Wetland **Association CNVC00116**

Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens

Tamarack – Black Spruce / Bog Birch – Glandular Birch / Golden Fuzzy Fen Moss

Mélèze laricin – Épinette noire / Bouleau nain boréal – Bouleau glanduleux / Tomenteuse à feuilles droites

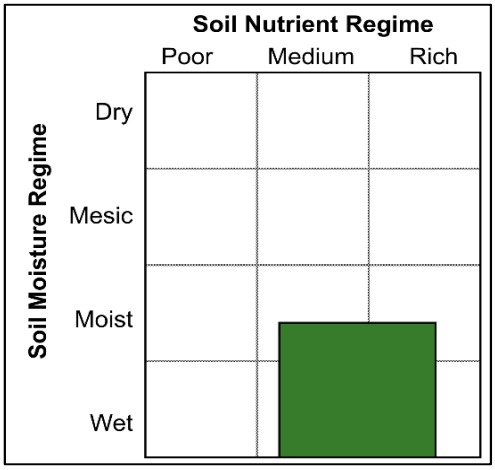
Subassociations: *116a typic, 116b Carex aquatilus*
CNVC Alliance: CA00051 *Picea mariana – Larix laricina / Carex* spp. / *Aulacomnium palustre*
CNVC Group: CG0022 West-Central Boreal Black Spruce – Tamarack Poor – Intermediate Treed Wetland

Type Description

Concept: CNVC00116 is a boreal wetland coniferous woodland Association that ranges from Yukon to Manitoba. It has a sparse tree layer of tamarack (*Larix laricina*) and black spruce (*Picea mariana*) in varying proportions. The well-developed shrub layer has common Labrador tea (*Rhododendron groenlandicum*) and bog birch (*Betula pumila*) or glandular birch (*B. glandulosa*) as dominant shrubs, along with black spruce and tamarack of various ages. The herb and dwarf shrub layer is moderately to well developed and typically includes three-leaved false Solomon's seal (*Maianthemum trifolium*), lingonberry (*Vaccinium vitis-idaea*) and small cranberry (*V. oxycoccos*). Water sedge (*Carex aquatilis*) can be abundant when present. Ribbed bog moss (*Aulacomnium palustre*), golden fuzzy fen moss (*Tomentypnum nitens*) and peat mosses (*Sphagnum* spp.) constitute the well-developed to continuous moss layer. CNVC00116 occurs on wet, nutrient-medium to rich sites in a region with a subhumid boreal climate. Substrates are usually deep (>40cm) organic soils formed from slowly decomposing sedges, *Sphagnum* and brown mosses. Although fire can occasionally occur, this is typically a stable condition that is maintained by a persistently high water table. Local hydrology is the main driver of vegetation dynamics but insect disturbance can also play a role. Two subassociations are recognized, *typic* and *Carex aquatilis*.

Vegetation: CNVC00116 is a coniferous woodland Association with a sparse tree layer of typically stunted (<10m height) *Larix laricina* and *Picea mariana* in varying proportions, from nearly pure stands of one species to equal proportions of both. The shrub layer is well developed and characterized by *Rhododendron groenlandicum, Betula pumila* or *B. glandulosa* (see Comments) and *P. mariana* and *L. laricina* of various ages. The herb and dwarf shrub layer is moderately to well developed, with *Maianthemum trifolium, Vaccinium vitis-idaea* and *V. oxycoccus* common. *Carex aquatilis* can be abundant and high constancy and abundance of this species distinguishes a subassociation of the same name. Less constant species in this layer, such as *Comarum palustre*, *Calamagrostis canadensis, Equisetum fluviatile, Caltha palustris* and *Menyanthes trifoliata,* can be abundant on the wettest, richest sites. A thick, well-developed to continuous moss mat covers the hummocks and depressions. *Tomentypnum nitens* is generally indicative of nutrient-medium to rich conditions; *Aulacomnium palustre* is also constant and abundant, but occurs across a wider nutrient range. *Sphagnum* spp. are common and locally abundant, occupying distinct zones within the hummocky microtopography: *S. fuscum* typically on the nutrient-poor hummock tops and *S. warnstorfii* on the hummock sides and bases in closer proximity to groundwater. Feathermosses (*Hylocomium splendens* and *Pleurozium schreberi*) occupy drier microsites (e.g., hummock tops).

