**Forest / Forêt** **Association CNVC00216**

# *Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*

**Black Spruce – Paper Birch (Balsam fir) / Mountain Maple**

**Épinette noire – Bouleau à papier (Sapin baumier) / Érable à épis**

**Subassociations:** none
**CNVC Alliance:** CA00015 *Betula papyrifera – Populus tremuloides – Abies balsamea / Acer spicatum*
**CNVC Group:** CG0007 Ontario-Quebec Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest

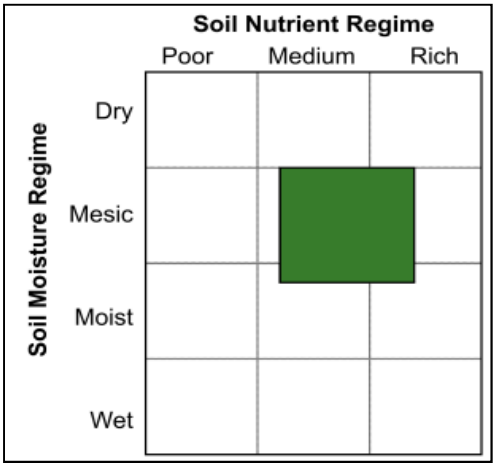
## Type Description

**Concept:** CNVC00216 is a boreal mixedwood forest Association that occurs in Quebec. It has a closed canopy that is typically dominated by black spruce (*Picea mariana*) and paper birch (*Betula papyrifera*), with a minor component of balsam fir (*Abies balsamea*). Trembling aspen (*Populus tremuloides*) is occasionally abundant. The shrub layer is dense and dominated by mountain maple (*Acer spicatum*), with lower abundance of regenerating black spruce, balsam fir and paper birch, and several other shrub species, including northern bush-honeysuckle (*Diervilla lonicera*), serviceberries (*Amelanchier* spp.), velvet-leaved blueberry (*Vaccinium myrtilloides*), early lowbush blueberry (*V. angustifolium*), American mountain-ash (*Sorbus americana*) and wild raisin (*Viburnum nudum*). The herb layer is well developed and typically includes yellow clintonia (*Clintonia borealis*), wild sarsaparilla (*Aralia nudicaulis*), bunchberry (*Cornus canadensis*), northern starflower (*Lysimachia borealis*), wild lily-of-the-valley (*Maianthemum canadense*), goldthread (*Coptis trifolia*), twinflower (*Linnaea borealis*), bracken fern (*Pteridium aquilinum*) and creeping snowberry (*Gaultheria hispidula)*. The forest floor cover is mainly broad-leaf litter so the moss layer is poorly developed, with only minor cover of red-stemmed feathermoss (*Pleurozium schreberi*). CNVC00216 occurs in a region with a humid continental boreal climate on mesic, nutrient-medium to rich sites. It typically establishes as the first cohort after fire, but harvesting and outbreaks of spruce budworm (*Choristoneura fumiferana*) also play a role in its dynamics.

**Vegetation:** CNVC00216 is a mixedwood forest Association with a closed canopy dominated by *Picea mariana* and *Betula papyrifera,* with lower cover of *Abies balsamea. Populus tremuloides* is sometimes abundant. The dense shrub layer is dominated by *Acer spicatum* but also includes abundant regenerating *P. mariana*, *A. balsamea* and *B. papyrifera* as well as several shrub species, such as *Diervilla lonicera*, *Amelanchier* spp., *Vaccinium myrtilloides*, *V. angustifolium*, *Sorbus americana* and *Viburnum nudum* (see Comments). *Corylus cornuta* and *Alnus viridis* can be locally abundant. The herb layer is well developed and commonly includes *Clintonia borealis*, *Aralia nudicaulis*, *Cornus canadensis*, *Lysimachia borealis*, *Maianthemum canadense*, *Coptis trifolia, Linnaea borealis, Pteridium aquilinum* and *Gaultheria hispidula.* Forest floor cover is predominantly broad-leaf litter so the moss layer is poorly developed, with only *Pleurozium schreberi* common, mainly on fallen logs and at the base of trees.

