

# **A Field Guide for Identification and Interpretation of the Engelmann Spruce-Subalpine Fir Zone in the Prince Rupert Forest Region, British Columbia**

by

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## HUCKLEBERRY — BUNCHBERRY — MOSS (ESSFi/01)

---

### ACTIVITY OR CONCERN

---

Species choice:

Preferred

- PI on coarse-textured soils (dominant).
- Sxw on finer textured soils.

Acceptable

- BI.

Logging:

- season not critical.
- in moist, fine-textured soils delay until winter freeze-up.
- check for hardpan layers and potential for windfall; adjust block layout if necessary.

Site preparation:

Mechanical

- OK.
- in finer textured soils, avoid planting in depressions or gouges following scraping.

Prescribed fire

- OK.
- USE CAUTION on coarse soils or sites with steep (greater than 35%) southerly aspects.
- aim for a light burn to consume fine and medium fuels and approx. 30–40% of the F horizon.

Brush hazard:

- generally low.
- *Vaccinium* spp. may restrict planter access and seedling establishment.

Reforestation:

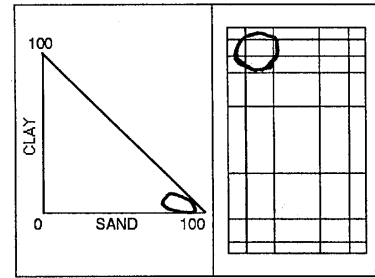
- plant PI or Sxw.
  - use plugs on coarse, rocky soils.
  - deeper humus forms may necessitate screening.
-

## LICHEN — MOSS (ESSFi/02)

**SLOPE POSITIONS:** Crest

**SLOPE GRADIENT:** 0–25% on convex surfaces

**ASPECT:** South and crests



### VEGETATION LAYERS

**TREE [43]:** Open and scrubby.

BI  
(Hm)  
(Hw)  
(PI)

**SHRUB [90]:** Very well developed with abundant advance regen. of BI and the two hemlock species.

*Menziesia ferruginea*  
*Vaccinium membranaceum*  
(*Vaccinium ovalifolium*)  
(*Sorbus sitchensis*)  
(*Sorbus scopulina*)

**HERB [21]:** Poorly to moderately developed; low diversity.

*Cornus canadensis*  
*Rubus pedatus*  
*Orthilia secunda*

**MOSS [95]:** Very well developed.

*Pleurozium schreberi*  
*Dicranum fuscescens*  
*Barbilophozia* spp.  
*Cladonia* spp.  
*Cladina* spp.

### SOILS

**LANDFORM:**

Discontinuous morainal and colluvial veneers over bedrock.

**TEXTURE:**

Sandy with high coarse fragment content (75+%).

**DRAINAGE:**

Rapid.

**EFFECTIVE ROOTING:**

30+ cm.

**SOIL NAME:**

Orthic Humo-Ferric Podzols  
(shallow lithic phase).

**HUMUS FORM:**

Hemimors; Xeromors.

**OTHER FEATURES:**

Occurs on the subzone's driest sites with shallow rocky soils; usually associated with bedrock knobs.

**COMMENTS:** Uncommon and local site series in the ESSFi.

## LICHEN — MOSS (ESSFi/02)

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### ACTIVITY OR CONCERN

---

#### AVOID LOGGING

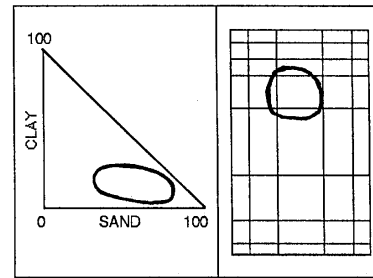
These ecosystems are marginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining. Plant PI plugs if necessary.

**SUBALPINE FIR — MOSS (ESSFi/03)**

**SLOPE POSITIONS:** Upper

**SLOPE GRADIENT:** 15–70%

**ASPECT:** South and west



**VEGETATION LAYERS**

**SOILS**

**TREES [68]:** Scrubby; irregular canopy.

BI  
(Hm)  
(Sxx)  
(Hw)

**SHRUB [42]:** Variable; abundant advance regeneration of BI, Hw, Hm, Sxx.

*Menziesia ferruginea*  
*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
*Sorbus sitchensis*  
*Sorbus scopulina*

**HERB [23]:** Poorly to moderately developed; low diversity.

*Cornus canadensis*  
*Rubus pedatus*  
*Orthilia secunda*

**MOSS [86]:** Very well-developed carpet, dominated by feathermoss.

*Pleurozium schreberi*  
*Dicranum fuscescens*  
*Barbilophozia* spp.

