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A Guide to the Canadian National Vegetation Classification Associations of the Eastern North American Boreal Forest Macrogroup M495

**Chapman, K.¹, Baldwin, K.^{1*}, Basquill, S.², Major, M.³,
Meades, W. (B.)^{1*}, Morneau, C.³, Saucier, J-P.³, Uhlig, P.^{4*}, Wester, M.⁴**

**Natural Resources Canada, Canadian Forest Service
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***retired**

¹Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre.
1219 Queen Street East, Sault Ste. Marie, ON, Canada, P6A 2E5

² Nova Scotia Department of Natural Resources

³ Québec Ministère des Forêts, de la Faune et des Parcs

⁴ Ontario Ministry of Natural Resources and Forestry

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The Canadian National Vegetation Classification (CNVC) system has been developed by a team of experts from across Canada. Development of the Associations of the Eastern North American Boreal Forest Macrogroup M495, would not have been possible without the expertise of the ecologists who have served on the CNVC Technical Committee or on Bioregional Peer Review Panels over the period of development, 2000-2018 (Baldwin et al. 2019b).

Development of the CNVC has benefited significantly from earlier or concurrent work of various provincial/ territorial and regional ecological classification programs across Canada. Data, classifications and partnerships with ecologists from agencies in Alberta, British Columbia, New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan and Yukon have been critical to development. These varied ecological classification programs, and the conceptual thinking they embody, laid the foundation for the CNVC. Along with the considerable amount of ecological plot data collected by hundreds of field workers over decades and made available to NRCan – CFS through data sharing agreements with each jurisdiction, these programs and ecologists have given strength to the Associations developed through the CNVC process.

Abstract

In this report we present the Canadian National Vegetation Classification (CNVC) for upland boreal forest communities of Eastern Canada, Macrogroup M495 [Eastern North American Boreal Forest]. This Macrogroup includes 55 Associations that have been determined by a panel of experts with regional ecological expertise, based on vegetation characteristics that relate to ecological conditions. We aim to explain the ecology and classification of these forest communities to help users understand and apply the classification. We provide an overview of Macrogroup M495, including floristic distinctions from other geographically nearby or related Macrogroups. Using a conceptual framework of diagnostic overstory and understory plant indicator species, we present the Associations and provide instructions for determining an Association from plot data or from constituent or correlated provincial or regional vegetation types. One-page summaries of each Association are provided in this report, but more complete descriptions are provided for many of the Associations in factsheets that are available for download from cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications.

1.0 Introduction

1.1 Overview

The Canadian National Vegetation Classification (CNVC) is a hierarchical ecological classification of natural vegetation communities in Canada (Table 1; Baldwin et al. 2019b). As a nationally standardized vegetation classification, it is intended as a tool for coordinating the exchange of ecological information to support research, conservation and land management activities in a variety of ways, such as:

- serving as a standardized ecological framework and language;
- providing ecologically meaningful units for reporting;
- providing baseline information for monitoring and predicting change;
- informing ecosystem-based management;
- assisting in conservation planning;
- providing information on historic conditions; and
- promoting the understanding of national (and ecological) variation at a variety of conceptual scales.

The need for such national standards has been identified by the Ecosystem Status and Trends 2010 report (Federal, Provincial and Territorial Governments of Canada 2010) and has more recently been highlighted by The Expert Panel on the State of Knowledge and Practice of Integrated Approaches to Natural Resource Management in Canada (Council of Canadian Academies 2019).

Our report presents an ecological synthesis of the Associations within the Eastern North American Boreal Forest Macrogroup [M495]. This compilation will contribute to an understanding of the ecology of eastern Canadian boreal forests and assist in better application of the CNVC classification.

Associations are the stand-level vegetation types that are the fundamental units of classification in the CNVC (Table 1). An Association is a plant community type having consistent species dominance and floristic composition. Each Association has a clearly interpretable ecological context (i.e., a narrow range of site-scale factors such as climate, substrate, hydrology, moisture and nutrient conditions, and disturbance regime), as expressed by diagnostic plant indicator species. Within M495 [Eastern North American Boreal Forest], 55 Associations have been confirmed (Appendix 1). In this report, we explain the ecological principles and vegetation characteristics underlying the classification of M495 Associations. One-page summaries of each of the 55 Associations are available in Appendix 2; detailed factsheet

descriptions are available for 40 of the 55 Associations at cnvc-cnvc.ca/ and cfs.nrcan.gc.ca/publications (listed in Appendix 1).

Associations comprise one or more provincial or regional vegetation community types (Baldwin et al. 2019b). When the CNVC was initiated in 2000, except for insular Newfoundland, provinces in eastern Canada did not have vegetation community types compatible with the CNVC Association concept. Through CNVC development, vegetation types from published sources in Newfoundland (Damman 1963, 1964, 1967; Meades 1976, 1986) were compiled, and new CNVC-compatible vegetation types were developed for Labrador (unpublished), Ontario (Uhlir et al. 2016), Quebec (unpublished) and, regionally, for the Maritimes provinces (New Brunswick, Nova Scotia and Prince Edward Island; Basquill et al. 2015). These new provincial and regional vegetation types, consistent with the CNVC Association concept, as determined by the CNVC Technical Committee, were then correlated between jurisdictions to develop national Associations. The resulting 55 Associations, developed through integration of ecological information across jurisdictional boundaries, are the only nationally standardized, stand-level forest types in existence for Canada's Eastern Boreal forests.

In the CNVC hierarchy, M495 [Eastern North American Boreal Forest] is distinguished from three other upland boreal forest/woodland Macrogroups that occur in Canada: M156 [Alaskan-Yukon North American Boreal Forest & Woodland], M179 [North American Northern Boreal Woodland] and M496 [West-Central North American Boreal Forest] (Table 2). Together, these four upland boreal forest and woodland Macrogroups constitute Division D014 [North American Boreal Forest & Woodland]. All upland boreal forests and woodlands (D014) are distinguished from boreal treed wetlands, which are classified in Division D016 [North American Boreal Flooded & Swamp Forest].

Table 1. CNVC hierarchy levels and their definitions (from Baldwin et al. 2019b).

Hierarchy Level	Definition
1. Formation Class	A broad combination of general dominant plant growth forms that are adapted to basic moisture, temperature, and/or substrate or aquatic conditions, e.g., C01 Forest & Woodland.
2. Formation Subclass	A combination of general dominant and diagnostic growth forms that reflect global mega- or macroclimatic factors driven primarily by latitude and continental position or that reflect overriding substrate or aquatic conditions, e.g., S15 Temperate & Boreal Forest & Woodland.
3. Formation	A combination of dominant and diagnostic growth forms that reflect global macroclimatic conditions as modified by altitude, seasonality of precipitation, substrates, and hydrologic conditions, e.g., F001 Boreal Forest & Woodland.
4. Division	A combination of dominant and diagnostic growth forms and a broad set of diagnostic plant species that reflect biogeographic differences in composition and continental differences in mesoclimate, geology, substrates, hydrology, and disturbance regimes, e.g., D014 North American Boreal Forest & Woodland.
5. Macrogroup	<p><i>For upland vegetation that includes zonal vegetation:</i> A regionally distinct subset of plant species composition, abundance and/or dominance, representing primary regional climatic gradients as reflected in vegetation patterns on circum-mesic (“zonal”) sites, e.g., M495 Eastern North American Boreal Forest.</p> <p><i>For azonal vegetation:</i> A vegetation unit that contains moderately large sets of diagnostic plant species and diagnostic growth forms that reflect subcontinental to regional biogeographic composition and subcontinental to regional mesoclimate, geology, substrates, hydrology, and disturbance regimes, e.g., M299 North American Boreal Conifer Poor Swamp.</p>
6. Group	<p><i>For upland vegetation that includes zonal vegetation:</i> An aggregation of Alliances within the regional vegetation defined by a Macrogroup (or subtype), with consistency in dominant and/or diagnostic species. Groups describe regionally generalized vegetation patterns attributable to ecological drivers such as edaphic or geological conditions within the Macrogroup (subtype), successional relationships within the Macrogroup (subtype), etc., e.g., CG0001 Atlantic Boreal Dry Black Spruce – Sheep Laurel Woodland.</p> <p><i>For azonal vegetation:</i> A vegetation unit that is defined by a relatively small set of diagnostic plant species (including dominants and codominants), broadly similar composition, and diagnostic growth forms that reflect regional mesoclimate, geology, substrates, hydrology, and disturbance regimes, e.g., CG0016 Atlantic Boreal Black Spruce – Balsam Fir Poor – Intermediate Treed Wetland.</p>
7. Alliance	<p><i>For upland vegetation that includes zonal vegetation:</i> An aggregation of Associations, with consistency in dominant and/or diagnostic species, describing regionally repeating vegetation patterns at the local to sub-regional scale. Alliances are created by grouping Associations that are ecologically “related” into more generalized ecological units (e.g., successional related Associations on similar edaphic conditions can be aggregated into more generalized Alliances). An example is CA00001 <i>Picea mariana</i> / <i>Kalmia angustifolia</i> – <i>Rhododendron canadense</i> / <i>Cladina</i> spp.</p> <p><i>For azonal vegetation:</i> A vegetation classification unit containing one or more associations and defined by a characteristic range of species composition, habitat conditions, physiognomy, and diagnostic species, typically at least one of which is found in the uppermost or dominant stratum of the vegetation. Alliances reflect regional to subregional climate, substrates, hydrology, moisture/nutrient factors, and disturbance regimes, e.g., CA00040 <i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Sphagnum capillifolium</i>.</p>
8. Association	A plant community type with consistency of species dominance and overall floristic composition, having a clearly interpretable ecological context in terms of site-scale climate, substrate and/or hydrology conditions, moisture/nutrient factors and disturbance regimes, as expressed by diagnostic indicator species, e.g., CNVC00307 <i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i> .

Table 2. Forest and woodland Macrogroups (M or CM) that occur in Canada, placed within their Division (D) and Formation (F). Note that Macrogroups denoted by “M” are also recognized in the United States National Vegetation Classification (USNVC); those with “CM,” for Canadian Macrogroup, differ from USNVC Macrogroups. All of the forests and woodlands in Canada are classified within the S15 Temperate & Boreal Forest & Woodland Formation Subclass of Formation Class C01 Forest & Woodland. Hierarchy information is also available at cnvc-cnvc.ca/.

Formation Class	Formation Subclass	Formation	Division	Macrogroup
C01 Forest & Woodland	S15 Temperate & Boreal Forest & Woodland	F001 Boreal Forest & Woodland	D014 North American Boreal Forest & Woodland	M156 Alaskan-Yukon North American Boreal Forest & Woodland M179 North American Northern Boreal Woodland M496 West-Central North American Boreal Forest M495 Eastern North American Boreal Forest
		F036 Boreal Flooded & Swamp Forest	D016 North American Boreal Flooded & Swamp Forest	M299 North American Boreal Conifer Poor Swamp M300 North American Boreal Flooded & Rich Swamp Forest
		F008 Cool Temperate Forest & Woodland	D008 Eastern North American Forest & Woodland	CM014 Eastern North American Temperate Hardwood - Conifer Forest CM742 Eastern Canadian Temperate Deciduous Forest CM744 Acadian Temperate Forest
			D192 Vancouverian Forest & Woodland	M024 Vancouverian Coastal Rainforest M025 Vancouverian Subalpine - High Montane Forest M886 Southern Vancouverian Dry Foothill Forest & Woodland
			D194 Rocky Mountain Forest & Woodland	M020 Rocky Mountain Subalpine - High Montane Forest M500 Central Rocky Mountain Mesic Lower Montane Forest M501 Central Rocky Mountain Dry Lower Montane - Foothill Forest M890 Rocky Mountain Intermontane Subboreal Forest
			D326 North American Great Plains Forest & Woodland	M151 Great Plains Forest & Woodland
		F026 Temperate Flooded & Swamp Forest	D011 Eastern North American-Great Plains Flooded & Swamp Forest	M028 Great Plains Floodplain Forest M029 Central Hardwood Floodplain Forest M503 Central Hardwood Swamp Forest M504 Laurentian-Acadian Flooded & Swamp Forest
			D193 Vancouverian Flooded & Swamp Forest	M035 Vancouverian Flooded & Swamp Forest
			D195 Rocky Mountain-Great Basin Montane Flooded & Swamp Forest	M034 Rocky Mountain-Great Basin Montane Riparian & Swamp Forest

1.2 Report content

The main purpose of this report is to assist users in identifying Associations of M495 [Eastern North American Boreal Forest]. After the Introduction, the next section, **2.0 Eastern North American Boreal Forest, M495**, provides context. It explains the ecology of eastern North American boreal forests by way of an overview of the Macrogroup (**2.1**) and each of its two subtypes, CM495a [Atlantic Boreal Forest] and CM495b [Ontario – Quebec Boreal Forest] (**2.2**). Sub-section **2.3 Floristic distinctions from other Macrogroups** includes descriptions of the floristic differences between M495 and other upland forest Macrogroups that overlap parts of the range (M496 [West-Central North American Boreal Forest], M179 [North American Northern Boreal Woodland], CM014 [Eastern North American Temperate Hardwood – Conifer Forest] and CM744 [Acadian Temperate Forest]), as well as between M495 and treed wetland Macrogroups that occur in the same range (M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest]). Sub-section **2.4 Alliances and Groups of M495** provides an overview of M495 types at hierarchy levels between the Association and Macrogroup (Table 1).

The next section of the report, **3.0 Conceptual framework for Associations of M495**, provides a conceptual framework for understanding the combinations of overstory and understory vegetation characteristics that differentiate the 55 Associations of M495. Sub-section **3.1 Overstory classes** includes descriptions of the three broad overstory classes (Hardwood, Mixedwood and Conifer) and sub-section **3.2 Understory classes** includes descriptions of the six understory classes (Lichen, Ericaceous Shrub & Feathermoss, Feathermoss & Peat Moss, Mesophytic Herb or Feathermoss, Mesic Rich Shrub & Herb and Moist Rich Shrub & Herb) that are useful for distinguishing Associations.

Section **4.0 How to determine an Association** describes the process of determining an Association from different starting points: previously unclassified plot data (**4.1**), plot data previously classified to a constituent provincial or regional vegetation type (**4.2**), or plot data previously classified to a non-constituent, but correlated provincial or regional vegetation type (**4.3**).

Note that methods of Association development, standards for botanical nomenclature and naming of Associations, and a glossary of terms are provided in Baldwin et al. (2019b). Instructions for interpreting the vegetation tables throughout the report are provided in sub-section **1.4**.

1.3 M495 scope and criteria for classification

The core range of M495 is represented by the Eastern Boreal Forest vegetation zone (Figure 1; Baldwin et al. 2019a). However, not every forested stand within this geographic area is treated within M495. The CNVC does not classify plantations, culturally modified or immature (approx. <40 years) forests. Also, M495 describes only upland forests; wet forests and treed wetlands within the Eastern Boreal Forest vegetation zone are classified within M299 [North American Boreal Conifer Poor Swamp] or M300 [North American Boreal Flooded & Rich Swamp Forest]. Furthermore, forests within this vegetation zone that are dominated by eastern white cedar (*Thuja occidentalis*) or black ash (*Fraxinus nigra*) have not yet been classified, so this report does not include these forests.

Near borders with other vegetation zones (Figure 1), some stands may be better classified to Associations in other Macrogroups. These include M496 [West-Central North American Boreal Forest] to the northwest, M179 [North American Northern Boreal Woodland] to the north, and CM014 [Eastern North American Temperate Hardwood – Conifer Forest] and CM744 [Acadian Temperate Forest] to the south. Floristic distinctions among Macrogroups are used to determine membership and are explained in **2.3 Floristic distinctions from other Macrogroups**.

To be classified as a forest within M495 a stand must therefore:

- 1) Be a mature (approx. >40 years), natural (or semi-natural) forest or woodland (>10% tree layer cover);
- 2) Occur within or near the range of the Eastern Boreal Forest vegetation zone (Figure 1);
- 3) Have species composition that better reflects that of M495 than of Macrogroups that characterize surrounding vegetation zones;
- 4) Occur on an upland site (moisture regime dry to moist, not wet; total peat moss [*Sphagnum* spp.] cover < total feathermoss cover);
- 5) Have less than 5% tree layer cover of eastern white cedar (*Thuja occidentalis*) or black ash (*Fraxinus nigra*).

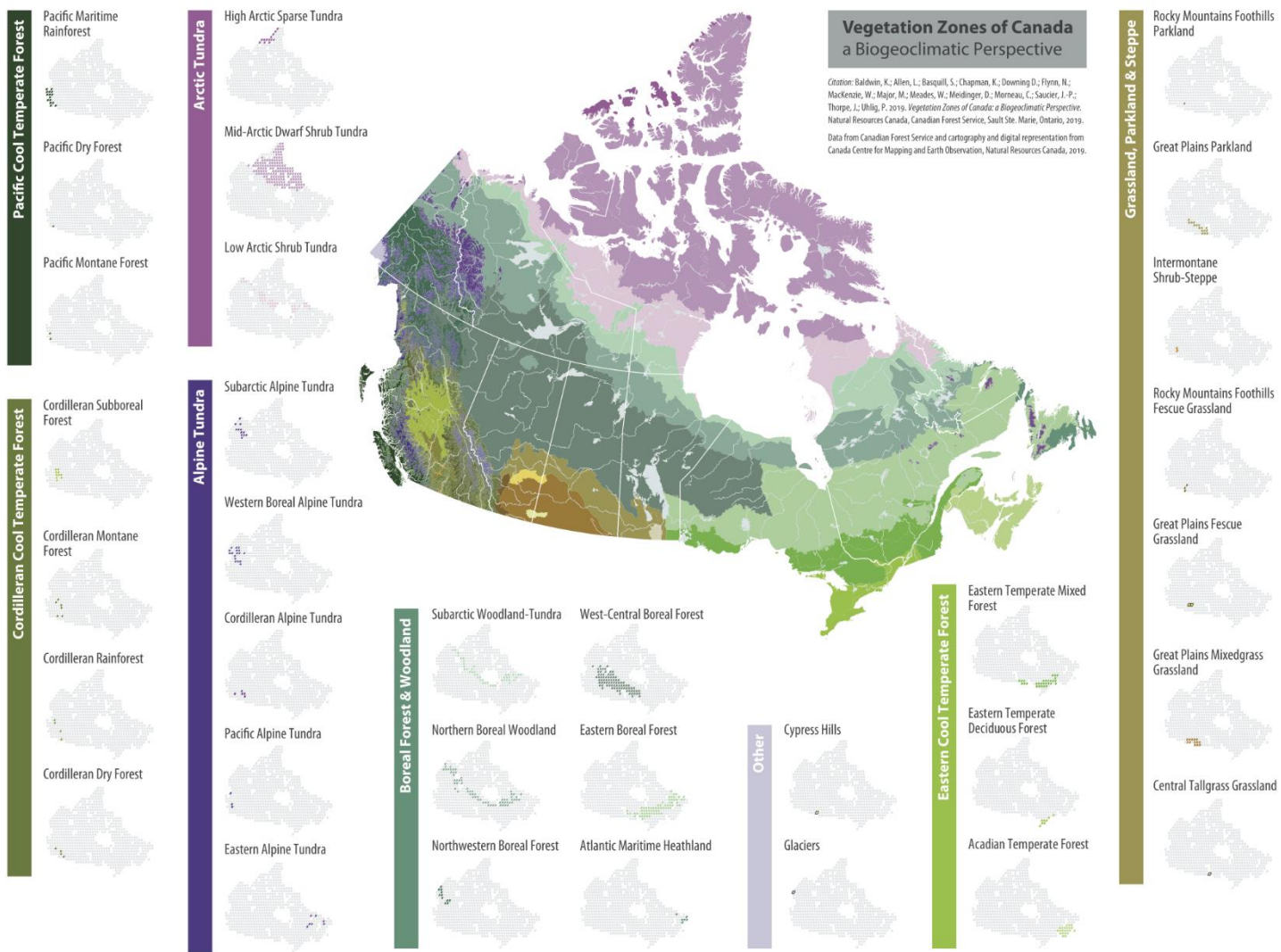


Figure 1. Vegetation zones of Canada (Baldwin et al. 2019a)

1.4 Instructions for interpreting vegetation tables

Vegetation tables are provided in the following report sections as well as in Appendices 3 and 4. These tables compare species' presence and abundance (in rows) among vegetation types (in columns) as calculated from sample plots (shown above each column) of each vegetation type.

The vegetation tables list the scientific names of species on the left side and the common species names on the right (see Baldwin et al. 2019b for species name conventions). Species are arranged alphabetically within strata: tree, shrub, herb & dwarf shrub (which also includes ferns, lycopods and graminoids), and moss & lichen (which also includes liverworts and hornworts). The minimum threshold of species presence for inclusion (typically 20%, but sometimes different) is provided in each table's header information.

The tables use symbols that simultaneously display both a species' presence (i.e., the percentage of plots in which a species was found) and abundance (i.e., the average cover in plots where the species was present). Symbol colour or shape, black, grey or asterisk, indicates the presence of a species:

Symbol colour/ shape	Presence	
asterisk	*	5.0 – 30.0%
grey	■	30.1 – 50.0%
black	■	≥ 50.1%

The number of symbols in each cell indicates the abundance of a species:

Symbol number	Abundance
0	absent
1	< 1.0%
2	1.0 – 3.0 %
3	3.1 – 10.0%
4	10.1 – 25.0%
5	25.1 – 60.0%
6	≥ 60.1%

As an example, *** in a cell indicates that a species was present in 5-30% of the plots, because the symbol colour/shape is an asterisk(s), and where that species was present, it occurred with an abundance of 3-10%, because the number of symbols is three. Where the symbol colour/shape is the same among vegetation types (e.g., black), but the number of symbols differs, the species had similar presence, but different abundance. Conversely, where the symbol/colour differs (e.g., black vs. grey vs. asterisk), but the number of symbols is the same, species' presence differed among the vegetation types, but in the plots in which it occurred, it did so at similar abundance.

Occasionally a species may be unique to a particular vegetation type, but usually it is the presence and abundance of a group of species that distinguishes among vegetation types. Therefore, in order to understand the vegetation type, the user should look at differences in presence and abundance of species within and among the types shown in a table.

2.0 Eastern North American Boreal Forest, M495

2.1 Macrogroup summary

The factsheet for M495 (Baldwin et al. 2017) is available at cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications. The abstract follows.

M495 describes upland boreal forests and woodlands in eastern Canada, ranging from southeastern Manitoba to Atlantic Canada (Figure 2). Forest canopies can be evergreen coniferous, cold-deciduous broad-leaved, 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.

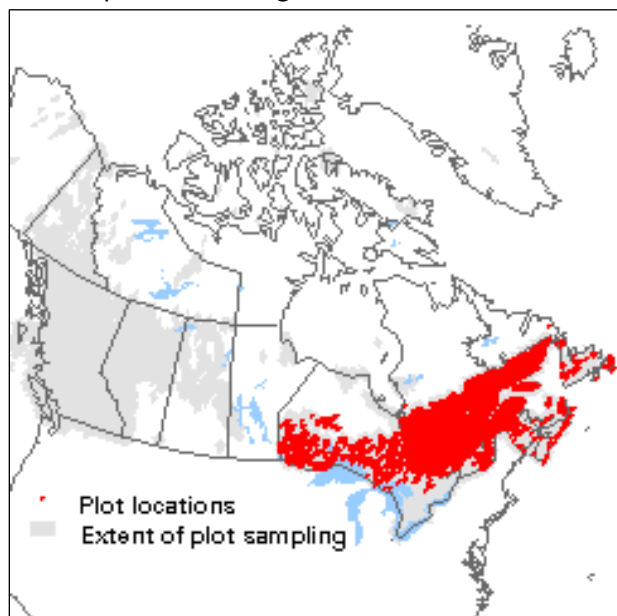


Figure 2. Plot distribution map for M495 [Eastern North American Boreal Forest]. Although M495 also describes forests in eastern Manitoba, there were no plot data available for analysis. Note that the extent of plot sampling in Quebec corresponds to plots currently classified in the CNVC (south of 52°N); M495 is likely present to some extent up to 54°N in Quebec.

Dominant tree species include balsam fir (*Abies balsamea*), black spruce (*Picea mariana*), paper birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), white spruce (*Picea glauca*) 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 understories 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 ashes (*Sorbus* spp.), mountain maple (*Acer spicatum*), creeping snowberry (*Gaultheria hispidula*), yellow clintonia (*Clintonia borealis*), northern starflower (*Lysimachia borealis*), wild sarsaparilla (*Aralia nudicaulis*) and red-stemmed feathermoss (*Pleurozium schreberi*).

The M495 range 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 late Pleistocene glaciation; soils are mostly Podzols, Brunisols and Luvisols developed in glacial surficial materials.

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].

2.2 Subtype distinctions between CM495a [Atlantic Boreal Forest] and CM495b [Ontario – Quebec Boreal Forest]

Two subtypes describe characteristics of vegetation floristics and species dominance in M495 that partly reflect variation in climate-driven disturbance regimes. Stand-replacing fire and eastern spruce budworm (*Choristoneura fumiferana*) outbreaks are the predominant modes of natural disturbance in these forests. Although both disturbance modes occur throughout the range of these forests, in general, fire frequency decreases eastward as the increasingly maritime climate creates more humid environmental conditions. With less frequent fire, the incidence of late-seral stands dominated by balsam fir (*Abies balsamea*) increases, and eastern spruce budworm outbreaks, windthrow and other gap-forming processes become the primary agents of disturbance. Each disturbance mode creates characteristic patterns of stand dynamics, affecting stand structure, overstory dominance and overall species composition. The relative frequency and intensity of these disturbance modes is conceptualized by the subtype distinctions.

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 (Thompson et al. 2003). Stand dynamics tend to reflect a relatively greater importance of gap-generating disturbances, particularly cyclical outbreaks of eastern spruce budworm and, in some areas, hemlock looper (*Lambdina fiscellaria fiscellaria*). In the absence of fire, the moss layer, made up primarily of feathermosses, can become increasingly thick and, over time, lead to greater peat moss (*Sphagnum* spp.) development, even on slopes (Table 3). Wood ferns (*Dryopteris* spp.), common wood-sorrel (*Oxalis montana*), three-lobed whipwort (*Bazzania trilobata*) and staircase moss (*Hylocomium splendens*) also tend to be more abundant in the understory.

By contrast, CM495b [Ontario – Quebec Boreal Forest] describes forests more typical of a drier, continental climate with vegetation characteristics reflecting greater frequency of stand-replacing fire. Jack pine (*Pinus banksiana*) and trembling aspen (*Populus tremuloides*) are much more prevalent (Table 3). The late seral species balsam fir (*Abies balsamea*) still occurs, but is rarely dominant unless fire has been absent for a prolonged period, such as in fire refugia. In the shrub layer, mountain maple (*Acer spicatum*), northern bush-honeysuckle (*Diervilla lonicera*), common Labrador tea (*Rhododendron groenlandicum*) and sheep laurel (*Kalmia angustifolia*) occur more frequently and in greater abundance. The moss layer can be continuous, but overall, upland sites do not develop peat mosses (*Sphagnum* spp.) to the same degree evident in forests of CM495a.

Table 3. Comparison of vegetation characteristics for CM495a [Atlantic Boreal Forest] and CM495b [Ontario – Quebec Boreal Forest]. Tree species are totalled for tree and shrub layers. Species with presence $\geq 20\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meaning.

		n Plots	3944	11737	
Layer	Scientific Name		CM495a	CM495b	Common Name
Tree	<i>Abies balsamea</i>		■■■■■	■■■■■	balsam fir
	<i>Picea glauca</i>		■■■■■	■■■■■	white spruce
	<i>Picea mariana</i>		■■■■■	■■■■■	black spruce
	<i>Pinus banksiana</i>			■■■■■	jack pine
	<i>Betula papyrifera</i>		■■■■■	■■■■■	paper birch
	<i>Populus tremuloides</i>		***	■■■■■	trembling aspen
Shrub	<i>Acer spicatum</i>		***	■■■■■	mountain maple
	<i>Alnus incana</i>		***	****	speckled alder
	<i>Alnus viridis</i>		***	****	green alder
	<i>Amelanchier</i> spp.		■■■■■	■■■■■	serviceberries
	<i>Corylus cornuta</i>		***	****	beaked hazelnut
	<i>Diervilla lonicera</i>		***	■■■■■	northern bush-honeysuckle
	<i>Ilex mucronata</i>		***	***	mountain holly
	<i>Kalmia angustifolia</i>		***	■■■■■	sheep laurel
	<i>Prunus pensylvanica</i>		***	***	pin cherry
	<i>Rhododendron groenlandicum</i>		***	■■■■■	common Labrador tea
	<i>Ribes</i> spp.		**	***	currants
	<i>Rubus idaeus</i>		***	***	red raspberry
	<i>Salix</i> spp.		***	■■■■■	willows
	<i>Sorbus americana</i> + <i>S. decora</i>		■■■■■	■■■■■	mountain-ashes
	<i>Vaccinium angustifolium</i>		■■■■■	■■■■■	early lowbush blueberry
<i>Vaccinium myrtilloides</i>		■■■■■	■■■■■	velvet-leaved blueberry	
<i>Viburnum nudum</i>		***	***	wild raisin	
Herb & dwarf shrub	<i>Aralia nudicaulis</i>		■■■■■	■■■■■	wild sarsaparilla
	<i>Carex</i> spp.		■■■■■	■■■■■	sedges
	<i>Clintonia borealis</i>		■■■■■	■■■■■	yellow clintonia
	<i>Coptis trifolia</i>		■■■■■	■■■■■	goldthread
	<i>Cornus canadensis</i>		■■■■■	■■■■■	bunchberry
	<i>Dryopteris spinulosa</i> complex		■■■■■	***	wood ferns
	<i>Eurybia macrophylla</i>		**	***	large-leaved aster
	<i>Gaultheria hispidula</i>		■■■■■	■■■■■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>		**	**	common oak fern
	<i>Linnaea borealis</i>		■■■■■	■■■■■	twinflower
	<i>Lycopodium annotinum</i>		***	***	stiff clubmoss
	<i>Lycopodium obscurum</i>		**	**	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>		■■■■■	■■■■■	northern starflower
	<i>Maianthemum canadense</i>		■■■■■	■■■■■	wild lily-of-the-valley
	<i>Oxalis montana</i>		■■■■■	***	common wood-sorrel
	<i>Pteridium aquilinum</i>		***	***	bracken fern
<i>Rubus pubescens</i>		***	***	dwarf raspberry	
<i>Streptopus lanceolatus</i>		**	**	rose twisted-stalk	
Moss & lichen	<i>Bazzania trilobata</i>		■■■■■	**	three-lobed whipwort
	<i>Cladina</i> spp. + <i>Clad</i> spp.		■■■■■	■■■■■	reindeer + clad lichens
	<i>Dicranum</i> spp.		■■■■■	■■■■■	broom mosses
	<i>Hylocomium splendens</i>		■■■■■	■■■■■	stairstep moss
	<i>Pleurozium schreberi</i>		■■■■■	■■■■■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.		■■■■■	■■■■■	haircap mosses
	<i>Ptilium crista-castrensis</i>		■■■■■	■■■■■	knight's plume moss
<i>Sphagnum</i> spp.		■■■■■	■■■■■	peat mosses	

2.3 Floristic distinctions from other Macrogroups

Although M495 Associations primarily occur within the Eastern Boreal Forest vegetation zone (Figure 1), individual stands may occur outside this area on sites that are, for example, warmer, cooler, drier or moister than normal for the zone in which they are located (Figure 3). For instance, although none of New Brunswick lies within the Eastern Boreal Forest vegetation zone, there are several M495 Associations that occur in New Brunswick (Appendix 1), usually in the northern part of the province at higher elevations. Conversely, Associations classified to other Macrogroups may range into the Eastern Boreal Forest vegetation zone. The classification of plots to Associations and of Associations to Macrogroups is based on diagnostic indicator plant species related to ecological factors; it is the vegetation composition of the plot (and Association), rather than its geocoordinates, that determines its classification. In the descriptions that follow, **species indicative of M495 are in bold font**.

2.3.1 M496 West-Central North American Boreal Forest

In northwestern Ontario and eastern Manitoba, forests are classified to M495, rather than M496 [West-Central North American Boreal Forest] when they have greater frequency and abundance of diagnostic indicator species of CM495b [Ontario – Quebec Boreal Forest] than of CM496a [Central Boreal Forest] (Appendix 3, Table 1). In this area of transition between the Eastern Boreal Forest and West-Central Boreal Forest vegetation zones (Figure 1), the species that are most strongly indicative of CM495b include **balsam fir (*Abies balsamea*)** in the tree and shrub layers, **mountain maple (*Acer spicatum*)**, **beaked hazelnut (*Corylus cornuta*)**, **northern bush-honeysuckle (*Diervilla lonicera*)** and **early lowbush blueberry (*Vaccinium angustifolium*)** in the shrub layer, and **yellow clintonia (*Clintonia borealis*)**, **large-leaved aster (*Eurybia macrophylla*)** and **wild lily-of-the-valley (*Maianthemum canadense*)** in the herb and dwarf shrub layer.

2.3.2 M179 North American Northern Boreal Woodland

Northward, the Eastern Boreal Forest vegetation zone transitions to Northern Boreal Woodland (Figure 1), and M495 forests intergrade with the woodlands and forests of M179 [North American Northern Boreal Woodland]. Associations in M179 typically have more open tree layers, often with shorter trees (i.e., woodland structure). Diagnostic species of M179 include glandular birch (*Betula glandulosa*), shrubby cinquefoil (*Dasiphora fruticosa*) and the ericaceous species bog bilberry (*Vaccinium uliginosum*), red bearberry (*Arctous rubra*), lingonberry (*V. vitis-idaea*), Lapland rosebay (*Rhododendron lapponicum*) and black crowberry (*Empetrum nigrum*; Appendix 3, Table 2). M179 woodlands tend to have greater overall cover of reindeer (*Cladina* spp.) and clad (*Cladonia* spp.) lichens as well.

Compared to M179, M495 has greater frequency and abundance of the tree species **balsam fir (*Abies balsamea*)**, **paper birch (*Betula papyrifera*)** and **jack pine (*Pinus banksiana*)**, and more **mountain maple (*Acer spicatum*)**, **northern bush-honeysuckle (*Diervilla lonicera*)**, **sheep laurel (*Kalmia angustifolia*)**, **mountain-ashes (*Sorbus* spp.)** and **blueberries (*Vaccinium angustifolium* and *V. myrtilloides*)** in the shrub layer. In the herb and dwarf shrub layer, M495 stands overall have more **wild sarsaparilla (*Aralia nudicaulis*)**, **yellow clintonia (*Clintonia borealis*)**, **twinfleur (*Linnaea borealis*)**, **northern starflower (*Lysimachia borealis*)** and **wild lily-of-the-valley (*Maianthemum canadense*)**. In the moss and lichen layer, **stairstep moss (*Hylocomium splendens*)** tends to be more prominent.

2.3.3 CM014 Eastern North American Temperate Hardwood – Conifer Forest and CM744 Acadian Temperate Forest

To the south, the Eastern Boreal Forest vegetation zone transitions to the Eastern Temperate Mixed Forest, or in Cape Breton, the southern part of the Gaspé Peninsula and adjacent New Brunswick, to the Acadian Temperate Forest (Figure 1). M495 forests are distinguished from the temperate Macrogroups characteristic of these vegetation zones, CM014 [Eastern North American Temperate Hardwood – Conifer Forest] and CM744 [Acadian Temperate Forest], respectively, by greater frequency and abundance of the tree species **black spruce (*Picea mariana*)** and **jack pine (*Pinus banksiana*)**, the shrub species **common Labrador tea (*Rhododendron groenlandicum*)**, **blueberries (*Vaccinium angustifolium* and *V. myrtilloides*)**, the dwarf shrub **creeping snowberry (*Gautheria hispidula*)** and by greater moss and lichen layer abundance of **feathermosses, peat mosses (*Sphagnum* spp.)** and **reindeer (*Cladina* spp.)** and **clad (*Cladonia* spp.)** lichens (Appendix 3, Table 3). M495 forests are further distinguished by the near absence (i.e., <5% overstory cover) of temperate tree species such as red maple (*Acer rubrum*), sugar maple (*A. saccharum*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), eastern hop-hornbeam (*Ostrya virginiana*), red spruce (*Picea rubens*), red pine (*Pinus resinosa*), eastern white pine (*P. strobus*), large-toothed aspen (*Populus grandidentata*), black cherry (*Prunus serotina*), northern red oak (*Quercus rubra*) and eastern hemlock (*Tsuga canadensis*). M495 stands typically lack the shrub species striped maple (*A. pensylvanicum*), Canada fly-honeysuckle (*Lonicera canadensis*) and hobblebush (*Viburnum lantanoides*), and in the herb and dwarf shrub layer, trilliums (*Trillium* spp.).

2.3.4 M299 North American Boreal Conifer Poor Swamp and M300 North American Boreal Flooded & Rich Swamp Forest

Throughout the range of the Eastern Boreal Forest vegetation zone (Figure 1), wet forests and treed wetlands (i.e., azonal conditions) are distinguished from the predominantly zonal upland forests (e.g., M495). These wet forests and treed wetlands are classified in M299 [North American Boreal Conifer Poor Swamp], within Groups CG0016 [Atlantic Boreal Black Spruce – Balsam Fir Poor – Intermediate Treed Wetland] or CG0019 [Ontario – Quebec Boreal Black Spruce Poor – Intermediate Treed Wetland], or M300 [North American Boreal Flooded & Rich Swamp Forest], within Groups CG0018 [Atlantic Boreal Rich Treed Wetland] or CG0021 [Ontario – Quebec Boreal Rich Treed Wetland]. Compared to these wet forests and woodlands, M495 forests have greater cover of the tree species **jack pine (*Pinus banksiana*)** and **trembling aspen (*Populus tremuloides*)**, and less tamarack (*Larix laricina*) and balsam poplar (*P. balsamifera*). In the shrub layer, M495 Associations have more **northern bush-honeysuckle (*Diervilla lonicera*)** and less leatherleaf (*Chamaedaphne calyculata*) and in the herb and dwarf shrub layer, they have more **large-leaved aster (*Eurybia macrophylla*)** and lower abundance of sedges (*Carex* spp.), horsetails (*Equisetum* spp.), three-leaved false Solomon's seal (*Maianthemum trifolium*), cloudberry (*Rubus chamaemorus*) and small cranberry (*Vaccinium oxycoccos*; Appendix 3, Table 4). M495 Associations also have less peat moss (*Sphagnum* spp.) cover.

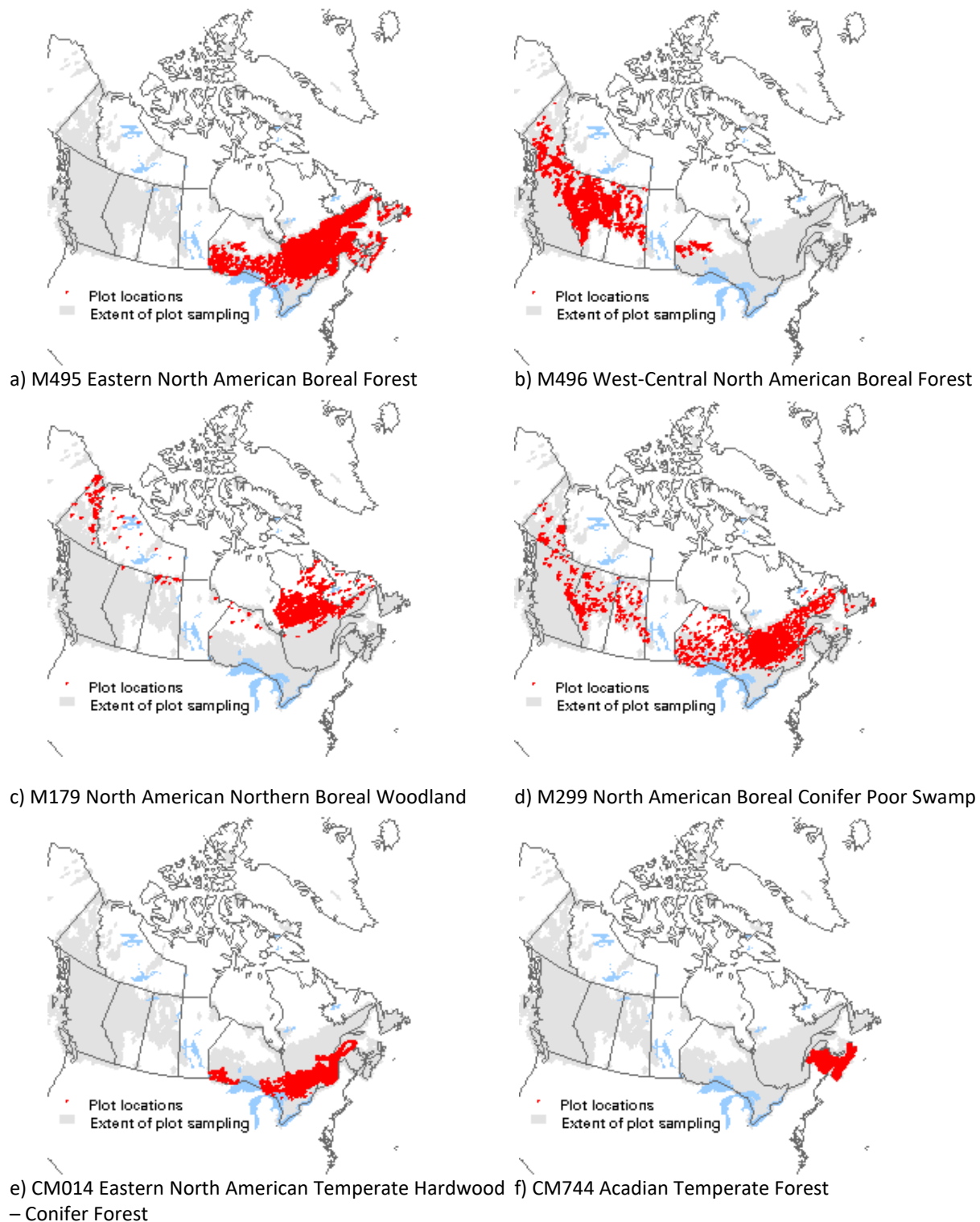
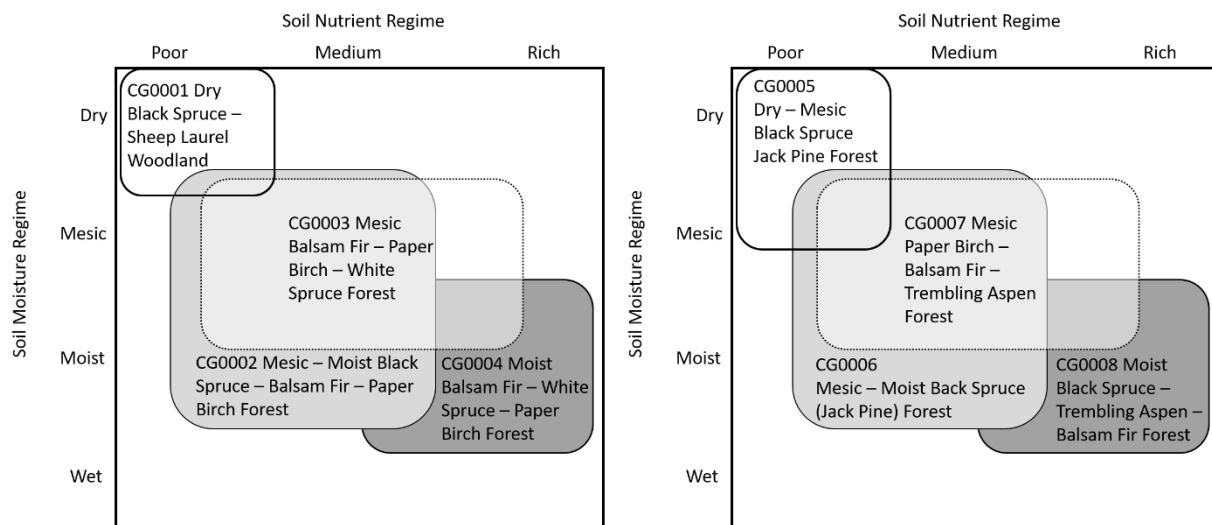


Figure 3. Plot distribution maps for boreal upland forests: a) M495 [Eastern North American Boreal Forest], b) M496 [West-Central North American Boreal Forest] and c) M179 [North American Northern Boreal Woodland]; boreal wetland forests, d) M299 [North American Boreal Conifer Poor Swamp]; and temperate upland forests, e) CM014 [Eastern North American Temperate Hardwood – Conifer Forest] and f) CM744 [Acadian Temperate Forest]. Note the overlap in distributions between M495 (a) and other Macrogroups (b-f). No map is provided for M300 [North American Boreal Flooded & Rich Swamp Forest] as this type has not yet been fully described. Data are not available for Manitoba. Note that the extent of plot sampling in Quebec corresponds to plots currently classified in the CNVC (south of 52°N); M495 is likely present to some extent up to 54°N in Quebec.

2.4 Alliances and Groups of M495

The CNVC has two formal hierarchy levels between Macrogroup, and the finest-scale unit, Association. These units, Alliance and Group, are aggregations of Associations based on ecological criteria (Table 1). Alliances are aggregations of Associations at a local to subregional scale having similar overstory and understory vegetation conditions. They typically occupy a broader geographic range and a slightly broader range of edaphic conditions than any constituent Association. For M495, Associations have been aggregated into eight Alliances within CM495a [Atlantic Boreal Forest] and 10 Alliances within CM495b [Ontario – Quebec Boreal Forest] (Appendix 4, Table 1). Vegetation summaries for Alliances are provided in Appendix 4 (Tables 2 and 3). Groups are aggregations of Alliances at a local to subregional scale that reflect broader species combinations and edaphic conditions. Alliances have been aggregated into four Groups for each of CM495a and CM495b (Figure 4). Vegetation summary tables for Groups are provided in Appendix 4 (Tables 4 and 5). Alliances and Groups are beyond the scope of this report and are not discussed further.



CM495a Atlantic Boreal Forest

CM495b Ontario – Quebec Boreal Forest

Figure 4. Conceptual edatopic grids of Groups arranged along gradients of relative soil moisture and nutrient regime for CM495a [Atlantic Boreal Forest] and CM495b [Ontario – Quebec Boreal Forest].

3.0 Conceptual framework for Associations of M495

Associations represent repeating combinations of overstory and understory vegetation conditions that are ecologically meaningful. Figure 5 shows the 55 Associations of M495 placed in a conceptual framework of three generalized overstory classes (Hardwood, Mixedwood and Conifer) and six understory classes (Lichen, Ericaceous Shrub & Feathermoss, Feathermoss & Peat Moss, Mesophytic Herb or Feathermoss, Mesic Rich Shrub & Herb and Moist Rich Shrub & Herb). ‘Feathermosses’ refers to: red-stemmed feathermoss (*Pleurozium schreberi*), stairstep moss (*Hylocomium splendens*) and/or knight’s plume moss (*Ptilium crista-castrensis*). ‘Ericaceous’ refers to shrub species of the family Ericaceae. ‘Mesophytic’ plant species are those adapted to average moisture conditions; here we use the term broadly to describe ubiquitous, not particularly moisture- or nutrient-demanding, species.

Figure 5 also shows the membership of Associations to Macrogroup subtype, CM495a [Atlantic Boreal Forest] (dark grey) or CM495b [Ontario – Quebec Boreal Forest] (light grey), and the province(s) or region(s) from which the Associations are described, Ontario (yellow), Quebec (green), insular Newfoundland (orange) and Maritimes provinces (blue). The prevalence of certain overstory types differs among provinces/regions and between subtypes; these differences are explained in **3.1 Overstory classes**. The six understory classes occur in both subtypes, but have slightly different indicator species; these differences are discussed in **3.2 Understory classes**. Within certain combinations of overstory and understory classes, there are multiple Associations, sometimes even from one jurisdiction. Vegetation and ecological characteristics that distinguish these Associations are explained in the following sections. Note that Association names are provided in Appendix 1. Appendix 2 includes one-page summary descriptions for each Association.

Overstory		Understory						
		Lichen	Ericaceous Shrub & Feathermoss	Feathermoss & Peat Moss	Mesophytic Herb or Feathermoss	Mesic Rich Shrub & Herb	Moist Rich Shrub & Herb	
Hardwood	<i>B. papyrifera</i> and/or <i>P. tremuloides</i>		CNVC00269			CNVC00239	CNVC00242	
			CNVC00237		CNVC00238	CNVC00315	CNVC00349 CNVC00316	
	<i>P. tremuloides</i> (<i>P. balsamifera</i>)						CNVC00241	
Mixedwood	<i>P. tremuloides</i> and/or <i>B. papyrifera</i> with <i>P. banksiana</i> and/or <i>P. mariana</i>				CNVC00213	CNVC00215	CNVC00272	
	<i>B. papyrifera</i> with <i>P. mariana</i> (<i>A. balsamea</i>)		CNVC00214	CNVC00270	CNVC00218 CNVC00234 CNVC00344	CNVC00216		
	<i>A. balsamea</i> with <i>B. papyrifera</i>				CNVC00231 CNVC00232 CNVC00233	CNVC00235 CNVC00311	CNVC00273 CNVC00274	
Conifer	<i>P. banksiana</i> (<i>P. mariana</i>)	CNVC00201	CNVC00207				CNVC00294	
		CNVC00245	CNVC00209					
	<i>P. mariana</i>	CNVC00204	CNVC00208	CNVC00276	CNVC00350			CNVC00295
		CNVC00246	CNVC00211					
		CNVC00205	CNVC00338 CNVC00307					
	<i>P. mariana</i> with <i>A. balsamea</i>		CNVC00217	CNVC00277	CNVC00351			CNVC00296
			CNVC00292					
<i>A. balsamea</i> and/or <i>P. glauca</i>		CNVC00226	CNVC00278	CNVC00220	CNVC00222	CNVC00256 CNVC00225 CNVC00310	CNVC00297 CNVC00348	
		CNVC00309						

Legend

Ontario
Quebec
Newfoundland (island)
Maritimes
CM495a Atlantic Boreal Forest
CM495b Ontario-Quebec Boreal Forest

Figure 5. Conceptual framework of M495 Associations organized by overstory and understory vegetation classes. The Macrogroup subtype is shown in grey shades and the jurisdictions in which there are sample plots are shown in yellow (Ontario), green (Quebec), orange (Newfoundland and Labrador) and blue (Maritimes region – includes New Brunswick, and/or Nova Scotia and/or Prince Edward Island).

3.1 Overstory classes

3.1.1 Hardwood

Nine Associations in M495 are hardwood types (Figure 5); they typically have less than 5% cover of conifer species in the overstory, but may have as much as 15% (Table 4). These Associations are usually dominated by paper birch (*Betula papyrifera*) and/or trembling aspen (*Populus tremuloides*). On circum-mesic sites, for both the hardwood and mixedwood overstory classes, these two species have generally been treated as ecologically interchangeable to avoid the proliferation of Associations without strong ecological distinction. *B. papyrifera*, however, is usually the more abundant species on moist or nutrient-poor sites. Both of these species occur throughout the range of the Eastern Boreal Forest vegetation zone, but *P. tremuloides* is more characteristic of the west, where the climate is drier and fires are more frequent (and thus of CM495b [Ontario – Quebec Boreal Forest]). *B. papyrifera* is more prevalent in the eastern part of the range (and of CM495a [Atlantic Boreal Forest]).

In addition to *B. papyrifera* and *P. tremuloides*, the CNVC also recognizes additional hardwood conditions in M495. Balsam poplar (*Populus balsamifera*) dominates or codominates an Association that occurs in Ontario and Quebec (CNVC00241 [*Populus tremuloides* (*P. balsamifera*) / *Alnus incana* / *Eurybia macrophylla*]). In the CNVC, although yellow birch (*Betula alleghaniensis*) is generally considered a temperate species (Appendix 3, Table 3), its occurrence on the island of Newfoundland is not accompanied by other temperate overstory or understory species. Consequently, Associations on the island that are dominated or codominated by *B. alleghaniensis* (i.e., CNVC00315 [*Betula papyrifera* – *B. alleghaniensis* / *Dryopteris carthusiana*] and the mixedwood CNVC00311 [*Abies balsamea* (*Betula alleghaniensis*) / *Dryopteris carthusiana*]) are treated as boreal, and thus included in M495. Because of the absence of other temperate indicator species, there are no temperate forest Associations recognized in insular Newfoundland.

The hardwood Associations of M495 are early seral forests. They develop after stand-replacing fire or harvesting, or in the case of CNVC00316 [*Betula papyrifera* / *Alnus viridis* / *Solidago macrophylla*], form a pioneer community on previously unvegetated sites. *Betula papyrifera* (Uchytel 1991b), *Populus tremuloides* (Howard 1996) and *P. balsamifera* (Harris 1990) are well-adapted to disturbance; they produce abundant, light, wind-dispersed seeds that can readily colonize mineral soil seedbeds. If their root systems survive disturbance, these species can also reproduce vegetatively – *B. papyrifera* from stump sprouts and *Populus* spp. from root suckers. All three species grow rapidly in full-light conditions but are intolerant of shade so do not replace themselves in a stand without further disturbance. They are usually succeeded by shade-tolerant conifers, especially balsam fir (*Abies balsamea*), forming mid-seral mixedwoods over time, unless further disturbed.

Of the nine hardwood Associations in M495, four occur in Ontario, five in Quebec and four in Newfoundland (Figure 5). In the Maritime provinces, similar early seral hardwood forests include a variety of temperate understory species and are instead classified within Macrogroup CM014 [Acadian Temperate Forest] (Appendix 3, Table 3).

Table 4. Vegetation summary for hardwood Associations of M495 [Eastern North American Boreal Forest]. Association names are provided in Appendix 1, factsheet summaries in Appendix 2. Associations of CM495a [Atlantic Boreal Forest] have codes highlighted in dark grey; those of CM495b [Ontario – Quebec Boreal Forest] in light grey. Species with presence $\geq 35\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

		Newfoundland	Quebec	Ontario								
		n Plots	3	157	263	1480	315	93	6	3	10	
Layer	Scientific Name	CNVC 00269	CNVC 00237	CNVC 00238	CNVC 00239	CNVC 00241	CNVC 00242	CNVC 00315	CNVC 00316	CNVC 00349	Common Name	
Tree	<i>Abies balsamea</i>		■■■	■■■	■■■	■■■■	■■■	■■■	■■■■	■■■■	balsam fir	
	<i>Acer rubrum</i>		***	***			***		■	■	red maple	
	<i>Betula alleghaniensis</i>						***	■■■■■			yellow birch	
	<i>Betula papyrifera</i>	■■■■■	■■■■■	■■■	■■■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch	
	<i>Picea glauca</i>	■■■	***	■■■	■■■	***	■■■	■			white spruce	
	<i>Picea mariana</i>	■■	■■■	■■■	■■■	■■■	■■■				black spruce	
	<i>Populus balsamifera</i>					■■■■■					balsam poplar	
	<i>Populus tremuloides</i>		■■■	■■■■■	■■■■■	■■■■■	■■■■■				trembling aspen	
	<i>Prunus pensylvanica</i>		***	■■■	■■■	■■■	***	■■■	***	■	■	pin cherry
Shrub	<i>Abies balsamea</i>	■■■■	■■■■	■■■	■■■■	■■■	■■■■	■■■■	■■■	■■■	balsam fir	
	<i>Acer rubrum</i>		***	***	**	***	***		■■■	■■■	red maple	
	<i>Betula papyrifera</i>	■■■■	■■■	■■■	■■■	■■■	■■■		■	■	paper birch	
	<i>Picea glauca</i>	■■■	***	■■■	■■■	***	■■■		■	■	white spruce	
	<i>Picea mariana</i>	■■■	■■■	■■■	■■■	■■■	■■■				black spruce	
	<i>Populus balsamifera</i>					■■■					balsam poplar	
	<i>Populus tremuloides</i>	■	■■■	■■■	■■■	■■■	***				trembling aspen	
	<i>Prunus pensylvanica</i>		■■■	■■■	■■■	■■■	***	■■■				pin cherry
	<i>Acer spicatum</i>	■■	***	■■■	■■■■■	■■■■	■■■■	■■■	■■■■■	■■■■■		mountain maple
	<i>Alnus incana</i>		***	***	***	■■■■■	■■■■■					speckled alder
	<i>Alnus viridis</i>	■■■	■■■■	■■■	****	****	***		■■■	■■■	green alder	
	<i>Amelanchier spp.</i>	■	■■■	■■■	■■■	■■■	■■■					serviceberries
	<i>Cornus stolonifera</i>			**	***	■■■	**		■	■		red-osier dogwood
	<i>Corylus cornuta</i>		***	***	■■■■	■■■	■■■		■	■		beaked hazelnut
	<i>Diervilla lonicera</i>	■■■■■	***	■■■■	■■■■	■■■	■■■					northern bush-honeysuckle
	<i>Ilex mucronata</i>		■■■	***	***		■■■		■	■		mountain holly
	<i>Kalmia angustifolia</i>		■■■■	■■■■	***	***	***		■	■		sheep laurel
	<i>Rhododendron groenlandicum</i>		■■■■	■■■	***	***	***					common Labrador tea
	<i>Ribes spp.</i>		■	■	■■■	■■■	■■■	■■■	■	■	■	currants
	<i>Rosa acicularis</i>			**		■						prickly rose
	<i>Rubus idaeus</i>		***	***	■■■	■■■	■■■	■				red raspberry
	<i>Salix spp.</i>		■■■	■■■	***	■■■	■■■					willows
	<i>Sambucus racemosa</i>		**	**	***	**	■	■				red elderberry
<i>Sorbus americana + S. decora</i>	■■	■■■	■■■	■■■	■■■	■■■	■				mountain-ashes	
<i>Vaccinium angustifolium</i>	■	■■■	■■■	■■■	■■■	**	■		■	■	early lowbush blueberry	
<i>Vaccinium myrtilloides</i>	■■■■	■■■	■■■	■■■	■■■	***	■■■				velvet-leaved blueberry	
<i>Viburnum nudum</i>		***	■■■	■■■	■■■	■■■	■■■■		■	■	wild raisin	
Herb & dwarf shrub	<i>Actaea rubra</i>	■			**	■					red baneberry	
	<i>Aralia nudicaulis</i>	■■■	■■■	■■■	■■■	■■■	■■■				wild sarsaparilla	
	<i>Athyrium filix-femina</i>			**	***	■■■	■■■				common lady fern	
	<i>Carex spp.</i>		**	**	■	■	■■■		■■■	■■■	sedges	
	<i>Chamerion angustifolium</i>	■	**	■	**	■	**				fireweed	
<i>Clintonia borealis</i>	■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	yellow clintonia		

Layer	Scientific Name	CNVC 00269	CNVC 00237	CNVC 00238	CNVC 00239	CNVC 00241	CNVC 00242	CNVC 00315	CNVC C00316	CNVC 00349	Common Name	
Herb & dwarf shrub	<i>Coptis trifolia</i>	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■		■ ■	■ ■	goldthread	
	<i>Cornus canadensis</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■			bunchberry	
	<i>Dryopteris spinulosa</i> complex		■ ■	***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■	■ ■		wood fern
	<i>Equisetum</i> spp.		**	**	***	■ ■ ■ ■	■ ■ ■ ■					horsetail
	<i>Eurybia macrophylla</i>		***	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■					large-leaved aster
	<i>Galearis rotundifolia</i>											small round-leaved orchid
	<i>Galium triflorum</i>	■ ■		**	**	■ ■	■ ■	***		■ ■	■ ■	three-flowered bedstraw
	<i>Gaultheria hispidula</i>		■ ■ ■ ■	**	**	**	**					creeping snowberry
	<i>Gymnocarpium dryopteris</i>		**	**	■ ■	■ ■	■ ■	■ ■		■ ■	■ ■	common oak fern
	<i>Huperzia lucidula</i>		***		**	**	**	***				shining firmoss
	<i>Linnaea borealis</i>	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■		■ ■	■ ■	twinflower
	<i>Lycopodium annotinum</i>	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	***	■ ■ ■ ■ ■ ■	■ ■ ■ ■			stiff clubmoss
	<i>Lycopodium clavatum</i>	■ ■	***	■ ■	**	**	**	***				running clubmoss
	<i>Lycopodium obscurum</i>		■ ■	■ ■	■ ■	**	**	■ ■	**			flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	northern starflower
	<i>Maianthemum canadense</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	wild lily-of-the-valley
	<i>Mitella nuda</i>			**	**	■ ■ ■ ■	**		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	naked mitrewort
	<i>Monotropa uniflora</i>	■ ■	**	**	**		**	**	■ ■	■ ■	■ ■	Indian pipe
	<i>Orthilia secunda</i>	■ ■		**	**	**						one-sided wintergreen
	<i>Oxalis montana</i>		***	**	■ ■ ■ ■	***	■ ■ ■ ■	■ ■ ■ ■				common wood-sorrel
	<i>Petasites frigidus</i>			**		■ ■	**					arctic sweet coltsfoot
	<i>Poaceae</i>		**	***	***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■				grass family
	<i>Pteridium aquilinum</i>	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	***	***				bracken fern
	<i>Rubus pubescens</i>	**	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■		■ ■ ■ ■	■ ■ ■ ■	dwarf raspberry
	<i>Solidago macrophylla</i>	■ ■ ■ ■	**	**	**	**	**	**		■ ■ ■ ■	■ ■ ■ ■	large-leaved goldenrod
	<i>Solidago rugosa</i>						****			■ ■	■ ■	rough-stemmed goldenrod
	<i>Streptopus lanceolatus</i>		**	■ ■	■ ■	■ ■	■ ■	**	■ ■	■ ■	■ ■	rose twisted-stalk
	<i>Viola</i> spp.		**	**	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	violets
Moss & lichen	<i>Cladina</i> spp. + <i>Clad</i> spp.	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■ ■ ■				reindeer + clad lichens	
	<i>Dicranum</i> spp.	■ ■	■ ■ ■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	broom mosses	
	<i>Hylocomiastrum umbratum</i>							■ ■			shaded wood moss	
	<i>Hylocomium splendens</i>	■ ■ ■ ■	***	***	***	**	***	■ ■	■ ■	■ ■	stairstep moss	
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.	■ ■	**	**	**	■ ■	**					leafy mosses
	<i>Pleurozium schreberi</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.		■ ■	■ ■ ■ ■	■ ■	■ ■	***	■ ■	■ ■	■ ■	■ ■	haircap mosses
	<i>Ptilium crista-castrensis</i>	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■			knight's plume moss
	<i>Rhytidiadelphus loreus</i>							■ ■				lanky moss
	<i>Sphagnum</i> spp.	■ ■	■ ■ ■ ■	***	***	***	■ ■ ■ ■	■ ■ ■ ■				peat mosses

3.1.2 Mixedwood

There are 16 mixedwood Associations in M495 (Figure 5; Table 5). Seven occur in Ontario, 15 in Quebec, 1 in insular Newfoundland and 1 in the Maritimes region (described from New Brunswick and Nova Scotia). These types all have canopies with at least 5% cover of both a conifer and a hardwood species. In a few situations, conifer-dominated Associations may also have minor (i.e., 5-15%) cover of a hardwood species and are discussed in **3.1.3 Conifer**.

In Figure 5, the mixedwood overstory class is split into three rows according to the conifer species component. Associations containing jack pine (*Pinus banksiana*) and/or black spruce (*Picea mariana*) without balsam fir (*Abies balsamea*) are listed in the top row. Trembling aspen (*Populus tremuloides*) is especially prevalent in these Associations, which typically regenerate after fire or harvesting. *P. banksiana* (Carey 1993) and *P. mariana* (Fryer 2014) rarely survive fire, but they are the most fire-adapted of the eastern boreal conifer species, having serotinous and semi-serotinous seed cones, respectively.

The middle row of the mixedwood class (Figure 5) includes Associations, mainly from Quebec, that have overstories dominated by a combination of paper birch (*Betula papyrifera*) and *P. mariana*, often with a minor component of *A. balsamea*. CNVC00218 [*Pinus banksiana* – *Abies balsamea* – *Betula papyrifera* / *Diervilla lonicera* / *Pleurozium schreberi*] is an exception, as it has an overstory of *P. banksiana* with *A. balsamea* and *B. papyrifera*. *A. balsamea* is a late seral species, with seeds able to germinate and persist on a variety of substrates under a closed canopy because of its shade tolerance (Uchytil 1991a). Its proportion in the canopy thus increases with stand age and seral status. In some cases, stands of these Associations represent the first cohort after fire, but the mixedwood Associations with greater *A. balsamea* content generally represent mid-seral conditions.

Mixedwood Associations that include *A. balsamea* and/or white spruce (*Picea glauca*), with little *P. mariana* content, are in the bottom row of the mixedwood class (Figure 5). *A. balsamea* and *P. glauca* are more nutrient demanding than are *P. banksiana* and *P. mariana*, and these Associations occur on mesic to moist, nutrient-medium to -rich sites. The Associations in this row represent mid-seral conditions. They usually form by succeeding an early seral Association, but sometimes develop when a gap-causing disturbance, such as an insect outbreak, opens up a late seral conifer forest, providing adequate light and substrate for light-seeded hardwoods to become established.

