Natural Resources Canada | Ressources naturelles Canada

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
Information Report GLC-X-24

Canada

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]

[*]**retired**

[1]Natural 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

Published by:
Natural Resources Canada
Canadian Forest Service
Great Lakes Forestry Centre
1219 Queen Street East
Sault Ste. Marie, Ontario P6A 2E5

Information Report Number: GLC-X-24
2020

Cataloguing information for this publication is available from Library and Archives Canada.

A Guide to the Canadian National Vegetation Classification Associations of the Eastern North American Boreal Forest Macrogroup M495
(Information Report, ISSN 2562-0738 GLC-X-24)

Issued also in French under the title: "Guide des associations de Macrogroupe M495 Forêts boréales de l'Est de l'Amérique du Nord de la Classification nationale de la végétation du Canada".
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]
[*]**retraité**
Electronic monograph in PDF format.
Includes bibliographical references.
ISBN 978-0-660-34652-6
Cat. no.: Fo123-2/24-2020E-PDF

Table of Contents

List of Tables

List of Figures

List of Appendices

Acknowledgements

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 (Uhlig 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 Committe, 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**	*For upland vegetation that includes zonal vegetation:* 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. *For azonal vegetation*: 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.
6. **Group**	*For upland vegetation that includes zonal vegetation*: 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. *For azonal vegetation*: 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.
7. **Alliance**	*For upland vegetation that includes zonal vegetation*: 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., successionally related Associations on similar edaphic conditions can be aggregated into more generalized Alliances). An example is CA00001 *Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp. *For azonal vegetation*: 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 *Picea mariana (Abies balsamea) / Kalmia angustifolia / Sphagnum capillifolium*.
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 *Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*.

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*).

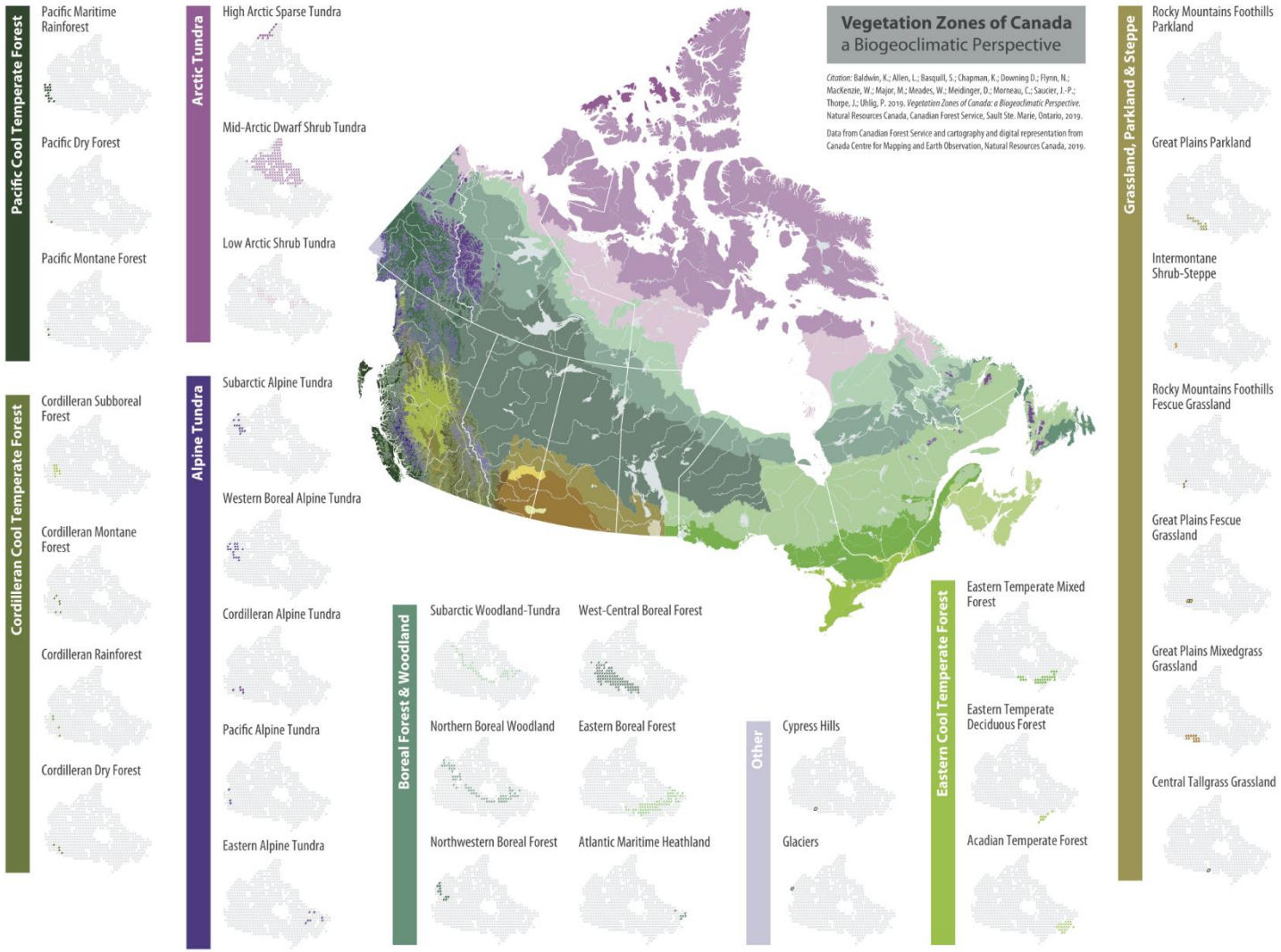


Figure 1. Vegetation zones of Canada (Baldwin et al. 2019a)

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 occured 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.

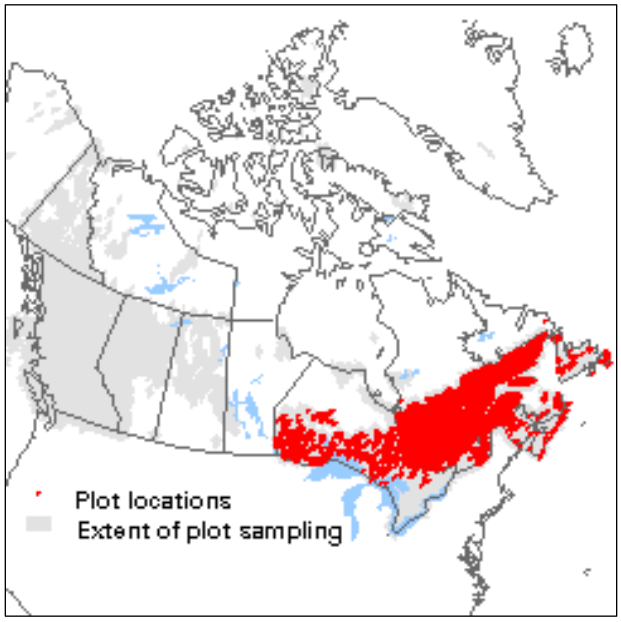


Figure 2. Plot distribution map for M495 [Eastern North American Boreal Forest]. Although M495 also describes forests in eastern Manitoba, there were no plot data available for analysis. Note that the extent of plot sampling in Quebec corresponds to plots currently classified in the CNVC (south of 52°N); 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 stairstep 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 ≥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	*Abies balsamea*		■■■■■	■■■■	balsam fir
	Picea glauca		■■■■	■■■	white spruce
	Picea mariana		■■■■■	■■■■■	black spruce
	Pinus banksiana			■■■■	jack pine
	Betula papyrifera		■■■■	■■■■	paper birch
	Populus tremuloides		***	■■■■	trembling aspen
Shrub	*Acer spicatum*		***	■■■■	mountain maple
	Alnus incana		***	****	speckled alder
	Alnus viridis		***	****	green alder
	Amelanchier spp.		■■■	■■■	serviceberries
	Corylus cornuta		***	****	beaked hazelnut
	Diervilla lonicera		***	■■■	northern bush-honeysuckle
	Ilex mucronata		***	***	mountain holly
	Kalmia angustifolia		***	■■■■	sheep laurel
	Prunus pensylvanica		***	***	pin cherry
	Rhododendron groenlandicum		***	■■■■	common Labrador tea
	Ribes spp.		**	***	currants
	Rubus idaeus		***	***	red raspberry
	Salix spp.		***	■■■	willows
	Sorbus americana + S. decora		■■■	■■■	mountain-ashes
	Vaccinium angustifolium		■■■	■■■	early lowbush blueberry
	Vaccinium myrtilloides		■■■	■■■	velvet-leaved blueberry
	Viburnum nudum		***	***	wild raisin
Herb & dwarf shrub	*Aralia nudicaulis*		■■■	■■■	wild sarsaparilla
	Carex spp.		■■	■■	sedges
	Clintonia borealis		■■■	■■■	yellow clintonia
	Coptis trifolia		■■	■■	goldthread
	Cornus canadensis		■■■	■■■	bunchberry
	Dryopteris spinulosa complex		■■■	***	wood ferns
	Eurybia macrophylla		**	***	large-leaved aster
	Gaultheria hispidula		■■■	■■■	creeping snowberry
	Gymnocarpium dryopteris		**	**	common oak fern
	Linnaea borealis		■■■	■■	twinflower
	Lycopodium annotinum		***	***	stiff clubmoss
	Lycopodium obscurum		**	**	flat-branched tree-clubmoss
	Lysimachia borealis		■■	■■	northern starflower
	Maianthemum canadense		■■■	■■■	wild lily-of-the-valley
	Oxalis montana		■■■■	***	common wood-sorrel
	Pteridium aquilinum		***	***	bracken fern
	Rubus pubescens		***	***	dwarf raspberry
	Streptopus lanceolatus		**	**	rose twisted-stalk
Moss & lichen	*Bazzania trilobata*		■■■	**	three-lobed whipwort
	Cladina spp. + *Clad* spp.		■■■	■■■	reindeer + clad lichens
	Dicranum spp.		■■■	■■■	broom mosses
	Hylocomium splendens		■■■■	■■■	stairstep moss
	Pleurozium schreberi		■■■■■	■■■■■	red-stemmed feathermoss
	Polytrichum spp.		■■	■■	haircap mosses
	Ptilium crista-castrensis		■■■	■■■	knight's plume moss
	Sphagnum 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*), twinflower (*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.

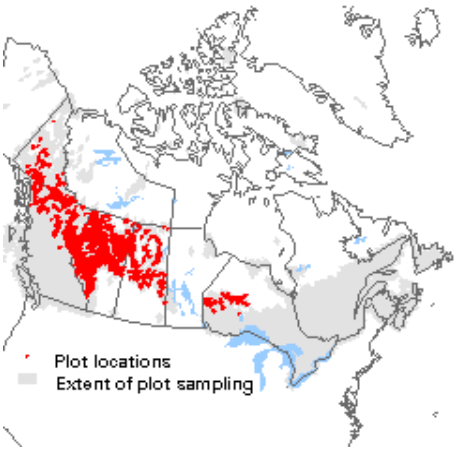
2.3.3 CM014 Eastern North American Temperate Hardwood – Conifer Forest and CM744 Acadian Temperate Forest

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 (*Gaultheria 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.).

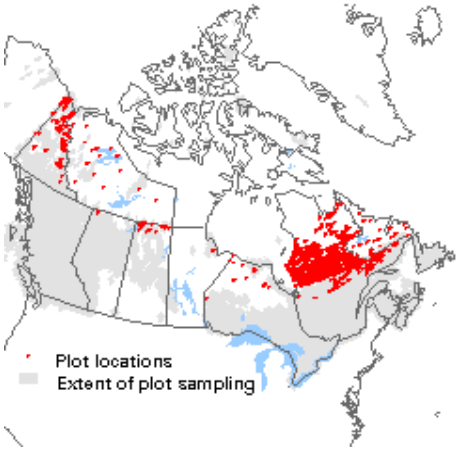
2.3.4 M299 North American Boreal Conifer Poor Swamp and M300 North American Boreal Flooded & Rich Swamp Forest

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.

a) M495 Eastern North American Boreal Forest



b) M496 West-Central North American Boreal Forest



c) M179 North American Northern Boreal Woodland

d) M299 North American Boreal Conifer Poor Swamp

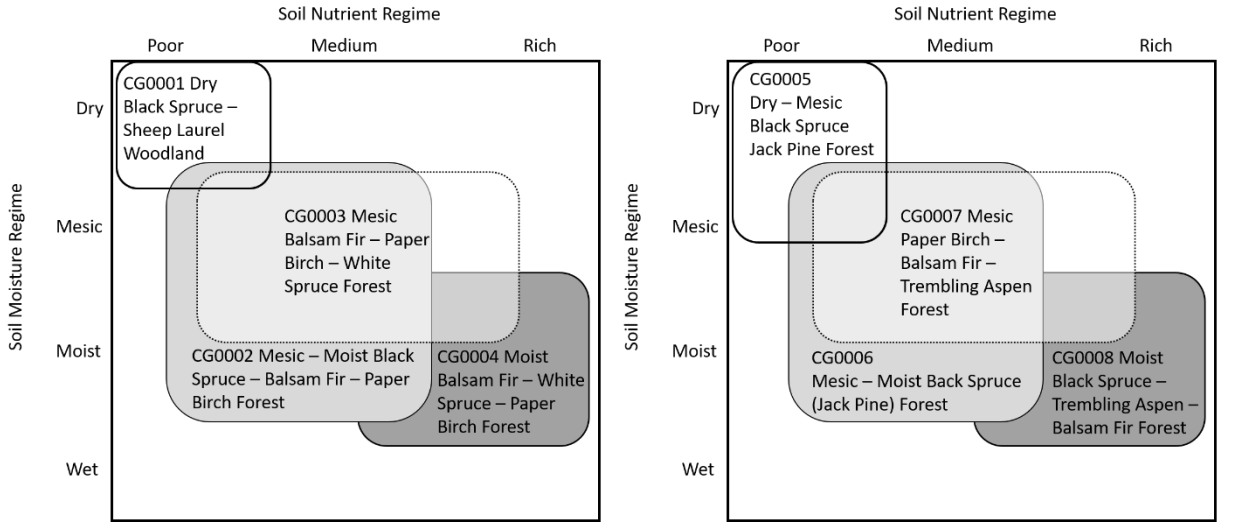
e) CM014 Eastern North American Temperate Hardwood – Conifer Forest

f) CM744 Acadian Temperate Forest

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	*B. papyrifera* and/or *P. tremuloides*		CNVC00269 CNVC00237		CNVC00238	CNVC00239 CNVC00315	CNVC00242 CNVC00349 CNVC00316
	P. tremuloides (P. balsamifera)						CNVC00241
Mixedwood	*P. tremuloides* and/or *B. papyrifera* with *P. banksiana* and/or *P. mariana*				CNVC00213	CNVC00215	CNVC00272
	B. papyrifera with *P. mariana (A. balsamea*)		CNVC00214	CNVC00270	CNVC00218 CNVC00234 CNVC00344	CNVC00216	
	A. balsamea with *B. papyrifera*				CNVC00231 CNVC00232 CNVC00233	CNVC00235 CNVC00311	CNVC00273 CNVC00274
Conifer	*P. banksiana (P. mariana)*	CNVC00201 CNVC00245	CNVC00207 CNVC00209				CNVC00294
	P. mariana	CNVC00204 CNVC00246 CNVC00205	CNVC00208 CNVC00211 CNVC00338 CNVC00307	CNVC00276	CNVC00350		CNVC00295
	P. mariana with *A. balsamea*		CNVC00217 CNVC00292	CNVC00277	CNVC00351		CNVC00296
	A. balsamea and/or *P. glauca*		CNVC00226 CNVC00309	CNVC00278	CNVC00220 CNVC00222	CNVC00256 CNVC00225 CNVC00310	CNVC00297 CNVC00348

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

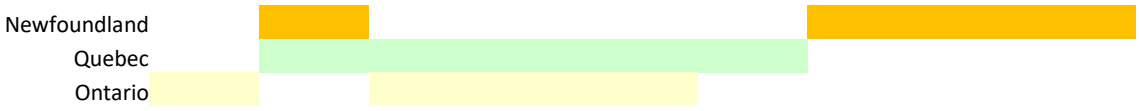
Nine Associations in M495 are hardwood types (Figure 5); they typically have less than 5% cover of conifer species in the overstory, but may have as much as 15% (Table 4). These Associations are usually dominated by paper birch (*Betula papyrifera*) and/or trembling aspen (*Populus tremuloides*). On 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 alleghanienis*) 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* (Uchytil 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 ≥35% are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.



Layer	Scientific Name	CNVC 00269	CNVC 00237	CNVC 00238	CNVC 00239	CNVC 00241	CNVC 00242	CNVC 00315	CNVC 00316	CNVC 00349	Common Name
	n Plots	3	157	263	1480	315	93	6	3	10	
Tree	*Abies balsamea*		■■■	■■■	■■■	■■■■	■■■	■■■	■■■■	■■■■	balsam fir
	Acer rubrum		***	***			***		■■	■■	red maple
	Betula alleghaniensis						***	■■■■■			yellow birch
	Betula papyrifera	■■■■■	■■■■■	■■■■	■■■■■	■■■	■■■■■	■■■■■	■■■■■■	■■■■■■	paper birch
	Picea glauca	■■■	***	■■■	■■■	***	■■■	■■			white spruce
	Picea mariana	■■	■■■	■■■	■■■	■■■	■■■				black spruce
	Populus balsamifera					■■■■■					balsam poplar
	Populus tremuloides		■■■	■■■■■	■■■■■	■■■■■	■■■■				trembling aspen
	Prunus pensylvanica		***	■■■	■■■	***	■■■	***	■■	■■	pin cherry
Shrub	*Abies balsamea*	■■■■	■■■■	■■■■	■■■■	■■■	■■■■	■■■■	■■■	■■■	balsam fir
	Acer rubrum		***	***	**	***	***		■■■	■■■	red maple
	Betula papyrifera	■■■■	■■■	■■■	■■■	■■■	■■■		■■	■■	paper birch
	Picea glauca	■■■	***	■■■	■■■	***	■■■		■■	■■	white spruce
	Picea mariana	■■■	■■■	■■■	■■■	■■■	■■■				black spruce
	Populus balsamifera					■■■					balsam poplar
	Populus tremuloides	■■	■■■	■■■	■■■	■■■	***				trembling aspen
	Prunus pensylvanica		■■■	■■■	■■■	***	■■■				pin cherry
	Acer spicatum	■■	***	■■■	■■■■■	■■■■	■■■■	■■■	■■■■■	■■■■■	mountain maple
	Alnus incana		***	***	***	■■■■■	■■■■■				speckled alder
	Alnus viridis	■■■	■■■■	■■■■	****	****	***		■■■	■■■	green alder
	Amelanchier spp.	■■	■■■	■■■	■■■	***	■■■				serviceberries
	Cornus stolonifera			**	***	■■■	**		■■	■■	red-osier dogwood
	Corylus cornuta		***	***	■■■■	■■■	■■■		■■	■■	beaked hazelnut
	Diervilla lonicera	■■■■■	***	■■■■	■■■■	■■■	■■■				northern bush-honeysuckle
	Ilex mucronata		■■■	***	***		■■■		■■	■■	mountain holly
	Kalmia angustifolia		■■■■	■■■■	***	***	***		■■	■■	sheep laurel
	Rhododendron groenlandicum		■■■■	■■■	***	***	***				common Labrador tea
	Ribes spp.		■■	■■	■■■	■■■	■■■	■■	■■	■■	currants
	Rosa acicularis			**		■■					prickly rose
	Rubus idaeus		***	***	■■■	■■■	■■■	■■			red raspberry
	Salix spp.		■■■	■■■	***	■■■	■■■				willows
	Sambucus racemosa		**	**	***	**	■■	■■			red elderberry
	Sorbus american + S. decora	■■	■■■	■■■	■■■	■■■	■■■	■■			mountain-ashes
	Vaccinium angustifolium	■■	■■■	■■■	■■■	**	■■		■■	■■	early lowbush blueberry
	Vaccinium myrtilloides	■■■■	■■■	■■■	■■■	***	■■■				velvet-leaved blueberry
	Viburnum nudum		***	■■■	■■■	***	■■■■		■■	■■	wild raisin
Herb & dwarf shrub	*Actaea rubra*	■■			**	■■					red baneberry
	Aralia nudicaulis	■■■	■■■	■■■	■■■	■■■	■■■				wild sarsaparilla
	Athyrium filix-femina			**	***	■■■	■■■				common lady fern
	Carex spp.		**	**	■■	■■	■■■		■■■	■■■	sedges
	Chamerion angustifolium	■■	**	■■	**	■■	**				fireweed
	Clintonia borealis	■■■■	■■■	■■■	■■■	■■■	■■■	■■■■	■■■	■■■	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	*Coptis trifolia*	■■	■■	■■	■■	■■	■■		■■	■■	goldthread
	Cornus canadensis	■■■■	■■■■	■■■■	■■■	■■■	■■■	■■■			bunchberry
	Dryopteris spinulosa complex		■■	***	■■■	■■■	■■■	■■■■■■	■■	■■	wood fern
	Equisetum spp.		**	**	***	■■■	■■■				horsetail
	Eurybia macrophylla		***	■■■■	■■■■	■■■■	■■■				large-leaved aster
	Galearis rotundifolia										small round-leaved orchid
	Galium triflorum	■■		**	**	■■	***		■■	■■	three-flowered bedstraw
	Gaultheria hispidula		■■■	**	**	**	**				creeping snowberry
	Gymnocarpium dryopteris		**	**	■■	■■	■■		■■	■■	common oak fern
	Huperzia lucidula		***		**	**	***				shining firmoss
	Linnaea borealis	■■	■■■	■■■	■■■	■■	■■		■■	■■	twinflower
	Lycopodium annotinum	■■	■■■	■■■	■■■	***	■■■■	■■■			stiff clubmoss
	Lycopodium clavatum	■■	***	■■	**	**	***				running clubmoss
	Lycopodium obscurum		■■	■■	■■	**	■■	**			flat-branched tree-clubmoss
	Lysimachia borealis	■■	■■	■■	■■	■■	■■	■■■	■■■	■■■	northern starflower
	Maianthemum canadense	■■■	■■■	■■■	■■■	■■	■■■	■■■■	■■■	■■■	wild lily-of-the-valley
	Mitella nuda			**	**	■■■	**		■■■	■■■	naked mitrewort
	Monotropa uniflora	■■	**	**	**		**	■■	■■	■■	Indian pipe
	Orthilia secunda	■■		**	**	**					one-sided wintergreen
	Oxalis montana		***	**	■■■	***	■■■				common wood-sorrel
	Petasites frigidus			**		■■	**				arctic sweet coltsfoot
	Poaceae		**	***	***	■■■	■■■				grass family
	Pteridium aquilinum		■■■	■■■■	■■■■	****	***				bracken fern
	Rubus pubescens		**	■■	■■■	■■■	■■■		■■■■	■■■■	dwarf raspberry
	Solidago macrophylla		■■■	**	**	**	**		■■■	■■■	large-leaved goldenrod
	Solidago rugosa					****			■■	■■	rough-stemmed goldenrod
	Streptopus lanceolatus		**	■■	■■	■■	**	■■	■■	■■	rose twisted-stalk
	Viola spp.		**	**	■■	■■■	■■■	■■	■■	■■	violets
Moss & lichen	*Cladina* spp. + *Clad* spp.	■■	■■■	■■■	■■■	■■	■■■				reindeer + clad lichens
	Dicranum spp.	■■	■■■	■■	■■■	■■	■■	■■	■■	■■	broom mosses
	Hylocomiastrum umbratum							■■			shaded wood moss
	Hylocomium splendens	■■■■	***	***	***	**	***	■■	■■	■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.	■■	**	**	**	■■	**				leafy mosses
	Pleurozium schreberi	■■■■	■■■■	■■■	■■■	■■■	■■■	■■	■■	■■	red-stemmed feathermoss
	Polytrichum spp.		■■	■■■	■■	***	■■	■■	■■	■■	haircap mosses
	Ptilium crista-castrensis	■■	■■■	■■	■■	■■	■■■	■■			knight's plume moss
	Rhytidiadelphus loreus							■■			lanky moss
	Sphagnum spp.	■■	■■■	***	***	***	■■■				peat mosses

3.1.2 Mixedwood

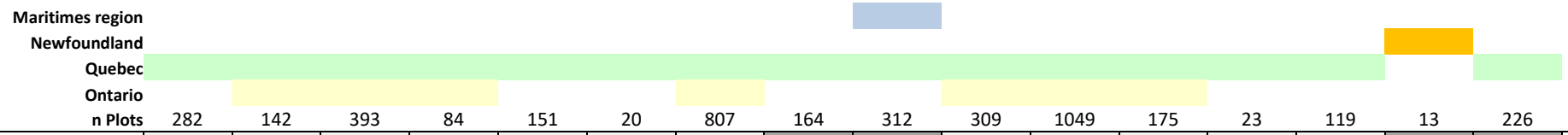
There are 16 mixedwood Associations in M495 (Figure 5; Table 5). Seven occur in Ontario, 15 in Quebec, 1 in insular Newfoundland and 1 in the Maritimes region (described from New Brunswick and Nova Scotia). These types all have canopies with at least 5% cover of both a conifer and a hardwood species. 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 ≥35% are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.



