Canadian National Vegetation Classification (CNVC)
Classification nationale de la végétation du Canada (CNVC)
http://cnvc-cnvc.ca

Forest / Forêt **Association CNVC00311**

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana

Balsam Fir (Yellow Birch) / Spinulose Wood Fern

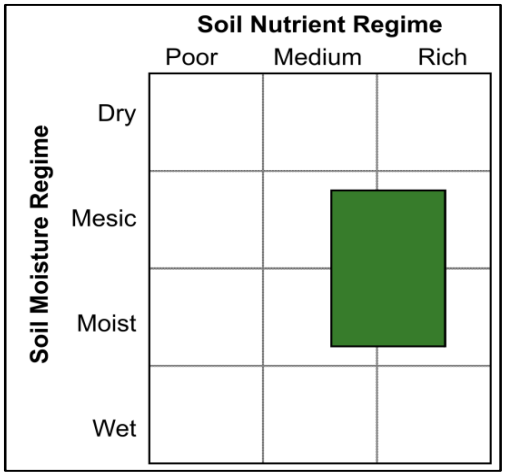
Sapin baumier (Bouleau jaune) / Dryoptère spinuleuse

Subassociations: *311a typic, 311b Bazzania trilobata*

CNVC Alliance: CA00007 *Abies balsamea (Betula papyrifera – B. alleghaniensis) / Dryopteris carthusiana*

CNVC Group: CG0003 Atlantic Boreal Mesic Balsam Fir – Paper Birch – White Spruce Forest

Source: B. Meades



Type Description

Concept: CNVC00311 is a boreal mixedwood forest Association that occurs in the southern part of insular Newfoundland. It has a closed canopy dominated by balsam fir (*Abies balsamea*) with a significant component of yellow birch (*Betula alleghaniensis*). The shrub layer is usually moderately developed and consists mainly of balsam fir regeneration. A moderately developed to dense herb layer that is dominated by wood ferns (spinulose wood fern [*Dryopteris carthusiana*] or evergreen wood fern [*D. intermedia*]) characterizes this Association. Bunchberry (*Cornus canadensis*) and northern starflower (*Lysimachia borealis*) are usually present. Wild lily-of-the-valley (*Maianthemum canadense*) is less common but can be abundant when present. Where fern cover is dense, the moss layer is poorly developed, but where it is more moderate, the moss layer can be continuous and is typically dominated by three-lobed whipwort (*Bazzania trilobata*) and lanky moss (*Rhytidiadelphus loreus*), with lower abundance of greater broom moss (*Dicranum majus*), stairstep moss (*Hylocomium splendens*) and red-stemmed feathermoss (*Pleurozium schreberi*). CNVC00311 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 Newfoundland. Fire is uncommon in the humid climate; instead windthrow and insect outbreaks 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 balsam fir and yellow birch regeneration. Two subassociations are distinguished, *typic* and *Bazzania trilobata*.

Vegetation: CNVC00311 is a mixedwood forest Association with a closed canopy dominated by *Abies balsamea* in mixture with *Betula alleghaniensis*. The shrub layer is usually moderately developed, consisting primarily of regenerating *A. balsamea* often with a minor component of *Acer spicatum*. The herb layer is moderately developed to dense and characterized by dominance of *Dryopteris carthusiana,* sometimes with *D. intermedia*. *Cornus canadensis* and *Lysimachia borealis* are usually present under the ferns, but not abundant. *Maianthemum canadense* can be abundant when present. The moss layer ranges from sparse to continuous. In the *typic* subassociation, characterized by dense cover of *D. carthusiana*, there are only small patches of bryophytes, usually *Dicranum majus, Rhytidiadelphus loreus* and *Hylocomiastrum umbratum,* mainly on fallen logs and on tree bases. In the *Bazzania trilobata* subassociation, there is lower fern cover (led by *D. intermedia*) and a continuous moss layer dominated by *B. trilobata, R. loreus* and sometimes *R. triquetrus*.

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana CNVC00311

Type Description (cont'd)

Environment: CNVC00311 occurs in a humid to very humid, maritime-influenced boreal climate where the regional fire cycle is long (270-500 years). It is found most frequently on mesic to moist, nutrient-medium to rich sites; these are among the most productive sites in Newfoundland. Stands are usually on moderately steep to gentle slopes, often on north (i.e., cooler) aspects. Soils are usually loamy and well drained. Seepage enhances the moisture and nutrient availability on these sites. Mor humus forms are common but compared to other boreal Associations, mulls are relatively frequent.

