturing.

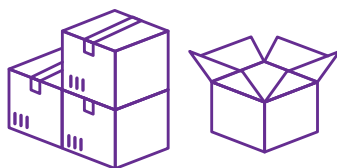


While most forest sector operations have recovered, some – notably newsprint and the printing and writing subsectors – are still affected and vulnerable.

## 2. Altered routines affected the supply and demand of forest products



Concerns over potential supply restrictions in tissue and paper hygiene products, combined with increased health and safety precautions, caused significant increases in demand.



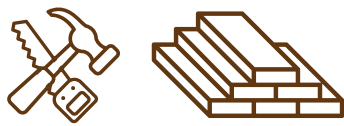
Increased online shopping has led to a surge in demand for packaging products, such as cardboard, while decreasing the demand for paper flyers used in advertising.



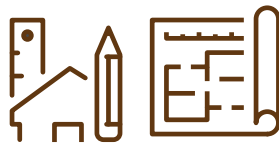
Working from home has increased the emphasis on electronic media, decreasing the demand for both newsprint and office paper. Newsprint exports were down 31% in 2020.



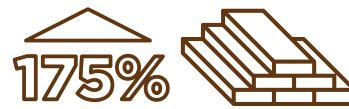
### 3. Canadians made changes to their living spaces, increasing the demand for lumber



As homeowners tackled home improvement projects and created more outdoor spaces, the demand for lumber was greatly increased.



With people working from home, the preference for more space and bigger homes contributed to a rise in new home construction. Canadian single-family housing starts were up 6% between 2019 and 2020.



Construction of single-family homes uses more lumber than multi-family homes, contributing to record high lumber prices. Lumber prices at the beginning of 2021 were 175% higher than one year earlier.

### 4. With restrictions on socializing, Canadians sought out green spaces, including forests



Strict health and safety protocols enticed many to find comfort and mental relief on hiking trails and in nature.



As authorities restricted travel to popular tourism destinations, the demand for camping sites surged across the country.



Newly created day passes in popular areas sold out quickly as officials limited access to trails and sites to reduce exposure, overuse and environmental degradation.

### 5. The economic recovery and lifestyle changes mean opportunities for the forest sector



Countries around the world are taking steps to “build back greener,” creating a unique opportunity for Canada to invest, expand and promote environmentally friendly forest bio-products.



Canada's forest sector continues to innovate and respond quickly to shifting demands, such as developing compostable personal protective equipment (PPE) made from wood fibre.



The forest sector offers sustainable packaging alternatives to plastic. These support the effort to reduce waste in response to the notable increase in residential garbage caused by people ordering food delivery more during the pandemic.

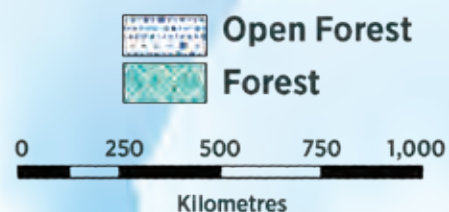
# Forested ecozones across Canada

Canada has 362 million hectares of forests that support a wide range of social, cultural, economic and ecological services. Many of these services are monitored by the forest sector, often summarized and reported for administrative areas, such as the country, provinces and territories. But ecosystems do not follow administrative boundaries. That's why ecological classification systems such as the Terrestrial Ecozones of Canada are used by planners and ecologists to inform and support sustainable forest management initiatives across Canada's forest sector. Statistical reports for the first remeasurement of Canada's National Forest Inventory have been released. These reports are available by Terrestrial Ecozone and can be accessed on the National Forest Inventory website at <https://nfi.nfis.org/en/standardreports>.

## Forested ecozones



## Non-forested ecozones





Percent of ecozone forested



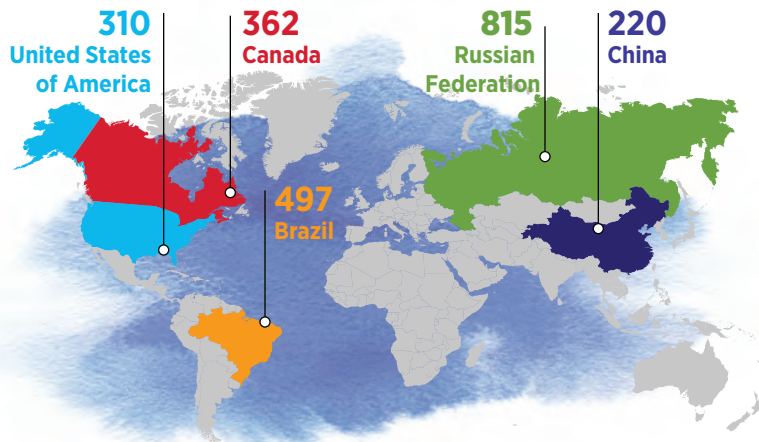


# Finding solutions within Canada's forests

## Key facts and figures about Canada's forests and forest sector

Canada has **362 million hectares (ha)** of forest, making it the **third most forested country** in the world. (2020)

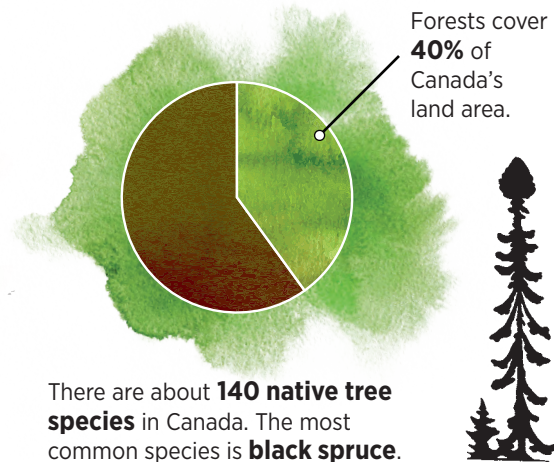
Forest area (million ha)



Canada has **9% of the world's forests** and **one quarter** of the world's boreal forest.

### How big is a hectare?

A hectare is 10,000 m<sup>2</sup> or 100 m by 100 m. It's the same as 2.47 acres or the size of 15 tennis courts!



## Canada's forests are important to the economy and are a model in sustainable management

Canada has **164 million ha** of forest certified to third-party standards of sustainable forest management. (2020)

**74%** of Crown forest land managed in Canada is certified to third-party standards of sustainable forest management. (2020)

Canada's forest sector contributed **\$25.2 billion** to Canada's nominal GDP in 2020.

In 2020, Canada's forest sector **employed 184,510 people**.

Average earnings were about **\$53,000 annually**. (2020)

Percentage of forest area with long-term forest management plans that is Indigenous-held tenure area (2019)

**12.9%**

**8.1%**

About 17 million ha of forestry tenure is **Indigenous-held**. This estimate incorporates both area and volume allocated to Indigenous Peoples.

**3.6%**

New Zealand

Canada

United States of America

## How have disturbances shaped Canada's forests?

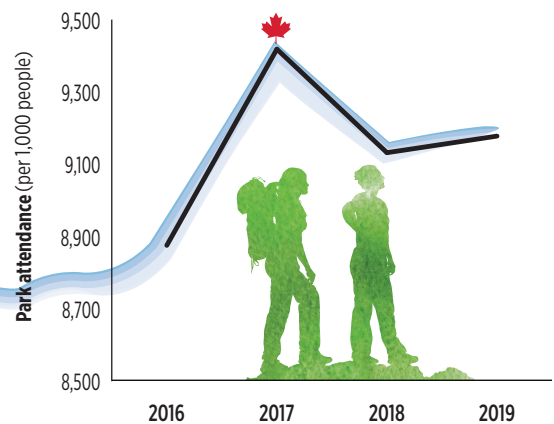
Type of disturbance	Area (ha)	Percentage of forest area (%)
Area affected by insects (2019)	14,473,760	4.00
Area harvested (2019)	756,875	0.21
Area burned (2020)	227,477	0.06
Area deforested (2019)	49,046	0.01

Canada's forest land (2020)  
**362 million ha**

## Canadians are closely connected with forests and the forest sector

Over **23 million people** lived in or near forests in Canada (about two thirds of the total population in 2016).

Attendance in national parks with boreal forest remained high across Canada from 2016 to 2019.



As demand outpaced supply, benchmark prices for Eastern and Western Spruce-Pine-Fir lumber **increased more than 290%** between May 2020 and May 2021.



The peak in 2017 was a result of free parks passes for Canada 150.

## The Canadian forest sector is a leader in product innovation



Since 2007, over **480 mass timber** projects have been built, are under construction, or are planned across Canada.



**Artificial intelligence**, along with other breakthrough digital technologies, are currently being used to strengthen the sustainability, efficiency and agility of supply chains.



Between 2005 and 2018, the forest sector reduced fossil greenhouse gas emissions by **46%**.



# Planting 2 billion trees: A natural climate solution

**As part of efforts to limit climate change, Canada and many other countries have committed to achieving net-zero greenhouse gas (GHG) emissions by 2050. This goal requires achieving a balance between GHG emissions put into the atmosphere and those removed. While global efforts toward this goal must focus on far-reaching transformations in energy systems and human behaviour, natural climate solutions also have a significant role to play.**

The 2018 Special Report by the Intergovernmental Panel on Climate Change (IPCC) suggests an increase of 1 billion hectares of forest will be necessary to limit global warming to 1.5°C by 2050. As part of climate actions plans, countries around the world such as the United States, New Zealand, Australia, and the United Kingdom have committed to large-scale tree planting efforts.

The carbon sequestration and storage resulting from planting 2 billion trees will slow the rise of GHG emissions. As well, it will provide a host of co-benefits to communities and the environment, including:

- improving air and water quality
- restoring wildlife habitat
- stabilizing soils
- improving the physical health and well-being of urban residents
- fireproofing neighbourhoods and communities
- stimulating local economies

For more information, see the urban forest infographic.

## **An incremental change with great impact**

Canada has committed to planting 2 billion trees by 2030, above and beyond the replanting legally mandated after harvesting, to reduce GHG emissions, make our communities greener, improve human well-being and support biodiversity. Compared to current commercial forest regeneration activities in Canada, this initiative constitutes a 40% annual increase in the number of trees planted in Canada. The total area planted will cover about 1.1 million hectares – about twice the size of Prince Edward Island.

The ultimate goal of planting 2 billion trees is to create permanent additions to Canada's forests and increase tree cover outside of forests to facilitate greater long-term carbon storage, while providing a host of co-benefits. The carbon storage of trees planted will be slow at first, but will increase exponentially as trees grow. The Canadian Forest Service estimates that by 2050, the 2 billion trees planted could reduce GHG emissions by up to 12 megatonnes of carbon dioxide equivalent (Mt CO<sub>2</sub>e) annually – the equivalent of taking over 2 million gasoline-powered cars off the road each year.

The trees planted will also achieve key biodiversity, conservation, and human well-being co-benefits. By planting the right tree species in the right places and restoring wildlife habitat, tree planting will enhance biodiversity and forest resilience to climate change.



### Planning and planting for the future

While planting a tree might seem simple, doing it on a large scale – and in a sustainable, ecologically appropriate, and inclusive manner – requires careful planning to ensure the right tree is planted in the right place, for the right reasons. For example, this means planting only in areas where the ecosystem would naturally support trees, to maintain ecosystem health and biodiversity.

The tree planting process involves many steps and takes several years. The process begins with identifying land and creating a plan to establish clear planting objectives. From there, it takes 2 to 3 years to collect the seeds and grow tree seedlings in nurseries – and even longer for planting trees in urban settings. When the seedlings are strong enough to be planted, the site must be prepared to ensure adequate environmental conditions – some environments, such as urban areas or abandoned farmland, can be extremely difficult growing areas. After the trees are planted, they must be monitored to ensure health and survival.

### Investing in nature to mitigate climate change

Planting 2 billion trees is no small task. This historical initiative will require the efforts of Canadians from coast to coast to plant areas destroyed by pests and fire, create parks and greenspaces in and around our cities, and restore forest habitat. This Canadian initiative will result in a significant contribution to the global effort to leverage nature-based solutions to address many of today's challenges.



# Urban forests: A nature-based solution for Canada

We can all recognize the beauty and enjoyment that forests located within cities bring to us. But beyond the aesthetics of urban greenspace, Canadians are noticing the valuable services that urban forests contribute to their daily lives. Urban forests make the air cleaner, keep the temperature cooler in summer and the wind velocity lower in winter. Urban forests increase the value of property and provide habitat for plants and animals. Perhaps most important, urban forests can contribute to the resiliency of cities and towns by creating conditions that lessen the effects of climate change. How many benefits of urban forests in the illustration have you considered?







**FILTER URBAN  
POLLUTANTS &  
PARTICULATES**

**REDUCE  
HEATING  
& COOLING  
COSTS**

**ABSORB  
CO<sub>2</sub> &  
SEQUESTER  
CARBON**

**FOOD &  
HABITAT  
FOR ANIMALS**

**FRUIT &  
FOOD**

**INCREASE  
BIODIVERSITY**

**PRIVACY  
& NOISE  
REDUCTION**



# Mass timber buildings are sustainable, safe and healthy

## What is mass timber?

Mass timber products are typically formed with lamination, fasteners, or structural adhesives and are engineered for high strength. Mass timber construction is built using engineered wood products made of large, solid wood panels, columns or beams for use as load-bearing wall, floor, and roof assemblies. Several mass timber products, including glue-laminated timber posts and beams and cross-laminated timber floors, are used in this building.

## Renewable and sustainable

Mass timber is a natural, renewable, and sustainable building material, with a lighter carbon footprint than other construction materials. Maximizing use of mass timber in construction in Canada could remove an estimated 0.6 million tonnes of CO<sub>2</sub> from the atmosphere annually by 2030 – equal to taking 125,000 cars off the road.

## Easy to work with

Mass timber is strong, flexible, easy to process and finish, and easily modified on-site in case of last minute changes in design. It can also be combined with different materials (e.g. steel, concrete) to deliver a wide range of structural solutions.

## Creates a healthy environment

Research is showing that incorporating wood and other natural materials into our buildings can reduce stress and contribute to good mental health.

## Low-carbon construction

A growing interest in green building materials and taller and larger wood buildings is emerging in Canada and globally. Mass timber buildings are a key part of the low-carbon construction solution because they are built with wood-based products that use little fossil fuel energy during manufacturing.







## **Building with wood is not new**

---

In the beginning of the 20th century, buildings as high as nine storeys were constructed with traditional solid sawn timbers in Canada. Toward the mid-20th century, concrete and steel systems slowly replaced wood systems. Many of these original wood buildings are still standing, serving their occupants and complying with modern building code requirements.

## **Proven fire safety**

---

Mass timber has inherent fire resistance. During fires, exposed mass timber chars on the outside, which forms an insulating layer protecting the interior wood from damage. Mass timber construction can meet and even exceed fire safety requirements in the Canadian building codes.

## **Built to last**

---

When mass timber buildings are designed with local climate impacts in mind, they can last for centuries. Durability can be enhanced through environmentally friendly preservative treatments.

## **Resilient**

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Mass timber buildings are designed to resist high winds and earthquakes given their light weight and inherent flexibility in the connections design.

## **Safe and quick construction**

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Since mass timber panels are prefabricated off-site and then assembled on-site, buildings made from mass timber have much shorter project timelines, less neighbourhood disturbance and safer construction sites.





We acknowledge the importance of forests to Indigenous Peoples and the significance of Indigenous Peoples in forest management and to the forest sector in this country.

Sustainable forest management, clean energy initiatives and greenhouse gas emission reductions will have enduring and significant contributions to the well-being of all Canadians.

The integration of Indigenous knowledge in the forest sector will benefit Canada's forests for generations to come.









# HOW MUCH FOREST DOES CANADA HAVE?





**With almost 362 million hectares (ha) of forest, Canada has 9% of the world's forests. The estimate of Canada's forest area is new this year and is based on improvements and updates to data sources and forest inventory techniques over the last 10 years. Differences from previously reported values are mainly attributed to these improvements. Natural- and human-induced change to the amount of forest area is also included. The forest area of Canada is relatively stable, with less than 0.5% deforested since 1990.**

Forests dominate many Canadian landscapes, but cover only 40% of Canada's land base.<sup>1</sup> Depending on where you live in Canada, forests may cover over 80% of your region, such as in the Atlantic Maritime ecozone or only 3% of the Prairies.

#### Tree cover versus forest area

Tree cover is a type of land cover, such as water or tundra, and includes trees in urban and agricultural areas. The area with tree cover can change from year to year because of disturbances (such as wildfire and harvesting) and regrowth (from planting and natural regeneration).

Forest area is the key sustainability indicator used internationally and is relatively stable in Canada. Forest area is defined by the Food and Agriculture Organization of the United Nations as land:

- that is not predominantly under agricultural or urban land use
- spanning an area greater than 0.5 ha
- with trees higher than 5 metres (m)
- with a tree canopy cover of more than 10%

OR

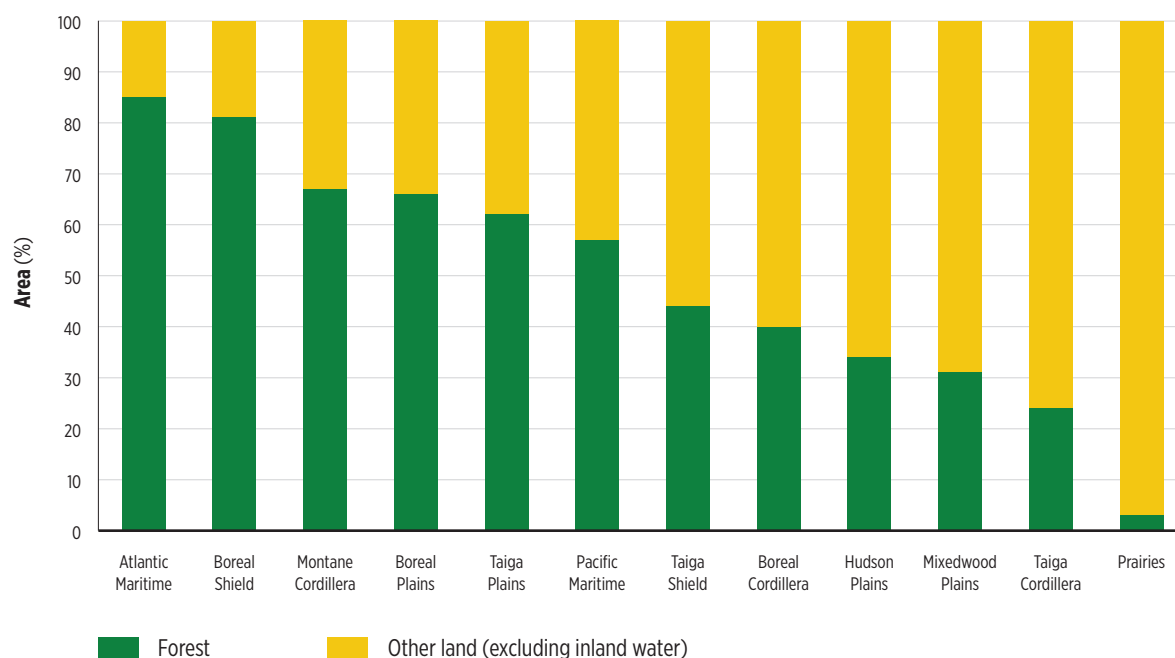
- that has the capability to reach these criteria in the natural environment

Forest area that has temporarily lost its tree cover is still considered to be forest when trees are expected to grow back and the land use has not changed. For example, an area where trees have been harvested and seedlings will be planted is still considered to be forest.

If tree cover was removed and the land use changed (e.g. from forestry to urban or agricultural use), this land is considered deforested.

Afforestation occurs when forests are established on land that was not previously forest, or forest was cleared long ago, such as abandoned agricultural fields.

**Percent of forested area by ecozone across Canada**



Other land includes other wooded land, other land with tree cover and other vegetated and non-vegetated land.

1. Excludes inland and coastal waters.





**National Tree Day takes place on the Wednesday of National Forest Week in September.**

### **How do we determine how much forest area Canada has?**

Because of the size and remoteness of Canada's forests, forest area is determined by sampling Canada's land using a systematic grid and combining many sources of information. The Government of Canada partners with provincial and territorial governments to assemble land use and ownership information and 3D aerial imagery to inventory Canada's forests.

High resolution satellite imagery is also collected, especially in Canada's North. Statistical estimation methods are applied to these data to determine how much forest Canada has and how it is changing over time. New estimates are available this year based on data collected between 2008 and 2017, and on improvements in forest inventory methods over the last decade.

**Source:** Dyk, A., Leckie, D., et al. 2015; Food and Agriculture Organization of the United Nations; National Forest Inventory. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](http://cfs.nrcan.gc.ca/stateoftheforests).



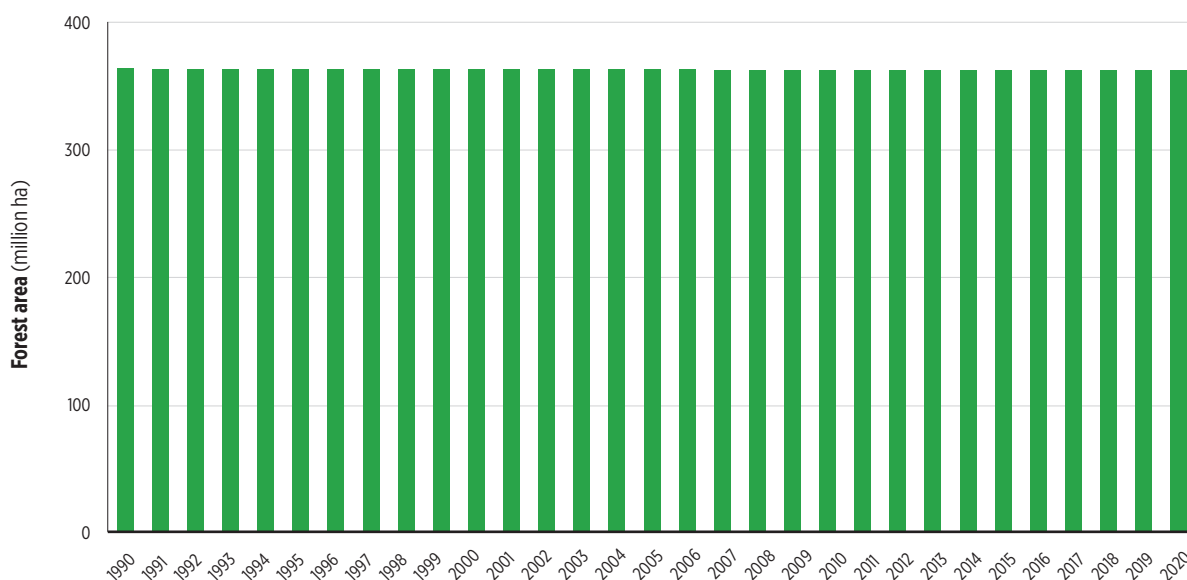
## Forest area

Canada has almost 362 million ha of forest. Forest area in Canada is relatively stable. Since 1990, less than 0.5% of Canada's forest has been converted to a non-forest land use, and very little afforestation has been recorded. Some gradual changes in forest area, including those attributed to climate change, are more challenging to quantify but can include expansions in some areas and losses in others. The current estimate of forest area in Canada (362 million ha) is an improved estimate relative to what has been reported previously, based on better data and more advanced assessment tools.

- While forest area in Canada is relatively stable, the tree cover is more dynamic because of forest fires, insect infestations, harvest activities and re-establishment of tree cover.
- Updated data sources, remote sensing techniques and improved forest inventories over the last 10 years have enhanced our estimates of forest area in Canada.
- Information presented here is based on data from Canada's National Forest Inventory (2017, first re-measurement) and is adjusted annually for estimated forest area lost (deforestation) and gained (afforestation). See the indicator **Deforestation and afforestation** for more information.

Many types of information are gathered to measure Canada's forest area. Some measurements are taken directly in the forest, but because of Canada's size, most are made using aerial and satellite imagery. In addition to analyzing current tree cover, land use and tree growing capacity of the land are also evaluated. It is difficult to imagine measuring Canada's vast forests without the aid of satellites. However, measurements must be taken directly in the forest to make sure we understand exactly what the satellites are seeing.

Canada's estimated forest area, 1990–2020







### Why is this indicator important?

- Relatively stable forest area is one important indication that forests are being managed sustainably.
- It is a vital sustainability indicator because stability of forest ecosystems may depend on their size and diversity.

### What is the outlook?

- Ongoing improvements in forest monitoring science and technology will continue to provide more accurate estimates of forest area in Canada. Differences between the newly released forest statistics and those previously released are a reflection of:
  - better satellite imagery over Canada's northern forest
  - updated and improved forest inventories in Canada's managed forest
  - more accurate information on land use
  - changes in the forest area caused by human and environmental factors
- Natural changes in forest area tend to occur gradually, but the climate may accelerate change, expanding forests in some areas and reducing them in other areas, including rapid change after disturbances such as wildfires.
- Rates of human-induced change are likely to remain low (see the indicator **Deforestation and afforestation** for more information). However, the [2 Billion Trees](#) program will plant an incremental 2 billion trees by 2030. These trees will be planted to establish new forests (afforestation), regenerate areas that have temporarily lost their tree cover (reforestation), restore forest habitat, or provide tree cover in suburban and urban areas.



**Source:** Dyk, A., Leckie D., et al. 2015; Food and Agriculture Organization of the United Nations; National Forest Inventory. See **Sources and information** for more detail and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Deforestation and afforestation

Canada's annual deforestation rate declined slightly over the last 30 years, with 49,000 ha of forest converted to other land uses in 2019 compared to 65,250 ha in 1990.

- Canada has **9%** of the world's forest, but **0.37%** of the total global deforestation that has occurred since 1990.
- **Agricultural** expansion continues to be the main driver of deforestation in Canada.
- Forest flooded during the development of hydroelectric reservoirs produces large annual spikes in deforestation, as seen in 1993 and 2006.
- New forestry roads and landings that are not slated for prompt decommissioning do contribute to deforestation, as shown in the following figure.
- The annual area of afforestation has been very small relative to the total forest area of Canada – and much smaller than the annual area of deforestation.

The National Deforestation Monitoring System (NDMS) tracks changes from forest land to other land uses across Canada. Deforestation does not include forest harvest when forest is being regrown on the site.

The NDMS can show trends by time, region and industry sector type.

