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FOREST MANAGEMENT AND DISTURBANCES

CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

Canada

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

FOREST MANAGEMENT AND DISTURBANCES

March 2024

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Forest management and disturbances

In 2022, Canada's forests made up an area of approximately 3.7 million square kilometres (about 40% of Canada's land area). These forests account for approximately 9% of the world's forests. Much of it grows in the boreal zone, throughout which over 2.8 million square kilometres of forest are interspersed with lakes, wetlands, and other ecosystems. Canada's rich forest ecosystems offer significant environmental, social and cultural benefits, as well as opportunities for responsible economic development.[1] This indicator presents a series of measures covering timber harvest, forest disturbances, and forest regeneration.

Timber harvest

This section compares the total amount of wood harvested with the sustainable wood supply. To ensure that forests can continue to provide timber, harvests must remain within sustainable limits. The sustainable wood supply is defined as the potential volume of timber which can be harvested sustainably as determined by a complex analysis of ecological, economic, and social considerations. The volume of wood harvested should remain at or below the sustainable wood supply, and it is usually well below these limits.

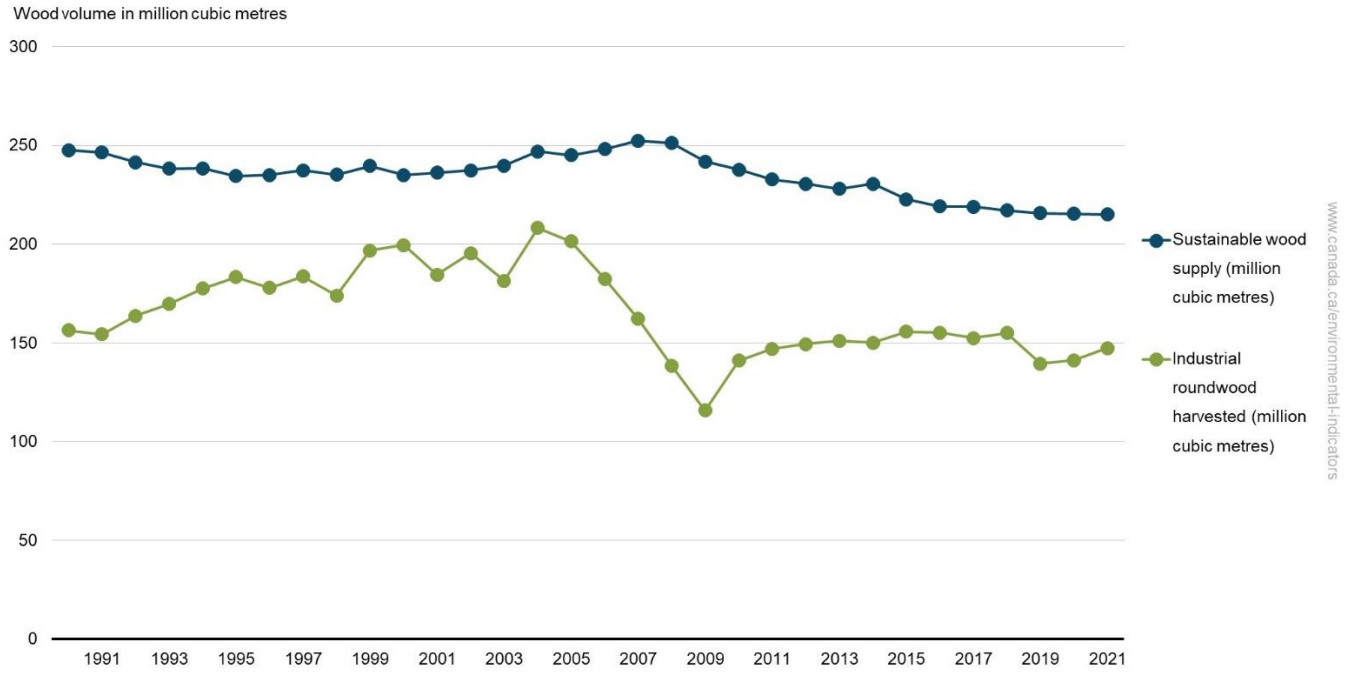
Annual timber harvest compared to the sustainable wood supply

Key results

In 2021:

- Canada's sustainable wood supply was approximately 215 million cubic metres
- the amount of industrial roundwood harvested in 2021 was 147 million cubic metres, which represents approximately 68% of the sustainable wood supply

Figure 1. Maximum sustainable wood supply and annual harvest of industrial roundwood, Canada, 1990 to 2021



Data for Figure 1

[1] Natural Resources Canada (2024) The State of Canada's Forests Annual Report. Retrieved on March 25, 2024.

Note: Sustainable wood supply data presented are for industrial roundwood only. Harvested industrial roundwood is intended to be delivered to a mill (for example, logs and bolts, and pulpwood) and also includes poles and pilings.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

The annual harvest of industrial roundwood reached a peak of 208 million cubic metres in 2004, declined to a low of 116 million cubic metres in 2009, then increased to reach approximately 147 million cubic metres in 2021. This pattern is mostly the result of economic factors, such as the collapse in the United States housing market in 2008 and subsequent global economic downturn that led to reduced demands for Canadian lumber and pulp and paper products. The 2021 increase in harvest is mostly attributable to net increases in timber volumes harvested in British Columbia and Quebec. Both the estimated wood supply and the volume of wood harvested fluctuate in response to a wide range of ecological, social and economic factors. Changes in wood supply are largely a result of adjustments in provincial forest management objectives, such as, decreases in order to conserve animal habitat or increases to harvest insect-damaged wood. Comparing the amount of timber harvested to the estimated sustainable wood supply is one way to track forest management.

Canada is committed to sustainable forest management, which is defined as "management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social and cultural opportunities for present and future generations." [2] In practice, sustainable forest management means ensuring that forests provide a broad range of goods and services over the long term. Therefore, forest managers plan for harvest levels that ensure the long-term sustainability of environmental, economic and social objectives for the managed forest.