Table 5. Vegetation summary for mixedwood Associations of M495 [Eastern North American Boreal Forest]. Association names are provided in Appendix 1, factsheet summaries in Appendix 2. Associations of CM495a [Atlantic Boreal Forest] have codes highlighted in dark grey; those of CM495b [Ontario – Quebec Boreal Forest] in light grey. Species with presence $\geq 35\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

		Maritimes region																Common Name	
		Newfoundland																	
		Quebec																	
		Ontario																	
		n Plots																	
		282	142	393	84	151	20	807	164	312	309	1049	175	23	119	13	226		
Layer	Scientific Name	CNVC 00214	CNVC 00270	CNVC 00213	CNVC 00215	CNVC 00216	CNVC 00218	CNVC 00231	CNVC 00232	CNVC 00233	CNVC 00234	CNVC 00235	CNVC 00272	CNVC 00273	CNVC 00274	CNVC 00311	CNVC 00344	Common Name	
Tree	<i>Abies balsamea</i>	■■■■	■■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir	
	<i>Betula alleghaniensis</i>		***							***		***			***	■■■■■		yellow birch	
	<i>Betula papyrifera</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch
	<i>Picea glauca</i>	***	■■■■	***	***	■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■	■■■■■	■■■■■	white spruce
	<i>Picea mariana</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce
	<i>Pinus banksiana</i>	■■■■■	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	jack pine
	<i>Populus tremuloides</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	trembling aspen
Shrub	<i>Abies balsamea</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir
	<i>Acer rubrum</i>	***	***	***	■■■■	***	■■■■	■■■■	***	***	■■■■	■■■■		**	***		***	red maple	
	<i>Betula papyrifera</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch
	<i>Picea glauca</i>	***	■■■■	***	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■	■■■■	**	■■■■■	white spruce	
	<i>Picea mariana</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce
	<i>Populus tremuloides</i>	■■■■	***	■■■■	■■■■	■■■■	■■■■	■■■■	**		■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	trembling aspen
	<i>Acer spicatum</i>	***	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■	***	■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	mountain maple
	<i>Alnus incana</i>	***	■■■■	***	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	speckled alder
	<i>Alnus viridis</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	green alder
	<i>Amelanchier spp.</i>	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	serviceberry
	<i>Cornus stolonifera</i>			***	**	***	**	***						***	■■■■	***	■■■■		red-osier dogwood
	<i>Corylus cornuta</i>		**	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	beaked hazelnut
	<i>Diervilla lonicera</i>	■■■■	***	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	northern bush-honeysuckle
	<i>Ilex mucronata</i>	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	mountain holly
	<i>Kalmia angustifolia</i>	■■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	sheep laurel
<i>Lonicera canadensis</i>		**	**	■■■■	■■■■	■■■■	■■■■	**	■■■■	**	■■■■	**	■■■■	■■■■	■■■■	■■■■	■■■■	Canada fly-honeysuckle	
<i>Prunus pensylvanica</i>	■■■■	***	**	**	■■■■	■■■■	**	■■■■	■■■■	■■■■	■■■■	■■■■	**	■■■■	■■■■	■■■■	■■■■	pin cherry	

Layer	Scientific Name	CNVC 00214	CNVC 00270	CNVC 00213	CNVC 00215	CNVC 00216	CNVC 00218	CNVC 00231	CNVC 00232	CNVC 00233	CNVC 00234	CNV C00235	CNVC 00272	CNVC 00273	CNVC 00274	CNVC 00311	CNVC 00344	Common Name		
Shrub	<i>Rhododendron groenlandicum</i>	■■■■	■■■	■■■	**	***	■■	***	***		■■■		■■■	***	***	**	■■■	common Labrador tea		
	<i>Ribes</i> spp.	**	■■	■■■	**	■■■	***	■■■	***	■■■	■■■	■■■	■■■	■■■	■■■	**	**	currants		
	<i>Rosa acicularis</i>			**	**	***	***	***	***			**	■■	***				prickly rose		
	<i>Rubus idaeus</i>	**	***	**	**	***	***	***	***	■■■	***	■■■	■■■	■■■	■■■	■■■	**	**	red raspberry	
	<i>Salix</i> spp.	■■■	***	■■■	***	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■		■■■	willows	
	<i>Sambucus racemosa</i>		**	**		**	***	**	**	■■■	**	**	**	**	**	**	**	**	red elderberry	
	<i>Sorbus americana + S. decora</i>	■■■	■■■	■■	■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■	■■■	mountain-ashes	
	<i>Vaccinium angustifolium</i>	■■■■	■■■	■■■	■■	■■■	■■■	■■■	■■	■■■	**	■■■	**	■■	**	**	**	■■■	early lowbush blueberry	
	<i>Vaccinium myrtilloides</i>	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■■	***	■■	**	■■■		■■■	velvet-leaved blueberry	
	<i>Viburnum edule</i>	**	**	**	***	***		***	**	***	***	**	■■■	■■■	■■■	■■■	**	**	squashberry	
	<i>Viburnum nudum</i>	■■■	■■■	■■■	***	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	**	***	wild raisin	
	Herb & dwarf shrub	<i>Actaea rubra</i>			**	**			**				**	**	■■	**			red baneberry	
<i>Aralia nudicaulis</i>		■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	wild sarsaparilla	
<i>Athyrium filix-femina</i>			***	**	**	***	**	***	**	***	**	***	**	■■■	■■■				common lady fern	
<i>Carex</i> spp.		**	■■■	**	**	**	**	■■	**	■■	**	■■	■■■	■■■	■■■		**	**	sedges	
<i>Chamerion angustifolium</i>		**	**	**	**	**	**	**	**	**	**	**	**	■■	**	**		**	fireweed	
<i>Clintonia borealis</i>		■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	yellow clintonia	
<i>Coptis trifolia</i>		■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	goldthread	
<i>Cornus canadensis</i>		■■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	bunchberry	
<i>Dryopteris spinulosa</i> complex		**	■■■	**	***	■■■	■■	■■	■■	■■■	■■	■■■	***	■■■	■■■	■■■	■■■■■	■■		wood fern
<i>Equisetum</i> spp.		**	***	**	***		***	**	**	**	**	**	**	■■	■■	■■■			horsetails	
<i>Eurybia macrophylla</i>		***	**	■■■	■■■	■■■	■■■	■■■	**			***	■■■	■■■	■■■	■■■	■■■	**	**	large-leaved aster
<i>Fragaria virginiana</i>				**	**			**						■■					wild strawberry	
<i>Galium</i> spp.				*	*	**	***	**					**	■■	■■	■■			bedstraws	
<i>Gaultheria hispidula</i>		■■■	■■■	■■	■■	■■	■■■	**	■■■	■■■	■■■	**	**	■■	**	**	**	■■■	creeping snowberry	
<i>Gymnocarpium dryopteris</i>		**	**	**	**	***	**	**	**	***	**	**	■■	■■	■■■	■■■		**	common oak fern	
<i>Linnaea borealis</i>	■■■	■■	■■■	■■	■■■	■■	■■■	■■■	■■	■■	■■■	■■■	■■	**	■■■	■■	■■	twinflower		

Layer	Scientific Name	CNVC 00214	CNVC 00270	CNVC 00213	CNVC 00215	CNVC 00216	CNVC 00218	CNVC 00231	CNVC 00232	CNVC 00233	CNVC 00234	CNV C00235	CNVC 00272	CNVC 00273	CNVC 00274	CNVC 00311	CNVC 00344	Common Name	
Herb & dwarf shrub	<i>Lycopodium annotinum</i>	■ ■ ■	**	■ ■ ■	**	***	***	■ ■ ■	■ ■	***	■ ■ ■	***	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	**	■ ■ ■	stiff clubmoss	
	<i>Lycopodium clavatum</i>	**		**	■ ■	**	**	**	**	**	**	**	**	***	**		**	running clubmoss	
	<i>Lycopodium obscurum</i>	■ ■	**	■ ■	■ ■	■ ■	**	■ ■	■ ■	**	■ ■	■ ■	**	■ ■	**		■ ■	flat-branched tree-clubmoss	
	<i>Lysimachia borealis</i>	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	northern starflower	
	<i>Maianthemum canadense</i>	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley	
	<i>Mitella nuda</i>			**	**			**		**		***	■ ■ ■	■ ■ ■	***			naked mitrewort	
	<i>Oxalis montana</i>		■ ■ ■	***		■ ■ ■	**	***	■ ■	■ ■ ■ ■	***	■ ■ ■ ■	***	■ ■ ■	■ ■ ■		**	common wood-sorrel	
	<i>Petasites frigidus</i>	***		**	**			**				**	■ ■	**	**			arctic sweet coltsfoot	
	<i>Poaceae</i>	**	***	***	**	***	**	***	**	***	**	***	***	■ ■ ■	■ ■ ■			**	grass family
	<i>Pteridium aquilinum</i>	■ ■ ■	***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	***	***	■ ■ ■ ■	■ ■ ■		***	***		***	bracken fern
	<i>Rubus pubescens</i>		**	**	■ ■	***	**	■ ■	**	**	**	***	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■		**	dwarf raspberry
	<i>Streptopus lanceolatus</i>	**	**	■ ■	■ ■	■ ■	**	■ ■	**	**	**	**	■ ■	■ ■	■ ■	**	**	**	rose twisted-stalk
	<i>Viola</i> spp.	**	**	**	■ ■	■ ■	■ ■	■ ■	**	***	**	**	■ ■	■ ■	■ ■ ■	■ ■ ■			violets
Moss & lichen	<i>Bazzania trilobata</i>	***	**	**	**	**	**	**	■ ■	***	**	**			**	■ ■ ■ ■	**	three-lobed whipwort	
	<i>Cladina</i> spp. + <i>Cladonia</i> spp.	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■		■ ■ ■	reindeer + clad lichens
	<i>Dicranum</i> spp.	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	broom mosses
	<i>Hylocomiastrum umbratum</i>									***						■ ■ ■		shaded wood moss	
	<i>Hylocomium splendens</i>	***	■ ■ ■	■ ■ ■	**	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	**	***	■ ■ ■	■ ■ ■	stairstep moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.	**	**	**	**	**	**	**	**	**	**	**	■ ■	■ ■	■ ■	■ ■ ■	**	**	leafy mosses
	<i>Pleurozium schreberi</i>	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■ ■ ■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.	■ ■ ■	■ ■	■ ■	**	■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■	■ ■	***	■ ■	■ ■	■ ■	■ ■	haircap moss
	<i>Ptilium crista-castrensis</i>	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■	**	■ ■ ■	knight's plume moss
	<i>Rhytidiadelphus loreus</i>																■ ■ ■		lanky moss

Layer	Scientific Name	CNVC 00214	CNVC 00270	CNVC 00213	CNVC 00215	CNVC 00216	CNVC 00218	CNVC 00231	CNVC 00232	CNVC 00233	CNVC 00234	CNV C00235	CNVC 00272	CNVC 00273	CNVC 00274	CNVC 00311	CNVC 00344	Common Name
Moss & lichen	<i>Rhytidiadelphus triquetrus</i>			***	**	***	***	**			**	***	■ ■ ■	**	***	****		electrified cat's-tail moss
	<i>Sphagnum</i> spp.	■ ■ ■	■ ■ ■ ■ ■	***	**	■ ■ ■	■ ■ ■	***	■ ■ ■	■ ■ ■	■ ■ ■	***	***	■ ■ ■ ■ ■	■ ■ ■	***	■ ■ ■	peat mosses

3.1.3 Conifer

More than half of the M495 Associations are coniferous forest types (Figure 5). Of the 30 conifer Associations, 12 occur in Ontario, 15 in Quebec, 10 in insular Newfoundland, 7 in Nova Scotia, 5 in New Brunswick and 1 on Prince Edward Island. These Associations usually have less than 5% cover of any hardwood species, but in a few situations, may include stands with hardwood species cover up to 15%, (e.g., CNVC00208 [*Picea mariana* – *Pinus banksiana* / *Vaccinium angustifolium* / *Pleurozium schreberi*]) (Tables 6 and 7).

The conifer overstory category is split into four rows in Figure 5, according to species dominance. Associations dominated by jack pine (*Pinus banksiana*) are listed in the top row. Black spruce (*Picea mariana*)-dominated Associations with <5% balsam fir (*Abies balsamea*) cover are in the second row. The third row includes Associations with overstories having at least 5% each of *P. mariana* and *A. balsamea*. Associations in the fourth row are dominated by *A. balsamea* and/or white spruce (*Picea glauca*).

The top row is Associations dominated by *P. banksiana*. These types occur in Ontario and Quebec and typically establish after fire or harvesting. *P. banksiana* is an early seral species that normally requires fire to regenerate, so is only prevalent where it is supported by the relatively more frequent fires in the western part of the range of the Eastern Boreal Forest vegetation zone.

Associations dominated by *P. mariana*, in the second conifer row of Figure 5, occur throughout the range of the Eastern Boreal Forest vegetation zone. These Associations typically establish after fire or harvesting, like those in the first row, but because *P. mariana* is more tolerant of shade than *P. banksiana*, it can replace itself in a stand over time, either by seed or vegetatively, by layering. It sometimes succeeds *P. banksiana*.

Associations with overstories dominated by *P. mariana* and *A. balsamea* (the third conifer row of Figure 5) also occur throughout the range of the Eastern Boreal Forest vegetation zone. Proportions of *P. mariana* tend to be greater on more edaphically limited sites (i.e., dry, very moist or nutrient limited), or where there is more recent history of fire or eastern spruce budworm (*Choristoneura fumiferana*) outbreak, events that both reduce the abundance of *A. balsamea*.

A. balsamea Associations (bottom row of Figure 5), occur throughout the range of the Eastern Boreal Forest vegetation zone, but become more prevalent farther east as the climate becomes increasingly humid and maritime, and fire frequency diminishes. Where they occur in the western portion of the range, *A. balsamea* Associations are primarily found on sites that have escaped fire for a prolonged period (e.g., CNVC00256 [*Picea glauca* – *Abies balsamea* / *Streptopus lanceolatus* / *Pleurozium schreberi*]). These Associations typically self-replace through gap-forming processes, primarily insect disturbance and windthrow.

Table 6. Vegetation summary for *Pinus banksiana*- and/or *Picea mariana*-dominated conifer Associations of M495 [Eastern North American Boreal Forest]. Association names are provided in Appendix 1, factsheet summaries in Appendix 2. Associations of CM495a [Atlantic Boreal Forest] have codes highlighted in dark grey; those of CM495b [Ontario – Quebec Boreal Forest] in light grey. Species with presence $\geq 20\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

		Newfoundland															Quebec															Ontario																	
		35					171					16					158					274					751					853					2118					11	20	4	207	826	47	201	
Layer	Scientific Name	CNVC 00245	CNVC 00201	CNVC 00246	CNVC 00204	CNVC 00207	CNVC 00208	CNVC 00209	CNVC 00211	CNVC 00205	CNVC 00307	CNVC 00338	CNVC 00350	CNVC 00276	CNVC 00294	CNVC 00295	Common Name																																
Tree	<i>Abies balsamea</i>	**			**		***	***	■■■■		■■■■■	■■	■■■■	■■■■	***	***	balsam fir																																
	<i>Betula papyrifera</i>		***	**	**	**	***	■■■■	■■■■	**	■■■	**	■■■■	***	***	***	paper birch																																
	<i>Larix laricina</i>			***	***				***	■■	****	**	***	***		****	tamarack																																
	<i>Picea mariana</i>	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce																															
	<i>Pinus banksiana</i>	■■■■■	■■■■■	**	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	***				***	■■■■■	***	jack pine																																
	<i>Pinus strobus</i>								**	**							eastern white pine																																
	<i>Populus tremuloides</i>		***		***	**	■■■■■	***	***	**	**			***	■■■■■	***	trembling aspen																																
	Shrub	<i>Abies balsamea</i>	**	**	**	***	■■■■	■■■■	■■■■	■■■■	**	■■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir																															
<i>Acer rubrum</i>							**	***			**				**	red maple																																	
<i>Betula papyrifera</i>		**	***	***	***	■■■■	■■■■	■■■■	■■■■	***	**		■■■■	■■■■	***	***	paper birch																																
<i>Larix laricina</i>					**				**	****		**		**		**	tamarack																																
<i>Picea mariana</i>		■■■■	■■■■■	■■■■■	■■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce																																
<i>Pinus banksiana</i>		■■■■■	■■■■	***	**	**	**	**									jack pine																																
<i>Populus tremuloides</i>		**	***	**	**	**	■■■	**	**	■■					**	**	trembling aspen																																
<i>Prunus pensylvanica</i>		**				**	**	***	**		**				***		pin cherry																																
<i>Alnus incana</i>							***						***	***	■■■■■	■■■■■	speckled alder																																
<i>Alnus viridis</i>		***	***	**	***	■■■■	■■■■			■■■■■	***		***	***	***	***	green alder																																
<i>Amelanchier spp.</i>		***	■■■	**	■■■	**	**			**	**	■■■■	■■■■	■■■■	■■■	***	serviceberries																																
<i>Diervilla lonicera</i>		***					■■■	■■■■							***	***	northern bush-honeysuckle																																
<i>Ilex mucronata</i>			***		***						****	■■■■	***	***	***	***	mountain holly																																
<i>Juniperus communis</i>										**	***						common juniper																																
<i>Kalmia angustifolia</i>			■■■■■	***	■■■■■					■■■■■	■■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■■	sheep laurel																																
<i>Kalmia polifolia</i>			**		**							■■■	**	**		**	pale bog laurel																																
<i>Rhododendron canadense</i>					****						■■■■	■■■■■	****				rhodora																																
<i>Rhododendron groenlandicum</i>		**	■■■■■	■■■■■	■■■■■	■■■■	■■■■				■■■■	■■■	■■■■	■■■■■	■■■■	■■■■■	common Labrador tea																																
<i>Ribes spp.</i>							**				**		**	**	■■■■	■■■	currants																																
<i>Rosa acicularis</i>		**				■■■	■■■							**	**	**	prickly rose																																
<i>Rosa nitida</i>											**					shining rose																																	
<i>Rubus idaeus</i>	*				**	**				**				■■■■■	***	red raspberry																																	

Layer	Scientific Name	CNVC 00245	CNVC 00201	CNVC 00246	CNVC 00204	CNVC 00207	CNVC 00208	CNVC 00209	CNVC 00211	CNVC 00205	CNVC 00307	CNVC 00338	CNVC 00350	CNVC 00276	CNVC 00294	CNVC 00295	Common Name		
Shrub	<i>Salix</i> spp.	*	■ ■ ■		■ ■ ■	**	**						***	■ ■ ■	■ ■ ■	■ ■ ■	willows		
	<i>Sorbus americana</i> + <i>S. decora</i>	**		*	**	**	■ ■				**	**	■ ■	■ ■	***	■ ■	mountain-ashes		
	<i>Taxus canadensis</i>											■ ■ ■					Canada yew		
	<i>Vaccinium angustifolium</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■					■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	early lowbush blueberry	
	<i>Vaccinium myrtilloides</i>	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■						■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	velvet-leaved blueberry	
	<i>Viburnum nudum</i>											■ ■ ■ ■	**	***	***	***	***	wild raisin	
	Herb & dwarf shrub	<i>Aralia nudicaulis</i>	**		**			■ ■	■ ■ ■	***	**			**	**	***	**	wild sarsaparilla	
<i>Arctostaphylos uva-ursi</i>		■ ■ ■ ■				***					■ ■ ■						common bearberry		
<i>Avenella flexuosa</i>											**	■ ■ ■					wavy hairgrass		
<i>Calamagrostis pickeringii</i>											**	**					Pickering's reedgrass		
<i>Carex</i> spp.		*	***		**		**	**	**		**	■ ■ ■	**	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	sedges	
<i>Chamerion angustifolium</i>		**	**	**	**	■	*	**	**		**	***		**	■ ■	**	**	fireweed	
<i>Clintonia borealis</i>		**	**		**	■ ■	■ ■	■ ■ ■	■ ■ ■		**	***	■ ■	■ ■	■ ■ ■	■ ■	■ ■	yellow clintonia	
<i>Coptis trifolia</i>			**		**	**	■ ■	■ ■	■ ■		**	■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■	goldthread	
<i>Cornus canadensis</i>		***	■ ■	*	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	**		■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	bunchberry	
<i>Cypripedium acaule</i>		*		*		*	*	**				■ ■						pink lady's-slipper	
<i>Dryopteris spinulosa</i> complex								**	**		**		**	**	■ ■ ■	***		wood fern	
<i>Empetrum nigrum</i>					**				**	**	**	■ ■	**	**				black crowberry	
<i>Epigaea repens</i>		**	■ ■	***		**	**	***	**		***	■ ■ ■ ■		***				trailing arbutus	
<i>Equisetum</i> spp.							*		**					**	■ ■	■ ■ ■	■ ■ ■	horsetail	
<i>Eurybia macrophylla</i>		***				**	■ ■ ■	***							■ ■ ■	***		large-leaved aster	
<i>Fragaria virginiana</i>		**		*		*	**						■ ■		***	*		wild strawberry	
<i>Galium</i> spp.															■ ■			bedstraw	
<i>Gaultheria hispidula</i>		**	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■			■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	creeping snowberry
<i>Gaultheria procumbens</i>		***				**	**	***		****								eastern teaberry	
<i>Goodyera repens</i>		*				*	*						**		**	**	**	dwarf rattlesnake-plantain	
<i>Gymnocarpium dryopteris</i>							**						**	**	**	**	**	common oak fern	
<i>Linnaea borealis</i>		***	**	*	**	■ ■	■ ■	■ ■ ■	■ ■ ■			■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■	twinflower
<i>Lycopodium annotinum</i>			**	**	**	**	**	***	**		***		**	■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	stiff clubmoss	
<i>Lycopodium clavatum</i>		**				**	**	***								**		running clubmoss	
<i>Lycopodium obscurum</i>						*	**	**	**		**					**	**	flat-branched tree-clubmoss	
<i>Lysimachia borealis</i>		**				*	■ ■	**	**		■ ■	**	■ ■	**	■ ■	■ ■	■ ■	northern starflower	
<i>Maianthemum canadense</i>		■ ■	**	*	**	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	**	■ ■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■	wild lily-of-the-valley	

Table 7. Vegetation summary for *Abies balsamea*- and/or *Picea glauca*-dominated conifer Associations of M495 [Eastern North American Boreal Forest]. Association names are provided in Appendix 1, factsheet summaries in Appendix 2. Associations of CM495a [Atlantic Boreal Forest] have codes highlighted in dark grey; those of CM495b [Ontario – Quebec Boreal Forest] in light grey. Species with presence $\geq 35\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

		Maritimes region Newfoundland Quebec Ontario																
		37	22	28	254	315	256	634	71	1246	92	300	35	57	19	24		
Layer	Scientific Name	CNVC 00292	CNVC 00226	CNVC 00309	CNVC 00217	CNVC 00277	CNVC 00278	CNVC 00351	CNVC 00220	CNVC 00222	CNVC 00256	CNVC 00225	CNVC 00310	CNVC 00296	CNVC 00297	CNVC 00348	Common Name	
Tree	<i>Abies balsamea</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir	
	<i>Acer rubrum</i>	■■■	***	**					***			**		***			red maple	
	<i>Betula papyrifera</i>	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■■	■■■	■■■	■■■	■■■	paper birch	
	<i>Picea glauca</i>	****	■■■■■	■■■	***	***	■■■	***	****	■■■■■	■■■■■	■■■■■	■■■	****	■■■	■■■	white spruce	
	<i>Picea mariana</i>	■■■■■	■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■	■■■	■■■	***	***	■■■■■	■■■	■■■	black spruce
	<i>Populus tremuloides</i>		***		***			***				***	***		***	■■■		trembling aspen
Shrub	<i>Abies balsamea</i>	■■■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■	balsam fir
	<i>Acer rubrum</i>	■■■	*	**					■■■	***		***		***			red maple	
	<i>Betula papyrifera</i>	■	*	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	paper birch
	<i>Picea glauca</i>	*	■■■	**	***	***	■■■	***	■■■	■■■	■■■	■■■	■■■	**	■■■	**	white spruce	
	<i>Picea mariana</i>	■■■	***	■■■	■■■■■	■■■■■	■■■	■■■■■	■■■■■	■■■	■■■	■■■	***	■■■	■■■	***	black spruce	
	<i>Populus tremuloides</i>		*		**						■■■	***		**	■■■		trembling aspen	
	<i>Prunus pensylvanica</i>				**			**	***	***	***		***		***	■■■	pin cherry	
	<i>Acer spicatum</i>				***		***	***	■■■	***	■■■■■	■■■■■	■■■	***	■■■	■■■	■■■	mountain maple
	<i>Alnus incana</i>				***	***	***	***	***	***	****	***	***	■■■■■	■■■■■	****	speckled alder	
	<i>Alnus viridis</i>	*	■■■	**	■■■■■	***	***	***		***	***	***	***	****	***	****	green alder	
	<i>Amelanchier spp.</i>	*	*	*	■■■	■■■	■■■	■■■	■■■	■■■	■■■	**	■■■	■■■	■■■	■■■	■■■	serviceberries
	<i>Cornus stolonifera</i>									***	**	***	***	***	***	■■■	red-osier dogwood	
	<i>Corylus cornuta</i>				**					***		■■■	■■■		***	***		beaked hazelnut
	<i>Diervilla lonicera</i>		*		***				***	***	***	■■■	■■■		***	■■■		northern bush-honeysuckle
	<i>Gaylussacia baccata</i>	■■■	**															black huckleberry
	<i>Ilex mucronata</i>	■■■	■	■	***	***	***	***	***	***	***		**		***		**	mountain holly
<i>Kalmia angustifolia</i>	■■■	■	■■■	■■■■■	■■■	***	■■■	■■■	■■■	■■■		***		■■■	**	****	sheep laurel	
<i>Lonicera canadensis</i>		*	*	**					■■■		■■■	■■■		**	**		Canada fly-honeysuckle	
<i>Gaylussacia baccata</i>	■■■	**															black huckleberry	
<i>Ilex mucronata</i>	■■■	■	■	***	***	***	***	***	***	***		**		***		**	mountain holly	

Layer	Scientific Name	CNVC 00292	CNVC 00226	CNVC 00309	CNVC 00217	CNVC 00277	CNVC 00278	CNVC 00351	CNVC 00220	CNVC 00222	CNVC 00256	CNVC 00225	CNVC 00310	CNVC 00296	CNVC 00297	CNVC 00348	Common Name	
Shrub	<i>Kalmia angustifolia</i>	■■■	■	■■	■■■■	■■■	***	■■■	***	***		***		■■■	**	***	sheep laurel	
	<i>Lonicera canadensis</i>		*	*	**				■■■		■■	■■■		**	**		Canada fly-honeysuckle	
	<i>Rhododendron groenlandicum</i>	**	*	*	■■■■	■■■	■■	■■		***	***			■■■	**		common Labrador tea	
	<i>Ribes</i> spp.		*		**	**	**	**	■■■	■■■	■■	■■■	■■	■■■	■■■	■■	currants	
	<i>Rosa acicularis</i>				**						■■			**	**		prickly rose	
	<i>Rubus idaeus</i>		**	*	**	**	***	***	■■■	***	**	■■■	■■	■■■	■■■■	■■	red raspberry	
	<i>Salix</i> spp.				***	***	**	***		***		***		■■■	***		willows	
	<i>Sambucus racemosa</i>						**		***	**		**		**	■■	**	red elderberry	
	<i>Sorbus americana</i> + <i>S. decora</i>	■■	■	■■	■■	■■	■■	■■	■■■	■■■	■■	■■■	■■	■■	■■■	■■	mountain-ashes	
	<i>Taxus canadensis</i>			**							***	***	***	***	**	■■■■	Canada yew	
	<i>Vaccinium angustifolium</i>	■	■■	■■■	■■■	■■■	■■	■■■			**	■■■	***		■■	■■	**	early lowbush blueberry
	<i>Vaccinium myrtilloides</i>	■	*	*	■■■	■■■	**	■■■	■■■	■■■	***	■■	■■■	■■	**	**		velvet-leaved blueberry
	<i>Viburnum edule</i>				**	**	**	**	**	**	**	■■	■■■	**	■■	■■■	■■■	squashberry
	<i>Viburnum nudum</i>	■	■	■■	***	***	***	***	***	**	**	***	***	***	**	***	***	wild raisin
	Herb & dwarf shrub	<i>Anemone quinquefolia</i>				**						■			**			wood anemone
<i>Aralia nudicaulis</i>		■	■■■	■■■	■■	***	**	***	■■	■■■	■■	■■■	■■■	■■■	■■	***	wild sarsaparilla	
<i>Athyrium filix-femina</i>							***		**	***	**	■■■	***	**	■■	■■■	common lady fern	
<i>Carex</i> spp.		*	**	**	**	■■	■■	**	**	**	■■	■■	*	■■■	■■■	***	sedges	
<i>Cinna latifolia</i>											*			**		■■	drooping woodreed	
<i>Clintonia borealis</i>		■■	*	**	■■	■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■■	■■	■■■	■■■	yellow clintonia
<i>Coptis trifolia</i>		■■	■■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■■	■■	■■	**	goldthread
<i>Cornus canadensis</i>		■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	bunchberry
<i>Dryopteris</i> spp.		**	■■■	■	**	**	■■■	**	■■	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	wood ferns
<i>Equisetum</i> spp.					**	***	**	**		**	**	■■	**		■■	■■	***	horsetails
<i>Eurybia macrophylla</i>					***						■■■	**		■■■	**			large-leaved aster
<i>Galium</i> spp.					*				*		■	**		■■	■■	■■		bedstraws
<i>Gaultheria hispida</i>		■■■	**	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■	**	*	■■■	■■	■■	creeping snowberry
<i>Goodyera</i> spp.		*	*	*	**			**	■■	**	**	■	**		**	**		rattlesnake-plantains
<i>Gymnocarpium dryopteris</i>			**		**	**	■■	**	*	**	**	■■	■■	■■	■■	■■■		common oak fern
<i>Huperzia lucidula</i>		**						**	**		■■		**	**			shining firmoss	
<i>Linnaea borealis</i>	■■■	■■■	■■■	■■	■■	■■	■■	■■	■■	■■■	■■	■■■	■■■	■■	■■	■■■	twinflower	
<i>Lycopodium annotinum</i>				■■	■■	■■	■■	**	**	**	■■	■■■	***	■■■	■■■		stiff clubmoss	

Layer	Scientific Name	CNVC 00292	CNVC 00226	CNVC 00309	CNVC 00217	CNVC 00277	CNVC 00278	CNVC 00351	CNVC 00220	CNVC 00222	CNVC 00256	CNVC 00225	CNVC 00310	CNVC 00296	CNVC 00297	CNVC 00348	Common Name	
Herb & dwarf shrub	<i>Lycopodium obscurum</i>				**		**	**		**	**	***	**	**	■ ■		flat-branched tree-clubmoss	
	<i>Lysimachia borealis</i>	■	■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■	■ ■	■ ■ ■	■ ■	■ ■	■ ■	northern starflower	
	<i>Maianthemum canadense</i>	■ ■	■ ■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley	
	<i>Mertensia paniculata</i>										■ ■			**			tall bluebells	
	<i>Mitella nuda</i>				**			**		**	■ ■	■ ■		■ ■	■ ■	■ ■ ■ ■	naked mitrewort	
	<i>Neottia cordata</i>				**	**	■ ■	**		**				**		■ ■	heart-leaved twayblade	
	<i>Oclemena acuminata</i>	*	■ ■	■ ■					**	***		***	***		***		whorled wood aster	
	<i>Orthilia secunda</i>	*	**	**	**	**	**	**	**	■ ■	**	*	**	**	**	■ ■	one-sided wintergreen	
	<i>Osmundastrum cinnamomeum</i>	■ ■ ■	■	**				***		**			**	**	***		***	cinnamon fern
	<i>Oxalis montana</i>	*	■ ■	■ ■			***	■ ■ ■ ■	***	■ ■ ■ ■	■ ■ ■ ■	****	■ ■ ■ ■	■ ■ ■ ■	***	■ ■ ■ ■		common wood-sorrel
	<i>Petasites frigidus</i>				**	**		**		**		■ ■			■ ■	**		arctic sweet coltsfoot
	<i>Phegopteris connectilis</i>		*				**	**		*	**		■ ■ ■	***	**	**	**	northern beech fern
	<i>Poaceae</i>				**	***	***	**	**	**	**	**	■ ■		■ ■ ■	■ ■ ■		grass family
	<i>Pteridium aquilinum</i>	■ ■	■ ■	*	**			**	**	■ ■ ■	***	**	***	**	***	***		bracken fern
	<i>Rubus chamaemorus</i>				**		■ ■ ■	■ ■ ■	**									cloudberry
	<i>Rubus pubescens</i>		*		**		**	**	*	**	**	■ ■ ■	■ ■ ■		■ ■ ■	■ ■ ■	■ ■ ■	dwarf raspberry
	<i>Solidago macrophylla</i>			**	**	**	**	**	**	**	**	**	**	■ ■ ■	**	**	■ ■ ■	large-leaved goldenrod
	<i>Streptopus lanceolatus</i>				**	**	**	**	**	**	**	■ ■	■ ■	■ ■	**	**	■ ■	rose twisted-stalk
	<i>Vaccinium vitis-idaea</i>	■ ■	■ ■	■ ■ ■	**	**	**	**	**	**	**			*	■ ■ ■	■ ■	***	lingonberry
	<i>Viola spp.</i>		***		**		**		**	**	■ ■	■ ■	*	■ ■ ■	■ ■	***		violets
	Moss & lichen	<i>Bazzania trilobata</i>	■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	**	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■	**	**	***	three-lobed whipwort
		<i>Cladina spp.</i>	■ ■	*	*	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■		reindeer + clad lichens
		<i>Dicranum spp.</i>	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■ ■
<i>Hylocomiastrum umbratum</i>									***			***	■ ■ ■ ■			■ ■ ■ ■	shaded wood moss	
<i>Hylocomium splendens</i>		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	stairstep moss
<i>Mnium spp. + Rhizomnium spp. + Plagiomnium spp.</i>			**		**	**	**	**	**	**	**	■ ■ ■	■ ■ ■		■ ■ ■	■ ■	****	leafy mosses
<i>Pleurozium schreberi</i>		■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	red-stemmed feathermoss
<i>Polytrichum spp.</i>		*	■	***	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■ ■	■ ■	**	■ ■	■ ■	■ ■	■ ■ ■	**	haircap mosses
<i>Ptilium crista-castrensis</i>		■ ■ ■	*	■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	knight's plume moss
<i>Rhytidiadelphus loreus</i>				***										■ ■ ■		■ ■ ■ ■	lanky moss	

Layer	Scientific Name	CNVC 00292	CNVC 00226	CNVC 00309	CNVC 00217	CNVC 00277	CNVC 00278	CNVC 00351	CNVC 00220	CNVC 00222	CNVC 00256	CNVC 00225	CNVC 00310	CNVC 00296	CNVC 00297	CNVC 00348	Common Name
Moss & lichen	<i>Rhytidiadelphus triquetrus</i>	**	***	***	**					***	■ ■ ■	***	**	***	■ ■	■ ■ ■ ■	electrified cat's-tail moss
	<i>Sanionia uncinata</i>				**						■ ■			**		***	sickle moss
	<i>Sphagnum</i> spp.	■ ■ ■	***	■ ■ ■	■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■	**	***	■ ■ ■	■ ■ ■ ■	■ ■ ■	***	peat mosses

3.2 Understory classes

The six understory vegetation classes in Figure 5 are indicative of different combinations of soil moisture and nutrient conditions within the overall macroclimate of the Eastern Boreal Forest vegetation zone. These site-scale edatopic envelopes are presented in Figure 6. The suites of indicator species for these understory classes differ slightly between the two Macrogroup subtypes (Table 8). In the descriptions that follow, species that are more characteristic of CM495a [Atlantic Boreal Forest] are underlined; those that are more characteristic of **CM495b [Ontario – Quebec Boreal Forest]** are in **bold font**.

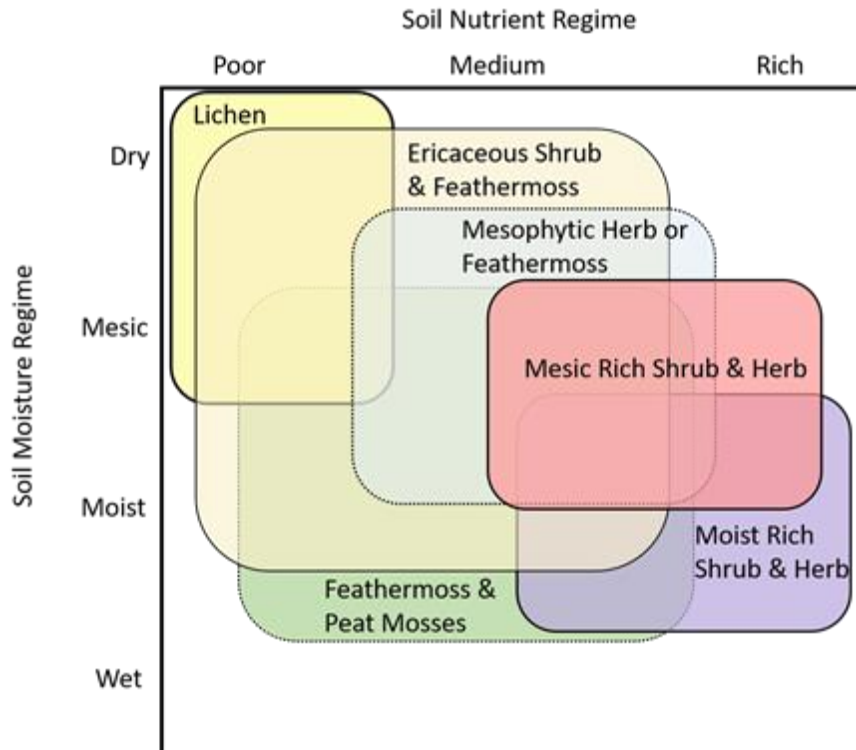


Figure 6. Edatopic grid representing conceptual ranges of soil moisture and soil nutrient regime indicated by the six understory vegetation classes from Figure 5.

Table 8. Vegetation summary of CM495a [Atlantic Boreal Forest] and CM495b [Ontario – Quebec Boreal Forest] Associations by understory vegetation class. Tree species occurring in the shrub layer have been omitted, otherwise species with presence $\geq 40\%$ are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

		Lichen		Ericaceous Shrub & Feathermoss		Feathermoss & Peat Moss		Mesophytic Herb or Feathermoss		Mesic Rich Shrub & Herb		Moist Rich Shrub & Herb			
n Plots		11	380	111	4692	571	968	2860	1792	354	2856	37	1049		
Layer	Scientific Name	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	Common Name	
Tree	<i>Abies balsamea</i>			■■■■■	■■■	■■■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir	
	<i>Betula papyrifera</i>	**	***	■■■	■■■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch	
	<i>Larix laricina</i>	■■	***	****			***					**	****	tamarack	
	<i>Picea glauca</i>			■■■■■	***	***	***	■■■	■■■■■	■■■■■	■■■■■	■■■	■■■■■	****	white spruce
	<i>Picea mariana</i>	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	***	■■■	■■■■■	■■■■■	black spruce
	<i>Pinus banksiana</i>		■■■■■		■■■■■		***		****		***		****	****	jack pine
	<i>Populus tremuloides</i>	**	***		***	***	***	***	■■■■■	■■■■■	■■■■■	■■■■■	****	■■■■■	trembling aspen
Shrub	<i>Acer spicatum</i>				***	***	***	***	■■■	■■■■■	■■■■■	■■■■■	■■■■■	mountain maple	
	<i>Alnus incana</i>				***	***	***	***	***	***	***	***	■■■■■	speckled alder	
	<i>Alnus viridis</i>	■■■■■	***	**	■■■■■	***	***	***	***	***	***	***	***	green alder	
	<i>Amelanchier</i> spp.	**	■■	***	■■■	■■■	■■■	■■■	■■■	■■■	■■■	**	■■■	serviceberries	
	<i>Cornus stolonifera</i>								***	***	***	■■■	***	red-osier dogwood	
	<i>Corylus cornuta</i>				***				■■■	■■■	■■■■■	**	***	beaked hazelnut	
	<i>Diervilla lonicera</i>				***			***	■■■	■■■	■■■■■	***	■■■	northern bush-honeysuckle	
	<i>Ilex mucronata</i>		***	■■	***	***	***	***	***	**	***	**	***	mountain holly	
	<i>Kalmia angustifolia</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■	■■■■■	***	■■■	***	***	***	***	sheep laurel	
	<i>Lonicera canadensis</i>								**	■■■	■■		**	Canada fly-honeysuckle	
	<i>Rhododendron canadense</i>	■■■		***										rhodora	
	<i>Rhododendron groenlandicum</i>	■■■	■■■■■	***	■■■■■	■■■	■■■■■	***	***		***		■■■■■	common Labrador tea	
	<i>Ribes</i> spp.			**	**	**	**	***	■■	■■■■■	■■■	■■	■■■	currants	
	<i>Rubus idaeus</i>			**	**	***	***	***	***	■■■	■■■	**	■■■	red raspberry	
	<i>Salix</i> spp.	■■	■■■		■■■	***	***	***	■■■	■■■	■■■		■■■	willows	
	<i>Sorbus americana</i> + <i>S. decora</i>		**	■■	■■	■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	mountain-ashes
	<i>Taxus canadensis</i>			**					**	****	***	■■■■■		Canada yew	
<i>Vaccinium angustifolium</i>	■■■■■	■■■■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	**	■■■	**	■■	early lowbush blueberry	
<i>Vaccinium myrtilloides</i>		■■■	*	■■■	■■■	■■■	■■■	■■■	■■■	***	■■■		■■■	velvet-leaved blueberry	
<i>Viburnum edule</i>				**	**		**	**	***	***	■■■	■■■	■■■	squashberry	
<i>Viburnum nudum</i>			■■	***	***	***	***	■■■	■■■	■■■	■■■	■■■	■■■	wild raisin	

Layer	Scientific Name	Lichen		Ericaceous Shrub & Feathermoss		Feathermoss & Peat Moss		Mesophytic Herb or Feathermoss		Mesic Rich Shrub & Herb		Moist Rich Shrub & Herb		Common Name	
		CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b		
Herb & dwarf shrub	<i>Aralia nudicaulis</i>			■ ■ ■	***	**	**	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	****	■ ■ ■	wild sarsaparilla	
	<i>Arctostaphylos uva-ursi</i>	■ ■ ■												common bearberry	
	<i>Carex</i> spp.		**	**	**	■ ■	■ ■	**	**	■ ■	■ ■	***	■ ■ ■	sedges	
	<i>Clintonia borealis</i>		**	**	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>		**	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	**	■ ■	goldthread
	<i>Cornus canadensis</i>	**	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	bunchberry
	<i>Dryopteris spinulosa</i> complex			**	**	■ ■ ■ ■	***	■ ■ ■ ■	■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	wood fern
	<i>Eurybia macrophylla</i>				***			**	■ ■ ■ ■	**	■ ■ ■ ■			■ ■ ■ ■ ■	large-leaved aster
	<i>Gaultheria hispida</i>		■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	**	**	■ ■	■ ■ ■ ■	■ ■ ■ ■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>					**	**	**	**	■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	common oak fern
	<i>Linnaea borealis</i>		**	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	twinflower
	<i>Lycopodium obscurum</i>			**	**	**	**	**	■ ■	***	■ ■	***	**	***	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>			■ ■	■ ■	■ ■	**	■ ■	■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■	■ ■	northern starflower
	<i>Maianthemum canadense</i>	**	**	■ ■	■ ■ ■ ■	■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	wild lily-of-the-valley
	<i>Mitella nuda</i>						**	**	**	**	**	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	naked mitrewort
	<i>Orthilia secunda</i>			**	**	**	**	**	**	**	**	■ ■	■ ■	**	one-sided wintergreen
	<i>Oxalis montana</i>			**		****	***	■ ■ ■ ■	***	■ ■ ■ ■	■ ■ ■ ■			***	common wood-sorrel
	<i>Petasites frigidus</i>				**	**	**	**	**	**	**	**	**	■ ■	arctic sweet coltsfoot
	<i>Phegopteris connectilis</i>					**		**	**	■ ■ ■ ■	**	**	**	**	northern beech fern
	<i>Poaceae</i>		**	**	**	***	***	**	***	■ ■	***			■ ■ ■ ■	grass family
	<i>Pteridium aquilinum</i>			■ ■ ■ ■	***		***	***	■ ■ ■ ■ ■	**	■ ■ ■ ■ ■			***	bracken fern
	<i>Rubus chamaemorus</i>				**	■ ■ ■ ■	■ ■	**							cloudberry
	<i>Rubus pubescens</i>			**	**	**	**	**	**	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	dwarf raspberry
	<i>Solidago macrophylla</i>			**	**	**	**	**	**	**	**	■ ■ ■ ■	**	**	large-leaved goldenrod
	<i>Streptopus lanceolatus</i>				**	**		**	**	■ ■	■ ■	■ ■	**	**	rose twisted-stalk
	<i>Vaccinium vitis-idaea</i>	■ ■ ■	**	■ ■	**	**	**	**	**				**	**	lingonberry
	<i>Viola</i> spp.			**				**	**	■ ■	■ ■	***	■ ■ ■ ■		violets

Layer	Scientific Name	Lichen		Ericaceous Shrub & Feathermoss		Feathermoss & Peat Moss		Mesophytic Herb or Feathermoss		Mesic Rich Shrub & Herb		Moist Rich Shrub & Herb		Common Name	
		CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b	CM495a	CM495b		
Moss & lichen	<i>Bazzania trilobata</i>		**	■■■■■	**	■ ■	**	■ ■ ■	**	■ ■ ■	**	***		three-lobed whipwort	
	<i>Cladina</i> spp. + <i>Cladonia</i> spp.	■■■■■	■■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	reindeer and clad lichens	
	<i>Dicranum</i> spp.	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	broom mosses	
	<i>Hylocomiastrum umbratum</i>									****		■■■		shaded wood moss	
	<i>Hylocomium splendens</i>	**	**	■■■■■	■ ■ ■	■■■■■	■■■	■■■■■	■ ■ ■	■■■■■	■ ■ ■	■■■■■	■ ■ ■	stairstep moss	
	<i>Pleurozium schreberi</i>	■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■	■■■■■	red-stemmed feathermoss	
	<i>Polytrichum</i> spp.	■■■	■ ■		■ ■	■■	■■	■■	■ ■ ■	**	■ ■		■ ■ ■	haircap mosses	
	<i>Ptilidium ciliare</i>	■ ■	■ ■ ■	***	**	**	***	**		**			**	ciliate fringewort	
	<i>Ptilium crista-castrensis</i>	■■	■ ■ ■	■■■	■■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■ ■	■ ■ ■	■■■	knight's plume moss
	<i>Rhytidiadelphus triquetrus</i>			***				***	**	***	***	■ ■ ■ ■	***	electrified cat's-tail moss	
	<i>Sphagnum</i> spp.		■ ■ ■	■■■	■■■	■■■■■	■■■■■	■■■	***	***	***	***	■ ■ ■ ■	peat mosses	
<i>Stereocaulon paschale</i>	■■■■■												Easter foam lichen		

3.2.1 Lichen

Associations in this understory vegetation category typically occur on the driest, most nutrient-impooverished sites capable of supporting tree-dominated vegetation (Figure 6). Consequently, these types are characterized by species that tolerate nutrient-poor, usually acidic, soil conditions. Of the eastern boreal tree species, jack pine (*Pinus banksiana*) and black spruce (*Picea mariana*) are the least nutrient demanding and Associations in the Lichen class have a sparse to open (i.e., <40% cover) tree layer dominated by one or both of these species (Table 8). No hardwood, mixedwood, or balsam fir (*Abies balsamea*) or white spruce (*Picea glauca*)-dominated conifer Association has been described for the Lichen understory class (Figure 5).

Stands usually have at least well-developed (>40% cover) shrub layers dominated by ericaceous species, including sheep laurel (*Kalmia angustifolia*), early lowbush blueberry (*Vaccinium angustifolium*), **velvet-leaved blueberry (*V. myrtilloides*)**, common Labrador tea (*Rhododendron groenlandicum*), and rhodora (*R. canadense*). Herb and dwarf shrub layer development is poor with only sparse cover of species such as common bearberry (*Arctostaphylos uva-ursi*), lingonberry (*Vaccinium vitis-idaea*), creeping snowberry (*Gaultheria hispidula*), bunchberry (*Cornus canadensis*) and wild lily-of-the-valley (*Maianthemum canadense*). These Associations are further characterized by a well-developed to continuous (>50% cover) ground layer in which the total cover of ground lichens, including reindeer lichens (*Cladina* spp.), clad lichens (*Cladonia* spp.) and Easter foam lichen (*Sterocaulon paschale*), exceeds the total cover of feathermosses.

Lichen Associations are described for Ontario, Quebec and insular Newfoundland. In Ontario and Quebec, these Associations occur mostly in the northern part of the Eastern Boreal Forest vegetation zone. There are two *P. banksiana*-dominated Associations that occur in Ontario (Figure 5); these are distinguished by presence of *K. angustifolia*, which reaches its western range limit in northeastern Ontario. In Ontario, stands with presence of *K. angustifolia* are classified as CNVC00201 [*Pinus banksiana* (*Picea mariana*) / *Kalmia angustifolia* (*Rhododendron groenlandicum*) / *Cladina* spp.] and stands without are classified as CNVC00245 [*Pinus banksiana* / *Vaccinium angustifolium* / *Cladina* spp.].

3.2.2 Ericaceous Shrub & Feathermoss

Ericaceous Shrub & Feathermoss understories can develop over a wide range of edaphic conditions, from dry to moist, and from nutrient-poor to -medium (Figure 6). These Associations are characterized by a moderate to well-developed (20-60% cover) shrub layer dominated by ericaceous species and a moderately developed to continuous (>80%) moss layer dominated by feathermosses. This understory condition can develop under hardwood, mixedwood or conifer canopies (Figure 5), but ground cover by feathermosses tends to decrease with increasing hardwood cover because of greater broadleaf litter. As in the Lichen (described previously) and the Feathermoss & Peat Moss (described next) classes, the shrub layer typically includes sheep laurel (*Kalmia angustifolia*), within its range, early lowbush blueberry (*Vaccinium angustifolium*), **velvet-leaved blueberry (*V. myrtilloides*)**, **common Labrador tea (*Rhododendron groenlandicum*)** and rhodora (*R. canadense*) (Table 8). Regenerating tree species can also contribute significantly to the shrub layer cover. The herb and dwarf shrub layer is usually poorly developed (<20% cover) in Associations of CM495b [Ontario – Quebec Boreal Forest], but may be moderately developed (20-40%) in Associations of CM495a [Atlantic Boreal Forest]. The more common species in this layer include bunchberry (*Cornus canadensis*), creeping snowberry (*Gaultheria hispidula*), twinflower (*Linnaea borealis*) and wild lily-of-the-valley (*Maianthemum canadense*). Although reindeer (*Cladina* spp.) and clad (*Cladonia* spp.) lichens are often present, they do not exceed 20% cover, and total

cover of feathermosses exceeds that of lichens. Peat mosses (*Sphagnum* spp.) may be present, but typically total <10% cover.

There are two hardwood Associations described with this understory condition, and both are dominated by paper birch (*Betula papyrifera*). CNVC00237 [*Betula papyrifera* / *Vaccinium angustifolium* – *Kalmia angustifolia* / *Pleurozium schreberi*], occurs in Quebec and insular Newfoundland. CNVC00269 [*Betula papyrifera* / *Vaccinium angustifolium* / *Pleurozium schreberi*] is a provisional Association, described from only three plots in Ontario.

One mixedwood Association from Quebec is described for the Ericaceous Shrub & Feathermoss understory class (CNVC00214 [*Picea mariana* – *Betula papyrifera* / *Kalmia angustifolia* / *Pleurozium schreberi*]; Figure 5). Black spruce (*Picea mariana*) is the dominant conifer in this Association, but the type also includes stands with jack pine (*Pinus banksiana*) or balsam fir (*Abies balsamea*). If the hardwood component is minimal, then consideration should be given to the conifer Association CNVC00209 [*Pinus banksiana* – *Picea mariana* / *Kalmia angustifolia* / *Pleurozium schreberi*] (Table 4).

The Ericaceous Shrub & Feathermoss understory develops with various conifer overstory conditions (Figure 5). In Ontario and Quebec, this understory occurs with overstories dominated by *P. banksiana*, *P. mariana*, or a mix of *P. mariana* and *A. balsamea*. In Ontario, presence of sheep laurel (*Kalmia angustifolia*) distinguishes CNVC00209 [*Pinus banksiana* – *Picea mariana* / *Kalmia angustifolia* / *Pleurozium schreberi*] from CNVC00207 [*Pinus banksiana* (*Picea mariana*) / *Vaccinium angustifolium* / *Pleurozium schreberi*], and CNVC00211 [*Picea mariana* / *Rhododendron groenlandicum* – *Kalmia angustifolia* / *Pleurozium schreberi*] from CNVC00208 [*Picea mariana* – *Pinus banksiana* / *Vaccinium angustifolium* / *Pleurozium schreberi*]).

Where Associations comprise vegetation types from both Ontario and Quebec (i.e., CNVC00209, CNVC00211 and CNVC00217 [*Picea mariana* – *Abies balsamea* / *Rhododendron groenlandicum* / *Pleurozium schreberi*]), the Ontario component generally has a lower abundance of ericaceous shrubs and is more varied than is the Quebec component. In Quebec, plots with less abundant ericaceous shrubs are classified to Associations shown in the Mesophytic Herb or Feathermoss class (e.g., CNVC00350 [*Picea mariana* / *Pleurozium schreberi* – *Hylocomium splendens*] and CNVC00351 [*Picea mariana* – *Abies balsamea* / *Pleurozium schreberi* (*Hylocomium splendens*)]).

In insular Newfoundland, the Ericaceous Shrub & Feathermoss understory occurs with tree layers dominated by *P. mariana* or *A. balsamea* (Figure 5). There are two Associations, both woodlands (i.e., more open tree layers, often with stunted trees), that are dominated by *P. mariana*: CNVC00307 [*Picea mariana* (*Abies balsamea*) / *Kalmia angustifolia* / *Pleurozium schreberi*] has abundant sheep laurel (*K. angustifolia*) in the shrub layer, whereas CNVC00338 [*Picea mariana* / *Rhododendron canadense* – *Taxus canadensis* / *Pleurozium schreberi*] has a shrub layer with abundant rhodora (*R. canadense*). The *A. balsamea*-dominated condition, CNVC00309 [*Abies balsamea* / *Vaccinium vitis-idaea* / *Pleurozium schreberi* – *Bazzania trilobata*], also occurs on coastal sites in Nova Scotia.

Like CNVC00309, CNVC00292 [*Picea mariana* – *Abies balsamea* / *Vaccinium vitis-idaea* / *Pleurozium schreberi* – *Bazzania trilobata*] and CNVC00226 [*Picea glauca* (*Abies balsamea*) / *Pleurozium schreberi* (*Bazzania trilobata*)] occur on coastal sites in Nova Scotia. These three Associations may be distinguished by their tree layers. CNVC00309 is dominated by *A. balsamea*, CNVC00292 includes *P. mariana* and *A. balsamea*, and CNVC00226 is dominated by *P. glauca*.

3.2.3 Feathermoss & Peat Moss

The Feathermoss & Peat Moss understory condition occurs mainly on moist, nutrient-poor to -medium sites that are transitional between uplands and wetlands or, particularly in the humid climate of the eastern part of the vegetation zone, on sites where fire has been absent for a prolonged period (Figure 6). In both cases, moist soil conditions and longer fire cycles promote the development of peat mosses (*Sphagnum* spp.) through the process of paludification, which can be a factor even on mid-slope topopositions. Total *Sphagnum* spp. cover typically exceeds 20%, but feathermosses still dominate the moss layer (Table 8). Note that *Sphagnum* spp. cover in excess of feathermoss cover is more indicative of treed wetland Associations classified in M299 [North American Boreal Conifer Poor Swamp].

Associations of the Feathermoss & Peat Moss category typically develop under at least moderately closed (>40%) canopies. Shrub layers are usually dominated by regenerating tree species, particularly balsam fir (*Abies balsamea*), black spruce (*Picea mariana*) and paper birch (*Betula papyrifera*), depending on their proportions in the overstory (Table 8). Shrub layers also typically include the same ericaceous species as in the Ericaceous Shrub & Feathermoss category, but generally with lower abundance. Herb and dwarf shrub layer cover is usually sparse (<20% cover), but it can be more developed on sites with better nutrient status. In addition to the ubiquitous herb and dwarf shrub layer species listed for the Ericaceous Shrub & Feathermoss class, there tends to be greater presence of species that are more characteristic of the Mesophytic Herb or Feathermoss condition, such as yellow clintonia (*Clintonia borealis*), or of species indicative of wetter conditions, such as cloudberry (*Rubus chamaemorus*) and sedges (*Carex* spp.). The moss layer is usually continuous (>80% cover) under coniferous canopies and well-developed (40-60%) in mixedwood stands where there is greater ground cover of broadleaf litter. Total feathermoss cover exceeds total *Sphagnum* spp. cover. The most common *Sphagnum* species is Girgensohn's peat moss (*S. girgensohnii*).

As the Feathermoss & Peat Moss condition typically takes time to develop, it is not described for early seral hardwood or jack pine (*Pinus banksiana*) overstories; it occurs under mid- to late-seral mixedwood and conifer canopies (Figure 5). In Ontario and Quebec, a mixedwood condition is described, CNVC00270 [*Betula papyrifera* – *Picea mariana* – *Abies balsamea* / *Pleurozium schreberi* – *Sphagnum* spp.]. Conifer overstories of black spruce (*P. mariana*) (CNVC00276 [*Picea mariana* / *Rhododendron groenlandicum* – *Vaccinium angustifolium* / *Pleurozium schreberi* (*Sphagnum* spp.)]), balsam fir (*A. balsamea*) (CNVC00278 [*Abies balsamea* / *Pleurozium schreberi* – *Sphagnum* spp.]) and their mix (CNVC00277 [*Picea mariana* – *Abies balsamea* / *Pleurozium schreberi* – *Sphagnum* spp.]) occur in Quebec. Only the *P. mariana* condition is described for Ontario, and only the *A. balsamea* condition is described for insular Newfoundland. This understory condition has not been described in the Maritimes region.

3.2.4 Mesophytic Herb or Feathermoss

The Mesophytic Herb or Feathermoss understory condition develops primarily on mesic, nutrient-medium sites (Figure 6) under hardwood, mixedwood or conifer overstories (Figure 5). In these Associations, canopy cover is often closed (>60% cover). Shrub layers are usually well-developed to dense (>40%) and dominated by tree species regeneration. Shrub species are less abundant, but can include the ericaceous species mentioned above, as well as mountain-ashes (*Sorbus americana* and *S. decora*) and, especially in CM495b, **northern bush-honeysuckle (*Diervilla lonicera*)** and minor amounts of species that are more characteristic of the Mesic Rich Shrub & Herb understory class, such as **mountain maple (*Acer spicatum*)** and **beaked hazelnut (*Corylus cornuta*;** Table 8).

Herb and dwarf shrub layer development tends to be better developed in Associations with more hardwood overstory cover and a less developed moss and lichen layer. The more ubiquitous species listed

for the Ericaceous Shrub & Feathermoss class commonly occur (i.e., bunchberry [*Cornus canadensis*], creeping snowberry [*Gautheria hispidula*], twinflower [*Linnaea borealis*] and wild lily-of-the-valley [*Maianthemum canadense*]), but there is also greater presence of more mesophytic or even nutrient-demanding species, which helps to differentiate these Associations from those of the former condition. Species that become more common include wild sarsaparilla (*Aralia nudicaulis*), yellow clintonia (*Clintonia borealis*), **large-leaved aster (*Eurybia macrophylla*)**, northern starflower (*Lysimachia borealis*), **bracken fern (*Pteridium aquilinum*)**, wood ferns (*Dryopteris* spp.) and common wood-sorrel (*Oxalis montana*).

In Ontario, this understory condition is only described in Associations with hardwood and mixedwood canopies (Figure 5). It does occur under conifer overstories however, and in these cases, it is combined with the Ericaceous Shrub & Feathermoss understory condition for jack pine (*Pinus banksiana*; CNVC00207 and CNVC00209), black spruce (*Picea mariana*; CNVC00208 and CNVC00211) and the mixed *P. mariana* and balsam fir (*Abies balsamea*; CNVC00217) overstory conditions. Similarly, it is combined with the Mesic Rich Shrub & Herb understory class for overstories of *A. balsamea* and/or white spruce (*Picea glauca*; CNVC00256 [*Picea glauca* – *Abies balsamea* / *Streptopus lanceolatus* / *Pleurozium schreberi*]).

In Quebec, Mesophytic Herb or Feathermoss understories occur with the full range of overstory conditions, including multiple Associations in certain overstory categories (Figure 5). The only gap in the conceptual framework is for *P. banksiana*; these stands likely exist but are not distinguished from CNVC00209 in the Ericaceous Shrub & Feathermoss category. In the middle mixedwood row of Figure 5, *P. banksiana* presence distinguishes CNVC00218 [*Pinus banksiana* – *Abies balsamea* – *Betula papyrifera* / *Diervilla lonicera* / *Pleurozium schreberi*] from the *P. mariana* with *A. balsamea* conditions (CNVC00234 [*Picea mariana* – *Betula papyrifera* – *Abies balsamea* / *Clintonia borealis*] and CNVC00344 [*Picea mariana* – *Betula papyrifera* – *Abies balsamea* / *Pleurozium schreberi*]). In CNVC00234, the herb and dwarf shrub layer is better developed with less feathermoss cover than CNVC00344; CNVC00234 stands are generally farther south or on warmer sites than are those of CNVC00344. In the bottom mixedwood row of Figure 5, CNVC00231 [*Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Clintonia borealis*] and CNVC00233 [*Abies balsamea* – *Betula papyrifera* / *Oxalis montana* / *Pleurozium schreberi*] have better developed herb and dwarf shrub layers with less feathermoss cover than CNVC00232 [*Abies balsamea* – *Betula papyrifera* / *Pleurozium schreberi*]. CNVC00231 occurs farther west and has more trembling aspen (*Populus tremuloides*) and northern bush-honeysuckle (*Diervilla lonicera*); CNVC00233 occurs farther east and south, and is characterized by abundant common wood-sorrel (*Oxalis montana*) and often, wood ferns (*Dryopteris* spp.).

In insular Newfoundland, the Mesophytic Herb or Feathermoss understory is only described for conifer overstories and from the Maritime provinces, it is described for one mixedwood and two *A. balsamea* overstory conditions (Figure 5). On Newfoundland, the three conifer types are distinguished by dominant tree species. In the Maritimes region, a mixedwood is described for New Brunswick and Nova Scotia (CNVC00233) and two *A. balsamea*-dominated conditions are described: CNVC00222 [*Abies balsamea* / *Pleurozium schreberi*], which is widespread in Newfoundland and Quebec, and the more circumscribed CNVC00220 [*Abies balsamea* (*Picea mariana*) / *Oxalis montana* / *Pleurozium schreberi*] which, when compared to CNVC00222, has more *P. mariana* in both the overstory and understory, greater presence of mountain-ash (*Sorbus americana*) in the shrub layer and presence of three-lobed whipwort (*Bazzania trilobata*) in the moss and lichen layer.

3.2.5 Mesic Rich Shrub & Herb

The Mesic Rich Shrub & Herb understory condition develops mainly on nutrient-medium to -rich, mesic to moist sites (Figure 6). These occur with hardwood, mixedwood and conifer canopies that are usually closed (>60% cover; Figure 5). Development of shrub, herb and dwarf shrub and moss and lichen layers is variable; this category includes Associations with dense herb and dwarf shrub layers dominated by wood ferns (*Dryopteris* spp.), as well as Associations with dense tall shrub layers dominated by **mountain maple** (*Acer spicatum*) and **beaked hazelnut** (*Corylus cornuta*), often with abundant tree species regeneration (Table 8). A luxuriant layer of wood ferns is characteristic of CM495a, especially in Associations that occur in insular Newfoundland. A dense tall shrub layer of *A. spicatum* and *C. cornuta* is generally more characteristic of CM495b, but can also occur in CM495a (i.e., CNVC00225 [*Abies balsamea* (*Picea glauca*) / *Acer spicatum* / *Oxalis montana*]). In Newfoundland, *A. spicatum* is diagnostic of moist site conditions and is one of the indicator species included in the Moist Rich Shrub & Herb class. For the Mesic Rich Shrub & Herb class, moss and lichen layers are typically poorly developed under closed hardwood or mixedwood canopies because of the abundant broadleaf litter that results from deciduous shrubs and overstory trees.

In addition to the diagnostic shrub and herb species noted above, other species more common to Mesic Rich Shrub & Herb Associations include the shrub species **northern bush-honeysuckle** (*Diervilla lonicera*), Canada fly-honeysuckle (*Lonicera canadensis*), currants (*Ribes* spp.), red raspberry (*Rubus idaeus*) and mountain-ashes (*Sorbus americana* and *S. decora*; Table 8). Ericaceous shrub species sometimes occur, but with low abundance. Species in the herb and dwarf shrub layer include those mentioned in the Ericaceous Shrub & Feathermoss and Mesophytic Herb or Feathermoss sections, as well as presence (but not abundance) of some of the species more characteristic of the Moist Rich Shrub & Herb class, such as dwarf raspberry (*Rubus pubescens*), rose twisted-stalk (*Streptopus lanceolatus*) and violets (*Viola* spp.). In the moss and lichen layer, stairstep moss (*Hylocomium splendens*) tends to make up a greater proportion of the total feathermoss cover than in previously described understory classes.

The Mesic Rich Shrub & Herb understory condition occurs with hardwood, mixedwood and conifer canopies in Ontario, Quebec and Newfoundland and under conifer canopies in New Brunswick and Nova Scotia (Figure 5). Although CNVC00225 [*Abies balsamea* (*Picea glauca*) / *Acer spicatum* / *Oxalis montana*] and CNVC00310 [*Abies balsamea* / *Dryopteris* spp. / *Hylocomiastrum umbratum*] are both balsam fir (*Abies balsamea*)-dominated Associations that occur in New Brunswick and Nova Scotia, a tall shrub layer of mountain maple (*Acer spicatum*) distinguishes CNVC00225 from CNVC00310, which is characterised by abundant wood ferns (*Dryopteris* spp.) in the herb and dwarf shrub layer.

Mesic Rich Shrub & Herb understories that occur with overstories dominated by jack pine (*Pinus banksiana*), black spruce (*Picea mariana*) or mixed *P. mariana* – *A. balsamea* are treated with Associations in the Moist Rich Shrub & Herb class: CNVC00294 [*Pinus banksiana* – *Picea mariana* / *Alnus incana* / *Pleurozium schreberi*] for *P. banksiana*, CNVC00295 [*Picea mariana* / *Alnus incana* / *Pleurozium schreberi*] for *P. mariana*, and CNVC00296 [*Picea mariana* – *Abies balsamea* / *Alnus incana*] for the mix of *P. mariana* and *A. balsamea*, hence the gaps in these Conifer rows in Figure 5.

3.2.6 Moist Rich Shrub & Herb

Associations in the Moist Rich Shrub & Herb category occur on the most productive sites (Figure 6) and are the most floristically diverse forests of M495 (Table 8). This understory condition can have hardwood, mixedwood or conifer overstories (Figure 5). Canopies are usually closed (>60% cover), with at least moderately developed (>20% cover) shrub layers characterised by **speckled alder** (*Alnus incana* spp. *incana*), mountain maple (*Acer spicatum*), for insular Newfoundland, and, to a lesser extent, currants (*Ribes* spp.), red raspberry (*Rubus idaeus*), Canada yew (*Taxus canadensis*) and squashberry (*Viburnum*

edule). Herb and dwarf shrub layer development varies from moderate (20-40% cover) to dense (>60%), and is usually rich in species. This layer typically includes greater frequency and abundance of species indicative of moist, nutrient-rich site conditions, including naked mitrewort (*Mitella nuda*), dwarf raspberry (*Rubus pubescens*), large-leaved goldenrod (*Solidago macrophylla*), rose twisted-stalk (*Streptopus lanceolatus*) and violets (*Viola* spp.). Compared to the other understory classes, the moss and lichen layer is less well developed because of the abundant broadleaf litter from deciduous shrubs and, in hardwood and mixedwood overstory classes, trees.

On these moist, rich sites trembling aspen (*Populus tremuloides*) tends to be dominant on glaciolacustrine deposits, such as the Clay Belt in northeastern Ontario and northwestern Quebec, and paper birch (*Betula papyrifera*) is more frequently dominant on glacial tills. In Ontario, the Moist Rich Shrub & Herb condition tends to occur on glaciolacustrine sediments with *P. tremuloides* as the dominant hardwood species; the hardwood condition is described by CNVC00241 [*Populus tremuloides* (*P. balsamifera*) / *Alnus incana* / *Eurybia macrophylla*] and the mixedwood condition by CNVC00272 [*Populus tremuloides* – *Picea mariana* / *Alnus incana*] (Figure 5). These Associations occur in Quebec as well. In Quebec, this understory condition also occurs frequently on glacial tills with *B. papyrifera* and distinguishes additional hardwood (CNVC00242 [*Betula papyrifera* / *Alnus incana*]) and balsam fir (*Abies balsamea*) -containing mixedwood types (CNVC00273 [*Populus tremuloides* – *Betula papyrifera* – *Abies balsamea* / *Alnus incana*], which has more *P. tremuloides*, and CNVC00274 [*Betula papyrifera* – *Abies balsamea* / *Alnus incana*]).

4.0 How to determine an Association

The following sub-sections describe the process and provide the tools for classifying Associations of M495 [Eastern North American Boreal Forest] from ecological plot data. Successful determination of Associations within this Macrogroup assumes foremost that the vegetation condition fits within the overall concept of M495. Thus, a stand must:

- 1) Be a mature (approximately >40 years) natural (or semi-natural) forest. It should have approximately >20% tree layer cover. Sparser (i.e., 10-20%) tree layer cover (woodlands) sometimes occur in very dry, poor environments with lichen-dominated understories (i.e., Lichen understory class), or on extremely wind-exposed sites, with stunted trees (i.e., Associations in the Ericaceous Shrub & Feathermoss understory class that are from Newfoundland and/or the Maritimes region; Figure 5).
- 2) Occur within or near the range of the Eastern Boreal Forest vegetation zone (Figure 1).
- 3) Have species composition that better reflects that of M495 than Macrogroups characterizing surrounding vegetation zones. To ensure this criterion is met, review the important diagnostic species in **2.3 Floristic distinctions from other Macrogroups** and consider Appendix 3, Tables 1-3; these tables compare vegetation characteristics of M495 to those of other upland boreal (a and b), and temperate (c and d) forests:
 - a. M496 [West-Central Boreal Forest] in the west,
 - b. M179 [North American Northern Boreal Woodland] in the north, and
 - c. CM014 [Eastern North American Temperate Hardwood – Conifer Forest], and
 - d. CM744 [Acadian Temperate Forest] in the south.
- 4) Occur on an upland site (moisture regime very dry to moist, not wet). Total peat moss (*Sphagnum* spp.) cover is less than that of feathermoss cover. Refer to Appendix 3, Table 4, which compares vegetation characteristics of M495 to those of boreal wetland Macrogroups M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest], as well as to **2.3 Floristic distinctions from other Macrogroups**.

- 5) Have <5% tree layer cover of eastern white cedar (*Thuja occidentalis*) or black ash (*Fraxinus nigra*); these forests have not yet been described for M495.

In addition to these five criteria, it is important to keep in mind that there is variability within ecosystems of a given type, and the classification is a construct to organize general patterns. Not every plot will fit easily into an Association, so consideration of the various overstory and understory conditions shown in the conceptual framework (Figure 5) should be used to determine the best fit. Although most of the Associations are based on a representative and large set of plot data and have been thoroughly peer reviewed, some Associations are based on relatively little data and have lower confidence. Furthermore, the classification has been developed from ecological plot data collected over previous decades (Baldwin et al. 2019b) and reflects conditions at the time of sampling. These Associations are likely to change over time, with changing climate (and related disturbance regimes) and invasion of alien species.

There are a few ways to determine the CNVC Association, depending on the starting point:

- 1) From unclassified ecological plot data.
- 2) From plot data previously classified to a constituent provincial/regional vegetation type.
- 3) From plot data previously classified to a non-constituent, but correlated, vegetation type.

The methods for determining Associations from these different starting points are explained in the following sub-sections.

4.1 Determining an Association from unclassified ecological plot data

If plot data have not previously been classified, determination of an Association assumes the availability of at least vegetation data but preferably also site and soil data. These data should be collected over a minimum of a 10m x 10m area (ideally 400m², 20m x 20m) and be representative of a repeating pattern on the landscape. A plot should be relatively homogeneous in overstory and understory vegetation cover, not transitional between two obviously different conditions. Likewise, site and soil conditions should be uniform across the stand of interest. The vegetation data should include species composition and abundance (i.e., % cover) data in each of the tree, shrub, herb and dwarf shrub and moss and lichen layers. Site data including meso-topoposition, slope, aspect and parent material will help to determine an Association. As well, soil characteristics such as relative soil moisture and nutrient regimes, rooting zone substrate (soil texture), root restricting depth and humus form can also help inform a decision. Standard methods for collecting these data are provided in provincial guides (e.g., Damman 1976 for Newfoundland; Harris et al. 2005 for Ontario; Keys et al. 2007 for Nova Scotia; New Brunswick Department of Natural Resources 1985 and Dunlap 1989 for New Brunswick; Prince Edward Island Department of Energy and Forestry 1992 for Prince Edward Island and Saucier et al. 1994 for Quebec).

Once the five criteria in the previous section have been met, classification steps include:

- 1) Using the conceptual framework (Figure 5) and interrogation of the plot data, select the most likely Associations:
 - a) Consider general overstory dominance: hardwood, mixedwood or conifer; generally with a 5% cutoff for hardwood and conifer; <5% hardwood means it is a conifer Association, and <5% conifer means it is a hardwood Association. The Association is most likely a mixedwood if overstory composition includes at least 5-15% of conifer species and 5-15% of hardwood species, but it is prudent to also examine conifer and hardwood Associations.
 - b) Consider specifics of overstory dominance. If the plot is a hardwood type, is it best described as dominated by trembling aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*) or

- balsam poplar (*Populus balsamifera*); if mixedwood, is the conifer component jack pine (*Pinus banksiana*) and/or black spruce (*Picea mariana*), *P. mariana* and balsam fir (*Abies balsamea*), or *A. balsamea* and/or white spruce (*Picea glauca*)?
- c) Consider understory floristics together with site conditions. Use the edatopic diagram (Figure 6) with diagnostic indicator species of different site conditions (Table 8) to interpret the plot vegetation data to further narrow the range of likely Associations on the conceptual framework (Figure 5).
 - d) Consider plot location; not all Associations occur throughout the Eastern Boreal Forest vegetation zone. Colours on the conceptual framework indicate each Association's province or region of known occurrence.

2) Using vegetation summary tables for hardwood (Table 4), mixedwood (Table 5) and conifer Associations (Tables 6 and 7), compare summary floristics among likely types to those of the plot in question to determine the best Association match.

3) Consult summary factsheet descriptions (Appendix 2; note factsheets are in order by CNVC number) to confirm the selected Association. The Notes & Similar Associations sections of these factsheets report characteristics that distinguish the Association from similar Associations.

Note that many of these Associations have two or more subassociations that represent species occurrence or dominance patterns that are not strong enough to warrant recognition at the Association rank. For further information, refer to the long factsheet, if available (Appendix 1, Table 1); long factsheets are available online at cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications.

