

## Northwestern Boreal Forest



### General Description

The *Northwestern Boreal Forest* zone covers an area of approximately 267,000 km<sup>2</sup> in Yukon, northern British Columbia (BC) and southwestern Northwest Territories (NWT). It includes higher elevation forested areas in northern BC, southeastern Yukon and southwestern NWT, as well as all forested areas in Yukon west of approximately Swift River. The continental boreal climate has long winters and short summers. Landcover is dominated by forests and woodlands, but numerous lakes, rivers and wetlands contribute to a complex landscape mosaic.

### Vegetation

Closed forests are typical on upland sites at lower elevations, however open forests and woodlands occur on dry sites and in colder environments. Treed stands become more open and patchy with increased elevation (or in valleys where cold air ponding is significant), often occurring as tree islands or widely-spaced trees in a shrubland matrix. At the highest elevations or on sites most exposed to wind, trees develop characteristic krummholtz growth forms in response to physical damage by extreme cold and blowing snow and ice crystals. 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 and mosses. A continuous feathermoss

ground cover is characteristic of these forests, especially under conifer canopies; lichen cover is often high on dry sites and under open 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. Anthropogenic disturbance is uncommon, except near settlements.

Dominant tree species include white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*), lodgepole pine (*Pinus contorta* var. *latifolia*), subalpine fir (*Abies lasiocarpa*) and black spruce (*Picea mariana*). Higher elevation woodlands are dominated by white spruce and/or subalpine fir, sometimes with Yukon lodgepole pine (*Pinus contorta* var. *yukonensis*). Trembling aspen or balsam poplar (*Populus balsamifera*) occasionally occur at high elevations on steep warm aspects. Alluvial forests dominated by white spruce and balsam poplar occur on stable floodplain terraces. Peatland forests dominated mostly by black spruce occur in wet basins and on cold upland slopes.

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 willows (*Salix* spp.), shrub birches (primarily arctic dwarf birch

[*Betula nana*] and glandular birch [*B. glandulosa*]), black crowberry (*Empetrum nigrum*), common Labrador tea (*Rhododendron groenlandicum*), fireweed (*Chamaenerion angustifolium*), mountain cranberry (*Vaccinium vitis-idaea*), twinflower (*Linnaea borealis*), arctic lupine (*Lupinus arcticus*), northern rough fescue (*Festuca altaica*), common bearberry (*Arctostaphylos uva-ursi*), reindeer lichens (*Cladina* spp.) and staircase moss (*Hylocomium splendens*). At higher elevations greater abundance of shrub birches, willows, black crowberry and bog bilberry (*Vaccinium uliginosum*) occurs, especially in the understory of open woodland stands and in shrubland patches.

Wetlands are common and often extensive in poorly drained locations. Bogs and fens are the predominant wetland classes, with peat accumulation occurring on both lowland and cold upland sites. Peatlands often contain permafrost. Swamps occur where seepage provides higher nutrient status. Marshes and rich fens occur at the margins of shallow water bodies and in areas of permanently elevated water tables.

In addition to stunted black spruce, bogs and nutrient-poor fens typically include arctic dwarf birch, glandular birch, black crowberry, common Labrador tea, mountain cranberry, bog bilberry, small cranberry (*Vaccinium oxycoccus*) and cloudberry (*Rubus chamaemorus*). Peat mosses (*Sphagnum* spp.) dominate the moss layer, with staircase moss, red-stemmed feathermoss (*Pleurozium schreberi*) feathermoss or lichens on the tops of hummocks.

Treed swamps are usually dominated by white and/or black spruce, with black spruce prevalent on nutrient-poor sites. Shrub swamps, fens and annually active floodplains include mountain alder (*Alnus incana* ssp. *tenuifolia*), willows (e.g. Barclay's willow [*S. barclayi*], grey-leaved willow [*S. glauca*], tea-leaved willow [*S. planifolia*], Alaska willow [*S. alaxensis*]), arctic dwarf birch and glandular birch.