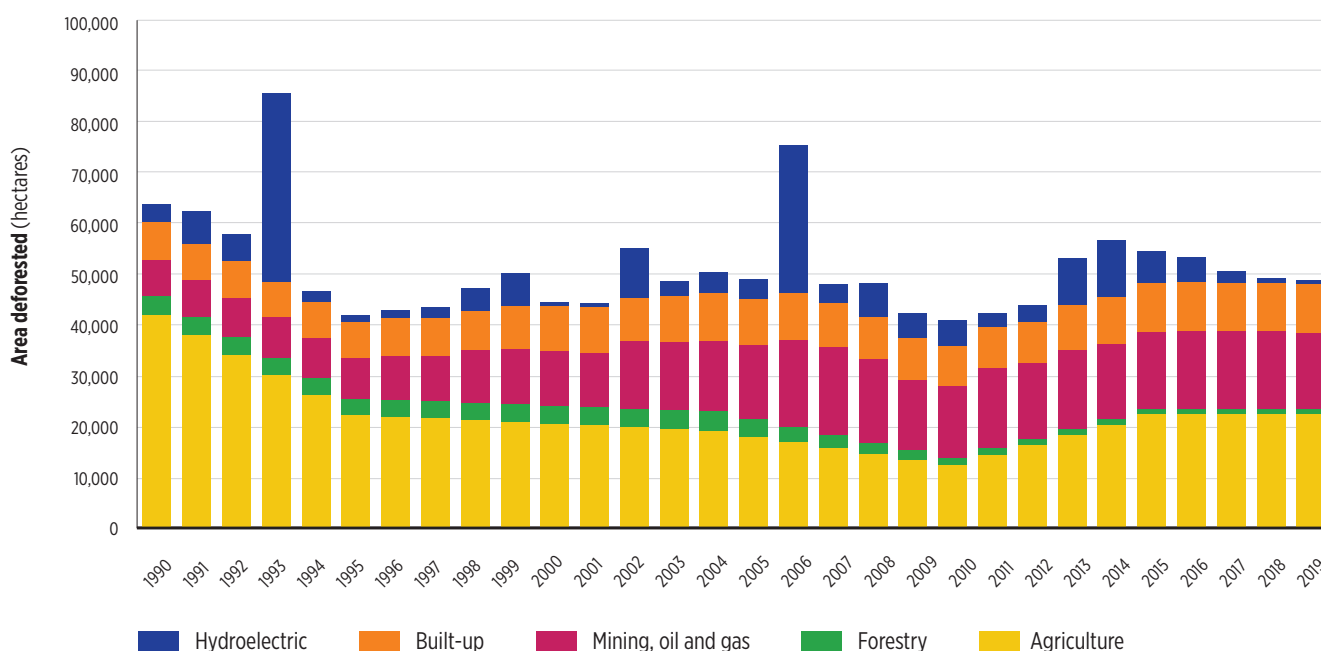
### What is the outlook?

- Canada's overall deforestation rate is expected to remain consistent with current levels.
- The dominant industrial sectors contributing to deforestation are agriculture, mining, oil and gas.
- Ongoing and planned initiatives for urban and rural tree planting are expected to increase the area afforested in coming years. The contribution of this activity to ecosystem services such as restoring habitat and carbon sequestration is increasingly recognized.
- The federal government's new 2 Billion Trees Program will increase the rate of additional tree planting, including afforestation, by up to 40% over 10 years from 2020 to 2030.

### Why is this indicator important?

- Forest loss affects biodiversity, soil, air and water quality, and the availability of wildlife habitat. Forests also store more carbon than other terrestrial ecosystems and can be managed to mitigate climate change, for example, by increasing the area of forest or minimizing deforestation.

Estimated area (hectares) of annual deforestation in Canada, by industrial sector, 1990–2019



Source: Dyk, A., Leckie D., et al. 2015; United Nations Framework Convention on Climate Change. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Wood volume

Canada's forests contain an estimated 51 billion cubic metres (m<sup>3</sup>) of wood. Almost 30% of this wood volume grows in the Boreal Shield ecozone. Another 20% is north of the Boreal Shield, in the Taiga Plains, Taiga Cordillera, Taiga Shield and Hudson Plains. The Pacific Maritime ecozone is smaller in area and contains only 11% of the total wood volume in Canada, but the climate supports some of the highest volume forests in the world, with an average of 475 m<sup>3</sup>/ha.

### Estimated wood volume (million cubic metres) in Canada

Year	1990	1995	2000	2005	2010	2015	2016	2017	2018	2019
Wood volume	53,488	53,408	52,931	51,175	50,563	50,145	50,096	49,900	49,622	49,505

#### What is new?

- Continual improvements in forest inventory science and data analytics are producing more accurate estimates of wood volume in Canada.
- New national estimates of wood volume released this year are based on updated data collection and improvements in wood volume models over the last 10 years.
- More detailed satellite imagery, especially in northern Canada, have enhanced our understanding of where and how much wood volume exists in Canada's forests.

#### Why is this indicator important?

- Wood volume is used along with other information to determine forest productivity monitor carbon storage, predict the amount of forest fire fuel and forecast harvest levels.
- It is important to monitor general trends in wood volume in forests because volume is a valued natural resource and high value commodity for Canada's forest sector.

Wood volume reported here is for the total stem of the tree, including the stump and top but not including bark, branches, foliage or roots.

All forest stands are included, regardless of ownership, age, protection status, management status or wood merchantability.

#### What is the outlook?

- Local wood supply decreases after large or severe disturbances. It takes several decades for forests in Canada to mature and for wood volumes to return to pre-disturbance levels.
- Some trees are beginning to grow faster as the climate changes, while others seem to be growing more slowly. Subtle changes in growth and mortality of trees caused by climate change affect wood availability and wood volume trends locally and nationally.
- In British Columbia, wildfire activity has been especially high in several recent years, and the historic mountain pine beetle outbreak contributed to the decline in wood volume. Because of the decrease in the volume available, British Columbia has had to reduce harvest levels.

Source: National Forest Inventory. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).







# IS TIMBER BEING HARVESTED SUSTAINABLY?





**Sustainable forest management aims to balance society's need for forest ecosystem services with the need to conserve forest biodiversity and protect forest health. Its principles dictate forest management practices in Canada. In 2019, the harvested area represented 0.2% of the total area of forest land.**

#### **The majority of Canadian forests are publicly owned**

About 90% of Canada's forests are located on provincial or territorial public lands. Those governments are responsible for forest management and have varied regulations and policies. Principles of sustainable forest management apply in all cases. For example, sustainable management is the central purpose of the *Crown Forest Sustainability Act* of Ontario, is at the heart of the *Sustainable Forest Development Act* of Quebec, and is central to British Columbia's *Provincial Timber Management Goals, Objectives and Targets*.

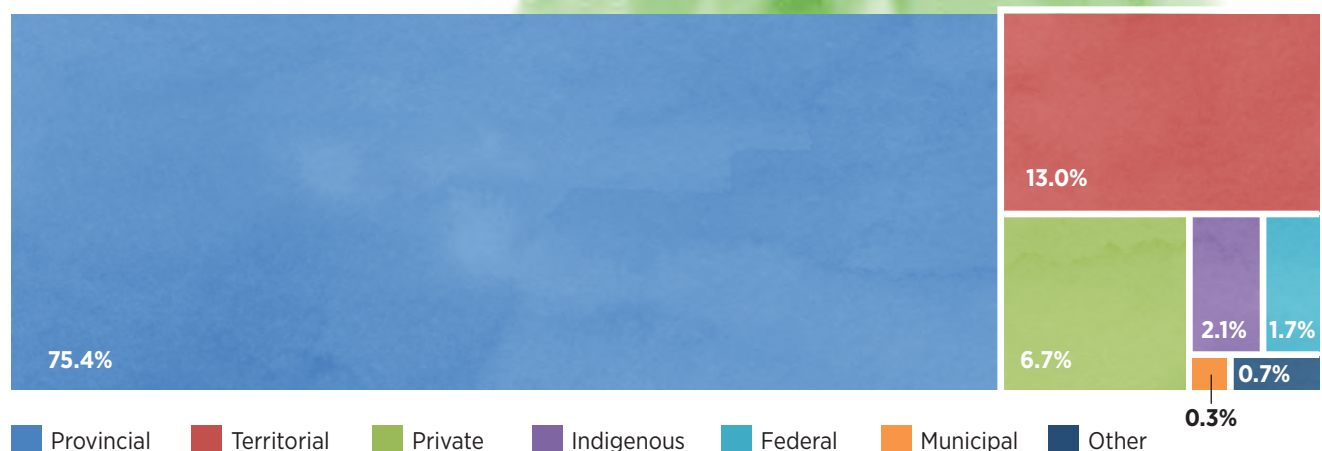
#### **Harvesting rates respect the growth of the forest**

The forest management process involves conducting resource inventories. These forest inventories provide information about the composition of tree species, their age and their structure and allow planners to calculate the volume of wood that can be harvested sustainably and in a responsible manner. High-tech tools, such as satellite remote sensing or airborne laser (LIDAR), now contribute to enhanced forest inventories in Canada. These tools also provide information for land use planning which take into account many considerations including forest health and biodiversity.

#### **Forest management plans outline objectives and strategies**

Forest management plans describe planned forest activities for specific periods and areas. They are prepared by governments, forest companies and other forestry stakeholders, in accordance with the laws, rules and policies in place. The process of creating forest management plans takes into account the interests and concerns of Indigenous Peoples and partners affected by forest management on public lands. Public consultations are part of the planning process.

**Percent of forest ownership in Canada**







### Regeneration after harvesting is a key element

Regeneration of forests is mandatory in all provinces and territories, either through natural or artificial means. Regeneration standards are used to assess regeneration success, using criteria that describe species composition, density and stocking of free-to-grow stems after a specified number of years after harvesting. Natural regeneration is the most common method of re-establishing forest tree species after harvesting. However, its success depends on the availability of seeds and propagules on sites and on past disturbances. Artificial regeneration requires investments in seed collection, seedling production and planting.

**By law, all forests harvested on public lands must be regenerated. Successful regeneration, either through natural or artificial means, contributes to maintaining or restoring ecosystem services. About 550 million seedlings were planted in Canadian forests in 2019.**



However, it results in productivity gains from tree breeding programs and offers the opportunity to control the composition of forests and make them more resistant or resilient to future conditions.

Global changes present new challenges to Canadian forestry, as changing climates modify forest ecosystems and broader uses of forest resources, such

as biomass for bioenergy, are required and being developed. The recent world crisis of the coronavirus disease 2019 (COVID-19) pandemic has illustrated how forestry practices such as reforestation can continue to enable sustainable forest management even under such challenging circumstances.



**Source:** National Forestry Database; National Forestry Inventory. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Forest area harvested

Monitoring the area of forest harvested each year is important for understanding the level of industrial activity in Canada's forests and for assessing long term sustainability. In 2019, an estimated 757,000 ha of forest were harvested. This is a 6.6% increase from 2018 levels, when 710,000 ha were harvested, and is well below the average area harvested each year during the peak period of 1995 to 2005 (1 million ha).

- The area of forest harvested increased in all provinces and territories except British Columbia and Newfoundland and Labrador.
- In British Columbia, the area of forest harvested decreased by 25% (45,000 ha) from 2018 levels. This change was as a result of reduced harvesting in areas affected by the mountain pine beetle, by wildfires, and by a prolonged strike by millworkers, loggers and contractors that curtailed forestry operations on the west coast.
- Compared to 2018, the area of forest harvested in Newfoundland and Labrador decreased by 4% (300 ha).

The area of forests harvested each year is less than 0.5% of Canada's 362 million ha of forest land, significantly smaller than the areas affected by insects and burned by fires each year.

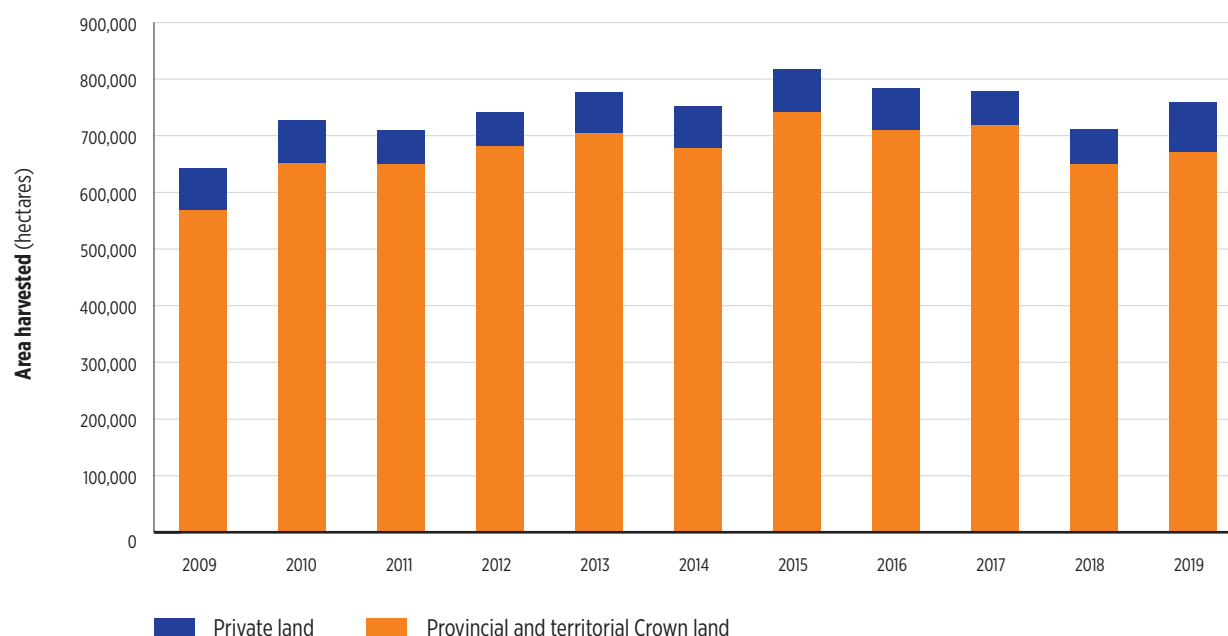
### Why is this indicator important?

- Commercial timber harvesting is one of several indicators of the level of industrial activity in the forest sector.
- Harvesting of provincial and territorial Crown forests, the source of most commercial timber, is regulated to provide a sustainable level of timber for industrial use.

### What is the outlook?

- The area harvested each year will vary as forest managers adjust their management objectives in response to conservation objectives, natural disturbances such as pests and forest fires and as the demand for Canadian forest products changes.
- Demand for Canadian forest products was strong in 2020 and is expected to remain strong in 2021 as the economy continues to recover from the COVID-19 pandemic. However, the recovery has been uneven across the sector, with lumber and panel industries recovering more rapidly than pulp and paper. While the demand for newsprint continues to decline, the demand for Canadian wood products is exceeding expectations because of the strength in the home construction and repair and remodeling markets. Demand is expected to remain strong into 2022.

### Forest area harvested on private and Crown land in Canada, 2009–2019



Source: National Forestry Database. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Forest regeneration

In 2019, 547 million seedlings were planted on 397,000 ha of provincial forest lands in Canada. A further 8,600 ha of forest were established by seeding.

- Compared to the 10-year average, in 2019, the area artificially regenerated increased by 2.3%, and the number of seedlings planted increased by 1.5%.
- There is a gradual decline in regeneration levels starting in 2016. The area artificially regenerated was 4% less and the number of seedlings planted was 9% lower in 2019 than the 2016 peak.
- Declines in regeneration and planting are likely related to the gradual decline in the area harvested starting in 2015, mostly in British Columbia.
- The method used for regenerating forests can influence forest composition over time. Most artificial regeneration is for the establishment of coniferous trees.

### What is the outlook?

- Regeneration is required on all Crown lands in Canada, so virtually all harvested lands will continue to be regenerated.
- The area regenerated annually is most strongly related to recent harvest levels. These levels are influenced by markets for wood products but are always within the bounds of sustainable forest management.
- Regeneration rates in British Columbia are likely to decline in step with the projected decline in the allowable harvest, mostly because of mortality from the mountain pine beetle epidemic. Declining regeneration

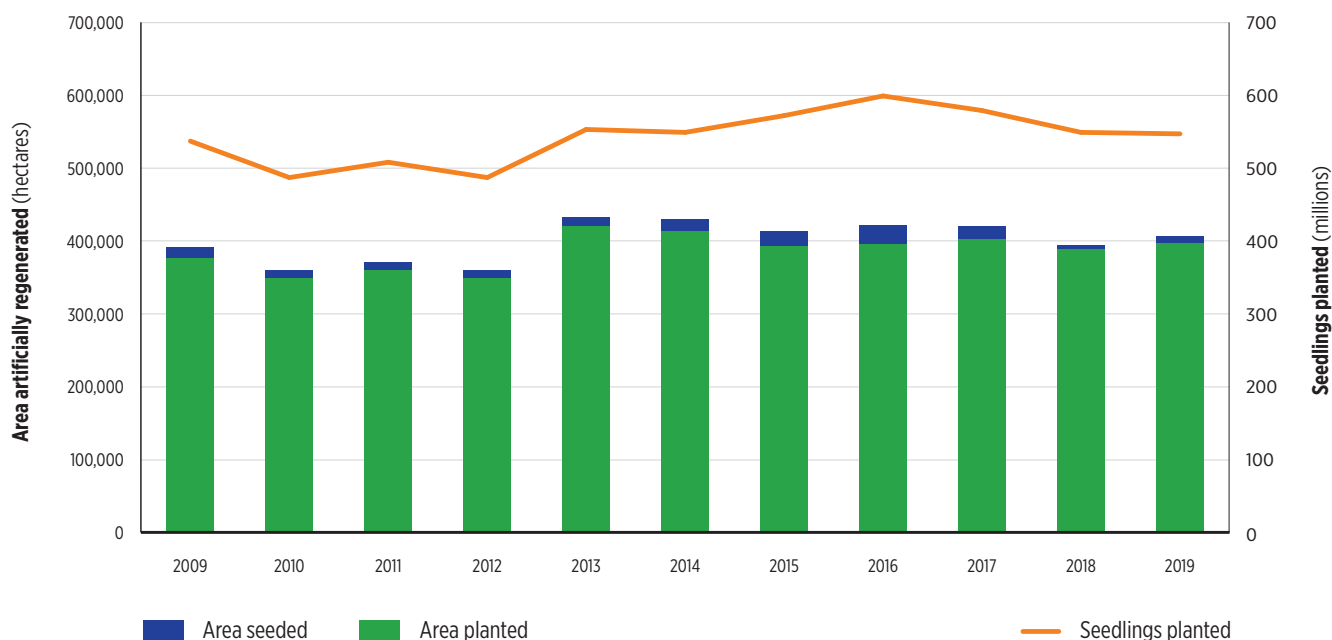
- Successful regeneration is required following forest harvesting on public lands.
- Forest type, silviculture system and the required composition of the new forest determine the regeneration method (natural or artificial).
- Artificial regeneration – planting or seeding – has been applied to about 55% of the area harvested in the past 20 years.

### Why is this indicator important?

- Regeneration activities ensure that harvested areas regrow as forests and continue to produce timber and maintain ecosystem services, such as storing carbon, regulating water quality and providing habitat.

rates may be offset in the short-term by significant reforestation efforts following record-breaking area burned by forest fires in 2017 and 2018. As one of the largest Canadian forestry jurisdictions, changes in British Columbia regeneration rates will have a corresponding impact on the national totals.

**Area artificially regenerated and number of seedlings planted on provincial and territorial Crown lands in Canada, 2009–2019**



Source: National Forestry Database. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Volume harvested relative to the sustainable wood supply

In 2019, Canada harvested 139.8 million m<sup>3</sup> of industrial roundwood, well below the estimated sustainable wood supply level of 218.1 million m<sup>3</sup>.

- This level is a decrease of 15.1 million m<sup>3</sup> from 2017 levels, when 154.9 million m<sup>3</sup> of industrial roundwood was harvested. At the same time, the estimated wood supply deemed to be sustainable declined by 1.9 million m<sup>3</sup>.
- While both the volume of industrial roundwood harvested and the sustainable wood supply declined compared to 2018, the gap between them widened because the harvest declined by more than the sustainable wood supply.
- The widening gap between harvest and the sustainable wood supply indicates Canada is harvesting well below the level deemed to be sustainable.
- The decrease in harvest is attributable to a large decrease in the volume of softwood timber harvested in British Columbia.

Sustainable wood supply refers to the volume of timber that can be harvested annually from federal, provincial, territorial and private lands while meeting environmental, economic and social objectives.

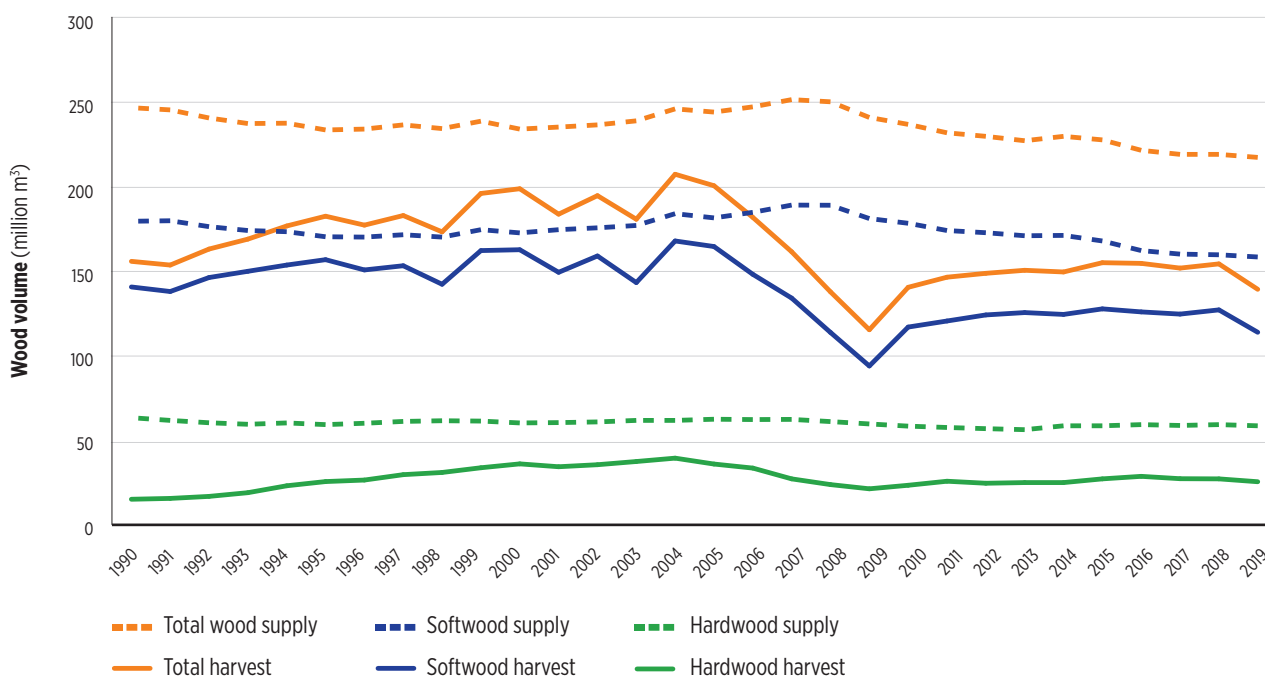
### Why is this indicator important?

- Forest managers track the volume of industrial roundwood harvested each year to ensure it falls within sustainable levels.
- Harvests from provincial Crown lands are regulated by allowable annual cuts (AAC). Although there is no AAC calculated for Canada as a whole, it is possible to compare the combined provincial AACs with the combined harvest totals from the same provincial Crown land base.

### What is the outlook?

- Harvest levels are expected to remain below the sustainable wood supply.
- Sustainable wood supply will continue to decline over the next several years as AACs in British Columbia are reduced in response to the impact of the mountain pine beetle and severe wildfires.
- As the economy continues to recover from the COVID-19 pandemic, harvests are expected to increase. The demand for Canadian wood products is rising, driven by strong demand from the house construction and repair and remodeling markets, which will narrow the gap between harvest and sustainable wood supply.

### Annual harvest versus supply deemed sustainable for harvest, 1990–2019



Source: National Forestry Database. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





# HOW DOES DISTURBANCE SHAPE CANADA'S FORESTS?





**During the last 10 years, wildfires and insect outbreaks have affected an average of 17.60 million ha of forests each year in Canada, while 0.74 million ha have been harvested annually. During this decade, at least 16% of Canada's forest land has been disturbed, attesting to their importance in shaping Canada's forest landscapes.**

#### **Climate change**

There is increasing evidence that most natural disturbances are already being magnified by climate change. The forest area burned has increased by roughly 75% since 1980 in Canada compared to most of the 20th century. Models predict that burned areas will likely increase in boreal forests as a result of climate change. The number of mountain pine beetles that survive the winter weather has increased since 1990. This change occurred because of milder winters caused by climate warming, leading to an unprecedented outbreak that has

killed pines across millions of hectares in western Canada. In eastern Canada, the severity of the ongoing spruce budworm outbreak on the Côte-Nord region in Quebec is also unprecedented at this latitude. The frequency and severity of droughts, flooding, blowdown, and thunderstorms are also rising, and damage is expected to increase from these factors in forest ecosystems in the future.

#### **Cumulative effects**

Cumulative effects are the changes to environmental, economic, social and cultural values caused by the combined

effects of past, present and potential future actions or events, both natural and human-caused.

Cumulative effects can be caused by a broad range of activities that may

- be direct or indirect
- occur across small or large geographic scales
- result from actions that
  - occurred in the past
  - are occurring currently
  - are anticipated to occur in the future



Trees killed by the spruce budworm





Ultimately, even relatively minor effects may accumulate across time and space and cause negative environmental, economic, social or cultural impacts. For example, climate change increases the risk of drought, which stresses trees and makes them vulnerable to insects and diseases. The further consequence is that trees that are killed by these pests can increase the risk of wildfire and change fire behaviour or intensity.

Innovative forest and land management practices are needed to counteract the many possible interactions between various types of disturbance and,

potentially, climate change. These practices will help to maintain resilient and healthy forests that will continue to provide the various goods and services that forests provide and that Canadians rely upon.

