



# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada

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## West-Central North American Boreal Forest & Woodland

Macrogroup M496

### Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

#### Boreal Forest & Woodland

##### D014 North American Boreal Forest & Woodland

M156 Alaskan-Yukon North American Boreal Forest

M179 North American Subarctic Woodland

M495 Eastern North American Boreal Forest

##### **M496 West-Central North American Boreal Forest & Woodland**

CM496a Central Boreal Forest

CG0009 Central Boreal Dry Jack Pine Forest

CG0010 Central Boreal Mesic-Moist Black Spruce – Jack Pine Forest

CG0011 Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest

CM496b Cordilleran Boreal Forest

CG0012 Cordilleran Boreal Dry Lodgepole Pine Forest

CG0013 Cordilleran Boreal Mesic-Moist Black Spruce – Lodgepole Pine Forest

CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest

CG0015 Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest

CM496c Cordilleran Boreal Woodland



## Concept

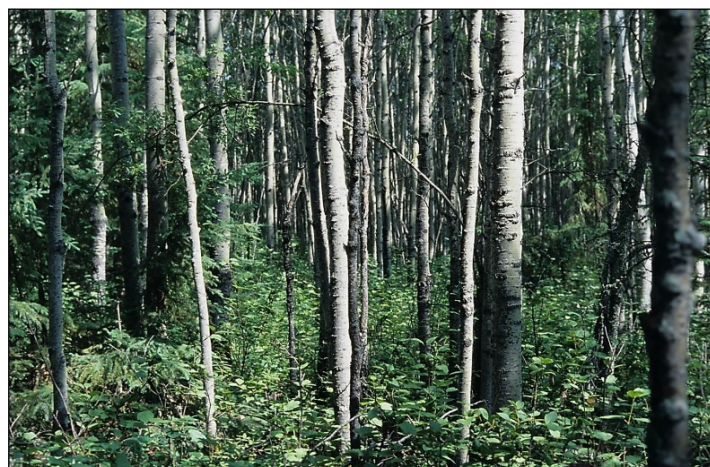
M496 describes upland boreal and Rocky Mountain foothill forests and woodlands in west-central Canada, ranging from southern Yukon and Northwest Territories to northwestern Ontario. Forest canopies can be coniferous, broad-leaved cold-deciduous or a conifer – broad-leaved mixture. These forests are maintained on the landscape by stand-replacing fire, with most parts of the range experiencing short (<100 years) to intermediate (100-270 years) regional fire cycles. 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 range. At higher elevations or in fire-sheltered locations, fir species (*Abies lasiocarpa* or *A. balsamea*) co-occur with white spruce in late seral stands. Understories range from dense, species-rich shrub and herb conditions to sparse and open, with continuous feathermoss and/or lichen ground cover. Common understory species include prickly rose (*Rosa acicularis*), squashberry (*Viburnum edule*), common Labrador tea (*Rhododendron groenlandicum*), fireweed (*Chamerion angustifolium*), tall bluebells (*Mertensia paniculata*), downy lymegrass (*Leymus innovatus*), bluejoint reedgrass (*Calamagrostis canadensis*), lingonberry (*Vaccinium vitis-idaea*), red-stemmed feathermoss (*Pleurozium schreberi*) and stairstep moss (*Hylocomium splendens*). Three subtypes distinguish Central boreal forests (CM496a [Central Boreal Forest]), Cordilleran low elevation boreal and foothills forests (CM496b [Cordilleran Boreal Forest]) and higher elevation Cordilleran boreal woodlands (CM496c [Cordilleran Boreal Woodland]).

The area occupied by M496 is characterized by a subhumid continental boreal climate, with long, cold winters and short, mild summers. Continental effects are modified in the Cordilleran portion of the range (CM496b&c), where higher elevations and mountain influences mitigate temperature extremes and generate greater precipitation than in the northern and eastern parts of the range. Mean annual temperature varies from about -5°C at the northern limit in the Northwest Territories to about +2°C in the southern Alberta foothills. Annual precipitation varies between approximately 300 and 750 mm across the geographic range of M496, depending on latitude, longitude and elevation. Elevations are generally <500 mASL in the eastern portion of the range (i.e., northwestern Ontario to central Saskatchewan), increasing gradually westward to approximately 800 mASL in northwestern Alberta, then rising to the lower boundary of the Cordilleran subalpine zone in western Alberta and central British Columbia (approx. 1400 mASL), and to treeline in Yukon, Northwest Territories and northern British Columbia (1000 – 1500 mASL). Regional geologic and topographic features of the Cordilleran, Interior Plains and western Precambrian Shield physiographic regions produce an array of local site conditions. Essentially, all parts of the range experienced Pleistocene glaciation; soils are mostly Brunisols and Luvisols developed in surficial glacial materials.