Forest disturbances

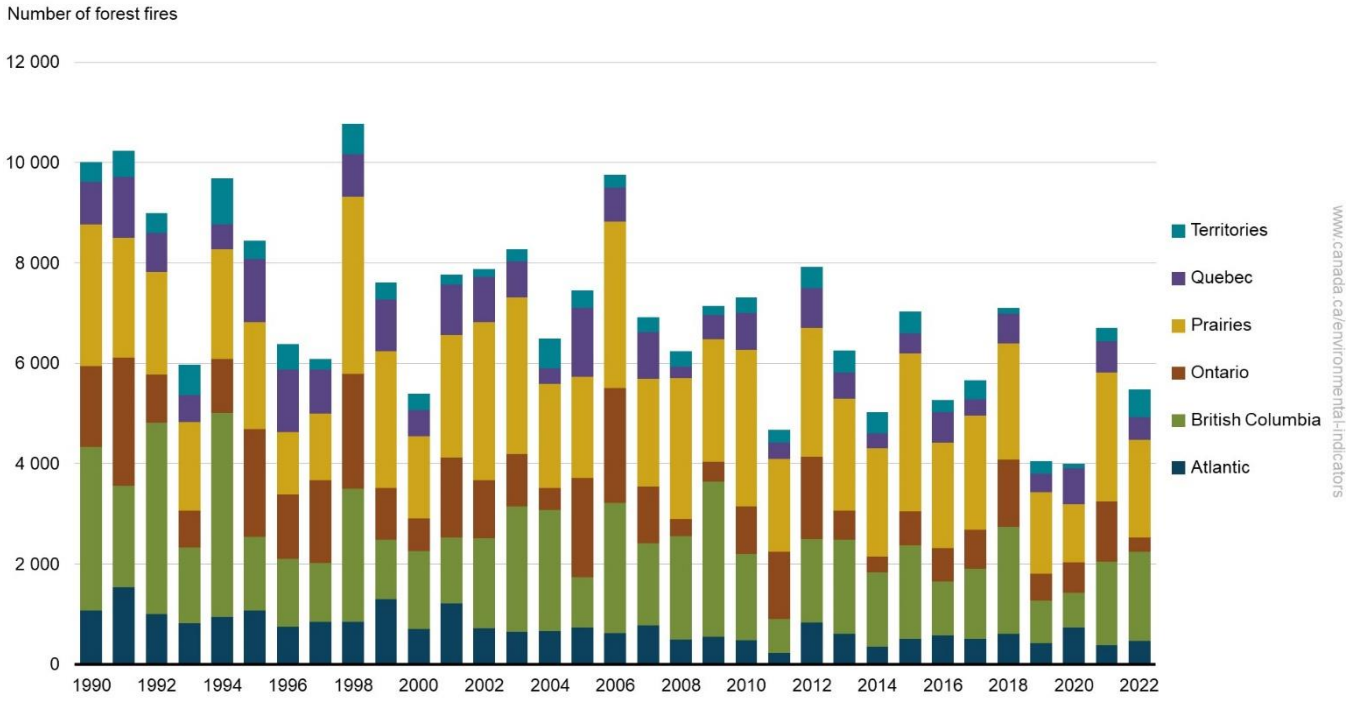
Number of forest fires and area burned

Key results

- In 2022, Canada experienced an estimated 5 639 fires that burned approximately 16 543 square kilometres of forest
- While the number of fires and area burned fluctuate year over year, Canada experienced a peak in 1998 for number of fires and in 1995 for area burned with a low in 2020 for both number of fires and area burned

[2] Natural Resources Canada, Canadian Forest Service (2020) Forestry Glossary - Sustainable forest management. Retrieved on September 8, 2023.

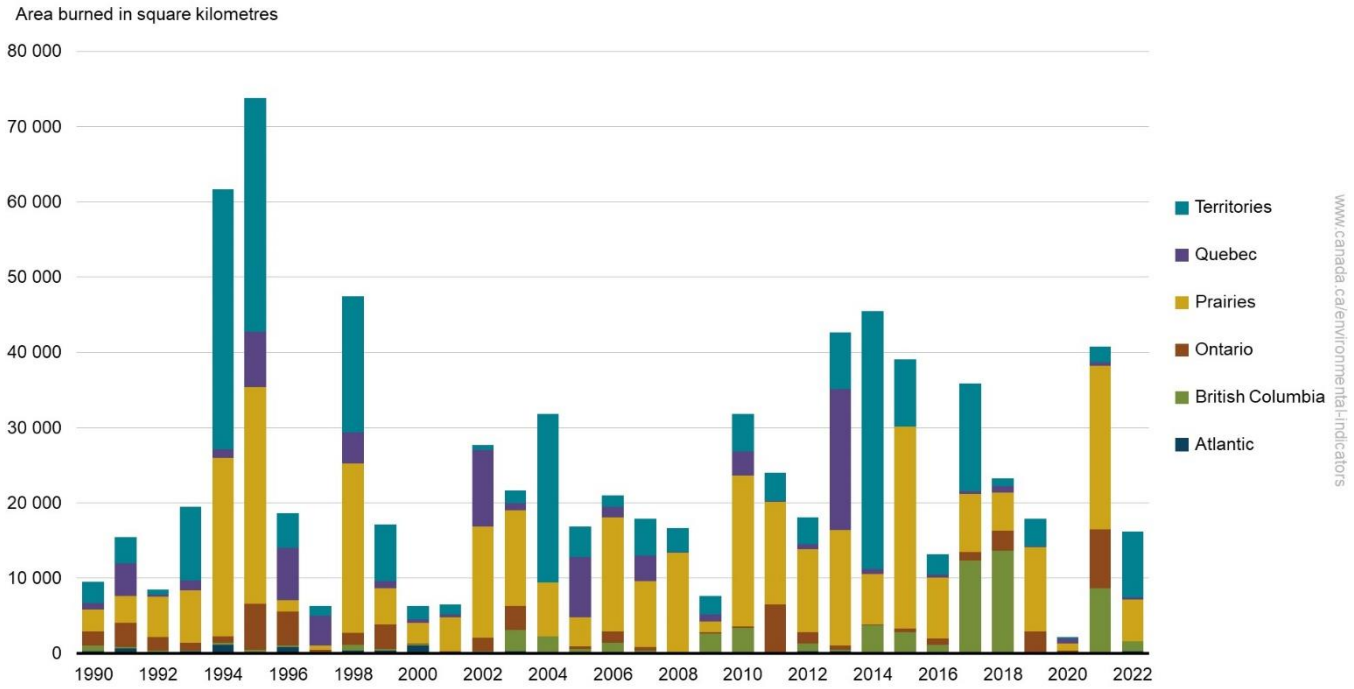
Figure 2. Number of forest fires by region, Canada, 1990 to 2022



Data for Figure 2

Note: Data include fires of known and unknown or indeterminable origin. The Territories region includes Yukon and Northwest Territories. Nunavut was not included as they are not a part of the data sharing agreement with Natural Resources Canada. The Prairies region includes Manitoba, Saskatchewan, and Alberta. The Atlantic region includes New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Totals for 2022 do not include all forest fires taking place in national parks as they have not been reallocated to the appropriate provinces and territories.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Figure 3. Area burned by forest fires by region, Canada, 1990 to 2022