Dynamics: CNVC00311 is a stable self-perpetuating mixedwood forest Association. Wildfires are generally absent from its range but strong winds are frequent, often causing local windthrow gaps. Insect defoliation by spruce budworm (*Choristoneura fumiferana*) and hemlock looper (*Lambdina fiscellaria fiscellaria*) is common in these forests, particularly in the mature to senescent stages of stand development and can lead to extensive canopy mortality of *Abies balsamea*. While insect disturbance has considerable impact on the commercial yields of timber, it rarely has long-term consequences for ecosystem composition and structure in these forests. Following disturbance (including harvesting), stands tend to recover by release of understory *Abies balsamea* regeneration and seeding in of both *Betula alleghaniensis* and *A. balsamea* from surrounding areas. Small canopy gaps caused by the death of a single tree or a small group of trees favour the more shade tolerant *A. balsamea*, while large patches promote the persistence of *B. alleghaniensis*. These gap and patch dynamics typically result in an uneven age structure within stands. Following harvesting or insect disturbance, hardwood cover may initially increase, but the Association typically recovers to a mixedwood condition over a period of 70-80 years.

When fires do occur, they are usually of anthropogenic origin and are rarely extensive. Fire eliminates *A. balsamea*; early seral hardwoods such as *Betula papyrifera* (see Comments) and *B. alleghaniensis* are likely to dominate the initial post-fire stand on these sites (e.g., CNVC00315 [*Betula papyrifera – B. alleghaniensis / Dryopteris carthusiana*]). Over time, as humus builds up in a stand, *A. balsamea* seedlings are better able to establish and survive in the low-light environment than are *Betula* seedlings; *A. balsamea* persists in the understory as advanced regeneration until being released by further canopy disturbance. As long as *B. alleghaniensis* remains abundant in the stand, these sites recover to the mixedwood condition (CNVC00311); if *B. alleghaniensis* is eliminated, CNVC00310 [*Abies balsamea / Dryopteris* spp. */ Hylocomiastrum umbratum*] could develop.

Abies balsamea regeneration is heavily grazed by moose (*Alces alces*) in some locations, so these stands can have a relatively higher cover of *Picea glauca,* which is not grazed to the same extent.

Range: CNVC00311 occurs within the range of *Betula alleghaniensis* in southern Newfoundland, from Corner Brook to the central Avalon Peninsula, at elevations less than 300 mASL. The *typic* subassociation occurs throughout the range of CNVC00311. The *Bazzania trilobata* subassociation has only been described from the Avalon Peninsula, but may occur in valleys throughout the south coastal region.

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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Balsam Fir (Yellow Birch) / Spinulose Wood Fern
Sapin baumier (Bouleau jaune) / Dryoptère spinuleuse

Distribution

Countries: Canada

Provinces / Territories / States: Newfoundland and Labrador

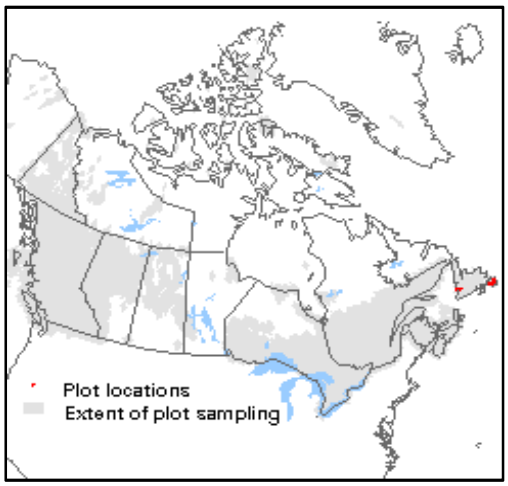
Terrestrial Ecozones and Ecoregions of Canada: Boreal Shield: Avalon Forest, Maritime Barrens, Southwestern Newfoundland

Rowe's Forest Regions and Sections of Canada: Boreal: Avalon, Corner Brook

NAAEC CEC Ecoregions of North America (Levels I & II): Northern Forests: Softwood Shield

Nature Conservancy of Canada Ecoregions: Boreal Shield

Ecoregions of Newfoundland: Avalon Forest, Maritime Barrens, Southwestern Newfoundland



Corresponding Types and Associations

311a typic	Newfoundland and Labrador	E bFd	Eastern: Dryopteris - balsam fir forest
		W Fd	Western: Dryopteris - balsam fir forest
311b Bazzania trilobata	Newfoundland and Labrador	E bFdb	Eastern: Bazzania - Dryopteris - balsam fir forest

Forest / Forêt **Association CNVC00311**

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana

Balsam Fir (Yellow Birch) / Spinulose Wood Fern
Sapin baumier (Bouleau jaune) / Dryoptère spinuleuse

