

West-Central Boreal Forest



General Description

The *West-Central Boreal Forest* zone covers an area of approximately 1,740,000 km² in western and central Canada. It occupies the low elevation boreal and Rocky Mountain foothill areas from northern British Columbia (BC) and southeastern Yukon to northwestern Ontario. The continental boreal climate has long winters and short summers. Landcover is dominated by forests, but numerous lakes, rivers and wetlands contribute to a complex landscape mosaic.

Vegetation

Productive closed forests dominate most upland sites, although open forests and woodlands are commonly associated with very dry sites. Forest canopies can be dominated by evergreen coniferous, cold-deciduous broad-leaved or a mixture of conifer – broad-leaved species. Understory structure varies from dense to sparse, and is usually dominated by cold-deciduous broad-leaved shrubs, conifer regeneration, perennial herbs and mosses. A continuous feathermoss ground layer is characteristic of these forests, especially under conifer canopies.

Frequent stand-replacing fires create a diverse landscape mosaic comprising forest stands of varying age and composition. Individual stands are seldom over 150 years old, and are typically even-aged with a simple structure. In the prolonged absence of fire, multi-storied stand structure can develop over time. Forest harvesting, other industrial activities (e.g., oil

and gas exploration), agricultural conversion and settlement clearance are also significant disturbance factors in some areas.

Dominant tree species include trembling aspen (*Populus tremuloides*), white spruce (*Picea glauca*), black spruce (*Picea mariana*), lodgepole pine (*Pinus contorta* var. *latifolia*) and jack pine (*Pinus banksiana*). Balsam poplar (*Populus balsamifera*) occurs on nutrient-rich, usually moist, sites. Paper birch (*Betula papyrifera*) is an early seral species that becomes more common eastward in the zone. At higher elevations or in fire-sheltered locations, subalpine fir (*Abies lasiocarpa*) or balsam fir (*A. balsamea*) occur with white spruce in late seral stands. In general terms, jack pine and balsam fir occur east of the Rocky Mountain foothills and northwestern Alberta, while lodgepole pine and subalpine fir occur to the west; hybrids occur in areas where the species ranges overlap. Alluvial forests dominated by white spruce, paper birch, trembling aspen and balsam poplar occur on stable floodplain terraces.

Understories vary from dense, species-rich shrub and herb conditions to a continuous feathermoss ground cover with only a few erect vascular plants. Common understory species include prickly rose (*Rosa acicularis*), squashberry (*Viburnum edule*), common Labrador tea (*Rhododendron groenlandicum*), fireweed (*Chamaenerion angustifolium*), tall bluebells (*Mertensia paniculata*), downy lymegrass (*Leymus innovatus*), bluejoint reedgrass (*Calamagrostis canadensis*), mountain cranberry (*Vaccinium vitis-idaea*), red-stemmed

feathermoss (*Pleurozium schreberi*) and stairstep moss (*Hylocomium splendens*).

Wetlands are common and often extensive in poorly drained locations. Swamps, marshes and fens are the predominant wetland classes; true bogs are less common, especially on the Interior Plains.

Treed swamps are typically dominated by black spruce and tamarack (*Larix laricina*), with black spruce prevalent on nutrient-poor sites. Shrub swamps and annually active floodplains typically include grey alder (*Alnus incana*), willows (e.g. Bebb's willow [*Salix bebbiana*], tea-leaved willow [*S. planifolia*]), bluejoint reedgrass and field horsetail (*Equisetum arvense*).

Shallow marshes and wetter fens are often dominated by water sedge (*Carex aquatilis*) and northern beaked sedge (*C. utriculata*), sometimes in association with common spikerush (*Eleocharis palustris*), bluejoint reedgrass or northern reedgrass (*C. stricta* ssp. *inexpansa*). In the southern part of the zone, broad-leaved cattail (*Typha latifolia*) and hard-stemmed bulrush (*Schoenoplectus acutus*) marshes occur on the margins of shallow water bodies. Where water tables fluctuate and some root zone drying occurs during the growing season, fens include shrub birches (mainly arctic dwarf birch [*Betula nana*] and bog birch [*B. pumila*]), willows (e.g., bog willow [*Salix pedicellaris*]) and stunted tamarack. Brown mosses such as ribbed bog moss (*Aulacomnium palustre*), golden fuzzy fen moss (*Tomentypnum nitens*) and hook mosses (*Drepanocladus* spp.) are usually dominant between *Sphagnum* hummocks.

In addition to stunted black spruce and tamarack, bogs and nutrient-poor fens typically include common Labrador tea (*Rhododendron groenlandicum*), mountain cranberry (*Vaccinium vitis-idaea*), small cranberry (*Vaccinium oxycoccus*), cloudberry (*Rubus chamaemorus*), pale bog laurel (*Kalmia polifolia*), three-leaved false Solomon's seal (*Maianthemum trifolium*) or, in the west, field horsetail. Peat mosses (*Sphagnum* spp.) dominate the moss layer, with red-stemmed feathermoss, stairstep moss or lichens on the tops of hummocks.

Upland grasslands and shrublands are rare on the landscape, other than immediately following forest removal and on some very dry sites.

