TABLE 4.1 *Summary of climate data for biogeoclimatic units within the guide area*[a]

Climatic Characteristics		Biogeoclimatic Unit					
		BWBSdk1	**ESSFmv3**	**SBSmk2**	**SBSwk2**	**SBSwk3**	**SWBmk**
Annual precipitation (mm)	Mean	417 (502)[b]	(743)	692 (543)	952 (759)	608 (622)	579 (664)
	Range	326–513	N/A	N/A	518–1916	518–698	459–699
	SD[c]	(123)	(118)	(77)	(260)	(77)	(116)
Growing-season precipitation (mm)	Mean	221	262	249	335	239	341
	Range	130–278	202–316	209–296	198–583	198–293	254–442
Annual snowfall (cm)	Mean	157	N/A	337	786	209	269
	Range	15–269	N/A	N/A	210–1075	N/A	144–395
Annual temperature (°C)	Mean	-0.3 (-0.7)	(0.4)	1.2 (1.6)	1.4 (1.3)	2.4 (1.7)	-1.5 (-1.7)
	Range	-1.9–2.0	N/A	0.7–1.9	-0.1–5.0	N/A	-3.2–0.5
	SD	(1.2)	(0.7)	(0.6)	(0.7)	(0.5)	(0.7)
Growing degree days (>5 °C)	Mean	953	N/A	1110	1139	1188	667
	Range	595–1897	N/A	N/A	984–1139	866–1510	534–933
Frost-free period (days)	Mean	N/A	N/A	75	91	104	58
	Range	N/A	N/A	N/A	88–95	79–128	37–99

[a] Reynolds, G. 1989. Climatic data summaries for the biogeoclimatic zones of British Columbia. B.C. Min. For., Research Branch, Victoria, B.C., unpublished report.

[b] Data in brackets are estimated using an overlay of the biogeoclimatic map and climatic maps modelled using the PRISM process (Daly et al. 1997)

[c] Standard deviation of the mean.

8 FINLAY-PEACE WET COOL SUB-BOREAL SPRUCE (SBSwk2)[1]

Location
The SBSwk2 occurs above the SBSmk2 along Williston Lake and in all major drainages in the Rocky Mountains from the Narraway River in the south to the Peace Arm of Williston Lake in the north.

Elevation range
750 – 1200 m

Climate
The SBSwk2 is the wettest of the units described (Table 4.1). It is similar in temperature regime to the other sub-boreal units but warmer than the BWBSdk1, which replaces it to the north.

Distinguishing the SBSwk2 from adjoining biogeoclimatic units

BWBSdk1, BWBSmw1, BWBSwk1, BWBSwk2, SBSmk1, and SBSmk2, have:
- less devil's club in the shrub layer on mesic sites; and
- less oak fern in the herb layer on mesic sites.

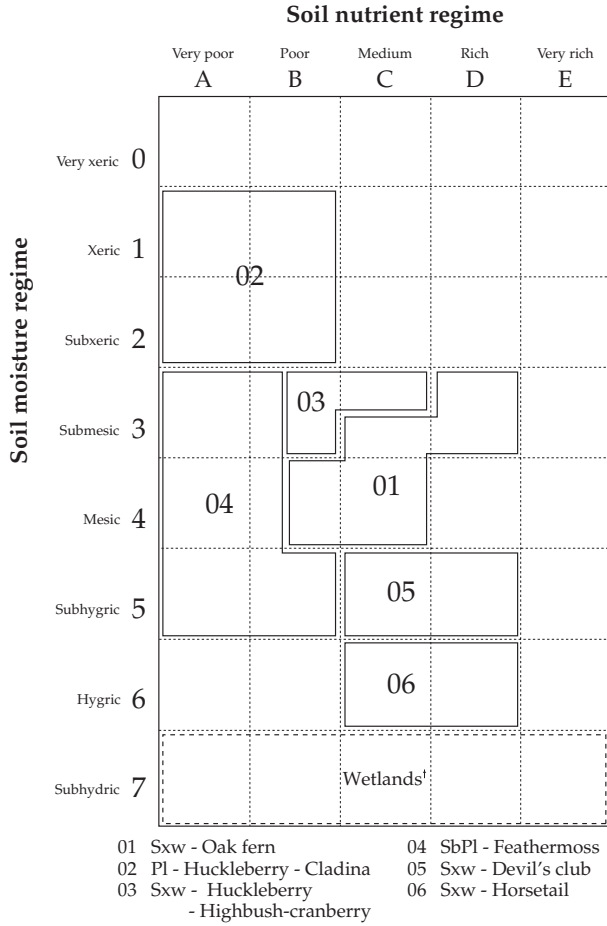
ESSFmv3 has:
- more white-flowered rhododendron but less devil's club in the shrub layer on mesic sites; and
- less oak fern in the herb layer on mesic sites.

Forests
Due to the longer periodicity of stand replacement events in this variant, forested areas are often climax forests dominated by hybrid white spruce and subalpine fir. Lodgepole pine is common on sites drier than mesic. Black spruce occurs on upland sites with lodgepole pine on gentle slopes with a cool aspect and in wetlands. Some fairly homogeneous stands of paper birch occur primarily along the east side of Williston Lake. Black cottonwood occurs along streams and rivers and is often associated with hybrid white spruce.

[1] Formerly SBSj2

Wildlife

This variant provides some winter range for moose and is important to caribou during early winter. It includes summer habitat for black bear, and to a lesser extent, grizzly bear.



