



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

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Rocky Mountain Intermontane Subboreal Forest Forêts subboréales intermontagneuses des Rocheuses

Macrogroup M890

Cool Temperate Forest & Woodland

D194 Rocky Mountain Forest & Woodland

M890 Rocky Mountain Intermontane Subboreal Forest

CM890a Cool Dry Rocky Mountain Subboreal Forest

CM890b Warm Rocky Mountain Subboreal Forest

CM890c Cool Humid Rocky Mountain Subboreal Forest

M020 Rocky Mountain Subalpine – High Montane Forest

M500 Central Rocky Mountain Mesic Lower Montane Forest

M501 Central Rocky Mountain Dry Lower Montane – Foothill Forest



Concept

M890 describes the upland subboreal forests and woodlands of the intermontane plateau areas of central British Columbia. Forest canopies can be evergreen coniferous, cold-deciduous broad-leaved, or a conifer – broad-leaved mixture. Stand-replacing fires and insect infestations are the most widespread forms of natural disturbance throughout the range of M890. Dominant tree species are interior spruce (*Picea engelmannii* x *glauca*), subalpine fir (*Abies lasiocarpa*) and lodgepole pine (*Pinus contorta* var. *latifolia*). Rocky Mountain Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) co-occurs in warmer locations. Black spruce (*Picea mariana*) sometimes occurs, primarily on poor sites with cold soils. Trembling aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*) commonly occur following disturbance and often dominate near settlements and in agricultural areas. Understories vary from dense, species-rich shrub and herb conditions to poorly developed shrub and herb layers with continuous feathermoss and/or lichen ground cover. Understory species diversity is generally high. Common understory shrubs include prickly rose (*Rosa acicularis*), shiny-leaved meadowsweet (*Spiraea lucida*), bracted honeysuckle (*Lonicera involucrata*), mountain huckleberry (*Vaccinium membranaceum*), squashberry (*Viburnum edule*), bristly black currant (*Ribes lacustre*) and soapberry (*Shepherdia canadensis*). Typical herb/dwarf shrub species include bunchberry (*Cornus canadensis*), twinflower (*Linnaea borealis*), one-sided wintergreen (*Orthilia secunda*), fireweed (*Chamerion angustifolium*) and arnicas (*Arnica* spp.). The most common moss species are red-stemmed feathermoss (*Pleurozium schreberi*), knight's plume moss (*Ptilium crista-castrensis*) and staircase moss (*Hylocomium splendens*).

M890 occurs within a subhumid, mostly continental, temperate climate, with short, warm summers and cool, snowy winters. Local climatic effects significantly modify seasonal temperature extremes and annual precipitation in some portions of the range. As a result, mean annual temperatures (-0.5°C to 4.5°C) and precipitation (<350 mm to >1500 mm) are highly variable throughout the range. Up to half of the annual precipitation falls as snow. M890 forests occupy the lower elevations of the plateaus and lowlands of the southern interior system of the Cordilleran physiographic region, from the valley bottoms to the lower boundary of the high montane zone in surrounding mountain ranges (approximately 450-1500 mASL). Regional geologic and topographic features produce an array of local site conditions. All parts of the range experienced Pleistocene glaciation; soils are mostly Luvisols and Brunisols developed in glacial surficial materials.

Three subtypes distinguish regional variation within this Macrogroup. Subtype CM890a [Cool Dry Rocky Mountain Subboreal Forest] characterizes the lodgepole pine dominated forests that prevail in the dry, cool climate of the southwestern portion of the range. CM890b [Warm Rocky Mountain Subboreal Forest] characterizes the mixed lodgepole pine – interior spruce – Douglas-fir forests that occur in warmer areas of the central and southeastern portions of the range. CM890c [Cool Humid Rocky Mountain Subboreal Forest] characterizes the subalpine fir – interior spruce forests that occur in moist to wet climates primarily of the northern portion of the range.