Source: Yukon government



Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens
CNVC00116

Type Description (cont'd)

Environment: CNVC00116 occurs on peat-accumulating sites with permanently high water tables in a region with a subhumid continental boreal climate. It usually occurs in landscape depressions, on level sites or occasionally on gentle slopes. Substrates are usually deep (>40cm) organic soils, formed from slowly decomposing sedges, *Sphagnum* spp. and other mosses. Surface microtopography is strongly hummocky, with drier conditions on the hummock tops, and hollows that are often in contact with groundwater for at least part of the growing season. Groundwater flow or seepage inputs create minerotrophic conditions in the rooting layer; nutrient status is generally medium to rich, although it can be variable over short distances. These organic deposits are cold and wet, often inhibiting nutrient uptake and limiting tree growth. On gently sloping sites, patterned fens may develop when low linear ridges (strings) that are able to support tree growth form perpendicular to the direction of water flow; on either side of these ridges, the wet areas (flarks) are dominated by sedges, herbs and mosses with only a few shrubs. Richer site conditions (e.g., calcareous groundwater) favour dominance of *Larix laricina*, often resulting in pure stands.

Dynamics: CNVC00116 is a stable condition that is maintained by a persistently high water table and minerotrophic groundwater. Local hydrology is the main driver of vegetation dynamics. Although fires occur on peatlands, they are infrequent and of limited extent because these sites are so wet. Consequently, stands of CNVC00116 tend to be long lived and multi-aged, with trees up to or exceeding 200 years. Both *Larix laricina* and *Picea mariana* can regenerate from seed under favourable conditions (e.g., suitable seedbed) and by vegetative layering.

Long-term change in the water table (either by anthropogenic activities or natural causes [e.g., beaver dams]) usually results in changes to the vegetation community. A rise in the water table can result in tree mortality and transition to shrubby wetland vegetation. In the absence of hydrological changes over long time periods, the accumulation of peat may elevate the rooting zone above the water table, promoting succession to poor fen or bog conditions (e.g., CNVC00112 [*Picea mariana / Vaccinium vitis-idaea / Sphagnum* spp.]). Larch sawfly (*Pristiphora erichsonii*) can cause extensive mortality to *L. laricina* stands if heavy defoliation occurs successively for 6 to 9 years, potentially leaving *P. mariana* as the dominant overstory species.

Range: CNVC00116 occurs in the boreal region from Yukon to western Manitoba. The *typic* subassociation is known from British Columbia, Alberta and Saskatchewan. The *Carex aquatilis* subassociation is described from British Columbia and Yukon.

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, Manitoba, Saskatchewan, Yukon

Terrestrial Ecozones and Ecoregions of Canada: Boreal Cordillera: Boreal Mountains and Plateaus, Hyland Highland, Liard Basin, Yukon Plateau - North; Boreal Plains: Boreal Transition, Clear Hills Upland, Mid-Boreal Lowland, Mid-Boreal Uplands, Peace Lowland, Wabasca Lowland, Western Alberta Upland, Western Boreal; Boreal Shield: Athabasca Plain, Churchill River Upland; Montane Cordillera: Central Canadian Rocky Mountains, Eastern Continental Ranges; Taiga Cordillera: North Ogilvie Mountains, Selwyn Mountains

Rowe's Forest Regions and Sections of Canada: Boreal: Aspen Grove, Athabasca South, Central Yukon, Eastern Yukon, Hay River, Lower Foothills, Manitoba Lowlands, Mixedwood, Northern Coniferous, Stikine Plateau, Upper Churchill, Upper Foothills, Upper Liard, Upper Mackenzie

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

Nature Conservancy of Canada Ecoregions: Boreal Cordillera, Boreal Plains, Boreal Shield, Central Interior, Montane Cordillera, Muskwa - Kechika, Taiga Cordillera, Taiga Plains, Yukon Plateau and Flats

Ecozones and Ecoregions of the Yukon: Boreal Cordillera: Hyland Highland, Liard Basin, Yukon Plateau - North; Taiga Cordillera: North Ogilvie Mountains, Selwyn Mountains

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

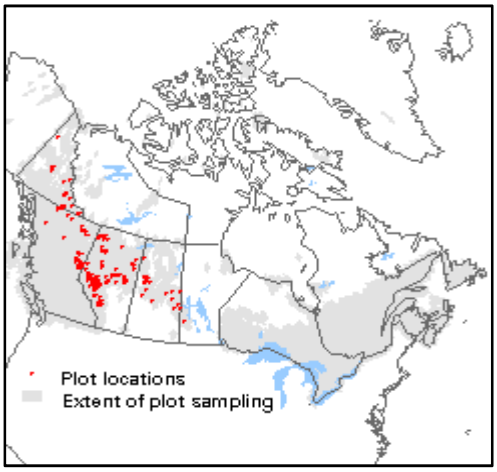
British Columbia Ecoregion Classification (ecoregions): Boreal Mountains and Plateaus, Central Alberta Uplands, Central Canadian Rocky Mountains, Hay-Slave Lowland, Hyland Highland, Liard Basin, Peace River Basin, Southern Alberta Upland