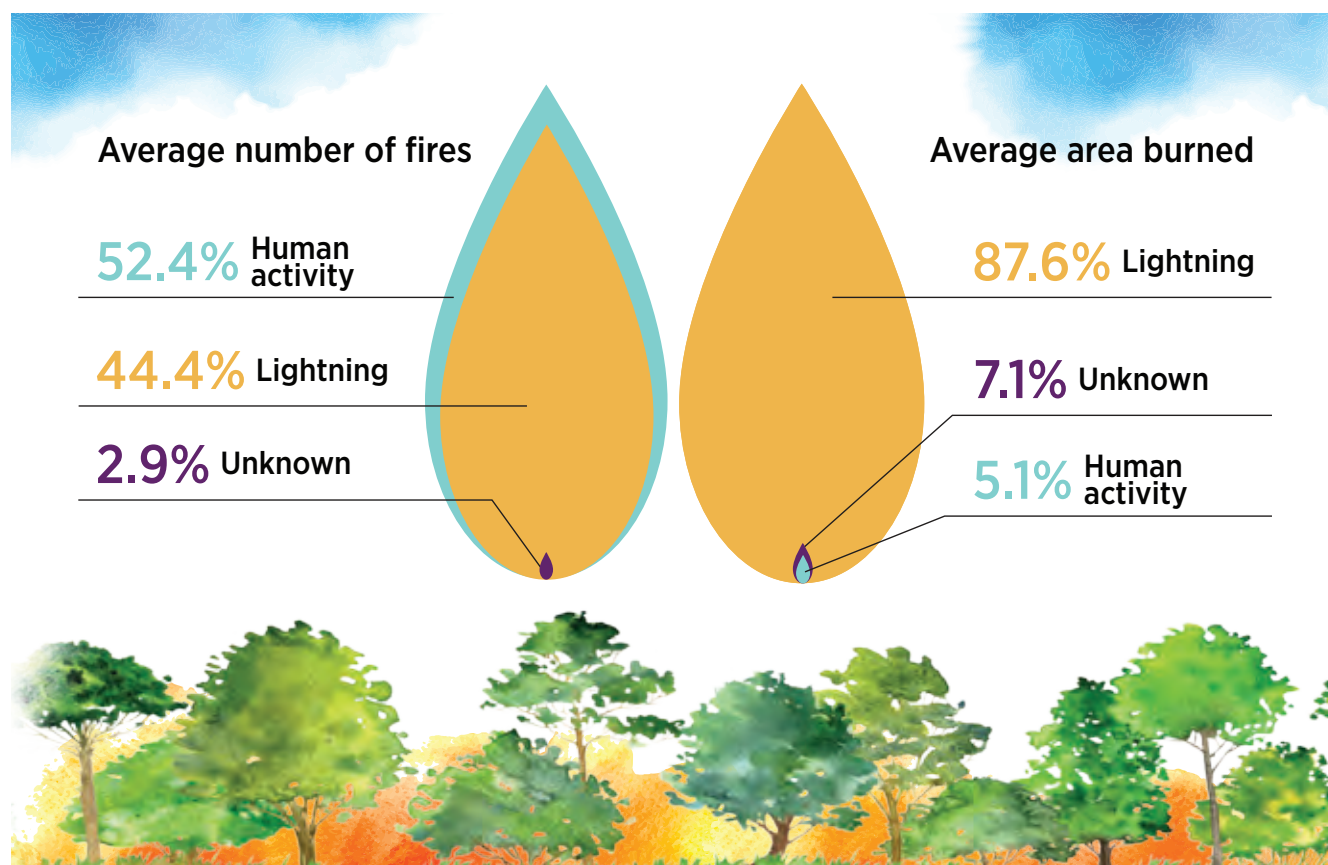
### Ecosystem-based forest management

Ecosystem-based forest management aims to maintain forest ecosystems within their natural range of variability, using natural disturbance regimes as references. This concept has been developed for maintaining biodiversity and associated ecological processes in managed forests by considering both the landscape and stand scales of the forest.

At the landscape scale, the size and distribution of logging patches are intended to mimic the spatial arrangement generated by natural disturbances. This management element is essential to species such as Woodland Caribou, whose survival is dependent on large and continuous habitat ranges, and which is an umbrella species for biodiversity.

At the stand scale, ecosystem-based forest management attempts to maintain key structural elements produced by natural disturbances. For example, management practices that ensure snags and coarse woody debris remain on the harvested landscape can enhance biodiversity by providing habitat for species that depend on these.

### Forest fire causes in Canada (2010–2020)



Source: Amiro, B.D., Flannigan, M.D., et al. 2003; Audley, J.P., Fettig, C.J., et al. 2020; Bichet O., Dupuch, A., et al. 2016. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).

## Forest insects

In 2019, 14.5 million ha were affected by insects. This was a 12% decrease from 2018.

- The area of moderate to severe defoliation by spruce budworm decreased slightly but is still very significant, with most defoliation occurring in the northern and Gaspé regions of Quebec.
- Almost 2 million ha were defoliated by jack pine budworm in northwestern Ontario.
- The area affected by spruce beetle increased to almost 0.5 million ha, mostly in British Columbia, and the mountain pine beetle affected almost 0.4 million ha.
- Outbreaks of *Lymantria dispar* (former common name: gypsy moth) increased, primarily in southern Ontario.

### Why is this indicator important?

- Forest insects affect all forests in Canada, ultimately reducing timber supply, affecting carbon stocks, increasing fire risk, reducing recreational enjoyment, and affecting other forest values.
- Outbreaks of native insects are an expected and normal part of the ecology of most Canadian forests. However, climate change is predicted to change the distribution, frequency and intensity of outbreaks of native and non-native species, including species that may not have been important pests in the past. Monitoring the change in damage caused by all forest insects allows forest managers to predict the effects on overall forest health.

### What is the outlook?

- Outbreaks of spruce budworm will likely increase in extent, affecting large areas of susceptible forests from Ontario east to Newfoundland and Labrador. The jack pine budworm outbreak in Ontario is expected to continue for the next few years.
- Spruce beetle populations are expected to be stable or increase slightly in British Columbia. Mountain pine beetle populations are expected to persist in British Columbia and Alberta at levels much lower than the recent outbreak peak. This insect could spread eastward in Alberta and into the boreal forest of Saskatchewan.
- The invasive species emerald ash borer and hemlock woolly adelgid are likely to continue to expand their ranges and kill trees. *Lymantria dispar* is expected to continue its current outbreak in Ontario for 2 to 3 years. Asian long-horned beetle was declared eradicated from Toronto and Mississauga in Ontario in June 2020. This was the only known population of the highly destructive pest in Canada.
- Other damaging insects will continue to affect forests, especially in the North where the area affected by these groups almost doubled in 2019.

Insect outbreaks frequently kill trees. In other situations, the insects cause dieback, growth loss or reduced vigour. These trees may recover and persist on the landscape. This is why the indicator can remain high over many years. However, persistent or severe insect outbreaks can kill trees. Tree mortality can be worse if the trees suffer an additional stressor, such as another insect, disease or drought.

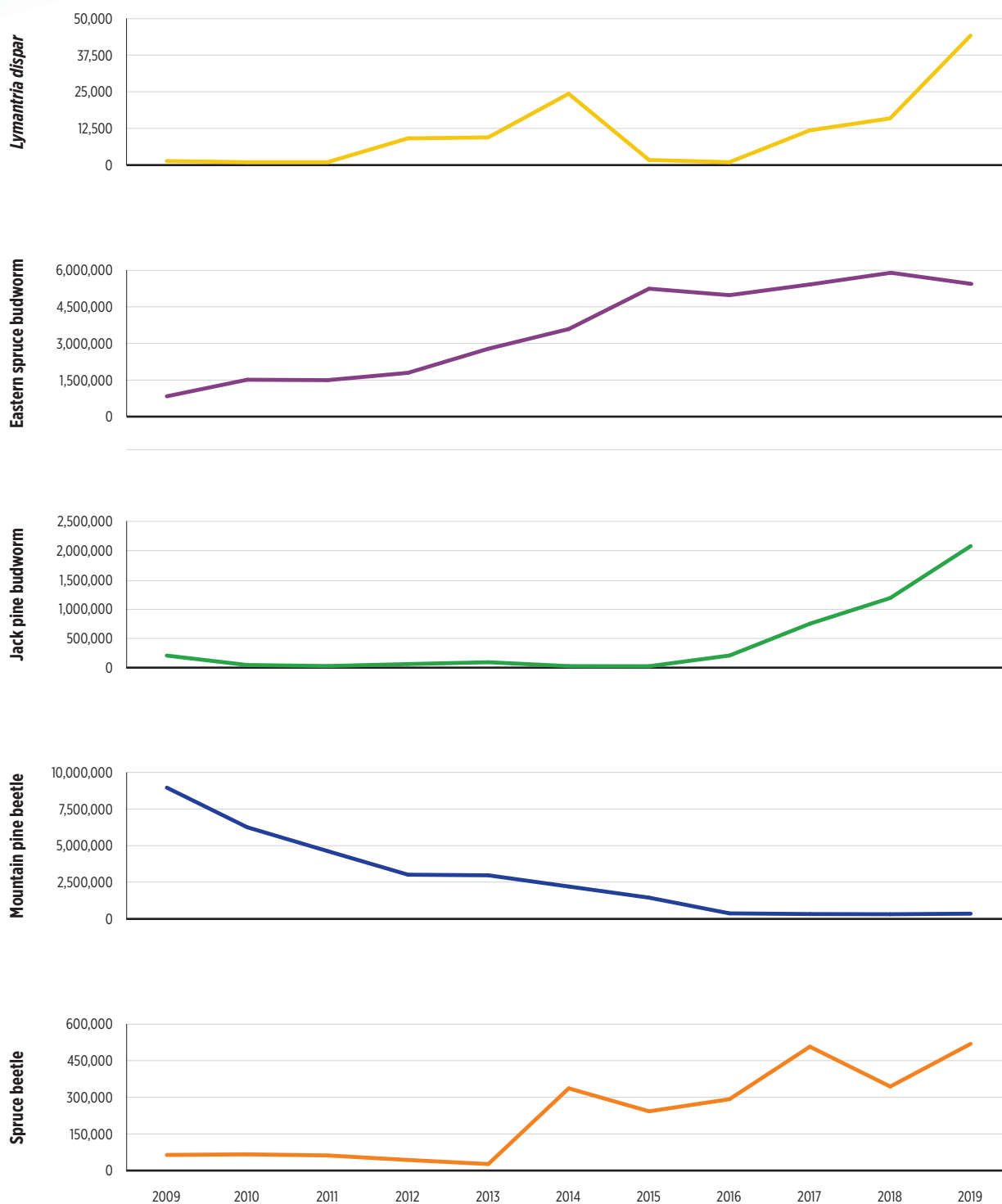


*Lymantria dispar*





## Forest area (in hectares) containing defoliated or beetle-killed trees for five insects in Canada, 2009–2019



Source: National Forestry Database. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Forest diseases

Tree diseases play a crucial role in driving forest community structure, decomposition, nutrient cycling and the carbon cycle of forested ecosystems. However, tree diseases also cause undesirable economic, social and ecological outcomes, including regeneration failure, volume loss and widespread tree mortality. Both native and non-native diseases continue to present new and continuing challenges to Canadian forest health:

- Beech leaf disease was discovered in Ontario in 2017.
- Climate change will increase the risk from emerging diseases through several mechanisms, such as altered environmental conditions that either benefit the pathogen or increase stress on host trees. Novel host-pathogen combinations may develop as species migrate and redistribute under a changing climate.
- Oak wilt disease has not reached Canada but is precariously close to the Canadian border. The Oak Wilt Response Framework was established to respond to the possible incursion of oak wilt into Canada.

### Why is this indicator important?

- Non-native diseases significantly alter Canadian forest ecosystems, threatening biodiversity and Canada's economy.
- Tree diseases can greatly reduce growth, yield and health in managed forests.

### What is the outlook?

- Climate change stresses trees and disrupts the balance between tree hosts and pathogens, exacerbating the effects of native pathogens.
- Proactive monitoring is needed to maintain safe international trade.
- Developing and integrating tools to inform and improve early detection, surveillance and control are necessary to mitigate forest health challenges.



European larch canker (*Lachnellula willkommii*) disease on tamarack (*Larix laricina*) in New Brunswick. This invasive disease spread from Asia to Europe and then to North America, where it was first detected in the Maritimes in the 1980s.

### Biological invasions and forest health

- Global movement of commodities, including live plants and wood products, increases the risk of introducing non-native pathogens into native ecosystems.
- Trees can be extremely vulnerable to novel pathogens, resulting in new and unpredictable diseases that cause unprecedented damage.
- Devastating invasive diseases already established in Canada include Dutch elm disease, white pine blister rust and butternut canker. Collectively, invasive diseases kill millions of trees and cost the Canadian economy billions of dollars.

Prevention is the most effective way to stop biological invasions of non-native diseases. Mitigation efforts include developing and implementing international standards for phytosanitary measures to reduce the spread of invasive diseases linked with global trade pathways.





## Forest fires

In 2020, Canada had roughly the same number of fires as in 2019 but only about 250,000 ha burned – the lowest area in the last 30 years and 90% below the 10-year average.

- A late spring and continued spring and summer rain, as well as COVID-19 restrictions, limited fire activity in the West and northern Boreal.
- Drying trends over the summer led to increased fire activity with New Brunswick and Quebec experiencing a busier than average fire season.
- Canada sent firefighting resources to Australia and the United States, who experienced some of their worst fire years on record.

### Why is this indicator important?

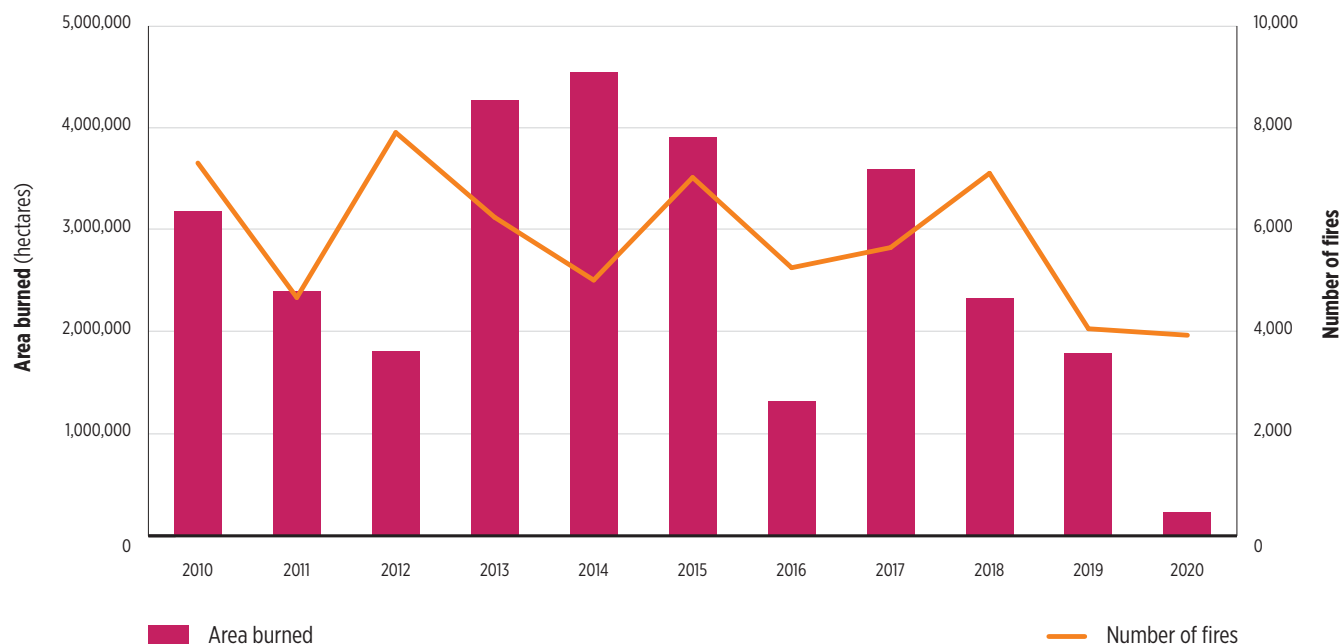
- Forest fires are a natural part of the forest ecosystem and are important for maintaining the health and diversity of the forest. However, they may also result in costly economic and environmental losses and public health and safety concerns, directly threatening communities and infrastructure, or reducing visibility and air quality through smoke.

### What is the outlook?

- When and where forest fires occur varies greatly from year to year, but studies of long-term trends show that fire seasons are starting earlier and lasting longer.
- The hotter and drier conditions from climate change will result in more frequent and more severe forest fires in Canada.
- The increased frequency and severity of fires affects the cost of fire management and results in greater impacts on people and communities, such as evacuations and losses of homes and businesses.

Decreased capacity because of COVID-19 made fighting fires more difficult. Sending Canadian personnel to the United States required added safety measures. Agencies across Canada took steps to lessen the impacts of forest fires at home through measures such as broader use of fire and off road vehicle bans.

### Forest area burned and number of forest fires in Canada, 2010–2020



Source: National Forestry Database. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Forest carbon emissions and removals

In 2019, total net greenhouse gas (GHG) emissions – measured as carbon dioxide equivalent (CO<sub>2</sub>e) – from Canada's managed forests (forest lands managed for timber production, conservation or fire suppression) and forest products were about 165 million tonnes (Mt).

Total net emissions are calculated by adding emissions and removals caused by human activities to emissions and removals caused by large-scale natural disturbances in Canada's managed forests.

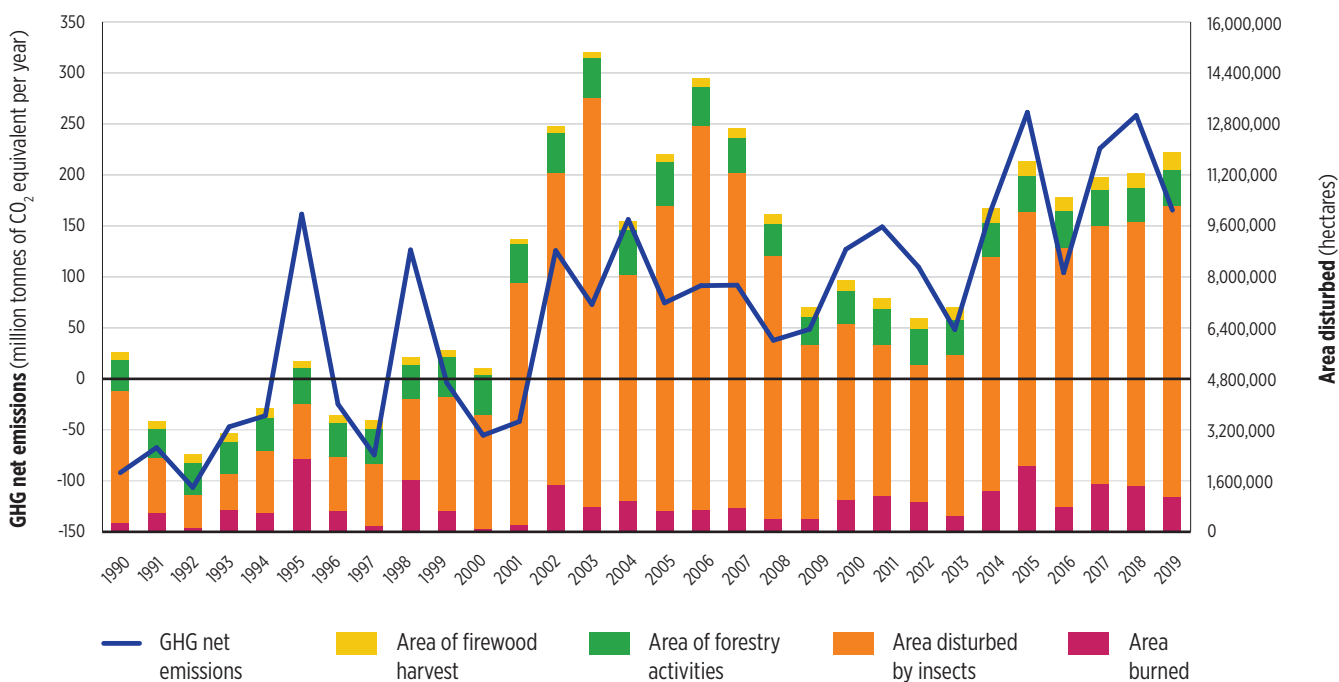
Human activities in Canada's managed forests accounted for net emissions of about 8.6 Mt CO<sub>2</sub>e in 2019, while large-scale natural disturbances accounted for net emissions of about 157 Mt CO<sub>2</sub>e, resulting in total net emissions of 165 Mt CO<sub>2</sub>e. These calculations include 3.9 Mt CO<sub>2</sub>e of methane and nitrous oxide emissions from harvested wood products manufactured from wood harvested in Canada. These emissions

are reported by the Waste and Energy sectors rather than as emissions in the harvested wood products category in the National Inventory Report (NIR). Also included are 12.6 Mt CO<sub>2</sub>e emissions of carbon monoxide from wildfires, which are reported separately in the NIR as indirect CO<sub>2</sub>.

- Taken together, managed forest lands and the wood products harvested from these lands continue to be an ongoing source of emissions to the atmosphere (8.6 Mt CO<sub>2</sub>e in 2019).
- The area burned in managed forests of Canada in 2019 was 1.1 million ha, 25% lower than 2018.

Canada's forests both absorb and release GHGs. In any given year, depending on the area of natural disturbances (forest fires, insects) and harvest, Canada's forests will either be a net source or a net sink of GHGs. Data for 2019 indicate that overall, forests and harvested wood products were a net source of GHGs. This result was due in large part to 1.1 million ha of area having burned.

### Net carbon emissions in Canada's managed forests: All areas, 1990–2019

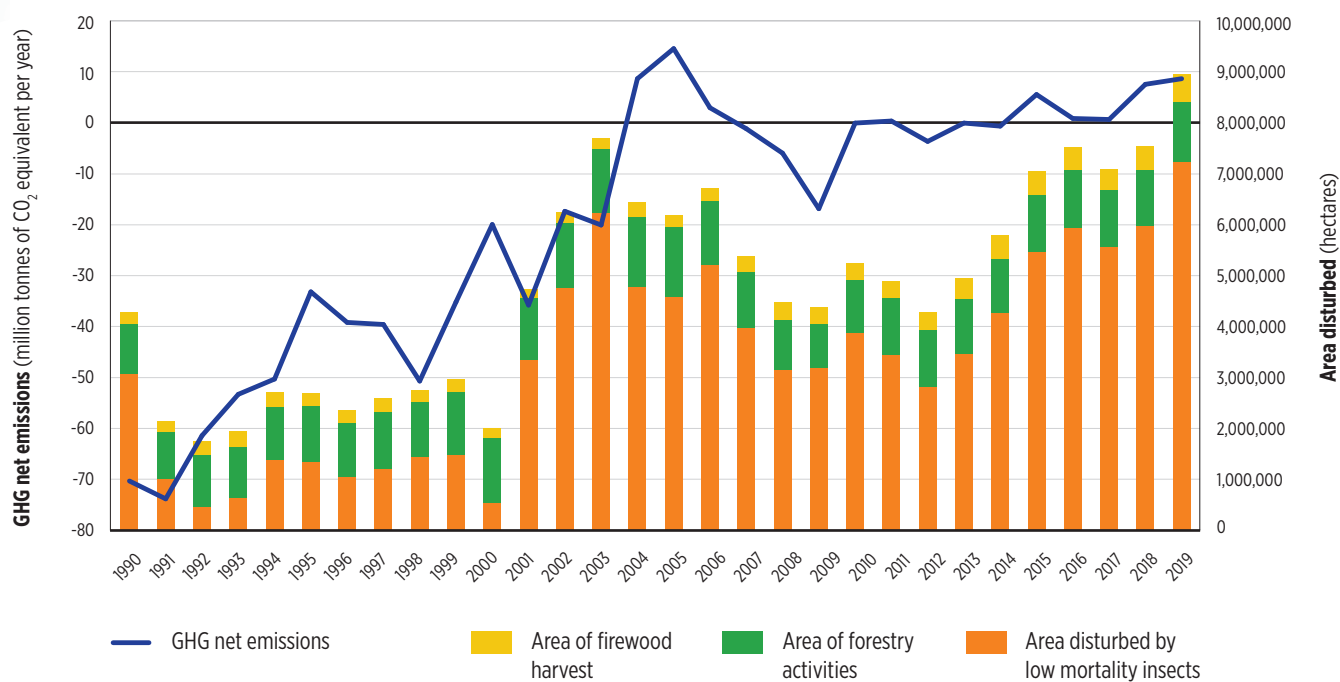


The total net emissions and removals from Canada's managed forests, taking into account both human activities and natural disturbances, were about 165 Mt CO<sub>2</sub>e in 2019. This includes 142 Mt CO<sub>2</sub>e emissions in 2019 from wood harvested in Canada since 1900 and wood products used in Canada and abroad.



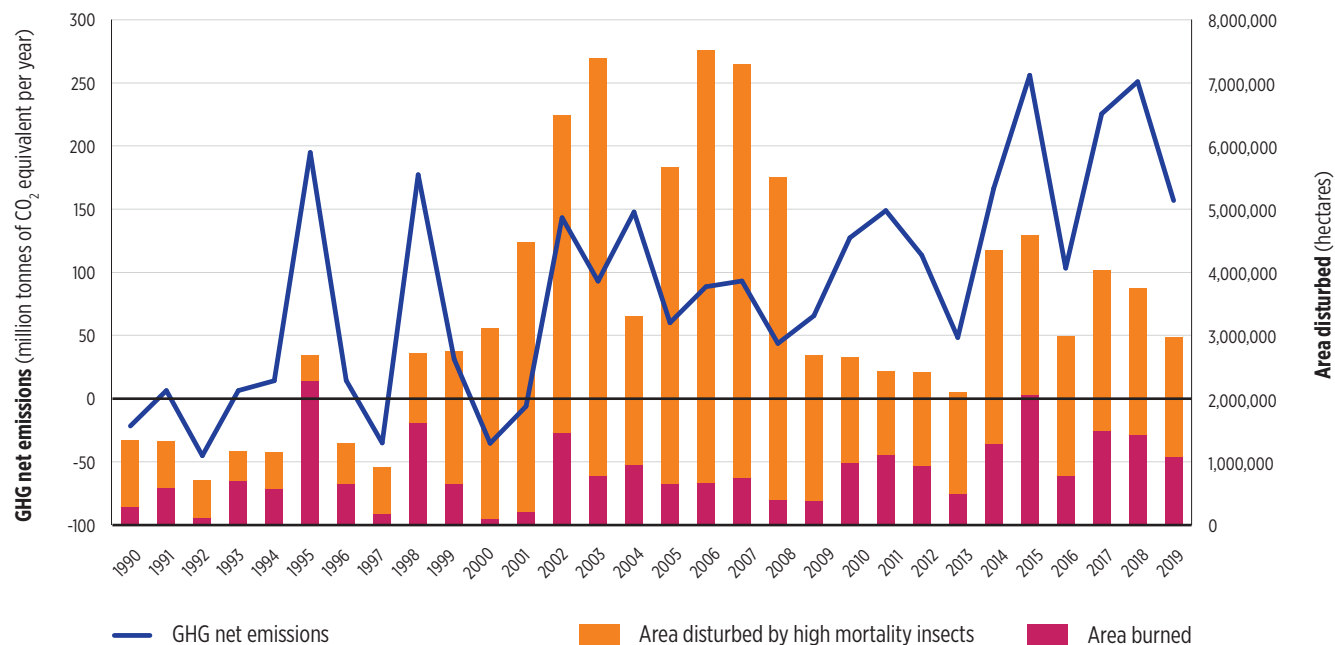


## Net carbon emissions in Canada's managed forest: Areas subject to human activities, 1990–2019



Human activities in Canada's managed forests, such as harvesting, slash pile burning, regeneration, and firewood collection, as well as the use and disposal of harvested wood products, were a net source of about 8.6 Mt CO<sub>2</sub>e in 2019. This includes the impact of large areas disturbed by insects causing low rates of tree mortality.