Data for Figure 3

Note: Data include fires of known and unknown or indeterminable origin. The Territories region includes Yukon and Northwest Territories. Nunavut was not included as they are not a part of the data sharing agreement with Natural Resources Canada. The Prairies region includes Manitoba, Saskatchewan, and Alberta. The Atlantic region includes New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Totals for 2022 do not include all forest fires taking place in national parks as they have not been reallocated to the appropriate provinces and territories.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Forest fires are a natural part of the forest ecosystem and are important for maintaining the health and diversity of the forest. Fire is the primary means of environmental change in the boreal zone and is as crucial to forest renewal as the sun and rain. Forest fires release valuable nutrients stored in the debris on the forest floor. They open the forest canopy to sunlight, which stimulates new growth.[3] However, they can also result in costly economic and environmental losses and public health and safety concerns by directly threatening communities and infrastructure or reducing visibility and air quality through smoke. The expected hotter and drier conditions as a result of climate change may result in more frequent and severe forest fires in Canada.[4]

The total area burned varies widely from year to year, but averages about 25 000 square kilometres annually. Only 3% of all wildland fires that start each year in Canada grow to more than 2 square kilometres in area. However, these fires account for 97% of the total area burned across the country.[5] In 2021, about 3 090, or 46% of forest fires across Canada were caused by human activity. This resulted in approximately 5 500 square kilometres of forest burned, representing nearly 14% of the total area burned nationally.[6]

[3] Natural Resources Canada (2023), Forest fires. Retrieved on August 23, 2023

[4] Natural Resources Canada (2024) The State of Canada's Forests Annual Report. Retrieved on March 25, 2024

[5] Natural Resources Canada (2023) Why forests need fires, insects and diseases. Retrieved on January 30, 2024

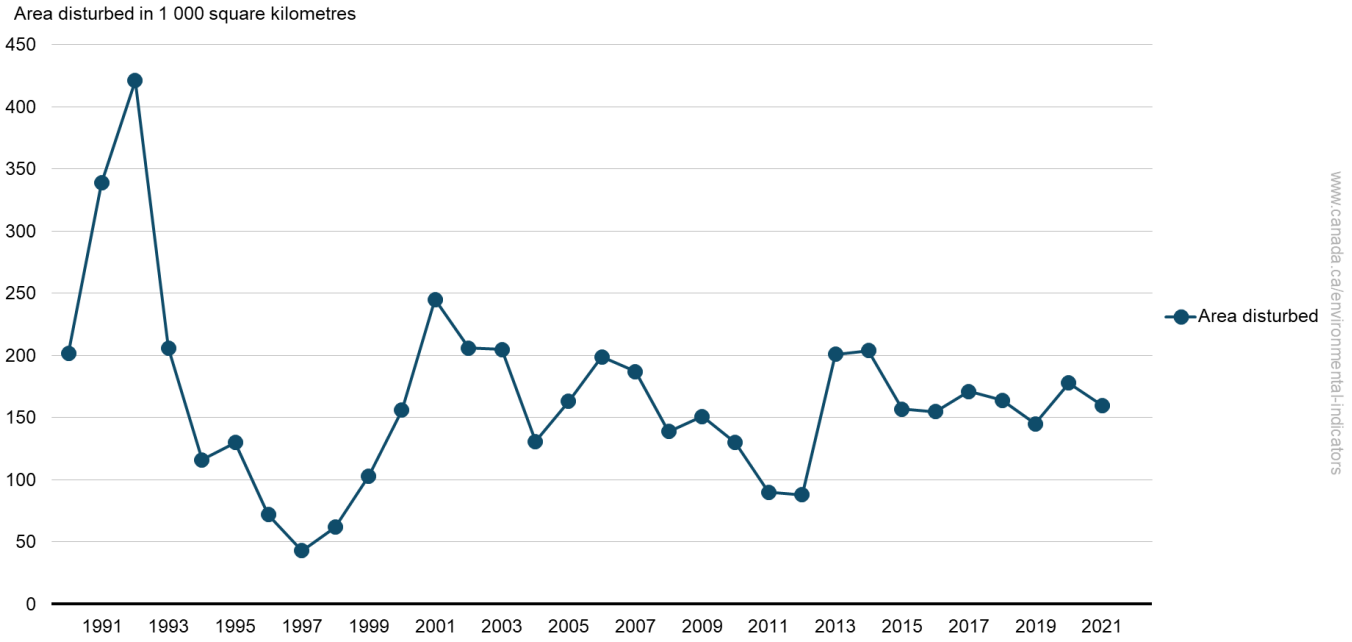
[6] Canadian Council of Forest Ministers (2024) National Forestry Database. Retrieved on March 25, 2024

Area disturbed by insects

Key results

- In 2021, approximately 160 000 square kilometres of Canadian forests were disturbed (including beetle-killed trees) by insects

Figure 4. Area disturbed by insects, Canada, 1990 to 2021



Data for Figure 4

Note: Includes beetle-killed trees. Trees that suffer moderate to severe defoliation are those on which 30% or more of the current foliage has been removed.

Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Canada's forests are home to thousands of species of native and introduced insects. Most of the time, these species contribute a vital role to the normal functioning of forest ecosystems as prey for other species or by recycling nutrients back into the forest.[7] Only a small number of insect species kill trees and damage forests. This can occur when insect populations experience outbreaks over vast areas. Disturbance, or defoliation, is the removal of all or most of a plant's leaves by natural disturbance agents (for example, insects) or through the actions of humans (for example, the application of herbicides). These impacts can reduce Canada's timber supply and influence the functioning of forest ecosystems, which can in turn affect carbon stocks, increase fire risk and reduce the recreational and non-timber uses of forests.

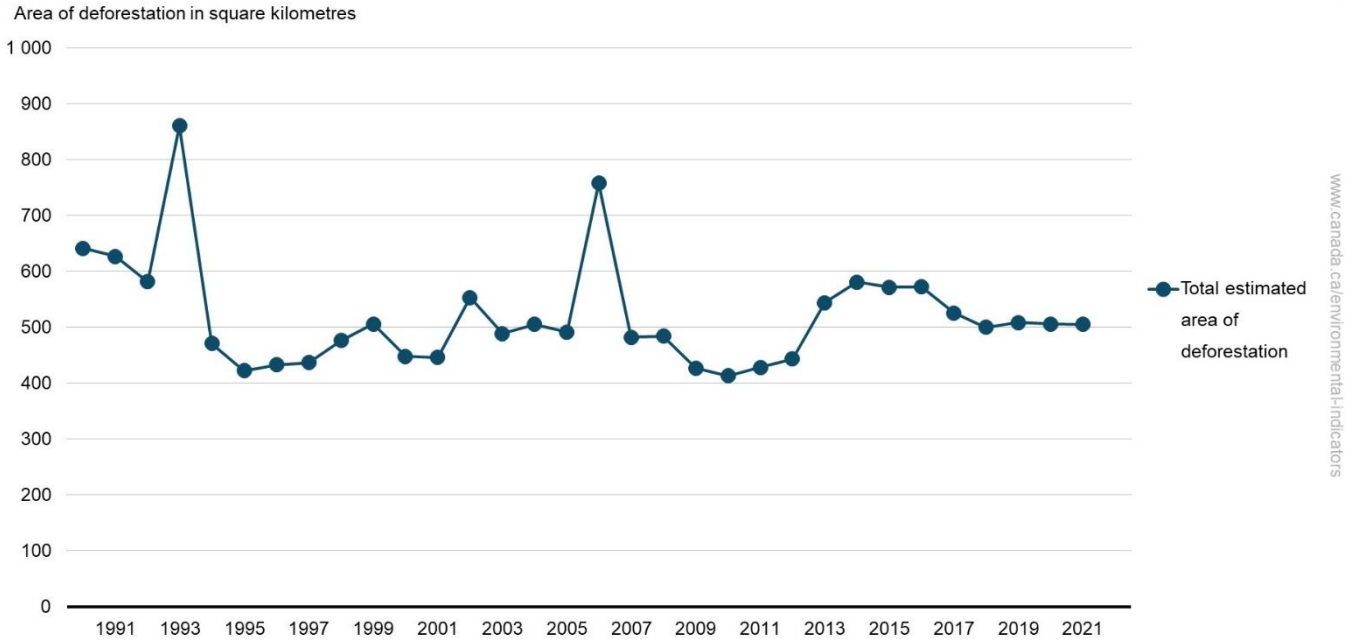
Estimated total area of annual deforestation