Lodgepole pine (*Pinus contorta* var. *latifolia*) dominated forest with interior spruce (*Picea engelmannii* x *glauca*) and trembling aspen (*Populus tremuloides*), near Burns Lake, British Columbia. Note high pine mortality from mountain pine beetle (*Dendroctonus ponderosae*) outbreak.
Source: W. MacKenzie, British Columbia Forest Service



Interior spruce (*Picea engelmannii* x *glauca*) – lodgepole pine (*Pinus contorta* var. *latifolia*) stand with open understory dominated by low forbs (e.g., *Cornus canadensis*) and feathermosses (e.g. *Pleurozium schreberi*). Naglico Hills, British Columbia.
Source: British Columbia Forest Service



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Vegetation

Physiognomy and Structure

M890 includes mainly closed upland forests, although open forests and woodlands are sometimes associated with very dry sites or very dry climates. Subboreal riparian and wetland forests and woodlands within the range of M890 are described by M034 [Rocky Mountain-Great Basin Montane Riparian & Swamp Forest]. Forest canopies are typically evergreen coniferous, sometimes composed of just one tree species but more often of mixed species composition. Cold-deciduous broad-leaved ("hardwood") species often intermingle with, and sometimes dominate, the conifers. Understory structure varies from dense to sparse, and is usually dominated by cold-deciduous broad-leaved shrubs, conifer regeneration and perennial herbs. The moss layer is typically well developed, especially under conifer canopies. These forests are subject to regular stand replacement or significant modification by wildfire and insect outbreaks, especially in the climatically drier portions of the range, creating a diverse landscape mosaic comprising stands of varying age and composition. Post-fire stand structure is simple, but generally becomes multi-storied as succession proceeds. Fire cycles are shorter and insect outbreaks more frequent in subtypes CM890a [Cool Dry Rocky Mountain Subboreal Forest] and CM890b [Warm Rocky Mountain Subboreal Forest]; stands are often even aged, with simple structure in CM890a but in CM890b, old fire-surviving individuals of *Pseudotsuga menziesii* (see Comments) tower above some stands, resulting in multi-storied, multi-aged structures. Stands of CM890c [Cool Humid Rocky Mountain Subboreal Forest], where fire cycles are longer, are frequently multi-aged with two-storied structure.

Floristics

The main tree species of M890 forests are *Pinus contorta* (see Comments), *Picea engelmannii x glauca*, *Abies lasiocarpa* (see Comments) and *Populus tremuloides*. While all of these species occur throughout the full range, only *Picea engelmannii x glauca* and *Pinus contorta* are consistently present in the forest overstory, often as dominant species. *Abies lasiocarpa* occurs in fire-sheltered locations throughout the range, but is most common in more humid (typically snowy) areas where fire cycles are longer (especially subtype CM890c [Cool Humid Rocky Mountain Subboreal Forest]). *Populus tremuloides* and, less commonly, *Betula papyrifera* occur in most parts of the range following disturbance and are often prevalent near settlements and in agricultural areas. Both species are most common in the warmer conditions of subtype CM890b [Warm Rocky Mountain Subboreal Forest]. When present, *Pseudotsuga menziesii* is characteristic of CM890b, with old trees often persisting in stands for hundreds of years. *Picea mariana* is found in some nutrient-poor forests in the northern part of the range, especially on cold soils. Tree species are distributed on the landscape in response to both environmental and historic factors; climate, site moisture and nutrients, and fire frequency are important determinants of stand composition. Of the major tree species, *P. contorta*, *P. tremuloides*, *B. papyrifera* and, to a lesser extent, *P. menziesii* are adapted to regenerate following stand-replacing fire, forming both pure and mixed stands.

Across the range of M890, *P. contorta* is normally the most successful early seral species on dry to mesic, nutrient-poor to medium sites. In the colder, drier climate of CM890a [Cool Dry Rocky Mountain Subboreal Forest], where fire is frequent on the landscape and *P. tremuloides* is less common, *P. contorta* dominates all sites following stand-replacing fire, forming extensive even-aged stands. Hardwood and conifer-hardwood stands are most common in CM890b where *P. contorta* and *P. tremuloides* often form even-aged, early seral mixed stands following fire, especially on mesic to moist sites. *B. papyrifera* is also more frequent in CM890b, occurring most frequently on moist, rich sites.

Picea engelmannii x glauca is generally common in mid- to late seral stands on mesic to moist sites, however where fire cycles are shorter it occurs most frequently on moist sites. *P. engelmannii x glauca* can establish immediately following fire or other disturbance that exposes mineral soil seedbeds if there is an adequate seed supply. Throughout the range, *P. engelmannii x glauca* also seeds into existing early seral stands, especially of *P. contorta* or *P. tremuloides*, persisting in the understory due to its shade tolerance and eventually growing into the main canopy where, in the absence of fire for extended periods (approximately >100 years), it can dominate uneven-aged stands with various species mixes.

