



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

<http://cnvc-cnvc.ca>

Forest / Forêt

Association CNVC00091

Populus tremuloides* – *Picea glauca* – *Pinus contorta* / *Leymus innovatus
Trembling Aspen – White Spruce – Lodgepole Pine / Downy Lymegrass
Peuplier faux-tremble – Épinette blanche – Pin tordu / Élyme innovant

Subassociations: none

CNVC Alliance: CA00032 *Populus tremuloides* (*Picea glauca*) / *Shepherdia canadensis* / *Leymus innovatus*

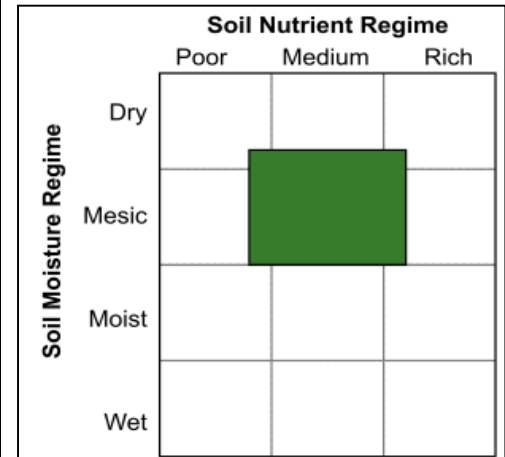
CNVC Group: CG0014 Cordilleran Boreal Mesic Trembling Aspen – White Spruce Forest

Type Description

Concept: CNVC00091 is a boreal mixedwood forest Association that occurs in Alberta and British Columbia. It has a moderately closed canopy of trembling aspen (*Populus tremuloides*) with white spruce (*Picea glauca*) and/or lodgepole pine (*Pinus contorta*). The shrub layer is usually moderately developed and consists mainly of soapberry (*Shepherdia canadensis*) and prickly rose (*Rosa acicularis*). The herb and dwarf shrub layer is typically dense and has abundant downy lymegrass (*Leymus innovatus*) and common bearberry (*Arctostaphylos uva-ursi*) as well as lower cover of wild strawberry (*Fragaria virginiana*), cream-coloured vetchling (*Lathyrus ochroleucus*), northern bedstraw (*Galium boreale*), twinflower (*Linnaea borealis*) and rayless alkali aster (*Symphotrichum ciliolatum*). The forest floor cover is mainly broad-leaf and grass litter, so the moss layer is sparse. CNVC00091 occurs on mesic, nutrient-medium sites in a region with a subhumid continental climate. It is an early to mid-successional condition that typically establishes after fire.

Vegetation: CNVC00091 is a mixedwood forest Association with a moderately closed canopy that is dominated by *Populus tremuloides*, with *Picea glauca* and/or *Pinus contorta* (see Comments) as codominant species. The shrub layer is usually moderately developed and consists mainly of *Shepherdia canadensis* and *Rosa acicularis*. The dense herb and dwarf shrub layer is characterized by abundant *Leymus innovatus* and, to a lesser degree, *Arctostaphylos uva-ursi*. *Fragaria virginiana*, *Lathyrus ochroleucus*, *Galium boreale*, *Linnaea borealis* and *Symphotrichum ciliolatum* commonly occur in this layer as well. Forest floor cover is predominantly broad-leaf and grass litter, so the moss layer is poorly developed.

Environment: CNVC00091 occurs in a subhumid continental climate where regional fire cycles are short (<100 years) or intermediate (100-270 years). It is typically found on mesic, or sometimes dry, nutrient-medium sites. Slope gradient and topoposition are variable, but stands are frequently on warmer (often drier), south-facing aspects. Soils vary in texture because they are derived from a wide range of parent materials. Humus forms are typically mors.





