

# The Boreal Forest

Draped like a great green scarf across the shoulders of North America, the boreal or "northern" forest is Canada's largest ecosystem.



The boreal forest occupies 35 percent of Canada's land area and its vitality creates one of the country's most significant ecological communities.

It stretches between southern grassland and mixed hardwood trees, north to the tundra. Its animals, plants and products affect every Canadian every day. They include paper products made strong by the long fibres of black spruce, to jack pine railway ties and telephone poles that keep communications going. Even the air we breathe is enriched with oxygen from this massive photosynthetic machine. The northern forest — named after Boreas, the Greek god of the north wind — is an integral part of who we are as Canadians.

Annual rings in the slow-growing coniferous trees of this forest, some hundreds of years old, provide a living record of atmospheric conditions and changes in climate. Canadian history is etched in the trails, graves, roads and campsites that mark the lakes, bogs and hills of the boreal forest. Our economy is buoyed by its industries, our climate is moderated by its trees, and our national imagination is informed by memories and myths of seeing it up close by canoe and snowshoe.

Since the first appearance of spruce trees in Canada's fossil record about 60 million years ago, the boreal forest has adapted to the massive forces of ice, fire, insect infestation and disease. In fact, without such natural disturbances, the forest as we know it today would never have come to be. These natural agents of change are necessary for the maintenance of the forest's ecological balance. However, human activities have occurred in the last century. Such activities as tree harvesting, manufacturing, resource development and intensive recreational use — in concert with natural alterations — have produced cumulative and long-term effects which are difficult to measure precisely.

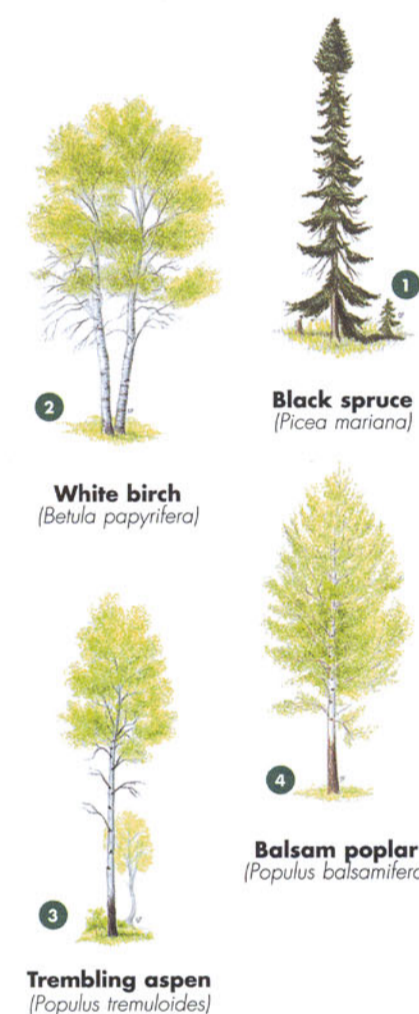
In response, Canada has committed itself to the sustainable development of the boreal forest. Through efforts like development of the National Forest Strategy and the publication of this poster-map, the goal is to protect the forest's social, spiritual, economic, esthetic and environmental dimensions for present and future generations.

Canada's boreal forest is part of a great northern circumpolar band of mostly coniferous forests extending across the subarctic latitudes of Russia, Scandinavia and North America.

