TABLE 8. Summary of climate data for biogeoclimatic units within the guide area [a]

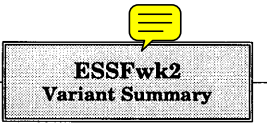
Climatic Characteristics		Biogeoclimatic Unit ESSFwc3	ESSFwk2	ESSFmv2	ESSFmv4
Annual Precipitation (mm)	Mean	1408.5	1537.8	780.4	N/A[b]
	Range	1177.1 - 1624.7	1190.4-1737.8	414.2 - 1259.3	N/A
Growing Season Precipitation (mm)	Mean	510.3	456.7	368.9	N/A
	Range	401.6 - 631.0	229.9 - 683.7	243.8 - 507.5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

[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 Victoria, B.C. Unpublished report.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] 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 [a]	*			
Stone Sheep	*	*		
Caribou [a]	*	*	*	*
Elk	*	*		
Moose	*	*	*	*
Mule Deer	*	*		
White-tailed Deer	*			
Grizzly Bear [a]	*	*	*	*
Furbearers	*	*	*	*

[a] 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.



4.4 Misinchinka Wet Cool Engelmann Spruce - Subalpine Fir [11]

Location
The ESSFwk2 occurs predominantly west of the Rocky Mountain divide as far south as the Morkill River and as far north as the Ospika Arm of Williston Reservoir. It occurs above the ICH at its southern boundary, and the SBS over the rest of its range. Throughout its range it occurs below the ESSFwc3.

Elevation range
950 - 1300 m

Climate
The climate of the ESSFwk2 is wetter and warmer than the ESSFmv variants (Table 8). Very high snow accumulations (3 m +) occur in this variant.

Soils, geology and landforms
This variant lies south of the Peace River, within the Misinchinka, Hart and Park ranges of the Rocky Mountains and the McGregor Plateau. The Misinchinka Ranges are the westernmost of Rocky Mountain ranges in this subzone and have sedimentary and metamorphosed sedimentary bedrock, including sandstone, conglomerate, and phyllite. These rocks are less resistant to erosion than the limestones and quartzites of the Hart and Park ranges to the east and southeast, resulting in more rounded summits. Soil parent materials are dominantly morainal and colluvial, with textures ranging from medium to coarse, depending on the underlying bedrock type. Brunisols and Luvisols are associated with calcareous materials (i.e., derived from limestone bedrock), while Podzols are found on non-calcareous parent materials. The McGregor Plateau is at the eastern edge of the Interior Plateau, between the offset ends of the northern and southern portions of the Rocky Mountain Trench. Bedrock types consist of sedimentary and metamorphosed sedimentary rocks of Cambrian and Precambrian age. Humo-Ferric Podzols have formed on parent materials consisting predominantly of medium-textured morainal and colluvial deposits.

Distinguishing the ESSFwk2 from adjoining biogeoclimatic units
SBSwk2 has:
- more highbush-cranberry but no white-flowered rhododendron in the shrub layer; and
- trembling aspen and paper birch that occur occasionally in canopy.

BWBSwk1 has:
- less subalpine fir in the canopy;
- prickly rose but no white-flowered rhododendron in shrub layer; and
- more trailing raspberry but less five-leaved bramble in the herb layer, especially on mesic sites.

ESSFmv2 has:
- more sites dominated by lodgepole pine; and

[11] Formerly ESSFh3 below 1300 m.

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

ESSFmv4 has:

- more sites dominated by lodgepole pine; and
- less sites dominated by devil's club and oak fern.

