



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Boreal Forest & Woodland

D014 North American Boreal Forest & Woodland

M156 Alaskan-Yukon North American Boreal Forest

M179 North American Subarctic Woodland

M496 West-Central North American Boreal Forest & Woodland

M495 Eastern North American Boreal Forest

CM495a Atlantic Boreal Forest

CG0001 Atlantic Boreal Dry Black Spruce - Sheep Laurel Woodland

CG0002 Atlantic Boreal Mesic-Moist Black Spruce - Balsam Fir - Paper Birch Forest

CG0003 Atlantic Boreal Mesic Balsam Fir - Paper Birch - White Spruce Forest

CG0004 Atlantic Boreal Moist Balsam Fir - White Spruce - Paper Birch Forest

CM495b Ontario-Quebec Boreal Forest

CG0005 Ontario-Quebec Boreal Dry-Mesic Black Spruce - Jack Pine Forest

CG0006 Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest

CG0007 Ontario-Quebec Boreal Mesic Paper Birch - Balsam Fir - Trembling Aspen Forest

CG0008 Ontario-Quebec Boreal Moist Black Spruce - Trembling Aspen - Balsam Fir - Paper Birch Forest



Concept

M495 describes upland boreal forests and woodlands in eastern Canada, ranging from southeastern Manitoba to Atlantic Canada. Forest canopies can be coniferous, broad-leaved cold-deciduous or a conifer – broad-leaved mixture. Stand-replacing fires and insect infestation (primarily by spruce budworm [*Choristoneura fumiferana*]) are the most widespread forms of natural disturbance throughout the range of M495. In general, the relative frequency of fire decreases eastward as maritime climatic influences create more humid environmental conditions. Forests that are characteristic of a longer fire cycle with periodic insect perturbations become more prevalent on the landscape in the eastern part of the range. Dominant tree species include trembling aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), black spruce (*Picea mariana*), white spruce (*Picea glauca*), balsam fir (*Abies balsamea*) and jack pine (*Pinus banksiana*). Balsam poplar (*Populus balsamifera*) occurs on moist, nutrient-rich sites. 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 common Labrador tea (*Rhododendron groenlandicum*), sheep laurel (*Kalmia angustifolia*), velvet-leaved blueberry (*Vaccinium myrtilloides*), early lowbush blueberry (*V. angustifolium*), mountain ash (*Sorbus* spp.), mountain maple (*Acer spicatum*), creeping snowberry (*Gaultheria hispida*), yellow clintonia (*Clintonia borealis*), northern starflower (*Lysimachia borealis*), wild sarsaparilla (*Aralia nudicaulis*) and red-stemmed feathermoss (*Pleurozium schreberi*). Two subtypes distinguish boreal forests characteristic of maritime climatic influences (CM495a [Atlantic Boreal Forest]) from forests characteristic of shorter fire cycles in a more continental climate (CM495b [Ontario-Quebec Boreal Forest]).

The area occupied by M495 is characterized by a humid, mostly continental boreal climate, with long, cold winters and short, mild summers. Maritime influences become pronounced in the eastern part of the range, where seasonal temperature extremes are mitigated and annual precipitation is higher. High elevation areas and colder more exposed coastal environments of otherwise temperate southern Quebec and the Maritime Provinces also support boreal forests described by M495. Mean annual temperature varies from <0°C at the northern limit of the range to >3.5°C in insular Newfoundland. Annual precipitation generally increases eastward from approximately 640 mm in southeastern Manitoba and northwestern Ontario to >1800 mm in parts of insular Newfoundland and Cape Breton Island. Elevations are mostly <500 mASL although parts of the Laurentian Region of the Precambrian Shield and the Chic-Choc Mountains of the Gaspé region reach 1000 mASL or higher. Regional geologic and topographic features of the Precambrian Shield and Appalachian physiographic regions produce an array of local site conditions. All parts of the range experienced Pleistocene glaciation; soils are mostly Podzols, Brunisols and Luvisols developed in surficial glacial materials.



Trembling aspen (*Populus tremuloides*) and black spruce (*Picea mariana*) dominated stands on low relief Shield terrain in north-central Ontario. Aspen is on the upper slopes while black spruce occupies the lower slopes and landscape depressions.
Source: K. Baldwin



Balsam fir (*Abies balsamea*) stand with an open understory characterized by a carpet of feathermosses in western Newfoundland.
Source: B. Meades



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Vegetation

Physiognomy and Structure

M495 includes mainly upland forests, although woodlands sometimes occur on very dry sites, at the climatic limits of closed forest and after repeated severe disturbances. Boreal riparian and wetland forests and woodlands within the range of M495 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. Six tree species, of three evergreen coniferous (*Picea*, *Pinus*, *Abies*) 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; stands are often even-aged. Fire cycles are longer in the eastern part of the range (subtype CM495a [Atlantic Boreal Forest]) where insect outbreaks usually play a greater role in stand dynamics, creating a multi-aged, multi-storied structure. All tree species exhibit one or more disturbance adaptation traits, in some cases specific to fire.

Floristics

The main tree species of M495 forests are *Populus tremuloides*, *Betula papyrifera*, *Picea mariana*, *Picea glauca*, *Abies balsamea* and *Pinus banksiana*. While all species occur throughout the full range of the Macrogroup, only *P. mariana* is equally important in both subtypes. Of the other conifer species, *P. banksiana* occurs almost exclusively in subtype CM495b [Ontario-Quebec Boreal Forest], while prevalence of *Abies balsamea* is characteristic of subtype CM495a [Atlantic Boreal Forest]. *P. glauca* is a constant companion species throughout the range, especially of *A. balsamea*. *Larix laricina* and *Thuja occidentalis* occur occasionally in M495 forests. Of the hardwood species, *P. tremuloides* is more important in CM495b, while *B. papyrifera* dominates the hardwood component of CM495a (*B. cordifolia* is also common in eastern portions of the range). In the southern part of the range, temperate species like *Betula alleghaniensis*, *Acer rubrum* and *Picea rubens* sometimes occur with low abundance. *Populus balsamifera* occurs on nutrient-rich, generally moist sites throughout the range. 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 *A. balsamea* and *P. glauca*, are adapted to regenerate following stand-replacing fire, forming both pure and mixed stands.