Natural Regions and Subregions of Alberta: Boreal Forest: Central Mixedwood, Dry Mixedwood, Lower Boreal Highlands; Foothills: Lower Foothills, Upper Foothills

Ecozones and Ecoregions of Saskatchewan: Boreal Plain: Boreal Transition, Mid-Boreal Lowland, Mid-Boreal Upland; Boreal Shield: Athabasca Plain, Churchill River Upland

Ecozones and Ecoregions of Manitoba: Boreal Plains, Boreal Shield

Manitoba Protected Areas Initiative Natural Regions: Manitoba Lowlands, Precambrian Boreal Forest, Western Upland



Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens
CNVC00116

Corresponding Types and Associations

116a typic	British Columbia	BWBSmk /Wb06	*Larix laricina – Carex aquatilus – Tomenthypnum nitens*
		BWBSmw /Wb06	*Larix laricina – Carex aquatilus – Tomenthypnum nitens*
		BWBSwk 1 /Wb06	*Larix laricina – Carex aquatilus – Tomenthypnum nitens*
	Alberta	NN/BM/J/01/01	Sb - Lt / dwarf birch / sedge / peat moss
		NN/BM/K/01/01	Lt / dwarf birch / sedge / golden moss
		SW/LF/J/01/01	Sb - Lt / Labrador tea - dwarf birch / sedge / golden moss
		SW/UF/J/01/01	Sb - Lt / Labrador tea - dwarf birch / sedge / peat moss
		SW/UF/K/01/01	Lt / dwarf birch / sedge / golden moss
		WC/LF/L/01/01	Sb - Lt / dwarf birch / sedge / peat moss
		WC/LF/M/01/01	Lt / dwarf birch / sedge / golden moss
		WC/UF/L/01/01	Sb - Lt / dwarf birch / sedge / peat moss
	Saskatchewan	BP23	Tamarack treed fen: Wet fibric organic
		BS21	Tamarack treed fen: Wet fibric organic
116b Carex aquatilus	Yukon	SbL50b	*Picea mariana – Larix laricina / Betula glandulosa / Carex aquatilis / Sphagnum* spp. *[Picea mariana]*
		SbL50l	*Picea mariana – Larix laricina / Betula glandulosa / Carex aquatilis / Sphagnum* spp. *[Larix laricina]*
	British Columbia	BWBSmk /Wb05	*Picea mariana – Carex aquatilus – Sphagnum*
		BWBSmw /Wb05	*Picea mariana – Carex aquatilus – Sphagnum*

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Vegetation Summary*

	Association CNVC00116		Subassociation 116a *typic*		Subassociation 116b *Carex aquatilus*	
	204 plots		**177 plots**		**27 plots**	
Species Name†	% Cover±	% Presence^	% Cover±	% Presence^	% Cover±	% Presence^
Overstory Trees						
Larix laricina	**13**	**76**	**14**	**80**	**6**	**52**
Picea mariana	**16**	**70**	**16**	**71**	**12**	**67**
Tree Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(2 8 21 30 45)**		**(5 10 23 31 46)**		**(0 3 12 21 29)**	
Understory Woody Shrubs and Regenerating Trees						
Rhododendron groenlandicum	15	84	16	85	13	78
Picea mariana	11	75	11	76	10	74
Larix laricina	10	65	10	68	5	44
Betula pumila	**17**	**44**	**17**	**51**	**-**	**-**
Betula glandulosa	16	34	16	28	16	78
Salix myrtillifolia	9	30	8	30	14	33
Betula nana	**17**	**28**	**16**	**28**	**19**	**37**
Salix pedicellaris	6	21	6	22	3	11
Salix sp.	8	19	6	17	16	30
Picea glauca	3	11	3	9	3	22
Dasiphora fruticosa	3	8	3	6	2	26
Vaccinium uliginosum	4	6	-	-	4	48
Shrub Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})‡	**(18 31 50 65 92)**		**(20 33 50 65 89)**		**(16 26 53 82 91)**	
Understory Herbs and Dwarf Shrubs						
Maianthemum trifolium	5	66	5	71	2	30
Vaccinium oxycoccos	2	61	2	63	2	52
Vaccinium vitis-idaea	5	60	5	59	6	67
Carex aquatilis	15	57	14	51	**17**	**96**
Rubus arcticus	2	38	2	38	2	33
Mitella nuda	2	34	2	36	1	22
Comarum palustre	3	33	3	37	1	7
Equisetum arvense	11	28	12	28	4	30
Equisetum scirpoides	2	28	2	27	4	41
Calamagrostis canadensis	12	27	13	28	4	19
Rubus chamaemorus	3	27	3	28	5	26
Petasites frigidus	3	24	3	26	< 1	7
Equisetum fluviatile	5	23	5	25	5	7
Carex gynocrates	3	23	4	25	1	11
Carex disperma	3	23	3	25	3	7
Caltha palustris	3	20	3	23	-	-
Carex sp.	9	19	9	22	-	-
Linnaea borealis	2	19	2	21	1	4
Menyanthes trifoliata	6	18	5	20	12	4

Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens
CNVC00116

Vegetation Summary (cont'd)*

	Association CNVC00116		Subassociation 116a *typic*		Subassociation 116b *Carex aquatilus*	
Species Name[†]	% Cover[±]	% Presence^	% Cover[±]	% Presence^	% Cover[±]	% Presence^
Chamerion angustifolium	1	18	1	21	-	-
Pedicularis labradorica	1	13	1	11	1	26
Geocaulon lividum	1	12	1	10	2	26
Empetrum nigrum	4	11	5	5	3	48
Arctous rubra	5	9	4	2	5	52
Herb Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(13 26 44 59 81)**		**(15 26 45 60 81)**		**(10 18 37 45 62)**	
Bryophytes and Lichens						
Aulacomnium palustre	13	75	13	79	13	52
Tomentypnum nitens	**21**	**70**	**20**	**73**	**31**	**48**
Hylocomium splendens	16	45	14	47	35	33
Pleurozium schreberi	11	45	11	48	9	22
Peltigera aphthosa	2	28	2	26	2	44
Sphagnum sp.	37	26	38	20	36	67
Sphagnum fuscum	24	25	24	28	38	7
Sphagnum warnstorfii	19	25	19	28	-	-
Polytrichum strictum	2	24	2	28	-	-
Cladina mitis	3	23	3	23	2	19
Cladonia sp.	3	21	3	20	2	30
Ptilium crista-castrensis	4	20	4	23	-	-
Dicranum undulatum	2	19	2	20	1	7
Cladina rangiferina	2	11	3	7	2	33
Cladina stellaris	6	3	5	1	6	22
Bryo-Lichen Stratum Cover (P_{10} P_{25} Mean P_{75} P_{90})[‡]	**(36 64 77 97 100)**		**(35 60 77 97 100)**		**(61 80 81 92 99)**	

* 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 CNVC00116 **204 plots**	Subassociation 116a *typic* **177 plots**	Subassociation 116b *Carex aquatilus* **27 plots**
Elevation Range (min–mean–max meters)			
	245–803–1395	245–818–1395	460–724–1186
	missing data (20)	missing data (22)	missing data (4)
Slope Gradient (% frequency)			
	moderate (1)	moderate (1)	moderate (4)
	gentle (2)	gentle (1)	gentle (11)
	level (83)	**level (83)**	**level (85)**
	missing data (13)	missing data (15)	missing data (0)
Aspect (% frequency)			
	north (4)	north (5)	north (4)
	east (3)	east (4)	east (0)
	south (4)	south (2)	south (15)
	west (5)	west (5)	west (4)
	level (64)	**level (68)**	**level (41)**
	missing data (19)	missing data (16)	missing data (37)
Meso Topoposition (% frequency)			
	crest / upper (1)	crest / upper (1)	crest / upper (7)
	mid (0)	mid (0)	mid (4)
	lower / toe (4)	lower / toe (2)	lower / toe (22)
	depression (15)	depression (16)	depression (7)
	level (37)	level (34)	**level (56)**
	missing data (41)	missing data (47)	missing data (4)
Moisture Regime (% frequency)			
	mesic (0)	mesic (1)	mesic (0)
	moist (20)	moist (19)	moist (26)
	wet (75)	**wet (79)**	**wet (48)**
	missing data (4)	missing data (1)	missing data (26)
Nutrient Regime (% frequency)			
	poor (23)	poor (24)	poor (15)
	medium (19)	medium (21)	medium (0)
	rich (28)	**rich (29)**	rich (22)
	missing data (31)	missing data (26)	missing data (63)

Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens
CNVC00116

Site / Soil Characteristics (cont'd)