Key results

- In 2021, an estimated 505 square kilometres of forest were converted to non-forest uses
    - This is due to deforestation from the agriculture, forestry, mining, oil and gas, built-up (for example industrial development and golf courses), and hydroelectric sectors

[7] Natural Resources Canada (2024) The State of Canada's Forests Annual Report. Retrieved on March 25, 2024

Figure 5. Estimated total area of annual deforestation, Canada, 1990 to 2021



Data for Figure 5

Source: Natural Resources Canada (2024) State of Canada's Forest Annual Report.

Deforestation is the permanent clearing of forests to make way for new, non-forest land uses, such as agriculture or urban expansion. The annual estimated area of deforestation in Canada has declined steadily from about 640 square kilometres in 1990, to about 505 square kilometres in 2021. Two (2) spikes in the overall declining trend occurred in 1993 and 2006. These were due to forest flooding for the development of hydroelectric reservoirs. As of 2021, agricultural expansion continues to be the main driver of deforestation in Canada with 224 square kilometers being converted.

Forest regeneration

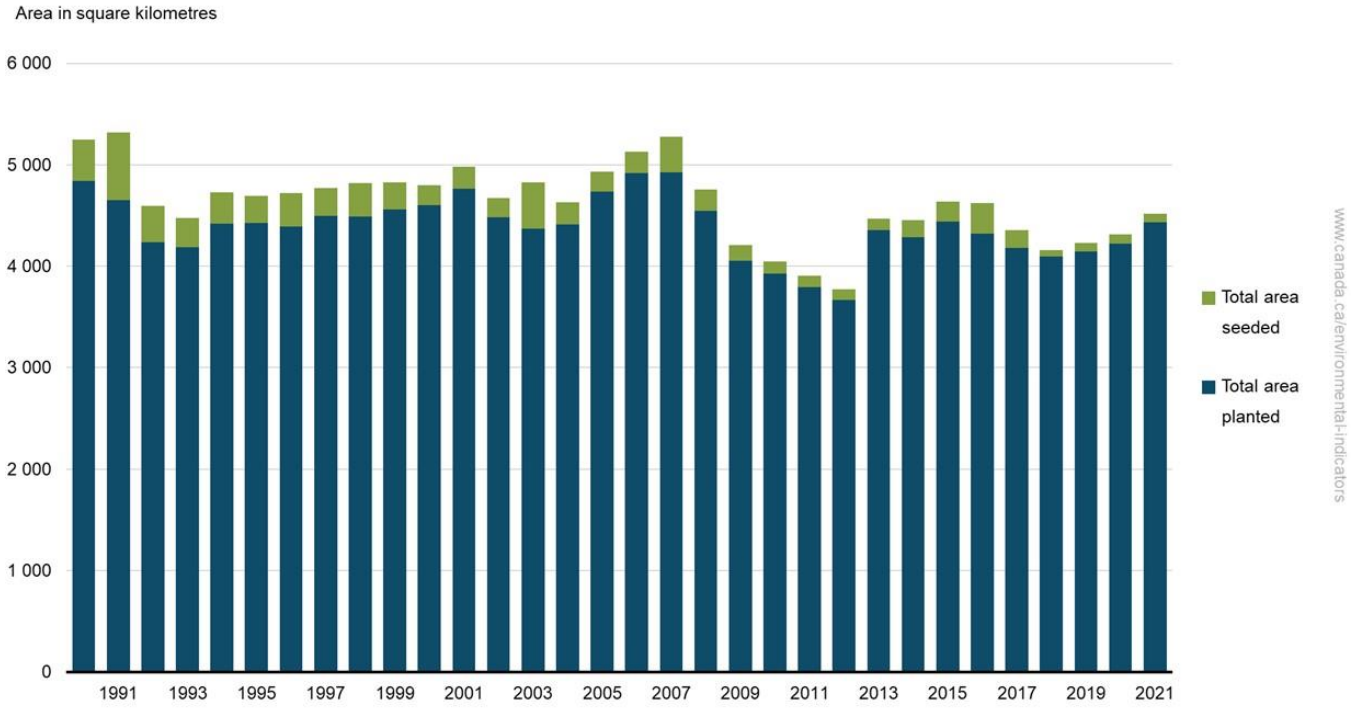
This section presents the total area of land that was regenerated by planting and seeding, as well as the number of seedlings planted in Canada between 1990 and 2021.

Key results

In 2021,

- approximately 4 435 square kilometres were planted with around 625 million seedlings
- approximately 85 square kilometres were seeded

Figure 6. Area planted and seeded, Canada, 1990 to 2021



Data for Figure 6

Note: These data may include area planted and area of direct seeding under the Government of Canada's commitment to plant 2 billion trees.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Successful regeneration ensures that harvested areas return to a forested state so that they can continue to produce timber and maintain ecosystem services, such as regulating water and providing habitat for wild species. In all provinces and territories, tree regeneration is mandatory on Crown lands after harvesting activities.[8] Both area planted and number of seedlings planted are near 10-year highs. These higher levels are mostly due to higher rates of planting in British Columbia in recent years.

About the indicator

What the indicator measures

This indicator is not a single measure of the state of forests in Canada, but rather presents a series of measures that provide an overall picture of their condition. The specific measures used in this indicator are:

- Timber harvest
  - Maximum sustainable wood supply and annual harvest of industrial roundwood
- Forest disturbances
  - Number of forest fires and area burned
  - Area disturbed by insects
  - Estimated total area of annual deforestation
- Forest regeneration:
  - Area planted and seeded

[8] Natural Resources Canada (2024) The State of Canada's Forests Annual Report. Retrieved on March 25, 2024

Why this indicator is important

In addition to their economic value as an important natural resource, Canada's forests constitute important ecosystems, home to about 180 native tree species across the country, as well as a great variety of plants, insects, fungi, birds, mosses, lichens and more. Of the 426 bird species that breed in Canada, about one-third depend on forests to survive. Forest characteristics such as age, composition and structure influence what species are able to thrive in Canada's forests. These forest characteristics are primarily driven by forest disturbances. Disturbances can be of natural origin, such as forest fires ignited by lightning, ice storms, and native insect outbreaks and diseases. They can also be human-induced, such as forest logging, land-use change and invasive pest outbreaks.