Vegetation Summary*

	Association CNVC00311		Subassociation 311a *typic*		Subassociation 311b *Bazzania trilobata*	
	13 plots		**10 plots**		**3 plots**	
Species Name[T]	% Cover[±]	% Presence[^]	% Cover[±]	% Presence[^]	% Cover[±]	% Presence[^]
Overstory Trees						
Abies balsamea	**57**	**100**	**55**	**100**	**63**	**100**
Betula alleghaniensis	**24**	**100**	**26**	**100**	**16**	**100**
Picea glauca	2	54	1	50	5	67
Betula papyrifera	11	46	11	60	-	-
Tree Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(66 72 85 96 100)**		**(65 72 85 99 100)**		**(74 78 82 87 89)**	
Understory Woody Shrubs and Regenerating Trees						
Abies balsamea	18	85	14	90	35	67
Acer spicatum	5	62	5	80	-	-
Sorbus americana	2	31	1	30	4	33
Ribes glandulosum	1	23	1	30	-	-
Picea glauca	2	15	1	10	2	33
Betula alleghaniensis	1	15	1	10	1	33
Sorbus decora	1	15	1	10	1	33
Rhododendron groenlandicum	2	8	-	-	2	33
Viburnum nudum	2	8	-	-	2	33
Vaccinium angustifolium	1	8	-	-	1	33
Viburnum opulus	1	8	-	-	1	33
Shrub Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(3 8 23 29 49)**		**(4 9 21 22 38)**		**(8 16 28 40 47)**	
Understory Herbs and Dwarf Shrubs						
Dryopteris carthusiana	**51**	**100**	**66**	**100**	**4**	**100**
Cornus canadensis	4	92	6	90	1	100
Lysimachia borealis	3	85	3	80	2	100
Maianthemum canadense	16	46	16	60	-	-
Dryopteris intermedia	14	46	10	30	19	100
Clintonia borealis	4	46	4	60	-	-
Linnaea borealis	2	31	1	20	3	67
Monotropa uniflora	2	31	1	30	4	33
Streptopus lanceolatus	1	23	1	30	-	-
Gaultheria hispidula	2	15	-	-	2	67
Solidago macrophylla	1	8	-	-	1	33
Herb Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(32 59 75 99 100)**		**(62 82 88 100 100)**		**(28 30 31 33 34)**	
Bryophytes and Lichens						
Dicranum majus	5	92	3	90	9	100
Rhytidiadelphus loreus	8	85	3	80	20	100
Hylocomium splendens	6	62	6	50	6	100

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana CNVC00311

Vegetation Summary (cont'd)*

	Association CNVC00311		Subassociation 311a *typic*		Subassociation 311b *Bazzania trilobata*	
Species Name[†]	% Cover[±]	% Presence[^]	% Cover[±]	% Presence[^]	% Cover[±]	% Presence[^]
Bazzania trilobata	16	54	4	40	**32**	**100**
Hylocomiastrum umbratum	8	46	8	60	-	-
Pleurozium schreberi	3	38	2	20	4	100
Polytrichum commune	1	38	1	50	-	-
Dicranum scoparium	2	23	2	30	-	-
Rhytidiadelphus triquetrus	21	15	4	10	38	33
Dicranum fuscescens	3	15	1	10	4	33
Dicranum polysetum	19	8	-	-	19	33
Sphagnum girgensohnii	4	8	-	-	4	33
Sphagnum quinquefarium	2	8	-	-	2	33
Ptilidium ciliare	1	8	-	-	1	33
Bryo-Lichen Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(6 8 35 34 95)**		**(6 6 17 28 29)**		**(85 90 93 99 100)**	

* 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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Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana

Balsam Fir (Yellow Birch) / Spinulose Wood Fern
Sapin baumier (Bouleau jaune) / Dryoptère spinuleuse

Site / Soil Characteristics

	Association CNVC00311 **13 plots**	Subassociation 311a *typic* **10 plots**	Subassociation 311b *Bazzania trilobata* **3 plots**
Elevation Range (min–mean–max meters)			
	30–143–229	30–134–229	125–174–200
Slope Gradient (% frequency)			
	moderately steep (54)	**moderately steep (50)**	**moderately steep (67)**
	moderate (8)	moderate (0)	moderate (33)
	gentle (23)	gentle (30)	gentle (0)
	level (8)	level (10)	level (0)
	missing data (8)	missing data (10)	missing data (0)
Aspect (% frequency)			
	north (46)	**north (50)**	north (33)
	east (15)	east (20)	east (0)
	south (23)	south (20)	south (33)
	west (8)	west (0)	west (33)
	missing data (8)	missing data (10)	missing data (0)
Meso Topoposition (% frequency)			
	crest / upper (8)	crest / upper (0)	crest / upper (33)
	mid (8)	mid (0)	mid (33)
	missing data (85)	missing data (100)	missing data (33)
Moisture Regime (% frequency)			
	mesic (54)	**mesic (60)**	mesic (33)
	moist (38)	moist (30)	**moist (67)**
	missing data (8)	missing data (10)	missing data (0)
Nutrient Regime (% frequency)			
	missing data (100)	missing data (100)	missing data (100)