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
	n Plots	282	142	393	84	151	20	807	164	312	309	1049	175	23	119	13	226	
Tree	*Abies balsamea*	■■■	■■■■	■■■	■■■	■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■	balsam fir
	Betula alleghaniensis		***							***		***			***	■■■■		yellow birch
	Betula papyrifera	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■	****	■■■■	■■■■	■■■■	■■■■	paper birch
	Picea glauca	***	■■■	***	***	■■■	■■■	■■■■	■■■	■■■	■■■	■■■■	****	■■■■	■■■■	■■	****	white spruce
	Picea mariana	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	■■■	***	■■■■	***	■■■■■	■■■	■■■■		■■■■	black spruce
	Pinus banksiana	■■■■	***	■■■■	■■■■	****	■■■■■	***			***		■■■■				***	jack pine
	Populus tremuloides	■■■■	****	■■■■■	■■■■■	■■■■	■■■	■■■■■	***		■■■■	■■■■■	■■■■■	■■■■■	****		***	trembling aspen
Shrub	*Abies balsamea*	■■■■	■■■■■	■■■■	■■■	■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■	■■■■	■■■	■■■	■■■■	■■■■	■■■■	balsam fir
	Acer rubrum	***	***	***	■■■	***	■■■	■■■	***	***	■■■	■■■		**	***		***	red maple
	Betula papyrifera	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■		■■■	paper birch
	Picea glauca	***	■■■	***	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■	■■■	**	***	white spruce
	Picea mariana	■■■■	■■■■	■■■	■■■	■■■	■■■■	■■■	■■■	***	■■■■	***	■■■	■■■	■■■		■■■■	black spruce
	Populus tremuloides	■■■	***	■■	■■	■■■	■■	■■	**		■■■	■■	■■	■■■	***		**	trembling aspen
	Acer spicatum	***	■■■	■■■	■■■■■	■■■■	■■■■	■■■	***	■■■	■■■	■■■■■	***	■■■	■■■■	■■■	***	mountain maple
	Alnus incana	***	■■■	***	***	***	■■■	***	***	***	***	***	■■■■■	■■■■■	■■■■■	**	***	speckled alder
	Alnus viridis	■■■■	****	■■■■	■■■	****	■■■■	****	***		***	***	****		***		■■■	green alder
	Amelanchier spp.	■■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■	■■■		■■■	serviceberry
	Cornus stolonifera			***	**	***	**	***				***	■■■	***	■■■			red-osier dogwood
	Corylus cornuta		**	***	■■■■	■■■■	***	■■■		***	***	■■■■	***	■■■	■■■■			beaked hazelnut
	Diervilla lonicera	■■■	***	■■■	■■■	■■■■	■■■	■■■	***	***	■■■	■■■	■■■	■■■	■■■		***	northern bush-honeysuckle
	Ilex mucronata	■■■	■■■	***	***	■■■	■■	***	***	***	■■■	***		***	***		■■■	mountain holly
	Kalmia angustifolia	■■■■	■■■	■■■	***	■■■	■■■■	***	■■■		■■■	***	***	***	***		■■■	sheep laurel
	Lonicera canadensis		**	**	■■	***	■■	**		***	**	■■	**		***			Canada fly-honeysuckle
	Prunus pensylvanica	■■■	***	**	**	■■■	■■	**	***	■■■	***	***	**	■■■	***		**	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	*Rhododendron groenlandicum*	■■■■	■■■	■■■	**	***	■■	***	***		■■■		■■■	***	***	**	■■■	common Labrador tea
	Ribes spp.	**	■■	■■	**	■■	***	■■	***	■■■	■■	■■■	■■■	■■■	■■■	**	**	currants
	Rosa acicularis			**	**			**				**	■■	***				prickly rose
	Rubus idaeus	**	***	**	**	***	***	***	***	■■■	***	■■■	■■■	■■■	■■■		**	red raspberry
	Salix spp.	■■■	***	■■■	***	■■■	■■■	***	***	***	■■■	***	***	■■■	■■■		■■■	willows
	Sambucus racemosa		**	**		**	***	**	**	■■■	**	**	**	***	■■		**	red elderberry
	Sorbus americana + S. decora	■■■	■■■	■■	■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■	■■■	mountain-ashes
	Vaccinium angustifolium	■■■■	■■■	■■■	■■	■■■	■■■	■■	■■■	**	■■■	**	■■	**	**	**	■■■	early lowbush blueberry
	Vaccinium myrtilloides	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■■	***	■■	**	■■■		■■■	velvet-leaved blueberry
	Viburnum edule	**	**	**	***	***		***	**	***	***	**	■■■	■■■	■■■	**	**	squashberry
	Viburnum nudum	■■■	■■■	■■■	***	■■■	■■■	***	***	***	■■■	■■■	***	■■■	■■■	**	***	wild raisin
Herb & dwarf shrub	*Actaea rubra*			**	**			**				**	**	■■	**			red baneberry
	Aralia nudicaulis	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■■	■■■■	■■■		■■■	wild sarsaparilla
	Athyrium filix-femina		***	**	**	***	**	***	**	***	**	***	**	■■■	■■■			common lady fern
	Carex spp.	**	■■■	**	**	**	**	■■	**	■■	**	■■	■■■	■■■	■■■		**	sedges
	Chamerion angustifolium	**	**	**	**	**	**	**	**	**	**	**	■■	**	**		**	fireweed
	Clintonia borealis	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	yellow clintonia
	Coptis trifolia	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■		■■	goldthread
	Cornus canadensis	■■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■	■■■	bunchberry
	Dryopteris spinulosa complex	**	■■■	**	***	■■■	■■	■■	■■	■■■■	■■	■■■	***	■■■	■■■	■■■■■	■■	wood fern
	Equisetum spp.	**	***	**	***		***	**	**		**	**	■■	■■	■■■			horsetails
	Eurybia macrophylla	***	**	■■■	■■■	■■■	■■■	■■■	**		***	■■■	■■■■	■■■■	***		**	large-leaved aster
	Fragaria virginiana			**	**			**					■■					wild strawberry
	Galium spp.			*	*	**	***	**				**	■■	■■	■■			bedstraws
	Gaultheria hispidula	■■■	■■■	■■	■■	■■	■■■	**	■■■	***	■■■	**	■■	**	**	**	■■■	creeping snowberry
	Gymnocarpium dryopteris	**	**	**	**	***	**	**	***	**	**	■■	■■	■■■	■■■		**	common oak fern
	Linnaea borealis	■■■	■■	■■■	■■	■■■	■■	■■■	■■	■■	■■■	■■■	■■	**	■■■	■■	■■	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	*Lycopodium annotinum*	■■■	**	■■■	**	***	***	■■■	■■	***	■■■	***	■■■	■■■■	■■■■	**	■■■	stiff clubmoss
	Lycopodium clavatum	**		**	■■	**	**	**	**	**	**	**	**	***	**		**	running clubmoss
	Lycopodium obscurum	■■	**	■■	■■	■■	**	■■	■■	**	■■	■■	**	■■	**		■■	flat-branched tree-clubmoss
	Lysimachia borealis	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	northern starflower
	Maianthemum canadense	■■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■■■	■■■	wild lily-of-the-valley
	Mitella nuda			**	**			**		**		***	■■■	■■■	***			naked mitrewort
	Oxalis montana		■■■	***		■■■	**	***	■■	■■■■	***	■■■■	***	■■■	■■■		**	common wood-sorrel
	Petasites frigidus	***		**	**			**				**	■■	**	**			arctic sweet coltsfoot
	Poaceae	**	***	***	**	***	**	***	**	***	**	***	***	■■■	■■■		**	grass family
	Pteridium aquilinum	■■■	***	■■■■	■■■■	■■■■	■■■	■■■	***	***	■■■■	■■■		***	***		***	bracken fern
	Rubus pubescens		**	**	■■	***	**	■■	**	**	***	■■■	■■■	■■■	■■■		**	dwarf raspberry
	Streptopus lanceolatus	**	**	■■	■■	■■	**	■■	**	**	**	■■	■■	■■	**	**	**	rose twisted-stalk
	Viola spp.	**	**	**	■■	■■	■■	**	***	**	**	■■	■■	■■■	■■■			violets
Moss & lichen	*Bazzania trilobata*	***	**	**	**	**	**	**	■■	***	**	**			**	■■■■	**	three-lobed whipwort
	Cladina spp. + *Cladonia* spp.	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■	■■	■■■		■■■	reindeer + clad lichens
	Dicranum spp.	■■■	■■■	■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■	■■■	■■■	■■■	broom mosses
	Hylocomiastrum umbratum									***						■■■		shaded wood moss
	Hylocomium splendens	***	■■■	■■■	**	■■■	■■	■■■	■■■■	■■■	■■■	■■■	■■■	**	***	■■■	■■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.	**	**	**	**	**	**	**	**	**	**	■■	■■	■■	■■■	**	**	leafy mosses
	Pleurozium schreberi	■■■■■	■■■■	■■■■	■■■	■■■■	■■■■■	■■■	■■■■■	■■■■	■■■■	■■■	■■■■	■■■	■■■	■■	■■■■■	red-stemmed feathermoss
	Polytrichum spp.	■■■	■■	■■	**	■■	■■	■■■	■■	■■■	■■	■■	***	■■	■■	■■	■■	haircap moss
	Ptilium crista-castrensis	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■	■■	■■■	■■	■■■	**	■■■	knight's plume moss
	Rhytidiadelphus loreus															■■■		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	*Rhytidiadelphus triquetrus*			***	**	***	***	**			**	***	■■■	**	***	****		electrified cat's-tail moss
Moss & lichen	*Sphagnum* 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*).

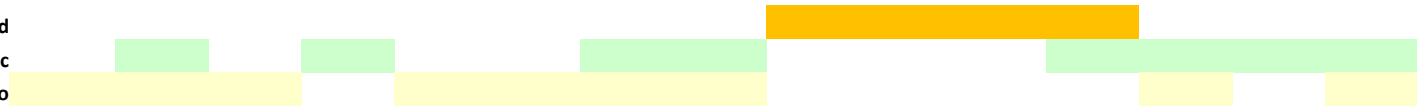
The top row is Associations dominated by *P. banksiana*. These types occur in Ontario and Quebec and typically establish after fire or harvesting. *P. banksiana* is an early seral species that normally requires fire to regenerate, so is only prevalent where it is supported by the relatively more frequent 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 ≥20% are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.

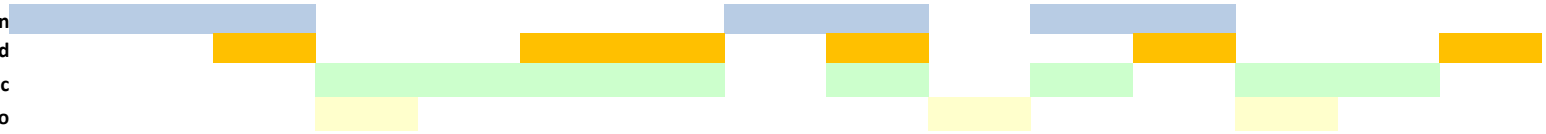


Layer	Scientific Name	CNVC 00245	CNVC 00201	CNVC 00246	CNVC 00204	CNVC 00207	CNVC 00208	CNVC 00209	CNVC 00211	CNVC 00205	CNVC 00307	CNVC 00338	CNVC 00350	CNVC 00276	CNVC 00294	CNVC 00295	Common Name
	n Plots	35	171	16	158	274	751	853	2118	11	20	4	207	826	47	201	
Tree	*Abies balsamea*	**			**		***	***	■■■		■■■■	■■	■■■	■■■	***	***	balsam fir
	Betula papyrifera		***	**	**	**	***	■■■	■■■	**	■■	**	■■■	***	***	***	paper birch
	Larix laricina			***	***				***	■■	****	**	***	***		****	tamarack
	Picea mariana	■■■	■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■	■■■■■	black spruce
	Pinus banksiana	■■■■	■■■■■	**	■■■	■■■■■	■■■■	■■■■■	***					***	■■■■■	***	jack pine
	Pinus strobus									**	**						eastern white pine
	Populus tremuloides		***		***	**	■■■■	***	***	**	**			***	■■■■	***	trembling aspen
Shrub	*Abies balsamea*	**	**	**	***	■■■	■■■	■■■	■■■	**	■■■■	■■	■■■■	■■■■	■■■	■■■	balsam fir
	Acer rubrum						**	***				**			**		red maple
	Betula papyrifera	**	***	***	***	■■■	■■■	■■■	■■■	***	**		■■■	■■■	***	***	paper birch
	Larix laricina				**				**	****		**		**		**	tamarack
	Picea mariana	■■■	■■■■	■■■■	■■■■	■■■	■■■	■■■■	■■■■	■■■	■■■■	■■■■■	■■■■	■■■■	■■■	■■■■	black spruce
	Pinus banksiana	■■■■	■■■	****	**	**	**	**									jack pine
	Populus tremuloides	**	***	**	**	**	■■	**	**	■■					**	**	trembling aspen
	Prunus pensylvanica	**				**	**	***	**		**				***		pin cherry
	Alnus incana						***						***	***	■■■■■	■■■■	speckled alder
	Alnus viridis	***	***	**	***	■■■	■■■			■■■■	***		***	***	****	***	green alder
	Amelanchier spp.	***	■■	**	■■	**	**			**	**	■■■	■■■	■■■	■■	***	serviceberries
	Diervilla lonicera	***				■■	■■■								***	***	northern bush-honeysuckle
	Ilex mucronata		***		***						****	■■■	***	***	***	***	mountain holly
	Juniperus communis									**	***						common juniper
	Kalmia angustifolia		■■■■■	***	■■■■■					■■■■■	■■■■■	■■■	■■■	■■■■	■■■■	■■■■	sheep laurel
	Kalmia polifolia		**		**							■■	**	**		**	pale bog laurel
	Rhododendron canadense				****						■■■	■■■■■	****				rhodora
	Rhododendron groenlandicum	**	■■■■	■■■■	■■■■	■■■	■■■				■■■	■■	■■■	■■■■	■■■	■■■■	common Labrador tea
	Ribes spp.						**				**		**	**	■■■	■■	currants
	Rosa acicularis	**				■■	■■							**	**	**	prickly rose
	Rosa nitida											**					shining rose
	Rubus idaeus	*				**	**				**				■■■■	***	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	*Salix* spp.	*	■■■		■■■	**	**						***	■■■	■■■	■■■	willows
	Sorbus americana + S. decora	**		*	**	**	■■				**	**	■■	■■	***	■■	mountain-ashes
	Taxus canadensis											■■■					Canada yew
	Vaccinium angustifolium	■■■■	■■■■	■■■■	■■■■	■■■	■■■				■■■■	■■■■	■■■	■■■	■■■	■■■	early lowbush blueberry
	Vaccinium myrtilloides	■■■	■■■	■■■	■■■	■■■	■■■						■■■	■■■	■■■	■■■	velvet-leaved blueberry
	Viburnum nudum										■■■■	**	***	***	***	***	wild raisin
Herb & dwarf shrub	*Aralia nudicaulis*	**		**		■■	■■■	***	**				**	**	***	**	wild sarsaparilla
	Arctostaphylos uva-ursi	■■■■				***				■■■							common bearberry
	Avenella flexuosa										**	■■■					wavy hairgrass
	Calamagrostis pickeringii										**	**					Pickering's reedgrass
	Carex spp.	*	***		**		**	**	**		**	■■■	**	■■	■■■	■■■	sedges
	Chamerion angustifolium	**	**	**	**	■	*	**	**		**	***		**	■■	**	fireweed
	Clintonia borealis	**	**		**	■■	■■	■■■	■■■		**	***	■■	■■	■■■	■■	yellow clintonia
	Coptis trifolia		**		**	**	■■	■■	■■		**	■■	■■	■■	■■■	■■	goldthread
	Cornus canadensis	***	■■	*	■■	■■■	■■■	■■■	■■■	**	■■■■	■■■	■■■	■■■	■■■■	■■■	bunchberry
	Cypripedium acaule	*		*		*	*	**				■■					pink lady's-slipper
	Dryopteris spinulosa complex							**	**		**		**	**	■■■	***	wood fern
	Empetrum nigrum				**				**	**	**	■■	**	**			black crowberry
	Epigaea repens	**	■■	***		**	**	***	**		***	■■■■		***			trailing arbutus
	Equisetum spp.						*		**					**	■■	■■■	horsetail
	Eurybia macrophylla	***				**	■■■	***							■■■	***	large-leaved aster
	Fragaria virginiana	**		*		*	**					■■			***	*	wild strawberry
	Galium spp.														■■		bedstraw
	Gaultheria hispidula	**	■■	■■	■■	■■	■■	■■■	■■■		■■■	■■■■	■■■	■■■	■■■	■■■	creeping snowberry
	Gaultheria procumbens	***				**	**	***		****							eastern teaberry
	Goodyera repens	*				*	*						**		**	**	dwarf rattlesnake-plantain
	Gymnocarpium dryopteris						**						**	**	**	**	common oak fern
	Linnaea borealis	***	**	*	**	■■	■■	■■	■■		■■■	■■■	■■	■■	■■■	■■	twinflower
	Lycopodium annotinum		**	**	**	**	**	***	**		***		**	■■	■■■■	■■■	stiff clubmoss
	Lycopodium clavatum	**				**	**	***							**		running clubmoss
	Lycopodium obscurum					*	**	**	**		**				**	**	flat-branched tree-clubmoss
	Lysimachia borealis	**				*	■■	**	**		■■	**	■■	**	■■	■■	northern starflower
	Maianthemum canadense	■■	**	*	**	■■■	■■	■■■	■■■	**	■■■	■■	■■	■■	■■■	■■	wild lily-of-the-valley

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
Herb & dwarf shrub	*Maianthemum trifolium*								**				**	■■		**	three-leaved false Solomon's seal
	Melampyrum lineare	■		*		*	*										American cow-wheat
	Mitella nuda						**						**	**	**	■■	naked mitrewort
	Oryzopsis asperifolia	**				**	**					***					rough-leaved mountain rice
	Petasites frigidus						**	**	**				**	**	■■	■■	arctic sweet coltsfoot
	Poaceae	**	**	**	**			**	**				**	**	■■■	***	grass family
	Polystichum lonchitis											**					northern holly fern
	Pteridium aquilinum		***			**	***	***	***		*****		**	***			bracken fern
	Rubus chamaemorus								**		**		**	■■		***	cloudberry
	Rubus pubescens					*	**					**		**	■■■	■■■	dwarf raspberry
	Solidago hispida	**				*											hairy goldenrod
	Solidago macrophylla								**		**	■■	**		**	**	large-leaved goldenrod
	Streptopus lanceolatus					*	*					**				**	rose twisted-stalk
	Vaccinium vitis-idaea		**	*	**	***	**		**	■■■	■■■		■■	**		**	lingonberry
	Viola spp.						*						**		■■■	**	violet
Moss & lichen	*Bazzania trilobata*		**		**			**	**		**	■■■■	■■■	**			three-lobed whipwort
	Cetraria islandica									■■							true Iceland lichen
	Cladina spp. + *Cladonia* spp.	■■■■■	■■■■■■	■■■■■■	■■■■■■	■■■	■■	■■■■	■■■	■■■■■■	■■■■	■■■■■	■■■	■■■	■■■	■■■	reindeer + clad lichens
	Dicranum spp.	■■■	■■	■■	■■	■■■	■■■	■■■	■■■	■■■	■■■■	■■■■	■■■	■■■	■■■	■■	broom mosses
	Hylocomium splendens			**	**	■■	■■■	**	■■■	**	■■■■	■■■■	■■■■■	■■■	**	■■■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.						**				****		**	**	**	**	leafy mosses
	Peltigera aphthosa			■		*	*			**	■■■		**	**		*	common freckle pelt lichen
	Pleurozium schreberi	■■■■	■■■■	■■■■	■■■■■	■■■■■■	■■■■■	■■■■■	■■■■■	■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	red-stemmed feathermoss
	Polytrichum spp.	■■	■■	**	■■	**	**	■■■	■■	■■■	***		■■	■■	■■■	**	haircap moss
	Ptilidium ciliare		■■	*	■■■	**	**	**	■■	■■	***	■■■■	■■	***	**	**	ciliate fringewort
	Ptilidium ciliare		■■	*	■■■	**	**	**	■■	■■	***	■■■■	■■	***	**	**	ciliate fringewort
	Ptilium crista-castrensis	**	■■■	■■	■■■	■■■	■■■	■■■	■■■■	■■	■■■	■■■	■■■■	■■■	■■■	■■■■	knight's plume moss
	Sphagnum spp.	**	***	■■■	■■■	**	***	■■■	■■■		■■■	■■■	■■■	■■■■■	■■■	■■■■	peat mosses
	Stereocaulon paschale	**		**						■■■■							Easter foam lichen

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 ≥35% are listed. Refer to **1.4 Instructions for interpreting vegetation tables** for symbol meanings.



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
	n Plots	37	22	28	254	315	256	634	71	1246	92	300	35	57	19	24	
Tree	*Abies balsamea*	■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■■	■■■■	■■■■■	■■■■■■	■■■■	■■■■■	■■■■■	balsam fir
	Acer rubrum	■■■	***	**					***			**		***			red maple
	Betula papyrifera	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	***	■■■■	■■■	■■■	■■■	■■■	paper birch
	Picea glauca	****	■■■■■	■■■	***	***	■■■■	***	****	■■■■	■■■■■	■■■■	■■■	****	■■■	■■■	white spruce
	Picea mariana	■■■■■	■■■	■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	■■■■	***	***	■■■■	■■■	■■■■	black spruce
	Populus tremuloides		***		***			***			***	***		***	■■■■		trembling aspen
Shrub	*Abies balsamea*	■■■■	■■	■■■■	■■■■	■■■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	balsam fir
	Acer rubrum	■■	*	**					■■■	***		***		***			red maple
	Betula papyrifera	■	*	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	***	paper birch
	Picea glauca	*	■■■	**	***	***	■■■	***	■■■	■■■	■■■	■■■	■■■	**	■■■	**	white spruce
	Picea mariana	■■■	***	■■■	■■■■	■■■■	■■■	■■■■	■■■■	■■■	■■■	***		■■■	■■■	***	black spruce
	Populus tremuloides		*		**						■■	***		**	■■		trembling aspen
	Prunus pensylvanica				**			**	***	***		***		***	■■		pin cherry
	Acer spicatum				***		***	***	■■■	***	■■■■	■■■■	■■	***	■■■	■■■	mountain maple
	Alnus incana				***	***	***	***	***	***	****	***	****	■■■■■	■■■■■	****	speckled alder
	Alnus viridis	*	■■	**	■■■■	***	***	***		***	***	****		****	***	****	green alder
	Amelanchier spp.	*	*	*	■■■	■■■	■■■	■■■	■■■	■■■	**	■■■	■■■	■■■	■■■	■■	serviceberries
	Cornus stolonifera									***	**	***	***	***	***	■■■	red-osier dogwood
	Corylus cornuta				**				***		■■■	■■■		***	***		beaked hazelnut
	Diervilla lonicera		*		***			***	***	***	■■■	■■■		***	■■■		northern bush-honeysuckle
	Gaylussacia baccata	■■	**														black huckleberry
	Ilex mucronata	■■	■	■	***	***	***	***	***	***		**		***		**	mountain holly
	Kalmia angustifolia	■■■	■	■■	■■■■	■■■	***	■■■	***	***		***		■■■	**	****	sheep laurel
	Lonicera canadensis		*	*	**				■■■		■■	■■■		**	**		Canada fly-honeysuckle
	Gaylussacia baccata	■■	**														black huckleberry
	Ilex mucronata	■■	■	■	***	***	***	***	***	***		**		***		**	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	*Kalmia angustifolia*	■■■	■	■■	■■■■	■■■	***	■■■	***	***		***		■■■	**	****	sheep laurel
	Lonicera canadensis		*	*	**				■■■		■■	■■■		**	**		Canada fly-honeysuckle
	Rhododendron groenlandicum	**	*	*	■■■■	■■■	■■	■■		***	***			■■■	**		common Labrador tea
	Ribes spp.		*		**	**	**	**	■■■	■■■	■■	■■■	■■	■■■	■■■	■■	currants
	Rosa acicularis				**						■■			**	**		prickly rose
	Rubus idaeus		**	*	**	**	***	***	■■■	***	**	■■■	■■	■■■	■■■■	■■	red raspberry
	Salix spp.				***	***	**	***		***		***		■■■	***		willows
	Sambucus racemosa						**		***	**		**		**	■■	**	red elderberry
	Sorbus americana + S. decora	■■	■	■■	■■	■■	■■	■■■	■■■	■■■	■■	■■■	■■	■■	■■■	■■	mountain-ashes
	Taxus canadensis			**							***	****	***	***	**	■■■■	Canada yew
	Vaccinium angustifolium	■	■■	■■■	■■■	■■■	■■	■■■		**	■■■	***		■■	■■	**	early lowbush blueberry
	Vaccinium myrtilloides	■	*	*	■■■	■■■	**	■■■	■■■	***	■■	***		■■	**		velvet-leaved blueberry
	Viburnum edule				**	**	**	**	**	**	■■	■■■	**	■■	■■■	■■■	squashberry
	Viburnum nudum	■	■	■■	***	***	***	***	***	**		***		***	**	****	wild raisin
Herb & dwarf shrub	*Anemone quinquefolia*				**						■			**			wood anemone
	Aralia nudicaulis	■	■■■	■■■	■■	***	**	***	■■	■■■	■■	■■■	■■■	■■■	■■	***	wild sarsaparilla
	Athyrium filix-femina						***		**	***	**	■■■	***	**	■■	■■■	common lady fern
	Carex spp.	*	**	**	**	■■	■■	**	**	**	■■	■■	*	■■■	■■■	***	sedges
	Cinna latifolia										*			**		■■	drooping woodreed
	Clintonia borealis	■■	*	**	■■	■■	■■■	■■■	■■■	■■■	■■	■■■	■■■■	■■■	■■	■■■	yellow clintonia
	Coptis trifolia	■■	■■■	■■	■■	■■	■■	■■	■■	■■	■■	■■	■■■	■■	■■	**	goldthread
	Cornus canadensis	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■■	■■■	■■■	■■■	bunchberry
	Dryopteris spp.	**	■■■	■	**	**	■■■	**	■■	■■■	■■	■■■	■■■■■	■■■	■■■	■■■■	wood ferns
	Equisetum spp.				**	***	**	**		**	■■	**		■■	■■	***	horsetails
	Eurybia macrophylla				***						■■■	**		■■■	**		large-leaved aster
	Galium spp.				*				*		■	**		■■	■■	■■	bedstraws
	Gaultheria hispidula	■■■	**	■■■■	■■■	■■■	■■■	■■■	■■	■■■	■■	**	*	■■■	■■	■■	creeping snowberry
	Goodyera spp.	*	*	*	**			**	■■	**	■	**		**	**		rattlesnake-plantains
	Gymnocarpium dryopteris		**		**	**	■■	**	*	**	■■	■■		■■	■■	■■■	common oak fern
	Huperzia lucidula		**						**	**		■■		**	**		shining firmoss
	Linnaea borealis	■■■	■■■	■■■■	■■	■■	■■	■■	■■	■■■	■■	■■■	■■■	■■	■■	■■■	twinflower
	Lycopodium annotinum				■■	■■	■■■	**	**	**	■■	■■■	***	■■■	■■■		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	*Lycopodium obscurum*				**		**	**		**	**	***	**	**	■■		flat-branched tree-clubmoss
	Lysimachia borealis	■	■	■■	■■	■■	■■	■■	■■	■■	■	■■	■■■	■■	■■	■■	northern starflower
	Maianthemum canadense	■■	■■■	■■	■■	■■	■■	■■■	■■	■■■	■■	■■	■■■	■■	■■■	■■■	wild lily-of-the-valley
	Mertensia paniculata										■■			**			tall bluebells
	Mitella nuda				**			**		**	■■	■■		■■	■■	■■■■	naked mitrewort
	Neottia cordata				**	**	■■	**		**			**			■■	heart-leaved twayblade
	Oclemena acuminata	*	■■	■■					**	***		***	***		***		whorled wood aster
	Orthilia secunda	*	**	**	**	**	**	**	■■	**	*	**	**	**		■■	one-sided wintergreen
	Osmundastrum cinnamomeum	■■■	■	**			***		**			**	**	***		***	cinnamon fern
	Oxalis montana	*	■■	■■		***	■■■■	***	■■■	■■■■	****	■■■	■■■■	***	■■■		common wood-sorrel
	Petasites frigidus				**	**		**			■■			■■	**		arctic sweet coltsfoot
	Phegopteris connectilis		*			**	**		*	**		■■■	***	**	**	**	northern beech fern
	Poaceae				**	***	***	**	**	**	**	■■		■■■	■■■		grass family
	Pteridium aquilinum	■■	■■	*	***			***	■■■	***	**	***	**	***	***		bracken fern
	Rubus chamaemorus				**	■■■	■■■	**									cloudberry
	Rubus pubescens		*		**		**	**	*	**	■■■	■■■		■■■	■■■	■■■	dwarf raspberry
	Solidago macrophylla			**	**	**	***	**		**		**	■■■	**	**	■■■	large-leaved goldenrod
	Streptopus lanceolatus				**		**	**	**	**	■■	■■	■■	**	**	■■	rose twisted-stalk
	Vaccinium vitis-idaea	■■	■■	■■■	**	**	**	**		**							lingonberry
	Viola spp.		***		**		**		**	**	■■	■■	*	■■■	■■	***	violets
Moss & lichen	*Bazzania trilobata*	■■■■	■■■	■■■■	**	■■	■■■	■■	■■■	■■■		■■■	■■	**	**	***	three-lobed whipwort
	Cladina spp.	■■	*	*	■■■	■■■	■■■	■■■	■■■	■■■	■■	■■		■■■	■■■		reindeer + clad lichens
	Dicranum spp.	■■■	■■	■■■	■■■	■■	■■■	■■■	■■■	■■■	■■	■■■	■■■■	■■	■■	■■■■	broom mosses
	Hylocomiastrum umbratum								***			***	■■■■			■■■■	shaded wood moss
	Hylocomium splendens	■■■■	■■■■	■■■■	■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	■■■■	■■■■■	■■■	■■■■	■■■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.		**		**	**	**	**	**	**	■■■	■■■		■■■	■■	****	leafy mosses
	Pleurozium schreberi	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■■	■■■■	■■■■	■■■■	■■■	■■■	red-stemmed feathermoss
	Polytrichum spp.	*	■	***	■■	■■	■■	■■	■■■	■■	**	■■	■■	■■	■■■	**	haircap mosses
	Ptilium crista-castrensis	■■■	*	■■	■■■■	■■■	■■■	■■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	knight's plume moss
	Rhytidiadelphus loreus			***									■■■			■■■■	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	*Rhytidiadelphus triquetrus*	**	***	***	**					***	■■■	***	**	***	■■	■■■■	electrified cat's-tail moss
	Sanionia uncinata				**						■■			**		***	sickle moss
	Sphagnum 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.**

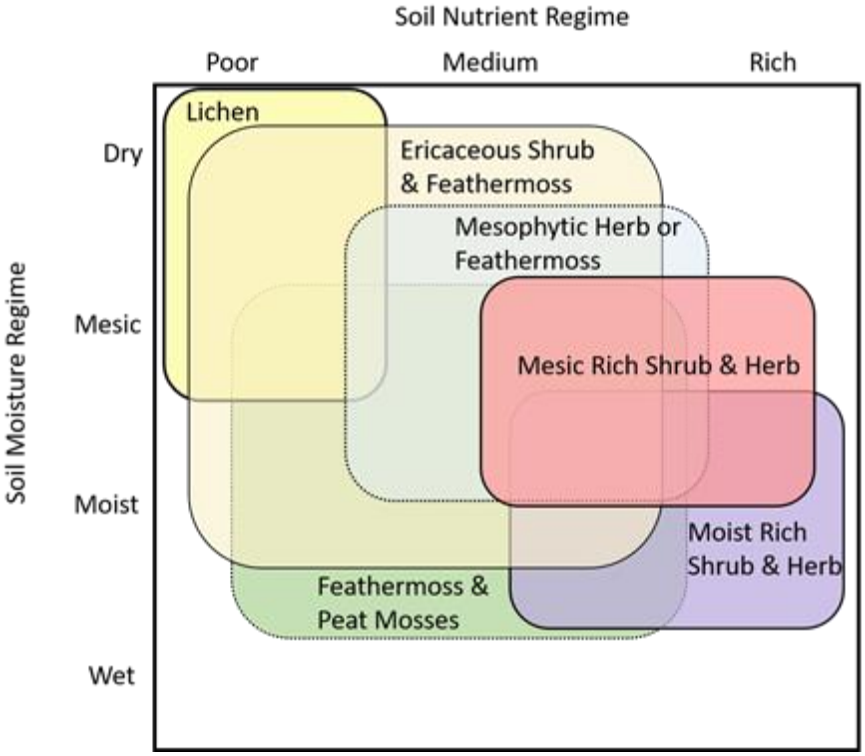


Figure 6. Edatopic grid representing conceptual ranges of soil moisture and soil nutrient regime indicated by the six understory vegetation classes from Figure 5.