## Net carbon emissions in Canada's managed forest: Areas subject to natural disturbances, 1990–2019



Natural disturbances in Canada's managed forests – wildfire and insects causing high rates of tree mortality and windthrow – caused net emissions of about 157 Mt CO<sub>2</sub>e in 2019.



#### Why is this indicator important?

- Emissions of carbon as carbon dioxide (CO<sub>2</sub>) and as methane (CH<sub>4</sub>) to the atmosphere are important contributors to global warming.
- Canada's forest sector provides renewable resources to the Canadian economy, resulting in emissions and removals, while also providing aesthetic values, clean water and wildlife habitat.

#### What is the outlook?

- The impacts of climate change on Canada's future forest GHG balance are difficult to predict. Regionally, impacts can be both positive (enhanced forest growth and, therefore, greater carbon sinks) and negative (higher mortality, more forest fires or insect outbreaks). The area burned in Canada in 2020 was considerably less than in 2017, 2018 and 2019. Thus we expect overall GHG emissions in 2020 to be lower than in the previous 3 years.

- Natural disturbances, mostly outside the control of humans, impact significantly the ability of Canada's managed forests to consistently absorb more CO<sub>2</sub> than they emit.
- Changes in forest management and the use of harvested wood products can contribute to mitigating climate change.
- Increased use of long-lived wood products to store carbon in the built environment and use of wood products instead of emissions-intensive materials such as concrete, steel and fossil fuels provide climate change mitigation opportunities.





# HOW DO FORESTS BENEFIT CANADIANS?





# The COVID-19 pandemic has highlighted how essential forests are to Canadians, as they provide a wide range of economic, social and environmental benefits.

## Deemed an essential sector during the COVID-19 pandemic

Because of the COVID-19 pandemic, the federal, provincial and territorial governments closed several non-essential businesses to limit the spread of infection. However, the Canadian forest sector was deemed essential, playing a key role in meeting four essential needs for Canadians:

- health and hygiene (e.g. toilet paper, tissue and sanitary products)
- nutrition (e.g. food and pharmaceutical packaging)
- public works and emergency construction (e.g. lumber and structural panels)
- heating and energy production (e.g. biofuels for communities relying on wood pellets for power generation)

Before and during the pandemic, the forest sector continues to be a major contributor to Canada's economy.

The sector provides income for local workers in 2,400 communities, contributes \$25.2 billion to nominal GDP, supports more than 300 forest-reliant communities and directly employs more than 184,000 Canadians.

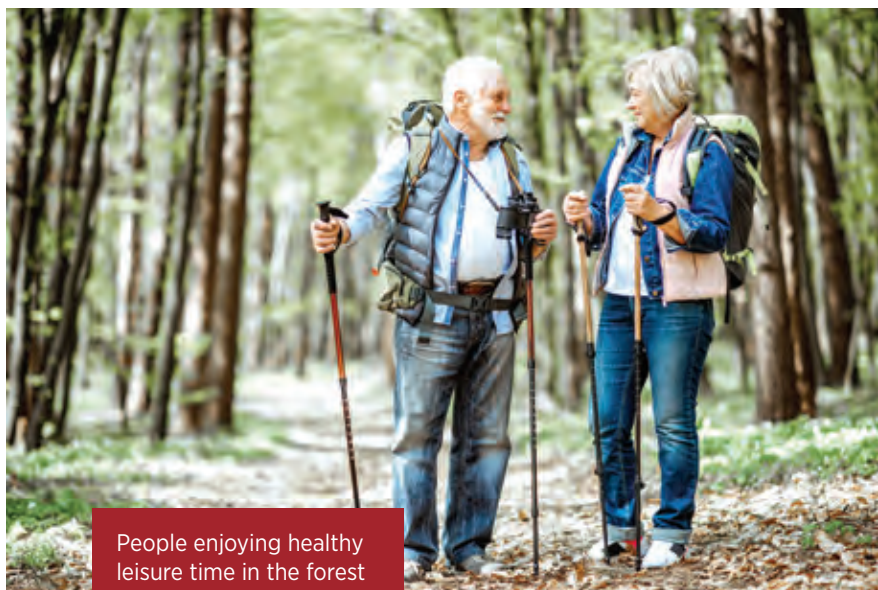
## Safe environment for the well-being of Canadians before and during the pandemic

Ensuring the physical and mental well-being of Canadians is always imperative, and forests provide a safe environment that supports that. Forests support a wide variety of recreational and ecotourism activities, such as hiking, mountain bike riding, camping and bird watching, that could be done while respecting health and safety measures. Additionally, forests continue to be a source of spiritual, cultural and aesthetic importance to all Canadians.

## Support Canada's climate change goals by providing ecosystem and environmental benefits

Forest ecosystems provide important biodiversity habitat; supply goods and services that can drive sustainable growth; and are an essential part of the solution to climate change. Sustainably managed forests, and the wood products produced from them, provide important pathways to manage carbon and help mitigate the impacts of climate change.

Forests provide several ecosystem services, such as reducing surface and air temperature; improving air and water quality; and mitigating flooding, which all reduce urban infrastructure costs and energy use. Given that the majority of our population live in urban areas, these benefits are significant for Canadians.



People enjoying healthy leisure time in the forest

In Canada, 15 cities have been recognized as Tree Cities of the World by the Food and Agriculture Organization of the United Nations and Arbor Day Foundation (<https://treecitiesoftheworld.org>).







## Forest sector employment

In 2020, Canada's forest sector employed 184,510 people, a decrease of 8.8% between 2019 and 2020, largely attributable to the COVID-19 pandemic. The ratio of employment between forest subsectors stayed consistent with previous years.

- Employment in the wood products manufacturing subsector fell dramatically at the beginning of the pandemic. Strong demand in the following months helped the subsector recovery, but 2020 employment was still the lowest seen since 2011. The subsector continued to account for close to 50% of total forest sector employment in 2020.
- Over the past few years, employment in the pulp and paper product manufacturing subsector has declined because of reduced demand for newsprint, printing and writing paper, as consumers switch to digital media. This trend continued in 2020 and was accelerated by COVID-19.
- Forest activities, including nursery operations, tree planting, timber cruising and logging, accounted for about 25% of forest sector employment in 2020, decreasing slightly year-over-year.

### COVID-19 and forest sector employment

At the onset of the pandemic, many facilities closed or curtailed production to implement safety measures and in anticipation of diminished demand. This led to job losses throughout the forest sector. Strong demand for solid wood products has since helped bolster employment in that subsector. However, pre-pandemic challenges continue to constrain overall recovery.

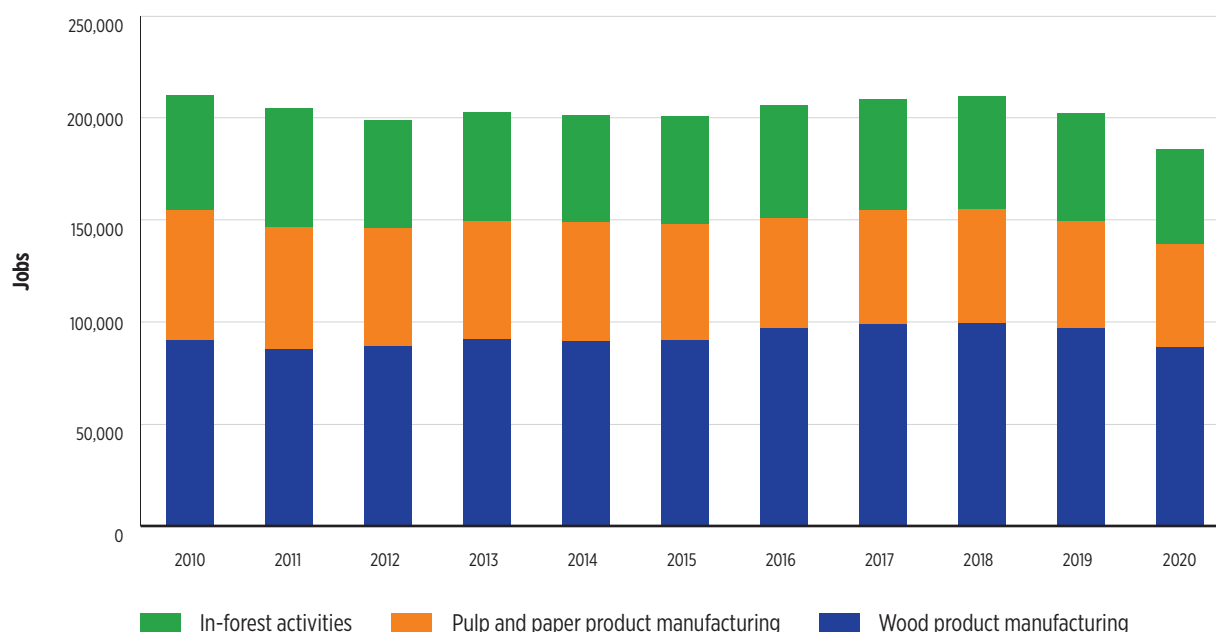
### Why is this indicator important?

- The Canadian forest sector is an important employer nationwide and contributes to the economic and social welfare of Canadians. Forest sector employment is particularly important in many rural and Indigenous communities, where forest-related work is often the main source of income.

### What is the outlook?

- After market challenges reduced employment early in the COVID-19 pandemic, strong demand and high prices for many Canadian forest products have been helping employment in the sector recover. The short-term outlook for forest employment will depend on the continued strength of wood products, balanced against continued declines in demand for pulp and paper products.
- In the medium to long term, forest sector diversification through the growth of the circular bioeconomy (e.g. bioproducts and bioenergy) should create new job opportunities across the country, and help maintain the current employment levels.

### Forest sector direct employment, 2010–2020



Source: Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Forest sector average earnings

Average 2020 earnings across the forest sector decreased by 1.9% from 2019 levels. They were 2.1% below the 10-year peak achieved in 2016 – averaging approximately \$53,000 annually. While average earnings tend to be volatile year-over-year, they have followed a relatively stable upward trend since 2001.

- In 2020, the pulp and paper product manufacturing subsector saw a significant decrease (7.9%) compared to 2019. This decrease is mostly due to the negative impact of COVID-19 on certain pulp and paper products (e.g. newsprint), which resulted in several mill closures and curtailments.
- Earnings from forestry and logging activities were relatively constant (0.2% decrease), while those for wood product manufacturing increased 4.0%. These statistics reflect how high lumber prices helped keep company profits, and salaries, high, despite the negative impacts of the pandemic on operations.
- Overall, average earnings in the forest sector outperformed average earnings for all manufacturing, with the latter increasing by only 1.0% between 2019 and 2020.

Average earnings refer to the average net annual income per person directly employed in the forest sector, not including overtime pay.

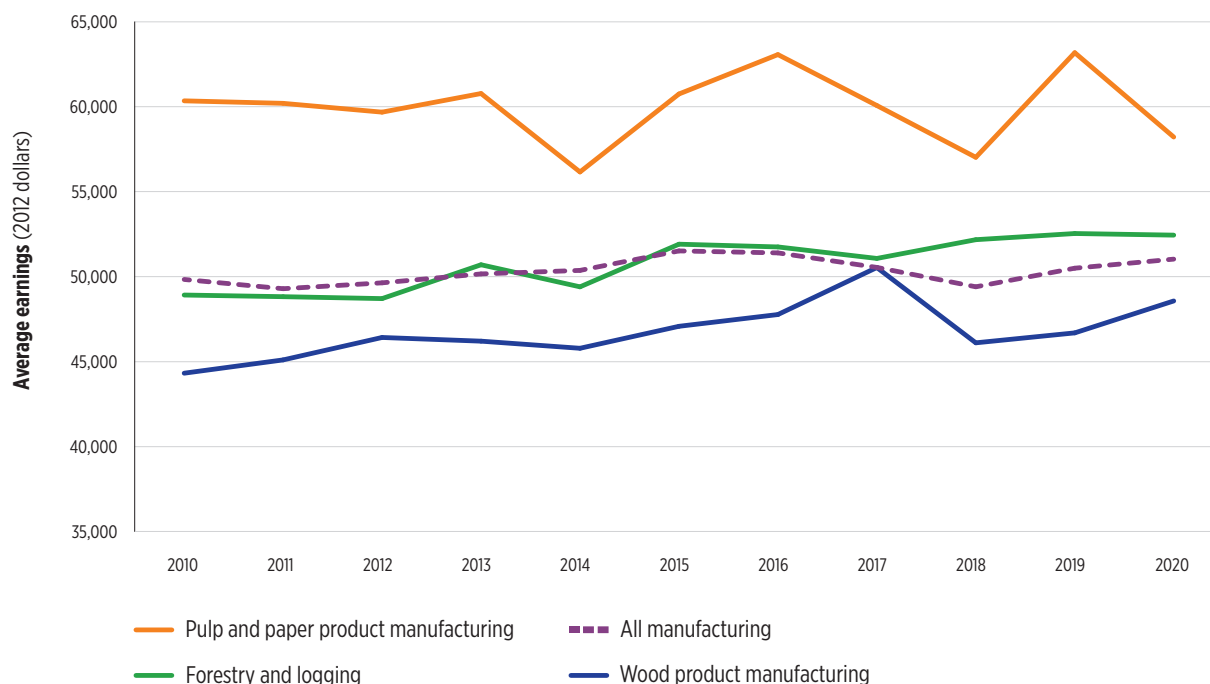
### Why is this indicator important?

- Trends in forest sector average earnings indicate the importance of the sector to the economy and to the social well-being of Canadians, especially when compared with other industries.
- Real wage growth (that is not the result of inflation) shows the change in actual purchasing power of forest sector employees.

### What is the outlook?

- In the short-term, record lumber prices could translate into higher earnings, but market volatility could dampen increases. In the pulp and paper segment, graphic paper (including newspaper) will continue to decline, which could negatively affect average earnings, while packaging, tissue and towels should remain stable. Overall performance in the industry will depend on COVID-19 vaccine rollout and post-pandemic economic recovery.
- Looking to the long-term, average forest sector earnings are anticipated to increase as a result of productivity improvements and the ongoing transition toward the bioeconomy. This is likely to support growth in specialized technical positions with high rates of pay.

**Average earnings in the forest sector compared with all manufacturing sectors, 2010–2020**



Source: Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Forest communities

Forests provide a key source of environmental, economic and cultural benefits to communities across Canada.

- Over 23 million people live in or near forests in Canada (about two-thirds of the total population).
- The forest sector is a key provider of jobs and income in approximately 300 Canadian communities.
- According to the last census (2016), over 1.1 million Indigenous peoples live in or near forests and nearly 12,000 are employed in the forest sector.
- Indigenous peoples represent about 9% of forest sector workers in Canada's forest-reliant communities.

A community is a municipality or a similar area where people live and work.

There are over 5,000 of these communities across Canada, and the forest sector provides income for local workers in over 2,400 of them.





About 23% of Canadian forest sector workers live in communities that rely on the sector as a key source of jobs and income. Many of these forest-reliant communities are in rural areas, making up only 2% of Canada's population (700,000 people).

#### Why is this indicator important?

- Forests are central to the health, well-being and culture of many communities across Canada.
- Broad issues such as global market trends and climate change and more localized ones such as a mill closure can have a significant impact on communities, particularly on the health and well-being of the residents.

#### What is the outlook?

- After facing market challenges early in the COVID-19 pandemic, strong demand for many Canadian forest products indicates that the forest sector will continue to provide opportunities for people in communities across the country. The emerging forest-based bioeconomy, increased demand for high-value products, and innovation in the sector means a strong outlook for people and communities who rely on the sector for economic opportunity and other benefits.





# HOW DOES THE FOREST SECTOR CONTRIBUTE TO CANADA'S ECONOMY?





# The forest sector is an important contributor to Canada's economy, serving as a key source of prosperity for people and communities across the country.

The forest sector:

- directly employs about 184,510 people (2020), including an estimated 12,000 Indigenous Peoples (2016)
- generates more than \$1.9 billion in revenue for provincial and territorial governments (2018)
- exports \$33.1 billion in forest products, which accounts for 6.9% of Canada's total exports (2020)
- injects about \$25.2 billion into Canada's nominal GDP (2020)

## What forest products are made in Canada?

The Canadian forest sector has traditionally manufactured products such as lumber, panels, wood pulp, newsprint and other printing and writing papers. However, new non-traditional products are added to the forest sector's repertoire each year to meet the needs and demands of our ever-changing

world. Bioproducts, such as biofuels and bioplastics, and high-value products, such as engineered wood products, create more value and advance Canada's transition toward the low-carbon economy. This past year, the forest sector began manufacturing biodegradable personal protective equipment (PPE) in response to the COVID-19 pandemic.

## Who works in the forest sector?

The forest sector serves as an important source of economic opportunity for people and communities, employing Canadians from every province and territory except Nunavut. The economic contributions from the sector are particularly important in many rural, remote and Indigenous communities, where forest-related work is often the main source of income. In terms of direct forest sector employment:

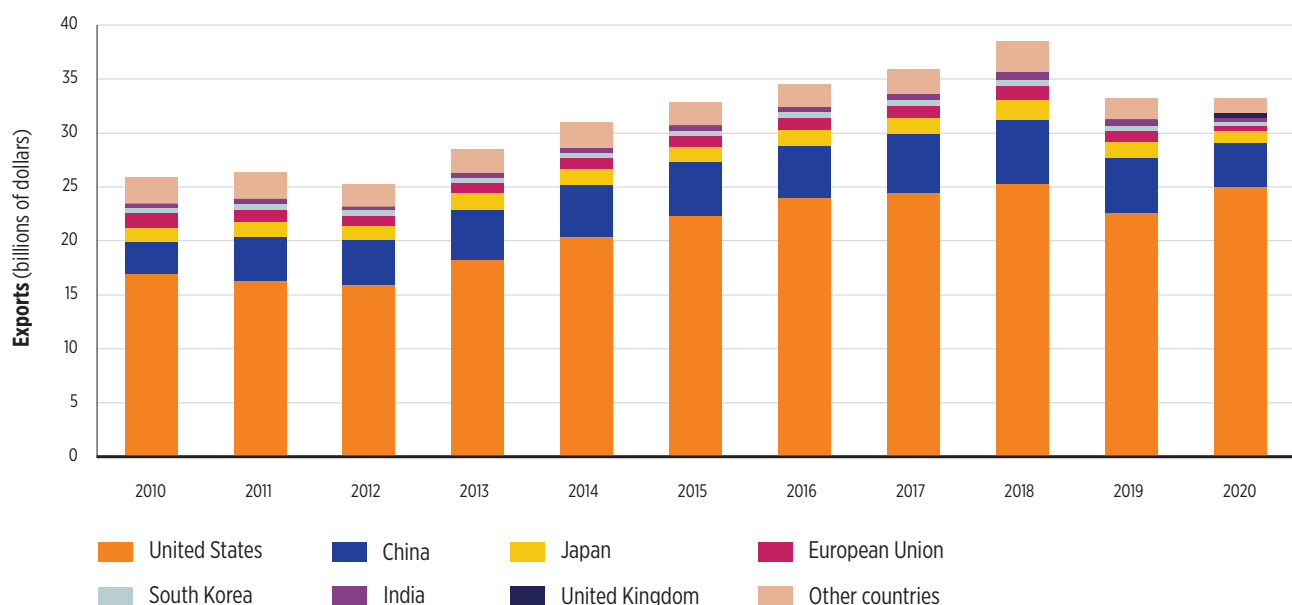
- 101,430 jobs are in Ontario and Quebec

- 67,235 jobs are in western Canada and the Prairies (with the vast majority in British Columbia)
- 15,590 jobs are in Atlantic Canada

## Where are Canada's forest products exported to?

Canada is a global leader in the export of softwood lumber, newsprint and graphic paper, and the second largest exporter of northern bleached softwood kraft pulp. Although Canada exports forest products to more than 150 countries, the United States remains Canada's major destination, representing three-quarters of Canadian forest product exports. Moreover, the United States, China, and Japan together were the destination of 91% of all forest product exports in 2020. Nevertheless, Canada continues to focus on market diversification and seizing new opportunities in emerging markets, particularly in Asia and Europe.

Exports of Canadian forest products by market, 2010–2020



Source: National Forestry Database; Statistics Canada. See Sources and information for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Forest sector gross domestic product

In 2020, the forest sector contributed \$25.2 billion (1.2%) to Canada's nominal GDP, which represents a growth of 4% compared to 2019. As for real GDP, it declined by 1.6%.

The total economy contracted by 5.6% in nominal terms during that period and by 5.2% in real terms.

- The difference between the nominal and real GDP is explained by the fact that the forest sector benefited from higher than average lumber and panel prices and some strong pulp prices. However, the pandemic has resulted in an overall decline of the sector in real terms because some operations slowed down.
- Real GDP fell by 1.7% in the wood product manufacturing subsector, despite a significant increase in prices. This decrease is mostly due to the decline in production, as mills curtailed production or closed as a result of the pandemic.

Gross domestic product (GDP) is the total value of all final goods and services produced annually in a country. It can be thought of as the size of a country's economy. In 2018, the World Bank ranked Canada as the 10th largest economy in the world.

- Similarly, in the pulp and paper manufacturing subsector, real GDP decreased by 1.4%. This is mostly due to the negative impact of COVID-19 on certain products such as graphic paper, while certain paper products (packaging and tissue and towel) experienced higher than normal demand.
- The contribution of the forestry and logging subsector to Canada's real GDP decreased by 1.9% in 2020, mostly due to COVID-19 restrictions that caused disruptions in forestry activities.





### Why is this indicator important?

- Contribution to nominal GDP is one of the primary indicators used to evaluate the size and health of Canada's forest sector compared with that of other sectors in a given year.
- Real GDP measures the year-over-year change in the size of the forest sector's economy, after taking inflation into account.

### What is the outlook?

- Demand for graphic paper is expected to continue to decline in 2021, while tissue and towel and packaging products are expected to remain steady.

- Overall, the Canadian forest sector is expected to grow in 2021, driven by earlier-than-expected recovery for Canada's main trading partners and strong demand for Canadian lumber. However, some uncertainty around the post-pandemic recovery remains.

### Canadian forest sector GDP, 2010–2020



Source: Statistics Canada. See Sources and information for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Production of forest products

- Production of both solid wood and pulp and paper products decreased between 2019 and 2020, with softwood lumber production decreasing by 4.0%, structural panel production falling by 1.8% and wood pulp production decreasing by 8.7%. Newsprint and printing and writing paper continued their more dramatic decline, with production falling by 27.0% and 13.8%, respectively.
- The COVID-19 pandemic accelerated the existing long-term decline in the production in newsprint and printing and writing paper.
- A surge in home construction and renovation activity in Canada and the United States led to soaring demand for solid wood products, prompting mills to ramp up production to full or near-full capacity. There was a brief halt in production during the early phase of the pandemic.

Canada is the world's largest producer of newsprint, the largest producer of northern bleached softwood kraft pulp, and the second largest producer of softwood lumber.

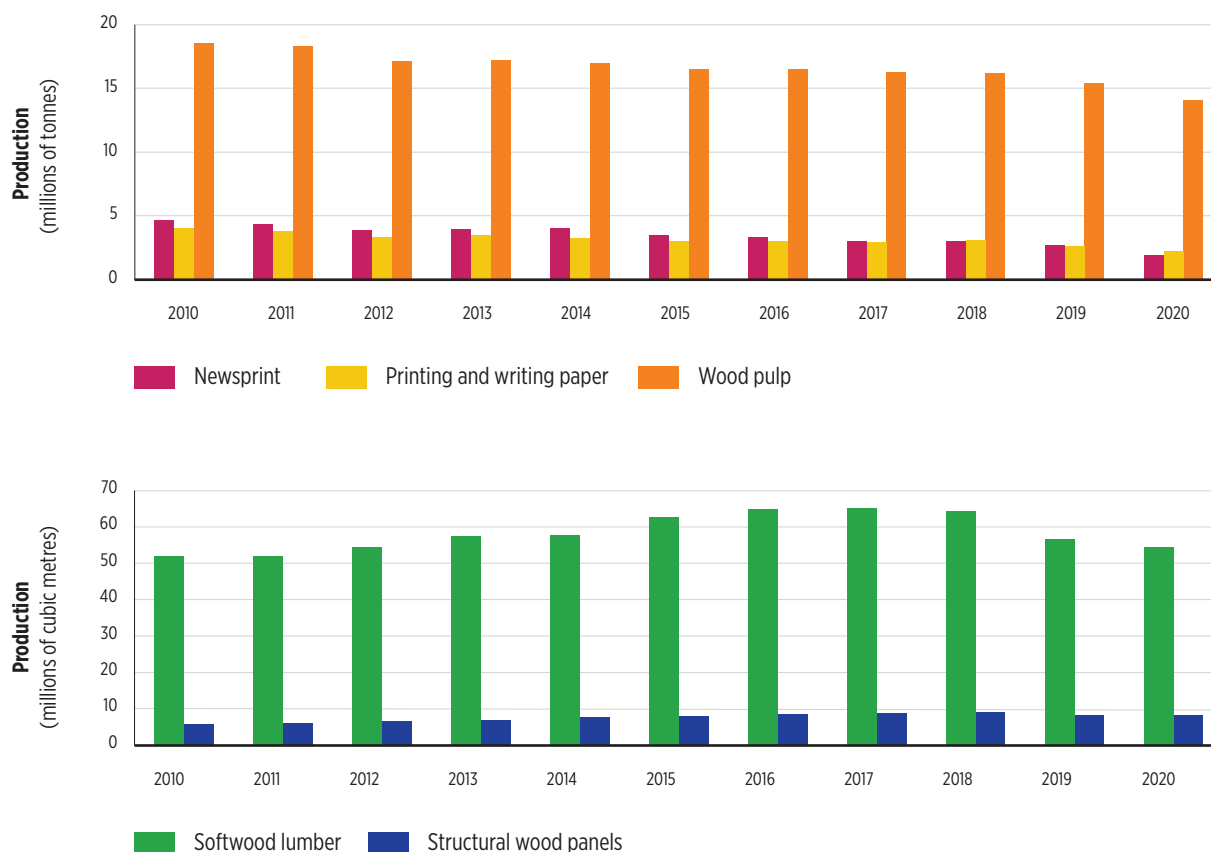
### Why is this indicator important?