Dense and diverse stands of spruce (*Picea* spp.), trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*) and lodgepole pine (*Pinus contorta*) on terraces and eskers adjacent to the South Nahanni River, Northwest Territories.

Source: D. Downing



Trembling aspen (*Populus tremuloides*) stand with a dense broad-leaved shrub understory dominated by squashberry (*Viburnum edule*) and prickly rose (*Rosa acicularis*).

Source: L. Allen



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Macrogroup M496

### Vegetation

#### Physiognomy and Structure

M496 includes mainly upland forests, although woodlands can occur on very dry sites and at the climatic limits of closed forest (higher elevations and latitudes). Boreal riparian and wetland forests and woodlands within the range of M496 are described by M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest]. Physiognomically, forest canopies can be coniferous, broad-leaved cold-deciduous ("hardwood") or a conifer-hardwood mixture, depending on regional climate, local site conditions, seed/propagule availability at time of establishment and disturbance history. Seven tree species, of two evergreen coniferous (*Picea*, *Pinus*) and two cold-deciduous hardwood (*Betula*, *Populus*) genera, dominate overstory cover. Understory structure ranges from dense to sparse shrub and herb/dwarf shrub layers, usually with ericaceous species and regenerating conifers present. The moss layer is typically well developed, especially under conifer canopies. These forests are subject to regular stand replacement by wildfire and seldom reach ages >150 years; stands are often even-aged. Most species exhibit one or more adaptation traits to disturbance, in some cases specific to fire. Post-disturbance stand structure is usually simple but multi-storied structure can develop over time in the absence of fire.

#### Floristics

The main tree species of M496 forests are *Populus tremuloides*, *Picea glauca*, *Picea mariana*, *Pinus contorta* (see Comments section) and *Pinus banksiana*. *P. tremuloides* and the *Picea* species occur throughout the full range of the Macrogroup. The *Pinus* species are segregated between the Cordilleran and Central subtypes, with *P. contorta* characteristic of subtype CM496b [Cordilleran Boreal Forest] and lower elevations of subtype CM496c [Cordilleran Boreal Woodland], and *P. banksiana* occurring in subtype CM496a [Central Boreal Forest]. Other important tree species include *Populus balsamifera* on nutrient-rich, generally moist sites throughout the range and *Betula papyrifera*, which increases in frequency eastward in CM496a (*Betula neoalaskana* replaces *B. papyrifera* in Yukon). *Abies lasiocarpa* (see Comments section), in CM496b&c, and *A. balsamea*, in CM496a, are shade tolerant, late seral species that can grow into the main canopy of M496 forests and woodlands after approximately 120 years but are usually uncommon in this Macrogroup because fire cycles are generally too short to allow their persistence on the landscape. However, at higher elevations where fires are less common, *A. lasiocarpa* is an important component of the open stands constituting CM496c. *Larix laricina* occurs occasionally in M496 forests. Tree species are distributed on the landscape in response to both environmental and historic factors. Site moisture and nutrient status, together with fire frequency, are important determinants of stand composition. All of the major tree species, except *Abies* spp., are adapted to regenerate following stand-replacing fire, forming both pure and mixed stands.

In subtypes CM496b&c, *P. contorta* often forms extensive even-aged stands following fire. On dry to moist, nutrient-poor sites in CM496b, it often occurs with an understory of *P. mariana* that seeds into the stand at the same time as *P. contorta* but grows more slowly. In subtype CM496a, ecologically similar *P. banksiana* substitutes for *P. contorta*. It also forms extensive even-aged stands following fire, often in association with *P. mariana*, but mainly on dry, nutrient-poor sites associated with sandy soils and shallow bedrock on the Precambrian Shield. Where the ranges of *P. contorta* and *P. banksiana* overlap in north-central Alberta, the two species hybridize (*Pinus x murraybanksiana*). On dry to moist, nutrient-poor sites throughout the range of CM496a&b, *P. mariana* occurs as a leading, codominant or subdominant species, often in association with one of the *Pinus* species. Where it is dominant, *P. mariana* can form either even-aged or uneven-aged stands, depending on site characteristics and stand history (usually time since last fire). *P. mariana* is the dominant spruce species on the Precambrian Shield, where soil nutrient status is typically poorer than in the Interior Plains and Cordilleran physiographic regions.

