



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

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Forest / Forêt

Association CNVC00231

Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Clintonia borealis

Balsam Fir – Paper Birch – Trembling Aspen / Yellow Clintonia

Sapin baumier – Bouleau à papier – Peuplier faux-tremble / Clintonie boréale

Subassociations: none

CNVC Alliance: CA00014 *Betula papyrifera* – *Populus tremuloides* – *Abies balsamea* / *Clintonia borealis*

CNVC Group: CG0007 Ontario-Quebec Boreal Mesic Paper Birch – Balsam Fir – Trembling Aspen Forest



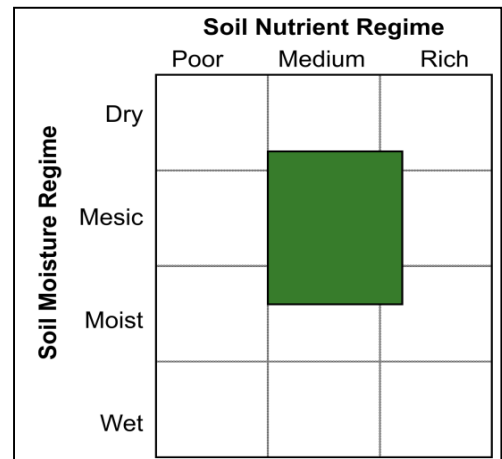
Source: Natural Resources Canada - Canadian Forest Service

Type Description

Concept: CNVC00231 is a boreal mixedwood forest Association that ranges from Manitoba to Quebec. It has a closed canopy of balsam fir (*Abies balsamea*) and/or white spruce (*Picea glauca*) with paper birch (*Betula papyrifera*) and/or trembling aspen (*Populus tremuloides*). The shrub layer is well developed and dominated by balsam fir regeneration, although paper birch saplings can be abundant in larger canopy openings. The herb layer is moderately developed and commonly includes bunchberry (*Cornus canadensis*), wild lily-of-the-valley (*Maianthemum canadense*), wild sarsaparilla (*Aralia nudicaulis*), yellow clintonia (*Clintonia borealis*), northern starflower (*Lysimachia borealis*) and twinflower (*Linnaea borealis*). The forest floor cover is mainly broad-leaf litter so the moss layer is sparse, with only minor cover of red-stemmed feathermoss (*Pleurozium schreberi*). CNVC00231 is a mid-seral condition that typically succeeds an early seral, post-fire Association. It occurs in a region with a boreal climate that grades from subhumid continental in the western portion of its range to very humid and more maritime in the east. It is most frequently found on mesic, nutrient-medium sites. As the fire cycle lengthens in the eastern portion of its range, outbreaks of spruce budworm (*Choristoneura fumiferana*) play a greater role in the dynamics of this Association.

Vegetation: CNVC00231 is a mixedwood forest Association with a closed canopy that can include various mixes of the conifer species *Abies balsamea* and/or *Picea glauca* with the hardwood species *Betula papyrifera* and/or *Populus tremuloides*. *Picea mariana* is sometimes present. *A. balsamea* regeneration dominates the well-developed shrub layer. *B. papyrifera* saplings can be abundant where canopy openings are large enough to provide adequate light. The herb layer is moderately developed and commonly includes *Cornus canadensis*, *Maianthemum canadense*, *Aralia nudicaulis*, *Clintonia borealis*, *Lysimachia borealis* and *Linnaea borealis*. 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: CNVC00231 occurs in a boreal climate that is subhumid continental in the western part of its range, becoming very humid and maritime influenced in the east, and more temperate farther south. Regional fire cycles within the range are intermediate (100-270 years), long (270-500 years) or even very long (>500 years). It is commonly found on mesic, nutrient-medium sites. Stands are often on level sites or gentle to moderate slopes on water-shedding, middle to upper-slope topositions. Soils are usually well drained, moderately deep to deep and coarse-textured, often coarse loams or sands, that develop on morainal, or less frequently, glaciofluvial deposits. Occasionally stands occur on fine-textured sediments deposited by proglacial lakes or seas. Mor humus forms are typical, but compared to other boreal Associations, moders are relatively common.





***Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Clintonia borealis*
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Type Description (cont'd)

Dynamics: CNVC00231 is a mid-seral condition that can succeed early seral Associations that establish after fire or harvesting (e.g., CNVC00238 [*Populus tremuloides* (*Betula papyrifera*) / *Diervilla lonicera*]), or can sometimes result from smaller-scale gap or patch disturbances in a late seral Association (e.g., CNVC00222 [*Abies balsamea* / *Pleurozium schreberi*]). *Abies balsamea* is eliminated by fire, but the pioneer species *Betula papyrifera* and *Populus tremuloides* are adapted to disturbance. Following any disturbance that does not kill their roots they can reproduce vegetatively, *B. papyrifera* from stump sprouts and *P. tremuloides* from root suckers. These species also produce abundant, light, wind-dispersed seeds that can readily colonize mineral soil seedbeds exposed by disturbance. Both species grow rapidly in full-light conditions but are intolerant of shade so do not replace themselves in a stand without further disturbance. The shade tolerant conifers *A. balsamea* and/or *Picea glauca* become established in these stands when seeds are disseminated from nearby areas, growing into the canopy and forming CNVC00231 as the pioneer hardwood species decline.

Harvesting and natural disturbances, such as outbreaks of spruce budworm (*Choristoneura fumiferana*) or windthrow events, help to maintain CNVC00231 on the landscape. Canopy openings that result from these disturbances can release the abundant *A. balsamea* regeneration in the understory or, conversely, provide opportunities for the hardwood species (especially *B. papyrifera*) to regenerate by seed or sprouts, maintaining the mixedwood condition. *A. balsamea* is more vulnerable to spruce budworm than is *P. glauca*, so outbreaks of this insect can temporarily encourage dominance of *P. glauca*.

On Anticosti Island, *A. balsamea* and *B. papyrifera* regeneration is heavily grazed by white-tailed deer (*Odocoileus virginianus*) so these forests often become dominated by *P. glauca*, which is not grazed to the same extent. These *P. glauca*-dominated stands are considered to be an alternative state for this Association.

Range: CNVC00231 occurs in the boreal region of Quebec and Ontario and likely extends into southeastern Manitoba as far west as Lake Winnipeg. In Quebec, it extends east to the Lower North Shore of the Gulf of Saint Lawrence near the Little Mecatina River and also occurs in the Gaspé region and on Anticosti Island. However, it is most common in the western part of the province and in the Appalachian Mountains and the Gaspé region south of the Saint Lawrence River. CNVC00231 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



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Distribution

Countries: Canada

Provinces / Territories / States: Manitoba, Ontario, Quebec

Terrestrial Ecozones and Ecoregions of Canada: Atlantic Highlands: Appalachians, Northern New Brunswick Uplands; Boreal Shield: Abitibi Plains, Algonquin-Lake Nipissing, Anticosti Island, Big Trout Lake, Central Laurentians, Lac Seul Upland, Lake Nipigon, Lake of the Woods, Lake Timiskaming Lowland, Mecatina Plateau, Rivière Rupert Plateau, Southern Laurentians, Thunder Bay-Quetico; Mixedwood Plains: Manitoulin-Lake Simcoe, St. Lawrence Lowlands

Rowe's Forest Regions and Sections of Canada: Boreal: Anticosti, Central Plateau, Chibougamau-Natashquan, Gaspé, Gouin, Laurentide-Onatchiway, Lower English River, Missinaibi-Cabonga, Nipigon, Northern Clay, Northern Coniferous, Superior, Upper English River; Great Lakes-St. Lawrence: Algoma, Algonquin-Pontiac, Eastern Townships, Georgian Bay, Haileybury Clay, Huron-Ontario, Laurentian, Middle Ottawa, Middle St. Lawrence, Quetico, Saguenay, Sudbury-North Bay, Temiscouata-Restigouche, Timagami

