

TABLE 14 Environmental characteristics of SBS subzones and variants in the Cariboo Forest Region^a

	SBSdw1	SBSdw2	SBSmh	SBSmw	SBSmc1	SBSmc2 ^b	SBSwk1 ^b
Area (km ²)	3443	2567	789	1374	419	1205	1473
Elevation range (m)	750–1200	750–1200	450–750	700–1000	1250–1350	1200–1500	900–1250
Climate							
Precipitation (mm)							
Mean annual	585	487	559			575	719
Mean summer	286	252	257	328	298	229	334
Mean winter	298	235	297			354	429
Mean annual snowfall (cm)	182	198	197			237	240
Temperature(°C)							
Mean annual	3.7	3.4	4.6		2.9	1.5	2.4
Mean - warmest month	14.8	14.9	16.6	14.1		12.3	13.1
Mean - coldest month	-10.4	-11.0	-10.8			-12.6	-11.1
Frost-free days	152	170	179			151	117
Soils							
Zonal soils ^c	Br.G.L.	Br.G.L.	Br.G.L.	Br.G.L.	Br.G.L.	Br.G.L.	Br.G.L.
Zonal humus form ^d	HR (RM)	HR	HR, RM	HR (RM)	HR (RM)	HR (RM)	HR (RM)

^aThe SBSmm has a very small area (86 km²) in the Cariboo Forest Region and is not included here. Refer to Lloyd *et al.* 1990.

^bClimatic data are from the Prince George and/or Prince Rupert forest regions; few or no data are available from the Cariboo.

^cBr.G.L. = Brunisolic Gray Luvisol

^dHR = HemiMor; RM = MorModer

TABLE 15 SBS vegetation table - zonal sites^a

Biogeoclimatic Unit		SBSdw1	SBSdw2	SBSmh	SBSmw	SBSmc1	SBSmc2	SBSwk1		
Tree Layer	<i>Pseudotsuga menziesii</i>	◇	◇	◇	◇				Douglas-fir	
	<i>Betula papyrifera</i>		□	×					paper birch	
	<i>Pinus contorta</i>	×	◇		×	◇	◇	□	lodgepole pine	
	<i>Picea engelmannii</i> x <i>glauca</i>	×	■	■	×	■	■	◇	hybrid white spruce	
	<i>Abies lasiocarpa</i>	□		□	■	■	□	×	subalpine fir	
Shrub Layer	<i>Rosa acicularis</i>	■	■	■	■		□		prickly rose	
	<i>Cornus stolonifera</i>	□		■	□				red-osier dogwood	
	<i>Mahonia aquifolium</i>	■	□	■	■				tall Oregon-grape	
	<i>Amelanchier alnifolia</i>	■		■	■			■	saskatoon	
	<i>Lonicera involucrata</i>	■	■	■	■	□	□	■	black twinberry	
	<i>Corylus cornuta</i>			×					beaked hazelnut	
	<i>Spiraea betulifolia</i>	■	■	■	■	■	■	□	birch-leaved spirea	
	<i>Pachistima myrsinites</i>	■		■	■	■			falsebox	
	<i>Viburnum edule</i>	■	■	■	■			■	highbush-cranberry	
	<i>Rubus parviflorus</i>	×		×	■	□		■	thimbleberry	
	<i>Vaccinium membranaceum</i>	■	□		■		×	■	black huckleberry	
	<i>Ribes lacustre</i>			■	■	■		■	black gooseberry	
	Herb Layer	<i>Elymus glaucus</i>	■		□					blue wildrye
		<i>Calamagrostis rubescens</i>	■	×			■	■		pinegrass
		<i>Aralia nudicaulis</i>	×	■	■	■				wild sarsaparilla
		<i>Chimaphila umbellata</i>	■	■	□	■				prince's pine
		<i>Rubus pubescens</i>	■	□	■	■				trailing raspberry
<i>Aster conspicuus</i>		■	■	■	■				showy aster	
<i>Oryzopsis asperifolia</i>		■		■	□				rough-leaved ricegrass	
<i>Lathyrus ochroleucus</i>		□	□	■	□				creamy peavine	
<i>Arnica cordifolia</i>		■		□	■	■	■		heart-leaved arnica	
<i>Cornus canadensis</i>		×	■	■	×	×	■	×	bunchberry	
<i>Linnaea borealis</i>		■	■	×	■	■	■	■	twinflower	
<i>Clintonia uniflora</i>		■		□	■	■	■	■	queen's cup	
<i>Gymnocarpium dryopteris</i>								◇	oak fern	
<i>Streptopus roseus</i>					□	□			rosy twistedstalk	
<i>Rubus pedatus</i>						■	■	■	five-leaved bramble	
<i>Veratrum viride</i>								■	Indian hellebore	
Moss Layer		<i>Rhytidiadelphus triquetrus</i>	■	■	■	×			■	electrified cat's-tail moss
	<i>Pleurozium schreberi</i>	◇	◇	■	◇	◇	◇	◇	red-stemmed feathermoss	
	<i>Ptilium crista-castrensis</i>	×	◇	□	◇	◇	◇	◇	knight's plume	
	<i>Peltigera aphthosa</i>	□	■		■	■	■	□	freckle pelt	
	<i>Hylocomium splendens</i>	□	×	□	×			×	step moss	
	<i>Mnium</i> spp.			■	□			×	leafy mosses	
	<i>Barbilophozia</i> spp.							■	leafy liverworts	

^aData are for zonal sites only.

Species abundance: □ present in 40–60% of plots surveyed; ■ >60% of plots, mean cover <1%; ▣ >60% of plots, mean cover 1–7%;

× >60% of plots, mean cover >7–15%; ◇ >60% of plots, mean cover >15%

SBSmc Subzone In the Cariboo Forest Region, the SBSmc occurs primarily on localized heights-of-land above the SBSdw, SBPSmk, or SBPSdc. Locations include Timothy Mountain, Dragon Mountain, and the low summits in the Blackwater–Nazko area. The elevation range of the SBSmc is generally 1200–1350 m east of the Fraser River and 1250–1500 m in the drier areas west of the Fraser River. A large area of the SBSmc occurs in the Prince George and Prince Rupert forest regions.

The SBSmc has a cool, moist climate, which is cooler than that of other SBS subzones in the Cariboo Forest Region, with the exception of the SBSwk.