On mesic to moist sites with medium nutrient status, especially at lower elevations (i.e., approx. <800 mASL) in subtypes CM496a&b, *Populus tremuloides* is the main fire-successional tree species, often in association with *Picea glauca*. In CM496b, *Pinus contorta* competes with *P. tremuloides* on these sites, resulting in early seral mixed *P. contorta*–*P. tremuloides* stands in addition to pure *P. tremuloides* stands. *P. glauca* can establish immediately following fire or other disturbance that exposes mineral seedbeds if there is an adequate seed supply. Throughout the range, *P. glauca* also seeds into existing stands of *P. contorta*, *Pinus banksiana*, *P. tremuloides*, *Picea mariana* and *Betula* spp., persisting in the understory due to its shade tolerance and eventually growing into the main canopy where, in the absence of fire for extended periods (approximately >120 years), it dominates uneven-aged stands with variable species mixes. In fire-sheltered locations (most common in CM496c), *Abies* spp. (*A. lasiocarpa* in CM496b&c; *A. balsamea* in CM496a) co-occur with *P. glauca* in these late seral stands. On moist sites with richer nutrient status, *P. glauca* often forms mixed stands with *P. mariana* and/or *Populus balsamifera*. In the southern and central Cordillera, *P. glauca* hybridizes with *Picea engelmannii* (= *P. engelmannii* x *glauca*) at elevations above approx. 1000 mASL. In subtype CM496c, scrubby stands of *P. tremuloides* or sometimes *P. balsamifera* can occur on steep, warm-aspect slopes following fire and can persist, especially in the absence of a nearby *P. glauca* or *A. lasiocarpa* seed source.

At lower elevations throughout the range of M496, on moist, nutrient-rich sites such as seepage slopes and stable river terraces, *P. balsamifera* is found in mixed stands with *P. tremuloides* and coniferous species. In southeastern Saskatchewan and west-central Manitoba, *Acer negundo* and *Fraxinus pennsylvanica* also occur on these sites, while *Fraxinus nigra* can be present in northwestern Ontario. Although they occur on a wide variety of site moisture and nutrient conditions, in pure or mixed stands, *Betula papyrifera* and *B. neoalaskana* can also be abundant on moist, nutrient-rich sites. Boreal riparian forests within the range of M496 are described by M300 [North American Boreal Flooded & Rich Swamp Forest].



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#### Vegetation (cont'd)

The understories of M496 forests include widely distributed boreal species as well as species more characteristic of northwestern North America. Many species are associated with a specific range of site moisture and nutrient conditions and are used as diagnostic indicators at Group, Alliance and Association levels of the CNVC hierarchy within M496.

The broad-leaved shrub *Rosa acicularis*, the herb/dwarf shrub species *Chamerion angustifolium*, *Cornus canadensis* and *Linnaea borealis*, and the feathermosses *Pleurozium schreberi* and *Hylocomium splendens* are ubiquitous, occurring with low to high abundance on a broad spectrum of site conditions. The ericaceous species *Rhododendron groenlandicum* and *Vaccinium vitis-idaea* occur with high frequency and cover on nutrient-poor sites. *Arctostaphylos uva-ursi* and ground lichens are dominant on dry sites, typically under open canopies. *Rubus pubescens* and *Mertensia paniculata* are indicators of moist, nutrient-rich sites.

Plant species composition and relative importance change from west to east across the range of M496 and, in the Cordillera, from low to high elevations. *Viburnum edule*, *Lonicera involucrata*, *Shepherdia canadensis*, *C. angustifolium*, *Leymus innovatus* and *Calamagrostis canadensis* are more common and abundant in subtype CM496b. These species are missing or occur with much lower frequency and abundance in subtype CM496a, while eastern species like *Acer spicatum*, *Clintonia borealis*, *Gaultheria hispidula* and *Eurybia macrophylla* are increasingly found in the eastern portion of the range. On nutrient-poor sites, *Vaccinium myrtilloides* is both common and abundant in CM496a. *Equisetum* spp. dominated understories on moist, nutrient-rich sites are characteristic of subtype CM496b but absent or very rare in CM496a. Except on nutrient-poor sites, feathermoss dominance changes from *P. schreberi* in CM496a to *H. splendens* in CM496b. Likewise, with increasing elevation in the Cordillera, the characteristic species of CM496b become less frequent and *Betula nana*, *Salix glauca*, *Vaccinium uliginosum* and *Empetrum nigrum* become important in the open woodland physiognomy of subtype CM496c.