4.2 Determining an Association from a constituent provincial/regional vegetation type

M495 Associations comprise one to many provincial or regional vegetation community types (Appendix 5). For insular Newfoundland, CNVC Associations include forest types developed by Damman (1963, 1964, 1967) for northern, central and western Newfoundland and by Meades (1976, 1986) for Terra Nova Park and eastern Newfoundland. For Labrador, Meades developed provisional types from unpublished data (Baldwin et al. 2019b). Vegetation types from Ontario (see Uhlir et al. 2016), Quebec and the Maritimes Region are currently unpublished. Appendix 5, Table 1 shows the membership of various provincial/regional constituent units in M495 Associations.

If plot data have been previously classified to a constituent provincial/regional vegetation community type, then Appendix 5, Table 1 may be used to point the way to the Association that is likely to best fit the data. The conceptual framework (Figure 5), the indicator species of various understory classes (Table 8) and summary descriptions of the Associations (Appendix 2) should be reviewed to confirm that the suggested Association is the best fit.

4.3 Determining an Association from a correlated vegetation type

Classification systems typically use unique criteria, so there is rarely a 1:1 correspondence between the types developed under different systems. Through an expert process, we compared the Associations of M495 to V-types from Northwestern Ontario (Sims et al. 1997), Northeastern Ontario (Taylor et al. 2000) and Central Ontario (Chambers et al. 1997); Vegetation Types from Nova Scotia (Neily et al. 2011); and Forest Types from Newfoundland (Meades and Moores 1994), to provide lists of the most appropriate correlations (Appendix 6). These comparisons should not be thought of as direct equivalencies unless expressly stated, rather they should be considered the best matches between different classification systems.

If plot data are available, it is preferable to use these data to determine the Association directly using the steps in **4.1 Determining an Association from unclassified ecological plot data**. Otherwise, after consulting the correlation tables in Appendix 6, the conceptual framework (Figure 5), Association summary vegetation tables (Tables 4 to 7) and Association factsheet summaries (Appendix 2) should be reviewed to confirm the suggested “best fit” CNVC Association.

5.0 Literature cited

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APPENDICES

Appendix 1. List of the Associations of the Eastern North American Boreal Forest Macrogroup, M495, with concept authors, date and province(s) of known occurrence.

**Detailed factsheet available at cnvc-cnvc.ca and cfs.nrcan.gc.ca/publications in both French and English; *English only; n/a, not available. Note summary descriptions of all 55 Associations are available in Appendix 2.

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
**	CNVC00201	<i>Pinus banksiana (Picea mariana) / Kalmia angustifolium (Rhododendron groenlandicum) / Cladina spp.</i>	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	May, 2010	Ontario, Quebec
**	CNVC00204	<i>Picea mariana / Rhododendron groenlandicum – Kalmia angustifolium / Cladina spp.</i>	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
*	CNVC00205	<i>Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina spp.</i>	K. Baldwin, K. Chapman, B. Meades	May, 2010	Newfoundland and Labrador
*	CNVC00207	<i>Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi</i>	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
*	CNVC00208	<i>Picea mariana – Pinus banksiana / Vaccinium angustifolium / Pleurozium schreberi</i>	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
**	CNVC00209	<i>Pinus banksiana – Picea mariana / Kalmia angustifolia / Pleurozium schreberi</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Ontario, Quebec
**	CNVC00211	<i>Picea mariana / Rhododendron groenlandicum – Kalmia angustifolia / Pleurozium schreberi</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	October, 2013	Ontario, Quebec
**	CNVC00213	<i>Populus tremuloides – Betula papyrifera – Picea mariana – Pinus banksiana / Diervilla lonicera / Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario, Quebec

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
**	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
**	CNVC00215	<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Pinus banksiana</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	March, 2013	Manitoba, Ontario, Quebec
**	CNVC00216	<i>Picea mariana</i> – <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i>	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
**	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	November, 2013	Manitoba, Ontario, Quebec
n/a	CNVC00218	<i>Pinus banksiana</i> – <i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
n/a	CNVC00220	<i>Abies balsamea</i> (<i>Picea mariana</i>) / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	K. Baldwin, S. Basquill, K. Chapman	May, 2010	New Brunswick, Nova Scotia
**	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	K. Baldwin, S. Basquill, K. Chapman, B. Meades, C. Morneau	May, 2010	New Brunswick, Newfoundland and Labrador, Nova Scotia, Quebec
**	CNVC00225	<i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Acer spicatum</i> / <i>Oxalis montana</i>	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau	May, 2013	New Brunswick, Nova Scotia, Quebec
n/a	CNVC00226	<i>Picea glauca</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> (<i>Bazzania trilobata</i>)	K. Baldwin, S. Basquill, K. Chapman	May, 2010	New Brunswick, Nova Scotia, Prince Edward Island

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
**	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Manitoba, Ontario, Quebec
**	CNVC00232	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
n/a	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	K. Baldwin, S. Basquill, K. Chapman, C. Morneau	May, 2010	New Brunswick, Nova Scotia, Quebec
**	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2014	Ontario, Quebec
**	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Manitoba, Ontario, Quebec
**	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
**	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	August, 2011	Manitoba, Ontario, Quebec
**	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	May, 2013	Manitoba, Ontario, Quebec
**	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2014	Manitoba, Ontario, Quebec
**	CNVC00242	<i>Betula papyrifera</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
*	CNVC00245	<i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Cladina</i> spp.	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
*	CNVC00246	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Cladina</i> spp.	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Ontario
*	CNVC00256	<i>Picea glauca</i> – <i>Abies balsamea</i> / <i>Streptopus lanceolatus</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
n/a	CNVC00269	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	January, 2011	Ontario
**	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	December, 2012	Ontario, Quebec
**	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	January, 2014	Manitoba, Ontario, Quebec
n/a	CNVC00273	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00276	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario, Quebec
n/a	CNVC00277	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
n/a	CNVC00277	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
**	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
n/a	CNVC00292	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	K. Baldwin, S. Basquill, K. Chapman	January, 2011	Nova Scotia
n/a	CNVC00294	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00295	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario, Quebec
**	CNVC00296	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	December, 2013	Ontario, Quebec
n/a	CNVC00297	<i>Abies balsamea</i> / <i>Alnus incana</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau	December, 2013	Quebec
*	CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, B. Meades	March, 2012	Newfoundland and Labrador
*	CNVC00309	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	K. Baldwin, S. Basquill, K. Chapman, B. Meades	August, 2013	Newfoundland and Labrador, Nova Scotia
*	CNVC00310	<i>Abies balsamea</i> / <i>Dryopteris</i> spp. / <i>Hylocomiastrum umbratum</i>	K. Baldwin, K. Chapman, B. Meades, S. Basquill	February, 2012	New Brunswick, Newfoundland and Labrador, Nova Scotia
*	CNVC00311	<i>Abies balsamea</i> (<i>Betula alleghaniensis</i>) / <i>Dryopteris carthusiana</i>	K. Baldwin, K. Chapman, B. Meades	February, 2012	Newfoundland and Labrador
*	CNVC00315	<i>Betula papyrifera</i> – <i>B. alleghaniensis</i> / <i>Dryopteris carthusiana</i>	K. Baldwin, K. Chapman, B. Meades	February, 2012	Newfoundland and Labrador

Factsheet	Association Code	Association Scientific Name	Concept Authors	Concept Date	Province(s) of Known Occurrence
*	CNVC00316	<i>Betula papyrifera</i> / <i>Alnus viridis</i> / <i>Solidago macrophylla</i>	K. Baldwin, K. Chapman, B. Meades	August, 2011	Newfoundland and Labrador
*	CNVC00338	<i>Picea mariana</i> / <i>Rhododendron canadense</i> – <i>Taxus canadensis</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, B. Meades	February, 2013	Newfoundland and Labrador
n/a	CNVC00344	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	K. Baldwin, K. Chapman, M. Major, C. Morneau	February, 2012	Quebec
*	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	K. Baldwin, K. Chapman, B. Meades	February, 2012	Newfoundland and Labrador
*	CNVC00349	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Dryopteris carthusiana</i> – <i>Rubus pubescens</i>	K. Baldwin, K. Chapman, B. Meades	May, 2013	Newfoundland and Labrador
**	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	October, 2013	Newfoundland and Labrador, Quebec
**	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	November, 2013	Newfoundland and Labrador, Quebec

Appendix 2. Summary factsheets for the 55 Associations of M495 [Eastern North American Boreal Forest].

One-page summary descriptions of each of the 55 Associations of M495 are presented in order of their CNVC code. More detailed descriptions for 40 of these Associations are available online (see Appendix 1). CNVC standards for botanical nomenclature, Association names, a glossary of terms and class codes are available in Baldwin et al. (2019b; see in particular report section *CNVC Type Name and Code Standards*, and Appendices 4 [Reporting Conventions], 7 [Glossary], and 8 [Association Factsheet]).

Each description includes six sections:

The header includes the CNVC Association code and its scientific and English common names. It also includes the names of subassociations and the provinces of known occurrence. The right side of the title bar includes information to assist the user in selecting a subset of Associations that may be relevant to a particular jurisdiction, overstory or understory class. The overstory class, HARDWOOD, MIXEDWOOD or CONIFER is included on the top. The colour bars indicate jurisdiction (as in the conceptual framework, Figure 5). The understory class, Lichen, Ericaceous Shrub & Feathermoss, Feathermoss & Peat Moss, Mesophytic Herb or Feathermoss, Mesic Rich Shrub & Herb or Moist Rich Shrub & Herb is shown on the bottom.

A general description of the Association's vegetation characteristics, range, environment and successional dynamics makes up the next section. Usually diagnostic, dominant and characteristic species are listed within strata (tree, shrub, herb & dwarf shrub and moss & lichen), in decreasing order of presence. Typically, only species present in >60% of the plots are included in the description. Total stratum cover is described using the following terms:

Stratum	Term	Percentage Cover (%)
Tree	Sparse	≤25
	Open	26-40
	Moderately closed	41-60
	Closed	>60
Shrub and Herb & dwarf shrub	Poorly or Lightly developed	≤20
	Moderately developed	21-40
	Well developed	41-60
	Dense	>60
Moss & lichen	Sparse, or Poorly or Lightly developed	≤30
	Moderately developed	31-50
	Well developed	51-80
	Continuous	>80

The Characteristic Plants section shows the % presence and % cover (characteristic cover = cover where present), for the sample plots of the Association. Scientific names of species are provided and species are displayed by strata. Mean stratum cover totals are also provided. The species list is truncated by presence, with the minimum indicated.

Site / Soil Characteristics presents sample plot information on elevation, slope, aspect, meso topoposition, moisture and nutrient regimes, soil parent material, soil rooting zone substrate, root restricting depth and humus form. For elevation, the minimum, mean and maximum elevations of sample plots are provided. Slope gradient and aspect classes are as follows:

Slope Gradient class	Slope (%)	Aspect class	Azimuth (degrees)
very steep	66 - 100	north	316 - 45
steep	35 - 65	east	46 - 135
moderately steep	20 - 34	south	136 - 225
moderate	11 - 19	west	226 - 315
gentle	4 - 10	level	slope < 4%
level	< 4		

Meso Topoposition is provided at the scale of the local landscape, and the following classes are reported:

Crest / upper (both crest and upper slope topopositions);

Mid;

Lower / toe (both lower and toe slope topopositions);

Depression; and

Level.

Relative moisture regime refers to the potential capacity of a soil to hold, lose or receive water, as determined from the properties of the soil as well as site position on the landscape, regardless of climate. Reported moisture regime is usually a grouping of two data classes:

Very dry (very xeric);

Dry (xeric and subxeric);

Mesic (submesic and mesic);

Moist (subhygric and hygric); and

Wet (subhydric and hydric).

Nutrient regime is the relative level of nutrients available for plant growth. Nutrient regime data were limited to New Brunswick, Nova Scotia and Prince Edward Island datasets. The classes are:

Poor (very poor and poor; oligotrophic and submesotrophic);

Medium (mesotrophic);

Rich (rich and very rich; permesotrophic and eutrophic); and

Excess saline (saline; hypereutrophic).

Soil parent material is the unconsolidated and more or less chemically unweathered material from which soil develops by pedogenic processes. The soil parent material classes include:

Anthropogenic

Bedrock

Colluvium (both colluvium and weathered bedrock)

Eolian

Fluvial

Glaciofluvial

Glaciolacustrine

Glaciomarine

Lacustrine

Marine

Moraine / till

Organic
Undifferentiated

Soil rooting zone substrate is the substrate or texture classes within the zone of maximum rooting; classes are:

Non-soil
Sandy
Silty
Clayey
Coarse loamy
Fine loamy
Organic

Root restricting depth is the average depth to a root restricting layer in the soil profile, classes are: 0 – 20 cm (i.e., shallow); 21 – 100 cm (i.e., moderately deep); or > 100 cm (i.e., deep).

Humus form classes include:

No humus
Mor
Moder
Mull
Peatymor

Below the Site / Soil Characteristics section of the factsheet, there are images of an edatopic grid, a map of sample plots, and sometimes a representative stand photo. Each edatopic grid shows the conceptual placement of the Association on gradients of relative soil moisture and nutrient regimes. The distribution map shows the location of sample plots in red and the extent of plot sampling in grey.

The final section of the description is the Notes & Similar Associations section. Here we provide additional information about the Association as well as characteristics useful for distinguishing the Association from similar M495 Associations.

CNVC00201 *Pinus banksiana* (*Picea mariana*) / *Kalmia angustifolia* (*Rhododendron groenlandicum*) / *Cladina* spp.

Jack Pine (Black Spruce) / Sheep Laurel (Common Labrador Tea) / Reindeer Lichens

Subassociations: *Pinus banksiana*, *Picea mariana*

Provinces: Ontario, Quebec

CONIFER



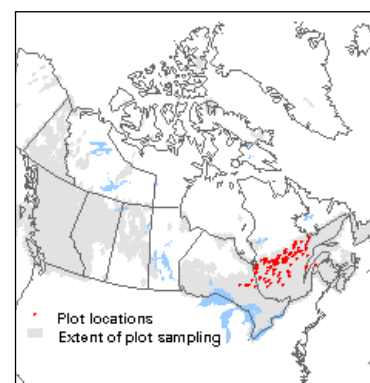
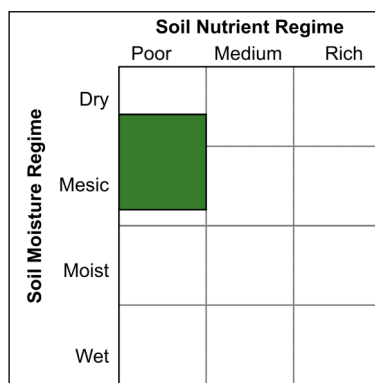
Lichen

CNVC00201 has a moderately closed canopy of *Pinus banksiana*, often with *Picea mariana* as a companion species. The shrub layer is dense, with abundant *P. mariana* and ericaceous species, including *Kalmia angustifolia*, *Vaccinium angustifolium*, *V. myrtilloides* and *Rhododendron groenlandicum*. *Salix* spp. are usually present but not abundant. The herb layer is virtually nonexistent. The moss and lichen layer is continuous and dominated by reindeer lichens, including *Cladina rangiferina*, *C. stellaris* and *C. mitis*. Patches of *Pleurozium schreberi* are present on moister microsites.

CNVC00201 occurs in a humid continental boreal climate, usually on mesic, nutrient-poor sites; these are among the poorest sites capable of supporting tree-dominated vegetation in the region. Stands are commonly on level sites or mid- to upper-slope or crest topopositions, often on warm aspects. Coarse-textured soils, sands or coarse loams, derived from glaciofluvial or morainal parent materials predominate. This is an early seral condition. Fire is the primary natural disturbance. Although this Association typically occurs on sites too edaphically limited to support a closed forest, it can also result from regeneration failure in a closed stand (e.g., CNVC00209).

Characteristic Plants	CNVC00201	
	171 plots	
[^] ≥40% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	47	
<i>Pinus banksiana</i>	100	33
<i>Picea mariana</i>	85	15
Shrub Stratum Cover (Mean)	67	
<i>Picea mariana</i>	99	12
<i>Kalmia angustifolia</i>	96	32
<i>Vaccinium angustifolium</i>	92	19
<i>Salix</i> spp.	74	4
<i>Vaccinium myrtilloides</i>	71	9
<i>Rhododendron groenlandicum</i>	70	13
<i>Pinus banksiana</i>	55	4
Herb Stratum Cover (Mean)	0	
<i>Gaultheria hispidula</i>	40	2
Bryo-Lichen Stratum Cover (Mean)	88	
<i>Cladina rangiferina</i>	100	28
<i>Pleurozium schreberi</i>	98	23
<i>Cladina stellaris</i>	96	37
<i>Cladina mitis</i>	89	10
<i>Dicranum</i> spp.	82	3
<i>Cladonia</i> spp.	57	3
<i>Ptilium crista-castrensis</i>	46	3
<i>Ptilidium ciliare</i>	43	3
<i>Polytrichum</i> spp.	40	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	115–361–605 m
Slope	level (47); gentle (28); moderate (19); moderately steep (4); steep (1); very steep (1)
Aspect	north (12); east (9); south (13); west (29); level (37)
Meso Topoposition	crest/ upper (29); mid (37); lower/ toe (5); depression (1); level (29)
Moisture Regime	dry (13); mesic (86); moist (1)
Nutrient Regime	md (100)
Soil Parent Material	glaciofluvial (50); moraine/ till (32); glaciolacustrine (13); other (5)
Soil Rooting Zone Substrate	sandy (22); coarse loamy (18); other (5); md (56)
Root Restricting Depth	0-20 cm (3); 21-99 cm (68); ≥100 cm (1); md (27)
Humus Form	mor (95); moder (5)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Kalmia angustifolia is an aggressive competitor to conifer regeneration.
 CNVC00204 has *Picea mariana* dominant and only occurs in Quebec.
 CNVC00245 occurs in Ontario and lacks *Kalmia angustifolia*.

CNVC00204 *Picea mariana* / *Rhododendron groenlandicum*—*Kalmia angustifolia* / *Cladina* spp.

CONIFER

Black Spruce / Common Labrador Tea—Sheep Laurel / Reindeer Lichens

Subassociations: *Cladina stellaris*, *Cladina mitis*

Provinces: Quebec



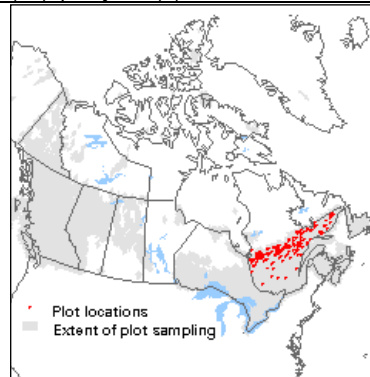
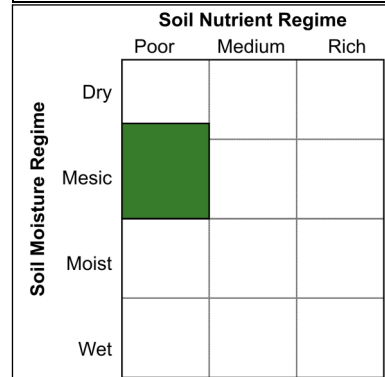
Lichen

CNVC00204 has an open tree layer of *Picea mariana*. The shrub layer is dense, with abundant *P. mariana* and ericaceous species, including *Rhododendron groenlandicum*, *Kalmia angustifolia*, *Vaccinium myrtilloides* and *V. angustifolium*. *Salix* spp. are usually present but not abundant. The herb layer is virtually nonexistent. The moss and lichen layer is continuous and dominated by reindeer lichens, including *Cladina stellaris*, *C. rangiferina* and *C. mitis*, with some *Cladonia* spp. Patches of *Pleurozium schreberi* are present on moister microsites.

CNVC00204 occurs in a region with a humid continental boreal climate. It occurs mainly on mesic, nutrient-poor sites; these are among the poorest sites capable of supporting tree-dominated vegetation in the region. Stands are usually on crest or upper- to mid-slope topopositions, often on warm (and dry), south or west, aspects. Soils are usually coarse loams or sands derived from morainal parent materials. Dynamics are closely tied to fire, but CNVC00204 can be a stable, self-perpetuating community. Although it typically occurs on sites too edaphically limited to support a closed forest, this Association can also result from regeneration failure in a closed stand (e.g., CNVC00211).

Characteristic Plants	CNVC00204	
	158 plots	
^≥40% presence; ±characteristic cover	% Presence^	% Cover†
Tree Stratum Cover (Mean)		35
<i>Picea mariana</i>	100	27
Shrub Stratum Cover (Mean)		73
<i>Picea mariana</i>	100	18
<i>Rhododendron groenlandicum</i>	96	24
<i>Kalmia angustifolia</i>	88	26
<i>Vaccinium myrtilloides</i>	84	9
<i>Vaccinium angustifolium</i>	83	13
<i>Salix</i> spp.	68	4
<i>Amelanchier</i> spp.	43	3
Herb Stratum Cover (Mean)		2
<i>Gaultheria hispidula</i>	57	3
<i>Cornus canadensis</i>	41	3
Bryo-Lichen Stratum Cover (Mean)		89
<i>Pleurozium schreberi</i>	100	28
<i>Cladina rangiferina</i>	100	16
<i>Cladina stellaris</i>	93	49
<i>Dicranum</i> spp.	91	3
<i>Cladina mitis</i>	84	8
<i>Cladonia</i> spp.	69	5
<i>Ptilium crista-castrensis</i>	61	3
<i>Ptilidium ciliare</i>	58	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	45–384–820 m
Slope	level (29); gentle (40); moderate (18); moderately steep (6); steep (6); very steep (1)
Aspect	north (13); east (16); south (21); west (25); level (25)
Meso Topoposition	crest/ upper (39); mid (38); lower/ toe (3); depression (1); level (19)
Moisture Regime	very dry (1); dry (8); mesic (90); moist (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (65); glaciofluvial (15); glaciolacustrine (11); other (9)
Soil Rooting Zone Substrate	coarse loamy (17); sandy (12); non-soil (5); other (6); md (60)
Root Restricting Depth	0-20 cm (14); 21-99 cm (55); md (31)
Humus Form	mor (99); peatymor (1)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Cladina mitis is an earlier seral species than *C. stellaris*; the *C. mitis* subassociation describes stands that have burned in the previous 60 years (approx.).

Kalmia angustifolia is an aggressive competitor to conifer regeneration.

CNVC00201 has *Pinus banksiana* dominant.

CNVC00205 is a similar Association that occurs on the island of Newfoundland.

CNVC00246 is a similar Association without *Kalmia angustifolia* that occurs in Ontario.

CNVC00205 *Picea mariana* / *Kalmia angustifolia*—*Rhododendron canadense* / *Cladina* spp.

CONIFER

Black Spruce / Sheep Laurel—Rhodora / Reindeer Lichens

Subassociations: none

Provinces: Newfoundland and Labrador



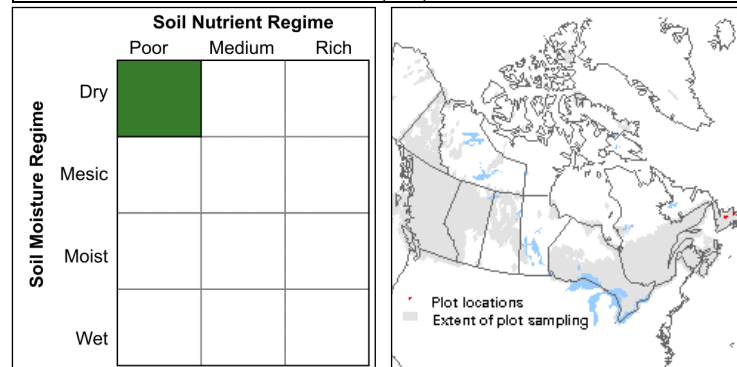
Lichen

CNVC00205 is a woodland. It has an open tree layer dominated by *Picea mariana*, sometimes with presence of *Larix laricina* and occasionally *Pinus strobus*. There is a dense shrub layer dominated by ericaceous species (called “goowiddy” in Newfoundland), especially *Kalmia angustifolia*, with less abundant *Vaccinium angustifolium*, *Rhododendron canadense* and *R. groenlandicum*. *P. mariana* is usually present and *Alnus viridis* can be abundant. The herb layer is virtually nonexistent. The continuous ground layer is dominated by lichens (*Cladina* spp., *Cladonia* spp. and *Stereocaulon paschale*).

CNVC00205 occurs in central Newfoundland, the driest and most continental area on the island. It is restricted to dry, nutrient-poor sites; these are among the poorest sites capable of supporting tree-dominated vegetation in the region. Sites are usually old river terraces or bedrock ridges that have coarse-textured soils of glaciofluvial origin, tills overlying outwash materials, or shallow soils over bedrock. These edaphic conditions maintain a woodland structure, and stands do not develop into a closed forest even at maturity. Fire is the primary disturbance.

Characteristic Plants	CNVC00205	
	11 plots	
[^] ≥40% presence;	%	%
[±] characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	9	
<i>Picea mariana</i>	100	7
<i>Larix laricina</i>	73	1
Shrub Stratum Cover (Mean)	72	
<i>Kalmia angustifolia</i>	100	35
<i>Vaccinium angustifolium</i>	100	13
<i>Rhododendron canadense</i>	91	9
<i>Rhododendron groenlandicum</i>	73	3
<i>Picea mariana</i>	64	3
<i>Populus tremuloides</i>	55	2
<i>Alnus viridis</i>	45	24
Herb Stratum Cover (Mean)	7	
<i>Vaccinium vitis-idaea</i>	55	4
<i>Arctostaphylos uva-ursi</i>	45	5
Bryo-Lichen Stratum Cover (Mean)	95	
<i>Cladina mitis</i>	100	42
<i>Cladonia</i> spp.	100	20
<i>Cladina stellaris</i>	100	8
<i>Cladina rangiferina</i>	91	24
<i>Stereocaulon paschale</i>	73	14
<i>Pleurozium schreberi</i>	73	2
<i>Ptilium crista-castrensis</i>	64	1
<i>Polytrichum juniperinum</i>	55	6
<i>Dicranum spurium</i>	55	2
<i>Ptilidium ciliare</i>	45	3
<i>Dicranum undulatum</i>	45	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	md (100)
Slope	md (100)
Aspect	md (100)
Meso Topoposition	md (100)
Moisture Regime	dry (100)
Nutrient Regime	md (100)
Soil Parent Material	md (100)
Soil Rooting Zone Substrate	md (100)
Root Restricting Depth	md (100)
Humus Form	md (100)



Source: W. Meades

Notes & Similar Associations

Kalmia angustifolia is an aggressive competitor to conifer regeneration. In the CNVC, *Pinus strobus* and *P. resinosa* are considered temperate species. *P. resinosa* is uncommon in Newfoundland, but where it occurs, it is in this Association. As these stands lack understory species typically associated with temperate forests, CNVC00205 is classified as boreal. CNVC00205 is of significance to the conservation of *P. resinosa* in Newfoundland as the species is only known from a small number of locations. CNVC00204 is a similar Association that includes *Vaccinium myrtilloides* and occurs in Quebec.

CNVC00207 *Pinus banksiana* (*Picea mariana*) / *Vaccinium angustifolium* / *Pleurozium schreberi*

CONIFER

Jack Pine (Black Spruce) / Early Lowbush Blueberry / Red-stemmed Feathermoss

Subassociations: none

Provinces: Manitoba, Ontario

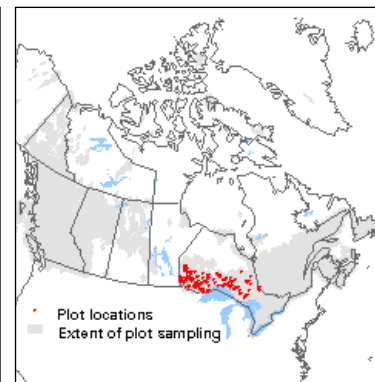
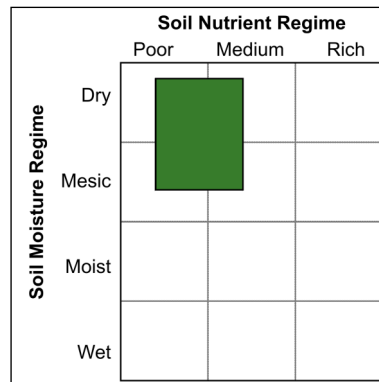
Ericaceous Shrub & Feathermoss

CNVC00207 has an open to moderately closed canopy of *Pinus banksiana*, sometimes with a minor component of *Picea mariana*. The moderately developed shrub layer includes regenerating *P. mariana* and the ericaceous species *Vaccinium myrtilloides*, *V. angustifolium* and occasionally, *Rhododendron groenlandicum*. The herb layer is usually sparse; only *Maianthemum canadense*, *Cornus canadensis* and *Linnaea borealis* are common. A well-developed moss layer dominated by *Pleurozium schreberi* further characterizes this Association.

CNVC00207 occurs on dry to mesic, nutrient-poor to medium sites in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. Stands are usually on crest or upper- to mid-slope topopositions, and frequently on warm, south or west, aspects. Typically soils are coarse textured and derived from glaciofluvial or morainal parent materials, but sometimes they are fine-textured lacustrine or glaciolacustrine sediments. This is an early seral condition that is naturally perpetuated by fire.

Characteristic Plants	CNVC00207	
	266 plots	
^≥40% presence; ±characteristic cover	Presence^	Cover±
Tree Stratum Cover (Mean)	36	
<i>Pinus banksiana</i>	100	30
<i>Picea mariana</i>	53	12
Shrub Stratum Cover (Mean)	34	
<i>Vaccinium myrtilloides</i>	85	7
<i>Picea mariana</i>	82	9
<i>Vaccinium angustifolium</i>	73	9
<i>Abies balsamea</i>	44	4
<i>Diervilla lonicera</i>	44	3
<i>Rosa acicularis</i>	42	1
<i>Rhododendron groenlandicum</i>	41	10
Herb Stratum Cover (Mean)	19	
<i>Maianthemum canadense</i>	89	4
<i>Cornus canadensis</i>	81	5
<i>Linnaea borealis</i>	80	2
<i>Gaultheria hispidula</i>	53	2
<i>Aralia nudicaulis</i>	45	2
<i>Clintonia borealis</i>	42	1
Bryo-Lichen Stratum Cover (Mean)	79	
<i>Pleurozium schreberi</i>	99	64
<i>Dicranum polysetum</i>	93	5
<i>Cladina rangiferina</i>	69	3
<i>Ptilium crista-castrensis</i>	56	8

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	200–387–515 m; md (5)
Slope	level (46); gentle (20); moderate (18); moderately steep (7); steep (2); very steep (1); md (7)
Aspect	north (13); east (9); south (24); west (26); level (24); md (5)
Meso Topoposition	crest/ upper (44); mid (24); lower/ toe (10); depression (1); level (21)
Moisture Regime	very dry (5); dry (61); mesic (29); moist (6)
Nutrient Regime	md (100)
Soil Parent Material	glaciofluvial (53); moraine/ till (23); lacustrine (11); other (8); md (5)
Soil Rooting Zone Substrate	sandy (52); coarse loamy (28); other (6); md (14)
Root Restricting Depth	0-20 cm (6); 21-99 cm (15); ≥100 cm (63), md (16)
Humus Form	mor (68); moder (18); mull (2); md (12)



Source: NRCan—CFS

Notes & Similar Associations

CNVC00208 occurs on similar or slightly moister sites. *Pinus banksiana* or *Picea mariana* may be dominant, but herb layer development is greater than in CNVC00207.

CNVC00209 has more abundant ericaceous shrubs, including *Kalmia angustifolia* (absent from CNVC00207).

CNVC00208 *Picea mariana*—*Pinus banksiana* / *Vaccinium angustifolium* / *Pleurozium schreberi*

CONIFER

Black Spruce—Jack Pine / Early Lowbush Blueberry / Red-stemmed Feathermoss

Subassociations: *typic*, *Diervilla lonicera*

Provinces: Manitoba, Ontario

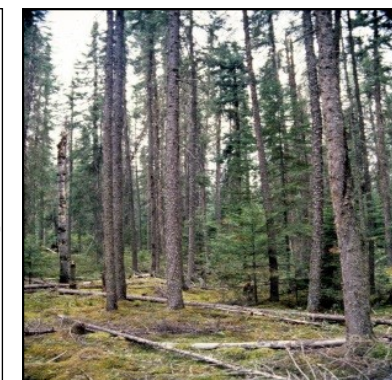
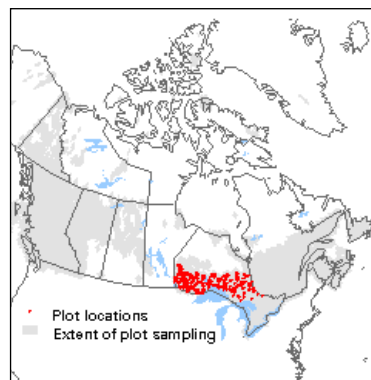
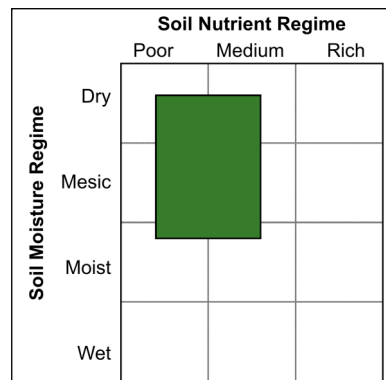
Ericaceous Shrub & Feathermoss

CNVC00208 has a moderately closed canopy of *Picea mariana* and/or *Pinus banksiana*, usually with *P. mariana* dominant (except in the *Diervilla lonicera* subassociation). The moderately to well-developed shrub layer usually includes *P. mariana* and *Abies balsamea*, as well as *Vaccinium myrtilloides* and *V. angustifolium*. The herb layer is poorly developed in the *typic* subassociation, with only *Cornus canadensis*, *Maianthemum canadense* and *Linnaea borealis* common. The *D. lonicera* subassociation has a better developed understory that usually includes *Clintonia borealis*, *Aralia nudicaulis* and *Lysimachia borealis*. A well-developed moss layer dominated by *Pleurozium schreberi*, with minor amounts of *Dicranum polysetum* and *Ptilium crista-castrensis*, further characterizes this Association.

CNVC00208 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is found on dry to moist, nutrient-poor to -medium sites. Soils are most often deep and coarse textured, derived from morainal or glaciofluvial parent materials, but they can be fine-textured lacustrine sediments (particularly for the slightly richer *D. lonicera* subassociation). CNVC00208 can develop as the first cohort after fire or succeed an earlier seral Association.

Characteristic Plants	CNVC00208	
	744 plots	
[^] ≥40% presence; [±] characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	43	
<i>Picea mariana</i>	85	26
<i>Pinus banksiana</i>	72	20
Shrub Stratum Cover (Mean)	31	
<i>Picea mariana</i>	79	9
<i>Vaccinium myrtilloides</i>	77	3
<i>Vaccinium angustifolium</i>	70	4
<i>Abies balsamea</i>	62	6
<i>Diervilla lonicera</i>	48	7
<i>Rhododendron groenlandicum</i>	47	8
<i>Betula papyrifera</i>	40	4
Herb Stratum Cover (Mean)	22	
<i>Cornus canadensis</i>	85	5
<i>Maianthemum canadense</i>	81	3
<i>Linnaea borealis</i>	67	2
<i>Gaultheria hispidula</i>	61	2
<i>Clintonia borealis</i>	58	2
<i>Aralia nudicaulis</i>	48	3
<i>Lysimachia borealis</i>	47	1
<i>Coptis trifolia</i>	40	1
Bryo-Lichen Stratum Cover (Mean)	69	
<i>Pleurozium schreberi</i>	99	52
<i>Dicranum polysetum</i>	92	3
<i>Ptilium crista-castrensis</i>	79	9
<i>Hylocomium splendens</i>	56	5
<i>Cladina rangiferina</i>	50	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	154–381–531 m; md (2)
Slope	level (44); gentle (28); moderate (13); moderately steep (7); steep (3); very steep (1); md (4)
Aspect	north (19); east (16); south (17); west (21); level (26)
Meso Topoposition	crest/ upper (40); mid (24); lower/ toe (15); depression (2); level (19)
Moisture Regime	very dry (7); dry (33); mesic (39); moist (20); wet (2)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (40); glaciofluvial (31); lacustrine (19); other (8); md (3)
Soil Rooting Zone Substrate	coarse loamy (31); sandy (28); other (23); md (18)
Root Restricting Depth	0-20 cm (9); 21-99 cm (33); ≥100 cm (49), md (9)
Humus Form	mor (70); moder (21); mull (2) peatymor (2); md (5)



Source: NRCan—CFS

Notes & Similar Associations

Moister sites and longer fire cycles favour *Picea mariana* dominance over *Pinus banksiana*.
 CNVC00207 is dominated by *P. banksiana* and often occurs on drier sites.
 CNVC00211 occurs in Ontario and Quebec and has more abundant ericaceous shrubs, including *Kalmia angustifolia*.

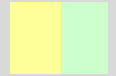
CNVC00209 *Pinus banksiana*—*Picea mariana* / *Kalmia angustifolia* / *Pleurozium schreberi*

CONIFER

Jack Pine—Black Spruce / Sheep Laurel / Red-stemmed Feathermoss

Subassociations: *typic*, *inops*, *Kalmia angustifolia*, *Rhododendron groenlandicum*

Provinces: Ontario, Quebec



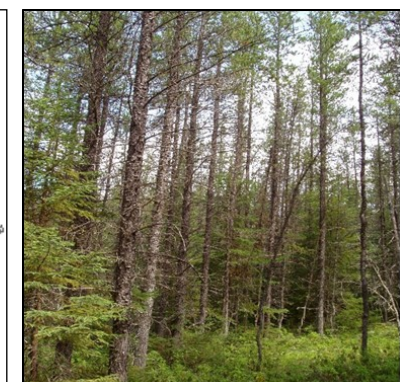
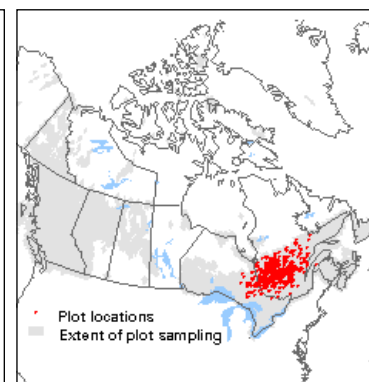
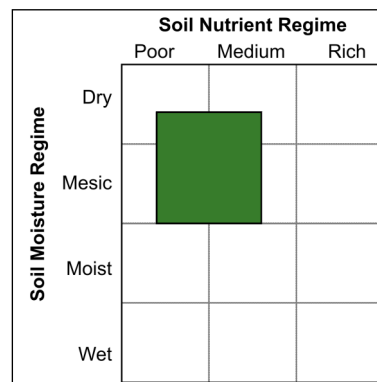
Ericaceous Shrub & Feathermoss

CNVC00209 has a moderately closed to closed canopy dominated by *Pinus banksiana*, with *Picea mariana* as the main companion species. The shrub layer is well developed to dense with abundant regenerating *P. mariana* and ericaceous species, especially *Kalmia angustifolia* but also *Vaccinium myrtilloides*, *V. angustifolium* and *Rhododendron groenlandicum*. *Salix* spp. are usually present but not abundant. The herb layer is sparse; only *Gaultheria hispidula* and *Cornus canadensis* are common. A well-developed moss layer dominated by *Pleurozium schreberi* further characterizes this Association.

CNVC00209 occurs in a region with a humid continental boreal climate on mesic, nutrient-poor to -medium sites. Stands are usually on level sites or gentle to moderate slopes on mid- to upper-slope or crest topopositions. Soils are typically coarse textured, derived from morainal or glaciofluvial parent materials, but they can be fine-textured sediments deposited by proglacial lakes or seas. CNVC00209 typically establishes as the first cohort after fire.

Characteristic Plants	CNVC00209	
	853 plots	
[^] ≥40% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	60	
<i>Pinus banksiana</i>	100	37
<i>Picea mariana</i>	89	20
Shrub Stratum Cover (Mean)	65	
<i>Picea mariana</i>	95	12
<i>Kalmia angustifolia</i>	94	27
<i>Vaccinium myrtilloides</i>	86	9
<i>Vaccinium angustifolium</i>	85	9
<i>Salix</i> spp.	70	4
<i>Rhododendron groenlandicum</i>	68	14
<i>Amelanchier</i> spp.	49	3
<i>Abies balsamea</i>	42	5
Herb Stratum Cover (Mean)	13	
<i>Gaultheria hispidula</i>	70	4
<i>Cornus canadensis</i>	69	6
<i>Maianthemum canadense</i>	58	4
<i>Linnaea borealis</i>	43	3
Bryo-Lichen Stratum Cover (Mean)	72	
<i>Pleurozium schreberi</i>	99	56
<i>Cladina rangiferina</i>	82	5
<i>Dicranum</i> spp.	81	3
<i>Ptilium crista-castrensis</i>	69	8
<i>Cladonia</i> spp.	54	3
<i>Cladonia stellaris</i>	49	5
<i>Cladonia mitis</i>	46	3
<i>Polytrichum</i> spp.	44	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	50–348–640 m
Slope	level (41); gentle (30); moderate (18); moderately steep (8); steep (2); md (1)
Aspect	north (12); east (14); south (17); west (24); level (34)
Meso Topoposition	crest/ upper (31); mid (33); lower/ toe (8); depression (1); level (26)
Moisture Regime	very dry (1); dry (10); mesic (79); moist (10); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (42); glaciofluvial (31); glaciolacustrine (16); other (11)
Soil Rooting Zone Substrate	sandy (18); coarse loamy (13); other (9); md (61)
Root Restricting Depth	0-20 cm (5); 21-99 cm (64); ≥100 cm (4), md (27)
Humus Form	mor (89); moder (6); peatymor (3); md (1)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Kalmia angustifolia is an aggressive competitor to conifer regeneration.
 CNVC00207 & CNVC00208 occur in Ontario but have lower abundance of ericaceous shrubs (and no *K. angustifolia*).
 CNVC00211 is dominated by *Picea mariana*.

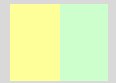
CNVC00211 *Picea mariana* / *Rhododendron groenlandicum*—*Kalmia angustifolia* / *Pleurozium schreberi*

CONIFER

Black Spruce / Common Labrador Tea—Sheep Laurel / Red-stemmed Feathermoss

Subassociations: *typic*, *Kalmia angustifolia*, *Rhododendron groenlandicum*, *Alnus viridis*

Provinces: Ontario, Quebec



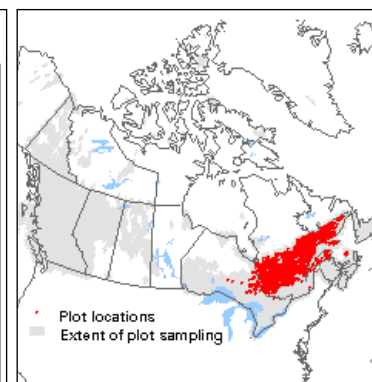
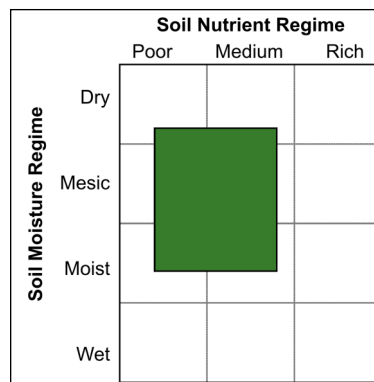
Ericaceous Shrub & Feathermoss

CNVC00211 has a moderately closed canopy dominated by *Picea mariana*. The shrub layer is well developed to dense with abundant *P. mariana*, a minor component of *Abies balsamea* (especially in the eastern part of the range) and abundant ericaceous species, including *Rhododendron groenlandicum*, *Vaccinium myrtilloides*, *V. angustifolium* and *Kalmia angustifolia*. *Alnus viridis* can be abundant. The herb layer is sparse; only *Gaultheria hispidula* and *Cornus canadensis* are common. The moss layer is a continuous thick mat of feathermosses dominated by *Pleurozium schreberi*.

CNVC00211 occurs mainly in a region with a humid continental boreal climate on mesic, nutrient-poor to -medium sites. Stands are most common on mid- to upper-slope or crest topopositions. Soils are usually coarse textured and derived from morainal parent materials, but they can be fine-textured sediments deposited by proglacial lakes or seas. CNVC00211 can develop as the first cohort after fire or succeed an earlier seral Association. Outbreaks of spruce budworm (*Choristoneura fumiferana*) can also play a role in the dynamics of this Association.

Characteristic Plants	CNVC00211	
[^] ≥40% presence except	2118 plots	
<i>Alnus viridis</i> ;	%	%
±characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	58	
<i>Picea mariana</i>	100	44
<i>Abies balsamea</i>	51	7
<i>Betula papyrifera</i>	42	7
Shrub Stratum Cover (Mean)	59	
<i>Picea mariana</i>	100	17
<i>Rhododendron groenlandicum</i>	83	19
<i>Vaccinium myrtilloides</i>	83	7
<i>Vaccinium angustifolium</i>	82	6
<i>Kalmia angustifolia</i>	77	16
<i>Abies balsamea</i>	67	9
<i>Salix</i> spp.	57	4
<i>Amelanchier</i> spp.	54	4
<i>Betula papyrifera</i>	44	4
<i>Alnus viridis</i>	26	10
Herb Stratum Cover (Mean)	10	
<i>Gaultheria hispidula</i>	91	4
<i>Cornus canadensis</i>	82	5
<i>Clintonia borealis</i>	45	3
<i>Maianthemum canadense</i>	42	3
Bryo-Lichen Stratum Cover (Mean)	81	
<i>Pleurozium schreberi</i>	99	59
<i>Dicranum</i> spp.	91	4
<i>Cladina rangiferina</i>	87	4
<i>Ptilium crista-castrensis</i>	85	15
<i>Cladonia</i> spp.	61	3
<i>Sphagnum</i> spp.	59	6
<i>Cladina stellaris</i>	54	5
<i>Cladina mitis</i>	49	3
<i>Hylocomium splendens</i>	43	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	2–411–990 m
Slope	level (24); gentle (31); moderate (27); moderately steep (14); steep (4)
Aspect	north (20); east (17); south (20); west (24); level (19)
Meso Topoposition	crest/ upper (27); mid (47); lower/ toe (9); depression (1); level (15)
Moisture Regime	dry (3); mesic (77); moist (17); wet (3)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (72); glaciofluvial (10); other (18)
Soil Rooting Zone Substrate	coarse loamy (15); sandy (10); other (10); md (64)
Root Restricting Depth	0-20 cm (6); 21-99 cm (63); ≥100 cm (1), md (31)
Humus Form	mor (89); moder (1); peatymor (9)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

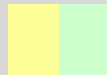
Kalmia angustifolia is an aggressive competitor to conifer regeneration.

CNVC00208 occurs in Ontario and has lower abundance of ericaceous shrubs (and no *K. angustifolia*).

CNVC00209 is dominated by *Pinus banksiana*.

CNVC00350 has less abundant ericaceous shrubs.

CNVC00307 & CNVC00338 occur on the island of Newfoundland. They lack *Vaccinium myrtilloides*.

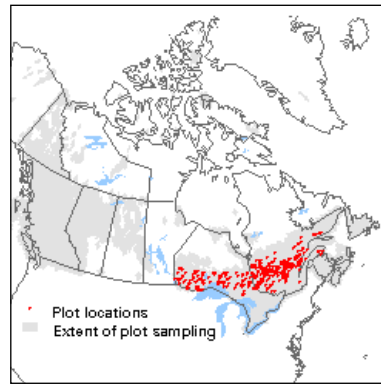
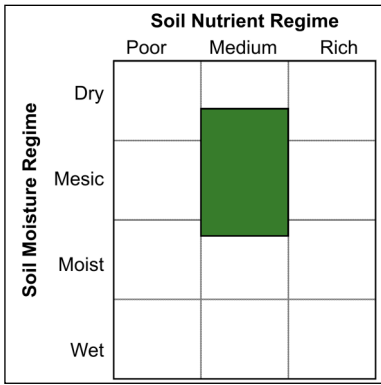
CNVC00213 *Populus tremuloides*—*Betula papyrifera*—*Picea mariana*—*Pinus banksiana* / *Diervilla lonicera* / *Pleurozium schreberi* MIXEDWOOD
 Trembling Aspen—Paper Birch—Black Spruce—Jack Pine / Northern Bush-honeysuckle / Red-stemmed Feathermoss
 Subassociations: *typic*, *Pteridium aquilinum*
 Provinces: Manitoba, Ontario, Quebec 
Mesophytic Herb or Feathermoss

CNVC00213 has a closed canopy of *Populus tremuloides* and/or *Betula papyrifera*, mixed with *Picea mariana* and/or *Pinus banksiana*. The shrub layer is well developed and includes a mix of tree species, especially *P. mariana* and *Abies balsamea*, as well as the low shrubs *Diervilla lonicera*, *Vaccinium myrtilloides* and *V. angustifolium*. The herb layer is moderately developed and commonly includes *Cornus canadensis*, *Maianthemum canadense*, *Linnaea borealis*, *Clintonia borealis*, *Aralia nudicaulis* and *Lysimachia borealis*. *Pteridium aquilinum* can be abundant. The moss layer is poorly to moderately developed, better developed in stands with less broad-leaf litter, and dominated by *Pleurozium schreberi*.

CNVC00213 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is most frequently found on mesic, nutrient-medium sites, but stands can occur on a wide range of site conditions. Stands are usually on mid- to upper-slope or crest topopositions. Soils are often coarse textured and derived from morainal or glaciofluvial parent materials. CNVC00213 is an early seral condition that typically establishes after fire or harvesting.

Characteristic Plants	CNVC00213	
	387 plots	
[^] ≥50% presence except <i>Pteridium aquilinum</i> ;	%	%
[±] characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	66	
<i>Populus tremuloides</i>	89	28
<i>Picea mariana</i>	88	18
<i>Betula papyrifera</i>	74	17
<i>Pinus banksiana</i>	58	22
Shrub Stratum Cover (Mean)	47	
<i>Picea mariana</i>	85	9
<i>Abies balsamea</i>	78	10
<i>Vaccinium myrtilloides</i>	77	5
<i>Vaccinium angustifolium</i>	72	5
<i>Diervilla lonicera</i>	71	10
<i>Betula papyrifera</i>	66	4
<i>Populus tremuloides</i>	61	3
Herb Stratum Cover (Mean)	37	
<i>Cornus canadensis</i>	97	10
<i>Maianthemum canadense</i>	95	5
<i>Linnaea borealis</i>	83	3
<i>Clintonia borealis</i>	81	5
<i>Aralia nudicaulis</i>	80	6
<i>Lysimachia borealis</i>	75	2
<i>Coptis trifolia</i>	57	3
<i>Gaultheria hispidula</i>	56	3
<i>Pteridium aquilinum</i>	39	14
Bryo-Lichen Stratum Cover (Mean)	31	
<i>Pleurozium schreberi</i>	98	22
<i>Ptilium crista-castrensis</i>	70	6
<i>Dicranum</i> spp.	56	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	20–356–640 m
Slope	level (27); gentle (34); moderate (17); moderately steep (14); steep (5); very steep (1); md (1)
Aspect	north (19); east (17); south (21); west (23); level (20); md (1)
Meso Topoposition	crest/ upper (35); mid (40); lower/ toe (8); depression (1); level (16)
Moisture Regime	very dry (2); dry (16); mesic (69); moist (13)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (54); glaciofluvial (24); other (20); md (2)
Soil Rooting Zone Substrate	coarse loamy (21); sandy (17); other (13); md (50)
Root Restricting Depth	0-20 cm (5); 21-99 cm (50); ≥100 cm (23), md (23)
Humus Form	mor (80); moder (16); mull (1); peatymor (1); md (3)



Source: NRCan—CFS

Notes & Similar Associations
 CNVC00238 is a similar hardwood Association.
 CNVC00231 is a similar Association with abundant *Abies balsamea* in the overstory.
 CNVC00215 occurs on slightly richer sites and has abundant *Acer spicatum* and/or *Corylus cornuta*.

CNVC00214 *Picea mariana*—*Betula papyrifera* / *Kalmia angustifolia* / *Pleurozium schreberi*

MIXEDWOOD

Black Spruce—Paper Birch / Sheep Laurel / Red-stemmed Feathermoss

Subassociations: *typic*, *Alnus viridis*, *Ilex mucronata*

Provinces: Quebec

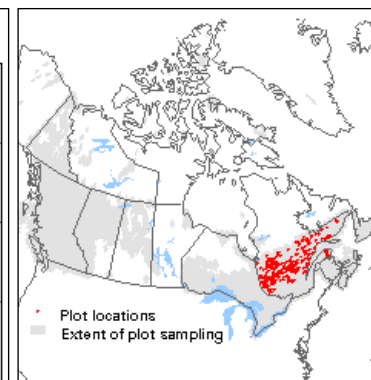
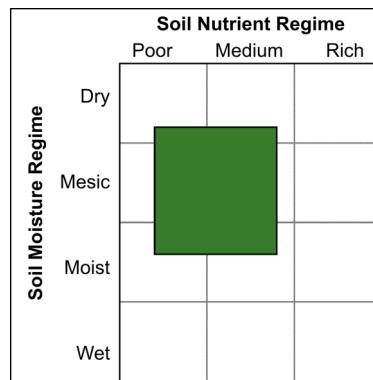
Ericaceous Shrub & Feathermoss

CNVC00214 has a moderately closed canopy of *Picea mariana* and *Betula papyrifera*, sometimes with *Populus tremuloides*, *Abies balsamea* or *Pinus banksiana* as companion species. Regenerating *P. mariana*, *B. papyrifera* and *A. balsamea* are common in the shrub layer, which is dense and usually dominated by the ericaceous species *Kalmia angustifolia*, *Vaccinium angustifolium*, *V. myrtilloides* and *Rhododendron groenlandicum*. *Amelanchier* spp. and *Salix* spp. are often present. The herb layer is poorly to moderately developed and typically includes *Cornus canadensis*, *Maianthemum canadense*, *Gaultheria hispidula* and *Clintonia borealis*. The moss layer is moderately to well developed, better developed in stands with less broad-leaf litter, and dominated by *Pleurozium schreberi*.

CNVC00214 occurs in a region with a humid continental boreal climate on mesic, nutrient-poor to -medium sites. Stands are usually on gentle to moderately steep slopes, on mid- to upper-slope topopositions. Soils are commonly coarse textured and derived from morainal parent materials. CNVC00214 typically establishes as the first cohort after fire, but harvesting can also play a role in its dynamics.

Characteristic Plants	CNVC00214	
[^] ≥50% presence except <i>Ilex mucronata</i> and <i>Viburnum nudum</i> ; ±characteristic cover	282 plots	
	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		57
<i>Picea mariana</i>	97	20
<i>Betula papyrifera</i>	92	19
<i>Abies balsamea</i>	54	8
<i>Populus tremuloides</i>	52	18
Shrub Stratum Cover (Mean)		79
<i>Picea mariana</i>	96	11
<i>Kalmia angustifolia</i>	85	23
<i>Vaccinium angustifolium</i>	85	10
<i>Vaccinium myrtilloides</i>	85	10
<i>Betula papyrifera</i>	83	5
<i>Rhododendron groenlandicum</i>	77	17
<i>Amelanchier</i> spp.	76	6
<i>Abies balsamea</i>	73	11
<i>Salix</i> spp.	66	5
<i>Alnus viridis</i>	58	20
<i>Sorbus americana</i>	54	4
<i>Ilex mucronata</i>	49	6
<i>Viburnum nudum</i>	42	7
Herb Stratum Cover (Mean)		21
<i>Cornus canadensis</i>	88	8
<i>Maianthemum canadense</i>	72	4
<i>Gaultheria hispidula</i>	71	4
<i>Clintonia borealis</i>	70	4
<i>Linnaea borealis</i>	52	3
<i>Lysimachia borealis</i>	52	2
<i>Coptis trifolia</i>	51	3
Bryo-Lichen Stratum Cover (Mean)		50
<i>Pleurozium schreberi</i>	98	38
<i>Dicranum</i> spp.	87	4
<i>Cladina rangiferina</i>	79	3
<i>Ptilium crista-castrensis</i>	72	6

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	56–368–755 m
Slope	level (18); gentle (28); moderate (26); moderately steep (21); steep (7)
Aspect	north (18); east (18); south (23); west (23); level (18)
Meso Topoposition	crest/ upper (30); mid (49); lower/ toe (7); depression (1); level (13)
Moisture Regime	very dry (1); dry (5); mesic (82); moist (12)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (73); other (27)
Soil Rooting Zone Substrate	coarse loamy (12); sandy (11); other (12); md (65)
Root Restricting Depth	0-20 cm (10); 21-99 cm (63); md (28)
Humus Form	mor (91); moder (6); peatymor (3)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Kalmia angustifolia is an aggressive competitor to conifer regeneration.

CNVC00213 occurs on slightly richer sites and has lower abundance of ericaceous shrubs.

CNVC00216 occurs on richer sites and has abundant *Acer spicatum*.

CNVC00234 occurs on slightly richer sites and has more *Abies balsamea*, lower abundance of ericaceous shrubs and a less developed moss layer.

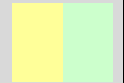
CNVC00215 *Betula papyrifera*—*Populus tremuloides*—*Pinus banksiana* / *Acer spicatum* / *Clintonia borealis*

MIXEDWOOD

Paper Birch—Trembling Aspen—Jack Pine / Mountain Maple / Yellow Clintonia

Subassociations: *typic*, *Acer rubrum*

Provinces: Manitoba, Ontario, Quebec



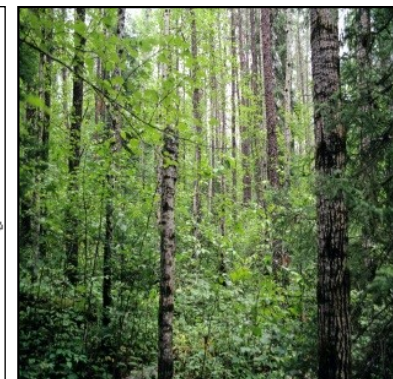
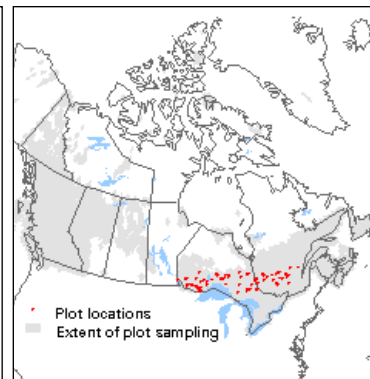
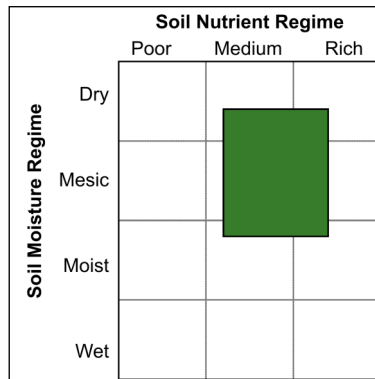
Mesic Rich Shrub & Herb

CNVC00215 has a closed canopy of *Betula papyrifera* and/or *Populus tremuloides*, mixed with *Pinus banksiana* and/or *Picea mariana*. The shrub layer is dense and dominated by the tall shrubs *Acer spicatum* and/or *Corylus cornuta*, with lower abundances of regenerating *Abies balsamea*, *B. papyrifera* and *P. mariana*. The low shrubs *Diervilla lonicera*, *Vaccinium angustifolium* and *V. myrtilloides* are common. The herb layer is well developed and typically includes *Aralia nudicaulis*, *Maianthemum canadense*, *Cornus canadensis*, *Clintonia borealis*, *Eurybia macrophylla*, *Lysimachia borealis*, *Streptopus lanceolatus* and *Linnaea borealis*. The forest floor cover is mainly broad-leaf litter so the moss layer is sparse, with only minor cover of *Pleurozium schreberi*.

CNVC00215 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is most frequently found on mesic, nutrient-medium to rich sites. Stands are often on upper- to mid-slope topopositions. Soils are usually coarse textured and derived from moraine or, less commonly, glaciofluvial parent materials, but they may be fine-textured lacustrine silts or clays. This is an early seral condition that typically establishes after fire or harvesting.

Characteristic Plants	CNVC00215	
[^] ≥50% presence except	83 plots	
<i>Acer rubrum</i> ;	%	%
±characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	65	
<i>Pinus banksiana</i>	88	23
<i>Betula papyrifera</i>	77	23
<i>Populus tremuloides</i>	70	25
<i>Picea mariana</i>	66	11
<i>Acer rubrum</i>	22	13
Shrub Stratum Cover (Mean)	68	
<i>Diervilla lonicera</i>	92	10
<i>Acer spicatum</i>	83	27
<i>Corylus cornuta</i>	82	19
<i>Abies balsamea</i>	78	7
<i>Betula papyrifera</i>	72	6
<i>Picea mariana</i>	64	5
<i>Vaccinium angustifolium</i>	60	2
<i>Vaccinium myrtilloides</i>	59	4
<i>Populus tremuloides</i>	51	2
<i>Acer rubrum</i>	34	6
Herb Stratum Cover (Mean)	40	
<i>Aralia nudicaulis</i>	98	6
<i>Maianthemum canadense</i>	96	4
<i>Cornus canadensis</i>	94	5
<i>Clintonia borealis</i>	93	4
<i>Eurybia macrophylla</i>	81	10
<i>Lysimachia borealis</i>	78	2
<i>Streptopus lanceolatus</i>	72	2
<i>Linnaea borealis</i>	71	2
<i>Lycopodium obscurum</i>	59	2
<i>Coptis trifolia</i>	54	2
<i>Pteridium aquilinum</i>	51	11
Bryo-Lichen Stratum Cover (Mean)	14	
<i>Pleurozium schreberi</i>	94	8

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	214–407–524 m
Slope	level (29); gentle (27); moderate (25); moderately steep (14); steep (2); md (2)
Aspect	north (18); east (22); south (16); west (28); level (17)
Meso Topoposition	crest/ upper (41); mid (34); lower/ toe (8); depression (2); level (14)
Moisture Regime	dry (25); mesic (65); moist (10)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (60); glaciofluvial (23); lacustrine (13); other (3)
Soil Rooting Zone Substrate	coarse loamy (20); sandy (19); silty (12); other (10); md (37)
Root Restricting Depth	0-20 cm (2); 21-99 cm (36); ≥100 cm (42), md (19)
Humus Form	mor (72); moder (25); mull (1); md (1)



Source: NRCan—CFS

Notes & Similar Associations

The *Acer rubrum* subassociation occurs on warm aspects and has more temperate species. CNVC00213 occurs on poorer sites and lacks the abundant tall shrubs of CNVC00215. CNVC00216 occurs on similar sites in Quebec and has more *Abies balsamea* and less *Pinus banksiana*. CNVC00239 is a similar hardwood Association.

CNVC00216 *Picea mariana*—*Betula papyrifera* (*Abies balsamea*) / *Acer spicatum*

MIXEDWOOD

Black Spruce—Paper Birch (Balsam Fir) / Mountain Maple

Subassociations: none

Provinces: Quebec

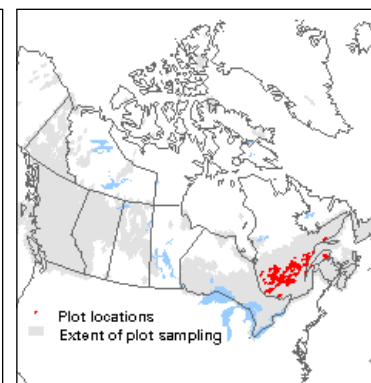
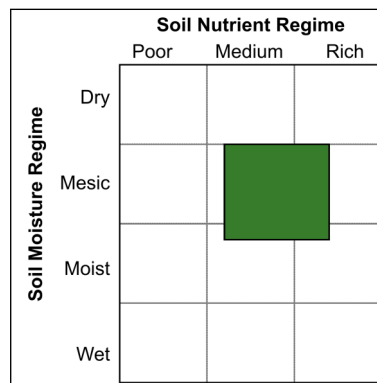
Mesic Rich Shrub & Herb

CNVC00216 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, with a minor component of *Abies balsamea*. *Populus tremuloides* is occasionally abundant. The shrub layer is dense with *Acer spicatum* dominant, and lower abundances of regenerating *P. mariana*, *A. balsamea* and *B. papyrifera*, and several shrub species, including *Diervilla lonicera*, *Amelanchier* spp., *Vaccinium myrtilloides*, *V. angustifolium*, *Sorbus americana* and *Viburnum nudum*. The herb layer is well developed and typically includes *Clintonia borealis*, *Aralia nudicaulis*, *Cornus canadensis*, *Lysimachia borealis*, *Maianthemum canadense*, *Coptis trifolia*, *Linnaea borealis*, *Pteridium aquilinum* and *Gaultheria hispidula*. The forest floor cover is mainly broad-leaf litter so the moss layer is sparse, with essentially only minor cover of *Pleurozium schreberi*.

CNVC00216 occurs in a region with a humid continental boreal climate on mesic, nutrient-medium to -rich sites. Stands are usually on gentle to moderately steep slopes on mid-slope topopositions. Seepage often enhances moisture and nutrient availability. Soils are usually coarse textured and derived from morainal parent materials. CNVC00216 typically establishes as the first cohort after fire, but harvesting and outbreaks of spruce budworm (*Choristoneura fumiferana*) also play a role in its dynamics.

Characteristic Plants	CNVC00216	
^≥50% presence except bryo-lichen layer; ±characteristic cover	151 plots	
	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	68	
<i>Picea mariana</i>	100	23
<i>Betula papyrifera</i>	97	21
<i>Abies balsamea</i>	78	13
Shrub Stratum Cover (Mean)	76	
<i>Acer spicatum</i>	95	26
<i>Picea mariana</i>	95	8
<i>Abies balsamea</i>	93	13
<i>Betula papyrifera</i>	85	5
<i>Diervilla lonicera</i>	81	12
<i>Amelanchier</i> spp.	79	6
<i>Vaccinium myrtilloides</i>	77	5
<i>Vaccinium angustifolium</i>	74	3
<i>Sorbus americana</i>	71	5
<i>Viburnum nudum</i>	64	8
Herb Stratum Cover (Mean)	41	
<i>Clintonia borealis</i>	99	8
<i>Aralia nudicaulis</i>	95	7
<i>Cornus canadensis</i>	93	8
<i>Lysimachia borealis</i>	93	3
<i>Maianthemum canadense</i>	92	7
<i>Coptis trifolia</i>	83	3
<i>Linnaea borealis</i>	78	3
<i>Pteridium aquilinum</i>	59	14
<i>Gaultheria hispidula</i>	59	3
<i>Lycopodium obscurum</i>	57	3
<i>Dryopteris spinulosa</i> complex	54	3
Bryo-Lichen Stratum Cover (Mean)	27	
<i>Pleurozium schreberi</i>	98	16
<i>Dicranum</i> spp.	91	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	65–377–600 m
Slope	level (15); gentle (27); moderate (21); moderately steep (23); steep (14); other (1)
Aspect	north (17); east (28); south (23); west (21); level (11)
Meso Topoposition	crest/ upper (19); mid (64); lower/ toe (8); depression (3); level (6)
Moisture Regime	dry (3); mesic (87); moist (10)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (79); glaciofluvial (11); other (10)
Soil Rooting Zone Substrate	coarse loamy (20); sandy (10); other (4); md (66)
Root Restricting Depth	0-20 cm (5); 21-99 cm (69); md (26)
Humus Form	mor (89); moder (11); peatymor (1)



Notes & Similar Associations

CNVC00214 occurs on poorer sites and has more abundant ericaceous shrubs.

CNVC00215 has less *Abies balsamea* and usually more *Pinus banksiana* in the overstory.

CNVC00234 occurs on slightly poorer sites and has less *Acer spicatum* and *Corylus cornuta* in the shrub layer.

CNVC00235 has less overstory *Picea mariana*.

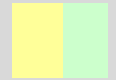
CNVC00217 *Picea mariana*—*Abies balsamea* / *Rhododendron groenlandicum* / *Pleurozium schreberi*

CONIFER

Black Spruce—Balsam Fir / Common Labrador Tea / Red-stemmed Feathermoss

Subassociations: *typic*, *Kalmia angustifolia*

Provinces: Manitoba, Ontario, Quebec



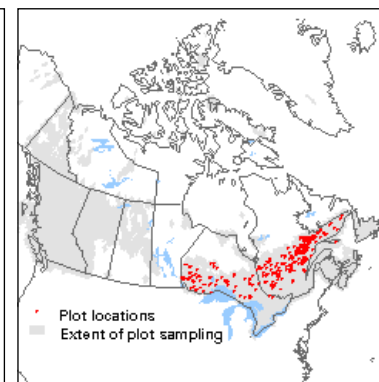
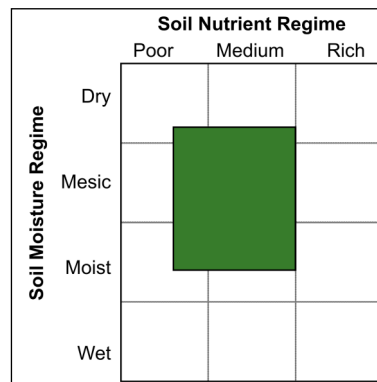
Ericaceous Shrub & Feathermoss

CNVC00217 has a moderately closed canopy of varying proportions of *Picea mariana* and *Abies balsamea*. The well-developed to dense shrub layer is dominated by regeneration of these species, as well as *Rhododendron groenlandicum*. It also includes *Betula papyrifera*, *Vaccinium myrtilloides*, *V. angustifolium* and, in the eastern part of the range, *Kalmia angustifolia*. The herb layer is poorly developed with only *Cornus canadensis* and *Gaultheria hispidula* common. A well-developed to continuous mat of feathermosses, dominated by *Pleurozium schreberi*, further characterizes this Association.

CNVC00217 occurs in a region with a continental boreal climate that is subhumid in the west, becoming increasingly humid farther east. It commonly occurs on sites that are mesic and nutrient medium. Stands are usually on mid- to upper-slope topositions. Soils are typically coarse textured and derived from morainal parent materials. This is a late seral condition with dynamics driven by fire, outbreaks of spruce budworm (*Choristoneura fumiferana*) and windthrow. Although *P. mariana* and *A. balsamea* are present in every stand, climate, disturbance type and history, and site conditions affect their relative dominance.