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 ≥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	*Abies balsamea*			■■■■	■■■	■■■■■	■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■	balsam fir
	Betula papyrifera	**	***	■■■	■■■■	■■■	■■■■	■■■■	■■■■	■■■■	■■■■■	■■■■■	■■■■	paper birch
	Larix laricina	■■	***	****			***					**	****	tamarack
	Picea glauca			■■■■■	***	***	***	■■■	■■■■	■■■■	■■■	■■■	****	white spruce
	Picea mariana	■■■	■■■■	■■■■	■■■■■	■■■■	■■■■■	■■■■	■■■■	***	■■■	■■■■	■■■■	black spruce
	Pinus banksiana		■■■■■		■■■■		***		****		****		****	jack pine
	Populus tremuloides	**	***		***		***	***	■■■■■	***	■■■■■	*****	■■■■■	trembling aspen
Shrub	*Acer spicatum*				***	***	***	***	■■■	■■■■	■■■■■	■■■■	■■■■	mountain maple
	Alnus incana				***	***	***	***	***	***	***	***	■■■■■	speckled alder
	Alnus viridis	■■■■	***	**	■■■■	***	***	***	****	****	****	***	****	green alder
	Amelanchier spp.	**	■■	***	■■■	■■■	■■■	■■■	■■■	■■■	■■■	**	■■■	serviceberries
	Cornus stolonifera								***	***	***	■■■	***	red-osier dogwood
	Corylus cornuta				***				■■■	■■■	■■■■	**	***	beaked hazelnut
	Diervilla lonicera				***			***	■■■	■■■	■■■■	****	■■■	northern bush-honeysuckle
	Ilex mucronata		***	■■	***	***	***	***	***	**	***	**	***	mountain holly
	Kalmia angustifolia	■■■■■	■■■■■	■■■■	■■■■	■■■	■■■■	***	■■■	***	***	***	***	sheep laurel
	Lonicera canadensis								**	■■■	■■		**	Canada fly-honeysuckle
	Rhododendron canadense	■■■		****										rhodora
	Rhododendron groenlandicum	■■■	■■■■	***	■■■■	■■■	■■■■	***	***		***		■■■■	common Labrador tea
	Ribes spp.			**	**	**	**	***	■■	■■■	■■■	■■	■■■	currants
	Rubus idaeus			**	**	***	***	***	***	■■■	■■■	**	■■■	red raspberry
	Salix spp.	■■	■■■		■■■	***	***	***	■■■	***	***		■■■	willows
	Sorbus americana + *S. decora*		**	■■	■■	■■	■■	■■■	■■■	■■■	■■■	■■	■■■	mountain-ashes
	Taxus canadensis			**					**	****	****	■■■■		Canada yew
	Vaccinium angustifolium	■■■■	■■■■	■■■	■■■	■■	■■■	■■■	■■■	**	■■■	**	■■	early lowbush blueberry
	Vaccinium myrtilloides		■■■	*	■■■	■■■	■■■	■■■	■■■	***	■■■		■■■	velvet-leaved blueberry
	Viburnum edule				**	**		**	**	***	***	■■■	■■■	squashberry
	Viburnum nudum			■■	***	***	***	***	■■■	***	■■■	****	***	wild raisin

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

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

3.2.1 Lichen

Associations in this understory vegetation category typically occur on the driest, most nutrient-impoverished 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 Bunswick 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 400m^2, 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 Uhlig 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 Appendix5, 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

Baldwin, K.; Allen, L.; Basquill, S.; Chapman, K.; Downing, D.; Flynn, N.; MacKenzie, W.; Major, M.; Meades, W.; Meidinger, D.; Morneau, C.; Saucier, J-P.; Thorpe, J.; Uhlig, P. 2019a. Vegetation Zones of Canada: a Biogeoclimatic Perspective. [Map] Scale 1:5,000,000. Nat. Resour. Can., Can. For. Ser., Sault Ste. Marie, ON.

Baldwin, K.; Chapman, K.; Meidinger, D.; Uhlig, P.; Allen, L.; Basquill, S.; Faber-Langendoen, D.; Flynn, N.; Kennedy, C.; MacKenzie, W.; Major, M.; Meades, W.; Morneau, C.; Saucier, J-P. 2019b. The Canadian National Vegetation Classification: principles, methods and status. Nat. Resour. Can., Info. Rep. Number: GLC-X-23. Can. For. Ser., Sault Ste. Marie, ON.

Baldwin, K.; Saucier, J-P.; Meades, B.; Chapman, K. 2017. Eastern North American Boreal Forest [available: cnvc-cnvc.ca]. Sault Ste. Marie, Ontario, Canada: Canadian National Vegetation Classification Macrogroup: M495; generated 30-April-2018 (accessed: October 2018). 11p.

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

Carey, J.H. 1993. *Pinus banksiana*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/pinban/all.html (accessed: May 26, 2015).

Chambers, B.A.; Naylor, B.J.; Nieppola, J.; Merchant, B.; Uhlig, P. 1997. Field guide to forest ecosystems of central Ontario. Ont. Min. Nat. Resour., South-central Science Development and Transfer Branch, North Bay, ON. SGSS Field Guide FG-01. 200 p.

Council of Canadian Academies. 2019. Greater than the sum of its parts: toward integrated natural resource management in Canada. Ottawa, ON: The expert panel on the state of knowledge and practice of integrated approaches to natural resource management in Canada. Available: https://cca-reports.ca/reports/the-state-of-knowledge-and-practice-of-integrated-approaches-to-natural-resource-management-in-canada/ (accessed: May 17, 2019).

Damman, A.W.H. 1963. A reconnaissance survey of the ecological conditions in the forests of the Roddickton area, Newfoundland. For. Res. Branch, Can. Dept. For., NL. Mimeo 63-N-1.

Damman, A.W.H. 1964. Some forest types of central Newfoundland and their relation to environmental factors. The Society of American Foresters, US. Monograph 8.

Damman, A.W.H. 1967. The forest vegetation of western Newfoundland and site degradation associated with vegetation change. PhD thesis, Univ. of Michigan, Ann Arbor, MI, US.

Damman, A.W.H. 1976. Site description manual: a guide to terminology and abbreviations used for describing habitat and vegetation. Unpuplished Manual and Site Description Cards, Biology 452, University of Connecticut. 51p.

Dunlap, J.A. 1989. New Brunswick cooperative permanent sample plot procedure manual. Timber Management Branch, New Brunswick Department of Natural Resources and Energy. Frederickton, NB.

Federal, Provincial and Territorial Governments of Canada. 2010. Canadian biodiversity: ecosystem status and trends 2010 [online]. Canadian Councils of Resource Ministers. Ottawa, ON. Available: http://www.biodivcanada.ca (accessed: May 17, 2019).

Fryer, J.L. 2014. *Picea mariana*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/picmar/all.html (accessed: May 26, 2015).

Harris, H.T. 1990. *Populus balsamifera* subsp. *balsamifera*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/popbalb/all.html (accessed: May 28, 2015).

Harris, A., Foster, R.F., McMurray, S., Uhlig, P. 2005. Describing Ontario's ecosystems – field data collection standards for ecological land classification in Ontario. Northern Bioscience and OMNR. Thunder Bay and Sault Ste. Marie, ON. 117 p. + appendices.

Howard, J.L. 1996. *Populus tremuloides*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/poptre/all.html (accessed: May 27, 2015).

Keys, K.; Neily, P.D.; Quigley, E.J.; Stewart, B.J. 2007. Field manual for forest ecosystem classification in Nova Scotia. Nova Scotia Dept. of Natural Resources, Renewable Resource Branch, Forestry Division, Ecosystem Management Group. Truro, NS.

Meades, W.J. 1976. Vegetation of Terra Nova National Park. In: Biophysical classification of Terra Nova National Park: environmental component 3c. Can. Dept. Indian & North. Aff., Parks Branch, CA.

Meades, W.J. 1986. Successional status of ericaceous dwarf-shrub heath in eastern Newfoundland. PhD thesis, Univ. of Connecticut, Storrs, CT.

Meades, W.J.; Moores, L. 1994. Forest site classification manual: a field guide to the Damman forest types of Newfoundland. 2nd ed. Corner Brook, Western Newfoundland Model Forest, Inc., NL. FRDA Rep. 003.

Neily, P.; Basquill, S.; Quigley, E.; Stewart, B.; Keys, K. 2011. Forest ecosystem classification for Nova Scotia, Part 1: Vegetation types. N.S. Dept. Nat. Resour., Renew. Resour. Branch, NS.

New Brunswick Department of Natural Resources. 1985. Reference manual for forest site classification in New Brunswick. New Brunswick Department of Natural Resources, Timber Management Branch. Frederickton, NB.

Prince Edward Island Department of Energy and Forestry. 1992. 1990/92 Prince Edward Island forest inventory, fieldwork specifications. Prince Edward Island Dept. of Energy & Forestry, Forestry Branch, Silviculture Development. Charlottetown, P.E.I.

Saucier, J.-P.; Berger, J.-P.; D'Avignon, H.; Racine, P. 1994. Le point d'observation écologique. Min. des Res. Nat. du Québec, Dir. de la gestion des stocks forestiers, Service des inventaires forestiers. 116 p.

Sims, R. A.; Towill, W.D.; Baldwin, K.A.; Uhlig, P.; Wickware, G.M. 1997. Field guide to the forested ecosystem classification for northwestern Ontario. Ont. Min. Natur. Resour., Northwest Sci. & Technol. Field Guide FG-03. Thunder Bay, ON. 191 p.

Taylor, K.C.; Arnup, R.W.; Merchant, B.G.; Parton, W.J.; Nieppola, J. 2000. A field guide to forest ecosystems of northeastern Ontario, 2nd ed. NEST Field Guide FG-001. Ont. Min. Natur. Resour., Northeast Sci. & Technol. ON. 325 p.

Thompson, I.D.; Larson, D.J.; Montevecchi, W.A. 2003. Characterization of old "wet boreal" forests, with an example from balsam fir forests of western Newfoundland. Environ. Rev. 11:S23-S46.

Uchytil, R.J. 1991a. *Abies balsamea*. In: Fire Effects Information System. U.S. Dept. Agric. For. Serv. Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/abibal/all.html (accessed: May 26, 2015).

Uchytil, R.J. 1991b. *Betula papyrifera*. In: Fire Effects Information System. U.S. Dept. Agric., For. Serv., Rocky Mt. Res. Stn., Fire Sci. Lab., Missoula, MT, US. Available: http://www.fs.fed.us/database/feis/plants/tree/betpap/all.html (accessed: May 27, 2015).

Uhlig, P.W.C., Chapman, K., Baldwin, K., Wester, M., Yanni, S. 2016. Draft boreal treed vegetation type factsheets. Ecol. Land Class. Prog., Ont. Min. Nat. Resour. & For., Sci. & Info Branch, Sault Ste. Marie, ON.

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	*Pinus banksiana (Picea mariana) / Kalmia angustifolium (Rhododendron groenlandicum) / Cladina* spp.	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	May, 2010	Ontario, Quebec
**	CNVC00204	*Picea mariana / Rhododendron groenlandicum – Kalmia angustifolium / Cladina* spp.	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
*	CNVC00205	*Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.	K. Baldwin, K. Chapman, B. Meades	May, 2010	Newfoundland and Labrador
*	CNVC00207	*Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi*	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
*	CNVC00208	*Picea mariana – Pinus banksiana / Vaccinium angustifolium / Pleurozium schreberi*	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
**	CNVC00209	*Pinus banksiana – Picea mariana / Kalmia angustifolia / Pleurozium schreberi*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Ontario, Quebec
**	CNVC00211	*Picea mariana / Rhododendron groenlandicum – Kalmia angustifolia / Pleurozium schreberi*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	October, 2013	Ontario, Quebec
**	CNVC00213	*Populus tremuloides – Betula papyrifera – Picea mariana – Pinus banksiana / Diervilla lonicera / Pleurozium schreberi*	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	*Picea mariana – Betula papyrifera / Kalmia angustifolia / Pleurozium schreberi*	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
**	CNVC00215	*Betula papyrifera – Populus tremuloides – Pinus banksiana / Acer spicatum / Clintonia borealis*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	March, 2013	Manitoba, Ontario, Quebec
**	CNVC00216	*Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
**	CNVC00217	*Picea mariana – Abies balsamea / Rhododendron groenlandicum / Pleurozium schreberi*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	November, 2013	Manitoba, Ontario, Quebec
n/a	CNVC00218	*Pinus banksiana – Abies balsamea – Betula papyrifera / Diervilla lonicera / Pleurozium schreberi*	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
n/a	CNVC00220	*Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*	K. Baldwin, S. Basquill, K. Chapman	May, 2010	New Brunswick, Nova Scotia
**	CNVC00222	*Abies balsamea / Pleurozium schreberi*	K. Baldwin, S. Basquill, K. Chapman, B. Meades, C. Morneau	May, 2010	New Brunswick, Newfoundland and Labrador, Nova Scotia, Quebec
**	CNVC00225	*Abies balsamea (Picea glauca) / Acer spicatum / Oxalis montana*	K. Baldwin, S. Basquill, K. Chapman, M. Major, C. Morneau	May, 2013	New Brunswick, Nova Scotia, Quebec
n/a	CNVC00226	*Picea glauca (Abies balsamea) / Pleurozium schreberi (Bazzania trilobata)*	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	*Abies balsamea – Betula papyrifera – Populus tremuloides / Clintonia borealis*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Manitoba, Ontario, Quebec
**	CNVC00232	*Abies balsamea – Betula papyrifera / Pleurozium schreberi*	K. Baldwin, K. Chapman, C. Morneau	May, 2010	Quebec
n/a	CNVC00233	*Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*	K. Baldwin, S. Basquill, K. Chapman, C. Morneau	May, 2010	New Brunswick, Nova Scotia, Quebec
**	CNVC00234	*Picea mariana – Betula papyrifera – Abies balsamea / Clintonia borealis*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2014	Ontario, Quebec
**	CNVC00235	*Abies balsamea – Betula papyrifera / Acer spicatum*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2012	Manitoba, Ontario, Quebec
**	CNVC00237	*Betula papyrifera / Vaccinium angustifolium – Kalmia angustifolia / Pleurozium schreberi*	K. Baldwin, K. Chapman, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
**	CNVC00238	*Populus tremuloides (Betula papyrifera) / Diervilla lonicera*	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	August, 2011	Manitoba, Ontario, Quebec
**	CNVC00239	*Betula papyrifera (Populus tremuloides) / Acer spicatum / Clintonia borealis*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	May, 2013	Manitoba, Ontario, Quebec
**	CNVC00241	*Populus tremuloides (P. balsamifera) / Alnus incana / Eurybia macrophylla*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	February, 2014	Manitoba, Ontario, Quebec
**	CNVC00242	*Betula papyrifera / Alnus incana*	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	*Pinus banksiana / Vaccinium angustifolium / Cladina* spp.	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
*	CNVC00246	*Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Cladina* spp.	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Ontario
*	CNVC00256	*Picea glauca – Abies balsamea / Streptopus lanceolatus / Pleurozium schreberi*	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario
n/a	CNVC00269	*Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi*	K. Baldwin, K. Chapman, P. Uhlig, M. Wester	January, 2011	Ontario
**	CNVC00270	*Betula papyrifera – Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	December, 2012	Ontario, Quebec
**	CNVC00272	*Populus tremuloides – Picea mariana / Alnus incana*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	January, 2014	Manitoba, Ontario, Quebec
n/a	CNVC00273	*Populus tremuloides – Betula papyrifera – Abies balsamea / Alnus incana*	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00274	*Betula papyrifera – Abies balsamea / Alnus incana*	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00276	*Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Pleurozium schreberi (Sphagnum* spp.*)*	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario, Quebec
n/a	CNVC00277	*Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00278	*Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
n/a	CNVC00277	*Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* 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	*Abies balsamea / Pleurozium schreberi – Sphagnum* spp.	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	January, 2011	Newfoundland and Labrador, Quebec
n/a	CNVC00292	*Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	K. Baldwin, S. Basquill, K. Chapman	January, 2011	Nova Scotia
n/a	CNVC00294	*Pinus banksiana – Picea mariana / Alnus incana / Pleurozium schreberi*	K. Baldwin, K. Chapman, C. Morneau	January, 2011	Quebec
**	CNVC00295	*Picea mariana / Alnus incana / Pleurozium schreberi*	K. Baldwin, K. Chapman, C. Morneau, P. Uhlig, M. Wester	November, 2011	Manitoba, Ontario, Quebec
**	CNVC00296	*Picea mariana – Abies balsamea / Alnus incana*	K. Baldwin, K. Chapman, M. Major, C. Morneau, P. Uhlig, M. Wester	December, 2013	Ontario, Quebec
n/a	CNVC00297	*Abies balsamea / Alnus incana*	K. Baldwin, K. Chapman, M. Major, C. Morneau	December, 2013	Quebec
*	CNVC00307	*Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*	K. Baldwin, K. Chapman, B. Meades	March, 2012	Newfoundland and Labrador
*	CNVC00309	*Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	K. Baldwin, S. Basquill, K. Chapman, B. Meades	August, 2013	Newfoundland and Labrador, Nova Scotia
*	CNVC00310	*Abies balsamea / Dryopteris* spp. */ Hylocomiastrum umbratum*	K. Baldwin, K. Chapman, B. Meades, S. Basquill	February, 2012	New Brunswick, Newfoundland and Labrador, Nova Scotia
*	CNVC00311	*Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana*	K. Baldwin, K. Chapman, B. Meades	February, 2012	Newfoundland and Labrador
*	CNVC00315	*Betula papyrifera – B. alleghaniensis / Dryopteris carthusiana*	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	*Betula papyrifera / Alnus viridis / Solidago macrophylla*	K. Baldwin, K. Chapman, B. Meades	August, 2011	Newfoundland and Labrador
*	CNVC00338	*Picea mariana / Rhododendron canadense – Taxus canadensis / Pleurozium schreberi*	K. Baldwin, K. Chapman, B. Meades	February, 2013	Newfoundland and Labrador
n/a	CNVC00344	*Picea mariana – Betula papyrifera – Abies balsamea / Pleurozium schreberi*	K. Baldwin, K. Chapman, M. Major, C. Morneau	February, 2012	Quebec
*	CNVC00348	*Abies balsamea / Taxus canadensis / Rubus pubescens / Dicranum majus*	K. Baldwin, K. Chapman, B. Meades	February, 2012	Newfoundland and Labrador
*	CNVC00349	*Betula papyrifera (Populus tremuloides) / Dryopteris carthusiana – Rubus pubescens*	K. Baldwin, K. Chapman, B. Meades	May, 2013	Newfoundland and Labrador
**	CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	K. Baldwin, K. Chapman, M. Major, B. Meades, C. Morneau	October, 2013	Newfoundland and Labrador, Quebec
**	CNVC00351	*Picea mariana – Abies balsamea / Pleurozium schreberi (Hylocomium splendens)*	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. **CONIFER**

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

Subassociations: *Pinus banksiana, Picea mariana*

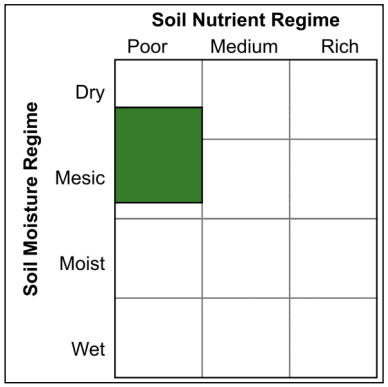
Provinces: Ontario, Quebec **Lichen**

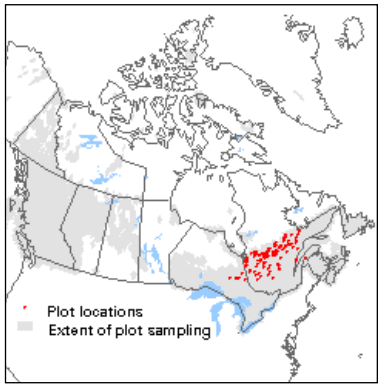
CNVC00201 has a moderately closed canopy of *Pinus banksiana*, often with *Picea mariana* as a companion species. The shrub layer is dense, with abundant *P. mariana* and ericaceous species, including *Kalmia angustifolia*, *Vaccinium angustifolium*, *V. myrtilloides* and *Rhododendron groenlandicum*. *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**
Pinus banksiana	100	33
Picea mariana	85	15
Shrub Stratum Cover (Mean)		**67**
Picea mariana	99	12
Kalmia angustifolia	96	32
Vaccinium angustifolium	92	19
Salix spp.	74	4
Vaccinium myrtilloides	71	9
Rhododendron groenlandicum	70	13
Pinus banksiana	55	4
Herb Stratum Cover (Mean)		**0**
Gaultheria hispidula	40	2
Bryo-Lichen Stratum Cover (Mean)		**88**
Cladina rangiferina	100	28
Pleurozium schreberi	98	23
Cladina stellaris	96	37
Cladina mitis	89	10
Dicranum spp.	82	3
Cladonia spp.	57	3
Ptilium crista-castrensis	46	3
Ptilidium ciliare	43	3
Polytrichum 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*

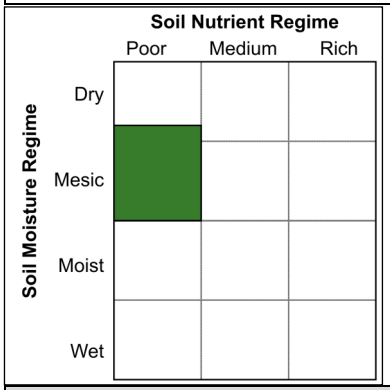
Provinces: Quebec **Lichen**

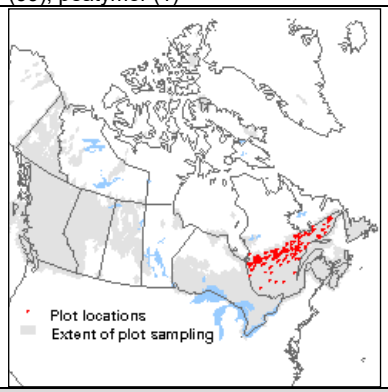
CNVC00204 has an open tree layer of *Picea mariana.* The shrub layer is dense, with abundant *P. mariana* and ericaceous species, including *Rhododendron groenlandicum*, *Kalmia angustifolia*, *Vaccinium myrtilloides* and *V. angustifolium*. *Salix* spp. are usually present but not abundant. The herb 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**
Picea mariana	100	27
Shrub Stratum Cover (Mean)		**73**
Picea mariana	100	18
Rhododendron groenlandicum	96	24
Kalmia angustifolia	88	26
Vaccinium myrtilloides	84	9
Vaccinium angustifolium	83	13
Salix spp.	68	4
Amelanchier spp.	43	3
Herb Stratum Cover (Mean)		**2**
Gaultheria hispidula	57	3
Cornus canadensis	41	3
Bryo-Lichen Stratum Cover (Mean)		**89**
Pleurozium schreberi	100	28
Cladina rangiferina	100	16
Cladina stellaris	93	49
Dicranum spp.	91	3
Cladina mitis	84	8
Cladonia spp.	69	5
Ptilium crista-castrensis	61	3
Ptilidium ciliare	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

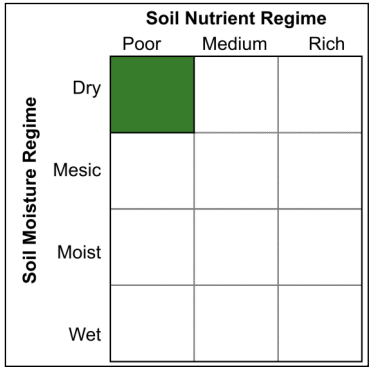
Provinces: Newfoundland and Labrador **Lichen**

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**
Picea mariana	100	7
Larix laricina	73	1
Shrub Stratum Cover (Mean)		**72**
Kalmia angustifolia	100	35
Vaccinium angustifolium	100	13
Rhododendron canadense	91	9
Rhododendron groenlandicum	73	3
Picea mariana	64	3
Populus tremuloides	55	2
Alnus viridis	45	24
Herb Stratum Cover (Mean)		**7**
Vaccinium vitis-idaea	55	4
Arctostaphylos uva-ursi	45	5
Bryo-Lichen Stratum Cover (Mean)		**95**
Cladina mitis	100	42
Cladonia spp.	100	20
Cladina stellaris	100	8
Cladina rangiferina	91	24
Stereocaulon paschale	73	14
Pleurozium schreberi	73	2
Ptilium crista-castrensis	64	1
Polytrichum juniperinum	55	6
Dicranum spurium	55	2
Ptilidium ciliare	45	3
Dicranum undulatum	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

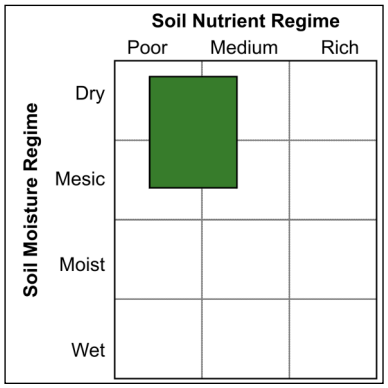
Provinces: Manitoba, Ontario **Ericaceous Shrub & Feathermoss**

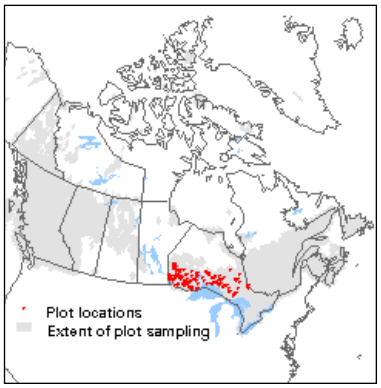
CNVC00207 has an open to moderately closed canopy of *Pinus banksiana*, sometimes with a minor component of *Picea mariana*. The moderately developed shrub layer includes regenerating *P. mariana* and the ericaceous species *Vaccinium myrtilloides, V. angustifolium* and occasionally, *Rhododendron groenlandicum*. 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	
^≥**40%** presence; ±characteristic cover	**266 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**36**
Pinus banksiana	100	30
Picea mariana	53	12
Shrub Stratum Cover (Mean)		**34**
Vaccinium myrtilloides	85	7
Picea mariana	82	9
Vaccinium angustifolium	73	9
Abies balsamea	44	4
Diervilla lonicera	44	3
Rosa acicularis	42	1
Rhododendron groenlandicum	41	10
Herb Stratum Cover (Mean)		**19**
Maianthemum canadense	89	4
Cornus canadensis	81	5
Linnaea borealis	80	2
Gaultheria hispidula	53	2
Aralia nudicaulis	45	2
Clintonia borealis	42	1
Bryo-Lichen Stratum Cover (Mean)		**79**
Pleurozium schreberi	99	64
Dicranum polysetum	93	5
Cladina rangiferina	69	3
Ptilium crista-castrensis	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*

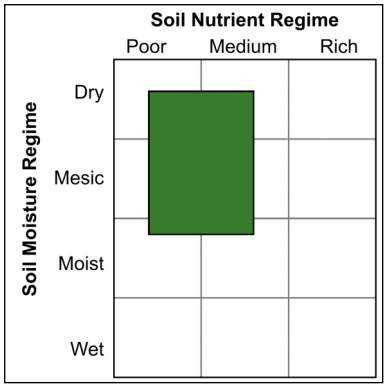
Provinces: Manitoba, Ontario **Ericaceous Shrub & Feathermoss**

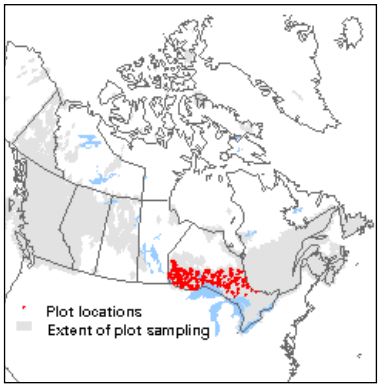
CNVC00208 has a moderately closed canopy of *Picea mariana* and/or *Pinus banksiana*, usually with *P. mariana* dominant (except in the *Diervilla lonicera* subassociation). The moderately to well-developed shrub layer usually includes *P. mariana* and *Abies balsamea,* as well as *Vaccinium myrtilloides* 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**
Picea mariana	85	26
Pinus banksiana	72	20
Shrub Stratum Cover (Mean)		**31**
Picea mariana	79	9
Vaccinium myrtilloides	77	3
Vaccinium angustifolium	70	4
Abies balsamea	62	6
Diervilla lonicera	48	7
Rhododendron groenlandicum	47	8
Betula papyrifera	40	4
Herb Stratum Cover (Mean)		**22**
Cornus canadensis	85	5
Maianthemum canadense	81	3
Linnaea borealis	67	2
Gaultheria hispidula	61	2
Clintonia borealis	58	2
Aralia nudicaulis	48	3
Lysimachia borealis	47	1
Coptis trifolia	40	1
Bryo-Lichen Stratum Cover (Mean)		**69**
Pleurozium schreberi	99	52
Dicranum polysetum	92	3
Ptilium crista-castrensis	79	9
Hylocomium splendens	56	5
Cladina rangiferina	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*

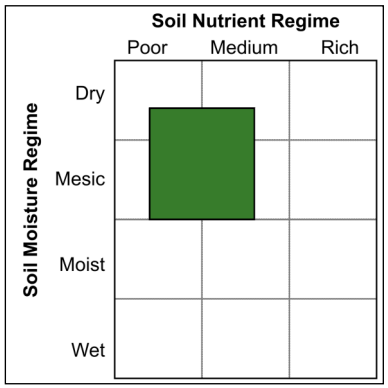
Provinces: Ontario, Quebec **Ericaceous Shrub & Feathermoss**

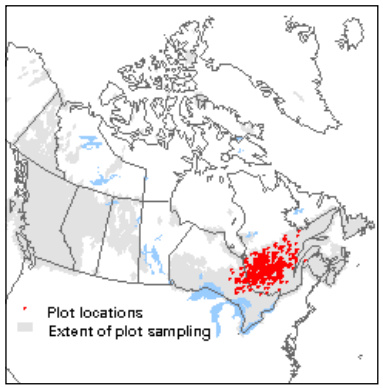
CNVC00209 has a moderately closed to closed canopy dominated by *Pinus banksiana*, with *Picea mariana* as the main companion species. The shrub layer is well developed to dense with abundant regenerating *P. mariana* and ericaceous species, especially *Kalmia angustifolia* but also *Vaccinium myrtilloides*, *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**
Pinus banksiana	100	37
Picea mariana	89	20
Shrub Stratum Cover (Mean)		**65**
Picea mariana	95	12
Kalmia angustifolia	94	27
Vaccinium myrtilloides	86	9
Vaccinium angustifolium	85	9
Salix spp.	70	4
Rhododendron groenlandicum	68	14
Amelanchier spp.	49	3
Abies balsamea	42	5
Herb Stratum Cover (Mean)		**13**
Gaultheria hispidula	70	4
Cornus canadensis	69	6
Maianthemum canadense	58	4
Linnaea borealis	43	3
Bryo-Lichen Stratum Cover (Mean)		**72**
Pleurozium schreberi	99	56
Cladina rangiferina	82	5
Dicranum spp.	81	3
Ptilium crista-castrensis	69	8
Cladonia spp.	54	3
Cladina stellaris	49	5
Cladina mitis	46	3
Polytrichum 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*