† *See MacKenzie and Moran (2004) for classifying wetlands occuring in the area*

FIGURE 8.1 *Edatopic grid displaying site units of the SBSwk2 variant.*

Site Series	02	03	04	01	05	06	
Trees							
Pinus contorta	5	5	3				lodgepole pine
Picea mariana			1				black spruce
Picea glauca × engelmannii		3	3	4	4	5	hybrid white spruce
Shrubs							
Shepherdia canadensis			3				soopolallie
Vaccinium membranaceum	4	4	3	4	3		black huckleberry
Amelanchier alnifolia			2				saskatoon
Spiraea betulifolia		3		3			birch-leaved spirea
Rubus parviflorus		2		4	3	2	thimbleberry
Lonicera involucrata		2		2	2	3	black twinberry
Salix spp.		3	2				willows
Oplopanax horridus				2	4	2	devil's club
Viburnum edule		2	3	3	2	4	highbush-cranberry
Herbs and Dwarf Shrubs							
Linnaea borealis		2	3	3		2	twinberry
Cornus canadensis	2	4	4	4	4	3	bunchberry
Smilacina racemosum		2		2	2		false Solomon's-seal
Rubus pubescens		2	2	2	2	3	trailing raspberry
Streptopus amplexifolius				2	2	2	clasping twistedstalk
Gymnocarpium dryopteris				3	4	4	oak fern
Equisetum arvense					2	5	common horsetail
Mosses and Lichens							
Cladina spp.	3						cladina lichens
Pleurozium schreberi	4	5	5	5	4	5	red-stemmed feathermoss
Ptilium crista-castrensis	2	5	5	4	4	4	knight's plume
Mnium spp.				3	4	4	leafy mosses

Prominence class: 1 2 3 4 5

FIGURE 8.2 *SBSwk2 vegetation table.*

1a Canopy composed almost exclusively of lodgepole pine or mixed lodgepole pine and black spruce; white spruce low cover (<5%) or absent; upper slope or level

2a Black spruce present in canopy; soils generally not coarse textured; *Cladina* spp. (p. 334)[2] low cover (<5%) or absent

SBSwk2/04

2b Black spruce not present in canopy; soils coarse textured; *Cladina* spp. usually moderate to high cover (>5%)

SBSwk2/02

1b Canopy composed partly or entirely of hybrid white spruce, occasionally in combination with lodgepole pine; slope position variable

3a Canopy usually lodgepole pine and hybrid white spruce; mid to upper slope; *Gymnocarpium dryopteris* (p. 293) low cover (<1%) or absent

SBSwk2/03

3b Lodgepole pine usually absent from canopy; mid to lower slope or toe, or level, occasionally upper slope on north aspects; *Gymnocarpium dryopteris* moderate to high cover (>5%)

4a Lower slope; *Oplopanax horridus* (p. 36) moderate to high cover (>5%)

SBSwk2/05

4b Midslope to toe or level; *Oplopanax horridus* low cover (<5%) or absent

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

5a Usually toe or level; seepage water often present; *Equisetum* spp. (pp. 281–282) moderate to high cover (>5%)

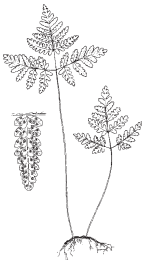
SBSwk2/06

5b Usually midslope, upper slope if north aspect, lower slope if south aspect; seepage water usually absent; *Equisetum* spp. low cover (<5%) or absent

SBSwk2/01

Ribes lacustre

Viburnum edule



Gymnocarpium dryopteris

VEGETATION

Tree Layer: 25% cover
Hybrid white spruce, subalpine fir

Shrub Layer: 30% cover

Ribes lacustre	(black gooseberry)
Viburnum edule	(highbush-cranberry)
Vaccinium membranaceum	(black huckleberry)
Oplopanax horridus	(devil's club)
Alnus viridis ssp. *sinuata***	(Sitka alder)
[*Rubus parviflorus*	(thimbleberry)]
[*Acer glabrum*	(Douglas maple)]
Ribes lacustre	
subalpine fir	

Herb Layer: 60% cover

Gymnocarpium dryopteris	(oak fern)
Cornus canadensis	(bunchberry)
Orthilia secunda	(one-sided wintergreen)
Streptopus amplexifolius	(clasping twistedstalk)
Lycopodium annotinum	(stiff clubmoss)
Rubus pedatus	(five-leaved bramble)
Petasites frigidus var. *palmatus*	(palmate coltsfoot)
*Maianthemum racemosum***	(false Solomon's-seal)
Linnaea borealis	(twinflower)
Tiarella trifoliata	(three-leaved foamflower)

Moss Layer: 80% cover

Pleurozium schreberi	(red-stemmed feathermoss)
Ptilium crista-castrensis	(knight's plume)
Hylocomium splendens	(step moss)

SOIL AND SITE

Moisture Regime:	(3)–4 ((submesic)–mesic)
Nutrient Regime:	(B)–(D) ((poor–) medium (–rich))
Slope Gradient (%):	0–80 (rarely 0)
* Slope Position:	mid; upper if northerly aspect
* Parent Material:	morainal, (glacio) fluvial
Soil Texture:	coarse to moderately fine
Coarse Fragments (%):	0–60

DISTRIBUTION: common

** The name of this species has been updated (see Appendix 1).

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.***

Site preparation:
- see Section 12.

Species choice:
- Pl, Sx, [Bl]
  At, Ep, {Act}

Vegetation potential:
- moderate to high (trembling aspen, fireweed, thimbleberry)

Reforestation:
- plant sturdy stock as soon after harvesting as possible.
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- help maintain stand diversity on sites to be planted with Pl by mapping aspen patches prior to harvest and planting these areas to spruce.
- Act may not be consistently productive on these sites.