The SBSmc is distinguished from the SBSdw, SBSmh, and SBSmw by the presence on zonal sites of species characteristic of moist, relatively snowy climates, such as five-leaved bramble, rosy twistedstalk, bluejoint, and red elderberry. It is distinguished from vegetation of the SBSwk by the absence of oak fern on zonal sites. Climax forests, dominated by hybrid white spruce and subalpine fir, are more common than in the SBSdw, SBSmh, or SBSmw but less common than in the SBSwk. Lodgepole pine is the predominant forest type and is the principal seral tree species. Douglas-fir forests are common in the SBSmc east of the Fraser River, especially on warm slope aspects, but are virtually absent west of the Fraser River. Deciduous forests, mostly trembling aspen and white birch, are relatively uncommon.

The undergrowth includes a sparse to moderate cover of shrubs and herbaceous species and a well-developed moss layer. Common shrubs are black huckleberry, birch-leaved spirea, and black gooseberry. Principal mosses are red-stemmed feathermoss and knight's plume.

The SBSmc includes two biogeoclimatic variants in the Cariboo Forest Region:

The SBSmc1 Variant occurs east of the Fraser River from the Bowers Lake area in the southeastern corner of the Region to Dragon Mountain near Quesnel. Based on vegetation, the climate is probably somewhat warmer than that of the SBSmc2. The vegetation on zonal sites differs from that of the SBSmc2 by the frequent presence of falsebox in the undergrowth.

The SBSmc2 Variant occurs locally west of the Fraser River on the

SBSmc1
SUB-BOREAL SPRUCE
MOIST COLD SUBZONE
MOFFAT VARIANT

The SBSmc1 is a small biogeoclimatic unit (419 km² in the Cariboo Forest Region) that occurs on local heights-of-land on the Fraser Plateau, east of the Fraser River. It occurs in the vicinity of Bowers Lake, Little Timothy Mountain, upper Moffat Creek, and Dragon Mountain. Elevations are predominantly 1250–1350 m.

Distinguishing Adjacent Units from the SBSmc1

Lower elevations of the SBSmc1 border the **SBSdw1** on gently rolling and hilly terrain, and the **SBPSmk** on low-relief, level to gently undulating terrain. The **ESSFwk1** occurs at higher elevations in the Quesnel Highland, north of Canim Lake, while the **ESSFdc2** occurs at higher elevations on the edge of the Shuswap Highland, south of Canim Lake. A very small area of **ICHmk3** borders the lower elevation boundary of the SBSmc1, south of Canim Lake.

In the **SBSdw1**, zonal sites have:

- wild sarsaparilla and abundant thimbleberry;
- no five-leaved bramble, rosy twistedstalk, or one-leaved foamflower;
- uncommon subalpine fir in forest canopy.

In the **SBPSmk**, zonal sites have:

- abundant pinegrass;
- little or no subalpine fir;
- no five-leaved bramble, queen's cup, rosy twistedstalk, one-leaved foamflower, or bluejoint.

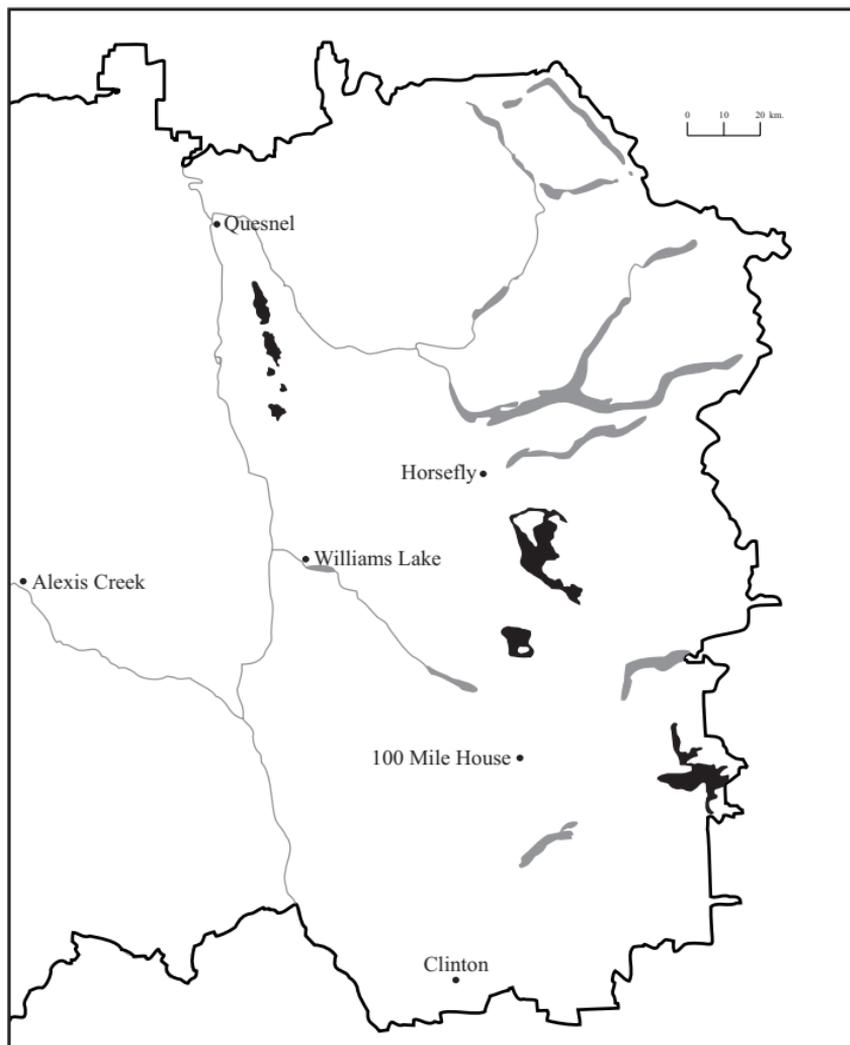
In the **ESSFwk1** and **ESSFdc2**, zonal sites have:

- white-flowered rhododendron, Sitka valerian, Indian hellebore, or red elderberry;
- no pinegrass.

In the **ICHmk3**, zonal sites have:

- western redcedar;
- common wild sarsaparilla, prince's pine, electrified cat's-tail moss, and Douglas-fir.

Distribution of SBSmc1 Variant in the Cariboo Forest Region



Site Units of the SBSmc1

Zonal Site Series 01 Sxw - Huckleberry Site Series dominates the SBSmc1 landscape, occurring on gentle to moderately steep slopes on all slope aspects. The climax forest canopy is dominated by hybrid white spruce and subalpine fir but, due to past fire history, most stands are younger and dominated by lodgepole pine with spruce and subalpine fir regeneration. Douglas-fir is occasionally present in the forest canopy at low elevations. The undergrowth has a sparse to moderate cover of low shrubs, primarily black huckleberry. The moss layer is nearly continuous and only partially obscured by a sparse to moderate cover of low herbaceous plants, primarily bunchberry, queen's cup, and twinflower. Pinegrass is often present but cover values are typically low. Three phases are recognized. The Shallow Phase has 50 cm or less of soil over bedrock, but, due to intermittent seepage water from upslope areas, vegetation is similar to the Typic Phase, which has generally deeper soils. The Sandy Phase occurs primarily on north or east aspects, but occasionally on level sites, with sand or loamy sand soils.