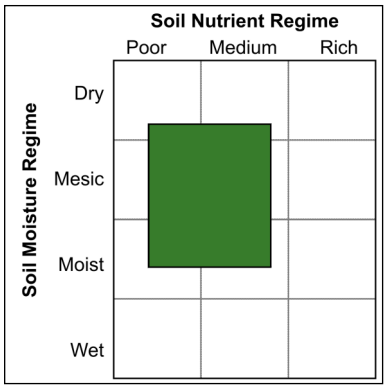
Provinces: Ontario, Quebec **Ericaceous Shrub & Feathermoss**

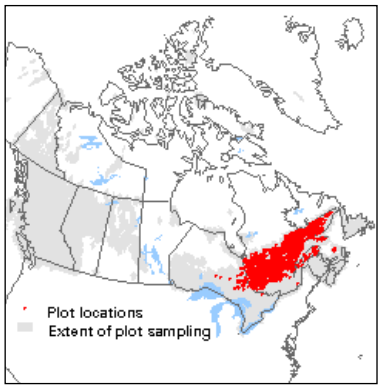
CNVC00211 has a moderately closed canopy dominated by *Picea mariana*. The shrub layer is well developed to dense with abundant *P. mariana*, a minor component of *Abies balsamea* (especially in the eastern part of the range) and abundant ericaceous species, including *Rhododendron groenlandicum*, *Vaccinium 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 *Alnus viridis;* ±characteristic cover	2118 plots	
	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**58**
Picea mariana	100	44
Abies balsamea	51	7
Betula papyrifera	42	7
Shrub Stratum Cover (Mean)		**59**
Picea mariana	100	17
Rhododendron groenlandicum	83	19
Vaccinium myrtilloides	83	7
Vaccinium angustifolium	82	6
Kalmia angustifolia	77	16
Abies balsamea	67	9
Salix spp.	57	4
Amelanchier spp.	54	4
Betula papyrifera	44	4
Alnus viridis	26	10
Herb Stratum Cover (Mean)		**10**
Gaultheria hispidula	91	4
Cornus canadensis	82	5
Clintonia borealis	45	3
Maianthemum canadense	42	3
Bryo-Lichen Stratum Cover (Mean)		**81**
Pleurozium schreberi	99	59
Dicranum spp.	91	4
Cladina rangiferina	87	4
Ptilium crista-castrensis	85	15
Cladonia spp.	61	3
Sphagnum spp.	59	6
Cladina stellaris	54	5
Cladina mitis	49	3
Hylocomium splendens	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

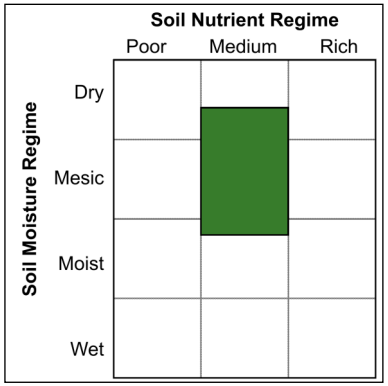
Mesophytic Herb or Feathermoss

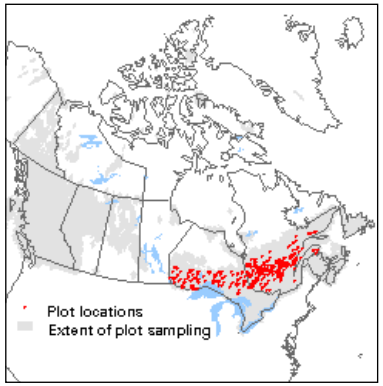
CNVC00213 has a closed canopy of *Populus tremuloides* and/or *Betula papyrifera*, mixed with *Picea mariana* and/or *Pinus banksiana*. The shrub layer is well developed and includes a mix of tree species, especially *P. mariana* and *Abies balsamea*, as well as the low shrubs *Diervilla lonicera*, *Vaccinium 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	
^≥50% presence except *Pteridium aquilinum*; ±characteristic cover	387 plots	
	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**66**
Populus tremuloides	89	28
Picea mariana	88	18
Betula papyrifera	74	17
Pinus banksiana	58	22
Shrub Stratum Cover (Mean)		**47**
Picea mariana	85	9
Abies balsamea	78	10
Vaccinium myrtilloides	77	5
Vaccinium angustifolium	72	5
Diervilla lonicera	71	10
Betula papyrifera	66	4
Populus tremuloides	61	3
Herb Stratum Cover (Mean)		**37**
Cornus canadensis	97	10
Maianthemum canadense	95	5
Linnaea borealis	83	3
Clintonia borealis	81	5
Aralia nudicaulis	80	6
Lysimachia borealis	75	2
Coptis trifolia	57	3
Gaultheria hispidula	56	3
Pteridium aquilinum	39	14
Bryo-Lichen Stratum Cover (Mean)		**31**
Pleurozium schreberi	98	22
Ptilium crista-castrensis	70	6
Dicranum 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*

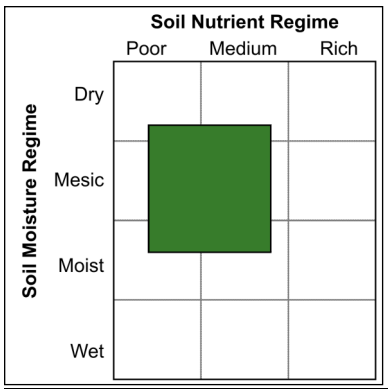
Provinces: Quebec **Ericaceous Shrub & Feathermoss**

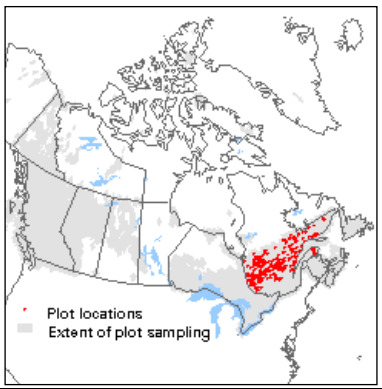
CNVC00214 has a moderately closed canopy of *Picea mariana* and *Betula papyrifera*, sometimes with *Populus tremuloides, Abies balsamea* or *Pinus banksiana* as companion species. Regenerating *P. mariana*, *B. papyrifera* and *A. balsamea* are common in the shrub layer, which is dense and usually dominated 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 *Ilex mucronata* and *Viburnum nudum*; ±characteristic cover	**282 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**57**
Picea mariana	97	20
Betula papyrifera	92	19
Abies balsamea	54	8
Populus tremuloides	52	18
Shrub Stratum Cover (Mean)		**79**
Picea mariana	96	11
Kalmia angustifolia	85	23
Vaccinium angustifolium	85	10
Vaccinium myrtilloides	85	10
Betula papyrifera	83	5
Rhododendron groenlandicum	77	17
Amelanchier spp.	76	6
Abies balsamea	73	11
Salix spp.	66	5
Alnus viridis	58	20
Sorbus americana	54	4
Ilex mucronata	49	6
Viburnum nudum	42	7
Herb Stratum Cover (Mean)		**21**
Cornus canadensis	88	8
Maianthemum canadense	72	4
Gaultheria hispidula	71	4
Clintonia borealis	70	4
Linnaea borealis	52	3
Lysimachia borealis	52	2
Coptis trifolia	51	3
Bryo-Lichen Stratum Cover (Mean)		**50**
Pleurozium schreberi	98	38
Dicranum spp.	87	4
Cladina rangiferina	79	3
Ptilium crista-castrensis	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*

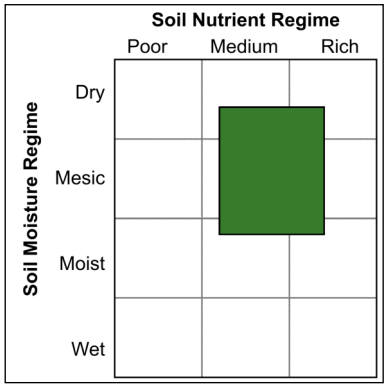
Provinces: Manitoba, Ontario, Quebec **Mesic Rich Shrub & Herb**

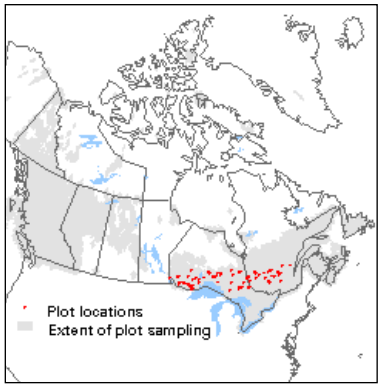
CNVC00215 has a closed canopy of *Betula papyrifera* and/or *Populus tremuloides*, mixed with *Pinus banksiana* and/or *Picea mariana*. The shrub layer is dense and dominated by the tall shrubs *Acer spicatum* and/or *Corylus cornuta*, with lower abundances of regenerating *Abies balsamea*, *B. papyrifera* 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 morainal 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 *Acer rubrum;* ±characteristic cover	**83 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**65**
Pinus banksiana	88	23
Betula papyrifera	77	23
Populus tremuloides	70	25
Picea mariana	66	11
Acer rubrum	22	13
Shrub Stratum Cover (Mean)		**68**
Diervilla lonicera	92	10
Acer spicatum	83	27
Corylus cornuta	82	19
Abies balsamea	78	7
Betula papyrifera	72	6
Picea mariana	64	5
Vaccinium angustifolium	60	2
Vaccinium myrtilloides	59	4
Populus tremuloides	51	2
Acer rubrum	34	6
Herb Stratum Cover (Mean)		**40**
Aralia nudicaulis	98	6
Maianthemum canadense	96	4
Cornus canadensis	94	5
Clintonia borealis	93	4
Eurybia macrophylla	81	10
Lysimachia borealis	78	2
Streptopus lanceolatus	72	2
Linnaea borealis	71	2
Lycopodium obscurum	59	2
Coptis trifolia	54	2
Pteridium aquilinum	51	11
Bryo-Lichen Stratum Cover (Mean)		**14**
Pleurozium schreberi	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

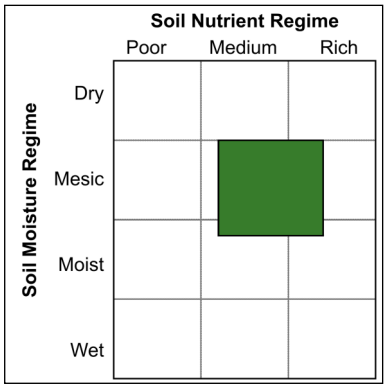
Provinces: Quebec **Mesic Rich Shrub & Herb**

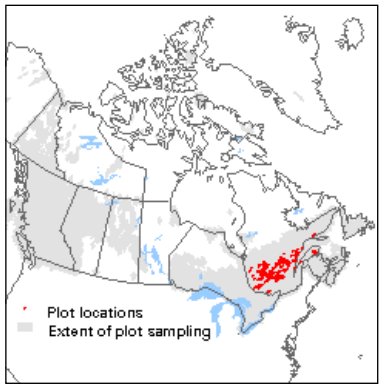
CNVC00216 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, with a minor component of *Abies balsamea*. *Populus tremuloides* is occasionally abundant. The shrub layer is dense with *Acer spicatum* dominant, and lower abundances of regenerating *P. mariana*, *A. balsamea* and *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**
Picea mariana	100	23
Betula papyrifera	97	21
Abies balsamea	78	13
Shrub Stratum Cover (Mean)		**76**
Acer spicatum	95	26
Picea mariana	95	8
Abies balsamea	93	13
Betula papyrifera	85	5
Diervilla lonicera	81	12
Amelanchier spp.	79	6
Vaccinium myrtilloides	77	5
Vaccinium angustifolium	74	3
Sorbus americana	71	5
Viburnum nudum	64	8
Herb Stratum Cover (Mean)		**41**
Clintonia borealis	99	8
Aralia nudicaulis	95	7
Cornus canadensis	93	8
Lysimachia borealis	93	3
Maianthemum canadense	92	7
Coptis trifolia	83	3
Linnaea borealis	78	3
Pteridium aquilinum	59	14
Gaultheria hispidula	59	3
Lycopodium obscurum	57	3
Dryopteris spinulosa complex	54	3
Bryo-Lichen Stratum Cover (Mean)		**27**
Pleurozium schreberi	98	16
Dicranum 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*

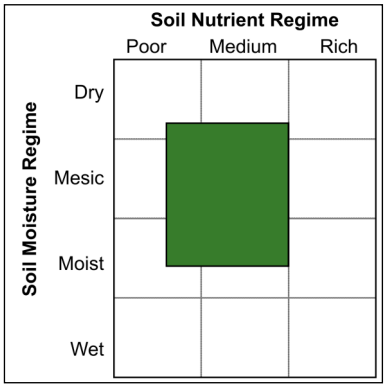
Provinces: Manitoba, Ontario, Quebec **Ericaceous Shrub & Feathermoss**

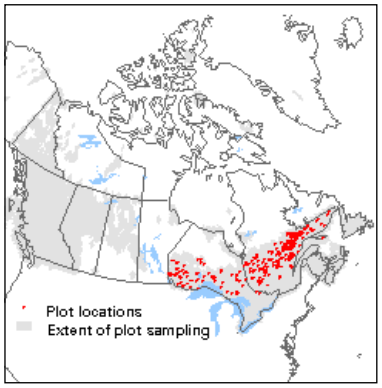
CNVC00217 has a moderately closed canopy of varying proportions of *Picea mariana* and *Abies balsamea*. The well-developed to dense shrub layer is dominated by regeneration of these species, as well as *Rhododendron groenlandicum*. It also includes *Betula papyrifera*, *Vaccinium myrtilloides*, *V. 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 topopositions. 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**
Picea mariana	99	24
Abies balsamea	98	18
Shrub Stratum Cover (Mean)		**61**
Abies balsamea	99	16
Picea mariana	96	15
Rhododendron groenlandicum	76	22
Vaccinium myrtilloides	72	5
Vaccinium angustifolium	70	5
Betula papyrifera	68	5
Kalmia angustifolia	51	13
Amelanchier spp.	43	4
Herb Stratum Cover (Mean)		**15**
Cornus canadensis	92	4
Gaultheria hispidula	85	4
Clintonia borealis	61	3
Maianthemum canadense	60	2
Linnaea borealis	55	2
Coptis trifolia	52	2
Lysimachia borealis	43	2
Bryo-Lichen Stratum Cover (Mean)		**75**
Pleurozium schreberi	100	49
Ptilium crista-castrensis	87	16
Cladina rangiferina	71	3
Dicranum spp.	67	3
Hylocomium splendens	61	8
Cladonia spp.	52	2
Sphagnum spp.	47	9
Polytrichum 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 Topoposition	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*

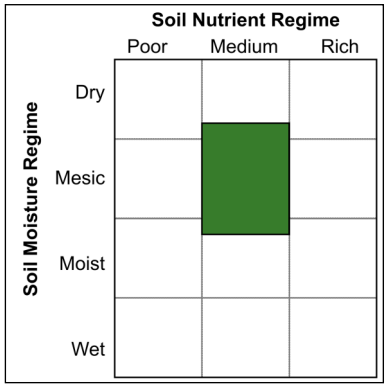
Provinces: Quebec **Mesophytic Herb or Feathermoss**

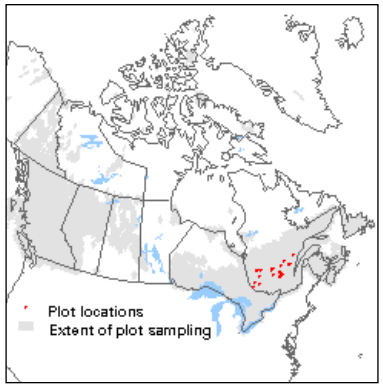
CNVC00218 has a closed canopy of *Pinus banksiana, Abies balsamea, Betula papyrifera* and *Picea mariana*, often with a minor component of *Populus tremuloides.* Regenerating *A. balsamea, P. mariana* and *B. papyrifera* are usually abundant in the dense shrub layer, as are the ericaceous species *Vaccinium 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	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**79**
Pinus banksiana	100	36
Abies balsamea	95	21
Betula papyrifera	95	13
Picea mariana	85	10
Populus tremuloides	65	8
Shrub Stratum Cover (Mean)		**70**
Abies balsamea	100	19
Vaccinium myrtilloides	95	7
Picea mariana	90	10
Betula papyrifera	90	5
Sorbus americana	75	5
Kalmia angustifolia	70	11
Diervilla lonicera	70	9
Viburnum nudum	65	3
Vaccinium angustifolium	60	4
Salix spp.	60	3
Picea glauca	55	4
Herb Stratum Cover (Mean)		**30**
Cornus canadensis	100	10
Maianthemum canadense	95	4
Linnaea borealis	90	3
Clintonia borealis	85	6
Aralia nudicaulis	85	5
Lysimachia borealis	75	2
Coptis trifolia	70	3
Pteridium aquilinum	65	10
Gaultheria hispidula	65	3
Bryo-Lichen Stratum Cover (Mean)		**41**
Pleurozium schreberi	100	35
Dicranum spp.	85	6
Ptilium crista-castrensis	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*

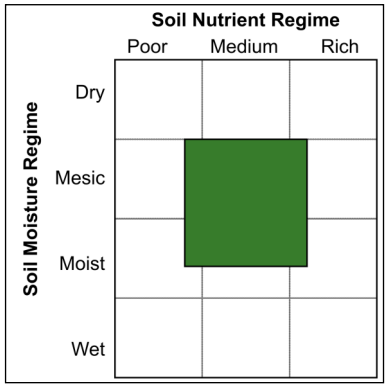
Provinces: New Brunswick, Nova Scotia **Mesophytic Herb or Feathermoss**

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

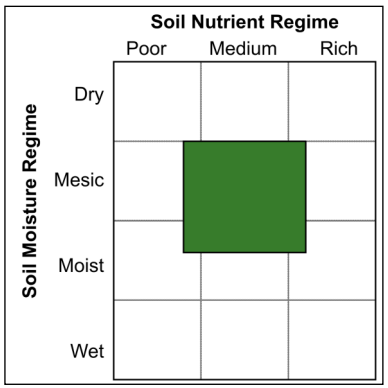
Provinces: New Brunswick, Newfoundland and Labrador, Nova Scotia, Quebec **Mesophytic Herb or Feathermoss**

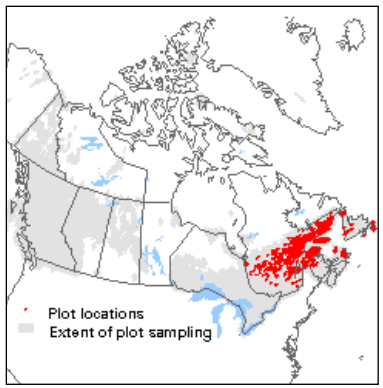
CNVC00222 has a closed canopy dominated by *Abies balsamea*, usually with smaller components of *Betula papyrifera*, *Picea glauca* and/or *P. mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately developed shrub layer. The herb layer varies from poorly to well 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	
^≥**40%** presence, except *Taxus canadensis*; ±characteristic cover	**1229 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**65**
Abies balsamea	100	46
Betula papyrifera	75	8
Picea glauca	60	10
Picea mariana	58	9
Shrub Stratum Cover (Mean)		**38**
Abies balsamea	98	24
Betula papyrifera	86	6
Picea mariana	61	8
Picea glauca	54	5
Amelanchier spp.	48	4
Taxus canadensis	4	4
Herb Stratum Cover (Mean)		**25**
Cornus canadensis	90	7
Maianthemum canadense	74	3
Lysimachia borealis	73	2
Clintonia borealis	72	4
Gaultheria hispidula	67	4
Linnaea borealis	63	3
Coptis trifolia	59	3
Oxalis montana	50	11
Dryopteris spinulosa complex	47	5
Bryo-Lichen Stratum (Mean)		**70**
Pleurozium schreberi	98	39
Ptilium crista-castrensis	84	8
Dicranum spp.	81	5
Hylocomium splendens	79	22
Polytrichum spp.	56	2
Cladonia spp.	54	2
Cladina rangiferina	41	2
Sphagnum spp.	40	6

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	5–423–1050 m; md (2)
Slope	level (15); gentle (20); moderate (25); moderately steep (26); steep (11); md (1)
Aspect	north (23); east (25); south (17); west (23); level (10); md (1)
Meso Topoposition	crest/ upper (18); mid (58); lower/ toe (9); depression (2); level (7); md (6)
Moisture Regime	dry (2); mesic (79); moist (18); wet (1)
Nutrient Regime	poor (2); medium (4); rich (1); md (93)
Soil Parent Material	moraine/ till (73); colluvium (12); other (10); md (4)
Soil Rooting Zone Substrate	coarse loamy (17); non-soil (12); other (14); md (57)
Root Restricting Depth	0-20 (3); 21-99 cm (52); ≥100 cm (5); md (40)
Humus Form	mor (83); moder (2); peatymor (3); md (12)





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*

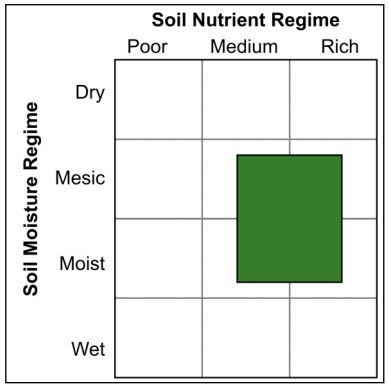
Provinces: New Brunswick, Nova Scotia, Quebec **Mesic Rich Shrub & Herb**

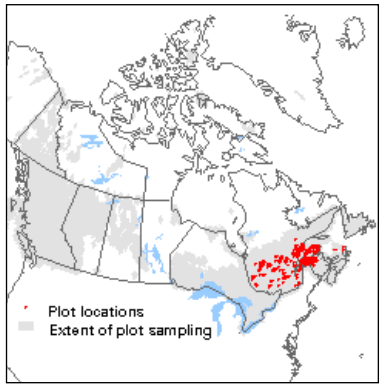
CNVC00225 has a closed canopy dominated by *Abies balsamea*, often with *Picea glauca* and *Betula papyrifera* as companion species. The shrub layer is well developed with *Acer spicatum* and *A. balsamea* dominant, and lower abundances of *B. papyrifera* and *P. glauca*. The herb layer is moderately 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	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**65**
Abies balsamea	100	41
Picea glauca	81	15
Betula papyrifera	79	10
Shrub Stratum Cover (Mean)		**53**
Abies balsamea	100	20
Acer spicatum	94	23
Betula papyrifera	82	6
Picea glauca	72	6
Sorbus americana	57	4
Corylus cornuta	54	8
Rubus idaeus	53	7
Ribes lacustre	53	4
Herb Stratum Cover (Mean)		**37**
Aralia nudicaulis	87	4
Clintonia borealis	87	4
Cornus canadensis	84	5
Lysimachia borealis	83	2
Oxalis montana	81	9
Maianthemum canadense	79	3
Coptis trifolia	75	2
Linnaea borealis	73	3
Rubus pubescens	63	3
Gymnocarpium dryopteris	63	3
Viola spp.	63	2
Streptopus lanceolatus	57	2
Dryopteris spinulosa complex	52	7
Phegopteris connectilis	50	3
Bryo-Lichen Stratum Cover (Mean)		**36**
Pleurozium schreberi	93	17
Ptilium crista-castrensis	63	4
Hylocomium splendens	61	11
Dicranum 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*

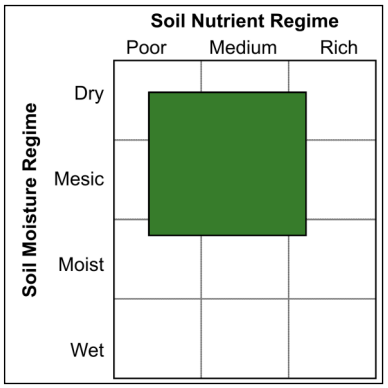
Provinces: New Brunswick, Nova Scotia, Prince Edward Island **Ericaceous Shrub & Feathermoss**

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

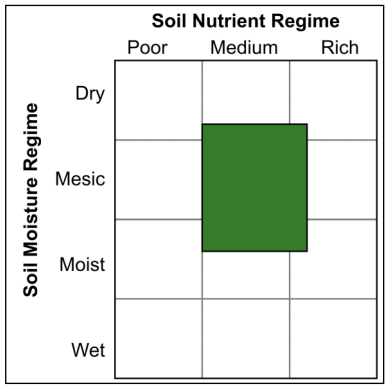
Provinces: Manitoba, Ontario, Quebec **Mesophytic Herb or Feathermoss**

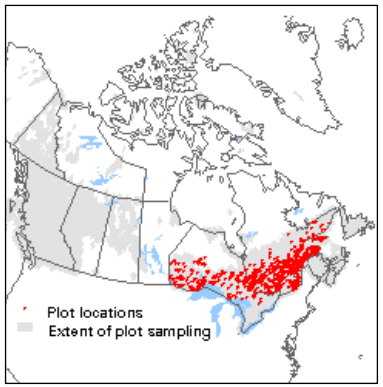
CNVC00231 has a closed canopy of *Abies balsamea* and/or *Picea glauca* with *Betula papyrifera* and/or *Populus tremuloides*. The shrub layer is well developed and dominated by *A. balsamea*, although *B. papyrifera* can be abundant in larger canopy openings. The herb layer is moderately developed and 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 topopositions. 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	
	805 plots	
^≥**40%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**70**
Abies balsamea	90	26
Betula papyrifera	80	22
Populus tremuloides	61	28
Picea glauca	60	13
Picea mariana	45	8
Shrub Stratum Cover (Mean)		**43**
Abies balsamea	97	18
Betula papyrifera	66	5
Acer spicatum	53	4
Diervilla lonicera	52	7
Picea glauca	48	5
Vaccinium myrtilloides	48	4
Picea mariana	47	6
Populus tremuloides	44	3
Amelanchier spp.	40	4
Herb Stratum Cover (Mean)		**32**
Cornus canadensis	88	7
Maianthemum canadense	85	4
Aralia nudicaulis	78	5
Clintonia borealis	77	4
Lysimachia borealis	72	2
Linnaea borealis	67	3
Coptis trifolia	56	2
Lycopodium obscurum	42	3
Rubus pubescens	40	3
Bryo-Lichen Stratum Cover (Mean)		**18**
Pleurozium schreberi	86	10
Dicranum spp.	53	4
Ptilium crista-castrensis	48	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	5–339–975 m; md (3)
Slope	level (31); gentle (26); moderate (20); moderately steep (15); steep (6); very steep (1); md (1)
Aspect	north (18); east (16); south (21); west (22); level (22)
Meso Topoposition	crest/ upper (26); mid (42); lower/ toe (13); depression (2); level (17)
Moisture Regime	very dry (1); dry (10); mesic (71); moist (17); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (57); lacustrine (13); glaciofluvial (12); other (15); md (1)
Soil Rooting Zone Substrate	coarse loamy (19); sandy (11); other (23); md (26)
Root Restricting Depth	0-20 cm (3); 21-99 cm (51); ≥100 cm (20); md (26)
Humus Form	mor (74); moder (19); mull (3); peatymor (3); md (1)





Source: NRCan—CFS

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*

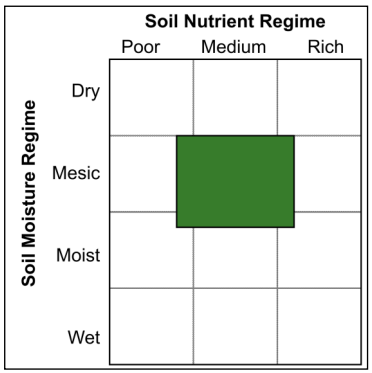
Provinces: Quebec **Mesophytic Herb or Feathermoss**

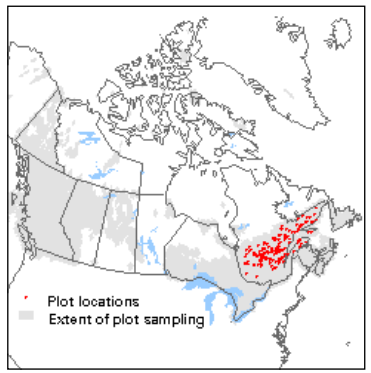
CNVC00232 has a moderately closed to closed canopy dominated by *Abies balsamea* and *Betula papyrifera*, often with a minor component of *Picea mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the well-developed shrub layer. *Amelanchier* spp., *Vaccinium myrtilloides* 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	
^>**50**% presence; ±characteristic cover	**164 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**62**
Betula papyrifera	100	25
Abies balsamea	100	24
Picea mariana	80	9
Shrub Stratum Cover (Mean)		**52**
Abies balsamea	100	26
Betula papyrifera	91	6
Picea mariana	84	8
Amelanchier spp.	67	5
Vaccinium myrtilloides	62	4
Vaccinium angustifolium	55	3
Sorbus americana	54	4
Herb Stratum Cover (Mean)		**23**
Cornus canadensis	95	10
Clintonia borealis	84	4
Gaultheria hispidula	81	3
Maianthemum canadense	79	5
Linnaea borealis	73	3
Lysimachia borealis	71	2
Coptis trifolia	66	3
Dryopteris spinulosa complex	54	2
Bryo-Lichen Stratum Cover (Mean)		**65**
Pleurozium schreberi	100	45
Dicranum spp.	98	4
Ptilium crista-castrensis	82	6
Cladina rangiferina	68	2
Hylocomium splendens	67	13
Polytrichum spp.	67	3
Cladonia spp.	63	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	40–454–895 m
Slope	level (9); gentle (18); moderate (31); moderately steep (29); steep (12); very steep (1)
Aspect	north (26); east (32); south (16); west (16); level (11)
Meso Topoposition	crest/ upper (16); mid (69); lower/ toe (5); depression (3); level (6)
Moisture Regime	dry (2); mesic (85); moist (12); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (86); other (14)
Soil Rooting Zone Substrate	coarse loamy (21); other (17); md (63)
Root Restricting Depth	0-20 cm (6); 21-99 cm (59); md (35)
Humus Form	mor (98); moder (2)





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

Notes & Similar Associations

CNVC00231 has more *Populus tremuloides* and a less developed moss layer.