Throughout the range of M495, on dry to moist, nutrient-poor to medium sites, *P. mariana* is the main fire-successional species. Following fire, where seed sources are available, it forms extensive even-aged stands as a leading, codominant or subdominant species, often in association with *P. banksiana*, *B. papyrifera* and/or *P. tremuloides*. 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). Mid- and late seral *P. mariana* stands often include *A. balsamea* and *P. glauca*. Mixed *P. mariana* – *A. balsamea* stands, often with a component of *B. papyrifera*, are characteristic of subtype CM495a.

Abies balsamea is a late seral conifer species that usually establishes in existing stands by seeding in from surrounding areas. Unlike other boreal tree species, seeds of *A. balsamea* are able to germinate and survive on seedbeds of feathermoss and leaf litter. *A. balsamea* is also highly shade tolerant, so seedlings can persist under closed canopy conditions for many years. *A. balsamea* is prevalent as a canopy dominant or codominant on all but the poorest sites in subtype CM495a, reflecting humid climatic conditions and a long (270-500 years) to very long (>500 years) fire cycle. *A. balsamea* usually occurs in uneven-aged stands, typically in association with combinations of all other tree species found in M495.

Picea glauca is typically an associate species in mixed stands, usually with *A. balsamea*. Under certain conditions, such as intense browsing and/or insect infestation that selectively remove *A. balsamea*, it can become the dominant canopy species. *P. glauca* can also be abundant along marine coastlines exposed to salt spray where it sometimes forms dense short, even prostrate, stands. In Quebec and insular Newfoundland, *P. glauca* is dominant or codominant (with *A. balsamea*) in high elevation stands approaching the alpine treeline.

In subtype CM495b, usually on dry to mesic, nutrient-poor to medium sites, *Pinus banksiana* forms extensive even-aged stands following fire. It often occurs with an understory of *Picea mariana* that establishes in the stand at the same time as *P. banksiana* but grows more slowly. On very dry and poor sites, stands remain open with a forest floor cover dominated by reindeer lichens (*Cladina* spp.).

In subtype CM495b, *Populus tremuloides* is the dominant fire-successional tree species on mesic to moist sites with medium nutrient status, often in association with *P. banksiana*, *Betula papyrifera* and *P. mariana*. In CM495a, across a broad spectrum of site moisture and nutrient conditions, *B. papyrifera* is the main hardwood species. Both *P. tremuloides* and *B. papyrifera* are adapted to regenerate following stand-replacing disturbance, but *B. papyrifera* is better able to maintain itself in gap disturbance regimes characteristic of extended fire-free intervals; it forms a constant landscape presence in *A. balsamea* dominated ecosystems. Throughout the range of M495 on moist, nutrient-rich sites, such as seepage slopes and stable river terraces, *Populus balsamifera* can be found in mixed stands with *P. tremuloides* and coniferous species.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Vegetation (cont'd)

The understories of M495 forests include widely distributed boreal species as well as species more characteristic of northeastern 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 M495.

Characteristic herb/dwarf shrub species of eastern boreal forests include *Cornus canadensis*, *Maianthemum canadense*, *Clintonia borealis*, *Gaultheria hispidula*, *Lysimachia borealis*, *Linnaea borealis*, *Coptis trifolia* and *Aralia nudicaulis*. In the shrub layer, *Sorbus americana* and/or *S. decora* are common, usually with low abundance. On nutrient-poor sites, the ericaceous shrubs *Vaccinium myrtilloides*, *V. angustifolium*, *Rhododendron groenlandicum* and *Kalmia angustifolia* (especially in Quebec and Atlantic Canada) dominate. On more fertile sites, usually under a *P. tremuloides* dominated canopy, *Acer spicatum* can be abundant in the shrub layer. *Alnus incana* (see Comments section) is characteristic of moist, nutrient-rich soil conditions. The feathermoss species *Pleurozium schreberi*, *Ptilium crista-castrensis* and *Hylocomium splendens* are ubiquitous, often covering the forest floor with extensive carpets. On dry sites, especially under open canopies, ground lichens (esp. *Cladina* spp.) are prevalent. On moist sites, *Sphagnum* spp. usually co-occur with the feathermosses.

Although the major distinction between subtypes CM495a & b is reflected in overstory dominance, there are some differences in understory species as well. *Oxalis montana* and *Bazzania trilobata* occur more frequently in CM495a, while *Diervilla lonicera*, *Corylus cornuta* and *Eurybia macrophylla* are more common in CM495b. Except on the poorest sites, feathermoss dominance switches from *H. splendens* in CM495a to *P. schreberi* in CM495b.

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 M495. Stand-replacing fires and insect infestation (primarily by spruce budworm [*Choristoneura fumiferana*]) are the most widespread forms of natural disturbance throughout the range of M495. Although both fire and budworm-driven dynamics occur throughout the full range of M495, in general the relative frequency of fire decreases eastward as maritime climatic influences create more humid environmental conditions and forests that are characteristic of a longer fire cycle dominate the landscape. Subtype CM495a [Atlantic Boreal Forest] describes forest conditions characterized by prevalence of *Abies balsamea* that are typical of a longer fire cycle, including some "old growth" boreal forests from areas where fire is essentially absent. Stand conditions that are characteristic of a shorter fire cycle, including prominence of *Pinus banksiana* and *Populus tremuloides*, are described by subtype CM495b [Ontario-Quebec Boreal Forest].

