Forest / Forêt **Association CNVC00031**

Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Hylocomium splendens (Rhytidiadelphus triquetrus)

Douglas-fir - Western Hemlock (Western Redcedar) / Stairstep Moss (Electified Cat's-tail Moss)

Douglas de Menzies - Pruche de l'Ouest (Thuya géant) / Hypne éclatante (Hypne triquètre)

Subassociations: none
CNVC Alliance: not yet determined
CNVC Group: not yet determined

Type Description

Concept: CNVC00031 is an endemic, mature to old, coniferous forest association that occurs on a variety of mesic sites with medium to poor soil nutrient regimes within submaritime and subcontinental areas of southwestern British Columbia. Elevations range from 30 to 1000 mASL. It typically has a fairly closed forest canopy, a poor to well developed shrub layer dominated by regenerating conifers, a moderately developed herb layer with scattered forbs, and a moderately well-developed moss layer. The dominant trees are Douglas-fir (*Pseudotsuga menziesii*) and western hemlock (*Tsuga heterophylla*), which occur in the canopy with a moderate amount of western redcedar (*Thuja plicata*). In addition to regenerating hemlock and cedar, the main shrub species is Oregon boxleaf (*Paxistima myrsinites*). The herbs are mostly common pipsissewa (*Chimaphila umbellata*), twinflower (*Linnaea borealis*) and Menzies' rattlesnake-plantain (*Goodyera oblongifolia*). Stairstep moss (*Hylocomium splendens*), pipecleaner moss (*Rhytidiopsis robusta*) and electified cat's-tail moss (*Rhytidiadelphus triquetrus*) dominate the forest floor. Forest harvesting has significantly reduced the old forest occurrences of this association and it is considered imperilled in British Columbia.

Vegetation: The canopy of CNVC00031, a mature to old, coniferous forest association, is characterized by a high cover of *Pseudotsuga menziesii* and *Tsuga heterophylla* with moderate cover of *Thuja plicata*. The poor to well developed shrub layer comprises mostly regenerating *Thuja plicata* and *Tsuga heterophylla*, often with *Paxistima myrsinites*. The moderately developed herb layer consists mainly of *Chimaphila umbellata* and *Linnaea borealis*, with very low cover of *Goodyera oblongifolia* and often *Pyrola asarifolia* and *Orthilia secunda*. *Clintonia uniflora*, when present, can be of moderate cover. The moderately well-developed moss layer is characterized by *Hylocomium splendens*, *Rhytidiopsis robusta*, and *Rhytidiadelphus triquetrus*, often with *Pleurozium schreberi* and *Eurhynchium oreganum*.

Environment: CNVC00031 is the zonal association of dry, submaritime to subcontinental climates in the Coast Mountains of British Columbia. It occurs on a variety of mesic sites with medium to poor soil nutrient regimes. Although it mostly occurs at elevations below 650 m, it can be found up to 1000 mASL. Slope gradients, slope positions, and parent materials are varied. Soils are mostly medium to coarse-textured and have mor humus forms. Soils are typically classified as either Humo-Ferric Podzols or Dystric Brunisols.

Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Hylocomium splendens (Rhytidiadelphus triquetrus) CNVC00031

Type Description (cont'd)

Dynamics: CNVC00031 is a late successional (mature and climax) forest association. Stands originate from infrequent stand-replacing fires (perhaps every few hundred years) or windthrow. Within mature and old forests, small gaps result from the death of single trees or small groups of trees due to root diseases, bark beetles, or windthrow. Gap dynamics in old forests can result in an all-age stand structure. Hemlock dwarf mistletoe (*Arceuthobium tsugense*) is of moderate risk to *Tsuga heterophylla*; it can significantly reduce growth and stress the trees, thereby making them more susceptible to other forest pests or pathogens. Two root diseases are particular problems: Armillaria root disease (*Armillaria ostoyae*) to *Pseudotsuga menziesii* and *Tsuga heterophylla*; and laminated root disease (*Phellinus weirii*) to *P. menziesii*. In the southern portion of the range of this association, Douglas-fir beetle (*Dendroctonus pseudotsugae*) and western spruce budworm (*Choristoneura occidentalis*) can cause mortality to *P. menziesii*. Forest harvesting has significantly reduced the occurrence of old to very old stands of CNVC00030 on the landscape.