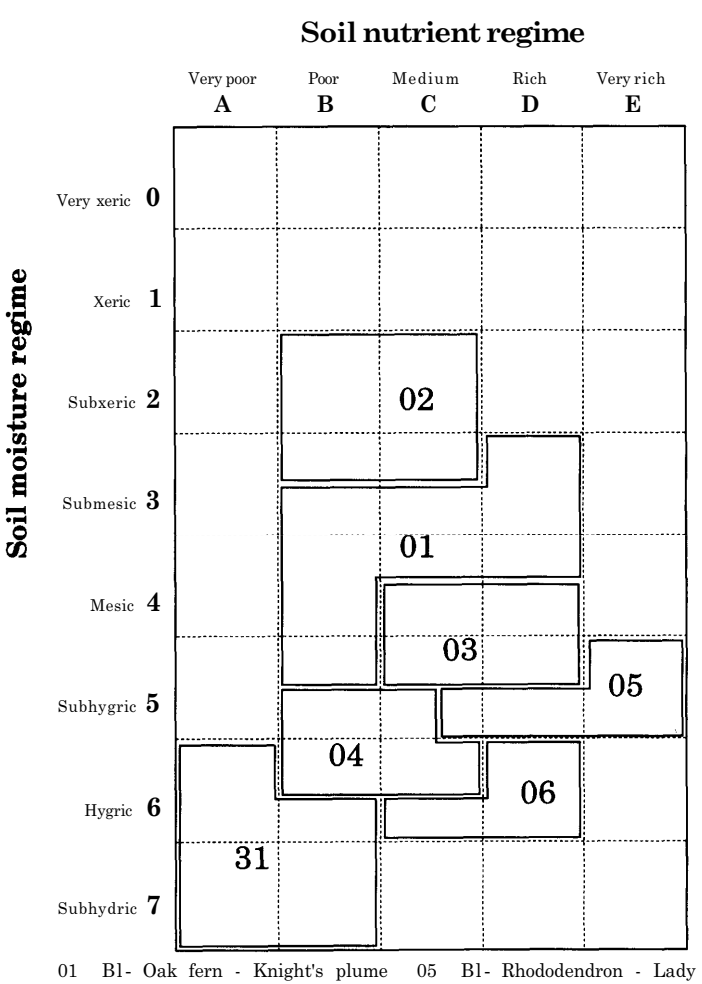
Forests

Climax forests are dominated by Engelmann spruce and subalpine fir. Very few seral stands exist in this variant because of the lack of fire history although some lodgepole pine stands do exist, especially at the southern end of the subzone. Sitka alder *(Alnus crispa* ssp. *sinuata)* swales are common, especially on north-facing slopes. These have been determined to be very old (200+ years).

Wildlife

Towards the north, upper elevation subalpine fir/Engelmann spruce forests in conjunction with alpine and subalpine are used by Mountain Goat. Extensive coniferous forests are used by Caribou during migratory periods in the spring and fall. Mature coniferous stands support Wolverine, Marten, Gray Wolf, and Red Squirrel, as well as Spruce Grouse, Great Gray Owl, Barred Owl, and Hawk Owl. Mixed age stands interspersed with openings support Moose, Gray Wolf, Grizzly Bear, Wolverine, Fisher, Blue Grouse, and Great Horned Owl.

ESSFwk2
Edatopic Grid



01 Bl- Oak fern - Knight's plume
02 Bl- Oak fern - Sarsaparilla
03 Bl- Oak fern - Bluebells
04 Bl - Devil's club - Rhododendron
05 Bl- Rhododendron - Lady fern
06 Bl- Horsetail - Sphagnum
31 Non-forested bog