***Populus tremuloides* – *Picea glauca* – *Pinus contorta* / *Leymus innovatus* CNVC00091**

Type Description (cont'd)

Dynamics: CNVC00091 is an early to mid-successional mixedwood Association that is naturally perpetuated by stand-replacing fire. It can succeed early seral *Populus tremuloides* or *Pinus contorta* Associations (e.g., CNVC00087 [*Populus tremuloides* / *Leymus innovatus*] and CNVC00121 [*Pinus contorta* / *Shepherdia canadensis* / *Leymus innovatus*]) or form the first cohort after disturbance. *P. tremuloides* is a pioneer species that can reproduce vegetatively from root suckers following any disturbance that does not kill its roots. It also produces abundant, light, wind-dispersed seeds that can readily colonize mineral soil seedbeds exposed by disturbance. *P. contorta* has cones that open when heated by fire, releasing large quantities of seeds onto fire-prepared seedbeds. Both of these species grow rapidly in full-light conditions but are intolerant of shade so do not replace themselves in a stand without further disturbance.

Succession usually proceeds slowly on these sites, typically with ingress of *Picea glauca* into the stand by seed dissemination from nearby sources. If seed sources are available, *P. glauca* sometimes re-colonizes at the same time as *P. tremuloides* and *P. contorta*, but *P. glauca* grows more slowly, so it usually requires several decades to attain canopy height. *P. glauca* is shade-tolerant and able to self-replace once established in a stand. Succession is often re-initiated by fire before a stand reaches the mid-successional stage, but in the prolonged absence of disturbance *P. glauca* can gradually dominate the overstory. A late successional *P. glauca*-dominated condition (e.g., CNVC00104 [*Picea glauca* (*Pinus contorta*) / *Shepherdia canadensis* / *Leymus innovatus* / *Hylocomium splendens*]) could develop after approximately 120 years.

Forest tent caterpillar (*Malacosoma disstria*) and *Armillaria* root disease (*Armillaria* spp.) can have significant impacts on *P. tremuloides*. Defoliation by the caterpillar can reduce growth, cause dieback and sometimes lead to mortality over successive years. *Armillaria* spp. can weaken or kill individual or small groups of trees. Canopy openings that result from insect or pathogen disturbance can promote forest succession by enhancing the growth of *P. glauca* in the understory.

In recent years, mountain pine beetle (*Dendroctonus ponderosae*) has caused significant economic and ecological impacts to *P. contorta* forests in sub-boreal British Columbia (BC). Within its historic range in interior BC, beetle cycles occur every 20-40 years. At low population densities, the insect preferentially attacks and kills older, less vigorous trees, opening canopy gaps. At epidemic levels however, mass attacks can extend over large areas and overwhelm the defenses of vigorously growing immature pines. Recently the beetle has spread northward and eastward into boreal *P. contorta* forests, affecting even hybrid *Pinus x murraybanksiana* and *P. banksiana* stands in northern Alberta. Climate change and forest management practices, including fire suppression, have likely contributed to these unprecedented beetle densities as well as to the expansion of its range and host species. Because the mountain pine beetle is novel to boreal ecosystems, long-term effects on these forests are uncertain.

Range: CNVC00091 occurs in the Rocky Mountain foothills of Alberta and the boreal plains of northeastern British Columbia.

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: Alberta, British Columbia

Terrestrial Ecozones and Ecoregions of Canada: Boreal Plains: Clear Hills Upland, Peace Lowland, Western Alberta Upland; Montane Cordillera: Eastern Continental Ranges, Northern Continental Divide

Rowe's Forest Regions and Sections of Canada: Boreal: Lower Foothills, Mixedwood, Upper Foothills; Montane: Douglas-fir and Lodgepole Pine; Subalpine: East Slope Rockies

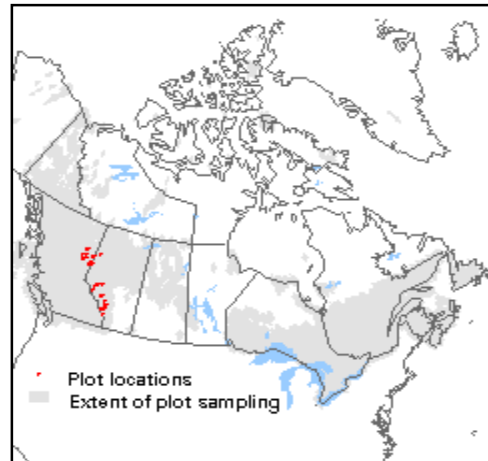
NAAEC CEC Ecoregions of North America (Levels I & II): Northern Forests: Boreal Plains; Northwestern Forested Mountains: Western Cordillera