CNVC00233 occurs in New Brunswick, Nova Scotia and Quebec, often at higher elevations and has more *Sorbus americana*, *Oxalis montana* and *Dryopteris* spp.

CNVC00234 has *Picea mariana* codominant in the tree layer.

CNVC00235 occurs on slightly richer sites and has abundant *Acer spicatum*.

CNVC00270 occurs on moister sites and has more *P. mariana* and *Sphagnum* mosses.

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*

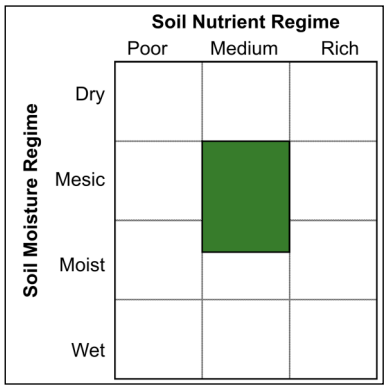
Provinces: New Brunswick, Nova Scotia, Quebec **Mesophytic Herb or Feathermoss**

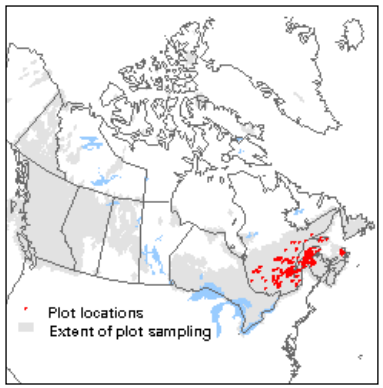
CNVC00233 has a closed canopy dominated by *Abies balsamea* and *Betula papyrifera*, often with a minor component of *Picea mariana*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately to well-developed shrub layer. *Sorbus americana* is often present. The herb layer 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	
	312 plots	
^≥40% presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**64**
Abies balsamea	99	32
Betula papyrifera	99	24
Picea glauca	55	8
Shrub Stratum Cover (Mean)		**41**
Abies balsamea	99	25
Betula papyrifera	94	11
Sorbus americana	67	6
Rubus idaeus	59	7
Picea glauca	57	6
Acer spicatum	53	8
Ribes glandulosum	44	4
Herb Stratum Cover (Mean)		**48**
Oxalis montana	95	20
Cornus canadensis	91	8
Clintonia borealis	87	6
Lysimachia borealis	81	3
Maianthemum canadense	70	3
Dryopteris spinulosa complex	67	13
Aralia nudicaulis	58	3
Coptis trifolia	44	3
Bryo-Lichen Stratum Cover (Mean)		**33**
Pleurozium schreberi	93	14
Dicranum spp.	65	6
Ptilium crista-castrensis	62	3
Hylocomium splendens	52	9
Polytrichum spp.	48	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	50–527–950 m; md (3)
Slope	level (13); gentle (24); moderate (24); moderately steep (27); steep (8); very steep (1); md (2)
Aspect	north (23); east (21); south (16); west (24); level (13); md (2)
Meso Topoposition	crest/ upper (19); mid (44); lower/ toe (16); depression (2); level (10); md (9)
Moisture Regime	dry (4); mesic (74); moist (21); wet (2)
Nutrient Regime	poor (2); medium (25); rich (4); md (69)
Soil Parent Material	moraine/ till (66); colluvium (22); other (7); md (4)
Soil Rooting Zone Substrate	non-soil (22); coarse loamy (19); other (10); md (49)
Root Restricting Depth	0-20 cm (1); 21-99 cm (44); ≥100 cm (28); md (35)
Humus Form	mor (59); moder (10); peatymor (2); md (30)





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*

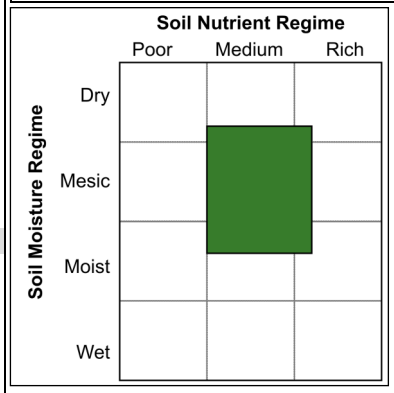
Provinces: Ontario, Quebec **Mesophytic Herb or Feathermoss**

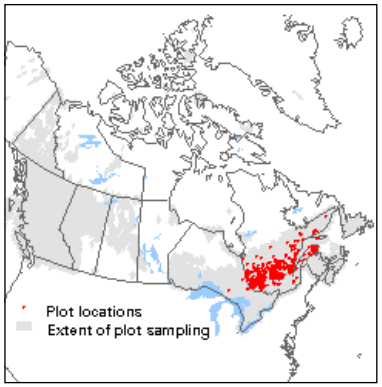
CNVC00234 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, usually with a smaller component of *Abies balsamea* and sometimes *Populus tremuloides* or *Acer rubrum*. Regeneration of these species dominates the well-developed shrub layer. *Vaccinium myrtilloides*, *Amelanchier* 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	
^≥**50%** presence except *A. rubrum*, *P. tremuloides* and the bryo-lichen layer; ±characteristic cover	**309 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**66**
Picea mariana	99	23
Betula papyrifera	99	22
Abies balsamea	82	12
Populus tremuloides	47	15
Acer rubrum	23	7
Shrub Stratum Cover (Mean)		**55**
Abies balsamea	95	17
Picea mariana	95	10
Betula papyrifera	91	6
Vaccinium myrtilloides	80	5
Amelanchier spp.	68	5
Vaccinium angustifolium	66	4
Sorbus americana	66	4
Kalmia angustifolia	62	5
Ilex mucronata	55	4
Viburnum nudum	54	7
Herb Stratum Cover (Mean)		**30**
Cornus canadensis	93	10
Clintonia borealis	86	5
Maianthemum canadense	85	5
Gaultheria hispidula	77	3
Linnaea borealis	73	4
Lysimachia borealis	73	3
Coptis trifolia	70	3
Aralia nudicaulis	67	4
Pteridium aquilinum	54	13
Bryo-Lichen Stratum Cover (Mean)		**26**
Pleurozium schreberi	96	14

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	50–388–945 m
Slope	level (18); gentle (28); moderate (24); moderately steep (22); steep (6); very steep (1)
Aspect	north (17); east (15); south (20); west (32); level (17)
Meso Topoposition	crest/ upper (23); mid (54); lower/ toe (10); depression (2); level (11)
Moisture Regime	dry (6); mesic (79); moist (14); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (80); other (20)
Soil Rooting Zone Substrate	coarse loamy (16); other (17); md (66)
Root Restricting Depth	0-20 cm (6); 21-99 cm (67); md (26)
Humus Form	mor (89); moder (8); peatymor (3)





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

Notes & Similar Associations

The *Pteridium aquilinum* and *Acer rubrum* 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 *Acer spicatum* and *Corylus cornuta.*

CNVC00231, CNVC00232 and CNVC00233 do not have *Picea mariana* codominant.

CNVC00344 occurs on cooler sites, often farther north, and has a better developed moss layer.

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

Balsam Fir—Paper Birch / Mountain Maple

Subassociations: *typic, Rubus pubescens*

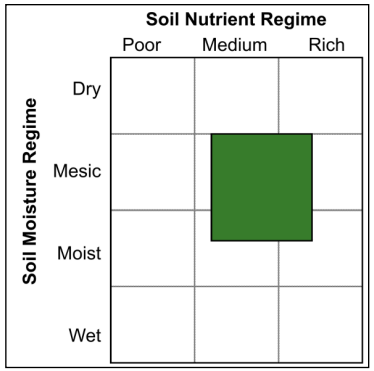
Provinces: Manitoba, Ontario, Quebec **Mesic Rich Shrub & Herb**

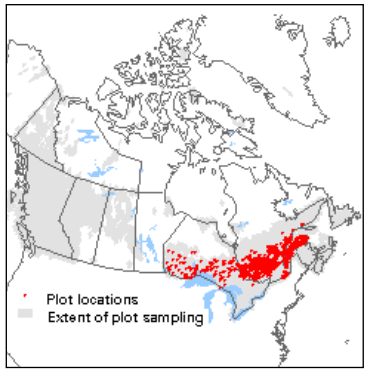
CNVC00235 has a closed canopy of *Abies balsamea* and/or *Picea glauca,* mixed with *Betula papyrifera* and/or *Populus tremuloides*. The shrub layer is dense with abundant *Acer spicatum*, *Corylus cornuta* and *A. balsamea* and less abundant *B. papyrifera* and *Diervilla lonicera*. The herb layer 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 topopositions. 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	
^≥**45%** presence except *Rubus pubescens*; ±characteristic cover	**1040 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**70**
Abies balsamea	93	22
Betula papyrifera	90	22
Picea glauca	68	12
Shrub Stratum Cover (Mean)		**68**
Abies balsamea	99	14
Acer spicatum	97	33
Corylus cornuta	67	14
Betula papyrifera	66	5
Diervilla lonicera	61	8
Picea glauca	48	4
Lonicera canadensis	48	3
Sorbus americana	46	4
Amelanchier spp.	45	4
Herb Stratum Cover (Mean)		**41**
Clintonia borealis	89	7
Aralia nudicaulis	88	7
Maianthemum canadense	78	4
Cornus canadensis	75	6
Lysimachia borealis	74	2
Dryopteris spinulosa complex	60	8
Streptopus lanceolatus	54	2
Linnaea borealis	51	3
Coptis trifolia	49	3
Eurybia macrophylla	47	9
Oxalis montana	45	12
Rubus pubescens	44	5
Bryo-Lichen Stratum Cover (Mean)		14
Pleurozium schreberi	84	7
Dicranum 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 Topoposition	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

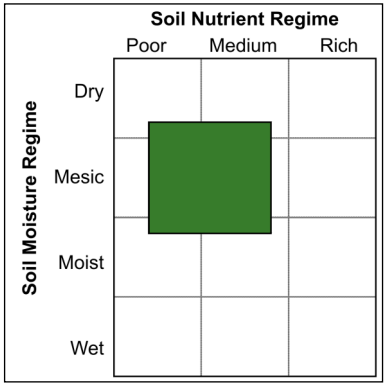
Ericaceous Shrub & Feathermoss

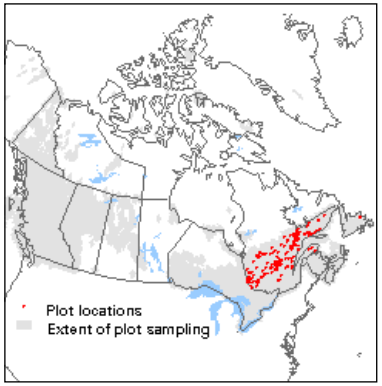
CNVC00237 has a closed canopy dominated by *Betula papyrifera,* usually with a minor component of *Picea mariana* and/or *Abies balsamea*. The well-developed to dense shrub layer includes regeneration of these species as well as *Amelanchier* spp., *Alnus viridis*, *Vaccinium myrtilloides*, *V. angustifolium, 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 topopositions. 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	
	157 plots	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**68**
Betula papyrifera	100	47
Picea mariana	79	9
Abies balsamea	65	6
Shrub Stratum Cover (Mean)		**70**
Betula papyrifera	90	7
Picea mariana	87	9
Abies balsamea	85	13
Vaccinium angustifolium	78	8
Vaccinium myrtilloides	75	9
Amelanchier spp.	69	8
Rhododendron groenlandicum	66	14
Alnus viridis	62	23
Kalmia angustifolia	59	15
Salix spp.	54	5
Herb Stratum Cover (Mean)		**28**
Cornus canadensis	89	11
Maianthemum canadense	71	5
Clintonia borealis	70	5
Lysimachia borealis	68	3
Gaultheria hispidula	67	4
Linnaea borealis	55	4
Lycopodium annotinum	54	6
Dryopteris spinulosa complex	53	3
Bryo-Lichen Stratum Cover (Mean)		**30**
Pleurozium schreberi	95	22
Dicranum spp.	85	4
Polytrichum spp.	69	3
Cladina rangiferina	67	3
Cladonia spp.	64	2
Ptilium crista-castrensis	50	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	46–426–830 m
Slope	level (8); gentle (22); moderate (28); moderately steep (26); steep (15); md (1)
Aspect	north (22); east (26); south (18); west (24); level (9); md (1)
Meso Topoposition	crest/ upper (24); mid (65); lower/ toe (3); level (7); md (1)
Moisture Regime	very dry (1); dry (5); mesic (85); moist (8); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (87); other (14)
Soil Rooting Zone Substrate	coarse loamy (14); other (15); md (71)
Root Restricting Depth	0-20 cm (13); 21-99 cm (59); md (28)
Humus Form	mor (90); moder (5); mull (1); peatymor (3); md (1)





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*

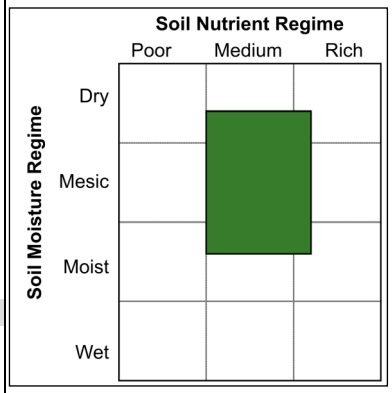
Provinces: Manitoba, Ontario, Quebec **Mesophytic Herb or Feathermoss**

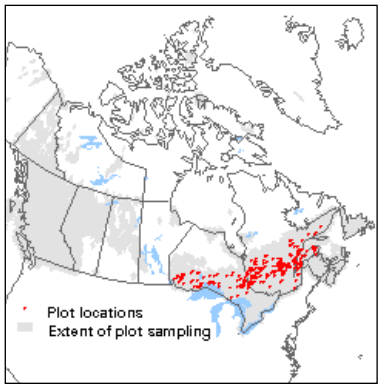
CNVC00238 has a closed canopy dominated by *Populus tremuloides*, usually with a smaller component of *Betula papyrifera*, overtopping a well-developed to dense shrub layer that includes regenerating trees and low shrubs, such as *Vaccinium myrtilloides*, *Diervilla lonicera* and *V. angustifolium*. *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 *Alnus viridis, Kamia angustifolia* and the bryo-lichen layer; ±characteristic cover	**259 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**69**
Populus tremuloides	98	47
Betula papyrifera	74	17
Abies balsamea	51	8
Picea mariana	49	7
Shrub Stratum Cover (Mean)		**59**
Populus tremuloides	77	5
Abies balsamea	76	11
Vaccinium myrtilloides	71	9
Betula papyrifera	66	5
Diervilla lonicera	65	10
Vaccinium angustifolium	62	8
Picea mariana	61	6
Salix spp.	54	5
Amelanchier spp.	54	5
Prunus pensylvanica	47	4
Alnus viridis	39	22
Kalmia angustifolia	39	15
Herb Stratum Cover (Mean)		**47**
Cornus canadensis	93	13
Maianthemum canadense	89	5
Aralia nudicaulis	78	9
Clintonia borealis	78	6
Linnaea borealis	71	4
Lysimachia borealis	66	2
Lycopodium obscurum	54	3
Coptis trifolia	51	2
Pteridium aquilinum	44	15
Eurybia macrophylla	43	13
Bryo-Lichen Stratum Cover (Mean)		**14**
Pleurozium schreberi	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

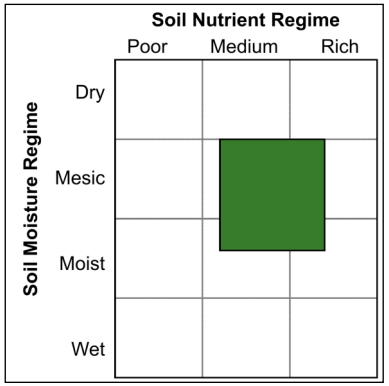
Provinces: Manitoba, Ontario, Quebec **Mesic Rich Shrub & Herb**

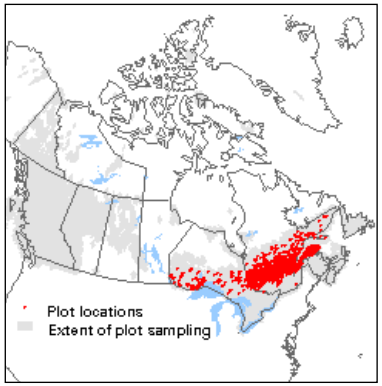
CNVC00239 has a closed canopy dominated by *Betula papyrifera* and/or *Populus tremuloides*. The tall shrub layer is dense and usually dominated by *Acer spicatum* and/or *Corylus cornuta*. *A. balsamea*, *B. papyrifera* and *Diervilla lonicera* are also common in the shrub layer. The well-developed 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 topopositions. 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	
^**≥45%** presence except herb layer; ±characteristic cover	**1478 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**74**
Betula papyrifera	94	41
Abies balsamea	68	10
Populus tremuloides	53	37
Shrub Stratum Cover (Mean)		**67**
Abies balsamea	89	14
Betula papyrifera	77	5
Acer spicatum	76	31
Diervilla lonicera	62	12
Amelanchier spp.	59	5
Picea mariana	52	6
Sorbus americana	52	5
Corylus cornuta	46	17
Herb Stratum Cover (Mean)		**44**
Clintonia borealis	90	7
Maianthemum canadense	86	5
Cornus canadensis	82	9
Aralia nudicaulis	81	7
Lysimachia borealis	81	3
Dryopteris spinulosa complex	65	6
Coptis trifolia	56	3
Lycopodium obscurum	55	3
Linnaea borealis	52	3
Viola spp.	45	3
Streptopus lanceolatus	44	2
Eurybia macrophylla	43	11
Oxalis montana	40	9
Bryo-Lichen Stratum Cover (Mean)		**12**
Pleurozium schreberi	88	6
Dicranum spp.	79	4
Polytrichum spp.	57	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	20–400–930 m; md (1)
Slope	level (15); gentle (26); moderate (26); moderately steep (23); steep (10); very steep (1); md (1)
Aspect	north (23); east (26); south (19); west (21); level (10)
Meso Topoposition	crest/ upper (21); mid (61); lower/ toe (9); depression (2); level (8)
Moisture Regime	dry (3); mesic (82); moist (14); wet (1)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (74); glaciofluvial (10); other (15); md (1)
Soil Rooting Zone Substrate	coarse loamy (18); other (21); md (62)
Root Restricting Depth	0-20 cm (3); 21-99 cm (62); ≥100 cm (5); md (30)
Humus Form	mor (78); moder (18); mull (2); peatymor (1); md (1)





Source: NRCan—CFS

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*

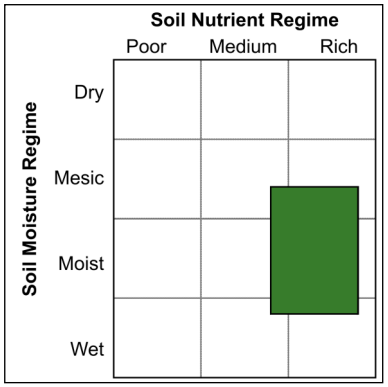
Provinces: Manitoba, Ontario, Quebec **Moist Rich Shrub & Herb**

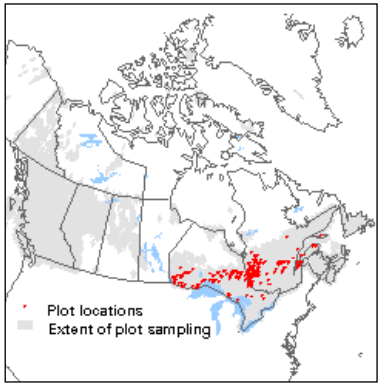
CNVC00241 has a closed canopy of *Populus tremuloides* and/or *P. balsamifera* over a dense tall shrub layer that is dominated by *Alnus incana*, with lower abundances of *Rubus idaeus*, *P. tremuloides* and *Abies balsamea*. *Acer spicatum* is less common but can be abundant. The herb layer is usually 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	
^>**40%** presence except *Acer spicatum;* ±characteristic cover	**305 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**67**
Populus tremuloides	83	43
Populus balsamifera	47	31
Shrub Stratum Cover (Mean)		**63**
Alnus incana	80	33
Rubus idaeus	76	8
Abies balsamea	68	7
Populus tremuloides	62	4
Ribes glandulosum	54	4
Ribes triste	51	3
Salix spp.	45	10
Diervilla lonicera	41	8
Acer spicatum	36	17
Herb Stratum Cover (Mean)		**57**
Rubus pubescens	88	8
Maianthemum canadense	75	2
Eurybia macrophylla	67	12
Cornus canadensis	65	5
Aralia nudicaulis	63	9
Clintonia borealis	63	3
Lysimachia borealis	58	2
Mitella nuda	55	4
Petasites frigidus	51	3
Poaceae	50	10
Viola spp.	48	6
Chamerion angustifolium	44	3
Galium triflorum	42	2
Bryo-Lichen Stratum Cover (Mean)		**8**
Pleurozium schreberi	73	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	10–281–474 m; md (2)
Slope	level (63); gentle (21); moderate (7); moderately steep (2); steep (1); very steep (1); md (7)
Aspect	north (16); east (11); south (12); west (15); level (44); md (2)
Meso Topoposition	crest/ upper (11); mid (24); lower/ toe (14); depression (4); level (47)
Moisture Regime	dry (2); mesic (31); moist (61); wet (5)
Nutrient Regime	md (100)
Soil Parent Material	glaciolacustrine (40); lacustrine (27); moraine/ till (11); other (21); md (2)
Soil Rooting Zone Substrate	clayey (19); other (32); md (49)
Root Restricting Depth	0-20 cm (2); 21-99 cm (52); ≥100 cm (23); md (23)
Humus Form	mor (50); moder (25); mull (15); peatymor (5); md (5)





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

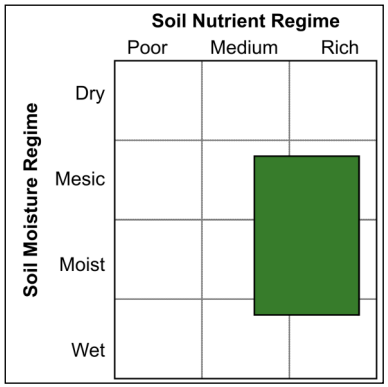
Provinces: Quebec **Moist Rich Shrub & Herb**

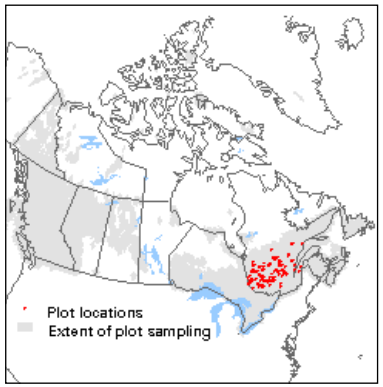
CNVC00242 has a closed canopy dominated by *Betula papyrifera*, often with a minor component of *Abies balsamea.* The tall shrub layer is dense and dominated by *Alnus incana*, with less abundant *A. balsamea* and *Acer spicatum*. *B. papyrifera*, *Rubus idaeus*, *Sorbus americana*, *Ribes glandulosum* 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	
^≥**50%** presence except bryo-lichen layer; ±characteristic cover	**93 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**63**
Betula papyrifera	100	34
Abies balsamea	58	8
Picea mariana	51	6
Shrub Stratum Cover (Mean)		**76**
Alnus incana	91	44
Abies balsamea	86	14
Betula papyrifera	74	6
Rubus idaeus	73	9
Acer spicatum	71	12
Sorbus americana	71	6
Ribes glandulosum	71	4
Amelanchier spp.	62	4
Picea mariana	56	5
Prunus pensylvanica	54	4
Viburnum nudum	52	10
Herb Stratum Cover (Mean)		**42**
Dryopteris spinulosa complex	86	7
Clintonia borealis	86	7
Cornus canadensis	82	6
Lysimachia borealis	76	3
Maianthemum canadense	74	4
Carex spp.	67	4
Aralia nudicaulis	67	4
Coptis trifolia	67	3
Poaceae	63	8
Oxalis montana	58	5
Viola spp.	57	4
Rubus pubescens	53	4
Lycopodium obscurum	51	3
Bryo-Lichen Stratum Cover (Mean)		**14**
Pleurozium schreberi	82	6

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	70–356–630 m
Slope	level (41); gentle (30); moderate (22); moderately steep (5); steep (1); very steep (1)
Aspect	north (15); east (14); south (13); west (23); level (35)
Meso Topoposition	crest/ upper (9); mid (39); lower/ toe (16); depression (5); level (31)
Moisture Regime	dry (1); mesic (44); moist (44); wet (11)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (66); glaciolacustrine (19); other (14)
Soil Rooting Zone Substrate	coarse loamy (11); other (18); md (70)
Root Restricting Depth	0-20 cm (4); 21-99 cm (76); md (19)
Humus Form	mor (71); moder (17); mull (2); peatymor (10)





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. **CONIFER**

Jack Pine / Early Lowbush Blueberry / Reindeer Lichens

Subassociations: none

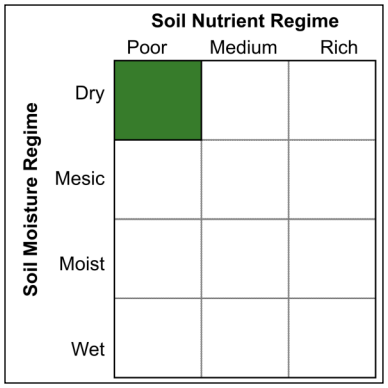
Provinces: Manitoba, Ontario **Lichen**

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-impoverished 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	
^≥**30%** presence; ±characteristic cover	**31 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**22**
Pinus banksiana	97	21
Picea mariana	42	5
Shrub Stratum Cover (Mean)		**23**
Vaccinium angustifolium	77	11
Vaccinium myrtilloides	74	3
Pinus banksiana	71	7
Picea mariana	68	3
Diervilla lonicera	32	4
Abies balsamea	32	2
Herb Stratum Cover (Mean)		**15**
Melampyrum lineare	61	1
Maianthemum canadense	55	2
Arctostaphylos uva-ursi	39	15
Bryo-Lichen Stratum Cover (Mean)		**72**
Cladina rangiferina	100	18
Cladina mitis	90	24
Pleurozium schreberi	87	16
Cladina stellaris	87	10
Dicranum polysetum	84	3
Cladonia spp.	58	8
Polytrichum juniperinum	35	2
Polytrichum piliferum	32	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	203–363–508 m; md (3)
Slope	level (42); gentle (13); moderate (13); moderately steep (26); steep (6)
Aspect	north (10); east (3); south (19); west (45); level (23)
Meso Topoposition	crest/ upper (68); mid (19); lower/ toe (3); level (10)
Moisture Regime	very dry (19); dry (71); mesic (6); md (3)
Nutrient Regime	md (100)
Soil Parent Material	glaciofluvial (35); bedrock (19); moraine/ till (16); eolian (13); lacustrine (13); md (3)
Soil Rooting Zone Substrate	sandy (32); non-soil (19); coarse loamy (19); other (3); md (26)
Root Restricting Depth	0-20 cm (23); 21-99 cm (19); ≥100 cm (32); md (26)
Humus Form	mor (84); moder (6); mull (3); md (6)



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

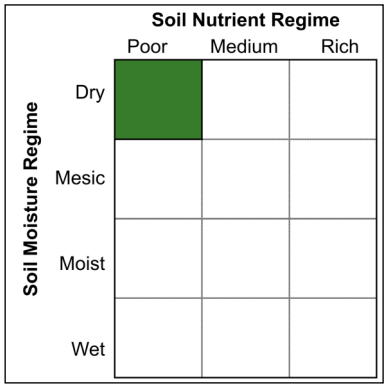
Provinces: Ontario **Lichen**

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-impoverished 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 topopositions. 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	
^≥**20%** presence; ±characteristic cover	**12 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**16**
Picea mariana	100	15
Shrub Stratum Cover (Mean)		**47**
Picea mariana	100	17
Rhododendron groenlandicum	75	18
Vaccinium myrtilloides	67	7
Vaccinium angustifolium	58	20
Sorbus decora	25	1
Alnus viridis	25	1
Herb Stratum Cover (Mean)		**2**
Gaultheria hispidula	50	1
Chamerion angustifolium	25	1
Cornus canadensis	25	1
Vaccinium vitis-idaea	25	1
Bryo-Lichen Stratum Cover (Mean)		**92**
Pleurozium schreberi	100	23
Cladina rangiferina	100	23
Cladina mitis	92	18
Cladina stellaris	92	18
Dicranum polysetum	92	2
Cladonia spp.	83	4
Ptilium crista-castrensis	58	2
Peltigera aphthosa	42	< 1
Sphagnum capillifolium	33	3
Ptilidium ciliare	33	1
Bucklandiella heterosticha	25	1
Polytrichum commune	25	1

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	232–356–465 m; md (8)
Slope	level (50); gentle (17); moderate (25); md (8)
Aspect	north (8); east (0); south (8); west (25); level (58)
Meso Topoposition	crest/ upper (75); mid (8); level (17)
Moisture Regime	very dry (50); dry (50)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (42); bedrock (25); lacustrine (17); other (8); md (8)
Soil Rooting Zone Substrate	sandy (25); non-soil (25); other (16); md (33)
Root Restricting Depth	0-20 cm (50); 21-99 cm (25); ≥100 cm (8); md (17)
Humus Form	mor (83); moder (8); peatymor (8)



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*

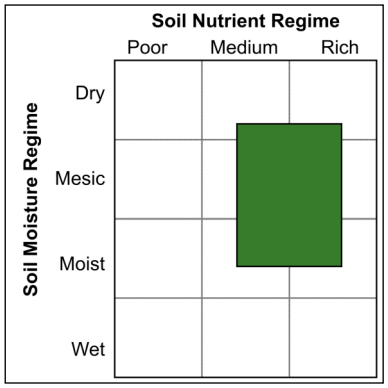
Provinces: Manitoba, Ontario **Mesic Rich Shrub & Herb**

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	
	82 plots	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**46**
Picea glauca	91	27
Abies balsamea	73	19
Shrub Stratum Cover (Mean)		**41**
Abies balsamea	94	10
Sorbus decora	65	1
Acer spicatum	62	18
Rosa acicularis	57	1
Diervilla lonicera	54	4
Herb Stratum Cover (Mean)		**37**
Cornus canadensis	89	5
Clintonia borealis	87	3
Maianthemum canadense	85	2
Aralia nudicaulis	83	2
Linnaea borealis	82	2
Rubus pubescens	77	4
Streptopus lanceolatus	74	1
Lysimachia borealis	72	1
Galium triflorum	65	1
Mitella nuda	63	2
Coptis trifolia	61	2
Viola renifolia	55	1
Bryo-Lichen Stratum Cover (Mean)		**58**
Pleurozium schreberi	95	32
Ptilium crista-castrensis	83	4
Hylocomium splendens	72	7
Rhytidiadelphus triquetrus	57	10
Dicranum polysetum	55	1

Site / Soil Characteristics	(% Frequency); md=missing data
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)
Aspect	north (17); east (9); south (23); west (26); level (26)
Meso Topoposition	crest/ upper (29); mid (35); lower/ toe (15); depression (6); level (15)
Moisture Regime	very dry (1); dry (15); mesic (52); moist (27); wet (2); md (2)
Nutrient Regime	md (100)
Soil Parent Material	lacustrine (50); moraine/ till (22); glaciofluvial (16); other (7); md (5)
Soil Rooting Zone Substrate	coarse loamy (26); silty (16); sandy (13); clayey (12); other (10); md (22)
Root Restricting Depth	0-20 cm (2); 21-99 cm (20); ≥100 cm (65); md (13)
Humus Form	mor (57); moder (32); mull (6); peatymor (1); md (4)



Source: NRCan—CFS

Notes & Similar Associations

The *Acer spicatum* subassociation is slightly richer and has a better developed shrub layer, usually with abundant *A. spicatum* or *Corylus cornuta* 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.