Regional fire cycles vary from intermediate (100-270 years) to very long (>500 years) within the range of M495. 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. Agricultural clearing, forest harvesting and other industrial activities (mainly mining and hydro-electric development) are also significant disturbance factors in some areas. Site moisture and nutrient status are important determinants of post-disturbance 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 deciduous species, such as *Populus* spp. and *Betula papyrifera*, are less affected by competition. On mesic to dry sites, post-fire conditions are usually suitable for seed germination and growth of *P. banksiana*, *Picea mariana*, *P. tremuloides* and *B. papyrifera*. On all but the poorest sites, early seral stands comprising some combination of these species are subsequently colonized by *A. balsamea* and sometimes *Picea glauca*, which seed in from adjacent unburned areas during 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 prolonged absence of fire, *A. balsamea* (and to a lesser extent *P. mariana* and *P. glauca*) self-replaces by gap dynamics when death of mature trees creates canopy openings that release seedlings from the understory. Under humid conditions, *P. mariana* can also reproduce vegetatively by layering. In cases of anthropogenic disturbance (e.g., forest harvesting) or stand-scale windthrow, secondary succession immediately includes *A. balsamea* and *P. glauca* if they were present in the pre-disturbance stand or if seed sources exist nearby. Post-fire or harvest stand structure is usually simple and even-aged, but multi-storied, multi-aged structure can develop in the absence of fire.

These forests 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 M495, causing mortality of young trees and increasing susceptibility of older trees to windthrow and insect attack. Insects, such as eastern spruce budworm (*Choristoneura fumiferana*), hemlock looper (*Lambdina fiscellaria fiscellaria*), jack pine budworm (*Choristoneura pinus pinus*) and forest tent caterpillar (*Malacosoma disstria*), are endemic and can cause extensive defoliation and mortality of their host tree species during periodic epidemics.

Spruce budworm and hemlock looper feed on *Abies balsamea* and, to a lesser extent, *Picea glauca*. Where these tree species are dominant components of the forest canopy (usually as a result of an extended period without fire), episodic outbreaks of these insects result in high landscape-scale mortality, especially of *A. balsamea*. Other overstory species may be favoured for a short period during these outbreaks because they are either not attacked or are less susceptible to defoliation than is *A. balsamea*, but usually the highly shade tolerant *A. balsamea* quickly re-establishes canopy dominance from a bank of seedlings and saplings that persists in the understory.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Vegetation (cont'd)

Regeneration failure of *Pinus banksiana* or *Picea mariana* on sites with poor nutrient status can sometimes result in conversion of closed feathermoss stands to semi-stable open woodlands with high lichen cover. The openness of the tree layer promotes an increase in *Cladina* lichen cover and/or, especially on insular Newfoundland, *Kalmia angustifolia* abundance in the shrub layer. Conifer germination and seedling survival are inhibited by the lichen mat as well as by *K. angustifolia* competition and allelopathic effects, contributing to perpetuation of these disturbance-induced woodland conditions.

Environment

Climate

M495 develops within the humid, mostly continental boreal climate of eastern Canada, characterized by long, cold winters and short, cool to moderately warm summers. Maritime influences become pronounced in the eastern part of the range, and some coastal areas of Newfoundland, Nova Scotia and the Quebec North Shore have hyper-maritime climates with persistent fog and cloud. These areas experience cooler summers, milder winters and higher year-round precipitation. In otherwise temperate parts of Quebec and the Maritime Provinces, boreal climates occur at higher elevations.

Mean annual temperatures vary from approximately 0.7°C (<0°C at the northern edge of the range) in the continental part of the range (i.e., Ontario, western and north-central Quebec, and Labrador) to >3.5°C in the maritime part of the range (i.e., parts of insular Newfoundland, the Maritime Provinces, and along the North Shore of the Gulf of St. Lawrence). Temperature extremes are also moderated in the maritime areas. The growing season averages about 1300 growing degree days above 5°C (GDD); the longest growing season (approximately 1600 GDD) is in the western part of the range in southeastern Manitoba and northwestern Ontario. Mean annual precipitation generally follows a strong west to east gradient, increasing from (approximately) 640 mm west of Lake Superior, to 825 mm in north-central and northeastern Ontario and western Quebec, to 980 mm in central and eastern Quebec and Labrador, and >1800 mm in parts of Cape Breton Island and insular Newfoundland. Rainfall significantly exceeds snowfall, except at higher elevations in the maritime portion of the range where much of the overall annual precipitation falls as snow.

Physiography, Geology, Topography and Soils

M495 occurs primarily in the James and Laurentian physiographic regions of the east-central Precambrian Shield. The southeastern portion of the Hudson region is also included in the range of subtype CM495b [Ontario-Quebec Boreal Forest]. South of the Shield, in the Appalachian physiographic region, subtype CM495a [Atlantic Boreal Forest] occurs on insular Newfoundland and at the highest elevations in the Notre Dame Mountains of the Gaspé Peninsula, the Chaleur Uplands of Gaspé and northwestern New Brunswick, and the highlands of Cape Breton Island and northern New Brunswick. In the St. Lawrence Lowlands physiographic province, the forests of Anticosti Island, the Magdalen Islands and other islands of the Gulf of St. Lawrence are described by CM495a.

Most of the Shield landscapes in Ontario and western Quebec comprise rolling terrain containing numerous wetlands and lakes, with elevations largely below 500 mASL and local relief rarely exceeding 100 m. However, in the Laurentian physiographic region of Quebec, the topography is considerably more rugged and dissected, with elevations up to 1000 mASL. The geology consists of 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. The Appalachian physiographic region is more diverse, with many subdivisions. Highland and mountainous areas on the Gaspé peninsula, Cape Breton Island and in northwestern New Brunswick are generally rugged, often deeply dissected plateaux with steep slopes, developed in Precambrian or Paleozoic rocks. Elevations vary from >1000 mASL in the Chic-Choc Mountains of Gaspé to approximately 800 mASL in northern New Brunswick and 500 mASL on Cape Breton Island. On insular Newfoundland, the western highlands reach elevations up to approximately 700 mASL, while the rest of the island consists of generally rolling terrain with low relief at elevations <400 mASL.