Click here to go to next page

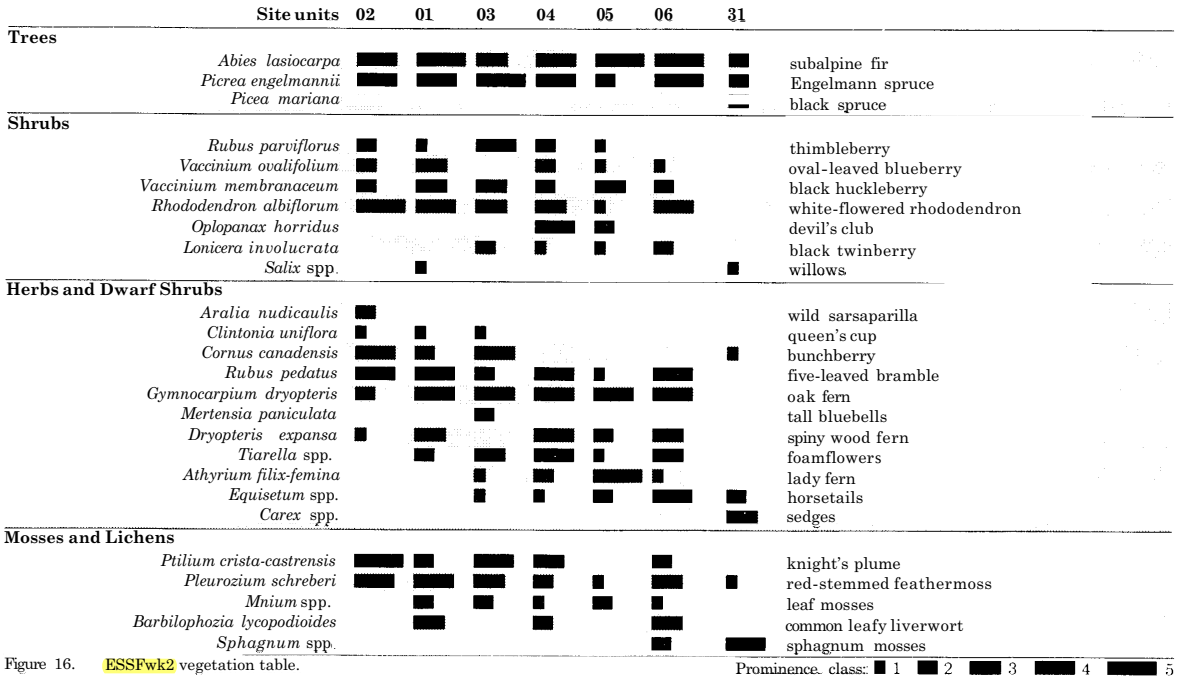


Figure 16. ESSFwk2 vegetation table.

ESSFwk2
Site Series Key

1a Black spruce present in canopy; *Carex* spp. (pp. 258-274)[12] moderate to high cover (> 1%): organic soils.

ESSFwk2/31

1b Black spruce absent from canopy; *Carex* spp. absent; soils variable.

2a *Equisetum* spp. (pp. 281-284) high cover (> 10%); mineral soils or organic over mineral soils.

ESSFwk2/06

2b *Equisetum* spp. low cover (< 3%) or absent: mineral soils.

3a Mid to upper slope or crest; *Athyrium filix-femina* (p. 291) or *Dryopteris expansa* (p. 291) low cover (< 1%) or absent.

4a *Rhododendron albiflorum* (p. 41) low to moderate cover (< 10%); *Ribes lacustre* (p. 32) cover (> 3%).

ESSFwk2/03

4b *Rhododendron albiflorum* high cover (> 25%); *Ribes lacustre* low cover (< 2%) or absent.

ESSFwk2/02

3b Mid to toe slope or level; *Athyrium filix-femina* or *Dryopteris expansa* moderate to high cover (> 1%).

5a *Oplopanax horridus* (p. 36) high cover (usually > 10%).

ESSFwk2/05

5b *Oplopanax horridus* low cover (< 2%) or absent.

6a *Athyrium filix-femina* low cover (< 1%) or absent; seepage water generally absent.

ESSFwk2/01

6b *Athyrium filix-femina* high cover (> 10%); seepage water generally present.