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

Paper Birch / Early Lowbush Blueberry / Red-stemmed Feathermoss

Subassociations: none

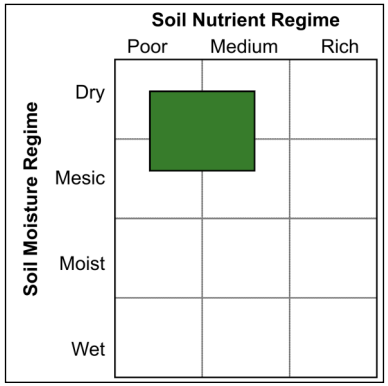
Provinces: Ontario **Ericaceous Shrub & Feathermoss**

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**
Betula papyrifera	100	30
Picea glauca	33	4
Picea mariana	33	3
Shrub Stratum Cover (Mean)		**42**
Betula papyrifera	100	11
Vaccinium angustifolium	100	2
Abies balsamea	67	13
Picea glauca	67	4
Picea mariana	67	3
Acer spicatum	67	1
Sorbus decora	67	1
Diervilla lonicera	33	30
Vaccinium myrtilloides	33	11
Alnus viridis	33	4
Populus tremuloides	33	3
Herb Stratum Cover (Mean)		**38**
Maianthemum canadense	100	4
Aralia nudicaulis	100	4
Lycopodium annotinum	100	2
Cornus canadensis	67	12
Clintonia borealis	67	10
Lysimachia borealis	67	2
Polypodium virginianum	33	20
Linnaea borealis	33	2
Maianthemum trifolium	33	2
Bryo-Lichen Stratum Cover (Mean)		**37**
Pleurozium schreberi	100	23
Ptilium crista-castrensis	100	2
Cladina rangiferina	67	2
Hylocomium splendens	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*

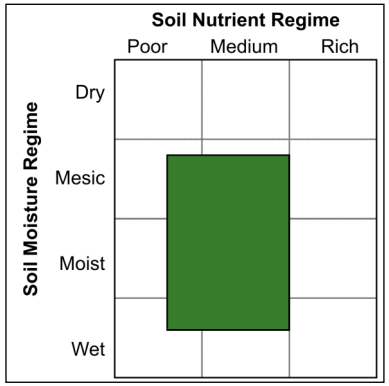
Provinces: Ontario, Quebec **Feathermoss & Peat Moss**

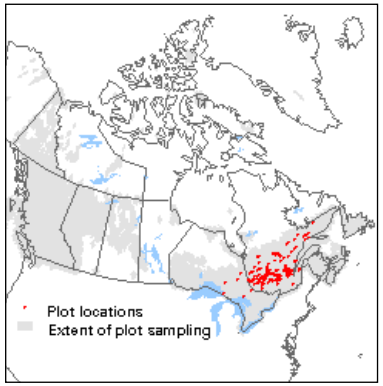
CNVC00270 has a moderately closed to closed canopy of *Betula papyrifera*, *Picea mariana* and *Abies balsamea*, in various mixes. Regeneration of these species, especially *A. balsamea*, dominates the well-developed to dense shrub layer. *Sorbus americana* is a common but less abundant species. The 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	
	142 plots	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**60**
Betula papyrifera	99	24
Picea mariana	92	16
Abies balsamea	89	15
Shrub Stratum Cover (Mean)		**59**
Abies balsamea	98	26
Betula papyrifera	94	9
Picea mariana	90	11
Sorbus americana	64	5
Vaccinium myrtilloides	58	3
Vaccinium angustifolium	53	3
Amelanchier spp.	51	4
Herb Stratum Cover (Mean)		**28**
Cornus canadensis	94	6
Gaultheria hispidula	83	6
Clintonia borealis	82	5
Coptis trifolia	79	3
Maianthemum canadense	78	3
Lysimachia borealis	69	2
Oxalis montana	65	8
Dryopteris spinulosa complex	64	4
Carex spp.	63	4
Linnaea borealis	58	3
Bryo-Lichen Stratum Cover (Mean)		**60**
Pleurozium schreberi	95	17
Dicranum spp.	89	4
Polytrichum spp.	77	3
Sphagnum spp.	73	30
Cladina rangiferina	61	2
Ptilium crista-castrensis	56	4
Sphagnum girgensohnii	52	25

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	55–460–945 m
Slope	level (38); gentle (31); moderate (14); moderately steep (11); steep (4); very steep (1)
Aspect	north (22); east (23); south (13); west (15); level (27); md (1)
Meso Topoposition	crest/ upper (9); mid (46); lower/ toe (16); depression (8); level (20)
Moisture Regime	dry (5); mesic (34); moist (44); wet (17)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (80); other (20)
Soil Rooting Zone Substrate	coarse loamy (12); other (15); md (72)
Root Restricting Depth	0-20 cm (15); 21-99 cm (58); ≥100 cm (1); md (26)
Humus Form	mor (73); moder (3); peatymor (24); md (1)





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

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 *Sphagnum* moss cover.

CNVC00276, CNVC00277 & CNVC00278 are similar conifer Associations.

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

Trembling Aspen—Black Spruce / Speckled Alder

Subassociations: *typic, Populus balsamifera*

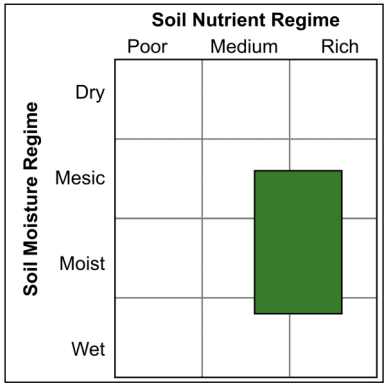
Provinces: Manitoba, Ontario, Quebec **Moist Rich Shrub & Herb**

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

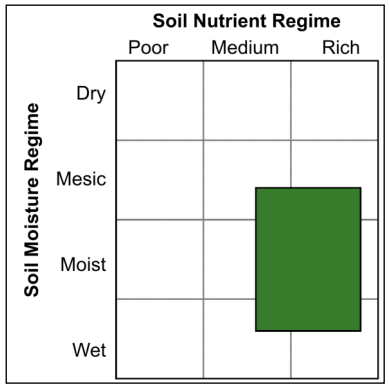
Provinces: Quebec **Moist Rich Shrub & Herb**

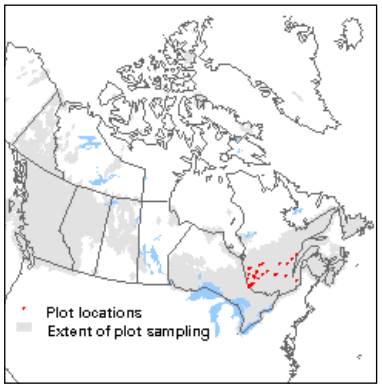
CNVC00273 has a closed canopy of *Populus tremuloides* and/or *Betula papyrifera* mixed with *Abies balsamea* and/or *Picea glauca*. The shrub layer is dense with *Alnus incana* dominant and lower abundances of tree species, *Ribes glandulosum, Rubus idaeus* and *Salix* spp. The herb layer is well developed 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**
Populus tremuloides	100	27
Abies balsamea	100	17
Betula papyrifera	83	18
Picea glauca	52	11
Shrub Stratum Cover (Mean)		**71**
Alnus incana	100	34
Abies balsamea	96	8
Ribes glandulosum	78	4
Populus tremuloides	74	4
Rubus idaeus	70	9
Salix spp.	70	6
Diervilla lonicera	57	4
Amelanchier spp.	52	2
Herb Stratum Cover (Mean)		**56**
Dryopteris spinulosa complex	87	7
Rubus pubescens	83	8
Maianthemum canadense	83	4
Aralia nudicaulis	78	11
Clintonia borealis	74	7
Viola spp.	74	5
Carex spp.	65	7
Poaceae	65	5
Lysimachia borealis	61	3
Galium spp.	61	3
Athyrium filix-femina	52	7
Bryo-Lichen Stratum Cover (Mean)		**12**
Pleurozium schreberi	78	3
Dicranum spp.	65	3
Cladonia 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 Topoposition	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*

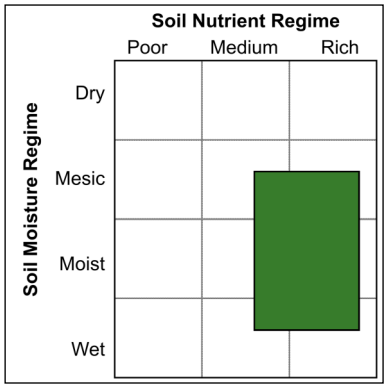
Provinces: Quebec **Moist Rich Shrub & Herb**

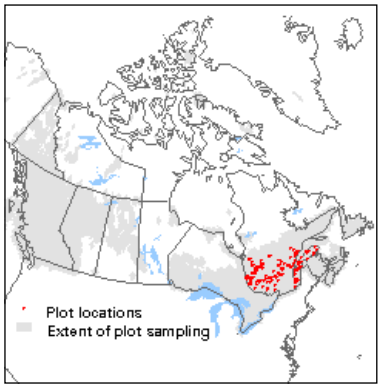
CNVC00274 has a closed canopy of *Betula papyrifera* with *Abies balsamea* and/or *Picea glauca*. The shrub layer is dense and dominated by *Alnus incana,* with abundant *A. balsamea* and *Acer spicatum*. *Rubus idaeus*, *B. papyrifera* and *Sorbus americana* are also common. The herb layer is well developed 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**
Betula papyrifera	93	20
Abies balsamea	91	18
Picea glauca	59	16
Shrub Stratum Cover (Mean)		**68**
Alnus incana	97	35
Abies balsamea	97	13
Rubus idaeus	73	7
Acer spicatum	68	21
Betula papyrifera	66	5
Sorbus americana	63	4
Ribes glandulosum	57	4
Herb Stratum Cover (Mean)		**45**
Dryopteris spinulosa complex	79	6
Lysimachia borealis	75	3
Rubus pubescens	72	6
Clintonia borealis	71	5
Cornus canadensis	71	5
Maianthemum canadense	67	4
Viola spp.	66	4
Coptis trifolia	64	3
Carex spp.	63	6
Gymnocarpium dryopteris	61	3
Oxalis montana	57	6
Poaceae	57	5
Aralia nudicaulis	57	4
Bryo-Lichen Stratum Cover (Mean)		**18**
Pleurozium schreberi	82	6
Dicranum spp.	75	3
Polytrichum 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*

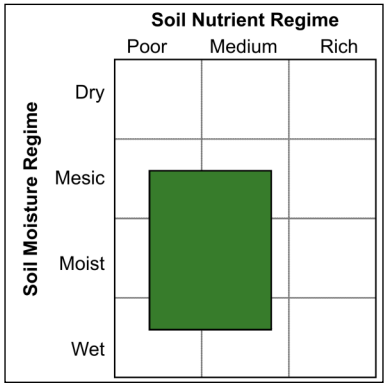
Provinces: Manitoba, Ontario, Quebec **Feathermoss & Peat Moss**

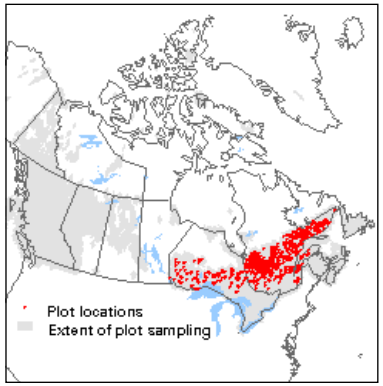
CNVC00276 has a moderately closed canopy dominated by *Picea mariana*. The shrub layer is well developed to dense with abundant *P. mariana* and *Abies balsamea* as well as ericaceous shrubs including *Rhododendron groenlandicum*, *Vaccinium myrtilloides*, *V. angustifolium* and, in the east, *Kalmia 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	
	823 plots	
^≥**40%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**52**
Picea mariana	100	43
Abies balsamea	50	8
Shrub Stratum Cover (Mean)		**58**
Picea mariana	98	18
Rhododendron groenlandicum	92	20
Vaccinium myrtilloides	80	5
Vaccinium angustifolium	74	5
Abies balsamea	70	11
Kalmia angustifolia	66	12
Herb Stratum Cover (Mean)		**13**
Gaultheria hispidula	97	5
Cornus canadensis	83	4
Coptis trifolia	49	2
Clintonia borealis	43	3
Carex spp.	41	2
Bryo-Lichen Stratum Cover (Mean)		**88**
Pleurozium schreberi	100	42
Ptilium crista-castrensis	86	10
Cladina rangiferina	83	4
Dicranum spp.	72	3
Sphagnum spp.	70	29
Hylocomium splendens	63	8
Cladonia spp.	51	2
Polytrichum spp.	49	3
Sphagnum fuscum	46	8
Cladina stellaris	42	4
Sphagnum girgensohnii	41	14

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	15–402–1110 m
Slope	level (45); gentle (25); moderate (16); moderately steep (9); steep (2); very steep (1); md (2)
Aspect	north (18); east (15); south (14); west (19); level (34)
Meso Topoposition	crest/ upper (11); mid (37); lower/ toe (17); depression (4); level (31)
Moisture Regime	dry (4); mesic (31); moist (45); wet (20)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (57); organic (15); glaciolacustrine (11); other (16); md (1)
Soil Rooting Zone Substrate	organic (17); coarse loamy (10); other (17); md (57)
Root Restricting Depth	0-20 cm (8); 21-99 cm (62); ≥100 cm (6); md (24)
Humus Form	mor (57); moder (2); peatymor (39); md (1)





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

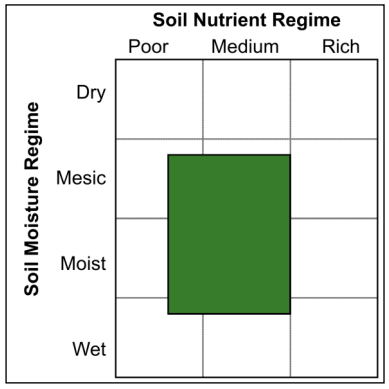
Provinces: Quebec **Feathermoss & Peat Moss**

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 topopositions 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 315 plots	
^≥**45%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**53**
Picea mariana	100	24
Abies balsamea	100	22
Shrub Stratum Cover (Mean)		**60**
Abies balsamea	100	26
Picea mariana	100	17
Rhododendron groenlandicum	73	7
Betula papyrifera	72	5
Vaccinium angustifolium	62	3
Amelanchier spp.	56	4
Vaccinium myrtilloides	50	3
Kalmia angustifolia	45	5
Herb Stratum Cover (Mean)		**15**
Gaultheria hispidula	99	5
Cornus canadensis	95	4
Coptis trifolia	61	3
Clintonia borealis	58	3
Linnaea borealis	58	3
Carex spp.	55	3
Rubus chamaemorus	52	3
Lycopodium annotinum	45	3
Bryo-Lichen Stratum Cover (Mean)		**87**
Pleurozium schreberi	100	29
Dicranum spp.	94	3
Ptilium crista-castrensis	92	10
Sphagnum spp.	89	39
Hylocomium splendens	84	13
Polytrichum spp.	81	3
Cladina rangiferina	72	2
Cladonia spp.	67	2

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	20–465–955 m
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)
Meso Topoposition	crest/ upper (11); mid (60); lower/ toe (14); depression (4); level (11)
Moisture Regime	dry (2); mesic (32); moist (58); wet (8)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (82); other (18)
Soil Rooting Zone Substrate	coarse loamy (15); other (19); md (67)
Root Restricting Depth	0-20 cm (6); 21-99 cm (65); md (29)
Humus Form	mor (66); peatymor (34)



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*

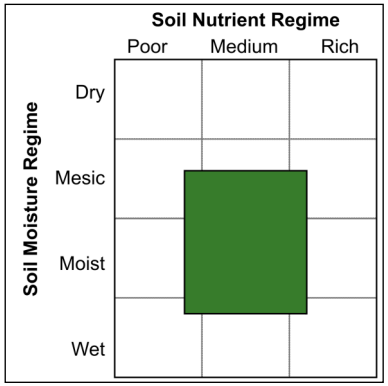
Provinces: Newfoundland and Labrador, Quebec **Feathermoss & Peat Moss**

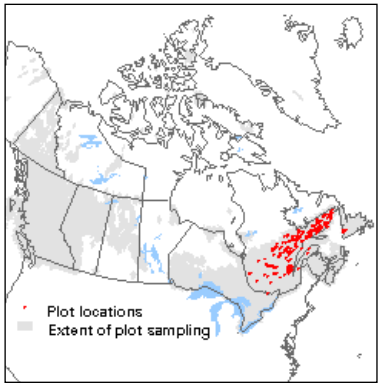
CNVC00278 has a closed canopy dominated by *Abies balsamea*, usually with minor components of *Picea mariana* and *Betula papyrifera*. Regeneration of these species, particularly *A. balsamea*, dominates the moderately to well-developed shrub layer. The herb layer can vary from sparse to dense. It usually 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 256 plots	
^≥**40%** presence; ±characteristic cover	% Presence^	% Cover±
Overstory Trees		**61**
Abies balsamea	100	41
Picea mariana	80	11
Betula papyrifera	61	7
Shrub Stratum Cover (Mean)		**53**
Abies balsamea	100	31
Picea mariana	86	10
Betula papyrifera	86	6
Amelanchier spp.	52	4
Herb Stratum Cover (Mean)		**21**
Cornus canadensis	93	5
Gaultheria hispidula	90	4
Linnaea borealis	67	3
Clintonia borealis	60	5
Coptis trifolia	60	3
Lysimachia borealis	60	2
Carex spp.	52	3
Maianthemum canadense	50	3
Dryopteris spinulosa complex	43	4
Oxalis montana	42	13
Bryo-Lichen Stratum Cover (Mean)		**87**
Pleurozium schreberi	100	20
Dicranum spp.	90	4
Ptilium crista-castrensis	88	8
Hylocomium splendens	86	19
Polytrichum spp.	82	2
Sphagnum spp.	78	40
Cladonia spp.	55	2
Cladina rangiferina	51	2
Sphagnum girgensohnii	44	32
Bazzania trilobata	40	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	10–503–1025 m
Slope	level (14); gentle (26); moderate (24); moderately steep (24); steep (10); very steep (1); md (1)
Aspect	north (31); east (26); south (17); west (18); level (7); md (1)
Meso Topoposition	crest/ upper (5); mid (64); lower/ toe (14); depression (5); level (7); md (4)
Moisture Regime	mesic (29); moist (64); wet (7)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (82); other (18)
Soil Rooting Zone Substrate	coarse loamy (18); other (18); md (64)
Root Restricting Depth	0-20 cm (4); 21-99 cm (62); md (34)
Humus Form	mor (69); moder (2); peatymor (28); md (2)





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*

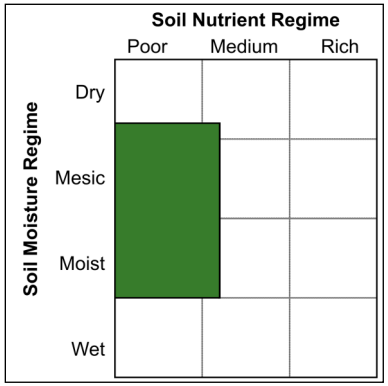
Provinces: Nova Scotia **Ericaceous Shrub & Feathermoss**

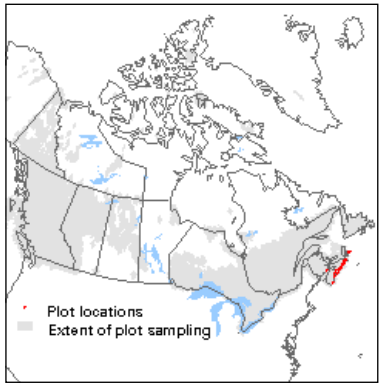
CNVC00292 has a moderately closed canopy dominated by *Picea mariana*, with less abundant *Abies balsamea.* The shrub layer is moderately developed and includes regeneration of these species, as well as the shrubs *Kalmia angustifolia, Ilex mucronata* and *Viburnum nudum.* The moderately developed herb 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-impoverished 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	
^≥**50%** presence; ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**46**
Picea mariana	97	29
Abies balsamea	92	14
Shrub Stratum Cover (Mean)		**28**
Kalmia angustifolia	97	9
Picea mariana	97	4
Abies balsamea	92	12
Ilex mucronata	86	1
Viburnum nudum	83	1
Sorbus americana	56	1
Herb Stratum Cover (Mean)		**28**
Cornus canadensis	92	9
Vaccinium vitis-idaea	86	1
Gaultheria hispidula	75	8
Maianthemum canadense	69	2
Coptis trifolia	64	2
Linnaea borealis	61	4
Pteridium aquilinum	61	3
Lysimachia borealis	61	1
Aralia nudicaulis	53	1
Osmundastrum cinnamomeum	50	3
Bryo-Lichen Stratum Cover (Mean)		**88**
Pleurozium schreberi	97	48
Bazzania trilobata	94	13
Hylocomium splendens	86	12
Sphagnum capillifolium	78	9
Cladonia spp.	75	1
Dicranum polysetum	72	3
Dicranum scoparium	67	2
Cladina rangiferina	64	1
Ptilium crista-castrensis	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 Topoposition	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*

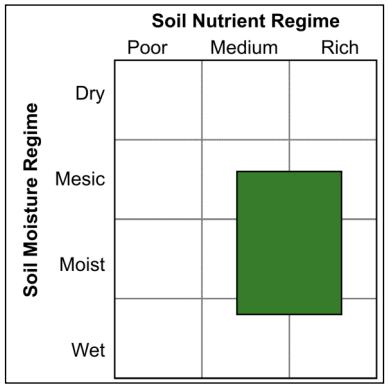
Provinces: Quebec **Moist Rich Shrub & Herb**

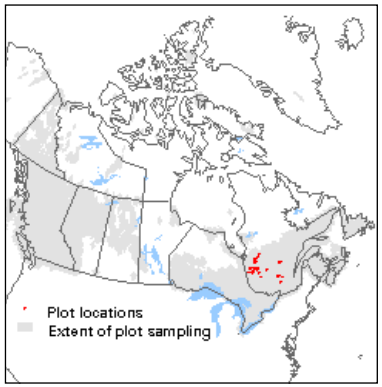
CNVC00294 has a closed canopy dominated by *Pinus banksiana,* with a smaller component of *Picea mariana*. The shrub layer is dense, generally a thicket of *Alnus incana,* although regenerating *P. mariana* is common. Other shrub species are present but less abundant, including *Ribes glandulosum, Salix* 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**
Pinus banksiana	100	41
Picea mariana	98	19
Shrub Stratum Cover (Mean)		**82**
Alnus incana	100	53
Picea mariana	98	10
Ribes glandulosum	66	6
Salix spp.	66	5
Vaccinium angustifolium	66	3
Rubus idaeus	64	12
Rhododendron groenlandicum	64	7
Vaccinium myrtilloides	60	5
Herb Stratum Cover (Mean)		**39**
Cornus canadensis	89	11
Maianthemum canadense	87	8
Linnaea borealis	79	6
Poaceae	77	7
Clintonia borealis	77	5
Dryopteris spinulosa complex	64	5
Gaultheria hispidula	62	4
Petasites frigidus	62	3
Rubus pubescens	60	6
Viola spp.	60	5
Lysimachia borealis	60	3
Carex spp.	57	5
Coptis trifolia	57	3
Bryo-Lichen Stratum Cover (Mean)		**42**
Pleurozium schreberi	100	31
Ptilium crista-castrensis	81	8
Dicranum spp.	81	3
Polytrichum spp.	70	4
Cladonia 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 Topoposition	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*

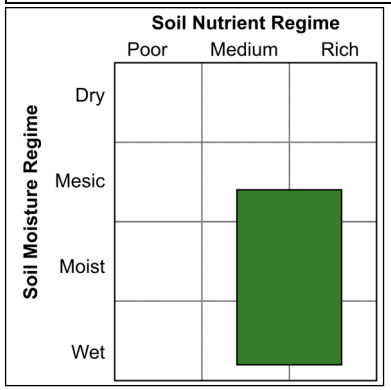
Provinces: Manitoba, Ontario, Quebec **Moist Rich Shrub & Herb**

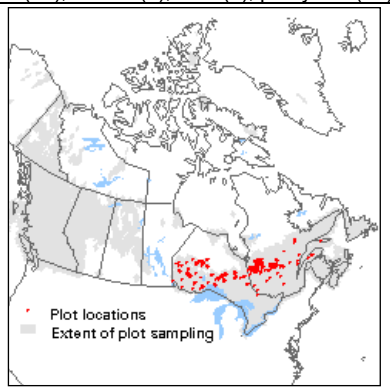
CNVC00295 has an open to moderately closed canopy of *Picea mariana* over a moderately developed to dense shrub layer that commonly includes *P. mariana, Abies balsamea*, *Alnus incana* (which sometimes forms dense thickets), *Rhododendron groenlandicum* and *Vaccinium myrtilloides*. The herb layer is 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 *Larix laricina*; ±characteristic cover	**196 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**50**
Picea mariana	99	39
Larix laricina	19	17
Shrub Stratum Cover (Mean)		**56**
Picea mariana	90	14
Alnus incana	88	24
Rhododendron groenlandicum	83	16
Vaccinium myrtilloides	74	4
Abies balsamea	62	9
Vaccinium angustifolium	54	4
Herb Stratum Cover (Mean)		**28**
Cornus canadensis	91	4
Gaultheria hispidula	83	5
Coptis trifolia	63	2
Linnaea borealis	61	2
Petasites frigidus	53	3
Equisetum sylvaticum	53	3
Rubus pubescens	52	3
Maianthemum canadense	48	2
Lysimachia borealis	44	2
Clintonia borealis	42	3
Lycopodium annotinum	40	7
Mitella nuda	37	2
Bryo-Lichen Stratum Cover (Mean)		**76**
Pleurozium schreberi	98	40
Ptilium crista-castrensis	88	11
Hylocomium splendens	68	13
Sphagnum girgensohnii	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* **CONIFER**

Black Spruce—Balsam Fir / Speckled Alder

Subassociations: none

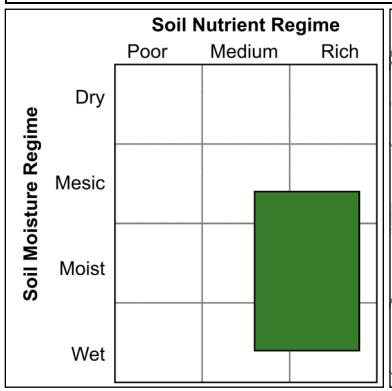
Provinces: Ontario, Quebec **Moist Rich Shrub & Herb**