Canadian forests are well adapted to natural disturbances, but climate change is altering the frequency, severity and size of disturbances and facilitating the movement of forest pests. The increase in disturbances may transform forest composition. For example, the anticipated increase in fire frequency and severity may benefit some species that could take advantage of the new conditions (for example, pines, white birch and red oaks), while other species could decline (for example, sugar maple, American beech and eastern hemlock). The rate of climate change in Canada also means that some tree species will not migrate quickly enough to maintain viable populations. Cumulatively, these affects will impact forest-dependent communities and make the lives of people in these areas more precarious through increasing frequency and severity of fires leading to greater needs to evacuate communities and a lower sustainable wood supply that can affect jobs in these areas.

Forests are a vital part of the constant movement of carbon from the land and water through the atmosphere and living organisms, both storing and releasing this essential element in a dynamic process of growth, decay, disturbance, and renewal.[9] Land use activities (such as timber harvesting and land conversion) as well as natural disturbances (such as forest fires and insect infestations) result in greenhouse gas emissions. Land use activities can also result in greenhouse gas removals. For example, as forests recover, carbon is removed from the atmosphere and converted into wood by trees. In 2020, natural disturbances (such as wildfires and insect infestations) accounted for emissions of about 8.8 megatonnes of carbon dioxide equivalent (Mt CO_2 eq) and human activities (such as timber harvesting and agricultural activities) accounted for removals of 6.3 Mt CO_2 eq. For more detailed information on this specific issue see the Land-based greenhouse gas emissions and removals indicator from the Canadian Environmental Sustainability Indicators Program.

The forest sector is also an important contributor to Canada’s economy, serving as a key source of prosperity for people and communities across the country. 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. 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.[10] In 2022, direct employment in the sector decreased slightly to approximately 212 660 people.[11]

Related Initiatives

The timber harvest portion of this indicator tracks progress on the 2022 to 2026 Federal Sustainable Development Strategy, supporting the target: "Between 2023 and 2026, Canada's sustainable wood supply level (guided by sustainable forest management policies to reflect the current unique social, environmental and economic characteristics of managed forests), exceeds the annual timber harvests”.

In addition, the indicator contributes to the Sustainable Development Goals of the 2030 Agenda for Sustainable Development. It is linked to Goal 15, Life on land and Target 15.2, "By 2020, promote the implementation of

[9] Natural Resources Canada (2023) Forest Carbon. Retrieved on January 30, 2024

[10] Natural Resources Canada (2024) How does the forest sector contribute to Canada’s economy?. Retrieved on March 25, 2024

[11] Natural Resources Canada (2024) The State of Canada’s Forests Annual Report. Retrieved on March 25, 2024

sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally."

The indicator also contributes towards reporting on Target 10 of the Kunming-Montreal Global Biodiversity Framework: “Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches contributing to the resilience and long-term efficiency and productivity of these production systems and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.”

Along with 11 other countries, Canada is a member of the Montréal Process, an international working group of northern and southern hemisphere nations committed to sustainable forest management. Since 1995, the Montréal Process member countries have used a common set of science-based criteria and indicators to measure progress toward the conservation and sustainable management of 90% of the world's boreal and temperate forests.

Data sources and methods

Data sources

The data for the Sustainable forest indicators comes from two main sources; Canadian Council of Forest Ministers National Forestry Database and the State of Canada's Forest Annual Report from Natural Resources Canada.

More information

National Forestry Database:

The data for the following measures included in this indicator come from the National Forestry Database. The database was mandated through the Canadian Council of Forest Ministers and is maintained by the Canadian Forest Service of Natural Resources Canada.

Measure	National Forestry Database
Annual timber harvest compared to the sustainable wood supply	Wood supply estimates by ownership and species group Net merchantable volume of roundwood harvested by ownership, category and species group
Number of forest fires by region	Number of fires by cause class
Area burned by forest fires by region	Area burned by cause class
Area disturbed by insects	Area of moderate to severe defoliation (including beetle-killed trees) by insects
Area planted and seeded	Area of direct seeding by ownership and application method Area planted by ownership and species group

The indicator includes data from 1990 to 2022 from all provinces, Yukon, the Northwest Territories and federal government departments. Data on Nunavut is not included because it is not a National Forestry Database partner.

In December of every year, provinces, territories and federal agencies submit data that were collected the previous year. The data are compiled and published within 6 months of submission.

Canada's total area is estimated using the Land and freshwater area, by province and territory from Natural Resources Canada Atlas of Canada. The Canadian Forest Service uses the National Forest Inventory to track forest area over time.

The State of Canada's Forest Annual Report:

The data for the following measures included in this indicator come from the State of Canada's Forest Annual Report. The report has been a trusted and authoritative source of comprehensive information on the social, economic and environmental state of Canada's forests and forest sector for 32 years.

Measure	State of Canada's Forest Annual Report
Estimated total area of annual deforestation	Estimated area (hectares) of annual deforestation in Canada, by industrial sector

Science-based measures called sustainability indicators are helpful tools for understanding the overall condition or state of Canada's forests. They provide a way to consistently define, assess, monitor and report progress toward sustainable forest management. Reporting on these indicators over time helps to ensure and promote the long-term sustainable management of our forests. They do so by:

- providing reliable data and essential information on the state of and trends in Canada's forests
- highlighting any needs for improvement in forest management policies and practices
- supplying reliable information for discussions and initiatives related to environmental performance and trade

The State of Canada's Forests annual reports are based on the most accurate and currently available data from Canada's most trusted sources, including Statistics Canada, the National Forestry Database, and the National Forest Inventory, among others. These data and information are then analyzed by a collection of Canada's leading experts who produce the written text for the report. The report provides government, industry, researchers and the public with relevant context on the current day status, the historical trends as well as future forecasts. The report demonstrates Canada's ongoing commitment to sustainably managing its forests and forest sector.

Methods

Data from the National Forestry Database and the State of Canada's Forest Annual Report are used in this indicator. The only changes to the data are converting units to square kilometres where appropriate. There are no custom views of the data or additional data sets.