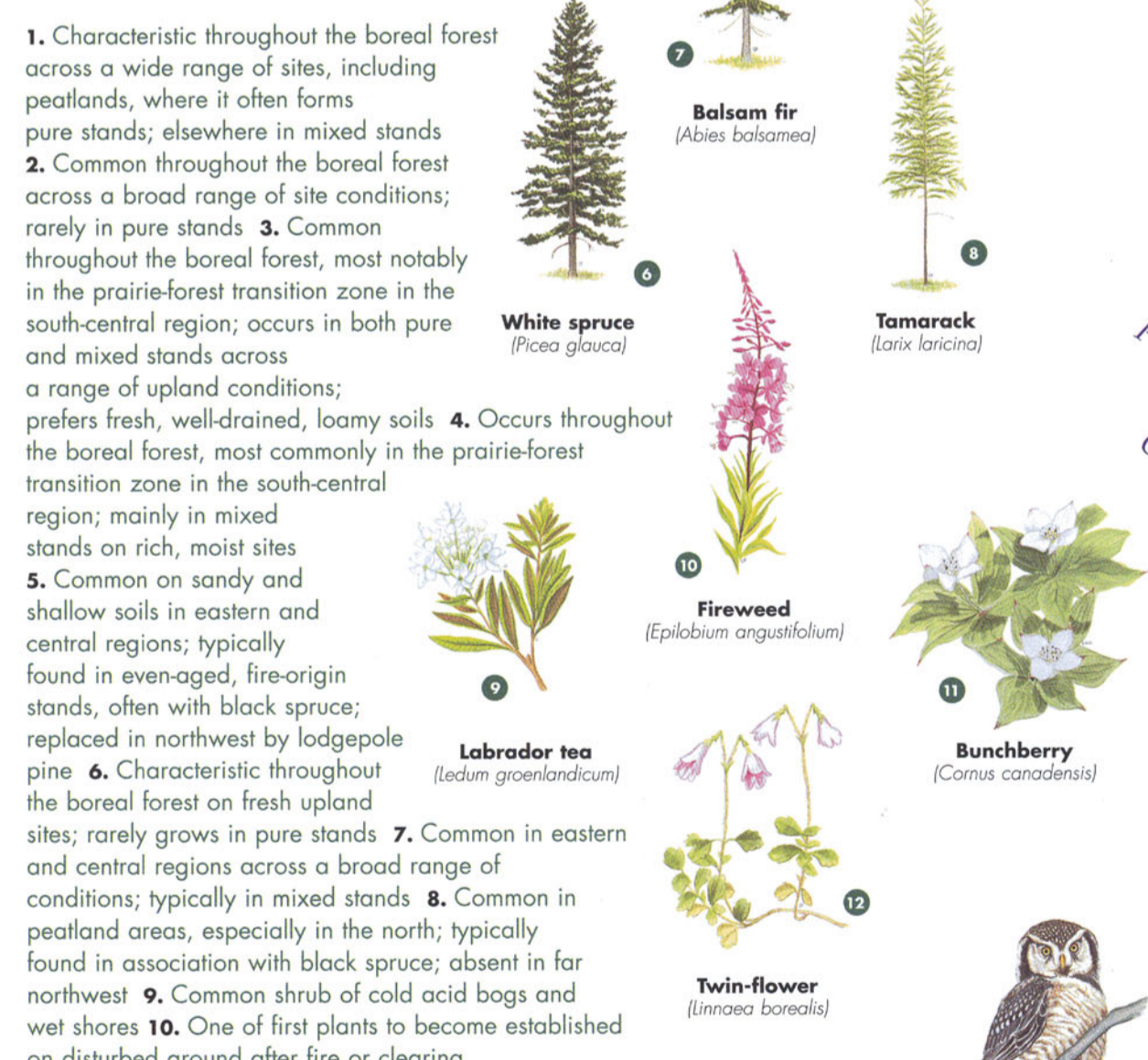
Globally, the boreal forest comprises about a quarter of the world's closed-canopy forest, and plays a significant role in the earth's environmental balance and life on this planet. Besides being a producer of oxygen, the boreal forest absorbs and stores carbon dioxide and so may play a critical role in the phenomenon of global warming. Canadians cannot forget they are custodian to one-third of this essential life force.

The boreal forest is a dynamic system of shrubs, trees, herbs, mosses, micro-organisms, insects and animals interacting among themselves and with rock, soil, water and air.

The predominance of a few coniferous species — spruce, fir, pine and tamarack — contribute to its overall uniform appearance from afar. Yet, at closer range, depending on climate, topography, soil, effects of fire, insects and disease, the composition of the boreal forest varies widely. The result is a patchwork of stands of trees, large and small, old and young, at different successional stages, each of which supports different birds and fur-bearing animals. The boundaries of the boreal forest are closely related to climate. In the north, hardy tamarack and black spruce hug the ground, and grow so slowly as to be finger-sized after 100 years. Beyond them lies the tundra. Move south, where it's warmer and the soils and drainage are better, and eventually boreal species are driven out by hardwoods and other deciduous trees of the mixed forest. Although the boundaries of the boreal forest are gradual, creating zones of change — known as ecotones — between it and its neighbouring ecosystems, the northern limit of the boreal forest, or treeline, is a demarcation that looms large in the Canadian psyche. This is the point at which wood for fuel, shelter and tools is absent, leaving the human species exposed and vulnerable on the arctic plain until they reach the arctic waters, where the oils and skins of sea mammals are available for warmth and protection.



The hardy trees of the boreal forest are well adapted to the north. Many can grow on only a skiff of sandy soil over bare Precambrian rock. Conifers like black spruce can grow with roots in the wet acidic soils of boreal peatlands, often on top of frozen subsoils. Although species diversity is lower in the boreal forest than it is in forests farther south, the need for constant adaptation to a harsh world results in high genetic diversity. This contributes a resilience to cope with disturbances. In spite of cold, sparse soils, and a short growing season, the extent and stamina of this forest has created a living fabric with monumental value as a resource as well as an important influence on global climate.

