

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%

The SBSdw2 Variant occurs primarily in the central and northern portion of the SBSdw in a band between the SBSdw1 and either the IDF or SBPS. Compared to the SBSdw1, lodgepole pine stands are more common, pinegrass is more abundant, subalpine fir regeneration is less common, kinnikinnick is common, and fewer shrub and tall forb species are present. The SBSdw2 is the SBS unit most similar to the IDFdk.

SBSmh Subzone The SBSmh Subzone occurs on the lower slopes and valley floors of the Fraser River valley, north of Alexandria, and the Quesnel River valley, downstream of about Quesnel Forks. It is the lowest-elevation subzone of the SBS in the Cariboo Forest Region. Upper elevation limits are near 750 m, where the SBSmh borders the SBSdw or SBSmw.

The SBSmh is the warmest subzone of the SBS in the Cariboo Forest Region (mean annual temperature 4.6°C) and is a principal agricultural area of the Region. Precipitation is similar to or slightly greater than that of the SBSdw.

The SBSmh zonal vegetation is distinguished from that of other subzones of the SBS Zone in the Cariboo Forest Region by the abundance of tall shrubs, such as red-osier dogwood and Douglas maple, presence of beaked hazelnut, and absence or very low abundance of pinegrass as well as species most commonly found in snowier climates, such as five-leaved bramble. The forest canopy of late seral to climax forests on zonal sites is dominated by hybrid white spruce, together with some subalpine fir and scattered Douglas-fir. Seral stands are primarily Douglas-fir, trembling aspen, and/or white birch. Most seral stands are single-storied. Deciduous forests of trembling aspen and/or white birch, often mixed with Douglas-fir, hybrid white spruce, and subalpine fir, occupy a large proportion of the SBSmh landscape, due partly to frequent wildfires and harvesting in the past. Lodgepole pine is infrequent in the SBSmh and restricted primarily to local areas of sandy soils.

Mature Douglas-fir forests on zonal sites have a diverse, relatively well-developed shrub layer. Common species include red-osier dogwood, highbush-cranberry, saskatoon, prickly rose, soopolallie, Douglas-maple, and beaked hazelnut. The herbaceous and bryophyte/lichen layers are often sparse, especially in stands with a closed canopy. Deciduous forests in the SBSmh have a very productive undergrowth with numerous shrub and herbaceous species.

The SBSmh bordering the Fraser River is the most culturally developed subzone of the Cariboo Forest Region. The forest has been cleared for agricultural purposes from many valley bottom and low terrace sites.

SBSmw Subzone The SBSmw Subzone occurs in the northeastern portion of the Cariboo Forest Region, east of the Fraser River and north of the Quesnel River. It occurs on the middle and upper slopes of these river valleys as well as eastward across the northeastern Fraser Plateau as it rises toward the Quesnel Highland. Highest elevations of the SBSmw are about 950–1000 m, where the SBSmw borders the wetter, colder SBSwk subzone. Lowest elevations of the SBSmw are bordered by the SBSmh at about 750 m. A nearly equal area of the SBSmw occurs in the Cariboo and Prince George forest regions.

Climate of the SBSmw is moderately warm and moist. It is slightly wetter than that of the SBSdw.

The SBSmw vegetation is distinguished from that of other SBS subzones in the Region by frequent Douglas-fir and queen's cup but little or no pinegrass, oak fern, or beaked hazelnut on zonal sites. Five-leaved bramble is much less common than in wetter climates with a higher snowpack, such as the SBSwk and SBSmc.

Climax forests of the SBSmw are dominated by hybrid white spruce and subalpine fir. However, as in most other subzones on the Fraser Plateau, climax forests are uncommon due to past wildfires. Seral forests are dominated by a mixture of Douglas-fir, lodgepole pine, hybrid white spruce, and subalpine fir. Trembling aspen and white birch are also common. Douglas-fir and lodgepole pine forests are primarily single-storied. Tree regeneration is predominantly subalpine fir with secondary spruce and Douglas-fir. The shrub layer is moderately well developed and includes saskatoon, falsebox, thimbleberry, and Douglas maple. Several forbs (including queen's cup, bunchberry, twinflower, sarsaparilla, and showy aster) are present in the undergrowth, but, in contrast to the SBSdw, grasses are a minor component.

SBSmm Subzone The SBSmm Subzone occurs primarily in the Kamloops Forest Region and has only a very small area (86 km²) in the Cariboo Forest Region, near Bowers Lake. It is very similar to the SBSmc, described below, and differs from it by having more falsebox, black twinberry, palmate-leaved coltsfoot, and stiff clubmoss. See Lloyd *et al.* (1990).

SBSmh

SUB-BOREAL SPRUCE MOIST HOT SUBZONE

The SBSmh is a small subzone (789 km²) in the Cariboo Forest Region that occurs on lower valley slopes and valley bottoms of the Fraser River valley, north of about Alexandria, and in the Quesnel River valley west of Quesnel Forks. The SBSmh also extends northward along the Fraser River to about Prince George. Elevations are from valley bottom (about 450 m) to 750 m.

Distinguishing Adjacent Units from the SBSmh

The **SBSmw** occurs above the SBSmh east of the Quesnel River valley and along the east side of the Fraser River valley north of the Cottonwood River. It has a cooler, slightly wetter climate. The **SBSdw1** and **SBSdw2** occur above the SBSmh along most of the Fraser River valley as well as west of the Quesnel River valley. The **IDFxm** replaces the SBSmh in the Fraser River valley south of about Alexandria. Near Quesnel Forks, the **ICHmk3** occurs above a very small portion of the SBSmh.

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

- common foamflower, rosy twistedstalk, lodgepole pine, queen's cup, and black huckleberry;
- no beaked hazelnut;
- uncommon Douglas maple and red-osier dogwood.

In the **SBSdw1** and **SBSdw2**, zonal sites have:

- common lodgepole pine, black huckleberry, and pinegrass;
- no beaked hazelnut or Hooker's fairybells.

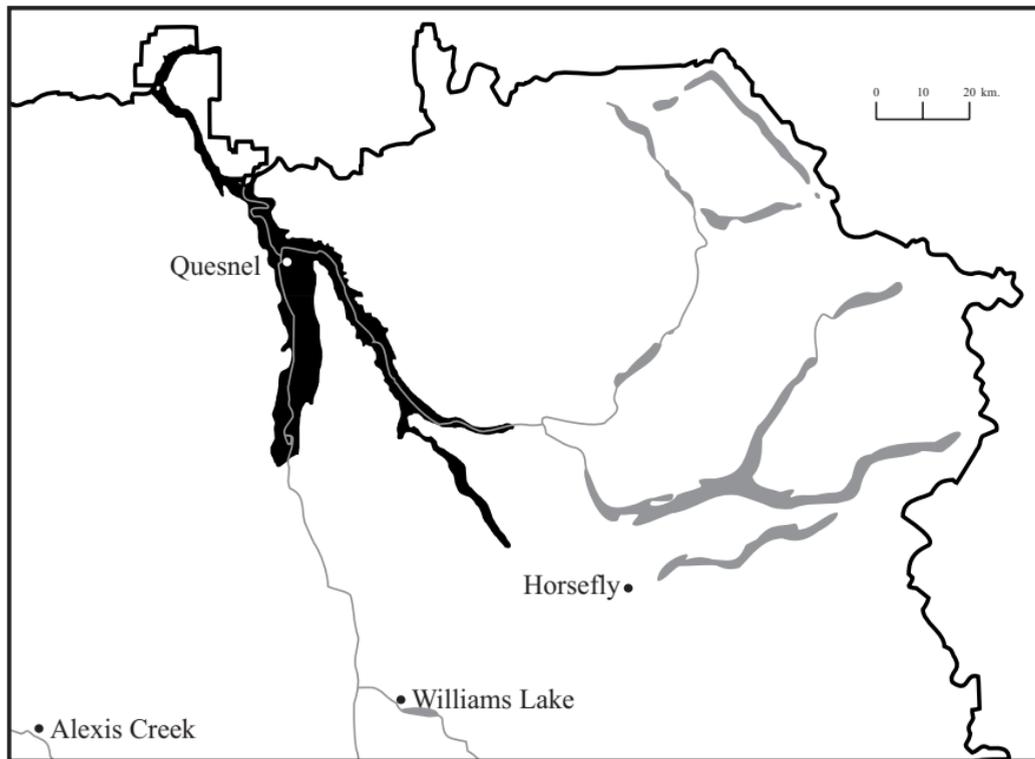
In the **IDFxm**, zonal sites have:

- pinegrass, kinnikinnick, spreading needlegrass, and bluebunch wheatgrass;
- no spruce, paper birch, beaked hazelnut, or red-osier dogwood.

