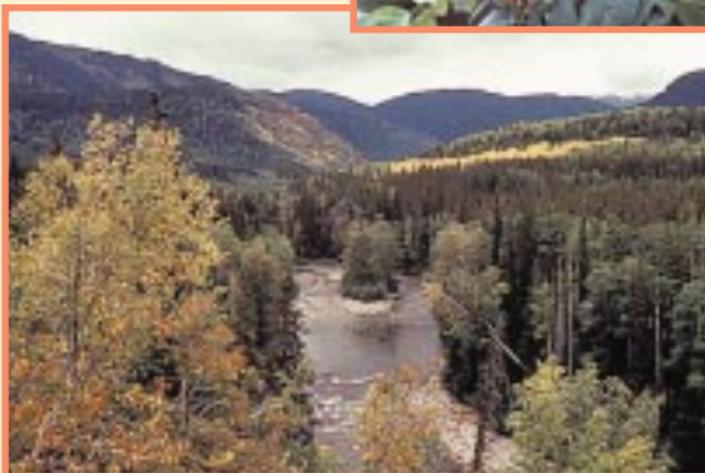


BROADLEAVED TREES

Unsung Component of British Columbia's Forests



THEIR ROLE
IN FOREST
ECOSYSTEMS



The Centre for Applied
Conservation Biology
University of British Columbia



BRITISH
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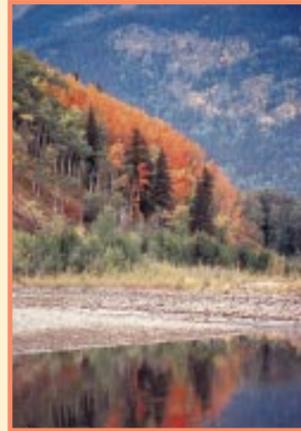
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What are broadleaved trees?

Broadleaved trees are also commonly known as hardwoods. Except for arbutus trees, B.C.'s broadleaved trees are deciduous. They shed their leaves each year in response to the cooler, shorter days that signal the onset of winter.



The term *deciduous* stems from the Latin root *decidere*, "to fall."

Broadleaved trees and forest ecosystems

Broadleaved trees are a natural component of B.C. landscapes. They help to:

- cycle nutrients and contribute to long-term sustainability
- provide "nurse" sites for plants and fungi
- provide food, cover, and nesting sites for insects and other animals
- provide fibre for lumber and paper
- enhance visual resources
- broaden the diversity of structures and organisms in forests.

Broadleaved trees and shrubs and nutrient cycling

Broadleaved, deciduous trees acquire high levels of nutrients in their foliage which falls to the forest floor each year. Deciduous tree leaves are less acidic than conifer needles and contain fewer protective chemicals. Once fallen, the decaying foliage contributes to a nutrient-rich soil with diverse invertebrate, fungal, and bacterial communities.

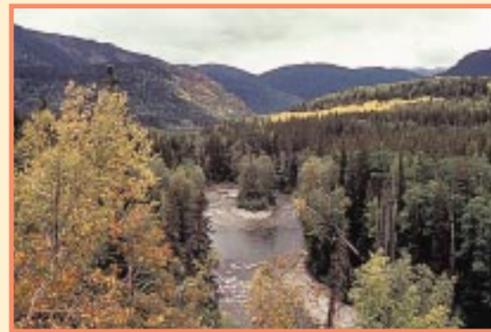
Red alder has bacteria associated with its root system that can convert nitrogen into a form plants can use.



Some broadleaved trees have bacteria associated with their roots that convert unusable nutrients into forms that plants can use. Nutrient-rich leaves and associated bacteria help to make rates of nutrient cycling higher in broadleaved forests than in coniferous ones.

The successional role of broadleaved trees

Broadleaved trees are often the first trees to grow on open sites where vegetation has been removed through disturbances such as fires, floods, diseases, insects, or forest harvesting. These rapid colonizers are called "pioneers" and typically grow and reproduce quickly. They provide shade and moderate temperatures so that tree species less able to withstand open, harsh habitats can grow. Some broadleaved trees, such as trembling aspen, act as "nurse" logs, furnishing ideal growing sites for other tree and plant species.



When broadleaved trees colonize a large area they may form almost pure stands. More commonly, broadleaved trees establish in small areas and combine with conifers to create mixed stands.



Forests of a mix of deciduous and conifer trees generally allow more light to reach the forest floor than do pure stands thereby contributing to the growth of diverse plant communities. The rich forest floor, the variety of plant species, and the complex forest structure contribute important habitat for many wildlife species.

Broadleaved trees and wildlife

Wildlife require food, cover from weather extremes, and safe areas in which to escape predation, breed, rear young, and rest. Ecosystems with a large component of broadleaved trees fulfill some or all of these requirements for about 150 species of vertebrates in B.C.

Broadleaved species provide food

Broadleaved foliage is usually much more palatable and rich in nutrients than coniferous foliage.

Leaves, twigs, and stems of broadleaved shrubs and young trees are critically important forage for ungulates such as mule deer, elk, and moose, and other herbivores such as snowshoe hares, meadow voles, and many insects. The diversity of insects found on broadleaved trees feeds many birds and other animals. Broadleaved trees have shorter lifespans and decay more rapidly than the resinous conifer trees.



Deciduous trees and shrubs provide food and cover for moose and other herbivores.

The fruits borne by broadleaved shrubs, such as members of the rose family, are rich in sugars, proteins, and fats, and are key items in the diets of berry-eating birds such as chickadees, finches, waxwings, and thrushes.



Broadleaved species provide cover and nesting sites

Because broadleaved trees decay rapidly, many of the 12 woodpecker species in B.C. prefer them for excavating their nests.