Characteristic Plants	CNVC00217	
	249 plots	
[^] ≥40% presence; ±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		50
<i>Picea mariana</i>	99	24
<i>Abies balsamea</i>	98	18
Shrub Stratum Cover (Mean)		61
<i>Abies balsamea</i>	99	16
<i>Picea mariana</i>	96	15
<i>Rhododendron groenlandicum</i>	76	22
<i>Vaccinium myrtilloides</i>	72	5
<i>Vaccinium angustifolium</i>	70	5
<i>Betula papyrifera</i>	68	5
<i>Kalmia angustifolia</i>	51	13
<i>Amelanchier</i> spp.	43	4
Herb Stratum Cover (Mean)		15
<i>Cornus canadensis</i>	92	4
<i>Gaultheria hispidula</i>	85	4
<i>Clintonia borealis</i>	61	3
<i>Maianthemum canadense</i>	60	2
<i>Linnaea borealis</i>	55	2
<i>Coptis trifolia</i>	52	2
<i>Lysimachia borealis</i>	43	2
Bryo-Lichen Stratum Cover (Mean)		75
<i>Pleurozium schreberi</i>	100	49
<i>Ptilium crista-castrensis</i>	87	16
<i>Cladina rangiferina</i>	71	3
<i>Dicranum</i> spp.	67	3
<i>Hylocomium splendens</i>	61	8
<i>Cladonia</i> spp.	52	2
<i>Sphagnum</i> spp.	47	9
<i>Polytrichum</i> spp.	44	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	110–428–845 m; md (2)
Slope	level (23); gentle (23); moderate (24); moderately steep (20); steep (8); md (2)
Aspect	north (19); east (21); south (14); west (29); level (17)
Meso Toposition	crest/ upper (28); mid (48); lower/ toe (9); depression (1); level (13)
Moisture Regime	very dry (2); dry (8); mesic (68); moist (18); wet (2)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (65); glaciofluvial (13); lacustrine (11); other (8); md (2)
Soil Rooting Zone Substrate	coarse loamy (20); sandy (13); other (14); md (53)
Root Restricting Depth	0-20 cm (8); 21-99 cm (50); ≥100 cm (16); md (27)
Humus Form	mor (86); moder (6); peatymor (7)



Source: NRCan—CFS

Notes & Similar Associations

CNVC00208, CNVC00211 & CNVC00350 have little to no *Abies balsamea* in the canopy.
 CNVC00351 occurs on sites that experience a more humid, maritime climate and has less abundant ericaceous shrubs and more *Hylocomium splendens* in the moss layer.
 CNVC00277 occurs on moister sites and has significant *Sphagnum* moss cover.

CNVC00218 *Pinus banksiana*—*Abies balsamea*—*Betula papyrifera* / *Diervilla lonicera* / *Pleurozium schreberi*

MIXEDWOOD

Jack Pine—Balsam Fir—Paper Birch / Northern Bush-honeysuckle / Red-stemmed Feathermoss

Subassociations: *typic*, *Diervilla lonicera*

Provinces: Quebec

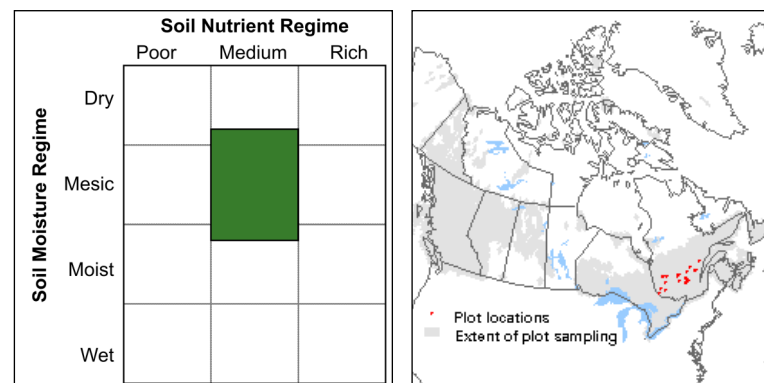
Mesophytic Herb or Feathermoss

CNVC00218 has a closed canopy of *Pinus banksiana*, *Abies balsamea*, *Betula papyrifera* and *Picea mariana*, often with a minor component of *Populus tremuloides*. Regenerating *A. balsamea*, *P. mariana* and *B. papyrifera* are usually abundant in the dense shrub layer, as are the ericaceous species *Vaccinium myrtilloides*, *Kalmia angustifolia* and *V. angustifolium*. *Sorbus americana*, *Diervilla lonicera*, *Viburnum nudum* and *Salix* spp. are common but less abundant. The herb layer is usually moderately developed and typically includes *Cornus canadensis*, *Maianthemum canadense*, *Linnaea borealis*, *Clintonia borealis*, *Aralia nudicaulis*, *Lysimachia borealis*, *Coptis trifolia*, *Pteridium aquilinum* and *Gaultheria hispidula*. The moss layer is poorly to well developed, better developed where there is less broad-leaf litter on the forest floor; *Pleurozium schreberi* is dominant.

CNVC00218 occurs in a region with a humid continental boreal climate and is most frequently found on mesic, nutrient-medium sites. Stands are commonly on mid- to upper-slope topopositions. Soils are typically coarse textured and derived from morainal or glaciofluvial parent materials.

Characteristic Plants	CNVC00218 20 plots	
$\geq 50\%$ presence; \pm characteristic cover	% Presence [^]	% Cover ⁺
Tree Stratum Cover (Mean)		79
<i>Pinus banksiana</i>	100	36
<i>Abies balsamea</i>	95	21
<i>Betula papyrifera</i>	95	13
<i>Picea mariana</i>	85	10
<i>Populus tremuloides</i>	65	8
Shrub Stratum Cover (Mean)		70
<i>Abies balsamea</i>	100	19
<i>Vaccinium myrtilloides</i>	95	7
<i>Picea mariana</i>	90	10
<i>Betula papyrifera</i>	90	5
<i>Sorbus americana</i>	75	5
<i>Kalmia angustifolia</i>	70	11
<i>Diervilla lonicera</i>	70	9
<i>Viburnum nudum</i>	65	3
<i>Vaccinium angustifolium</i>	60	4
<i>Salix</i> spp.	60	3
<i>Picea glauca</i>	55	4
Herb Stratum Cover (Mean)		30
<i>Cornus canadensis</i>	100	10
<i>Maianthemum canadense</i>	95	4
<i>Linnaea borealis</i>	90	3
<i>Clintonia borealis</i>	85	6
<i>Aralia nudicaulis</i>	85	5
<i>Lysimachia borealis</i>	75	2
<i>Coptis trifolia</i>	70	3
<i>Pteridium aquilinum</i>	65	10
<i>Gaultheria hispidula</i>	65	3
Bryo-Lichen Stratum Cover (Mean)		41
<i>Pleurozium schreberi</i>	100	35
<i>Dicranum</i> spp.	85	6
<i>Ptilium crista-castrensis</i>	55	5

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	165–332–525 m
Slope	level (20); gentle (50); moderate (10); moderately steep (15); steep (5)
Aspect	north (25); east (20); south (20); west (25); level (10)
Meso Topoposition	crest/ upper (35); mid (55); lower/ toe (10)
Moisture Regime	dry (10); mesic (80); moist (10)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (50); glaciofluvial (35); glaciolacustrine (10); other (5)
Soil Rooting Zone Substrate	coarse loamy (20); sandy (10); md (70)
Root Restricting Depth	21-99 cm (80); md (20)
Humus Form	mor (90); moder (10)



Notes & Similar Associations
 CNVC00213 has little to no *Abies balsamea* in the overstory.
 CNVC00234 has little to no *Pinus banksiana* in the overstory.

CNVC00220 *Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*

CONIFER

Balsam Fir (Black Spruce) / Common Wood-sorrel / Red-stemmed Feathermoss

Subassociations: *typic, Hylocomium splendens, Acer spicatum*

Provinces: New Brunswick, Nova Scotia

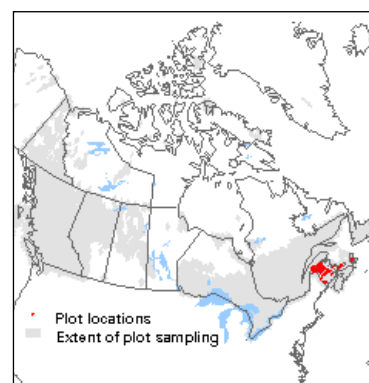
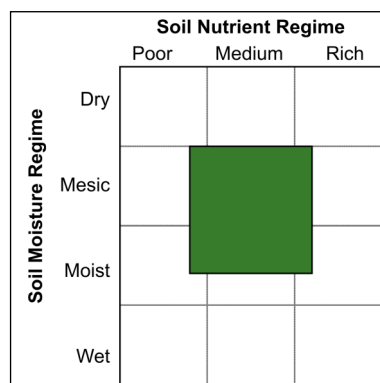
Mesophytic Herb or Feathermoss

CNVC00220 has a closed canopy dominated by *Abies balsamea*, with lower abundance of *Picea mariana* and sometimes a minor component of *Betula papyrifera*. The shrub layer is usually moderately developed and dominated by regeneration of these species. *Sorbus americana*, *Amelanchier* spp. and *Acer rubrum* are common, but less abundant. *A. spicatum* can be abundant and distinguishes a subassociation. The herb layer is moderately developed and characterized by *Oxalis montana* and/or *Dryopteris intermedia*, but typically includes lower abundances of a variety of other herb and dwarf shrub species. The well-developed moss layer consists mainly of *Pleurozium schreberi*, except in the *Hylocomium splendens* subassociation.

CNVC00220 occurs in a region with a very humid, maritime-influenced boreal climate, generally on mesic to moist, nutrient-medium sites. Stands usually occur on lower slopes, often on warm, west or south, aspects. Soils are typically deep and coarse textured, on morainal or colluvial deposits. This is a late seral condition with dynamics driven mainly by outbreaks of spruce budworm (*Choristoneura fumiferana*).

Characteristic Plants	CNVC00220	
	82 plots	
^≥40% presence except		
<i>Acer spicatum</i> ;	%	%
±characteristic cover	Presence^	Cover±
Tree Stratum Cover (Mean)		63
<i>Abies balsamea</i>	100	47
<i>Picea mariana</i>	100	22
<i>Betula papyrifera</i>	51	9
Shrub Stratum Cover (Mean)		28
<i>Abies balsamea</i>	99	31
<i>Picea mariana</i>	93	16
<i>Betula papyrifera</i>	85	9
<i>Sorbus americana</i>	65	5
<i>Amelanchier</i> spp.	63	6
<i>Acer rubrum</i>	61	7
<i>Vaccinium myrtilloides</i>	59	6
<i>Rubus idaeus</i>	41	7
<i>Acer spicatum</i>	35	5
Herb Stratum Cover (Mean)		33
<i>Cornus canadensis</i>	95	5
<i>Maianthemum canadense</i>	91	3
<i>Lysimachia borealis</i>	91	2
<i>Clintonia borealis</i>	89	4
<i>Aralia nudicaulis</i>	84	2
<i>Linnaea borealis</i>	82	3
<i>Oxalis montana</i>	77	7
<i>Coptis trifolia</i>	72	2
<i>Dryopteris intermedia</i>	70	2
<i>Gaultheria hispidula</i>	63	2
Bryo-Lichen Stratum Cover (Mean)		53
<i>Pleurozium schreberi</i>	99	25
<i>Dicranum scoparium</i>	88	5
<i>Hylocomium splendens</i>	78	12
<i>Dicranum polysetum</i>	68	5
<i>Ptilium crista-castrensis</i>	68	3
<i>Bazzania trilobata</i>	67	5

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	14–319–645 m; md (4)
Slope	level (27); gentle (27); moderate (13); moderately steep (15); steep (11); very steep (4); md (4)
Aspect	north (17); east (9); south (20); west (33); level (17); md (5)
Meso Topoposition	crest/ upper (7); mid (15); lower/ toe (32); depression (2); level (22); md (22)
Moisture Regime	dry (6); mesic (60); moist (28); wet (6)
Nutrient Regime	poor (9); medium (60); rich (26); md (6)
Soil Parent Material	moraine/ till (56); colluvium (27); other (2); md (15)
Soil Rooting Zone Substrate	coarse loamy (39); non-soil (27); other (10); md (23)
Root Restricting Depth	21-99 cm (6); ≥100 cm (85); md (9)
Humus Form	mor (2); md (98)



Source: S. Basquill

Notes & Similar Associations

Acer rubrum is considered a temperate species in the CNVC, but as it is not a significant canopy component in CNVC00220, and is not accompanied by temperate understory species, this Association is classified as boreal. CNVC00222 has little to no *Picea mariana*. CNVC00351 is a similar condition in Quebec and Newfoundland that has less developed shrub and herb layers.

CNVC00222 *Abies balsamea* / *Pleurozium schreberi*

CONIFER

Balsam Fir / Red-stemmed Feathermoss



Subassociations: *typic*, *Hylocomium splendens*, *Oxalis montana*, *Cornus canadensis*, *Taxus canadensis*

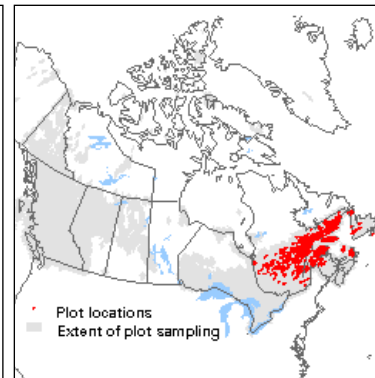
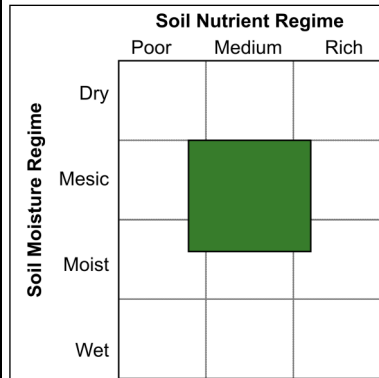
Provinces: New Brunswick, Newfoundland and Labrador, Nova Scotia, Quebec

Mesophytic Herb or Feathermoss

CNVC00222 has a closed canopy dominated by *Abies balsamea*, usually with smaller components of *Betula papyrifera*, *Picea glauca* and/or *P. mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately developed shrub layer. The herb layer varies from poorly to well developed, depending on subassociation, but usually includes *Cornus canadensis*, *Maianthemum canadense*, *Lysimachia borealis* and *Clintonia borealis*. The moss layer is typically well developed and dominated by *Pleurozium schreberi*.

CNVC00222 occurs mainly in a region with a very humid maritime-influenced boreal climate, on primarily mesic, nutrient-medium sites. Site conditions vary among subassociations. This is a late successional condition that can form extensive stands where fire has been absent for a long period. Insect outbreaks and windthrow are the primary natural disturbances. The canopy gaps or large patches that result from these disturbances promote self-replacement of this Association by the release of *A. balsamea* regeneration.

Characteristic Plants	CNVC00222		Site / Soil Characteristics	(% Frequency); md=missing data
^≥40% presence, except <i>Taxus canadensis</i> ; ±characteristic cover	1229 plots		Elevation (min–mean–max)	5–423–1050 m; md (2)
	%	%	Slope	level (15); gentle (20); moderate (25); moderately steep (26); steep (11); md (1)
	Presence [^]	Cover [±]	Aspect	north (23); east (25); south (17); west (23); level (10); md (1)
Tree Stratum Cover (Mean)	65		Meso Toposition	crest/ upper (18); mid (58); lower/ toe (9); depression (2); level (7); md (6)
<i>Abies balsamea</i>	100	46	Moisture Regime	dry (2); mesic (79); moist (18); wet (1)
<i>Betula papyrifera</i>	75	8	Nutrient Regime	poor (2); medium (4); rich (1); md (93)
<i>Picea glauca</i>	60	10	Soil Parent Material	moraine/ till (73); colluvium (12); other (10); md (4)
<i>Picea mariana</i>	58	9	Soil Rooting Zone Substrate	coarse loamy (17); non-soil (12); other (14); md (57)
Shrub Stratum Cover (Mean)	38		Root Restricting Depth	0-20 (3); 21-99 cm (52); ≥100 cm (5); md (40)
<i>Abies balsamea</i>	98	24	Humus Form	mor (83); moder (2); peatymor (3); md (12)
<i>Betula papyrifera</i>	86	6		
<i>Picea mariana</i>	61	8		
<i>Picea glauca</i>	54	5		
<i>Amelanchier</i> spp.	48	4		
<i>Taxus canadensis</i>	4	4		
Herb Stratum Cover (Mean)	25			
<i>Cornus canadensis</i>	90	7		
<i>Maianthemum canadense</i>	74	3		
<i>Lysimachia borealis</i>	73	2		
<i>Clintonia borealis</i>	72	4		
<i>Gaultheria hispida</i>	67	4		
<i>Linnaea borealis</i>	63	3		
<i>Coptis trifolia</i>	59	3		
<i>Oxalis montana</i>	50	11		
<i>Dryopteris spinulosa</i> complex	47	5		
Bryo-Lichen Stratum (Mean)	70			
<i>Pleurozium schreberi</i>	98	39		
<i>Ptilium crista-castrensis</i>	84	8		
<i>Dicranum</i> spp.	81	5		
<i>Hylocomium splendens</i>	79	22		
<i>Polytrichum</i> spp.	56	2		
<i>Cladonia</i> spp.	54	2		
<i>Cladina rangiferina</i>	41	2		
<i>Sphagnum</i> spp.	40	6		



Source: W Meades

Notes & Similar Associations

Heavy browsing by deer or moose can result in these forests becoming dominated by *Picea glauca*. CNVC00217, CNVC00220 and CNVC00351 have more *Picea mariana*. CNVC00225 occurs on moister, richer sites in New Brunswick, Nova Scotia and Quebec. It has more *Acer spicatum* and greater frequency and abundance of nutrient-demanding herb species. CNVC00310 occurs in New Brunswick, Nova Scotia and the island of Newfoundland. It has *Taxus canadensis*, much more *Dryopteris* spp. and lacks *Oxalis montana*.

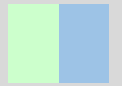
CNVC00225 *Abies balsamea* (*Picea glauca*) / *Acer spicatum* / *Oxalis montana*

CONIFER

Balsam Fir (White Spruce) / Mountain Maple / Common Wood-sorrel

Subassociations: *typic*, *Rubus pubescens*

Provinces: New Brunswick, Nova Scotia, Quebec



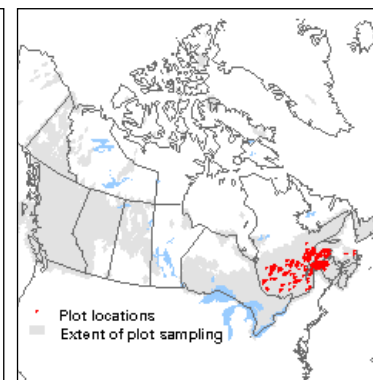
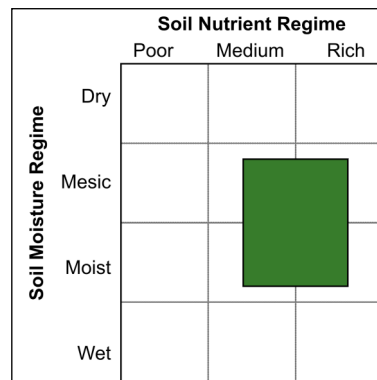
Mesic Rich Shrub & Herb

CNVC00225 has a closed canopy dominated by *Abies balsamea*, often with *Picea glauca* and *Betula papyrifera* as companion species. The shrub layer is well developed with *Acer spicatum* and *A. balsamea* dominant, and lower abundances of *B. papyrifera* and *P. glauca*. The herb layer is moderately developed and typically includes *Aralia nudicaulis*, *Clintonia borealis*, *Cornus canadensis*, *Lysimachia borealis*, *Oxalis montana*, *Maianthemum canadense*, *Coptis trifolia* and *Linnaea borealis*. The moderately developed moss layer consists mainly of *Pleurozium schreberi* and *Hylocomium splendens*.

CNVC00225 occurs in a region with a boreal climate that grades from humid continental in the west to very humid and more maritime in the east. It is most common on mesic to moist, nutrient-medium to -rich sites; these are some of the most productive sites in the region. Stands are usually on mid- to lower-slope topopositions where seepage enhances moisture and nutrient availability. Soils are mainly coarse textured and derived from morainal parent materials. This is a self-replacing, late seral condition that occurs where fire has been absent for a long period. Insect outbreaks and windthrow are the primary natural disturbances.

Characteristic Plants	CNVC00225 300 plots	
$\wedge \geq 50\%$ presence;	%	%
\pm characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)		65
<i>Abies balsamea</i>	100	41
<i>Picea glauca</i>	81	15
<i>Betula papyrifera</i>	79	10
Shrub Stratum Cover (Mean)		53
<i>Abies balsamea</i>	100	20
<i>Acer spicatum</i>	94	23
<i>Betula papyrifera</i>	82	6
<i>Picea glauca</i>	72	6
<i>Sorbus americana</i>	57	4
<i>Corylus cornuta</i>	54	8
<i>Rubus idaeus</i>	53	7
<i>Ribes lacustre</i>	53	4
Herb Stratum Cover (Mean)		37
<i>Aralia nudicaulis</i>	87	4
<i>Clintonia borealis</i>	87	4
<i>Cornus canadensis</i>	84	5
<i>Lysimachia borealis</i>	83	2
<i>Oxalis montana</i>	81	9
<i>Maianthemum canadense</i>	79	3
<i>Coptis trifolia</i>	75	2
<i>Linnaea borealis</i>	73	3
<i>Rubus pubescens</i>	63	3
<i>Gymnocarpium dryopteris</i>	63	3
<i>Viola</i> spp.	63	2
<i>Streptopus lanceolatus</i>	57	2
<i>Dryopteris spinulosa</i> complex	52	7
<i>Phegopteris connectilis</i>	50	3
Bryo-Lichen Stratum Cover (Mean)		36
<i>Pleurozium schreberi</i>	93	17
<i>Ptilium crista-castrensis</i>	63	4
<i>Hylocomium splendens</i>	61	11
<i>Dicranum</i> spp.	60	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	25–331–830 m; md (2)
Slope	level (21); gentle (21); moderate (22); moderately steep (21); steep (13); md (1)
Aspect	north (24); east (20); south (17); west (24); level (14); md (1)
Meso Topoposition	crest/ upper (13); mid (43); lower/ toe (23); depression (2); level (12); md (7)
Moisture Regime	dry (3); mesic (63); moist (29); wet (7)
Nutrient Regime	poor (2); medium (18); rich (13); md (67)
Soil Parent Material	moraine/ till (65); colluvium (12); other (18); md (4)
Soil Rooting Zone Substrate	coarse loamy (17); non-soil (12); other (15); md (56)
Root Restricting Depth	0-20 cm (2); 21-99 cm (42); ≥ 100 cm (30); md (26)
Humus Form	mor (56); moder (7); mull (1); peatymor (5); md (31)



Source: S. Basquill

Notes & Similar Associations

Acer spicatum can form dense thickets in canopy openings, sometimes delaying tree regeneration.
 CNVC00222 occurs on sites that are not as moist nor rich and lacks abundant *A. spicatum*.
 CNVC00256 occurs in Ontario and southeastern Manitoba.
 CNVC00297 occurs in Quebec on moister, richer sites and has abundant *Alnus incana* rather than *A. spicatum*.
 CNVC00348 occurs on the island of Newfoundland and has less abundant *Picea glauca* and *A. spicatum*.

CNVC00226 *Picea glauca* (*Abies balsamea*) / *Pleurozium schreberi* (*Bazzania trilobata*)

CONIFER

White Spruce (Balsam Fir) / Red-stemmed Feathermoss (Three-lobed Whipwort)

Subassociations: *typic*, *Empetrum nigrum*

Provinces: New Brunswick, Nova Scotia, Prince Edward Island

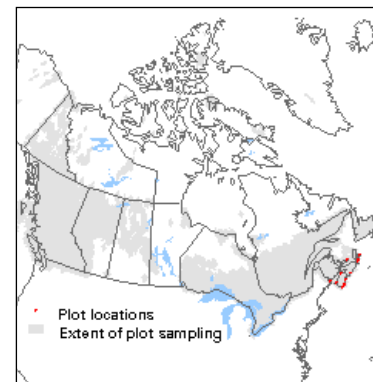
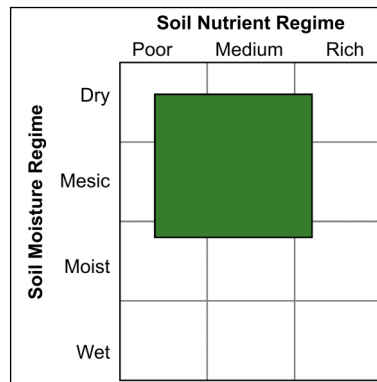
Ericaceous Shrub & Feathermoss

CNVC00226 has a closed tree layer dominated by *Picea glauca*, with less abundant *Abies balsamea*. The shrub layer is poorly developed except in the *Empetrum nigrum* subassociation, which can have abundant *E. nigrum* and *Juniperus communis*. The moderately developed herb layer usually includes *Maianthemum canadense*, *Lysimachia borealis* and *Cornus canadensis*. The moss layer is moderately developed and consists mainly of *Pleurozium schreberi*.

CNVC00226 occurs in a region with a very humid, maritime boreal climate. It occurs on coastal sites characterized by strong winds, salt spray, high humidity and cool mean annual temperatures. Windthrow is the primary natural disturbance but stands typically self perpetuate. Stands of this Association sometimes occur as krummholtz.

Characteristic Plants	CNVC00226	
	19 plots	
[^] ≥40% presence except <i>Juniperus communis</i> and <i>Empetrum nigrum</i> ; [±] characteristic cover;	%	%
	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	69	
<i>Picea glauca</i>	100	47
<i>Abies balsamea</i>	84	19
<i>Picea mariana</i>	53	5
<i>Betula papyrifera</i>	47	4
Shrub Stratum Cover (Mean)	16	
<i>Abies balsamea</i>	68	2
<i>Ilex mucronata</i>	63	< 1
<i>Kalmia angustifolia</i>	53	1
<i>Vaccinium angustifolium</i>	47	1
<i>Sorbus americana</i>	42	1
<i>Picea glauca</i>	32	9
<i>Vaccinium myrtilloides</i>	21	< 1
<i>Juniperus communis</i>	16	35
Herb Stratum Cover (Mean)	29	
<i>Maianthemum canadense</i>	84	4
<i>Lysimachia borealis</i>	84	1
<i>Cornus canadensis</i>	79	6
<i>Linnaea borealis</i>	58	9
<i>Coptis trifolia</i>	58	4
<i>Oclemena acuminata</i>	53	1
<i>Aralia nudicaulis</i>	42	6
<i>Dryopteris intermedia</i>	42	1
<i>Vaccinium vitis-idaea</i>	42	1
<i>Osmundastrum cinnamomeum</i>	42	< 1
<i>Empetrum nigrum</i>	26	14
Bryo-Lichen Stratum Cover (Mean)	46	
<i>Pleurozium schreberi</i>	89	34
<i>Dicranum scoparium</i>	68	2
<i>Bazzania trilobata</i>	63	4
<i>Hylocomium splendens</i>	53	14

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	4–23–58 m
Slope	level (11); gentle (21); moderately steep (5); md (63)
Aspect	north (0); east (21); south (5); west (16); md (58)
Meso Toposition	crest/ upper (26); mid (21); level (26); md (26)
Moisture Regime	dry (37); mesic (47); moist (16)
Nutrient Regime	poor (37); medium (47); rich (16)
Soil Parent Material	moraine/ till (63); other (5); md (32)
Soil Rooting Zone Substrate	coarse loamy (37); sandy (11); md (53)
Root Restricting Depth	md (100)
Humus Form	mor (47); moder (5); md (47)



Source: S. Basquill

Notes & Similar Associations

CNVC00292 & CNVC00309 occur on coastal sites in Nova Scotia but have different tree layer composition.

CNVC00231 *Abies balsamea*—*Betula papyrifera*—*Populus tremuloides* / *Clintonia borealis*

MIXEDWOOD

Balsam Fir—Paper Birch—Trembling Aspen / Yellow Clintonia

Subassociations: none

Provinces: Manitoba, Ontario, Quebec



Mesophytic Herb or Feathermoss

CNVC00231 has a closed canopy of *Abies balsamea* and/or *Picea glauca* with *Betula papyrifera* and/or *Populus tremuloides*. The shrub layer is well developed and dominated by *A. balsamea*, although *B. papyrifera* can be abundant in larger canopy openings. The herb layer is moderately developed and commonly includes *Cornus canadensis*, *Maianthemum canadense*, *Aralia nudicaulis*, *Clintonia borealis*, *Lysimachia borealis* and *Linnaea borealis*. The forest floor cover is mainly broad-leaf litter so the moss layer is sparse, with only minor cover of *Pleurozium schreberi*.

CNVC00231 occurs in a region with a boreal climate that grades from subhumid continental in the west, to very humid and more maritime in the east. It is most frequently found on mesic, nutrient-medium sites. Stands are often on mid- to upper-slope topositions. Soils are usually coarse textured, derived from morainal parent materials, but can be fine-textured sediments deposited by proglacial lakes or seas. CNVC00231 is a mid-seral condition that typically succeeds an early seral, post-fire Association. As the fire cycle lengthens in the eastern part of its range, outbreaks of spruce budworm (*Choristoneura fumiferana*) play a greater role in its dynamics.

Characteristic Plants		CNVC00231		Site / Soil Characteristics		(% Frequency); md=missing data																							
		805 plots																											
^≥40% presence; ±characteristic cover		% Presence^	% Cover±																										
Tree Stratum Cover (Mean)		70		Elevation (min–mean–max)		5–339–975 m; md (3)																							
<i>Abies balsamea</i>		90	26	Slope		level (31); gentle (26); moderate (20); moderately steep (15); steep (6); very steep (1); md (1)																							
<i>Betula papyrifera</i>		80	22	Aspect		north (18); east (16); south (21); west (22); level (22)																							
<i>Populus tremuloides</i>		61	28	Meso Toposition		crest/ upper (26); mid (42); lower/ toe (13); depression (2); level (17)																							
<i>Picea glauca</i>		60	13	Moisture Regime		very dry (1); dry (10); mesic (71); moist (17); wet (1)																							
<i>Picea mariana</i>		45	8	Nutrient Regime		md (100)																							
Shrub Stratum Cover (Mean)		43		Soil Parent Material		moraine/ till (57); lacustrine (13); glaciofluvial (12); other (15); md (1)																							
<i>Abies balsamea</i>		97	18	Soil Rooting Zone Substrate		coarse loamy (19); sandy (11); other (23); md (26)																							
<i>Betula papyrifera</i>		66	5	Root Restricting Depth		0-20 cm (3); 21-99 cm (51); ≥100 cm (20); md (26)																							
<i>Acer spicatum</i>		53	4	Humus Form		mor (74); moder (19); mull (3); peatymor (3); md (1)																							
<i>Diervilla lonicera</i>		52	7	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Soil Nutrient Regime</p> <table border="1"> <thead> <tr> <th colspan="2"></th> <th>Poor</th> <th>Medium</th> <th>Rich</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Soil Moisture Regime</th> <th>Dry</th> <td></td> <td></td> <td></td> </tr> <tr> <th>Mesic</th> <td></td> <td style="background-color: #008000;"></td> <td></td> </tr> <tr> <th>Moist</th> <td></td> <td></td> <td></td> </tr> <tr> <th>Wet</th> <td></td> <td></td> <td></td> </tr> </tbody> </table> </div> <div> <p>Plot locations Extent of plot sampling</p> </div> <div> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Source: NRCan—CFS</p> </div> </div>						Poor	Medium	Rich	Soil Moisture Regime	Dry				Mesic				Moist				Wet			
		Poor	Medium					Rich																					
Soil Moisture Regime	Dry																												
	Mesic																												
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	Wet																												
<i>Picea glauca</i>		48	5																										
<i>Vaccinium myrtilloides</i>		48	4																										
<i>Picea mariana</i>		47	6																										
<i>Populus tremuloides</i>		44	3																										
<i>Amelanchier</i> spp.		40	4																										
Herb Stratum Cover (Mean)		32																											
<i>Cornus canadensis</i>		88	7																										
<i>Maianthemum canadense</i>		85	4																										
<i>Aralia nudicaulis</i>		78	5																										
<i>Clintonia borealis</i>		77	4																										
<i>Lysimachia borealis</i>		72	2																										
<i>Linnaea borealis</i>		67	3																										
<i>Coptis trifolia</i>		56	2																										
<i>Lycopodium obscurum</i>		42	3																										
<i>Rubus pubescens</i>		40	3																										
Bryo-Lichen Stratum Cover (Mean)		18																											
<i>Pleurozium schreberi</i>		86	10																										
<i>Dicranum</i> spp.		53	4																										
<i>Ptilium crista-castrensis</i>		48	3																										

Notes & Similar Associations

CNVC00213 is a similar Association that lacks *Abies balsamea*.
 CNVC00232 and CNC00233 have less *Populus tremuloides* and greater feathermoss cover.
 CNVC00234 has more *Picea mariana* in the overstory.
 CNVC00238 is a similar hardwood Association.

CNVC00232 *Abies balsamea*—*Betula papyrifera* / *Pleurozium schreberi*

MIXEDWOOD

Balsam Fir—Paper Birch / Red-stemmed Feathermoss

Subassociations: *typic*, *Hylocomium splendens*

Provinces: Quebec

Mesophytic Herb or Feathermoss

CNVC00232 has a moderately closed to closed canopy dominated by *Abies balsamea* and *Betula papyrifera*, often with a minor component of *Picea mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the well-developed shrub layer. *Amelanchier* spp., *Vaccinium myrtilloides* and *V. angustifolium* are often present. The herb layer is poorly to moderately developed but usually includes *Cornus canadensis*, *Clintonia borealis*, *Gaultheria hispidula*, *Maianthemum canadense*, *Linnaea borealis*, *Lysimachia borealis* and *Coptis trifolia*. The moss layer is well developed to continuous, inversely related to the amount of broadleaf litter. *Pleurozium schreberi* is usually dominant, but *Hylocomium splendens* dominance distinguishes a subassociation.

CNVC00232 occurs in a region with a boreal climate that grades from humid continental in the west to very humid and maritime in the east. It is most commonly found on mesic, nutrient-medium sites. Stands are often on gentle to moderately steep slopes, on mid-slope topopositions and tend to be on cool, east or north, aspects. This is a mid-seral condition that is usually maintained on the landscape by small-scale gap or patch disturbances, such as insect outbreaks and windthrow, in the absence of fire or harvesting.

Characteristic Plants		CNVC00232		Site / Soil Characteristics		(% Frequency); md=missing data	
^>50% presence; ±characteristic cover		164 plots		Elevation (min–mean–max)		40–454–895 m	
		%	%	Slope		level (9); gentle (18); moderate (31); moderately steep (29); steep (12); very steep (1)	
		Presence [^]	Cover [±]	Aspect		north (26); east (32); south (16); west (16); level (11)	
Tree Stratum Cover (Mean)		62		Meso Topoposition		crest/ upper (16); mid (69); lower/ toe (5); depression (3); level (6)	
<i>Betula papyrifera</i>		100	25	Moisture Regime		dry (2); mesic (85); moist (12); wet (1)	
<i>Abies balsamea</i>		100	24	Nutrient Regime		md (100)	
<i>Picea mariana</i>		80	9	Soil Parent Material		moraine/ till (86); other (14)	
Shrub Stratum Cover (Mean)		52		Soil Rooting Zone Substrate		coarse loamy (21); other (17); md (63)	
<i>Abies balsamea</i>		100	26	Root Restricting Depth		0-20 cm (6); 21-99 cm (59); md (35)	
<i>Betula papyrifera</i>		91	6	Humus Form		mor (98); moder (2)	
<i>Picea mariana</i>		84	8				
<i>Amelanchier</i> spp.		67	5				
<i>Vaccinium myrtilloides</i>		62	4				
<i>Vaccinium angustifolium</i>		55	3				
<i>Sorbus americana</i>		54	4				
Herb Stratum Cover (Mean)		23					
<i>Cornus canadensis</i>		95	10				
<i>Clintonia borealis</i>		84	4				
<i>Gaultheria hispidula</i>		81	3				
<i>Maianthemum canadense</i>		79	5				
<i>Linnaea borealis</i>		73	3				
<i>Lysimachia borealis</i>		71	2				
<i>Coptis trifolia</i>		66	3				
<i>Dryopteris spinulosa</i> complex		54	2				
Bryo-Lichen Stratum Cover (Mean)		65		Notes & Similar Associations CNVC00231 has more <i>Populus tremuloides</i> and a less developed moss layer. CNVC00233 occurs in New Brunswick, Nova Scotia and Quebec, often at higher elevations and has more <i>Sorbus americana</i> , <i>Oxalis montana</i> and <i>Dryopteris</i> spp. CNVC00234 has <i>Picea mariana</i> codominant in the tree layer. CNVC00235 occurs on slightly richer sites and has abundant <i>Acer spicatum</i> . CNVC00270 occurs on moister sites and has more <i>P. mariana</i> and <i>Sphagnum</i> mosses.			
<i>Pleurozium schreberi</i>		100	45				
<i>Dicranum</i> spp.		98	4				
<i>Ptilium crista-castrensis</i>		82	6				
<i>Cladina rangiferina</i>		68	2				
<i>Hylocomium splendens</i>		67	13				
<i>Polytrichum</i> spp.		67	3				
<i>Cladonia</i> spp.		63	2				

Source: Ministère des Forêts, de la Faune et des Parcs

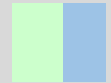
CNVC00233 *Abies balsamea*—*Betula papyrifera* / *Oxalis montana* / *Pleurozium schreberi*

MIXEDWOOD

Balsam Fir—Paper Birch / Common Wood-sorrel / Red-stemmed Feathermoss

Subassociations: *typic*, *Hylocomium splendens*, *Sorbus americana*

Provinces: New Brunswick, Nova Scotia, Quebec

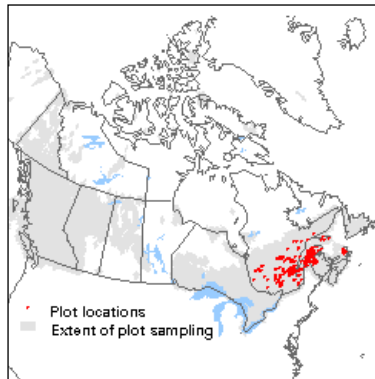
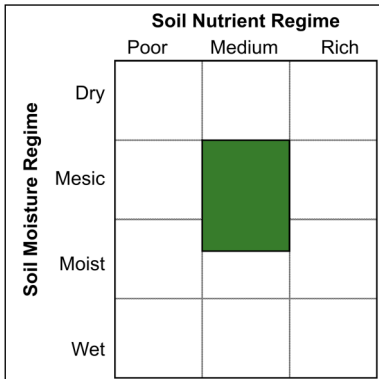


Mesophytic Herb or Feathermoss

CNVC00233 has a closed canopy dominated by *Abies balsamea* and *Betula papyrifera*, often with a minor component of *Picea mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately to well-developed shrub layer. *Sorbus americana* is often present. The herb layer is well developed and characterized by abundant *Oxalis montana* and sometimes *Dryopteris* spp. *Cornus canadensis*, *Clintonia borealis*, *Lysimachia borealis* and *Maianthemum canadense* are usually present. The moss layer is usually moderately developed, inversely related to the amount of broad-leaf litter on the forest floor. *Pleurozium schreberi* is the dominant moss.

CNVC00233 occurs in a region with a boreal climate that grades from humid continental in the west to very humid and maritime in the east. It is most commonly found on mesic to moist, nutrient-medium sites. Stands are usually on gentle to moderately steep slopes. Soils are typically moderately deep to deep and coarse textured, derived from morainal parent materials, but colluvium is also common. CNVC00233 is a mid-seral condition that is usually maintained on the landscape by small-scale gap or patch disturbances, such as insect outbreaks and windthrow, in the absence of fire or harvesting.

Characteristic Plants		CNVC00233		Site / Soil Characteristics		(% Frequency); md=missing data	
		312 plots					
^≥40% presence; ±characteristic cover		% Presence [^]	% Cover [±]				
Tree Stratum Cover (Mean)		64		Elevation (min–mean–max)		50–527–950 m; md (3)	
<i>Abies balsamea</i>		99	32	Slope		level (13); gentle (24); moderate (24); moderately steep (27); steep (8); very steep (1); md (2)	
<i>Betula papyrifera</i>		99	24	Aspect		north (23); east (21); south (16); west (24); level (13); md (2)	
<i>Picea glauca</i>		55	8	Meso Toposition		crest/ upper (19); mid (44); lower/ toe (16); depression (2); level (10); md (9)	
Shrub Stratum Cover (Mean)		41		Moisture Regime		dry (4); mesic (74); moist (21); wet (2)	
<i>Abies balsamea</i>		99	25	Nutrient Regime		poor (2); medium (25); rich (4); md (69)	
<i>Betula papyrifera</i>		94	11	Soil Parent Material		moraine/ till (66); colluvium (22); other (7); md (4)	
<i>Sorbus americana</i>		67	6	Soil Rooting Zone Substrate		non-soil (22); coarse loamy (19); other (10); md (49)	
<i>Rubus idaeus</i>		59	7	Root Restricting Depth		0-20 cm (1); 21-99 cm (44); ≥100 cm (28); md (35)	
<i>Picea glauca</i>		57	6	Humus Form		mor (59); moder (10); peatymor (2); md (30)	
<i>Acer spicatum</i>		53	8				
<i>Ribes glandulosum</i>		44	4				
Herb Stratum Cover (Mean)		48					
<i>Oxalis montana</i>		95	20				
<i>Cornus canadensis</i>		91	8				
<i>Clintonia borealis</i>		87	6				
<i>Lysimachia borealis</i>		81	3				
<i>Maianthemum canadense</i>		70	3				
<i>Dryopteris spinulosa complex</i>		67	13				
<i>Aralia nudicaulis</i>		58	3				
<i>Coptis trifolia</i>		44	3				
Bryo-Lichen Stratum Cover (Mean)		33					
<i>Pleurozium schreberi</i>		93	14				
<i>Dicranum</i> spp.		65	6				
<i>Ptilium crista-castrensis</i>		62	3				
<i>Hylocomium splendens</i>		52	9				
<i>Polytrichum</i> spp.		48	3				



Source: S. Basquill

Notes & Similar Associations

CNVC00231 has more *Populus tremuloides* and a less developed moss layer.
 CNVC00232 occurs farther north, or on cooler sites, and has less *Sorbus americana* and *Oxalis montana*.
 CNVC00234 has *Picea mariana* codominant in the overstory.
 CNVC00235 occurs on slightly richer sites and has abundant *Acer spicatum*.
 CNVC00270 occurs on moister sites, has more *Picea mariana* and a moss layer with more *Sphagnum* moss cover.

CNVC00234 *Picea mariana*—*Betula papyrifera*—*Abies balsamea* / *Clintonia borealis*

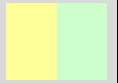
MIXEDWOOD

Black Spruce—Paper Birch—Balsam Fir / Yellow Clintonia

Subassociations: *typic*, *Pteridium aquilinum*, *Acer rubrum*

Provinces: Ontario, Quebec

Mesophytic Herb or Feathermoss



CNVC00234 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, usually with a smaller component of *Abies balsamea* and sometimes *Populus tremuloides* or *Acer rubrum*. Regeneration of these species dominates the well-developed shrub layer. *Vaccinium myrtilloides*, *Amelanchier* spp., *V. angustifolium*, *Sorbus americana* and *Kalmia angustifolia* are common. The herb layer is moderately developed and usually includes *Cornus canadensis*, *Clintonia borealis*, *Maianthemum canadense*, *Gaultheria hispidula*, *Linnaea borealis*, *Lysimachia borealis*, *Coptis trifolia* and *Aralia nudicaulis*. The forest floor cover is mainly broad-leaf litter, so the moss layer is poorly developed, with only minor cover of *Pleurozium schreberi*.

CNVC00234 occurs in a region with a humid continental boreal climate, most frequently on mesic, nutrient-medium sites. Stands are usually on gentle to moderately steep slopes on mid- to upper-slope topopositions, often on warm, west or south, aspects. Soils are usually moderately deep and coarse textured, derived from morainal parent materials. CNVC00234 is a mid-seral condition that typically succeeds an early seral, post-fire Association. Outbreaks of spruce budworm (*Choristoneura fumiferana*) play a greater role in the dynamics of this Association in the east, where fires are less frequent.

Characteristic Plants		CNVC00234		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥50% presence except <i>A. rubrum</i> , <i>P. tremuloides</i> and the bryo-lichen layer; ±characteristic cover		309 plots		Elevation (min–mean–max)		50–388–945 m	
	% Presence [^]	% Cover [±]		Slope	level (18); gentle (28); moderate (24); moderately steep (22); steep (6); very steep (1)		
Tree Stratum Cover (Mean)			66	Aspect	north (17); east (15); south (20); west (32); level (17)		
<i>Picea mariana</i>	99	23		Meso Topoposition	crest/ upper (23); mid (54); lower/ toe (10); depression (2); level (11)		
<i>Betula papyrifera</i>	99	22		Moisture Regime	dry (6); mesic (79); moist (14); wet (1)		
<i>Abies balsamea</i>	82	12		Nutrient Regime	md (100)		
<i>Populus tremuloides</i>	47	15		Soil Parent Material	moraine/ till (80); other (20)		
<i>Acer rubrum</i>	23	7		Soil Rooting Zone Substrate	coarse loamy (16); other (17); md (66)		
Shrub Stratum Cover (Mean)			55	Root Restricting Depth	0-20 cm (6); 21-99 cm (67); md (26)		
<i>Abies balsamea</i>	95	17		Humus Form	mor (89); moder (8); peatymor (3)		
<i>Picea mariana</i>	95	10					
<i>Betula papyrifera</i>	91	6					
<i>Vaccinium myrtilloides</i>	80	5					
<i>Amelanchier</i> spp.	68	5					
<i>Vaccinium angustifolium</i>	66	4					
<i>Sorbus americana</i>	66	4					
<i>Kalmia angustifolia</i>	62	5		<p>Source: Ministère des Forêts, de la Faune et des Parcs</p>			
<i>Ilex mucronata</i>	55	4					
<i>Viburnum nudum</i>	54	7		<p>Notes & Similar Associations</p> <p>The <i>Pteridium aquilinum</i> and <i>Acer rubrum</i> subassociations occur on warmer sites and have more temperate species. CNVC00214 occurs on slightly poorer sites and has more abundant ericaceous shrubs. CNVC00216 occurs on slightly richer sites and has abundant <i>Acer spicatum</i> and <i>Corylus cornuta</i>. CNVC00231, CNVC00232 and CNVC00233 do not have <i>Picea mariana</i> codominant. CNVC00344 occurs on cooler sites, often farther north, and has a better developed moss layer.</p>			
Herb Stratum Cover (Mean)			30				
<i>Cornus canadensis</i>	93	10					
<i>Clintonia borealis</i>	86	5					
<i>Maianthemum canadense</i>	85	5					
<i>Gaultheria hispidula</i>	77	3					
<i>Linnaea borealis</i>	73	4					
<i>Lysimachia borealis</i>	73	3					
<i>Coptis trifolia</i>	70	3					
<i>Aralia nudicaulis</i>	67	4					
<i>Pteridium aquilinum</i>	54	13					
Bryo-Lichen Stratum Cover (Mean)			26				
<i>Pleurozium schreberi</i>	96	14					

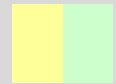
CNVC00235 *Abies balsamea*—*Betula papyrifera* / *Acer spicatum*

MIXEDWOOD

Balsam Fir—Paper Birch / Mountain Maple

Subassociations: *typic*, *Rubus pubescens*

Provinces: Manitoba, Ontario, Quebec



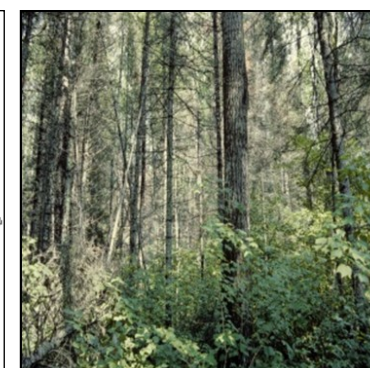
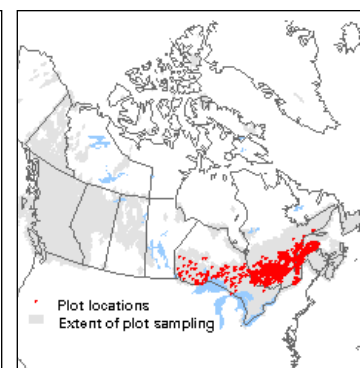
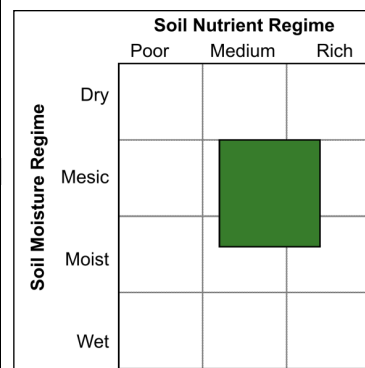
Mesic Rich Shrub & Herb

CNVC00235 has a closed canopy of *Abies balsamea* and/or *Picea glauca*, mixed with *Betula papyrifera* and/or *Populus tremuloides*. The shrub layer is dense with abundant *Acer spicatum*, *Corylus cornuta* and *A. balsamea* and less abundant *B. papyrifera* and *Diervilla lonicera*. The herb layer is well developed and commonly includes *Clintonia borealis*, *Aralia nudicaulis*, *Maianthemum canadense*, *Cornus canadensis*, *Lysimachia borealis* and *Dryopteris* spp. The forest floor cover is mainly broad-leaf litter, so the moss layer is sparse, with only minor cover of *Pleurozium schreberi*.

CNVC00235 occurs in a region with a boreal climate that grades from subhumid continental in the west to very humid and more maritime in the east. It is most frequently found on mesic, nutrient-medium to -rich sites; these are some of the most productive sites in the region. Stands are usually on gentle to moderate slopes on mid- to upper-slope topositions. Seepage often enhances moisture and nutrient availability. Soils are usually coarse textured, derived from morainal parent materials. CNVC00235 is a mid-seral condition that typically succeeds a fire- or harvest-origin hardwood Association. Outbreaks of spruce budworm (*Choristoneura fumiferana*) play a greater role in the dynamics of this Association in the eastern part of the range, where fires are less frequent.

Characteristic Plants	CNVC00235 1040 plots	
^≥45% presence except <i>Rubus pubescens</i> ;	%	%
±characteristic cover	Presence^	Cover±
Tree Stratum Cover (Mean)		70
<i>Abies balsamea</i>	93	22
<i>Betula papyrifera</i>	90	22
<i>Picea glauca</i>	68	12
Shrub Stratum Cover (Mean)		68
<i>Abies balsamea</i>	99	14
<i>Acer spicatum</i>	97	33
<i>Corylus cornuta</i>	67	14
<i>Betula papyrifera</i>	66	5
<i>Diervilla lonicera</i>	61	8
<i>Picea glauca</i>	48	4
<i>Lonicera canadensis</i>	48	3
<i>Sorbus americana</i>	46	4
<i>Amelanchier</i> spp.	45	4
Herb Stratum Cover (Mean)		41
<i>Clintonia borealis</i>	89	7
<i>Aralia nudicaulis</i>	88	7
<i>Maianthemum canadense</i>	78	4
<i>Cornus canadensis</i>	75	6
<i>Lysimachia borealis</i>	74	2
<i>Dryopteris spinulosa</i> complex	60	8
<i>Streptopus lanceolatus</i>	54	2
<i>Linnaea borealis</i>	51	3
<i>Coptis trifolia</i>	49	3
<i>Eurybia macrophylla</i>	47	9
<i>Oxalis montana</i>	45	12
<i>Rubus pubescens</i>	44	5
Bryo-Lichen Stratum Cover (Mean)		14
<i>Pleurozium schreberi</i>	84	7
<i>Dicranum</i> spp.	66	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	10–361–880 m
Slope	level (19); gentle (25); moderate (26); moderately steep (18); steep (10); very steep (2)
Aspect	north (23); east (25); south (20); west (19); level (13)
Meso Toposition	crest/ upper (20); mid (56); lower/ toe (12); depression (3); level (10)
Moisture Regime	dry (5); mesic (78); moist (15); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (69); glaciofluvial (10); other (20); md (1)
Soil Rooting Zone Substrate	coarse loamy (17); other (25); md (58)
Root Restricting Depth	0-20 cm (3); 21-99 cm (59); ≥100 cm (13); md (26)
Humus Form	mor (71); moder (24); mull (3); peatymor (2); md (1)



Source: NRCan—CFS

Notes & Similar Associations

Acer spicatum and *Corylus cornuta* can form dense thickets, sometimes delaying tree regeneration. CNVC00216 occurs in Quebec but has more overstory *Picea mariana*. CNVC00231 occurs on slightly poorer sites and has less *A. spicatum* and *C. cornuta*. CNVC00232 and CNVC00233 occur on slightly poorer sites and have more feathermoss cover. CNVC00239 is a similar hardwood Association.

CNVC00237 *Betula papyrifera* / *Vaccinium angustifolium*—*Kalmia angustifolia* / *Pleurozium schreberi*

HARDWOOD

Paper Birch / Early Lowbush Blueberry—Sheep Laurel / Red-stemmed Feathermoss

Subassociations: *Alnus viridis*, *Rhododendron groenlandicum*, *Vaccinium angustifolium*, *Pleurozium schreberi*, *Kalmia angustifolia*

Provinces: Newfoundland and Labrador, Quebec

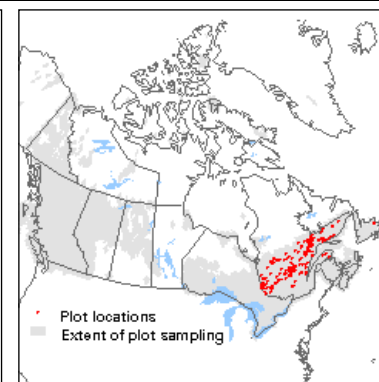
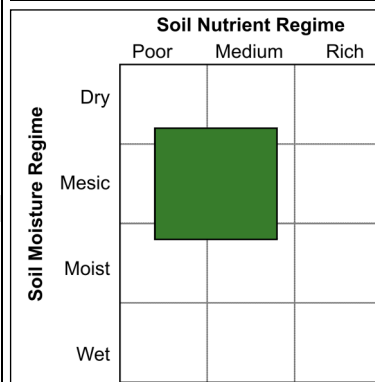
Ericaceous Shrub & Feathermoss



CNVC00237 has a closed canopy dominated by *Betula papyrifera*, usually with a minor component of *Picea mariana* and/or *Abies balsamea*. The well-developed to dense shrub layer includes regeneration of these species as well as *Amelanchier* spp., *Alnus viridis*, *Vaccinium myrtilloides*, *V. angustifolium*, *Rhododendron groenlandicum* and *Kalmia angustifolia*. The herb layer can vary from poorly developed to dense. It usually includes *Cornus canadensis*, *Maianthemum canadense*, *Clintonia borealis*, *Lysimachia borealis* and *Gaultheria hispidula*. Moss layer development is poor to moderate, usually consisting of patches of *Pleurozium schreberi*.

CNVC00237 occurs in a region with a humid to very humid, continental to maritime boreal climate. It usually occurs on mesic, nutrient-poor to -medium sites. Stands are most common on gentle to moderately steep slopes on mid- to upper-slope topositions. Soils are usually moderately deep, coarse textured and derived from morainal parent materials. This is an early seral condition that typically follows fire.

Characteristic Plants	CNVC00237		Site / Soil Characteristics	(% Frequency); md=missing data
	157 plots			
^≥50% presence;	%	%		
±characteristic cover				
	Presence [^]	Cover [±]		
Tree Stratum Cover (Mean)		68		
<i>Betula papyrifera</i>	100	47	Elevation (min–mean–max)	46–426–830 m
<i>Picea mariana</i>	79	9	Slope	level (8); gentle (22); moderate (28); moderately steep (26); steep (15); md (1)
<i>Abies balsamea</i>	65	6	Aspect	north (22); east (26); south (18); west (24); level (9); md (1)
Shrub Stratum Cover (Mean)		70	Meso Toposition	crest/ upper (24); mid (65); lower/ toe (3); level (7); md (1)
<i>Betula papyrifera</i>	90	7	Moisture Regime	very dry (1); dry (5); mesic (85); moist (8); wet (1)
<i>Picea mariana</i>	87	9	Nutrient Regime	md (100)
<i>Abies balsamea</i>	85	13	Soil Parent Material	moraine/ till (87); other (14)
<i>Vaccinium angustifolium</i>	78	8	Soil Rooting Zone Substrate	coarse loamy (14); other (15); md (71)
<i>Vaccinium myrtilloides</i>	75	9	Root Restricting Depth	0-20 cm (13); 21-99 cm (59); md (28)
<i>Amelanchier</i> spp.	69	8	Humus Form	mor (90); moder (5); mull (1); peatymor (3); md (1)
<i>Rhododendron groenlandicum</i>	66	14		
<i>Alnus viridis</i>	62	23		
<i>Kalmia angustifolia</i>	59	15		
<i>Salix</i> spp.	54	5		
Herb Stratum Cover (Mean)		28		
<i>Cornus canadensis</i>	89	11		
<i>Maianthemum canadense</i>	71	5		
<i>Clintonia borealis</i>	70	5		
<i>Lysimachia borealis</i>	68	3		
<i>Gaultheria hispidula</i>	67	4		
<i>Linnaea borealis</i>	55	4		
<i>Lycopodium annotinum</i>	54	6		
<i>Dryopteris spinulosa</i> complex	53	3		
Bryo-Lichen Stratum Cover (Mean)		30		
<i>Pleurozium schreberi</i>	95	22		
<i>Dicranum</i> spp.	85	4		
<i>Polytrichum</i> spp.	69	3		
<i>Cladina rangiferina</i>	67	3		
<i>Cladonia</i> spp.	64	2		
<i>Ptilium crista-castrensis</i>	50	3		



Source: W. Meades

Notes & Similar Associations

CNVC00269 is a similar Association described from Ontario that lacks *Kalmia angustifolia*.
 CNVC00238 occurs on slightly richer sites in Quebec; it has more *Populus tremuloides* and less ericaceous shrubs.
 CNVC00214 is a similar mixedwood condition in Quebec that has *Picea mariana* codominant.
 CNVC00315, CNVC00316 and CNVC00349 are hardwood Associations in Newfoundland that occur on moister, richer sites.

CNVC00238 *Populus tremuloides (Betula papyrifera) / Diervilla lonicera*

HARDWOOD

Trembling Aspen (Paper Birch) / Northern Bush-honeysuckle

Subassociations: *typic, Alnus viridis, Kalmia angustifolia*

Provinces: Manitoba, Ontario, Quebec

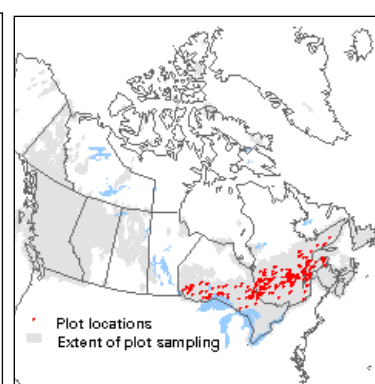
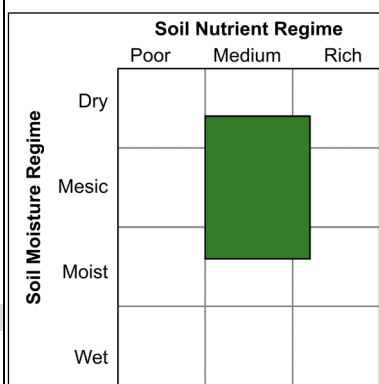
Mesophytic Herb or Feathermoss

CNVC00238 has a closed canopy dominated by *Populus tremuloides*, usually with a smaller component of *Betula papyrifera*, overtopping a well-developed to dense shrub layer that includes regenerating trees and low shrubs, such as *Vaccinium myrtilloides*, *Diervilla lonicera* and *V. angustifolium*. *Alnus viridis* and *Kalmia angustifolia* can be abundant. The herb layer is well developed and typically includes *Cornus canadensis*, *Maianthemum canadense*, *Aralia nudicaulis*, *Clintonia borealis*, *Linnaea borealis* and *Lysimachia borealis*. The forest floor cover is mainly broad-leaf litter so the moss layer is sparse.

CNVC00238 occurs in a region with a continental boreal climate that grades from subhumid in the west to humid in the east. It is usually found on mesic, nutrient-medium sites. Stands are often on mid- to upper-slope topopositions. Soils are typically moderately deep and coarse textured, derived from morainal or glaciofluvial parent materials. CNVC00238 is an early seral condition that typically establishes after fire or harvesting.

Characteristic Plants	CNVC00238	
>40% presence except <i>Alnus viridis</i>, <i>Kalmia angustifolia</i> and the bryolichen layer; ±characteristic cover	259 plots	
	% Presence [^]	% Cover ⁺
Tree Stratum Cover (Mean)	69	
<i>Populus tremuloides</i>	98	47
<i>Betula papyrifera</i>	74	17
<i>Abies balsamea</i>	51	8
<i>Picea mariana</i>	49	7
Shrub Stratum Cover (Mean)	59	
<i>Populus tremuloides</i>	77	5
<i>Abies balsamea</i>	76	11
<i>Vaccinium myrtilloides</i>	71	9
<i>Betula papyrifera</i>	66	5
<i>Diervilla lonicera</i>	65	10
<i>Vaccinium angustifolium</i>	62	8
<i>Picea mariana</i>	61	6
<i>Salix</i> spp.	54	5
<i>Amelanchier</i> spp.	54	5
<i>Prunus pensylvanica</i>	47	4
<i>Alnus viridis</i>	39	22
<i>Kalmia angustifolia</i>	39	15
Herb Stratum Cover (Mean)	47	
<i>Cornus canadensis</i>	93	13
<i>Maianthemum canadense</i>	89	5
<i>Aralia nudicaulis</i>	78	9
<i>Clintonia borealis</i>	78	6
<i>Linnaea borealis</i>	71	4
<i>Lysimachia borealis</i>	66	2
<i>Lycopodium obscurum</i>	54	3
<i>Coptis trifolia</i>	51	2
<i>Pteridium aquilinum</i>	44	15
<i>Eurybia macrophylla</i>	43	13
Bryo-Lichen Stratum Cover (Mean)	14	
<i>Pleurozium schreberi</i>	88	8

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	75–285–545 m
Slope	level (30); gentle (28); moderate (24); moderately steep (14); steep (4)
Aspect	north (18); east (14); south (20); west (22); level (26)
Meso Topoposition	crest/ upper (36); mid (32); lower/ toe (14); depression (2); level (16)
Moisture Regime	dry (10); mesic (84); moist (6)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (52); glaciofluvial (22); marine (14); other (12)
Soil Rooting Zone Substrate	coarse loamy (22); sandy (14); other (10); md (54)
Root Restricting Depth	0-20 cm (4); 21-99 cm (76); md (20)
Humus Form	mor (90); moder (8); peatymor (2)



Source: NRCan—CFS

Notes & Similar Associations
 CNVC00213, CNVC00218, CNVC00231 and CNVC00234 are similar mixedwood Associations.
 CNVC00237 and CNVC00269 have less *Populus tremuloides* and more ericaceous shrubs.
 CNVC00239 occurs on moister, richer sites and has abundant *Acer spicatum* and *Corylus cornuta*.
 CNVC00241 and CNVC00242 occur on moister, richer sites and have abundant *Alnus incana*.

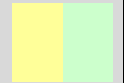
CNVC00239 *Betula papyrifera* (*Populus tremuloides*) / *Acer spicatum* / *Clintonia borealis*

HARDWOOD

Paper Birch (Trembling Aspen) / Mountain Maple / Yellow Clintonia

Subassociations: none

Provinces: Manitoba, Ontario, Quebec



Mesic Rich Shrub & Herb

CNVC00239 has a closed canopy dominated by *Betula papyrifera* and/or *Populus tremuloides*. The tall shrub layer is dense and usually dominated by *Acer spicatum* and/or *Corylus cornuta*. *A. balsamea*, *B. papyrifera* and *Diervilla lonicera* are also common in the shrub layer. The well-developed herb layer typically includes *Clintonia borealis*, *Maianthemum canadense*, *Cornus canadensis*, *Aralia nudicaulis*, *Lysimachia borealis* and *Dryopteris* spp. The forest floor cover is mainly broad-leaf litter, so the moss layer is sparse, with only minor cover of *Pleurozium schreberi*.

CNVC00239 occurs in a region with a boreal climate that grades from subhumid continental in the west to very humid and more maritime in the east. It is most frequently found on mesic, nutrient-medium to rich sites; these are some of the most productive sites in the region. Stands are often on gentle to moderately steep slopes, mainly on mid-slope topositions. Seepage often enhances moisture and nutrient availability on these sites. Soils are usually moderately deep to deep, coarse textured and derived from morainal parent materials. CNVC00239 is an early seral condition that typically establishes after fire or harvesting.

Characteristic Plants		CNVC00239		Site / Soil Characteristics		(% Frequency); md=missing data																					
^≥45% presence except herb layer;		1478 plots		Elevation (min–mean–max)		20–400–930 m; md (1)																					
±characteristic cover		Presence^	% Cover*	Slope		level (15); gentle (26); moderate (26); moderately steep (23); steep (10); very steep (1); md (1)																					
Tree Stratum Cover (Mean)		74		Aspect		north (23); east (26); south (19); west (21); level (10)																					
<i>Betula papyrifera</i>		94	41	Meso Toposition		crest/ upper (21); mid (61); lower/ toe (9); depression (2); level (8)																					
<i>Abies balsamea</i>		68	10	Moisture Regime		dry (3); mesic (82); moist (14); wet (1)																					
<i>Populus tremuloides</i>		53	37	Nutrient Regime		md (100)																					
Shrub Stratum Cover (Mean)		67		Soil Parent Material		moraine/ till (74); glaciofluvial (10); other (15); md (1)																					
<i>Abies balsamea</i>		89	14	Soil Rooting Zone Substrate		coarse loamy (18); other (21); md (62)																					
<i>Betula papyrifera</i>		77	5	Root Restricting Depth		0-20 cm (3); 21-99 cm (62); ≥100 cm (5); md (30)																					
<i>Acer spicatum</i>		76	31	Humus Form		mor (78); moder (18); mull (2); peatymor (1); md (1)																					
<i>Diervilla lonicera</i>		62	12	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Soil Nutrient Regime</p> <table border="1"> <tr> <td></td> <td>Poor</td> <td>Medium</td> <td>Rich</td> </tr> <tr> <td>Dry</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Mesic</td> <td></td> <td style="background-color: #008000;"></td> <td></td> </tr> <tr> <td>Moist</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Wet</td> <td></td> <td></td> <td></td> </tr> </table> </div> <div> </div> <div> </div> </div> <p style="text-align: right; font-size: small;">Source: NRCan—CFS</p>					Poor	Medium	Rich	Dry				Mesic				Moist				Wet			
	Poor	Medium	Rich																								
Dry																											
Mesic																											
Moist																											
Wet																											
<i>Amelanchier</i> spp.		59	5																								
<i>Picea mariana</i>		52	6																								
<i>Sorbus americana</i>		52	5																								
<i>Corylus cornuta</i>		46	17																								
Herb Stratum Cover (Mean)		44																									
<i>Clintonia borealis</i>		90	7																								
<i>Maianthemum canadense</i>		86	5																								
<i>Cornus canadensis</i>		82	9																								
<i>Aralia nudicaulis</i>		81	7																								
<i>Lysimachia borealis</i>		81	3																								
<i>Dryopteris spinulosa</i> complex		65	6																								
<i>Coptis trifolia</i>		56	3																								
<i>Lycopodium obscurum</i>		55	3																								
<i>Linnaea borealis</i>		52	3																								
<i>Viola</i> spp.		45	3																								
<i>Streptopus lanceolatus</i>		44	2																								
<i>Eurybia macrophylla</i>		43	11																								
<i>Oxalis montana</i>		40	9																								
Bryo-Lichen Stratum Cover (Mean)		12																									
<i>Pleurozium schreberi</i>		88	6																								
<i>Dicranum</i> spp.		79	4																								
<i>Polytrichum</i> spp.		57	3																								

Notes & Similar Associations

CNVC00215, CNVC00216 and CNVC00235 are similar mixedwood Associations.
 CNVC00237 and CNVC00269 have less *Populus tremuloides* and more ericaceous shrubs.
 CNVC00238 occurs on mesic, nutrient-medium sites and has less *Acer spicatum* and *Corylus cornuta*.
 CNVC00241 and CNVC00242 occur on moister, richer sites and have abundant *Alnus incana*.

CNVC00241 *Populus tremuloides* (*P. balsamifera*) / *Alnus incana* / *Eurybia macrophylla*

HARDWOOD

Trembling Aspen (Balsam Poplar) / Speckled Alder / Large-leaved Aster

Subassociations: *typic*, *Populus balsamifera*

Provinces: Manitoba, Ontario, Quebec

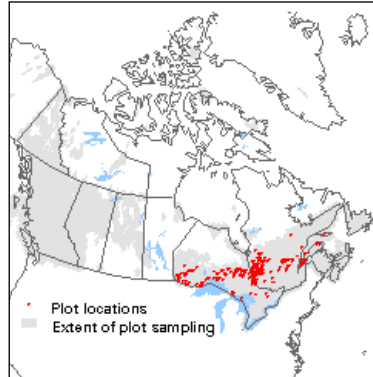
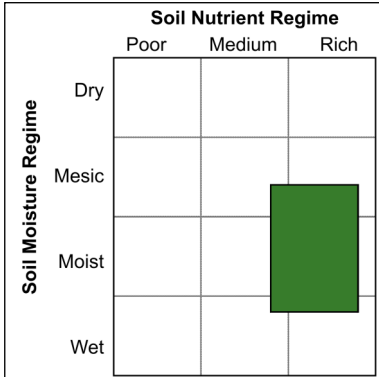


Moist Rich Shrub & Herb

CNVC00241 has a closed canopy of *Populus tremuloides* and/or *P. balsamifera* over a dense tall shrub layer that is dominated by *Alnus incana*, with lower abundances of *Rubus idaeus*, *P. tremuloides* and *Abies balsamea*. *Acer spicatum* is less common but can be abundant. The herb layer is usually dense and typically includes *Rubus pubescens*, *Maianthemum canadense*, *Eurybia macrophylla*, *Cornus canadensis*, *Aralia nudicaulis* and *Clintonia borealis*, among other species that occur with lower frequency and abundance. Grasses (*Poaceae*) can be abundant. The forest floor cover is mainly broad-leaf litter, so the moss layer is sparse, with only minor cover of *Pleurozium schreberi*.