**LANDFORM:**

Morainal and colluvial veneers over bedrock.

**TEXTURE:**

Sandy loam, loamy sand, loam.

**DRAINAGE:**

Good to rapid.

**EFFECTIVE ROOTING:**

20–40 cm.

**SOIL NAME:**

Orthic Humo-Ferric Podzols,  
Podzolic Gray Luvisols.

**HUMUS FORM AND DEPTH:**

Hemimors.  
4–12 cm.

**OTHER FEATURES:**

Very acidic mineral soil (pH 3.9) and humus (pH 3.4); abundant decaying wood on soil surface; Podzolic Bf horizon (bright red colour); shallower soil than mesic site series.

**COMMENTS:** Common site series on the upper portions of long slopes. Similar in some respects to the mesic site series, but herb layer less developed and soils have brighter colours and lower content of organic matter.

## SUBALPINE FIR — MOSS (ESSFi/03)

---

### ACTIVITY OR CONCERN

---

Species choice:

Preferred

— PI.

Acceptable

— BI, Sxw (minor components of stand).

Logging:

— summer log.

— potential windfall hazard due to shallow soils; adjust block layout where necessary.

Site preparation:

Mechanical

— OK; preferable to burning.

— maintain humus on site.

Prescribed fire

— DO NOT BURN.

— loss of organic matter will reduce site productivity.

Brush hazard:

— very low.

Reforestation:

— plant PI if required.

— use plugs on rocky soils.

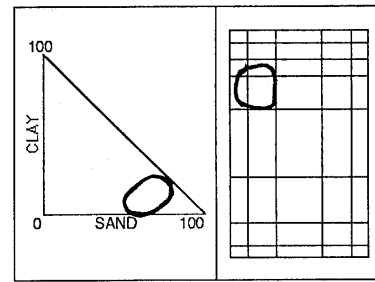
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## MOUNTAIN HEMLOCK — MOSS (ESSFi/04)

**SLOPE POSITIONS:** Upper slope and crest

**SLOPE GRADIENT:** 0–40%

**ASPECT:** South and ridge crests



### VEGETATION LAYERS

**TREES [60]:** Scrubby; mountain hemlock dominates main canopy.

Hm  
(Hw)  
(Bl)

**SHRUB [70]:** Very well developed; abundant Hm and Hw advance regeneration.

*Menziesia ferruginea*  
*Vaccinium membranaceum*  
*Vaccinium ovalifolium*

**HERB [1]:** Sparse or absent.  
(*Cornus canadensis*)  
(*Rubus pedatus*)

**MOSS [90]:** Thick carpet of mosses.

*Pleurozium schreberi*  
*Dicranum fuscescens*  
*Barbilophozia floerkei*  
*Cladonia* spp.  
*Nephroma arcticum*

### SOILS

**LANDFORM:**  
Morainal and organic veneer overlying bedrock.

**TEXTURE:**  
Sandy loam.

**DRAINAGE:**  
Good to rapid.

**EFFECTIVE ROOTING:**  
3–25 cm.

**SOIL NAME:**  
Orthic Humo-Ferric Podzols;  
Typic Folisols.

**HUMUS FORM AND DEPTH:**  
Humimors;  
5–40 cm.

**COMMENTS:** Common on moisture-shedding crests of ridges, knolls, and hills. Very acidic, nutrient-poor mineral soils with low levels of organic matter and nitrogen. Slowly decomposing humus forms are dominated by H horizons. Similar site series to ESSFi/03 except for dominance of mountain hemlock in main and lower canopy and very sparse herb layer.

## **MOUNTAIN HEMLOCK — MOSS (ESSFi/04)**

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### **ACTIVITY OR CONCERN**

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#### **AVOID LOGGING**

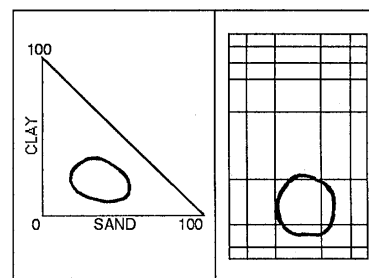
These ecosystems are marginal for timber production. If they are included within larger openings, then consider their harvesting as timber mining. Very shallow soils and rock outcrops dominate, rendering these sites very sensitive to disturbance from logging and subsequent site preparation. In deeper soils, planting PI may produce a viable crop.