Abies lasiocarpa is a late seral species that can either invade existing early or mid-seral stands by seeding in from surrounding areas or maintain itself within stands where it is already established. Unlike *P. engelmannii x glauca*, seeds of *A. lasiocarpa* are able to germinate and survive on seedbeds of litter, moss and thick humus. *A. lasiocarpa* is highly shade tolerant, so seedlings persist under closed canopy conditions for many years. *A. lasiocarpa* is prevalent as a canopy dominant or co-dominant, usually in uneven-aged mid- to late seral stands with *P. engelmannii x glauca*, on all but the poorest sites in subtype CM890c, reflecting cool, humid (typically snowy) climates and a long (270-500 years) to very long (>500 years) fire cycle.

Pseudotsuga menziesii is a long-lived early seral species that is generally restricted to warm aspects in subtype CM890b where it maintains itself by regenerating from seed in existing stands or in post-fire stands where mineral soil seedbeds are exposed. With its thick bark, it is somewhat resistant to moderate-intensity surface fires and old individuals ("veterans") can persist in stands for long periods, often as canopy emergents.

Understory species diversity within M890 forests and woodlands is relatively high. Common species include *Rosa acicularis*, *Spiraea lucida*, *Vaccinium membranaceum*, *Shepherdia canadensis*, *Cornus canadensis*, *Linnaea borealis*, *Orthilia secunda*, *Chamerion angustifolium*, *Arnica cordifolia*, *Fragaria virginiana*, *Vaccinium caespitosum* and *Pyrola chlorantha*. *Lonicera involucrata* and *Ribes lacustre* are characteristic of moist, nutrient-rich sites. Feathermoss carpets are typically dominated by *Pleurozium schreberi*, usually in association with *Ptilium crista-castrensis*, *Hylocomium splendens* and *Dicranum polysetum*. On dry sites, especially under open canopies, ground lichens (especially *Cladonia* and *Cladina* spp.) are prevalent.



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Floristics (cont'd)

Plant species composition and relative abundance vary among subtypes. Species diversity is lowest in the dry, cool climate of CM890a, which lacks many species of the warmer and moister areas of the Macrogroup. *Juniperus communis* and *Arctostaphylos uva-ursi*, characteristic of dry sites, commonly occur in CM890a. Ground lichens, mostly *Cladina* spp., *Cladonia* spp., *Stereocaulon* spp. and *Peltigera* spp., occur frequently and even dominate over *P. schreberi* on many sites. *Shepherdia canadensis* is more common in CM890a than in the other subtypes. *Calamagrostis rubescens* is often abundant in the southern portion of the CM890a range, and on dry, warm sites in the central range. *Viburnum edule*, *Rubus parviflorus*, *Maianthemum racemosum*, *Aralia nudicaulis*, *Clintonia uniflora*, *Osmorhiza berteroi* and *Rubus pubescens*, common in the other subtypes, are infrequent in CM890a.

Subtype CM890b occurs in warmer climates and on warm sites in cooler climates and is characterized by varying amounts of *Pseudotsuga menziesii* and higher constancies of associated species such as *Amelanchier alnifolia*, *Acer glabrum*, *Berberis aquifolium*, *Paxistima myrsinites*, *Aralia nudicaulis*, *Goodyera oblongifolia*, *Chimaphila umbellata* and *Prosartes hookeri*.

Subtype CM890c represents the central concept of this Macrogroup. Species diversity is highest in these forests, including all typical species noted above, as well as some species characteristic of a cooler, moister climate (e.g., *Rubus pedatus*, *Tiarella trifoliata*, *Streptopus* spp. and *Veratrum viride*). *Oplopanax horridus* occurs on moist, nutrient-rich sites in CM890c, and even on circum-mesic sites in the wettest climates. *Gymnocarpium dryopteris*, *Dryopteris expansa*, *Athyrium filix-femina* and other ferns are common on moist sites.