Concerns:
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***
- site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***

Vaccinium membranaceum

Alnus viridis ssp. *sinuata*

Cladina spp.

VEGETATION

Tree Layer: 40% cover
Lodgepole pine

Shrub Layer: 60% cover

Vaccinium membranaceum	(black huckleberry)
Alnus viridis ssp. *sinuata*[**]	(Sitka alder)

subalpine fir, hybrid white spruce

Herb Layer: 15% cover

Cornus canadensis	(bunchberry)
Orthilia secunda	(one-sided wintergreen)
Pyrola chlorantha	(green wintergreen)

Moss Layer: 95% cover

Pleurozium schreberi	(red-stemmed feathermoss)
Cladina spp.	(cladina lichens)
Peltigera aphthosa	(freckle pelt lichen)
Dicranum spp.	(crane's-bill mosses)
Barbilophozia spp.	(leafy liverworts)

SOIL AND SITE

Moisture Regime:	1–2 (subxeric–xeric)
Nutrient Regime:	A–B (poor–very poor)
* Slope Gradient (%):	0–6 (usually 0)
* Slope Position:	level or upper
* Parent Material:	glaciofluvial, (fluvial)
* Soil Texture:	coarse
Coarse Fragments (%):	40–60

DISTRIBUTION: uncommon

[**] The name of this species has been updated (see Appendix 1).

INTERPRETATIONS

Site limitations:
- site and soil conditions of this unit result in marginal forest productivity; ***serious consideration should be given to 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 Pl cones.***

Site preparation:
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.
- no site preparation
- see Section 12.

Species choice:
- Pl, (**Bl**, **Sx**)

Vegetation potential: low

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Pl without site preparation.
- Sx and Bl are generally significantly less productive than Pl on this unit and should be accepted only on moist microsites.

Concerns:
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***
- site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; ***natural regeneration is generally better adapted to surviving these conditions, especially during establishment.***
- sites within this unit 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.***

Sxw – Huckleberry – Highbush-cranberry

Vaccinium membranaceum

Viburnum edule

Spiraea betulifolia

VEGETATION

Tree Layer: 30% cover
Lodgepole pine, hybrid white spruce

Shrub Layer: 50% cover

Vaccinium membranaceum	(black huckleberry)
Viburnum edule	(highbush-cranberry)
Spiraea betulifolia	(birch-leaved spirea)
Alnus viridis ssp. *sinuata***	(Sitka alder)
Ribes lacustre	(black gooseberry)
Sorbus scopulina	(western mountain-ash)

subalpine fir, lodgepole pine

Herb Layer: 60% cover

Cornus canadensis	(bunchberry)
Orthilia secunda	(one-sided wintergreen)
Lycopodium annotinum	(stiff clubmoss)
Rubus pedatus	(five-leaved bramble)
Linnaea borealis	(twinflower)
*Maianthemum racemosum***	(false Solomon's-seal)
Pyrola chlorantha	(green wintergreen)
Arnica cordifolia	(heart-leaved arnica)

Moss Layer: 95% cover

Pleurozium schreberi	(red-stemmed feathermoss)
Ptilium crista-castrensis	(knight's plume)

SOIL AND SITE

Moisture Regime:	3 (submesic)
Nutrient Regime:	B–C (poor–medium)
Slope Gradient (%):	0–75
* Slope Position:	mid to upper; or level
Parent Material:	glaciofluvial, morainal, colluvial
* Soil Texture:	moderately coarse to coarse
Coarse Fragments (%):	0–60

DISTRIBUTION: common

** The name of this species has been updated (see Appendix 1).

INTERPRETATIONS

Site limitations:
- sites within this unit with colluvial soils may be difficult to plant; ***attempt to regenerate naturally or make use of advance regeneration.***
- 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.***

Site preparation:
- see Section 12.

Species choice:
- Sx, Pl, [Bl]
  {At, Ep}

Vegetation potential:
- low to moderate (fireweed)

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Pl or Sx without site preparation.
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- At and Ep will generally be less productive on these sites.

Concerns:
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***

black spruce

Equisetum scirpoides

Lycopodium annotinum

VEGETATION

Tree Layer: 25% cover
Hybrid white spruce, lodgepole pine, black spruce

Shrub Layer: 50% cover

Rosa acicularis	(prickly rose)
Vaccinium membranaceum	(black huckleberry)
Viburnum edule	(highbush-cranberry)
Alnus viridis ssp. *sinuata***	(Sitka alder)
Ribes lacustre	(black gooseberry)
Sorbus scopulina	(western mountain-ash)
[*Ledum groenlandicum*	(Labrador tea)]

subalpine fir, hybrid white spruce, black spruce

Herb Layer: 45% cover

Cornus canadensis	(bunchberry)
Linnaea borealis	(twinflower)
Equisetum scirpoides	(dwarf scouring-rush)
Orthilia secunda	(one-sided wintergreen)
Epilobium angustifolium	(fireweed)
Lycopodium annotinum	(stiff clubmoss)
Mitella nuda	(common mitrewort)
Gymnocarpium dryopteris	(oak fern)
Rubus pubescens	(trailing raspberry)
Petasites frigidus var. *palmatus*	(palmate coltsfoot)
Rubus pedatus	(five-leaved bramble)

Moss Layer: 60% cover

Ptilium crista-castrensis	(knight's plume)
Pleurozium schreberi	(red-stemmed feathermoss)
Peltigera aphthosa	(freckle pelt lichen)