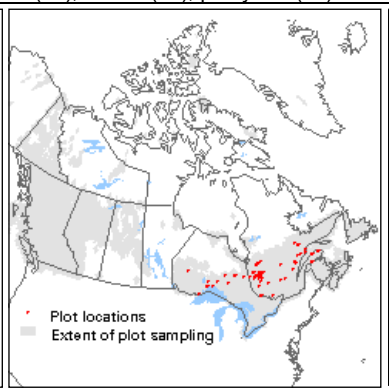
CNVC00296 has a moderately closed canopy of *Picea mariana* and *Abies balsamea,* in varying proportions. The shrub layer is dense with abundant *Alnus incana*, and less abundant *A. balsamea, P. mariana, Rubus idaeus*, *Rhododendron groenlandicum*, *Vaccinium myrtilloides* and *Salix* spp. The herb 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 topopositions. 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	
^**≥60%** presence except *Sphagnum* spp.; ±characteristic cover	**56 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**57**
Picea mariana	100	22
Abies balsamea	98	23
Shrub Stratum Cover (Mean)		**67**
Alnus incana	100	39
Abies balsamea	96	13
Picea mariana	89	5
Rubus idaeus	64	5
Rhododendron groenlandicum	63	5
Vaccinium myrtilloides	63	3
Salix spp.	61	9
Herb Stratum Cover (Mean)		**36**
Cornus canadensis	91	7
Linnaea borealis	77	3
Maianthemum canadense	75	3
Lysimachia borealis	75	2
Clintonia borealis	73	3
Coptis trifolia	73	2
Gaultheria hispidula	71	3
Rubus pubescens	68	5
Carex spp.	63	6
Viola spp.	61	3
Bryo-Lichen Stratum Cover (Mean)		**42**
Pleurozium schreberi	98	20
Ptilium crista-castrensis	73	6
Dicranum spp.	66	3
Sphagnum 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 Topoposition	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

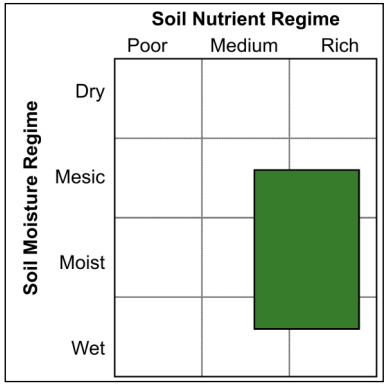
Provinces: Quebec **Moist Rich Shrub & Herb**

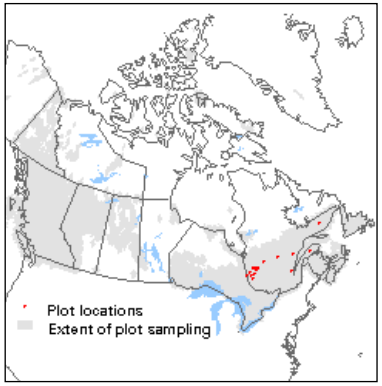
CNVC00297 has a moderately closed canopy dominated by *Abies balsamea,* often with minor components of *Betula papyrifera* and *Picea mariana*. The shrub layer is dense and dominated by *Alnus incana*, with abundant regenerating *A. balsamea* and *B. papyrifera* and less abundant *Rubus idaeus*, *Ribes 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**
Abies balsamea	100	31
Betula papyrifera	79	8
Picea mariana	58	6
Shrub Stratum Cover (Mean)		**69**
Alnus incana	100	30
Abies balsamea	100	15
Rubus idaeus	84	13
Ribes glandulosum	68	6
Betula papyrifera	68	4
Amelanchier spp.	63	4
Herb Stratum Cover (Mean)		**33**
Dryopteris spinulosa complex	89	4
Rubus pubescens	84	6
Cornus canadensis	84	5
Carex spp.	79	7
Maianthemum canadense	74	4
Viola spp.	74	3
Lysimachia borealis	74	3
Lycopodium annotinum	68	10
Clintonia borealis	68	3
Aralia nudicaulis	63	3
Coptis trifolia	63	3
Poaceae	58	4
Bryo-Lichen Stratum Cover (Mean)		**25**
Pleurozium schreberi	95	8
Dicranum spp.	79	3
Sphagnum spp.	74	4
Cladonia spp.	68	3
Polytrichum spp.	63	7
Ptilium crista-castrensis	63	4
Hylocomium splendens	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 Topoposition	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*

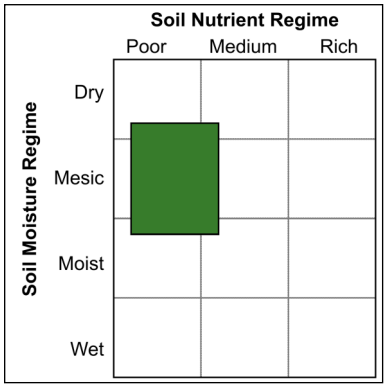
Provinces: Newfoundland and Labrador **Ericaceous Shrub & Feathermoss**

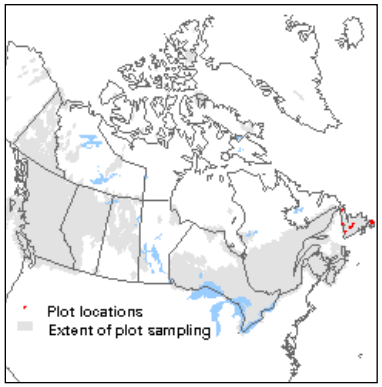
CNVC00307 is a woodland. It has an open to moderately closed tree layer dominated by *Picea mariana*, usually with lower abundance of *Abies balsamea*. *Kalmia angustifolia* forms a dense, almost continuous, shrub layer with lower abundance of *Vaccinium angustifolium*. The herb layer is moderately to 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**
Picea mariana	95	30
Abies balsamea	70	15
Betula papyrifera	35	1
Shrub Stratum Cover (Mean)		**78**
Kalmia angustifolia	100	50
Vaccinium angustifolium	95	18
Rhododendron groenlandicum	50	6
Picea mariana	45	13
Abies balsamea	35	19
Viburnum nudum	35	11
Herb Stratum Cover (Mean)		**31**
Gaultheria hispidula	90	4
Cornus canadensis	70	11
Vaccinium vitis-idaea	55	6
Maianthemum canadense	40	3
Bryo-Lichen Stratum Cover (Mean)		**77**
Pleurozium schreberi	100	36
Dicranum undulatum	85	13
Cladina rangiferina	85	9
Cladonia spp.	70	10
Dicranum scoparium	65	5
Hylocomium splendens	55	13
Ptilium crista-castrensis	55	4
Cladina mitis	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*

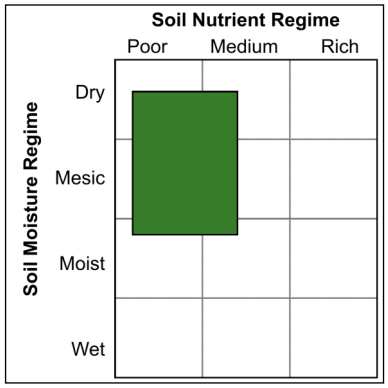
Provinces: Newfoundland and Labrador, Nova Scotia **Ericaceous Shrub & Feathermoss**

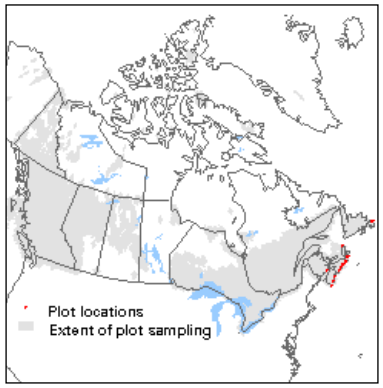
CNVC00309 has a tree layer dominated by *Abies balsamea,* often with sporadic *Picea mariana* and/or *P. glauca.* The moderately developed to dense shrub layer is dominated by *A. balsamea* and usually has *Sorbus americana* and *Kalmia angustifolia* present. *Linnaea borealis*, *Cornus canadensis* and *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**
Abies balsamea	93	53
Picea mariana	57	9
Picea glauca	50	8
Shrub Stratum Cover (Mean)		**29**
Abies balsamea	93	19
Sorbus americana	75	2
Kalmia angustifolia	75	2
Viburnum nudum	57	2
Ilex mucronata	57	1
Picea mariana	43	7
Vaccinium angustifolium	43	4
Herb Stratum Cover (Mean)		**41**
Linnaea borealis	82	16
Cornus canadensis	79	7
Maianthemum canadense	79	1
Lysimachia borealis	79	1
Aralia nudicaulis	71	5
Gaultheria hispidula	61	13
Vaccinium vitis-idaea	61	3
Oxalis oregana	50	2
Coptis trifolia	43	2
Bryo-Lichen Stratum Cover (Mean)		**67**
Pleurozium schreberi	75	31
Bazzania trilobata	75	20
Hylocomium splendens	64	17
Dicranum scoparium	64	2
Ptilium crista-castrensis	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 Topoposition	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*

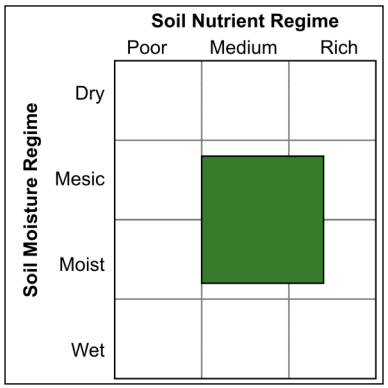
Provinces: New Brunswick, Newfoundland and Labrador, Nova Scotia **Mesic Rich Shrub & Herb**

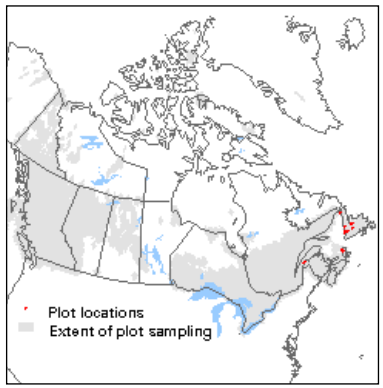
CNVC00310 has a closed canopy dominated by *Abies balsamea*, often with a minor component of *Betula papyrifera*. The shrub layer varies from poorly to moderately developed and consists mainly of *A. balsamea*. A dense herb layer with abundant wood ferns (*Dryopteris carthusiana*, *D. campyloptera* or *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 *Cornus stolonifera, Dryopteris spp.* and *Oxalis montana;* ±characteristic cover	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**73**
Abies balsamea	100	72
Betula papyrifera	71	9
Picea glauca	51	5
Shrub Stratum Cover (Mean)		**26**
Abies balsamea	94	16
Betula papyrifera	54	6
Picea glauca	43	7
Amelanchier bartramiana	43	5
Sorbus decora	43	2
Cornus stolonifera	11	8
Herb Stratum Cover (Mean)		**77**
Lysimachia borealis	97	5
Maianthemum canadense	94	7
Cornus canadensis	83	13
Clintonia borealis	83	11
Dryopteris carthusiana	66	39
Coptis trifolia	46	6
Linnaea borealis	43	6
Oxalis montana	34	17
Dryopteris campyloptera	31	23
Dryopteris intermedia	11	18
Bryo-Lichen Stratum Cover (Mean)		**67**
Pleurozium schreberi	86	11
Ptilium crista-castrensis	86	4
Hylocomiastrum umbratum	80	18
Dicranum majus	80	12
Rhytidiadelphus loreus	60	8
Hylocomium splendens	51	34
Sphagnum capillifolium	51	9
Bazzania trilobata	49	2
Dicranum fuscescens	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 Topoposition	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*

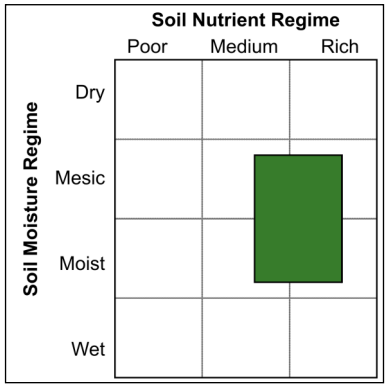
Provinces: Newfoundland and Labrador **Mesic Rich Shrub & Herb**

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**
Abies balsamea	100	57
Betula alleghaniensis	100	24
Picea glauca	54	2
Betula papyrifera	46	11
Shrub Stratum Cover (Mean)		**23**
Abies balsamea	85	18
Acer spicatum	62	5
Herb Stratum Cover (Mean)		**75**
Dryopteris carthusiana	100	51
Cornus canadensis	92	4
Lysimachia borealis	85	3
Maianthemum canadense	46	16
Dryopteris intermedia	46	14
Clintonia borealis	46	4
Bryo-Lichen Stratum Cover (Mean)		**35**
Dicranum majus	92	5
Rhytidiadelphus loreus	85	8
Hylocomium splendens	62	6
Bazzania trilobata	54	16
Hylocomiastrum umbratum	46	8
Pleurozium schreberi	38	3
Polytrichum commune	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*

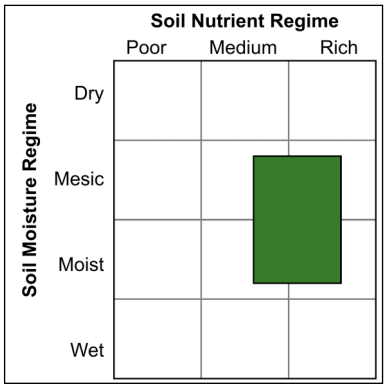
Provinces: Newfoundland and Labrador **Mesic Rich Shrub & Herb**

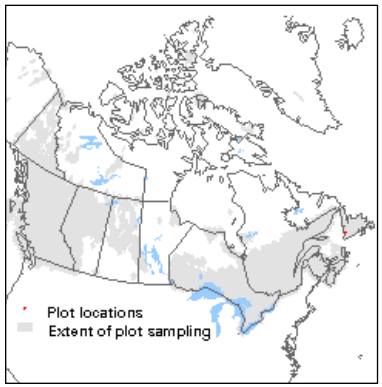
CNVC00315 has a closed canopy dominated by *Betula papyrifera* and *B. alleghaniensis*, with a minor component of *Abies balsamea*. The shrub layer is usually sparse, sometimes consisting of only regenerating *A. balsamea*. Abundant wood ferns, especially *Dryopteris carthusiana* and *D. intermedia,* 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.

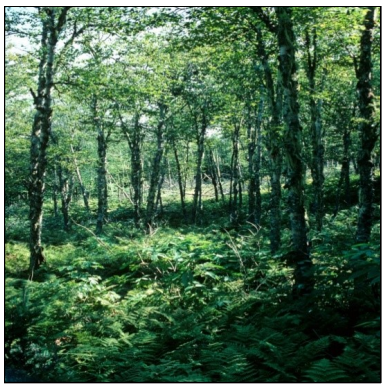
CNVC00315 occurs in a region with a humid to very humid, maritime boreal climate. It is typically found on mesic to moist, nutrient-medium to -rich sites; these are some of the most productive sites on the island of Newfoundland. Stands can be on level sites or gentle to moderate slopes. Soils are typically 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 *Clintonia borealis;* ±characteristic cover	**6 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**67**
Betula papyrifera	100	33
Abies balsamea	100	9
Betula alleghaniensis	83	30
Shrub Stratum Cover (Mean)		**13**
Abies balsamea	83	11
Acer spicatum	50	3
Sambucus racemosa	50	3
Ribes glandulosum	50	1
Herb Stratum Cover (Mean)		**99**
Dryopteris carthusiana	100	71
Cornus canadensis	100	6
Lysimachia borealis	100	6
Lycopodium annotinum	83	5
Maianthemum canadense	67	19
Dryopteris intermedia	50	19
Clintonia borealis	33	19
Bryo-Lichen Stratum Cover (Mean)		**8**
Dicranum scoparium	83	2
Hylocomium splendens	67	3
Pleurozium schreberi	67	2
Polytrichum commune	50	2
Rhytidiadelphus loreus	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 Topoposition	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

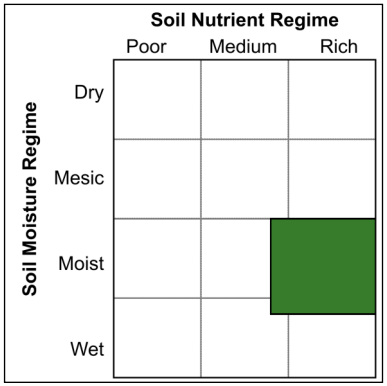
Provinces: Newfoundland and Labrador **Moist Rich Shrub & Herb**

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	
^≥**67%** presence; ±characteristic cover	3 plots	
	% Presence^	% Cover±
Tree Stratum Cover (Mean)		**73**
Betula papyrifera	100	63
Abies balsamea	67	15
Shrub Stratum Cover (Mean)		**41**
Acer spicatum	67	32
Alnus viridis	67	9
Abies balsamea	67	8
Cornus stolonifera	67	2
Vaccinium angustifolium	67	1
Herb Stratum Cover (Mean)		**64**
Rubus pubescens	100	11
Solidago macrophylla	100	6
Maianthemum canadense	67	8
Clintonia borealis	67	6
Lysimachia borealis	67	3
Galium triflorum	67	3
Solidago rugosa	67	2
Dryopteris carthusiana	67	1
Monotropa uniflora	67	1
Streptopus lanceolatus	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

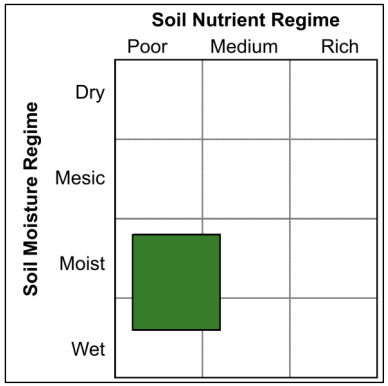
Provinces: Newfoundland and Labrador **Ericaceous Shrub & Feathermoss**

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**
Picea mariana	100	27
Abies balsamea	75	1
Shrub Stratum Cover (Mean)		**90**
Picea mariana	100	32
Rhododendron canadense	100	28
Vaccinium angustifolium	100	16
Kalmia angustifolia	100	8
Kalmia polifolia	100	2
Rhododendron groenlandicum	100	2
Abies balsamea	100	2
Amelanchier bartramiana	75	7
Taxus canadensis	75	3
Herb Stratum Cover (Mean)		**58**
Epigaea repens	100	14
Gaultheria hispidula	100	11
Avenella flexuosa	100	7
Linnaea borealis	100	7
Carex vaginata	100	5
Cornus canadensis	100	5
Coptis trifolia	100	2
Maianthemum canadense	75	3
Empetrum nigrum	75	2
Bryo-Lichen Stratum Cover (Mean)		**95**
Pleurozium schreberi	100	39
Cladina rangiferina	100	19
Dicranum undulatum	100	14
Bazzania trilobata	100	14
Hylocomium splendens	100	13
Sphagnum capillifolium	100	7
Cladonia spp.	100	7
Ptilidium ciliare	75	11
Ptilium crista-castrensis	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*

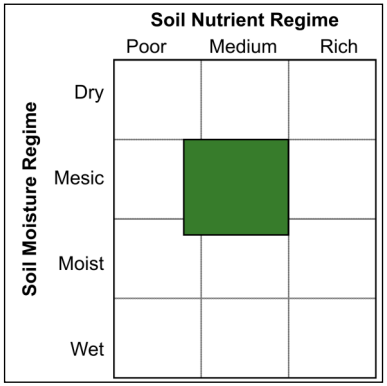
Provinces: Quebec **Mesophytic Herb or Feathermoss**

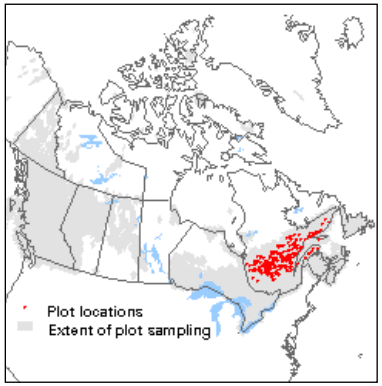
CNVC00344 has a closed canopy dominated by *Picea mariana* and *Betula papyrifera*, with a smaller component of *Abies balsamea*. Regeneration of these species dominates the well-developed shrub layer. *Vaccinium myrtilloides*, *Amelanchier* spp., *V. angustifolium*, *Sorbus americana* and *Kalmia angustifolia* 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 topopositions. 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	
^**≥50%** presence except *Pteridium aquilinum;* ±characteristic cover	**226 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**63**
Picea mariana	100	25
Betula papyrifera	99	23
Abies balsamea	82	13
Shrub Stratum Cover (Mean)		**50**
Picea mariana	99	11
Abies balsamea	93	19
Betula papyrifera	86	6
Vaccinium myrtilloides	74	6
Vaccinium angustifolium	72	4
Amelanchier spp.	71	4
Kalmia angustifolia	62	5
Sorbus americana	56	4
Herb Stratum Cover (Mean)		**20**
Cornus canadensis	92	7
Gaultheria hispidula	90	4
Clintonia borealis	82	4
Maianthemum canadense	78	3
Linnaea borealis	69	3
Coptis trifolia	65	3
Lysimachia borealis	60	2
Pteridium aquilinum	24	10
Bryo-Lichen Stratum Cover (Mean)		**70**
Pleurozium schreberi	100	52
Dicranum spp.	96	4
Ptilium crista-castrensis	86	9
Cladina rangiferina	74	2
Polytrichum spp.	68	3
Cladonia spp.	67	2
Hylocomium splendens	64	9

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	80–423–910 m
Slope	level (12); gentle (23); moderate (30); moderately steep (26); steep (9); very steep (1)
Aspect	north (21); east (23); south (23); west (25); level (8)
Meso Topoposition	crest/ upper (27); mid (62); lower/ toe (5); depression (2); level (4)
Moisture Regime	very dry (1); dry (2); mesic (87); moist (10)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (85); other (15)
Soil Rooting Zone Substrate	coarse loamy (13); other (16); md (71)
Root Restricting Depth	0-20 cm (4); 21-99 cm (62); md (34)
Humus Form	mor (95); moder (1); peatymor (4)





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

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 *Acer spicatum* and *Corylus cornuta*.

CNVC00231, CNVC00232 and CNVC00233 do not have *Picea mariana* codominant.

CNVC00234 typically occurs on warmer, often more southern, sites and has a better developed herb layer with less moss cover.

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*

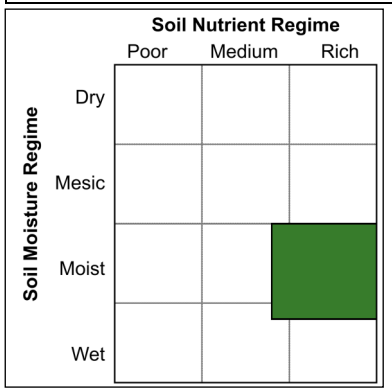
Provinces: Newfoundland and Labrador **Moist Rich Shrub & Herb**

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	
^≥**50**% presence except *Viburnum nudum*; ±characteristic cover	**24 plots**	
	%% Presence^	% Cover±
Tree Stratum Cover (Mean)		**69**
Abies balsamea	96	57
Betula papyrifera	71	6
Picea glauca	58	4
Shrub Stratum Cover (Mean)		**48**
Acer spicatum	88	9
Abies balsamea	79	7
Viburnum edule	71	5
Cornus stolonifera	67	4
Taxus canadensis	58	17
Ribes lacustre	58	1
Viburnum nudum	21	22
Herb Stratum Cover (Mean)		**64**
Rubus pubescens	88	6
Lysimachia borealis	88	3
Dryopteris carthusiana	71	17
Linnaea borealis	67	7
Gymnocarpium dryopteris	58	7
Clintonia borealis	58	6
Mitella nuda	54	14
Cornus canadensis	54	5
Solidago macrophylla	54	4
Bryo-Lichen Stratum Cover (Mean)		**62**
Dicranum majus	79	11
Rhytidiadelphus triquetrus	63	16
Pleurozium schreberi	63	7
Hylocomiastrum umbratum	58	12
Hylocomium splendens	54	24

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	15–139–381 m
Slope	level (63); gentle (13); moderate (4); moderately steep (8); steep (4); md (8)
Aspect	north (13); east (8) south (25); west (17); level (29); md (8)
Meso Topoposition	crest/ upper (8); mid (8); md (83)
Moisture Regime	moist (50); wet (42); md (8)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (33); glaciofluvial (13); other (4); md (50)
Soil Rooting Zone Substrate	coarse loamy (17); sandy (4); md (79)
Root Restricting Depth	md (100)
Humus Form	mull (17); md (83)



Source: W. Meades

Notes & Similar Associations

The *Viburnum nudum* subassociation occurs on the Avalon Peninsula, the *Taxus canadensis* on the Northern Peninsula, and both the *Dryopteris carthusiana* and *Gymnocarpium dryopteris* subassociations occur in sw Newfoundland.

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

CNVC00348 occurs on moister, richer sites and has greater floristic diversity than other *Abies balsamea* Associations on the island (e.g., CNVC00222, CNVC00310).

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

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

Subassociations: none

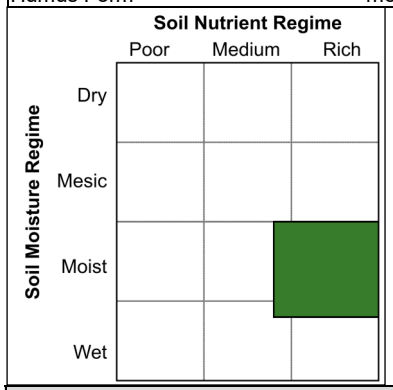
Provinces: Newfoundland and Labrador **Moist Rich Shrub & Herb**

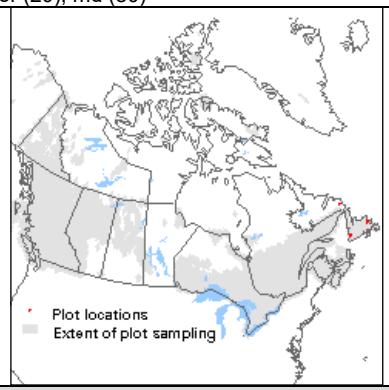
CNVC00349 has a closed canopy dominated by *Betula papyrifera*, sometimes with *Populus tremuloides* codominant, and often minor components of *Abies balsamea*, *Picea mariana* or *Acer rubrum*. This is one of the most floristically diverse forest Associations on the island of Newfoundland. The shrub 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; ±characteristic cover	**10 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**69**
Betula papyrifera	100	34
Abies balsamea	70	14
Picea mariana	60	7
Acer rubrum	60	6
Populus tremuloides	50	29
Shrub Stratum Cover (Mean)		**37**
Abies balsamea	80	6
Sorbus americana	70	2
Picea mariana	60	6
Acer rubrum	50	10
Acer spicatum	50	10
Populus tremuloides	50	6
Herb Stratum Cover (Mean)		**86**
Cornus canadensis	90	20
Clintonia borealis	90	15
Linnaea borealis	90	12
Maianthemum canadense	90	5
Lysimachia borealis	90	3
Rubus pubescens	70	11
Dryopteris carthusiana	70	8
Solidago macrophylla	70	4
Aralia nudicaulis	40	32
Huperzia lucidula	40	12
Viola cucullata	30	15
Gymnocarpium dryopteris	30	14
Bryo-Lichen Stratum Cover (Mean)		**27**
Dicranum scoparium	90	4
Pleurozium schreberi	60	9
Hylocomium splendens	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*

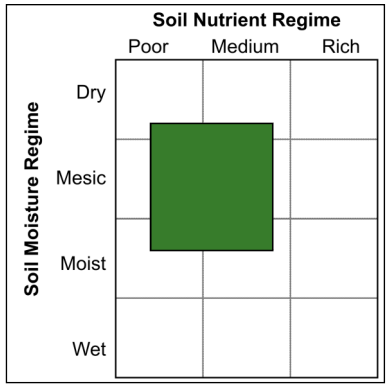
Provinces: Newfoundland and Labrador, Quebec **Mesophytic Herb or Feathermoss**

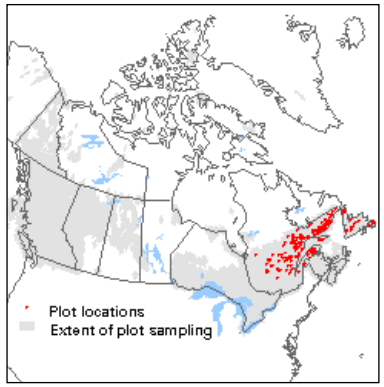
CNVC00350 has a moderately closed to closed canopy dominated by *Picea mariana*, usually with a minor component of *Abies balsamea*. *Betula papyrifera* occurs sporadically. The shrub layer is well developed to dense; it is mostly *P. mariana* and *A. balsamea*, with presence of *Vaccinium angustifolium* 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 topopositions. 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	
^≥**40%** presence except *Rhododendron canadense;* ±characteristic cover	**207 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**60**
Picea mariana	100	46
Abies balsamea	84	9
Betula papyrifera	40	6
Shrub Stratum Cover (Mean)		**48**
Picea mariana	93	22
Abies balsamea	92	15
Vaccinium angustifolium	62	4
Kalmia angustifolia	60	5
Rhododendron groenlandicum	49	5
Betula papyrifera	45	4
Vaccinium myrtilloides	44	3
Rhododendron canadense	12	21
Herb Stratum Cover (Mean)		**11**
Gaultheria hispidula	91	5
Cornus canadensis	89	4
Clintonia borealis	47	3
Linnaea borealis	47	2
Maianthemum canadense	45	3
Coptis trifolia	44	2
Bryo-Lichen Stratum Cover (Mean)		**89**
Pleurozium schreberi	99	45
Hylocomium splendens	98	30
Ptilium crista-castrensis	91	12
Dicranum spp.	94	5
Cladina rangiferina	71	3
Cladonia spp.	68	3
Sphagnum spp.	55	7
Bazzania trilobata	43	4

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	30–308–820 m; md (7)
Slope	level (21); gentle (15); moderate (24); moderately steep (21); steep (10); md (8)
Aspect	north (20); east (22); south (14); west (23); level (13); md (8)
Meso Topoposition	crest/ upper (19); mid (51); lower/ toe (6); level (11); md (13)
Moisture Regime	dry (5); mesic (77); moist (14); wet (3)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (71); glaciofluvial (10); other (16); md (3)
Soil Rooting Zone Substrate	coarse loamy (16); other (22); md (61)
Root Restricting Depth	0-20 cm (5); 21-99 cm (47); md (48)
Humus Form	mor (76); peatymor (7); md (16)





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.