CNVC00241 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is primarily found on moist, nutrient-rich sites; these are some of the most productive sites in the region. Stands are usually on level sites or gentle slopes, usually on mid-to lower or toe-slope topopositions. Soils are typically moderately deep to deep and fine textured, of lacustrine or glaciolacustrine origin. CNVC00241 is an early seral condition that typically establishes after fire or harvesting.

Characteristic Plants		CNVC00241		Site / Soil Characteristics		(% Frequency); md=missing data	
^>40% presence except		305 plots		Elevation (min–mean–max)	10–281–474 m; md (2)		
<i>Acer spicatum</i> ;	%	%		Slope	level (63); gentle (21); moderate (7); moderately steep (2); steep (1); very steep (1); md (7)		
±characteristic cover	Presence [^]	Cover [±]		Aspect	north (16); east (11); south (12); west (15); level (44); md (2)		
Tree Stratum Cover (Mean)		67		Meso Topoposition	crest/ upper (11); mid (24); lower/ toe (14); depression (4); level (47)		
<i>Populus tremuloides</i>	83	43		Moisture Regime	dry (2); mesic (31); moist (61); wet (5)		
<i>Populus balsamifera</i>	47	31		Nutrient Regime	md (100)		
Shrub Stratum Cover (Mean)		63		Soil Parent Material	glaciolacustrine (40); lacustrine (27); moraine/ till (11); other (21); md (2)		
<i>Alnus incana</i>	80	33		Soil Rooting Zone Substrate	clayey (19); other (32); md (49)		
<i>Rubus idaeus</i>	76	8		Root Restricting Depth	0-20 cm (2); 21-99 cm (52); ≥100 cm (23); md (23)		
<i>Abies balsamea</i>	68	7		Humus Form	mor (50); moder (25); mull (15); peatymor (5); md (5)		
<i>Populus tremuloides</i>	62	4					
<i>Ribes glandulosum</i>	54	4					
<i>Ribes triste</i>	51	3					
<i>Salix</i> spp.	45	10					
<i>Diervilla lonicera</i>	41	8					
<i>Acer spicatum</i>	36	17					
Herb Stratum Cover (Mean)		57					
<i>Rubus pubescens</i>	88	8					
<i>Maianthemum canadense</i>	75	2					
<i>Eurybia macrophylla</i>	67	12					
<i>Cornus canadensis</i>	65	5					
<i>Aralia nudicaulis</i>	63	9					
<i>Clintonia borealis</i>	63	3					
<i>Lysimachia borealis</i>	58	2					
<i>Mitella nuda</i>	55	4					
<i>Petasites frigidus</i>	51	3					
<i>Poaceae</i>	50	10					
<i>Viola</i> spp.	48	6					
<i>Chamerion angustifolium</i>	44	3					
<i>Galium triflorum</i>	42	2					
Bryo-Lichen Stratum Cover (Mean)		8					
<i>Pleurozium schreberi</i>	73	4					



Source: NRCan—CFS

Notes & Similar Associations

CNVC00238 occurs on mesic, nutrient-medium sites and lacks the abundance of tall shrubs of CNVC00241.
 CNVC00239 occurs on sites that are not as moist nor rich and has *Acer spicatum* dominant in the shrub layer.
 CNVC00242 occurs in Quebec, usually on tills, and is dominated by *Betula papyrifera*.
 CNVC00272, CNVC00273 and CNVC00274 are similar mixedwood Associations.

CNVC00242 *Betula papyrifera* / *Alnus incana*

HARDWOOD

Paper Birch / Speckled Alder

Subassociations: none

Provinces: Quebec

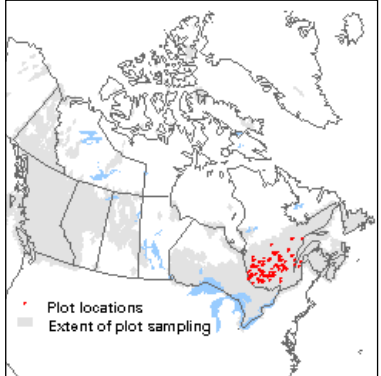
Moist Rich Shrub & Herb


CNVC00242 has a closed canopy dominated by *Betula papyrifera*, often with a minor component of *Abies balsamea*. The tall shrub layer is dense and dominated by *Alnus incana*, with less abundant *A. balsamea* and *Acer spicatum*. *B. papyrifera*, *Rubus idaeus*, *Sorbus americana*, *Ribes glandulosum* and *Amelanchier* spp are also common. The well-developed herb layer includes *Dryopteris* spp., *Clintonia borealis*, *Cornus canadensis*, *Lysimachia borealis*, *Maianthemum canadense*, *Carex* spp., *Aralia nudicaulis*, *Coptis trifolia* and grasses (*Poaceae*). The forest floor cover is mainly broad-leaf litter, so the moss layer is sparse.

CNVC00242 occurs in a region with a humid continental boreal climate. It is usually on mesic to moist, nutrient-rich sites; these are some of the most productive sites in the region. Stands are typically on gentle to moderate slopes on mid- to lower or toe-slope topopositions. Soils are typically moderately deep and coarse textured, derived from morainal parent materials. CNVC00242 is an early seral condition that usually develops after fire or harvesting, but it can also result from spruce budworm (*Choristoneura fumiferana*) outbreak.

Characteristic Plants			CNVC00242		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥50% presence except bryo-lichen layer; ±characteristic cover			93 plots					
	Presence [^]	Cover [±]	%	%				
Tree Stratum Cover (Mean)		63						
<i>Betula papyrifera</i>	100	34						
<i>Abies balsamea</i>	58	8						
<i>Picea mariana</i>	51	6						
Shrub Stratum Cover (Mean)		76						
<i>Alnus incana</i>	91	44						
<i>Abies balsamea</i>	86	14						
<i>Betula papyrifera</i>	74	6						
<i>Rubus idaeus</i>	73	9						
<i>Acer spicatum</i>	71	12						
<i>Sorbus americana</i>	71	6						
<i>Ribes glandulosum</i>	71	4						
<i>Amelanchier</i> spp.	62	4						
<i>Picea mariana</i>	56	5						
<i>Prunus pensylvanica</i>	54	4						
<i>Viburnum nudum</i>	52	10						
Herb Stratum Cover (Mean)		42						
<i>Dryopteris spinulosa</i> complex	86	7						
<i>Clintonia borealis</i>	86	7						
<i>Cornus canadensis</i>	82	6						
<i>Lysimachia borealis</i>	76	3						
<i>Maianthemum canadense</i>	74	4						
<i>Carex</i> spp.	67	4						
<i>Aralia nudicaulis</i>	67	4						
<i>Coptis trifolia</i>	67	3						
<i>Poaceae</i>	63	8						
<i>Oxalis montana</i>	58	5						
<i>Viola</i> spp.	57	4						
<i>Rubus pubescens</i>	53	4						
<i>Lycopodium obscurum</i>	51	3						
Bryo-Lichen Stratum Cover (Mean)		14						
<i>Pleurozium schreberi</i>	82	6						

Soil Nutrient Regime		Soil Moisture Regime	
Poor	Medium	Dry	Wet





Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Alnus incana can form dense thickets that impede tree regeneration.
 CNVC00241 typically occurs on fine-textured soils of glaciolacustrine origin and is dominated by *Populus tremuloides* or *P. balsamifera*.
 CNVC00239 occurs on sites that are not as moist nor rich and has more *Acer spicatum*.
 CNVC00272, CNVC00273 and CNVC00274 are similar mixedwood Associations.

CNVC00245 *Pinus banksiana* / *Vaccinium angustifolium* / *Cladina* spp.

Jack Pine / Early Lowbush Blueberry / Reindeer Lichens

Subassociations: none

Provinces: Manitoba, Ontario

CONIFER

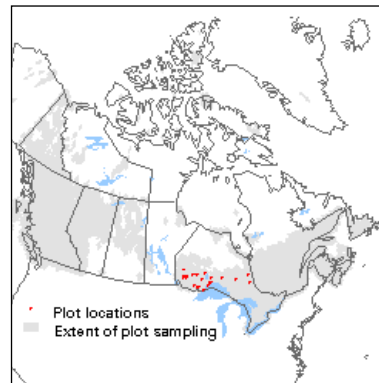
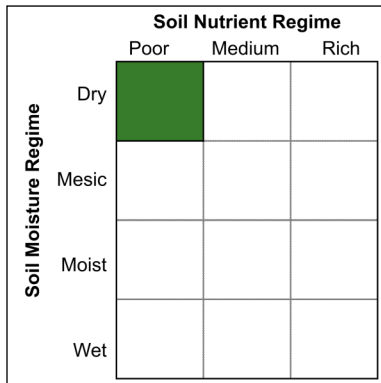


Lichen

CNVC00245 has a sparse to open tree layer of *Pinus banksiana* and a poorly to moderately developed shrub layer of *P. banksiana*, *Picea mariana*, *Vaccinium angustifolium* and *V. myrtilloides*. The herb and dwarf shrub layer is usually poorly developed; *Arctostaphylos uva-ursi* is sometimes abundant, but only *Melampyrum lineare* is consistently present. The moss and lichen layer is well developed and dominated by reindeer lichens (*Cladina rangiferina*, *C. mitis* and *C. stellaris*). Patches of *Pleurozium schreberi* are also present.

CNVC00245 occurs in a region with a continental boreal climate that is subhumid in the west and becomes increasingly humid eastward. It occurs on some of the driest, most nutrient-impooverished sites capable of supporting tree-dominated vegetation in the region. Stands are usually on level sites or upper-slope or crest topopositions, often on warm, west or south, aspects. Sites tend to be bedrock-dominated or have coarse-textured soils derived from glaciofluvial or morainal parent materials. CNVC00245 is an early seral condition with dynamics that are driven by fire and limited by edaphic conditions. Although this Association typically occurs on sites too edaphically limited to support a closed forest, it can also result from regeneration failure in a closed stand (e.g., CNVC00207).

Characteristic Plants	CNVC00245		Site / Soil Characteristics	(% Frequency); md=missing data
	31 plots		Elevation (min–mean–max)	203–363–508 m; md (3)
^≥30% presence; ±characteristic cover	% Presence^	% Cover±	Slope	level (42); gentle (13); moderate (13); moderately steep (26); steep (6)
Tree Stratum Cover (Mean)	22		Aspect	north (10); east (3); south (19); west (45); level (23)
<i>Pinus banksiana</i>	97	21	Meso Topoposition	crest/ upper (68); mid (19); lower/ toe (3); level (10)
<i>Picea mariana</i>	42	5	Moisture Regime	very dry (19); dry (71); mesic (6); md (3)
Shrub Stratum Cover (Mean)	23		Nutrient Regime	md (100)
<i>Vaccinium angustifolium</i>	77	11	Soil Parent Material	glaciofluvial (35); bedrock (19); moraine/ till (16); eolian (13); lacustrine (13); md (3)
<i>Vaccinium myrtilloides</i>	74	3	Soil Rooting Zone Substrate	sandy (32); non-soil (19); coarse loamy (19); other (3); md (26)
<i>Pinus banksiana</i>	71	7	Root Restricting Depth	0-20 cm (23); 21-99 cm (19); ≥100 cm (32); md (26)
<i>Picea mariana</i>	68	3	Humus Form	mor (84); moder (6); mull (3); md (6)
<i>Diervilla lonicera</i>	32	4		
<i>Abies balsamea</i>	32	2		
Herb Stratum Cover (Mean)	15			
<i>Melampyrum lineare</i>	61	1		
<i>Maianthemum canadense</i>	55	2		
<i>Arctostaphylos uva-ursi</i>	39	15		
Bryo-Lichen Stratum Cover (Mean)	72			
<i>Cladina rangiferina</i>	100	18		
<i>Cladina mitis</i>	90	24		
<i>Pleurozium schreberi</i>	87	16		
<i>Cladina stellaris</i>	87	10		
<i>Dicranum polysetum</i>	84	3		
<i>Cladonia</i> spp.	58	8		
<i>Polytrichum juniperinum</i>	35	2		
<i>Polytrichum piliferum</i>	32	1		



Source: NRCan—CFS

Notes & Similar Associations

Jack pine budworm (*Choristoneura pinus pinus*) can reduce growth and cause top kill of *Pinus banksiana* but does not usually result in widespread tree mortality. Dead wood and needle litter may increase the flammability of these stands after an outbreak.

CNVC00201 occurs in Ontario and Quebec and has *Kalmia angustifolia*.

CNVC00246 has *Picea mariana* dominant.

CNVC00246 *Picea mariana* / *Rhododendron groenlandicum*—*Vaccinium angustifolium* / *Cladina* spp.

CONIFER

Black Spruce / Common Labrador Tea—Early Lowbush Blueberry / Reindeer Lichens

Subassociations: none

Provinces: Ontario

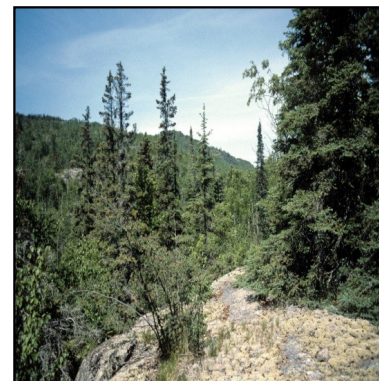
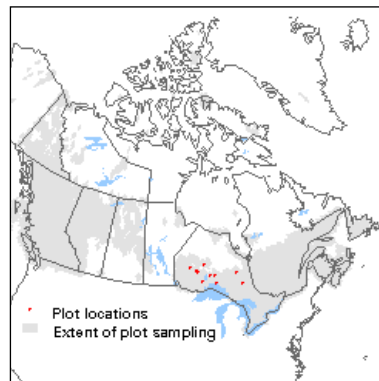
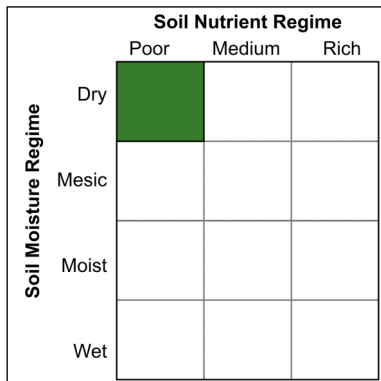


Lichen

CNVC00246 has a sparse tree layer of *Picea mariana* but a well-developed shrub layer with abundant *P. mariana* and ericaceous species, including *Rhododendron groenlandicum*, *Vaccinium myrtilloides* and *V. angustifolium*. The herb layer is virtually nonexistent. The moss and lichen layer is continuous and dominated by reindeer lichens (*Cladina rangiferina*, *C. mitis* and *C. stellaris*), with minor amounts of *Cladonia* lichens. Patches of *Pleurozium schreberi* are often present.

CNVC00246 occurs on dry, nutrient-poor sites in a region with a continental boreal climate that is subhumid in the west, becoming increasingly humid eastward. These are among the driest, most nutrient-impooverished sites capable of supporting tree-dominated vegetation in the region. Stands are usually on level sites or gentle to moderate slopes on crest or upper-slope topositions. Stands tend to be on warm, west or south, aspects. The dynamics of CNVC00246 are closely tied to fire, but this can be a stable, self-perpetuating community. Although this Association typically occurs on sites too edaphically limited to support a closed forest, it can also result from regeneration failure in a closed stand (e.g., CNVC00208).

Characteristic Plants		CNVC00246		Site / Soil Characteristics		(% Frequency); md=missing data	
		12 plots					
^≥20% presence; ±characteristic cover		Presence^	Cover±				
Tree Stratum Cover (Mean)		16					
<i>Picea mariana</i>		100	15	Elevation (min–mean–max)		232–356–465 m; md (8)	
Shrub Stratum Cover (Mean)		47		Slope		level (50); gentle (17); moderate (25); md (8)	
<i>Picea mariana</i>		100	17	Aspect		north (8); east (0); south (8); west (25); level (58)	
<i>Rhododendron groenlandicum</i>		75	18	Meso Toposition		crest/ upper (75); mid (8); level (17)	
<i>Vaccinium myrtilloides</i>		67	7	Moisture Regime		very dry (50); dry (50)	
<i>Vaccinium angustifolium</i>		58	20	Nutrient Regime		md (100)	
<i>Sorbus decora</i>		25	1	Soil Parent Material		moraine/ till (42); bedrock (25); lacustrine (17); other (8); md (8)	
<i>Alnus viridis</i>		25	1	Soil Rooting Zone Substrate		sandy (25); non-soil (25); other (16); md (33)	
Herb Stratum Cover (Mean)		2		Root Restricting Depth		0-20 cm (50); 21-99 cm (25); ≥100 cm (8); md (17)	
<i>Gaultheria hispidula</i>		50	1	Humus Form		mor (83); moder (8); peatymor (8)	
<i>Chamerion angustifolium</i>		25	1				
<i>Cornus canadensis</i>		25	1				
<i>Vaccinium vitis-idaea</i>		25	1				
Bryo-Lichen Stratum Cover (Mean)		92					
<i>Pleurozium schreberi</i>		100	23				
<i>Cladina rangiferina</i>		100	23				
<i>Cladina mitis</i>		92	18				
<i>Cladina stellaris</i>		92	18				
<i>Dicranum polysetum</i>		92	2				
<i>Cladonia</i> spp.		83	4				
<i>Ptilium crista-castrensis</i>		58	2				
<i>Peltigera aphthosa</i>		42	< 1				
<i>Sphagnum capillifolium</i>		33	3				
<i>Ptilidium ciliare</i>		33	1				
<i>Bucklandiella heterosticha</i>		25	1				
<i>Polytrichum commune</i>		25	1				



Source: NRCan—CFS

Notes & Similar Associations

CNVC00246 has physiognomic affinities to M179 [North American Northern Boreal Woodland] *Picea mariana* – lichen woodlands but is readily distinguished by the absence of northern species, such as *Betula glandulosa*, *Vaccinium uliginosum* and *Empetrum nigrum*.
 CNVC00204 occurs in Quebec and has *Kalmia angustifolia*.
 CNVC00245 has *Pinus banksiana* dominant.

CNVC00256 *Picea glauca*—*Abies balsamea* / *Streptopus lanceolatus* / *Pleurozium schreberi*

CONIFER

White Spruce—Balsam Fir / Rose Twisted-stalk / Red-stemmed Feathermoss

Subassociations: *typic*, *Acer spicatum*

Provinces: Manitoba, Ontario

Mesic Rich Shrub & Herb

CNVC00256 has a moderately closed canopy of *Picea glauca* and/or *Abies balsamea* over a moderately to well-developed shrub layer that usually includes *A. balsamea*, *Sorbus decora* and *Acer spicatum*. The herb layer is moderately developed and commonly includes *Cornus canadensis*, *Clintonia borealis*, *Maianthemum canadense*, *Aralia nudicaulis*, *Linnaea borealis*, *Rubus pubescens*, *Streptopus lanceolatus*, *Lysimachia borealis*, *Galium triflorum*, *Mitella nuda* and *Coptis trifolia*. The typically well-developed moss layer has *Pleurozium schreberi* dominant, with less abundant *Ptilium crista-castrensis* and *Hylocomium splendens*.

CNVC00256 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is most frequently found on mesic to moist, nutrient-medium to -rich sites. These are some of the most productive sites in the region. Stands are often on level sites or gentle slopes where seepage may enhance moisture and nutrient availability. This is a late seral condition that tends to occur as small patches in areas that have escaped fire for a long period. Insect outbreaks and windthrow are the primary natural disturbances; canopy gaps or large patches that result from these disturbances can promote self-replacement of this Association by the release of *A. balsamea* regeneration.

Characteristic Plants		CNVC00256		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥50% presence; ±characteristic cover		82 plots		Elevation (min–mean–max)		136–330–491 m; md (1)	
		%	%	Slope		level (43); gentle (28); moderate (5); moderately steep (7); steep (6); very steep (5); md (6)	
		Presence^	Cover±	Aspect		north (17); east (9); south (23); west (26); level (26)	
Tree Stratum Cover (Mean)		46		Meso Topoposition		crest/ upper (29); mid (35); lower/ toe (15); depression (6); level (15)	
<i>Picea glauca</i>		91	27	Moisture Regime		very dry (1); dry (15); mesic (52); moist (27); wet (2); md (2)	
<i>Abies balsamea</i>		73	19	Nutrient Regime		md (100)	
Shrub Stratum Cover (Mean)		41		Soil Parent Material		lacustrine (50); moraine/ till (22); glaciofluvial (16); other (7); md (5)	
<i>Abies balsamea</i>		94	10	Soil Rooting Zone Substrate		coarse loamy (26); silty (16); sandy (13); clayey (12); other (10); md (22)	
<i>Sorbus decora</i>		65	1	Root Restricting Depth		0-20 cm (2); 21-99 cm (20); ≥100 cm (65); md (13)	
<i>Acer spicatum</i>		62	18	Humus Form		mor (57); moder (32); mull (6); peatymor (1); md (4)	
<i>Rosa acicularis</i>		57	1				
<i>Diervilla lonicera</i>		54	4				
Herb Stratum Cover (Mean)		37					
<i>Cornus canadensis</i>		89	5				
<i>Clintonia borealis</i>		87	3				
<i>Maianthemum canadense</i>		85	2				
<i>Aralia nudicaulis</i>		83	2				
<i>Linnaea borealis</i>		82	2				
<i>Rubus pubescens</i>		77	4				
<i>Streptopus lanceolatus</i>		74	1				
<i>Lysimachia borealis</i>		72	1				
<i>Galium triflorum</i>		65	1				
<i>Mitella nuda</i>		63	2				
<i>Coptis trifolia</i>		61	2				
<i>Viola renifolia</i>		55	1				
Bryo-Lichen Stratum Cover (Mean)		58					
<i>Pleurozium schreberi</i>		95	32				
<i>Ptilium crista-castrensis</i>		83	4				
<i>Hylocomium splendens</i>		72	7				
<i>Rhytidadelphus triquetrus</i>		57	10				
<i>Dicranum polysetum</i>		55	1				
Notes & Similar Associations				The <i>Acer spicatum</i> subassociation is slightly richer and has a better developed shrub layer, usually with abundant <i>A. spicatum</i> or <i>Corylus cornuta</i> and greater presence of nutrient-demanding forbs.			
				CNVC00215 and CNVC00235 are similar mixedwood Associations.			
				CNVC00225 is a similar Association that occurs in Quebec, New Brunswick and Nova Scotia.			

Source: NRCan—CFS

CNVC00269 *Betula papyrifera* / *Vaccinium angustifolium* / *Pleurozium schreberi*

HARDWOOD

Paper Birch / Early Lowbush Blueberry / Red-stemmed Feathermoss

Subassociations: none

Provinces: Ontario

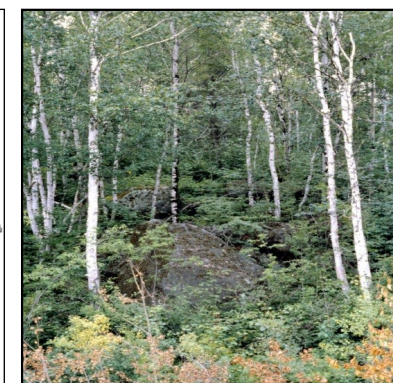
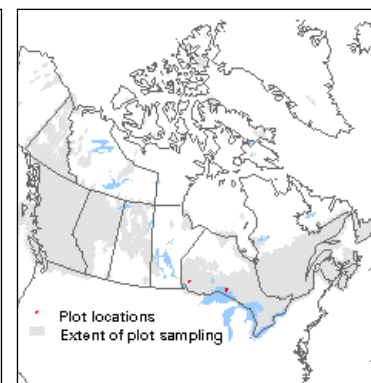
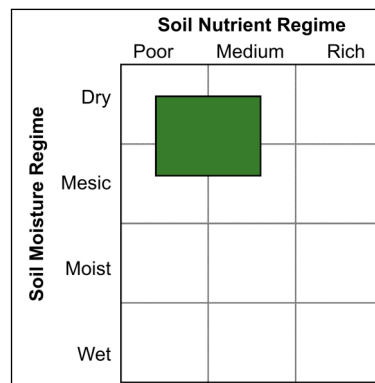
Ericaceous Shrub & Feathermoss

CNVC00269 is a provisional Association characterized by only three plots. It has an open tree layer dominated by *Betula papyrifera* over a well-developed shrub layer that includes the tree species *B. papyrifera*, *Abies balsamea*, *Picea glauca* and *P. mariana*, as well as shrubs such as *Acer spicatum*, *Sorbus decora*, *Diervilla lonicera*, *Vaccinium angustifolium* and *V. myrtilloides*. The moderately developed herb layer includes low cover of *Maianthemum canadense*, *Aralia nudicaulis*, *Lycopodium annotinum*, *Cornus canadensis*, *Clintonia borealis* and *Lysimachia borealis*. Moss layer development is likewise moderate, consisting mainly of *Pleurozium schreberi* and *Hylocomium splendens*.

CNVC00269 occurs on nutrient-poor to -medium sites that, owing to location (e.g., north shore of Lake Superior), may experience greater humidity than the subhumid to humid continental boreal climate that characterizes the region. This is an early seral condition that likely develops after fire.

Characteristic Plants	CNVC00269	
	3 plots	
[^] ≥33% presence; ±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	32	
<i>Betula papyrifera</i>	100	30
<i>Picea glauca</i>	33	4
<i>Picea mariana</i>	33	3
Shrub Stratum Cover (Mean)	42	
<i>Betula papyrifera</i>	100	11
<i>Vaccinium angustifolium</i>	100	2
<i>Abies balsamea</i>	67	13
<i>Picea glauca</i>	67	4
<i>Picea mariana</i>	67	3
<i>Acer spicatum</i>	67	1
<i>Sorbus decora</i>	67	1
<i>Diervilla lonicera</i>	33	30
<i>Vaccinium myrtilloides</i>	33	11
<i>Alnus viridis</i>	33	4
<i>Populus tremuloides</i>	33	3
Herb Stratum Cover (Mean)	38	
<i>Maianthemum canadense</i>	100	4
<i>Aralia nudicaulis</i>	100	4
<i>Lycopodium annotinum</i>	100	2
<i>Cornus canadensis</i>	67	12
<i>Clintonia borealis</i>	67	10
<i>Lysimachia borealis</i>	67	2
<i>Polypodium virginianum</i>	33	20
<i>Linnaea borealis</i>	33	2
<i>Maianthemum trifolium</i>	33	2
Bryo-Lichen Stratum Cover (Mean)	37	
<i>Pleurozium schreberi</i>	100	23
<i>Ptilium crista-castrensis</i>	100	2
<i>Cladina rangiferina</i>	67	2
<i>Hylocomium splendens</i>	33	20

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	179–256–388 m
Slope	gentle (33); moderate (33); steep (33)
Aspect	north (0); east (0); south (67); west (33)
Meso Topoposition	lower/ toe (67); level (33)
Moisture Regime	dry (100)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (67); glaciofluvial (33)
Soil Rooting Zone Substrate	coarse loamy (33); md (67)
Root Restricting Depth	21-99 cm (67); ≥100 cm (33)
Humus Form	mor (100)



Source: NRCan—CFS

Notes & Similar Associations

CNVC00237 occurs in Quebec and Newfoundland and Labrador and typically has *Kalmia angustifolia*.
 CNVC00238 has more *Populus tremuloides*.

CNVC00270 *Betula papyrifera*—*Picea mariana*—*Abies balsamea* / *Pleurozium schreberi*—*Sphagnum* spp.

MIXEDWOOD

Paper Birch—Black Spruce—Balsam Fir / Red-stemmed Feathermoss—Peat Mosses

Subassociations: *typic*, *Picea mariana*, *Betula papyrifera*

Provinces: Ontario, Quebec



Feathermoss & Peat Moss

CNVC00270 has a moderately closed to closed canopy of *Betula papyrifera*, *Picea mariana* and *Abies balsamea*, in various mixes. Regeneration of these species, especially *A. balsamea*, dominates the well-developed to dense shrub layer. *Sorbus americana* is a common but less abundant species. The herb layer is moderately developed and typically includes *Cornus canadensis*, *Gaultheria hispidula*, *Clintonia borealis*, *Coptis trifolia*, *Maianthemum canadense*, *Lysimachia borealis*, *Oxalis montana*, *Dryopteris* spp. and *Carex* spp. The moss layer is well developed and characterized by abundant *Pleurozium schreberi* and *Sphagnum* spp., especially *S. girgensohnii*. Minor amounts of *Dicranum* spp., *Polytrichum* spp. and *Cladina* spp. are present.

CNVC00270 occurs in a region with a humid continental boreal climate, typically on moist to mesic, sometimes wet, nutrient-medium sites. Stands are often on level sites in the transition between upland and wetland forests, but can also occur on moisture-collecting, mid- to lower- or toe-slope topopositions. This is a mid-seral condition that can develop after low-severity fires, harvesting or partial disturbances such as insect outbreak or windthrow.

Characteristic Plants		CNVC00270		Site / Soil Characteristics		(% Frequency); md=missing data																		
^≥50% presence; ±characteristic cover		142 plots		Elevation (min–mean–max)		55–460–945 m																		
		%	%	Slope		level (38); gentle (31); moderate (14); moderately steep (11); steep (4); very steep (1)																		
		Presence [^]	Cover [±]	Aspect		north (22); east (23); south (13); west (15); level (27); md (1)																		
Tree Stratum Cover (Mean)		60		Meso Topoposition		crest/ upper (9); mid (46); lower/ toe (16); depression (8); level (20)																		
<i>Betula papyrifera</i>		99	24	Moisture Regime		dry (5); mesic (34); moist (44); wet (17)																		
<i>Picea mariana</i>		92	16	Nutrient Regime		md (100)																		
<i>Abies balsamea</i>		89	15	Soil Parent Material		moraine/ till (80); other (20)																		
Shrub Stratum Cover (Mean)		59		Soil Rooting Zone Substrate		coarse loamy (12); other (15); md (72)																		
<i>Abies balsamea</i>		98	26	Root Restricting Depth		0-20 cm (15); 21-99 cm (58); ≥100 cm (1); md (26)																		
<i>Betula papyrifera</i>		94	9	Humus Form		mor (73); moder (3); peatymor (24); md (1)																		
<i>Picea mariana</i>		90	11	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Soil Nutrient Regime</p> <table border="1"> <tr> <td></td> <td>Poor</td> <td>Medium</td> <td>Rich</td> </tr> <tr> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg);">Soil Moisture Regime</td> <td>Dry</td> <td></td> <td></td> </tr> <tr> <td>Mesic</td> <td style="background-color: #006400;"></td> <td></td> </tr> <tr> <td>Moist</td> <td></td> <td></td> </tr> <tr> <td>Wet</td> <td></td> <td></td> </tr> </table> </div> <div> <p>Plot locations Extent of plot sampling</p> </div> <div> </div> </div>					Poor	Medium	Rich	Soil Moisture Regime	Dry			Mesic			Moist			Wet		
	Poor	Medium	Rich																					
Soil Moisture Regime	Dry																							
	Mesic																							
	Moist																							
	Wet																							
<i>Sorbus americana</i>		64	5																					
<i>Vaccinium myrtilloides</i>		58	3																					
<i>Vaccinium angustifolium</i>		53	3																					
<i>Amelanchier</i> spp.		51	4																					
Herb Stratum Cover (Mean)		28																						
<i>Cornus canadensis</i>		94	6																					
<i>Gaultheria hispidula</i>		83	6																					
<i>Clintonia borealis</i>		82	5																					
<i>Coptis trifolia</i>		79	3																					
<i>Maianthemum canadense</i>		78	3																					
<i>Lysimachia borealis</i>		69	2																					
<i>Oxalis montana</i>		65	8																					
<i>Dryopteris spinulosa</i> complex		64	4																					
<i>Carex</i> spp.		63	4																					
<i>Linnaea borealis</i>		58	3																					
Bryo-Lichen Stratum Cover (Mean)		60																						
<i>Pleurozium schreberi</i>		95	17																					
<i>Dicranum</i> spp.		89	4																					
<i>Polytrichum</i> spp.		77	3																					
<i>Sphagnum</i> spp.		73	30																					
<i>Cladina rangiferina</i>		61	2																					
<i>Ptilium crista-castrensis</i>		56	4																					
<i>Sphagnum girgensohnii</i>		52	25																					
				Notes & Similar Associations																				
				On wet or cool sites, paludification can reduce site productivity over time in this Association.																				
				CNVC00214, CNVC00234 & CNVC00344 occur on sites that are not as moist and have less <i>Sphagnum</i> moss cover.																				
				CNVC00276, CNVC00277 & CNVC00278 are similar conifer Associations.																				

Source: Ministère des Forêts, de la Faune et des Parcs

CNVC00272 *Populus tremuloides*—*Picea mariana* / *Alnus incana*

MIXEDWOOD

Trembling Aspen—Black Spruce / Speckled Alder

Subassociations: *typic*, *Populus balsamifera*

Provinces: Manitoba, Ontario, Quebec



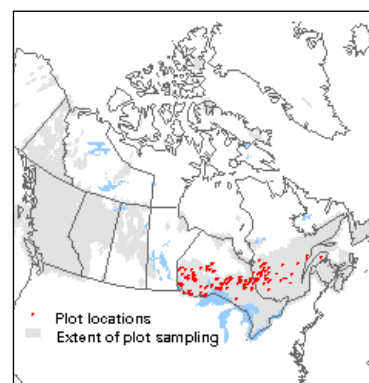
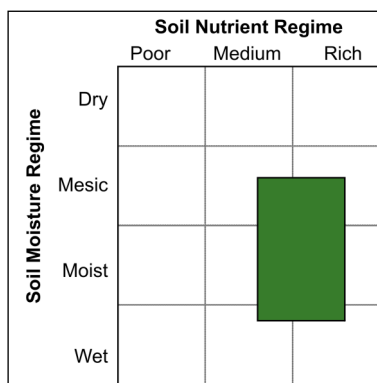
Moist Rich Shrub & Herb

CNVC00272 has a moderately closed to closed canopy dominated by *Populus tremuloides* and *Picea mariana*, sometimes with a minor component of *P. balsamifera*. The shrub layer is tall and moderately developed to dense, often with abundant *Alnus incana*. *Abies balsamea* and *P. mariana* are usually present, and various shrub species occur with low abundance. The herb layer is well developed and commonly includes *Cornus canadensis*, *Rubus pubescens*, *Maianthemum canadense*, *Petasites frigidus*, *Linnaea borealis*, *Lysimachia borealis*, *Mitella nuda* and *Clintonia borealis*. The moss layer varies from poorly to well developed; it is better developed in stands with less broad-leaf litter. *Pleurozium schreberi* and *Ptilium crista-castrensis* are usually present.

CNVC00272 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It is primarily found on moist, nutrient-rich sites; these are some of the most productive sites in the region. Stands are usually on level sites or gentle slopes. Soils are typically fine textured, lacustrine or glaciolacustrine sediments. CNVC00272 can establish as the first cohort after fire or harvesting, or succeed an earlier seral hardwood Association.

Characteristic Plants	CNVC00272	
^≥45% presence except	171 plots	
<i>Populus balsamifera</i> ;	%	%
±characteristic cover	Presence^	Cover±
Tree Stratum Cover (Mean)		61
<i>Populus tremuloides</i>	76	31
<i>Picea mariana</i>	75	25
<i>Populus balsamifera</i>	26	13
Shrub Stratum Cover (Mean)		56
<i>Alnus incana</i>	80	29
<i>Abies balsamea</i>	73	8
<i>Picea mariana</i>	70	9
<i>Rosa acicularis</i>	58	3
<i>Vaccinium myrtilloides</i>	57	3
<i>Populus tremuloides</i>	53	2
<i>Rubus idaeus</i>	47	4
<i>Viburnum edule</i>	46	4
Herb Stratum Cover (Mean)		48
<i>Cornus canadensis</i>	89	7
<i>Rubus pubescens</i>	84	6
<i>Maianthemum canadense</i>	82	3
<i>Petasites frigidus</i>	74	2
<i>Linnaea borealis</i>	69	3
<i>Lysimachia borealis</i>	67	1
<i>Mitella nuda</i>	63	4
<i>Clintonia borealis</i>	62	4
<i>Aralia nudicaulis</i>	59	5
<i>Coptis trifolia</i>	59	2
<i>Eurybia macrophylla</i>	50	13
<i>Equisetum sylvaticum</i>	49	1
<i>Lycopodium annotinum</i>	46	8
Bryo-Lichen Stratum Cover (Mean)		33
<i>Pleurozium schreberi</i>	93	16
<i>Ptilium crista-castrensis</i>	73	7
<i>Hylocomium splendens</i>	53	9

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min—mean—max)	50–309–520 m; md (13)
Slope	level (64); gentle (20); moderate (7); moderately steep (3); very steep (1); md (5)
Aspect	north (13); east (9); south (11); west (19); level (46); md (2)
Meso Topoposition	crest/ upper (19); mid (16); lower/ toe (16); depression (2); level (46); md (1)
Moisture Regime	very dry (1); dry (5); mesic (42); moist (48); wet (4)
Nutrient Regime	md (100)
Soil Parent Material	lacustrine (40); glaciolacustrine (18); moraine/ till (16); other (21); md (6)
Soil Rooting Zone Substrate	clayey (20); fine loamy (12); silty (11); other (19); md (38)
Root Restricting Depth	0-20 cm (6); 21-99 cm (34); ≥100 cm (30); md (30)
Humus Form	mor (57); moder (27); mull (2); peatymor (9); md (4)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Alnus incana can form dense thickets that impede tree regeneration.

CNVC00241 & CNVC00242 are similar hardwood Associations.

CNVC00273 occurs in Quebec and has mainly *Abies balsamea* as the conifer component of its mixedwood canopy.

CNVC00274 occurs in Quebec and has a canopy of *Betula papyrifera* and *A. balsamea*.

CNVC00295 is a similar conifer Association that is dominated by *Picea mariana*.

CNVC00273 *Populus tremuloides*—*Betula papyrifera*—*Abies balsamea* / *Alnus incana*

MIXEDWOOD

Trembling Aspen—Paper Birch—Balsam Fir / Speckled Alder

Subassociations: none

Provinces: Quebec

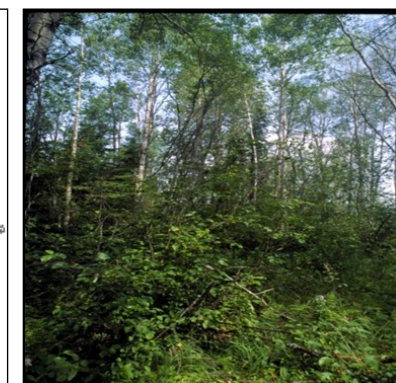
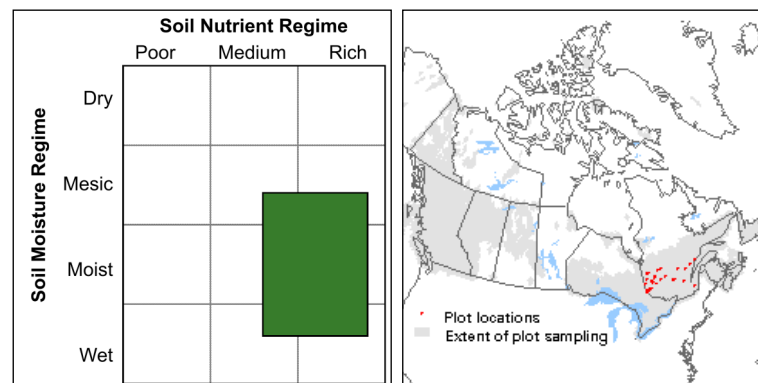
Moist Rich Shrub & Herb

CNVC00273 has a closed canopy of *Populus tremuloides* and/or *Betula papyrifera* mixed with *Abies balsamea* and/or *Picea glauca*. The shrub layer is dense with *Alnus incana* dominant and lower abundances of tree species, *Ribes glandulosum*, *Rubus idaeus* and *Salix* spp. The herb layer is well developed and typically includes low cover of many species, such as *Dryopteris* spp., *Rubus pubescens*, *Maianthemum canadense*, *Aralia nudicaulis*, *Clintonia borealis*, *Viola* spp., *Carex* spp., grasses (*Poaceae*), *Lysimachia borealis* and *Galium* spp. The forest floor cover is mainly broad-leaf litter, so the moss layer is virtually nonexistent.

CNVC00273 occurs in a region with a humid continental boreal climate. It is most frequently found on moist, nutrient-rich sites; these are some of the most productive sites in the region. Stands are commonly on level sites or gentle slopes, primarily on fine-textured soils developed on glaciolacustrine sediments. This is a mid-seral condition that can develop as shade-tolerant *A. balsamea* and *P. glauca* become established in early seral stands. Partial disturbances such as insect outbreaks and windthrow can maintain this mixedwood condition on the landscape.

Characteristic Plants	CNVC00273 23 plots	
[^] ≥50% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		68
<i>Populus tremuloides</i>	100	27
<i>Abies balsamea</i>	100	17
<i>Betula papyrifera</i>	83	18
<i>Picea glauca</i>	52	11
Shrub Stratum Cover (Mean)		71
<i>Alnus incana</i>	100	34
<i>Abies balsamea</i>	96	8
<i>Ribes glandulosum</i>	78	4
<i>Populus tremuloides</i>	74	4
<i>Rubus idaeus</i>	70	9
<i>Salix</i> spp.	70	6
<i>Diervilla lonicera</i>	57	4
<i>Amelanchier</i> spp.	52	2
Herb Stratum Cover (Mean)		56
<i>Dryopteris spinulosa</i> complex	87	7
<i>Rubus pubescens</i>	83	8
<i>Maianthemum canadense</i>	83	4
<i>Aralia nudicaulis</i>	78	11
<i>Clintonia borealis</i>	74	7
<i>Viola</i> spp.	74	5
<i>Carex</i> spp.	65	7
<i>Poaceae</i>	65	5
<i>Lysimachia borealis</i>	61	3
<i>Galium</i> spp.	61	3
<i>Athyrium filix-femina</i>	52	7
Bryo-Lichen Stratum Cover (Mean)		12
<i>Pleurozium schreberi</i>	78	3
<i>Dicranum</i> spp.	65	3
<i>Cladonia</i> spp.	52	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	10–295–445 m
Slope	level (57); gentle (26); moderate (13); steep (4)
Aspect	north (13); east (13); south (13); west (17); level (43)
Meso Toposition	crest/ upper (4); mid (17); lower/ toe (30); level (48)
Moisture Regime	mesic (17); moist (65); wet (17)
Nutrient Regime	md (100)
Soil Parent Material	glaciolacustrine (52); moraine/ till (35); other (13)
Soil Rooting Zone Substrate	clayey (9); md (91)
Root Restricting Depth	21-99 cm (78); md (22)
Humus Form	mor (52); moder (35); mull (4); peatymor (9)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Alnus incana can form dense thickets that impede regeneration.
 CNVC00241 & CNVC00242 are similar hardwood Associations.
 CNVC00272 has mainly *Picea mariana* as the conifer component of the canopy.
 CNVC00274 has less *Populus tremuloides* in the canopy and is more common on tills.
 CNVC00297 is a similar conifer Association that is dominated by *Abies balsamea*.

CNVC00274 *Betula papyrifera*—*Abies balsamea* / *Alnus incana*

MIXEDWOOD

Paper Birch—Balsam Fir / Speckled Alder

Subassociations: *typic*, *Rubus pubescens*

Provinces: Quebec

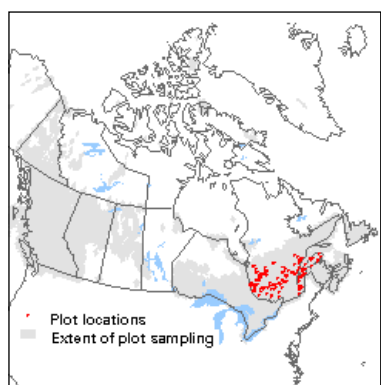
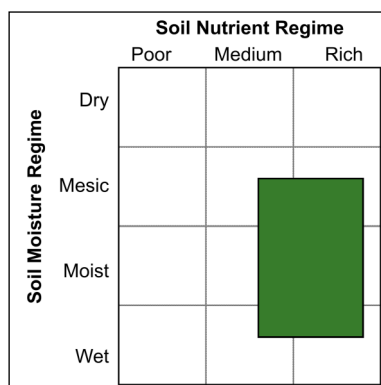
Moist Rich Shrub & Herb

CNVC00274 has a closed canopy of *Betula papyrifera* with *Abies balsamea* and/or *Picea glauca*. The shrub layer is dense and dominated by *Alnus incana*, with abundant *A. balsamea* and *Acer spicatum*. *Rubus idaeus*, *B. papyrifera* and *Sorbus americana* are also common. The herb layer is well developed and typically includes low cover of many species, such as *Dryopteris* spp., *Lysimachia borealis*, *R. pubescens*, *Clintonia borealis*, *Cornus canadensis*, *Maianthemum canadense*, *Viola* spp., *Coptis trifolia*, *Carex* spp. and *Gymnocarpium dryopteris*. The forest floor cover is mainly broad-leaf litter, so the moss layer is sparse.

CNVC00274 occurs in a region with a humid continental boreal climate. It is usually on moist, nutrient-rich sites; these are some of the most productive sites in the region. Stands are most common on gentle morainal slopes on water-receiving, mid- to lower- or toe-slope topopositions, but can also occur on level glaciolacustrine deposits. CNVC00274 is a mid-seral condition that can develop as shade-tolerant *A. balsamea* and *P. glauca* become established in early seral *B. papyrifera* / *A. incana* stands. Partial disturbances such as insect outbreak and windthrow can maintain this mixedwood condition on the landscape.

Characteristic Plants	CNVC00274	
	119 plots	
^≥50% presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		65
<i>Betula papyrifera</i>	93	20
<i>Abies balsamea</i>	91	18
<i>Picea glauca</i>	59	16
Shrub Stratum Cover (Mean)		68
<i>Alnus incana</i>	97	35
<i>Abies balsamea</i>	97	13
<i>Rubus idaeus</i>	73	7
<i>Acer spicatum</i>	68	21
<i>Betula papyrifera</i>	66	5
<i>Sorbus americana</i>	63	4
<i>Ribes glandulosum</i>	57	4
Herb Stratum Cover (Mean)		45
<i>Dryopteris spinulosa</i> complex	79	6
<i>Lysimachia borealis</i>	75	3
<i>Rubus pubescens</i>	72	6
<i>Clintonia borealis</i>	71	5
<i>Cornus canadensis</i>	71	5
<i>Maianthemum canadense</i>	67	4
<i>Viola</i> spp.	66	4
<i>Coptis trifolia</i>	64	3
<i>Carex</i> spp.	63	6
<i>Gymnocarpium dryopteris</i>	61	3
<i>Oxalis montana</i>	57	6
Poaceae	57	5
<i>Aralia nudicaulis</i>	57	4
Bryo-Lichen Stratum Cover (Mean)		18
<i>Pleurozium schreberi</i>	82	6
<i>Dicranum</i> spp.	75	3
<i>Polytrichum</i> spp.	55	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	20–320–680 m
Slope	level (52); gentle (29); moderate (11); moderately steep (6); steep (3)
Aspect	north (18); east (17); south (13); west (13); level (40)
Meso Topoposition	crest/ upper (7); mid (38); lower/ toe (16); depression (5); level (34)
Moisture Regime	mesic (37); moist (43); wet (20)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (53); glaciolacustrine (29); other (18)
Soil Rooting Zone Substrate	coarse loamy (8); fine loamy (8); other (18); md (67)
Root Restricting Depth	0-20 cm (2); 21-99 cm (67); md (31)
Humus Form	mor (66); moder (13); mull (8); peatymor (14)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Alnus incana can form dense thickets that impede regeneration.

CNVC00242 is a similar hardwood Association.

CNVC00273 has more *Populus tremuloides* in the canopy and is more common on glaciolacustrine deposits.

CNVC00297 is a similar conifer Association.

CNVC00276 *Picea mariana* / *Rhododendron groenlandicum*—*Vaccinium angustifolium* / *Pleurozium schreberi* (*Sphagnum* spp.)

CONIFER

Black Spruce / Common Labrador Tea—Early Lowbush Blueberry / Red-stemmed Feathermoss (Peat Mosses)



Subassociations: *typic*, *Hylocomium splendens*, *Rhododendron groenlandicum*

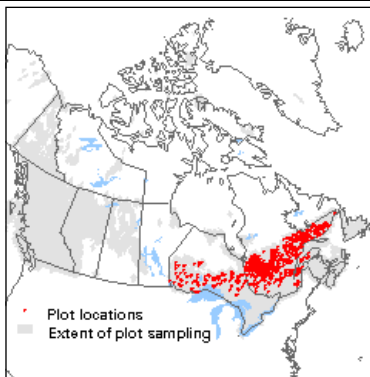
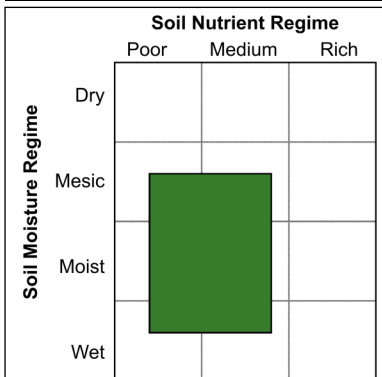
Provinces: Manitoba, Ontario, Quebec

Feathermoss & Peat Moss

CNVC00276 has a moderately closed canopy dominated by *Picea mariana*. The shrub layer is well developed to dense with abundant *P. mariana* and *Abies balsamea* as well as ericaceous shrubs including *Rhododendron groenlandicum*, *Vaccinium myrtilloides*, *V. angustifolium* and, in the east, *Kalmia angustifolia*. The herb layer is sparse; only *Gaultheria hispidula* and *Cornus canadensis* are common. The forest floor is covered by a continuous carpet of feathermosses, dominated by *Pleurozium schreberi*, with less abundant *Sphagnum* mosses.

CNVC00276 occurs primarily on moist, nutrient-poor to -medium sites in a region with a boreal climate that grades from subhumid continental in the west, to humid and maritime in the east. Stands often occur on level sites in the transition between *P. mariana* upland (e.g., CNVC00208, CNVC00211) and wetland (e.g., CNVC00282) forests, but they can also occur on moisture-collecting, mid- to lower- or toe-slope topopositions. Stands typically recolonize after fire and are self-replacing over time.

Characteristic Plants		CNVC00276		Site / Soil Characteristics		(% Frequency); md=missing data	
		823 plots					
^≥40% presence; ±characteristic cover		% Presence [^]	% Cover [±]				
Tree Stratum Cover (Mean)		52					
<i>Picea mariana</i>		100	43	Elevation (min–mean–max)		15–402–1110 m	
<i>Abies balsamea</i>		50	8	Slope		level (45); gentle (25); moderate (16); moderately steep (9); steep (2); very steep (1); md (2)	
Shrub Stratum Cover (Mean)		58		Aspect		north (18); east (15); south (14); west (19); level (34)	
<i>Picea mariana</i>		98	18	Meso Topoposition		crest/ upper (11); mid (37); lower/ toe (17); depression (4); level (31)	
<i>Rhododendron groenlandicum</i>		92	20	Moisture Regime		dry (4); mesic (31); moist (45); wet (20)	
<i>Vaccinium myrtilloides</i>		80	5	Nutrient Regime		md (100)	
<i>Vaccinium angustifolium</i>		74	5	Soil Parent Material		moraine/ till (57); organic (15); glaciolacustrine (11); other (16); md (1)	
<i>Abies balsamea</i>		70	11	Soil Rooting Zone Substrate		organic (17); coarse loamy (10); other (17); md (57)	
<i>Kalmia angustifolia</i>		66	12	Root Restricting Depth		0-20 cm (8); 21-99 cm (62); ≥100 cm (6); md (24)	
Herb Stratum Cover (Mean)		13		Humus Form		mor (57); moder (2); peatymor (39); md (1)	
<i>Gaultheria hispidula</i>		97	5				
<i>Cornus canadensis</i>		83	4				
<i>Coptis trifolia</i>		49	2				
<i>Clintonia borealis</i>		43	3				
<i>Carex</i> spp.		41	2				
Bryo-Lichen Stratum Cover (Mean)		88					
<i>Pleurozium schreberi</i>		100	42				
<i>Ptilium crista-castrensis</i>		86	10				
<i>Cladina rangiferina</i>		83	4				
<i>Dicranum</i> spp.		72	3				
<i>Sphagnum</i> spp.		70	29				
<i>Hylocomium splendens</i>		63	8				
<i>Cladonia</i> spp.		51	2				
<i>Polytrichum</i> spp.		49	3				
<i>Sphagnum fuscum</i>		46	8				
<i>Cladina stellaris</i>		42	4				
<i>Sphagnum girgensohnii</i>		41	14				



Source: NRCan—CFS

Notes & Similar Associations

On wet or cool sites, paludification can reduce site productivity over time in this Association.

The *Hylocomium splendens* subassociation is more frequently found mid-slope on morainal deposits in the northeastern part of the range, where the humid maritime-influenced climate maintains high soil moisture.

CNVC00208, CNVC00211 & CNVC00350 occur on sites that are not as moist and have less *Sphagnum* moss cover.

CNVC00270 is a similar mixedwood Association.

CNVC00277 & CNVC00278 occur in Quebec and have *Abies balsamea* codominant or dominant in the tree layer.

CNVC00277 *Picea mariana*—*Abies balsamea* / *Pleurozium schreberi* (*Sphagnum* spp.)

CONIFER

Black Spruce—Balsam Fir / Red-stemmed Feathermoss (Peat Mosses)

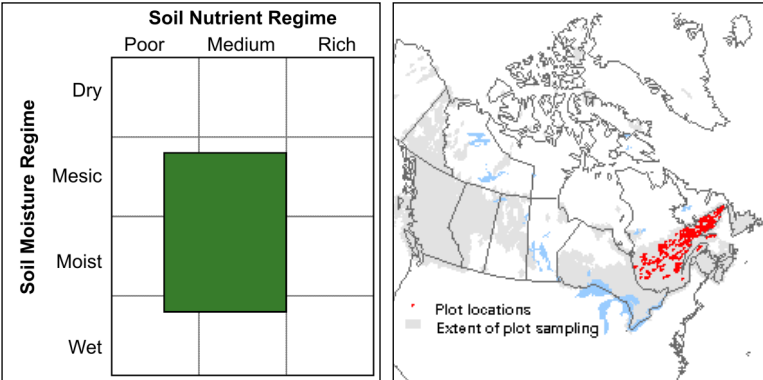
Subassociations: none

Provinces: Quebec

Feathermoss & Peat Moss

CNVC00277 has a moderately closed canopy of varying proportions of *Picea mariana* and *Abies balsamea*. The shrub layer is usually dense and has abundant regeneration of these species, in addition to *Rhododendron groenlandicum* and *Vaccinium angustifolium*, with *Betula papyrifera* in larger canopy openings. The herb layer is poorly developed with only *Gaultheria hispidula*, *Cornus canadensis* and *Coptis trifolia* common. A continuous moss layer of *Pleurozium schreberi*, *Ptilium crista-castrensis* and *Hylocomium splendens*, in combination with several species of *Sphagnum*, further characterizes this Association.

CNVC00277 usually occurs on moist or mesic, nutrient-medium sites in a region with a boreal climate that grades from humid continental in the west, to very humid and more maritime in the east. Stands are commonly on mid-slope topositions on morainal deposits. This is a late seral condition with dynamics driven mainly by fires and insect outbreaks. Although *P. mariana* and *A. balsamea* are present in every stand, climate, disturbance type and history, and site conditions affect the relative dominance of each species.

Characteristic Plants		CNVC00277		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥45% presence;		315 plots		Elevation (min–mean–max)		20–465–955 m	
±characteristic cover				Slope		level (20); gentle (26); moderate (29); moderately steep (17); steep (8); very steep (1)	
		%	%	Aspect		north (27); east (23); south (14); west (24); level (12)	
		Presence [^]	Cover [±]	Meso Toposition		crest/ upper (11); mid (60); lower/ toe (14); depression (4); level (11)	
Tree Stratum Cover (Mean)		53		Moisture Regime		dry (2); mesic (32); moist (58); wet (8)	
<i>Picea mariana</i>		100	24	Nutrient Regime		md (100)	
<i>Abies balsamea</i>		100	22	Soil Parent Material		moraine/ till (82); other (18)	
Shrub Stratum Cover (Mean)		60		Soil Rooting Zone Substrate		coarse loamy (15); other (19); md (67)	
<i>Abies balsamea</i>		100	26	Root Restricting Depth		0-20 cm (6); 21-99 cm (65); md (29)	
<i>Picea mariana</i>		100	17	Humus Form		mor (66); peatymor (34)	
<i>Rhododendron groenlandicum</i>		73	7	 <p>The figure consists of two parts. On the left is a 4x3 matrix titled 'Soil Nutrient Regime' with columns 'Poor', 'Medium', and 'Rich', and rows 'Dry', 'Mesic', 'Moist', and 'Wet'. A green square highlights the 'Mesic' row and 'Medium' column. On the right is a map of Canada with red dots indicating 'Plot locations' and a shaded area indicating the 'Extent of plot sampling' in the eastern part of the country.</p>			
<i>Betula papyrifera</i>		72	5				
<i>Vaccinium angustifolium</i>		62	3				
<i>Amelanchier</i> spp.		56	4				
<i>Vaccinium myrtilloides</i>		50	3				
<i>Kalmia angustifolia</i>		45	5				
Herb Stratum Cover (Mean)		15					
<i>Gaultheria hispidula</i>		99	5				
<i>Cornus canadensis</i>		95	4				
<i>Coptis trifolia</i>		61	3				
<i>Clintonia borealis</i>		58	3				
<i>Linnaea borealis</i>		58	3				
<i>Carex</i> spp.		55	3				
<i>Rubus chamaemorus</i>		52	3				
<i>Lycopodium annotinum</i>		45	3				
Bryo-Lichen Stratum Cover (Mean)		87					
<i>Pleurozium schreberi</i>		100	29				
<i>Dicranum</i> spp.		94	3				
<i>Ptilium crista-castrensis</i>		92	10				
<i>Sphagnum</i> spp.		89	39				
<i>Hylocomium splendens</i>		84	13				
<i>Polytrichum</i> spp.		81	3				
<i>Cladina rangiferina</i>		72	2				
<i>Cladonia</i> spp.		67	2				



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

CNVC00217 & CNVC00351 occur on sites that are not as moist and have less *Sphagnum* moss cover.
 CNVC00270 is a similar mixedwood Association.
 CNVC00276 has less *Abies balsamea* in the tree layer.
 CNVC00278 has less *Picea mariana* in the tree layer.

CNVC00278 *Abies balsamea* / *Pleurozium schreberi*—*Sphagnum* spp.

CONIFER

Balsam Fir / Red-stemmed Feathermoss—Peat Mosses

Subassociations: *typic*, *Sphagnum* spp., *Bazzania trilobata*

Provinces: Newfoundland and Labrador, Quebec

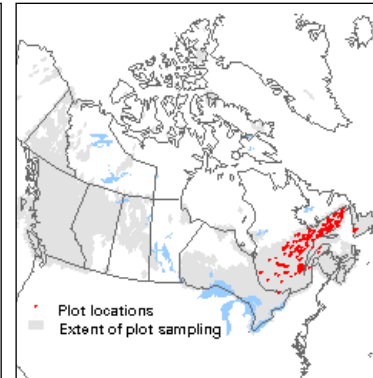
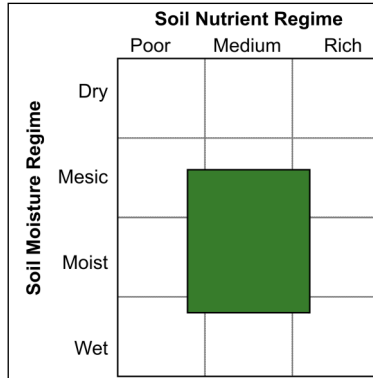


Feathermoss & Peat Moss

CNVC00278 has a closed canopy dominated by *Abies balsamea*, usually with minor components of *Picea mariana* and *Betula papyrifera*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately to well-developed shrub layer. The herb layer can vary from sparse to dense. It usually includes *Cornus canadensis*, *Gaultheria hispidula*, *Linnaea borealis*, *Clintonia borealis*, *Coptis trifolia* and *Lysimachia borealis*. Feathermosses, especially *Pleurozium schreberi*, but also *Ptilium crista-castrensis* and *Hylocomium splendens*, dominate the continuous moss layer, but *Sphagnum* mosses are also abundant and help to characterize this Association.

CNVC00278 occurs mainly on moist to mesic, nutrient-medium sites in a region with a boreal climate that grades from humid continental in the west, to very humid and more maritime in the east. Stands are typically on mid-slope topopositions, often on cool aspects, on morainal deposits. CNVC00278 is a late seral condition with dynamics driven mainly by insect outbreak, especially of spruce budworm (*Choristoneura fumiferana*), windthrow and disease.

Characteristic Plants		CNVC00278		Site / Soil Characteristics		(% Frequency); md=missing data	
		256 plots					
$\geq 40\%$ presence;		%	%				
\pm characteristic cover		Presence [^]	Cover [±]				
Overstory Trees		61					
<i>Abies balsamea</i>		100	41	Elevation (min–mean–max)			
<i>Picea mariana</i>		80	11	10–503–1025 m			
<i>Betula papyrifera</i>		61	7	Slope			
Shrub Stratum Cover (Mean)		53		level (14); gentle (26); moderate (24); moderately steep (24); steep (10); very steep (1); md (1)			
<i>Abies balsamea</i>		100	31	Aspect			
<i>Picea mariana</i>		86	10	north (31); east (26); south (17); west (18); level (7); md (1)			
<i>Betula papyrifera</i>		86	6	Meso Topoposition			
<i>Amelanchier</i> spp.		52	4	crest/ upper (5); mid (64); lower/ toe (14); depression (5); level (7); md (4)			
Herb Stratum Cover (Mean)		21		Moisture Regime			
<i>Cornus canadensis</i>		93	5	mesic (29); moist (64); wet (7)			
<i>Gaultheria hispidula</i>		90	4	Nutrient Regime			
<i>Linnaea borealis</i>		67	3	md (100)			
<i>Clintonia borealis</i>		60	5	Soil Parent Material			
<i>Coptis trifolia</i>		60	3	moraine/ till (82); other (18)			
<i>Lysimachia borealis</i>		60	2	Soil Rooting Zone Substrate			
<i>Carex</i> spp.		52	3	coarse loamy (18); other (18); md (64)			
<i>Maianthemum canadense</i>		50	3	Root Restricting Depth			
<i>Dryopteris spinulosa</i> complex		43	4	0-20 cm (4); 21-99 cm (62); md (34)			
<i>Oxalis montana</i>		42	13	Humus Form			
Bryo-Lichen Stratum Cover (Mean)		87		mor (69); moder (2); peatymor (28); md (2)			
<i>Pleurozium schreberi</i>		100	20				
<i>Dicranum</i> spp.		90	4				
<i>Ptilium crista-castrensis</i>		88	8				
<i>Hylocomium splendens</i>		86	19				
<i>Polytrichum</i> spp.		82	2				
<i>Sphagnum</i> spp.		78	40				
<i>Cladonia</i> spp.		55	2				
<i>Cladina rangiferina</i>		51	2				
<i>Sphagnum girgensohnii</i>		44	32				
<i>Bazzania trilobata</i>		40	4				



Source: W. Meades

Notes & Similar Associations

Paludification is often a factor in the dynamics of CNVC00278. The *Sphagnum* spp. subassociation is more common on wetter, lower-slope topopositions. The *Bazzania trilobata* subassociation often occurs near wetlands that experience seasonal water table fluctuations. CNVC00220 & CNVC00222 occur on sites that are not as moist and have less *Sphagnum* moss cover. CNVC00270 is a similar mixedwood Association. CNVC00277 has *Picea mariana* codominant in the tree layer.

CNVC00292 *Picea mariana*—*Abies balsamea* / *Vaccinium vitis-idaea* / *Pleurozium schreberi*—*Bazzania trilobata*

CONIFER

Black Spruce—Balsam Fir / Lingonberry / Red-stemmed Feathermoss—Three-lobed Whipwort

Subassociations: *typic*, *Sphagnum capillifolium*

Provinces: Nova Scotia

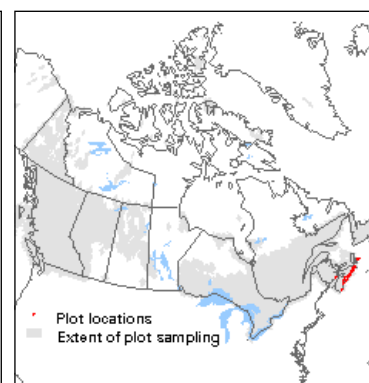
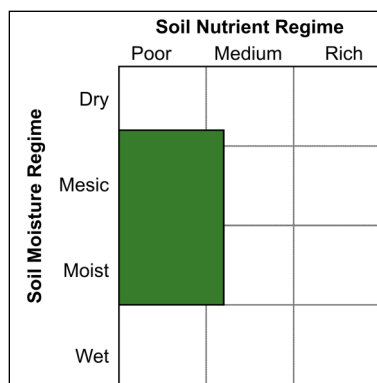
Ericaceous Shrub & Feathermoss

CNVC00292 has a moderately closed canopy dominated by *Picea mariana*, with less abundant *Abies balsamea*. The shrub layer is moderately developed and includes regeneration of these species, as well as the shrubs *Kalmia angustifolia*, *Ilex mucronata* and *Viburnum nudum*. The moderately developed herb layer commonly includes *Cornus canadensis*, *Vaccinium vitis-idaea*, *Gaultheria hispidula*, *Maianthemum canadense*, *Coptis trifolis*, *Linnaea borealis*, *Pteridium aquilinum* and *Lysimachia borealis*. The moss layer is continuous and characterized by dominance of *Pleurozium schreberi*, with less abundant *Bazzania trilobata* and *Hylocomium splendens*.

CNVC00292 occurs in a region with a very humid, maritime boreal climate, where it is found on nutrient-impooverished coastal sites characterized by strong winds, high humidity and cool mean annual temperatures. It is maintained by limiting climatic and edaphic factors. Windthrow is the primary natural disturbance, but stands typically self-perpetuate.

Characteristic Plants	CNVC00292	
	36 plots	
$\wedge \geq 50\%$ presence; \pm characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		46
<i>Picea mariana</i>	97	29
<i>Abies balsamea</i>	92	14
Shrub Stratum Cover (Mean)		28
<i>Kalmia angustifolia</i>	97	9
<i>Picea mariana</i>	97	4
<i>Abies balsamea</i>	92	12
<i>Ilex mucronata</i>	86	1
<i>Viburnum nudum</i>	83	1
<i>Sorbus americana</i>	56	1
Herb Stratum Cover (Mean)		28
<i>Cornus canadensis</i>	92	9
<i>Vaccinium vitis-idaea</i>	86	1
<i>Gaultheria hispidula</i>	75	8
<i>Maianthemum canadense</i>	69	2
<i>Coptis trifolia</i>	64	2
<i>Linnaea borealis</i>	61	4
<i>Pteridium aquilinum</i>	61	3
<i>Lysimachia borealis</i>	61	1
<i>Aralia nudicaulis</i>	53	1
<i>Osmundastrum cinnamomeum</i>	50	3
Bryo-Lichen Stratum Cover (Mean)		88
<i>Pleurozium schreberi</i>	97	48
<i>Bazzania trilobata</i>	94	13
<i>Hylocomium splendens</i>	86	12
<i>Sphagnum capillifolium</i>	78	9
<i>Cladonia</i> spp.	75	1
<i>Dicranum polysetum</i>	72	3
<i>Dicranum scoparium</i>	67	2
<i>Cladina rangiferina</i>	64	1
<i>Ptilium crista-castrensis</i>	61	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	5–28–114 m
Slope	level (11); gentle (19); moderate (11); moderately steep (6); steep (3); md (50)
Aspect	north (22); east (17); south (6); west (6); level (3); md (47)
Meso Toposition	crest/ upper (22); mid (17); lower/ toe (3); level (22); md (36)
Moisture Regime	dry (11); mesic (36); moist (53)
Nutrient Regime	poor (89); medium (11)
Soil Parent Material	moraine/ till (50); other (6); md (44)
Soil Rooting Zone Substrate	coarse loamy (28); other (15); md (58)
Root Restricting Depth	md (100)
Humus Form	mor (42); peatymor (3); md (56)



Source: S. Basquill

Notes & Similar Associations
 CNVC00226 & CNVC00309 occur on coastal sites in Nova Scotia but have different tree layer composition.

CNVC00294 *Pinus banksiana*—*Picea mariana* / *Alnus incana* / *Pleurozium schreberi*

CONIFER

Jack Pine—Black Spruce / Speckled Alder / Red-stemmed Feathermoss

Subassociations: *typic*, *Pleurozium schreberi*

Provinces: Quebec

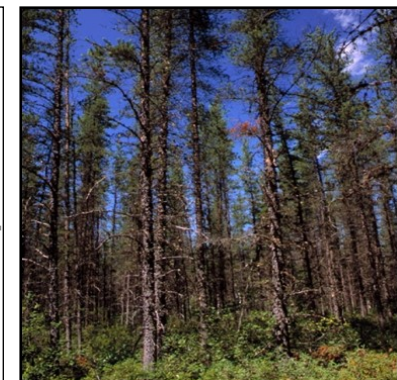
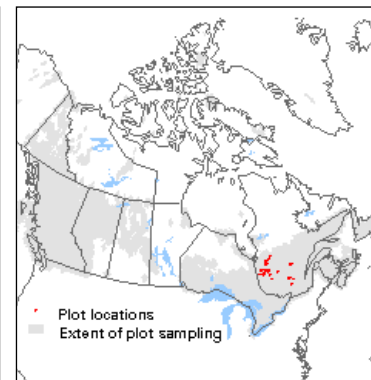
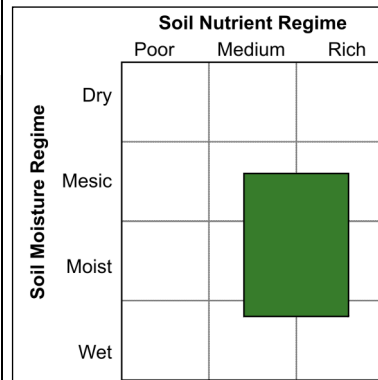
Moist Rich Shrub & Herb

CNVC00294 has a closed canopy dominated by *Pinus banksiana*, with a smaller component of *Picea mariana*. The shrub layer is dense, generally a thicket of *Alnus incana*, although regenerating *P. mariana* is common. Other shrub species are present but less abundant, including *Ribes glandulosum*, *Salix* spp., *Vaccinium angustifolium*, *Rubus idaeus*, *Rhododendron groenlandicum* and *V. myrtilloides*. The herb layer is moderately developed and usually includes a variety of common herbs and dwarf shrubs as well as *Dryopteris* spp., *Petasites frigidus* and *Rubus pubescens*. The moss layer is moderately developed with *Pleurozium schreberi* dominant.