ESSFwk2/04

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

ESSFwk2/01

Bl - Oak fern - Knight's plume

Rhododendron albiflorum

Gymnocarpium dryopteris

Rubus pedatus

VEGETATION

Tree Layer: 20% cover
subalpine fir, Engelmann spruce

Shrub Layer: 65% cover

Rhododendron albiflorum	(white-flowered rhododendron)
Vaccinium membranaceum	(black huckleberry)
Vaccinium ovalifolium	(oval-leaved blueberry)
Ribes lacustre	(black gooseberry)
[Rubus parviflorus	(thimbleberry)]
subalpine fir	
Engelmann spruce	

Herb Layer: 65% cover

Gymnocarpium dryopteris	(oak fern)
Rubus pedatus	(five-leaved bramble)
Dryopteris expansa	(spiny wood fern)
Lycopodium annotinum	(stiff clubmoss)
Tiarella unifoliata	(one-leaved foamflower)
Streptopus roseus	(rosy twistedstalk)
[Veratrum viride	(Indian hellebore)]
[Clintonia uniflora	(queen's cup)]
[Cornus canadensis	(bunchberry)]

Moss Layer: 75% cover

Pleurozium schreberi	(red-stemmed feathermoss)
Barbilophozia lycopodioides	(common leafy liverwort)
Ptilium crista-castrensis	(knight's plume)
Mnium spp.	(leafy mosses)
[Calliergon spp.	(water mosses)]

SOIL AND SITE

Moisture Regime:	3-5 (sm-shg)
Nutrient Regime:	B-D (p-r)
Slope Gradient (%):	3-69, often < 30
* Slope Position:	mid (upper)
Parent Material:	variable, often morainal
Soil Texture:	medium (fine - coarse)
Coarse Fragments (%):	3-48
Seepage Water:	rarely present

DISTRIBUTION: extremely common and often large in size

B1- Oak fern - Knight's plume (ESSFwk2/01)

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, reduce snow creep 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

Vegetation potential:
- high (thimbleberry, fireweed, white-flowered rhododendron)

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.***

ESSFwk2/02

Bl - Oak fern - Sarsaparilla

Rhododendron albiflorum

Rubus pedatus

Ptilium crista-castrensis

VEGETATION

Tree Layer: 20% cover
Engelmann spruce, subalpine fir

Shrub Layer: 60% cover

Rhododendron albiflorum	(white-flowered rhododendron)
Vaccinium membranaceum	(black huckleberry)
Rubus parviflorus	(thimbleberry)
Sorbus scopulina	(western mountain-ash)
[Vaccinium ovalifolium	(oval-leaved b1ueberry)]
subalpine fir	
Engelmann spruce	

Herb Layer: 50% cover

Cornus canadensis	(bunchberry)
Rubus pedatus	(five-leaved bramble)
Gymnocarpium dryopteris	(oak fern)
Lycopodium annotinum	(stiff clubmoss)
Clintonia uniflora	(queen's cup)
Streptopus roseus	(rosy twistedstalk)
Aralia nudicaulis	(wild sarsaparilla)
[Dryopteris expansa	(spiny wood fern)]

Moss Layer: 50% cover

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

SOIL AND SITE

Moisture Regime:	2-3 (sx-sm)
Nutrient Regime:	B-C (p-m)
* Slope Gradient (%):	0-7
* Slope Position:	mid - upper
Parent Material:	fluvial
* Soil Texture:	coarse
Coarse Fragments (%):	50-53

COMMENTS: Bedrock root-restricting layers occur occasionally

DISTRIBUTION: fairly common in upper slope positions

Bl - Oak fern - Sarsaparilla (ESSFwk2/02)

INTERPRETATIONS

Site limitations:
- sites within this unit with high coarse fragment content (> 70%) will have significantly reduced soil moisture holding capacity and will be extremely difficult to plant; ***retain advance regeneration.***

Silviculture system:
- clearcut 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.
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce snow creep and fire hazard.

Site preparation:
- see Section 5.2

Species choice:
- Bl, Se

Vegetation potential:
- low to moderate (white-flowered rhododendron, fireweed, thimbleberry)

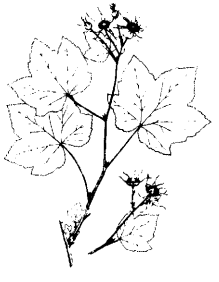
Reforestation:
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- advance Bl regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).
- planting Pl may be an option on these sites below 1100 m, but provenances from high elevation, high snowpack areas must be used.