## OAK FERN (ESSFi/05)

**SLOPE POSITIONS:** Lower to toe

**SLOPE GRADIENT:** 20–45%

**ASPECT:** Primarily north and west



### VEGETATION LAYERS

**TREE [37]:** Open canopy of large trees.

Bl  
(Sxx)  
(Hw)  
(Hm)

**SHRUB [59]:** Well developed; abundant advance regen. of Bl.

*Menziesia ferruginea*  
*Vaccinium ovalifolium*  
*Vaccinium membranaceum*  
*Ribes lacustre*  
(*Oplopanax horridus*)  
(*Sorbus sitchensis*)

**HERB [73]:** Very well developed and diverse.

*Gymnocarpium dryopteris*  
*Tiarella* spp.  
*Streptopus amplexifolius*  
*Streptopus roseus*  
*Valeriana sitchensis*  
*Listera cordata*  
*Veratrum viride*  
*Rubus pedatus*  
*Cornus canadensis*  
*Lycopodium annotinum*

**MOSS [67]:** Fewer feather-mosses and more leafy mosses relative to mesic and drier sites.

*Mnium* spp.  
*Brachythecium* spp.  
*Pleurozium schreberi*  
*Ptilium crista-castrensis*

### SOILS

**LANDFORM:**

Morainal and colluvial blankets, occasionally washed near surface.

**TEXTURE:**

Loamy (fine to coarse).

**DRAINAGE:**

Moderately good to imperfect.

**EFFECTIVE ROOTING:**

25–55 cm.

**SOIL NAME:**

Gleyed Ferro-Humic Podzols;  
Gleyed Gray Luvisols.

**HUMUS FORM AND DEPTH:**

Hemihumimors; Humimors.  
7–20 cm.

**OTHER FEATURES:**

Moist soils with periodic seepage at depth; soil colours are darker and duller than those of mesic sites.

**COMMENTS:** Quite extensive in the southern two-thirds of the ESSFi. Next to the mesic series this is the most common site series of the ESSFi. Soils are very moist and fertile.

## OAK FERN (ESSFi/05)

---

### ACTIVITY OR CONCERN

---

**Species choice:**

- Preferred — Sx.
- Acceptable — Bl.

**Logging:**

- winter or late summer (if dry).
- excessive soil disturbance may increase brush hazard.

**Site preparation:**

**Mechanical**

- OK.
- conduct during dry periods only.

**Prescribed fire**

- OK.
- only low to medium intensity burns on sites not having dark-coloured surface mineral horizons (Ah, Bhf).
- hotter burns possible on fine-textured soils having considerable organic matter incorporation in mineral horizons.

**Brush hazard:**

- moderate to high.
- plan for one maintenance treatment; assess at time of planting or preharvest silviculture assessment.

**Reforestation:**

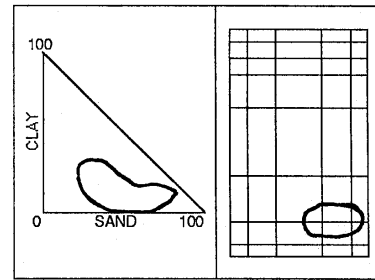
- PLANT ASAP WITH Sx.
  - plant vigorous stock on elevated mounds where possible.
-

## DEVIL'S CLUB (ESSFi/06)

**SLOPE POSITIONS:** Lower and toe

**SLOPE GRADIENT:** 25–70%

**ASPECT:** Variable



### VEGETATION LAYERS

**TREE [70]:** Large decadent trees; productive sites.

BI  
(Sxx)

**SHRUB [75]:** Very well developed, often with dense BI regen.

*Oplopanax horridus*  
*Menziesia ferruginea*  
*Vaccinium membranaceum*  
(*Vaccinium ovalifolium*)  
(*Ribes lacustre*)  
(*Alnus viridis*)