**Environment:** CNVC00216 occurs mainly in a humid continental boreal climate, becoming increasingly temperate in the southern portion of its range. It is found most frequently on mesic, nutrient-medium to rich sites; these are some of the most productive sites in this region of the boreal. Stands are often on gentle to moderately steep slopes on middle-slope topopositions. Seepage often enhances moisture and nutrient availability on these sites. Soils are usually moderately deep, well drained, coarse-textured and derived from morainal parent materials. Mor humus forms are common.

CNVC00216 is most prevalent where the regional fire cycle is intermediate (100-270 years), but it also occurs in areas where the fire cycle is long (270-500 years) or even very long (>500 years). Where the regional fire cycle is longer, stands of CNVC00216 likely occur on sites that burn more frequently than the regional average.



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

## Type Description (cont'd)

**Dynamics:** CNVC00216 typically establishes as the first cohort after fire if *Betula papyrifera* and *Picea mariana* seed availability and regeneration success are high. Both species are adapted to disturbance. *B. papyrifera* can reproduce vegetatively from stump sprouts and also produces abundant, light, wind-dispersed seeds that can readily colonize mineral soil seedbeds exposed by disturbance. *P. mariana* has cones that open when heated to release seeds. Although its seeds can germinate on a variety of substrates, seedbeds are usually improved by a fire that reduces organic matter and exposes mineral soil. *B. papyrifera* grows rapidly in full-light conditions and is intolerant of shade, whereas *P. mariana* grows more slowly and is self-replacing in a stand because of its shade tolerance. *Abies balsamea* can also become established in these stands if seeds are disseminated from nearby areas. Once established, it is highly shade tolerant and self-replacing.

Harvesting and natural disturbances, such as outbreaks of spruce budworm (*Choristoneura fumiferana*) or windthrow events, help to maintain CNVC00216 on the landscape. Canopy openings that result from these disturbances can release *P. mariana* or *A. balsamea* regeneration in the understory or, conversely, provide opportunities for *B. papyrifera* to regenerate from seeds or sprouts, maintaining the mixedwood condition.

*Acer spicatum* and *Corylus cornuta* can form dense thickets in canopy openings, sometimes significantly delaying tree regeneration. Their deep roots can survive even high-severity fires and they respond quickly after disturbance by suckering. Being semi-shade tolerant, these tall shrubs persist as the canopy closes, limiting available light for plants beneath them.

**Range:** CNVC00216 occurs in the boreal region of Quebec. It is most common in western Quebec from east of Lake Abitibi to the Upper North Shore of the Gulf of Saint Lawrence south of the Manicouagan Reservoir, but it is also known from near Havre-Saint-Pierre on the Lower North Shore (where it usually occurs on limestone) and from the Gaspé region. CNVC00216 occurs sporadically in the northern temperate region, usually on sites that are cooler than normal for that region (e.g., at higher elevations or on north aspects).

## Conservation Status (NatureServe)

**Global Conservation Rank:** no applicable rank
**National Conservation Rank:** not yet determined
**Subnational Conservation Rank:** not yet determined

**Forest / Forêt** **Association CNVC00216**

## *Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*

**Black Spruce – Paper Birch (Balsam fir) / Mountain Maple**
**Épinette noire – Bouleau à papier (Sapin baumier) / Érable à épis**

## Distribution

**Countries:** Canada

**Provinces / Territories / States:** Quebec

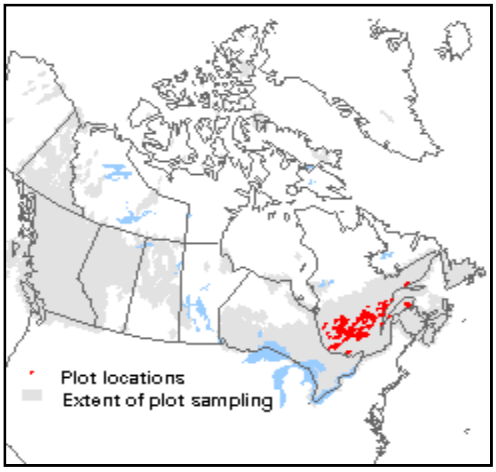
**Terrestrial Ecozones and Ecoregions of Canada:** Atlantic Highlands: Appalachians; Boreal Shield: Abitibi Plains, Central Laurentians, Mecatina Plateau, Rivière Rupert Plateau, Southern Laurentians