Dynamics

Environmental site characteristics, plant species autecology, seed/propagule availability, and disturbance history (i.e., type, severity and frequency) influence secondary succession trends within the forests of M890. Stand-replacing fires and insect infestations are the most widespread forms of natural disturbance throughout the range. Stand conditions that are characteristic of shorter fire cycles, including prominence of *Pinus contorta*, *Populus tremuloides* and *Pseudotsuga menziesii*, are described by subtypes CM890a [Cool Dry Rocky Mountain Subboreal Forest] & CM890b [Warm Rocky Mountain Subboreal Forest]. Fires vary considerably in extent, with large fires possible in any part of the range despite modern fire suppression practices. Burn severity is variable within each fire, so a spatial mosaic of burned and residual patches is typical on the post-fire landscape. Fires are much less frequent in forests described by subtype CM890c [Cool Humid Rocky Mountain Subboreal Forest], where humid climatic conditions create a generally moist environment and longer fire cycles. These forests have a higher proportion of late seral stands, characterized by prevalence of *Abies lasiocarpa* and *Picea engelmannii x glauca*, and show a greater influence of gap dynamics, especially from localized windthrow and insect/disease mortality. Forest harvesting, agricultural clearing (at lower elevations) and other industrial activities (e.g., mining) are also significant disturbance factors in some areas.

Site-scale moisture and nutrient status, as well as temperature regime, are important determinants of secondary succession. On mesic to dry sites, post-burn conditions are usually suitable for seed germination and growth of *P. contorta*. On warm sites, *P. tremuloides* and *P. menziesii* are also common early seral species. If seed sources are available, *P. engelmannii x glauca* and *A. lasiocarpa* seed-in from adjacent unburned areas during the mid- to late seral stages and, over time (usually more than 100 years), can grow into the main canopy and eventually become dominant as the early seral species decline. On moist, nutrient-rich sites, intense competition from shrubs and herbs immediately following disturbance limits the availability of microsites suitable for the germination and growth of conifers; root or stump-regenerating hardwood species, such as *P. tremuloides* and *Betula papyrifera*, are less affected by this competition. In the prolonged absence of fire, *A. lasiocarpa* (and to a lesser extent *P. engelmannii x glauca*) self-replaces by gap dynamics when death of mature trees creates canopy openings that release seedlings from the understory. In cases of disturbance other than fire, secondary succession immediately includes *A. lasiocarpa* and *P. engelmannii x glauca* if they were present in the pre-disturbance stand or if seed sources exist nearby. Post-fire stand structure is usually simple and even aged, but multi-storied, multi-aged structure can develop in the absence of fire.

A variety of diseases and insects are endemic to these forests. Typically, mortality is limited to individual or small groups of trees within stands, but occasional broad-scale infestations are capable of creating changes in tree species dominance at both the stand and landscape levels. Lodgepole pine dwarf mistletoe (*Arceuthobium americanum*), red ring rot (*Phellinus pini*), hard pine stem rusts (*Endocronartium harknessii*, *Cronartium* spp.), tomentosus root rot (*Inonotus tomentosus*) and armillaria root disease (*Armillaria ostoyae*) are widespread in forests of M890, causing mortality of young trees and increasing the susceptibility of older trees to windthrow and insect attack.

Mountain pine beetle (*Dendroctonus ponderosae*), spruce beetle (*D. rufipennis*), Douglas-fir beetle (*D. pseudotsugae*) and western balsam bark beetle (*Dryocoetes confusus*) have a history of frequent outbreaks in these forests. High-severity outbreaks of any of these insects are influential in stand development and succession.



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Dynamics (cont'd)

In recent years, mountain pine beetle has caused significant economic and ecological impacts to *Pinus contorta* forests in subboreal British Columbia. Historically, beetle cycles occur every 20-40 years. At low population densities, the insect preferentially attacks and kills older, less vigorous trees, creating canopy gaps. At epidemic levels however, mass attacks can extend over large areas and overwhelm the defenses of vigorously growing immature pines. Climate change and forest management practices, including fire suppression, have likely contributed to these unprecedented beetle densities.

Environment

Climate

M890 forests develop in the intermontane area of central British Columbia (BC) in the lee of the Coast Mountains, where rain shadow effects on moist Pacific air masses create relatively dry to subhumid conditions within the continental temperate climate of interior BC. Temperature extremes are generally more moderate than those of the boreal region to the north and east. Some areas within the range are relatively more humid and some slightly less continental in seasonal temperature variation, depending on orographic effects and prevailing westerly air flows. Overall, summers are relatively short but warm, and winters are cool and snowy.

Mean annual temperatures vary from -0.5°C to 4.5°C. The growing season is short, averaging less than 1000 growing degree days above 5°C (GDD). The frost-free period averages about 80 days, but can be as short as 20 days. Mean annual precipitation is highly variable throughout the range, from <350 mm to >1500 mm (approximately), depending on local orographic effects. Up to half of the annual precipitation falls as snow.