The entire range of M495 was affected by Pleistocene glaciation, and surficial landscape expression is dominated by glacial features and bedrock-controlled terrain. In the mountains and foothills of the Appalachian physiographic region, till blankets overlie bedrock. This variable topography produces significant changes in local site moisture and nutrient status over short distances. In the Shield areas of M495, till veneers are often shallow over bedrock on upland sites, while deeper deposits of glacial drift fill landscape depressions. An extensive area of glaciolacustrine sediments occurs in the Clay Belt of northeastern Ontario and northwestern Quebec. Upland mineral soils are typically well to imperfectly drained Podzols, 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 areas within the range of M495, vegetation on these sites is primarily described by M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest]. Paludification may occur on imperfectly drained sites, especially in the Clay Belt. Permafrost is not a regular feature of soils associated with the forests of M495, although it does occur sporadically at the northern edge of the range on cold, moist sites where mineral soils are overlain by shallow peat.



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

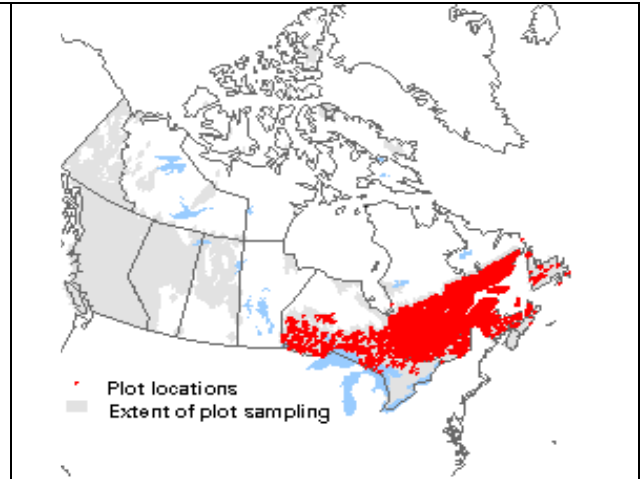
<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Distribution and Geographic Range

M495 includes the upland boreal forests and woodlands of southeastern Manitoba, Ontario, Quebec, Newfoundland and Labrador, and the Maritime Provinces. In Manitoba and northwestern Ontario, M495 occurs south of approximately latitude 51°N. East of approximately 86°W, M495 includes boreal forests south of approximately latitude 52°N. Closed forests and associated woodlands in southeastern Labrador, insular Newfoundland and the islands of the Gulf of St. Lawrence are included in M495. Forests of M495 occur in southern Quebec and the Maritime Provinces at higher elevations, including above approximately 400 mASL in the Gaspé region and northwestern New Brunswick, and above approximately 350 mASL on Cape Breton Island. Some elements of M495 occur at sea level in a narrow strip along the outer Atlantic coast of otherwise temperate Nova Scotia, where extreme weather conditions and salt spray favour boreal-like vegetation.



Related Concepts

M495 includes upland forests and woodlands that have been described in provincial publications for insular Newfoundland, the Northern Plateau and Cape Breton Highlands ecoregions in Nova Scotia, the Highlands ecoregion of New Brunswick, the Spruce – Moss and Balsam Fir – White Birch bioclimatic domains in Quebec and ecoregions 2E [James Bay], 3E [Lake Abitibi], 3W [Lake Nipigon] and parts of 4W [Pigeon River] and 4S [Lake Wabigoon] in Ontario.

Boreal riparian and wetland forests and woodlands within the range of M495 are described by M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest].

Comments

M495 describes the upland boreal forests of eastern Canada, characterized by general dominance of *Abies balsamea*, *Picea mariana* and *Betula papyrifera* on circum-mesic sites. Boreal upland forests and woodlands in west-central Canada (excluding southwestern Yukon), described by M496 [West-Central North American Boreal Forest & Woodland], are distinguished from those of M495 by general dominance of *Populus tremuloides*, *Picea glauca* and *Pinus contorta* var. *latifolia* or *P. banksiana* on circum-mesic sites, although *Abies lasiocarpa* is important in higher elevation woodlands of the Cordillera. Understories also differ in dominant species, including ericaceous shrubs and feathermosses. North of the range of M495, M179 [North American Subarctic Woodland] describes subarctic upland treed communities dominated mainly by *P. mariana* that exhibit woodland physiognomy, typically with ground cover of lichens rather than feathermosses. M495 does not include conifer and hardwood forests that contain temperate species, like *Acer rubrum*, *A. saccharum*, *Betula alleghaniensis*, *Picea rubens*, *Pinus strobus* and *Pinus resinosa*; these forests are described by CM014 [Northern Temperate Hardwood – Conifer Forest] and CM159 [Acadian Hardwood – Conifer Forest].

Within subtypes CM495a [Atlantic Boreal Forest] and CM495b [Ontario-Quebec Boreal Forest], CNVC Groups break out forests using diagnostic species indicators of site-scale moisture and nutrient conditions. In CM495a, four Groups are recognized: CG0001 [Atlantic Boreal Dry Black Spruce – Sheep Laurel Woodland]; CG0002 [Atlantic Boreal Mesic-Moist Black Spruce – Balsam Fir – Paper Birch Forest]; CG0003 [Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest]; CG0004 [Atlantic Boreal Moist Balsam Fir – White Spruce – Paper Birch Forest]. In CM495b, four Groups are recognized: CG0005 [Ontario-Quebec Boreal Dry-Mesic Black Spruce – Jack Pine Forest]; CG0006 [Ontario-Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest]; CG0007 [Ontario-Quebec Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest]; CG0008 [Ontario-Quebec Boreal Moist Black Spruce – Trembling Aspen – Balsam Fir – Paper Birch Forest].

Alnus incana here refers to ssp. *rugosa* (speckled alder).