**HERB [65]:** Very well developed and diverse.

*Gymnocarpium dryopteris*  
*Tiarella* spp.  
*Streptopus amplexifolius*  
*Athyrium filix-femina*  
*Dryopteris assimilis*  
*Veratrum viride*  
*Rubus pedatus*  
*Cornus canadensis*  
*Lycopodium annotinum*

**MOSS [63]:** Well developed but patchy; leafy mosses common.

*Mnium* spp.  
*Brachythecium* spp.  
*Rhytidiadelphus loreus*  
(*Pleurozium schreberi*)  
(*Ptilium crista-castrensis*)  
(*Hylocomium splendens*)

### SOILS

**LANDFORM:**

Morainal and colluvial veneers and blankets, often showing signs of having been water-worked.

**TEXTURE:**

Sandy loam, loam.

**DRAINAGE:**

Imperfect.

**EFFECTIVE ROOTING:**

Variable; 10–90 cm.

**SOIL NAME:**

Orthic, Duric, and Gleyed Ferro-Humic Podzols; Orthic Humic Gleysols.

**HUMUS FORM AND DEPTH:**

Mormoders; Hemihumimors. 7–30 cm.

**OTHER FEATURES:**

Abundant seepage in lower B horizons; loose, permeable soil in upper horizons; dark-coloured surface horizons; mottling common; loose humus forms.

**COMMENTS:** Restricted distribution, mainly confined to steep sideslopes at lower elevations of the subzone. Very fertile sites.

## DEVIL'S CLUB (ESSFi/06)

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### ACTIVITY OR CONCERN

---

Species choice:

Preferred  
Acceptable

— Sx.  
— Bl.

Logging:

— winter or after ground has frozen.  
— excessive soil disturbance will likely increase brush hazard.

Site preparation:

Mechanical

— OK.  
— conduct during dry periods only.  
— avoid on steep, unstable slopes.

Prescribed fire

— OK.  
— will TEMPORARILY (maybe for 1–3 years) reduce brush problem.

Brush hazard:

— High to very high.  
— plan for at least one maintenance treatment; assess at time of planting or preharvest silviculture assessment.

Reforestation:

— PLANT Sx IMMEDIATELY.  
— plant vigorous stock on elevated mounds where possible, to keep roots above water table.

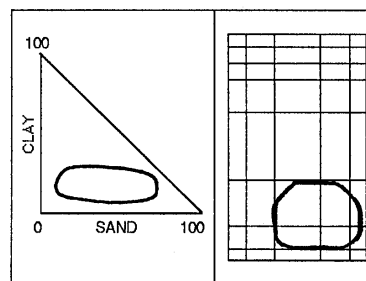
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## MEADOW FOREST (ESSFi/07)

**SLOPE POSITIONS:** Lower to toe slopes at high elevations

**SLOPE GRADIENT:** 10–30%

**ASPECT:** All



### VEGETATION LAYERS

**TREES [31]:** Open patchy canopy; trees have clumped distribution.

BI  
(Sxx)  
(Hm)  
(Hw)

**SHRUBS [35]:** Moderately developed with most shrubs around tree clumps.

*Ribes glandulosum*  
*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
*Menziesia ferruginea*

**HERB [70]:** Dense, very well developed and diverse, particularly in openings.

*Valeriana sitchensis*  
*Veratrum viride*  
*Senecio triangularis*  
*Parnassia fimbriata*  
*Arnica cordifolia*  
*Tiarella* spp.  
*Streptopus* spp.  
*Gymnocarpium dryopteris*  
*Osmorhiza purpurea*  
*Epilobium anagallidifolium*  
(*Heracleum sphondylium*)

**MOSS [75]:** Very well developed.

*Mnium* spp.  
*Rhytidiadelphus squarrosus*  
*Drepanocladus uncinatus*  
*Brachythecium* spp.  
*Barbilophozia* spp.

### SOILS

**LANDFORM:**

Morainal blankets often with a fluvial veneer.

**TEXTURE:**

Sandy loam, loam, silt loam.

**DRAINAGE:**

Imperfect to poor.

**EFFECTIVE ROOTING:**

Largely in humus to as deep as 50 cm in mineral soil.

**SOIL NAME:**

Orthic Gleysols, Gleyed Humo-Ferric Podzols, Gleyed Ferro-Humic Podzols.

**HUMUS FORM AND DEPTH:**

Hemihumimors; Humimors; Mormoders; Histomoders; 4–20 cm.