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

- redcedar and foamflower;
- no beaked hazelnut or red-osier dogwood.

Distribution of SBSmh Subzone in the Cariboo Forest Region



Site Units of the SBSmh

Zonal Site Series 01 SxwFd - Hazelnut Site Series occurs on gentle to moderate mid and lower slope positions and level benches. Soil parent materials are primarily loamy and fine sandy fluvial and lacustrine materials with low gravel content. The mature forest canopy is most often dominated by Douglas-fir but hybrid white spruce is usually present. Subalpine fir occurs in the canopy of mature stands in the northern part of the subzone. Deciduous forests (paper birch, cottonwood, and trembling aspen) are very common. Tree regeneration is predominantly spruce but all of the overstory species are usually present. The undergrowth has a relatively large number of species and a high percent cover of both shrubs and herbs. Common species include beaked hazelnut, Douglas maple, thimbleberry, prickly rose, wild sarsaparilla, cream-flowered peavine, common mitrewort, and rough-leaved ricegrass. Mosses cover a relatively small percentage of the surface. Electrified cat's-tail moss and red-stemmed feathermoss are most common.

Drier Sites Sites drier than those of the zonal site series are common on hill crests, steep south- and west-facing slopes, and coarse soils. In contrast to zonal and other mesic sites, they have kinnikinnick and early blue violet, more lichens, and little or no beaked hazelnut, trailing raspberry, or common mitrewort.

02 FdPI - Cladonia Site Series is relatively uncommon and occurs on shallow (<50 cm) soils over bedrock on the few ridge crests in the subzone. The mature forest canopy is dominated by relatively widely spaced Douglas-fir. Subalpine fir and paper birch are occasional components in sub-canopy layers. The undergrowth vegetation is sparse and includes common juniper, soopolallie, kinnikinnick, and early blue violet. Species common on mesic and wetter sites, including thimbleberry, black twinberry, and creamy peavine, are absent. The moss/lichen layer contains a moderate to high cover of red-stemmed feathermoss and wavy-leaved moss, and abundant cladonia lichens.

03 FdPI - Velvet-leaved blueberry - Cladonia Site Series occurs on level and gently sloping sites with coarse glaciofluvial soils, predominantly gravelly sands. It is uncommon. The mature forest canopy is typically dominated by lodgepole pine and Douglas-fir. The undergrowth vegetation includes a moderate cover of low and dwarf shrubs including kinnikinnick, soopolallie, common juniper, and velvet-leaved

SITE UNITS

blueberry. The herbaceous layer is relatively sparse, but mosses, especially red-stemmed feathermoss and wavy-leaved moss, are abundant. The abundance of lodgepole pine and velvet-leaved blueberry distinguishes these sites from all others in the subzone.

04 Fd - Douglas maple - Step moss Site Series occurs on mid and upper slope positions of steep south- and west-facing slopes. It includes the warmest sites in the subzone. The mature forest canopy is dominated by Douglas-fir but occasionally includes scattered hybrid white spruce and subalpine fir. Tree regeneration is also dominated by Douglas-fir. Shrub and herb layers have a large diversity of species and typically high total percent ground cover. The presence of choke cherry, American vetch, and abundant showy aster, along with the absence or very low abundance of kinnikinnick and velvet-leaved blueberry, distinguish these sites.

05 SxwFd - Feathermoss Site Series includes mesic and submesic sites with gravelly loamy or sandy soils that are periodically moistened by intermittent seepage. They occur primarily on gentle mid to toe slope positions. The mature forest canopy is typically dominated by Douglas-fir and less often by hybrid white spruce. Subalpine fir is frequently present as a minor canopy species, especially in the northern part of the subzone. Tree regeneration is often dense and predominantly subalpine fir. Shrubs and herbs have a low to moderate abundance. Many of the species are the same as those of the /01 site series but abundance is significantly less. Feathermosses have a nearly continuous cover. The presence of common mitrewort and trailing raspberry distinguishes /05 sites from other site series drier than the /01.

Wetter Sites Sites wetter than the /01 site series are moderately common at the toe of slopes, on seepage slopes, and adjacent to streams. Forests on these sites are most often dominated by hybrid white spruce and are distinguished by relatively abundant ferns, clasping twistedstalk, and common horsetail.

06 SxwFd - Coltsfoot Site Series is relatively uncommon. It occurs from mid to toe slope positions where soils are moistened by intermittent seepage and on some moist low-lying flats without a near-surface water table. The mature forest canopy is dominated by hybrid white spruce and Douglas-fir, often with scattered lodgepole pine. The shrub layer is moderately dense and includes a large number of

species, including red-osier dogwood, soopolallie, highbush-cranberry, and thimbleberry. Many herbaceous species are also present but none consistently has a high cover. The presence of coltsfoot, clasping twistedstalk, and western meadowrue distinguishes these sites.

07 SxwEp - Devil's club Site Series is common on lower and toe slope positions, especially adjacent to small streams. Most sites occur on north aspects where seepage volumes tend to be greater. Seepage is evidenced in the soil by mottled and occasionally gleyed lower soil horizons. The forest canopy of mature stands is dominated by hybrid white spruce and Douglas-fir, but black cottonwood and paper birch frequently form a significant component of the stand. Devil's club and ferns, including lady fern, dominate the undergrowth and distinguish these sites from other site series. The moss layer is typically poorly developed.

08 Sxw - Ostrich fern Site Series occurs primarily on medium- to fine-textured fluvial soils at the toe of slopes and on floodplains of streams. Due to seepage water inputs, soils are moist and nutrient regimes are rich. Stands are mostly small but very productive. The mature forest canopy is dominated by large, often widely spaced hybrid white spruce but also includes subalpine fir and cottonwood. The undergrowth vegetation includes many tall shrubs (especially mountain alder) and a nearly complete cover of forbs, including ostrich fern, stinging nettle, and enchanter's nightshade. The abundance of ostrich fern and the presence of stinging nettle distinguishes the mature vegetation. The moss layer is poorly developed.

09 Sxw - Horsetail - Glow moss Site Series is uncommon. It occurs locally on poorly drained flats and depressions where there is a near-surface (<50 cm) water table. The canopy of mature stands is relatively open, and dominated by hybrid white spruce, often with scattered subalpine fir, trembling aspen, or black cottonwood. The shrub layer has a low cover of several wet-site shrubs, including devil's club, mountain alder, and black twinberry, and a dense cover of horsetail species. Boreal feathermosses are restricted to raised microsites, while leafy mosses and liverworts are abundant in micro-depressions.

Non-forested Sites The natural landscape of the SBSmh is mostly forested but includes a few small wetlands. These are predominantly sedge fens, shrub fens, and transitional bogs, often with black spruce.

SITE UNITS

Key to Site Units of the SBSmh

1a. Soils shallow (<50 cm), bedrock usually exposed; slope position crest; moisture regime xeric.

SBSmh/02 FdPI - Cladonia

1b. Soils deeper; slope position not crest; moisture regime subxeric or wetter.

2a. Slope steep (>35 %) **and** aspect SE to W (rarely NW); American vetch and early blue violet present.

SBSmh/04 Fd - Douglas maple - Step moss

2b. Slope gentle (<35%) or if steep then aspect NW to N to E; American vetch and early blue violet absent or incidental.

3a. Moisture regime subxeric; soils rapidly drained gravelly sands; pinegrass, kinnikinnick, and dwarf blueberry present; sweet-scented bedstraw, common mitrewort, black gooseberry, and false Solomon's-seal absent or incidental.

SBSmh/03 FdPI - Velvet-leaved blueberry - Cladonia

3b. Moisture regime submesic or wetter; soils not rapidly drained and if gravelly sands then moistened by seepage inputs; kinnikinnick, pinegrass, and dwarf blueberry absent; sweet-scented bedstraw, common mitrewort, or false Solomon's-seal present.

4a. Moisture regime predominantly subhygric or hygric; palmate coltsfoot, clasping twistedstalk, western meadowrue, foamflower, common horsetail, or spiny wood fern present.

5a. Ostrich fern abundant (>30% cover) and large-leaved avens and northern golden-saxifrage present; usually on floodplains subject to periodic flooding.

SBSmh/08 Sxw - Ostrich fern

5b. Ostrich fern, large-leaved avens, and northern golden-saxifrage absent or incidental; usually not on floodplain.

6a. Moisture regime predominantly hygric; horsetail species abundant (>40% cover); soft-leaved sedge present.

SBSmh/09 Sxw - Horsetail - Glow moss

6b. Moisture regime predominantly subhygric; horsetail species absent or incidental (<1% cover); soft-leaved sedge absent.

7a. Devil's club cover >10% and spiny wood fern and foamflower present; combined cover of feathermosses generally <20%; soopolallie and showy aster absent.