Drier Sites Sites drier than the zonal site series are uncommon in the SBSmc1 landscape and are found primarily on steep south and west aspects and on upper slopes and ridge crests. The vegetation is distinguished by little or no subalpine fir in the forest canopy, the presence of soopolallie or saskatoon in the shrub layer, the presence of pelt lichens in the moss/lichen layer, and the absence of queen's cup and palmate coltsfoot in the herb layer.

02 P1 - Cladonia - Haircap moss Site Series occurs on ridge crests with shallow (<50 cm) soils over bedrock. Bedrock is often exposed. The forest canopy is dominated by lodgepole pine and is usually relatively open. Tree regeneration is sparse to moderate and predominantly subalpine fir. The undergrowth vegetation includes a moderate cover of low shrubs, and several low herbaceous species with small percent covers. Principal shrubs are black huckleberry, birch-leaved spirea, and soopolallie. Pinegrass is the principal herbaceous species but cover is typically less than 5%. The vegetation is distinguished by the relatively small cover of mosses, the presence of cladonia and pelt lichens, and the absence of queen's cup, black twinberry, and Douglas-fir.

SITE UNITS

03 Fd - Pinegrass - Aster Site Series occurs on steep south- and west-facing slopes and is the only site series in the SBSmcl that typically has Douglas-fir in the canopy and regeneration layers. The forest canopy is typically relatively open and includes large Douglas-fir and smaller lodgepole pine trees. The undergrowth vegetation has scattered low shrubs, (especially prickly rose, common juniper, and birch-leaved spirea), a moderate cover of herbaceous plants including showy aster and pinegrass, and a relatively small cover of mosses.

Mesic and Near-mesic Sites Not Included in Zonal Site Series

04 Sxw - Huckleberry - Labrador tea Site Series occurs on submesic to subhygric sites in cold air accumulation basins, primarily on level to gently sloping areas removed from the influence of persistent seepage. Soils may be moistened by intermittent seepage. The mature forest canopy is a mixture of lodgepole pine, hybrid white spruce, and subalpine fir. Shrub cover is moderate and predominantly black huckleberry and Labrador tea. Herbaceous species have a sparse cover dominated by twinflower, queen's cup, and rosy twistedstalk. Moss cover is nearly continuous and predominantly red-stemmed feathermoss. The presence of Labrador tea and creeping-snowberry distinguish the vegetation from that on other sites.

Wetter Sites Sites wetter than the zonal site series are common on lower slopes and seepage areas, and at the perimeter of streams and wetlands. The vegetation is generally distinguished from mesic and drier sites by abundant black twinberry and the presence of moist- or wet-site herbaceous species including common mitrewort, trailing raspberry, Sitka valerian, common horsetail, and glow moss.

05 Sxw - Spirea - Glow moss Site Series is relatively uncommon. It occurs on moist sites in cold air accumulation areas, generally on toe slope positions in the bottoms of small valleys. The mature forest canopy is dominated by lodgepole pine or by hybrid white spruce and subalpine fir. A moderate to relatively high percent cover of shrubs and a relatively large number of herbaceous species are usually present. The undergrowth vegetation is distinguished from other moist to wet sites by the presence of pinegrass, scrub birch, and Indian hellebore, and the absence of common horsetail, oak fern, and devil's club.

06 Sxw - Oak fern Site Series is the most common site series on moist lower slopes in the SBSmc1. Seepage water is often present near the soil surface following snowmelt and rainy periods but not continuously throughout the summer. The mature forest canopy is dominated by hybrid white spruce and occasionally by Douglas-fir or lodgepole pine. The undergrowth includes vigorous shrub and herb layers and is distinguished by the presence of palmate-leaved colts-foot, western meadowrue, oak fern, and common mitrewort, and the absence of devil's club, common horsetail, glow moss, and leafy mosses.

07 Sxw - Devil's club - Step moss Site Series is uncommon, occurring on moist lower slopes where seepage water input is more persistent than in the /06 site series. These are moist, rich, and very productive sites. The vegetation of mature forests is distinguished from all other SBSmc1 site series by abundant devil's club. Other species most common in this site series are lady fern and three-leaved foamflower. The mature forest canopy is dominated by hybrid white spruce.

08 Sxw - Horsetail - Glow moss Site Series is a common site series that occurs on wet toe slope positions and wet depressions that have a near-surface (<50 cm) water table throughout the summer. The forest canopy is dominated by hybrid white spruce, typically on raised microsites. Lodgepole pine and subalpine fir are often present in the canopy. The undergrowth vegetation is distinguished by abundant horsetails, either common, wood, or meadow horsetail. Shrubs are moderately abundant; the most common species are black twinberry, black gooseberry, and black huckleberry.

Non-forested Sites Wetlands are common on the floor of small valleys and along gently sloping drainage channels. However, they are generally less abundant than on many other parts of the Fraser Plateau since the SBSmc1 landscape is predominantly well-drained, hilly terrain. Fens dominate the wetland area, although swamps are also present. Grasslands are virtually absent and nearly all of the uplands are forested.

SITE UNITS

Key To Site Units of the SBSmc1

1a. Moisture regime mesic or drier (rarely subhygric in /04); no evidence of persistent seepage or water table within 1 m of the surface; trailing raspberry, sweet-scented bedstraw, common mitrewort, leafy mosses, and sphagnum moss absent or incidental.

2a. Slope gradient >30% **and** slope aspect SE, S, SW, or W (135–280°).

SBSmc1/03 Fd - Pinegrass - Aster

2b. Slope gentler **or**, if steep, then slope aspect NW, N, NE, or E.

3a. Soils shallow (<50 cm) to bedrock; moisture regime xeric or subxeric (occasionally submesic in /01b).

4a. Cladonia or cladina lichens abundant (total ground cover >5%); red-stemmed feathermoss cover <30% and knight's plume moss absent or incidental (<1% cover); primarily crest slope position.

SBSmc1/02 Pl - Cladonia - Haircap moss

4b. Cladonia and cladina lichens not abundant; red-stemmed feathermoss cover usually >30% and knight's plume present (cover often >10%); mostly upper slope position.