- Canada is one of the top global manufacturers of forest products.
- Production is one of the first indicators influenced by economic and market challenges.

### What is the outlook?

- Although demand for solid wood products is expected to remain strong in 2021, further production increases continue to be constrained by fibre supply challenges in Canada, particularly in British Columbia.
- Production of both newsprint and printing and writing paper is expected to continue its downward trend.

### Production of Canadian forest products, 2010–2020



**Source:** APA – the Engineered Wood Association; Pulp and Paper Products Council; Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).



## Exports of forest products

In 2020, Canada's total forest products exports remained almost unchanged from 2019, at \$33.1 billion. This situation was caused by the uneven impacts of the COVID-19 pandemic across the global economy, in that increases in exports of forest products used in home construction and renovation were offset by declines in exports of pulp and paper products.

- The value of exports of softwood lumber increased by \$2 billion, while the value of structural panel exports increased by \$850 million. This increase was due to high prices caused by strong demand from American homebuilding and home renovation markets.
- The values of wood pulp; newsprint and printing; and writing paper exports experienced the largest decline since 2009 (a \$2.3 billion decline in total compared to 2019), as the pandemic decreased the demand for many pulp and paper products.

### Why is this indicator important?

- As one of the largest forest product exporters, Canada is a key supplier to countries around the world.
- Canada has an abundant and renewable supply of wood sourced from sustainably managed forests. By exporting forest products, the Canadian forest sector meets the needs of global consumers, including helping them achieve their climate mitigation goals, while making a substantial contribution to Canada's economy and balance of trade.

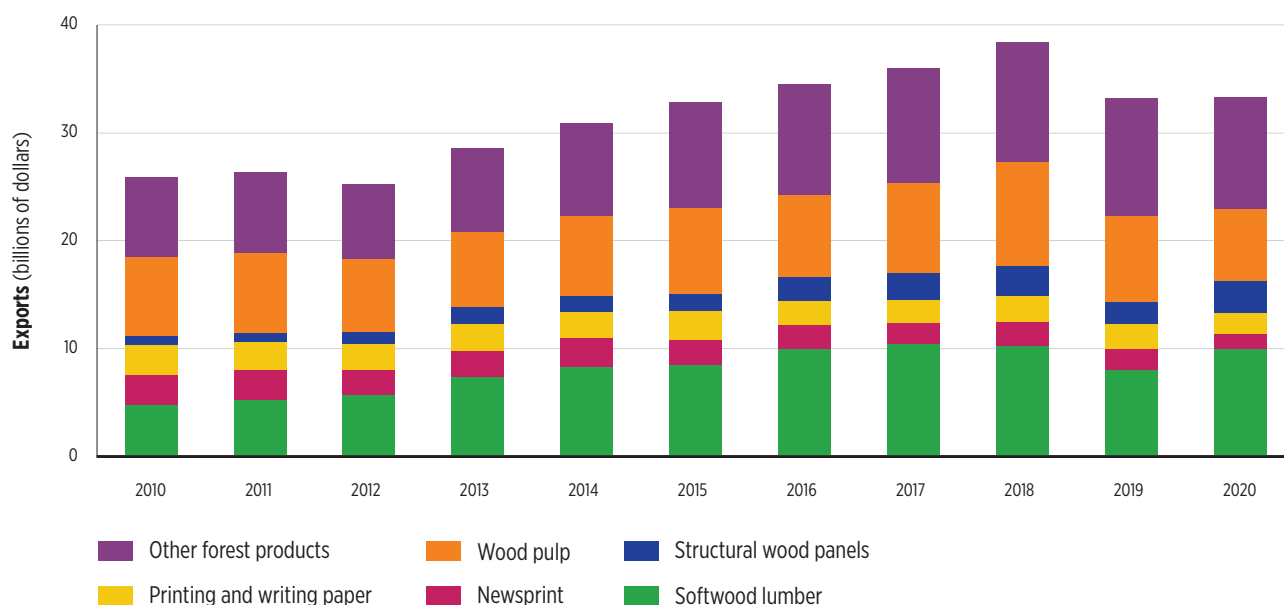
### What is the outlook?

- Exports of forest products used for building and renovating homes, such as softwood lumber and wood panels, are expected to remain elevated in 2021 because of continuing strong demand from the United States.
- While exports for some pulp and paper products should improve in 2021, the decline in demand for other types of papers (such as newsprint) – which was accelerated by the pandemic – is likely to continue.

Canada is the world's leading exporter of softwood lumber, exporting US\$3.5 billion more than Russia, the second-largest exporting country, in 2020.

Most (84%) of these exports go to the United States, where they are used primarily in building, repairing and renovating homes.

### Exports of Canadian forest products, 2010–2020



Source: IHS Connect; Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





# HOW IS THE FOREST SECTOR CHANGING?



**The forest sector is adapting to changing global markets and consumer preferences. While demand for many traditional forest products is strong, there is increasing interest in non-traditional forest products such as biofuels, paper packaging and compostable bioplastics. The market for these innovative, sustainable and environmentally friendly products is growing in Canada and across the world. Canada's forest sector is seizing this opportunity to advance our transition to a low-carbon economy.**

#### **The forest sector transition is accelerating**

The COVID-19 pandemic accelerated the drop in demand for print media such as flyers, newspapers and writing paper as consumers, particularly those who worked from home, continued to shift toward digital media. In 2020, North American demand for newsprint fell by 29% and demand for printing and writing paper declined by 21%, compared to the previous year. Fibre supply challenges, up-and-down market conditions and shifts in consumer preference are other reasons why the sector is pivoting toward higher-value and innovative products.

#### **Innovation in the forest sector**

Adaptation is key for the forest sector as it faces a range of challenges and opportunities. The forest sector is now embracing new products, as well as new applications for existing products, to remain a key contributor to the Canadian economy and to contribute to Canada's transition to a low-carbon economy.

For example, wood-fibre residues are increasingly used to make bioproducts, biochemicals, biomaterials and bioenergy. Compostable bioplastics made from wood-based biomass are gaining ground as a replacement for single use plastics (e.g. packaging). Canadians generated approximately 3.3 million tons of plastic waste in 2016, and the forest sector is in a position to provide biodegradable, environmentally friendly alternatives that can help Canada reduce plastic waste.

Forest biomass is also increasingly used to generate heat and power. Biofuel plants convert forest sector residues such as contaminated wood, wood biomass and construction materials into methanol and ethanol. This is a key forest sector contribution to reducing emissions and to diversifying Canada's energy mix.

#### **Providing a strong foundation to communities across Canada**

There are about 300 communities across Canada that rely on the forest sector as a key source of jobs and income.

Innovation and adaptation ensure that the forest sector remains a competitive, forward-looking source of economic stability for the people living in these forest communities.

The contribution of forest biomass to Canada's energy supply has increased from **3 to 4% in the 1970s to 5 to 6% today.**







## Forest sector financial performance

Financial performance in the forest sector improved significantly in 2020. Operating profits were 181% higher than the seven-year low of 2019 and were the sector's best performance since 2001. After a sharp decline in 2019, return on capital employed remained steady in 2020, going from 4.4% to 4.6%, which suggests an increase in capital employed in the sector.

- After declining in both 2018 and 2019, certain commodity prices improved during the pandemic. However, the pace of price recovery was different across subsectors.
- Products such as lumber, panels, hygiene products and packaging products benefited from strong demand, which increased commodity prices. Market conditions also improved slightly in the pulp segment.
- However, declining demand for graphic papers (including newsprint) during the pandemic overshadowed pulp market performance, negatively affecting performance in the pulp and paper subsector overall.

### Why is this indicator important?

- Strong financial performance is essential for the continued economic competitiveness of Canada's forest sector.
- Both operating profits and return on capital employed indicate whether Canada's forest sector can attract investment and continue to generate economic benefits for Canadians.

Together, operating profits and the return on capital employed can be used as measures of the forest sector's economic competitiveness.

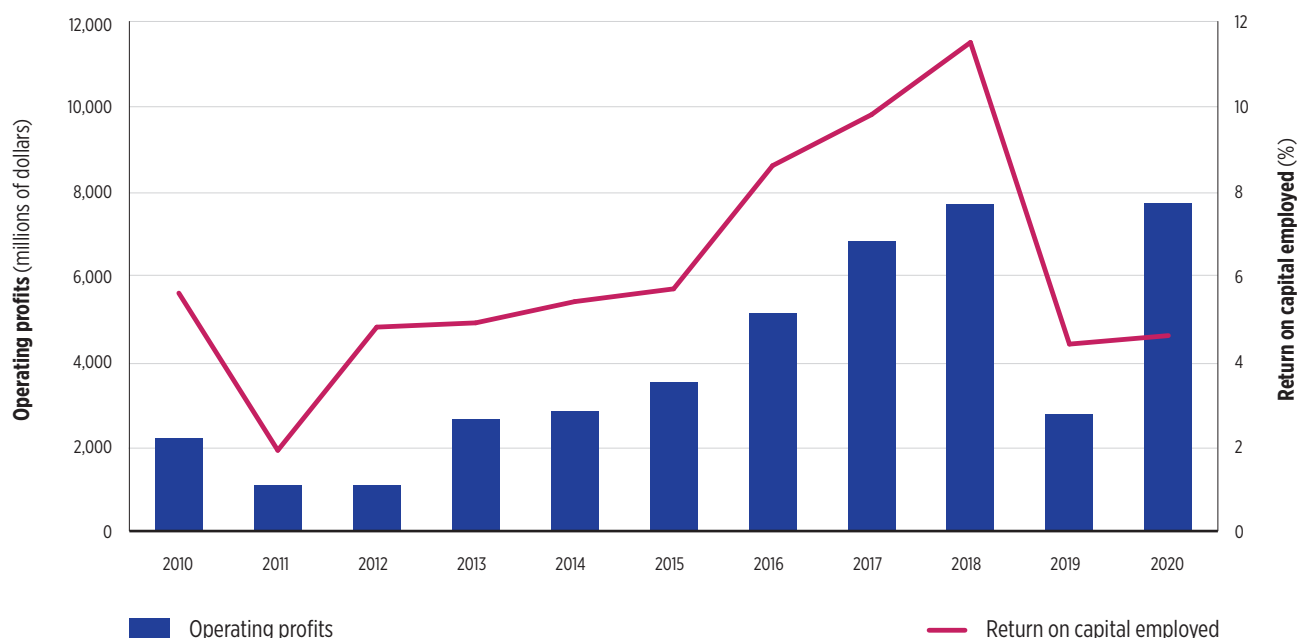
Operating profit measures the difference between operating revenues and operating expenses.

Return on capital employed measures the efficiency of capital in the sector.

### What is the outlook?

- The post-pandemic economic recovery is expected to be sustained throughout 2021. However, the full recovery remains linked to the effectiveness of vaccines.
- Strong demand for wood products and certain pulp and paper products is projected to continue in 2021, maintaining high prices and supporting the financial performance of the forest sector. However, challenges such as fibre supply shortage (notably caused by fire and pests), declining demand for graphic paper products, and uncertainty about trade restrictions could damage the sector's financial performance.

### Financial performance by Canada's forest sector, 2010–2020



Source: Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).

## Forest sector secondary manufacturing

The secondary wood and paper product manufacturing industries in Canada generated \$5.9 billion in real gross domestic product (GDP) in 2020. This is a 3.1% increase from 2019, despite economic disruptions caused by the pandemic and follows a 1.8% increase from 2018 to 2019. In 2020, real GDP from secondary manufacturing was 5.8% higher than 2010.

An increase in exports of secondary wood products and an increase in domestic consumption of secondary paper products, mainly packaging and shipping and sanitary products, contributed to growth in 2020.

### Why is this indicator important?

- Secondary manufacturing of forest products generates additional employment and revenue, which in turn increases the forest sector's overall contribution to the Canadian economy.
- Secondary manufacturing helps balance changes in world markets because it is largely focused on domestic markets, which tend to be more stable than the international market on which the primary products are geared.

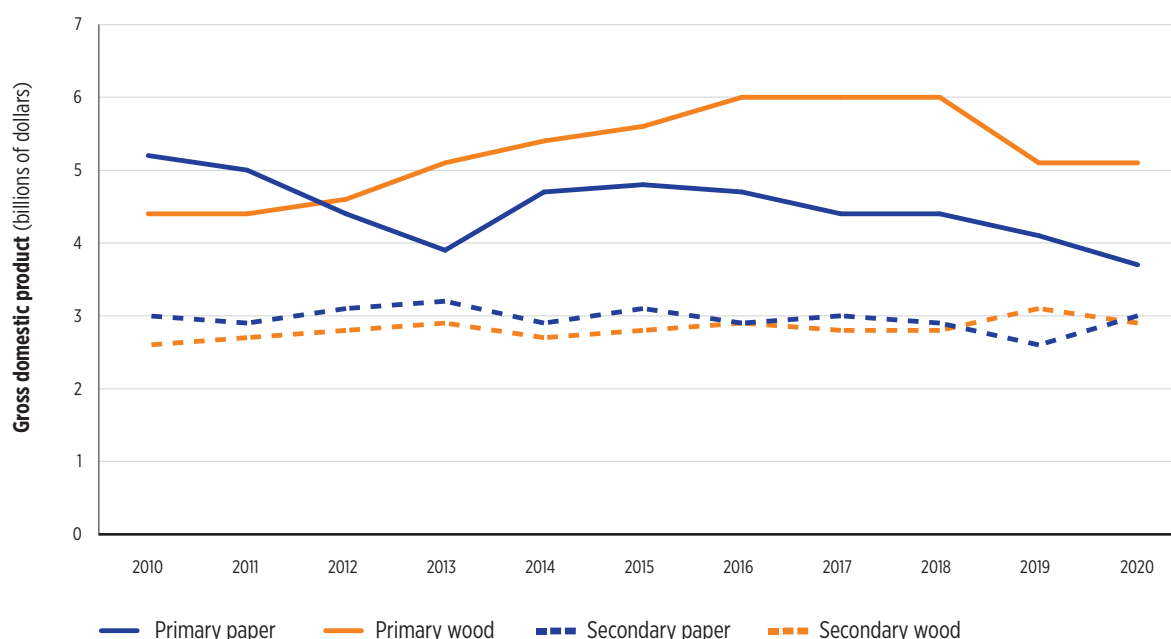
### What is the outlook?

- There remains some uncertainty in the demand for secondary paper and wood products for 2021.
- As the Canadian and global economies recover from the pandemic, demand for secondary paper and wood products is expected to remain stable.
- Housing construction trends in North America during 2021 will be important for the outlook of the secondary wood product manufacturing industries, while trends in on-line shopping, health and safety, and remote work will be important for the secondary paper product industries.

Secondary wood and paper product manufacturers transform lumber and paper into hundreds of intermediate and final products, such as doors and crates from lumber to boxes and grocery bags from paper.

Businesses involved in secondary wood manufacturing tend to be small and medium sized with less than 50 employees.

### Gross domestic product from primary and secondary wood and paper product subsectors, 2010–2020



Source: Industry Canada; Statistics Canada. See **Sources and information** for more detail, and visit us online at [cfs.nrcan.gc.ca/stateoftheforests](https://cfs.nrcan.gc.ca/stateoftheforests).





## Forest sector carbon emissions

Total greenhouse gas (GHG) emissions from fossil fuel use in the Canadian forest industry have been stable in the last decade after a pronounced decline between 2005 and 2010. Energy use has followed a similar trend. GHG emissions are expressed as carbon dioxide equivalents (CO<sub>2</sub>e).

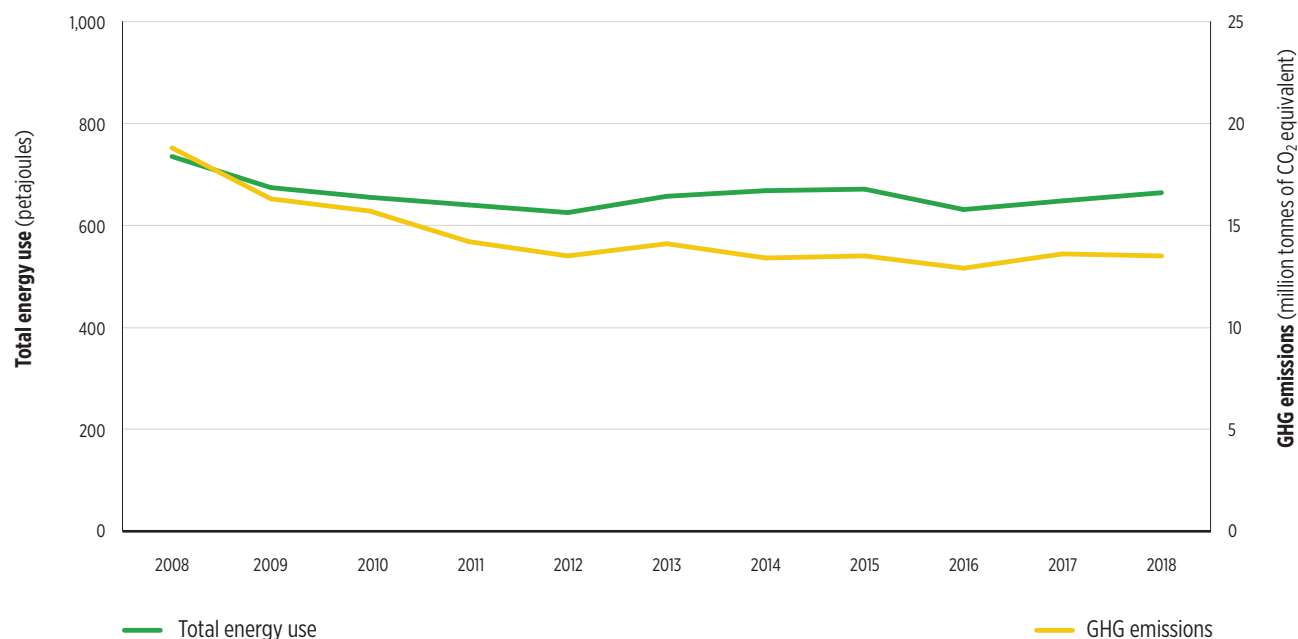
The trends in forest sector energy use and emissions are strongly affected by:

- structural decline in the newsprint and publishing industries
- consequential closures
- investments in improving environmental performance and energy efficiency

Wood pellet facilities have helped fill the role in the supply chain vacated by newsprint facilities by using wood waste from sawmills. The facilities also provide sustainable sources of bioenergy.

- Bioenergy use in Canada's forest sector has remained relatively stable over the past decade, representing almost 55% of the sector's total energy use annually.
- The forest industry's ability to generate its own electricity, largely from bioenergy, has reduced its reliance on fossil fuels. Between 2005 and 2018, the forest industry reduced total energy use by 28% and reduced total fossil GHG emissions (direct emissions plus indirect emissions from purchased electricity) by almost 46%.
- Wood pellet production in Canada grew from 0.4 million tonnes in 2005 to 3.0 million tonnes in 2018, of which 2.6 million tonnes were exported. Wood pellets are made from compressed wood fibre, mostly made from sawmill residues, but also material taken from forests that cannot be used by sawmills or pulp and paper mills, such as harvest residues and low-quality logs. Wood pellets are used primarily for industrial applications (power generation, where they are co-fired with or used in place of coal) and heating.

**Fossil fuel greenhouse gas (GHG) emissions and total energy use in Canada's forest sector, 2008–2018**





### Why is this indicator important?

- Unlike most other renewable energy sources, bioenergy creates direct GHG emissions. However, these emissions are part of the natural carbon cycle, in which carbon removals from forest regrowth occur in parallel with the emissions, unlike those created by fossil fuels.
- Bioenergy is part of a suite of climate solutions that the forest sector can provide, which also include the increased use of wood in construction and improved forest management. Mitigation benefits come from using local wood that is sourced sustainably for bioenergy. The preferred sources are harvest residues and residues from wood product manufacturing facilities because they have lower emissions on a life cycle basis

compared to the use of fossil fuels. The forest sector is transitioning toward greater use of biomass for its own energy needs while continuing to responsibly advance as a supplier of sustainable forest biomass for energy generation in other sectors. Consequently, the need to track energy use and emissions for the sector grows more important.

### What is the outlook?


- Forming a more symbiotic relationship with the natural biogenic carbon cycle will help Canada meet its long-term climate targets. To help achieve Canada's net-zero GHG emission goal in 2050, Canada needs to support forest industry value chains that have climate-friendly, cascading wood-use policies. Such policies must include increasing the

use of bioenergy produced with sustainable supplies of forest fibre.

- Canada pledged in 2020, along with 92 countries, to reverse biodiversity loss by 2030 and has also committed to a new conservation goal, 30 by 30, which aims to conserve at least 30% of Canada's lands and waters by 2030. To these ends, Canada strengthened its climate plan under the title, A Healthy Environment and a Healthy Economy. When combined with such initiatives as the Canadian Council of Forest Ministers' Forest Bioeconomy Framework for Canada, endorsed in 2017, Canada has set the stage for the forest sector to play a key role in climate change mitigation, enhanced carbon storage, safeguarding biodiversity, and regional economic development.



# Statistical profiles

 <b>Canada</b> Population (January 2021) <b>38,048,738</b> Arboreal emblem <b>Maple</b>	
<b>Forest inventory</b>	
<b>Forest area by classification</b> (hectares)	
Forest land	361,784,852
Other wooded land	36,249,346
Other land with tree cover	12,662,714
<b>Forest area change</b> (hectares, 2019)	
Afforestation	Not available
Deforestation (total; by sectors below)	49,046
Agriculture	22,378
Mining, oil and gas	15,115
Built-up	9,518
Forestry	1,078
Hydroelectric	957
<b>Forest type</b> (forest land only)	
Coniferous	69.8%
Mixedwood	13.7%
Broadleaf	11.5%
Temporarily non-treed	4.9%
<b>Forest ownership</b>	
Provincial	75.4%
Territorial	13.0%
Private	6.7%
Indigenous	2.1%
Federal	1.7%
Municipal	0.3%
Other	0.7%
<b>Growing stock</b> (million cubic metres, 2019)	
Total volume	49,505

<b>Disturbance</b>	
<b>Insects</b> (hectares, 2019)	
Area defoliated by insects and containing beetle-killed trees	14,473,760
<b>Fire</b> (2020)	
Area burned (hectares)	227,476
Number of fires	3,935
<b>Forest management</b>	
<b>Harvesting</b> (2019)	
Area harvested (hectares)	756,875
Volume harvested (cubic metres)	142,168,691
<b>Regeneration</b> (hectares, 2019)	
Area planted	404,528
Area seeded	8,620
<b>Third-party certification</b> (hectares, 2020)	
Area certified	164,290,088
<b>Protected forest</b> (IUCN categories)	
Ia Strict Nature Reserve	0.1%
Ib Wilderness area	2.4%
II Ecosystem conservation and protection	6.3%
III Conservation of natural features	0.0%
IV Conservation through active management	0.3%
V Landscape conservation and recreation	0.0%
<b>Greenhouse gas inventory</b>	
<b>For forest lands affected by land-use change</b> (2019)	
Removals from the atmosphere due to afforestation (CO <sub>2</sub> e/yr, megatonnes)	0.3
Total emissions due to deforestation (CO <sub>2</sub> e/yr, megatonnes)	10.2
<b>For managed forests</b> (2019)	
Area of managed forests (hectares)	225,569,672
Total net emissions or removals to the atmosphere, all causes (CO <sub>2</sub> e/yr, megatonnes)	165.4
Net emissions or removals due to natural disturbances (CO <sub>2</sub> e/yr, megatonnes)	156.8
Net emissions or removals due to human forest management activities and from harvested wood products (CO <sub>2</sub> e/yr, megatonnes)	8.6
Transfers from the managed forest sector to the forest products sector due to harvesting (CO <sub>2</sub> e/yr, megatonnes)	-160.9


Domestic economic impact	
Canadian housing starts (2020)	217,802
Contribution to nominal GDP* (current dollars, 2020)	
Forestry and logging	4,205,479,497
Pulp and paper product manufacturing	8,417,342,146
Wood product manufacturing	12,556,768,934
Total contribution to nominal GDP	25,179,590,577
Contribution to real GDP* (constant 2012 dollars, 2020)	
Forestry and logging	3,621,000,000
Pulp and paper product manufacturing	6,652,000,000
Wood product manufacturing	8,044,000,000
Total contribution to real GDP	18,317,000,000
Revenue from goods manufactured (dollars, 2019)	
Logging	10,607,968,000
Pulp and paper product manufacturing	29,998,937,000
Wood product manufacturing	31,630,326,000
Total revenue from goods manufactured	72,237,231,000
Forest sector employment	
Employment (number, 2020)	
Survey of Employment, Payrolls and Hours	169,155
Canadian System of National Accounts	184,510
Natural Resources Satellite Account	200,512
Direct and indirect employment	309,110
Wages and salaries (dollars, 2019)	
Logging	1,811,118,000
Pulp and paper manufacturing	3,749,562,000
Wood product manufacturing	5,202,716,000
Total wages and salaries	10,763,396,000
Trade	
Balance of trade (total exports, dollars, 2020)	21,799,615,557
Value of exports (dollars, 2020)	
Primary wood products	1,120,296,295
Pulp and paper products	15,275,977,826
Wood-fabricated materials	16,866,826,856
Total value of exports	33,263,100,977
Value of imports (dollars, 2020)	
Primary wood products	534,793,405
Pulp and paper products	7,760,834,208
Wood-fabricated materials	3,167,857,807
Total value of imports	11,463,485,420


Domestic production and investment	
Production (2020)	
Hardwood lumber (cubic metres)	985,800
Softwood lumber (cubic metres)	54,404,900
Newsprint (tonnes)	1,956,000
Printing and writing paper (tonnes)	2,259,000
Wood pulp (tonnes)	14,078,000
Structural panels (plywood and oriented strandboard, cubic metres)	8,301,256
Capital expenditures (dollars, 2020)	
Forestry and logging	390,800,000
Pulp and paper product manufacturing	877,700,000
Wood product manufacturing	808,700,000
Total capital expenditures	2,077,200,000
Repair expenditures (dollars, 2019)	
Forestry and logging	524,200,000
Pulp and paper product manufacturing	1,263,700,000
Wood product manufacturing	1,241,600,000
Total repair expenditures	3,029,500,000
Domestic consumption	
Consumption (2020)	
Hardwood lumber (cubic metres)	1,006,752
Softwood lumber (cubic metres)	18,837,922
Newsprint (tonnes)	-3,513
Printing and writing paper (tonnes)	823,370
Wood pulp (tonnes)	5,699,956
Structural panels (plywood and oriented strandboard, cubic metres)	3,877,752


\* See **Sources and information** section for information on GDP from Statistics Canada's Natural Resources Satellite Account.