In line with the internationally agreed upon definition from the United Nation Food and Agriculture Organization, forests in Canada are defined as land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10% or trees able to reach these thresholds in their original habitat. This may also include treed areas, land cover where 10% or more of the area is covered in tree species of any size, and non-treed areas, for example, areas that have recently been harvested and that are temporarily unstocked. It does not include land that is predominantly under agricultural or urban land use.[12]

More information

Timber harvest

Maximum sustainable wood supply and annual harvest of industrial roundwood

The indicator compares wood supply to industrial roundwood harvest. Wood supplies from federal, provincial, territorial and private lands are summed to estimate Canada's wood supply. Similarly, Canada's industrial roundwood harvest is the volume of wood harvested from federal, provincial, territorial and private lands.

Wood supply is the volume of timber that can be harvested from an area over a specified period of time while meeting environmental, economic and social objectives.[13] In the indicator, wood supply refers to industrial roundwood supplies only. It does not include other types of harvest such as fuelwood and

[12] United Nation Food and Agriculture Organization (2023) Global Forest Resources Assessments. Retrieved on July 20, 2023

[13] Canadian Council of Forest Ministers (2023) National Forestry Database, Wood Supply - Background. Retrieved on July 21, 2023.

firewood. Under sustainable forest management, forest managers plan for harvest levels that will not affect the long-term sustainability of forest resources.

Industrial roundwood is defined as sections of tree stems (with or without bark), logs, bolts, pulpwood, posts and pilings that are usually intended to be delivered to mills. Fuelwood (for industrial purposes) and firewood (for household use) are not part of the industrial roundwood harvest, although they contribute to the total roundwood harvest. Other forest products, such as Christmas trees, are not included.

Forest land is defined as “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 more than 5 metres. This does not include land that is predominantly urban or used for agricultural purposes." [14]

Other wooded land is defined as "Areas of land where 1) tree canopies cover 5 to 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."

Wood supply estimation

Wood supply, the volume of timber that can be harvested sustainably, is estimated for each province and territory. Wood supply levels are estimated for forests that are actively managed for timber, which are a subset of forests and other wooded land. Provincial and territorial wood supplies are summed to estimate Canada's wood supply.

Wood supply is the sum of 2 values:

1. The estimated Allowable Annual Cut (known as Allowable Annual Cut in British Columbia and as Guarantee of Supply in Quebec) for provincial Crown lands, that is, publicly owned lands under provincial jurisdiction.

   The estimated Annual Allowable Cut is the volume of industrial roundwood that can be harvested sustainably each year from provincial Crown lands, as estimated by professional foresters. Provincial Crown lands make up 75%[15] of Canada's forest, but the percentage varies by province. Most provinces establish Annual Allowable Cuts for their Crown lands based on a policy of maintaining a non-declining future wood supply. They also consider a range of additional factors. For example, Annual Allowable Cuts may be decreased in order to maintain animal habitat, or they may be increased so that insect-damaged wood can be salvaged. The importance of individual factors to the Annual Allowable Cut varies among provinces and even among forest management areas within provinces, due to regional differences in forestry policies. Each province is responsible for the extensive rationale behind an Annual Allowable Cut determination for individual forest management areas. Additional information is available from provincial resource management organizations.[16] The volume of wood harvested may be above or below the Annual Allowable Cut in any one year, but it must balance out over the regulation period, which varies from 5 to 10 years depending on the jurisdiction. Annual Allowable Cuts are set based on an assessment of a wide range of ecological, social and economic factors.

2. Estimates of wood supply on federal, territorial and private lands.

   Federal, territorial and private lands account for 1.7%, 12.8% and 6.6%, respectively, of Canada's forest land, with Indigenous peoples owning 2.1%.[17] Wood supply estimates on federal, territorial and private lands are based on sustainable management plans (when available) or on past harvest levels. Estimation methods are not standardized and may or may not be similar to those used for the Annual Allowable Cut on provincial lands.

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[14] United Nation Food and Agriculture Organization (2023) Global Forest Resources Assessments. Retrieved on July 20, 2023

[15] Canadian Council of Forest Ministers (2023) National Forestry Database. Retrieved on July 21, 2023.

[16] Canadian Council of Forest Ministers (2023) National Forestry Database, Collaborators. Retrieved on July 21, 2023.

[17] Canada’s National Forest Inventory (2016) Canada’s National Forest Inventory. Retrieved on January 16, 2024.

Because historical harvests are often used by the Canadian Forest Service to estimate wood supply, recent declines in harvest levels have led to a decreased estimate of wood supply in some jurisdictions. This does not necessarily imply a change in forest health or harvest sustainability.

Industrial roundwood harvest estimations

Canada's total industrial roundwood harvest is the sum of the following:

1. The reported industrial roundwood harvested from provincial/territorial Crown lands.

   Provincial law requires harvest from provincial Crown lands to be reported and compared to the Annual Allowable Cut value for individual forest management areas. The harvest must not exceed the Annual Allowable Cut over multi-year regulation periods. However, in a given year, the volume harvested may vary by as much as 50%, depending on a range of social, economic and environmental factors.

2. The estimated industrial roundwood harvested from federal, territorial and private lands.

   Because there is generally no legislated mechanism to report the volume harvested on these lands, it is estimated by either provincial or federal forest authorities located in that jurisdiction. There is no set sustainable harvest level for federal, territorial and private lands.

Forest disturbances

Number of forest fires by region

Data for this measure has been taken from the National Forestry Database. Totals from all types of fires in a region have been added together to give the regional total presented in the tables and graph. Due to data collection methods, forest fires taking place in national parks are first allocated to Parks Canada each year before being reallocated to provinces and territories as appropriate in future years. Therefore provincial and territorial totals may change between years due to this reallocation.

Area burned by forest fires by region

Data for this measure has been taken from the National Forestry Database. Totals from all types of fires in a region have been added together to give the regional total presented in the tables and graph. Due to data collection methods, forest fires taking place in national parks are first allocated to Parks Canada each year before being reallocated to provinces and territories as appropriate in future years. Therefore provincial and territorial totals may change between years due to this reallocation.

Area of defoliation by insects

Data for this measure has been taken from the National Forestry Database. The data for this measure have been summarised nationally.

Estimated area of annual deforestation in Canada

Deforestation is the conversion of forest to non-forest land uses. Consistent with international definitions, deforestation does not include harvest followed by forest regrowth. The National Deforestation Monitoring System tracks changes from forest land to other land uses across Canada.

Deforestation by sector:

- Forestry sector includes the creation of new permanent forestry access roads and landings
- Hydroelectric sector includes new hydro lines and reservoir flooding
- Built-up sector includes industrial, institutional or commercial developments as well as municipal urban development, recreation (ski hills and golf courses) and transportation
- Mining, oil and gas sector includes mine development for minerals and peat as well as oil and gas developments

National deforestation estimates are calculated on a periodic basis using the method described in the National Deforestation Monitoring System description report. Data from the National Deforestation Monitoring System was provided to the Canadian Forest Service as a special tabulation, which has subsequently been used for this indicator from the State of Forest Report produced by Natural Resources Canada.