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

Nature Conservancy of Canada Ecoregions: Boreal Shield, Great Lakes, Northern Appalachians-Acadia, St. Lawrence Lowland, Superior-Lake of the Woods

Ecozones and Ecoregions of Manitoba: Boreal Shield

Manitoba Protected Areas Initiative Natural Regions: Manitoba Lowlands: Lake of the Woods; Precambrian Boreal Forest: Lac Seul Upland

Ecological Land Classification of Ontario (ecoregions and ecodistricts): 2W-1, 2W-2, 2W-3, 3E-1, 3E-2, 3E-4, 3E-5, 3E-6, 3E-7, 3S-1, 3S-2, 3S-3, 3S-4, 3S-5, 3W-1, 3W-2, 3W-3, 3W-4, 3W-5, 4E-3, 4E-4, 4S-1, 4S-2, 4S-3, 4S-4, 4S-5, 4S-6, 4W-1, 4W-2, 5E-1, 5E-4, 5E-5, 5E-6, 5E-7, 5E-8, 5E-9, 5E-11, 5E-13

Bioclimatic Domains and Subdomains of Québec: 2 Est, 2 Ouest, 3 Est, 3 Ouest, 4 Est, 4 Ouest, 5 Est, 5 Ouest, 6 Est, 6 Ouest



Corresponding Types and Associations

CNVC00231	Ontario	BTr8-4	<i>Populus tremuloides</i> - <i>Betula papyrifera</i> - <i>Abies balsamea</i> (<i>Picea glauca</i>) / <i>Diervilla lonicera</i> / <i>Clintonia borealis</i>
	Quebec	QC022A	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> [Typique]
		QC022C	<i>Abies balsamea</i> - <i>Betula papyrifera</i> / <i>Cornus canadensis</i> [<i>Pteridium aquilinum</i>]
		QC076A	<i>Picea glauca</i> - <i>Betula papyrifera</i> - <i>Populus tremuloides</i> / <i>Cornus canadensis</i> [Typique]
		QC076B	<i>Picea glauca</i> - <i>Betula papyrifera</i> - <i>Populus tremuloides</i> / <i>Cornus canadensis</i> [<i>Pleurozium schreberi</i>]



Abies balsamea* – *Betula papyrifera* – *Populus tremuloides* / *Clintonia borealis
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Corresponding Types and Associations (cont'd)

QC093A	Populus tremuloides - Abies balsamea (Betula papyrifera) / Cornus canadensis [Typique]
QC093B	Populus tremuloides - Abies balsamea (Betula papyrifera) / Cornus canadensis [Pteridium aquilinum]
QC093C	Populus tremuloides - Abies balsamea (Betula papyrifera) / Cornus canadensis [Pleurozium schreberi]
QC093D	Populus tremuloides - Abies balsamea (Betula papyrifera) / Cornus canadensis [Ledum groenlandicum]



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Sapin baumier - Bouleau à papier - Peuplier faux-tremble / Clintonie boréale