Nature Conservancy of Canada Ecoregions: Boreal Plains, Canadian Rocky Mountains

Biogeoclimatic Ecosystem Classification of British Columbia (zones and subzones): BWBSmw

British Columbia Ecoregion Classification (ecoregions): Central Alberta Uplands, Liard Basin, Northern Canadian Rocky Mountains, Peace River Basin, Southern Alberta Upland

Natural Regions and Subregions of Alberta: Boreal Forest: Lower Boreal Highlands; Foothills: Lower Foothills, Upper Foothills; Rocky Mountain: Montane



Corresponding Types and Associations

| | | | |
|-----------|------------------|-------------------|---|
| CNVC00091 | British Columbia | BWBSmw /103\$6M.1 | <i>Pinus contorta</i> - <i>Populus tremuloides</i> - <i>Shepherdia canadensis</i> - <i>Leymus innovatus</i> |
| | Alberta | SW/LF/B/03/01 | Aw - Sw - PI / bearberry / hairy wild rye |
| | | SW/MN/B/03/01 | Aw - Sw - PI / bearberry |
| | | SW/UF/B/03/01 | Aw - Sw - PI / bearberry / hairy wild rye |
| | | WC/LF/C/03/01 | Aw - Sw - PI / Canada buffalo-berry / hairy wild rye |
| | | WC/MN/B/04/01 | Aw - Sw - PI / bearberry / hairy wild rye |
| | | WC/UF/C/03/03 | Aw - Sw - PI / hairy wild rye |



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Trembling Aspen – White Spruce – Lodgepole Pine / Downy Lymegrass

Peuplier faux-tremble – Épinette blanche – Pin tordu / Élyme innovant

Vegetation Summary*

| Species Name [†] | Association CNVC00091 | |
|---|--------------------------|----------------------------|
| | 40 plots | |
| | % Cover [‡] | % Presence [^] |
| Overstory Trees | | |
| <i>Populus tremuloides</i> | 21 | 95 |
| <i>Picea glauca</i> | 14 | 90 |
| <i>Pinus contorta</i> | 19 | 73 |
| <i>Populus balsamifera</i> | 4 | 22 |
| Tree Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡] | (22 32 48 67 75) | |
| Understory Woody Shrubs and Regenerating Trees | | |
| <i>Shepherdia canadensis</i> | 6 | 90 |
| <i>Rosa acicularis</i> | 6 | 90 |
| <i>Picea glauca</i> | 7 | 55 |
| <i>Populus tremuloides</i> | 5 | 50 |
| <i>Juniperus communis</i> | 5 | 35 |
| <i>Salix</i> sp. | 2 | 30 |
| <i>Symphoricarpos albus</i> | 3 | 28 |
| <i>Lonicera dioica</i> | 1 | 28 |
| <i>Salix bebbiana</i> | 5 | 25 |
| <i>Amelanchier alnifolia</i> | 3 | 25 |
| <i>Spiraea lucida</i> | 3 | 25 |
| <i>Pinus contorta</i> | 3 | 25 |
| <i>Dasiphora fruticosa</i> | 6 | 22 |
| Shrub Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡] | (10 16 30 38 58) | |
| Understory Herbs and Dwarf Shrubs | | |
| <i>Leymus innovatus</i> | 27 | 93 |
| <i>Fragaria virginiana</i> | 4 | 93 |
| <i>Lathyrus ochroleucus</i> | 3 | 80 |
| <i>Arctostaphylos uva-ursi</i> | 14 | 75 |
| <i>Galium boreale</i> | 1 | 75 |
| <i>Linnaea borealis</i> | 7 | 68 |
| <i>Symphyotrichum ciliolatum</i> | 2 | 63 |
| <i>Vicia americana</i> | 1 | 55 |
| <i>Chamerion angustifolium</i> | 4 | 52 |
| <i>Eurybia conspicua</i> | 3 | 52 |
| <i>Orthilia secunda</i> | 1 | 50 |
| <i>Pyrola asarifolia</i> | 2 | 47 |
| <i>Arnica cordifolia</i> | 2 | 43 |
| <i>Achillea millefolium</i> | 1 | 43 |
| <i>Cornus canadensis</i> | 5 | 40 |
| <i>Hedysarum alpinum</i> | 4 | 32 |



