

TABLE 8. Summary of climate data for biogeoclimatic units within the guide area<sup>a</sup>

Climatic Characteristics		Biogeoclimatic Unit			
		ESSFwc3	ESSFwk2	ESSFmv2	ESSFmv4
<b>Annual Precipitation (mm)</b>	Mean	1408.5	1537.8	780.4	N/A <sup>b</sup>
	Range	1177.1 - 1624.7	1190.4-1737.8	414.2 - 1259.3	N/A
<b>Growing Season Precipitation (mm)</b>	Mean	510.3	456.7	368.9	N/A
	Range	401.6 - 631.0	229.9- 683.7	243.8 - 507.5	N/A
<b>Annual Snowfall (cm)</b>	Mean	782.1	N/A	N/A	N/A
	Range	N/A	N/A	N/A	N/A
<b>Annual Temperature (°C)</b>	Mean	-1.0	0.3	-0.3	N/A
	Range	-3.1- 1.1	-0.5 - 1.0	-9-1.9	N/A
<b>Growing Degree Days (&gt;5°C°)</b>	Mean	671	N/A	N/A	N/A
	Range	N/A	N/A	N/A	N/A
<b>Frost-Free Period (days)</b>	Mean	75	N/A	N/A	N/A
	Range	N/A	N/A	N/A	N/A

<sup>a</sup> Reynolds, G. 1989. Climatic data summaries for the biogeoclimatic zones of British Columbia. B.C. Min. For., Research Branch. Victoria, B.C. Unpublished report.

<sup>b</sup> N/A: not available.

TABLE 9. Some important wildlife species that utilize ESSF variants described in the guide

Species	Occurrence in Variants			
	ESSFmv2	ESSFmv4	ESSFwk2	ESSFwc3
Mountain Goat	*	*	*	*
Rocky Mountain Bighorn Sheep <sup>a</sup>	*			
Stone Sheep	*	*		
Caribou <sup>a</sup>	*	*	*	*
Elk	*	*		
Moose	*	*	*	*
Mule Deer	*	*		
White-tailed Deer	*			
Grizzly Bear <sup>a</sup>	*	*	*	*
Furbearers	*	*	*	*

<sup>a</sup> denotes species "Blue Listed" by Managing Wildlife to 2001: A Discussion Paper. 1991. B.C. Wildl. Br., B.C. Min. Environ., Victoria, B.C. 152 pp. Because of major declines in their populations, they are considered sensitive and/or deserving of management attention.



## ESSFmv2 Variant Summary

### 4.1 Bullmoose Moist Very Cold Engelmann Spruce - Subalpine Fir<sup>5</sup>

#### Location

The ESSFmv2 occurs predominantly east of the Rocky Mountain divide as far south as Willmore Wilderness Park and as far north as the Peace Arm of Williston Reservoir. It generally occurs between 1000 - 1400 m, and above the SBSwk2 (MacKinnon *et al.* 1990) or BWBSwk1 (Delong *et al.* 1990).

#### Elevation range

950 - 1550 m

#### Climate

The ESSFmv2 variant is the driest and coldest of the lower elevation ESSF variants, for which there are data, in the Prince George Forest Region. The coldness of this variant reflects its northern position and its dryness reflects its lee position with respect to the Rocky Mountains (Table 8).

#### Soils, Geology and Landforms

This variant lies within the Rocky Mountain Foothills. Bedrock types consist predominantly of sandstones and shales of Jurassic and Cretaceous age, with minor amounts of limestone and dolomite of Devonian age. Colluvial deposits have gravelly coarse and medium textures related to the bedrock from which they were derived, and have soil profiles somewhat less strongly developed than those occurring on morainal materials of similar texture (i.e., Regosols and Brunisols vs. Podzols, Luvisols and Brunisols).

#### Distinguishing the ESSFmv2 from adjoining biogeoclimatic units

SBSwk2 has:

- more highbush-cranberry but less white-flowered rhododendron in the shrub layer; and
- trembling aspen and paper birch that occur occasionally in the canopy.

BWBSwk1 has:

- less subalpine fir present in the canopy;
- prickly rose but no white-flowered rhododendron in the shrub layer; and
- more trailing raspberry but less five-leaved bramble in the herb layer, especially on mesic sites.

ESSFmv4 has:

- fewer sites dominated by devil's club and oak fern.

ESSFwk2 has:

- more oak fern and one- and three-leaved foamflower on mesic and wetter sites.

#### Forests

Like most ESSF forests, climax forests in the ESSFmv2 are dominated by Engelmann spruce and subalpine fir. A greater incidence of fire than is found in most ESSF forests has led to a larger portion of the stands being dominated by lodgepole pine. Mixtures of lodgepole pine and black spruce also occur on

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<sup>5</sup> Formerly ESSFn1

poor sites at the lower elevational extent of this variant.