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Source Information

Number of Source Plots for M495: 15620 (Canadian National Vegetation Classification. 2015. CNVC Master Database [VPro13/MSAccess 2010 format]. Natural Resources Canada, Sault Ste. Marie, ON.)

Information Sources (data):

Basquill, S.P. (compiler). 2015. Maritime provinces of Canada regional forest ecosystem plot database. Standardized forest ecosystem plot data compilation and classification from N.B. Dept. Nat. Resour.; P.E.I. For., Fish, & Wildlife Div., Dept. Commun., Land, & Environ.; N.S. Dept. Nat. Resour.; N.S. Environ.; Parks Can.; the Atlantic Can. Conserv. Data Centre; and other sources. Atlantic Can. Conserv. Data Centre, Sackville, NB. (495 plots)

Ministère des Ressources naturelles, de la Faune et des Parcs, Forêt Québec. 2003. Base de données des points d'observation écologique (version 2003). Gouv. du Qué., Min. des Res. nat., de la Faune et des Parcs, Forêt Qué., Dir. des inv. for., QC. (12063 plots)

Natural Resources Canada, Canadian Forest Service, Atlantic Region. 2006. Forest vegetation plot descriptions from the following publications; Damman, A.W.H. (1963, 1964, 1967); Meades, W.J. (1976, 1986). Nat. Res. Canada, Corner Brook, NL. (256 plots)

McMurray, S.C., Johnson, J.A., Zhou, K., Uhlig, P.W.C. 2015. Ontario ecological land classification program - Ecological Data Repository (EDR). Ont. Min. Nat. Resour. & For., Sci. & Info. Branch, Sault Ste. Marie, ON. (2806 plots)

Concept Authors: L. Allen, K. Baldwin, S. Basquill, K. Chapman, W. MacKenzie, M. Major, B. Meades, D. Meidinger, C. Morneau, P. Uhlig

Description Authors: K. Baldwin, J.-P. Saucier, B. Meades and K. Chapman

Date of Concept: February, 2013

Date of Description: September, 2016

References

Abrahamson, I. 2015. *Picea glauca*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/picgla/all.html> (accessed: October 2, 2015).

Baskerville, G.L. 1975. Spruce budworm: super silviculturist. *For. Chron.* 51(4):138-140.

Basquill, S.; Beaudette, D.; Cameron, R.; Curley, R.; Fenton, N.; Glen, W.; Gordon, S.; Hutchinson, J.; Kelly, G.; Loo, J.; Lynds, A.; MacAskill, D.; MacKinnon, D.; MacQuarrie, K.; Makepeace, S.; Matson, B.; Neily, P.; Quigley, E.; Zelazny, V. 2009 (updated 2015). Forest communities of the Maritime provinces of Canada. Atlantic Canada Conservation Data Centre, Sackville, NB.

Bergeron, J-F.; Grondin, P.; Blouin, J. 1999. Rapport de classification écologique du sous-domaine bioclimatique de la pessière à mousses de l'ouest. Min. des Res. nat. du Qué., Dir. des inv. for., Sainte-Foy, QC.

Bergeron, Y. 2000. Species and stand dynamics in the mixed woods of Quebec's southern boreal forest. *Ecology* 81(6):1500-1516.

Bergeron, Y.; Chen, H.Y.H.; Kenkel, N.C.; Leduc, A.; Macdonald, S.E. 2014. Boreal mixedwood stand dynamics: ecological processes underlying multiple pathways. *For. Chron.* 90(2):202-213.

Bergeron, Y.; Fenton, N.J. 2012. Boreal forests of eastern Canada revisited: old growth, nonfire disturbances, forest succession, and biodiversity. *Botany* 90(6):509-523.

Bergeron, Y.; Gauthier, S.; Kafka, V.; Lefort, P.; Lesieur, D. 2001. Natural fire frequency for the eastern Canadian boreal forest: consequences for sustainable forestry. *Can. J. For. Res.* 31:384-391.

Bostock, H.S. 1970. Physiographic subdivisions of Canada. *Geol. Surv. Can. Econ. Geol. Rep. No. 1*. Pages 10-30 in: R.J.W. Douglas (ed.) *Geology and economic minerals of Canada*. *Geol. Surv. Can.*, Ottawa, ON.

Bouchard, M.; Pothier, D.; Gauthier, S. 2008. Fire return intervals and tree species succession in the North Shore region of eastern Quebec. *Can. J. For. Res.* 38(6):1621-1633.

Boulanger, Y.; Gauthier, S.; Burton, P.J. 2014. A refinement of models projecting future Canadian fire regimes using homogeneous fire regime zones. *Can. J. For. Res.* 44(4):365-376.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