**Rowe's Forest Regions and Sections of Canada:** Boreal: Chibougamau-Natashquan, Gaspé, Gouin, Laurentide-Onatchiway, Northern Clay, Missinaibi-Cabonga; Great Lakes-St. Lawrence: Algonquin-Pontiac, Laurentian, Middle Ottawa, Saguenay, Temiscouata-Restigouche, Timagami

**NAAEC CEC Ecoregions of North America (Levels I & II):** Northern Forests: Atlantic Highlands, Mixed Wood Shield, Softwood Shield

**Nature Conservancy of Canada Ecoregions:** Boreal Shield, Northern Appalachians-Acadia

**Bioclimatic Domains and Subdomains of Québec:** 3 Est, 3 Ouest, 4 Est, 4 Ouest, 5 Est, 5 Ouest, 6 Est, 6 Ouest




## Corresponding Types and Associations

| | | | |
|---|---|---|---|
| **CNVC00216** | Quebec | QC019A | Picea mariana - Betula papyrifera (Abies balsamea) / Acer spicatum [Typique] |
| | | QC019B | Picea mariana - Betula papyrifera (Abies balsamea) / Acer spicatum [Diervilla lonicera] |
| | | QC086 | Populus tremuloides - Picea mariana - Betula papyrifera / Acer spicatum |

**Forest / Forêt** **Association CNVC00216**

## *Picea mariana - Betula papyrifera (Abies balsamea) / Acer spicatum*

**Black Spruce - Paper Birch (Balsam fir) / Mountain Maple**

**Épinette noire - Bouleau à papier (Sapin baumier) / Érable à épis**

## Vegetation Summary*

| | Association CNVC00216 151 plots | |
|---|---|---|
| **Species Name†** | % Cover± | % Presence^ |
| **Overstory Trees** | | |
| ***Picea mariana*** | **23** | **100** |
| ***Betula papyrifera*** | **21** | **97** |
| ***Abies balsamea*** | **13** | **78** |
| *Populus tremuloides* | 20 | 46 |
| *Picea glauca* | 6 | 43 |
| *Sorbus americana* | 3 | 28 |
| *Prunus pensylvanica* | 6 | 23 |
| **Tree Stratum Cover ($P_{10}$ $P_{25}$ Mean $P_{75}$ $P_{90}$)‡** | **(36 49 68 83 99)** | |
| **Understory Woody Shrubs and Regenerating Trees** | | |
| ***Acer spicatum*** | **26** | **95** |
| *Picea mariana* | 8 | 95 |
| *Abies balsamea* | 13 | 93 |
| *Betula papyrifera* | 5 | 85 |
| *Diervilla lonicera* | 12 | 81 |
| *Amelanchier* sp. | 6 | 79 |
| *Vaccinium myrtilloides* | 5 | 77 |
| *Vaccinium angustifolium* | 3 | 74 |
| *Sorbus americana* | 5 | 71 |
| *Viburnum nudum* | 8 | 64 |
| *Ilex mucronata* | 4 | 48 |
| *Corylus cornuta* | 16 | 44 |
| *Kalmia angustifolia* | 4 | 36 |
| *Salix* sp. | 4 | 32 |
| *Populus tremuloides* | 4 | 32 |
| *Prunus pensylvanica* | 3 | 30 |
| *Picea glauca* | 3 | 30 |
| *Ribes glandulosum* | 2 | 30 |
| *Acer rubrum* | 5 | 27 |
| *Sorbus decora* | 6 | 24 |
| *Viburnum edule* | 4 | 24 |
| *Lonicera canadensis* | 3 | 23 |
| *Alnus viridis* | 12 | 21 |
| *Rhododendron groenlandicum* | 5 | 21 |
| **Shrub Stratum Cover ($P_{10}$ $P_{25}$ Mean $P_{75}$ $P_{90}$)‡** | **(49 66 76 99 99)** | |