Climatic variation is the primary driver of the vegetation patterns that distinguish the subtype concepts of M890. CM890a [Cool Dry Rocky Mountain Subboreal Forest] tends to reflect cooler and drier conditions than those of the other subtypes (mean annual temperature -0.5°C to 2°C; mean annual precipitation <350 to 550 mm); CM890b [Warm Rocky Mountain Subboreal Forest] typically has warmer average temperatures (mean annual temperature 1.5°C to 4.5°C; mean annual precipitation 500 to 650 mm); CM890c [Cool Humid Rocky Mountain Subboreal Forest] has higher annual precipitation, mostly snowfall (mean annual temperature 1°C to 2.5°C; mean annual precipitation 550 to >1500 mm). In drier areas, CM890a forests receive summer (May – September) precipitation of 200-300 mm and most well-drained sites experience a slight soil moisture deficit. In the moister areas of subtype CM890c, relatively few sites experience a growing season soil moisture deficit.

Physiography, Geology, Topography and Soils

M890 is found primarily within the southern Interior System of the Cordilleran physiographic region of Canada, between the Coast Mountains and the Rocky and Columbia mountain ranges in British Columbia (BC). This area is dominated by the northern Interior Plateau, Fraser Basin and the northern Columbia (Shuswap) Highlands, and is characterized by a series of plateaux and lowlands. Forests of this Macrogroup also occur in the central and southern portions of the Rocky Mountain Trench and finger into valleys of the surrounding mountain ranges, particularly the Rocky Mountains, Cariboo Mountains, southern Omineca Mountains and northern Shuswap Highlands. There are disjunct occurrences in the Stikine and Taku River valleys on the Stikine Plateau in northwestern BC and in the Columbia River valley in southeastern BC.

Depending upon the location, these forests occur from low elevation valley bottoms (as low as 450 mASL) to mid-elevations (as high as 1500 mASL) in mountainous terrain. The core range of subtype CM890a [Cool Dry Rocky Mountain Subboreal Forest] is on the Chilcotin Plateau. Subtype CM890b [Warm Rocky Mountain Subboreal Forest] occurs in the northern Shuswap Highlands, Cariboo Plateau, eastern parts of the Chilcotin Plateau, and lower elevations of the Nechako Plateau and Fraser Basin. Subtype CM890c [Cool Humid Rocky Mountain Subboreal Forest] occurs at higher elevations of the Nechako Plateau and Fraser Basin, in the Rocky Mountain Trench, and in valleys of the Rocky Mountains, Cariboo Mountains and southern Omineca Mountains; CM890c also occurs at low elevations (as low as 100 mASL) in some river valleys (see above) in northwestern BC where the transition from maritime to boreal climates is abrupt.

The terrain of the Cordilleran physiographic region is a complex mixture of high mountains (up to 3000 mASL), plateaux, hill systems, valleys and trenches. The Coast and Omineca Mountains consist predominantly of crystalline igneous and metamorphic rocks, while the rest of the Interior and all of the Eastern Systems of the Cordillera comprise faulted and folded Paleozoic, Mesozoic or Tertiary sedimentary, and often carbonate-rich, rocks. The plateaux of central BC (the primary range of M890) are mostly underlain by geologically recent lava deposits.

The entire range of M890 experienced Pleistocene glaciation. The predominant surficial material is glacial till derived from basaltic bedrock, thus reasonably rich in basic cations. Also found on the plateaux are eskers of coarse-textured glaciofluvial materials and rock knobs with shallow soils. In the mountain valleys, fluvial and glaciofluvial materials occur, along with thin till and colluvial materials on steeper slopes. Several areas were inundated by large lakes at the time of glacial retreat and are now overlain by fine-textured glaciolacustrine materials. Mineral soils are mostly Luvisols in fine-textured parent materials and Brunisols in coarse-textured materials, although Podzols develop in wetter climates. Gleysols occur on moist, poorly drained sites.