SOIL AND SITE

Moisture Regime:	3–5 (submesic–subhygric)
Nutrient Regime:	A–B (very poor–poor)
* Aspect:	northerly or flat
* Slope Gradient (%):	usually less than 25
Slope Position:	mid to upper or level
* Parent Material:	glaciofluvial, morainal, (fluvial)
Soil Texture:	moderately fine to coarse
Coarse Fragments (%):	0–85

DISTRIBUTION: common in some areas

** The name of this species has been updated (see Appendix 1).

INTERPRETATIONS

Site limitations:
- soil drainage and rooting may be impeded by dense basal till layers or poorly structured clay-rich horizons within 30 cm of the soil surface; this results in a shallow rooting zone that is saturated and poorly aerated in the spring following snowmelt, but subject to drought in summer.
- ***the poor productivity resulting from these limitations should dictate a limited investment in intensive silviculture; protect advance regeneration and regenerate naturally whenever possible or if planting then plant stock that will achieve better lateral root development (e.g., Cu-treated).***

Site preparation:
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.
- see Section 12.

Species choice:
- Pl, (***Sx***, ***Sb***)
  {At}

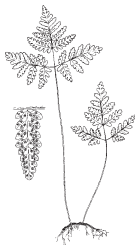
Vegetation potential:
- low

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Pl; ***use stock that will achieve better lateral root development (e.g., Cu-treated).***
- At, Sx, and Sb will generally be less productive than Pl on these sites.

Concerns:
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***
- these sites may be subject to severe growing-season frosts, especially in naturally occurring or artificially created depressional microsites; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***

Oplopanax horridus

Rubus parviflorus



Gymnocarpium dryopteris

VEGETATION

Tree Layer: 15% cover
Hybrid white spruce, subalpine fir

Shrub Layer: 75% cover

Oplopanax horridus	(devil's club)
Rubus parviflorus	(thimbleberry)
Ribes lacustre	(black gooseberry)
subalpine fir	

Herb Layer: 80% cover

Gymnocarpium dryopteris	(oak fern)
Rubus pedatus	(five-leaved bramble)
Tiarella trifoliata	(three-leaved foamflower)
Clintonia uniflora	(queen's cup)
Streptopus amplexifolius	(clasping twistedstalk)
Cornus canadensis	(bunchberry)
*Osmorhiza berteroi***	(mountain sweet-cicely)
Lycopodium annotinum	(stiff clubmoss)
*Maianthemum racemosum***	(false Solomon's-seal)
Rubus pubescens	(trailing raspberry)

Moss Layer: 70% cover

Ptilium crista-castrensis	(knight's plume)
Pleurozium schreberi	(red-stemmed feathermoss)
Mnium spp.	(leafy mosses)

SOIL AND SITE

Moisture Regime:	(4)–5 ((mesic)–subhygric)
Nutrient Regime:	C–D (medium–rich)
Slope Gradient (%):	5–35
* Slope Position:	lower
Parent Material:	variable
Soil Texture:	variable
Coarse Fragments (%):	9–80
* Seepage Water:	may be present

DISTRIBUTION: common

** The name of this species has been updated (see Appendix 1).

INTERPRETATIONS

Site limitations:
- sites within this unit with colluvial soils may be difficult to plant; ***attempt to regenerate naturally or make use of advance regeneration.***

Site preparation:
- see Section 12.

Species choice:
- ***Sx***, ***Bl***, [Pl]
  At, Ep, {Act}

Vegetation potential:
- high (black twinberry, thimbleberry, fireweed)

Reforestation:
- plant sturdy stock as soon after harvesing as possible.
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- planting Sx or Bl in obvious frost pockets should be avoided unless risk can be reduced by providing cover.
- Act may not be consistently productive on these sites.

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 thick organic horizons (>10 cm) have increased windthrow hazard; ***block layouts must have windfirm boundaries, or a wide buffer of standing timber must be left around such sites.***

Ribes lacustre

Cornus stolonifera

Equisetum arvense

VEGETATION

Tree Layer: 15% cover
Hybrid white spruce, subalpine fir

Shrub Layer: 25% cover

Ribes lacustre	(black gooseberry)
Lonicera involucrata	(black twinberry)
Viburnum edule	(highbush-cranberry)
Cornus stolonifera	(red-osier dogwood)
Rosa acicularis	(prickly rose)
subalpine fir	

Herb Layer: 80% cover

Equisetum arvense	(common horsetail)
Equisetum pratense	(meadow horsetail)
Cornus canadensis	(bunchberry)
Rubus pubescens	(trailing raspberry)
Linnaea borealis	(twinflower)
Mitella nuda	(common mitrewort)
Gymnocarpium dryopteris	(oak fern)
Mertensia paniculata	(tall bluebells)
Galium triflorum	(sweet-scented bedstraw)
Streptopus amplexifolius	(clasping twistedstalk)
*Maianthemum racemosum***	(false Solomon's-seal)
*Heracleum maximum***	(cow-parsnip)
Rubus pedatus	(five-leaved bramble)

Moss Layer: 50% cover

Hylocomium splendens	(step moss)
Mnium spp.	(leafy mosses)
Ptilium crista-castrensis	(knight's plume)
Pleurozium schreberi	(red-stemmed feathermoss)

SOIL AND SITE

Moisture Regime:	6 (hygric)
Nutrient Regime:	C–D (medium –rich)
Slope Gradient (%):	0–6
Slope Position:	(lower)–toe or level
Parent Material:	(glacio) fluvial
Soil Texture:	medium to moderately coarse
Coarse Fragments (%):	0–56
Seepage Water:	may be present

DISTRIBUTION: common but small

** The name of this species has been updated (see Appendix 1).

INTERPRETATIONS

Site limitations:
- very difficult sites to manage; ***serious consideration should be given to managing these sites as wildlife corridors.***
- sites with saturated soils are poorly aerated, which slows root development; ***plant seedlings on naturally or artificially raised microsites.***

Site preparation:
- creating an excessive number of mounds (i.e., >300/ha) should be avoided, especially on sites within this unit with a water table <30 cm from the surface.
- see Section 12.