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

## Vegetation Summary (cont'd)*

| Species Name† | Association CNVC00216 % Cover± | % Presence^ |
|---|---|---|
| **Understory Herbs and Dwarf Shrubs** | | |
| *Clintonia borealis* | 8 | 99 |
| *Aralia nudicaulis* | 7 | 95 |
| *Cornus canadensis* | 8 | 93 |
| *Lysimachia borealis* | 3 | 93 |
| *Maianthemum canadense* | 7 | 92 |
| *Coptis trifolia* | 3 | 83 |
| *Linnaea borealis* | 3 | 78 |
| *Pteridium aquilinum* | 14 | 59 |
| *Gaultheria hispidula* | 3 | 59 |
| *Lycopodium obscurum* | 3 | 57 |
| *Dryopteris spinulosa complex* | 3 | 54 |
| *Streptopus lanceolatus* | 2 | 49 |
| *Eurybia macrophylla* | 8 | 46 |
| *Viola* sp. | 2 | 37 |
| *Oxalis montana* | 4 | 33 |
| *Lycopodium annotinum* | 4 | 27 |
| *Solidago macrophylla* | 2 | 26 |
| *Gymnocarpium dryopteris* | 3 | 25 |
| *Oclemena acuminata* | 3 | 25 |
| *Osmunda claytoniana* | 10 | 21 |
| *Huperzia lucidula* | 3 | 21 |
| *Carex* sp. | 3 | 21 |
| **Herb Stratum Cover ($P_{10}$ $P_{25}$ Mean $P_{75}$ $P_{90}$)‡** | **(16 16 41 50 70)** | |
| **Bryophytes and Lichens** | | |
| *Pleurozium schreberi* | 16 | 98 |
| *Dicranum* sp. | 4 | 91 |
| *Ptilium crista-castrensis* | 4 | 74 |
| *Polytrichum* sp. | 2 | 70 |
| *Cladina rangiferina* | 2 | 56 |
| *Cladonia* sp. | 2 | 54 |
| *Hylocomium splendens* | 7 | 44 |
| *Sphagnum* sp. | 5 | 36 |
| *Bazzania trilobata* | 3 | 28 |
| *Cladina mitis* | 2 | 25 |
| **Bryo-Lichen Stratum Cover ($P_{10}$ $P_{25}$ Mean $P_{75}$ $P_{90}$)‡** | **(3 16 27 33 70)** | |

* species present in > 20% of sample plots are listed

† see **Botanical Nomenclature** link at http://cnvc-cnvc.ca for botanical sources, synonyms and common names

± average percent cover of a species within the plots in which it occurs (i.e., characteristic cover)

^ percent frequency occurrence for a species within the total plots

‡ $P_x = X^{th}$ percentile (e.g., $P_{10} = 10^{th}$ percentile)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**Forest / Forêt** **Association CNVC00216**

## *Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*

**Black Spruce – Paper Birch (Balsam fir) / Mountain Maple**
**Épinette noire – Bouleau à papier (Sapin baumier) / Érable à épis**

## Site / Soil Characteristics

| | Association CNVC00216 |
|---|---|
| | **151 plots** |
| **Elevation Range (min–mean–max meters)** | |
| | 65–377–600 |
| **Slope Gradient (% frequency)** | |
| | very steep (1) |
| | steep (14) |
| | moderately steep (23) |
| | moderate (21) |
| | **gentle (27)** |
| | level (15) |
| **Aspect (% frequency)** | |
| | north (17) |
| | **east (28)** |
| | south (23) |
| | west (21) |
| | level (11) |
| **Meso Topoposition (% frequency)** | |
| | crest / upper (19) |
| | **mid (64)** |
| | lower / toe (8) |
| | depression (3) |
| | level (6) |
| **Moisture Regime (% frequency)** | |
| | dry (3) |
| | **mesic (87)** |
| | moist (10) |
| **Nutrient Regime (% frequency)** | |
| | missing data (100) |