#### Dynamics

Environmental site characteristics, plant species autecology and seed/propagule availability, and disturbance history (i.e., type, severity and frequency) influence secondary succession trends within the forests of M496. Stand-replacing fires, usually caused by lightning strikes, are the most widespread form of disturbance; regional fire cycles are generally short (<100 years) to intermediate (100-270 years). Fires vary considerably in size, with large fires possible in any part of the range despite modern fire suppression practices. Burn severity is variable within each fire, so a complex spatial mosaic of burned and residual patches is typical on the post-fire landscape. At broader scales, especially for subtypes CM496a [Central Boreal Forest] and CM496b [Cordilleran Boreal Forest], early to mid-seral stands are prevalent on the landscape while late seral stands (approximately >120 years of age) generally cover less than 30% of the landscape. The higher elevation woodlands of subtype CM496c [Cordilleran Boreal Woodland] burn less frequently and have a greater proportion of late seral stands. Agricultural clearing, forest harvesting and other industrial activities (chiefly mineral and petroleum exploration and development) are also significant disturbance factors in some areas. Site moisture and nutrient status are important determinants of secondary succession. On moist, nutrient-rich sites, intense competition from shrubs and herbs immediately following fire, harvesting or land clearing controls the availability of microsites suitable for the germination and growth of conifers; root or stump-regenerating hardwood species, such as *Populus* spp. and *Betula papyrifera*, are less affected by competition. On mesic to dry sites, post-burn conditions are usually suitable for seed germination and growth of *Pinus* spp. and *Picea* spp. *Populus tremuloides* is the most widespread early seral species on circum-mesic sites at lower elevations, attaining very high stem densities and self-thinning over several decades. If seed sources are available, *Picea glauca* and *Abies balsamea* (CM496a) or *A. lasiocarpa* (CM496b&c) subsequently seed-in from adjacent unburned areas during the mid- to late seral stages and, over time (usually more than 120 years), can grow into the main canopy and eventually become dominant as the early seral species decline. In the longer fire cycle of CM496c woodlands, *P. glauca* and *A. lasiocarpa* are the main tree species. Throughout the range of M496, *Pinus* spp. are normally the most successful early seral species on very dry sites. At elevations above approx. 800 mASL in CM496b (but below approx. 1200 mASL in CM496c), *P. contorta* dominates early seral stands on all sites.

These forests and woodlands are subject to a variety of diseases and insects that typically cause mortality to individual or small groups of trees but are also capable of creating changes in tree species dominance at the stand and landscape levels. Tomentosus root disease (*Inonotus tomentosus*) and Armillaria root rot (*Armillaria* spp.) are widespread in spruce and pine forests of M496, causing mortality of young trees and increasing susceptibility of older trees to windthrow and insect attack. Insects such as eastern spruce budworm (*Choristoneura fumiferana*), jack pine budworm (*Choristoneura pinus pinus*) and forest tent caterpillar (*Malacosoma disstria*) are endemic to these forests and can cause defoliation and possible mortality of (primarily) *Picea glauca*, *Pinus banksiana* and *Populus tremuloides* respectively, during periodic population outbreaks.

In recent years, mountain pine beetle (*Dendroctonus ponderosae*) has caused significant economic and ecological impacts to *Pinus contorta* forests in sub-boreal British Columbia (BC). Within its historic range in interior BC, beetle cycles occur every 20-40 years. At low population densities, the insect preferentially attacks and kills older, less vigorous trees, opening canopy gaps. At epidemic levels however, mass attacks can extend over large areas and overwhelm the defenses of vigorously growing immature pines. Recently the beetle has spread northward and eastward into boreal *P. contorta* forests, affecting even hybrid *Pinus x murraybanksiana* and *P. banksiana* stands in northern Alberta. Climate change and forest management practices, including fire suppression, have likely contributed to these unprecedented beetle densities as well as to the expansion of its range and host species. Because the mountain pine beetle is novel to boreal ecosystems, long-term effects on these forests are uncertain.



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Macrogroup M496

### Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

#### Environment

##### Climate

M496 develops within the subhumid continental boreal climate 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 region of northern British Columbia, where higher elevations and orographic effects produce cooler summers, warmer winters and more precipitation than is characteristic of areas to the north and east.