SBSmh/07 SxwEp - Devil's club

7b. Devil's club, spiny wood fern, and foamflower absent or incidental; combined cover of feathermosses >30%; soopolallie and showy aster present.

SBSmh/06 SxwFd - Coltsfoot

4b. Moisture regime predominantly mesic; palmate coltsfoot, clasping twistedstalk, western meadowrue, ostrich fern, common horsetail, and spiny wood fern absent.

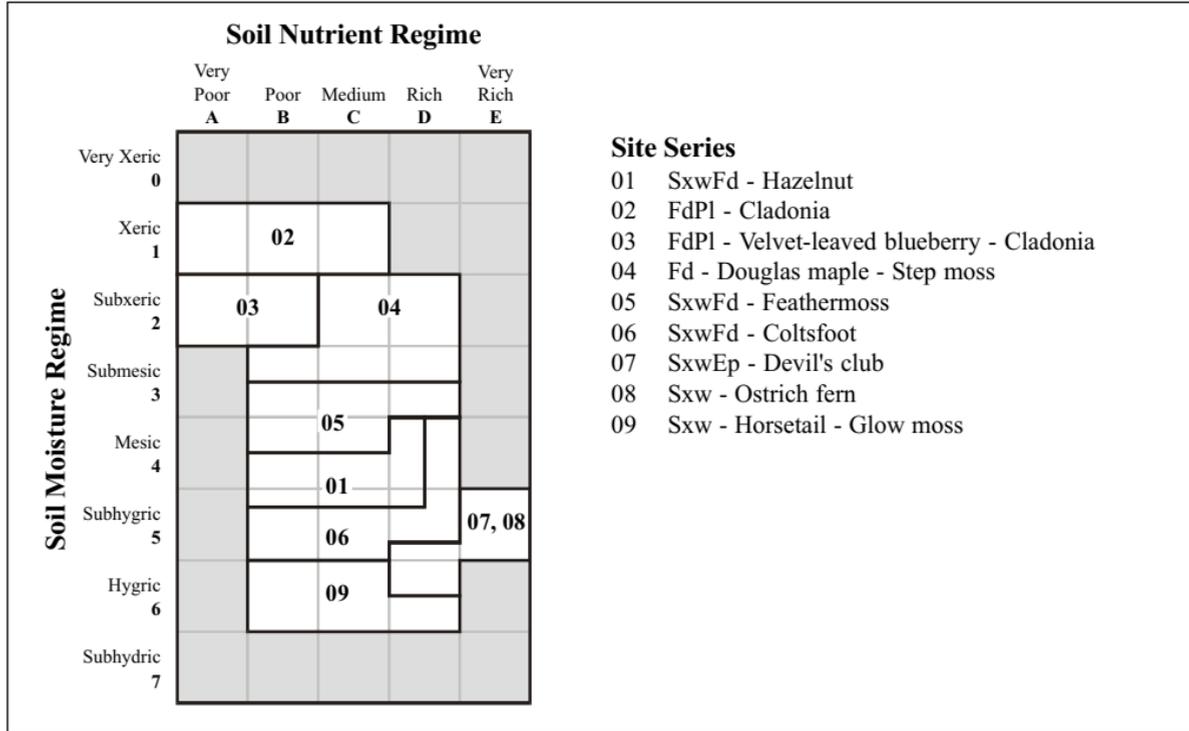
8a. Total moss cover >50%; prince's pine present; soils mostly gravelly (usually >35% coarse fragments).

SBSmh/05 SxwFd - Feathermoss

8b. Total moss cover <15%; prince's pine absent; soils mostly non-gravelly (<15% coarse fragments)

SBSmh/01 SxwFd - Hazelnut

SBSmh Edatopic Grid



SBSmh Landscape Profile

South and West Aspects

Soil Particle Size

F - Fine

M - Medium

C - Coarse

R - Bedrock

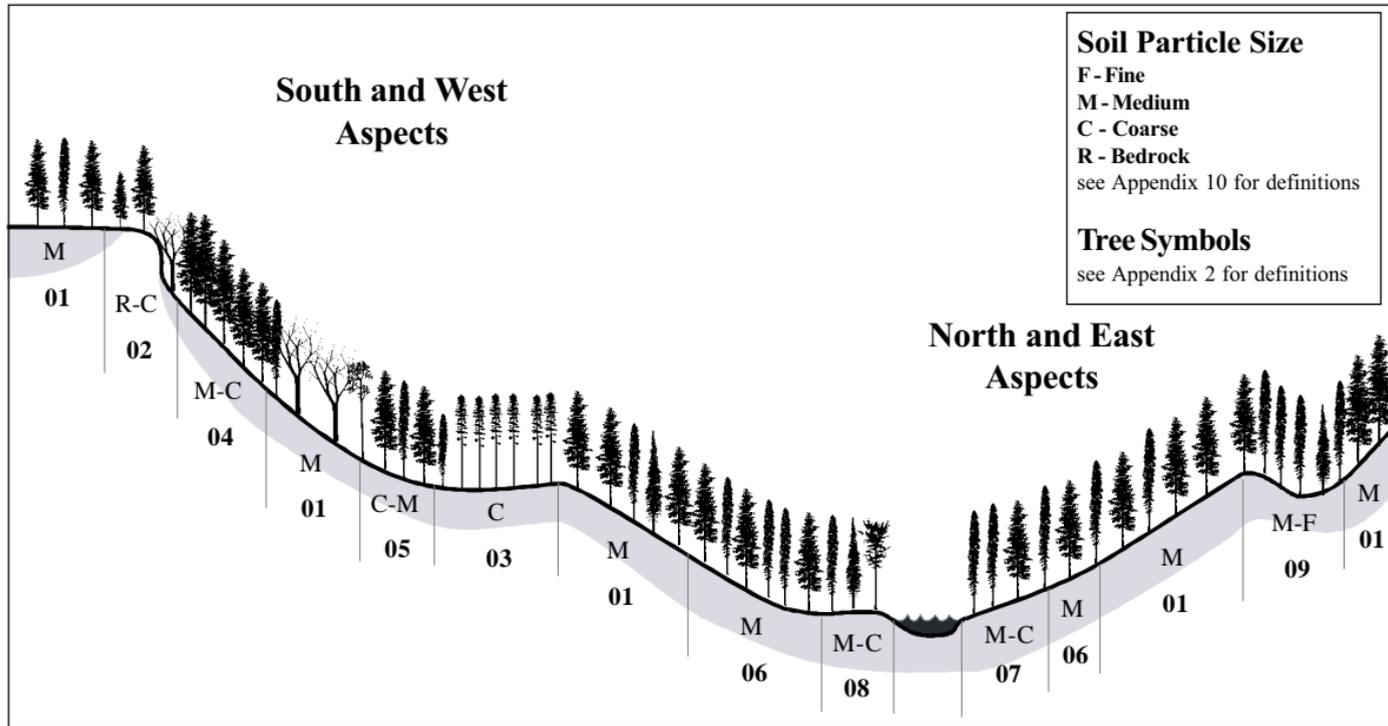
see Appendix 10 for definitions

Tree Symbols

see Appendix 2 for definitions

North and East Aspects

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Site Features of SBSmh Site Series

Site Series	01	02	03	04	05
Key Features	zonal and other gently to moderately sloping sites with mesic or near mesic moisture regime	dry ridge crests and upper slopes with shallow (< 50 cm) soils over bedrock	gently sloping and level sites with coarse sandy soils, usually glaciofluvial materials	middle and upper slope positions on steep S- and W-facing slopes	level to moderately sloping mesic and submesic sites with gravelly soils
Soil Moisture / Nutrient Regimes	mesic, subhygric / poor - rich	xeric / very poor - medium	subxeric / very poor, poor	subxeric, submesic / poor - rich	submesic, mesic / poor - rich
Slope Position	upper - lower, level	crest	level, toe	upper, mid	mid, toe, level
Aspect	all	all	N/A	SE, S, SW, W	all
Slope Grade (%)	0 - 20	< 10	< 10	35 - 90	0 - 35, rarely to 70 on NW to E aspect
Soil Texture	loamy, silty, sandy	gravelly loamy, sandy	gravelly sandy	gravelly loamy and sandy	gravelly sandy or loamy (rarely silty)
Humus Form and Thickness (cm)	Hemimor, Mormoder, Mullmoder 3 - 15	Xeromor (Hemimor) 2 - 4	Xeromor, Hemimor 2 - 4	Hemimor, Mullmoder, Humimor 3 - 7	Humimor, Mullmoder, Hemimor 5 - 8
Occurrence / Size / Distribution	predominant / medium - large / wide	uncommon / small / wide	uncommon / medium / wide	common / medium - large / wide	common / medium - large / wide

Site Features of SBSmh Site Series (continued)