SBSmc1/01 Sxw - Huckleberry; /01b Shallow Phase

3b. Soils deeper; moisture regime subxeric to mesic (rarely subhygric in /04).

5a. Creeping-snowberry, Labrador tea, and dwarf blueberry present; valley-bottom sites where cold air accumulates; primarily upper Moffat Creek area.

SBSmc1/04 Sxw - Huckleberry - Labrador tea

5b. Creeping snowberry, Labrador tea, and dwarf blueberry absent or incidental; generally on slopes rather than in cold air accumulation sites; widely distributed.

SBSmc1/01 Sxw - Huckleberry; /01a Typic Phase (not sand soils) /01c Sand Phase (sand soils)

1b. Moisture regime subhygric or wetter; evidence of persistent seepage water or water table within 1 m of surface; trailing raspberry, sweet-scented bedstraw, common mitrewort, leafy mosses, or sphagnum moss present.

6a. Moisture regime subhygric (rarely hygric in /07)); water table usually not present within 30 cm of surface; baneberry, pinegrass, queen's cup, western meadowrue, devil's club, or bracted lousewort present; Sitka valerian and sphagnum mosses absent.

7a. Devil's club abundant (>10% cover); palmate coltsfoot and trailing raspberry absent or incidental.

SBSmc1/07 Sxw - Devil's club - Step moss

7b. Devil's club not abundant; palmate coltsfoot and trailing raspberry usually present.

8a. Slope position toe (<10% slope gradient) in valley bottom with poor cold air drainage; yarrow, bracted lousewort, Scouler's willow, glow moss, and golden fuzzy fen moss usually present; oak fern absent.

SBSmc1/05 Sxw - Spirea - Glow moss

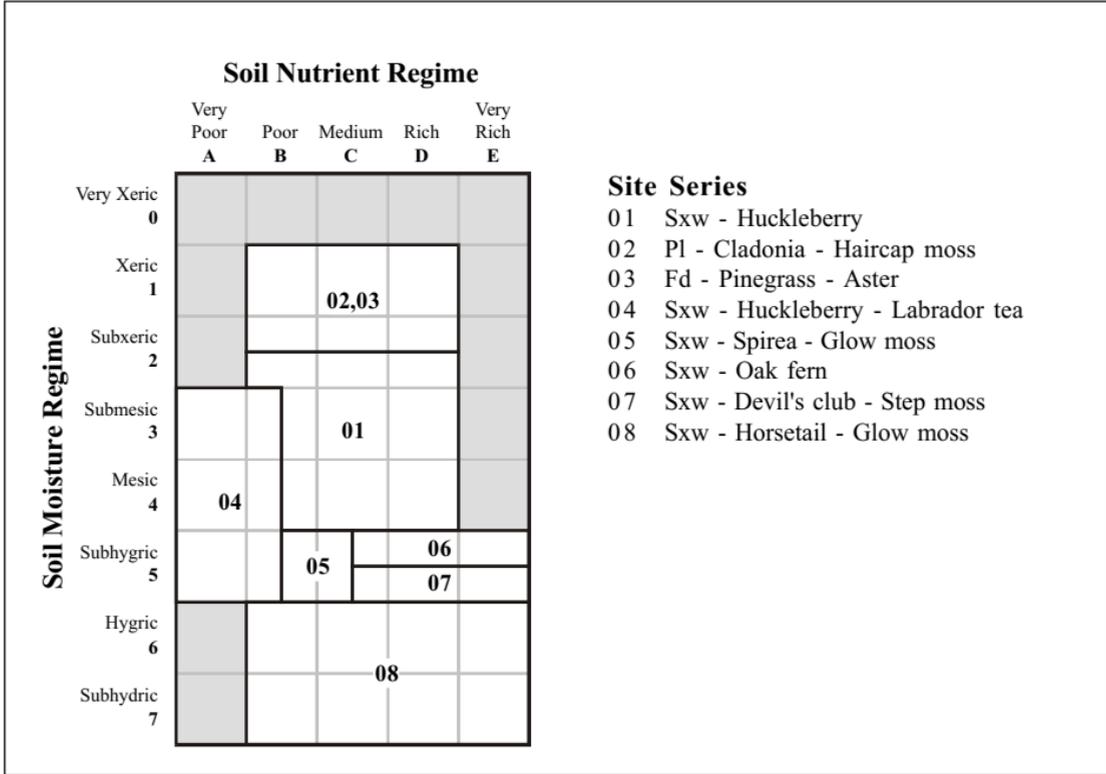
8b. Slope position lower; site usually adjacent to small drainages and, if in valley bottom, then slope gradient generally >10% and cold air drained from site; yarrow, bracted lousewort, Scouler's willow, glow moss, and golden fuzzy fen moss absent; oak fern often present.

SBSmc1/06 Sxw - Oak fern

6b. Moisture regime subhydric or occasionally hygric; water table usually within 30 cm of surface during summer; baneberry, pinegrass, queen's cup, western meadowrue, devil's club, and bracted lousewort absent or incidental; Sitka valerian or sphagnum moss usually present.