### **Wildlife**

The ESSFmv2 supports a wide variety of wildlife. Towards the southern portions of this variant, wind-swept ridges with terrestrial lichen are used by Caribou during heavy snowfall years. Alpine habitat associated with high elevation sites near tree line are used by Caribou in the summer. More rugged sites near escape terrain are used by Mountain Goats, especially in the winter. South of Narraway River, the most northerly population of Rocky Mountain Bighorn Sheep frequently summer near tree line if in proximity to high elevation lakes. Stone Sheep use lower elevation grass/shrub sites near the Peace Arm of Williston Reservoir and upper elevation grass/shrub sites north of the Hart Highway when these habitats are located near escape terrain. Coniferous stands are used by Elk during their annual movements from summer alpine habitats to winter open grass/aspenshrubland habitats. Moose are found throughout this variant in the summer. The higher foothills and mountain slopes support Mule Deer and White-tailed Deer in the summer. Mature coniferous forests are used by Wolverine, Marten, Red Squirrel, and Spruce Grouse. Mixed-aged stands with small openings and edges support Wolverine, Fisher, Grizzly Bear, and Great Horned Owl.

**ESSFmv2**  
Edatopic Grid

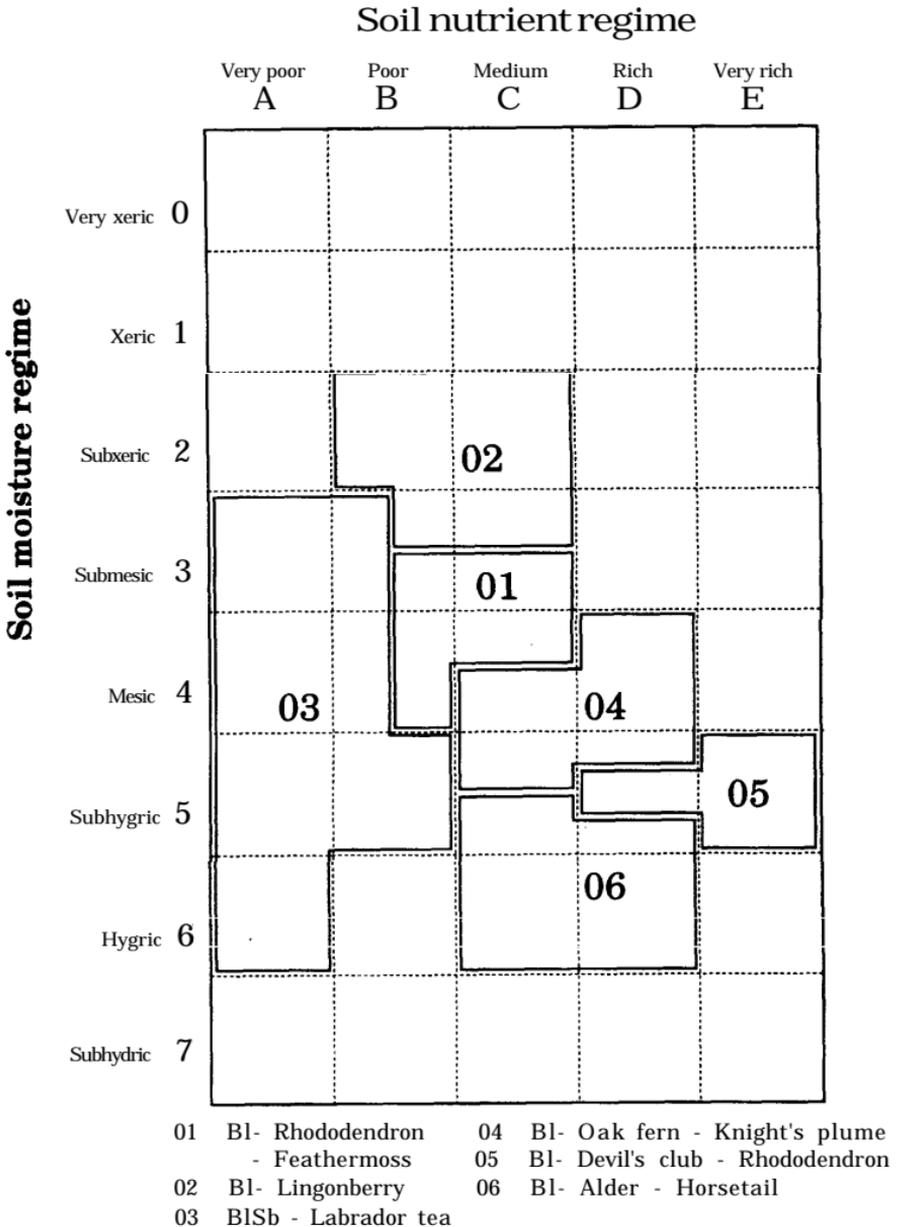


FIGURE 9. Edatopic grid displaying site series of the ESSFmv2 variant.