CNVC00294 occurs in a region with a humid continental boreal climate. It is found on mesic to wet, nutrient-medium to rich sites. Stands are commonly on level sites or gentle slopes. Soils are frequently fine textured, of glaciolacustrine origin. Stands typically recolonize after fire.

Characteristic Plants	CNVC00294	
	47 plots	
^≥55% presence; ±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		72
<i>Pinus banksiana</i>	100	41
<i>Picea mariana</i>	98	19
Shrub Stratum Cover (Mean)		82
<i>Alnus incana</i>	100	53
<i>Picea mariana</i>	98	10
<i>Ribes glandulosum</i>	66	6
<i>Salix</i> spp.	66	5
<i>Vaccinium angustifolium</i>	66	3
<i>Rubus idaeus</i>	64	12
<i>Rhododendron groenlandicum</i>	64	7
<i>Vaccinium myrtilloides</i>	60	5
Herb Stratum Cover (Mean)		39
<i>Cornus canadensis</i>	89	11
<i>Maianthemum canadense</i>	87	8
<i>Linnaea borealis</i>	79	6
<i>Poaceae</i>	77	7
<i>Clintonia borealis</i>	77	5
<i>Dryopteris spinulosa</i> complex	64	5
<i>Gaultheria hispidula</i>	62	4
<i>Petasites frigidus</i>	62	3
<i>Rubus pubescens</i>	60	6
<i>Viola</i> spp.	60	5
<i>Lysimachia borealis</i>	60	3
<i>Carex</i> spp.	57	5
<i>Coptis trifolia</i>	57	3
Bryo-Lichen Stratum Cover (Mean)		42
<i>Pleurozium schreberi</i>	100	31
<i>Ptilium crista-castrensis</i>	81	8
<i>Dicranum</i> spp.	81	3
<i>Polytrichum</i> spp.	70	4
<i>Cladonia</i> spp.	55	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	215–291–435 m
Slope	level (60); gentle (26); moderate (6); moderately steep (6); steep (2)
Aspect	north (26); east (15); south (23); west (6); level (30)
Meso Toposition	crest/ upper (11); mid (38); lower/ toe (21); level (30)
Moisture Regime	dry (2); mesic (36); moist (57); wet (4)
Nutrient Regime	md (100)
Soil Parent Material	glaciolacustrine (83); glaciofluvial (11); other (6)
Soil Rooting Zone Substrate	clayey (26); other (8); md (66)
Root Restricting Depth	21-99 cm (85); md (15)
Humus Form	mor (74); moder (17); mull (2); peatymor (4)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

CNVC00209 occurs on mesic, nutrient-medium sites and has a shrub layer with abundant ericaceous species rather than *Alnus incana*.

CNVC00295 has *Picea mariana* dominant in the tree layer.

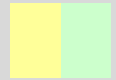
CNVC00295 *Picea mariana* / *Alnus incana* / *Pleurozium schreberi*

CONIFER

Black Spruce / Speckled Alder / Red-stemmed Feathermoss

Subassociations: *Alnus incana*, *Mitella nuda*, *Larix laricina*

Provinces: Manitoba, Ontario, Quebec



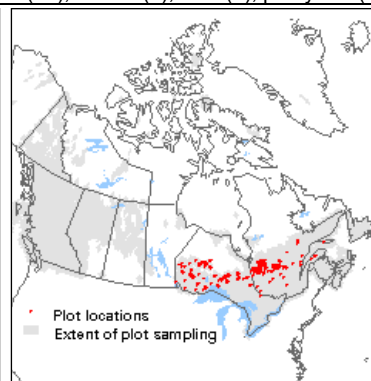
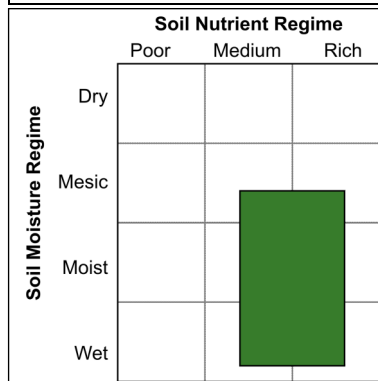
Moist Rich Shrub & Herb

CNVC00295 has an open to moderately closed canopy of *Picea mariana* over a moderately developed to dense shrub layer that commonly includes *P. mariana*, *Abies balsamea*, *Alnus incana* (which sometimes forms dense thickets), *Rhododendron groenlandicum* and *Vaccinium myrtilloides*. The herb layer is moderately developed and usually includes a large number of species, all with low cover. *Cornus canadensis*, *Gaultheria hispidula*, *Coptis trifolia* and *Linnaea borealis* are the most common. The well-developed to continuous moss layer is dominated by *Pleurozium schreberi*, with presence of *Ptilium crista-castrensis* and *Hylocomium splendens*, and sometimes small patches of *Sphagnum* mosses.

CNVC00295 occurs in a region with a continental boreal climate that grades from subhumid in the west, to humid in the east. It usually occupies the ecotone between upland and wetland *P. mariana* forests on moist to wet (sometimes mesic), nutrient-medium to -rich sites. Stands are usually small in extent and are often on level sites where organic materials sometimes exceed 40cm over fine-textured glaciolacustrine materials. Sometimes stands occur in linear bands along lower- or toe-slope topopositions on coarse-textured, morainal soils. Stands typically recolonize after fire and are self-replacing over time.

Characteristic Plants	CNVC00295	
[^] ≥40% presence except	196 plots	
<i>Larix laricina</i> ;	%	%
±characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	50	
<i>Picea mariana</i>	99	39
<i>Larix laricina</i>	19	17
Shrub Stratum Cover (Mean)	56	
<i>Picea mariana</i>	90	14
<i>Alnus incana</i>	88	24
<i>Rhododendron groenlandicum</i>	83	16
<i>Vaccinium myrtilloides</i>	74	4
<i>Abies balsamea</i>	62	9
<i>Vaccinium angustifolium</i>	54	4
Herb Stratum Cover (Mean)	28	
<i>Cornus canadensis</i>	91	4
<i>Gaultheria hispidula</i>	83	5
<i>Coptis trifolia</i>	63	2
<i>Linnaea borealis</i>	61	2
<i>Petasites frigidus</i>	53	3
<i>Equisetum sylvaticum</i>	53	3
<i>Rubus pubescens</i>	52	3
<i>Maianthemum canadense</i>	48	2
<i>Lysimachia borealis</i>	44	2
<i>Clintonia borealis</i>	42	3
<i>Lycopodium annotinum</i>	40	7
<i>Mitella nuda</i>	37	2
Bryo-Lichen Stratum Cover (Mean)	76	
<i>Pleurozium schreberi</i>	98	40
<i>Ptilium crista-castrensis</i>	88	11
<i>Hylocomium splendens</i>	68	13
<i>Sphagnum girgensohnii</i>	42	7

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	105–310–516 m; md (12)
Slope	level (70); gentle (18); moderate (6); moderately steep (1); steep (1); very steep (1); md (4)
Aspect	north (13); east (7); south (14); west (10); level (55); md (1)
Meso Topoposition	crest/ upper (7); mid (16); lower/ toe (20); depression (4); level (53)
Moisture Regime	dry (3); mesic (23); moist (36); wet (37)
Nutrient Regime	md (100)
Soil Parent Material	organic (25); glaciolacustrine (24); moraine/ till (18); lacustrine (15); other (17); md (3)
Soil Rooting Zone Substrate	organic (24); clayey (11); other (26); md (40)
Root Restricting Depth	0-20 cm (6); 21-99 cm (59); ≥100 cm (13); md (21)
Humus Form	mor (52); moder (6); mull (1); peatymor (40); md (2)



Source: NRCan—CFS

Notes & Similar Associations
 The *Mitella nuda* subassociation has less *Alnus incana* and higher constancy of nutrient-demanding herbs such as *M. nuda*, *Rubus pubescens* and *Petasites frigidus*. The *Larix laricina* subassociation has codominance of *L. laricina*.
 CNVC00294 has *Pinus banksiana* dominant in the overstory.
 CNVC00296 & CNVC00297 have more *Abies balsamea* in the overstory.

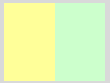
CNVC00296 *Picea mariana*—*Abies balsamea* / *Alnus incana*

Black Spruce—Balsam Fir / Speckled Alder

Subassociations: none

Provinces: Ontario, Quebec

CONIFER



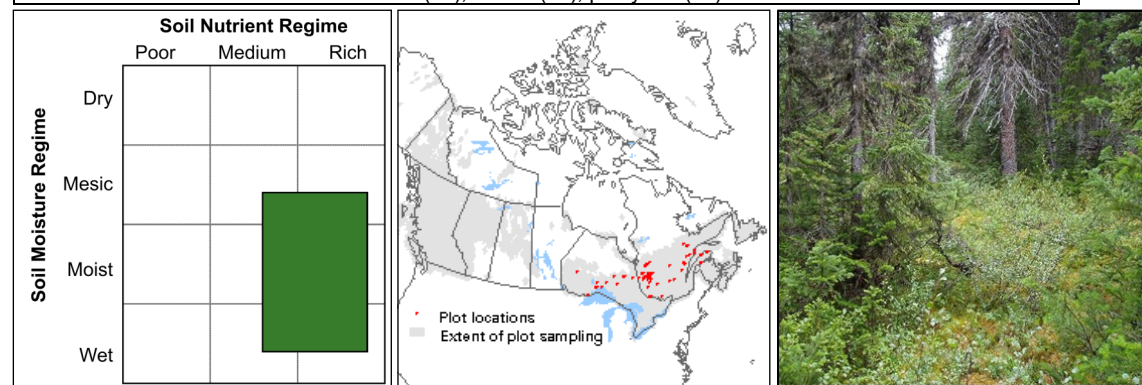
Moist Rich Shrub & Herb

CNVC00296 has a moderately closed canopy of *Picea mariana* and *Abies balsamea*, in varying proportions. The shrub layer is dense with abundant *Alnus incana*, and less abundant *A. balsamea*, *P. mariana*, *Rubus idaeus*, *Rhododendron groenlandicum*, *Vaccinium myrtilloides* and *Salix* spp. The herb layer is moderately developed and typically includes *Cornus canadensis*, *Linnaea borealis*, *Maianthemum canadense*, *Lysimachia borealis*, *Clintonia borealis*, *Coptis trifolia*, *Gaultheria hispidula*, *Rubus pubescens*, *Carex* spp. and *Viola* spp. The moss layer is moderately developed; *Pleurozium schreberi* is dominant, and sometimes there are discontinuous patches of *Sphagnum* mosses.

CNVC00296 occurs in a region with a continental boreal climate that grades from subhumid in the west to humid in the east. It is usually found on mesic to wet, nutrient-medium to -rich sites. Stands are often on level sites where organic materials sometimes exceed 40cm over fine-textured glaciolacustrine mineral soils. Less frequently, they occur on gentle morainal slopes on water-receiving, mid- to lower or toe-slope topositions. This is a late seral condition with dynamics driven mainly by fire, outbreaks of spruce budworm (*Choristoneura fumiferana*) and windthrow. Although *P. mariana* and *A. balsamea* are present in every stand, climate and disturbance type and history affect the relative dominance of each species.

Characteristic Plants	CNVC00296	
	56 plots	
^≥60% presence except	%	%
Sphagnum spp.;		
±characteristic cover	Presence [^]	Cover ⁺
Tree Stratum Cover (Mean)		57
<i>Picea mariana</i>	100	22
<i>Abies balsamea</i>	98	23
Shrub Stratum Cover (Mean)		67
<i>Alnus incana</i>	100	39
<i>Abies balsamea</i>	96	13
<i>Picea mariana</i>	89	5
<i>Rubus idaeus</i>	64	5
<i>Rhododendron groenlandicum</i>	63	5
<i>Vaccinium myrtilloides</i>	63	3
<i>Salix</i> spp.	61	9
Herb Stratum Cover (Mean)		36
<i>Cornus canadensis</i>	91	7
<i>Linnaea borealis</i>	77	3
<i>Maianthemum canadense</i>	75	3
<i>Lysimachia borealis</i>	75	2
<i>Clintonia borealis</i>	73	3
<i>Coptis trifolia</i>	73	2
<i>Gaultheria hispidula</i>	71	3
<i>Rubus pubescens</i>	68	5
<i>Carex</i> spp.	63	6
<i>Viola</i> spp.	61	3
Bryo-Lichen Stratum Cover (Mean)		42
<i>Pleurozium schreberi</i>	98	20
<i>Ptilium crista-castrensis</i>	73	6
<i>Dicranum</i> spp.	66	3
<i>Sphagnum</i> spp.	57	8

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	100–308–610 m; md (2)
Slope	level (64); gentle (20); moderate (7); moderately steep (4); md (5)
Aspect	north (5); east (9); south (13); west (16); level (57)
Meso Toposition	crest/ upper (5); mid (16); lower/ toe (13); depression (9); level (57)
Moisture Regime	dry (2); mesic (20); moist (50); wet (29)
Nutrient Regime	md (100)
Soil Parent Material	glaciolacustrine (41); moraine/ till (25); organic (20); other (15)
Soil Rooting Zone Substrate	organic (20); clayey (18); other (13); md (50)
Root Restricting Depth	0-20 cm (4); 21-99 cm (55); ≥100 cm (13); md (29)
Humus Form	mor (50); moder (16); peatymor (34)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

Alnus incana can form dense thickets that impede regeneration.

CNVC00294 has *Pinus banksiana* dominant in the canopy.

CNVC00295 has less *Abies balsamea* in the overstory.

CNVC00297 has less *Picea mariana* in the overstory.

CNVC00297 *Abies balsamea* / *Alnus incana*

CONIFER

Balsam Fir / Speckled Alder

Subassociations: none

Provinces: Quebec

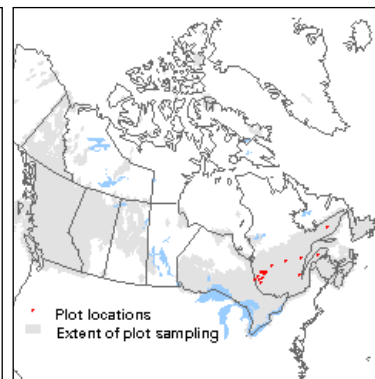
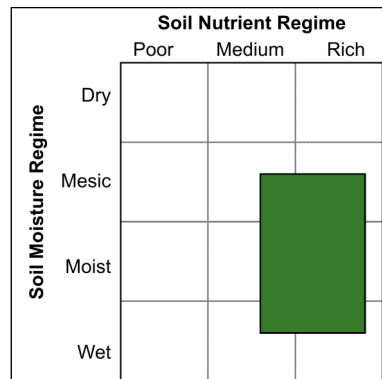
Moist Rich Shrub & Herb

CNVC00297 has a moderately closed canopy dominated by *Abies balsamea*, often with minor components of *Betula papyrifera* and *Picea mariana*. The shrub layer is dense and dominated by *Alnus incana*, with abundant regenerating *A. balsamea* and *B. papyrifera* and less abundant *Rubus idaeus*, *Ribes glandulosum* and *Amelanchier* spp. The herb layer is moderately developed and typically includes *Dryopteris* spp., *Rubus pubescens*, *Cornus canadensis*, *Maianthemum canadense*, *Viola* spp. and *Lysimachia borealis*, among other species. The moss layer is poorly developed.

CNVC00297 occurs in a region with a continental boreal climate that grades from subhumid in the west to humid in the east. It is found on mesic to wet, nutrient-medium to -rich sites; these are some of the most productive sites in the region. Stands are usually on level sites or gentle to moderately steep slopes. The most common parent materials are glaciolacustrine and morainal. This is a late seral condition with dynamics driven mainly by fire, outbreaks of spruce budworm (*Choristoneura fumiferana*) and windthrow.

Characteristic Plants	CNVC00297 19 plots	
[^] ≥55% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		57
<i>Abies balsamea</i>	100	31
<i>Betula papyrifera</i>	79	8
<i>Picea mariana</i>	58	6
Shrub Stratum Cover (Mean)		69
<i>Alnus incana</i>	100	30
<i>Abies balsamea</i>	100	15
<i>Rubus idaeus</i>	84	13
<i>Ribes glandulosum</i>	68	6
<i>Betula papyrifera</i>	68	4
<i>Amelanchier</i> spp.	63	4
Herb Stratum Cover (Mean)		33
<i>Dryopteris spinulosa</i> complex	89	4
<i>Rubus pubescens</i>	84	6
<i>Cornus canadensis</i>	84	5
<i>Carex</i> spp.	79	7
<i>Maianthemum canadense</i>	74	4
<i>Viola</i> spp.	74	3
<i>Lysimachia borealis</i>	74	3
<i>Lycopodium annotinum</i>	68	10
<i>Clintonia borealis</i>	68	3
<i>Aralia nudicaulis</i>	63	3
<i>Coptis trifolia</i>	63	3
<i>Poaceae</i>	58	4
Bryo-Lichen Stratum Cover (Mean)		25
<i>Pleurozium schreberi</i>	95	8
<i>Dicranum</i> spp.	79	3
<i>Sphagnum</i> spp.	74	4
<i>Cladonia</i> spp.	68	3
<i>Polytrichum</i> spp.	63	7
<i>Ptilium crista-castrensis</i>	63	4
<i>Hylocomium splendens</i>	58	12

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	135–310–710 m
Slope	level (42); gentle (42); moderately steep (16)
Aspect	north (16); east (26); south (26); west (0); level (32)
Meso Toposition	crest/ upper (11); mid (47); depression (16); level (26)
Moisture Regime	mesic (37); moist (42); wet (21)
Nutrient Regime	md (100)
Soil Parent Material	glaciolacustrine (58); moraine/ till (32); other (10)
Soil Rooting Zone Substrate	clayey (11); other (15); md (74)
Root Restricting Depth	21-99 cm (74); md (26)
Humus Form	mor (68); moder (16); peatymor (16)



Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations
Alnus incana can form dense thickets that impede regeneration.
 CNVC00294 has *Pinus banksiana* dominant in the overstory.
 CNVC00295 & CNVC00296 have less *Abies balsamea* in the overstory.

CNVC00307 *Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*

CONIFER

Black Spruce (Balsam Fir) / Sheep Laurel / Red-stemmed Feathermoss

Subassociations: *typic, Viburnum nudum*

Provinces: Newfoundland and Labrador



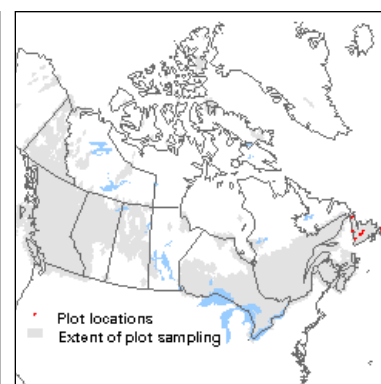
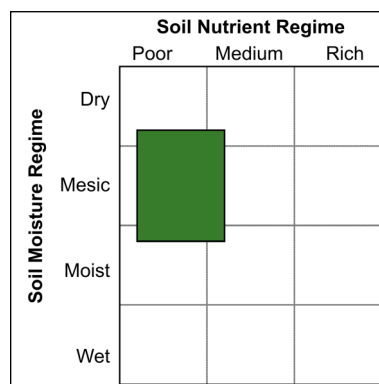
Ericaceous Shrub & Feathermoss

CNVC00307 is a woodland. It has an open to moderately closed tree layer dominated by *Picea mariana*, usually with lower abundance of *Abies balsamea*. *Kalmia angustifolia* forms a dense, almost continuous, shrub layer with lower abundance of *Vaccinium angustifolium*. The herb layer is moderately to well developed, although only *Gaultheria hispidula* and *Cornus canadensis* are constant. *Pleurozium schreberi* and *Dicranum* spp. dominate the moderately developed to continuous moss and lichen layer. Reindeer lichens (*Cladina* spp., especially *C. rangiferina*) and *Cladonia* lichens are usually present.

CNVC00307 occurs primarily on mesic, nutrient-poor sites. Soils are usually well drained and coarse textured, developing on upper slopes or in shallow soils over bedrock. Stands typically occur on sites that have been repeatedly disturbed by fire and/or logging. Frequent disturbances encourage the profuse development of a dense ericaceous shrub layer (called “goowiddy” locally) that inhibits succession to a forested condition, instead promoting the long-term maintenance of these woodlands on the landscape. This Association occurs extensively in the relatively more continental climate of central Newfoundland where wildfires are more frequent.

Characteristic Plants	CNVC00307	
	20 plots	
^≥35% presence; ±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		46
<i>Picea mariana</i>	95	30
<i>Abies balsamea</i>	70	15
<i>Betula papyrifera</i>	35	1
Shrub Stratum Cover (Mean)		78
<i>Kalmia angustifolia</i>	100	50
<i>Vaccinium angustifolium</i>	95	18
<i>Rhododendron groenlandicum</i>	50	6
<i>Picea mariana</i>	45	13
<i>Abies balsamea</i>	35	19
<i>Viburnum nudum</i>	35	11
Herb Stratum Cover (Mean)		31
<i>Gaultheria hispidula</i>	90	4
<i>Cornus canadensis</i>	70	11
<i>Vaccinium vitis-idaea</i>	55	6
<i>Maianthemum canadense</i>	40	3
Bryo-Lichen Stratum Cover (Mean)		77
<i>Pleurozium schreberi</i>	100	36
<i>Dicranum undulatum</i>	85	13
<i>Cladina rangiferina</i>	85	9
<i>Cladonia</i> spp.	70	10
<i>Dicranum scoparium</i>	65	5
<i>Hylocomium splendens</i>	55	13
<i>Ptilium crista-castrensis</i>	55	4
<i>Cladina mitis</i>	45	8

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	15–72–182 m; md (55)
Slope	level (55); gentle (20); md (25)
Aspect	north (0); east (10); south (35); west (25); level (5); md (25)
Meso Topoposition	crest/ upper (5); mid (5); md (90)
Moisture Regime	dry (5); mesic (85); moist (10)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (20); glaciofluvial (10); md (70)
Soil Rooting Zone Substrate	sandy (5); md (95)
Root Restricting Depth	md (100)
Humus Form	mor (100)



Source: W. Meades

Notes & Similar Associations
Kalmia angustifolia is an aggressive competitor to conifer regeneration.
 The *Viburnum nudum* subassociation has a more diverse shrub layer, with patches of *V. nudum* and *Ilex mucronata*.
 CNVC00205 occurs on drier sites, has less tree layer cover and a ground layer dominated by lichens.
 CNVC00338 occurs on moister sites and has a shrub layer dominated by *Rhododendron canadense*.
 CNVC00350 occurs on sites that are not as poor and has a forest physiognomy with less abundant ericaceous shrubs.

CNVC00309 *Abies balsamea* / *Vaccinium vitis-idaea* / *Pleurozium schreberi*—*Bazzania trilobata*

CONIFER

Balsam Fir / Lingonberry / Red-stemmed Feathermoss—Three-lobed Whipwort

Subassociations: *typic*, *Vaccinium vitis-idaea*

Provinces: Newfoundland and Labrador, Nova Scotia



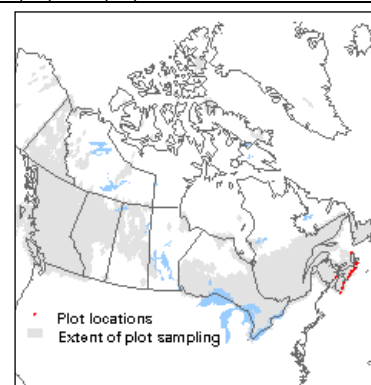
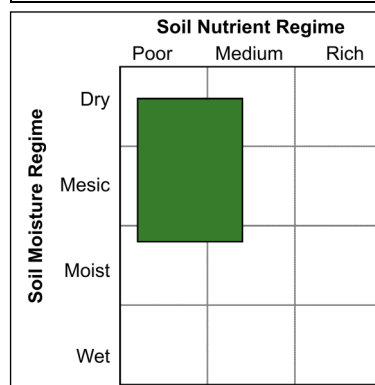
Ericaceous Shrub & Feathermoss

CNVC00309 has a tree layer dominated by *Abies balsamea*, often with sporadic *Picea mariana* and/or *P. glauca*. The moderately developed to dense shrub layer is dominated by *A. balsamea* and usually has *Sorbus americana* and *Kalmia angustifolia* present. *Linnaea borealis*, *Cornus canadensis* and *Gaultheria hispidula* are often abundant in the moderately developed to dense herb layer. Other common, but less abundant, species include *Maianthemum canadense*, *Lysimachia borealis*, *Aralia nudicaulis* and *Vaccinium vitis-idaea*. *Bazzania trilobata* is a characteristic bryophyte, usually occurring with *Pleurozium schreberi* and *Hylocomium splendens* in the typically well-developed moss layer.

CNVC00309 occurs on nutrient-poor sites in a very humid maritime climate. It occurs in coastal environments, often on headlands, where soils are shallow over bedrock, but may still have nutrient enrichment from seepage. This is a stable, self-perpetuating condition but, because it is subject to strong coastal winds, there is considerable variation in structural phases from open woodland to closed forest.

Characteristic Plants	CNVC00309	
	28 plots	
[^] ≥40% presence; [±] characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	61	
<i>Abies balsamea</i>	93	53
<i>Picea mariana</i>	57	9
<i>Picea glauca</i>	50	8
Shrub Stratum Cover (Mean)	29	
<i>Abies balsamea</i>	93	19
<i>Sorbus americana</i>	75	2
<i>Kalmia angustifolia</i>	75	2
<i>Viburnum nudum</i>	57	2
<i>Ilex mucronata</i>	57	1
<i>Picea mariana</i>	43	7
<i>Vaccinium angustifolium</i>	43	4
Herb Stratum Cover (Mean)	41	
<i>Linnaea borealis</i>	82	16
<i>Cornus canadensis</i>	79	7
<i>Maianthemum canadense</i>	79	1
<i>Lysimachia borealis</i>	79	1
<i>Aralia nudicaulis</i>	71	5
<i>Gaultheria hispidula</i>	61	13
<i>Vaccinium vitis-idaea</i>	61	3
<i>Oxalis oregana</i>	50	2
<i>Coptis trifolia</i>	43	2
Bryo-Lichen Stratum Cover (Mean)	67	
<i>Pleurozium schreberi</i>	75	31
<i>Bazzania trilobata</i>	75	20
<i>Hylocomium splendens</i>	64	17
<i>Dicranum scoparium</i>	64	2
<i>Ptilium crista-castrensis</i>	54	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	5–34–118 m
Slope	level (11); gentle (21); moderate (25); moderately steep (11); steep (11); md (21)
Aspect	north (29); east (18); south (32); west (7); md (14)
Meso Toposition	crest/ upper (29); mid (32); lower/ toe (11); level (21); md (7)
Moisture Regime	dry (36); mesic (50); moist (11); md (4)
Nutrient Regime	poor (64); medium (18); md (18)
Soil Parent Material	moraine/ till (79); other (15); md (7)
Soil Rooting Zone Substrate	coarse loamy (54); other (15); md (32)
Root Restricting Depth	md (100)
Humus Form	mor (86); md (14)



Source: S. Basquill

Notes & Similar Associations

In the *typic* subassociation, *Bazzania trilobata* forms extensive ground cover with *Pleurozium schreberi* and *Hylocomium splendens*.

The *Vaccinium vitis-idaea* subassociation has better developed shrub and herb layers, including greater abundance of *V. vitis-idaea*, but a less-developed moss layer.

CNVC00226 & CNVC00292 occur on coastal sites in Nova Scotia but have different tree layer composition.

CNVC00310 *Abies balsamea* / *Dryopteris* spp. / *Hylocomiastrum umbratum*

CONIFER

Balsam Fir / Wood Ferns / Shaded Wood Moss



Subassociations: *Hylocomium splendens*, *Rhytidiadelphus loreus*, *Cornus stolonifera*, *Oxalis montana*

Provinces: New Brunswick, Newfoundland and Labrador, Nova Scotia

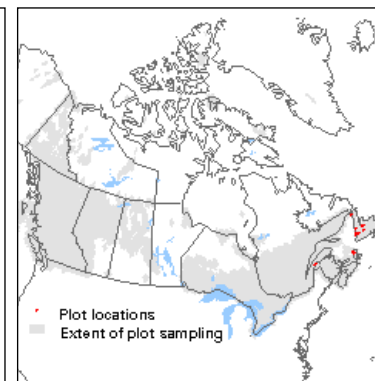
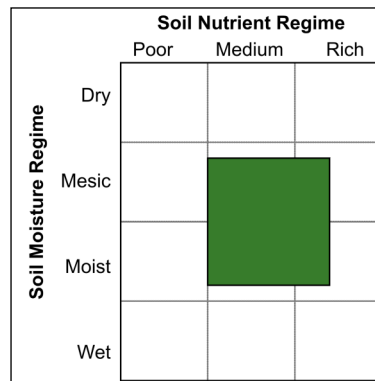
Mesic Rich Shrub & Herb

CNVC00310 has a closed canopy dominated by *Abies balsamea*, often with a minor component of *Betula papyrifera*. The shrub layer varies from poorly to moderately developed and consists mainly of *A. balsamea*. A dense herb layer with abundant wood ferns (*Dryopteris carthusiana*, *D. campyloptera* or *D. intermedia*) characterizes this Association. A well-developed moss layer in which *Hylocomiastrum umbratum* and *Dicranum majus* are prominent, occurring along with *Pleurozium schreberi* and *Ptilium crista-castrensis*, is also distinctive.

CNVC00310 occurs in a region with a humid to very humid, maritime-influenced boreal climate. It is typically found on mesic to moist, nutrient-medium to -rich sites. These are some of the most productive sites in the region. Stands are usually on level sites or gentle to moderate slopes, frequently on cool aspects. It is a late successional condition that occurs where fire has been absent for a long period. Windthrow and insect outbreak are the primary natural disturbances. Canopy gaps or large patches that result from these disturbances promote self-replacement of this Association by the release of *A. balsamea* regeneration.

Characteristic Plants	CNVC00310	
	35 plots	
^≥43% presence except <i>Cornus stolonifera</i> , <i>Dryopteris</i> spp. and <i>Oxalis montana</i> ; ±characteristic cover	%	%
	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)		73
<i>Abies balsamea</i>	100	72
<i>Betula papyrifera</i>	71	9
<i>Picea glauca</i>	51	5
Shrub Stratum Cover (Mean)		26
<i>Abies balsamea</i>	94	16
<i>Betula papyrifera</i>	54	6
<i>Picea glauca</i>	43	7
<i>Amelanchier bartramiana</i>	43	5
<i>Sorbus decora</i>	43	2
<i>Cornus stolonifera</i>	11	8
Herb Stratum Cover (Mean)		77
<i>Lysimachia borealis</i>	97	5
<i>Maianthemum canadense</i>	94	7
<i>Cornus canadensis</i>	83	13
<i>Clintonia borealis</i>	83	11
<i>Dryopteris carthusiana</i>	66	39
<i>Coptis trifolia</i>	46	6
<i>Linnaea borealis</i>	43	6
<i>Oxalis montana</i>	34	17
<i>Dryopteris campyloptera</i>	31	23
<i>Dryopteris intermedia</i>	11	18
Bryo-Lichen Stratum Cover (Mean)		67
<i>Pleurozium schreberi</i>	86	11
<i>Ptilium crista-castrensis</i>	86	4
<i>Hylocomiastrum umbratum</i>	80	18
<i>Dicranum majus</i>	80	12
<i>Rhytidiadelphus loreus</i>	60	8
<i>Hylocomium splendens</i>	51	34
<i>Sphagnum capillifolium</i>	51	9
<i>Bazzania trilobata</i>	49	2
<i>Dicranum fuscescens</i>	46	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	30–240–493 m; md (37)
Slope	level (51); gentle (17); moderate (14); moderately steep (3); steep (3); md (11)
Aspect	north (20); east (23); south (14); west (11); level (20); md (11)
Meso Toposition	crest/ upper (23); mid (3); lower/ toe (14); md (60)
Moisture Regime	dry (6); mesic (34); moist (57); wet (3)
Nutrient Regime	poor (11); medium (29); md (60)
Soil Parent Material	moraine/ till (71); other (12); md (17)
Soil Rooting Zone Substrate	coarse loamy (34); other (3); md (63)
Root Restricting Depth	21-99 cm (3); ≥100 cm (3); md (94)
Humus Form	mor (14); md (86)



Source: S. Basquill

Notes & Similar Associations

The *Hylocomium splendens*, *Rhytidiadelphus loreus* and *Cornus stolonifera* subassociations occur on the island of Newfoundland. The *Oxalis montana* subassociation occurs in New Brunswick and Nova Scotia. CNVC00310 is distinguished from other *Abies balsamea* forests (e.g., CNVC00222, CNVC00225, CNVC00348) by its luxurious understory of wood ferns.

CNVC00311 *Abies balsamea* (*Betula alleghaniensis*) / *Dryopteris carthusiana*

MIXEDWOOD

Balsam Fir (Yellow Birch) / Spinulose Wood Fern

Subassociations: *typic*, *Bazzania trilobata*

Provinces: Newfoundland and Labrador

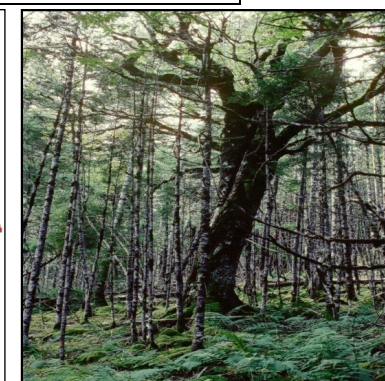
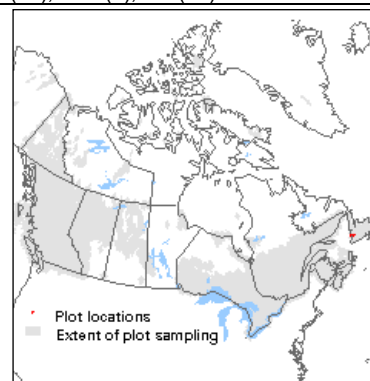
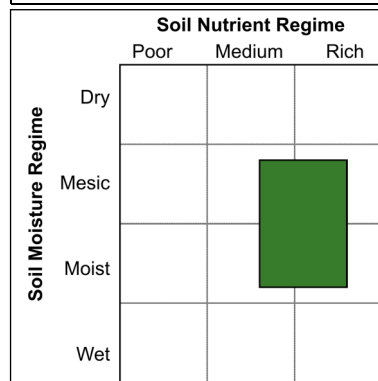
Mesic Rich Shrub & Herb

CNVC00311 has a closed canopy dominated by *Abies balsamea* with a significant component of *Betula alleghaniensis*. The shrub layer is usually moderately developed and consists mainly of *A. balsamea*. A moderately developed to dense herb layer dominated by wood ferns (*Dryopteris carthusiana*, *D. intermedia*) helps to characterize this Association. *Cornus canadensis* and *Lysimachia borealis* are usually present, and *Maianthemum canadense*, although less common, can be abundant. Where fern cover is dense, the moss layer is poorly developed; where it is more moderate, the moss layer can be continuous and is typically dominated by *Bazzania trilobata* and *Rhytidiadelphus loreus*.

CNVC00311 occurs in a region with a humid to very humid, maritime boreal climate. It is typically found on mesic to moist, nutrient-medium to -rich sites; these are some of the most productive sites on the island of Newfoundland. Stands are usually on moderately steep slopes, often on cool aspects. Soils are usually loamy and well drained, sometimes enriched by seepage. Fire is uncommon; instead windthrow and insect outbreaks are the primary natural disturbances. These disturbances promote self-replacement of stands by the release of *A. balsamea* and *B. alleghaniensis* regeneration.

Characteristic Plants	CNVC00311	
	13 plots	
[^] ≥38% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	85	
<i>Abies balsamea</i>	100	57
<i>Betula alleghaniensis</i>	100	24
<i>Picea glauca</i>	54	2
<i>Betula papyrifera</i>	46	11
Shrub Stratum Cover (Mean)	23	
<i>Abies balsamea</i>	85	18
<i>Acer spicatum</i>	62	5
Herb Stratum Cover (Mean)	75	
<i>Dryopteris carthusiana</i>	100	51
<i>Cornus canadensis</i>	92	4
<i>Lysimachia borealis</i>	85	3
<i>Maianthemum canadense</i>	46	16
<i>Dryopteris intermedia</i>	46	14
<i>Clintonia borealis</i>	46	4
Bryo-Lichen Stratum Cover (Mean)	35	
<i>Dicranum majus</i>	92	5
<i>Rhytidiadelphus loreus</i>	85	8
<i>Hylocomium splendens</i>	62	6
<i>Bazzania trilobata</i>	54	16
<i>Hylocomiastrum umbratum</i>	46	8
<i>Pleurozium schreberi</i>	38	3
<i>Polytrichum commune</i>	38	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	30–143–229 m
Slope	level (8); gentle (23); moderate (8); moderately steep (54); md (8)
Aspect	north (46); east (15); south (23); west (8); md (8)
Meso Topoposition	crest/ upper (8); mid (8); md (85)
Moisture Regime	mesic (54); moist (38); md (8)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (69); other (8); md (23)
Soil Rooting Zone Substrate	coarse loamy (23); other (8); md (69)
Root Restricting Depth	md (100)
Humus Form	mor (38); mull (8); md (54)



Source: W. Meades

Notes & Similar Associations

Betula alleghaniensis is considered a temperate species in the CNVC, but CNVC00311 lacks temperate understory species, so is classified as boreal.

The *Bazzania trilobata* subassociation has lower fern cover and a more continuous moss layer.

Where *Abies balsamea* regeneration is heavily grazed by moose, stands can have greater cover of *Picea glauca*.

CNVC00310 is a similar conifer Association (lacks *B. alleghaniensis*) and CNVC00315 is a similar hardwood Association.

CNVC00315 *Betula papyrifera*—*B. alleghaniensis* / *Dryopteris carthusiana*

HARDWOOD

Paper Birch—Yellow Birch / Spinulose Wood Fern

Subassociations: *typic*, *Clintonia borealis*

Provinces: Newfoundland and Labrador

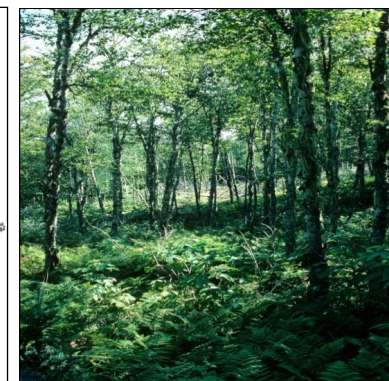
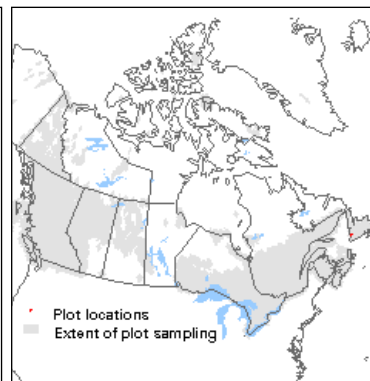
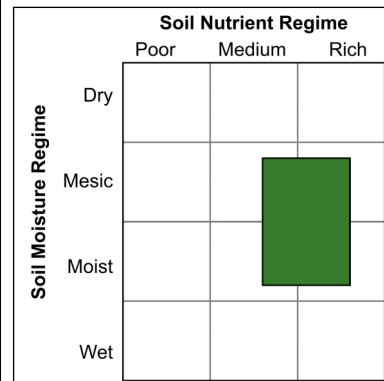
Mesic Rich Shrub & Herb

CNVC00315 has a closed canopy dominated by *Betula papyrifera* and *B. alleghaniensis*, with a minor component of *Abies balsamea*. The shrub layer is usually sparse, sometimes consisting of only regenerating *A. balsamea*. Abundant wood ferns, especially *Dryopteris carthusiana* and *D. intermedia*, form a dense herb layer. *Cornus canadensis*, *Lysimachia borealis*, *Lycopodium annotinum* and *Maianthemum canadense* are often present. The moss layer is sparse or nonexistent because of abundant fern and broad-leaf litter.

CNVC00315 occurs in a region with a humid to very humid, maritime boreal climate. It is typically found on mesic to moist, nutrient-medium to -rich sites; these are some of the most productive sites on the island of Newfoundland. Stands can be on level sites or gentle to moderate slopes. Soils are typically loamy and occur on morainal deposits derived from slate or shale bedrock. Often seepage enhances moisture and nutrient availability. CNVC00315 is an early seral condition that typically develops as a result of *A. balsamea* regeneration failure following disturbance. Because wildfires are generally absent from the humid coastal environments in which CNVC00315 occurs, this Association is relatively uncommon.

Characteristic Plants	CNVC00315	
[^] ≥40% presence except	6 plots	
<i>Clintonia borealis</i> ;	%	%
±characteristic cover	Presence [^]	Cover [±]
Tree Stratum Cover (Mean)	67	
<i>Betula papyrifera</i>	100	33
<i>Abies balsamea</i>	100	9
<i>Betula alleghaniensis</i>	83	30
Shrub Stratum Cover (Mean)	13	
<i>Abies balsamea</i>	83	11
<i>Acer spicatum</i>	50	3
<i>Sambucus racemosa</i>	50	3
<i>Ribes glandulosum</i>	50	1
Herb Stratum Cover (Mean)	99	
<i>Dryopteris carthusiana</i>	100	71
<i>Cornus canadensis</i>	100	6
<i>Lysimachia borealis</i>	100	6
<i>Lycopodium annotinum</i>	83	5
<i>Maianthemum canadense</i>	67	19
<i>Dryopteris intermedia</i>	50	19
<i>Clintonia borealis</i>	33	19
Bryo-Lichen Stratum Cover (Mean)	8	
<i>Dicranum scoparium</i>	83	2
<i>Hylocomium splendens</i>	67	3
<i>Pleurozium schreberi</i>	67	2
<i>Polytrichum commune</i>	50	2
<i>Rhizidiadelphus loreus</i>	50	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	107–150–244 m
Slope	level (50); gentle (33); moderate (17)
Aspect	north (17); east (33); south (17); west (33)
Meso Toposition	md (100)
Moisture Regime	moist (100)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (100)
Soil Rooting Zone Substrate	md (100)
Root Restricting Depth	md (100)
Humus Form	mor (33); md (67)



Source: W. Meades

Notes & Similar Associations

Betula alleghaniensis is considered a temperate species in the CNVC, but CNVC00315 lacks temperate understory species, so is classified as boreal.

The *Clintonia borealis* subassociation has *Acer spicatum* in the shrub layer and greater forb diversity.

CNVC00310 is a similar conifer Association and CNVC00311 is a similar mixedwood Association.

CNVC00316 & CNVC00349 are hardwood Associations that lack a dense herb layer of wood ferns.

CNVC00316 *Betula papyrifera* / *Alnus viridis* / *Solidago macrophylla*

HARDWOOD

Paper Birch / Green Alder / Large-leaved Goldenrod

Subassociations: none

Provinces: Newfoundland and Labrador

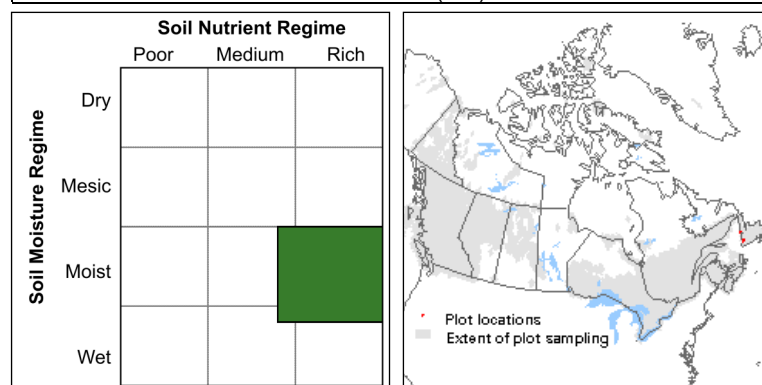
Moist Rich Shrub & Herb

CNVC00316 can have an open to closed canopy dominated by *Betula papyrifera*, sometimes with a minor component of *Abies balsamea*. The shrub layer is moderately to well developed, and any of *Acer spicatum*, *Alnus viridis* or *A. balsamea* can be abundant. *Cornus stolonifera* and *Vaccinium angustifolium* are often present. The herb layer can be dense and typically has numerous species in low abundance, often including *Rubus pubescens*, *Solidago macrophylla*, *Maianthemum canadense*, *Clintonia borealis*, *Lysimachia borealis*, *Galium triflorum* and *S. rugosa*. Usually, there is a significant amount of exposed talus and moss cover is sparse.

CNVC00316 occurs on talus slopes in a region with a very humid maritime boreal climate. Stands develop on lower- or toe-slope topopositions, once the substrate has stabilized. On these sites, colluvial materials are washed into the spaces between rocks, allowing vegetation to establish and then form this pioneer community. CNVC00316 is described from sample plots that all experience seepage; they are on moist, nutrient-rich sites in western Newfoundland. This condition probably occurs on other sites elsewhere on the island, and in the boreal region of Atlantic Canada, wherever there are talus deposits in hilly or mountainous terrain.

Characteristic Plants	CNVC00316	
	3 plots	
[^] ≥67% presence; [±] characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	73	
<i>Betula papyrifera</i>	100	63
<i>Abies balsamea</i>	67	15
Shrub Stratum Cover (Mean)	41	
<i>Acer spicatum</i>	67	32
<i>Alnus viridis</i>	67	9
<i>Abies balsamea</i>	67	8
<i>Cornus stolonifera</i>	67	2
<i>Vaccinium angustifolium</i>	67	1
Herb Stratum Cover (Mean)	64	
<i>Rubus pubescens</i>	100	11
<i>Solidago macrophylla</i>	100	6
<i>Maianthemum canadense</i>	67	8
<i>Clintonia borealis</i>	67	6
<i>Lysimachia borealis</i>	67	3
<i>Galium triflorum</i>	67	3
<i>Solidago rugosa</i>	67	2
<i>Dryopteris carthusiana</i>	67	1
<i>Monotropa uniflora</i>	67	1
<i>Streptopus lanceolatus</i>	67	1
Bryo-Lichen Stratum Cover (Mean)	3	
(no species)	>67	

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	171–179–183 m
Slope	gentle (33); moderately steep (33); steep (33)
Aspect	north (33); east (0); south (67); west (0)
Meso Topoposition	md (100)
Moisture Regime	moist (67); md (33)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (67); colluvium (33)
Soil Rooting Zone Substrate	non-soil (33); md (67)
Root Restricting Depth	md (100)
Humus Form	md (100)



Notes & Similar Associations

CNVC00237 has abundant ericaceous shrubs.
 CNVC00315 often has *Betula alleghaniensis* codominant and is characterized by a dense layer of *Dryopteris* spp.
 CNVC00349 is floristically similar but typically occurs on humus-enriched, deeper soils. It follows stand-replacing disturbance on previously vegetated sites (so is not a pioneer community like CNVC00316).

CNVC00338 *Picea mariana* / *Rhododendron canadense*—*Taxus canadensis* / *Pleurozium schreberi*

CONIFER

Black Spruce / Rhodora—Canada Yew / Red-stemmed Feathermoss

Subassociations: none

Provinces: Newfoundland and Labrador

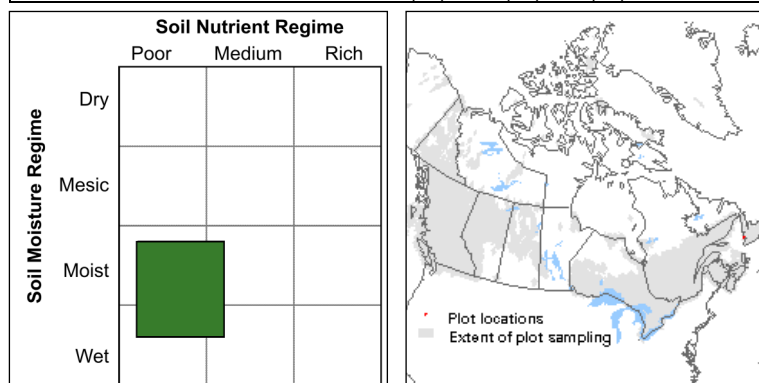
Ericaceous Shrub & Feathermoss

CNVC00338 is a woodland. It has an open tree layer dominated by scrubby *Picea mariana*. The shrub layer is dense with abundant *P. mariana* layers and ericaceous species, mainly *Rhododendron canadense*, *Vaccinium angustifolium* and, to a lesser extent, *Kalmia angustifolia*. *K. polifolia*, *R. groenlandicum*, *Amelanchier bartramiana* and *Taxus canadensis* are less abundant, but common. The herb layer is well developed to dense, and commonly includes *Epigaea repens*, *Gaultheria hispidula*, *Avenella flexuosa*, *Linnaea borealis*, *Carex vaginata*, *Cornus canadensis*, *Coptis trifolia*, *Maianthemum canadense* and *Empetrum nigrum*. *Pleurozium schreberi* dominates the continuous moss layer.

CNVC00338 occurs in western Newfoundland where the climate is very humid maritime boreal. It occurs in areas where there is limestone (i.e., calcareous) bedrock overlain by a shallow ericaceous mor; the vegetation thus represents a mixture of species indicative of nutrient-rich (e.g., *Taxus canadensis*) and nutrient-poor conditions (e.g., *R. canadense*). Sites can be quite wet during spring run off, but usually dry out in summer; overall they are moist to wet and nutrient poor. CNVC00338 is a stable condition that could readily regenerate after fire and logging, primarily by vegetative layering of *P. mariana*.

Characteristic Plants	CNVC00338 4 plots	
[^] ≥75% presence; ±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)		28
<i>Picea mariana</i>	100	27
<i>Abies balsamea</i>	75	1
Shrub Stratum Cover (Mean)		90
<i>Picea mariana</i>	100	32
<i>Rhododendron canadense</i>	100	28
<i>Vaccinium angustifolium</i>	100	16
<i>Kalmia angustifolia</i>	100	8
<i>Kalmia polifolia</i>	100	2
<i>Rhododendron groenlandicum</i>	100	2
<i>Abies balsamea</i>	100	2
<i>Amelanchier bartramiana</i>	75	7
<i>Taxus canadensis</i>	75	3
Herb Stratum Cover (Mean)		58
<i>Epigaea repens</i>	100	14
<i>Gaultheria hispidula</i>	100	11
<i>Avenella flexuosa</i>	100	7
<i>Linnaea borealis</i>	100	7
<i>Carex vaginata</i>	100	5
<i>Cornus canadensis</i>	100	5
<i>Coptis trifolia</i>	100	2
<i>Maianthemum canadense</i>	75	3
<i>Empetrum nigrum</i>	75	2
Bryo-Lichen Stratum Cover (Mean)		95
<i>Pleurozium schreberi</i>	100	39
<i>Cladina rangiferina</i>	100	19
<i>Dicranum undulatum</i>	100	14
<i>Bazzania trilobata</i>	100	14
<i>Hylocomium splendens</i>	100	13
<i>Sphagnum capillifolium</i>	100	7
<i>Cladonia</i> spp.	100	7
<i>Ptilidium ciliare</i>	75	11
<i>Ptilium crista-castrensis</i>	75	7

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	244–278–320 m
Slope	moderately steep (25); md (75)
Aspect	north (25); east (0); south (0); west (0); md (75)
Meso Topoposition	md (100)
Moisture Regime	moist (100)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (50); bedrock (50)
Soil Rooting Zone Substrate	non-soil (50); md (50)
Root Restricting Depth	md (100)
Humus Form	mor (25); mull (25); md (50)



Notes & Similar Associations

These sites are ecologically similar to alvars on the mainland.
 CNVC00205 occurs on drier sites with acidic soils in central Newfoundland. Lichens dominate the ground layer.
 CNVC00307 occurs on mesic sites in the same range and has a shrub layer dominated by *Kalmia angustifolia*.
 CNVC00335 & CNVC00339 are wetlands and have abundant *Sphagnum* mosses.
 CNVC00350 is a forest that occurs on acidic soils and has less abundant ericaceous shrubs.

CNVC00344 *Picea mariana*—*Betula papyrifera*—*Abies balsamea* / *Pleurozium schreberi*

MIXEDWOOD

Black Spruce—Paper Birch—Balsam Fir / Red-stemmed Feathermoss

Subassociations: *typic*, *Pteridium aquilinum*, *Hylocomium splendens*

Provinces: Quebec

Mesophytic Herb or Feathermoss

CNVC00344 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, with a smaller component of *Abies balsamea*. Regeneration of these species dominates the well-developed shrub layer. *Vaccinium myrtilloides*, *Amelanchier* spp., *V. angustifolium*, *Sorbus americana* and *Kalmia angustifolia* are common but less abundant. The herb layer is poorly to moderately developed. *Cornus canadensis*, *Gaultheria hispidula*, *Clintonia borealis*, *Maianthemum canadense*, *Linnaea borealis*, *Coptis trifolia* and *Lysimachia borealis* are usually present. *Pteridium aquilinum* can be abundant. The moss layer is well developed and dominated by *Pleurozium schreberi*.

CNVC00344 is most common on mesic, nutrient-medium sites. It occurs in a region with a humid continental boreal climate. It usually occurs on gentle to moderately steep slopes on mid- to upper-slope topositions. Soils are coarse textured, derived from morainal materials. CNVC00344 is a mid-seral condition that typically succeeds an early seral, post-fire Association. Outbreaks of spruce budworm (*Choristoneura fumiferana*) play a greater role in the dynamics of this Association in the east, where fires are less frequent.

Characteristic Plants		CNVC00344		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥50% presence except		226 plots		Elevation (min–mean–max)		80–423–910 m	
<i>Pteridium aquilinum</i> ;	%	%		Slope		level (12); gentle (23); moderate (30); moderately steep (26); steep (9); very steep (1)	
±characteristic cover	Presence^	Cover*		Aspect		north (21); east (23); south (23); west (25); level (8)	
Tree Stratum Cover (Mean)		63		Meso Toposition		crest/ upper (27); mid (62); lower/ toe (5); depression (2); level (4)	
<i>Picea mariana</i>	100	25		Moisture Regime		very dry (1); dry (2); mesic (87); moist (10)	
<i>Betula papyrifera</i>	99	23		Nutrient Regime		md (100)	
<i>Abies balsamea</i>	82	13		Soil Parent Material		moraine/ till (85); other (15)	
Shrub Stratum Cover (Mean)		50		Soil Rooting Zone Substrate		coarse loamy (13); other (16); md (71)	
<i>Picea mariana</i>	99	11		Root Restricting Depth		0-20 cm (4); 21-99 cm (62); md (34)	
<i>Abies balsamea</i>	93	19		Humus Form		mor (95); moder (1); peatymor (4)	
<i>Betula papyrifera</i>	86	6					
<i>Vaccinium myrtilloides</i>	74	6					
<i>Vaccinium angustifolium</i>	72	4				Source: Ministère des Forêts, de la Faune et des Parcs	
<i>Amelanchier</i> spp.	71	4					
<i>Kalmia angustifolia</i>	62	5		Notes & Similar Associations CNVC00214 occurs on slightly poorer sites and has more abundant ericaceous shrubs. CNVC00216 occurs on slightly richer sites and has more abundant <i>Acer spicatum</i> and <i>Corylus cornuta</i> . CNVC00231, CNVC00232 and CNVC00233 do not have <i>Picea mariana</i> codominant. CNVC00234 typically occurs on warmer, often more southern, sites and has a better developed herb layer with less moss cover.			
<i>Sorbus americana</i>	56	4					
Herb Stratum Cover (Mean)		20					
<i>Cornus canadensis</i>	92	7					
<i>Gaultheria hispidula</i>	90	4					
<i>Clintonia borealis</i>	82	4					
<i>Maianthemum canadense</i>	78	3					
<i>Linnaea borealis</i>	69	3					
<i>Coptis trifolia</i>	65	3					
<i>Lysimachia borealis</i>	60	2					
<i>Pteridium aquilinum</i>	24	10					
Bryo-Lichen Stratum Cover (Mean)		70					
<i>Pleurozium schreberi</i>	100	52					
<i>Dicranum</i> spp.	96	4					
<i>Ptilium crista-castrensis</i>	86	9					
<i>Cladina rangiferina</i>	74	2					
<i>Polytrichum</i> spp.	68	3					
<i>Cladonia</i> spp.	67	2					
<i>Hylocomium splendens</i>	64	9					

CNVC00348 *Abies balsamea* / *Taxus canadensis* / *Rubus pubescens* / *Dicranum majus*

CONIFER

Balsam Fir / Canada Yew / Dwarf Raspberry / Greater Broom Moss

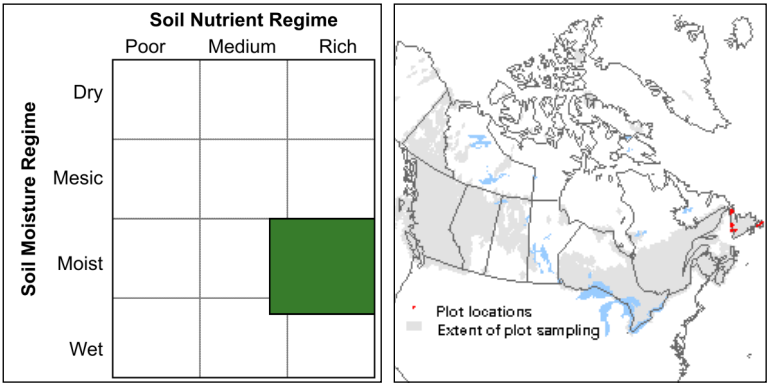
Subassociations: *Viburnum nudum*, *Taxus canadensis*, *Dryopteris carthusiana*, *Gymnocarpium dryopteris*

Provinces: Newfoundland and Labrador

Moist Rich Shrub & Herb

CNVC00348 has a closed canopy dominated by *Abies balsamea*, often with minor components of *Picea glauca* and *Betula papyrifera*. It is one of the most floristically diverse forest Associations on the island of Newfoundland. The shrub layer is well developed and commonly includes *Acer spicatum*, *A. balsamea*, *Viburnum edule* and *Cornus stolonifera*. The herb layer is usually dense and typically includes abundant *Dryopteris carthusiana* along with *Rubus pubescens*, *Lysimachia borealis* and *Linnaea borealis*. Numerous other herb species occur but at low frequency. The moss layer is usually well developed and includes *Dicranum majus*, *Rhytidiadelphus triquetrus* and *Pleurozium schreberi*. *Hylocomiastrum umbratum* and *Hylocomium splendens* can be abundant.

CNVC00348 occurs in a region with a very humid, maritime boreal climate. It is found on moist to wet, nutrient-rich sites; these are some of the most productive sites in Newfoundland. Stands are usually on level sites or gentle slopes on water-receiving, mid- or lower-slope topopositions, where seepage enhances moisture and nutrient availability. Soils are usually fine textured, derived from morainal or glaciofluvial parent materials. This is a stable, late successional condition that occurs where fire has been absent for a long period. Windthrow and insect outbreak are the primary natural disturbances. Canopy gaps or large patches that result from these disturbances promote self-replacement of this Association by the release of *A. balsamea* regeneration.

Characteristic Plants		CNVC00348	Site / Soil Characteristics		(% Frequency); md=missing data	
^≥50% presence except <i>Viburnum nudum</i> ; ±characteristic cover		24 plots % Presence^	% Cover±	Elevation (min–mean–max)	15–139–381 m	
Tree Stratum Cover (Mean)		69		Slope	level (63); gentle (13); moderate (4); moderately steep (8); steep (4); md (8)	
<i>Abies balsamea</i>	96	57	Aspect	north (13); east (8) south (25); west (17); level (29); md (8)		
<i>Betula papyrifera</i>	71	6	Meso Topoposition	crest/ upper (8); mid (8); md (83)		
<i>Picea glauca</i>	58	4	Moisture Regime	moist (50); wet (42); md (8)		
Shrub Stratum Cover (Mean)		48		Nutrient Regime	md (100)	
<i>Acer spicatum</i>	88	9	Soil Parent Material	moraine/ till (33); glaciofluvial (13); other (4); md (50)		
<i>Abies balsamea</i>	79	7	Soil Rooting Zone Substrate	coarse loamy (17); sandy (4); md (79)		
<i>Viburnum edule</i>	71	5	Root Restricting Depth	md (100)		
<i>Cornus stolonifera</i>	67	4	Humus Form	mull (17); md (83)		
<i>Taxus canadensis</i>	58	17	 <p>The figure consists of two parts. On the left is a 4x3 matrix for Soil Nutrient Regime (Poor, Medium, Rich) and Soil Moisture Regime (Dry, Mesic, Moist, Wet). The 'Moist' row and 'Rich' column are shaded green. On the right is a map of Newfoundland with a red dot indicating the plot location in the southwest and a grey shaded area representing the extent of plot sampling.</p>			
<i>Ribes lacustre</i>	58	1				
<i>Viburnum nudum</i>	21	22				
Herb Stratum Cover (Mean)		64				
<i>Rubus pubescens</i>	88	6				
<i>Lysimachia borealis</i>	88	3				
<i>Dryopteris carthusiana</i>	71	17				
<i>Linnaea borealis</i>	67	7				
<i>Gymnocarpium dryopteris</i>	58	7				
<i>Clintonia borealis</i>	58	6				
<i>Mitella nuda</i>	54	14				
<i>Cornus canadensis</i>	54	5				
<i>Solidago macrophylla</i>	54	4				
Bryo-Lichen Stratum Cover (Mean)		62				
<i>Dicranum majus</i>	79	11	Notes & Similar Associations The <i>Viburnum nudum</i> subassociation occurs on the Avalon Peninsula, the <i>Taxus canadensis</i> on the Northern Peninsula, and both the <i>Dryopteris carthusiana</i> and <i>Gymnocarpium dryopteris</i> subassociations occur in sw Newfoundland. Where <i>Abies balsamea</i> is heavily grazed by moose, stands can have relatively greater cover of <i>Picea glauca</i> . CNVC00348 occurs on moister, richer sites and has greater floristic diversity than other <i>Abies balsamea</i> Associations on the island (e.g., CNVC00222, CNVC00310).			
<i>Rhytidiadelphus triquetrus</i>	63	16				
<i>Pleurozium schreberi</i>	63	7				
<i>Hylocomiastrum umbratum</i>	58	12				
<i>Hylocomium splendens</i>	54	24				

Source: W. Meades

CNVC00349 *Betula papyrifera* (*Populus tremuloides*) / *Dryopteris carthusiana*—*Rubus pubescens*

HARDWOOD

Paper Birch (Trembling Aspen) / Spinulose Wood Fern—Dwarf Raspberry

Subassociations: none

Provinces: Newfoundland and Labrador

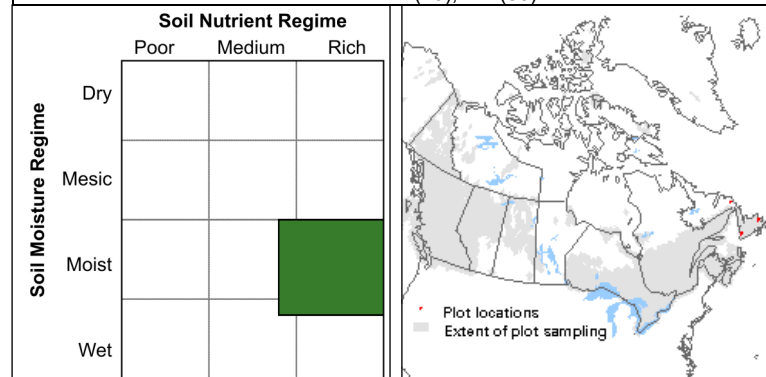
Moist Rich Shrub & Herb

CNVC00349 has a closed canopy dominated by *Betula papyrifera*, sometimes with *Populus tremuloides* codominant, and often minor components of *Abies balsamea*, *Picea mariana* or *Acer rubrum*. This is one of the most floristically diverse forest Associations on the island of Newfoundland. The shrub layer is usually moderately developed and typically includes *Sorbus americana*, *A. balsamea* and *P. mariana*. *Acer rubrum* or *A. spicatum* can be abundant. The herb layer is dense and relatively diverse. It usually includes *Cornus canadensis*, *Clintonia borealis*, *Linnaea borealis*, *Maianthemum canadense*, *Lysimachia borealis*, *Rubus pubescens*, *Dryopteris carthusiana* and *Solidago macrophylla*. *Aralia nudicaulis* can be abundant. The forest floor cover is mainly broad-leaf and herbaceous litter, so the moss layer is sparse, with only minor cover, primarily of *Dicranum scoparium* and *Pleurozium schreberi*.

CNVC00349 occurs in a region with a very humid, maritime boreal climate on moist, nutrient-rich sites. These are some of the most productive sites in Newfoundland. Stands are usually on moderate slopes on water-receiving, lower-slope topopositions, where seepage enhances moisture and nutrient availability. Soils are often shallow and derived from morainal materials or colluvium. CNVC00349 is an early seral condition that typically establishes after fire, which is uncommon in the humid coastal environments where it occurs.

Characteristic Plants	CNVC00349	
[^] ≥50% presence except herb layer;	10 plots	
±characteristic cover	% Presence [^]	% Cover [±]
Tree Stratum Cover (Mean)	69	
<i>Betula papyrifera</i>	100	34
<i>Abies balsamea</i>	70	14
<i>Picea mariana</i>	60	7
<i>Acer rubrum</i>	60	6
<i>Populus tremuloides</i>	50	29
Shrub Stratum Cover (Mean)	37	
<i>Abies balsamea</i>	80	6
<i>Sorbus americana</i>	70	2
<i>Picea mariana</i>	60	6
<i>Acer rubrum</i>	50	10
<i>Acer spicatum</i>	50	10
<i>Populus tremuloides</i>	50	6
Herb Stratum Cover (Mean)	86	
<i>Cornus canadensis</i>	90	20
<i>Clintonia borealis</i>	90	15
<i>Linnaea borealis</i>	90	12
<i>Maianthemum canadense</i>	90	5
<i>Lysimachia borealis</i>	90	3
<i>Rubus pubescens</i>	70	11
<i>Dryopteris carthusiana</i>	70	8
<i>Solidago macrophylla</i>	70	4
<i>Aralia nudicaulis</i>	40	32
<i>Huperzia lucidula</i>	40	12
<i>Viola cucullata</i>	30	15
<i>Gymnocarpium dryopteris</i>	30	14
Bryo-Lichen Stratum Cover (Mean)	27	
<i>Dicranum scoparium</i>	90	4
<i>Pleurozium schreberi</i>	60	9
<i>Hylocomium splendens</i>	50	11

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	122–156–183 m; md (60)
Slope	level (10); moderate (30); moderately steep (10); md (50)
Aspect	north (20); east (0); south (20); west (10); md (50)
Meso Topoposition	lower/ toe (10); md (90)
Moisture Regime	moist (50); md (50)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (30); colluvium (10); md (60)
Soil Rooting Zone Substrate	non-soil (10); md (90)
Root Restricting Depth	md (100)
Humus Form	mor (20); md (80)



Source: W. Meades

Notes & Similar Associations

Acer rubrum and *Betula alleghaniensis*, considered temperate species in the CNVC, sometimes occur in CNVC00349, but as this Association lacks temperate understory species, it is classified as boreal.

CNVC00237 occurs on mesic, nutrient-poor to -medium sites and has abundant ericaceous shrubs.

CNVC00315 occurs on mesic to moist, nutrient-medium to -rich sites and has very high abundance of *Dryopteris* spp.

CNVC00316 is a floristically similar condition that forms a pioneer Association on scree slopes.

CNVC00350 *Picea mariana* / *Pleurozium schreberi*—*Hylocomium splendens*

CONIFER

Black Spruce / Red-stemmed Feathermoss—Stairstep Moss

Subassociations: *typic*, *Rhododendron canadense*, *Dicranum majus*

Provinces: Newfoundland and Labrador, Quebec

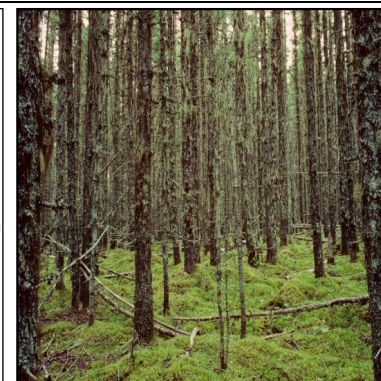
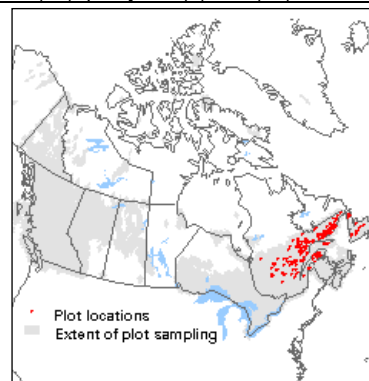
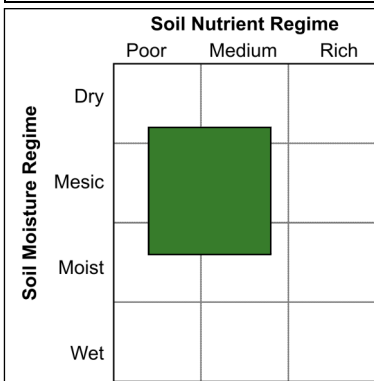


Mesophytic Herb or Feathermoss

CNVC00350 has a moderately closed to closed canopy dominated by *Picea mariana*, usually with a minor component of *Abies balsamea*. *Betula papyrifera* occurs sporadically. The shrub layer is well developed to dense; it is mostly *P. mariana* and *A. balsamea*, with presence of *Vaccinium angustifolium* and *Kalmia angustifolia*. The sparse herb layer is mainly *Gaultheria hispidula* and *Cornus canadensis*. The moss layer is continuous; *Pleurozium schreberi* and *Hylocomium splendens* form a thick mat, often with smaller amounts of *Ptilium crista-castrensis*, *Dicranum* spp. and *Cladina* and *Cladonia* lichens.