Data for this indicator has been summarized as its total, rather than being presented by industry.

Forest regeneration

The information included in this section was taken directly from the National Forestry Database.

Recent changes

This indicator has undergone significant changes in its scope since its last publication in August 2022. The changes made aim to provide a better sense of the state of Canadian forests. To this end, measures have been added alongside the latest timber harvest data, including information related to regeneration and disturbances.

Caveats and limitations

Area measurements used in this indicator are shown in square kilometers, where they may appear in hectares in other sources.

More information

Timber harvest

Annual roundwood harvest versus wood supply

National figures can mask variability between areas. In some cases, figures are either unavailable or too small to be expressed or included in the national aggregate values.

National aggregation can mask Crown harvests above or below the Annual Allowable Cut in individual provinces. Similarly, the provincial aggregates can mask variability among management areas. If harvesting above the Annual Allowable Cut occurs in a portion of a regulation period, it may be balanced at another time or location in such a way that the overall Annual Allowable Cut of the regulation period is not exceeded.

Detailed caveats on the quality or completeness of annual data from individual provinces and territories, including explicit indications of which data are estimates, can be found in the National Forestry Database.

Annual Allowable Cuts are calculations of the sustainable wood supply on Crown lands established by professional foresters with the objective of maintaining sustainable wood supplies over long periods. Annual Allowable Cut calculations use sophisticated growth models and scientific data to help estimate future wood supply and take into consideration fluctuating social, economic, or environmental factors.

A large percentage of forest land in Atlantic Canada is privately owned. The breakdown of private ownership across Atlantic provinces is approximately as follows: New Brunswick 47%,[18] Nova Scotia 66%,[19] 88%[20] in Prince Edward Island, and 4% in Newfoundland and Labrador.[21] Because of the high percentage of private land in Atlantic Canada, provincial agencies that determine Annual Allowable Cuts must also assess the potential timber supply on private land. Because private woodlots are not regulated by legislation, there is uncertainty associated with this portion of the wood supply equation. However, as the Atlantic region accounts for only about 8% of Canada's total wood supply, the uncertainty on a national scale is small.

The Canadian Forest Service wood supply estimates for private lands are often based solely on the average of past harvests, which are generally unregulated. Although estimates are provided, it is difficult to be certain whether harvesting on those lands is sustainable.

The Forest management and disturbances indicator uses the total land area of Canada to calculate the proportion of the country covered by forest. Statistical data about Canada’s forests shows that an

[18] SGS Belgium S.A. (2018) Forest Sustainability in the province of New Brunswick, Canada (PDF; 1.85 MB). Retrieved on July 20, 2023.

[19] SGS Belgium S.A. (2014) Forest Sustainability in the province of Nova Scotia, Canada (PDF; 2.59 MB). Retrieved on July 20, 2023.

[20] Government of Prince Edward Island (2019) Public Lands. Retrieved on July 20, 2023.

[21] SGS Belgium SA/NV (2018) Forest Sustainability in the province of Newfoundland and Labrador, Canada (PDF; 1.53 MB). Retrieved on July 20, 2023.

additional 9% of Canada's forested area is covered by other wooded land, and 3% is other land with tree cover.[22]

Resources

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Annex

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Maximum sustainable wood supply and annual harvest of industrial roundwood, Canada, 1990 to 2021

Year	Sustainable wood supply (million cubic metres)	Industrial roundwood harvested (million cubic metres)	Industrial roundwood harvested as a proportion of sustainable wood supply (percentage)
1990	247.6	156.4	63
1991	246.3	154.2	63
1992	241.5	163.7	68
1993	238.2	169.6	71
1994	238.4	177.4	74
1995	234.4	183.2	78
1996	234.9	177.9	76
1997	237.4	183.6	77
1998	235.2	173.9	74
1999	239.6	196.7	82
2000	234.9	199.5	85
2001	236.1	184.4	78
2002	237.4	195.4	82
2003	239.8	181.4	76
2004	246.9	208.1	84
2005	245.0	201.3	82
2006	248.1	182.5	74
2007	252.4	162.1	64
2008	251.1	138.3	55
2009	241.8	115.8	48
2010	237.7	141.0	59
2011	232.7	147.0	63
2012	230.6	149.3	65
2013	228.0	151.1	66
2014	230.6	150.1	65
2015	222.6	155.6	70
2016	219.1	155.2	71
2017	218.9	152.4	70
2018	217.1	155.0	71
2019	215.7	139.5	65
2020	215.3	141.1	66
2021	215.0	147.3	68

Note: Sustainable wood supply data presented are for industrial roundwood only. Harvested industrial roundwood is intended to be delivered to a mill (for example, logs and bolts, and pulpwood) and also includes poles and pilings. The total roundwood harvested column includes

harvest of industrial roundwood, fuelwood and firewood.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Table A.2. Data for Figure 2. Number of forest fires by region, Canada, 1990 to 2022

Year	Atlantic (number of fires)	British Columbia (number of fires)	Ontario (number of fires)	Prairies (number of fires)	Quebec (number of fires)	Territories (number of fires)
1990	1 077	3 255	1 612	2 825	851	390
1991	1 545	2 014	2 560	2 378	1 216	518
1992	1 005	3 805	960	2 058	765	401
1993	826	1 497	742	1 760	543	609
1994	953	4 057	1 079	2 183	499	908
1995	1 069	1 474	2 150	2 121	1 265	366
1996	748	1 360	1 275	1 247	1 250	499
1997	850	1 176	1 646	1 325	876	217
1998	841	2 663	2 291	3 522	854	597
1999	1 293	1 198	1 025	2 724	1 037	331
2000	703	1 551	653	1 643	517	330
2001	1 213	1 320	1 596	2 432	1 005	196
2002	716	1 795	1 163	3 150	899	155
2003	656	2 490	1 043	3 124	720	237
2004	660	2 418	435	2 072	322	581
2005	732	1 006	1 978	2 017	1 375	344
2006	628	2 587	2 292	3 316	684	247
2007	780	1 641	1 129	2 135	939	295
2008	495	2 058	344	2 803	223	316
2009	547	3 101	391	2 443	485	178
2010	479	1 731	933	3 120	740	313
2011	227	684	1 340	1 839	331	257
2012	837	1 659	1 635	2 573	798	416
2013	609	1 879	582	2 224	528	434
2014	358	1 478	309	2 157	296	422
2015	503	1 871	675	3 150	392	443
2016	582	1 075	657	2 100	607	246
2017	508	1 400	781	2 264	322	383
2018	613	2 123	1 339	2 317	597	114
2019	425	843	541	1 623	362	265
2020	741	684	614	1 156	712	94
2021	381	1 663	1 206	2 565	629	265
2022	471	1 778	275	1 950	449	557