***Populus tremuloides* – *Picea glauca* – *Pinus contorta* / *Leymus innovatus* CNVC00091**

Vegetation Summary (cont'd)*

| Species Name [†] | Association CNVC00091 | |
|--|--------------------------|----------------------------|
| | % Cover [‡] | % Presence [^] |
| <i>Anticlea elegans</i> | 3 | 32 |
| <i>Castilleja miniata</i> | 1 | 32 |
| <i>Mertensia paniculata</i> | 2 | 30 |
| <i>Vaccinium vitis-idaea</i> | 8 | 28 |
| <i>Anemone multifida</i> | 2 | 28 |
| <i>Petasites frigidus</i> | 5 | 25 |
| <i>Pyrola chlorantha</i> | 1 | 25 |
| <i>Rubus pubescens</i> | 4 | 22 |
| <i>Maianthemum canadense</i> | 2 | 22 |
| <i>Maianthemum stellatum</i> | 1 | 22 |
| <i>Viola renifolia</i> | 1 | 22 |
| Herb Stratum Cover (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡] | (36 43 68 96 100) | |
| Bryophytes and Lichens | | |
| <i>Hylocomium splendens</i> | 14 | 55 |
| <i>Pleurozium schreberi</i> | 11 | 50 |
| <i>Peltigera aphthosa</i> | 1 | 35 |
| <i>Peltigera canina</i> | 1 | 28 |
| <i>Ptilium crista-castrensis</i> | 11 | 25 |
| Bryo-Lichen Stratum Cover | | |
| (P₁₀ P₂₅ Mean P₇₅ P₉₀)[‡] | (1 2 19 27 62) | |

* 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
CNVC00091

40 plots

Elevation Range (min–mean–max meters)

640–1115–1760
missing data (15)

Slope Gradient (% frequency)

steep (15)
moderately steep (5)
moderate (10)
gentle (20)
level (45)
missing data (5)

Aspect (% frequency)

north (18)
east (13)
south (38)
west (18)
level (10)
missing data (5)

Meso Topoposition (% frequency)

crest / upper (13)
mid (10)
lower / toe (18)
level (20)
missing data (40)

Moisture Regime (% frequency)

dry (15)
mesic (60)
moist (3)
missing data (23)

Nutrient Regime (% frequency)

poor (5)
medium (58)
rich (10)
missing data (28)



***Populus tremuloides* – *Picea glauca* – *Pinus contorta* / *Leymus innovatus* CNVC00091**

Site / Soil Characteristics (cont'd)

Association
CNVC00091

Soil Parent Material (% frequency)

colluvium (8)
eolian (23)
moraine / till (25)
fluvial (10)
glaciofluvial (15)
lacustrine (5)
glaciolacustrine (8)
missing data (8)

Soil Rooting Zone Substrate (% frequency)

non-soil (8)
sandy (8)
coarse loamy (18)
fine loamy (15)
silty (13)
clayey (10)
missing data (30)

Root Restricting Depth (% frequency)

≥ 100 cm (5)
missing data (95)

Humus Form (% frequency)

mor (35)
moder (3)
mull (3)
missing data (60)



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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:

CNVC00087 [*Populus tremuloides* / *Leymus innovatus*] is a similar hardwood Association that occurs on comparable boreal sites in the same range and has a canopy of almost pure *Populus tremuloides*.

CNVC00092 [*Populus tremuloides* – *Pinus contorta* / *Rhododendron groenlandicum* / *Leymus innovatus* – *Vaccinium vitis-idaea* / *Hylocomium splendens*] occurs on similar, but cooler boreal sites in the same range and has greater abundance of *Rhododendron groenlandicum*, *Vaccinium myrtilloides* and *V. vitis-idaea* in the shrub layers and a better developed moss layer.

CNVC00095 [*Populus tremuloides* – *Picea glauca* / *Rosa acicularis* – *Viburnum edule*] occurs on comparable boreal sites in the same range. It has lower constancy of *Pinus contorta* in the overstory and greater shrub and herb diversity without the abundance of *Leymus innovatus* that helps to characterize CNVC00091.