Woodpeckers excavate new cavities each year. The cavities they build are eventually available to more than 20 species of secondary cavity-nesters, which can not excavate their own.



Birds such as the saw-whet owl, the black-capped chickadee and the wood duck, and mammals such as flying squirrels and marten use cavities in deciduous trees.

Small mammals such as deer mice and jumping mice, and large mammals such as grizzly and black bear forage on berries.



A 1995 survey of woodpecker nest trees found about 95% to be aspen, even though aspen comprised only 1% of the trees in the survey area.



Salamanders often seek refuge under decaying deciduous logs.

Broadleaved tree cavities and gaps beneath the loose bark of decaying trees may also provide roosting habitat for bats (such as long-eared myotis, silver-haired bat, and hoary bat), shelter for amphibians, and foraging areas for small mammals.

Some broadleaf forests can be structurally complex and typically have thick shrub and herb layers, which encourage shrub- and ground-nesting birds.



The structural complexity of some broadleaf forests provides shelter from predators and inclement weather for many species from wolves to western harvest mice and from winter wrens to salamanders.

Stream- and pond-side habitats—where everything comes together

Habitats adjacent to water are usually dominated by broadleaved vegetation well-adapted to moist, open growing conditions. Wildlife are abundant near streams because of the available water, relatively productive soils, and complex vegetation structure.



Habitats near watercourses are important to both aquatic and terrestrial ecosystems. Insects, leaves, and branches that drop from broadleaved trees provide important food for invertebrates and fish.

Dense thickets of willow and other broadleaved shrubs are typical of habitats near watercourses. These thickets provide forage and cover areas for many birds, mammals, amphibians, and insects. Deciduous streamside vegetation also provides valuable streamside cover, helps stabilize banks, and provides cooling shade.



Black cottonwoods are a major component of streamside habitats subject to frequent flooding. They are used extensively by cavity-nesting species (more than 60% of the world's population of Barrow's goldeneye nest in black cottonwood). They also provide nesting sites and perches for bald eagles, and dens for fishers.

The most common broadleaved tree species in B.C.

There are six commercially important broadleaved tree species in B.C.



Trembling aspen



Black cottonwood



Paper birch



Bigleaf maple



Red alder

Red alder and bigleaf maple are common in coastal regions; trembling aspen and paper birch are more prevalent in the interior. Black cottonwood is found throughout most of the coast and a large portion of the interior; it is replaced by balsam poplar in the northern and eastern-most parts of the province. As well, many other species of less commercial value are also found in B.C., including other alders, maples, birches, and poplars.

Broadleaved trees in managed stands

Changing uses for broadleaved trees

Until recently, the establishment and growth of many broadleaved trees were suppressed in B.C.'s managed forests because these trees lacked economic value. With the advent of new technology, several hardwood species have now become commercially valuable. B.C. harvests about two million cubic metres of broadleaved trees annually. Hardwoods are the lead



species on 11 percent of our productive forest land and mixedwood (conifer and broadleaved trees) forests cover approximately 35 percent of productive forest land. Though commercial use is relatively recent, traditional use of broadleaved trees by First Nations continues to be extensive for food, building materials, and medicines.

One uncommon tree species, cascara, grows in the shaded floodplains of south coastal B.C. Historically, cascara bark was collected for medicinal purposes, which caused it to decline in the province. Cascara is currently protected.



Manufacturing birch plywood.

Broadleaved trees are receiving greater consideration from biologists, forest managers, and the public because of the important contributions they make to maintaining diverse, productive, resilient ecosystems. Forests with broadleaved trees are often more resilient to attack from insects and disease than are pure coniferous stands.

Broadleaved trees are under pressure

On sites where conifers are the preferred crop, broadleaved trees may be suppressed to reduce competition with conifers. Their removal decreases plant species in the area and also decreases vertebrates associated with these plants. Broad-leaved species are, however, continuously replenished by nature and remain present in B.C.'s managed conifer forests.



Broadleaved trees may be removed by mechanical means (axes, chainsaws, heavy equipment), or by herbicides.

Several broadleaved species are included in new Pulpwood Management Agreements. The harvest for pulpwood could significantly alter broadleaved ecosystems and substantially reduce the size of area occupied by older broadleaved forests. Livestock forage on broadleaved shrubs and trees in forested range areas, especially when grasses are unavailable, dry or less palatable, often significantly reducing abundance of broadleaved species. Other threats to broadleaved-dominated habitats are agricultural, urban, and industrial developments.



In many areas where they do not offer significant competition, broadleaved trees are left to grow, and in most areas where they are controlled, some re-seed or survive to become significant components of the stand.

Maintaining broadleaved trees in managed stands

Because forest managers are recognizing the economic value of broadleaved trees and their important role in forest ecosystems, more effort is being directed to maintaining these species where ecologically appropriate.



Patches of broadleaved trees and shrubs can be retained within areas being logged, and the same patches can be used to retain coniferous trees, snags, and downed wood that are also important for maintaining biological diversity.

There are several means of maintaining broadleaved trees and shrubs during forestry operations. Broadleaved species seed in and establish readily on many sites.

Broadleaved trees can also be retained during site preparation and stand tending unless they significantly compete with the crop trees or affect worker safety. Where fires were historically frequent, prescribed burning can help maintain the natural fire cycle, and increase broadleaved tree or shrub abundance and productivity.

Livestock grazing can be managed to allow time for broadleaved shrubs and trees to recover between grazing periods. Recovery allows them to continue to provide forage and cover for both livestock and wildlife.

Maintaining broadleaved trees and shrubs will ensure forage and cover habitat for many wildlife species, and maintain site productivity and specific growing conditions for many plants.

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