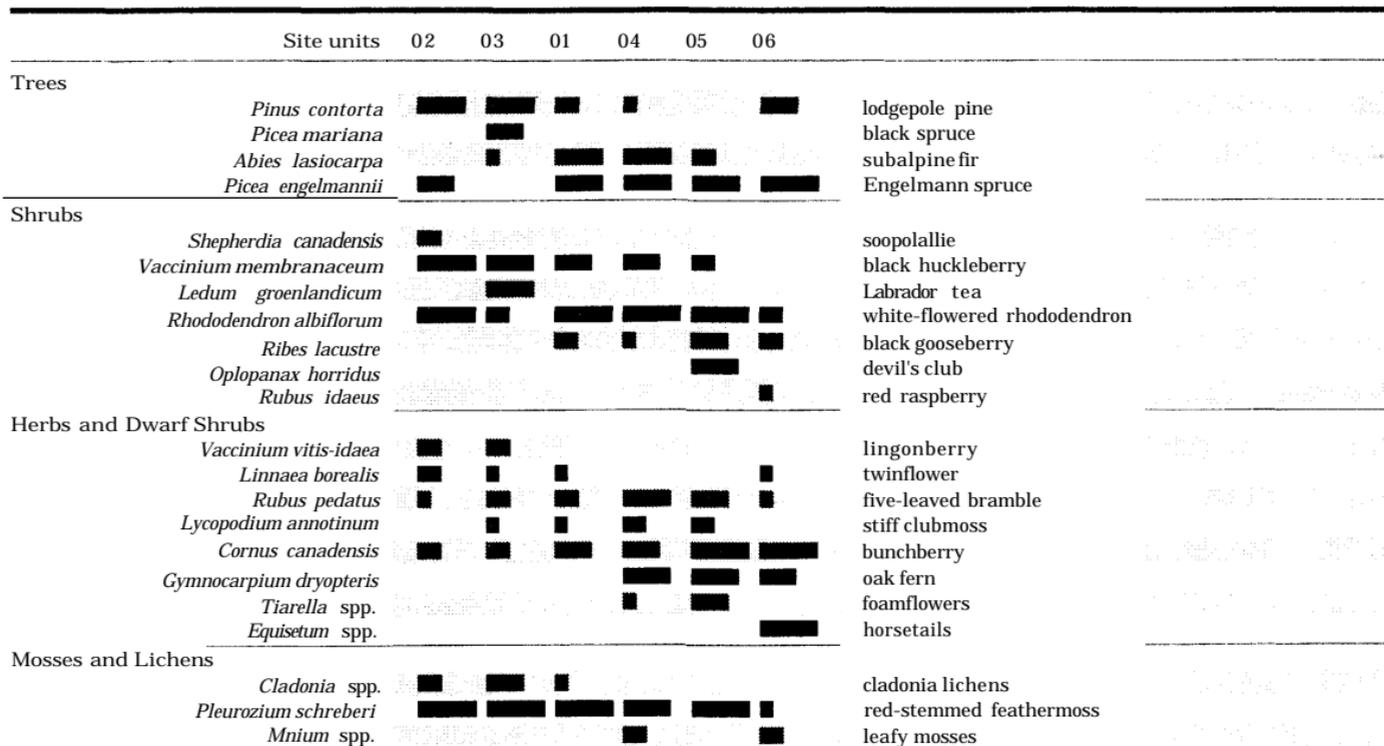


Figure 10. ESSFmv2 vegetation table.

Prominence class ■ 1 ■ 2 ■ 3 ■ 4 ■ 5

ESSFmv2  
Site Series Key

- 1a Canopy dominated by lodgepole pine or a combination of black spruce and lodgepole pine; occurring on mid to crest slope positions.
- 2a Canopy dominated by a combination of black spruce and lodgepole pine; *Ledum groenlandicum* (p. 40)<sup>6</sup> present; generally occurring on mid-slope position.  
ESSFmv2/03
- 2b Canopy dominated by lodgepole pine; *Ledum groenlandicum* absent; generally occurring on upper or crest slope positions.  
ESSFmv2/02
- 1b Canopy dominated by Engelmann spruce or subalpine fir, black spruce and/or lodgepole pine minor or absent; occurring on mid to level and depression slope positions.
- 3a Canopy often dominated by Engelmann spruce; *Oplopanax horridus* (p. 36) or *Equisetum* spp. (p. 280) abundant (> 10% cover).
- 4a Occurring on level or depression slope positions near open water or bogs; *Equisetum* spp. abundant, *Oplopanax horridus* absent.  
ESSFmv2/06
- 4b Generally occurring on lower slope or toe slope positions; *Equisetum* spp. absent, *Oplopanax horridus* abundant.  
ESSFmv2/05
- 3b Canopy dominated by Engelmann spruce or subalpine fir; *Oplopanax horridus* and *Equisetum* spp. low cover (< 1% cover) or absent.
- 5a Generally occurring in mid to lower slope positions; *Gymnocarpium dryopteris* (p. 293) moderate cover (> 1% cover).  
ESSFmv2/04
- 5b Slope position variable but often mid; *Gymnocarpium dryopteris* low cover (< 1% cover) or absent.  
ESSFmv2/01

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<sup>6</sup> Page numbers refer to the publication Plants of Northern British Columbia (MacKinnon et al. 1992).