CNVC00350 typically occurs on mesic, nutrient-poor to -medium sites in a region with a very humid, maritime-influenced boreal climate. Stands are usually on level sites or gentle to moderately steep slopes on mid- to upper-slope topositions. Soils are generally moderately deep to deep, well-drained, coarse loams or sands, derived from acidic parent materials. They typically develop on morainal, or less frequently, glaciofluvial deposits. Occasionally, soils can be very thin over colluvium or bedrock. Fire is required for the *P. mariana* dominance that characterizes this Association, but outbreaks of spruce budworm (*Choristoneura fumiferana*) and hemlock looper (*Lambdina fiscellaria fiscellaria*) can also influence dynamics by favouring *P. mariana* over *A. balsamea*, even in the absence of fire.

Characteristic Plants	CNVC00350		Site / Soil Characteristics	(% Frequency); md=missing data
[^] ≥40% presence except	207 plots		Elevation (min–mean–max)	30–308–820 m; md (7)
<i>Rhododendron canadense</i> ;	%	%	Slope	level (21); gentle (15); moderate (24); moderately steep (21); steep (10); md (8)
±characteristic cover	Presence [^]	Cover [±]	Aspect	north (20); east (22); south (14); west (23); level (13); md (8)
Tree Stratum Cover (Mean)	60		Meso Toposition	crest/ upper (19); mid (51); lower/ toe (6); level (11); md (13)
<i>Picea mariana</i>	100	46	Moisture Regime	dry (5); mesic (77); moist (14); wet (3)
<i>Abies balsamea</i>	84	9	Nutrient Regime	md (100)
<i>Betula papyrifera</i>	40	6	Soil Parent Material	moraine/ till (71); glaciofluvial (10); other (16); md (3)
Shrub Stratum Cover (Mean)	48		Soil Rooting Zone Substrate	coarse loamy (16); other (22); md (61)
<i>Picea mariana</i>	93	22	Root Restricting Depth	0-20 cm (5); 21-99 cm (47); md (48)
<i>Abies balsamea</i>	92	15	Humus Form	mor (76); peatymor (7); md (16)
<i>Vaccinium angustifolium</i>	62	4		
<i>Kalmia angustifolia</i>	60	5		
<i>Rhododendron groenlandicum</i>	49	5		
<i>Betula papyrifera</i>	45	4		
<i>Vaccinium myrtilloides</i>	44	3		
<i>Rhododendron canadense</i>	12	21		
Herb Stratum Cover (Mean)	11			
<i>Gaultheria hispidula</i>	91	5		
<i>Cornus canadensis</i>	89	4		
<i>Clintonia borealis</i>	47	3		
<i>Linnaea borealis</i>	47	2		
<i>Maianthemum canadense</i>	45	3		
<i>Coptis trifolia</i>	44	2		
Bryo-Lichen Stratum Cover (Mean)	89			
<i>Pleurozium schreberi</i>	99	45		
<i>Hylocomium splendens</i>	98	30		
<i>Ptilium crista-castrensis</i>	91	12		
<i>Dicranum</i> spp.	94	5		
<i>Cladina rangiferina</i>	71	3		
<i>Cladonia</i> spp.	68	3		
<i>Sphagnum</i> spp.	55	7		
<i>Bazzania trilobata</i>	43	4		



Source: W. Meades

Notes & Similar Associations
 The *typic* subassociation occurs in Quebec and Newfoundland, the *Rhododendron canadense* occurs in the Lower North Shore of the Gulf of Saint Lawrence and the *Dicranum majus* is known from the Avalon Peninsula.
 CNVC00211 occurs in Quebec and has less *Abies balsamea* regeneration, more ericaceous shrubs, especially *R. canadense* and *Kalmia angustifolia*, and a moss layer with less *Hylocomium splendens*.
 CNVC00217 & CNVC00351 have more *A. balsamea* in the canopy.

CNVC00351 *Picea mariana*—*Abies balsamea* / *Pleurozium schreberi* (*Hylocomium splendens*)

CONIFER

Black Spruce—Balsam Fir / Red-stemmed Feathermoss (Stairstep Moss)

Subassociations: *typic*, *Hylocomium splendens*, *Viburnum nudum*, *Cornus stolonifera*, *Sphagnum* spp.

Provinces: Newfoundland and Labrador, Quebec



Mesophytic Herb or Feathermoss

CNVC00351 has a moderately closed to closed canopy of varying proportions of *Abies balsamea* and *Picea mariana*, sometimes with a minor component of *Betula papyrifera*. The shrub layer is usually well developed with abundant *A. balsamea*, *P. mariana* and, to a lesser degree, *B. papyrifera*. The herb layer is poorly developed but usually includes low cover of *Cornus canadensis*, *Gaultheria hispidula*, *Clintonia borealis*, *Linnaea borealis* and *Maianthemum canadense*. A continuous moss layer of predominantly *Pleurozium schreberi*, *Ptilium crista-castrensis* and *Hylocomium splendens*, helps to characterize this Association.

CNVC00351 occurs in a region with a very humid, maritime-influenced boreal climate, typically on mesic to moist, nutrient-poor to -medium sites. Stands usually occur on mid- to upper-slope topopositions on gentle to steep slopes. Soils are typically moderately deep to deep, well drained and coarse textured, derived from morainal parent materials. This is a late seral condition with dynamics driven mainly by fire, insect outbreak and windthrow. Although *P. mariana* and *A. balsamea* are present in every stand, climate, disturbance type and history, and site conditions affect the relative dominance of each species.

Characteristic Plants		CNVC00351		Site / Soil Characteristics		(% Frequency); md=missing data	
^≥40% presence except subassociation spp.;		634 plots					
±characteristic cover		Presence [^]	Cover [±]				
Tree Stratum Cover (Mean)			56				
<i>Abies balsamea</i>		100	23	Elevation (min–mean–max)		5–430–1110 m; md (2)	
<i>Picea mariana</i>		99	24	Slope		level (11); gentle (18); moderate (27); moderately steep (29); steep (13); very steep (1)	
<i>Betula papyrifera</i>		55	6	Aspect		north (24); east (20); south (21); west (27); level (8)	
Shrub Stratum Cover (Mean)			52	Meso Topoposition		crest/ upper (19); mid (64); lower/ toe (7); depression (2); level (5); md (3)	
<i>Abies balsamea</i>		99	22	Moisture Regime		dry (2); mesic (79); moist (16); wet (2)	
<i>Picea mariana</i>		98	15	Nutrient Regime		md (100)	
<i>Betula papyrifera</i>		73	5	Soil Parent Material		moraine/ till (84); other (12); md (3)	
<i>Vaccinium angustifolium</i>		59	3	Soil Rooting Zone Substrate		coarse loamy (16); other (18); md (66)	
<i>Amelanchier</i> spp.		56	5	Root Restricting Depth		0-20 cm (6); 21-99 cm (61); md (34)	
<i>Vaccinium myrtilloides</i>		55	4	Humus Form		mor (89); moder (2); peatymor (6); md (3)	
<i>Rhododendron groenlandicum</i>		47	3				
<i>Viburnum nudum</i>		10	4				
<i>Cornus stolonifera</i>		3	3				
Herb Stratum Cover (Mean)			15				
<i>Cornus canadensis</i>		94	6				
<i>Gaultheria hispidula</i>		92	4				
<i>Clintonia borealis</i>		69	3				
<i>Linnaea borealis</i>		65	3				
<i>Maianthemum canadense</i>		62	3				
<i>Coptis trifolia</i>		58	3				
<i>Lysimachia borealis</i>		51	2				
Bryo-Lichen Stratum Cover (Mean)			80				
<i>Pleurozium schreberi</i>		99	48				
<i>Dicranum</i> spp.		91	3				
<i>Ptilium crista-castrensis</i>		90	15				
<i>Hylocomium splendens</i>		79	19				
<i>Cladina rangiferina</i>		69	2				
<i>Cladonia</i> spp.		66	2				
<i>Sphagnum</i> spp.		65	7				
<i>Polytrichum</i> spp.		65	3				
<i>Bazzania trilobata</i>		42	3				

Soil Nutrient Regime			
	Poor	Medium	Rich
Dry			
Mesic			
Moist			
Wet			

Soil Moisture Regime	
	Soil Nutrient Regime
Dry	
Mesic	
Moist	
Wet	

Source: Ministère des Forêts, de la Faune et des Parcs

Notes & Similar Associations

CNVC00217 occurs in Quebec but has more abundant ericaceous shrubs, especially *Rhododendron groenlandicum*, and less *Hylocomium splendens* in the moss layer.

CNVC00220 occurs in New Brunswick and Nova Scotia and has a better developed herb layer that includes *Dryopteris* spp. and *Oxalis montana*.

CNVC00222 has less *Picea mariana* in the overstory and less abundant ericaceous shrubs.

CNVC00350 has less *Abies balsamea* in the overstory.

Appendix 3. Vegetation summaries for Macrogroup determination.

The following four tables use the colour, shape and number of symbols to indicate species' presence and cover calculated from the sample plots in each column. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

A3 Table 1. Summary vegetation table of Ontario plots in CM495b [Ontario – Quebec Boreal Forest] and CM496a [Central Boreal Forest]. Only Ontario plots are shown in this summary to provide better distinction among these two Macrogroup subtypes in the area where they overlap (northwestern Ontario). Species with constancy $\geq 20\%$ are listed.

Layer	Scientific Name	n Plots		Common Name
		2891	543	
		CM495b	CM496a	
Tree	<i>Abies balsamea</i>	■ ■ ■ ■ ■	***	balsam fir
	<i>Betula papyrifera</i>	■ ■ ■ ■ ■	****	paper birch
	<i>Picea glauca</i>	****		white spruce
	<i>Picea mariana</i>	■ ■ ■ ■ ■	■ ■ ■ ■ ■	black spruce
	<i>Pinus banksiana</i>	■ ■ ■ ■ ■	■ ■ ■ ■ ■	jack pine
	<i>Populus tremuloides</i>	■ ■ ■ ■ ■	■ ■ ■ ■ ■	trembling aspen
Shrub	<i>Abies balsamea</i>	■ ■ ■	■ ■ ■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	■ ■ ■	■ ■ ■	paper birch
	<i>Picea glauca</i>	***		white spruce
	<i>Picea mariana</i>	■ ■ ■	■ ■ ■ ■ ■	black spruce
	<i>Populus tremuloides</i>	■ ■	***	trembling aspen
	<i>Acer spicatum</i>	■ ■ ■ ■ ■	*****	mountain maple
	<i>Alnus incana</i>	****	****	speckled alder
	<i>Alnus viridis</i>	***	■ ■ ■ ■ ■	green alder
	<i>Corylus cornuta</i>	■ ■ ■		beaked hazelnut
	<i>Diervilla lonicera</i>	■ ■ ■	****	northern bush-honeysuckle
	<i>Lonicera canadensis</i>	**		Canada fly-honeysuckle
	<i>Rhododendron groenlandicum</i>	■ ■ ■	■ ■ ■ ■ ■	common Labrador tea
	<i>Ribes</i> spp.	**	**	currants
	<i>Rosa acicularis</i>	■ ■	***	prickly rose
	<i>Sorbus americana</i> + <i>S. decora</i>	■ ■	*	mountain-ashes
	<i>Vaccinium angustifolium</i>	■ ■ ■		early lowbush blueberry
	<i>Vaccinium myrtilloides</i>	■ ■ ■	■ ■ ■	velvet-leaved blueberry
<i>Viburnum edule</i>	**	***	squashberry	
Herb & dwarf shrub	<i>Anemone quinquefolia</i>	*		wood anemone
	<i>Aralia nudicaulis</i>	■ ■ ■	■ ■ ■	wild sarsaparilla
	<i>Carex</i> spp.	**	**	sedges
	<i>Chamerion angustifolium</i>	**	*	fireweed
	<i>Clintonia borealis</i>	■ ■	***	yellow clintonia
	<i>Coptis trifolia</i>	■ ■	**	goldthread
	<i>Cornus canadensis</i>	■ ■ ■	■ ■ ■ ■ ■	bunchberry
	<i>Equisetum</i> spp.	**	**	horsetails
	<i>Eurybia macrophylla</i>	■ ■ ■		large-leaved aster
	<i>Fragaria virginiana</i>	**	**	wild strawberry
	<i>Galium triflorum</i>	**		three-flowered bedstraw
	<i>Gaultheria hispidula</i>	■ ■	■ ■ ■ ■ ■	creeping snowberry
	<i>Goodyera repens</i>	*	■	dwarf rattlesnake-plantain
	<i>Linnaea borealis</i>	■ ■	■ ■ ■ ■ ■	twinflor
	<i>Lycopodium annotinum</i>	***	■ ■ ■ ■ ■	stiff clubmoss
	<i>Lycopodium clavatum</i>	**	**	running clubmoss
	<i>Lycopodium obscurum</i>	**		flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>	■ ■	■ ■	northern starflower
	<i>Maianthemum canadense</i>	■ ■	■ ■	wild lily-of-the-valley
	<i>Mitella nuda</i>	**	**	naked mitrewort
	<i>Petasites frigidus</i>	**	**	arctic sweet coltsfoot
	<i>Rubus pubescens</i>	■ ■	***	dwarf raspberry
	<i>Streptopus lanceolatus</i>	■ ■	**	rose twisted-stalk
<i>Vaccinium vitis-idaea</i>	**	■ ■	lingonberry	
<i>Viola renifolia</i>	■ ■	*	kidney-leaved violet	

Layer	Scientific Name	CM495b	CM496a	Common Name
Moss & lichen	<i>Cladina</i> spp. + <i>Clad</i> spp.	■■■	■■■	reindeer + clad lichens
	<i>Dicranum</i> spp.	■■■	■■■	broom mosses
	<i>Hylocomium splendens</i>	■■■	■■■	stairstep moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.	**	**	leafy mosses
	<i>Peltigera aphthosa</i>	*	*	common freckle pelt lichen
	<i>Pleurozium schreberi</i>	■■■■■	■■■■■	red-stemmed feathermoss
	<i>Ptilidium ciliare</i>	**	*	ciliate fringewort
	<i>Ptilium crista-castrensis</i>	■■■	■■■	knight's plume moss
	<i>Rhytidiadelphus triquetrus</i>	***	**	electrified cat's-tail moss

A3 Table 2. Summary vegetation table of M495 [Eastern North American Boreal Forest] and M179 [North American Northern Boreal Woodland]. Note that M179 is not yet fully described by data so the summary below gives only a weak indication. Species with constancy $\geq 20\%$ are listed.

Layer	Scientific Name	n Plots		Common Name
		15681	616	
	M495	M179		
Tree	<i>Abies balsamea</i>	■■■■■		balsam fir
	<i>Betula papyrifera</i>	■■■■■	****	paper birch
	<i>Picea glauca</i>	****	■■■■■	white spruce
	<i>Picea mariana</i>	■■■■■	■■■■■	black spruce
	<i>Pinus banksiana</i>	****	****	jack pine
	<i>Populus tremuloides</i>	■■■■■		trembling aspen
Shrub	<i>Abies balsamea</i>	■■■■■	***	balsam fir
	<i>Betula papyrifera</i>	■■■	**	paper birch
	<i>Picea glauca</i>	***	****	white spruce
	<i>Picea mariana</i>	■■■■■	■■■■■	black spruce
	<i>Populus tremuloides</i>	***		trembling aspen
	<i>Acer spicatum</i>	■■■■■		mountain maple
	<i>Alnus viridis</i>	****	****	green alder
	<i>Amelanchier</i> spp.	■■■	**	serviceberry
	<i>Betula glandulosa</i>		■■■	glandular birch
	<i>Dasiphora fruticosa</i>		***	shrubby cinquefoil
	<i>Diervilla lonicera</i>	■■■		northern bush-honeysuckle
	<i>Kalmia angustifolia</i>	■■■■■	***	sheep laurel
	<i>Rhododendron groenlandicum</i>	■■■■■	■■■■■	common Labrador tea
	<i>Ribes</i> spp.	***		currants
	<i>Rubus idaeus</i>	***		red raspberry
	<i>Salix</i> spp.	■■■	■■■	willows
	<i>Sorbus americana</i> + <i>S. decora</i>	■■■		mountain-ashes
	<i>Vaccinium angustifolium</i>	■■■	****	early lowbush blueberry
<i>Vaccinium myrtilloides</i>	■■■	***	velvet-leaved blueberry	
<i>Vaccinium uliginosum</i>		■■■	bog bilberry	
<i>Viburnum nudum</i>	***		wild raisin	
Herb & dwarf shrub	<i>Aralia nudicaulis</i>	■■■		wild sarsaparilla
	<i>Arctous rubra</i>		***	red bearberry
	<i>Carex</i> spp.	■■■	■■■■■	sedges
	<i>Clintonia borealis</i>	■■■	***	yellow clintonia
	<i>Coptis trifolia</i>	■■■	**	goldthread
	<i>Cornus canadensis</i>	■■■	***	bunchberry
	<i>Dryas integrifolia</i>		****	entire-leaved mountain avens
	<i>Dryopteris spinulosa</i> complex	■■■		wood fern
	<i>Empetrum nigrum</i>		■■■	black crowberry
	<i>Eurybia macrophylla</i>	***		large-leaved aster
	<i>Gaultheria hispidula</i>	■■■	**	creeping snowberry
	<i>Geocaulon lividum</i>		**	northern comandra
	<i>Linnaea borealis</i>	■■■	***	twinflower
	<i>Lycopodium annotinum</i>	***	**	stiff clubmoss
	<i>Lycopodium obscurum</i>	**		flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>	■■■		northern starflower
<i>Maianthemum canadense</i>	■■■		wild lily-of-the-valley	

Layer	Scientific Name	M495	M179	Common Name
Herb & dwarf shrub	<i>Oxalis montana</i>	***		common wood-sorrel
	Poaceae	***	**	grass family
	<i>Pteridium aquilinum</i>	***		bracken fern
	<i>Rhododendron lapponicum</i>		***	Lapland rosebay
	<i>Rubus pubescens</i>	***		dwarf raspberry
	<i>Streptopus lanceolatus</i>	**		rose twisted-stalk
	<i>Vaccinium vitis-idaea</i>	**	■■■	lingonberry
Moss & lichen	<i>Cladina</i> spp. + <i>Clad</i> spp.	■■■	■■■■■	reindeer + clad lichens
	<i>Dicranum</i> spp.	■■■	■■	broom mosses
	<i>Flavocetraria nivalis</i>		**	crinkled snow lichen
	<i>Hylocomium splendens</i>	■■■■	****	stairstep moss
	Moss species		■■■■	moss
	<i>Pleurozium schreberi</i>	■■■■■	■■■■■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.	■■	**	haircap mosses
	<i>Ptilidium ciliare</i>	**	**	ciliate fringewort
	<i>Ptilium crista-castrensis</i>	■■■	***	knight's plume moss
	<i>Sphagnum</i> spp.	■■■■	****	peat mosses

A3 Table 3. Summary vegetation table of CM495 [Eastern North American Boreal Forest], CM014 [Eastern North American Temperate Hardwood – Conifer Forest] and CM744 [Acadian Temperate Forest]. Tree species are totalled for tree and shrub layers. Constancy of species listed varies by layer; list includes tree species with constancy ≥5%, shrub and herb & dwarf shrub species with constancy ≥10% and moss & lichen species with ≥20%.

Layer	Scientific Name	n Plots			Common Name
		15681	7705	4606	
		M495	CM014	CM744	
Tree	<i>Abies balsamea</i>	■■■■■	■■■■■	■■■■■	balsam fir
	<i>Acer rubrum</i>	***	■■■■■	■■■■■	red maple
	<i>Acer saccharum</i>		■■■■■	■■■■■	sugar maple
	<i>Betula alleghaniensis</i>		■■■■■	■■■■■	yellow birch
	<i>Betula papyrifera</i>	■■■■■	■■■■■	■■■■■	paper birch
	<i>Betula populifolia</i>			***	grey birch
	<i>Fagus grandifolia</i>		****	****	American beech
	<i>Fraxinus americana</i>			***	white ash
	<i>Fraxinus nigra</i>		****		black ash
	<i>Ostrya virginiana</i>		**	**	eastern hop-hornbeam
	<i>Picea glauca</i>	■■■■■	■■■■■	■■■■■	white spruce
	<i>Picea mariana</i>	■■■■■	****	****	black spruce
	<i>Picea rubens</i>		****	■■■■■	red spruce
	<i>Pinus banksiana</i>	****		****	jack pine
	<i>Pinus resinosa</i>		****		red pine
	<i>Pinus strobus</i>		****	**	eastern white pine
	<i>Populus grandidentata</i>		****	****	large-toothed aspen
	<i>Populus tremuloides</i>	■■■■■	■■■■■	****	trembling aspen
	<i>Prunus pensylvanica</i>	***	**	**	pin cherry
	<i>Prunus serotina</i>		**		black cherry
<i>Quercus rubra</i>		**	****	northern red oak	
<i>Thuja occidentalis</i>	**	****	****	eastern white cedar	
<i>Tsuga canadensis</i>		****	****	eastern hemlock	
Shrub	<i>Acer pensylvanicum</i>		■■■■■	■■■■■	striped maple
	<i>Acer spicatum</i>	■■■■■	■■■■■	■■■■■	mountain maple
	<i>Acer pensylvanicum</i>		■■■■■	■■■■■	striped maple
	<i>Acer spicatum</i>	■■■■■	■■■■■	■■■■■	mountain maple
	<i>Alnus incana</i>	****	****	**	speckled alder
	<i>Alnus viridis</i>	****			green alder
	<i>Amelanchier</i> spp.	■■■■■	■■■■■	■■■■■	serviceberries
	<i>Cornus alternifolia</i>		**	**	alternate-leaved dogwood
	<i>Corylus cornuta</i>	****	■■■■■	■■■■■	beaked hazelnut

Layer	Scientific Name	M495	CM014	CM744	Common Name
Shrub	<i>Diervilla lonicera</i>	■ ■ ■	■ ■ ■	**	northern bush-honeysuckle
	<i>Ilex mucronata</i>	***	***	**	mountain holly
	<i>Kalmia angustifolia</i>	■ ■ ■ ■	***	***	sheep laurel
	<i>Lonicera canadensis</i>	**	■ ■	■ ■	Canada fly-honeysuckle
	<i>Prunus virginiana</i>		***	***	chokecherry
	<i>Rhododendron groenlandicum</i>	■ ■ ■ ■			common Labrador tea
	<i>Ribes</i> spp.	***	**	**	currants
	<i>Rubus idaeus</i>	***	■ ■ ■	***	red raspberry
	<i>Salix</i> spp.	■ ■ ■	***	**	willows
	<i>Sambucus racemosa</i>	**	**	***	red elderberry
	<i>Sorbus americana + S. decora</i>	■ ■ ■	■ ■ ■	■ ■	mountain-ashes
	<i>Taxus canadensis</i>	***	****	***	Canada yew
	<i>Vaccinium angustifolium</i>	■ ■ ■	***	***	early lowbush blueberry
	<i>Vaccinium myrtilloides</i>	■ ■ ■	***	■ ■ ■	velvet-leaved blueberry
	<i>Viburnum edule</i>	**			squashberry
<i>Viburnum lantanoides</i>		■ ■ ■	***	hobblebush	
<i>Viburnum nudum</i>	***	■ ■ ■	■ ■	wild raisin	
Herb & dwarf shrub	<i>Actaea rubra</i>	**	**	**	red baneberry
	<i>Aralia nudicaulis</i>	■ ■ ■	■ ■ ■	■ ■	wild sarsaparilla
	<i>Athyrium filix-femina</i>	***	***	**	common lady fern
	<i>Carex</i> spp.	■ ■	■ ■ ■	■ ■	sedges
	<i>Chamerion angustifolium</i>	**	**		fireweed
	<i>Clintonia borealis</i>	■ ■ ■	■ ■ ■	■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>	■ ■	■ ■ ■	■ ■	goldthread
	<i>Cornus canadensis</i>	■ ■ ■	■ ■ ■	■ ■ ■	bunchberry
	<i>Dennstaedtia punctilobula</i>			***	eastern hay-scented fern
	<i>Dryopteris spinulosa complex</i>	■ ■ ■	■ ■ ■	■ ■ ■	wood fern
	<i>Epigaea repens</i>	**		**	trailing arbutus
	<i>Eurybia macrophylla</i>	***	■ ■ ■	**	large-leaved aster
	<i>Galium</i> spp.	**	**	**	bedstraws
	<i>Gaultheria hispida</i>	■ ■ ■	**	**	creeping snowberry
	<i>Gaultheria procumbens</i>		**	***	eastern teaberry
	<i>Gymnocarpium dryopteris</i>	**	***	***	common oak fern
	<i>Huperzia lucidula</i>	**	■ ■ ■	**	shining firmoss
	<i>Linnaea borealis</i>	■ ■	***	■ ■	twinflower
	<i>Lycopodium annotinum</i>	***	***	**	stiff clubmoss
	<i>Lycopodium clavatum</i>	**	**	**	running clubmoss
	<i>Lycopodium dendroideum</i>			**	round-branched tree-clubmoss
	<i>Lycopodium obscurum</i>	**	■ ■ ■	**	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>	■ ■	■ ■	■ ■	northern starflower
	<i>Maianthemum canadense</i>	■ ■ ■	■ ■ ■	■ ■	wild lily-of-the-valley
	<i>Maianthemum racemosum</i>		**	**	large false Solomon's seal
	<i>Medeola virginiana</i>		**	**	Indian cucumber-root
	<i>Mitchella repens</i>		**	*	partridgeberry
	<i>Mitella nuda</i>	**	**	**	naked mitrewort
	<i>Monotropa uniflora</i>	**	**	*	Indian pipe
	<i>Nabalus</i> spp.		**	**	rattlesnakeroots
	<i>Oclemena acuminata</i>	***	***	**	whorled wood aster
	<i>Orthilia secunda</i>	**	**	**	one-sided wintergreen
	<i>Osmunda claytoniana</i>	***	***	**	interrupted fern
	<i>Osmundastrum cinnamomeum</i>		***	**	cinnamon fern
	<i>Oxalis montana</i>	***	■ ■ ■	■ ■ ■	common wood-sorrel
	<i>Petasites frigidus</i>	**			arctic sweet coltsfoot
	<i>Phegopteris connectilis</i>	**	***	**	northern beech fern
	<i>Poaceae</i>	***	***	**	grass family
	<i>Polygonatum pubescens</i>		**	**	hairy Solomon's seal
	<i>Pteridium aquilinum</i>	***	■ ■ ■	■ ■ ■	bracken fern
	<i>Rubus pubescens</i>	***	■ ■ ■	***	dwarf raspberry
	<i>Solidago</i> spp.	**	**	**	goldenrods
	<i>Streptopus lanceolatus</i>	**	■ ■	■ ■	rose twisted-stalk
<i>Thelypteris noveboracensis</i>		***	***	New York fern	
<i>Trillium erectum</i>		**	**	red trillium	

Layer	Scientific Name	M495	CM014	CM744	Common Name
Herb & dwarf shrub	<i>Trillium undulatum</i>		**	■ ■	painted trillium
	<i>Viola</i> spp.	**	■ ■	■ ■	violets
Moss & lichen	<i>Bazzania trilobata</i>	***	**	■ ■ ■	three-lobed whipwort
	<i>Cladina</i> spp. + <i>Clad</i> spp.	■ ■ ■	■ ■ ■	***	reindeer + clad lichens
	<i>Dicranum</i> spp.	■ ■ ■	■ ■ ■	■ ■ ■	broom mosses
	<i>Hylocomium splendens</i>	■ ■ ■ ■	***	■ ■ ■	stairstep moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.	**	**	***	leafy mosses
	<i>Pleurozium schreberi</i>	■ ■ ■ ■ ■	■ ■ ■	■ ■ ■ ■	red-stemmed feathermoss
	<i>Polytrichum commune</i>	**		■ ■ ■	common haircap moss
	<i>Polytrichum</i> spp.	■ ■	■ ■		haircap mosses
	<i>Ptilium crista-castrensis</i>	■ ■ ■	**	***	knight's plume moss
	<i>Sphagnum</i> spp.	■ ■ ■ ■	***	***	peat mosses

A3 Table 4. Summary vegetation table of M495 [Eastern North American Boreal Forest], M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp Forest]. Note that M300 is not yet fully described by data so the summary below gives only a weak indication. Species with constancy $\geq 15\%$ are listed.

Layer	Scientific Name	n Plots			Common Name
		15681	2987	312	
		M495	M299	M300	
Tree	<i>Abies balsamea</i>	■ ■ ■ ■	***	■ ■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	■ ■ ■ ■	***	■ ■ ■ ■	paper birch
	<i>Larix laricina</i>		****	****	tamarack
	<i>Picea glauca</i>	****	****	■ ■ ■ ■	white spruce
	<i>Picea mariana</i>	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	black spruce
	<i>Pinus banksiana</i>	****	***		jack pine
	<i>Populus balsamifera</i>			■ ■ ■ ■ ■	balsam poplar
	<i>Populus tremuloides</i>	■ ■ ■ ■		***	trembling aspen
Shrub	<i>Abies balsamea</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	■ ■ ■	***	■ ■ ■	paper birch
	<i>Larix laricina</i>		***		tamarack
	<i>Picea glauca</i>	***	***	■ ■ ■	white spruce
	<i>Picea mariana</i>	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	black spruce
	<i>Populus balsamifera</i>			***	balsam poplar
	<i>Populus tremuloides</i>	***			trembling aspen
	<i>Prunus pensylvanica</i>	***		**	pin cherry
	<i>Acer spicatum</i>	■ ■ ■ ■		***	mountain maple
	<i>Alnus incana</i>	****	■ ■ ■ ■	■ ■ ■ ■ ■	speckled alder
	<i>Alnus viridis</i>	****	***	***	green alder
	<i>Amelanchier</i> spp.	■ ■ ■	***	***	serviceberries
	<i>Chamaedaphne calyculata</i>		■ ■ ■ ■		leatherleaf
	<i>Cornus stolonifera</i>	***		***	red-osier dogwood
	<i>Corylus cornuta</i>	****			beaked hazelnut
	<i>Diervilla lonicera</i>	■ ■ ■		**	northern bush-honeysuckle
	<i>Ilex mucronata</i>	***	***	***	mountain holly
	<i>Kalmia angustifolia</i>	■ ■ ■ ■	■ ■ ■ ■	***	sheep laurel
	<i>Kalmia polifolia</i>		**		pale bog laurel
	<i>Rhododendron groenlandicum</i>	■ ■ ■ ■	■ ■ ■ ■ ■	***	common Labrador tea
	<i>Ribes</i> spp.	***	**	■ ■ ■	currants
	<i>Rosa acicularis</i>	**	**	■ ■ ■ ■	prickly rose
	<i>Rubus idaeus</i>	***	**	■ ■ ■	red raspberry
	<i>Salix</i> spp.	■ ■ ■	■ ■ ■	***	willows
	<i>Sorbus americana</i> + <i>S. decora</i>	■ ■ ■	***	■ ■ ■	mountain-ashes
	<i>Vaccinium angustifolium</i>	■ ■ ■	■ ■ ■	**	early lowbush blueberry
<i>Vaccinium myrtilloides</i>	■ ■ ■	■ ■ ■	***	velvet-leaved blueberry	
<i>Viburnum edule</i>	**	**	■ ■ ■	squashberry	
<i>Viburnum nudum</i>	***	***	***	wild raisin	

Layer	Scientific Name	M495	M299	M300	Common Name
Herb & dwarf shrub	<i>Aralia nudicaulis</i>	■ ■ ■	**	■ ■ ■ ■	wild sarsaparilla
	<i>Carex</i> spp.	■ ■	■ ■ ■ ■	■ ■ ■ ■ ■	sedges
	<i>Chamerion angustifolium</i>	**	**	**	fireweed
	<i>Clintonia borealis</i>	■ ■ ■	***	■ ■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>	■ ■	■ ■	■ ■	goldthread
	<i>Cornus canadensis</i>	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	bunchberry
	<i>Dryopteris spinulosa</i> complex	■ ■ ■	***	■ ■ ■ ■	wood fern
	<i>Equisetum</i> spp.	**	■ ■ ■ ■	■ ■ ■ ■ ■	horsetails
	<i>Eurybia macrophylla</i>	***		**	large-leaved aster
	<i>Gaultheria hispidula</i>	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	creeping snowberry
	<i>Geocaldon lividum</i>		**	***	northern comandra
	<i>Gymnocarpium dryopteris</i>	**	**	**	common oak fern
	<i>Linnaea borealis</i>	■ ■	**	■ ■ ■ ■	twinflower
	<i>Lycopodium annotinum</i>	***	***	***	stiff clubmoss
	<i>Lycopodium obscurum</i>	**		**	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>	■ ■	**	■ ■	northern starflower
	<i>Maianthemum canadense</i>	■ ■ ■ ■	**	■ ■ ■ ■	wild lily-of-the-valley
	<i>Maianthemum trifolium</i>	**	■ ■ ■ ■	***	three-leaved false Solomon's seal
	<i>Mertensia paniculata</i>			**	tall bluebells
	<i>Mitella nuda</i>	**	**	***	naked mitrewort
	<i>Oxalis montana</i>	***	***	■ ■ ■ ■	common wood-sorrel
	<i>Petasites frigidus</i>	**	**	**	arctic sweet coltsfoot
	Poaceae	***	***	***	grass family
	<i>Pteridium aquilinum</i>	***		***	bracken fern
	<i>Rubus chamaemorus</i>	**	■ ■ ■ ■		cloudberry
	<i>Rubus pubescens</i>	***	**	■ ■ ■ ■	dwarf raspberry
	<i>Streptopus lanceolatus</i>	**			rose twisted-stalk
	<i>Vaccinium oxycoccos</i>		■ ■		small cranberry
<i>Vaccinium vitis-idaea</i>	**	***		lingonberry	
<i>Viola</i> spp.	**	**	■ ■	violets	
Moss & lichen	<i>Bazzania trilobata</i>	***	**	***	three-lobed whipwort
	<i>Cladina</i> spp. + <i>Clad</i> spp.	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	reindeer + clad lichens
	<i>Dicranum</i> spp.	■ ■ ■ ■	■ ■	■ ■ ■ ■	broom mosses
	<i>Hylocomium splendens</i>	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■	stairstep moss
	<i>Pleurozium schreberi</i>	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.	■ ■	■ ■	***	haircap mosses
	<i>Ptilidium ciliare</i>	**	**		ciliate fringewort
	<i>Ptilium crista-castrensis</i>	■ ■ ■	■ ■ ■ ■	***	knight's plume moss
<i>Sphagnum</i> spp.	■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	peat mosses	

Appendix 4. Alliances and Groups of M495 [Eastern North American Boreal Forest].

A4 Table 1. Hierarchical arrangement of M495 Associations by Alliance, Group and Macrogroup subtype.

Macro-group	Subtype	Group	Alliance	Association
M495	Eastern North American Boreal Forest			
	CM495a	Atlantic Boreal Forest		
		CG0001	Atlantic Boreal Dry Black Spruce – Sheep Laurel Woodland	
		CA00001	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> – <i>Rhododendron canadense</i> / <i>Cladina</i> spp.	
		CNVC00205	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> – <i>Rhododendron canadense</i> / <i>Cladina</i> spp.	
		CG0002	Atlantic Boreal Mesic-Moist Black Spruce – Balsam Fir – Paper Birch Forest	
		CA00002	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	
		CNVC00338	<i>Picea mariana</i> / <i>Rhododendron canadense</i> – <i>Taxus canadensis</i> / <i>Pleurozium schreberi</i>	
		CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	
		CA00003	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Gaultheria hispidula</i> / <i>Pleurozium schreberi</i>	
		CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	
		CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	
		CNVC00344	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	
		CNVC00277	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	
		CG0003	Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest	
		CA00004	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	
		CNVC00226	<i>Picea glauca</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> (<i>Bazzania trilobata</i>)	
		CNVC00309	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	
		CNVC00292	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	
		CA00005	<i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Pleurozium schreberi</i>	
		CNVC00220	<i>Abies balsamea</i> (<i>Picea mariana</i>) / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	
		CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	
		CNVC00232	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i>	
		CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	
		CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	
		CA00006	<i>Abies balsamea</i> – <i>Picea glauca</i> / <i>Acer spicatum</i> / <i>Oxalis montana</i>	
		CNVC00225	<i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Acer spicatum</i> / <i>Oxalis montana</i>	

Macro-group	Subtype	Group	Alliance	Association
			CA00007	<i>Abies balsamea (Betula papyrifera – B. alleghaniensis) / Dryopteris carthusiana</i>
			CNVC00310	<i>Abies balsamea / Dryopteris spp. / Hylacomiastrum umbratum</i>
			CNVC00311	<i>Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana</i>
			CNVC00315	<i>Betula papyrifera – B. alleghaniensis / Dryopteris carthusiana</i>
		CG0004		Atlantic Boreal Moist Balsam Fir – White Spruce – Paper Birch Forest
			CA00008	<i>Abies balsamea – Betula papyrifera / Rubus pubescens</i>
			CNVC00348	<i>Abies balsamea / Taxus canadensis / Rubus pubescens / Dicranum majus</i>
			CNVC00349	<i>Betula papyrifera (Populus tremuloides) / Dryopteris carthusiana – Rubus pubescens</i>
			CNVC00316	<i>Betula papyrifera / Alnus viridis / Solidago macrophylla</i>
CM495b	Ontario – Quebec	Boreal Forest		
			CG0005	Ontario – Quebec Boreal Dry-Mesic Black Spruce – Jack Pine Forest
			CA00009	<i>Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Cladina spp.</i>
			CNVC00201	<i>Pinus banksiana (Picea mariana) / Kalmia angustifolium (Rhododendron groenlandicum) / Cladina spp.</i>
			CNVC00245	<i>Pinus banksiana / Vaccinium angustifolium / Cladina spp.</i>
			CA00010	<i>Picea mariana / Vaccinium angustifolium / Cladina spp.</i>
			CNVC00246	<i>Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Cladina spp.</i>
			CNVC00204	<i>Picea mariana / Rhododendron groenlandicum – Kalmia angustifolium / Cladina spp.</i>
		CG0006		Ontario – Quebec Boreal Mesic-Moist Black Spruce (Jack Pine) Forest
			CA00011	<i>Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi</i>
			CNVC00269	<i>Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi</i>
			CNVC00237	<i>Betula papyrifera / Vaccinium angustifolium – Kalmia angustifolia / Pleurozium schreberi</i>
			CA00012	<i>Picea mariana (Pinus banksiana) / Vaccinium angustifolium / Pleurozium schreberi</i>
			CNVC00214	<i>Picea mariana – Betula papyrifera / Kalmia angustifolia / Pleurozium schreberi</i>
			CNVC00207	<i>Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi</i>
			CNVC00208	<i>Picea mariana – Pinus banksiana / Vaccinium angustifolium / Pleurozium schreberi</i>
			CNVC00217	<i>Picea mariana – Abies balsamea / Rhododendron groenlandicum / Pleurozium schreberi</i>
			CNVC00209	<i>Pinus banksiana – Picea mariana / Kalmia angustifolia / Pleurozium schreberi</i>
			CNVC00211	<i>Picea mariana / Rhododendron groenlandicum – Kalmia angustifolia / Pleurozium schreberi</i>

Macro-group	Subtype	Group	Alliance	Association
				CNVC00276 <i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)
		CA00013		<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.
				CNVC00270 <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.
CG0007	Ontario – Quebec		Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest	
		CA00014		<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>
				CNVC00234 <i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>
				CNVC00213 <i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>
				CNVC00218 <i>Pinus banksiana</i> – <i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>
				CNVC00231 <i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>
				CNVC00238 <i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>
		CA00015		<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Abies balsamea</i> / <i>Acer spicatum</i>
				CNVC00256 <i>Picea glauca</i> – <i>Abies balsamea</i> / <i>Streptopus lanceolatus</i> / <i>Pleurozium schreberi</i>
				CNVC00215 <i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Pinus banksiana</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>
				CNVC00216 <i>Picea mariana</i> – <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i>
				CNVC00235 <i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>
				CNVC00239 <i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>
CG0008	Ontario – Quebec		Boreal Moist Black Spruce – Trembling Aspen – Balsam Fir – Paper Birch Forest	
		CA00016		<i>Picea mariana</i> / <i>Alnus incana</i> – <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>
				CNVC00295 <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>
				CNVC00294 <i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>
		CA00017		<i>Populus tremuloides</i> / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>
				CNVC00272 <i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>
				CNVC00241 <i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>
		CA00018		<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>
				CNVC00296 <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>
				CNVC00297 <i>Abies balsamea</i> / <i>Alnus incana</i>
				CNVC00273 <i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>
				CNVC00274 <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>
				CNVC00242 <i>Betula papyrifera</i> / <i>Alnus incana</i>

The following tables use the colour, shape and number of symbols to indicate species' presence and cover calculated from the sample plots in each column. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

A4 Table 2. Summary vegetation table of Alliances within CM495a [Atlantic Boreal Forest]. Alliance names are provided in A4 Table 1. Groups are shown in the top row.

		Group	CG0001	CG0002			CG0003				CG0004		
		n Plots	11	24	1382	87	2049	300	54	37			
Layer	Scientific Name	Alliance	CA00001	CA00002	CA00003	CA00004	CA00005	CA00006	CA00007	CA00008		Common Name	
Tree	<i>Abies balsamea</i>			■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■		balsam fir	
	<i>Acer rubrum</i>					***		**		***		red maple	
	<i>Betula alleghaniensis</i>							**	■ ■ ■ ■	****		yellow birch	
	<i>Betula papyrifera</i>		**	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■		paper birch
	<i>Larix laricina</i>		■ ■	****		***					**	tamarack	
	<i>Picea glauca</i>			***	***	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■		white spruce
	<i>Picea mariana</i>		■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	***	***	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■		black spruce
<i>Pinus strobus</i>		**	**									eastern white pine	
Shrub	<i>Abies balsamea</i>		**	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■		balsam fir	
	<i>Acer rubrum</i>					**	***	***		***		red maple	
	<i>Betula papyrifera</i>		***	**	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	***		paper birch	
	<i>Picea glauca</i>			***	***	***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■		white spruce	
	<i>Picea mariana</i>		■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	***	***	■ ■ ■ ■		black spruce	
	<i>Populus tremuloides</i>		■ ■					***		***		trembling aspen	
	<i>Prunus pensylvanica</i>			**	**		***	***				pin cherry	
	<i>Acer spicatum</i>				***		***	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■		mountain maple	
	<i>Alnus incana</i>				***		***	***	***	***		grey alder	
	<i>Alnus viridis</i>		■ ■ ■ ■ ■ ■	***	***	**	***	****		***		green alder	
	<i>Amelanchier spp.</i>		**	***	■ ■ ■ ■	*	■ ■ ■ ■	■ ■ ■ ■	***	**		serviceberries	
	<i>Cornus stolonifera</i>							***	***	***	■ ■ ■ ■	red-osier dogwood	
	<i>Corylus cornuta</i>						***	■ ■ ■ ■		**		beaked hazelnut	
	<i>Diervilla lonicera</i>				***		***	■ ■ ■ ■		***		northern bush-honeysuckle	
	<i>Ilex mucronata</i>			****	***	■	***	**		**		mountain holly	
	<i>Juniperus communis</i>		**	***		*****						common juniper	
	<i>Kalmia angustifolia</i>		■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	***	***		***		sheep laurel	
	<i>Lonicera canadensis</i>					*	***	■ ■ ■ ■				Canada fly-honeysuckle	
	<i>Rhododendron canadense</i>		■ ■ ■ ■	■ ■ ■ ■ ■ ■								rhodora	
	<i>Rhododendron groenlandicum</i>		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	**	***					common Labrador tea	
	<i>Ribes spp.</i>				**	*	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■		currants	
	<i>Rubus idaeus</i>			**	***	*	***	■ ■ ■ ■	**	**		red raspberry	
<i>Salix spp.</i>		■ ■		***		***	***				willows		
<i>Sambucus racemosa</i>						***	**	***	**		red elderberry		
<i>Sorbus americana + S. decora</i>			**	■ ■ ■ ■	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	■ ■		mountain-ashes	

Layer	Scientific Name	Alliance	CA00001	CA00002	CA00003	CA00004	CA00005	CA00006	CA00007	CA00008	Common Name	
Shrub	<i>Taxus canadensis</i>			***				****	***	■ ■ ■ ■	Canada yew	
	<i>Vaccinium angustifolium</i>		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■	**	***		**	early lowbush blueberry	
	<i>Vaccinium myrtilloides</i>				■ ■ ■	*	***	***			velvet-leaved blueberry	
	<i>Viburnum edule</i>				**		**	■ ■ ■	**	■ ■ ■	squashberry	
	<i>Viburnum nudum</i>			■ ■ ■	***	■ ■	***	***		****	wild raisin	
Herb & dwarf shrub	<i>Aralia nudicaulis</i>				***	■ ■ ■	■ ■ ■ ■	■ ■ ■	***	****	wild sarsaparilla	
	<i>Arctostaphylos uva-ursi</i>	■ ■ ■									common bearberry	
	<i>Athyrium filix-femina</i>						***	■ ■ ■	***	***	common lady fern	
	<i>Avenella flexuosa</i>		■ ■ ■			****				***	wavy hairgrass	
	<i>Carex</i> spp.		***	■ ■	**	**	**	■ ■	*	***	sedges	
	<i>Cinna latifolia</i>									■ ■	drooping woodreed	
	<i>Circaea alpina</i>					***		**		***	small enchanter's nightshade	
	<i>Clintonia borealis</i>			**	■ ■ ■	**	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>			**	■ ■	■ ■	■ ■	■ ■	■ ■ ■	**		goldthread
	<i>Cornus canadensis</i>	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	bunchberry
	<i>Dryopteris campyloptera</i>				**	**	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	mountain wood fern
	<i>Dryopteris spinulosa</i> complex			**	**	**	■ ■ ■	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	wood ferns
	<i>Empetrum nigrum</i>	**	**	**	****	*					***	black crowberry
	<i>Epigaea repens</i>			***		*					***	trailing arbutus
	<i>Eurybia macrophylla</i>							**				large-leaved aster
	<i>Galium triflorum</i>							**			■ ■	three-flowered bedstraw
	<i>Gaultheria hispida</i>			■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	**	**		■ ■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>				**			**	■ ■		■ ■ ■	common oak fern
	<i>Huperzia lucidula</i>							**	■ ■		***	shining firmoss
	<i>Linnaea borealis</i>			■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	twinflower
	<i>Lycopodium annotinum</i>			***	■ ■			***	■ ■ ■	***	***	stiff clubmoss
	<i>Lycopodium obscurum</i>			**	**			**	***	**	***	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>			**	■ ■	■	■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■	northern starflower
	<i>Maianthemum canadense</i>	**	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley
	<i>Mitella nuda</i>							**	■ ■		■ ■ ■ ■	naked mitrewort
	<i>Moneses uniflora</i>				**	*	**	**	**	*		one-flowered wintergreen
	<i>Monotropa uniflora</i>				**	*	**	**	**	**	**	Indian pipe
	<i>Nabalus</i> spp.								**		**	rattlesnakeroots
	<i>Neottia cordata</i>				**			**	**	**	**	heart-leaved twayblade
	<i>Oclemena acuminata</i>					■ ■	■ ■	***	***	***		whorled wood aster
	<i>Orthilia secunda</i>				**	*	**	**	**	**	■ ■	one-sided wintergreen
	<i>Osmundastrum cinnamomeum</i>					■ ■	■ ■	**	**		***	cinnamon fern
	<i>Oxalis montana</i>				***	■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	****		common wood-sorrel
	<i>Phegopteris connectilis</i>					*	**	**	■ ■ ■	***	**	northern beech fern
<i>Platanthera obtusata</i>					*			**	**	**	blunt-leaved orchid	
<i>Poaceae</i>				**			***	■ ■			grass family	
<i>Pteridium aquilinum</i>			****	***	■ ■	■ ■	***	***			bracken fern	

Layer	Scientific Name	Alliance	CA00001	CA00002	CA00003	CA00004	CA00005	CA00006	CA00007	CA00008	Common Name
Herb & dwarf shrub	<i>Rubus pubescens</i>				**	**	**	■■■		■■■	dwarf raspberry
	<i>Solidago macrophylla</i>			**	**	**	**	**	***	■■■	large-leaved goldenrod
	<i>Solidago rugosa</i>									***	rough-stemmed goldenrod
	<i>Solidago</i> spp.			**				***	**		goldenrod
	<i>Streptopus lanceolatus</i>				**		**	■■	■■	■■	rose twisted-stalk
	<i>Vaccinium vitis-idaea</i>		■■■	■■■	**	■■	**	**			lingonberry
	<i>Viola</i> spp.					**	**	■■	***	***	violets
Moss & lichen	<i>Bazzania trilobata</i>			***	■■	■■■■	■■■	■■■	■■■	***	three-lobed whipwort
	<i>Cetraria islandica</i>		■■								true Iceland lichen
	<i>Cladina</i> spp. + <i>Clad</i> spp.		■■■■■■	■■■■	■■■	■■	■■■	■■			reindeer + clad lichens
	<i>Dicranum</i> spp.		■■■	■■■■	■■■	■■■	■■■	■■■	■■■	■■■■	broom mosses
	<i>Hylocomiastrum umbratum</i>							***	■■■■	■■■	shaded wood moss
	<i>Hylocomium splendens</i>		**	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	stairstep moss
	<i>Hypnum imponens</i>					**			***		pellucid plait moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.				**	**	**	■■■		****	leafy mosses
	<i>Peltigera aphthosa</i>		**	***	***		**			**	common freckle pelt lichen
	<i>Pleurozium schreberi</i>		■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■	■■■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.		■■■	***	■■	***	■■	■■	■■	**	haircap mosses
	<i>Ptilidium ciliare</i>		■■	■■■	**	*	**		**		ciliate fringewort
	<i>Ptilium crista-castrensis</i>		■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■	knight's plume moss
	<i>Rhytidiadelphus loreus</i>								■■■	***	lanky moss
	<i>Rhytidiadelphus triquetrus</i>					***	***	***	***	■■■■	electrified cat's-tail moss
	<i>Sphagnum</i> spp.			■■■	■■■■	■■■	■■■■	***	■■■	***	peat mosses
<i>Stereocaulon paschale</i>		■■■■								Easter foam lichen	

A4 Table 3. Summary vegetation table of Alliances within CM495b [Ontario – Quebec Boreal Forest]. Alliance names are provided in A4 Table 1. Groups are shown in the top row.

Layer	Scientific Name	Alliance	CG0005		CG0006			CG0007		CG0008			Common Name	
			206	174	160	5358	142	1792	2856	248	490	311		
			CA00009	CA00010	CA00011	CA00012	CA00013	CA00014	CA00015	CA00016	CA00017	CA00018		
Tree	<i>Abies balsamea</i>			**	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir	
	<i>Betula papyrifera</i>			**	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch	
	<i>Picea glauca</i>				***	***	■■■■	■■■■■	■■■■	■■■■■	■■■■■	■■■■■	white spruce	
	<i>Picea mariana</i>	■■■■■	■■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce	
	<i>Pinus banksiana</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	jack pine	
	<i>Populus balsamifera</i>												balsam poplar	
	<i>Populus tremuloides</i>			***	■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	trembling aspen
	<i>Prunus pensylvanica</i>				***		■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	pin cherry
Shrub	<i>Abies balsamea</i>		**	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	balsam fir	
	<i>Acer rubrum</i>				***	**	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	red maple	
	<i>Betula papyrifera</i>		***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	paper birch	
	<i>Picea glauca</i>				***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	white spruce	
	<i>Picea mariana</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	black spruce	
	<i>Pinus banksiana</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	jack pine	
	<i>Populus balsamifera</i>												balsam poplar	
	<i>Populus tremuloides</i>			**	**	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	trembling aspen
	<i>Prunus pensylvanica</i>			**	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	pin cherry
	<i>Acer spicatum</i>				***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	mountain maple
	<i>Alnus incana</i>				***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	grey alder
	<i>Alnus viridis</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	green alder
	<i>Amelanchier spp.</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	serviceberries
	<i>Cornus stolonifera</i>				***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	red-osier dogwood
	<i>Corylus cornuta</i>				***	***	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	beaked hazelnut
	<i>Diervilla lonicera</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	northern bush-honeysuckle
	<i>Ilex mucronata</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	mountain holly
	<i>Kalmia angustifolia</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	sheep laurel
	<i>Lonicera canadensis</i>						**	**	■■■■	**	**	**	**	Canada fly-honeysuckle
	<i>Prunus virginiana</i>						**	**	■■■■	**	**	**	**	chokecherry
	<i>Rhododendron groenlandicum</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	common Labrador tea
	<i>Ribes spp.</i>			■■■■	**	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	currants
	<i>Rosa acicularis</i>	**			**		**	**	**	**	■■■■	**	**	prickly rose
	<i>Rubus idaeus</i>				***		***	***	■■■■	■■■■	■■■■	■■■■	■■■■	red raspberry
	<i>Salix spp.</i>	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	willows
	<i>Sambucus racemosa</i>			**		**	**	**	**	**	**	**	**	red elderberry
<i>Sorbus americana + S. decora</i>		**	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	mountain-ashes	
<i>Vaccinium angustifolium</i>	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	early lowbush blueberry	
<i>Vaccinium myrtilloides</i>	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	velvet-leaved blueberry	

Layer	Scientific Name	Alliance	CA00009	CA00010	CA00011	CA00012	CA00013	CA00014	CA00015	CA00016	CA00017	CA00018	Common Name	
Shrub	<i>Viburnum edule</i>				***	**	**	**	***	**	■ ■ ■	■ ■ ■	squashberry	
	<i>Viburnum nudum</i>				***	***	■ ■ ■	■ ■ ■	■ ■ ■	***	***	■ ■ ■	wild raisin	
Herb & dwarf shrub	<i>Actaea rubra</i>							**	**	**	■ ■	**	red baneberry	
	<i>Anemone quinquefolia</i>							*	**	**	**	**	wood anemone	
	<i>Aralia nudicaulis</i>				■ ■ ■	***	■ ■ ■	■ ■ ■	■ ■ ■	***	■ ■ ■	■ ■ ■	wild sarsaparilla	
	<i>Athyrium filix-femina</i>						***	**	***	**	***	■ ■ ■	common lady fern	
	<i>Carex</i> spp.	**	**	**	**	**	■ ■ ■	**	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	sedges	
	<i>Chamerion angustifolium</i>	**	**	**	**	**	**	**	**	**	■ ■	**	fireweed	
	<i>Clintonia borealis</i>	**	**	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	yellow clintonia	
	<i>Coptis trifolia</i>	**	**	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	goldthread	
	<i>Cornus canadensis</i>	■ ■	■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	bunchberry
	<i>Dryopteris spinulosa</i> complex			■ ■	**	**	■ ■ ■	■ ■	■ ■ ■	***	■ ■ ■	■ ■ ■	■ ■ ■	wood fern
	<i>Epigaea repens</i>	■ ■	**		**	**								trailing arbutus
	<i>Equisetum</i> spp.			**	**	***	**	***	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	horsetails
	<i>Eurybia macrophylla</i>			***	***	**	■ ■ ■	■ ■ ■	***	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	large-leaved aster
	<i>Fragaria virginiana</i>							**	*	**	**	**	**	wild strawberry
	<i>Galium</i> spp.							**	**	**	■ ■	■ ■	■ ■	bedstraws
	<i>Gaultheria hispida</i>	■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	**	■ ■ ■	**	■ ■	■ ■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>			**	**	**	**	**	■ ■	**	**	■ ■	■ ■	common oak fern
	<i>Huperzia lucidula</i>			***	**	**	**	**	***	**	***	**	**	shining firmoss
	<i>Linnaea borealis</i>	**	**	■ ■ ■	■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■	■ ■	twinflower
	<i>Lycopodium annotinum</i>		**	■ ■ ■	**	**	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	stiff clubmoss
	<i>Lycopodium clavatum</i>			***	**	**	**	**	**	**	**	**	***	running clubmoss
	<i>Lycopodium obscurum</i>			■ ■	**	**	**	■ ■	■ ■	**	**	**	■ ■	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>			■ ■	**	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	northern starflower
	<i>Maianthemum canadense</i>	**	**	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley
	<i>Maianthemum trifolium</i>			**	**	**	**	**	**	**	**	**	**	three-leaved false Solomon's seal
	<i>Mertensia paniculata</i>								**	**	**	**	**	tall bluebells
	<i>Mitella nuda</i>							**	**	■ ■	■ ■ ■	**	**	naked mitrewort
	<i>Oclemena acuminata</i>			**	**	***	***	***	***	***	***	***	***	whorled wood aster
	<i>Osmunda claytoniana</i>			***	**	***	***	***	***	***	***	***	***	interrupted fern
	<i>Oxalis montana</i>			***	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	common wood-sorrel
	<i>Petasites frigidus</i>				**	**	**	**	**	■ ■	■ ■	■ ■	■ ■	arctic sweet coltsfoot
	<i>Phegopteris connectilis</i>					**	**	**	**	**	**	**	**	northern beech fern
	<i>Poaceae</i>	**	**	**	**	***	***	***	***	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	grass family
	<i>Pteridium aquilinum</i>	***		***	***	***	***	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	bracken fern
<i>Rubus pubescens</i>			**	**	**	**	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	dwarf raspberry	
<i>Solidago macrophylla</i>			■ ■ ■	**	***	**	**	**	**	**	**	**	large-leaved goldenrod	
<i>Streptopus lanceolatus</i>			**	**	**	**	**	■ ■	**	**	■ ■	**	rose twisted-stalk	
<i>Symphyotrichum ciliolatum</i>						**	**	**	**	**	**	**	Lindley's aster	
<i>Viola</i> spp.			**	**	**	**	**	■ ■	***	■ ■ ■	■ ■ ■	■ ■ ■	violets	

Layer	Scientific Name	Alliance	CA00009	CA00010	CA00011	CA00012	CA00013	CA00014	CA00015	CA00016	CA00017	CA00018	Common Name
Moss & lichen	<i>Bazzania trilobata</i>			**	**	**	**	**	**			**	three-lobed whipwort
	<i>Cladina</i> spp. + <i>Clad</i> spp.		■■■■■■■	■■■■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	reindeer + clad lichens
	<i>Dicranum</i> spp.		■■	■■	■■■	■■■	■■■	■■■	■■■	■■	■■	■■■	broom mosses
	<i>Hylocomium splendens</i>			**	***	■■■	■■■	■■■	■■■	■■■■■	■■■	■■■	stairstep moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.				**	**	**	**	**	**	■■	■■■	leafy mosses
	<i>Pleurozium schreberi</i>		■■■■■	■■■■■■■	■■■■■	■■■■■■■	■■■■■	■■■■■	■■■	■■■■■■■	■■■	■■■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.		■■	■■	■■	■■	■■	■■■	■■	■■	***	■■■	haircap mosses
	<i>Ptilidium ciliare</i>		■■	■■■	**	**	**			**	**	**	ciliate fringewort
	<i>Ptilium crista-castrensis</i>		■■■	■■	■■■	■■■■■	■■■■■	■■■	■■	■■■■■	■■■	■■■	knight's plume moss
	<i>Rhytidiadelphus triquetrus</i>							**	***	***	■■■	***	electrified cat's-tail moss
<i>Sphagnum</i> spp.		***	■■■	■■■	■■■■■	■■■■■■■	***	***	■■■■■	***	■■■	peat mosses	

A4 Table 4. Summary vegetation table of Groups within CM495a [Atlantic Boreal Forest]. Group names are provided in A4 Table 1.

Layer	Scientific Name	n Plots	11	1406	2490	37	Common Name
			CG001	CG002	CG003	CG004	
Tree	<i>Abies balsamea</i>			■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	**	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	paper birch
	<i>Larix laricina</i>	■ ■				**	tamarack
	<i>Picea glauca</i>			***	■ ■ ■ ■	■ ■ ■	white spruce
	<i>Picea mariana</i>	■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	black spruce
	<i>Pinus strobus</i>	**					eastern white pine
Shrub	<i>Abies balsamea</i>	**	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	***	■ ■ ■	■ ■ ■	■ ■ ■	***	paper birch
	<i>Picea glauca</i>			***	■ ■ ■	**	white spruce
	<i>Picea mariana</i>	■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	black spruce
	<i>Populus tremuloides</i>	■ ■				***	trembling aspen
	<i>Acer spicatum</i>			***	■ ■ ■ ■	■ ■ ■ ■	mountain maple
	<i>Alnus viridis</i>	■ ■ ■ ■	***	***	***	***	green alder
	<i>Amelanchier spp.</i>	**	■ ■ ■	■ ■ ■	■ ■ ■	**	serviceberries
	<i>Cornus stolonifera</i>				***	■ ■ ■	red-osier dogwood
	<i>Ilex mucronata</i>			***	**	**	mountain holly
	<i>Kalmia angustifolia</i>	■ ■ ■ ■ ■ ■	■ ■ ■	■ ■ ■	***	***	sheep laurel
	<i>Rhododendron canadense</i>	■ ■ ■	■ ■ ■	■ ■ ■	***		rhodora
	<i>Rhododendron groenlandicum</i>	■ ■ ■	■ ■ ■	■ ■ ■	***		common Labrador tea
	<i>Ribes spp.</i>			**	■ ■ ■	■ ■	currants
	<i>Rubus idaeus</i>			***	■ ■ ■	**	red raspberry
	<i>Salix spp.</i>	■ ■	***	***	***		willows
	<i>Sorbus americana + S. decora</i>			■ ■ ■	■ ■ ■	■ ■	mountain-ashes
	<i>Taxus canadensis</i>				***	■ ■ ■ ■	Canada yew
	<i>Vaccinium angustifolium</i>	■ ■ ■ ■	■ ■ ■	■ ■ ■	**	**	early lowbush blueberry
	<i>Vaccinium myrtilloides</i>			■ ■ ■	***		velvet-leaved blueberry
<i>Viburnum edule</i>			**	**	■ ■ ■	squashberry	
<i>Viburnum nudum</i>			***	***	****	wild raisin	
Herb & dwarf shrub	<i>Aralia nudicaulis</i>			***	■ ■ ■	****	wild sarsaparilla
	<i>Arctostaphylos uva-ursi</i>	■ ■ ■					common bearberry
	<i>Athyrium filix-femina</i>				***	***	common lady fern
	<i>Carex spp.</i>			■ ■	■ ■	***	sedges
	<i>Cinna latifolia</i>					■ ■	drooping woodreed
	<i>Clintonia borealis</i>			■ ■ ■	■ ■ ■	■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>			■ ■	■ ■	**	goldthread
	<i>Cornus canadensis</i>	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■ ■	bunchberry
	<i>Dryopteris spinulosa complex</i>			**	■ ■ ■	■ ■ ■ ■	wood fern
	<i>Galium triflorum</i>				**	■ ■	three-flowered bedstraw
	<i>Gaultheria hispida</i>			■ ■ ■	■ ■ ■	■ ■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>			**	**	■ ■ ■	common oak fern
	<i>Linnaea borealis</i>			■ ■	■ ■ ■	■ ■ ■	twinflower
	<i>Lycopodium annotinum</i>			■ ■	***	***	stiff clubmoss
	<i>Lysimachia borealis</i>			■ ■	■ ■	■ ■ ■	northern starflower
	<i>Maianthemum canadense</i>	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley
	<i>Mitella nuda</i>				**	■ ■ ■ ■	naked mitrewort
	<i>Neottia cordata</i>			**	**	**	heart-leaved twayblade
	<i>Orthilia secunda</i>			**	**	■ ■	one-sided wintergreen
	<i>Oxalis montana</i>			***	■ ■ ■ ■		common wood-sorrel
	<i>Phegopteris connectilis</i>				**	**	northern beech fern
	<i>Platanthera obtusata</i>					**	blunt-leaved orchid
	<i>Rubus pubescens</i>			**	**	■ ■ ■	dwarf raspberry
	<i>Solidago macrophylla</i>			**	**	■ ■ ■	large-leaved goldenrod
	<i>Solidago rugosa</i>					***	rough-stemmed goldenrod
	<i>Streptopus lanceolatus</i>			**	**	■ ■	rose twisted-stalk
	<i>Vaccinium vitis-idaea</i>	■ ■ ■	**	**	**		lingonberry
	<i>Viola blanda</i>					***	sweet white violet

Layer	Scientific Name	CG001	CG002	CG003	CG004	Common Name
Moss & lichen	<i>Bazzania trilobata</i>		■ ■	■ ■ ■	***	three-lobed whipwort
	<i>Cetraria islandica</i>	■ ■				true Iceland lichen
	<i>Cladina</i> spp. + <i>Clad</i> spp.	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■		reindeer + clad lichens
	<i>Dicranum</i> spp.	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ■ ■	broom mosses
	<i>Hylocomiastrum umbratum</i>			***	■ ■ ■ ■	shaded wood moss
	<i>Hylocomium splendens</i>	**	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	stairstep moss
	<i>Peltigera aphthosa</i>	**	***		**	common freckle pelt lichen
	<i>Pleurozium schreberi</i>	■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■	red-stemmed feathermoss
	<i>Polytrichum juniperinum</i>	■ ■ ■ ■				juniper haircap moss
<i>Polytrichum</i> spp.		■ ■	■ ■		haircap mosses	

A4 Table 5. Summary vegetation table of Groups within CM495b [Ontario – Quebec Boreal Forest]. Group names are provided in A4 Table 1.

		n Plots	380	5660	4648	1049	
Layer	Scientific Name	CG0005	CG0006	CG0007	CG0008	Common Name	
Tree	<i>Abies balsamea</i>		■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	balsam fir
	<i>Betula papyrifera</i>	***	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	paper birch
	<i>Picea glauca</i>		***	■ ■ ■ ■	■ ■ ■ ■	****	white spruce
	<i>Picea mariana</i>	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	black spruce
	<i>Pinus banksiana</i>	■ ■ ■ ■ ■	■ ■ ■ ■	****	****		jack pine
	<i>Populus balsamifera</i>				****		balsam poplar
	<i>Populus tremuloides</i>	***	***	■ ■ ■ ■ ■	■ ■ ■ ■ ■		trembling aspen
	<i>Prunus pensylvanica</i>			***	***		pin cherry
Shrub	<i>Abies balsamea</i>	***	■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	balsam fir
	<i>Acer rubrum</i>		***	***	***	***	red maple
	<i>Betula papyrifera</i>	***	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	paper birch
	<i>Picea glauca</i>		***	■ ■ ■ ■	■ ■ ■ ■	***	white spruce
	<i>Picea mariana</i>	■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	■ ■ ■	black spruce
	<i>Pinus banksiana</i>	■ ■ ■	**				jack pine
	<i>Populus tremuloides</i>	**	**	■ ■ ■	■ ■ ■	■ ■ ■	trembling aspen
	<i>Prunus pensylvanica</i>	**	***	■ ■ ■	***	***	pin cherry
	<i>Acer spicatum</i>		***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	mountain maple
	<i>Alnus incana</i>		***	***	***	■ ■ ■ ■ ■	speckled alder
	<i>Alnus viridis</i>	***	■ ■ ■ ■	****	****	****	green alder
	<i>Amelanchier spp.</i>	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	serviceberries
	<i>Cornus stolonifera</i>			***	***	***	red-osier dogwood
	<i>Corylus cornuta</i>		***	■ ■ ■ ■	■ ■ ■ ■	***	beaked hazelnut
	<i>Diervilla lonicera</i>		***	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■	northern bush-honeysuckle
	<i>Ilex mucronata</i>	***	***	***	***	***	mountain holly
	<i>Kalmia angustifolia</i>	■ ■ ■ ■ ■	■ ■ ■ ■	***	***	***	sheep laurel
	<i>Lonicera canadensis</i>			**	**	**	Canada fly-honeysuckle
	<i>Rhododendron groenlandicum</i>	■ ■ ■ ■	■ ■ ■ ■	***	■ ■ ■ ■	■ ■ ■ ■	common Labrador tea
	<i>Ribes spp.</i>		**	■ ■	■ ■ ■	■ ■ ■	currants
	<i>Rosa acicularis</i>		**	**	**	**	prickly rose
	<i>Rubus idaeus</i>		**	***	■ ■ ■	■ ■ ■	red raspberry
	<i>Salix spp.</i>	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	willows
	<i>Sorbus americana + S. decora</i>	**	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	mountain-ashes
	<i>Vaccinium angustifolium</i>	■ ■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	early lowbush blueberry
	<i>Vaccinium myrtilloides</i>	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	velvet-leaved blueberry
<i>Viburnum edule</i>		**	***	■ ■ ■	■ ■ ■	squashberry	
<i>Viburnum nudum</i>		***	■ ■ ■	■ ■ ■	***	wild raisin	
Herb & dwarf shrub	<i>Aralia nudicaulis</i>		***	■ ■ ■	■ ■ ■	■ ■ ■	wild sarsaparilla
	<i>Athyrium filix-femina</i>		***	***	***	***	common lady fern
	<i>Carex spp.</i>	**	**	■ ■	■ ■ ■	■ ■ ■	sedges
	<i>Chamerion angustifolium</i>	**	**	**	■ ■	■ ■	fireweed
	<i>Clintonia borealis</i>	**	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	yellow clintonia
	<i>Coptis trifolia</i>	**	■ ■	■ ■	■ ■	■ ■	goldthread
	<i>Cornus canadensis</i>	■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	bunchberry
	<i>Dryopteris spinulosa complex</i>		**	■ ■ ■	■ ■ ■	■ ■ ■	wood fern
	<i>Equisetum spp.</i>		**	**	**	■ ■ ■	horsetails
	<i>Eurybia macrophylla</i>		***	■ ■ ■	■ ■ ■	■ ■ ■	large-leaved aster
	<i>Galium spp.</i>			**	**	**	bedstraws
	<i>Gaultheria hispida</i>	■ ■	■ ■ ■	■ ■	■ ■ ■	■ ■ ■	creeping snowberry
	<i>Gymnocarpium dryopteris</i>		**	**	**	■ ■	common oak fern
	<i>Linnaea borealis</i>	**	■ ■	■ ■ ■	■ ■	■ ■	twinflower
	<i>Lycopodium annotinum</i>	**	**	■ ■ ■	■ ■ ■	■ ■ ■	stiff clubmoss
	<i>Lycopodium clavatum</i>		**	**	**	**	running clubmoss
	<i>Lycopodium obscurum</i>		**	■ ■	**	**	flat-branched tree-clubmoss
	<i>Lysimachia borealis</i>		**	■ ■	■ ■	■ ■	northern starflower
	<i>Maianthemum canadense</i>	**	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	wild lily-of-the-valley

Layer	Scientific Name	CG0005	CG0006	CG0007	CG0008	Common Name
Herb & dwarf shrub	<i>Mitella nuda</i>			**	■ ■ ■	naked mitrewort
	<i>Oxalis montana</i>			■ ■ ■	***	common wood-sorrel
	<i>Petasites frigidus</i>		**	**	■ ■	arctic sweet coltsfoot
	<i>Poaceae</i>	**	**	***	■ ■ ■	grass family
	<i>Pteridium aquilinum</i>		***	■ ■ ■ ■	***	bracken fern
	<i>Rubus pubescens</i>		**	■ ■ ■ ■	■ ■ ■ ■	dwarf raspberry
	<i>Solidago macrophylla</i>		**	**	**	large-leaved goldenrod
	<i>Streptopus lanceolatus</i>		**	■ ■	**	rose twisted-stalk
	<i>Viola</i> spp.			■ ■	■ ■ ■	violet
Moss & lichen	<i>Cladina</i> spp. + <i>Clad</i> spp.	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	reindeer + clad lichens
	<i>Dicranum</i> spp.	■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■	broom mosses
	<i>Hylacomium splendens</i>	**	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	stairstep moss
	<i>Mnium</i> spp. + <i>Rhizomnium</i> spp. + <i>Plagiomnium</i> spp.		**	**	■ ■	leafy mosses
	<i>Pleurozium schreberi</i>	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■	red-stemmed feathermoss
	<i>Polytrichum</i> spp.	■ ■	■ ■	■ ■	■ ■ ■ ■	haircap mosses
	<i>Ptilidium ciliare</i>	■ ■ ■ ■	**		**	ciliate fringewort
	<i>Ptilium crista-castrensis</i>	■ ■ ■ ■	■ ■ ■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	knight's plume moss
	<i>Rhytidiadelphus triquetrus</i>			***	***	electrified cat's-tail moss
	<i>Sphagnum</i> spp.	■ ■ ■ ■	■ ■ ■ ■ ■ ■	***	■ ■ ■ ■ ■ ■	peat mosses

Appendix 5. Constituent provincial and regional vegetation types

A5 Table 1. CNVC Associations and constituent vegetation community types from Ontario (Uhlir et al. 2016), Quebec, Newfoundland* and Labrador, and the Maritimes region. Association names and vegetation type codes are included in A5 Tables 2-5. *Newfoundland types that begin with N (for northern Newfoundland) refer to Damman 1963; with C (for central) to Damman 1964; with W (for western) to Damman 1967; with TNP (for Terra Nova Park) to Meades 1976, and with E (for eastern) to Meades 1986.