Site Series	06	07	08	09
Key Features	moist sites on lower, toe, and level slope positions with intermittent seepage	very moist, lower and toe slope sites on cool N and E aspects with persistent seepage; often adjacent to streams	very moist, toe and level slope positions with persistent seepage; often on current floodplain	wet depressions and level sites with near-surface (< 50 cm) water table
Soil Moisture / Nutrient Regimes	mesic, subhygric / poor - rich	subhygric, hygric / rich - very rich	subhygric, hygric / rich - very rich	hygric / poor - rich
Slope Position	lower (toe, level)	lower, toe (depression)	level, toe	depression, level
Aspect	all	NW, N, NE, E	all	N/A
Slope Grade (%)	< 10	0 - 50	< 10	< 5
Soil Texture	fine loamy	loamy, sandy	loamy, sandy	loamy, silty and clayey
Humus Form and Thickness (cm)	Hemimor, Humimor 6 - 12	Mormoder, Mullmoder 7 - 30	Vermimull, Mormoder 2 - 10	Histomoder, Hydromoder 15 - 40
Occurrence / Size / Distribution	uncommon / small / wide	common / medium / wide	uncommon / small / wide	uncommon / small / wide

SBSmh Vegetation Table^a

	Site Unit	02	03	04	05	01	06	07	08	09	
Tree Layer	<i>Pinus contorta</i>		■■■■				■■■				lodgepole pine
	<i>Pseudotsuga menziesii</i>	■■■	■	■■■■	■■■	■■■	■■■	■■■			Douglas-fir
	<i>Betula papyrifera</i>	■■	■				■■■				paper birch
	<i>Picea engelmannii</i> x <i>glauca</i>				■■■	■■■	■■■	■■■	■■■	■■■	hybrid white spruce
	<i>Abies lasiocarpa</i>	■■■			■	■	■■■	■■■			subalpine fir
	<i>Populus balsamifera</i>							■	■	■■■	black cottonwood
Shrub Layer	<i>Juniperus communis</i>	■■	■								common juniper
	<i>Vaccinium myrtilloides</i>		■■■								velvet-leaved blueberry
	<i>Shepherdia canadensis</i>	■■■	■■■	■■■		■■■	■■■				soopolallie
	<i>Acer glabrum</i>	■■		■■■	■■■	■■■	■■■	■■■			Douglas maple
	<i>Amelanchier alnifolia</i>	■■	■	■■■	■■■	■■■	■■■			■■■	saskatoon
	<i>Cornus stolonifera</i>			■■■	■■■	■■■	■■■		■■■	■■■	red-osier dogwood
	<i>Corylus cornuta</i>				■	■■■	■■■	■■■			beaked hazelnut
	<i>Oplopanax horridus</i>				■			■■■	■■■	■■■	devil's club
	<i>Alnus tenuifolia</i>							■■■	■■■	■■■	mountain alder
	<i>Sambucus racemosa</i>							■	■■■		red elderberry
	<i>Ribes glandulosum</i>								■■■		skunk currant
	Herb Layer	<i>Arctostaphylos uva-ursi</i>	■■	■■■■							
<i>Viola adunca</i>		■■	■	■■							early blue violet
<i>Chimaphila umbellata</i>		■■	■■	■	■■■	■	■■			■■■	prince's pine
<i>Smilacina racemosa</i>		■■		■■	■■	■■	■■	■■	■	■■	false Solomon's-seal
<i>Dryopteris expansa</i>								■■■	■		spiny wood fern
<i>Galium triflorum</i>					■■	■■	■■	■■	■■	■■	sweet-scented bedstraw
<i>Mitella nuda</i>					■■■			■■	■■	■■■	common mitrewort
<i>Streptopus amplexifolius</i>							■■	■■		■■■	clasping twistedstalk
<i>Thalictrum occidentale</i>							■■■		■■■		western meadowrue
<i>Tiarella trifoliata</i>								■■	■■■		one-leaved foamflower
<i>Equisetum</i> spp.								■■	■■■	■■■	horsetails
<i>Chrysoplenium tetrandum</i>									■■■		northern golden-saxifrage
<i>Matteuccia struthiopteris</i>									■■■	■■■	ostrich fern
<i>Carex disperma</i>										■■■	soft-leaved sedge
Moss Layer		<i>Aulacomnium androgynum</i>	■■								
	<i>Cladina</i> spp.	■■■	■	■							reindeer lichens
	<i>Cladonia</i> spp.	■■■	■								cladonia lichens
	<i>Dicranum polysetum</i>	■■■	■■■	■■■	■■■	■	■■■				wavy-leaved moss
	<i>Hylacomium splendens</i>	■■■		■■■	■■■	■	■■■				step moss
	<i>Pleurozium schreberi</i>	■■■	■■■	■■■	■■■	■■■	■■■	■■■		■■■	red-stemmed feathermoss
	<i>Ptilium crista-castrensis</i>		■		■■■	■	■■■	■	■■■	■■■	knight's plume
	<i>Mnium</i> spp.					■	■■■	■■■	■■■	■■■	leafy mosses
<i>Brachythecium</i> spp.					■	■■■	■■■	■■■	■■■	ragged 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%

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

TABLE 4.1 Summary of climate data for biogeoclimatic units within the Southeast guide area^a

Climatic characteristics	Biogeoclimatic unit							
	SBSdw1	SBSmw	SBSmh	SBSwk1	SBSvk	ICHvk2	ESSFwk1	ESSFwc3
Annual precipitation (mm)	Mean 585	N/A ^b	559	931	1247	840	1044	1408
Growing season precipitation (mm)	Range 520–739	N/A	528–601	897–964	990–1635	N/A	N/A	1177–1625
Annual snowfall (cm)	Mean 286	290	257	345	472	466	426	510
Annual temperature (°C)	Range 227–401	276–306	214–287	181–437	405–583	374–538	378–491	402–631
Growing degree days (>5°C)	Mean 182	N/A	197	334	N/A	307	538	782
Frost-free period (days)	Range 180–183	N/A	166–226	328–339	N/A	N/A	N/A	N/A
	Mean 3.7	N/A	4.6	2.6	2.6	3.3	-0.1	-1.0
	Range 3.1–4.2	N/A	4.2–5.0	1.3–4.0	1.3–4.0	3.1–3.4	-1.5–1.4	-3.1–1.1
	Mean 1224	N/A	1428	N/A	N/A	1133	748	671
	Range 1160–1287	N/A	1342–1510	N/A	N/A	N/A	N/A	N/A
	Mean 68	N/A	112	N/A	N/A	72	48	75
	Range 49–86	N/A	104–119	N/A	N/A	N/A	N/A	N/A

^a Reynolds (1989).^b N/A = Not available.

TABLE 4.2 Some important wildlife species that use biogeoclimatic units in the Southeast guide area

Species	Occurrence in variants										
	SBSdw1	SBSmw	SBSmh	SBSwk1	SBSvk	ICHvk2	ESSFwk1	ESSFwc3			
Mountain Goat							*	*			
Caribou ^a				*	*	*	*	*			
Elk		*		*		*					
Moose	*	*	*	*	*	*					
Mule Deer	*	*	*	*	*	*	*	*			
White-tailed Deer	*										
Grizzly Bear ^a				*	*	*	*	*			
Wolverine ^a					*	*	*	*			

^a Denotes species "Blue Listed" in 1989 by the Ministry of Environment. Because of major declines in their populations, these species are considered sensitive and/or deserving of management attention (B.C. Ministry of Environment 1987).

6 MOIST HOT SUB-BOREAL SPRUCE (SBSmh)

Subzone Summary

Location

The SBSmh occurs from around Willow River south along the valley of the Fraser River to the border of the Prince George Forest Region just west of Hixon. It is bordered by the SBSdw2 and SBSdw3 on its western boundary; by the SBSmk1 to the west and north; by the SBSwk1, SBSmk1, and SBSmw to the east; and by the SBSdw1 to the southeast and south. This subzone extends well into the Cariboo Forest Region.

Elevation range

460–725 m

Climate

The SBSmh is dry and warm relative to other biogeoclimatic units of the guide area, and is one of the warmest units in the region (see Table 4.1). The relative warmth reflects its protected location in the valley of the Fraser River. Winter snowfall is relatively low, and the number of growing degree days is probably the highest in the region.

Distinguishing the SBSmh from adjoining biogeoclimatic units

SBSdw1 has:

- falsebox and no hazelnut on mesic sites; and
- more red-osier dogwood on mesic and wetter sites.

SBSdw2 has:

- pinegrass and no hazelnut on mesic sites; and
- more red-osier dogwood on mesic and wetter sites.

SBSdw3 has:

- stiff clubmoss and no hazelnut on mesic sites; and
- Sitka alder on submesic to subhygric sites.