*Rhododendron  
albiflorum*



*Orthilia secunda*



*Pleurozium schreberi*

**VEGETATION**

Tree Layer: 40% cover

Engelmann spruce, subalpine fir, (lodgepole pine)

Shrub Layer: 60% cover

*Rhododendron albiflorum* (white-flowered rhododendron)

*Vaccinium membranaceum* (black huckleberry)

*Ribes lacustre* (black gooseberry)

subalpine fir

Herb Layer: 35% cover

*Cornus canadensis* (bunchberry)

*Orthilia secunda* (one-sided wintergreen)

*Lycopodium annotinum* (stiff clubmoss)

*Arnica cordifolia* (heart-leaved arnica)

[*Rubus pedatus* (five-leaved bramble)]

[*Linnaea borealis* (twinline)]

Moss Layer: 70% cover

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

*Pleurozium schreberi* (red-stemmed feathermoss)

[*Hylocomium splendens* (step moss)]

**SOIL AND SITE**

Moisture Regime: 3-4 (sm-m)

Nutrient Regime: B-C (p-m)

Slope Gradient (%): 0-53

\* Slope Position: mid (upper - lower)

Parent Material: variable, often morainal or

colluvial over rock

\* Soil Texture: medium (- coarse)

Coarse Fragments (%): 6-57 (usually less than 30)

Seepage Water: rarely present

**DISTRIBUTION:** very common

### INTERPRETATIONS

- Site limitations: - sites within this unit with thick organic horizons (> 10 cm) have reduced spring soil temperatures, which slows root development; **reduce organic horizon thickness during site preparation.**
- Silviculture system: - see Section 5.1  
- log on firm snowpack to protect advance regeneration.  
- under a partial cutting system spruce regeneration requires mineral soil exposure and/or planting.  
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.  
- reduce spruce beetle hazard by avoiding high stumps and shaded slash > 15 cm diameter.
- Site preparation: - see Section 5.2
- Species choice: - Bl, Se, [Pl]
- Vegetation potential: - moderate (white-flowered rhododendron, fireweed)
- Reforestation: - try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.  
- advance Bl regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).  
- plant stock with large caliper and low shoot-to-root ratio immediately after harvest.
- 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 preserving advance regeneration are advised.**  
- heavy snowpack may cause stem deformity, especially on steep slopes; **obstacle planting is advised.**  
- if heavy equipment is used in summer, during or after partial cutting, every attempt should be made to avoid disturbing roots of standing trees.  
- spruce beetle may infest partial cut stands after harvesting; **minimize blowdown and avoid mechanical damage to residuals.**  
- tomentosus root rot may cause low to moderate problems in mature spruce-dominated stands.



*Vaccinium membranaceum*



*Linnaea borealis*



*Cladonia* spp.

**VEGETATION**

Tree Layer: 35% cover  
Lodgepole pine, Engelmann spruce

Shrub Layer: 80% cover  
*Vaccinium membranaceum* (black huckleberry)  
*Rhododendron albiflorum* (white-flowered rhododendron)  
[*Alnus tenuifolia* (mountain alder)]  
[*Alnus crispa* ssp. *sinuata* (Sitka alder)]  
subalpine fir

Herb Layer: 20% cover  
*Cornus canadensis* (bunchberry)  
*Linnaea borealis* (twinflower)  
*Orthilia secunda* (one-sided wintergreen)  
[*Vaccinium vitis-idaea* (lingonberry)]

Moss Layer: 40% cover  
*Pleurozium schreberi* (red-stemmed feathermoss)  
*Ptilium crista-castrensis* (knight' s plume)  
*Cladonia* spp. (cladonia lichens)  
*Peltigera* spp. (peltigera lichens)  
[*Dicranum*spp. (dicranum mosses)]  
[*Hylocomium splendens* (step moss)]

**SOIL AND SITE**

Moisture Regime: 2-3 (sx-sm)  
Nutrient Regime: B-C (p-m)  
Slope Gradient (%): 0-49  
\* Slope Position: crest or upper  
\* Parent Material: colluvial or morainal over rock  
\* Soil Texture: coarse  
Coarse Fragments (%): 20-75

**DISTRIBUTION:** uncommon

**COMMENTS:** based on limited data

## Bl - Lingonberry (ESSFmv2/02)

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### **INTERPRETATIONS**

Site limitations: - the combination of very poor productivity and high wildlife value means that these sites should be protected from harvesting.