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

### Site / Soil Characteristics (cont'd)

| | Association CNVC00216 |
|---|---|
| **Soil Parent Material (% frequency)** | |
| | colluvium (3) |
| | **moraine / till (79)** |
| | fluvial (1) |
| | glaciofluvial (11) |
| | glaciolacustrine (3) |
| | marine (3) |
| **Soil Rooting Zone Substrate (% frequency)** | |
| | non-soil (3) |
| | sandy (10) |
| | coarse loamy (20) |
| | fine loamy (1) |
| | missing data (66) |
| **Root Restricting Depth (% frequency)** | |
| | 0 – 20 cm (5) |
| | **21 – 99 cm (69)** |
| | missing data (26) |
| **Humus Form (% frequency)** | |
| | **mor (89)** |
| | moder (11) |
| | peatymor (1) |

**Forest / Forêt** **Association CNVC00216**

# *Picea mariana – Betula papyrifera (Abies balsamea) / Acer spicatum*

**Black Spruce – Paper Birch (Balsam fir) / Mountain Maple**

**Épinette noire – Bouleau à papier (Sapin baumier) / Érable à épis**

## Additional Characteristics

**Species of High Conservation Concern:**

**Non-native Species:**

**Management Issues:**

## Type Statistics

**Internal Similarity:** **Confidence:**

**Strength:**

## Related Concepts

**Similar CNVC Associations:**

CNVC00214 [*Picea mariana – Betula papyrifera / Kalmia angustifolia / Pleurozium schreberi*] occurs on poorer sites in the same range and has abundant heath species, rather than *Acer spicatum*, in the shrub layer.

CNVC00215 [*Betula papyrifera – Populus tremuloides – Pinus banksiana / Acer spicatum / Clintonia borealis*] occurs on similar sites in the same range but has *Pinus banksiana* and lacks *Abies balsamea*.

CNVC00234 [*Picea mariana – Betula papyrifera – Abies balsamea / Clintonia borealis*] occurs on slightly poorer sites in the same range and has less *Acer spicatum* and *Corylus cornuta* in the shrub layer.

CNVC00235 [*Abies balsamea – Betula papyrifera / Acer spicatum*] occurs on similar sites in the same range but has less overstory *Picea mariana*.

CNVC00270 [*Betula papyrifera – Picea mariana – Abies balsamea / Pleurozium schreberi – Sphagnum* spp.] occurs on moister sites in the same range and has less *Acer spicatum* and a more developed moss layer with more abundant *Sphagnum* mosses.

CNVC00344 [*Picea mariana – Betula papyrifera – Abies balsamea / Pleurozium schreberi*] occurs on poorer sites in the same range and has less *Acer spicatum* and a more developed moss layer.

**Related United States National Vegetation Classification Associations:**

**Relationships with Other Classifications:**

## Comments

*Viburnum nudum* here refers to var. *cassinoides* (wild raisin).

## Source Information

**Number of source plots for CNVC00216**: 151

**Information Sources:**

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

**Concept Authors:** K. Baldwin, K. Chapman, C. Morneau
**Description Authors:** K. Chapman, K. Baldwin and J.-P. Saucier
**Date of Concept:** May, 2010
**Date of Description:** February, 2016

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

**Classification References:**

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

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**Characterization References:**

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Gauthier, S.; Raulier, F.; Robitaille, A.; Chabot, M.; Duval, J.; Lord, D. 2013. Vulnérabilité face au risque de feu: description du critère et de l'indicateur, justification des seuils, méthode retenue et résultats détaillés. Chapitre 4 dans Rapport du Comité scientifique chargé d'examiner la limite nordique des forêts attribuables. Min. des Res. nat. du Qué., Sect. des for., QC.

Greene, D.F.; Zasada, J.C.; Sirois, L.; Kneeshaw, D.; Morin, H.; Charron, I.; Simard, M.J. 1999. A review of the regeneration dynamics of North American boreal forest tree species. Can. J. For. Res. 29:824-839.

Jobidon, R. 1995. Autécologie de quelques espèces de compétition d'importance pour la régénération forestière au Québec. Revue de littérature. Min. des Res. nat., Dir. de la rech. for., QC. Mémoire de recherche forestière n° 117.

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

**Characterization References (cont'd):**

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

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

For more information about the contents of this factsheet and definitions of attribute names and data classes, see the **Understanding the Factsheet** link at http//cnvc-cnvc.ca.

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