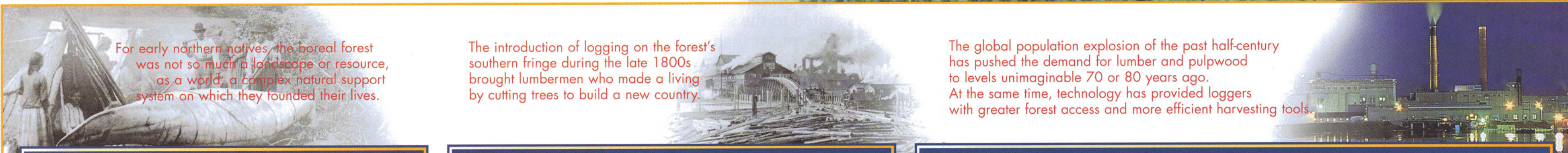


1. Characteristic throughout the boreal forest across a wide range of sites, including peatlands, where it often forms pure stands; elsewhere in mixed stands 2. Common throughout the boreal forest across a broad range of site conditions; rarely in pure stands 3. Common throughout the boreal forest, most notably in the prairie-forest transition zone in the south-central region; occurs in both pure and mixed stands across a range of upland conditions; prefers fresh, well-drained, loamy soils 4. Occurs throughout the boreal forest, most commonly in the prairie-forest transition zone in the south-central region; mainly in mixed stands on rich, moist sites 5. Common on sandy and shallow soils in eastern and central regions; typically found in even-aged, fire-origin stands, often with black spruce; replaced in northwest by lodgepole pine 6. Characteristic throughout the boreal forest on fresh upland sites; rarely grows in pure stands 7. Common in eastern and central regions across a broad range of conditions; typically in mixed stands 8. Common in peatland areas, especially in the north; typically found in association with black spruce; absent in far northwest 9. Common shrub of cold acid bogs and wet shores 10. One of first plants to become established on disturbed ground after fire or clearing 11. Typical forest floor species 12. Inhabitant of forest floor, bogs, forest edges and clearings 13. Year-round boreal resident 14. Wetland species; winters between California and South America 15. Summer resident; breeds in the boreal forest and migrates in winter as far as Central America 16. Boreal-dwelling weasel and important fur-bearer; under pressure from human activities along the southern limit of its range 17. By consuming the larvae of the larval sawfly, this small, active boreal mammal contributes to the control of an insect pest of the tamarack 18. Inhabitant of mature coniferous woodland; feeds principally on lichen; southern range has been retreating northward in response to pressures from development



Copies of this poster-map may be purchased from:  
 Canadian Geographic  
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## This forest has shaped our history and economy



**7,000 — 8,000 years ago**

- Forest cover gradually regenerates over Canada following the last Ice Age which ended some 13,000 years ago.
- Native populations and cultures become established across the boreal forest; controlled fires often set to encourage animals and plants needed for survival, and to facilitate hunting and travelling.

**1670 to early 1900s**

- The fur trade begins. European trade and culture affects animal populations and Native ways of life (1670-1870).
- Demand for lumber depletes forests in the south and east. This pushes forestry activities into the southern fringes of the boreal forest (mid-1880s).
- Growth of literacy and consumer spending sparks the demand for paper. The first pulp and paper mills are established in the boreal forest (late 1880s to early 1900s).

**Post World War II**

- Existing pulp and paper mills expand and new ones are built.
- Power saws replace hand saws and axes (1950s).
- Tractors replace horses in the woods, and trucks begin to replace water transportation (1970s).
- Improved harvesting equipment increases cutting efficiency (1980s).
- Technology optimizes the use of trees and wood waste, including species once considered "weeds" (1990s).
- Utilization of recyclable material (e.g. newspaper) increases (1990s).

The family wigwamin was a structure of spruce poles covered in squares of birchbark sewn together with long strands of peeled spruce root, as thin and strong as snare wire. Spruce boughs covered its floor, sweetening the air and providing a cushion for sitting and sleeping. The boughs' smell and needles were a natural repellent to small mammals, reptiles and insects. Girls learned hide tanning, leatherwork, and the construction of baskets and cooking pots from birchbark. Young men joined the hunt, armed with birchwood arrows, bows strung with animal gut, spears and knives of wood, stone and bone. These hunters and gatherers took only what they needed from the forest, a part of its delicate balance. After the hunt, or even after activities such as berry picking or spruce-root gathering, the people expressed gratitude to the Great Spirit and Creator.