Silvicultural system: - avoid logging

**VEGETATION**

Tree Layer: 35% cover  
Lodgepole pine, black spruce

Shrub Layer: 60% cover  
*Vaccinium membranaceum* (black huckleberry)  
*Ledum groenlandicum* (Labrador tea)  
*Rhododendron albiflorum* (white-flowered rhododendron)  
[*Vaccinium myrtilloides* (velvet-leaved blueberry)]  
subalpine fir  
black spruce

Herb Layer: 12% cover  
*Cornus canadensis* (bunchberry)  
*Vaccinium vitis-idaea* (lingonberry)  
[*Rubus pedatus* (five-leaved bramble)]  
[*Lycopodium annotinum* (stiff clubmoss)]  
[*Empetrum nigrum* (crowberry)]  
[*Linnaea borealis* (twinflower)]

Moss Layer: 80% cover  
*Pleurozium schreberi* (red-stemmed feathermoss)  
*Cladonia* spp. (cladonia lichens)  
*Ptilium crista-castrensis* (knight's plume)  
*Hylocomium splendens* (step moss)  
*Peltigera* spp. (peltigera lichens)

**SOIL AND SITE**

Moisture Regime: 3-6 (sm-hg)  
Nutrient Regime: A-B (vp-p)  
\* Slope Gradient (%): 0-49, generally < 10  
Slope Position: variable, often level or mid  
Parent Material: morainal or colluvial  
\* Soil Texture: coarse to medium  
Coarse Fragments (%): 0-80, often > 40

**DISTRIBUTION:** common

**COMMENTS:** sites in this unit always have one or both of black spruce and *Ledum groenlandicum*



*Ledum groenlandicum*



*Vaccinium vitis-idaea*



*Pleurozium schreberi*

## BISb - Labrador tea (ESSFmv2/03)

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### INTERPRETATIONS

- Site limitations:
- sites within this unit with thick organic horizons (> 10 cm) have reduced spring soil temperatures, which slows root development; **reduce organic horizon thickness during site preparation.**
  - soils are saturated in the spring, but may experience drought in summer, both resulting in poor root development; **poor productivity resulting from these limitations should dictate a limited intensive silvicultural investment.**
- Silviculture system:
- see Section 5.1
  - minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.
- Site preparation:
- light scarification for seed bed preparation or summer logging with no site preparation.
- Species choice:
- Bl, Pl, Se, (Sb)
- Vegetation potential:
- low
- Reforestation:
- attempt to regenerate naturally if potential exists.
- 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).**
  - frost will cause regeneration damage, especially in any naturally occurring or artificially created depressions; **leaving a partial canopy and/or planting a frost-resistant species (e.g., Pl) is advised.**
  - heavy snowpack may cause stem deformity, especially on steep slopes; **obstacle planting is advised.**
  - trafficability may be a problem on these sites during the summer.
  - western gall rust can cause stem damage and mortality in lodgepole pine stands.



*Vaccinium membranaceum*



*Gymnocarpium dryopteris*



*Rubus pedatus*

**VEGETATION**

Tree Layer: 40% cover

Engelmann spruce, subalpine fir, [lodgepole pine]

Shrub Layer: 40% cover

*Rhododendron albiflorum* (white-flowered rhododendron)

*Vaccinium membranaceum* (black huckleberry)

*Ribes lacustre* (black gooseberry)

*Sorbus scopulina* (western mountain-ash)

subalpine fir

Engelmann spruce

Herb Layer: 55% cover

*Gymnocarpium dryopteris* (oak fern)

*Rubus pedatus* (five-leaved bramble)

*Cornus canadensis* (bunchberry)

*Lycopodium annotinum* (stiff clubmoss)

*Streptopus amplexifolius* (clasping twistedstalk)

*Valeriana sitchensis* (Sitka valerian)

*Orthilia secunda* (one-sided wintergreen)

*Veratrum viride* (Indian hellebore)

[*Tiarella trifoliata* (three-leaved foamflower)]

Moss Layer: 50% cover

*Pleurozium schreberi* (red-stemmed feathermoss)

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

[*Hylocomium splendens* (step moss)]

[*Mnium* spp. (leafy mosses)]

**SOIL AND SITE**

Moisture Regime: 4-5 (m-shg)

Nutrient Regime: C-D (m-r)