**OTHER FEATURES:**

Abundant seepage; rich soils with abundant organic matter incorporation; few coarse fragments; low soil temperatures.

**COMMENTS:** This site series occurs as a mosaic of groups of trees on elevated microsites and herb-rich meadows in slight depressional areas. Although soils are fertile, productivity is limited by adverse local climate and short growing season.

## MEADOW FOREST (ESSFi/07)

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### ACTIVITY OR CONCERN

---

Species choice:

Preferred

— Sx.

Acceptable

— Bl.

Logging:

— winter logging preferred to minimize soil compaction and improve trafficability.

— preserve and promote natural regeneration by selective logging.

Site preparation:

Mechanical

— AVOID.

Prescribed fire

— AVOID.

Brush hazard:

— low.

Reforestation:

— plant Sx if extensive areas of this unit are logged.

— severe planting check expected in ecosystems exposed to severe climatic conditions.

— promote natural regeneration where possible.

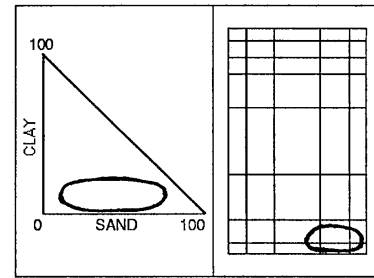
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## HORSETAIL (ESSFi/08)

**SLOPE POSITIONS:** Toe slope

**SLOPE GRADIENT:** 5–15%

**ASPECT:** All



### VEGETATION LAYERS

**TREE [41]:** Open stands; trees growing on hummocks.

BI  
(Sxx)

**SHRUB [47]:** Well developed with frequent BI advance regen.; minor Hm, Hw regen. on hummocks.

*Ribes lacustre*  
*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
(*Lonicera involucrata*)  
(*Oplopanax horridus*)  
(*Menziesia ferruginea*)

**HERB [90]:** Very well developed and diverse; dominated by horsetails.

*Equisetum arvense*  
*Valeriana sitchensis*  
*Veratrum viride*  
*Senecio triangularis*  
*Tiarella* spp.  
*Gymnocarpium dryopteris*  
*Calamagrostis canadensis*  
*Mitella pentandra*  
(*Athyrium filix-femina*)  
(*Viola glabella*)

**MOSS [75]:** Dominated by leafy mosses.

*Mnium* spp.  
*Rhytidiadelphus squarrosus*  
*Barbilophozia lycopodioides*  
*Pleurozium schreberi* (raised microsites)

### SOILS

**LANDFORM:**

Fluvial veneers, blankets, and aprons.

**TEXTURE:**

Sandy loam, loam, silt loam.

**DRAINAGE:**

Poor.

**EFFECTIVE ROOTING:**

Largely in humus to as deep as 30 cm in mineral soil.

**SOIL NAME:**

Orthic Gleysols.

**HUMUS FORM AND DEPTH:**

Hydromoders in depressions;  
Hemimors on raised hummocks.  
12–17 cm.

**OTHER FEATURES:**

Seepage and/or water table close to surface; mottled soils characteristic; mucky surface organics.

**COMMENTS:** Common but not extensive on toe slope and slightly depressed areas. Poor drainage restricts productivity on these otherwise rich sites.

## HORSETAIL (ESSFi/08)

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### ACTIVITY OR CONCERN

---

Species choice:

- Preferred — Sx.
- Acceptable — Bl.

Logging:

- winter or when ground is frozen.
- excessive soil disturbance may increase brush hazard.

Site preparation:

- Mechanical
  - mounding.
  - preserve natural mounds where possible.
- Prescribed fire
  - OK, but difficult.
  - beneficial for species conversion but these wet sites do not carry fire well.

Brush hazard:

- High to very high.
- plan for at least one maintenance treatment; assess at the time of planting or preharvest silviculture assessment.