See the **Sources and information** section for background information and sources for the statistics presented in these tables.




	<b>British Columbia</b>	
	Population (January 2021)	5,153,039
	Arboreal emblem	Western redcedar
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		5,504,608
<b>Fire</b> (2020)		
Area burned (hectares)		14,534
Number of fires		668
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		137,243
Volume harvested (cubic metres)		54,713,340
<b>Regeneration</b> (hectares, 2019)		
Area planted		181,830
Area seeded		752
<b>Third-party certification</b> (hectares, 2020)		
Area certified		46,517,615
<b>Domestic economic impact</b>		
Housing starts (2020)		37,734
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		5,297,003,000
Pulp and paper product manufacturing		5,049,209,000
Wood product manufacturing		10,296,028,000
Total revenue from goods manufactured		20,642,240,000
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		42,885
Survey of Employment, Payrolls and Hours		45,027
<b>Wages and salaries</b> (dollars, 2019)		
Logging		880,017,000
Pulp and paper product manufacturing		616,485,000
Wood product manufacturing		1,493,662,000
Total wages and salaries		2,990,164,000
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		9,279,020,976
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		857,829,736
Pulp and paper products		3,427,786,537
Wood-fabricated materials		7,015,721,300
Total value of domestic exports		11,301,337,573
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		143,424,964
Pulp and paper products		927,284,263
Wood-fabricated materials		951,607,370
Total value of imports		2,022,316,597


	<b>Alberta</b>	
	Population (January 2021)	4,436,258
	Arboreal emblem	Lodgepole pine
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		640,748
<b>Fire</b> (2020)		
Area burned (hectares)		3,275
Number of fires		723
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		112,324
Volume harvested (cubic metres)		25,084,749
<b>Regeneration</b> (hectares, 2019)		
Area planted		76,513
Area seeded		197
<b>Third-party certification</b> (hectares, 2020)		
Area certified		21,429,312
<b>Domestic economic impact</b>		
Housing starts (2020)		24,023
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		1,087,026,000
Pulp and paper product manufacturing		2,447,313,000
Wood product manufacturing		3,843,750,000
Total revenue from goods manufactured		7,378,089,000
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		14,885
Survey of Employment, Payrolls and Hours		14,666
<b>Wages and salaries</b> (dollars, 2019)		
Logging		196,909,000
Pulp and paper product manufacturing		256,024,000
Wood product manufacturing		682,496,000
Total wages and salaries		1,135,429,000
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		3,660,058,016
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		27,387,259
Pulp and paper products		1,652,036,293
Wood-fabricated materials		2,296,269,127
Total value of domestic exports		3,975,692,679
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		7,457,707
Pulp and paper products		172,923,856
Wood-fabricated materials		135,253,100
Total value of imports		315,634,663


 <b>Saskatchewan</b> Population (January 2021) Arboreal emblem			1,178,832 White birch
<b>Disturbance</b>			
<b>Insects</b> (hectares, 2019)			
Area defoliated by insects and containing beetle-killed trees			66,444
<b>Fire</b> (2020)			
Area burned (hectares)			42,160
Number of fires			145
<b>Forest management</b>			
<b>Harvesting</b> (2019)			
Area harvested (hectares)			21,952
Volume harvested (cubic metres)			4,353,813
<b>Regeneration</b> (hectares, 2019)			
Area planted			5,732
Area seeded			Not available
<b>Third-party certification</b> (hectares, 2020)			
Area certified			6,666,270
<b>Domestic economic impact</b>			
Housing starts (2020)			3,087
<b>Revenue from goods manufactured</b> (dollars, 2019)			
Logging			137,854,000
Pulp and paper product manufacturing			Not available
Wood product manufacturing			564,163,000
Total revenue from goods manufactured			Not available
<b>Forest sector employment</b>			
<b>Employment</b> (number, 2020)			
Canadian System of National Accounts			3,505
Survey of Employment, Payrolls and Hours			1,553
<b>Wages and salaries</b> (dollars, 2019)			
Logging			20,878,000
Pulp and paper product manufacturing			Not available
Wood product manufacturing			94,947,000
Total wages and salaries			Not available
<b>Trade</b>			
Balance of trade (total exports, dollars, 2020)			581,138,217
<b>Value of domestic exports</b> (dollars, 2020)			
Primary wood products			3,688,006
Pulp and paper products			241,108,619
Wood-fabricated materials			436,603,503
Total value of domestic exports			681,400,128
<b>Value of imports</b> (dollars, 2020)			
Primary wood products			6,093,390
Pulp and paper products			71,073,536
Wood-fabricated materials			23,094,985
Total value of imports			100,261,911


 <b>Manitoba</b> Population (January 2021) Arboreal emblem			1,380,935 White spruce
<b>Disturbance</b>			
<b>Insects</b> (hectares, 2019)			
Area defoliated by insects and containing beetle-killed trees			1,060,869
<b>Fire</b> (2020)			
Area burned (hectares)			49,527
Number of fires			149
<b>Forest management</b>			
<b>Harvesting</b> (2019)			
Area harvested (hectares)			9,721
Volume harvested (cubic metres)			1,360,947
<b>Regeneration</b> (hectares, 2019)			
Area planted			3,353
Area seeded			Not available
<b>Third-party certification</b> (hectares, 2020)			
Area certified			10,927,934
<b>Domestic economic impact</b>			
Housing starts (2020)			7,314
<b>Revenue from goods manufactured</b> (dollars, 2019)			
Logging			48,589,000
Pulp and paper product manufacturing			Not available
Wood product manufacturing			504,282,000
Total revenue from goods manufactured			Not available
<b>Forest sector employment</b>			
<b>Employment</b> (number, 2020)			
Canadian System of National Accounts			5,960
Survey of Employment, Payrolls and Hours			3,144
<b>Wages and salaries</b> (dollars, 2019)			
Logging			12,312,000
Pulp and paper product manufacturing			Not available
Wood product manufacturing			107,840,000
Total wages and salaries			Not available
<b>Trade</b>			
Balance of trade (total exports, dollars, 2020)			-33,245,851
<b>Value of domestic exports</b> (dollars, 2020)			
Primary wood products			1,906,677
Pulp and paper products			253,364,544
Wood-fabricated materials			294,104,226
Total value of domestic exports			549,375,447
<b>Value of imports</b> (dollars, 2020)			
Primary wood products			6,721,772
Pulp and paper products			453,971,698
Wood-fabricated materials			121,927,828
Total value of imports			582,621,298



	<b>Ontario</b>	
	Population (January 2021)	14,755,211
	Arboreal emblem	Eastern white pine
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		1,471,863
<b>Fire</b> (2020)		
Area burned (hectares)		15,480
Number of fires		608
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		130,526
Volume harvested (cubic metres)		14,792,051
<b>Regeneration</b> (hectares, 2019)		
Area planted		47,075
Area seeded		7,671
<b>Third-party certification</b> (hectares, 2020)		
Area certified		27,601,260
<b>Domestic economic impact</b>		
Housing starts (2020)		81,305
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		1,085,563,000
Pulp and paper product manufacturing		9,015,936,000
Wood product manufacturing		5,253,884,000
Total revenue from goods manufactured		15,355,383,000
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		44,615
Survey of Employment, Payrolls and Hours		35,703
<b>Wages and salaries</b> (dollars, 2019)		
Logging		195,131,000
Pulp and paper product manufacturing		1,284,895,000
Wood product manufacturing		1,023,303,000
Total wages and salaries		2,503,329,000
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		-1,207,099,423
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		55,484,655
Pulp and paper products		2,782,257,135
Wood-fabricated materials		2,048,864,453
Total value of domestic exports		4,886,606,243
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		70,027,819
Pulp and paper products		4,654,966,896
Wood-fabricated materials		1,368,710,951
Total value of imports		6,093,705,666


	<b>Quebec</b>	
	Population (January 2021)	8,575,944
	Arboreal emblem	Yellow birch
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		4,891,885
<b>Fire</b> (2020)		
Area burned (hectares)		59,985
Number of fires		707
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		224,007
Volume harvested (cubic metres)		27,278,197
<b>Regeneration</b> (hectares, 2019)		
Area planted		68,597
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		44,276,589
<b>Domestic economic impact</b>		
Housing starts (2020)		54,066
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		2,134,263,000
Pulp and paper product manufacturing		9,651,270,000
Wood product manufacturing		9,016,386,000
Total revenue from goods manufactured		20,801,919,000
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		56,815
Survey of Employment, Payrolls and Hours		53,480
<b>Wages and salaries</b> (dollars, 2019)		
Logging		351,268,000
Pulp and paper product manufacturing		1,128,136,000
Wood product manufacturing		1,454,115,000
Total wages and salaries		2,933,519,000
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		7,277,908,836
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		115,927,652
Pulp and paper products		5,460,140,966
Wood-fabricated materials		3,729,548,866
Total value of domestic exports		9,305,617,484
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		245,502,759
Pulp and paper products		1,284,479,350
Wood-fabricated materials		497,726,539
Total value of imports		2,027,708,648


	<b>New Brunswick</b>	
	Population (January 2021) Arboreal emblem	782,078 Balsam fir
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		0
<b>Fire</b> (2020)		
Area burned (hectares)		1,388
Number of fires		462
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		79,047
Volume harvested (cubic metres)		9,341,187
<b>Regeneration</b> (hectares, 2019)		
Area planted		12,384
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		4,233,777
<b>Domestic economic impact</b>		
Housing starts (2020)		3,483
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		665,230,000
Pulp and paper product manufacturing		2,086,343,000
Wood product manufacturing		1,618,487,000
Total revenue from goods manufactured		4,370,060,000
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		10,365
Survey of Employment, Payrolls and Hours		10,420
<b>Wages and salaries</b> (dollars, 2019)		
Logging		113,305,000
Pulp and paper product manufacturing		224,616,000
Wood product manufacturing		Not available
Total wages and salaries		Not available
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		1,619,238,039
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		33,853,155
Pulp and paper products		1,026,755,995
Wood-fabricated materials		816,985,908
Total value of domestic exports		1,877,595,058
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		55,494,139
Pulp and paper products		159,080,248
Wood-fabricated materials		43,782,632
Total value of imports		258,357,019


	<b>Nova Scotia</b>	
	Population (January 2021) Arboreal emblem	979,449 Red spruce
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		18,757
<b>Fire</b> (2020)		
Area burned (hectares)		709
Number of fires		176
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		33,768
Volume harvested (cubic metres)		3,314,626
<b>Regeneration</b> (hectares, 2019)		
Area planted		5,521
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		1,278,688
<b>Domestic economic impact</b>		
Housing starts (2020)		4,865
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		112,468,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total revenue from goods manufactured		Not available
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		3,590
Survey of Employment, Payrolls and Hours		2,117
<b>Wages and salaries</b> (dollars, 2019)		
Logging		29,373,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total wages and salaries		Not available
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		438,932,699
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		24,187,551
Pulp and paper products		268,656,944
Wood-fabricated materials		204,755,901
Total value of domestic exports		497,600,396
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		26,798
Pulp and paper products		33,045,378
Wood-fabricated materials		25,595,521
Total value of imports		58,667,697



 <b>Prince Edward Island</b> Population (January 2021) <b>159,819</b> Arboreal emblem <b>Red oak</b>		
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		19
<b>Fire</b> (2020)		
Area burned (hectares)		13
Number of fires		15
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		271
Volume harvested (cubic metres)		446,577
<b>Regeneration</b> (hectares, 2019)		
Area planted		322
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		0
<b>Domestic economic impact</b>		
Housing starts (2020)		1,162
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		10,380,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total revenue from goods manufactured		Not available
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		585
Survey of Employment, Payrolls and Hours		Not available
<b>Wages and salaries</b> (dollars, 2019)		
Logging		1,703,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total wages and salaries		Not available
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		28,716,755
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		28,480,546
Wood-fabricated materials		275,769
Total value of domestic exports		28,756,315
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		28,232
Wood-fabricated materials		11,328
Total value of imports		39,560

 <b>Newfoundland and Labrador</b> Population (January 2021) <b>520,438</b> Arboreal emblem <b>Black spruce</b>		
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		0
<b>Fire</b> (2020)		
Area burned (hectares)		4,178
Number of fires		94
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		7,624
Volume harvested (cubic metres)		1,438,225
<b>Regeneration</b> (hectares, 2019)		
Area planted		3,201
Area seeded		0
<b>Third-party certification</b> (hectares, 2020)		
Area certified		1,358,643
<b>Domestic economic impact</b>		
Housing starts (2020)		763
<b>Revenue from goods manufactured</b> (dollars, 2019)		
Logging		28,528,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total revenue from goods manufactured		Not available
<b>Forest sector employment</b>		
<b>Employment</b> (number, 2020)		
Canadian System of National Accounts		1,050
Survey of Employment, Payrolls and Hours		38
<b>Wages and salaries</b> (dollars, 2019)		
Logging		10,044,000
Pulp and paper product manufacturing		Not available
Wood product manufacturing		Not available
Total wages and salaries		Not available
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		154,831,723
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		31,604
Pulp and paper products		135,390,247
Wood-fabricated materials		23,581,237
Total value of domestic exports		159,003,088
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		44,057
Pulp and paper products		3,980,340
Wood-fabricated materials		146,968
Total value of imports		4,171,365

	<b>Yukon</b>	
	Population (January 2021)	42,192
	Arboreal emblem	Subalpine fir
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		8,947
<b>Fire</b> (2020)		
Area burned (hectares)		15,491
Number of fires		24
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		100
Volume harvested (cubic metres)		5,810
<b>Regeneration</b> (hectares, 2019)		
Area planted		0
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		0
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		115,981
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		0
Wood-fabricated materials		116,566
Total value of domestic exports		116,566
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		0
Wood-fabricated materials		585
Total value of imports		585

	<b>Northwest Territories</b>	
	Population (January 2021)	45,136
	Arboreal emblem	Tamarack
<b>Disturbance</b>		
<b>Insects</b> (hectares, 2019)		
Area defoliated by insects and containing beetle-killed trees		809,620
<b>Fire</b> (2020)		
Area burned (hectares)		19,073
Number of fires		71
<b>Forest management</b>		
<b>Harvesting</b> (2019)		
Area harvested (hectares)		392
Volume harvested (cubic metres)		39,169
<b>Regeneration</b> (hectares, 2019)		
Area planted		Not available
Area seeded		Not available
<b>Third-party certification</b> (hectares, 2020)		
Area certified		0
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		0
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		0
Wood-fabricated materials		0
Total value of domestic exports		0
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		0
Wood-fabricated materials		0
Total value of imports		0

	<b>Nunavut</b>	
	Population (January 2021)	39,407
<b>Trade</b>		
Balance of trade (total exports, dollars, 2020)		-411
<b>Value of domestic exports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		0
Wood-fabricated materials		0
Total value of domestic exports		0
<b>Value of imports</b> (dollars, 2020)		
Primary wood products		0
Pulp and paper products		411
Wood-fabricated materials		0
Total value of imports		411



# Sources and information

The data in this report are derived from a number of sources, which are identified here by their relevant section. Where necessary, data have been edited for accuracy and consistency. All data are subject to revision.

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

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

It may not be possible to directly compare the data from the various sections, as they come from several sources that may compile their statistics differently from each other.

Dates on which data were accessed online are now included for the Food and Agriculture Organization of the United Nations, the National Forest Inventory, the National Forestry Database, the Canadian Interagency Forest Fire Centre, and Statistics Canada.

## The 2021 State of Canada's Forests Annual Report: An overview

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020 main report*. Rome, Italy. <https://doi.org/10.4060/ca9825en>

Additional information can be found at:

- Montreal Process Working Group. <https://www.montrealprocess.org/>
- United Nations. 2019. *Global forest goals and targets*. <https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf>

## Infographic: Five ways COVID-19 affected forests and the Canadian forest sector

Natural Resources Canada. *Current lumber, pulp and panel prices*. <https://www.nrcan.gc.ca/our-natural-resources/domestic-and-international-markets/current-lumber-pulp-panel-prices/13309> (accessed April 1, 2021).

### Notes:

- Eastern spruce-pine-fir 2x4 #2 and better, random lengths composite prices and western spruce-pine-fir 2x4 #2 and better, kiln dried
- Sources: 1) Random Lengths, used with publishers permission  
2) Madison's Lumber Reporter, used with permission granted by the publisher

Statistics Canada. Table 14-10-0022-01 (formerly CANSIM 282-007): Labour force characteristics by industry, monthly, unadjusted for seasonality. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410002201> (accessed March 15, 2021).

Statistics Canada. Table 34-10-0126-01 (formerly CANSIM 0277-0009): Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410012601> (accessed April 5, 2021).

Statistics Canada. Merchandise trade data (special extraction, April 1, 2021).

- Wood pulp, paper and paper article exports include HS Code 49.

## Map: Forested ecozones across Canada

Ecological Stratification Working Group (ESWG). 1995. *A national ecological framework for Canada*. Agriculture and Agri-food Canada and Environment Canada. Ottawa, Ontario.

National Forest Inventory. Standard reports, Table 4.1. Area (1000 ha) of forest and non-forest land by terrestrial ecozone in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- Remeasurement (2017) estimate of Canada's forest area by terrestrial ecozone.

Science and Technology Branch. National Ecological Framework for Canada – Terrestrial Ecozones. *Agriculture and Agri-food Canada*. <https://open.canada.ca/data/en/dataset/7ad7ea01-eb23-4824-bccc-66adb7c5bdf8> (accessed May 15, 2021).

### Notes:

- Terrestrial Ecozones of Canada data were downloaded as an ESRI REST file.

## Infographic: Finding solutions within Canada's forests: Key facts and figures about Canada's forests and forest sector

### Canada has 9% of the world's forest

Food and Agricultural Organization of the United Nations. 2020. *The state of the world's forests 2020: Forests, biodiversity and people*. Rome, Italy. <http://www.fao.org/documents/card/en/c/ca8642en>

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Report: Canada*. Rome, Italy. <http://www.fao.org/3/ca9983en/ca9983en.pdf>

Rowe, S.J. February 7, 2006. Trees. *The Canadian Encyclopedia*. <https://www.thecanadianencyclopedia.ca/en/article/trees>

National Forest Inventory. Standard reports, Table 4.1. Area (1000 ha) of forest and non-forest land by terrestrial ecozone in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- Remeasurement (2017) estimate of Canada's forest area by terrestrial ecozone.

Tree Canada. Trees of Canada. <https://treecanada.ca/resources/trees-of-canada/>

## Canada's forests are important to the economy and are a model in sustainable management

Certification Canada. Canadian statistics. <http://certificationcanada.org/en/statistics/canadian-statistics/> (accessed March 16, 2021).

- If a forest area has been certified to more than one of the three sustainable forest management standards (Canadian Standards Association, Sustainable Forestry Initiative, and Forest Stewardship Council), the area is counted only once. Therefore, the total certification for sustainable forest management standards may be less than the sum of the individual totals for these standards. The independently certified forest area is calculated using Forest Management Units, which include streams, lakes, rivers and roads.

Food and Agricultural Organization of the United Nations. 2020. *The state of the world's forests 2020: Forests, biodiversity and people*. Rome, Italy. <http://www.fao.org/documents/card/en/c/ca8642en>

- Calculation for the percentage of forest area with long-term forest management plans that is Indigenous-held tenure area (2019). One source for the calculation was the Indigenous forestry-tenure data from the *Fifth report on Indigenous-held forest tenures in Canada 2020*, published by the National Aboriginal Forestry Association. The second of the two sources for the calculation was the forest area with long-term management plans data from the *State of the world's forests 2020* report, published by the Food and Agricultural Organization of the United Nations.

National Aboriginal Forestry Association. 2020. *Fifth report on Indigenous-held forest tenures in Canada 2020*. <http://www.nafaforestry.org/>

Statistics Canada. Table 18-10-0265-01: Industrial product price index, by major product group, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026501> (accessed March 30, 2021).

Statistics Canada. Table 36-10-0489-01 (formerly CANSIM 383-0031): Labour statistics consistent with the System of National Accounts (SNA), by job category and industry. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610048901> (accessed May 20, 2021).

- Data include NAICS 113, 1153, 321, and 322.
- Employment includes jobs held by people employed directly in the following industries: forestry and logging, support activities for forestry, pulp and paper product manufacturing, and wood product manufacturing.
- Natural Resources Canada–Canadian Forest Service prefers to use employment data from Statistics Canada's System of National Accounts (SNA) because these data are linked to the underlying framework used to compile the Canadian System of National Accounts.

Statistics Canada. Table 14-10-0204-01 (formerly CANSIM 281-0027): Average weekly earnings by industry, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020401> (accessed March 30, 2021).

- The data excludes overtime.
- The 2020 average earnings were calculated using the Consumer Price Index re-based to 2012 values. This method matches the one used for the previous report in which all data prior to 2019 were updated as well according to current method.

## How have disturbances shaped Canada's forests?

### Area harvested:

National Forestry Database. Harvest, Table 5.2. Area harvested by ownership, management and harvesting method. <http://nfdp.ccfm.org/en/data/harvest.php> (accessed July 12, 2021).

### Deforestation:

Dyk, A., Leckie, D., et al. 2015. *Canada's National Deforestation Monitoring System: System description*. Victoria, BC: Natural Resources Canada–Canadian Forest Service, Pacific Forestry Centre. <https://cfs.nrcan.gc.ca/publications?id=36042>

- National deforestation estimates are calculated on a periodic basis using the method described in *Canada's National Deforestation Monitoring System: System description*. Figure data provided by *Canada's National Deforestation Monitoring System: System description*, special tabulation, April 27, 2021.

National Forest Inventory. Standard reports, Table 4.0. Area (1000 ha) of forest and non-forest land in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- Remeasurement (2021) estimate of Canada's forest area.

### Forest fires:

National Forestry Database. Table 3.2.1. Area burned by cause class. <http://nfdp.ccfm.org/en/data/fires.php> (accessed July 12, 2021).

- The National Forestry Database sources the latest year's fire data from the Canadian Interagency Forest Fire Centre, and all years prior from the Canadian Wildland Fire Information System.

### Insects:

National Forestry Database. Forest insects, Table 4. Area of moderate to severe defoliation (including beetle-killed trees) by insects. <http://nfdp.ccfm.org/en/data/insects.php> (accessed July 12, 2021).

## Canadians are closely connected with forests and the forest sector

Natural Resources Canada. North American boreal zone map shapefiles. <http://nrcan.gc.ca/forests/boreal/14252>

Natural Resources Canada. June 2021. Why are lumber prices so high? *Canadian forest service science-Policy Note*. [https://cfs.nrcan.gc.ca/publications?id=40376&lang=en\\_CA](https://cfs.nrcan.gc.ca/publications?id=40376&lang=en_CA)

Natural Resources Canada–Canadian Forest Service calculations for boreal National Parks attendance are based on 1) Parks Canada, Parks Canada Attendance 2016–2019. <https://www.pc.gc.ca/en/docs/pc/attend>, and 2) Natural Resources Canada, North American boreal zone map shapefile. <https://www.nrcan.gc.ca/forests/boreal/14252>

- Attendance of National Parks is recorded by fiscal year (April to March) and was calculated by determining which National Parks contained boreal forest using the North American boreal zone map shapefile (GIS-based analyses used the BOREAL and B\_ALPINE layers) and then totalling attendance.
- Parks Canada attendance data were not available for 4 out of the 20 of parks located within Canada's boreal region. Nááts'ihch'oh National Park Reserve of Canada in the Northwest Territories had park attendance for only the 2019–2020 fiscal year.



Statistics Canada. 2016 Census of Population. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm>

- The **Forest communities** indicator is based on Statistics Canada's census subdivisions. A subdivision is "the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g. Indian reserves, Indian settlements and unorganized territories)." Since there is no standardized definition of community across provinces and territories, using census subdivisions allows for a consistent approach in reporting over time. In 2016, Canada was divided into 5,161 census subdivisions.

### The Canadian forest sector is a leader in product innovation

Canada NewsWire. June 21 2021. SCALE AI supports four new projects and reports another extraordinary year of AI investments in Canada, for a total impact since inception of more than \$200 million. *Stock house*. <https://stockhouse.com/news/press-releases/2021/06/21/scale-ai-supports-four-new-projects-and-reports-another-extraordinary-year-of>

Natural Resources Canada. 2021. *The state of mass timber in Canada 2021*. <https://www.nrcan.gc.ca/our-natural-resources/forests/industry-and-trade/forest-products-applications/mass-timber-construction-canada/23428>

Natural Resources Canada. 2021. *The state of mass timber in Canada 2021*. Ottawa, Ontario. <https://cfs.nrcan.gc.ca/publications?id=40364>

Natural Resources Canada. Comprehensive Energy Use Database. [https://oe.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive\\_tables/list.cfm](https://oe.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm) (accessed May 27, 2021).

- NRCan's Comprehensive Energy Use Database is compiled using the following sources:
  - The Canadian Energy and Emissions Data Centre (CEEDC), Simon Fraser University. 2020.
  - Statistics Canada. 2020. *Report on Energy Supply and Demand in Canada 2000–2018*.
  - Natural Resources Canada. 2020. Industrial End-Use Model.
  - Environment and Climate Change Canada. 2020. *National Inventory Report 2000–2018: Greenhouse Gas Sources and Sinks in Canada*.