\* Slope Gradient (%): 0-50, often < 20

Slope Position: mid - toe or depression

Parent Material: variable, often morainal

\* Soil Texture: medium - coarse

Coarse Fragments (%): 5-58

**DISTRIBUTION:** common

## Bl- Oak fern - Knight's plume (ESSFmv2/04)

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### INTERPRETATIONS

- Site limitations:
- sites within this unit with thick organic horizons (> 10 cm) have reduced spring soil temperatures, which slows root development; **reduce organic horizon thickness during site preparation.**
- Silviculture system:
- see Section 5.1
  - log on firm snowpack to protect advance regeneration.
  - under a partial cutting system spruce regeneration requires mineral soil exposure and/or planting.
  - reduce spruce beetle hazard by avoiding high stumps and shaded slash > 15 cm diameter.
- Site preparation:
- see Section 5.2
- Species choice:
- Bl, Se, [Pl]
- Vegetation potential:
- high (white-flowered rhododendron, fireweed, Sitka alder)
- Reforestation:
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
  - advance Bl regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).
  - plant stock with large caliper and low shoot-to-root ratio immediately after harvest.
- 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 preserving advance regeneration are advised.**
  - heavy snowpack may cause stem deformity, especially on steep slopes; **obstacle planting is advised.**
  - spruce beetle may infest partial cut stands after harvesting; **minimize blowdown and avoid mechanical damage to residuals.**
  - if heavy equipment is used in summer, during or after partial cutting, every attempt should be made to avoid disturbing roots of standing trees.
  - tomentosus root rot may cause low to moderate problems in mature spruce-dominated stands.

VEGETATION

Tree Layer: 25% cover  
Engelmann spruce, subalpine fir

Shrub Layer: 70% cover  
*Rhododendron albiflorum* (white-flowered rhododendron)  
*Oplopanax horridus* (devil's club)  
*Ribes lacustre* (black gooseberry)  
*Vaccinium ovalifolium* (oval-leaved blueberry)  
*Rubus parviflorus* (thimbleberry)  
*Vaccinium membranaceum* (black huckleberry)  
 subalpine fir

Herb Layer: 80% cover  
*Cornus canadensis* (bunchberry)  
*Gymnocarpium dryopteris* (oak fern)  
*Tiarella trifoliata* (three-leaved foamflower)  
*Rubus pedatus* (five-leaved bramble)  
*Streptopus roseus* (rosy twisted stalk)  
*Clintonia uniflora* (queen's cup)  
*Lycopodium annotinum* (stiff clubmoss)  
*Streptopus amplexifolius* (clasping twisted stalk)

Moss Layer: 60% cover  
*Pleurozium schreberi* (red-stemmed feathermoss)  
*Ptilium crista-castrensis* (knight's plume)  
*Dicranum fuscescens* (curly heron's-bill moss)

SOIL AND SITE

Moisture Regime: 5 (shg)  
 Nutrient Regime: D-E (r-vr)  
 Slope Gradient (%): 0-53  
 \* Slope Position: lower - toe  
 Parent Material: morainal, colluvial, or glaciofluvial  
 Soil Texture: variable  
 Coarse Fragments (%): 11-57

DISTRIBUTION: common



*Oplopanax horridus*



*Gymnocarpium dryopteris*



*Tiarella trifoliata*

## B1- Devil's club - Rhododendron (ESSFmv2/05)

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### INTERPRETATIONS

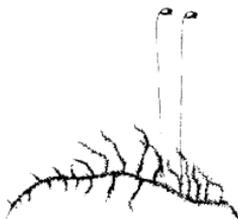
- Site limitations: - sites within this unit with thick organic horizons (> 10 cm) have reduced spring soil temperatures, which slows root development; **reduce organic horizon thickness during site preparation.**
- Silviculture system: - clearcut (winter) or partial cut (see Section 5.1)  
- log on firm snowpack to protect advance regeneration.  
- under a partial cutting system spruce regeneration requires mineral soil exposure and/or planting.  
- reduce spruce beetle hazard by avoiding high stumps and shaded slash > 15 cm diameter.
- Site preparation: - see Section 5.2
- Species choice: - Bl, Se, [PI]
- Vegetation potential: - very high (white-flowered rhododendron, fireweed, thimbleberry)
- Reforestation: - try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.  
- advance Bl regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).  
- plant stock with large caliper and low shoot-to-root ratio immediately after harvest.
- 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 preserving advance regeneration are advised.**  
- heavy snowpack may cause stem deformity, especially on steep slopes; **obstacle planting is advised.**  
- if heavy equipment is used in summer, during or after partial cutting, every attempt should be made to avoid disturbing roots of standing trees.  
- sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; **restrict traffic to winter operations.**  
- sites within this unit with thick organic horizons have increased windthrow hazard; **block layouts must have wind-firm boundaries.**  
- spruce beetle may infest partial cut stands after harvesting; **minimize blowdown and avoid mechanical damage to residuals.**  
- tomentosus root rot may cause low to moderate problems in mature spruce-dominated stands.



*Alnus tenuifolia*



*Equisetum pratense*



*Brachythecium* spp.