SBSmk1 has:

- stiff clubmoss and five-leaved bramble on mesic sites;
- little to no Douglas-fir on mesic sites; and
- no Douglas maple or hazelnut.

SBSmw has:

- common foamflower and rosy twistedstalk on mesic sites but no hazelnut; and
- black huckleberry on subxeric and submesic sites.

SBSwk1 has:

- black huckleberry and oval-leaved blueberry in the shrub layer;
- rosy twistedstalk on mesic to hygric sites;
- Douglas-fir restricted to subxeric to submesic sites; and
- black twinberry found on submesic to hygric sites.

Forests

Forests of the SBSmh tend to be a mixture of Douglas-fir (more on the drier sites) and hybrid white spruce (more on the wetter sites), with lesser amounts of paper birch and subalpine fir. Lodgepole pine dominates some of the drier sites, while black cottonwood can dominate on wet sites.

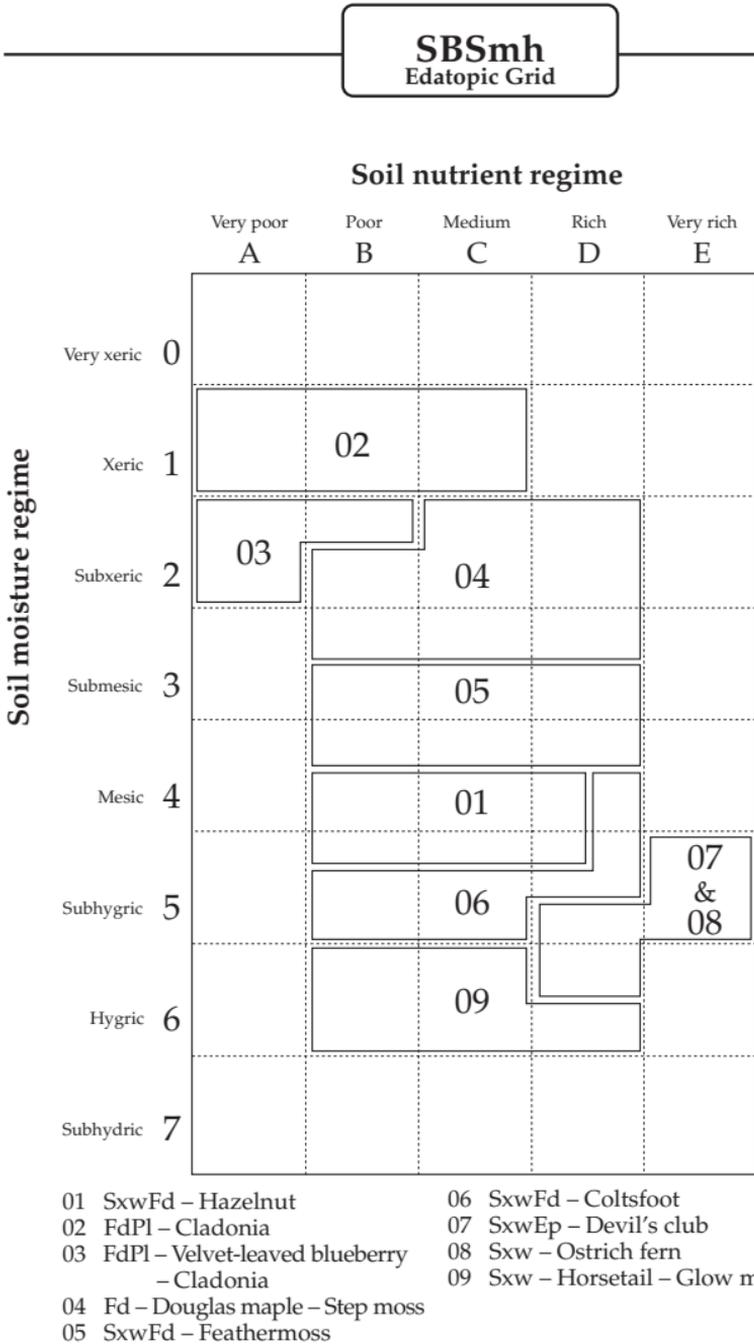


FIGURE 6.1 Edatopic grid displaying site units of the SBSmh subzone.

Site Series Key

- 1a Soils shallow (<50 cm); often crest slope position; very open tree canopy; shrub layer sparse (<5%), dominated by *Paxistima myrsinites* (falsebox) (p. 44)¹ and *Shepherdia canadensis* (soopolallie) (p. 49).
- SBSmh/02
- 1b Soils deeper (>50 cm); not crest slope position; canopy less open; shrub layer cover >5%, dominant species is variable.
- 2a Slopes steep (>35%), aspect mostly south to west (180–320°), rarely northwest; *Viola adunca* (early blue violet) (p. 177) and *Vicia americana* (American vetch) (p. 169) present.
- SBSmh/04
- 2b Slopes gentler (<35%) or if steep then aspect northwest to east (281–360°, 1–109°); *Viola adunca* and *Vicia americana* usually absent or minor cover (<1%).
- 3a Tree canopy dominated by lodgepole pine; parent materials rapidly drained, gravelly sandy glaciofluvial on level sites; *Calamagrostis rubescens* (pinegrass) (p. 240), *Arctostaphylos uva-ursi* (kinnikinnik) (p. 82), and *Cladina rangiferina* (reindeer lichen) (p. 334) present; *Galium triflorum* (sweet-scented bedstraw) (p. 220), *Mitella nuda* (common mitrewort) (p. 145), and *Smilacina racemosa* (false Solomon's-seal) (p. 130) absent or minor cover (<1%).
- SBSmh/03
- 3b Tree canopy generally not dominated by lodgepole pine; soils not rapidly drained and if parent materials are gravelly sandy glaciofluvial, then receiving seepage; *Calamagrostis rubescens*, *Arctostaphylos uva-ursi*, and *Cladina rangiferina* generally absent; *Galium triflorum*, *Mitella nuda*, and *Smilacina racemosa* present (>1%).
- 4a *Petasites frigidus* var. *palmatus* (palmate coltsfoot) (p. 114), *Streptopus amplexifolius* (clasping twistedstalk) (p. 128), *Tiarella trifoliata* (foamflower) (p. 147), *Equisetum arvense* (common horsetail) (p. 282), or *Dryopteris expansa* (spiny wood fern) (p. 292) present.

¹ Page numbers refer to the publication *Plants of Northern British Columbia* (MacKinnon et al. [editors] 1992).

- 5a *Matteuccia struthiopteris* (ostrich fern) abundant (>30% cover) and *Geum macrophyllum* (large-leaved avens) (p. 160) present; usually floodplains subject to periodic flooding.

SBSmh/08

- 5b *Matteuccia struthiopteris* and *Geum macrophyllum* absent; usually not alluvial floodplain.

- 6a *Equisetum* spp. (horsetails) (pp. 281–284) abundant (>40% cover), *Carex disperma* (soft-leaved sedge) (p. 260) present.

SBSmh/09

- 6b *Equisetum* spp. absent or incidental (<1% cover), *Carex disperma* absent.

- 7a *Oplopanax horridus* (devil's club) (p. 36) abundant (>10% cover) and *Dryopteris expansa* and *Tiarella trifoliata* present; total cover of feathermosses low to moderate (<20% cover); *Shepherdia canadensis* and *Aster conspicuus* (showy aster) (p. 116) absent.

SBSmh/07

- 7b *Oplopanax horridus*, *Dryopteris expansa*, and *Tiarella trifoliata* absent; total cover of feathermosses higher (>20% cover); *Shepherdia canadensis* and *Aster conspicuus* present.

SBSmh/06

- 4b *Petasites frigidus* var. *palmatus*, *Streptopus amplexifolius*, *Tiarella trifoliata*, *Equisetum arvense*, and *Dryopteris expansa* absent.

- 8a Moss layer well developed (>50% cover); *Chimaphila umbellata* (prince's pine) (p. 90) present; parent material predominantly gravelly loamy or sandy fluvial.

SBSmh/05

- 8b Moss layer poorly to moderately developed (<20% cover); *Chimaphila umbellata* absent; parent material variable.