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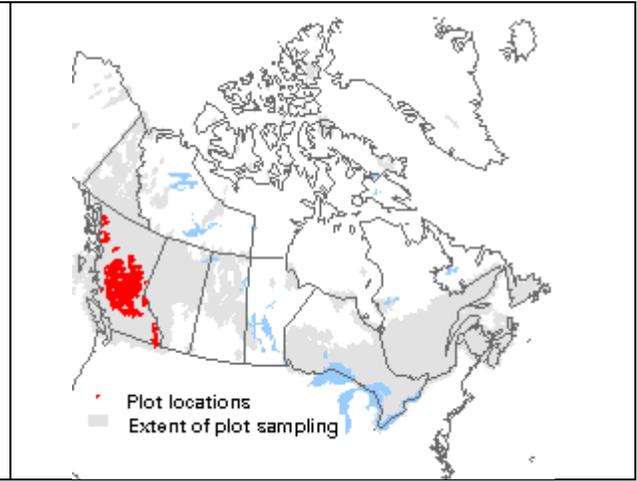
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Distribution and Geographic Range

M890 occurs primarily in the intermontane area of central British Columbia (BC), fingering into valleys of the surrounding mountain ranges. It also occurs in small patches in major river valleys in the lee of the Coast Mountains north to the Taku River, as well as in the Columbia River valley in southeastern BC.



Related Concepts

M890 includes upland forests and woodlands that have been described in provincial publications for the Sub-Boreal Spruce, the Sub-Boreal Pine – Spruce and portions of the Montane Spruce and Interior Douglas-Fir biogeoclimatic zones in British Columbia.

Riparian and wetland forests and woodlands within the range of M890 are described by M034 [Rocky Mountain-Great Basin Montane Riparian & Swamp Forest].

Comments

M890 describes the low elevation subboreal forests and woodlands of the plateau landscapes of central British Columbia. These forests are characterized by general dominance of *Pinus contorta*, *Picea engelmannii* x *glauca*, *Abies lasiocarpa* and *Populus tremuloides* on circum-mesic sites. They are transitional to upland Cordilleran boreal forests, described in M496 [West-Central North American Boreal Forest], which occur to the north and east of the M890 range. *Picea glauca* replaces *P. engelmannii* x *glauca* on circum-mesic sites in M496 forests and *P. mariana* is more prevalent in upland stands. Understories in M890 include species with more southerly distributions (e.g., *Spiraea lucida* and *Rubus parviflorus*).

Low elevation forests of warmer continental climates adjacent to the range of M890 that are dominated by *Thuja plicata* and *Tsuga heterophylla* are described by M500 [Central Rocky Mountain Mesic Lower Montane Forest]. Low elevation forests in drier climates south of the range of M890 that have more extensive *Pseudotsuga menziesii* forests are described by M501 [Central Rocky Mountain Dry Lower Montane – Foothill Forest]. Low elevation forests of maritime temperate climates near the Pacific coast are described by M024 [Vancouverian Coastal Rainforest]. Higher elevation forests within (and surrounding) the range of M890 that are characterized by *Picea engelmannii*, are described by M020 [Rocky Mountain Subalpine – High Montane Forest].

Abies lasiocarpa here refers to both *A. lasiocarpa* (subalpine fir) and *A. bifolia* (Rocky Mountain alpine fir), as well as their hybrids, as recognized by VASCAN.

Pseudotsuga menziesii here refers to variety *glauca* (Rocky Mountain Douglas-fir).

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



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Source Information

Number of Source Plots for M890: 1821 (BECMaster ecosystem plot database [VPro13/MSAccess 2010 format]).

Information Sources (data):

Biogeoclimatic Ecosystem Classification Program of British Columbia. 2015. BECMaster ecosystem plot database [VPro13/MSAccess 2010 format]. W.H. MacKenzie, ed. B.C. Min. For., Lands, and Nat. Resour. Ops., Smithers, BC. Available: www.for.gov.bc.ca/hre/becweb/resources/information-requests. (accessed June 2015). (1821 plots)

Concept Authors: D. Meidinger, W. MacKenzie, K. Baldwin

Description Authors: D. Meidinger and K. Baldwin

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Rocky Mountain Intermontane Subboreal Forest Forêts subboréales intermontagneuses des Rocheuses

Macrogroup M890

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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.