Mean annual temperatures vary from -3°C to -5°C along the northern edge of the range to greater than +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, Northwest Territories, British Columbia (BC) and Alberta, mean annual precipitation varies from 300 to 750 mm (approximately), depending upon latitude, longitude and elevation (>1000 mm at some higher elevations in northwestern BC). East of the foothills, mean annual precipitation generally increases eastward, reaching approx. 750 mm at the eastern limit of the range in northwestern Ontario. In all parts of the range over half of the annual precipitation falls as rain, often during summer thunderstorms. Drought is a regular occurrence, especially for subtypes CM496a [Central Boreal Forest] and CM496b [Cordilleran Boreal Forest], affecting productivity of these forests and exacerbating disturbance by fire, insects and diseases.

##### Physiography, Geology, Topography and Soils

M496 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, subtypes CM496b [Cordilleran Boreal Forest] and CM496c [Cordilleran Boreal Woodland] describe the upland forests and woodlands below approx. 1500 mASL in the Selwyn, Wernecke, Pelly, Omineca, Cassiar and northern Rocky Mountains of Yukon and British Columbia (BC), as well as on the Stikine and Yukon plateaux of northwestern BC and central Yukon, and the Liard Plain and Liard and Hyland plateaux of northeastern BC, southeastern Yukon and southwestern Northwest Territories. Upland forests of the Rocky Mountain Foothills below the lower subalpine limit are also included in CM496b north of the Bow River in Alberta. In the Interior Plains region, M496 forests cover 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, subtype CM496a [Central Boreal Forest] describes all upland forests of 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.

Geology and topography within the range of M496 are highly diverse. In the Cordilleran physiographic region, the terrain is a complex mixture of high mountains (up to 3000 mASL) with intervening plateaux, hill systems, valleys, trenches, basins, etc. The geology of the Cordillera within the range of M496 is mostly faulted and folded Paleozoic, Mesozoic or Tertiary sedimentary, often carbonate, rocks. The Eastern System of the Cordillera (e.g., the Rocky Mountains and associated foothills) underwent little or no metamorphic or volcanic activity. In the Interior System some volcanism and igneous intrusions (e.g., the Omineca Mountains) occurred. In the northwestern part of the range (Yukon and northern BC), forests and woodlands described by subtypes CM496b&c are found up to elevational treeline (approx. 1000-1200 mASL in Yukon, 1500 mASL in northern BC). In western Alberta, foothill forests of CM496b are replaced by subalpine forests (M020 [Rocky Mountain Subalpine-High Montane Conifer Forest]) above approx. 1400 mASL, except in some mountain valleys where subalpine forests occur at lower elevations. 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. Interior Plains elevations in northern BC and Alberta range from approx. 1000 mASL in the hill systems of northern Alberta to <300 mASL in the Fort Nelson and Peace River Lowlands. Elevations in southern Saskatchewan and Manitoba rarely exceed 800 mASL. On the Precambrian Shield in northern Saskatchewan and Manitoba, as well as in northwestern Ontario, elevations are <600 mASL. 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 flat plain with low relief and extensive wetlands.

With the exception of a small area in southern Yukon, the entire range of M496 was affected by Pleistocene glaciation and surficial landscape expression is dominated by glacial features and bedrock-controlled terrain. In the mountains and foothills of subtypes CM496b&c, till blankets and veneers overlie bedrock. This variable topography produces significant changes in local site moisture and nutrient status over short distances. In areas with lower relief underlain by gently tilted to level sedimentary rocks (especially in the Interior Plains), thicker till and glaciolacustrine or glaciofluvial deposits provide consistent moisture and nutrient conditions over more extensive areas. In the Shield areas of CM496a, till veneers are often shallow over bedrock on upland sites, while deeper deposits of glacial drift fill landscape depressions. Upland mineral soils are typically well to imperfectly drained Brunisols (coarser textures) and Luvisols (finer textures), with Gleysols and some shallow peat veneers in moist, poorly drained locations. Although peatlands dominated by Organic soils are common in poorly drained landscape depressions within the range of M496, treed vegetation on these sites is primarily described by M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest]. Neither permafrost nor paludification are regular features of soils associated with the forests of M496, although these processes do occur sporadically at the northern edges of the range on cold, moist sites where mineral soils are overlain by shallow peat.