SBSmh/01

NOTES

VEGETATION

Tree Layer: 35% cover

Douglas-fir, hybrid white spruce, paper birch

Shrub Layer: 50% cover

Rubus parviflorus (thimbleberry)
Rosa acicularis (prickly rose)
Corylus cornuta (beaked hazelnut)
Cornus stolonifera (red-osier dogwood)
Viburnum edule (highbush-cranberry)
Ribes lacustre (black gooseberry)
Spiraea betulifolia (birch-leaved spirea)
Amelanchier alnifolia (saskatoon)
Mahonia aquifolium (tall Oregon-grape)
Lonicera involucrata (black twinberry)
Acer glabrum (Douglas maple)
Shepherdia canadensis (soopolallie)

Herb Layer: 30% cover

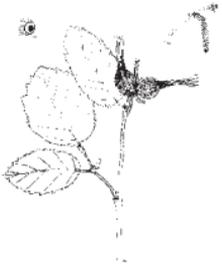
Aralia nudicaulis (wild sarsaparilla)
Cornus canadensis (bunchberry)
Lathyrus ochroleucus (creamy peavine)
Oryzopsis asperifolia (rough-leaved ricegrass)
Linnaea borealis (twinline)
Disporum hookeri (Hooker's fairybells)
Mitella nuda (common mitrewort)
Galium triflorum (sweet-scented bedstraw)
Aster conspicuus (showy aster)
Rubus pubescens (trailing raspberry)

Moss Layer: 20% cover

Rhytidiadelphus triquetrus (electrified cat's-tail moss)
Pleurozium schreberi (red-stemmed feathermoss)

SOIL AND SITE:

Moisture Regime: 4–5 (mesic-subhygric)
 Nutrient Regime: B-D (poor-rich)
 * Slope Gradient (%): 0–15
 * Slope Position: mid to level
 Parent Material: mostly (glacio)fluvial, some lacustrine
 Soil Texture: medium to coarse, some fine
 * Coarse Fragments (%): 0–50 (usually 0)

DISTRIBUTION: common and widely distributed*Rubus parviflorus**Corylus cornuta**Aralia nudicaulis*

INTERPRETATIONS

- Site limitations: – sites within this unit with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; *plant stock that will achieve better lateral root development (e.g., Cu-treated), prescribe natural regeneration, or protect advance regeneration.*
- Silvicultural system: – assess partial cutting feasibility if Fd is present.
- Site preparation: – see Section 12.1
- Species choice: – Fd, Pl, Sx, [Bl]
- Vegetation potential: – moderate (pinegrass, fireweed, aspen)
- Reforestation: – manage to maintain Fd component.
– attempt to preserve advance Fd regeneration when partial cutting.
– help maintain stand diversity on sites to be planted with Pl by mapping aspen patches prior to harvest and planting these areas with spruce.
– maintain Fd component, especially veterans that are valuable for wildlife and seed production.
- Concerns: – site conditions leading to cold air ponding will lead to frost damage of Fd and Sx regeneration; *leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) are advised.*
– sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; *restrict traffic to winter operations or dry soil conditions.*
– sites within this unit with silty soils are susceptible to frost heaving; *avoid exposing mineral soil and plant early in season, when conditions are moist, to encourage root egress.*

*Paxistima myrsinites**Aralia nudicaulis**Pleurozium schreberi***VEGETATION**

Tree Layer: 15% cover

Douglas-fir, subalpine fir, paper birch

Shrub Layer: 10% cover

Paxistima myrsinites (falsebox)
Shepherdia canadensis (soopolallie)
Acer glabrum (Douglas maple)
Amelanchier alnifolia (saskatoon)
Juniperus communis (common juniper)
Mahonia aquifolium (tall Oregon-grape)
Ribes oxycanthoides (northern gooseberry)
Rosa acicularis (prickly rose)
Spiraea betulifolia (birch-leaved spirea)
 paper birch
 Douglas-fir

Herb Layer: 10% cover

Aralia nudicaulis (wild sarsaparilla)
Linnaea borealis (twinflower)
Oryzopsis asperifolia (rough-leaved ricegrass)
Arctostaphylos uva-ursi (kinnikinnick)
Arnica cordifolia (heart-leaved arnica)

Moss Layer: 55% cover

Pleurozium schreberi (red-stemmed feathermoss)
Dicranum polysetum (wavy-leaved moss)
Cladina arbuscula (cladina lichen)
Hylocomium splendens (step moss)
Peltigera aphthosa (freckle lichen)
Peltigera malacea (toad lichen)
Cladonia spp. (cladonia lichens)

SOIL AND SITE:

Moisture Regime: 1 (xeric)
 Nutrient Regime: A-C (very poor-medium)
 Slope Gradient (%): 0–10
 * Slope Position: crest
 * Parent Material: fluvial
 * Soil Texture: coarse
 Coarse Fragments (%): 65

COMMENTS: based on few plots; often occur on thin soils as small inclusions within other site series that are being harvested

DISTRIBUTION: uncommon and small

INTERPRETATIONS

- Site limitations: –site and soil conditions of this unit result in marginal forest productivity; *seriously consider excluding logging from this unit.*
- sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; *attempt to regenerate naturally by retaining PI cones and/or leaving Fd seed trees on site.*
- Silvicultural system: –avoid clearcutting; stand re-establishment will be difficult because of high surface soil temperatures and drought.
- Site preparation: –light scarification for seedbed preparation or summer logging with no site preparation.
- Species choice: –Fd, PI
- Vegetation potential: –low
- Reforestation: –manage to maintain Fd component.
- leave as many Fd stems as possible for shade to help reduce excessive drying or heating of upper soil horizons.
- promote natural Fd and PI regeneration by light scarification or spot screening.
- fill planting may be required after partial cutting.
- Concerns: –site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; *leaving a shelterwood overstorey can reduce tree seedling moisture stress.*
- these sites are vulnerable to nutrient deficiency if forest floors are reduced; *site preparation methods that reduce forest floor thickness, such as slashburning or brushblading, must be avoided.*
- these sites may represent important early season range for wildlife; *discuss management prescriptions with wildlife personnel.*
- avoid clearcutting as stand re-establishment would likely be difficult because of high surface soil temperatures and drought.



*Shepherdia
canadensis*



Rosa acicularis



*Arctostaphylos
uva-ursi*

VEGETATION

Tree Layer: 25% cover

lodgepole pine, Douglas-fir, paper birch

Shrub Layer: 45% cover

Shepherdia canadensis (soopolallie)

Rosa acicularis (prickly rose)

Vaccinium myrtilloides (velvet-leaved blueberry)

Spiraea betulifolia (birch-leaved spirea)

Douglas-fir

[lodgepole pine]

Herb Layer: 30% cover

Arctostaphylos uva-ursi (kinnikinnick)

Linnaea borealis (twinline)

Vaccinium caespitosum (dwarf blueberry)

Chimaphila umbellata (prince's pine)

Fragaria virginiana (wild strawberry)

Maianthemum canadense (wild lily-of-the-valley)

Oryzopsis asperifolia (rough-leaved ricegrass)

[*Calamagrostis rubescens* (pinegrass)]

[*Cornus canadensis* (bunchberry)]

Moss Layer: 65% cover

Pleurozium schreberi (red-stemmed
feathermoss)

Dicranum polysetum (wavy-leaved moss)

[*Cladina rangiferina* (grey reindeer lichen)]

[*Ptilium crista-castrensis* (knight's plume)]

[*Rhytidiadelphus
triquetrus* (electrified cat's-tail
moss)]

[*Cladonia* spp. (cladonia lichens)]

SOIL AND SITE:

Moisture Regime: 2 (subxeric)

Nutrient Regime: A-B (very poor-poor)

* Slope Gradient (%): 0–10

* Slope Position: lower-toe, or level

* Parent Material: fluvial and glaciofluvial

* Soil Texture: coarse

* Coarse Fragments (%): 65–75

COMMENTS: based on few plots

DISTRIBUTION: rare

INTERPRETATIONS

- Site limitations: –sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; *attempt to regenerate naturally by retaining Pl cones and/or leaving Fd seed trees on site.*
- Silvicultural system: –avoid clearcutting; stand re-establishment will be difficult because of high surface soil temperatures and drought.
–leave enough stems to provide shade to the site.
- Site preparation: –light scarification for seedbed preparation or summer logging with no site preparation.
- Species choice: –Pl, Fd, Sx, [Bl]
- Vegetation potential: –low
- Reforestation: –maintain Fd component, especially veterans that are valuable for wildlife and seed production.
–attempt to preserve advance Fd regeneration when partial cutting.
–fill planting may be required after partial cutting.
- Concerns: –site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; *leaving a shelterwood overstorey can reduce tree seedling moisture stress.*
–full tree harvesting may lead to nutrient depletion and seriously reduce the number and distribution of cones; *distribute woody debris and cones across these sites (i.e., lop and scatter).*
–these sites may represent important early season range for wildlife; *discuss management prescriptions with wildlife personnel.*
–dwarf mistletoe may cause significant damage to planted or advance regeneration pine, especially where mature pine are maintained in the overstorey.