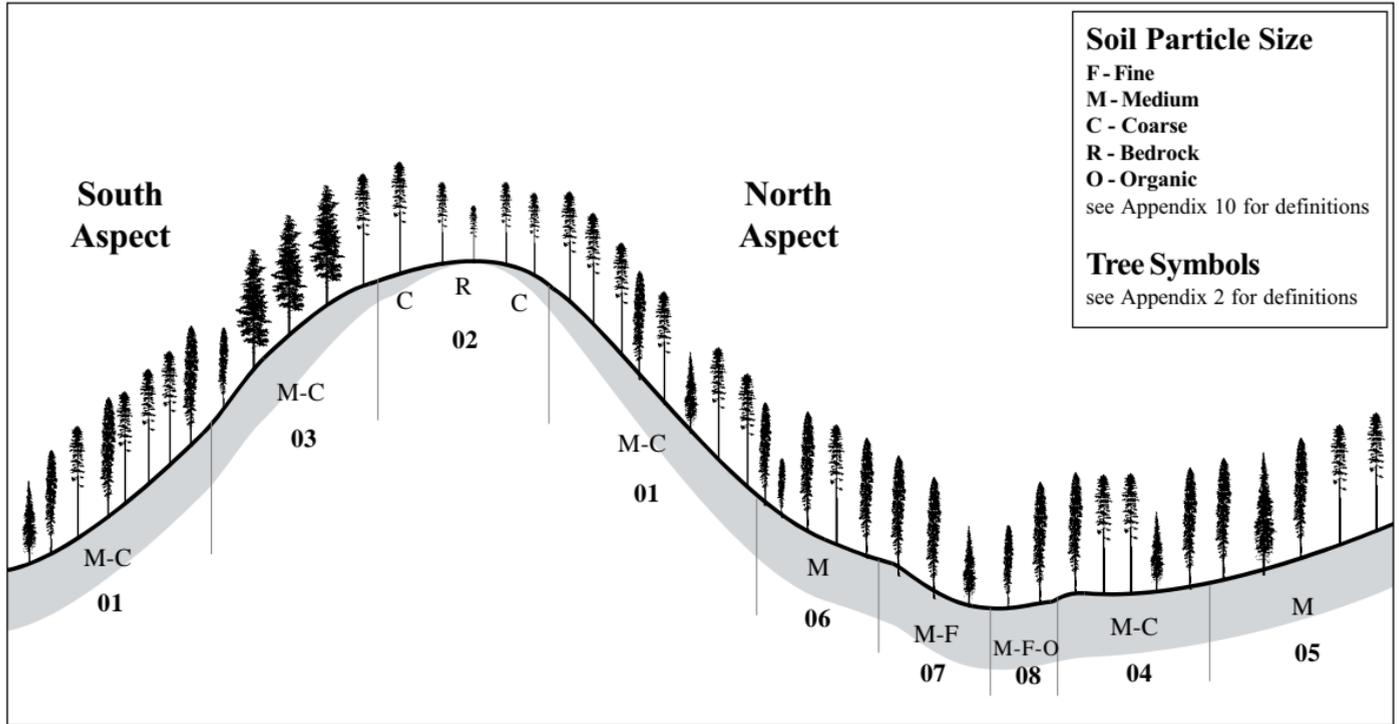
SBSmc1/08 Sxw - Horsetail - Glow moss

SBSmc1 Edatopic Grid



SBSmc1 Landscape Profile

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Site Features of SBSmcl Site Series

Site Series	01	02	03	04
Key Features	a) zonal and other mesic or near-mesic gently to steeply sloping sites; b) upper slopes with shallow soils and intermittent seepage; c) moderately steep N- and E-facing slopes and some level sites with sandy soils	crest slope positions with shallow soils (< 50 cm) over bedrock	middle and upper slope positions on steep (> 30%) S- and W-facing slopes	mesic, level, or gently sloping (< 10%) sites in cold air accumulation areas; commonly fluvial terraces
Soil Moisture / Nutrient Regimes	subxeric - mesic / poor - rich	xeric, subxeric / poor - rich	xeric, subxeric / poor - rich	submesic - subhygric / very poor, poor
Slope Position	upper - lower, level	crest, upper	upper, mid	mid, level
Aspect	all, but, if steep, then primarily N or E	all	SE, S, SW, W	all
Slope Grade (%)	0 - 70	< 10 (crest) 30 - 70 (upper)	> 30	< 10
Soil Texture	gravelly loamy, sand	gravelly loamy, sand	gravelly loamy	gravelly sandy and loamy
Humus Form and Thickness (cm)	Hemimor, Mormoder 3 - 13	Xeromor 1 - 2	Xeromor, Hemimor 1 - 5	Hemimor, Mormoder 3 - 16
Occurrence / Size / Distribution	predominant / large / wide	uncommon / small / wide	uncommon / small / wide	uncommon / small / primarily upper Moffat Creek drainage

Site Features of SBSmc1 Site Series (continued)

Site Series	05	06	07	08
Key Features	moist, level to gentle slopes in valley bottoms with poor cold air drainage; moist, cold sites	moist lower slope positions with intermittent near-surface seepage water; not cold air ponding sites	very moist lower slope positions with persistent near-surface seepage input; primarily N or E aspects	wet toe slope sites and depressions with near-surface (< 30 cm) water table; wet, cold sites
Soil Moisture / Nutrient Regimes	subhygric / poor, medium	subhygric / medium - very rich	subhygric, (hygric) / rich, very rich (medium)	hygric, subhydric / poor - very rich
Slope Position	toe, lower	lower, toe (mid)	lower, mid, toe	toe, depression
Aspect	all	all	all, but mostly N or E	all
Slope Grade (%)	< 10	0 - 30	0 - 20	0 - 10
Soil Texture	loamy	gravelly loamy	loamy	loamy, silty, clayey, organic
Humus Form and Thickness (cm)	Hemimor, Mormoder 5 - 15	Mormoder 6 - 50	Mormoder 5 - 30	Hydromor, Hydromoder 5 - 50
Occurrence / Size / Distribution	uncommon / small / Mt. Timothy area	common / medium / wide	very uncommon / small / wide	common / small / wide

SBSmc1 Vegetation Table^a

	Site Unit	02	03	04	01	05	06	07	08	
Tree Layer	<i>Pseudotsuga menziesii</i>		■■■					■■■		Douglas-fir
	<i>Pinus contorta</i>	■■■■	■	■■■■	■■■■	■■■■	■■■		■■■	lodgepole pine
	<i>Picea engelmannii</i> x <i>glauca</i>			■■■	■■■	■■■	■■■■	■■■■	■■■■	hybrid white spruce
	<i>Abies lasiocarpa</i>				■■■	■■■	■■■■	■■■	■	subalpine fir
Shrub Layer	<i>Shepherdia canadensis</i>	■■■	■							soopolallie
	<i>Amelanchier alnifolia</i>	■■	■							saskatoon
	<i>Rosa acicularis</i>	■■■	■■■			■■■				prickly rose
	<i>Spiraea betulifolia</i>	■■■	■		■■■		■			birch-leaved spirea
	<i>Vaccinium membranaceum</i>	■■■	■	■■■	■■■	■■■	■■■		■■■	black huckleberry
	<i>Ledum groenlandicum</i>			■■■						Labrador tea
	<i>Lonicera involucrata</i>			■■■	■	■■■	■■■	■■■	■■■	black twinberry
	<i>Ribes lacustre</i>			■	■■■	■■■	■■■	■■■	■■■	black gooseberry
	<i>Oplopanax horridus</i>							■■■■		devil's club
	<i>Trisetum spicatum</i>	■■	■							spike trisetum
Herb Layer	<i>Hieracium albiflorum</i>	■■		■						white-flowered hawkweed
	<i>Calamagrostis rubescens</i>	■■■	■■■■		■■■	■■■				pinegrass
	<i>Vaccinium caespitosum</i>	■■	■			■■■				dwarf blueberry
	<i>Clintonia uniflora</i>			■■■	■■■	■■■	■■■			queen's cup
	<i>Gaultheria hispida</i>			■■■						creeping-snowberry
	<i>Petasites frigidus</i> var. <i>palmatus</i>			■■■		■■■	■■■		■■■	palmate coltsfoot
	<i>Actaea rubra</i>					■■■	■■■			baneberry
	<i>Thalictrum occidentale</i>					■■■	■■■			western meadowrue
	<i>Galium triflorum</i>					■■■	■■■	■■■	■■■	sweet-scented bedstraw
	<i>Rubus pubescens</i>					■■■	■■■		■■■	trailing raspberry
	<i>Mitella nuda</i>					■■■	■■■			common mitrewort
	<i>Cinna latifolia</i>							■■■	■■■	nodding wood-reed
	<i>Valeriana sitchensis</i>							■■■	■■■	Sitka valerian
	<i>Gymnocarpium dryopteris</i>						■		■■■	oak fern
	<i>Equisetum</i> spp.						■■■		■■■■	horsetails
Moss Layer	<i>Cladina</i> spp.	■■■								reindeer lichens
	<i>Peltigera</i> spp.	■■■	■■■							pelt lichens
	<i>Cladonia</i> spp.	■■■		■						cladonia lichens
	<i>Pleurozium schreberi</i>	■■■	■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>		■	■■■■	■■■■	■■■■	■■■■	■■■	■	knight's plume
	<i>Rhytidiadelphus triquetrus</i>					■■■	■	■■■		electrified cat's-tail moss
	<i>Hylacomium splendens</i>						■■■	■■■	■	step moss
	<i>Aulacomnium palustre</i>					■■■			■	glow moss
	<i>Sphagnum</i> spp.								■■■■	sphagnum
<i>Mnium</i> spp.								■■■■	leafy mosses	