Climate

The *West-Central Boreal Forest* zone occurs within the subhumid continental boreal macroclimate of west-central Canada, characterized by long, cold winters and short, cool to moderately warm summers. Continental effects are moderated in the Cordilleran portion of the range, including the Rocky Mountain foothills of Alberta and the boreal regions of northern BC, southeastern Yukon and southwestern Northwest Territories (NWT), where higher elevations and orographic effects produce cooler summers, warmer winters and more precipitation than is characteristic of areas to the east.

Mean annual temperatures vary from -3°C to -5°C along the northern edge of the zone to >2°C in the southern Alberta foothills. The growing season is short, averaging less than 1000 growing degree days above 5°C (GDD), although southern portions of the range can reach 1600 GDD. In the Cordilleran areas of Yukon, NWT, BC and Alberta, mean annual precipitation varies from approximately 300 to 600 mm, depending upon latitude, longitude and elevation. East of the foothills, mean annual precipitation generally increases eastward, reaching 750 mm at the eastern limit of the zone in northwestern Ontario. In all parts of the zone, over half of the annual precipitation falls as rain, often during summer thunderstorms. Drought is a regular occurrence, affecting productivity of these forests and exacerbating disturbance by fire, insects and diseases.

Physiography, Geology, Topography, Soils and Land Cover

This zone occupies portions of the Cordilleran and Interior Plains physiographic regions of western Canada, as well as portions of the Kazan, Hudson and James regions of the western Precambrian Shield. In the Cordilleran region, the zone occurs below approximately 1200 mASL in the Omineca, Cassiar and northern Rocky Mountains of BC, and on the Stikine and Yukon plateaux of northwestern BC. It is found below approximately 950 mASL in the Selwyn and Mackenzie Mountains, the Liard Lowland and the Liard and Hyland Plateaux of southeastern

Yukon, southwestern NWT and northeastern BC. In the Rocky Mountain foothills of Alberta, this zone occurs below about 1400 mASL north of the Bow River. In the Interior Plains region, the zone includes the Alberta Plateau and associated Fort Nelson and Peace River Lowlands, as well as the forested portions of the Alberta, Saskatchewan and Manitoba Plains. On the Precambrian Shield, it occurs on the Athabasca Plain and the southern Kazan Uplands of northern Alberta, Saskatchewan and Manitoba, as well as the Severn Uplands and Hudson Bay Lowland of eastern Manitoba and northwestern Ontario. East of the Rocky Mountains, elevations rarely exceed 800 mASL.

The geology of the Cordillera within the zone is mostly faulted and folded Paleozoic, Mesozoic or Tertiary sedimentary, and often carbonate-rich, rocks. The terrain is a complex mixture of high mountains (up to 3900 mASL) with intervening plateaux, hill systems, valleys, trenches and basins. The Interior Plains physiographic region is underlain by level to gently tilted Paleozoic, Mesozoic or Tertiary sedimentary rocks. The topography is mostly an undulating plain, although there are several low elevation hill systems. The Kazan and Severn Uplands exhibit characteristic Shield landscapes, with broad expanses of rolling terrain containing numerous wetlands and lakes; local relief rarely exceeds 100 m. The geology comprises Precambrian sedimentary and crystalline rocks. On the Hudson Bay Lowland, Paleozoic carbonate-rich strata overlie the Precambrian rocks creating a level plain with low relief and extensive wetlands.

With the exception of a small area in southwestern NWT, the entire zone was affected by late Pleistocene glaciation, and surficial landscape expression is dominated by glacial features and bedrock-controlled terrain. Typically, in the mountains and foothills, glacial till overlies bedrock

while fluvial and glaciofluvial materials occur on valley bottoms. In areas with lower relief underlain by gently tilted to level sedimentary rocks (especially in the Interior Plains), deeper till and glaciolacustrine or glaciofluvial deposits occur over more extensive areas. In Shield areas, shallow till veneers often overlie bedrock on upland sites, while deeper deposits of glacial drift fill landscape depressions. Mineral soils are typically Brunisols and Luvisols, with Gleysols occurring on moist, poorly drained sites. Peatlands dominated by Organic soils are common and often extensive in poorly drained areas; peat depths can be >3 m. Discontinuous permafrost occurs sporadically at the northern edge of the zone. Numerous water bodies are a characteristic of the landscape.

Notes

The *West-Central Boreal Forest* zone is bounded to the north by the *Northern Boreal Woodland* and, to the east, by the *Eastern Boreal Forest*. Its southern boundary across most of its area is with the *Great Plains Parkland*, although small sections adjoin the *Rocky Mountain Foothills Parkland* in southwestern Alberta and the *Cordilleran Subboreal Forest* in northcentral BC. To the west, and at higher elevations in northern BC and Yukon, it borders the *Northwest Boreal Forest*. At higher elevations in Alberta, some parts of northcentral BC and south of approximately the Halfway River in eastern BC, the adjoining zone is the *Cordilleran Montane Forest*. In northern Alberta, two inclusions of the *Northern Boreal Woodland* occur in the Cameron Hills and Caribou Mountains.