



Is Canada's Boreal Forest Ancient?

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- Boreal forests are made up of trees that are mostly relatively young compared with some trees that grow in more temperate climates.
- Because of fire, insects, and other natural disturbances, few of the trees in the boreal zone are very old and little of the landscape is undisturbed.
- In the western boreal zone, forests are usually less than 100 years old and in the eastern boreal zone, forests are usually less than 200 years old.
- Scientists do not consider the boreal forest to be ancient because the forest itself is subject to ongoing natural disturbances that are part of an ecological cycle that renews the forest.

of the boreal forest is undisturbed by humans. Moreover, large-scale harvesting in the boreal zone began about a century ago in the east and more recently in the west, as governments and companies saw the economic development opportunities for creating lumber and pulp and paper out of the long-fibered trees of the boreal forest. Many areas harvested more than 100 years ago have been harvested a second time, and in the intervening period provided habitat, recreation opportunities, and other environmental and social services. This cycle demonstrates the renewable nature of forests and their multiple uses. Other important economic activities taking place in the boreal zone are mining, oil and gas development, hydroelectric development, and agriculture.

So Is the Boreal Forest Ancient?

Scientists do not consider the boreal forest to be ancient because the forest itself is subject to ongoing natural disturbances that are part of an ecological cycle that renews the forest. Under sustainable forest management, management strategies will often seek to imitate the effects of natural disturbances to help maintain the ecological integrity and health of the forest for the future.

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For example, spruce budworm, *Choristoneura fumiferana* (Clem.), defoliated 54 million ha of spruce and fir forests in 1975, whereas the most significant fire year in the last 30 years consumed about 7 million ha. The impact of insect infestations on forests varies by insect—feeding by some insects will simply slow the growth of trees in the forest, whereas others, like the mountain pine beetle, *Dendroctonus ponderosae*, can kill large swaths of trees outright, as we are currently seeing in the western boreal zone of British Columbia and Alberta.

How Much of the Boreal Forest Is Undisturbed?

Because of fire, insects, and other natural disturbances, few of the trees in the boreal zone are very old and little of the landscape is undisturbed. Boreal forests continually renew themselves through these disturbances.

Human-caused disturbance is also important. For thousands of years, people have used what is now Canada's boreal zone as a source of food, building materials, clothing, transportation, and medicines. As a result, it is difficult to pinpoint how much

Canada's boreal forest is often portrayed as one vast tract of ancient, pristine wilderness. Although the boreal region itself is ancient, boreal forests are made up of trees that are mostly relatively young compared with some trees that grow in more temperate climates. Nor is it all the same—the boreal forest is a complex and heterogeneous landscape of different ecosystems and species, continuously shaped and renewed by a cycle of natural disturbances, as well as human activity.

What Is the Boreal?

The **boreal zone** is a broad, circumpolar vegetation zone covered mostly with forests of spruce, fir, pine, larch, poplar, and birch that can tolerate the harsh, cold winter climate and a relatively short growing season. The zone consists of more than just forests—lakes, rivers, wetlands, and naturally treeless areas also cover substantial areas of the boreal. Because of the predominance of forests in the boreal landscape, the zone has often been referred to as the **boreal forest** in North America or the **taiga** in Russia.

In North America, the boreal zone covers 627 million ha from Greenland to Newfoundland, and across northern Canada into Alaska. About 88% of this area lies in Canada. In Eurasia, the boreal zone is distributed throughout most of Scandinavia and Russia and includes parts of China, Kazakhstan, and Mongolia. The boreal zone's northern boundary in both North America and Eurasia is generally the northern tree limit; its southern boundary is generally the northern limit of temperate forests or grasslands. These boundaries have changed over time with climate; for example, 5000 years ago the northern tree limit in western Canada was farther north than it is today because of particularly warm climatic periods, and similarly for eastern Canada 3000 years ago.

Even at the landscape level, the boreal zone is not really that old. As recently as 21 400 years ago, at the peak of the last continental glaciation, almost all the northern half of the continent—including the boreal zone—was covered with ice. As the continental glaciers melted during the next 15 000–16 000 years, the newly deglaciated land was colonized by tree species growing to the south of the ice margin. Over time, different plant groupings have evolved and established themselves as the climate changed.

In fact, the boreal forest as we know it with its characteristic tree species and understory plants did not exist until a few thousand years ago.

How Old Is the Boreal Forest?

Ages of trees in the boreal zone should be put into perspective. The longest living tree that scientists are aware of is the Great Basin bristlecone pine (*Pinus longaeva* D.K. Bailey) growing in the southwestern United States which can grow to be more than 4800 years old. In Canada, some of our longest living trees are eastern white-cedar (*Thuja occidentalis* L.) in the east and Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco var. *menziesii*) in the west, both of which can grow to be more than 1000 years old.

By comparison, the trees in the boreal zone are relatively young. Natural disturbances such as fire, insects, windthrow, ice storms, and disease all have a role in shaping the boreal forest, resulting in a patchwork of stands of trees, large and small, old and young, each supporting different birds and wildlife.

Some of these stands are considered “old-growth”, a term that is more scientifically recognized than the term “ancient”. Old-growth forests are those in a later stage of forest succession, with characteristic ages and structures that vary with forest type. The trees in boreal old-growth forests are typically not the giants



(Natural Resources Canada)

often pictured in maritime temperate zones such as the British Columbia coast, because of the younger age of the trees and because the tree species themselves do not tend to grow as large. Although some forests in the boreal zone may escape stand-replacing disturbances for long periods of time (more than 500 years), such forests are not a common feature in the boreal zone.

Fire in particular is critical in shaping boreal forests. In the boreal zone of western Canada and Alaska, fires typically occur every 50–100 years for any given area. In the eastern boreal zone, conditions are wetter because of more rainfall, and fires are less frequent. Here, fires have occurred generally every 100–200 years or longer. As a result, in the western boreal

zone, forests are usually less than 100 years old and in the eastern boreal zone, forests are usually less than 200 years old. There are forests in the boreal zone that can reach older ages; however, these old-growth forests are not as common and occur in areas like river valleys and islands in lakes where fire is unlikely to reach or in wetter areas where intensive fires are

less frequent. Vegetation and tree species in the boreal zone have not only adapted to fire but also rely on it for regeneration and renewal.

Insect infestations are another important factor in the boreal zone and, in fact, disturb a larger area of forest annually than fire.



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