*Rosa acicularis**Spiraea betulifolia**Pleurozium schreberi***VEGETATION**

Tree Layer: 30% cover

Douglas-fir, [subalpine fir]

Shrub Layer: 20% cover

Rosa acicularis (prickly rose)
Spiraea betulifolia (birch-leaved spirea)
Shepherdia canadensis (soopolallie)
Amelanchier alnifolia (saskatoon)
Mahonia aquifolium (tall Oregon-grape)
Acer glabrum (Douglas maple)
Cornus stolonifera (red-osier dogwood)
Prunus virginiana (choke cherry)
 Douglas-fir
 subalpine fir

Herb Layer: 20% cover

Disporum trachycarpum (rough-fruited fairybells)
Lathyrus ochroleucus (creamy peavine)
Aster conspicuus (showy aster)
Aralia nudicaulis (wild sarsaparilla)
Linnaea borealis (twinflower)
Fragaria virginiana (wild strawberry)
Aster ciliolatus (fringed aster)

Moss Layer: 40% cover

Pleurozium schreberi (red-stemmed
feathermoss)
Hylocomium splendens (step moss)
Rhytidiadelphus triquetrus (electrified cat's-tail
moss)
Dicranum polysetum (wavy-leaved moss)

SOIL AND SITE:

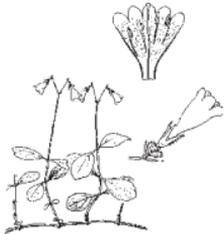
Moisture Regime: 2–3 (subxeric-submesic)
 Nutrient Regime: B-D (poor-rich)
 * Aspect: usually southerly
 * Slope Gradient (%): 40–90, often >60
 Slope Position: upper or mid
 Parent Material: colluvial veneers and
blankets; also (glacio)
fluvial and lacustrine
 Soil Texture: medium to coarse
 * Coarse Fragments (%): 0–80, often >70

COMMENTS: restricted to dry, steep warm aspects

DISTRIBUTION: common

INTERPRETATIONS

- Site limitations:
- site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; *natural regeneration is generally more adapted to surviving these conditions, especially during establishment.*
 - sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; *attempt to regenerate naturally by leaving Fd seed trees on site.*
- Silvicultural system:
- assess partial cutting feasibility.
 - avoid clearcutting as stand re-establishment would likely be difficult because of high surface soil temperatures and drought.
- Site preparation:
- light scarification for seedbed preparation or summer logging with no site preparation.
- Species choice:
- Fd, (Bl, Sx)
- Vegetation potential:
- low to moderate (pinegrass, fireweed, prickly rose)
- Reforestation:
- maintain component of larger Fd, especially veterans that are valuable for wildlife and seed production.
 - attempt to regenerate naturally or, if not feasible, plant Fd.
 - fill planting may be required after partial cutting.
 - Sx may be planted on moister microsites.
- Concerns:
- full tree harvesting may lead to nutrient depletion; *distribute woody debris across these sites.*
 - site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; *leaving a shelterwood overstorey can reduce tree seedling moisture stress.*
 - sites within this unit with shallow and/or coarse-textured soils are vulnerable to nutrient deficiency if forest floors are reduced; *avoid site preparation methods that reduce forest floor thickness, such as slashburning or brushblading.*

*Rosa acicularis**Linnaea borealis**Pleurozium schreberi***VEGETATION**

Tree Layer: 25% cover

Douglas-fir, hybrid white spruce, paper birch,
[subalpine fir]

Shrub Layer: 30% cover

Rosa acicularis (prickly rose)
Spiraea betulifolia (birch-leaved spirea)
Rubus parviflorus (thimbleberry)
Acer glabrum (Douglas maple)
Amelanchier alnifolia (saskatoon)
Ribes lacustre (black gooseberry)
Sorbus scopulina (western mountain-ash)
 Douglas-fir
 hybrid white spruce

Herb Layer: 25% cover

Linnaea borealis (twinflower)
Cornus canadensis (bunchberry)
Aralia nudicaulis (wild sarsaparilla)
Maianthemum canadense (wild lily-of-the-valley)
Chimaphila umbellata (prince's pine)
Mitella nuda (common mitrewort)
Smilacina racemosa (false Solomon's-seal)
Oryzopsis asperifolia (rough-leaved ricegrass)
Gymnocarpium dryopteris (oak fern)
Disporum hookeri (Hooker's fairybells)

Moss Layer: 65% cover

Pleurozium schreberi (red-stemmed
feathermoss)
Rhytidiadelphus triquetrus (electrified cat's-tail
moss)
Hylocomium splendens (step moss)
Dicranum polysetum (wavy-leaved moss)
Ptilium crista-castrensis (knight's plume)

SOIL AND SITE:

Moisture Regime: 3–4 (submesic-mesic)
 Nutrient Regime: B-D (poor-rich)
 Slope Gradient (%): 0–70 (usually <20)
 Slope Position: variable
 Parent Material: usually fluvial; some
morainal and lacustrine
 Soil Texture: variable
 Coarse Fragments (%): 0–85 (often >40)

DISTRIBUTION: common

INTERPRETATIONS

- Site limitations: – sites within this unit with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; *plant stock that will achieve better lateral root development (e.g., Cu-treated), prescribe natural regeneration, or protect advance regeneration.*
- Silvicultural system: – assess partial cutting feasibility if Fd is present.
- Site preparation: – see Section 12.1
- Species choice: – Fd, Pl, Sx, [BI]
- Vegetation potential: – moderate (thimbleberry, fireweed, aspen)
- Reforestation: – maintain Fd component, especially veterans that are valuable for wildlife and seed production.
– attempt to preserve advance Fd regeneration when partial cutting.
– help maintain stand diversity on sites to be planted with Pl by mapping aspen patches prior to harvest and planting these areas with spruce.
- Concerns: – sites within this unit with shallow and/or coarse-textured soils are vulnerable to nutrient deficiency if forest floors are reduced; *avoid site preparation methods that reduce forest floor thickness, such as slashburning or brushblading.*
– site conditions leading to cold air ponding will lead to frost damage of Fd and Sx regeneration; *leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) are advised.*
– sites with fine-textured soils are vulnerable to compaction under wet conditions; *restrict traffic to winter operations or dry soil conditions.*
– sites within this unit with silty soils are susceptible to frost heaving; *avoid exposing mineral soil and plant early in season, when conditions are moist, to encourage root egress.*

*Viburnum edule**Aster conspicuus**Rhytidiadelphus triquetrus***VEGETATION**

Tree Layer: 55% cover

Douglas-fir, hybrid white spruce, paper birch, lodgepole pine

Shrub Layer: 40% cover

Viburnum edule (highbush-cranberry)
Shepherdia canadensis (soopolallie)
Amelanchier alnifolia (saskatoon)
Cornus stolonifera (red-osier dogwood)
Rubus parviflorus (thimbleberry)
Spiraea betulifolia (birch-leaved spirea)
Lonicera involucrata (black twinberry)
Rosa acicularis (prickly rose)
Corylus cornuta (beaked hazelnut)
 hybrid white spruce

Herb Layer: 35% cover

Cornus canadensis (bunchberry)
Aralia nudicaulis (wild sarsaparilla)
Aster conspicuus (showy aster)
Linnaea borealis (twinline)
Orthilia secunda (one-sided wintergreen)
Arnica cordifolia (heart-leaved arnica)
Clintonia uniflora (queen's cup)
Disporum hookeri (Hooker's fairybells)
Thalictrum occidentale (western meadowrue)
Petasites frigidus
 var. *palmatus* (palmate coltsfoot)

Moss Layer: 70% cover

Rhytidiadelphus triquetrus (electrified cat's-tail moss)
Pleurozium schreberi (red-stemmed feathermoss)
Hylocomium splendens (step moss)

SOIL AND SITE:

Moisture Regime: 4–5 (mesic-subhygric)
 Nutrient Regime: B–D (poor-rich)
 * Slope Gradient (%): 0–9
 * Slope Position: lower or level
 Parent Material: variable
 Soil Texture: variable
 Coarse Fragments (%): 2–40

COMMENTS: based on few plots**DISTRIBUTION:** uncommon and small

INTERPRETATIONS

- Site limitations: – sites within this unit with medium- to fine-textured soils often have poor soil structure, leading to poor root growth; *plant stock that will achieve better lateral root development (e.g., Cu-treated), prescribe natural regeneration, or protect advance regeneration.*
- Site preparation: – see Section 12.1
- Species choice: – Fd, Pl, Sx, [BI]
- Vegetation potential: – moderate (black twinberry, thimbleberry, fireweed)
- Reforestation: – attempt to preserve advance Fd regeneration when partial cutting.
– maintain Fd component, especially veterans that are valuable for wildlife and seed production.
– plant sturdy stock as soon after harvesting as possible.
- Concerns: – sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; *restrict traffic to winter operations or dry soil conditions.*
– sites within this unit with silty soils are susceptible to frost heaving; *avoid exposing mineral soil and plant early in season, when conditions are moist, to encourage root egress.*
– Warren’s root collar weevil can cause mortality in young stands, especially where duff layers are thick.