Vegetation Summary*

Species Name [†]	Association CNVC00231	
	805 plots	
	% Cover [‡]	% Presence [^]
Overstory Trees		
<i>Abies balsamea</i>	26	90
<i>Betula papyrifera</i>	22	80
<i>Populus tremuloides</i>	28	61
<i>Picea glauca</i>	13	60
<i>Picea mariana</i>	8	45
Tree Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(36 49 70 92 99)	
Understory Woody Shrubs and Regenerating Trees		
<i>Abies balsamea</i>	18	97
<i>Betula papyrifera</i>	5	66
<i>Acer spicatum</i>	4	53
<i>Diervilla lonicera</i>	7	52
<i>Picea glauca</i>	5	48
<i>Vaccinium myrtilloides</i>	4	48
<i>Picea mariana</i>	6	47
<i>Populus tremuloides</i>	3	44
<i>Amelanchier</i> sp.	4	40
<i>Corylus cornuta</i>	4	38
<i>Sorbus americana</i>	3	37
<i>Vaccinium angustifolium</i>	3	37
<i>Sorbus decora</i>	2	33
<i>Acer rubrum</i>	6	30
<i>Lonicera canadensis</i>	2	26
<i>Viburnum nudum</i>	5	23
<i>Rubus idaeus</i>	5	22
<i>Prunus pensylvanica</i>	3	22
<i>Viburnum edule</i>	3	21
<i>Ribes glandulosum</i>	3	21
Shrub Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(15 22 43 61 83)	
Understory Herbs and Dwarf Shrubs		
<i>Cornus canadensis</i>	7	88
<i>Maianthemum canadense</i>	4	85
<i>Aralia nudicaulis</i>	5	78
<i>Clintonia borealis</i>	4	77
<i>Lysimachia borealis</i>	2	72
<i>Linnaea borealis</i>	3	67
<i>Coptis trifolia</i>	2	56
<i>Lycopodium obscurum</i>	3	42
<i>Rubus pubescens</i>	3	40



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Vegetation Summary (cont'd)*

Species Name [†]	Association CNVC00231	
	% Cover [‡]	% Presence [^]
<i>Lycopodium annotinum</i>	5	39
<i>Dryopteris spinulosa complex</i>	3	36
<i>Pteridium aquilinum</i>	9	35
<i>Eurybia macrophylla</i>	8	35
<i>Streptopus lanceolatus</i>	2	34
<i>Gaultheria hispidula</i>	2	29
<i>Lycopodium clavatum</i>	2	26
<i>Carex</i> sp.	3	24
<i>Viola</i> sp.	3	23
<i>Oxalis montana</i>	4	22
<i>Mitella nuda</i>	2	22
Herb Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(3 16 32 48 70)	
Bryophytes and Lichens		
<i>Pleurozium schreberi</i>	10	86
<i>Dicranum</i> sp.	4	53
<i>Ptilium crista-castrensis</i>	3	48
<i>Hylocomium splendens</i>	4	39
<i>Cladonia</i> sp.	2	38
<i>Polytrichum</i> sp.	3	36
<i>Cladina rangiferina</i>	2	24
<i>Rhytidiadelphus triquetrus</i>	3	23
Bryo-Lichen Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡]	(3 3 18 17 50)	

* 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 = Xth percentile (e.g., P₁₀ = 10th percentile)



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Site / Soil Characteristics

Association
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805 plots

Elevation Range (min–mean–max meters)

5–339–975
missing data (3)

Slope Gradient (% frequency)

very steep (1)
steep (6)
moderately steep (15)
moderate (20)
gentle (26)
level (31)
missing data (1)

Aspect (% frequency)

north (18)
east (16)
south (21)
west (22)
level (22)
missing data (0)

Meso Toposition (% frequency)

crest / upper (26)
mid (42)
lower / toe (13)
depression (2)
level (17)
missing data (0)

Moisture Regime (% frequency)

very dry (1)
dry (10)
mesic (71)
moist (17)
wet (1)

Nutrient Regime (% frequency)

missing data (100)



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Site / Soil Characteristics (cont'd)

Association

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Soil Parent Material (% frequency)

bedrock (0)
colluvium (6)
eolian (0)
moraine / till (57)
fluvial (1)
glaciofluvial (12)
lacustrine (13)
glaciolacustrine (3)
marine (5)
glaciomarine (0)
organic (0)
missing data (1)

Soil Rooting Zone Substrate (% frequency)

non-soil (7)
sandy (11)
coarse loamy (19)
fine loamy (6)
silty (4)
clayey (6)
organic (0)
missing data (48)

Root Restricting Depth (% frequency)