Concerns:
- trafficability may be a problem on these sites during the summer.

ESSFwk2/03

Bl - Oak fern - Bluebells

Ribes lacustre



Rubus parviflorus

Gymnocarpium dryopteris

VEGETATION

Tree Layer: 30% cover
Engelmann spruce, subalpine fir

Shrub Layer: 70% cover

Ribes lacustre	(black gooseberry)
Rubus parviflorus	(thimbleberry)
Vaccinium membranaceum	(black huckleberry)
Rhododendron albiflorum	(white-flowered rhododendron)
Ribes glandulosum	(skunk currant)
Rubus idaeus	(red raspberry)
Lonicera involucrata	(black twinberry)
[Spiraea betulifolia	(birch-leaved spirea)]

subalpine fir
Engelmann spruce

Herb Layer: 45% cover

Gymnocarpium dryopteris	(oak fern)
Cornus canadensis	(bunchberry)
Arnica cordifolia	(heart-leaved arnica)
Lycopodium annotinum	(stiff clubmoss)
Rubus pedatus	(five-leaved bramble)
Streptopus amplexifolius	(clasping twistedstalk)
Athyrium filix-femina	(lady fern)
Tiarella trifoliata	(three-leaved foamflower)
Mertensia paniculata	(tall bluebells)
Epilobium angustifolium	(fireweed)

Moss Layer: 70% cover

Ptilium crista-castrensis	(knight's plume)
Pleurozium schreberi	(red-stemmed feathermoss)
Neckera pennata	
Brachythecium hylotapetum	(woodsy ragged moss)

SOIL AND SITE

Moisture Regime:	4-5 (m-shg)
Nutrient Regime:	C-D (m-r)
Slope Gradient (%):	18-78
* Slope Position:	mid (upper)
* Parent Material:	morainal
* Soil Texture:	medium - coarse
Coarse Fragments (%):	15-47

DISTRIBUTION: common on the lee side of the Rocky Mountains

Bl- Oak fern - Bluebells (ESSFwk2/03)

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 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.
- minimize or align large slash accumulations when logging to help meet site preparation objectives, reduce snow creep 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)

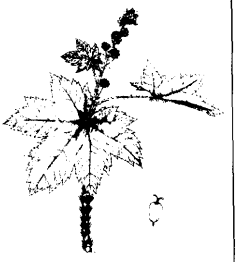
Vegetation potential:
- high (thimbleberry, fireweed, white-flowered rhododendron. lady fern)

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).
- planting Pl may be an option on these sites below 1100 m, but provenances from high elevation, high snowpack areas must be used.

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 fine-textured soils are vulnerable to compaction under wet conditions; ***restrict traffic to winter operations.***
- 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.***
- tomentosus root rot may cause low to moderate problems in mature spruce-dominated stands.

ESSFwk2/04

Bl - Devil's club - Rhododendron



Oplopanax horridus

Dryopteris expansa

Rubus pedatus

VEGETATION

Tree Layer: 25% cover
Engelmann spruce, subalpine fir

Shrub Layer: 85% cover

Oplopanax horridus	(devil's club)
Alnus crispa spp. *sinuata*	(Sitka alder)
Rhododendron albiflorum	(white-flowered rhododendron)
Vaccinium membranaceum	(black huckleberry)
Vaccinium ovalifolium	(oval-leaved blueberry)
subalpine fir	
Engelmann spruce	

Herb Layer: 70% cover

Dryopteris expansa	(spiny wood fern)
Gymnocarpium dryopteris	(oak fern)
Rubus pedatus	(five-leaved bramble)
Tiarella unifoliata	(one-leaved foamflower)
Veratrum viride	(Indian hellebore)

Moss Layer: 50% cover

Calliergon spp.	(water mosses)
Ptilium crista-castrensis	(knight's plume)
Barbilophozia lycopodioides	(common leafy liverwort)
Pleurozium schreberi	(red-stemmed feathermoss)