### Notes:

- The Office of Energy Efficiency at Natural Resources Canada (NRCan) has changed the base year related to its National Energy Use Database (NEUD) from 1990 to 2000, beginning with the release of 2018 data. This change in methodology has resulted in minor changes in the energy use and GHG emissions data back to 2000. This rebasing is to ensure that NEUD reflects developments in trends and structures of Canada's energy end use and efficiency across sectors. It also synchronizes Canada's energy use data reporting with changes recently made by the International Energy Agency. While new estimates are no longer made available for years prior to 2000, data with the new base year are expected to better service the development, implementation and monitoring of government policies, programs and projects; evidence-based decision making; industrial and market analysis and projection; and energy use literacy, education and stakeholder engagement.

### Article: Planting 2 billion trees: A natural climate solution

Intergovernmental Plan on Climate Change. *Special report: Global warming of 1.5°C*. <https://www.ipcc.ch/sr15/>

International Union for Conservation of Nature. *Nature-based solutions*. <https://www.iucn.org/theme/nature-based-solutions/about>

Natural Resources Canada. *2 billion trees commitment*. <https://www.canada.ca/en/campaign/2-billion-trees.html>

Natural Resources Canada. 2014. Autosmart: *Learn the facts: Emissions from your vehicle*. [https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/pdf/transportation/fuel-efficient-technologies/autosmart\\_factsheet\\_9\\_e.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/pdf/transportation/fuel-efficient-technologies/autosmart_factsheet_9_e.pdf)

Natural Resources Canada. Minister O'Regan Launches Canada's Plan to Plant Two Billion Trees. <https://www.canada.ca/en/natural-resources-canada/news/2020/12/minister-oregan-launches-canadas-plan-to-plant-two-billion-trees.html>

### Infographic: Urban forests: A nature-based solution for Canada

Climate Change Resource Center. Urban forests and climate change. *United States Department of Agriculture*. <https://www.fs.usda.gov/ccrc/topics/urban-forests-and-climate-change>

Food and Agriculture Organization of the United Nations. *Benefits of urban trees*. <http://www.fao.org/resources/infographics/infographics-details/en/c/411348/>

Forest Research. *Benefits of greenspace: Noise abatement*. <https://www.forestresearch.gov.uk/tools-and-resources/fthr/urban-regeneration-and-greenspace-partnership/greenspace-in-practice/benefits-of-greenspace/noise-abatement/>

Hammitt, W. 2002. Urban forests and parks as privacy refuges. *Journal of Arboriculture* 28(1), 19–26.

Natural Resources Canada. *Urban forests: A connection through time*. <https://www.nrcan.gc.ca/our-natural-resources/forests/state-canadas-forests-report/articles/urban-forests-connection-through-time/22290>

United States Department of Agriculture. *Urban forests*. <https://www.fs.usda.gov/managing-land/urban-forests>

United States Environmental Protection Agency. *Using trees and vegetation to reduce heat islands*. <https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands>

### Infographic: Mass timber buildings are sustainable, safe and healthy

Canadian Wood Council. <https://cwc.ca/>

FPInnovations. <https://web.fpinnovations.ca/>

Hart, J., D'Amico, B., et al. 2021. Whole-life embodied carbon in multistory buildings: Steel, concrete and timber structures. *Journal of Industrial Ecology* 25, 403–418. <https://doi.org/10.1111/jiec.13139>

Naturally Wood. *Wood performance*. <https://www.naturallywood.com/wood-performance/>

Padilla-Rivera, A., and Blanchet, P. 2017. Carbon footprint of pre-fabricated wood buildings. *International symposium on sustainable design*, 88–95. <https://doi.org/10.5151/sbds-issd-2017-015>

Think Wood. *Sustainable wood*. <https://www.thinkwood.com/sustainability>

#### Photo credit:

- 2150 Keith Drive, Vancouver BS design concept by Dialog Design <https://www.dialogdesign.ca/our-work/projects/2150-keith-drive/>

## SUSTAINABILITY INDICATORS

### How much forest does Canada have?

Canadian Institute of Forestry. *National forest week*. <http://www.cif-ifc.org/national-forest-week/> (accessed June 24, 2021).

Dyk, A., Leckie, D., et al. 2015. *Canada's National Deforestation Monitoring System: System description*. Victoria, BC: Natural Resources Canada–Canadian Forest Service, Pacific Forestry Centre. <https://cfs.nrcan.gc.ca/publications?id=36042>

- National deforestation estimates are calculated on a periodic basis using the method described in *Canada's National Deforestation Monitoring System: System description*. Figure data provided by *Canada's National Deforestation Monitoring System: System description* special tabulation, April 27, 2021.

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Report: Canada*. Rome, Italy. <http://www.fao.org/3/ca9983en/ca9983en.pdf>

- Describes the methodology used to adjust the National Forest Inventory baseline estimate of forest area.

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020 main report*. Rome, Italy. <https://doi.org/10.4060/ca9825en>

- This dataset was used to calculate Canada's forest area as a proportion of the world's forest area.

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Terms and definitions*. Rome, Italy. <http://www.fao.org/3/l8661en/l8661en.pdf>

- This document describes the definitions of forest, afforestation and other terms. Note that Canada uses this definition of forest for most but not all purposes. For example, the national greenhouse gas inventory and forest carbon accounting use a slightly different definition.

National Forest Inventory. 2021. *Canada's National Forest Inventory Business Process*. Victoria, BC: National Forest Inventory (NFI) Project Office. <https://nfi.nfis.org/resources/general/NFI-Business-Process-Version-8.0.pdf>

- Description of the procedure and means by which the NFI collects, validates, stores, uses and disseminates National Forest Inventory data.

National Forest Inventory. Standard reports, Table 4.0. Area (1000 ha) of forest and non-forest land in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- Remeasurement (2021) estimate of Canada's forest area.

National Forest Inventory. Standard reports, Table 4.1. Area (1000 ha) of forest and non-forest land by terrestrial ecozone in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/NFI/html/NFI_T4_FOR_AREA_en.html) (accessed August 12, 2021).

- Remeasurement (2021) estimate of Canada's forest area by terrestrial ecozone.

### Forest area

Dyk, A., Leckie, D., et al. 2015. *Canada's National Deforestation Monitoring System: System description*. Victoria, BC: Natural Resources Canada–Canadian Forest Service, Pacific Forestry Centre. <http://cfs.nrcan.gc.ca/publications?id=36042>

- This document describes Canada's deforestation monitoring system. Note that the system was initially set up for greenhouse gas inventory and forest carbon accounting purposes, so it uses the greenhouse gas inventory and carbon accounting definition of forest.

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Report: Canada*. Rome, Italy. <http://www.fao.org/3/ca9983en/ca9983en.pdf>

- Describes the methodology used to adjust the National Forest Inventory baseline estimate of forest area.

Food and Agriculture Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Terms and definitions*. Rome, Italy. <http://www.fao.org/3/l8661en/l8661en.pdf>

- This document provides definitions of forest, afforestation, and other key terms. Note that Canada uses this definition of forest for most, but not all, purposes. Note that this report uses National Forest Inventory Baseline data. National greenhouse gas inventory and forest carbon accounting uses a slightly different definition of forest and deforestation.

NFI. 2021. *Canada's National Forest Inventory Business Process*. Victoria, BC: National Forest Inventory (NFI) Project Office. <https://nfi.nfis.org/resources/general/NFI-Business-Process-Version-8.0.pdf>

- Description of the procedure and means by which the NFI collects, validates, stores, uses and disseminates National Forest Inventory data.

National Forest Inventory. Standard reports, Table 4.0. Area (1000 ha) of forest and non-forest land in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- First remeasurement (2021) estimate of Canada's forest area.

Two Billion Trees Initiative <https://www.canada.ca/en/campaign/2-billion-trees.html>

- *Two Billion Tree Commitment*

Publications referenced when considering the potential effects of climate change on forest area:

- Johnston, M., Campagna, M., et al. 2009. *Vulnerability of Canada's tree species to climate change and management options for adaptation: An overview for policy makers and practitioners*. Ottawa, ON: Canadian Council of Forest Ministers. <http://cfs.nrcan.gc.ca/publications?id=30276>



- Natural Resources Canada–Canadian Forest Service. *Changing climate, changing forest zones*. <https://www.nrcan.gc.ca/climate-change/impacts-adaptations/climate-change-impacts-forests/impacts/changing-climate-changing-forest-zones/13093> (accessed March 26, 2020).
- Price, D.T., Alfaro, R.I., et al. 2013. Anticipating the consequences of climate change for Canada's boreal forest ecosystems. *Environmental Reviews* 21, 322–365. <http://cfs.nrcan.gc.ca/publications?id=35306>

## Deforestation and afforestation

Dyk, A., Leckie, D., et al. 2015. *Canada's National Deforestation Monitoring System: System description*. Victoria, BC: Natural Resources Canada–Canadian Forest Service, Pacific Forestry Centre. <https://cfs.nrcan.gc.ca/publications?id=36042>

- National deforestation estimates are calculated on a periodic basis using the method described in *Canada's National Deforestation Monitoring System: System description*. Figure data provided by *Canada's National Deforestation Monitoring System: System description*, special tabulation, April 27, 2021.

Environment and Climate Change Canada. 2021. *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada*. <https://unfccc.int/documents/271493> (accessed April 27, 2021).

- Environment and Climate Change Canada's *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada* is based on data and analysis from Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Reporting System.

Natural Resources Canada. *2 Billion Tree Commitment*. <https://www.canada.ca/en/campaign/2-billion-trees.html>

United Nations Framework Convention on Climate Change. *Report on the conference of the parties on its seventh session, held at Marrakesh from 29 October to 10 November 2001; Addendum, part two: Action taken by the conference of the parties*. FCCC/CP/2001/13/Add.1. Bonn, Germany. <https://unfccc.int/resource/docs/cop7/13a01.pdf>

- Natural Resources Canada–Canadian Forest Service's National Deforestation Monitoring System and National Forest Carbon Monitoring, Accounting and Reporting System both define **forest** as a minimum land area of 1 ha with tree crown cover of more than 25%, and with trees having the potential to reach a minimum height of 5 m at maturity in situ. This definition harmonizes with the definitions found in the Marrakesh Accords of the United Nations Framework Convention on Climate Change but is different from the Food and Agriculture Organization of the United Nations' definition used elsewhere in this report.
- Deforestation is the conversion of forest to non-forest land uses. Consistent with international definitions, deforestation does not include harvest followed by forest regrowth.
- Data have been updated with new mapping, affecting estimates from 2004 onward, and totals include hydroelectric reservoirs.
- Deforestation by the forestry sector includes the creation of new permanent forestry access roads and landings.
- Deforestation by the hydroelectric sector includes new hydro lines and reservoir flooding.

- Deforestation by the built-up sector includes industrial, institutional or commercial developments as well as municipal urban development, recreation (ski hills and golf courses) and transportation.
- Deforestation by the mining, oil and gas sector includes mine development for minerals and peat as well as oil and gas developments.
- Afforestation is the conversion of non-forest land to forest through the planting or seeding of trees.

## Wood volume

Environment and Climate Change Canada. 2021. *National Inventory Report 1990–2020: Greenhouse Gas Sources and Sinks in Canada*. <https://unfccc.int/documents/271493>

- Environment and Climate Change Canada's *National Inventory Report 1990–2020: Greenhouse Gas Sources and Sinks in Canada* is based on data and analysis from Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Reporting System.

Girardin, M.P., Bouriaud, O., et al. 2016. No growth stimulation of Canada's boreal forest under half-century of combined warming and CO<sub>2</sub> fertilization. *Proceedings of the National Academy of Sciences of the United States of America* 113(52), E8406–E8414. <https://doi.org/10.1073/pnas.1610156113>

Keith, H., Mackey, B.G., et al. 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. *Proceedings of the National Academy of Sciences* 106(28), 11635–11640. <https://doi.org/10.1073/pnas.0901970106>

Kurz, W., Dymond, C., et al. 2009. CBM-CFS3: A model of carbon dynamics in forestry and land-use change implementing IPCC standards. *Ecological Modelling* 220, 480–504. <https://cfs.nrcan.gc.ca/publications?id=29137>

NFI. 2021. *Canada's National Forest Inventory Business Process*. Victoria, BC: National Forest Inventory (NFI) Project Office. <https://nfi.nfis.org/resources/general/NFI-Business-Process-Version-8.0.pdf>

- Description of the procedure and means by which the NFI collects, validates, stores, uses and disseminates National Forest Inventory data.

National Forest Inventory. Standard reports, Table 15.0. Total tree volume (million m<sup>3</sup>) on forest land by forest type and age class in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T15\\_FORAGE20\\_VOL\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T15_FORAGE20_VOL_en.html) (accessed August 13, 2021).

- First remeasurement (2021) estimate of Canada's wood volume.

Methodology used to adjust NFI point estimates of wood volume to annual values:

- Canada's National Forest Inventory (NFI) completed the data processing, quality control, compilation and estimation for its first re-measurement cycle (2008 to 2017). Canada is therefore in a position to report national wood volume estimates using higher quality and more recent data than previous reports. The wood volume estimate based on these data is reported for 2017 and using this more accurate and updated value, wood volume for previous years have been adjusted according to the methods described below.
- Forecasting and backcasting from 2017 was done using above-ground biomass carbon stock estimates from Canada's National

Forest Carbon Monitoring Accounting and Reporting System (NFCMARS), NIR 2021 version. Changes in wood volume should be closely related to changes in above-ground forest biomass and above-ground forest biomass carbon. Wood volume in 2017 was used to calculate wood volume in all other reporting years using the change in above-ground biomass carbon stock relative to 2017, as follows:

- Wood volume in [year] = (wood volume in 2017) x (above-ground biomass in [year] / above-ground biomass in 2017)
- Wood volume data are typically used to derive above-ground biomass and carbon data, but the opposite was done here in order to utilize NFCMARS annual time series data from 1990 to 2019.
- In NFCMARS, the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) uses merchantable wood volume growth increment data and converts these to biomass and then carbon. However, this all happens internally in the model, and CBM-CFS3 outputs are all in units of carbon (CBM-CFS3: a model of carbon-dynamics in forestry and land-use change implementing IPCC standards. 2009. Kurz, W., et al.).
- Note that NFCMARS does not provide data for all of Canada's forests. It is assumed here that the above-ground biomass carbon stock trend in Canada's managed forests is a good predictor of wood volume trend for Canada's entire forest (managed and unmanaged).

## Is timber being harvested sustainably?

National Forestry Database. Regeneration, Table 6.4. Number of seedlings planted by ownership and species group. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

National Forest Inventory. Standard reports, Table 12.0. Area (1000 ha) of forest land by ownership in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T12\\_FOROWN\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T12_FOROWN_AREA_en.html) (accessed August 13, 2021).

- First remeasurement (2021) of forest land ownership

## Forest area harvested

National Forestry Database. Harvest, Table 5.2. Area harvested by ownership, management and harvesting method. <http://nfdp.ccfm.org/en/data/harvest.php> (accessed July 12, 2021).

- Data include provincial and territorial Crown and private forest land subject to even-aged management (clearcutting), uneven-aged management (selection cutting), and commercial thinning harvest methods.
- The graph does not display federal lands because their small area cannot be represented at the given scale.

## Forest regeneration

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Government of British Columbia. *Wildfire season summary.* <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary> (accessed April 16, 2021).

National Forestry Database. Regeneration, Table 6.3. Area of direct seeding by ownership and application method. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

National Forestry Database. Regeneration, Table 6.4. Number of seedlings planted by ownership and species group. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

National Forestry Database. Regeneration, Table 6.5. Area planted by ownership and species group. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

- Data are for forests on provincial and territorial Crown lands across Canada. Federally and privately owned lands are excluded.
- Natural regeneration is often the most efficient approach for regenerating harvested areas. One scenario is when there is abundant existing understorey regeneration and a plentiful seed supply (e.g. lowland black spruce and tolerant hardwoods, respectively). Another scenario is when tree species that can resprout from established root systems are present and desired (e.g. trembling aspen). The area of forest naturally regenerated is not reported by jurisdiction, so it is estimated as the difference between total area harvested and the area artificially regenerated.
- Artificial regeneration is suitable for sites where there is insufficient desired natural regeneration and where the objective is to achieve species composition targets required for sustainable forest management objectives.

## Volume harvested relative to the sustainable wood supply

National Forestry Database. Wood supply, Table 2. Wood supply estimates by ownership and species group. <http://nfdp.ccfm.org/en/data/woodsupply.php> (accessed July 12, 2021).

- Wood supply includes allowable annual cuts for provincial and territorial Crown lands and potential harvests for federal and private lands.
- The discrepancy between the “total industrial roundwood” supply volumes and the sum of the “total industrial softwoods” and “total industrial hardwoods” supply volumes is due to a very small amount of harvest categorized as “unspecified.” This supply represents some of the federal wood supply that has not been differentiated between “softwood” and “hardwood.”

National Forestry Database. Harvest, Table 5.1. Net merchantable volume of roundwood harvested by ownership, category and species group. <http://nfdp.ccfm.org/en/data/harvest.php> (accessed July 12, 2021).

- Harvests include total industrial roundwood and exclude fuelwood and firewood.
- The discrepancy between the harvested volumes of “total industrial roundwood” and the sum of the “total industrial softwoods” and “total industrial hardwoods” is due to a very small amount of harvest categorized as “unspecified.” Typically, this harvest occurs in mixedwood forests where neither softwood nor hardwood categories strictly apply, and it accounts for less than 1% of the harvested volume of total industrial roundwood. More information on these data can be found at the National Forestry Database.

## How does disturbance shape Canada's forests?

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- The National Forestry Database sources the latest year's fire data from the Canadian Interagency Forest Fire Centre, and all years prior from the Canadian Wildland Fire Information System.
  - The graphic shows the 2010–2020 fire data (i.e. number of fires and area burned) broken down by cause class. *The State of Canada's Forests: Annual Report 2021* does contain 2020 data, as published on the National Forestry Database website; however, these data are preliminary and the breakdown by cause class has not been finalized. As a result, note that the “Unspecified” category for 2020 is overrepresented in the calculations.
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- Photo credit:**
- Photo of trees killed by the spruce budworm. Photo by Christian Hébert.
- Forest insects**
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#### Notes:

- Forest area disturbed by defoliators (e.g. budworms, *Lymantria dispar*) includes only areas with tree mortality or moderate to severe defoliation. Defoliation does not always result in mortality. Several factors, including defoliation severity, duration, and frequency, or presence of other stressors (e.g. drought), can affect the level of mortality.
- Forest area disturbed by bark beetles (e.g. mountain pine beetle, spruce beetle) is derived from aerial surveys that map trees that are dead or dying from successful beetle attack.
- Summing the areas affected by more than one insect to create a grand total can result in an overestimate if more than one insect species occurs in the same stand in the same year. For example, in a mixedwood forest, spruce budworm may defoliate balsam fir in the same stand where forest tent caterpillar is defoliating the aspen trees.

#### Forest diseases

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#### Photo credit:

- *Lachnellula willkommii* photo by David W. Malloch.

#### Forest fires

Canadian Broadcasting Corporation. July 5, 2020. Worst year in a decade for forest fires in Quebec and COVID-19 is partly to blame, say firefighters. <https://www.cbc.ca/news/canada/montreal/quebec-forest-fires-only-getting-worse-researcher-says-1.5638168>

CTV News, July 2, 2020. It's been a bad season for forest fires in N.B., and it's not over yet. <https://atlantic.ctvnews.ca/it-s-been-a-bad-season-for-forest-fires-in-n-b-and-it-s-not-over-yet-1.5009097>

Short, D., November 1, 2020. 2020 Alberta wildfire season well below five-year average. *Edmonton Journal*. <https://edmontonjournal.com/news/local-news/2020-alberta-wildfire-season-well-below-five-year-average>

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#### Forest carbon emissions and removals

Environment and Climate Change Canada. 2021. *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada*. <https://unfccc.int/documents/271493> (accessed April 21, 2021).

- This indicator is estimated annually using Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Reporting System. The system integrates information about forest inventories, forest growth, natural disturbances, forest management activities and land-use change to evaluate carbon stocks, stock changes and emissions of non-CO<sub>2</sub> greenhouse gases (carbon monoxide, methane and nitrous oxide) in Canada's managed forests. The system estimates changes in biomass, woody debris, litter and soil carbon pools. The system also estimates transfers to the forest product sector and the fate of harvested wood products manufactured from wood harvested in Canada since 1900, including carbon storage and emissions resulting from these products regardless of where in the world these emissions occur.



- “Managed land” includes all lands managed for production of any wood products or wood-based bioenergy, for protection from natural disturbances, or for the conservation of ecological values. Within those managed lands, “forest” includes all areas of 1 hectare or more having the potential to develop forest cover, with a minimum crown closure of 25% and a minimum tree height of 5 metres at maturity in situ.
- Managed forest land is further divided into an anthropogenic partition (those lands predominantly influenced by human activities) and a natural partition (those lands predominantly influenced by large-scale natural disturbances). When stands are affected by stand-replacing wildfires, the emissions and subsequent removals during post-fire regrowth are reported in the “natural partition.” When regrowing stands reach commercial maturity, the emissions and removals are reported in the “anthropogenic partition.” Stands affected by partial disturbances that cause more than 20% mortality are reported in the natural partition until the biomass reaches pre-disturbance levels.
- The first figure includes the entire managed forest, while the second figure includes only the anthropogenic partition (areas impacted by management and by insect disturbances causing 20% or less tree mortality), and the third figure includes only the natural partition (areas impacted by stand-replacing wildfires or insect disturbances causing greater than 20% tree mortality).
- Harvested wood product emissions are estimated using the “simple decay” approach of the Intergovernmental Panel on Climate Change (IPCC) and include annual emissions from all wood harvested in Canada and removed from the forest to produce products or energy since 1900, regardless of its current location. Transfers of wood and paper products to landfills are assumed to instantly oxidize as CO<sub>2</sub>.
- Starting in 2015, international greenhouse gas (GHG) reporting guidelines changed with respect to harvested wood products. Accordingly, Canada reports the net GHG balance of forested ecosystems and the net GHG balance from harvested wood products. In previous years, all wood removed from the forest was assumed to instantly release all carbon to the atmosphere, despite the long-term storage of carbon in houses and other long-lived wood products. Reporting the fate of carbon in harvested wood products encourages both the sustainable management of forests and the management of harvested wood products aimed at extending carbon storage.
- For forest lands affected by land-use change, the deforestation and afforestation figures reflect annual rates. Figures for CO<sub>2</sub>e emissions and removals reflect the current year plus the emissions in the reporting year from lands that were converted from or to forest in the previous 20 years. Thus, the figures for CO<sub>2</sub>e emissions include residual emissions from areas deforested over the past 20 years, and the figures for CO<sub>2</sub>e removals in the reporting year include removals by all areas afforested over the past 20 years.
- Emissions bear a positive sign. Removals bear a negative sign.

#### Additional information can be found at:

- Kurz, W., Shaw, C., et al. 2013. Carbon in Canada’s boreal forest: A synthesis. *Environmental Reviews* 21, 260–292. <https://cdnsiencepub.com/doi/full/10.1139/er-2013-0041>
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## How do forests benefit Canadians?

### Forest-reliant communities

- Natural Resources Canada–Canadian Forest Service. Calculations based on Statistics Canada’s *2016 Census of Population*.
- Statistics Canada. 2016 Census of Population. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm>
  - The **Forest communities** indicator is based on Statistics Canada’s census subdivisions. A subdivision is “the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g. Indian reserves, Indian settlements and unorganized territories).” Since there is no standardized definition of community across provinces and territories, using census subdivisions allows for a consistent approach in reporting over time. In 2016, Canada was divided into 5,161 census subdivisions.
  - In 2019, the Canadian Forest Service (CFS) adopted a new method for identifying communities that rely on economic activity from natural resource sectors. The method is based on the sector dependence index (SDI), a well-established approach to assess the relative importance of a given sector to local economies. In addition to considering the share of total income generated from the forest sector, CFS used the SDI to establish if the forest sector provides a high number of jobs relative to the average Canadian community. The calculations also established if there are many other sectors that are also a source of jobs for local residents.

- In 2018, *The State of Canada's Forests: Annual Report* noted that the forest sector was a major source of income for 105 census subdivisions in Canada. In 2019, following the new method, it reported that 300 Canadian communities rely on the forest sector for a significant share of economic activity.
- Employment data from Statistics Canada's 2016 *Census of Population* refers to the number of people employed, not in the labour force (which includes those people unemployed).

### **Total employment**

Statistics Canada. Table 36-10-0489-01 (formerly CANSIM 383-0031): Labour statistics consistent with the System of National Accounts (SNA), by job category and industry. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610048901> (accessed May 20, 2021).

- Data include NAICS 113, 1153, 321, and 322.
- Employment includes jobs held by people employed directly in the following industries: forestry and logging, support activities for forestry, pulp and paper product manufacturing, and wood product manufacturing.
- Natural Resources Canada–Canadian Forest Service prefers to use employment data from Statistics Canada's System of National Accounts (SNA) because these data are linked to the underlying framework used to compile the Canadian System of National Accounts.

### **Nominal GDP**

Statistics Canada. Table 36-10-0401-01 (formerly CANSIM 379-0029) Gross domestic product (GDP) at basic prices by industry (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610040101> (accessed March 30, 2021).

- For nominal GDP up to (and including) 2017.

Statistics Canada. Table 36-10-0434-04 Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043404> (accessed May 11, 2021).

Statistics Canada. Table 18-10-0267-01 Industrial product price index, by industry, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026701> (accessed March 30, 2021).

Statistics Canada. Table 18-10-0268-01 Raw materials price index, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026801> (accessed March 31, 2021).

Statistics Canada. Table 18-10-0265-01 Industrial product price index, by major product group, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026501> (accessed March 30, 2021).

- Natural Resources Canada–Canadian Forest Service's calculations for 2018–2020 nominal GDP are based on Statistics Canada's tables 36-10-0434-04, 18-10-0267-01, 18-10-0268-01 and 18-10-0265-01: GDP in 2012 constant prices, and estimated industry price deflators indexed to 2012.

Tree cities of the world. <https://treecitiesoftheworld.org/>

## **Forest sector employment**

### **Total employment**

Statistics Canada. 2016 *Census of Population*, customized tables. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm> (accessed March 17, 2020).

Statistics Canada. Table 36-10-0489-01 (formerly CANSIM 383-0031): Labour statistics consistent with the System of National Accounts (SNA), by job category and industry. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610048901> (accessed May 20, 2021).

- Data include NAICS 113, 1153, 321, and 322.
- Employment includes jobs held by people employed directly in the following industries: forestry and logging, support activities for forestry, pulp and paper product manufacturing, and wood product manufacturing.
- Natural Resources Canada–Canadian Forest Service prefers to use employment data from Statistics Canada's System of National Accounts (SNA) because these data are linked to the underlying framework used to compile the Canadian System of National Accounts.