References cont'd

- Brandt, J.P. 2009. The extent of the North American boreal zone. *Environ. Rev.* 17:101-161.
- Bridge, S.R.J. 2001. Spatial and temporal variations in the fire cycle across Ontario. OMNR, Northeast Sci. Tech., South Porcupine, ON. NEST TR-043.
- Brouillet, L.; Coursol, F.; Meades, S.J.; Favreau, M.; Anions, M.; Bélisle, P.; Desmet, P. 2010+. VASCAN, the database of vascular plants of Canada. Available: <http://data.canadensys.net/vascan/search> (accessed: September 2015).
- Carey, J.H. 1993. *Pinus banksiana*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/pinban/all.html> (accessed: May 26, 2015).
- Clayden, S.R.; Cameron, R.P.; McCarthy, J.W. 2011. Perhumid boreal and hemiboreal forests of eastern Canada. Chapter 4 in: D.A. DellaSala (ed.) *Temperate and boreal rainforests of the world: ecology and conservation*. Island Press, Washington DC, US.
- Collins, E.H. 1951. A study of the boreal forest formation in northern Cape Breton. M.Sc. thesis, Acadia Univ., Wolfville, NS.
- Côté, S.D.; Dussault, C.; Huot, J.; Potvin, F.; Tremblay, J.-P.; Viera, V. 2008. High herbivore density and boreal forest ecology: white-tailed deer on Anticosti Island. Pages 154- 161 in: Gaston A.J., Golumbia T.E., Martin J.L. and S.T. Sharpe (eds.) *Lessons from the Islands: introduced species and what they tell us about how ecosystems work*. Proceedings from the Research Group on Introduced Species 2002 Symposium. Queen Charlotte City, BC. Can. Wildlife Serv., Environ. Can., Ottawa, ON.
- Crins, W.J.; Gray, P.A.; Uhlig, P.W.C.; Wester, M. 2009. The ecosystems of Ontario, Part 1: Ecozones and ecoregions. *Ont. Min. Nat. Resour., Inven. Monit. Assess.*, Peterborough, ON. SIB TER IMA TR-01.
- Damman, A.W.H. 1963. A reconnaissance survey of the ecological conditions in the forests of the Roddickton area, Newfoundland. *For. Res. Branch, Can. Dept. For., NL. Mimeo 63-N-1*.
- Damman, A.W.H. 1964. Some forest types of central Newfoundland and their relation to environmental factors. *The Society of American Foresters, US. Monograph 8*.
- Damman, A.W.H. 1967. The forest vegetation of western Newfoundland and site degradation associated with vegetation change. PhD thesis, Univ. of Michigan, Ann Arbor, MI, US.
- Damman, A.W.H. 1983. An ecological subdivision of the island of Newfoundland. Pages 163-206 in: G.R. South (ed.) *Biogeography and ecology of the island of Newfoundland*. Dr W. Junk Publishers, The Hague, The Netherlands.
- Ecoregions Working Group. 1989. *Ecoclimatic regions of Canada*. W. Strong and S.C. Zoltai (compilers). *Sustain. Dev. Branch, Can. Wildlife Serv., Conserv. and Prot., Environ. Can., Ottawa, ON. ELC Series No. 23*.
- Environment Canada. 2015. *Canadian climate normals, 1961-1990*. Gov. Canada. Available: http://climate.weather.gc.ca/climate_normals/index_e.html (accessed: January 29, 2015).
- Flora of North America Editorial Committee. 2007+. *Flora of North America north of Mexico*, vols 27, 28, 29. Oxford University Press, New York and Oxford. Available: <http://www.mobot.org/plantscience/bfna/BFNAMenu.htm> (accessed: November, 2015).
- Foster, D.R. 1983. The history and pattern of fire in the boreal forest of southeastern Labrador. *Can. J. Bot.* 61:2459-2471.
- Foster, D.R. 1984. Phytosociological description of the forest vegetation of southeastern Labrador. *Can. J. Bot.* 62:899-906.
- Fryer, J.L. 2014. *Picea mariana*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/picmar/all.html> (accessed: May 26, 2015).
- Gagnon, R.; Morin, H. 2001. Les forêts d'épinette noire du Québec: dynamique, perturbations et biodiversité. *Nat. Can.* 125:26-35.
- Gauthier, S.; Raulier, F.; Robitaille, A.; Chabot, M.; Duval, J.; Lord, D. 2013. Vulnérabilité face au risque de feu: description du critère et de l'indicateur, justification des seuils, méthode retenue et résultats détaillés. Chapitre 4 dans *Rapport du Comité scientifique chargé d'examiner la limite nordique des forêts attribuables*. Min. des Res. nat. du Qué., Sect. des for., QC.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

References cont'd

- Greenall, J. 1998. Northern and boreal plant communities of Manitoba: descriptions and status ranks. Draft. MB Conserv. Data Centre, Winnipeg, MB.
- Greene, D.F.; Zasada, J.C.; Sirois, L.; Kneeshaw, D.; Morin, H.; Charron, I.; Simard, M.J. 1999. A review of the regeneration dynamics of North American boreal forest tree species. *Can. J. For. Res.* 29:824-839.
- Grondin, P.; Blouin, J.; Racine, P. 1998. Rapport de classification écologique du sous-domaine bioclimatique de la sapinière à bouleau blanc de l'ouest. Min. des Res. nat. du Qué., Dir. des inv. for., QC.
- Grondin, P.; Blouin, J.; Racine, P.; D'Avignon, H.; Tremblay, S. 2000. Rapport de classification écologique du sous-domaine bioclimatique de la sapinière à bouleau blanc de l'est. Forêt Qué., Dir. des inv. for., Min. des Res. nat. du Qué., QC.
- Hare, F.K. 1950. Climate and zonal divisions of the boreal forest formation in eastern Canada. *Geogr. Rev.* 40:615-635.
- Hare, F.K.; Hay, J.E. 1974. The climate of Canada and Alaska. Vol. 11, pages 49-192 in: R.A. Bryson and F.K. Hare (eds.) *World survey of climatology*. Elsevier Scientific Publishing Company, Amsterdam, The Netherlands.
- Harris, H.T. 1990. *Populus balsamifera* subsp. *balsamifera*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/popbalb/all.html> (accessed: May 28, 2015).
- Howard, J.L. 1996. *Populus tremuloides*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/poptre/all.html> (accessed: May 27, 2015).
- Iqbal, J.; MacLean, D.A.; Kershaw Jr., J.A. 2011. Impacts of hemlock looper defoliation on growth and survival of balsam fir, black spruce and white birch in Newfoundland, Canada. *For. Ecol. Manage.* 261:1106-1114.
- Kenkel, N.C.; Walker, D.J.; Watson, P.R.; Caners, R.T.; Lastra, R.A. 1997. Vegetation dynamics in boreal forest ecosystems. *Coenoses* 12(2-3):97-108.
- Kneeshaw, D.D.; Bergeron, Y. 1998. Canopy gap characteristics and tree replacement in the southeastern boreal forest. *Ecology* 79(3):783-794.
- La Roi, G.H. 1967. Ecological studies in the boreal spruce-fir forests of the North American taiga. I. Analysis of the vascular flora. *Ecol. Monogr.* 37(3):229-253.
- Li, T.; Hélie, R. (compilers). 2014. *Ecozones of Canada / Écozones du Canada* [map]. Canadian Council on Ecological Areas / Conseil Canadien des Aires Écologiques, CA. Scale 1:25,000,000.
- Loucks, O.L. 1962. A forest classification for the Maritime provinces. *Proc. Nova Scotia Inst. Sci.* 25(2):87-167.
- Man, R.; Rice, J.A. 2010. Response of aspen stands to forest tent caterpillar defoliation and subsequent overstory mortality in northeastern Ontario, Canada. *For. Ecol. Manage.* 260:1853-1860.
- McCarthy, J. 2001. Gap dynamics of forest trees: a review with particular attention to boreal forests. *Environ. Rev.* 9(1):1-59.
- McCarthy, J.W.; Weetman, G. 2006. Age and size structure of gap-dynamic old-growth boreal forest stands in Newfoundland. *Silva Fennica* 40(2):209-230.
- Meades, W.J. 1976. Vegetation of Terra Nova National Park. In: *Biophysical classification of Terra Nova National Park: environmental component 3c*. Can. Dept. Indian & North. Aff., Parks Branch, CA.
- Meades, W.J. 1983. Heathlands. Pages 267-318 in: G.R. South (ed.) *Biogeography and ecology of the island of Newfoundland*. Dr W. Junk Publishers, The Hague, The Netherlands.
- Meades, W.J. 1986. Successional status of ericaceous dwarf-shrub heath in eastern Newfoundland. PhD thesis, Univ. of Connecticut, Storrs, CT.
- Meades, W.J.; Moores, L. 1994. *Forest site classification manual: a field guide to the Damman forest types of Newfoundland*. 2nd ed. Corner Brook, Western Newfoundland Model Forest, Inc., NL. FRDA Rep. 003.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