Given the efficient but dispersed trade networks that existed before the arrival of the Europeans — and the 9,000-kilometre breadth of the boreal region — the forest must surely have seemed immense to the Cree, Ojibwa and Beothuk who lived there.

It certainly seemed endless to the first Europeans to arrive. Lacking the scientific data available today, the native peoples and early foreigners might also have assumed that the forest had existed since the beginning of time. But in geological terms, it is quite new. Until some 13,000 years ago, much of what is now Canada was covered with the glaciers of the last Ice Age. As the glaciers retreated north, vegetation reclaimed the land. But it was not until some 5,000 years ago that the boreal forest took on its present character.

European fur traders who arrived during the late 1600s brought a businesslike attitude. During the 18th and early 19th centuries, they extracted from the forest millions of beaver pelts for the production of fashionable hats. Animal populations that had been stable for centuries were disrupted. Natives abandoned age-old cultural ways to trap for profit.

The growth of literacy and publishing at the end of the 19th century, and the adoption of wood fibre rather than cotton as the main ingredient of paper, created a demand for pulp logs, putting added pressure on the forest. The pressure intensified with the establishment of northern pulp and paper mills, which consumed more logs and brought industrial byproducts with them.

Axes have been replaced by chainsaws, which in turn are being replaced by mechanical harvesters capable of gathering thousands of trees a day. Logs that were once moved to the mills along waterways in great spring drives are now trucked from the forest year round. An estimated 50 percent of Canada's vast boreal north is now accessible to the forestry industry via highways and logging roads.

While Canadians have not always been as considerate of the forest as they might have been, the forest has been constant in its benevolence to Canadians. At the moment, forestry is our largest natural resource industry, and we are the world's greatest exporter of wood products. An estimated 165,000 Canadians are employed directly by boreal forest industries: in logging and pulp and paper; in forest management and silviculture; in wood

industries whose products range from mouse traps in Niagara Falls to railway ties in Thunder Bay and hockey sticks in Victoriaville. Thousands more deliver services and goods to these industries, and sell and distribute forest products. The person in Montreal who makes steel parts for lumber-drying kilns is as dependent on the forests as the trucker who transports jack pine and spruce logs to the mills of Prince Albert, or The Pas.

The boreal forest provides Canadians with more than jobs and a trade surplus in wood and paper products. For millions, it is a recreational and spiritual refuge, a place to hike, canoe, camp, fish, take photos, or just look around and breathe the air. Its lakes, trees and rock formations are the base for hundreds of millions of dollars worth of tourism.