**VEGETATION**

Tree Layer: 25% cover

Engelmann spruce, lodgepole pine

Shrub Layer: 70% cover

*Alnus tenuifolia* (mountain alder)  
*Rhododendron albiflorum* (white-flowered rhododendron)  
*Ribes lacustre* (black gooseberry)  
*Rubus idaeus* (red raspberry)

Herb Layer: 80% cover

*Equisetum pratense* (meadow horsetail)  
*Cornus canadensis* (bunchberry)  
*Gymnocarpium dryopteris* (oak fern)  
*Calamagrostis canadensis* (bluejoint)  
*Rubus pubescens* (trailing raspberry)  
*Arnica cordifolia* (heart-leaved arnica)  
*Equisetum arvense* (common horsetail)

Moss Layer: 80% cover

*Brachythecium* spp. (ragged mosses)  
*Ptilium crista-castrensis* (knight's plume)  
*Hylocomium splendens* (step moss)  
*Mnium* spp. (leafy mosses)

**SOIL AND SITE**

Moisture Regime: 5-6 (shg-h)  
 Nutrient Regime: C-D (m-r)  
 \* Slope Gradient (%): 0-12  
 \* Slope Position: level or depressional  
 Parent Material: morainal or fluvial  
 Soil Texture: coarse to medium  
 Coarse Fragments (%): 0-35

**DISTRIBUTION:** uncommon and small in size

**COMMENTS:** based on limited data

## B1- Alder - Horsetail (ESSFmv2/06)

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### INTERPRETATIONS

- Site limitations:
- very difficult sites to manage; **serious consideration should be given to managing these sites as wildlife corridors.**
  - sites within this unit with thick organic horizons (> 10 cm) have reduced spring soil temperatures, which slows root development; **reduce organic horizon thickness during site preparation.**
  - saturated soils are poorly aerated, which slows root development; **plant seedlings on naturally or artificially raised microsites.**
- Silviculture system:
- clearcut (winter) or partial cut (see Section 5.1)
- Site preparation:
- see Section 5.2
  - creating an excessive number of microsites (e.g., >300/ha) should be avoided, especially on sites with a water table < 30 cm from the surface.
- Species choice:
- **Bl, Se, [P1]**
- Vegetation potential:
- very high (white-flowered rhododendron, fireweed)
- Reforestation:
- plant stock in groups, using available raised microsites, rather than evenly across the site.
  - try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
  - advance B1 regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).
- 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 preserving advance regeneration are advised.**
  - sites within this unit with high water tables, combined with thick organic horizons (>10 cm), have increased windthrow hazard: **block layouts must have wind-firm boundaries.**
  - water table will likely rise above the ground surface in the spring, causing seedling mortality.
  - these units represent important wildlife habitat; **discuss prescription with fish and wildlife personnel.**
  - this unit is critical to the control of runoff streamflow.

TABLE 16. Figure and page numbers for site preparation keys

<b>Site Series</b>	<b>Site Group</b>	<b>Figure Number</b>	<b>Page Number</b>
ESSFmv2/01 ESSFmv4/01,04	Bl - Rhododendron - Knight's plume	24	124
ESSFmv2/04 ESSFwk2/01,02,03,04	Bl - Rhododendron - Oak fern	23	122
ESSFmv2/05 ESSFwk2/05	Bl - Devil's club	23	122
ESSFmv4/05	Bl - Horsetail - Sphagnum	25	125
ESSFwk2/06	Bl - Horsetail - Oak fern	25	125
ESSFmv2/06	undescribed	25	125

**APPENDIX 1. New names for biogeoclimatic and site units in the Northern Rockies portion of the Prince George Forest Region**

<b>Old Biogeoclimatic Units and Ecosystem Associations</b>	<b>New Biogeoclimatic Units and Site Series</b>
<b>ESSFn1</b>	<b>ESSFmv2</b>
01 White-flowered Rhododendron - Black huckleberry	01 Bl - Rhododendron - Feathermoss
02 Pine - Black huckleberry	02 Bl - Lingonberry
03 Bunchberry - Stiff Clubmoss	01 Bl - Rhododendron - Feathermoss
04 White-flowered Rhododendron - Oak fern	04 Bl - Oak fern - Knight's plume
05 Pine - Black Spruce	03 BlSb - Labrador tea
06 Devil's club - Oak fern	05 Bl - Devil's club - Rhododendron
Not previously described	06 Bl - Alder - Horsetail
<b>ESSFn2</b>	<b>ESSFmv4</b>
01 White-flowered Rhododendron - Black huckleberry	01 Bl - Rhododendron - Feathermoss
02 Pine - Black huckleberry	02 BlPl - Crowberry - Cladina
03 White-flowered Rhododendron - Step moss	01 Bl - Rhododendron - Feathermoss
04 Currant - Gooseberry	04 Bl - Rhododendron - Horsetail
05 Pine - Black Spruce	03 BlSb - Labrador tea
06 Spruce - Horsetail	05 Bl - Alder - Horsetail
<b>ESSFh3 (above 1300 m)</b>	<b>ESSFwc3</b>
01 Rhododendron - Oak fern	01 Bl - Rhododendron - Oak fern
Not previously described	02 Bl - Rhododendron - Queen's cup
Not previously described	03 Bl - Globeflower - Horsetail
<b>ESSFh3 (below 1300 m)</b>	<b>ESSFwk2</b>
01 Rhododendron - Oak fern	01 Bl - Oakfern - Knight's plume
02 Rhododendron - Black huckleberry	02 Bl - Oakfern - Sarsaparilla
03 Devil's club - Oak fern	04 Bl - Devil's club - Rhododendron
04 Thimbleberry - Oak fern (in part)	03 Bl - Oakfern - Bluebells
04 Thimbleberry - Oak fern (in part)	05 Bl - Rhododendron - Lady fern
05 Rhododendron - Horsetail	06 Bl - Horsetail - Sphagnum
06 Bog Ecosystems	31 Non-forested Bog