References cont'd

- Ministère des Ressources naturelles du Québec, Forêt Québec. 2002+. Les guides de reconnaissance des types écologiques. Gouv. du Québec, Québec, QC. Available: <http://www.mffp.gouv.qc.ca/forets/inventaire/guide-types-ecologiques-carte.jsp> (accessed: May 2015).
- Ministère des Ressources naturelles. 2013. Le guide sylvicole du Québec, Tome 1, Les fondements biologiques de la sylviculture. Ouvrage collectif sous la supervision de B. Boulet et M. Huot. Les Publications du Québec, QC. 1044.
- Morneau, C. In prep. Rapport de classification écologique du sous-domaine bioclimatique de la pessière à mousses de l'est. Min. des forêts, de la Faune et des Parcs, Dir. des inv. for., QC.
- Myren, D.T. (ed.). 1994. Tree diseases of eastern Canada. Nat. Res. Can., Can. For. Serv., Ottawa, ON.
- Neily, P.; Basquill, S.; Quigley, E.; Stewart, B.; Keys, K. 2011. Forest ecosystem classification for Nova Scotia, Part I: Vegetation types. N.S. Dept. Nat. Resour., Renew. Resour. Branch, NS.
- Neily, P.; Quigley, E.; Basquill, S.; Keys, K. 2015. Ecological land classification for Nova Scotia. N.S. Dept. Nat. Resour., Renew. Resour. Branch, NS. Rep. FOR 2016-*
- Ontario Ministry of Natural Resources. 2009. Ecological land classification ecosites field manual – operational draft, April 20th, 2009 – boreal. Ecol. Land Class. Working Grp, Ont. Min. Nat. Resour., Sci. & Info Branch, Inven. Monit. Assess. Sect., Sault Ste. Marie, ON.
- Ruel, J-C. 2000. Factors influencing windthrow in balsam fir forests: from landscape studies to individual tree studies. *For. Ecol. Manage.* 135:169-178.
- Sanchez-Mata, D.; Rivas-Martinez, S. 2010. Bioclimatic dossier for the 'Circumboreal Vegetation Mapping Project' (CBVM). Pages 42-52 in: S.S. Talbot (ed.) Proc. 7th Intl. Conserv. Arctic Flora and Fauna (CAFF) Flora Gp. Workshop. January 28-February 3, 2011. Akureyri, Iceland. CAFF International Secretariat, CAFF Flora Expert Group (CFG), CAFF Proc. Series Rep. No. 8.
- Saucier, J.-P.; Baldwin, K.; Krestov, P.; Jorgenson, T. 2015. Boreal forests. Chapter 2 in: K.S.-H. Peh, R.T. Corlett and Y. Bergeron (eds.) *Routledge handbook of forest ecology*. Routledge, Abingdon, UK.
- Simard, M.; Payette, S. 2005. Reduction of black spruce seed bank by spruce budworm infestation compromises postfire stand regeneration. *Can. J. For. Res.* 35:1686-1696.
- Smith, R.T. 1974. A phytosociological study of fir and spruce forests on the plateau of Cape Breton Island, Nova Scotia. M.Sc. thesis, Univ. B.C., Vancouver, BC.
- Soil Classification Working Group. 1998. The Canadian system of soil classification. NRC Research Press, Ottawa, ON. Agric. and Agri-Food Can. Pub. 1646.
- Soil Classification Working Group. 2001. Soils of Canada [map]. Scale 1:6,500,000. Agric. and Agri-Food Can. Res. Br. Available: sis.agr.gc.ca/cansis (accessed: May 12, 2016).
- The Ecosystem Classification Working Group. 2007. Our landscape heritage: the story of ecological land classification in New Brunswick. V.F. Zelazny (ed.). N.B. Dept. Nat. Resour., Fredericton, NB.
- Thompson, I.D.; Larson, D.J.; Montevecchi, W.A. 2003. Characterization of old "wet boreal" forests, with an example from balsam fir forests of western Newfoundland. *Environ. Rev.* 11:523-546.
- Uchytel, R.J. 1991. *Abies balsamea*. In: Fire Effects Information System. U.S. Dept. Agric. For. Serv. Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/abibal/all.html> (accessed: May 26, 2015).
- Uchytel, R.J. 1991. *Betula papyrifera*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: <http://www.fs.fed.us/database/feis/plants/tree/betpap/all.html> (accessed: May 27, 2015).
- Uhlig, P.W.C., Chapman, K., Baldwin, K., Wester, M., Yanni, S. 2016. Draft boreal treed vegetation type factsheets. *Ecol. Land Class. Prog.*, Ont. Min. Nat. Resour. & For., Sci. & Info Branch, Sault Ste. Marie, ON.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

References cont'd

USNVC [United States National Vegetation Classification]. 2016. United States National Vegetation Classification Database ver. 2.0. Fed. Geogr. Data Comm., Veg. Subcomm., Washington DC, US. Available: <http://usnvc.org> (accessed: March 10, 2016).