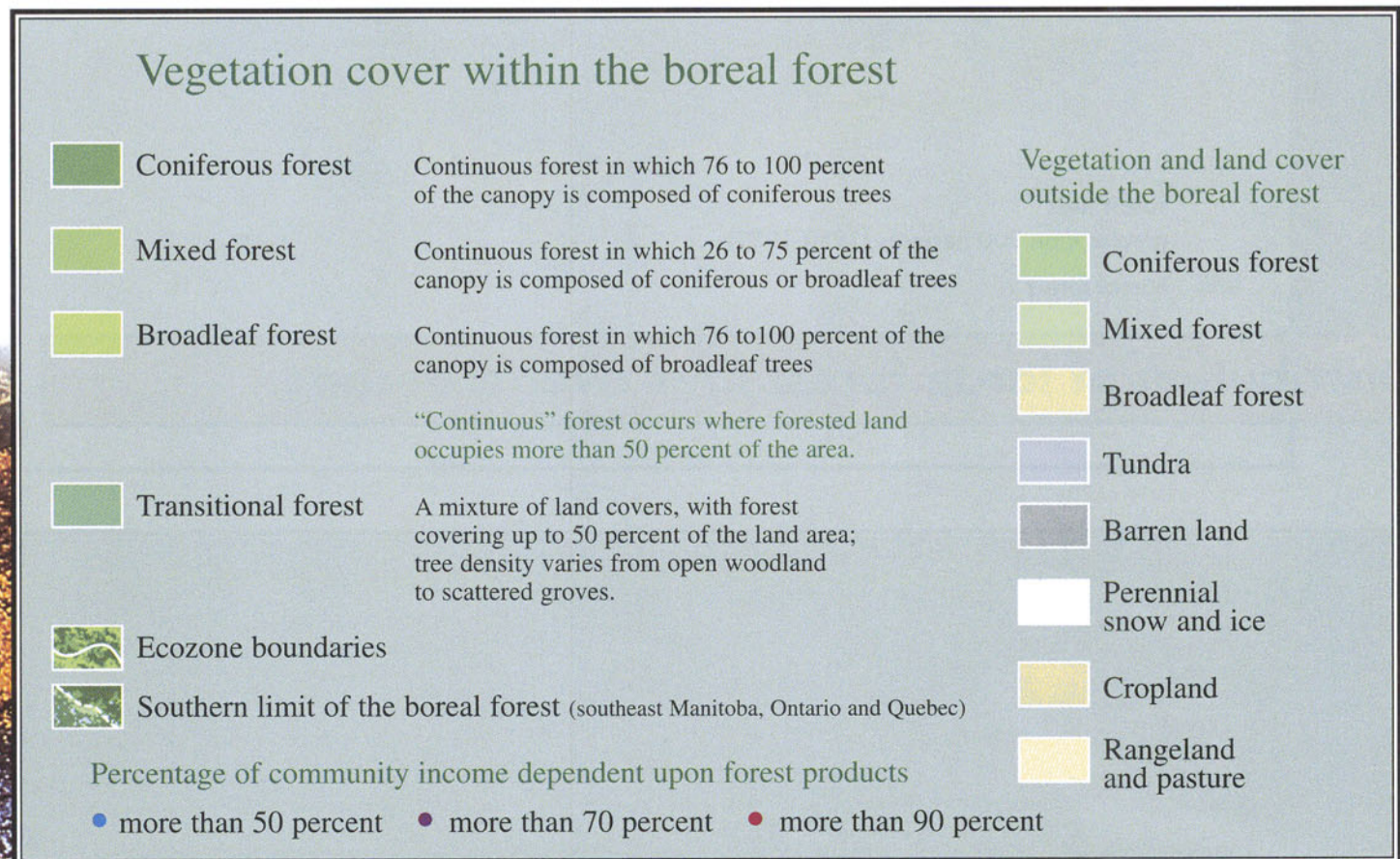
For all of these reasons it is crucial that, wherever possible, the boreal forest be managed for the well-being of future Canadians. Good forest management is expensive and complex. It must balance the interests of industry, educators, aboriginal groups, private land owners, tourist operations, outdoor enthusiasts, and conservationists. It must concern itself not just with individual plant or animal species but with the integrity of an ecosystem comprised of thousands of organisms. For example, forest managers might ask how will song-bird nesting or micro-organisms in the soil be affected by the removal of mature birch or tamarack.

During the early 1990s, forestry officials set out to develop a master plan that would ensure a co-ordinated, ecological approach to forest management in Canada. The result was the National Forest Strategy, endorsed in 1992 by all levels of government as well as by representatives of industry, aboriginal peoples, educational and conservation groups.

The strategy views the boreal forest as being as important to the hiker, the ecologist and the everyday citizen as to the lumber industry and the commodities trader. It encourages research that might aid to the knowledge of how forest ecosystems operate and how their biodiversity and vigour can be protected and enhanced.

Current management of the boreal forest falls largely to the provinces, which control 92 percent of it. Provincial governments allocate harvest rights, monitor harvesting, and encourage sound logging and reforestation practices. The federal government, which controls just over five percent of the boreal forest, contributes scientific research, economic development, international trade and relations and pesticide regulation. Both levels of government protect significant tracts of forest from logging — in national and provincial parks, wildlife sanctuaries, conservation areas and forest preserves.

Between 1977 and 1991, expenditures on forest management in Canada increased from \$500 million annually to \$2.5 billion. Much of the increase has gone to the development of sustainable forestry practices in recent years. Another portion of that increase has gone into progressive experimental projects such as the development of natural pesticides and biological control agents which, it is hoped, will gradually replace chemical pesticides and the chemical herbicides used in reforestation. Other projects include the development of disease- and insect-resistant trees for replanting.



The vegetation zones on this map come from an interpreted satellite image. Analysis and classification were done by the Manitoba Remote Sensing Centre and Geomatics Canada.

The scale is 1:10,750,000

The boreal forest extends across seven major eozones — areas that represent large ecosystem units and have characteristic landforms and climate.

The taiga cordillera, taiga plain, taiga shield and Hudson plain form the northern tier of the forest. "Taiga" is a subarctic area where the transition from tundra to forest occurs. As part of this transition, there are extensive treeless areas. A "cordillera" is a group of mountain ranges and valleys, a plain can be level or rolling land, and "shield" is rolling terrain with exposed Precambrian rock.

Three other ecozones form the southern tier of "closed" — more or less continuous — boreal forest. They are the boreal cordillera, in the western mountains, the boreal plain in the Prairies and the boreal shield that extends from northern Saskatchewan all the way to Newfoundland.