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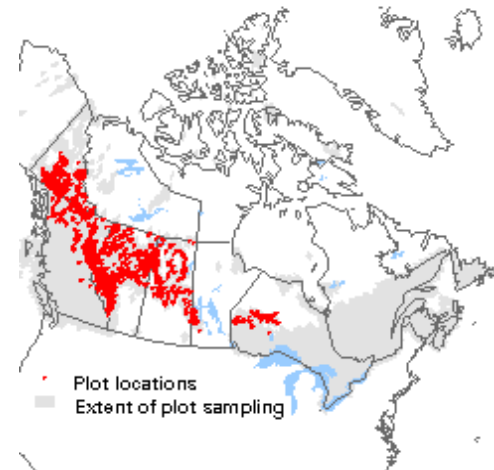
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## West-Central North American Boreal Forest & Woodland Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

Macrogroup M496

### Distribution and Geographic Range

M496 includes the upland boreal forests and woodlands of British Columbia, Alberta, Saskatchewan, Manitoba, south-central and eastern Yukon Territory, southern Northwest Territories, and northwestern Ontario north of approximately 51°N and west of approximately 86°W. In Alberta, forests of the Rocky Mountain foothills are also included in this Macrogroup.



### Related Concepts

M496 includes upland forests and woodlands that have been described in provincial/territorial publications for most of the Boreal Low and Boreal High bioclimatic zones in Yukon; the Mid- and High Boreal Level III ecoregions in Northwest Territories; the Boreal White & Black Spruce and Spruce – Willow – Birch biogeoclimatic zones in British Columbia; the Boreal Forest, Canadian Shield and Foothills natural regions in Alberta; the Boreal Shield, Taiga Shield and Boreal Plains ecozones of Saskatchewan and Manitoba; and ecoregions 2W [Big Trout Lake] and 3S [Lake St. Joseph] in Ontario.

Boreal riparian and wetland forests and woodlands within the range of M496 are described by M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest].

### Comments

M496 describes the upland boreal forests of west-central Canada (excluding southwestern Yukon), including the high-elevation boreal woodlands of the western Cordillera. These forests are characterized by general dominance of *Populus tremuloides*, *Picea glauca* and *Pinus contorta* or *P. banksiana* on circum-mesic sites, although *Abies lasiocarpa* is important in higher elevation woodlands. Boreal upland forests in eastern Canada, described by M495 [Eastern North American Boreal Forest], are distinguished from those of M496 by general dominance of *Abies balsamea*, *Picea mariana* and *Betula papyrifera* on circum-mesic sites. Understories also differ in dominant species, including ericaceous shrubs and feathermosses. To the northwest of the range of M496, M156 [Alaskan-Yukon North American Boreal Forest] is distinguished by the general absence of *Betula papyrifera*, *A. lasiocarpa* and *P. contorta* in the tree layer, and by increased prominence of a suite of arctic-northern boreal understory species (in conjunction with reduced presence of southern Cordilleran species). North of the range of M496, M179 [North American Subarctic Woodland] describes subarctic upland treed communities dominated by *P. glauca* and *P. mariana* and exhibiting woodland physiognomy, typically with ground cover of lichens rather than feathermosses. M496 does not include *Picea engelmannii* – *Abies lasiocarpa* forests in the Cordilleran region of western Canada; these forests are described by M020 [Rocky Mountain Subalpine-High Montane Conifer Forest]. In central British Columbia, low elevation sub-boreal forests (CM890 [Western Inter-Montane Sub-Boreal Forest]) occur in areas influenced by a more moderate climate than that of M496. Stands are more productive, reflecting the warmer and moister climate. Hybrid *Picea engelmannii* x *glauca* replaces *P. glauca* on circum-mesic sites in CM890 forests. Understory shrubs like *Vaccinium membranaceum*, *Rubus parviflorus* and *Lonicera involucrata*, together with various herb species (especially ferns), are more prominent than in the adjacent boreal forests of M496.

Within subtypes CM496a [Central Boreal Forest] and CM496b [Cordilleran Boreal Forest], CNVC Groups break out forests using diagnostic species indicators of site-scale moisture and nutrient conditions. In CM496a, three Groups are recognized: CG0009 [Central Boreal Dry Jack Pine Forest]; CG0010 [Central Boreal Mesic-Moist Black Spruce – Jack Pine Forest]; CG0011 [Central Boreal Mesic-Moist Trembling Aspen – White Spruce Forest]. In CM496b, four Groups are recognized: CG0012 [Cordilleran Boreal Dry Lodgepole Pine Forest]; CG0013 [Cordilleran Boreal Mesic-Moist Black Spruce – Lodgepole Pine Forest]; CG0014 [Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest]; CG0015 [Cordilleran Boreal Moist White Spruce – Trembling Aspen (Balsam Poplar) Forest]. CNVC Groups have not yet been characterized in subtype CM496c [Cordilleran Boreal Woodland].

*Abies lasiocarpa* here refers to both *A. lasiocarpa* (subalpine fir) and *A. bifolia* (Rocky Mountain alpine fir), as recognized by VASCAN.