Van Sleeuwen, M. 2006. Natural fire regimes in Ontario. Ont. Min. Nat. Resour., Queen's Printer for Ont., Toronto, ON.

Wester, M.C.; Henson, B.L.; Crins, W.J.; Uhlig, P.W.C.; Gray, P.A. In prep. The ecosystems of Ontario, Part 2: Ecodistricts. Ont. Min. Nat. Resour. & For., Sci. & Res. Branch, For. Res. & Monit. Sect., Sault Ste. Marie, ON.

Wilton, W.C. 1965. The forests of Labrador. Nfld. Dept. For., NL. Publ. No. 1066.

Zoladeski, C.A.; Wickware, G.M.; Delorme, R.J.; Sims, R.A.; Corns, I.G.W. 1995. Forest ecosystem classification for Manitoba: field guide. Nat. Res. Can., Can. For. Serv., North. For. Centre, Edmonton, AB. Special Rep. 2.

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.

Suggested Citation: Baldwin, K.; Saucier, J-P; Meades, B., Chapman, K. Eastern North American Boreal Forest [online]. Sault Ste. Marie, Ontario, Canada: Canadian National Vegetation Classification. May 2016; generated 15-September-2016; cited **ENTER DATE ACCESSED**. 12 p. Canadian National Vegetation Classification Macrogroup: M495. Available from <http://cnvc-cnvc.ca>. System Requirements: Adobe Acrobat Reader v. 7.0 or higher. ISSN 1916-3266.



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest
Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Comparison of Vegetation Characteristics for Boreal Forest Macrogroups

Lifeform	Species Name	n=265	n=8451	n=15620	Species Common Name
		M156 Alaska-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</i> + <i>contorta</i> var. <i>latifolia</i>		■■■■■	***	jack + lodgepole pines
	<i>Betula papyrifera</i> + <i>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>	■■			black crowberry
	<i>Arctous rubra</i>	**			red bearberry
	<i>Geocaulon 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>	■■■■■	■■■■■	■■■■■	stairstep 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%



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

<http://cnvc-cnvc.ca>

Eastern North American Boreal Forest Forêts boréales de l'Est de l'Amérique du Nord

Macrogroup M495

Comparison of Vegetation Characteristics for Macrogroup Subtypes in M495

Layer	Spp	n=11652		n=3968		
		CM495b Ontario-Quebec Boreal	CM495a Atlantic Boreal Forest	CM495b Ontario-Quebec Boreal	CM495a Atlantic Boreal Forest	Common Name
Tree	<i>Pinus banksiana</i>	■■■				jack pine
	<i>Populus tremuloides</i>	■■■				trembling aspen
	<i>Betula papyrifera</i>	■■■■		■■■		paper birch
	<i>Picea mariana</i>	■■■■		■■■■		black spruce
	<i>Abies balsamea</i>	■■■		■■■■■		balsam fir
	<i>Picea glauca</i>	**		■■■		white spruce
Shrub	<i>Diervilla lonicera</i>	■■				northern bush-honeysuckle
	<i>Alnus viridis</i>	**				green alder
	<i>Alnus incana</i>	***				grey alder
	<i>Corylus cornuta</i>	**				beaked hazelnut
	<i>Rhododendron groenlandicum</i>	■■■		**		common Labrador tea
	<i>Acer spicatum</i>	■■■		**		mountain maple
	<i>Kalmia angustifolia</i>	■■■		**		sheep laurel
	<i>Vaccinium myrtilloides</i>	■■■		■■		velvet-leaved blueberry
	<i>Vaccinium angustifolium</i>	■■■		■■		early lowbush blueberry
	<i>Sorbus spp.</i>	■■		■■		mountain-ash
Herb/ Dwarf Shrub	<i>Eurybia macrophylla</i>	**				large-leaved aster
	<i>Aralia nudicaulis</i>	■■		■■		wild sarsaparilla
	<i>Maianthemum canadense</i>	■■		■■		wild lily-of-the-valley
	<i>Cornus canadensis</i>	■■■		■■■		bunchberry
	<i>Linnaea borealis</i>	■■		■■		twinflower
	<i>Lysimachia borealis</i>	■■		■■		northern starflower
	<i>Clintonia borealis</i>	■■		■■		yellow clintonia
	<i>Gaultheria hispidula</i>	■■		■■		creeping snowberry
	<i>Coptis trifolia</i>	■■		■■		goldthread
	<i>Oxalis montana</i>			■■■		common wood-sorrel
Moss/Lichen	<i>Cladina spp.</i>	■■■		■■		reindeer lichens
	<i>Pleurozium schreberi</i>	■■■■■		■■■■■		red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>	■■■		■■■		knight's plume moss
	<i>Hylocomium splendens</i>	■■		■■■■		stairstep moss
	<i>Bazzania trilobata</i>			■■		three-lobed whipwort

Legend

Constancy:	Black bar >= 50%	Cover:	5 bars >= 25%	2 bars >= 1%
	Grey bar >= 30%		4 bars >= 10%	1 bar <= 1%
	Asterisk >= 20%		3 bars >= 3%	