Species choice:
- ***Sx***, ***Bl*** , [***Pl***]
  Act, At

Vegetation potential:
- high (black twinberry, fireweed)

Reforestation:
- advance regeneration should be preserved.
- supplement advance regeneration by planting sturdy stock in groups, using available raised microsites.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.

Concerns:
- site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***
- sites with thick organic horizons (>10 cm) have extreme windthrow hazard; ***block layouts must have windfirm boundaries, or a wide buffer of standing timber must be left around such sites.***
- water table will likely rise above the ground surface in the spring, causing seedling mortality on non-elevated sites.
- these units represent important wildlife habitat; ***discuss prescription with fish and wildlife personnel.***
- this unit is critical to the control of runoff streamflow.

TABLE 5.2.1 *Distribution of Fen Site Associations by biogeoclimatic zone*

		BG PP	BWBS SWB	ESSF	ICH	IDF	MS	SBPS SBS	CDF	CWH	MH
Wf01	Water sedge – Beaked sedge		xx	x	xx	xxx	xxx	xxx		x[i]	
Wf02	Scrub birch – Water sedge		xxx	x	xx	xx	xx	xx			
Wf03	Water sedge – Peat-moss			xx				x			
Wf04	Barclay's willow – Water sedge – Glow mosss		x	xxx			x	x			
Wf05	Slender sedge – Common hook-moss		x		xx	xx	xx	xx			
Wf06	Slender sedge – Buckbean		x		x	x		x			
Wf07	Scrub birch – Buckbean – Shore sedge		x		x	x		x			
Wf08	Shore sedge – Buckbean – Hook-moss		x	x		x	x	x			
Wf09	Few-flowered spike-rush – Hook-moss			x			x	x			
Wf10	Hudson Bay clubrush – Red hook-moss							x			
Wf11	Tufted clubrush – Star moss		x	x	x		x	x			
Wf12	Narrow-leaved cotton-grass – Marsh-marigold			xxx							
Wf13	Narrow-leaved cotton-grass – Shore sedge			xx			x				
Wf50	Narrow-leaved cotton-grass – Peat-moss									x	xxx
Wf51	Sitka sedge – Peat-moss				x				xx	xx	
Wf52	Sweet gale – Sitka sedge								xx	xx[s]	
Wf53	Slender sedge – White beak-rush								x	xx[s]	

x = incidental; < 5% of wetlands xx = minor; 5–25% of wetlands xxx = major; >25% of wetlands
i = inland areas only s = southern subzones only

TABLE 5.2.2 *Fen Species Importance Table*

	Species	Wf01	Wf02	Wf03	Wf04	Wf05	Wf06	Wf07	Wf08
Shrubs	*Betula nana*								
	Salix barclayi								
	Salix pedicellaris								
	Spiraea douglasii								
	Myrica gale								
Herbs and Dwarf Shrubs	*Carex utriculata*								
	Carex aquatilis								
	Comarum palustre								
	Calamagrostis canadensis								
	Carex lasiocarpa								
	Menyanthes trifoliata								
	Carex limosa								
	Carex chordorrhiza								
	Eleocharis quinqueflora								
	Trichophorum alpinum								
	Trichophorum cespitosum								
	Eriophorum angustifolium								
	Caltha leptosepala								
	Carex anthoxanthea								
	Equisetum fluviatile								
	Carex magellanica								
	Carex sitchensis								
	Rhynchospora alba								
	Carex livida								
	Eriophorum chamissonis								
	Vahlodea atropurpurea								
	Drosera anglica								
	Hypericum anagalloides								
	Triantha glutinosa								
	Schoenoplectus tabernaemontani								
	Fauria crista-galli								
	Senecio triangularis								
	Andromeda polifolia								
	Kalmia microphylla								
	Oxycoccus oxycoccos								
	Triglochin maritima								
	Drosera rotundifolia								
	Leptarrhena pyrolifolia								
	Platanthera dilatata								
	Sanguisorba canadensis								
	Utricularia intermedia								
	Viola palustris								
Lichens and Mosses	*Sphagnum* Group I								
	Aulacomnium palustre								
	Drepanocladus spp.								
	Sphagnum Group II								
	Tomentypnum nitens								
	Philonotis fontana								
	Calliergon stramineum								
	Scorpidium spp.								
	Campylium stellatum								
	Warnstorfia spp.								
	Meesia triquetra								

Wf09	Wf10	Wf11	Wf12	Wf13	Wf50	Wf51	Wf52	Wf53	Common Name
									scrub birch
									Barclay's willow
									bog willow
									pink spirea
									sweet gale
									beaked sedge
									water sedge
									marsh cinquefoil
									bluejoint reedgrass
									slender sedge
									buckbean
									shore sedge
									cordroot sedge
									few-flowered spike-rush
									Hudson Bay clubrush
									tufted clubrush
									narrow-leaved cotton-grass
									white mtn. marsh-marigold
									yellow-flowered sedge
									swamp horsetail
									poor sedge
									Sitka sedge
									white beak-rush
									pale sedge
									Chamisso's cotton-grass
									mountain hairgrass
									great sundew
									bog St. John's-wort
									sticky asphodel
									great bulrush
									deer-cabbage
									arrow-leaved groundsel
									bog-rosemary
									western bog-laurel
									bog cranberry
									seaside arrow-grass
									round-leaved sundew
									leatherleaf saxifrage
									fragrant white rein orchid
									Sitka burnet
									flat-leaved bladderwort
									marsh violet
									peat-moss Group I
									glow moss
									hook-mosses
									peat-moss Group II
									golden fuzzy fen moss
									spring moss
									straw spear-moss
									sausage-moss
									yellow star-moss
									hook-mosses
									three-ranked hump-moss