*Oplopanax horridus***VEGETATION**

Tree Layer: 30% cover

hybrid white spruce, Douglas-fir, [paper birch]

Shrub Layer: 40% cover

Oplopanax horridus (devil's club)
Acer glabrum (Douglas maple)
Ribes lacustre (black gooseberry)
Rubus parviflorus (thimbleberry)
Cornus stolonifera (red-osier dogwood)
Viburnum edule (highbush-cranberry)
 [*Lonicera involucrata* (black twinberry)]
 [*Corylus cornuta* (beaked hazelnut)]

Herb Layer: 30% cover

Gymnocarpium dryopteris (oak fern)
Dryopteris expansa (spiny wood fern)
Tiarella trifoliata
 ssp. *unifoliata* (one-leaved foamflower)
Mitella nuda (common mitrewort)
Streptopus amplexifolius (clasping twistedstalk)
Galium triflorum (sweet-scented bedstraw)
Aralia nudicaulis (wild sarsaparilla)
Cornus canadensis (bunchberry)
 [*Disporum hookeri* (Hooker's fairybells)]

*Dryopteris expansa*

Moss Layer: 10% cover

Rhytidiadelphus
triquetrus (electrified cat's-tail
 moss)
Brachythecium spp. (ragged mosses)
Pleurozium schreberi (step moss)
Mnium spp. (leafy mosses)

SOIL AND SITE:

Moisture Regime: 5–6 (subhygric-hygric)
 Nutrient Regime: D-E (rich-very rich)
 Slope Gradient (%): 0–50
 Slope Position: mid-slope to level or
 depression
 Parent Material: (glacio)fluvial, some
 lacustrine
 Soil Texture: medium to coarse
 Coarse Fragments (%): 0–50

*Rhytidiadelphus*
*triquetrus***DISTRIBUTION:** common

INTERPRETATIONS

- Site limitations: – sites within this unit with saturated soils are poorly aerated, which slows root development; *plant seedlings on naturally or artificially raised microsites.*
- Site preparation: – see Section 12.1
- Species choice: – Fd, Sx, [Bl]
- Vegetation potential: – moderate (black twinberry, thimbleberry, fireweed, aspen)
- Reforestation: – attempt to preserve advance Fd regeneration when partial cutting.
– maintain Fd component, especially veterans that are valuable for wildlife and seed production.
– plant sturdy stock as soon after harvesting as possible.
– avoid planting of Sx or Fd in obvious frost pockets unless cover is provided.
- Concerns: – sites within this unit with silty soils are susceptible to frost heaving; *avoid exposing mineral soil and plant early in season, when conditions are moist, to encourage root egress.*
– sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; *restrict traffic to winter operations or dry soil conditions.*
– Warren's root collar weevil can cause mortality in young stands, especially where duff layers are thick.
– site conditions leading to cold air ponding will lead to frost damage of Fd and Sx regeneration; *leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) are advised.*



Alnus incana
ssp. *tenuifolia*



Matteuccia
struthiopteris



Urtica dioica

VEGETATION

Tree Layer: 20% cover

hybrid white spruce, black cottonwood,
subalpine fir

Shrub Layer: 50% cover

Oplopanax horridus (devil's club)
Sambucus racemosa (red elderberry)
Alnus incana
ssp. *tenuifolia* (mountain alder)
Cornus stolonifera (red-osier dogwood)
[*Lonicera involucrata* (black twinberry)]

Herb Layer: 90% cover

Matteuccia struthiopteris (ostrich fern)
Urtica dioica (stinging nettle)
Circaea alpina (enchanter's nightshade)
Gymnocarpium dryopteris (oak fern)
Galium triflorum (sweet-scented bedstraw)
Geum macrophyllum (large-leaved avens)
Tiarella trifoliata
ssp. *unifoliata* (one-leaved foamflower)
[*Equisetum pratense* (meadow horsetail)]
[*Equisetum arvense* (common horsetail)]

Moss Layer: 5% cover

Mnium spp. (leafy mosses)
Brachythecium spp. (ragged mosses)
[*Marchantia polymorpha* (green-tongue liverwort)]

SOIL AND SITE:

Moisture Regime: 5–6 (subhygric-hygric)
Nutrient Regime: D–E (rich-very rich)
* Slope Gradient (%): 0–7
* Slope Position: level, toe
* Parent Material: fluvial
Soil Texture: medium to coarse
Coarse Fragments (%): 2–35

COMMENTS: restricted to localized rich
floodplain sites

DISTRIBUTION: uncommon

INTERPRETATIONS

- Site limitations: – very difficult sites to reforest; *seriously consider managing these sites as wildlife corridors.*
- sites within this unit with saturated soils are poorly aerated, which slows root development; *plant seedlings on naturally or artificially raised microsites.*
- Site preparation: – see Section 12.1
- sites with thick organic horizons reduce spring soil temperatures, slowing root development; *attempt to reduce organic horizon thickness during site preparation.*
- Species choice: – *Fd, Sx, [Bl]*
- Vegetation potential: – high (black twinberry, thimbleberry, fireweed)
- Reforestation: – fill planting may be required after partial cutting.
- plant sturdy stock as soon after harvesting as possible.
- avoid planting Sx or Fd in obvious frost pockets unless cover is provided.
- Concerns: – sites within this unit with silty soils are susceptible to frost heaving; *avoid exposing mineral soil and plant early in season, when conditions are moist, to encourage root egress.*
- sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; *restrict traffic to winter operations or dry soil conditions.*
- Warren’s root collar weevil can cause mortality in young stands, especially where duff layers are thick.
- site conditions leading to cold air ponding will lead to frost damage of Fd and Sx regeneration; *leaving a partial canopy and/or preserving advance regeneration are advised.*

VEGETATION

Tree Layer: 20% cover

hybrid white spruce, trembling aspen, paper birch,
black cottonwood

Shrub Layer: 10% cover

Lonicera involucrata (black twinberry)
Oplopanax horridus (devil's club)
Cornus stolonifera (red-osier dogwood)
Ribes lacustre (black gooseberry)
Amelanchier alnifolia (saskatoon)
Rosa acicularis (prickly rose)
 subalpine fir
 hybrid white spruce

Herb Layer: 80% cover

Equisetum arvense (common horsetail)
Equisetum scirpoides (dwarf scouring-rush)
Cornus canadensis (bunchberry)
Linnaea borealis (twinflower)
Mitella nuda (common mitrewort)
Chimaphila umbellata (prince's pine)
Gymnocarpium dryopteris (oak fern)
Rubus pubescens (trailing raspberry)

Moss Layer: 50% cover

Rhytidiadelphus triquetrus (electrified cat's-tail moss)
Pleurozium schreberi (red-stemmed feathermoss)
Ptilium crista-castrensis (knight's plume)
Brachythecium spp. (ragged mosses)
Mnium spp. (leafy mosses)

SOIL AND SITE:

Moisture Regime: 6 (hygric)
 Nutrient Regime: B-D (poor-rich)
 *Slope Gradient (%): 0
 *Slope Position: level
 Parent Material: glaciofluvial and lacustrine
 Soil Texture: medium to fine
 Coarse Fragments (%): 0

COMMENTS: restricted to localized shallow depression with very poor drainage

DISTRIBUTION: uncommon and small

*Lonicera involucrata**Equisetum arvense**Rhytidiadelphus triquetrus*

INTERPRETATIONS

- Site limitations: – very difficult sites to reforest; *seriously consider managing these sites as wildlife corridors.*
- sites within this unit have saturated soils that are poorly aerated, slowing root development; *plant seedlings on naturally or artificially raised microsites.*
- Site preparation: – see Section 12.1
- avoid creating an excessive number of mounds (e.g., >300/ha), especially on sites within this unit with a water table <30 cm from the surface.
- Species choice: – Sx, [Bl]
- Vegetation potential: – medium (black twinberry, fireweed, bluejoint)
- Reforestation: – preserve advance regeneration.
- supplement advance regeneration by planting sturdy stock in groups, using available raised microsites.
- consider reducing inter-tree spacing to take advantage of available raised microsites.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- maintain Ac component.
- Concerns: – site conditions may lead to frost damage of Sx and Bl regeneration, especially in any naturally occurring or artificially created depression; *leaving a partial canopy and/or preserving advance regeneration are advised.*
- these sites may represent important wildlife habitat; *discuss prescription with wildlife personnel.*
- water table will likely rise above the ground surface in the spring, causing seedling mortality on non-elevated sites.
- this unit is critical to the control of runoff streamflow.
- sites within this unit with thick organic horizons (>10 cm) will have an extreme windthrow hazard; *block layouts must have windfirm boundaries, or a wide buffer of standing timber must be left around such sites.*