Range: CNVC00031 occurs at low to mid elevations in the eastern Coast Mountains of British Columbia from east and north of Chilliwack, northward to the lower Klinaklini, Bella Coola, Talchako, and Dean valleys. CNVC00031 is a Canadian endemic association.

Conservation Status (NatureServe)

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

Forest / Forêt **Association CNVC00031**

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Distribution

Countries: Canada

Provinces / Territories / States: British Columbia

Terrestrial Ecozones and Ecoregions of Canada: Pacific Maritime: Coastal Gap, Pacific Ranges

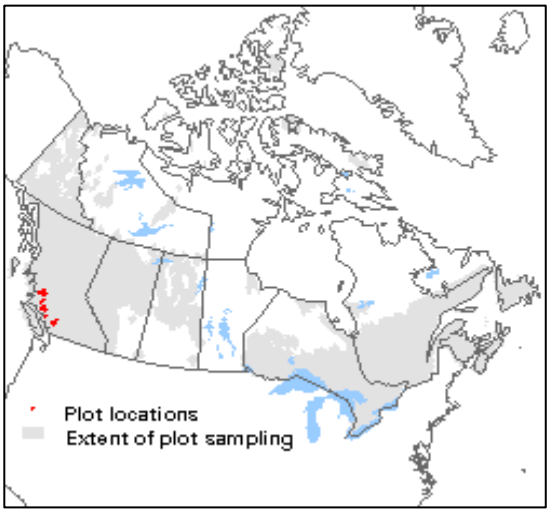
Rowe's Forest Regions and Sections of Canada: Coast: Southern Pacific Coast

NAAEC CEC Ecoregions of North America (Levels I & II): Marine West Coast Forests

Nature Conservancy of Canada Ecoregions: North Cascades and Pacific Ranges, Coastal Forests and Mountains of Southeast Alaska and B.C.

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

British Columbia Ecoregion Classification (ecoregions and ecosections): Pacific Ranges: Northern Pacific Ranges, Central Pacific Ranges, Eastern Pacific Ranges; Coastal Gap: Kimsquit Mountains



Corresponding Types and Associations

CNVC00031	British Columbia	CWHds 1 /01	Western Hemlock - Douglas-fir Cat's-tail Moss
		CWHds 2 /01	Western Hemlock - Douglas-fir Cat's-tail Moss

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Vegetation Summary*

	Association CNVC00031 40 plots	
Species Name†	% Cover±	% Presence^
Overstory Trees		
Pseudotsuga menziesii	**35**	**98**
Thuja plicata	**15**	**88**
Tsuga heterophylla	**42**	**77**
Betula papyrifera	5	32
Tree Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(49 60 68 80 89)**	
Understory Woody Shrubs and Regenerating Trees		
Tsuga heterophylla	12	65
Thuja plicata	9	65
Paxistima myrsinites	9	60
Vaccinium parvifolium	7	47
Vaccinium membranaceum	5	45
Rosa gymnocarpa	2	45
Acer glabrum	3	35
Mahonia nervosa	15	25
Acer circinatum	5	25
Menziesia ferruginea	2	25
Pseudotsuga menziesii	5	22
Amelanchier alnifolia	1	22
Shrub Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(4 10 35 50 73)**	
Understory Herbs and Dwarf Shrubs		
Goodyera oblongifolia	1	85
Chimaphila umbellata	5	82
Linnaea borealis	9	75
Orthilia secunda	2	57
Pyrola asarifolia	2	50
Clintonia uniflora	9	47
Pteridium aquilinum	2	35
Cornus canadensis	2	32
Polystichum munitum	2	30
Pyrola picta	1	25
Trientalis borealis	4	22
Viola orbiculata	2	22
Rubus ursinus	1	22
Tiarella trifoliata	1	22

Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Hylocomium splendens (Rhytidiadelphus triquetrus) CNVC00031

Vegetation Summary (cont'd)*

Species Name†	Association CNVC00031 % Cover±	% Presence^
Herb Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(1 3 20 29 45)**	
Bryophytes and Lichens		
Hylocomium splendens	**28**	**95**
Rhytidiadelphus triquetrus	**12**	**73**
Rhytidiopsis robusta	12	65
Pleurozium schreberi	18	43
Eurhynchium oreganum	10	43
Rhytidiadelphus loreus	6	38
Mnium spinulosum	1	25
Dicranum fuscescens	1	22
Peltigera aphthosa	1	22
Bryo-Lichen Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(21 39 63 90 96)**	

* 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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Site / Soil Characteristics

	Association CNVC00031
	40 plots
Elevation Range (min–mean–max meters)	
	30–410–960
Slope Gradient (% frequency)	
	very steep (3)
	steep (28)
	moderately steep (28)
	moderate (5)
	gentle (15)
	level (20)
	missing data (3)
Aspect (% frequency)	
	north (25)
	east (15)
	south (23)
	west (25)
	level (8)
	missing data (5)
Meso Topoposition (% frequency)	
	crest / upper (15)
	mid (45)
	lower / toe (13)
	level (10)
	missing data (18)
Moisture Regime (% frequency)	
	mesic (93)
	missing data (8)
Nutrient Regime (% frequency)	
	poor (48)
	medium (43)
	rich (5)
	missing data (5)

Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Hylocomium splendens (Rhytidiadelphus triquetrus) CNVC00031

Site / Soil Characteristics (cont'd)

	Association CNVC00031
Soil Parent Material (% frequency)	
	colluvium (18)
	eolian (3)
	moraine / till (8)
	fluvial (18)
	glaciofluvial (10)
	organic (3)
	missing data (43)
Soil Rooting Zone Substrate (% frequency)	
	non-soil (18)
	sandy (28)
	coarse loamy (45)
	fine loamy (3)
	organic (5)
	missing data (3)
Root Restricting Depth (% frequency)	
	0 – 20 cm (3)
	21 – 99 cm (25)
	missing data (73)
Humus Form (% frequency)	
	mor (78)
	moder (18)
	missing data (5)

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Additional Characteristics

Species of High Conservation Concern:

Non-native Species:

Management Issues:

Type Statistics

Internal Similarity:

Confidence: high

Strength:

Related Concepts

Similar CNVC Associations: CNVC00030 *Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Paxistima myrsinites - Vaccinium membranaceum / Rhytidiopsis robusta*

Related United States National Vegetation Classification Associations: CEGL002828 *Pseudotsuga menziesii - Tsuga heterophylla - Thuja plicata / Chimaphila umbellata / Rhytidiopsis robusta* Forest (also ms1/03- part of CNVC00030)

Relationships with Other Classifications:

Comments

This association is considered imperilled in British Columbia due to forest harvesting, and some urban and agricultural development. Although protected in some provincial parks, e.g., Tweedsmuir, Homathko, Mehatl, Chilliwack Lake, Skagit Valley, Garibaldi, and Birkenhead Lake, additional protection is required for this formerly widespread association. Old forest occurrences outside parks are small and fragmented in a matrix of younger forest.

CNVC00031 is similar to CNVC00030 [*Pseudotsuga menziesii - Tsuga heterophylla (Thuja plicata) / Paxistima myrsinites - Vaccinium membranaceum / Rhytidiopsis robusta*], which occurs in the same submaritime / subcontinental climatic areas of British Columbia, but on drier sites in slightly moister climates. It has more content of *Abies* spp. (*A. amabilis*, *A. lasiocarpa*), *Vaccinium membranceum* and *Paxistima myrsinites*, and less *Rhytidiadelphus triquetrus* than CNVC00031.