### **Indigenous employment in the forest sector**

Statistics Canada. 2016 *Census of Population* (special extraction, April 20, 2018).

- Natural Resources Canada–Canadian Forest Service calculations for Indigenous employment are based on Statistics Canada's 2016 *Census of Population*.
- These values refer to the number of people employed, not in the labour force, which includes those unemployed.
- Indigenous refers to people who are First Nations (North American Indian), Métis or Inuk (Inuit). Indigenous also refers to people who are Registered or Treaty Indians (that is, registered under the *Indian Act*) and/or those who have membership in a First Nation or Indian band.

### **Forest sector average earnings**

Statistics Canada. Table 14-10-0204-01 (formerly CANSIM 281-0027): Average weekly earnings by industry, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020401> (accessed March 30, 2021).

Statistics Canada. Table 18-10-0005-01 (formerly CANSIM 326-0021): Consumer Price Index, annual average, not seasonally adjusted. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501> (accessed March 30, 2021).

Statistics Canada. Table 14-10-0202-01 (formerly CANSIM 281-0024): Employment by industry, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020201> (accessed March 30, 2021).

- The data exclude overtime.
- The 2020 average earnings were calculated using the Consumer Price Index re-based to 2012 values. This method matches the one used for the previous report in which all data prior to 2019 were updated as well according to current method.
- Issues of *The State of Canada's Forests: Annual Report* prior to 2018 calculated real average earnings using GDP at market prices as the measure of inflation. More recent issues of *The State of Canada's Forests: Annual Report* use the Consumer Price Index (including volatile commodities) because it is a better indicator of the spending power of Canadians.



### Additional information can be found at:

- Forest2Market. January 11, 2021. *18 Predictions for the Global Forest, Pulp & Paper, and Chemicals Industries in 2021* (accessed April 30, 2021). <https://www.forest2market.com/blog/18-predictions-for-the-global-forest-pulp-paper-and-chemicals-industries-in-2021>
- Moody's. September 16, 2020. *Global paper, packaging and forest products industry outlook revised to positive as strong wood prices boost earnings* (accessed April 30, 2021). [https://www.moody's.com/research/Moodys-Global-paper-packaging-and-forest-products-industry-outlook-revised--PBC\\_1245764](https://www.moody's.com/research/Moodys-Global-paper-packaging-and-forest-products-industry-outlook-revised--PBC_1245764)
- Moody's. March 23, 2021. *Global paper, packaging and forest products outlook remains positive as operating earnings increase on higher demand* (accessed April 30, 2021). [https://www.moody's.com/research/Moodys-Global-paper-packaging-and-forest-products-outlook-remains-positive--PBC\\_1272605?cid=7QFRKQSZ021](https://www.moody's.com/research/Moodys-Global-paper-packaging-and-forest-products-outlook-remains-positive--PBC_1272605?cid=7QFRKQSZ021)
- Natural Resources Canada–Canadian Forest Service. Industry – Overview. <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/forest-industry-trade/overview-canadas-forest-industry/13311>
- Pulp & Paper Canada. *Market outlook: Pulp perspectives 2021. Pulp market predictions, the pandemic effect, China's fibre needs and next-gen opportunities*. <https://www.pulpandpapercanada.com/market-outlook-pulp-perspectives-2021/> (accessed April 30, 2021).

### Forest communities

#### Forest-reliant communities

- Natural Resources Canada–Canadian Forest Service. Calculations based on Statistics Canada's *2016 Census of Population*.
- Statistics Canada. *2016 Census of Population*. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm>
  - The **Forest communities** indicator is based on Statistics Canada's census subdivisions. A subdivision is "the general term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g. Indian reserves, Indian settlements and unorganized territories)." Since there is no standardized definition of community across provinces and territories, using census subdivisions allows for a consistent approach in reporting over time. In 2016, Canada was divided into 5,161 census subdivisions.
  - In 2019, the Canadian Forest Service (CFS) adopted a new method for identifying communities that rely on economic activity from natural resource sectors. The method is based on the sector dependence index (SDI), a well-established approach to assess the relative importance of a given sector to local economies. In addition to considering the share of total income generated from the forest sector, CFS used the SDI to establish if the forest sector provides a high number of jobs relative to the average Canadian community. The calculations also established if there are many other sectors that are also a source of jobs for local residents.
  - In 2018, *The State of Canada's Forests: Annual Report* noted that the forest sector was a major source of income for 105 census subdivisions in Canada. In 2019, following the new method, it reported that 300 Canadian communities rely on the forest sector for a significant share of economic activity.
  - Employment data from Statistics Canada's *2016 Census of Population* refers to the number of people employed, not in the labour force (which includes those people unemployed).

### How does the forest sector contribute to Canada's economy?

National Forestry Database. Revenues, Table 7. Statement of revenues from the sale of timber from provincial Crown land. <http://nfdp.ccfm.org/en/data/revenues.php> (accessed July 12, 2021).

Statistics Canada. Table 36-10-0489-01: Labour statistics consistent with the System of National Accounts (SNA), by job category and industry. Retrieved May 5, 2021 at DOI: <https://doi.org/10.25318/3610048901-eng>

Statistics Canada. Trade Data Online. HS Codes 44, 47, 48. <https://www.ic.gc.ca/eic/site/tldo-dcd.nsf/eng/home> (accessed May 5, 2021).

Statistics Canada. Merchandise trade data (special extraction, February 12, 2021).

- Total all forest products includes only HS Codes 44, 47, and 48.

### Forest sector gross domestic product

#### Nominal GDP

Statistics Canada. Table 36-10-0401-01 (formerly CANSIM 379-0029): Gross domestic product (GDP) at basic prices by industry (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610040101> (accessed March 30, 2021).

- For nominal GDP up to (and including) 2017.

Statistics Canada. Table 36-10-0434-04: Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043404> (accessed May 11, 2021).

Statistics Canada. Table 18-10-0267-01: Industrial product price index, by industry, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026701> (accessed March 30, 2021).

Statistics Canada. Table 18-10-0268-01: Raw materials price index, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026801> (accessed March 31, 2021).

Statistics Canada. Table 18-10-0265-01: Industrial product price index, by major product group, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026501> (accessed March 30, 2021).

- Natural Resources Canada–Canadian Forest Service's calculations for 2018–2020 nominal GDP are based on Statistics Canada's tables 36-10-0434-04, 18-10-0267-01, 18-10-0268-01 and 18-10-0265-01: GDP in 2012 constant prices and estimated industry price deflators indexed to 2012.

#### Real GDP

Statistics Canada. Table 36-10-0434-04: Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043404> (accessed May 11, 2021).

- Real GDP in 2012 constant prices.
- Nominal and real GDP vary in that real values are adjusted for inflation whereas nominal values are not. Therefore, real GDP is used to account for differences between time periods (e.g. comparing 2019 and 2020 GDP).

- Data from Statistics Canada's Natural Resources Satellite Account (NRSA) are a key source of information on the economic contribution of the forest sector in Canada. The NRSA, the result of collaboration between Natural Resources Canada and Statistics Canada, is able to capture economic activity in forest industry segments that have traditionally been difficult to measure, such as wood furniture manufacturing. According to data from the NRSA, the forest sector directly accounted for \$27.97 billion to Canada's nominal GDP (1.6% of total GDP) in 2020.

## Production of forest products

APA – The Engineered Wood Association. Quarterly production reports.

- For production data of structural panels (plywood and oriented strand board).

Pulp and Paper Products Council.

- For production data of newsprint, printing and writing paper, and wood pulp.

Statistics Canada. Table 16-10-0045-01: Lumber, production, shipments and stocks, monthly (x 1,000). <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3030064> (accessed April 8, 2021).

Statistics Canada. Table 16-10-0017-01: Lumber production, shipments, and stocks by species, monthly (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610001701> (accessed March 4, 2021).

- For production data of lumber, which includes total softwood production for Canada
- In January 2019, Statistics Canada noted that they made changes to the sampling and estimation methods for the monthly Sawmills survey, which is the source of the softwood lumber production data for this indicator. As a result of these changes, Statistics Canada replaced Table 16-10-0017-01 with Table 16-10-0045-01 as of January 2019. See <https://www150.statcan.gc.ca/n1/daily-quotidien/200302/dq200302a-eng.htm> for more information.
- Lumber production data for years 2010 to 2013 (inclusive) comes from the older Table 16-10-0045-01.
- Lumber production data for years 2014 to 2020 (inclusive) comes from the newer Table 16-10-0017-01.
- Because of changes in sampling and estimation methods in the Sawmills survey, readers should exercise caution in comparing data from different sources directly.

## Exports of forest products

IHS Connect. Global Trade Atlas (extracted April 29, 2021)

- Softwood lumber includes HS Codes 440710, 440711, 440712, and 440719.
- Global value comparisons are on a United States dollar basis.

Statistics Canada. Merchandise trade data (special extraction, February 12, 2021).

- Total all forest products includes only HS Codes 44, 47, and 48.

## How is the forest sector changing?

Environment and Climate Change Canada. 2019. *Economic study of the Canadian plastic industry, markets and waste: Summary report to Environment and Climate Change Canada*. Gatineau, QC. [https://publications.gc.ca/collections/collection\\_2019/eccc/En4-366-1-2019-eng.pdf](https://publications.gc.ca/collections/collection_2019/eccc/En4-366-1-2019-eng.pdf)

Natural Resources Canada. *Bioenergy from biomass*. <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/forest-industry-trade/forest-bioeconomy-bioenergy-biop/bioenergy-biomass/13323>

Pulp and Paper Products Council. *World Printing & Writing Report – December 2020*.

## Forest sector financial performance

Statistics Canada. Quarterly balance sheet and income statement, by North American Industry Classification System (NAICS) (special extraction, March 10, 2020).

- For data before and including 2019, as Statistics Canada discontinued the use and update of this source (to be replaced with Table 33-10-0225-01).

Statistics Canada. Table 33-10-0225-01: Quarterly balance sheet, income statement and selected financial ratios, by non-financial industries, non-seasonally adjusted (x 1,000,000) <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3310022501> (accessed April 7, 2021).

- For data including and beyond 2020.

## Forest sector secondary manufacturing

Industry Canada. Trade data online. <https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?productType=NAICS&lang=eng> (accessed April 27, 2021).

Statistics Canada. Table 16-10-0047-01 (formerly CANSIM 304-0014): Manufacturers' sales, inventories, orders and inventory to sales ratios, by industry (dollars unless otherwise noted) <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610004701> (accessed April 27, 2021).

Statistics Canada. Table 36-10-0434-06: Gross domestic product (GDP) at basic prices, by industry, annual average, industry detail (x 1,000,000), Canada. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043406> (accessed April 27, 2021).

## Notes:

- Real GDP in 2012 constant prices.
- Industry Canada defines value added as a measure of net output, meaning gross output minus the purchased inputs that have been embodied in the value of the product.
- Domestic consumption is calculated as domestic sales minus exports plus imports.
- Additional information on the regional secondary wood manufacturing industries can be found within these six publications:

Bogdanski, B.E.C., Sun, L., et al. 2020. *Secondary manufacturing of solid wood products in Ontario 2017: Structure and economic contribution* (Information report BC-X-451). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>



Bogdanski, B.E.C., Wong, L., et al. 2020. *Secondary manufacturing of solid wood products in Quebec 2017: Structure and economic contribution* (Information report BC-X-453). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>

Sun, L., and Bogdanski, B.E.C. 2019. *Secondary manufacturing of solid wood product in Alberta 2017: Structure and economic contribution* (Information report BC-X-448). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>

Sun, L., Bogdanski, B.E.C., et al. 2019. *Secondary manufacturing of solid wood products in Saskatchewan and Manitoba 2017: Structure and economic contribution* (Information report BC-X-449). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>

Wong, L., Stennes, B., et al. 2019. *Secondary manufacturing of solid wood products in British Columbia 2016: Structure, economic contribution and changes since 1990* (Information report BC-X-447). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>

Wong, L., and Bogdanski, B.E.C. 2019. *Secondary manufacturing of solid wood product in New Brunswick and Nova Scotia 2017: Structure and economic contribution* (Information report BC-X-452). Retrieved from <https://cfs.nrcan.gc.ca/publications/centre/pfc?sort=date&format=citation>

## Forest sector carbon emissions

Natural Resources Canada. Comprehensive Energy Use Database. [https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive\\_tables/list.cfm](https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm) (accessed May 27, 2021).

- NRCan's Comprehensive Energy Use Database is compiled using the following sources:
  - The Canadian Energy and Emissions Data Centre (CEEDC), Simon Fraser University. 2020.
  - Statistics Canada. 2020. *Report on Energy Supply and Demand in Canada 2000–2018*.
  - Natural Resources Canada. 2020. Industrial End-Use Model.
  - Environment and Climate Change Canada. 2020. *National Inventory Report 2000–2018: Greenhouse Gas Sources and Sinks in Canada*.

## Notes:

- The Office of Energy Efficiency at Natural Resources Canada (NRCan) has changed the base year related to its National Energy Use Database (NEUD) from 1990 to 2000, beginning with the release of 2018 data. This change in methodology has resulted in minor changes in the energy use and GHG emissions data back to 2000. This rebasing is to ensure that NEUD reflects developments in trends and structures of Canada's energy end use and efficiency across sectors. It also synchronizes Canada's energy use data reporting with changes recently made by the International Energy Agency. While new estimates are no longer made available for years prior to 2000, data with the new base year are expected to better service the development, implementation and monitoring of government policies, programs and projects; evidence-based decision making; industrial and market analysis and projection; and energy use literacy, education and stakeholder engagement.

## Statistical profiles

### Population

Statistics Canada. Table 17-10-0009-01 (formerly CANSIM 051-0005): Population estimates, quarterly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901> (accessed April 6, 2021).

### Forest inventory

#### Forest area by classification

Food and Agricultural Organization of the United Nations. 2020. *Global Forest Resources Assessment 2020: Report: Canada*. Rome, Italy. <http://www.fao.org/3/ca9983en/ca9983en.pdf>

National Forest Inventory. Standard reports, Table 4.0. Area (1000 ha) of forest and non-forest land in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T4\\_FOR\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T4_FOR_AREA_en.html) (accessed August 13, 2021).

- First remeasurement (2021) estimate of Canada's forest area
- The National Forest Inventory uses the following definitions from the Food and Agriculture Organization of the United Nations (FAO):
  - **Forest land** – land spanning more than 0.5 hectares where the tree canopy covers more than 10% of the total land area and the trees can grow to a height of more than 5 metres. It does not include land that is predominantly urban or used for agricultural purposes.
  - **Other land with tree cover** – areas of land where tree canopies cover more than 10% of the total area and the trees, when mature, can grow to a height of at least 5 metres. Includes treed areas on farms, in parks and gardens, and around buildings. Also includes tree plantations established mainly for purposes other than wood production, such as fruit orchards.
  - **Other wooded land** – areas of land where: 1) tree canopies cover 5% –10% of the total area and the trees, when mature, can grow to a height above 5 metres; or 2) shrubs, bushes and trees together cover more than 10% of the area. These areas include treed wetlands (swamps) and land with slow-growing and scattered trees. They do not include land that is predominantly agricultural or urban.

#### Forest area change

Environment and Climate Change Canada. 2021. *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada*. <https://unfccc.int/documents/271493> (accessed 21 April 2021).

- Environment and Climate Change Canada's *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada* uses Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Report System.

#### Forest type

National Forest Inventory. Standard reports, Table 5.0 Area (1000 ha) of forest land by forest type and age class in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T5\\_FORAGE20\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T5_FORAGE20_AREA_en.html) (accessed August 13, 2021).

#### Forest ownership

National Forest Inventory. Standard reports, Table 12.0 Area (1000 ha) of forest land by ownership in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T12\\_FOROWN\\_AREA\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T12_FOROWN_AREA_en.html) (accessed August 13, 2021).

## Growing stock

National Forest Inventory. Standard reports, Table 15.0. Total tree volume (million m<sup>3</sup>) on forest land by forest type and age class in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T15\\_FORAGE20\\_VOL\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T15_FORAGE20_VOL_en.html) (accessed August 13, 2021).

National Forest Inventory. Standard reports, Table 16.0. Total tree volume (million m<sup>3</sup>) by species group and age class in Canada. [https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA\\_T16\\_LSAGE20\\_VOL\\_en.html](https://nfi.nfis.org/resources/general/summaries/t1/en/CA/html/CA_T16_LSAGE20_VOL_en.html) (accessed August 13, 2021).

## Disturbance

### Insects

National Forestry Database. Forest insects, Table 4. Area of moderate to severe defoliation (including beetle-killed trees) by insects. <http://nfdp.ccfm.org/en/data/insects.php> (accessed July 12, 2021).

- Forest area disturbed by defoliators (e.g. budworms, *Lymantria dispar*) includes only areas with tree mortality or moderate to severe defoliation. Defoliation does not always result in mortality. Several factors, including defoliation severity, duration, and frequency, or presence of other stressors (e.g. drought), can affect the level of mortality.
- Forest area disturbed by bark beetles (e.g. mountain pine beetle, spruce beetle) is derived from aerial surveys that map trees that are dead or dying from successful beetle attack.
- Summing the areas affected by more than one insect to create a grand total can result in an overestimate if more than one insect species occurs in the same stand in the same year. For example, in a mixedwood forest, spruce budworm may defoliate balsam fir in the same stand where forest tent caterpillar is defoliating the aspen trees.

### Fire

National Forestry Database. Forest fires, Table 3.1.1 Number of fires by cause class. <http://nfdp.ccfm.org/en/data/fires.php> (accessed July 12, 2021).

National Forestry Database. Forest fires, Table 3.2.1 Area burned by cause class. <http://nfdp.ccfm.org/en/data/fires.php> (accessed July 12, 2021).

- The National Forestry Database sources the latest year's fire data from the Canadian Interagency Forest Fire Centre and all years prior from the Canadian Wildland Fire Information System.

## Forest management

### Harvesting

National Forestry Database. Harvest, Table 5.1 Net merchantable volume of roundwood harvested by ownership, category and species group. <http://nfdp.ccfm.org/en/data/harvest.php> (accessed July 12, 2021).

National Forestry Database. Harvest, Table 5.2 Area harvested by ownership, management and harvesting method. <http://nfdp.ccfm.org/en/data/harvest.php> (accessed July 12, 2021).

- The national and provincial/territorial profile figures for harvesting volumes include data for industrial roundwood, fuel wood and firewood from provincial and territorial Crown land and from private land.
- Area harvested data include federal, provincial, territorial and private forest lands.

## Regeneration

National Forestry Database. Regeneration, Table 6.3 Area of direct seeding by ownership and application method. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

National Forestry Database. Regeneration, Table 6.5 Area planted by ownership and species group. <http://nfdp.ccfm.org/en/data/regeneration.php> (accessed July 12, 2021).

### Third-party certification

Certification Canada. Canadian statistics. <http://certificationcanada.org/en/statistics/canadian-statistics/> (accessed March 16, 2021).

- If a forest area has been certified to more than one of the three sustainable forest management standards (Canadian Standards Association, Sustainable Forestry Initiative, and Forest Stewardship Council), the area is counted only once. Therefore, the total certification for sustainable forest management standards may be less than the sum of the individual totals for these standards. The independently certified forest area is calculated using Forest Management Units, which include streams, lakes, rivers and roads.

### Protected forest

IUCN: International Union for Conservation of Nature (<http://www.iucn.org>).

- Data obtained from the Canadian Protected and Conserved Areas Database (CPCAD) (<https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/protected-conserved-areas-database.html>).

## Greenhouse gas inventory

Environment and Climate Change Canada. 2021. *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada*. <https://unfccc.int/documents/271493> (accessed April 27, 2021).

- Environment and Climate Change Canada's *National Inventory Report 1990–2019: Greenhouse Gas Sources and Sinks in Canada* is based on data and analysis from Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Reporting System.
- For forest lands affected by land-use change, the deforestation and afforestation figures reflect annual rates. Figures for CO<sub>2</sub>e equivalent (CO<sub>2</sub>e) emissions and removals reflect the current year plus the previous 20 years. Thus, the figures for CO<sub>2</sub>e emissions include residual emissions from areas deforested over the past 20 years, and the figures for CO<sub>2</sub>e removals include ongoing removals by all areas afforested over the past 20 years.
- See the sources and information for the sustainability indicator **Forest carbon emissions and removals** for more detail.

## Domestic economic impact

### Canadian housing starts

Statistics Canada. Table 34-10-0126-01 (formerly CANSIM 0277-0009): Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410012601> (accessed April 5, 2021).



### **Contribution to nominal GDP**

Statistics Canada. Table 36-10-0434-04: Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043404> (accessed May 11, 2021).

Statistics Canada. Table 18-10-0267-01: Industrial product price index, by industry, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026701> (accessed March 30, 2021).

Statistics Canada. Table 18-10-0268-01: Raw materials price index, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026801> (accessed March 31, 2021).

Statistics Canada. Table 18-10-0265-01: Industrial product price index, by major product group, monthly. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810026501> (accessed March 30, 2021).

- Natural Resources Canada–Canadian Forest Service's calculations for the latest year's nominal GDP are based on Statistics Canada's tables 36-10-0434-04, 18-10-0267-01, 18-10-0268-01 and 18-10-0265-01: GDP in 2012 constant prices and on estimated industry price deflators indexed to 2012.
- Data from Statistics Canada's Natural Resources Satellite Account (NRSA) are a key source of information on the economic contribution of the forest sector in Canada. The NRSA, the result of collaboration between Natural Resources Canada and Statistics Canada, is able to capture economic activity in forest industry segments that have traditionally been difficult to measure, such as wood furniture manufacturing. According to data from the NRSA, the forest sector directly accounted for \$27.97 billion to Canada's nominal GDP (1.6% of total GDP) in 2020.

### **Contribution to real GDP**

Statistics Canada. Table 36-10-0434-04: Gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610043404> (accessed May 11, 2021).

- Real GDP in 2012 constant prices
- Nominal and real GDP vary in that real values are adjusted for inflation whereas nominal values are not. Therefore, real GDP is used to account for differences between time periods (e.g. comparing 2019 and 2020 GDP).

### **Revenue from goods manufactured**

Statistics Canada. Table 16-10-0117-01 (formerly CANSIM 301-0008): Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS) (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610011701> (accessed May 18, 2021).

Statistics Canada. Table 16-10-0114-01 (formerly CANSIM 301-0009): Logging industries, principal statistics by North American Industry Classification System (NAICS) (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610011401> (accessed May 18, 2021).

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

## **Forest sector employment**

### **Employment**

Statistics Canada. Table 14-10-0202-01 (formerly CANSIM 281-0024): Employment by industry, annual. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020201> (accessed March 30, 2021).

Statistics Canada. Table 36-10-0489-01 (formerly CANSIM 383-0031): Labour statistics consistent with the System of National Accounts (SNA), by job category and industry. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610048901> (accessed May 20, 2021).

Statistics Canada. Table 38-10-0285-01 (formerly CANSIM 388-0010): Natural resources satellite account, indicators (x 1,000,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810028501> (accessed July 7, 2021).

- Employment includes jobs held by people employed directly in the following subsectors: forestry and logging, support activities for forestry, pulp and paper product manufacturing, and wood product manufacturing.
- Natural Resources Canada prefers to use employment data from Statistics Canada's System of National Accounts (SNA) because these data are linked to the underlying framework used to compile the Canadian System of Natural Economic Accounts (e.g. GDP, national wealth).
- Employment data can also be sourced from Statistics Canada's Survey of Employment, Payrolls and Hours (SEPH) and the Natural Resources Satellite Account (NRSA).
  - SEPH data focus on industry and can be used for comparing direct company employment in forestry with that in other sectors.
  - Data from Statistics Canada's NRSA are a key source of information on the economic contribution of the forest sector in Canada. The NRSA is able to capture economic activity in forest industry segments that have traditionally been difficult to measure, such as wood furniture manufacturing.
- Natural Resources Canada–Canadian Forest Service calculated indirect employment using Statistics Canada's National Symmetric Input-Output Tables (15-207-XCB) and National Multipliers (15F0046XDB).
  - The calculations for indirect employment were changed in 2019 to better account for employment in the forest sector. Retroactive changes to previous years' data have not been applied at this time.

### **Wages and salaries**

Statistics Canada. Table 16-10-0117-01 (formerly CANSIM 301-0008): Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS) (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610011701> (accessed May 18, 2021).

Statistics Canada. Table 16-10-0114-01 (formerly CANSIM 301-0009): Logging industries, principal statistics by North American Industry Classification System (NAICS) (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610011401> (accessed May 18, 2021).

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

## Trade

Statistics Canada. Merchandise trade data (special extraction, February 12, 2021).

- Balance of trade is the difference between the value of the goods and services that a country exports domestically and the value of the goods and services that it imports. If a country's exports exceed its imports, it has a trade surplus. If its imports exceed exports, the country has a trade deficit.

## Domestic production and investment

### Production

APA – The Engineered Wood Association. Quarterly production reports.

- For production data of structural panels (plywood and oriented strand board).

Pulp and Paper Products Council.

- For production data of newsprint, printing and writing paper, and wood pulp.

Statistics Canada. Table 16-10-0017-01: Lumber production, shipments, and stocks by species, monthly (x 1,000). <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1610001701> (accessed March 4, 2021).

- For production data of lumber, which include total softwood production for Canada.
- In January 2019, Statistics Canada noted that they made changes to the sampling and estimation methods for the monthly Sawmills survey, which is the source of the softwood lumber production data for this indicator. As a result of these changes, Statistics Canada replaced Table 16-10-0017-01 with Table 16-10-0045-01 as of January 2019. See <https://www150.statcan.gc.ca/n1/daily-quotidien/200302/dq200302a-eng.htm> for more information.
- Because of changes in sampling and estimation methods in the Sawmills survey, readers should exercise caution in comparing data from different sources directly.

## Capital expenditures and repair expenditures

Statistics Canada. Table 34-10-0035-01 (formerly CANSIM 029-0045): Capital and repair expenditures, non-residential tangible assets, by industry and geography (x 1,000,000) <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410003501> (accessed May 28, 2021).

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

## Domestic consumption

Consumption figures for a range of products, calculated by Natural Resources Canada–Canadian Forest Service

- This information is available only at the national level.
- Domestic consumption of wood pulp (tonnes) contains Natural Resources Canada–Canadian Forest Service estimates of import volumes that may be subject to revision.