^a Species abundance: ■ present in 40–60% of plots surveyed; ■■■ >60% of plots, mean cover <1%; ■■■■ >60% of plots, mean cover 1–7%; ■■■■■ >60% of plots, mean cover >7–15%; ■■■■■■ >60% of plots, mean cover >15%

SBSmc1 Silviculture Considerations

Silviculture Practices and Options

Predominant silviculture system in the SBSmc1 is currently even-aged management (clearcutting). The predominant regeneration method is planting, both in cutover Pl and Sxw stands. Logged Pl sites are typically planted with Pl, while logged Sxw sites are typically planted with Sxw or a Pl/Sxw mixture. Mixtures reduce the risk of damage to Sxw from white pine weevil and frost. Scarification, primarily disc trenching, is often used to create favourable planting sites by exposing mineral soil and reducing vegetation competition. If slash loading is high and restricts planter access, as on some cutover Sxw stands, slash may be burned, or piled and burned, but this practice is not widespread.

Partial harvest systems experience in the SBSmc1 is essentially nonexistent.

Advance regeneration in Pl and Sxw stands ranges from relatively sparse to moderately dense, and consists primarily of Bl and Sxw. In Pl stands, most Sxw and many of the Bl stems <50 cm tall are of good form and vigour. Height growth releases following canopy opening. In Sxw/Bl stands with a high canopy closure, much of the Bl is of poor form and has incipient decay. Bl is susceptible to significant heart rot when mature.

Principal Insect, Disease, and Abiotic Damage Concerns

Pine dwarf mistletoe is endemic in Pl stands and results in growth losses, but is less prevalent than in the SBPS.

Stem rusts are present on Pl but cause relatively little growth loss.

Mountain pine beetle is common in mature Pl stands and causes mortality of many mature stems. However, the frequency and extent of mortality is less than in the SBPS.

Tomentosus root rot causes mortality of young and immature Sxw and Pl stems, often in infection centres.

White pine weevil can cause extensive terminal dieback of young open-grown trees. Planting Sxw in mixtures with Pl can reduce risk of damage. Spruce beetle damage risks are moderate in areas of windthrow and timber harvesting.

Growing-season frost can significantly damage young Sxw, especially on

SILVICULTURE CONSIDERATIONS

gentle lower slopes and in depressions.

Winter dessication damage has been noted on sites with low snowpack where young conifer needles are exposed to relatively warm winter air.

Silviculture Considerations Table — Harvest Assumptions

No or limited canopy refers to clearcuts and larger patch (generally >60 m wide) group selection systems;

Canopy present for Pl and most Sxw stands refers to group selection systems with small and moderate-size (generally 30–60 m wide) harvested groups. **Canopy present** for Fd stands on steep south-facing slopes (/03 site series) refers to low- to moderate-volume removal single tree selection similar to that in the IDFdk3/01. **Canopy present** for wet spruce stands (/08 site series) refers to single tree selection or small (two to few trees) group selection.

SBSmcl Site Series - Silviculture Considerations

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
01a	P:PI	<i>summer frost (gentle slopes)</i>		medium; Mixed shrub - low forb
Typic Phase	Sxw	Fd	Fd	
	Fd	<i>light deficits</i>		•shrub and herb cover typically increases slightly and slowly following canopy clearing.
	S:BI	----	PI, Act	
	D:Act	<i>moisture deficits</i>		
<ul style="list-style-type: none"> •summer frost may reduce survival and growth of Sxw and BI on gentle slopes in some years, especially where large upslope cleared areas are present; •survival and growth of planted PI and Sxw generally adequate to restock cleared sites without vegetation control if planted promptly; on partial cuts, survival and growth of PI likely poor to moderate on shaded microsites; •survival and growth of planted Fd likely adequate to restock cleared and partial-cut sites on slopes >15% in Dragon Mountain and Bowers Lake areas; growth likely best in partial cut or under partial canopy to reduce frost damage; in Moffat Lakes area and on slopes <15% elsewhere, survival and growth likely severely limited by frost; •PI natural regeneration stocking very limited by moderately thick soil organic layers; stocking density and distribution may be increased by scarification; •advance Sxw and BI regeneration often of good form and vigour, and can contribute to restocking. 				

SBSmc1 Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
01b	P:Pl	<i>moisture deficits</i>		low; Mixed shrub - low forb
Shallow Phase	Sxw	Sxw, Bl	----	
	Fd	<i>summer frost</i>		•shrub and herb cover increases little and only slowly following canopy clearing.
	S:Bl	Fd, Sxw, Bl	Fd	
	D:Act	<i>light deficits (vegetation overtop)</i>		
		----	Pl, Act	
<ul style="list-style-type: none"> •same as /01a except: •microsites with deeper soil limit suitable planting spots; •trees with large, dense crowns exposed to winds by logging are susceptible to windthrow; •maintenance of soil organic layers and woody debris especially important for long-term productivity and regeneration. 				
01c	P:Pl	<i>summer frost (gentle slopes)</i>		medium; Mixed shrub - low forb
Sandy Phase	Sxw	Fd	Fd	
	Fd	<i>moisture deficits</i>		•shrub and herb cover increases little following canopy clearing.
	S:Bl	Sxw, Bl	----	
	D:Act	<i>light deficits (vegetation overtop)</i>		
		----	Pl, Act	
<ul style="list-style-type: none"> •summer frost limitation ratings above apply to Dragon Mountain and Bowers Lake areas; Fd also severely limited by summer frost on “canopy present” sites in Moffat Lakes area; •same as /01a except: •Sxw growth slower due to greater moisture stress; •maintenance of soil organic layers and woody debris especially important for long-term productivity and regeneration. 				