SOIL AND SITE

Moisture Regime:	5-6 (shg-h)
Nutrient Regime:	B-C (p-m)
* Slope Gradient (%):	30-40
Slope Position:	lower - toe
* Parent Material:	morainal, occasionally lacustrine
* Soil Texture:	medium - fine
Coarse Fragments (%):	16-24
Seepage Water:	generally absent

DISTRIBUTION: fairly common; associated with areas of imperfect soil moisture drainage

COMMENTS: occasionally associated with compact till

B1- Devil's club - Rhododendron (ESSFwk2/04)

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.***
- sites within this unit with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; ***plant stock which will achieve better lateral root development (e.g., Cu-treated) or protect advance regeneration.***

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.
- minimize or align large slash accumulations when logging to help meet site preparation objectives, reduce snow creep 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

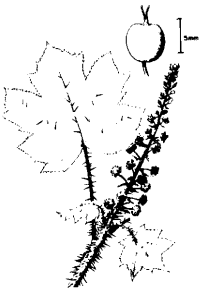
Brush hazard:
- very high (lady fern, white-flowered rhododendron, thimbleberry, fireweed)

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.***
- sites with restricted rooting and/or 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.

ESSFwk2/05

B1- Rhododendron - Lady fern



Oplopanax horridus

Dryopteris expansa

Gymnocarpium dryopteris

VEGETATION

Tree Layer: 15% cover
Engelmann spruce, subalpine fir

Shrub Layer: 60% cover

Vaccinium membranaceum	(black huckleberry)
Rhododendron albiflorum	(white-flowered rhododendron)
Rubus parviflorus	(thimbleberry)
Sambucus racemosa	(red elderberry)
subalpine fir	
Engelmann spruce	

Herb Layer: 70% cover

Athyrium filix-femina	(lady fern)
Dryopteris expansa	(spiny wood fern)
Gymnocarpium dryopteris	(oak fern)
Veratrum viride	(Indian hellebore)
Valeriana sitchensis	(Sitka valerian)
Rubus pedatus	(five-leaved bramble)
Tiarella unifoliata	(one-leaved foamflower)

Moss Layer: 90% cover

Mnium spp.	(leafy mosses)
Pleurozium schreberi	(red-stemmed feathermoss)

SOIL AND SITE

Moisture Regime:	5 (shg)
Nutrient Regime:	C-E (m-vr)
* Slope Gradient (%):	0-18
Slope Position:	variable
Parent Material:	morainal, occasionally fluvial or lacustrine
Soil Texture:	medium (fine - coarse)
Coarse Fragments (%):	5-55
* Seepage Water:	generally present

COMMENTS: A variable but distinctive site series; apparently possesses a considerably richer nutrient regime than the ESSFwk2/04

DISTRIBUTION: common and often large in size

Bl- Rhododendron - Lady fern (ESSFwk2/05)

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 prepamtion.***
- sites within this unit with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; ***plant stock which will achieve better lateral root development (e.g., Cu-treated) or protect advance regeneration.***

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.
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce snow creep and 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

Vegetation potential:
- very high (lady fern, 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.***
- spruce beetle may infest partial cut stands after harvesting; ***minimize blowdown and avoid mechanical damage to residuals.***
- trafficability will be a problem on these sites during the summer.

ESSFwk2/06

Bl - Horsetail - Sphagnum

Rhododendron albiflorum

Equisetum arvense

Barbilophozia lycopodioides

VEGETATION

Tree Layer: 30% cover
subalpine fir, Engelmann spruce

Shrub Layer: 75% cover

Rhododendron albiflorum	(white-flowered rhododendron)
Vaccinium membranaceum	(black huckleberry)
Alnus crispa ssp. *sinuata*	(Sitka alder)
Lonicera involucrata	(black twinberry)
[Ribes lacustre	(black gooseberry)]
subalpine fir	
Engelmann spruce	