CNVC00104 [*Picea glauca* (*Pinus contorta*) / *Shepherdia canadensis* / *Leymus innovatus* / *Hylocomium splendens*] is a similar conifer Association that occurs on comparable boreal sites in the same range.

CNVC00121 [*Pinus contorta* / *Shepherdia canadensis* / *Leymus innovatus*] is a similar conifer Association that occurs on comparable boreal sites in the same range.

CNVC00322 [*Pinus contorta* – *Picea mariana* / *Vaccinium membranaceum* / *Pleurozium schreberi*] occurs on comparable sites in the same range and usually has *Picea mariana* codominant in the canopy, abundant *Rhododendron groenlandicum* and *Vaccinium membranaceum* in the shrub layer and less *Leymus innovatus* in the herb and dwarf shrub layer.

CNVC00337 [*Picea glauca* (*Pinus contorta*) / *Arctostaphylos uva-ursi* – *Leymus innovatus*] is a similar conifer Association that occurs on comparable boreal sites in the same range.

Related United States National Vegetation Classification Associations:

Relationships with Other Classifications:

Comments

The Alberta Montane ecosite phases SW/MN/B31 and WC/MN/B41 are classified as CNVC00091 because they are ecologically similar to and not floristically distinguishable from comparable Lower and Upper Foothills units (see Distribution).

Pinus contorta here refers to var. *latifolia* (lodgepole pine).



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Source Information

Number of source plots for CNVC00091: 40

Information Sources:

Alberta Environment and Parks. 2014. Ecological Site Information System (ESIS). Govt. AB, Edmonton, AB.

Biogeoclimatic Ecosystem Classification Program of British Columbia. 2011. BECMaster ecosystem plot database [VPro13/MSAccess 2010 format]. W.H. MacKenzie (ed.) B.C. Min. For., Lands, and Nat. Res. Ops., Smithers, BC. Available: www.for.gov.bc.ca/hre/becweb/resources/information-requests (accessed: June 2015).

Concept Authors: L. Allen, J. Archibald, K. Baldwin, K. Chapman, W. MacKenzie, D. Meidinger

Description Authors: K. Chapman, D. Downing and K. Baldwin

Date of Concept: March, 2012

Date of Description: July, 2016

Classification References:

Archibald, J.H.; Klappstein, G.D.; Corns, I.G.W. 1996. Field guide to ecosites of southwestern Alberta. Nat. Resour. Can., Can. For. Ser., North. For. Cent., Edmonton, AB. Spec. Rep. 8.

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Characterization References:

Abrahamson, I. 2015. *Picea glauca*. 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/picgla/all.html> (accessed: October 2, 2015).

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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.

Hildahl, V.; Campbell, A.E. 1975. Forest tent caterpillar in the prairie provinces. Canadian Forestry Service, Northern Forestry Centre, Edmonton, AB. Inf. Rep. NOR-X-135.

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).

Kenkel, N.C.; Walker, D.J.; Watson, P.R.; Caners, R.T.; Lastra, R.A. 1997. Vegetation dynamics in boreal forest ecosystems. *Coenoses* 12(2-3):97-108.

Nealis, V.G.; Cooke, B. J. 2014. Risk assessment of the threat of mountain pine beetle to Canada's boreal and eastern pine forests. Nat. Resour. Can., Can. Coun. For. Min., Forest Pest Working Group, CA.



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Characterization References (cont'd):

Peters, V.S.; Macdonald, E.; Dale, M.R.T. 2006. Patterns of initial versus delayed regeneration of white spruce in boreal mixedwood succession. *Can. J. For. Res.* 36:1597-1609.

Safranyik, L.; Wilson, B. (eds.). 2006. The mountain pine beetle: a synthesis of biology, management and impacts on lodgepole pine. *Pac. For. Centre, Can. For. Serv., Nat. Resour. Can., Victoria, BC.*

Stockdale, C. 2014. Fire regimes of western boreal Canada and the foothills of Alberta. A discussion document and literature review for the LANDWEB Project.

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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