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 <sup>i</sup>	
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 mosses		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 <sup>s</sup>	
Wf53 Slender sedge – White beak-rush								x	xx <sup>s</sup>	

x = incidental; &lt; 5% of wetlands

i = inland areas only

xx = minor; 5–25% of wetlands

s = southern subzones only

xxx = major; &gt;25% of wetlands

TABLE 5.2.2 Fen Species Importance Table

Species		WF01	WF02	WF03	WF04	WF05	WF06	WF07	WF08
Shrubs	<i>Betula nana</i>								
	<i>Salix barclayi</i>								
	<i>Salix pedicellaris</i>								
	<i>Spiraea douglasii</i>								
	<i>Myrica gale</i>								
Herbs and Dwarf Shrubs	<i>Carex utriculata</i>								
	<i>Carex aquatilis</i>								
Shrubs	<i>Comarum palustre</i>								
	<i>Calamagrostis canadensis</i>								
Shrubs	<i>Carex lasiocarpa</i>								
	<i>Menyanthes trifoliata</i>								
Shrubs	<i>Carex limosa</i>								
	<i>Carex chordorrhiza</i>								
Shrubs	<i>Eleocharis quinqueflora</i>								
	<i>Trichophorum alpinum</i>								
Shrubs	<i>Trichophorum cespitosum</i>								
	<i>Eriophorum angustifolium</i>								
Shrubs	<i>Caltha leptosepala</i>								
	<i>Carex anthoxanthea</i>								
Shrubs	<i>Equisetum fluviatile</i>								
	<i>Carex magellanica</i>								
Shrubs	<i>Carex sitchensis</i>								
	<i>Rhynchospora alba</i>								
Shrubs	<i>Carex livida</i>								
	<i>Eriophorum chamissonis</i>								
Shrubs	<i>Vahlodea atropurpurea</i>								
	<i>Drosera anglica</i>								
Shrubs	<i>Hypericum anagalloides</i>								
	<i>Triantha glutinosa</i>								
Shrubs	<i>Schoenoplectus tabernaemontani</i>								
	<i>Fauria crista-galli</i>								
Shrubs	<i>Senecio triangularis</i>								
	<i>Andromeda polifolia</i>								
Shrubs	<i>Kalmia microphylla</i>								
	<i>Oxycoccus oxycoccus</i>								
Shrubs	<i>Triglochin maritima</i>								
	<i>Drosera rotundifolia</i>								
Shrubs	<i>Leptarrhena pyrolifolia</i>								
	<i>Platanthera dilatata</i>								
Shrubs	<i>Sanguisorba canadensis</i>								
	<i>Utricularia intermedia</i>								
Shrubs	<i>Viola palustris</i>								
	<i>Sphagnum Group I</i>								
Lichens and Mosses	<i>Aulaacomnium palustre</i>								
	<i>Drepanocladus spp.</i>								
Lichens and Mosses	<i>Sphagnum Group II</i>								
	<i>Tomentypnum nitens</i>								
Lichens and Mosses	<i>Philonotis fontana</i>								
	<i>Calliergon stramineum</i>								
Lichens and Mosses	<i>Scorpidium spp.</i>								
	<i>Campylopus stellatum</i>								
Lichens and Mosses	<i>Warnstorfia spp.</i>								
	<i>Meesia triquetra</i>								

*Betula nana* – *Carex aquatilis*



**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 surfactable 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).

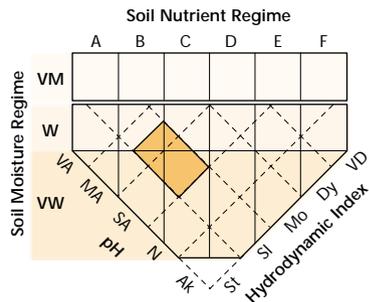


Common soil types are terric and typic Mesisols and Fibrisols. Peat depths are frequently between 1 and 2 m but deep sedge-derived peat to 4 m occurs; this Site Association can occasionally occur on thin organic veneers.

**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.