*Pinus contorta* here refers to variety *latifolia* (lodgepole pine).



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Macrogroup M496

### Source Information

**Number of Source Plots for M496:** 8788 (Canadian National Vegetation Classification. 2015. CNVC Master Database [VPro13/MSAccess 2010 format]. Natural Resources Canada, Sault Ste. Marie, ON.)

#### Information Sources (data):

Alberta Environment and Parks. 2014. Ecological Site Information System (ESIS). Govt. AB, Edmonton, AB. (3501 plots)

Biogeoclimatic Ecosystem Classification Program of British Columbia. 2011. BECMaster ecosystem plot database [VPro13/MSAccess 2010 format]. W.H. MacKenzie, (ed.) B.C. Min. For., Lands, and Nat. Res. Ops., Smithers, BC. Available: [www.for.gov.bc.ca/hre/becweb/resources/information-requests](http://www.for.gov.bc.ca/hre/becweb/resources/information-requests) (accessed: June 2015). (1230 plots)

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**Description Authors:** K. Baldwin, D. Downing, D. Meidinger and K. Chapman

**Date of Concept:** February, 2013

**Date of Description:** May, 2016

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# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada

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## West-Central North American Boreal Forest & Woodland Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

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## West-Central North American Boreal Forest & Woodland Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

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The information contained in this factsheet is based on data and expert knowledge that is current to the date of description. As new information becomes available, the factsheet will be updated.

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# Canadian National Vegetation Classification (CNVC) Classification nationale de la végétation du Canada

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## West-Central North American Boreal Forest & Woodland

Macrogroup M496

Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

### Comparison of Vegetation Characteristics for Boreal Forest Macrogroups

Lifeform	Species Name	n=265	n=8451	n=15620	Species Common Name
		M156 Alaskan-Yukon	M496 West-Central	M495 Eastern	
Tree	<i>Picea mariana</i>	■■■■	■■■	■■■■	black spruce
	<i>Picea glauca</i>	■■■■	■■■■	***	white spruce
	<i>Populus tremuloides</i>	***	■■■■	■■■	trembling aspen
	<i>Pinus banksiana + contorta</i>		■■■■	***	jack + lodgepole pines
	<i>Betula papyrifera + neoalaskana</i>	***	**	■■■■	paper + Alaska birches
	<i>Abies balsamea</i>			■■■■	balsam fir
Shrub	<i>Vaccinium uliginosum</i>	■■			bog bilberry
	<i>Betula</i> spp. (shrub)	***			shrub birches
	<i>Rosa acicularis</i>	■■■	■■■		prickly rose
	<i>Salix</i> spp. (shrub)	■■■	■■	■■	shrub willows
	<i>Rhododendron groenlandicum</i>	■■■■	■■■	■■■	common Labrador tea
	<i>Viburnum edule</i>		■■		squashberry
	<i>Vaccinium myrtilloides</i>		**	■■■	velvet-leaved blueberry
	<i>Vaccinium angustifolium</i>			■■■	early lowbush blueberry
	<i>Sorbus</i> spp.			■■	mountain-ash
	<i>Kalmia angustifolia</i>			■■■	sheep laurel
	<i>Acer spicatum</i>			■■■	mountain maple
	<i>Diervilla lonicera</i>			■■	northern bush-honeysuckle
	Herb/ Dwarf Shrub	<i>Empetrum nigrum</i>	■■		
<i>Arctous rubra</i>		**			red bearberry
<i>Geocalon lividum</i>		■■	*		northern comandra
<i>Vaccinium vitis-idaea</i>		■■■	■■■		lingonberry
<i>Mertensia paniculata</i>		■	■		tall bluebells
<i>Chamerion angustifolium</i>		*	■■		fireweed
<i>Linnaea borealis</i>		**	■■■	■■	twinflower
<i>Petasites frigidus</i>			■		arctic sweet coltsfoot
<i>Pyrola asarifolia</i>			■		pink pyrola
<i>Calamagrostis canadensis</i>			**		bluejoint reedgrass
<i>Leymus innovatus</i>			**		downy lymegrass
<i>Galium boreale</i>			*		northern bedstraw
<i>Rubus pubescens</i>			■■	*	dwarf raspberry
<i>Cornus canadensis</i>			■■■	■■■	bunchberry
<i>Maianthemum canadense</i>			■	■■	wild lily-of-the-valley
<i>Aralia nudicaulis</i>			**	■■	wild sarsaparilla
<i>Clintonia borealis</i>				■■	yellow clintonia
<i>Gaultheria hispidula</i>				■■	creeping snowberry
<i>Lysimachia borealis</i>				■■	northern starflower
<i>Coptis trifolia</i>				■■	goldthread
<i>Eurybia macrophylla</i>			**	large-leaved aster	
Moss/Lichen	<i>Hylocomium splendens</i>	■■■■	■■■■	■■■	stair-step moss
	<i>Pleurozium schreberi</i>	***	■■■■	■■■■	red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>		■■■	■■■	knight's plume moss
	<i>Cladina</i> spp.	**	■■■	■■■	reindeer lichens
	<i>Dicranum</i> spp.		*	■■■	broom mosses