Source Information

Number of source plots for CNVC00031: 40

Information Sources: British Columbia Ministry of Forests and Range, Research Branch BECMaster database, October 2007 (40 plots)

Concept Authors: K. Klinka, J. Pojar and D. Meidinger

Description Authors: D. Meidinger and K. Baldwin

Date of Concept: 1991

Date of Description: June, 2011

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Classification References:
British Columbia Ministry of Forests and Range, Research Branch. 2007. Vegetation classification hierarchy: BECMaster database (October 2007). B.C. Min. For., Victoria, BC.

Meidinger, D.; Chappell, C.; Cadrin, C.; Kittel, G.; McCain, C.; Boggs, K.; Kagan, J.; Cushon, G.; Banner, A.; DeMeo, T. 2005. International vegetation classification of the Pacific Northwest: International correlation of temperate coastal forest plant associations of Oregon, Washington, British Columbia and Alaska. Contributors: B.C. Ministry of Forests, USDA Forest Service, B.C. Conservation Data Centre, Alaska Natural Heritage Program, Washington Natural Heritage Program, Oregon Natural Heritage Information Center.

Characterization References:
British Columbia Conservation Data Centre. 2011. B.C. Species and Ecosystems Explorer. B.C. Min. of Environ. Victoria, BC. Available: http://www.env.gov.bc.ca/cdc/access.html (accessed Jun., 2011).

British Columbia Ministry of Forests and Range, Research Branch. 2007. BECMaster database (October 2007). B.C. Min. For., Victoria, BC.

Finck, K.E.; Humphreys, P.; Hawkins, G.V. 1989. Field guide to pests of managed forests in British Columbia. Joint publication of For. Can. and B.C. Min. For., ISSN 0843-4719, No. 16.

Green, R.N.; Klinka, K. 1994. A field guide to site identification and interpretation for the Vancouver Forest Region. B.C. Min. For., Res. Branch, Victoria, BC. Land Manage. Handb. No. 28. 285 p.

Muir, J.; Turner, J.; Swift, K. 2004. Coast Forest Region: Hemlock dwarf mistletoe stand establishment decision aid. B.C. Journal of Ecosystems and Management 5(1):7-9. Available: www.forrex.org/jem/2004/vol5/no1/art2.pdf (accessed Oct. 2009).

NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.2. NatureServe. Arlington, VA, USA. Available: http://www.natureserve.org/explorer (accessed Jun., 2011).

Pojar, J.; Flynn, S.; Cadrin, C. 2004. Western Hemlock - Douglas-fir / Electified cat's-tail moss, Tsuga heterophylla - Pseudotsuga menziesii / Rhytidiadelphus triquetrus in: Identified wildlife management strategy, accounts and measures for managing identified wildlife. Available: http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html (accessed 11 Oct. 2009).

Sturrock, R.; Zeglen, S.; Turner, J. 2006. British Columbia's coastal forests: Laminated root rot forest health stand establishment decision aid. B.C. Journal of Ecosystems and Management 7(3):41-43. Available: http://www.forrex.org/publications/jem/ISS38/vol7_no3_art5.pdf (accessed Oct. 2009).

Wong, C.; Sandmann, H.; Dorner, B. 2003. Estimating historical variability of natural disturbances in British Columbia. B.C. Ministry of Forests, Research Branch, Victoria, BC. Land Management Handbook No. 53. Available: http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh53.htm (accessed Oct. 2009).

Zeglen, S.; Hodge, J.; Heppner, D.; Burleigh, J. 2008. Coast Forest Region 2008-10 Coastal Timber Supply Areas Regional Forest Health Overview. B.C. Ministry of Forests and Range. 71 p. Available: http://www.for.gov.bc.ca/ftp/HFP/external/!publish/Forest_Health/TSA_FH_Strategies/CFR_FHoverview_v101.pdf (accessed Oct. 2009).

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, see the **Understanding the Factsheet** link at http//cnvc-cnvc.ca.

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