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana CNVC00311

Site / Soil Characteristics (cont'd)

	Association CNVC00311	Subassociation 311a *typic*	Subassociation 311b *Bazzania trilobata*
Soil Parent Material (% frequency)			
	colluvium (8) **moraine / till (69)** missing data (23)	colluvium (0) **moraine / till (80)** missing data (20)	colluvium (33) moraine / till (33) missing data (33)
Soil Rooting Zone Substrate (% frequency)			
	non-soil (8) coarse loamy (23) missing data (69)	non-soil (0) coarse loamy (30) missing data (70)	non-soil (33) coarse loamy (0) missing data (67)
Root Restricting Depth (% frequency)			
	missing data (100)	missing data (100)	missing data (100)
Humus Form (% frequency)			
	mor (38) mull (8) missing data (54)	**mor (50)** mull (10) missing data (40)	mor (0) mull (0) missing data (100)

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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:

CNVC00232 [*Abies balsamea – Betula papyrifera / Pleurozium schreberi*] occurs on mesic, medium sites in Quebec. It has an overstory codominated by *Abies balsamea* and *Betula papyrifera* and an understory with *Pleurozium schreberi* rather than *Dryopteris* spp. dominant.

CNVC00233 [*Abies balsamea – Betula papyrifera / Oxalis montana / Pleurozium schreberi*] occurs on mesic, medium sites in New Brunswick, Nova Scotia and Quebec, often at higher elevations. It has an overstory codominated by *Abies balsamea* and *Betula papyrifera* and a herb layer with abundant *Oxalis montana*.

CNCV00310 [*Abies balsamea / Dryopteris* spp. / *Hylocomiastrum umbratum*] is a similar coniferous Association that occurs on comparable sites in the same range. It has lower cover of *Betula alleghaniensis* and/or *B. papyrifera* in the overstory and a better developed moss layer (see Dynamics).

CNVC00315 [*Betula papyrifera – B. alleghaniensis / Dryopteris carthusiana*] is a similar hardwood Association that occurs on comparable sites in the same range (see Dynamics).

CNVC00348 [*Abies balsamea / Taxus canadensis / Rubus pubescens / Dicranum majus*] is a coniferous Association that occurs on moister, richer sites in the same range. It has a purer *Abies balsamea* overstory and a more diverse herb layer that also includes *Dryopteris carthusiana*.

CNVC00349 [*Betula papyrifera (Populus tremuloides) / Dryopteris carthusiana – Rubus pubescens*] is a hardwood Association that occurs on moister, richer sites in the same range. It lacks codominance of *Abies balsamea*, and often has *Populus tremuloides* in the overstory. *Dryopteris carthusiana* is common, but not as abundant as in CNVC00311.

Related United States National Vegetation Classification Associations:

Relationships with Other Classifications:

CNVC00311 contains elements of Fd#6 [Dryopteris – Balsam fir] in Meades & Moores 1994.

Comments

In the general context of boreal forests, this Association is notable for its content of *Betula alleghaniensis*, which is usually considered a temperate species. CNVC00311 lacks understory species typically associated with temperate forests however, so is classified here as a boreal forest Association.

CNVC00311 is absent from the more continental interior of Newfoundland where fire is more frequent.

Betula papyrifera here refers to both *B. papyrifera* (paper birch) and *B. cordifolia* (heart-leaved birch).

Abies balsamea (Betula alleghaniensis) / Dryopteris carthusiana CNVC00311

Source Information

Number of source plots for CNVC00311: 13
Number of source plots for 311a typic: 10
Number of source plots for 311b Bazzania trilobata: 3
Information Sources:
Natural Resources Canada, Canadian Forest Service, Atlantic Region. 2006. Forest vegetation plot descriptions from the following publications: Damman, A.W.H. 1963, 1964, 1967); Meades, W.J. (1976, 1986). Nat. Res. Canada, Corner Brook, NL.
Concept Authors: K. Baldwin, K. Chapman, B. Meades
Description Authors: B. Meades, K. Chapman and K. Baldwin
Date of Concept: February, 2012
Date of Description: October, 2016

Classification References:

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Characterization References:

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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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