Eriophorum angustifolium – Carex limosa

General Description

Narrow-leaved cotton-grass – Shore sedge fens occur at higher elevations (1200–1800 m) of the ESSF zone in depressions or gradual seepage slopes where standing water persists for most of the short growing season. The **Wf13** appears to be relatively common (at least locally) but has not been extensively sampled.

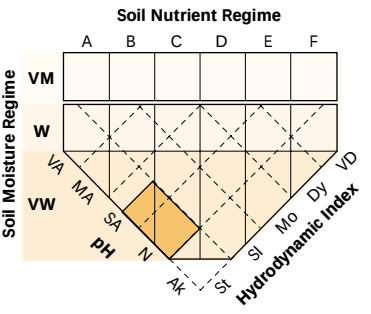
A community dominated by *Eriophorum angustifolium* with *Carex limosa* is typical but some sites may have poor sedge (*Carex magellanica*) instead of *C. limosa*. Grasses such as *Calamagrostis canadensis* and *Vahlodea atropurpurea* and the forb *Caltha leptosepala* are commonly abundant. The moss layer is well developed and is often diverse, with no one species dominating.

Soils are deep peat deposits of fibric or mesic cotton-grass remains. Typic Mesisols and Fibrisols are common soil types.

Characteristic Vegetation

Tree layer (0 - **0** - 0)
Shrub layer (0 - **2** - 10)
Herb layer (20 - **80** - 100)
Caltha leptosepala, Carex aquatilis, ***C. limosa, Eriophorum angustifolium***
Moss layer (0 - **40** - 99)
Aulacomnium palustre, Philonotis fontana, ***Sphagnum*** **Group I**

Wetland Edatopic Grid



Comments

The ***Wf13*** *is wetter than the closely related* ***Wf12*** *and tends to be found more commonly in depressional areas where water ponds. The high-elevation fen units* ***Wf03***, ***Wf04***, ***Wf11***, ***Wf12***, *and* ***Wf13*** *often occur together in complex in extensive subalpine peatlands, each occurring in habitats differing in water flow and ponding (****Wf03*** *driest to* ***Wf13*** *wettest).*

TABLE 5.2.1 *Distribution of Fen Site Associations by biogeoclimatic zone*

		BG PP	BWBS SWB	ESSF	ICH	IDF	MS	SBPS SBS	CDF	CWH	MH
Wf01	Water sedge – Beaked sedge		xx	x	xx	xxx	xxx	xxx		x[i]	
Wf02	Scrub birch – Water sedge		xxx	x	xx	xx	xx	xx			
Wf03	Water sedge – Peat-moss			xx				x			
Wf04	Barclay's willow – Water sedge – Glow mosss		x	xxx			x	x			
Wf05	Slender sedge – Common hook-moss		x		xx	xx	xx	xx			
Wf06	Slender sedge – Buckbean		x		x	x		x			
Wf07	Scrub birch – Buckbean – Shore sedge		x		x	x		x			
Wf08	Shore sedge – Buckbean – Hook-moss		x	x		x	x	x			
Wf09	Few-flowered spike-rush – Hook-moss			x			x	x			
Wf10	Hudson Bay clubrush – Red hook-moss							x			
Wf11	Tufted clubrush – Star moss		x	x	x		x	x			
Wf12	Narrow-leaved cotton-grass – Marsh-marigold			xxx							
Wf13	Narrow-leaved cotton-grass – Shore sedge			xx			x				
Wf50	Narrow-leaved cotton-grass – Peat-moss									x	xxx
Wf51	Sitka sedge – Peat-moss				x				xx	xx	
Wf52	Sweet gale – Sitka sedge								xx	xx[s]	
Wf53	Slender sedge – White beak-rush								x	xx[s]	

x = incidental; < 5% of wetlands xx = minor; 5–25% of wetlands xxx = major; >25% of wetlands
i = inland areas only s = southern subzones only

TABLE 5.2.2 *Fen Species Importance Table*

	Species	Wf01	Wf02	Wf03	Wf04	Wf05	Wf06	Wf07	Wf08
Shrubs	*Betula nana*								
	Salix barclayi								
	Salix pedicellaris								
	Spiraea douglasii								
	Myrica gale								
Herbs and Dwarf Shrubs	*Carex utriculata*								
	Carex aquatilis								
	Comarum palustre								
	Calamagrostis canadensis								
	Carex lasiocarpa								
	Menyanthes trifoliata								
	Carex limosa								
	Carex chordorrhiza								
	Eleocharis quinqueflora								
	Trichophorum alpinum								
	Trichophorum cespitosum								
	Eriophorum angustifolium								
	Caltha leptosepala								
	Carex anthoxanthea								
	Equisetum fluviatile								
	Carex magellanica								
	Carex sitchensis								
	Rhynchospora alba								
	Carex livida								
	Eriophorum chamissonis								
	Vahlodea atropurpurea								
	Drosera anglica								
	Hypericum anagalloides								
	Triantha glutinosa								
	Schoenoplectus tabernaemontani								
	Fauria crista-galli								
	Senecio triangularis								
	Andromeda polifolia								
	Kalmia microphylla								
	Oxycoccus oxycoccos								
	Triglochin maritima								
	Drosera rotundifolia								
	Leptarrhena pyrolifolia								
	Platanthera dilatata								
	Sanguisorba canadensis								
	Utricularia intermedia								
	Viola palustris								
Lichens and Mosses	*Sphagnum* Group I								
	Aulacomnium palustre								
	Drepanocladus spp.								
	Sphagnum Group II								
	Tomentypnum nitens								
	Philonotis fontana								
	Calliergon stramineum								
	Scorpidium spp.								
	Campylium stellatum								
	Warnstorfia spp.								
	Meesia triquetra								