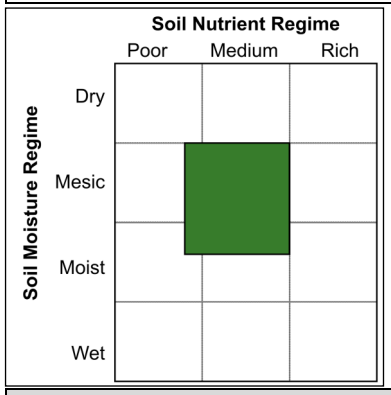
Provinces: Newfoundland and Labrador, Quebec **Mesophytic Herb or Feathermoss**

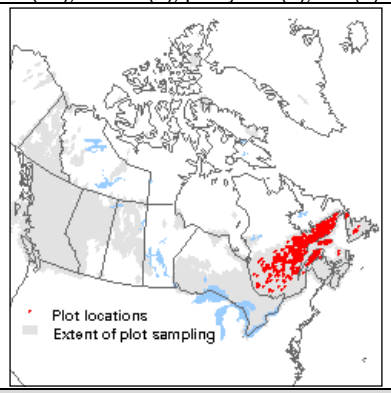
CNVC00351 has a moderately closed to closed canopy of varying proportions of *Abies balsamea* and *Picea mariana*, sometimes with a minor component of *Betula papyrifera*. The shrub layer is usually well developed with abundant *A. balsamea, P. mariana* and, to a lesser degree, *B. papyrifera*. The herb 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	
^≥**40%** presence except subassociation spp.; ±characteristic cover	**634 plots** % Presence^	% Cover±
Tree Stratum Cover (Mean)		**56**
Abies balsamea	100	23
Picea mariana	99	24
Betula papyrifera	55	6
Shrub Stratum Cover (Mean)		**52**
Abies balsamea	99	22
Picea mariana	98	15
Betula papyrifera	73	5
Vaccinium angustifolium	59	3
Amelanchier spp.	56	5
Vaccinium myrtilloides	55	4
Rhododendron groenlandicum	47	3
Viburnum nudum	10	4
Cornus stolonifera	3	3
Herb Stratum Cover (Mean)		**15**
Cornus canadensis	94	6
Gaultheria hispidula	92	4
Clintonia borealis	69	3
Linnaea borealis	65	3
Maianthemum canadense	62	3
Coptis trifolia	58	3
Lysimachia borealis	51	2
Bryo-Lichen Stratum Cover (Mean)		**80**
Pleurozium schreberi	99	48
Dicranum spp.	91	3
Ptilium crista-castrensis	90	15
Hylocomium splendens	79	19
Cladina rangiferina	69	2
Cladonia spp.	66	2
Sphagnum spp.	65	7
Polytrichum spp.	65	3
Bazzania trilobata	42	3

Site / Soil Characteristics	(% Frequency); md=missing data
Elevation (min–mean–max)	5–430–1110 m; md (2)
Slope	level (11); gentle (18); moderate (27); moderately steep (29); steep (13); very steep (1)
Aspect	north (24); east (20); south (21); west (27); level (8)
Meso Topoposition	crest/ upper (19); mid (64); lower/ toe (7); depression (2); level (5); md (3)
Moisture Regime	dry (2); mesic (79); moist (16); wet (2)
Nutrient Regime	md (100)
Soil Parent Material	moraine/ till (84); other (12); md (3)
Soil Rooting Zone Substrate	coarse loamy (16); other (18); md (66)
Root Restricting Depth	0-20 cm (6); 21-99 cm (61); md (34)
Humus Form	mor (89); moder (2); peatymor (6); md (3)





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 ≥20% are listed.

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

Layer	Scientific Name	CM495b	CM496a	Common Name
Moss & lichen	*Cladina* spp. + *Clad* spp.	■■■	■■■	reindeer + clad lichens
	Dicranum spp.	■■■	■■■	broom mosses
	Hylocomium splendens	■■■	■■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.	**	**	leafy mosses
	Peltigera aphthosa	*	*	common freckle pelt lichen
	Pleurozium schreberi	■■■■■	■■■■■	red-stemmed feathermoss
	Ptilidium ciliare	**	*	ciliate fringewort
	Ptilium crista-castrensis	■■■	■■■■	knight's plume moss
	Rhytidiadelphus triquetrus	***	**	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 ≥20% are listed.

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

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

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

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

Layer	Scientific Name	M495	CM014	CM744	Common Name
Herb & dwarf shrub	*Trillium undulatum*		**	■■	painted trillium
	Viola spp.	**	■■	■■	violets
Moss & lichen	*Bazzania trilobata*	***	**	■■■	three-lobed whipwort
	Cladina spp. + *Clad* spp.	■■■	■■■	***	reindeer + clad lichens
	Dicranum spp.	■■■	■■■	■■■	broom mosses
	Hylocomium splendens	■■■■	***	■■■	stairstep moss
	Mnium spp. + *Rhizomnium* spp. + *Plagiomnium* spp.	**	**	***	leafy mosses
	Pleurozium schreberi	■■■■■	■■■	■■■■	red-stemmed feathermoss
	Polytrichum commune	**		■■■	common haircap moss
	Polytrichum spp.	■■	■■		haircap mosses
	Ptilium crista-castrensis	■■■	**	***	knight's plume moss
	Sphagnum 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 ≥15% are listed.

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

Layer	Scientific Name	M495	M299	M300	Common Name
Herb & dwarf shrub	*Aralia nudicaulis*	■■■	**	■■■	wild sarsaparilla
	Carex spp.	■■	■■■	■■■■	sedges
	Chamerion angustifolium	**	**	**	fireweed
	Clintonia borealis	■■■	***	■■■	yellow clintonia
	Coptis trifolia	■■	■■	■■	goldthread
	Cornus canadensis	■■■	■■■	■■■	bunchberry
	Dryopteris spinulosa complex	■■■	***	■■■	wood fern
	Equisetum spp.	**	■■■	■■■■	horsetails
	Eurybia macrophylla	***		**	large-leaved aster
	Gaultheria hispidula	■■■	■■■	■■■	creeping snowberry
	Geocaulon lividum		**	***	northern comandra
	Gymnocarpium dryopteris	**	**	**	common oak fern
	Linnaea borealis	■■	**	■■■	twinflower
	Lycopodium annotinum	***	***	***	stiff clubmoss
	Lycopodium obscurum	**		**	flat-branched tree-clubmoss
	Lysimachia borealis	■■	**	■■	northern starflower
	Maianthemum canadense	■■■	**	■■■	wild lily-of-the-valley
	Maianthemum trifolium	**	■■■	***	three-leaved false Solomon's seal
	Mertensia paniculata			**	tall bluebells
	Mitella nuda	**	**	***	naked mitrewort
	Oxalis montana	***	***	■■■	common wood-sorrel
	Petasites frigidus	**	**	**	arctic sweet coltsfoot
	Poaceae	***	***	***	grass family
	Pteridium aquilinum	***		***	bracken fern
	Rubus chamaemorus	**	■■■		cloudberry
	Rubus pubescens	***	**	■■■	dwarf raspberry
	Streptopus lanceolatus	**			rose twisted-stalk
	Vaccinium oxycoccos		■■		small cranberry
	Vaccinium vitis-idaea	**	***		lingonberry
	Viola spp.	**	**	■■	violets
Moss & lichen	*Bazzania trilobata*	***	**	***	three-lobed whipwort
	Cladina spp. + *Clad* spp.	■■■	■■■	■■■	reindeer + clad lichens
	Dicranum spp.	■■■	■■	■■■	broom mosses
	Hylocomium splendens	■■■■	■■■	■■■■	stairstep moss
	Pleurozium schreberi	■■■■■	■■■■	■■■	red-stemmed feathermoss
	Polytrichum spp.	■■	■■	***	haircap mosses
	Ptilidium ciliare	**	**		ciliate fringewort
	Ptilium crista-castrensis	■■■	■■■	***	knight's plume moss
	Sphagnum 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 *Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.	
				CNVC00205 *Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.
		CG0002 Atlantic Boreal Mesic-Moist Black Spruce – Balsam Fir – Paper Birch Forest		
			CA00002 *Picea mariana / Kalmia angustifolia / Pleurozium schreberi*	
				CNVC00338 *Picea mariana / Rhododendron canadense – Taxus canadensis / Pleurozium schreberi*
				CNVC00307 *Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*
			CA00003 *Picea mariana – Abies balsamea / Gaultheria hispidula / Pleurozium schreberi*	
				CNVC00350 *Picea mariana / Pleurozium schreberi – Hylocomium splendens*
				CNVC00351 *Picea mariana – Abies balsamea / Pleurozium schreberi (Hylocomium splendens)*
				CNVC00344 *Picea mariana – Betula papyrifera – Abies balsamea / Pleurozium schreberi*
				CNVC00277 P*icea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.
		CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest		
			CA00004 *Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	
				CNVC00226 *Picea glauca (Abies balsamea) / Pleurozium schreberi (Bazzania trilobata)*
				CNVC00309 *Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*
				CNVC00292 *Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*
			CA00005 *Abies balsamea (Betula papyrifera) / Pleurozium schreberi*	
				CNVC00220 *Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*
				CNVC00222 *Abies balsamea / Pleurozium schreberi*
				CNVC00232 *Abies balsamea – Betula papyrifera / Pleurozium schreberi*
				CNVC00233 *Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*
				CNVC00278 *Abies balsamea / Pleurozium schreberi – Sphagnum* spp.
			CA00006 *Abies balsamea – Picea glauca / Acer spicatum / Oxalis montana*	
				CNVC00225 *Abies balsamea (Picea glauca) / Acer spicatum / Oxalis montana*

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

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

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	*Abies balsamea*			■■■■	■■■■	■■■■■	■■■■■	■■■■■	■■■■■■	■■■■■	balsam fir
	Acer rubrum					***		**		***	red maple
	Betula alleghaniensis							**	■■■■	****	yellow birch
	Betula papyrifera		**	■■	■■■■	■■■	■■■■	■■■■	■■■■	■■■■■	paper birch
	Larix laricina		■■	****		***				**	tamarack
	Picea glauca			***	***	■■■■■	■■■	■■■■	■■■	■■■	white spruce
	Picea mariana		■■■	■■■■■	■■■■■	■■■■	■■■■	***	***	■■■■	black spruce
	Pinus strobus		**	**							eastern white pine
Shrub	*Abies balsamea*		**	■■■■	■■■■	■■■■	■■■■■	■■■■	■■■■	■■■	balsam fir
	Acer rubrum					**	***	***		***	red maple
	Betula papyrifera		***	**	■■■	■■	■■■	■■■	■■■	***	paper birch
	Picea glauca				***	***	■■■	■■■	■■■	**	white spruce
	Picea mariana		■■■	■■■■	■■■■	■■■	■■■	***		■■■	black spruce
	Populus tremuloides		■■					***		***	trembling aspen
	Prunus pensylvanica			**	**		***	***			pin cherry
	Acer spicatum				***		***	■■■■	■■■	■■■■	mountain maple
	Alnus incana				***		***	***	***	***	grey alder
	Alnus viridis		■■■■	***	***	**	***	****		***	green alder
	Amelanchier spp.		**	***	■■■	*	■■■	■■■	***	**	serviceberries
	Cornus stolonifera							***	***	■■■	red-osier dogwood
	Corylus cornuta						***	■■■		**	beaked hazelnut
	Diervilla lonicera				***		***	■■■		****	northern bush-honeysuckle
	Ilex mucronata			****	***	■	***	**		**	mountain holly
	Juniperus communis		**	***		*****					common juniper
	Kalmia angustifolia		■■■■■	■■■■■	■■■	■■■	***	***		***	sheep laurel
	Lonicera canadensis					*	***	■■■			Canada fly-honeysuckle
	Rhododendron canadense		■■■	■■■■							rhodora
	Rhododendron groenlandicum		■■■	■■■	■■■	**	***				common Labrador tea
	Ribes spp.				**	*	■■■	■■■	■■	■■	currants
	Rubus idaeus			**	***	*	***	■■■	**	**	red raspberry
	Salix spp.		■■		***		***	***			willows
	Sambucus racemosa						***	**	***	**	red elderberry
	Sorbus americana + S. decora			**	■■■	■■	■■■	■■■	■■	■■	mountain-ashes

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

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

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

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

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

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

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

Layer	Scientific Name	CG001	CG002	CG003	CG004	Common Name
Moss & lichen	*Bazzania trilobata*		■■	■■■	***	three-lobed whipwort
	Cetraria islandica	■■				true Iceland lichen
	Cladina spp. + *Clad* spp.	■■■■■■	■■■	■■■		reindeer + clad lichens
	Dicranum spp.	■■■	■■■	■■■	■■■■	broom mosses
	Hylocomiastrum umbratum			***	■■■	shaded wood moss
	Hylocomium splendens	**	■■■■	■■■■	■■■■	stairstep moss
	Peltigera aphthosa	**	***		**	common freckle pelt lichen
	Pleurozium schreberi	■■	■■■■■	■■■■■	■■■	red-stemmed feathermoss
	Polytrichum juniperinum	■■■				juniper haircap moss
	Polytrichum 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	*Abies balsamea*		■■■	■■■■	■■■■	balsam fir
	Betula papyrifera	***	■■■■	■■■■■	■■■■	paper birch
	Picea glauca		***	■■■■	****	white spruce
	Picea mariana	■■■■	■■■■■	■■■■	■■■■	black spruce
	Pinus banksiana	■■■■■	■■■■	****	****	jack pine
	Populus balsamifera				*****	balsam poplar
	Populus tremuloides	***	***	■■■■■	■■■■■	trembling aspen
	Prunus pensylvanica			***	***	pin cherry
Shrub	*Abies balsamea*	***	■■■	■■■■	■■■	balsam fir
	Acer rubrum		***	***	***	red maple
	Betula papyrifera	***	■■■	■■■	■■■	paper birch
	Picea glauca		***	■■■	***	white spruce
	Picea mariana	■■■■	■■■■	■■■	■■■	black spruce
	Pinus banksiana	■■■	**			jack pine
	Populus tremuloides	**	**	■■■	■■■	trembling aspen
	Prunus pensylvanica	**	***	■■■	***	pin cherry
	Acer spicatum		***	■■■■	■■■■	mountain maple
	Alnus incana		***	***	■■■■■	speckled alder
	Alnus viridis	***	■■■■	****	****	green alder
	Amelanchier spp.	■■	■■■	■■■	■■■	serviceberries
	Cornus stolonifera			***	***	red-osier dogwood
	Corylus cornuta		***	■■■■	***	beaked hazelnut
	Diervilla lonicera		***	■■■	■■■	northern bush-honeysuckle
	Ilex mucronata	***	***	***	***	mountain holly
	Kalmia angustifolia	■■■■■	■■■■	***	***	sheep laurel
	Lonicera canadensis			**	**	Canada fly-honeysuckle
	Rhododendron groenlandicum	■■■■	■■■■	***	■■■■	common Labrador tea
	Ribes spp.		**	■■	■■■	currants
	Rosa acicularis		**	**	**	prickly rose
	Rubus idaeus		**	***	■■■	red raspberry
	Salix spp.	■■■	■■■	***	■■■	willows
	Sorbus americana + S. decora	**	■■	■■■	■■■	mountain-ashes
	Vaccinium angustifolium	■■■■	■■■	■■■	■■	early lowbush blueberry
	Vaccinium myrtilloides	■■■	■■■	■■■	■■■	velvet-leaved blueberry
	Viburnum edule		**	***	■■■	squashberry
	Viburnum nudum		***	■■■	***	wild raisin
Herb & dwarf shrub	*Aralia nudicaulis*		***	■■■	■■■	wild sarsaparilla
	Athyrium filix-femina			***	***	common lady fern
	Carex spp.	**	**	■■	■■■	sedges
	Chamerion angustifolium	**	**	**	■■	fireweed
	Clintonia borealis	**	■■	■■■	■■■	yellow clintonia
	Coptis trifolia	**	■■	■■	■■	goldthread
	Cornus canadensis	■■	■■■	■■■	■■■	bunchberry
	Dryopteris spinulosa complex		**	■■■	■■■	wood fern
	Equisetum spp.		**	**	■■■	horsetails
	Eurybia macrophylla		***	■■■	■■■■	large-leaved aster
	Galium spp.			**	**	bedstraws
	Gaultheria hispidula	■■	■■■	■■	■■■	creeping snowberry
	Gymnocarpium dryopteris		**	**	■■	common oak fern
	Linnaea borealis	**	■■	■■■	■■	twinflower
	Lycopodium annotinum	**	**	■■■	■■■	stiff clubmoss
	Lycopodium clavatum		**	**	**	running clubmoss
	Lycopodium obscurum		**	■■	**	flat-branched tree-clubmoss
	Lysimachia borealis		**	■■	■■	northern starflower
	Maianthemum canadense	**	■■■	■■■	■■■	wild lily-of-the-valley

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

Appendix 5. Constituent provincial and regional vegetation types

A5 Table 1. CNVC Associations and constituent vegetation community types from Ontario (Uhlig 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 *Typic*-u A180b *Hylocomium splendens*-u A180c *Acer spicatum*-u A180d *Nemopanthus mucronatus*-u
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 *Typic*-u A178b *Acer spicatum*-u
CNVC00225		QC025A QC025B		A179a *Typic*-u A179b *Mitella nuda*-u
CNVC00226				A304a *Typic*-u A304b *Empetrum nigrum*-u
CNVC00231	BTr8-4	QC022A QC022C QC076A QC076B QC093A QC093B QC093C QC093D		
CNVC00232		QC070A QC070C		
CNVC00233		QC022B QC041 QC070B		A187a *Typic*-u A187b *Acer spicatum*-u
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 QC101B QC101C QC102	W Bk	
CNVC00238	BTr10-2 BTr4-8	QC108A QC108B QC110A QC110B		
CNVC00239	BTr8-1	QC103A QC103B QC103C QC111A QC111B QC111C		
CNVC00241	BTr6-1 BTr9-2	QC109A 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 BTr8-7	QC088A 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 *Typic*-u A020b *Sphagnum capillifolium*-u
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 *Dryopteris campyloptera*-u
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 QC130B	C bS_I C bS_II C bS_III C bS_IV C bS_V E bSmI E bSmIII N LP N LPca W P	
CNVC00351		QC131A QC131B QC131C QC131D	C C_bF C Ru_bF N PA/IP 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	*Picea mariana / Rhododendron groenlandicum - Vaccinium angustifolium / Cladonia* spp. Woodland	12	CNVC00246	*Picea mariana / Rhododendron groenlandicum – Vaccinium angustifolium / Cladina* spp.	no subassociations
BTr1-3	*Pinus banksiana / Kalmia angustifolia / Cladonia* spp.	5	CNVC00201	*Pinus banksiana (Picea mariana) / Kalmia angustifolium (Rhododendron groenlandicum) / Cladina* spp.	*201a Pinus banksiana*
BTr1-4	*Pinus banksiana / Vaccinium angustifolium / Cladonia* spp. Woodland	31	CNVC00245	*Pinus banksiana / Vaccinium angustifolium / Cladina* spp.	no subassociations
BTr2-1	*Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi*	3	CNVC00269	*Betula papyrifera / Vaccinium angustifolium / Pleurozium schreberi*	no subassociations
BTr4-4	*Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi*	266	CNVC00207	*Pinus banksiana (Picea mariana) / Vaccinium angustifolium / Pleurozium schreberi*	no subassociations
BTr4-5	*Pinus banksiana (Picea mariana) / Kalmia angustifolia / Pleurozium schreberi*	64	CNVC00209	*Pinus banksiana – Picea mariana / Kalmia angustifolia / Pleurozium schreberi*	*209b inops*
BTr4-8	*Populus tremuloides - Betula papyrifera / Vaccinium angustifolium / Clintonia borealis*	19	CNVC00238	*Populus tremuloides (Betula papyrifera) / Diervilla lonicera*	*238a typic*
BTr4-12	*Populus tremuloides - Betula papyrifera - Pinus banksiana (Picea mariana) / Acer spicatum / Clintonia borealis*	58	CNVC00215	*Betula papyrifera – Populus tremuloides – Pinus banksiana / Acer spicatum / Clintonia borealis*	*215a typic*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	*350a typic*
C bS_II	Central: Black spruce - moss forest (II)	3	CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	*350a typic*
C bS_III	Central: Black spruce - moss forest (III)	1	CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	*350a typic*
C bS_IV	Central: Black spruce - moss forest (IV)	1	CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	*350a typic*
C bS_V	Central: Black spruce - moss forest (V)	3	CNVC00350	*Picea mariana / Pleurozium schreberi – Hylocomium splendens*	*350a typic*
C C_bF	Central: *Carex* - balsam fir forest	4	CNVC00351	*Picea mariana – Abies balsamea / Pleurozium schreberi (Hylocomium splendens)*	*351e Sphagnum spp*
C Clad_Kal_bS	Central: *Cladonia - Kalmia* - black spruce forest	11	CNVC00205	*Picea mariana / Kalmia angustifolia – Rhododendron canadense / Cladina* spp.	no subassociations
C Dry_L_bF	Central: *Dryopteris - Lycopodium* - balsam fir forest	3	CNVC00310	*Abies balsamea / Dryopteris* spp. */ Hylocomiastrum umbratum*	*310a Hylocomium splendens*
C Hyl_bF	Central: *Hylocomium* - balsam fir forest	14	CNVC00222	*Abies balsamea / Pleurozium schreberi*	*222b Hylocomium splendens*
C Kal_bS	Central: *Kalmia* - black spruce forest	10	CNVC00307	*Picea mariana (Abies balsamea) / Kalmia angustifolia / Pleurozium schreberi*	*307a typic*
C Pl_bF	Central: *Pleurozium* - balsam fir forest	4	CNVC00222	*Abies balsamea / Pleurozium schreberi*	*222a typic*
C Ru_bF	Central: *Rubus* - balsam fir forest	7	CNVC00351	*Picea mariana – Abies balsamea / Pleurozium schreberi (Hylocomium splendens)*	*351b Hylocomium splendens*
E bF	Eastern: *Dicranum* - balsam fir forest	5	CNVC00222	*Abies balsamea / Pleurozium schreberi*	*222a typic*

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

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

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

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

Maritimes Region Unit Code	Unit Name	n Plots	CNVC Association	CNVC Association Name	CNVC Subassociation
A180c *Acer spicatum*-u	*Abies balsamea - Picea mariana / Dryopteris intermedia - Gaultheria hispidula / Pleurozium schreberi* Forest *[Acer spicatum]*	26	CNVC00220	*Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*	*220c Acer spicatum*
A180d *Nemopanthus mucronatus*-u	*Abies balsamea - Picea mariana / Dryopteris intermedia - Gaultheria hispidula / Pleurozium schreberi* Forest *[Nemopanthus mucronatus]*	18	CNVC00220	*Abies balsamea (Picea mariana) / Oxalis montana / Pleurozium schreberi*	*220a typic*
A187a *Typic*-u	*Abies balsamea - Betula papyrifera / Sorbus americana / Oxalis montana / Polytrichum commune* Forest *[Typic]*	37	CNVC00233	*Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*	*233c Sorbus americana*
A187b *Acer spicatum*-u	*Abies balsamea - Betula papyrifera / Sorbus americana / Oxalis montana / Polytrichum commune* Forest *[Acer spicatum]*	60	CNVC00233	*Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*	*233c Sorbus americana*
A304a *Typic*-u	*Picea glauca / (Alnus viridis* ssp. *crispa) / Oclemena acuminata / Pleurozium schreberi* Woodland *[Typic]*	16	CNVC00226	*Picea glauca (Abies balsamea) / Pleurozium schreberi (Bazzania trilobata)*	*226a typic*
A304b *Empetrum nigrum*-u	*Picea glauca / (Alnus viridis* ssp. *crispa) / Oclemena acuminata / Pleurozium schreberi* Woodland *[Empetrum nigrum]*	3	CNVC00226	*Picea glauca (Abies balsamea) / Pleurozium schreberi (Bazzania trilobata)*	*226b Empetrum nigrum*
A314-u	*Abies balsamea – Picea mariana / Vaccinium angustifolium / Sphagnum capillifolium* Woodland	23	CNVC00309	*Abies balsamea / Vaccinium vitis-idaea / Pleurozium schreberi – Bazzania trilobata*	*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 / *Sphagnum*		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 (*Sphagnum*)	=	CNVC00276	M495
V35	Black Spruce / Speckled Alder / *Sphagnum*	=	CNVC00298	M299
V36	Black Spruce / Bunchberry / *Sphagnum* (Feathermoss)	<<	**CNVC00276** CNVC00282	**M495,** M299
V37	Black Spruce / Ericaceous Shrub / *Sphagnum*	=	CNVC00282	M299
V38	Black Spruce / Leatherleaf / *Sphagnum*	=	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	*Picea mariana – Abies balsamea / Vaccinium vitis-idaea / Ptilium crista-castrensis*	<	CNVC00292	M495
C02	*Picea glauca – Abies balsamea / Vaccinium vitis-idaea – Linnaea borealis*	<	CNVC00226	M495
C03	*Picea rubens / Sorbus americana / Vaccinium vitis-idaea*		n/a	CM744
C04	*Abies balsamea /Vaccinium vitis-idaea – Linnaea borealis*	<	CNVC00309	M495
C05	*Betula papyrifera – Abies balsamea / Vaccinium vitis-idaea – Aster acuminatus*		n/a	
C06	*Acer rubrum – Betula spp. / Cornus canadensis – Aralia nudicaulis*		n/a	CM744
C07	*Picea glauca / Myrica pensylvanica*		n/a	
HL1	*Abies balsamea / Sorbus americana / Solidago macrophylla*	<<	CNVC00220 CNVC00222 CNVC00225 CNVC00310	M495
HL2	*Picea glauca / Aster acuminatus*	<<	CNVC00229 CNVC00230	CM744
HL3	*Betula alleghaniensis – Abies balsamea / Dryopteris campyloptera – Oxalis acetosella*		n/a	CM744
HL4	*Betula spp. / Dryopteris spp. – Oxalis acetosella*		n/a	
OF1	*Picea glauca / Aster spp. – Solidago spp. / Rhytidiadelphus triquetris*		n/a	CM744
OF2	*Larix laricina / Alnus incana / Solidago rugosa / Rhytidiadelphus triquetris*		n/a	
OF4	*Abies balsamea – Picea glauca / Dryopteris intermedia – Aster acuminatus*		n/a	
OW1	*Pinus banksiana / Gaylussacia baccata / Empetrum nigrum / Cladina spp.*	<	CNVC00203	CM744

Code	Nova Scotia Vegetaton Type	Relationship	Association	Macrogroup
OW2	*Picea mariana / Kalmia angustifolia / Cladina spp.*		n/a	
SP1	*Pinus banksiana / Pteridium aquilinum – Gaultheria procumbens*	<	CNVC00210	CM744
SP4	*Pinus strobus / Vaccinium spp. / Pteridium aquilinum*		n/a	CM744
SP5	*Picea mariana / Kalmia angustifolium / Pteridium aquilinum*		n/a	
SP6	*Picea mariana – Acer rubrum / Pteridium aquilinum – Aralia nudicaulis*		n/a	CM744
SP7	*Picea mariana / Nemopanthus mucronata / Sphagnum capillifolium*	<	CNVC00219	CM744
WC1	*Picea mariana / Osmunda cinnamomea / Sphagnum spp.*	<	CNVC00291	
WC2	*Picea mariana / Kalmia angustifolia – Ledum groenlandicum / Sphagnum spp.*	<	CNVC00284	
WC3	*Pinus banksiana – Picea mariana / Rhododendron canadense / Sphagnum spp.*	<	CNVC00285	
WC5	*Picea rubens – Abies balsamea / Osmunda cinnamomea / Sphagnum spp.*		n/a	CM744
WC6	*Abies balsamea / Osmunda cinnamomea – Carex trisperma / Sphagnum spp.*	<	CNVC00279	
WC7	*Larix laricina – Picea mariana / Kalmia angustifolia / Sphagnum spp.*	<	CNVC00289 CNVC00302	
WD2	*Acer rubrum / Osmunda cinnamomea / Sphagnum spp.*		n/a	
WD3	*Acer rubrum / Onoclea sensibilis – Athyrium filix-femina / Sphagnum spp.*		n/a	
WD4	*Acer rubrum / Toxicodendron radicans / Sphagnum spp.*		n/a	
WD6	*Acer rubrum – Abies balsamea / Aster acuminatus / Sphagnum 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	*Equisetum* – *Rubus* – Balsam Fir	<	CNVC00348	M495
Fr #2	*Rubus* – Balsam fir	<<	CNVC00348	M495
		<<	CNVC00351	M495
Fc #3	*Clintonia* – Balsam Fir	<	CNVC00222	M495
Ft #4	*Taxus* – Balsam Fir	<	CNVC00222	M495
Fdh #5	*Dryopteris* – *Hylocomium* – Balsam Fir	<	CNVC00310	M495
Fd #6	*Dryopteris* – Balsam Fir	<<	CNVC00310	M495
		<<	CNVC00311	M495
Fdr #7	*Dryopteris* – *Rhytidiadelphus* – Balsam Fir	<	CNVC00310	M495
Fdl #8	*Dryopteris* – *Lycopodium* – Balsam Fir	<	CNVC00310	M495
Fh #9	*Hylocomium* – Balsam Fir	<	CNVC00222	M495
Fg #10	*Gaultheria* – Balsam Fir	<	CNVC00278	M495
Fp #11	*Pleurozium* – Balsam Fir	<<	CNVC00222	M495
		<<	CNVC00351	M495
Ss #12	*Sphagnum* – 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	*Carex* – Black Spruce	<	CNVC00293	M300
SO #19	*Osmunda* – Black Spruce	<<	CNVC00293	M300
		<<	CNVC00312	M299
SK #20	*Kalmia* – Black Spruce	=	CNVC00307	M495
SKc #21	*Cladonia* – *Kalmia* – Black Spruce	=	CNVC00205	M495

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