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Rocky Mountain Intermontane Subboreal Forest Forêts subboréales intermontagneuses des Rocheuses

Macrogroup M890

Comparison of Vegetation Characteristics for Rocky Mountain Forest Macrogroups

Lifeform	Species Name	n=2509				n=2627				n=1821				n=5225				
		M500 Mesic Low Montane		M501 Dry Low Montane		M890 Subboreal		M020 Subalpine		M500 Mesic Low Montane		M501 Dry Low Montane		M890 Subboreal		M020 Subalpine		Species Common Name
Tree	<i>Tsuga heterophylla</i>	■ ■ ■ ■ ■																western hemlock
	<i>Thuja plicata</i>	■ ■ ■ ■																western red cedar
	<i>Pinus ponderosa</i>			****														ponderosa pine
	<i>Pseudotsuga menziesii</i> var. <i>glauca</i>	■ ■ ■ ■		■ ■ ■ ■ ■														Rocky Mountain Douglas-fir
	<i>Pinus contorta</i> var. <i>latifolia</i>	****		■ ■ ■ ■														lodgepole pine
	<i>Picea engelmannii</i> x <i>glauca</i>	■ ■ ■		****														interior spruce
	<i>Abies lasiocarpa</i>	■ ■ ■ ■																subalpine fir
	<i>Picea engelmannii</i>																	Engelmann spruce
Shrub	<i>Vaccinium ovalifolium</i>	■ ■ ■																oval-leaved blueberry
	<i>Acer glabrum</i>	■ ■ ■		***														Rocky Mountain maple
	<i>Paxistima myrsinites</i>	■ ■ ■		■ ■ ■														falsebox
	<i>Berberis aquifolium</i>			■ ■														holly-leaved barberry
	<i>Symphoricarpos albus</i>			■ ■ ■														thin-leaved snowberry
	<i>Shepherdia canadensis</i>			■ ■ ■														soapberry
	<i>Spiraea lucida</i>	**		■ ■ ■														shiny-leaved meadowsweet
	<i>Rosa acicularis</i>			■ ■														prickly rose
	<i>Lonicera involucrata</i>																	bracted honeysuckle
	<i>Vaccinium membranaceum</i>	■ ■ ■																mountain huckleberry
	<i>Rhododendron albiflorum</i>																	white-flowered rhododendron
	<i>Menziesia ferruginea</i>	***																false azalea
Herb / Dwarf Shrub	<i>Prosartes hookeri</i>	**																Hooker's fairybells
	<i>Athyrium filix-femina</i>	***																common lady fern
	<i>Gymnocarpium dryopteris</i>	■ ■ ■ ■																common oak fern
	<i>Tiarella trifoliata</i>	■ ■ ■																three-leaved foamflower
	<i>Clintonia uniflora</i>	■ ■ ■																single-flowered clintonia
	<i>Orthilia secunda</i>	■ ■		*														one-sided wintergreen
	<i>Linnaea borealis</i>	■ ■ ■		■ ■ ■														twinflower
	<i>Calamagrostis rubescens</i>			■ ■ ■ ■														pine reedgrass
	<i>Eurybia conspicua</i>			■ ■ ■														western showy aster
	<i>Fragaria virginiana</i>			■														wild strawberry
	<i>Arnica cordifolia</i>			***														heart-leaved arnica
	<i>Rubus pubescens</i>																	dwarf raspberry
	<i>Vaccinium caespitosum</i>																	dwarf bilberry
	<i>Pyrola chlorantha</i>																	green wintergreen
	<i>Chamerion angustifolium</i>																	fireweed
	<i>Cornus canadensis</i>	■ ■ ■																bunchberry
	<i>Rubus pedatus</i>	■ ■ ■																five-leaved dwarf bramble
	<i>Valeriana sitchensis</i>																	Sitka valerian
<i>Vaccinium scoparium</i>																	grouseberry	
<i>Arnica latifolia</i>																	broad-leaved arnica	
Bryophyte / Lichen	<i>Rhytidiopsis robusta</i>	■ ■ ■ ■																pipecleaner moss
	<i>Hylocomium splendens</i>	■ ■ ■ ■		***														stairstep moss
	<i>Pleurozium schreberi</i>	■ ■ ■ ■		■ ■ ■ ■														red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>	■ ■ ■ ■																knight's plume moss
	<i>Cladonia</i> spp.			■ ■														clad and reindeer lichens
	<i>Barbilophozia lycopodioides</i>																	common leafy liverwort

Legend

Constancy:
Black bar >= 50%
Grey bar >= 30%
Asterisk >= 20%

Cover:
5 bars >= 25%
4 bars >= 10%
3 bars >= 3%
2 bars >= 1%
1 bar < 1%



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Rocky Mountain Intermontane Subboreal Forest