Note: Data include fires of known and unknown or indeterminable origin. The Territories region includes Yukon and Northwest Territories. Nunavut was not included as they are not a part of the data sharing agreement with Natural Resources Canada. The Prairies region includes Manitoba, Saskatchewan and Alberta. The Atlantic region includes New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador. Totals for 2022 do not include forest fires taking place in national parks as they have not been reallocated to the appropriate provinces and territories.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

Table A.3. Data for Figure 3. Area burned by forest fires by region, Canada, 1990 to 2022

Year	Atlantic (square kilometres)	British Columbia (square kilometres)	Ontario (square kilometres)	Prairies (square kilometres)	Quebec (square kilometres)	Territories (square kilometres)
1990	319.9	757.8	1 836.1	2 910.9	833.4	2 875.1
1991	618.4	251.9	3 188.1	3 558.8	4 383.3	3 457.4
1992	84.1	304.5	1 759.9	5 350.9	271.1	747.6
1993	297.1	51.8	1 046.6	7 031.7	1 282.3	9 793.9
1994	1 113.9	297.6	836.0	23 715.3	1 160.4	34 490.2
1995	17.1	480.8	6 125.6	28 800.3	7 277.3	31 052.5
1996	839.7	206.7	4 490.0	1 539.1	6 915.9	4 626.1
1997	94.8	29.7	386.2	506.0	3 930.8	1 380.0
1998	410.5	767.7	1 581.7	22 440.4	4 183.1	18 026.9
1999	423.9	115.6	3 283.3	4 812.7	977.5	7 558.5
2000	1 045.2	178.1	67.8	2 799.9	392.1	1 858.5
2001	23.0	141.7	108.7	4 531.4	330.9	1 341.0
2002	155.8	85.9	1 822.4	14 801.5	10 137.5	632.9
2003	292.2	2 834.0	3 191.2	12 718.1	882.5	1 766.1
2004	29.2	2 203.0	17.2	7 179.8	30.6	22 370.2
2005	193.0	368.3	423.5	3 825.8	8 001.4	4 055.7
2006	61.9	1 394.2	1 499.9	15 123.0	1 363.5	1 564.3
2007	126.5	299.9	406.8	8 759.5	3 427.2	4 834.9
2008	29.8	153.0	14.2	13 217.8	16.0	3 218.6
2009	178.4	2 475.2	206.9	1 416.6	940.0	2 408.5
2010	15.9	3 371.8	148.4	20 115.5	3 149.1	4 978.9
2011	6.2	131.5	6 359.8	13 651.3	124.0	3 701.5
2012	300.2	1 032.2	1 530.4	10 985.5	640.4	3 628.2
2013	314.1	188.4	510.9	15 409.5	18 728.4	7 533.7
2014	95.2	3 689.3	63.7	6 724.7	639.0	34 244.7
2015	44.9	2 809.6	427.3	26 820.9	61.6	8 919.5
2016	118.4	1 004.5	862.1	8 101.1	339.3	2 770.6
2017	18.5	12 298.6	1 129.3	7 739.9	384.4	14 323.6
2018	9.0	13 609.4	2 657.0	5 122.3	863.2	1 027.6
2019	6.8	215.4	2 697.3	11 233.2	96.9	3 612.3
2020	64.2	146.7	154.8	970.5	600.0	246.0
2021	9.2	8 663.7	7 845.7	21 653.1	497.1	2 120.3
2022	274.5	1 350.3	25.6	5 466.6	296.4	8 800.7

Note: Data include fires of known and unknown or indeterminable origin. The Territories region includes Yukon and Northwest Territories. Nunavut was not included as they are not a part of the data sharing agreement with Natural Resources Canada. The Prairies region includes Manitoba, Saskatchewan and Alberta. The Atlantic region includes New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador. Totals for 2022 do not include forest fires taking place in national parks as they have not been reallocated to the appropriate provinces and territories.
Source: Canadian Council of Forest Minister (2024) National Forestry Database.

Table A.4. Data for Figure 4. Area disturbed by insects, Canada, 1990 to 2021

Year	Forest area disturbed (1 000 square kilometres)
1990	202
1991	339
1992	421
1993	206
1994	116
1995	130
1996	72
1997	43
1998	62
1999	103
2000	156
2001	245
2002	206
2003	205
2004	131
2005	163
2006	199
2007	187
2008	139
2009	151
2010	130
2011	90
2012	88
2013	201
2014	204
2015	157
2016	155
2017	171
2018	164
2019	145
2020	178
2021	160

Note: Includes beetle-killed trees. Trees that suffer moderate to severe defoliation are those on which 30% or more of the current foliage has been removed.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database**.**

Table A.5. Data for Figure 5. Estimated total area of annual deforestation, Canada, 1990 to 2021

Year	Total estimated area of deforestation (square kilometres)
1990	641.4
1991	627.0
1992	581.5
1993	860.5
1994	470.9
1995	422.4
1996	432.9
1997	436.7
1998	476.4
1999	506.0
2000	447.8
2001	445.8
2002	553.4
2003	488.7
2004	505.3
2005	491.7
2006	758.0
2007	482.3
2008	484.4
2009	427.2
2010	413.1
2011	428.1
2012	443.6
2013	544.0
2014	580.6
2015	571.5
2016	572.3
2017	525.5
2018	500.0
2019	508.3
2020	505.9
2021	505.2

Source: Natural Resources Canada (2024) State of Canada's Forest Annual Report.

Table A.6. Data for Figure 6. Area planted and seeded, Canada, 1990 to 2021

Year	Total area planted (square kilometres)	Total area seeded (square kilometres)	Seedlings planted (millions)
1990	4 843.8	407.7	800
1991	4 650.0	667.2	761
1992	4 234.1	362.3	691
1993	4 186.2	290.9	675
1994	4 422.0	305.4	679
1995	4 427.8	266.4	678
1996	4 393.5	328.2	651
1997	4 498.8	269.0	684
1998	4 491.8	326.4	698
1999	4 561.5	263.3	708
2000	4 598.7	201.4	702
2001	4 764.5	213.7	702
2002	4 485.7	189.0	655
2003	4 368.7	460.8	643
2004	4 413.7	217.3	645
2005	4 737.1	194.8	681
2006	4 920.6	205.0	715
2007	4 928.3	345.5	704
2008	4 547.4	206.2	670
2009	4 051.8	159.4	584
2010	3 924.2	120.6	534
2011	3 791.7	112.0	548
2012	3 666.3	105.4	524
2013	4 353.9	116.4	585
2014	4 282.5	172.7	580
2015	4 442.4	197.6	607
2016	4 323.1	299.1	638
2017	4 179.4	175.6	606
2018	4 093.6	62.3	595
2019	4 146.0	86.2	600
2020	4 223.6	92.1	625
2021	4 434.6	85.3	625

Note: This data may include area planted and area of direct seeding under the Government of Canada's commitment to plant 2 billion trees.
Source: Canadian Council of Forest Ministers (2024) National Forestry Database.

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