Shallow marshes and wetter fens usually include sedges (e.g. water sedge [*Carex aquatilis*], spruce muskeg sedge [*Carex bigelowii* ssp. *lugens*], northern beaked sedge [*C. utriculata*]), spikerushes (e.g., needle spikerush [*Eleocharis acicularis*], common spikerush [*E. palustris*]), tussock cottongrass (*Eriophorum vaginatum*), water horsetail (*Equisetum*

*fluviatile*), bluejoint reedgrass (*Calamagrostis canadensis*) or northern reedgrass (*C. stricta* ssp. *inexpansa*). Brown mosses such as ribbed bog moss (*Aulacomnium palustre*), golden fuzzy fen moss (*Tomentypnum nitens*) and hook mosses (*Drepanocladus* spp.) usually dominate between *Sphagnum* hummocks.

Upland grasslands and shrublands are relatively common on the landscape, especially at higher elevations and on very dry sites. Upland shrub communities are usually dominated by shrub birches but can also be willow dominated, especially in areas with deeper snowpacks. Common juniper (*Juniperus communis*) and common bearberry occur on dry rocky sites. Grasslands occur on warm aspects; they are characterized by prairie sagebrush (*Artemisia frigida*), northern rough fescue, glaucous bluegrass (*Poa glauca*) and purple reedgrass (*Calamagrostis purpurascens*). At higher elevations, subalpine grasslands and meadows are common, including mountain monkshood (*Aconitum delphinifolium*), mountain sagewort (*Artemisia norvegica* ssp. *saxatilis*) and blue Jacob's-ladder (*Polemonium caeruleum*).

## Climate

The *Northwestern Boreal Forest* zone occurs within the subhumid continental boreal macroclimate of western Canada, characterized by long, cold winters and short, cool summers. Some areas are climatically more humid and some slightly less continental, depending on orographic effects and prevailing westerly air flows. Mean annual temperatures vary from -1°C to -6°C. The growing season is short, ranging between 450 and 1000 growing degree days above 5°C. Mean annual precipitation varies from approximately 300 to 800 mm, depending upon latitude, longitude and elevation (over 1000 mm is received at some higher elevations in northwestern BC). Over half of the annual precipitation falls as snow.

## Physiography, Geology, Topography, Soils and Land Cover

This zone occurs in north-central portions of the Cordilleran physiographic region. In Yukon and BC, it includes the Pelly, Omineca, Cassiar and northern Rocky Mountains, plus the southern windward

slopes and valleys of the Ogilvie, Selwyn and Wernecke Mountains. It also occurs on the Stikine and Yukon Plateaux of northwestern BC and central Yukon, and the Liard Lowland and the Liard and Hyland Plateaux of southeastern Yukon, southwestern NWT and northeastern BC. In western Yukon, this zone includes all areas that support upland forests and woodlands at elevations below approximately 750 to 1450 mASL. In northern BC, southeastern Yukon and southwestern NWT, it includes forested areas above 800 to 1100 mASL.

The geology of the Cordillera within the zone is mostly faulted and folded Paleozoic, Mesozoic or Tertiary sedimentary, often carbonate-rich, rocks. The Coast and Omineca Mountains consist predominantly of crystalline igneous and metamorphic rocks. The terrain is a complex mixture of high mountains (up to 2500 mASL) with intervening plateaux, hill systems, valleys, trenches and basins.

Except for some small areas in western Yukon and southwestern NWT, the entire zone was affected by late Pleistocene glaciation, and surficial landscape expression is dominated by glacial features and bedrock-controlled terrain. In mountainous areas,

the predominant parent material is glacial till, usually occurring as blankets and shallow veneers overlying bedrock; fluvial and glaciofluvial materials occur on valley bottoms. In areas with lower relief, deeper till and glaciolacustrine or glaciofluvial deposits occur over more extensive areas. 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 are usually <3 m. Cryosols are found where discontinuous permafrost occurs, mostly in peatlands and on steep cool aspects with thick moss mats.

### Notes

In northern BC, southeastern Yukon and southwestern NWT, the *Northwestern Boreal Forest* zone adjoins the *West-Central Boreal Forest*. At equivalent elevations in southern and western BC, it borders the *Cordilleran Montane Forest*. At higher elevations, it is bounded by the *Western Boreal Alpine Tundra* zone.