General Description

The Scrub birch – Water sedge Fen Site Association is one of the most common peatland Site Associations throughout the Interior and is absent only from PP/BG and wet ESSF subzones. It is frequently a major component of large peatlands where there is some watertable fluctuation and the surface becomes aerated by mid-season. These sites are often hummocked, with shrubs rooting on elevated microsites.

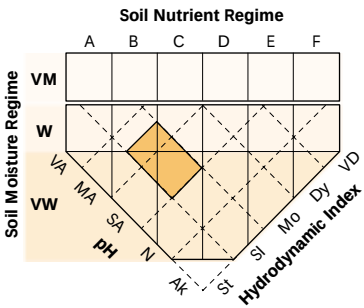
Betula nana and *Carex aquatilis* are the characteristic species but *Salix pedicellaris* and *Carex utriculata* dominate on wetter sites. The moss layer is variable and can be diverse, absent, or dominated by *Tomentypnum nitens*, *Sphagnum*, or *Drepanocladus*. Some drier sites will have scattered, stunted trees (spruce or black spruce most commonly).

Common soil types are terric and typic Mesisols and Fibrisols. Peat depths are frequently between 1 and 2 m but deep sedge-derived peat to 4 m occurs; this Site Association can occassionally occur on thin organic veneers.

Characteristic Vegetation

Tree layer (0 - **0** - 10)
Shrub layer (10 - **35** - 100)
Betula nana, *Salix pedicellaris*
Herb layer (5 - **60** - 100)
Carex aquatilis, ***C. utriculata***, *Comarum palustre*
Moss layer (0 - **70** - 100)
Aulacomnium palustre, Drepanocladus aduncus, Sphagnum Group I, ***Tomentypnum nitens***

Wetland Edatopic Grid



Comments

*The **Wf02** Site Association often occurs around the periphery of the wetter **Wf01** or adjacent to the drier **Wb05**. These three Site Associations may represent a sequence of long-term peatland succession. Many sites have a moss layer with rich and poor site indicators, suggesting that they are in transition from fen to bog conditions.*

*The **Wf02** is one of the most common Interior peatland community types at low to subalpine elevations. It is probably only absent from the AT, BG, and PP zones. In coastal areas, similar sites are occupied by the **Wf52**.*

TABLE 5.2.1 *Distribution of Fen Site Associations by biogeoclimatic zone*

		BG PP	BWBS SWB	ESSF	ICH	IDF	MS	SBPS SBS	CDF	CWH	MH
Wf01	Water sedge – Beaked sedge		xx	x	xx	xxx	xxx	xxx		x[i]	
Wf02	Scrub birch – Water sedge		xxx	x	xx	xx	xx	xx			
Wf03	Water sedge – Peat-moss			xx				x			
Wf04	Barclay's willow – Water sedge – Glow mosss		x	xxx			x	x			
Wf05	Slender sedge – Common hook-moss		x		xx	xx	xx	xx			
Wf06	Slender sedge – Buckbean		x		x	x		x			
Wf07	Scrub birch – Buckbean – Shore sedge		x		x	x		x			
Wf08	Shore sedge – Buckbean – Hook-moss		x	x		x	x	x			
Wf09	Few-flowered spike-rush – Hook-moss			x			x	x			
Wf10	Hudson Bay clubrush – Red hook-moss							x			
Wf11	Tufted clubrush – Star moss		x	x	x		x	x			
Wf12	Narrow-leaved cotton-grass – Marsh-marigold			xxx							
Wf13	Narrow-leaved cotton-grass – Shore sedge			xx			x				
Wf50	Narrow-leaved cotton-grass – Peat-moss									x	xxx
Wf51	Sitka sedge – Peat-moss				x				xx	xx	
Wf52	Sweet gale – Sitka sedge								xx	xx[s]	
Wf53	Slender sedge – White beak-rush								x	xx[s]	

x = incidental; < 5% of wetlands xx = minor; 5–25% of wetlands xxx = major; >25% of wetlands
i = inland areas only s = southern subzones only