0 – 20 cm (3)
21 – 99 cm (51)
≥ 100 cm (20)
missing data (26)

Humus Form (% frequency)

mor (74)
moder (19)
mull (3)
peatymor (3)
missing data (1)



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Additional Characteristics

Species of High Conservation Concern:

Non-native Species:

Management Issues:

Type Statistics

Internal Similarity:

Confidence:

Strength:

Related Concepts

Similar CNVC Associations:

CNVC00213 [*Populus tremuloides* – *Betula papyrifera* – *Picea mariana* – *Pinus banksiana* / *Diervilla lonicera* / *Pleurozium schreberi*] occurs on similar sites in the same range but has less *Abies balsamea* and more *Pinus banksiana*.

CNVC00232 [*Abies balsamea* – *Betula papyrifera* / *Pleurozium schreberi*] occurs on similar sites in Quebec but has less *Populus tremuloides* and a more developed moss layer with abundant *Pleurozium schreberi* and sometimes *Hylocomium splendens*.

CNVC00234 [*Picea mariana* – *Betula papyrifera* – *Abies balsamea* / *Clintonia borealis*] occurs on similar sites in Quebec and northeastern Ontario but has *Picea mariana* codominant in the canopy.

CNVC00235 [*Abies balsamea* – *Betula papyrifera* / *Acer spicatum*] occurs on slightly richer sites in the same range and has abundant *Acer spicatum* and *Corylus cornuta* in the shrub layer.

CNVC00238 [*Populus tremuloides* (*Betula papyrifera*) / *Diervilla lonicera*] is a similar hardwood Association that occurs on comparable sites in the same range (see Dynamics).

CNVC00274 [*Betula papyrifera* – *Abies balsamea* / *Alnus incana*] occurs on moister, richer sites in Quebec and has less *Populus tremuloides* in the canopy and abundant *Alnus incana* in the shrub layer.

Related United States National Vegetation Classification Associations:

Relationships with Other Classifications:

Comments



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

Source Information

Number of source plots for CNVC00231: 805

Information Sources:

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

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, M. Major, C. Morneau, P. Uhlig, M. Wester

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

Date of Concept: February, 2012

Date of Description: February, 2016

Classification References:

Gosselin, J.; Grondin, P.; Saucier, J.-P. 1998. Rapport de classification écologique du sous-domaine bioclimatique de l'érablière à bouleau jaune de l'est. Min. des Res. nat. du Qué., Dir. de la gestion des stocks forestiers, QC.

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Grondin, P.; Blouin, J.; Racine, P. 1998. Rapport de classification écologique du sous-domaine bioclimatique de la sapinière à bouleau blanc de l'ouest. Min. des Res. nat. du Qué., Dir. des inv. for., QC.

Grondin, P.; Blouin, J.; Racine, P. 1999. Rapport de classification écologique du sous-domaine bioclimatique de la sapinière à bouleau jaune de l'est. Min. des Res. nat. du Qué., Dir. des inv. for., QC.

Grondin, P.; Blouin, J.; Racine, P.; D'Avignon, H.; Tremblay, S. 2000. Rapport de classification écologique du sous-domaine bioclimatique de la sapinière à bouleau blanc de l'est. Forêt Qué., Dir. des inv. for., Min. des Res. nat. du Qué., QC.

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Characterization References:

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

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

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Côté, S.D.; Dussault, C.; Huot, J.; Potvin, F.; Tremblay, J.-P.; Viera, V. 2008. High herbivore density and boreal forest ecology: white-tailed deer on Anticosti Island. Pages 154- 161 in: Gaston A.J., Golumbia T.E., Martin J.L. and S.T. Sharpe (eds.) Lessons from the Islands: introduced species and what they tell us about how ecosystems work. Proceedings from the Research Group on Introduced Species 2002 Symposium. Queen Charlotte City, BC. Can. Wildlife Serv., Environ. Can., Ottawa, ON.



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Characterization References (cont'd):

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.

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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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