#### Legend

Constancy:  
Black bar >= 50%  
Grey bar >= 30%  
Asterisk >= 20%

Cover:  
5 bars >= 25%      2 bars >= 1%  
4 bars >= 10%      1 bar <= 1%  
3 bars >= 3%



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## West-Central North American Boreal Forest & Woodland

Macrogroup M496

Forêts et terres boisées boréales du Centre-ouest de l'Amérique du Nord

### Comparison of Vegetation Characteristics for Macrogroup Subtypes in M496

Layer	Spp	n=662	n=5870	n=1919	Common Name
		CM496c Cordilleran Boreal Woodland	CM496b Cordilleran Boreal Forest	CM496a Central Boreal Forest	
Tree	<i>Abies lasiocarpa</i>	■■■■			subalpine fir
	<i>Pinus contorta</i> var. <i>latifolia</i>	■■■■	■■■■■		Rocky Mountain lodgepole pine
	<i>Picea glauca</i>	■■■■■	■■■■■	***	white spruce
	<i>Picea mariana</i>	***	***	■■■■■	black spruce
	<i>Populus tremuloides</i>		■■■■■	■■■■■	trembling aspen
	<i>Pinus banksiana</i>			■■■■■	jack pine
	<i>Betula papyrifera</i>			■■■■	paper birch
Shrub	<i>Betula nana</i> + <i>glandulosa</i>	■■■■			arctic dwarf + glandular birches
	<i>Vaccinium uliginosum</i>	■■			bog bilberry
	<i>Salix</i> spp. (shrub)	■■■■	■■	*	shrub willows
	<i>Rhododendron groenlandicum</i>	■■■■	■■■■	■■■■	common Labrador tea
	<i>Rosa acicularis</i>	■	■■■■	■■	prickly rose
	<i>Shepherdia canadensis</i>	*	■■		soapberry
	<i>Lonicera involucrata</i>		**		bracted honeysuckle
	<i>Viburnum edule</i>		■■■■	*	squashberry
	<i>Vaccinium myrtilloides</i>			■■■■	velvet-leaved blueberry
Herb/ Dwarf Shrub	<i>Empetrum nigrum</i>	■■■■			black crowberry
	<i>Vaccinium vitis-idaea</i>	■■■■	■■■■	■■■■	lingonberry
	<i>Cornus canadensis</i>	■■	■■■■	■■■■	bunchberry
	<i>Linnaea borealis</i>	■■	■■■■	■■	twinflower
	<i>Mertensia paniculata</i>	■	■■		tall bluebells
	<i>Chamerion angustifolium</i>	*	■■	*	fireweed
	<i>Galium boreale</i>		■		northern bedstraw
	<i>Lathyrus ochroleucus</i>		■		cream-coloured vetchling
	<i>Pyrola asarifolia</i>		■		pink pyrola
	<i>Leymus innovatus</i>		■■		downy lymegrass
	<i>Calamagrostis canadensis</i>		■■		bluejoint reedgrass
	<i>Equisetum arvense</i> + <i>pratense</i>		**		field + meadow horsetails
	<i>Rubus pubescens</i>		■■	*	dwarf raspberry
	<i>Maianthemum canadense</i>		*	■	wild lily-of-the-valley
Moss/Lichen	<i>Nephroma arcticum</i>	**			arctic kidney lichen
	<i>Hylocomium splendens</i>	■■■■■	■■■■■	■■■■	stairstep moss
	<i>Pleurozium schreberi</i>	■■■■■	■■■■■	■■■■■	red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>		■■■■	■■■■	knight's plume moss
	<i>Cladina</i> spp.	■■■■	**	■■■■	reindeer lichens

#### Legend

Constancy:  
Black bar >= 50%  
Grey bar >= 30%  
Asterisk >= 20%

Cover:  
5 bars >= 25%  
4 bars >= 10%  
3 bars >= 3%  
2 bars >= 1%  
1 bar <= 1%