SBSmc1 Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
02	P:PI T:BI Sxw	<i>moisture deficits</i> BI, Sxw <i>rooting restrictions (bedrock)</i> <i>nutrient deficits</i>	BI, Sxw	medium; Ericaceous shrub - low shrub •shrub and herb cover increases little following canopy clearing.
<ul style="list-style-type: none"> •sites have low productivity for timber; •survival and growth of planted PI usually adequate to restock cleared and partial-cut sites if planted in pockets of deeper soil; •BI and Sxw growth on these sites generally slow; limited by dryness and nutrient deficiencies; •maintenance of soil organic layers and woody debris important for long-term site productivity and regeneration. 				
03	P:Fd PI D:At	<i>moisture deficits</i> Fd	Fd	medium; Dry shrub - pinegrass •pinegrass increases somewhat following canopy opening and is a strong competitor for soil moisture.
<ul style="list-style-type: none"> •most reliable regeneration option for Fd is release of advance regeneration and ingress of natural regeneration under partial canopy of mature Fd; growth of established individual stems generally greatest in full sunlight; •PI natural regeneration may be adequate to restock cleared sites if sufficient numbers of cones present and well distributed; scarification generally not required; •survival and growth of planted PI should be sufficient to restock cleared sites and sunny microsites of partial-cut sites; •survival and growth of planted Fd expected to be moderate due to moisture stress; •maintenance of soil organic layers and woody debris important for long-term nutrient availability and natural regeneration. 				

SBSmc1 Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
04	P:PI	<i>summer frost</i>		low to medium; Mixed shrub - low forb
	Sxw S:BI	<u>Sxw, BI</u> <i>light deficits (vegetation overtop)</i> PI <i>cold soils</i>	Sxw, BI <u>PI</u>	•vegetation generally changes little following canopy opening.
<ul style="list-style-type: none"> •survival and growth of planted Sxw generally adequate to restock cleared and partial-cut sites if measures taken to reduce frost; frost damage to Sxw may be reduced by planting on raised microsites or under partial canopy or nurse crop; planting as part of PI-dominated mixture may also reduce frost damage after PI provides protective canopy; •survival and growth of planted PI generally adequate to restock cleared site if vegetation controlled at planting spot; in partial cuts, PI plantations limited by shade; •natural regeneration of PI limited by cold soils and thick soil organic layers. 				
05	P:PI	<i>summer frost</i>		medium; Mixed shrub - moist shrub
	Sxw S:BI	<u>Sxw, BI</u> <i>light deficits (vegetation overtop)</i> PI <i>cold, moist soils</i> PI, Sxw, BI	<u>Sxw, BI</u> PI	•shrub cover may increase significantly following canopy clearing; willows common.
<ul style="list-style-type: none"> •survival and growth of planted PI, Sxw, and BI generally adequate to restock cleared and partial-cut sites if planted on exposed mineral soil or raised microsites; vegetation control likely necessary for adequate survival; •natural regeneration of PI limited by cold soils and thick soil organic layers; •frost damage to Sxw and BI may be reduced by planting on raised microsites, under partial canopy or nurse crop, or as part of PI-dominated mixture; benefits may be overwhelmed by cold air accumulation if large upslope cold air source is present. 				

SBSmc1 Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth	Vegetation potential and complex
		<u>No or limited canopy</u>	<u>Canopy present</u>
06	P:PI Sxw Fd S:BI D:Act	<i>summer frost (gentle slopes)</i> Fd , Sxw <i>light deficits (vegetation overtop)</i> PI , Fd , Act <i>cold, moist soils</i> Fd	medium; Mixed shrub - moist shrub •shrub cover may increase significantly following canopy clearing and/or soil disturbance. Fd
<ul style="list-style-type: none"> •prompt planting and vegetation control generally required for adequate survival of planted PI, Sxw, Fd, and Act on sites with abundant shrub cover; •survival of planted Fd expected to be poor on gentle slopes and in areas where it does not occur naturally (Moffat Lakes area); on steeper slopes in other areas, survival and growth likely poor on cleared areas, and poor to moderate on partial-cut areas; •Fd and PI natural regeneration is severely limited by cold soils, thick soil organic layers, and competing vegetation; •soils very susceptible to compaction and rutting when not frozen. 			
07	P:PI Sxw Fd S:BI D:Act	<i>light deficits (vegetation overtop)</i> all species <i>summer frost (gentle slopes)</i> Fd , Sxw, BI <i>cold, moist soils (toe slopes)</i> Fd, Sxw	high; Mixed shrub - tall fern •high percent cover of devil's club replaced after logging by high percent cover of other shrubs and tall herbs. Fd, Sxw
<ul style="list-style-type: none"> •survival and growth of planted PI, Sxw, and BI generally adequate to restock cleared sites if vegetation controlled at planting spot; Fd survival poor, except moderate on steeper slopes; in partial cuts, PI and Fd survival likely poor in shaded microsites; •natural regeneration of all tree species limited by thick soil organic layers and vigorous shrub and herbaceous cover; •advance Sxw and BI often of good form and vigour, and can contribute to restocking; •soils generally very susceptible to compaction and rutting and, on steeper slopes, to surface erosion. 			

SBSmc1 Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
08	P:Sxw	<i>cold, wet soils</i>		medium; Mixed shrub - wet forb
	S:Bl	<u>all species</u>	<u>all species</u>	
	Pl	<i>light deficits (vegetation overtop)</i>		•shrub and herb cover increase limited by cold, wet soils; soil disturbance may increase shrub cover.
	D:Act	Pl, Act	Sxw, <u>Pl</u> , <u>Act</u>	
		<i>summer frost</i>		
		<u>Sxw</u> , <u>Bl</u> , Pl, Act	<u>Sxw</u> , <u>Bl</u> , Pl, Act	
<ul style="list-style-type: none"> •low-productivity sites for timber, and difficult to restock after logging; •survival and early growth of planted Sxw and Bl generally poor, except moderate on raised microsites; •Pl is not common on these sites; Pl growth to maturity not well adapted to sites with near-surface water table; •frost damage may be slightly reduced by planting on raised microsites, but benefits likely overwhelmed by cold air accumulation if large upslope cold air source is present; •sites very susceptible to soil rutting and compaction; •trees with large, dense crowns exposed to winds by logging generally very susceptible to windthrow. 				