Macrogroup M890

Forêts subboréales intermontagneuses des Rocheuses

Comparison of Vegetation Characteristics for Macrogroup Subtypes in M890

Lifeform	Species Name	n=415			n=444			n=962		
		CM890a Cool Dry Subboreal	CM890b Warm Subboreal	M890c Cool Humid Subboreal	CM890a Cool Dry Subboreal	CM890b Warm Subboreal	M890c Cool Humid Subboreal	CM890a Cool Dry Subboreal	CM890b Warm Subboreal	M890c Cool Humid Subboreal
Tree	<i>Pinus contorta</i> var. <i>latifolia</i>	■■■■■	■■■■	■■■■	lodgepole pine					
	<i>Picea engelmannii</i> x <i>glauca</i>	■■■	■■■■	■■■■	interior spruce					
	<i>Abies lasiocarpa</i>	***	■■■■	■■■■	subalpine fir					
	<i>Pseudotsuga menziesii</i> var. <i>glauca</i>		■■■■		Rocky Mountain Douglas-fir					
	<i>Populus tremuloides</i>	**	■■■	***	trembling aspen					
	<i>Betula papyrifera</i>		■■■		paper birch					
Shrub	<i>Juniperus communis</i>	■■■	■■■		common juniper					
	<i>Shepherdia canadensis</i>	■■■	■■■	***	soapberry					
	<i>Spiraea lucida</i>	■■	■■	■■	shiny-leaved meadowsweet					
	<i>Acer glabrum</i>		■■■		Rocky Mountain maple					
	<i>Berberis aquifolium</i>		**		holly-leaved barberry					
	<i>Rubus parviflorus</i>		■■■	■■■	western thimbleberry					
	<i>Sorbus scopulina</i>		■	■	Greene's mountain-ash					
	<i>Viburnum edule</i>		■■	■■	squashberry					
	<i>Lonicera involucrata</i>		■■	■■■	bracted honeysuckle					
	<i>Vaccinium membranaceum</i>	***	■■■	■■■	mountain huckleberry					
	<i>Ribes lacustre</i>		■	■■	bristly black currant					
	<i>Oplopanax horridus</i>			■■■■	devil's club					
Herb / Dwarf Shrub	<i>Arctostaphylos uva-ursi</i>	■■■■			common bearberry					
	<i>Calamagrostis rubescens</i>	■■■■	■■■		pine reedgrass					
	<i>Achillea millefolium</i>	■	*		common yarrow					
	<i>Goodyera oblongifolia</i>	*	■		Menzies' rattlesnake-plantain					
	<i>Chimaphila umbellata</i>		■■		common pipsissewa					
	<i>Prosartes hookeri</i>		***		Hooker's fairybells					
	<i>Aralia nudicaulis</i>		■■■	***	wild sarsaparilla					
	<i>Maianthemum racemosum</i>		■■	■	large false Solomon's seal					
	<i>Clintonia uniflora</i>		■■	■■	single-flowered clintonia					
	<i>Rubus pubescens</i>		■■	■■	dwarf raspberry					
	<i>Osmorhiza berteroi</i>		■	■	mountain sweet cicely					
	<i>Mitella nuda</i>		■	■	naked mitrewort					
	<i>Petasites frigidus</i>		*	■■	arctic sweet coltsfoot					
	<i>Rubus pedatus</i>			■■■	five-leaved dwarf bramble					
	<i>Gymnocarpium dryopteris</i>			■■■■	common oak fern					
	<i>Tiarella trifoliata</i>			■■■	three-leaved foamflower					
	<i>Streptopus amplexifolius</i>			■	clasping-leaved twisted-stalk					
Bryophyte / Lichen	<i>Cladonia</i> spp.	■■■■	■■■	***	clad and reindeer lichens					
	<i>Dicranum</i> spp.	■■■	■■■	■■	wavy-leaved broom moss					
	<i>Pleurozium schreberi</i>	■■■■■	■■■■■	■■■■■	red-stemmed feathermoss					
	<i>Ptilium crista-castrensis</i>	■■■■	■■■■	■■■■	knight's plume moss					
	<i>Hylocomium splendens</i>	***	■■■	■■■■	stairstep moss					
	<i>Rhytidadelphus triquetrus</i>		■■■	■■■	electrified cat's-tail moss					
	Mniaceae		**	■■■	leafy mosses					

Legend

Constancy:
Black bar >= 50%
Grey bar >= 30%
Asterisk >= 20%

Cover:
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3 bars >= 3%
2 bars >= 1%
1 bar < 1%