Association	Ontario type	Quebec type	Newfoundland and Labrador type	Maritimes Region type
CNVC00201	BTr1-3	QC001 QC004		
CNVC00204		QC007A QC007B QC046		
CNVC00205			C Clad_Kal_bS	
CNVC00207	BTr4-4			
CNVC00208	BTr7-3 BTr7-7 BTr7-9			
CNVC00209	BTr4-5	QC002 QC003A QC003B QC029 QC030		
CNVC00211	BTr7-2	QC008A QC008B QC040A QC040B QC047		
CNVC00213	BTr7-8	QC056B QC057A QC057B QC083 QC085A QC085B		
CNVC00214		QC056A QC060A QC060B QC060C QC069 QC082A QC082B QC090A QC090B		
CNVC00215	BTr4-12	QC059 QC113		
CNVC00216		QC019A		

Association	Ontario type	Quebec type	Newfoundland and Labrador type	Maritimes Region type
		QC019B QC086		
CNVC00217	BTr7-11	QC013A QC013B QC013C QC014		
CNVC00218		QC058A QC058B		
CNVC00220				A180a <i>Typic-u</i> A180b <i>Hylocomium splendens-u</i> A180c <i>Acer spicatum-u</i> A180d <i>Nemopanthus mucronatus-u</i>
CNVC00222		QC023A QC023B QC023C QC039	C Hyl_bF C Pl_bF E bF E bFc E bFh E bFp N CA N TA W Fh W Fp W Ft W Fte	A178a <i>Typic-u</i> A178b <i>Acer spicatum-u</i>
CNVC00225		QC025A QC025B		A179a <i>Typic-u</i> A179b <i>Mitella nuda-u</i>
CNVC00226				A304a <i>Typic-u</i> A304b <i>Empetrum nigrum-u</i>
CNVC00231	BTr8-4	QC022A QC022C QC076A QC076B QC093A QC093B QC093C QC093D		
CNVC00232		QC070A QC070C		
CNVC00233		QC022B QC041 QC070B		A187a <i>Typic-u</i> A187b <i>Acer spicatum-u</i>
CNVC00234	BTr4-13	QC063A QC063B QC063C QC087A QC087B		

Association	Ontario type	Quebec type	Newfoundland and Labrador type	Maritimes Region type
CNVC00235	BTr8-3	QC021A		
		QC021B		
		QC078A		
		QC078B		
		QC094A		
		QC094B		
		QC094C		
		QC094D		
		QC118		
CNVC00237		QC101A	W Bk	
		QC101B		
		QC101C		
		QC102		
CNVC00238	BTr10-2	QC108A		
	BTr4-8	QC108B		
		QC110A		
		QC110B		
CNVC00239	BTr8-1	QC103A		
		QC103B		
		QC103C		
		QC111A		
		QC111B		
		QC111C		
CNVC00241	BTr6-1	QC109A		
	BTr9-2	QC109B		
		QC116		
CNVC00242		QC104		
CNVC00245	BTr1-4			
CNVC00246	BTr1-1			
CNVC00256	BTr5-4			
	BTr8-8			
CNVC00269	BTr2-1			
CNVC00270	BwTr12-1	QC064A		
		QC064B		
		QC074A		
		QC074B		
		QC105		
CNVC00272	BTr8-6	QC088A		
	BTr8-7	QC088B		
		QC089		
CNVC00273		QC096		
CNVC00274		QC065		
		QC072A		
		QC072B		
		QC072C		
		QC079A		

Association	Ontario type	Quebec type	Newfoundland and Labrador type	Maritimes Region type
		QC079B		
CNVC00276	BwTr11-2	QC010A QC010B QC031		
CNVC00277		QC016A QC016B		
CNVC00278		QC027A QC027B QC027C QC034	W Fg	
CNVC00292				A020a <i>Typic-u</i> A020b <i>Sphagnum capillifolium-u</i>
CNVC00294		QC006A QC006B		
CNVC00295	BwTr12-3 BwTr12-4 BwTr12-8	QC038		
CNVC00296	BwTr12-5	QC015		
CNVC00297		QC026		
CNVC00307			C Kal_bS E KP N KPt W KP	
CNVC00309			E bFv	A314-u
CNVC00310			C Dry_L_bF N DA W Fdh W Fdr	A178c <i>Dryopteris campyloptera-u</i>
CNVC00311			E bFd E bFdb W Fd	
CNVC00315			W Bd W Bdc	
CNVC00316			W Bu	
CNVC00338			W KPt	
CNVC00344		QC061A QC061B QC061C		
CNVC00348			E bFr N AA N RAa N RAm W Fr W Frw	
CNVC00349			Lab B_lyc TNP BtA	

Association	Ontario type	Quebec type	Newfoundland and Labrador type	Maritimes Region type
			W Br	
CNVC00350		QC130A	C bS_I	
		QC130B	C bS_II	
			C bS_III	
			C bS_IV	
			C bS_V	
			E bSmI	
			E bSmIII	
			N LP	
			N LPca	
			W P	
CNVC00351		QC131A	C C_bF	
		QC131B	C Ru_bF	
		QC131C	N PA/IP	
		QC131D	N PA/IPca	
			N PA/P	

A5 Table 2. Ontario Boreal Treed Vegetation Type (Uhlig et al. 2016) relationships to CNVC Associations and subassociations. Note that provincial botanical nomenclature (as in Unit Name) sometimes differs from CNVC standard nomenclature (Baldwin et al. 2019b). For crosswalks with published Ontario V-Types (Chambers et al. 1997, Sims et al. 1997, Taylor et al. 2000), see Appendix 6.

Ontario Boreal Treed Vegetation Type	Ontario Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
BTr1-1	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> - <i>Vaccinium angustifolium</i> / <i>Cladonia</i> spp. Woodland	12	CNVC00246	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Cladina</i> spp.	no subassociations
BTr1-3	<i>Pinus banksiana</i> / <i>Kalmia angustifolia</i> / <i>Cladonia</i> spp.	5	CNVC00201	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Kalmia angustifolia</i> (<i>Rhododendron groenlandicum</i>) / <i>Cladina</i> spp.	201a <i>Pinus banksiana</i>
BTr1-4	<i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Cladonia</i> spp. Woodland	31	CNVC00245	<i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Cladina</i> spp.	no subassociations
BTr2-1	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	3	CNVC00269	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	no subassociations
BTr4-4	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	266	CNVC00207	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	no subassociations
BTr4-5	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	64	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209b <i>inops</i>
BTr4-8	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> / <i>Clintonia borealis</i>	19	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238a <i>typic</i>
BTr4-12	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> - <i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	58	CNVC00215	<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Pinus banksiana</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	215a <i>typic</i>

Ontario Boreal Treed Vegetation Type	Ontario Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
BTr4-13	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Clintonia borealis</i>	3	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234a typic
BTr5-4	<i>Picea glauca</i> - <i>Abies balsamea</i> (<i>Picea mariana</i>) / <i>Rubus pubescens</i> / <i>Pleurozium schreberi</i>	49	CNVC00256	<i>Picea glauca</i> – <i>Abies balsamea</i> / <i>Streptopus lanceolatus</i> / <i>Pleurozium schreberi</i>	256a typic
BTr6-1	<i>Populus tremuloides</i> / <i>Alnus incana</i> / <i>Rubus pubescens</i>	40	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	241a typic
BTr7-11	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Clintonia borealis</i> / <i>Pleurozium schreberi</i>	76	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	217a typic
BTr7-2	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	43	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211a typic
BTr7-3	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Vaccinium angustifolium</i> / <i>Clintonia borealis</i> / <i>Pleurozium schreberi</i>	125	CNVC00208	<i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	208b <i>Diervilla lonicera</i>
BTr7-7	<i>Picea mariana</i> (<i>Pinus banksiana</i>) / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	316	CNVC00208	<i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	208a typic
BTr7-8	<i>Populus tremuloides</i> - <i>Picea mariana</i> (<i>Pinus banksiana</i>) / <i>Diervilla lonicera</i> / <i>Clintonia borealis</i> / <i>Pleurozium schreberi</i>	161	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213a typic
BTr7-9	<i>Picea mariana</i> - <i>Pinus banksiana</i> (<i>Populus tremuloides</i>) / <i>Vaccinium angustifolium</i> / <i>Clintonia borealis</i> / <i>Pleurozium schreberi</i>	303	CNVC00208	<i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i>	208a typic

Ontario Boreal Treed Vegetation Type	Ontario Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
BTr8-1	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	128	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
BTr8-3	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> - <i>Abies balsamea</i> - <i>Picea glauca</i> / <i>Acer spicatum</i> / <i>Rubus pubescens</i>	212	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
BTr8-4	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> - <i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Diervilla lonicera</i> / <i>Clintonia borealis</i>	295	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
BTr8-6	<i>Picea mariana</i> - <i>Populus balsamifera</i> / <i>Rubus pubescens</i> / <i>Hylocomium splendens</i>	38	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	272b <i>Populus balsamifera</i>
BTr8-7	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Rubus pubescens</i>	90	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	272a <i>typic</i>
BTr8-8	<i>Picea glauca</i> - <i>Abies balsamea</i> / <i>Acer spicatum</i> / <i>Rubus pubescens</i> / <i>Rhytidiadelphus triquetrus</i>	33	CNVC00256	<i>Picea glauca</i> – <i>Abies balsamea</i> / <i>Streptopus lanceolatus</i> / <i>Pleurozium schreberi</i>	256b <i>Acer spicatum</i>
BTr9-2	<i>Populus balsamifera</i> - <i>P. tremuloides</i> / <i>Alnus incana</i> / <i>Rubus pubescens</i>	97	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	241b <i>Populus balsamifera</i>
BTr10-2	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i> / <i>Clintonia borealis</i>	51	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238a <i>typic</i>
BwTr11-2	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	167	CNVC00276	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	276a <i>typic</i>

Ontario Boreal Treed Vegetation Type	Ontario Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
BwTr12-1	<i>Picea mariana</i> (<i>Betula papyrifera</i>) / <i>Abies balsamea</i> / <i>Sphagnum</i> spp. (<i>Pleurozium schreberi</i>)	7	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270b <i>Picea mariana</i>
BwTr12-3	<i>Picea mariana</i> - <i>Larix laricina</i> / <i>Rubus pubescens</i> / <i>Pleurozium schreberi</i>	30	CNVC00295	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	295c <i>Larix laricina</i>
BwTr12-4	<i>Picea mariana</i> / <i>Alnus incana</i> - <i>Rhododendron groenlandicum</i> / <i>Hylocomium splendens</i>	27	CNVC00295	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	295a <i>Alnus incana</i>
BwTr12-5	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Alnus incana</i> / <i>Rubus pubescens</i> / <i>Pleurozium schreberi</i>	11	CNVC00296	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	no subassociations
BwTr12-8	<i>Picea mariana</i> / <i>Rubus pubescens</i> / <i>Hylocomium splendens</i>	46	CNVC00295	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	295b <i>Mitella nuda</i>

A5 Table 3. Quebec Association (unpublished) relationships to CNVC Associations and subassociations. Note that Quebec botanical nomenclature (as in Unit Name) sometimes differs from CNVC standard nomenclature (Baldwin et al. 2019b).

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC001	<i>Pinus banksiana</i> / <i>Kalmia angustifolia</i> - <i>Vaccinium angustifolium</i> / <i>Cladina</i> spp.	64	CNVC00201	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Kalmia angustifolium</i> (<i>Rhododendron groenlandicum</i>) / <i>Cladina</i> spp.	201a <i>Pinus banksiana</i>
QC002	<i>Pinus banksiana</i> / <i>Pleurozium schreberi</i>	59	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209b <i>inops</i>
QC003A	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Pleurozium schreberi</i> [Typique]	272	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209a <i>typic</i>
QC003B	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	19	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209a <i>typic</i>
QC004	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Cladina</i> spp.	102	CNVC00201	<i>Pinus banksiana</i> (<i>Picea mariana</i>) / <i>Kalmia angustifolium</i> (<i>Rhododendron groenlandicum</i>) / <i>Cladina</i> spp.	201b <i>Picea mariana</i>
QC006A	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Alnus incana</i> [Typique]	21	CNVC00294	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	294a <i>typic</i>
QC006B	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Alnus incana</i> [<i>Pleurozium schreberi</i>]	26	CNVC00294	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	294b <i>Pleurozium schreberi</i>
QC007A	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Cladina</i> spp. [<i>Cladina stellaris</i>]	144	CNVC00204	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolium</i> / <i>Cladina</i> spp.	204a <i>Cladina stellaris</i>
QC007B	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Cladina</i> spp. [<i>Cladina mitis</i>]	11	CNVC00204	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolium</i> / <i>Cladina</i> spp.	204b <i>Cladina mitis</i>
QC008A	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> [Typique]	1403	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211a <i>typic</i>
QC008B	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	68	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211d <i>Alnus viridis</i>

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC010A	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [Typique]	443	CNVC00276	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	276a typic
QC010B	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [<i>Hylocomium splendens</i>]	35	CNVC00276	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	276b <i>Hylocomium splendens</i>
QC013A	<i>Picea mariana</i> - <i>Abies balsamea</i> / (<i>Ledum groenlandicum</i>) / <i>Pleurozium schreberi</i> [Typique]	50	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	217a typic
QC013B	<i>Picea mariana</i> - <i>Abies balsamea</i> / (<i>Ledum groenlandicum</i>) / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	22	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	217a typic
QC013C	<i>Picea mariana</i> - <i>Abies balsamea</i> / (<i>Ledum groenlandicum</i>) / <i>Pleurozium schreberi</i> [<i>Pteridium aquilinum</i>]	4	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	217a typic
QC014	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	97	CNVC00217	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Rhododendron groenlandicum</i> / <i>Pleurozium schreberi</i>	217b <i>Kalmia angustifolia</i>
QC015	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Alnus incana</i>	45	CNVC00296	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	no subassociations
QC016A	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [Typique]	272	CNVC00277	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	no subassociations
QC016B	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [<i>Sphagnum girgensohnii</i>]	43	CNVC00277	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	no subassociations
QC019A	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i> [Typique]	58	CNVC00216	<i>Picea mariana</i> – <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i>	no subassociations

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC019B	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i> [<i>Diervilla lonicera</i>]	67	CNVC00216	<i>Picea mariana</i> – <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i>	no subassociations
QC021A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Acer spicatum</i> [Typique]	513	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235a typic
QC021B	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Acer spicatum</i> [<i>Rubus pubescens</i>]	154	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
QC022A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> [Typique]	261	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC022B	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> [<i>Oxalis montana</i>]	142	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	233a typic
QC022C	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> [<i>Pteridium aquilinum</i>]	59	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC023A	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [Typique]	519	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222a typic
QC023B	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [<i>Hylocomium splendens</i>]	253	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222b <i>Hylocomium splendens</i>
QC023C	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [<i>Oxalis montana</i>]	221	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222c <i>Oxalis montana</i>
QC025A	<i>Abies balsamea</i> / <i>Acer spicatum</i> [Typique]	101	CNVC00225	<i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Acer spicatum</i> / <i>Oxalis montana</i>	225a typic
QC025B	<i>Abies balsamea</i> / <i>Acer spicatum</i> [<i>Rubus pubescens</i>]	101	CNVC00225	<i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Acer spicatum</i> / <i>Oxalis montana</i>	225b <i>Rubus pubescens</i>
QC026	<i>Abies balsamea</i> / <i>Alnus incana</i> - <i>Rubus idaeus</i> / (<i>Rubus pubescens</i>)	19	CNVC00297	<i>Abies balsamea</i> / <i>Alnus incana</i>	no subassociations
QC027A	<i>Abies balsamea</i> / <i>Sphagnum</i> spp. - <i>Pleurozium schreberi</i> [Typique]	112	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	278a typic

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC027B	<i>Abies balsamea</i> / <i>Sphagnum</i> spp. - <i>Pleurozium schreberi</i> [<i>Hylocomium splendens</i>]	63	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	278a <i>typic</i>
QC027C	<i>Abies balsamea</i> / <i>Sphagnum</i> spp. - <i>Pleurozium schreberi</i> [<i>Sphagnum girgensohnii</i>]	49	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	278a <i>typic</i>
QC029	<i>Pinus banksiana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	131	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209c <i>Kalmia angustifolia</i>
QC030	<i>Pinus banksiana</i> - <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	308	CNVC00209	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	209d <i>Rhododendron groenlandicum</i>
QC031	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp.	178	CNVC00276	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Vaccinium angustifolium</i> / <i>Pleurozium schreberi</i> (<i>Sphagnum</i> spp.)	276c <i>Rhododendron groenlandicum</i>
QC034	<i>Abies balsamea</i> / <i>Sphagnum</i> spp.	23	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	278b <i>Sphagnum</i> spp
QC038	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	93	CNVC00295	<i>Picea mariana</i> / <i>Alnus incana</i> / <i>Pleurozium schreberi</i>	295a <i>Alnus incana</i>
QC039	<i>Abies balsamea</i> / <i>Cornus canadensis</i>	66	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222d <i>Cornus canadensis</i>
QC040A	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Typique</i>]	272	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211c <i>Rhododendron groenlandicum</i>
QC040B	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Kalmia angustifolia</i>]	326	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211b <i>Kalmia angustifolia</i>
QC041	<i>Betula papyrifera</i> - <i>Abies balsamea</i> / <i>Sorbus americana</i>	20	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	233c <i>Sorbus americana</i>
QC046	<i>Picea mariana</i> - <i>Larix laricina</i> / <i>Cladina</i> spp. - <i>Pleurozium schreberi</i>	3	CNVC00204	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolium</i> / <i>Cladina</i> spp.	204a <i>Cladina stellaris</i>

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC047	<i>Picea mariana</i> - <i>Larix laricina</i> / <i>Ledum groenlandicum</i> - <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	6	CNVC00211	<i>Picea mariana</i> / <i>Rhododendron groenlandicum</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	211b <i>Kalmia angustifolia</i>
QC056A	<i>Pinus banksiana</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Kalmia angustifolia</i>]	19	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214a <i>typic</i>
QC056B	<i>Pinus banksiana</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Pteridium aquilinum</i>]	31	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213b <i>Pteridium aquilinum</i>
QC057A	<i>Pinus banksiana</i> - <i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Typique</i>]	14	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213a <i>typic</i>
QC057B	<i>Pinus banksiana</i> - <i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Pteridium aquilinum</i>]	22	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213b <i>Pteridium aquilinum</i>
QC058A	<i>Pinus banksiana</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Typique</i>]	10	CNVC00218	<i>Pinus banksiana</i> – <i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	218a <i>typic</i>
QC058B	<i>Pinus banksiana</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i> [<i>Diervilla lonicera</i>]	10	CNVC00218	<i>Pinus banksiana</i> – <i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	218b <i>Diervilla lonicera</i>
QC059	<i>Betula papyrifera</i> - <i>Pinus banksiana</i> / <i>Acer spicatum</i>	13	CNVC00215	<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Pinus banksiana</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	215a <i>typic</i>
QC060A	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> - <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Typique</i>]	88	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214a <i>typic</i>

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC060B	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> - <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	64	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214b <i>Alnus viridis</i>
QC060C	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> - <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Nemopanthus mucronatus</i>]	30	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214c <i>Ilex mucronata</i>
QC061A	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> [Typique]	182	CNVC00344	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	344a <i>typic</i>
QC061B	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> [<i>Pteridium aquilinum</i>]	26	CNVC00344	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	344b <i>Pteridium aquilinum</i>
QC061C	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> [<i>Hylocomium splendens</i>]	18	CNVC00344	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	344c <i>Hylocomium splendens</i>
QC063A	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Cornus canadensis</i> [Typique]	182	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234a <i>typic</i>
QC063B	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Cornus canadensis</i> [<i>Pteridium aquilinum</i>]	86	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234b <i>Pteridium aquilinum</i>
QC063C	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Cornus canadensis</i> [<i>Acer rubrum</i>]	13	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234c <i>Acer rubrum</i>
QC064A	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [Typique]	46	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270b <i>Picea mariana</i>

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC064B	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> - <i>Sphagnum</i> spp. [<i>Sphagnum girgensohnii</i>]	11	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270b <i>Picea mariana</i>
QC065	<i>Picea mariana</i> - <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Alnus incana</i>	25	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274a typical
QC069	<i>Larix laricina</i> - <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	2	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214a typical
QC070A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i> [Typique]	148	CNVC00232	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i>	232a typical
QC070B	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i> [<i>Oxalis montana</i>]	53	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	233b <i>Hylocomium splendens</i>
QC070C	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i> [<i>Hylocomium splendens</i>]	16	CNVC00232	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Pleurozium schreberi</i>	232b <i>Hylocomium splendens</i>
QC072A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Alnus incana</i> [Typique]	19	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274a typical
QC072B	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Alnus incana</i> [<i>Acer spicatum</i>]	29	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274a typical
QC072C	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Alnus incana</i> [<i>Rubus pubescens</i>]	15	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274b <i>Rubus pubescens</i>
QC074A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Sphagnum</i> spp. [Typique]	37	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270a typical
QC074B	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Sphagnum</i> spp. [<i>Sphagnum girgensohnii</i>]	14	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270a typical
QC076A	<i>Picea glauca</i> - <i>Betula papyrifera</i> - <i>Populus tremuloides</i> / <i>Cornus canadensis</i> [Typique]	34	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC076B	<i>Picea glauca</i> - <i>Betula papyrifera</i> - <i>Populus tremuloides</i> / <i>Cornus canadensis</i> [<i>Pleurozium schreberi</i>]	10	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC078A	<i>Picea glauca</i> - <i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> [Typique]	12	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235a typic
QC078B	<i>Picea glauca</i> - <i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> [<i>Rubus pubescens</i>]	9	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
QC079A	<i>Picea glauca</i> - <i>Betula papyrifera</i> / <i>Alnus incana</i> (<i>Acer spicatum</i>) [Typique]	14	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274a typic
QC079B	<i>Picea glauca</i> - <i>Betula papyrifera</i> / <i>Alnus incana</i> (<i>Acer spicatum</i>) [<i>Rubus pubescens</i>]	17	CNVC00274	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	274b <i>Rubus pubescens</i>
QC082A	<i>Populus tremuloides</i> - <i>Pinus banksiana</i> (<i>Betula papyrifera</i>) / <i>Kalmia angustifolia</i> - <i>Vaccinium</i> spp. [Typique]	9	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214a typic
QC082B	<i>Populus tremuloides</i> - <i>Pinus banksiana</i> (<i>Betula papyrifera</i>) / <i>Kalmia angustifolia</i> - <i>Vaccinium</i> spp. [<i>Alnus viridis</i>]	10	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214b <i>Alnus viridis</i>
QC083	<i>Pinus banksiana</i> - <i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i>	18	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213b <i>Pteridium aquilinum</i>
QC085A	<i>Populus tremuloides</i> - <i>Picea mariana</i> (<i>Betula papyrifera</i>) / <i>Pleurozium schreberi</i> [Typique]	94	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213a typic
QC085B	<i>Populus tremuloides</i> - <i>Picea mariana</i> (<i>Betula papyrifera</i>) / <i>Pleurozium schreberi</i> [<i>Pteridium aquilinum</i>]	47	CNVC00213	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Pinus banksiana</i> / <i>Diervilla lonicera</i> / <i>Pleurozium schreberi</i>	213b <i>Pteridium aquilinum</i>

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QC086	<i>Populus tremuloides</i> - <i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Acer spicatum</i>	26	CNVC00216	<i>Picea mariana</i> – <i>Betula papyrifera</i> (<i>Abies balsamea</i>) / <i>Acer spicatum</i>	no subassociations
QC087A	<i>Populus tremuloides</i> - <i>Picea mariana</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [Typique]	12	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234a typic
QC087B	<i>Populus tremuloides</i> - <i>Picea mariana</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [<i>Pteridium aquilinum</i>]	13	CNVC00234	<i>Picea mariana</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Clintonia borealis</i>	234b <i>Pteridium aquilinum</i>
QC088A	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Alnus incana</i> [Typique]	22	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	272a typic
QC088B	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Alnus incana</i> [<i>Pleurozium schreberi</i>]	15	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	272a typic
QC089	<i>Populus tremuloides</i> - <i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Alnus incana</i>	6	CNVC00272	<i>Populus tremuloides</i> – <i>Picea mariana</i> / <i>Alnus incana</i>	272a typic
QC090A	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Kalmia angustifolia</i> - <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [Typique]	46	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214a typic
QC090B	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Kalmia angustifolia</i> - <i>Ledum groenlandicum</i> / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	14	CNVC00214	<i>Picea mariana</i> – <i>Betula papyrifera</i> / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	214b <i>Alnus viridis</i>
QC093A	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [Typique]	70	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC093B	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [<i>Pteridium aquilinum</i>]	59	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC093C	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [<i>Pleurozium schreberi</i>]	10	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC093D	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [<i>Ledum groenlandicum</i>]	7	CNVC00231	<i>Abies balsamea</i> – <i>Betula papyrifera</i> – <i>Populus tremuloides</i> / <i>Clintonia borealis</i>	no subassociations
QC094A	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [Typique]	47	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235a typic
QC094B	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [<i>Diervilla lonicera</i>]	41	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235a typic
QC094C	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [<i>Rubus pubescens</i>]	29	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
QC094D	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [<i>Alnus incana</i>]	10	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
QC096	<i>Populus tremuloides</i> - <i>Abies balsamea</i> (<i>Betula papyrifera</i>) / <i>Alnus incana</i>	23	CNVC00273	<i>Populus tremuloides</i> – <i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Alnus incana</i>	no subassociations
QC101A	<i>Betula papyrifera</i> / <i>Alnus viridis</i> - <i>Vaccinium</i> spp. [<i>Alnus viridis</i>]	65	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	237a <i>Alnus viridis</i>
QC101B	<i>Betula papyrifera</i> / <i>Alnus viridis</i> - <i>Vaccinium</i> spp. [<i>Ledum groenlandicum</i>]	25	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	237b <i>Rhododendron groenlandicum</i>
QC101C	<i>Betula papyrifera</i> / <i>Alnus viridis</i> - <i>Vaccinium</i> spp. [<i>Vaccinium</i> spp.]	29	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	237c <i>Vaccinium angustifolium</i>
QC102	<i>Betula papyrifera</i> / <i>Cornus canadensis</i> / <i>Pleurozium schreberi</i>	36	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	237d <i>Pleurozium schreberi</i>

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC103A	<i>Betula papyrifera</i> / <i>Acer spicatum</i> [Typique]	553	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
QC103B	<i>Betula papyrifera</i> / <i>Acer spicatum</i> [Diervilla lonicera]	175	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
QC103C	<i>Betula papyrifera</i> / <i>Acer spicatum</i> [<i>Rubus pubescens</i>]	248	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
QC104	<i>Betula papyrifera</i> / <i>Alnus incana</i>	93	CNVC00242	<i>Betula papyrifera</i> / <i>Alnus incana</i>	no subassociations
QC105	<i>Betula papyrifera</i> (<i>Picea mariana</i>) / <i>Sphagnum</i> spp.	27	CNVC00270	<i>Betula papyrifera</i> – <i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	270c <i>Betula papyrifera</i>
QC108A	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [Typique]	120	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238a typical
QC108B	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Cornus canadensis</i> [<i>Alnus viridis</i>]	19	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238b <i>Alnus viridis</i>
QC109A	<i>Populus tremuloides</i> / <i>Alnus incana</i> [Typique]	64	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	241a typical
QC109B	<i>Populus tremuloides</i> / <i>Alnus incana</i> [<i>Rubus pubescens</i>]	82	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	241a typical
QC110A	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Kalmia angustifolia</i> - <i>Vaccinium</i> spp. [Typique]	31	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238c <i>Kalmia angustifolia</i>
QC110B	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Kalmia angustifolia</i> - <i>Vaccinium</i> spp. [<i>Pteridium aquilinum</i>]	19	CNVC00238	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Diervilla lonicera</i>	238c <i>Kalmia angustifolia</i>
QC111A	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [Typique]	179	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
QC111B	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [<i>Diervilla lonicera</i>]	177	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations

Quebec Association	Quebec Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
QC111C	<i>Populus tremuloides</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> [<i>Alnus viridis</i>]	18	CNVC00239	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	no subassociations
QC113	<i>Pinus banksiana</i> – <i>Acer rubrum</i> (<i>Betula papyrifera</i>) / <i>Acer spicatum</i> - <i>Diervilla lonicera</i>	12	CNVC00215	<i>Betula papyrifera</i> – <i>Populus tremuloides</i> – <i>Pinus banksiana</i> / <i>Acer spicatum</i> / <i>Clintonia borealis</i>	215b <i>Acer rubrum</i>
QC116	<i>Populus balsamifera</i> (<i>Populus tremuloides</i>) / <i>Rubus pubescens</i>	22	CNVC00241	<i>Populus tremuloides</i> (<i>P. balsamifera</i>) / <i>Alnus incana</i> / <i>Eurybia macrophylla</i>	241b <i>Populus balsamifera</i>
QC118	<i>Populus balsamifera</i> - <i>Abies balsamea</i> (<i>Populus tremuloides</i>) / <i>Acer spicatum</i> / <i>Rubus pubescens</i>	13	CNVC00235	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Acer spicatum</i>	235b <i>Rubus pubescens</i>
QC130A	<i>Picea mariana</i> / <i>Hylocomium splendens</i> [Typique]	166	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a <i>typic</i>
QC130B	<i>Picea mariana</i> / <i>Hylocomium splendens</i> [<i>Rhododendron canadense</i>]	8	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350b <i>Rhododendron canadense</i>
QC131A	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [Typique]	406	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351a <i>typic</i>
QC131B	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [<i>Hylocomium splendens</i>]	155	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351b <i>Hylocomium splendens</i>
QC131C	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [<i>Alnus viridis</i>]	35	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351a <i>typic</i>
QC131D	<i>Picea mariana</i> - <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> [<i>Viburnum nudum</i> var. <i>cassinoides</i>]	21	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351c <i>Viburnum nudum</i>

A5 Table 4. Newfoundland (Damman 1963, 1964, 1967 and Meades 1976, 1986) and Labrador (unpublished) Forest Type relationships to CNVC Associations and subassociations. Unit codes that begin with N (northern Newfoundland) refer to Damman 1963; with C (central) to Damman 1964; with W (western) to Damman 1967; with TNP (Terra Nova Park) to Meades 1976, and with E (eastern) to Meades 1986. Note that provincial botanical nomenclature (as in Unit Name) sometimes differs from CNVC standard nomenclature (Baldwin et al. 2019b).

Unit Code	Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
C bS_I	Central: Black spruce - moss forest (I)	7	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a typic
C bS_II	Central: Black spruce - moss forest (II)	3	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a typic
C bS_III	Central: Black spruce - moss forest (III)	1	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a typic
C bS_IV	Central: Black spruce - moss forest (IV)	1	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a typic
C bS_V	Central: Black spruce - moss forest (V)	3	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a typic
C C_bF	Central: <i>Carex</i> - balsam fir forest	4	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351e <i>Sphagnum</i> spp
C Clad_Kal_bs	Central: <i>Cladonia</i> - <i>Kalmia</i> - black spruce forest	11	CNVC00205	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> – <i>Rhododendron canadense</i> / <i>Cladina</i> spp.	no subassociations
C Dry_L_bF	Central: <i>Dryopteris</i> - <i>Lycopodium</i> - balsam fir forest	3	CNVC00310	<i>Abies balsamea</i> / <i>Dryopteris</i> spp. / <i>Hylocomiastrum umbratum</i>	310a <i>Hylocomium splendens</i>
C Hyl_bF	Central: <i>Hylocomium</i> - balsam fir forest	14	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222b <i>Hylocomium splendens</i>
C Kal_bs	Central: <i>Kalmia</i> - black spruce forest	10	CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	307a typic
C PI_bF	Central: <i>Pleurozium</i> - balsam fir forest	4	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222a typic
C Ru_bF	Central: <i>Rubus</i> - balsam fir forest	7	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351b <i>Hylocomium splendens</i>
E bF	Eastern: <i>Dicranum</i> - balsam fir forest	5	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222a typic

Unit Code	Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
E bFc	Eastern: <i>Clintonia</i> - balsam fir forest	6	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222b <i>Hylocomium splendens</i>
E bFd	Eastern: <i>Dryopteris</i> - balsam fir forest	4	CNVC00311	<i>Abies balsamea</i> (<i>Betula alleghaniensis</i>) / <i>Dryopteris carthusiana</i>	311a <i>typic</i>
E bFdb	Eastern: <i>Bazzania</i> - <i>Dryopteris</i> - balsam fir forest	3	CNVC00311	<i>Abies balsamea</i> (<i>Betula alleghaniensis</i>) / <i>Dryopteris carthusiana</i>	311b <i>Bazzania trilobata</i>
E bFh	Eastern: <i>Hylocomium</i> - balsam fir forest	7	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222b <i>Hylocomium splendens</i>
E bFp	Eastern: <i>Pleurozium</i> - balsam fir forest	5	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222a <i>typic</i>
E bFr	Eastern: <i>Rubus</i> - balsam fir forest	5	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348a <i>Viburnum nudum</i>
E bFv	Eastern: <i>Vaccinium</i> – balsam fir forest	5	CNVC00309	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium schreberi</i> – <i>Bazzania trilobata</i>	309b <i>Vaccinium vitis-idaea</i>
E bSml	Eastern: Black spruce - moss forest (I)	3	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350c <i>Dicranum majus</i>
E bSmlIII	Eastern: Black spruce - moss forest (III)	5	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350c <i>Dicranum majus</i>
E KP	Eastern: <i>Kalmia</i> - black spruce forest	5	CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	307b <i>Viburnum nudum</i>
Lab B_lyc	Labrador: <i>Lycopodium</i> - birch forest	1	CNVC00349	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Dryopteris carthusiana</i> – <i>Rubus pubescens</i>	no subassociations
N AA	Northern: <i>Alder</i> - balsam fir forest	2	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348b <i>Taxus canadensis</i>
N CA	Northern: <i>Clintonia</i> - balsam fir forest	7	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222e <i>Taxus canadensis</i>
N DA	Northern: <i>Dryopteris</i> - balsam fir forest	3	CNVC00310	<i>Abies balsamea</i> / <i>Dryopteris</i> spp. / <i>Hylocomiastrum umbratum</i>	310c <i>Cornus stolonifera</i>
N KPt	Northern: <i>Kalmia</i> - black spruce forest	1	CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	307a <i>typic</i>
N LP	Northern: Lithosolic - black spruce forest	3	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a <i>typic</i>

Unit Code	Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
N LPca	Northern: Lithosolic - black spruce forest (ca)	2	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a <i>typic</i>
N PA/IP	Northern: <i>Pleurozium</i> - balsam fir forest (IP)	3	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351d <i>Cornus stolonifera</i>
N PA/IPca	Northern: <i>Pleurozium</i> - balsam fir forest (IPca)	1	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351d <i>Cornus stolonifera</i>
N PA/P	Northern: <i>Pleurozium</i> - balsam fir forest (P)	2	CNVC00351	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Pleurozium schreberi</i> (<i>Hylocomium splendens</i>)	351d <i>Cornus stolonifera</i>
N RAa	Northern: <i>Rubus</i> - balsam fir forest [<i>Athyrium</i> variant]	1	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348b <i>Taxus canadensis</i>
N RAM	Northern: <i>Rubus</i> - balsam fir forest [<i>Mitella</i> variant]	6	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348b <i>Taxus canadensis</i>
N TA	Northern: <i>Taxus</i> - balsam fir forest	4	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222e <i>Taxus canadensis</i>
TNP BtA	Terra Nova Park: Birch - aspen	5	CNVC00349	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Dryopteris carthusiana</i> – <i>Rubus pubescens</i>	no subassociations
W Bd	Western: <i>Dryopteris</i> - birch forest [typical variant]	3	CNVC00315	<i>Betula papyrifera</i> – <i>B. alleghaniensis</i> / <i>Dryopteris carthusiana</i>	315a <i>typic</i>
W Bdc	Western: <i>Dryopteris</i> - birch forest [<i>Clintonia</i> variant]	3	CNVC00315	<i>Betula papyrifera</i> – <i>B. alleghaniensis</i> / <i>Dryopteris carthusiana</i>	315b <i>Clintonia borealis</i>
W Bk	Western: <i>Kalmia</i> - birch forest	2	CNVC00237	<i>Betula papyrifera</i> / <i>Vaccinium angustifolium</i> – <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	237e <i>Kalmia angustifolia</i>
W Br	Western: <i>Rubus</i> - birch forest	4	CNVC00349	<i>Betula papyrifera</i> (<i>Populus tremuloides</i>) / <i>Dryopteris carthusiana</i> – <i>Rubus pubescens</i>	no subassociations
W Bu	Western: Birch forests on unstable soils	3	CNVC00316	<i>Betula papyrifera</i> / <i>Alnus viridis</i> / <i>Solidago macrophylla</i>	no subassociations
W Fd	Western: <i>Dryopteris</i> - balsam fir forest	6	CNVC00311	<i>Abies balsamea</i> (<i>Betula alleghaniensis</i>) / <i>Dryopteris carthusiana</i>	311a <i>typic</i>
W Fdh	Western: <i>Dryopteris</i> - <i>Hylcomium</i> - balsam fir forest	10	CNVC00310	<i>Abies balsamea</i> / <i>Dryopteris</i> spp. / <i>Hylocomiastrum umbratum</i>	310a <i>Hylocomium splendens</i>

Unit Code	Unit Name	n Plots	CNVC Association	Association Scientific Name	CNVC Subassociation
W Fdr	Western: <i>Dryopteris</i> - <i>Rhytidiadelphus</i> - balsam fir forest	5	CNVC00310	<i>Abies balsamea</i> / <i>Dryopteris</i> spp. / <i>Hylocomiastrum umbratum</i>	310b <i>Rhytidiadelphus loreus</i>
W Fg	Western: <i>Gaultheria</i> - balsam fir forest	9	CNVC00278	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i> – <i>Sphagnum</i> spp.	278c <i>Bazzania trilobata</i>
W Fh	Western: <i>Hylocomium</i> - balsam fir forest	3	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222b <i>Hylocomium splendens</i>
W Fp	Western: <i>Pleurozium</i> - balsam fir forest	11	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222a <i>typic</i>
W Fr	Western: <i>Rubus</i> - balsam fir forest	6	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348c <i>Dryopteris carthusiana</i>
W Frw	Western: <i>Rubus</i> - balsam fir forest [wet variant]	4	CNVC00348	<i>Abies balsamea</i> / <i>Taxus canadensis</i> / <i>Rubus pubescens</i> / <i>Dicranum majus</i>	348d <i>Gymnocarpium dryopteris</i>
W Ft	Western: <i>Taxus</i> - balsam fir forest	8	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222e <i>Taxus canadensis</i>
W Fte	Western: <i>Taxus</i> - balsam fir forest [<i>Epigaea</i> subtype]	5	CNVC00222	<i>Abies balsamea</i> / <i>Pleurozium schreberi</i>	222e <i>Taxus canadensis</i>
W KP	Western: <i>Kalmia</i> - black spruce forest	4	CNVC00307	<i>Picea mariana</i> (<i>Abies balsamea</i>) / <i>Kalmia angustifolia</i> / <i>Pleurozium schreberi</i>	307a <i>typic</i>
W KPt	Western: <i>Taxus</i> - <i>Kalmia</i> - black spruce forest	4	CNVC00338	<i>Picea mariana</i> / <i>Rhododendron canadense</i> – <i>Taxus canadensis</i> / <i>Pleurozium schreberi</i>	no subassociations
W P	Western: Black spruce - moss forest	5	CNVC00350	<i>Picea mariana</i> / <i>Pleurozium schreberi</i> – <i>Hylocomium splendens</i>	350a <i>typic</i>

A5 Table 5. Maritimes Association (Basquill et al. 2015) relationships to CNVC Associations and subassociations. Note that regional botanical nomenclature (as in Unit Name) sometimes differs from CNVC standard nomenclature (Baldwin et al. 2019b).

Maritimes Region Unit Code	Unit Name	n Plots	CNVC Association	CNVC Association Name	CNVC Subassociation
A020a <i>Typic-u</i>	<i>Picea mariana - Abies balsamea / Vaccinium vitis-idaea / Sphagnum capillifolium</i> Forest - Woodland [<i>Typic</i>]	26	CNVC00292	<i>Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata</i>	292a <i>typic</i>
A020b <i>Sphagnum capillifolium-u</i>	<i>Picea mariana - Abies balsamea / Vaccinium vitis-idaea / Sphagnum capillifolium</i> Forest - Woodland [<i>Sphagnum capillifolium</i>]	10	CNVC00292	<i>Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata</i>	292b <i>Sphagnum capillifolium</i>
A178a <i>Typic-u</i>	<i>Abies balsamea - Picea glauca / Sorbus americana / Dryopteris intermedia / Pleurozium schreberi</i> Forest [<i>Typic</i>]	52	CNVC00222	<i>Abies balsamea / Pleurozium schreberi</i>	222c <i>Oxalis montana</i>
A178b <i>Acer spicatum-u</i>	<i>Abies balsamea - Picea glauca / Sorbus americana / Dryopteris intermedia / Pleurozium schreberi</i> Forest [<i>Acer spicatum</i>]	39	CNVC00222	<i>Abies balsamea / Pleurozium schreberi</i>	222c <i>Oxalis montana</i>
A178c <i>Dryopteris campyloptera-u</i>	<i>Abies balsamea - Picea glauca / Sorbus americana / Dryopteris intermedia / Pleurozium schreberi</i> Forest [<i>Dryopteris campyloptera</i>]	14	CNVC00310	<i>Abies balsamea / Dryopteris spp. / Hylocomiastrum umbratum</i>	310d <i>Oxalis montana</i>
A179a <i>Typic-u</i>	<i>Abies balsamea - Picea glauca / Ribes lacustre / Rubus pubescens - Streptopus lanceolatus</i> Forest [<i>Typic</i>]	43	CNVC00225	<i>Abies balsamea (Picea glauca) / Acer spicatum / Oxalis montana</i>	225a <i>typic</i>
A179b <i>Mitella nuda-u</i>	<i>Abies balsamea - Picea glauca / Ribes lacustre / Rubus pubescens - Streptopus lanceolatus</i> Forest [<i>Mitella nuda</i>]	55	CNVC00225	<i>Abies balsamea (Picea glauca) / Acer spicatum / Oxalis montana</i>	225b <i>Rubus pubescens</i>
A180a <i>Typic-u</i>	<i>Abies balsamea - Picea mariana / Dryopteris intermedia - Gaultheria hispidula / Pleurozium schreberi</i> Forest [<i>Typic</i>]	17	CNVC00220	<i>Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi</i>	220a <i>typic</i>
A180b <i>Hylocomium splendens-u</i>	<i>Abies balsamea - Picea mariana / Dryopteris intermedia - Gaultheria hispidula / Pleurozium schreberi</i> Forest [<i>Hylocomium splendens</i>]	21	CNVC00220	<i>Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi</i>	220b <i>Hylocomium splendens</i>

Maritimes Region Unit Code	Unit Name	n Plots	CNVC Association	CNVC Association Name	CNVC Subassociation
A180c Acer spicatum-u	<i>Abies balsamea</i> - <i>Picea mariana</i> / <i>Dryopteris intermedia</i> - <i>Gaultheria</i> <i>hispidula</i> / <i>Pleurozium schreberi</i> Forest [<i>Acer spicatum</i>]	26	CNVC00220	<i>Abies balsamea</i> (<i>Picea mariana</i>) / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	220c Acer spicatum
A180d <i>Nemopanthus</i> <i>mucronatus</i> -u	<i>Abies balsamea</i> - <i>Picea mariana</i> / <i>Dryopteris intermedia</i> - <i>Gaultheria</i> <i>hispidula</i> / <i>Pleurozium schreberi</i> Forest [<i>Nemopanthus mucronatus</i>]	18	CNVC00220	<i>Abies balsamea</i> (<i>Picea mariana</i>) / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	220a typic
A187a Typic-u	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Sorbus americana</i> / <i>Oxalis montana</i> / <i>Polytrichum commune</i> Forest [Typic]	37	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	233c <i>Sorbus</i> <i>americana</i>
A187b Acer spicatum-u	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Sorbus americana</i> / <i>Oxalis montana</i> / <i>Polytrichum commune</i> Forest [<i>Acer</i> <i>spicatum</i>]	60	CNVC00233	<i>Abies balsamea</i> – <i>Betula papyrifera</i> / <i>Oxalis montana</i> / <i>Pleurozium schreberi</i>	233c <i>Sorbus</i> <i>americana</i>
A304a Typic-u	<i>Picea glauca</i> / (<i>Alnus viridis</i> ssp. <i>crispa</i>) / <i>Oclemena acuminata</i> / <i>Pleurozium</i> <i>schreberi</i> Woodland [Typic]	16	CNVC00226	<i>Picea glauca</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> (<i>Bazzania trilobata</i>)	226a typic
A304b <i>Empetrum</i> <i>nigrum</i> -u	<i>Picea glauca</i> / (<i>Alnus viridis</i> ssp. <i>crispa</i>) / <i>Oclemena acuminata</i> / <i>Pleurozium</i> <i>schreberi</i> Woodland [<i>Empetrum</i> <i>nigrum</i>]	3	CNVC00226	<i>Picea glauca</i> (<i>Abies balsamea</i>) / <i>Pleurozium schreberi</i> (<i>Bazzania trilobata</i>)	226b <i>Empetrum</i> <i>nigrum</i>
A314-u	<i>Abies balsamea</i> – <i>Picea mariana</i> / <i>Vaccinium angustifolium</i> / <i>Sphagnum</i> <i>capillifolium</i> Woodland	23	CNVC00309	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Pleurozium</i> <i>schreberi</i> – <i>Bazzania trilobata</i>	309a typic

Appendix 6. Correlation tables (i.e., crosswalks) of best matches between non-constituent provincial types and CNVC Associations.

Relationships are: ‘=’ if the regional/ provincial type concept and that of the CNVC Association are equivalent; ‘<’ if the regional/ provincial type concept is entirely included within the Association concept, and ‘<<’ if part of the regional/ provincial type concept is included within the Association concept. Where type concepts do not fit well with a CNVC Association concept in M495 (or M299 [North American Boreal Conifer Poor Swamp]), the Association column typically has ‘n/a’; although sometimes a comment is provided.

A6 Table 1. Correlations between Northwestern Ontario V-Types (Sims et al. 1997) and CNVC Associations in M495 and M299. Where a V-Type corresponds to CNVC Associations in both M495 and M299, bold font indicates Associations in M495.

Code	NW Ontario Vegetation Type (Sims et al. 1997)	Relationship	Association	Macrogroup
V1	Balsam Poplar Hardwood and Mixedwood	<	CNVC00241	M495
V2	Black Ash Hardwood and Mixedwood		n/a	
V3.1	Maple (Yellow Birch) Hardwood and Mixedwood		n/a	
V3.2	Other Hardwoods and Mixedwoods		n/a	
V3.3	Upland Bur Oak		n/a	
V4	White Birch Hardwood and Mixedwood	<<	CNVC00213 CNVC00231 CNVC00235 CNVC00239 CNVC00269	M495
V5	Aspen Hardwood	<<	CNVC00238 CNVC00239 CNVC00241	M495
V6	Trembling Aspen (White Birch) - Balsam Fir / Mountain Maple	=	CNVC00235	M495
V7	Trembling Aspen - Balsam Fir / Balsam Fir Shrub	=	CNVC00231	M495
V8	Trembling Aspen (White Birch) / Mountain Maple	=	CNVC00239	M495
V9	Trembling Aspen Mixedwood	<<	CNVC00213 CNVC00215 CNVC00231 CNVC00234 CNVC00235 CNVC00272	M495

Code	NW Ontario Vegetation Type (Sims et al. 1997)	Relationship	Association	Macrogroup
V10	Trembling Aspen - Black Spruce - Jack Pine / Low Shrub	=	CNVC00213	M495
V11	Trembling Aspen - Conifer / Blueberry / Feathermoss	<<	CNVC00213 CNVC00231 CNVC00234	M495
V12	White Pine Mixedwood		n/a	
V13	Red Pine Mixedwood		n/a	
V14	Balsam Fir Mixedwood	<<	CNVC00231 CNVC00235	M495
V15	White Spruce Mixedwood	<<	CNVC00231 CNVC00235	M495
V16	Balsam Fir - White Spruce Mixedwood / Feathermoss	=	CNVC00231	M495
V17	Jack Pine Mixedwood / Shrub Rich	<<	CNVC00208 CNVC00215	M495
V18	Jack Pine Mixedwood / Feathermoss	<<	CNVC00208 CNVC00213	M495
V19	Black Spruce Mixedwood / Herb Rich	<<	CNVC00208 CNVC00215 CNVC00272	M495
V20	Black Spruce Mixedwood / Feathermoss	<	CNVC00208	M495
V21	Cedar (inc. Mixedwood) / Mountain Maple		n/a	
V22	Cedar (inc. Mixedwood) / Speckled Alder / <i>Sphagnum</i>		n/a	
V23	Tamarack (Black Spruce) / Speckled Alder / Labrador Tea	<<	CNVC00288 CNVC00295 CNVC00298 CNVC00326	M495, M299
V24	White Spruce - Balsam Fir / Shrub Rich	=	CNVC00256	M495
V25	White Spruce - Balsam Fir / Feathermoss	<	CNVC00217 CNVC00256	M495
V26	White Pine Conifer		n/a	

Code	NW Ontario Vegetation Type (Sims et al. 1997)	Relationship	Association	Macrogroup
V27	Red Pine Conifer		n/a	
V28	Jack Pine / Low Shrub	<	CNVC00207 CNVC00208	M495
V29	Jack Pine / Ericaceous Shrub / Feathermoss	=	CNVC00207	M495
V30	Jack Pine - Black Spruce / Blueberry / Lichen	<<	CNVC00245 CNVC00246	M495
V31	Black Spruce - Jack Pine / Tall Shrub / Feathermoss	<<	CNVC00208 CNVC00295	M495
V32	Jack Pine - Black Spruce / Ericaceous Shrub / Feathermoss	<<	CNVC00207 CNVC00208	M495
V33	Black Spruce / Feathermoss	=	CNVC00208	M495
V34	Black Spruce / Labrador Tea / Feathermoss (<i>Sphagnum</i>)	=	CNVC00276	M495
V35	Black Spruce / Speckled Alder / <i>Sphagnum</i>	=	CNVC00298	M299
V36	Black Spruce / Bunchberry / <i>Sphagnum</i> (Feathermoss)	<<	CNVC00276 CNVC00282	M495, M299
V37	Black Spruce / Ericaceous Shrub / <i>Sphagnum</i>	=	CNVC00282	M299
V38	Black Spruce / Leatherleaf / <i>Sphagnum</i>	=	CNVC00283	M299

A6 Table 2. Correlations between Northeastern Ontario V-Types (Taylor et al. 2000) and CNVC Associations in M495 and M299. Where a V-Type corresponds to CNVC Associations in both M495 and M299, bold font indicates Associations in M495.

Code	NE Ontario Vegetation Type (Taylor et al. 2000)	Relationship	Association	Macrogroup
V1	White Birch - White Spruce	<<	CNVC00231	M495
V2	White Birch - Mountain Maple	<	CNVC00239	M495
V3	Sugar Maple		n/a	
V4	Trembling Aspen - Beaked Hazel	<	CNVC00239	M495
V5	Trembling Aspen - Bush Honeysuckle - Large-leaved Aster	<	CNVC00238	M495
V6	Trembling Aspen - White Birch - Beaked Hazel - Bracken Fern	<	CNVC00208 CNVC00238	M495
V7	White Birch - Black Spruce - Blueberry	<	CNVC00208 CNVC00213	M495
V8	Trembling Aspen - Black Spruce - Herb Poor	<	CNVC00208 CNVC00213	M495
V9	Black Ash - Speckled Alder - Sedge		n/a	
V10	Trembling Aspen - Balsam Poplar - Speckled Alder	=	CNVC00241	M495
V11	Trembling Aspen - Black Spruce - Bush Honeysuckle - Herb Rich	<<	CNVC00213 CNVC00215 CNVC00231 CNVC00234 CNVC00235	M495
V12	Trembling Aspen - White Spruce - Squashberry	<<	CNVC00231 CNVC00235	M495
V13	Balsam Poplar - Trembling Aspen - Mountain Maple - Ferns	<	CNVC00241	M495
V14	White Cedar - White Spruce - Mountain Maple - Ferns		n/a	
V15	Black Spruce - Herb Rich	<	CNVC00272 CNVC00295	M495
V16	White Cedar - Spruce - Balsam Fir - Ferns		n/a	

Code	NE Ontario Vegetation Type (Taylor et al. 2000)	Relationship	Association	Macrogroup
V17	Jack Pine - Black Spruce - Feathermoss	<	CNVC00207 CNVC00208 CNVC00209	M495
V18	Jack Pine - Black Spruce - Blueberry	<	CNVC00207 CNVC00208 CNVC00209	M495
V19	Black Spruce - Stair-step Moss	<	CNVC00208 CNVC00211	M495
V20	Black Spruce - Jack Pine - Feathermoss	<	CNVC00208 CNVC00211	M495
V21	Jack Pine - Blueberry - Feathermoss - Lichen	<	CNVC00201 CNVC00207 CNVC00209 CNVC00245	M495
V22	Black Spruce - Jack Pine - Feathermoss - Lichen	<	CNVC00208 CNVC00211 CNVC00246	M495
V23	Black Spruce – Labrador Tea - Speckled Alder - Stair-step Moss	<	CNVC00276 CNVC00295	M495
V24	Black Spruce - Speckled Alder - Labrador-tea - Sphagnum	<	CNVC00276 CNVC00298	M495, M299
V25	Black Spruce - Larch - Speckled Alder - Stair-step Moss	<	CNVC00298	M299
V26	Black Spruce - Leatherleaf - Sphagnum	=	CNVC00283	M299
V27	Black Spruce – Labrador Tea - Feathermoss - Sphagnum	=	CNVC00276	M495
V28	Black Spruce - Bog Rosemary - Pale Laurel - Sphagnum	<<	CNVC00282 CNVC00283 CNVC00288	M299

A6 Table 3. Correlations between Central Ontario V-Types (Chambers et al. 1997) and CNVC Associations in M495 and M299. Note that most Central Ontario V-Types fit better with CM014 [Eastern North American Temperate Hardwood – Conifer Forests] than with M495 or M299 boreal Associations. Even where there are matches with boreal Associations, if there are temperate indicators within a plot, the plot would better align with a temperate Association (only provisional at this time so not shown).

Code	Central Ontario Vegetation Type (Chambers et al. 1997)	Relationship	Association	Macrogroup
V1	Sugar Maple - Basswood / Leatherwood		n/a	CM014
V2	Sugar Maple - Beech / Striped Maple		n/a	CM014
V3	Sugar Maple - Red Oak - Beech / Striped Maple		n/a	CM014
V4	Sugar Maple - White Birch - Basswood / Striped Maple - Herb Rich		n/a	CM014
V5	Sugar Maple - Red Oak - Basswood - Ironwood / Leatherwood		n/a	CM014
V6	Red Oak - Sugar Maple / Ironwood - Fly Honeysuckle		n/a	CM014
V7	Black Ash - Hardwoods / Herb Rich		n/a	
V8	White Cedar - Hardwoods / Fragrant Bedstraw - Herb Rich		n/a	
V9	White Cedar - Hardwoods / Dwarf Raspberry - Mountain Maple - Herb Rich		n/a	
V10	Sugar Maple - Yellow Birch / Spinulose Wood Fern		n/a	CM014
V11	Yellow Birch - Sugar Maple - White Spruce / White Cedar - Mountain Maple		n/a	CM014
V12	Sugar Maple - White Birch - Trembling Aspen - Red Maple - Balsam Fir / Shrub		n/a	CM014
V13	Sugar Maple - White Birch - Red Maple / Fly Honeysuckle - Beaked Hazel		n/a	CM014
V14	White Birch - Red Maple - Trembling Aspen / Mountain Maple		n/a	CM014
V15	Sugar Maple - Hemlock - Yellow Birch - Red Maple / Striped Maple		n/a	CM014

Code	Central Ontario Vegetation Type (Chambers et al. 1997)	Relationship	Association	Macrogroup
V16	Sugar Maple - Hemlock - Yellow Birch / Striped Maple		n/a	CM014
V17	Sugar Maple - Hemlock / Striped Maple		n/a	CM014
V18	Hemlock - Yellow Birch / Goldthread - Wood Sorrel		n/a	CM014
V19	Hemlock / Spinulose Wood Fern - Herb Poor		n/a	CM014
V20	Trembling Aspen - Balsam Poplar / Speckled Alder	=	CNVC00241	M495
V21	White Cedar - Trembling Aspen - White Spruce / Twinflower		n/a	
V22	Trembling Aspen - White Birch - White Spruce / Dwarf Raspberry	<	CNVC00235	M495
V23	White Birch - White Pine - Trembling Aspen / Beaked Hazel - Mountain Maple		n/a	CM014
V24	Trembling Aspen - White Birch - Jack Pine - Black Spruce / Bush Honeysuckle - Blueberry - Feather Moss	=	CNVC00213	M495
V25	Trembling Aspen - White Birch - White Spruce - White Pine - Red Pine / Beaked Hazel - Mountain Maple		n/a	CM014
V26	Balsam Fir - White Spruce / Balsam Fir - Bush Honeysuckle	<<	CNVC00256	M495
V27	White Pine - White Birch - Red Oak - Largetooth Aspen / Bracken Fern		n/a	CM014
V28	Largetooth Aspen - White Pine - Red Oak - Red Maple / Blueberry - Wintergreen		n/a	CM014
V29	White Pine - Red Pine / Beaked Hazel - Bracken Fern - Bush Honeysuckle		n/a	CM014
V30	Red Pine - White Pine - Jack Pine / Blueberry - Feathermoss		n/a	CM014
V31	Red Pine - White Pine - Jack Pine - Largetooth Aspen / White Pine Shrub - Wintergreen		n/a	CM014

Code	Central Ontario Vegetation Type (Chambers et al. 1997)	Relationship	Association	Macrogroup
V32	White Pine - Red Pine / Blueberry - Feathermoss - Lichen		n/a	CM014
V33	Jack Pine / Blueberry - Feathermoss - Lichen	<	CNVC00201 CNVC00245	M495
V34	White Pine - Red Oak / Bracken Fern - Wintergreen		n/a	CM014
V35	Black Spruce - Tamarack - White Cedar / Goldthread - Sphagnum		n/a	
V36	Black Spruce - White Cedar - Balsam Fir / Northern Wild Raisin - Sphagnum		n/a	
V37	Black Spruce - White Cedar - Balsam Fir / Mountain Maple - Creeping Snowberry		n/a	
V38	White Cedar / Goldthread - Sphagnum		n/a	
V39	Black Spruce - Jack Pine - Trembling Aspen - White Birch / Blueberry - Feathermoss	<<	CNVC00213	M495
V40	Black Spruce - Jack Pine - Red Pine - White Pine / Blueberry - Feathermoss		n/a	CM014
V41	Black Spruce - Tamarack / Labrador Tea - Sphagnum	<<	CNVC00282 CNVC00288	M299

A6 Table 4. Correlations between some Nova Scotia Vegetation Types (Neily et al. 2011) and CNVC Associations in M495 and CM744 [Acadian Temperate Forest]. Only the most boreal Nova Scotia Vegetation Types have been selected for inclusion in this table.

Code	Nova Scotia Vegetaton Type	Relationship	Association	Macrogroup
C01	<i>Picea mariana</i> – <i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> / <i>Ptilium crista-castrensis</i>	<	CNVC00292	M495
C02	<i>Picea glauca</i> – <i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> – <i>Linnaea borealis</i>	<	CNVC00226	M495
C03	<i>Picea rubens</i> / <i>Sorbus americana</i> / <i>Vaccinium vitis-idaea</i>		n/a	CM744
C04	<i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> – <i>Linnaea borealis</i>	<	CNVC00309	M495
C05	<i>Betula papyrifera</i> – <i>Abies balsamea</i> / <i>Vaccinium vitis-idaea</i> – <i>Aster acuminatus</i>		n/a	
C06	<i>Acer rubrum</i> – <i>Betula</i> spp. / <i>Cornus canadensis</i> – <i>Aralia nudicaulis</i>		n/a	CM744
C07	<i>Picea glauca</i> / <i>Myrica pensylvanica</i>		n/a	
HL1	<i>Abies balsamea</i> / <i>Sorbus americana</i> / <i>Solidago macrophylla</i>	<<	CNVC00220 CNVC00222 CNVC00225 CNVC00310	M495
HL2	<i>Picea glauca</i> / <i>Aster acuminatus</i>	<<	CNVC00229 CNVC00230	CM744
HL3	<i>Betula alleghaniensis</i> – <i>Abies balsamea</i> / <i>Dryopteris campyloptera</i> – <i>Oxalis acetosella</i>		n/a	CM744
HL4	<i>Betula</i> spp. / <i>Dryopteris</i> spp. – <i>Oxalis acetosella</i>		n/a	
OF1	<i>Picea glauca</i> / <i>Aster</i> spp. – <i>Solidago</i> spp. / <i>Rhytidiadelphus triquetris</i>		n/a	CM744
OF2	<i>Larix laricina</i> / <i>Alnus incana</i> / <i>Solidago rugosa</i> / <i>Rhytidiadelphus triquetris</i>		n/a	
OF4	<i>Abies balsamea</i> – <i>Picea glauca</i> / <i>Dryopteris intermedia</i> – <i>Aster acuminatus</i>		n/a	
OW1	<i>Pinus banksiana</i> / <i>Gaylussacia baccata</i> / <i>Empetrum nigrum</i> / <i>Cladina</i> spp.	<	CNVC00203	CM744

Code	Nova Scotia Vegetaton Type	Relationship	Association	Macrogroup
OW2	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Cladina</i> spp.		n/a	
SP1	<i>Pinus banksiana</i> / <i>Pteridium aquilinum</i> – <i>Gaultheria procumbens</i>	<	CNVC00210	CM744
SP4	<i>Pinus strobus</i> / <i>Vaccinium</i> spp. / <i>Pteridium aquilinum</i>		n/a	CM744
SP5	<i>Picea mariana</i> / <i>Kalmia angustifolium</i> / <i>Pteridium aquilinum</i>		n/a	
SP6	<i>Picea mariana</i> – <i>Acer rubrum</i> / <i>Pteridium aquilinum</i> – <i>Aralia nudicaulis</i>		n/a	CM744
SP7	<i>Picea mariana</i> / <i>Nemopanthus mucronata</i> / <i>Sphagnum capillifolium</i>	<	CNVC00219	CM744
WC1	<i>Picea mariana</i> / <i>Osmunda cinnamomea</i> / <i>Sphagnum</i> spp.	<	CNVC00291	
WC2	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> – <i>Ledum groenlandicum</i> / <i>Sphagnum</i> spp.	<	CNVC00284	
WC3	<i>Pinus banksiana</i> – <i>Picea mariana</i> / <i>Rhododendron canadense</i> / <i>Sphagnum</i> spp.	<	CNVC00285	
WC5	<i>Picea rubens</i> – <i>Abies balsamea</i> / <i>Osmunda cinnamomea</i> / <i>Sphagnum</i> spp.		n/a	CM744
WC6	<i>Abies balsamea</i> / <i>Osmunda cinnamomea</i> – <i>Carex trisperma</i> / <i>Sphagnum</i> spp.	<	CNVC00279	
WC7	<i>Larix laricina</i> – <i>Picea mariana</i> / <i>Kalmia angustifolia</i> / <i>Sphagnum</i> spp.	<	CNVC00289 CNVC00302	
WD2	<i>Acer rubrum</i> / <i>Osmunda cinnamomea</i> / <i>Sphagnum</i> spp.		n/a	
WD3	<i>Acer rubrum</i> / <i>Onoclea sensibilis</i> – <i>Athyrium filix-femina</i> / <i>Sphagnum</i> spp.		n/a	
WD4	<i>Acer rubrum</i> / <i>Toxicodendron radicans</i> / <i>Sphagnum</i> spp.		n/a	
WD6	<i>Acer rubrum</i> – <i>Abies balsamea</i> / <i>Aster acuminatus</i> / <i>Sphagnum</i> spp.		n/a	

A6 Table 5. Correlations between Newfoundland Forest Types (Meades and Moores 1994) and CNVC Associations. Some Newfoundland Forest Types relate to CNVC Associations in wetland Macrogroups, M299 [North American Boreal Conifer Poor Swamp] and M300 [North American Boreal Flooded & Rich Swamp]. Some M495 Associations that occur in insular Newfoundland were not treated in Meades & Moores and are not shown in this table: CNVC00309 [*Abies balsamea* / *Vaccinium vitis-idaea* / *Pleurozium schreberi* – *Bazzania trilobata*], CNVC00316 [*Betula papyrifera* / *Alnus viridis* / *Solidago macrophylla*] and CNVC00338 [*Picea mariana* / *Rhododendron canadense* – *Taxus canadensis* / *Pleurozium schreberi*].

Code	Meades & Moores Forest Type	Relationship	Association	Macrogroup
Fre #1	<i>Equisetum</i> – <i>Rubus</i> – Balsam Fir	<	CNVC00348	M495
Fr #2	<i>Rubus</i> – Balsam fir	<<	CNVC00348	M495
		<<	CNVC00351	M495
Fc #3	<i>Clintonia</i> – Balsam Fir	<	CNVC00222	M495
Ft #4	<i>Taxus</i> – Balsam Fir	<	CNVC00222	M495
Fdh #5	<i>Dryopteris</i> – <i>Hylocomium</i> – Balsam Fir	<	CNVC00310	M495
Fd #6	<i>Dryopteris</i> – Balsam Fir	<<	CNVC00310	M495
		<<	CNVC00311	M495
Fdr #7	<i>Dryopteris</i> – <i>Rhytidiadelphus</i> – Balsam Fir	<	CNVC00310	M495
Fdl #8	<i>Dryopteris</i> – <i>Lycopodium</i> – Balsam Fir	<	CNVC00310	M495
Fh #9	<i>Hylocomium</i> – Balsam Fir	<	CNVC00222	M495
Fg #10	<i>Gaultheria</i> – Balsam Fir	<	CNVC00278	M495
Fp #11	<i>Pleurozium</i> – Balsam Fir	<<	CNVC00222	M495
		<<	CNVC00351	M495
Ss #12	<i>Sphagnum</i> – Black Spruce	<	CNVC00312	M299
SM/R #13	Black Spruce – Feathermoss / Bedrock	<	CNVC00350	M495
SM/vD #14	Black Spruce – Feathermoss / Very dry	<	CNVC00350	M495
SM/D #15	Black Spruce – Feathermoss / Dry	<	CNVC00350	M495
SM/B #16	Black Spruce – Feathermoss / Bog	<	CNVC00350	M495
SM/M #17	Black Spruce – Feathermoss / Moist	<	CNVC00350	M495
Sc #18	<i>Carex</i> – Black Spruce	<	CNVC00293	M300
SO #19	<i>Osmunda</i> – Black Spruce	<<	CNVC00293	M300
		<<	CNVC00312	M299
SK #20	<i>Kalmia</i> – Black Spruce	=	CNVC00307	M495
SKc #21	<i>Cladonia</i> – <i>Kalmia</i> – Black Spruce	=	CNVC00205	M495

Code	Meades & Moores Forest Type	Relationship	Association	Macrogroup
SKn #22	<i>Nemopanthus</i> – <i>Kalmia</i> – Black Spruce	<<	CNVC00335	M299
		<<	CNVC00339	M299
SKs #23	<i>Sphagnum</i> – <i>Kalmia</i> – Black Spruce	<	CNVC00335	M299
BtA #24	Birch – Aspen	<	CNVC00349	M495
Bdc #25	<i>Dryopteris</i> – <i>Clintonia</i> – Birch	<	CNVC00315	M495
Br #27	<i>Rubus</i> – Birch	<	CNVC00349	M495
Bd #28	<i>Dryopteris</i> – Birch	<	CNVC00315	M495
BK #29	<i>Kalmia</i> – Birch	<	CNVC00237	M495