TABLE A1.1. Site units (shaded) in the Cariboo Forest Region and their precorrelation equivalents (unshaded).

Current (correlated) BEC unit code												
BEC Unit		Site unit										
		/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	/11
Equivalent precorrelation code												
BEC Unit		Ecosystem unit										
AT	AT	(site units not yet described)										
BGxh3	PPBGg	(see Iverson and Coupé 1996a)										
BGxw2	PPBGe	(see Iverson and Coupé 1996b)										
CWHds1	CWHc	see Guide for Vancouver Region (Green and Klinka 1994)										
ESSFdc2	ESSFe1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ESSFwc3	ESSFh2	/01	/02	/03								
ESSFwk1	ESSFh1	/01	/02	/03	/05	/04	/07 in part	/07 in part				
ESSFxc	ESSFd	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ESSF xv1	ESSFg, ESSF undif	npe	npe	npe	npe	npe	npe	npe	npe	npe		
ESSF xv2	ESSFg, ESSF undif	npe	npe	npe	npe	npe	npe	npe	npe			
ICHdk	ICHe3	/01	/02	/03	/04	/05	/06	/07	/08	/09		
ICHmk3	ICHe2	/01,/04	/02	/03	/05	/06	/07	/08				
ICHmw3	ICHm1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ICHwk2	ICHh1	/01,/05	/02	/03	/04	/06 in part	/06 in part	/07	/08			
ICHwk4	ICHh2	/01,/06	/02	/03	/04	/05	/07	/08	/09			
IDFdk3	IDFb2	/01	/03	/02	/05	/04	/06	/07	/08	/09, /10		
IDFdk4	IDFb5	/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	
IDFdw	IDFundiff.	npe	npe	npe	npe	npe	npe	npe	npe			
IDFmw2	IDFj1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
IDFxm	IDFa4	/01	/02	/03	/04	/05	/06	/07	/08	/09		
IDF xw	IDFa2	/01,/05,/07	/02	/03	/04	/06	/08	/09				

^aNo previous equivalent (npe)

TABLE A 1.1 (continued)

		Current (correlated) BEC unit code										
BEC unit		Site unit										
		/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	/11
		Equivalent Precorrelation Code										
BEC unit		Ecosystem Unit										
MHmm2	MHb	see Guide for Vancouver Forest Region (Green and Klinka 1994)										
MSdc2	MS undiff	npe	npe	npe	npe	npe	npe	npe	npe	npe	npe	npe
MSdv	MS undiff	npe	npe	npe	npe	npe	npe	npe	npe	npe	npe	npe
MSxk	MSc	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
MSxv	MSd	/01	/03	/02	/04	/05	/06	/07	/08			
SBPSdc	SBSa3	/01	/02	/03,/04	/05	/06	/07	/09	/08			
SBPSmc	SBSa2	see Guide for Prince Rupert Forest Region (Banner et al 1993)										
SBPSmk	SBSb	/01	/02	/03	/04	/05	/06	/07	/08,/09			
SBPSxc	SBSa1	/01	/02,/03	/05	/04	/06	/07					
SBSdw1	SBSk1	/01	/02	/03	/04	/05	/06	/07	/08	/09		
SBSdw2	SBSk2	/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	/11
SBSmc1	SBSm2	/01	/02	/03	/04	/06	/05	/07	/08			
SBSmc2	SBSel	/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	/11
SBSmh	SBSl	/01	/02	/03	/04	/05	/06	/07	/08	/09		
SBSmm	SBSm	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
SBSmw	SBSc	/01	/02	/05	/03,/04	npe	/06	/07	/08	/09	/10	
SBSwk1	SBSj1	/01	/02	/03,/04	/05	/06	npe	/07	/08	/10	/09	/11

^aNo previous equivalent (npe)

APPENDIX 5
ACTUAL SOIL MOISTURE REGIME
RELATIONSHIP TO RELATIVE SOIL MOISTURE
REGIME AND BIOGEOCLIMATIC UNIT

BEC unit	Relative soil moisture regime							7
	0	1	2	3	4	5	6	
BGxh3	ED	ED	ED	ED	ED	SD	M	W
BGxw2	ED	ED	ED	ED	ED	SD	M	W
IDFxw	ED	ED	VD	VD	MD	SD	M	W
IDFxm	ED	ED	VD	VD	MD	SD	M	W
SBPSxc	ED	ED	VD	VD	MD	SD	M	W
SBPSdc	ED	ED	VD	MD	SD	F	M-VM	W
SBPSmk	ED	VD	VD	MD	SD	F	M-VM	W
IDFdk3	ED	VD	VD	VD	MD	F	M	W
IDFdk4	ED	VD	VD	VD	MD	F	M	W
IDFdw	ED	VD	VD	MD	MD	F	VM	W
IDFmw2	VD	VD	VD	MD	SD	F	VM	W
MSxk	VD	VD	VD	VD	MD	F	M	W
MSxv	VD	VD	VD	MD	SD	F	VM	W
SBPSmc	VD	VD	VD	MD	SD	F	M-VM	W
SBSdw1	VD	MD	MD	SD	SD	F	M	W
SBSdw2	VD	MD	MD	SD	SD	F	M	W
SBSmh	VD	MD	MD	SD	SD	M	VM	W
SBSmw	VD	MD	MD	SD	F	M	VM	W
SBSmc1	VD	MD	MD	SD	F	M	VM	W
SBSmc2	VD	MD	MD	SD	F	M	VM	W
SBSwk1	VD	MD	SD	F	F	M	VM	W
ICHdk	VD	VD	VD	MD	SD	M	VM	W
ICHmk3	VD	MD	MD	SD	F	M	VM	W
ICHwk2	VD	MD	SD	F	F	M	VM	W
ICHwk4	VD	MD	SD	F	F	M	VM	W
ESSF xv	VD	VD	MD	MD	SD	F	M	W
ESSF dc2	VD	MD	MD	SD	SD-F	M	VM	W
ESSFwk1	MD	MD	SD	F	M	M	VM	W
ESSFwk3	MD	MD	SD	F	M	M	VM	W

Actual Moisture Regime Codes:

ED=extremely dry; VD=very dry; MD=moderately dry; SD=slightly dry;
 F=fresh; M=moist; VM=very moist; W=wet