TABLE 5.2.2 *Fen Species Importance Table*

	Species	Wf01	Wf02	Wf03	Wf04	Wf05	Wf06	Wf07	Wf08
Shrubs	*Betula nana*								
	Salix barclayi								
	Salix pedicellaris								
	Spiraea douglasii								
	Myrica gale								
Herbs and Dwarf Shrubs	*Carex utriculata*								
	Carex aquatilis								
	Comarum palustre								
	Calamagrostis canadensis								
	Carex lasiocarpa								
	Menyanthes trifoliata								
	Carex limosa								
	Carex chordorrhiza								
	Eleocharis quinqueflora								
	Trichophorum alpinum								
	Trichophorum cespitosum								
	Eriophorum angustifolium								
	Caltha leptosepala								
	Carex anthoxanthea								
	Equisetum fluviatile								
	Carex magellanica								
	Carex sitchensis								
	Rhynchospora alba								
	Carex livida								
	Eriophorum chamissonis								
	Vahlodea atropurpurea								
	Drosera anglica								
	Hypericum anagalloides								
	Triantha glutinosa								
	Schoenoplectus tabernaemontani								
	Fauria crista-galli								
	Senecio triangularis								
	Andromeda polifolia								
	Kalmia microphylla								
	Oxycoccus oxycoccos								
	Triglochin maritima								
	Drosera rotundifolia								
	Leptarrhena pyrolifolia								
	Platanthera dilatata								
	Sanguisorba canadensis								
	Utricularia intermedia								
	Viola palustris								
Lichens and Mosses	*Sphagnum* Group I								
	Aulacomnium palustre								
	Drepanocladus spp.								
	Sphagnum Group II								
	Tomentypnum nitens								
	Philonotis fontana								
	Calliergon stramineum								
	Scorpidium spp.								
	Campylium stellatum								
	Warnstorfia spp.								
	Meesia triquetra								

Betula nana – Menyanthes trifoliata – Carex limosa

General Description

Scrub birch – Buckbean – Shore sedge fens occur throughout the Central and Sub-Boreal Interior at middle elevations below 1400 m, in palustrine basins or patterned fens with permanently high watertables. Most sites are prominently hummocked or ribbed with elevated sites and permanent shallow-water hollows.

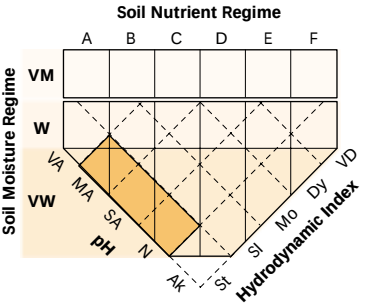
An open cover of *Betula nana* or *Salix pedicellaris* rooted on elevated microsites is distinctive. Low sedges such as *Carex chordorrhiza* and *C. limosa* are prominent throughout most sites, while *Comarum palustre* and *Menyanthes trifoliata* occupy inundated depressions. The composition of the well-developed bryophyte layer is variable. Mixed-species *Sphagnum* cover is common on some sites (not necessarily the most acidic), brown mosses are common on others, while true calciphiles such as *Scorpidium scorpioides* occur only on the most basic sites.

Mesisols and Fibrisols derived from sedge/moss peat are typical. Peat is often >1 m in depth but, less commonly, sites occur on peat veneers.

Characteristic Vegetation

Tree layer (0 - **0** - 0)
Shrub layer (10 - **26** - 55)
Betula nana*, *Salix pedicellaris
Herb layer (20 - **60** - 80)
Carex aquatilis, C. chordorrhiza, ***C. limosa***, ***Comarum palustre***, ***Menyanthes trifoliata***
Moss layer (20 - **95** - 100)
Drepanocladus aduncus, Scorpidium spp., *Sphagnum* Group I, *Sphagnum* Group II, *Tomentypnum nitens*

Wetland Edatopic Grid



Comments

*The **Wf07** covers much of the acidity/alkalinity gradient, with little change in the vascular flora but a marked difference in the bryophyte composition. Some sites have more* Sphagnum *and are generally more bog-like, while others are more clearly rich fens. These sites are similar to the **Wb13** but have a well developed shrub layer. However, there is a high degree of intergradation with few clear environmental criteria to separate most sites (except at the extremes of the spectrum). Hence, the variation has been grouped into a single Site Association.*

*The open shrub cover of the the **Wf07** distinguishes it from the wetter **Wf08** or **Wb13**. The **Wf07** may represent the middle stage of a peatland succession sequence: **Wf08** >> **Wf07** >> **Wb11** in some regions .*

TABLE 13.1 *Some important wildlife species that utilize biogeoclimatic units within the guide area*

Species	Occurrence of species by unit					
	BWBSdk1	ESSFmv3	SBSmk2	SBSwk2	SBSwk3[b]	SWBmk
Mountain goat	ps	Y	ps	ps	ps	Y
Stone sheep	ps	ps	-	-	-	Y
Caribou (northern pop.)	Y	Y	y	y	y	Y
Elk	y	sa	y	y	y	Y
Moose	Y	pSA	Y	Y	Y	Y
Grizzly bear[a]	Y	Y	y	Y	Y	Y
Gray wolf	Y	Y	Y	Y	Y	Y
Wolverine[a]	Y	Y	Y	Y	Y	Y
Fisher[a]	Y	y	Y	Y	Y	y
Marten	Y	Y	Y	Y	Y	Y

[a] Species considered to be threatened or endangered ("red-listed") or of special concern ("blue-listed") (B.C. Conservation Data Centre 2003.)

[b] Includes SBSwk3a

Key to coding

Abundance:

Uppercase letter = common to very common and abundant

Lowercase letter = rare, scarce, or uncommon and scattered

Timing:

Y, y = yearlong; P, p = spring (approximately March–May); S, s = summer (approximately June–August); A, a = autumn (approximately September–November); Example: pSA = scarce in spring, common–abundant in summer and autumn

Fisher – uses pole-sapling and young mixed forest in summer, mature forest and old growth in winter, possibly for snow interception; requires >50% crown closure; natal dens in large tree cavities; also uses coarse woody debris, slash piles, edges/ecotones.

Striped skunk – opportunistic omnivore; prefers open forest and forest edge.

Ermine – dependent on small mammals, chiefly voles; most common in early seral stages.