	Association CNVC00116	Subassociation 116a *typic*	Subassociation 116b *Carex aquatilus*
Soil Parent Material (% frequency)			
	moraine / till (2)	moraine / till (2)	moraine / till (4)
	fluvial (2)	fluvial (2)	fluvial (7)
	glaciofluvial (1)	glaciofluvial (1)	glaciofluvial (4)
	lacustrine (3)	lacustrine (3)	lacustrine (4)
	glaciolacustrine (2)	glaciolacustrine (2)	glaciolacustrine (0)
	organic (66)	**organic (70)**	organic (37)
	missing data (24)	missing data (20)	missing data (44)
Soil Rooting Zone Substrate (% frequency)			
	sandy (1)	sandy (1)	sandy (0)
	coarse loamy (1)	coarse loamy (1)	coarse loamy (4)
	fine loamy (1)	fine loamy (1)	fine loamy (0)
	clayey (1)	clayey (1)	clayey (0)
	organic (73)	**organic (78)**	organic (41)
	missing data (23)	missing data (18)	missing data (56)
Root Restricting Depth (% frequency)			
	0 – 20 cm (0)	0 – 20 cm (1)	0 – 20 cm (0)
	21 – 99 cm (1)	21 – 99 cm (1)	21 – 99 cm (0)
	≥ 100 cm (4)	≥ 100 cm (5)	≥ 100 cm (4)
	missing data (94)	missing data (94)	missing data (96)
Humus Form (% frequency)			
	mor (8)	mor (10)	mor (0)
	mull (0)	mull (0)	mull (4)
	peatymor (13)	peatymor (9)	peatymor (37)
	missing data (78)	missing data (81)	missing data (59)

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Mélèze laricin – Épinette noire / Bouleau nain boréal – Bouleau glanduleux / Tomenteuse à feuilles droites

Additional Characteristics

Species of High Conservation Concern:

Non-native Species:

Management Issues:

Type Statistics

Internal Similarity: **Confidence:**

Strength:

Related Concepts

Similar CNVC Associations:

CNVC00112 *[Picea mariana / Vaccinium vitis-idaea / Sphagnum* spp.] occurs on wet, nutrient-poor sites from British Columbia to northwestern Ontario. It has less *Larix laricina, Betula pumila, B. glandulosa* and *Carex* spp. (particularly *C. aquatilus*) and much greater cover of *Sphagnum* mosses relative to golden and brown mosses (e.g., *Tomentypnum nitens* and *Aulacomnium palustre*) (see Dynamics).

CNVC00113 [*Picea mariana / Equisetum arvense / Sphagnum* spp. *– Hylocomium splendens*] is a similar condition that occurs on comparable sites in the same range and has *Equisetum arvense* and *E. pratense* as dominant understory components.

CNVC00130 [*Picea mariana / Equisetum arvense (E. pratense) / Hylocomium splendens*] occurs on moist to wet, nutrient-medium boreal sites in the Rocky Mountain foothills of Alberta. It has greater *Picea glauca* in the tree and shrub layers and *Equisetum arvense, E. pratense* and *E. sylvaticum* as dominant understory components.

CNVC00327 [*Picea mariana – Larix laricina / Vaccinium vitis-idaea – Mitella nuda*] occurs on wet, nutrient-medium to rich sites in Saskatchewan and Manitoba. It has greater *Larix laricina* in the tree and shrub layers, lower constancy and cover of ericaceous shrubs and more *Carex* spp. with less *Sphagnum* spp.

Related United States National Vegetation Classification Associations:

Relationships with Other Classifications:

In southwestern Manitoba, CNVC00116 best matches the concept of ES63 [Larch - Black Spruce - Sedge on Wet Organic Soil] in Arnup et al. 2006.

Comments

Betula glandulosa here includes both *B. glandulosa* and *B. nana* as the two species were not always reliably identified in the plot data.

CNVC00116 is consistent with the concept of a treed fen in the Canadian Wetland Classification System.

Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens CNVC00116

Source Information

Number of source plots for CNVC00116: 204
Number of source plots for 116a typic: 177
Number of source plots for 116b Carex aquatilus: 27
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).

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Concept Authors: L. Allen, J. Archibald, K. Baldwin, K. Chapman, N. Flynn, C. Kennedy, W. MacKenzie, K. McKenna, M. McLaughlan, D. Meidinger
Description Authors: K. Baldwin, K. Chapman, D. Downing and D. Meidinger
Date of Concept: March, 2012
Date of Description: August, 2017

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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Meidinger, D.; Kennedy, C.E.; McKenna, K. 2017. In prep. Boreal treed vegetation associations of Yukon factsheets. Ecol. Land Class. Prog. Dept. Env. Govt. Yukon, Whitehorse, Yukon.

Larix laricina – Picea mariana / Betula pumila – B. glandulosa / Tomentypnum nitens
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Characterization References:

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