Herb Layer: 75% cover

Equisetum spp.	(horsetails)
Gymnocarpium dryopteris	(oak fern)
Rubus pedatus	(five-leaved bramble)
Tiarella unifoliata	(one-leaved foamflower)
Lycopodium annotinum	(stiff clubmoss)
Dryopteris expansa	(spiny wood fern)
[Valeriana sitchensis	(Sitka valerian)]

Moss Layer: 90% cover

Barbilophozia lycopodioides	(common leafy liverwort)
Pleurozium schreberi	(red-stemmed feathermoss)
Calliergon spp.	(water mosses)
Ptilium crista-castrensis	(knight's plume)
Sphagnum spp.	(sphagnums)

SOIL AND SITE

Moisture Regime:	6 (h)
Nutrient Regime:	C-D (m-r)
Slope Gradient (%):	5-30
* Slope Position:	lower, toe or level
* Parent Material:	lacustrine
* Soil Texture:	fine
Coarse Fragments (%):	0

DISTRIBUTION: uncommon and small in size

Bl- Horsetail - Sphagnum (ESSFwk2/06)

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.***
- sites within this unit with 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)
- log on firm snowpack to protect advance regeneration.
- under a partial cutting system spruce regeneration requires mineral soil exposure and/or planting.

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***

Vegetation potential:
- high (white-flowered rhododendron, fireweed, Sitka valerian)

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 Bl regeneration should only be accepted if it meets size and acceptability criteria (Section 5.1).

Concerns:
- sites with high water tables and thick organic horizons (> 10 cm) have increased windthrow hazard; ***block layouts must have wind-firm boundaries.***
- 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.***
- water table will likely rise above the ground surface in the spring, causing seedling mortality.
- this unit is critical to the control of runoff streamflow.
- these units are important wildlife habitat; ***discuss prescription with fish and wildlife personnel.***

ESSFwk2/31

Non-forested Bog

Salix spp.

Carex spp.

Sphagnum spp.

VEGETATION

Tree Layer: 10% cover
Black spruce, subalpine fir, lodgepole pine, Engelmann spruce

Shrub Layer: 15% cover
[Salix spp. (willows)]
[Betula glandulosa (scrub birch)]
black spruce

Herb Layer: 60% cover
[Kalmia microphylla ssp. *microphylla* (alpine bog-1aurel)]
[Carex spp. (sedges)]

Moss Layer: 95% cover
Sphagnum spp. (sphagnums)
[Aulacomnium palustre (glow moss)]

SOIL AND SITE

Moisture Regime:	6-7 (h-shd)
Nutrient Regime:	A-B (vp-p)
Slope Gradient (%):	0-2, usually 0
* Slope Position:	toe-level
* Parent Material:	organic
Soil Texture:	humic (organic material)
* Coarse Fragments (%):	0
* Seepage Water:	present, often at or near surface

DISTRIBUTION: uncommon

Non-forested Bog (ESSFwk2/31)

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

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

Old Biogeoclimatic Units and Ecosystem Associations	New Biogeoclimatic Units and Site Series
ESSFn1	**ESSFmv2**
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
ESSFn2	**ESSFmv4**
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
ESSFh3 (above 1300 m)	**ESSFwc3**
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
ESSFh3 (below 1300 m)	**ESSFwk2**
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[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.

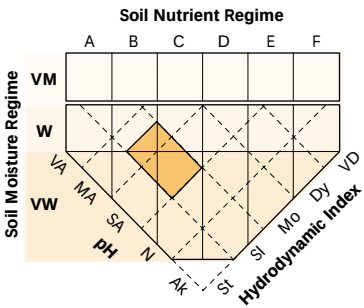
Betula nana and *Carex aquatilis* are the characteristic species but *Salix pedicellaris* and *Carex utriculata* dominate on wetter sites. The moss layer is variable and can be diverse, absent, or dominated by *Tomentypnum nitens*, *Sphagnum*, or *Drepanocladus*. Some drier sites will have scattered,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