Reforestation:

- PLANT Sx IMMEDIATELY ON ELEVATED MOUNDS.
  - plant vigorous stock.
  - beware frost heaving in soils high in silt.
  - when planting on mounds the minimum stocking standards may be reduced by increased number of unplantable spots.
-

6 THE ESSFI SUBZONE

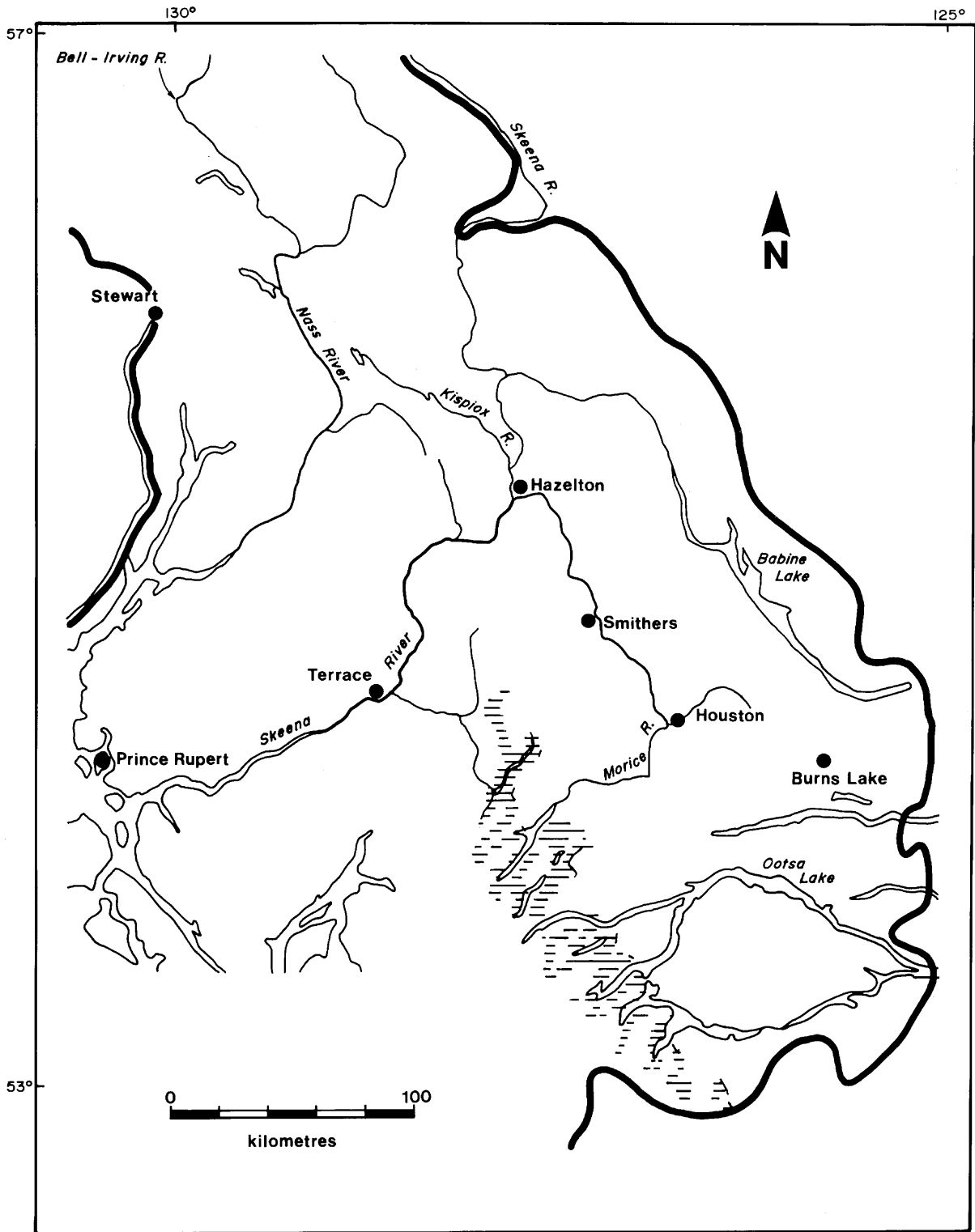


FIGURE 11. The Subcontinental Central Engelmann Spruce — Subalpine Fir Subzone (ESSFI) in the Prince Rupert Forest Region.

**6.1 Site Units of the ESSFI — Subcontinental Central Subzone**

- /01 Huckleberry — Queen's Cup — Moss site series
- /02 Whitebark Pine — Lichen site series
  - /02(a) Lithic phase
  - /02(b) Fluvial phase
- /03 Lichen — Moss site series
- /04 Oak Fern site series
- /05 Devil's Club site series
- /06 Horsetail site series

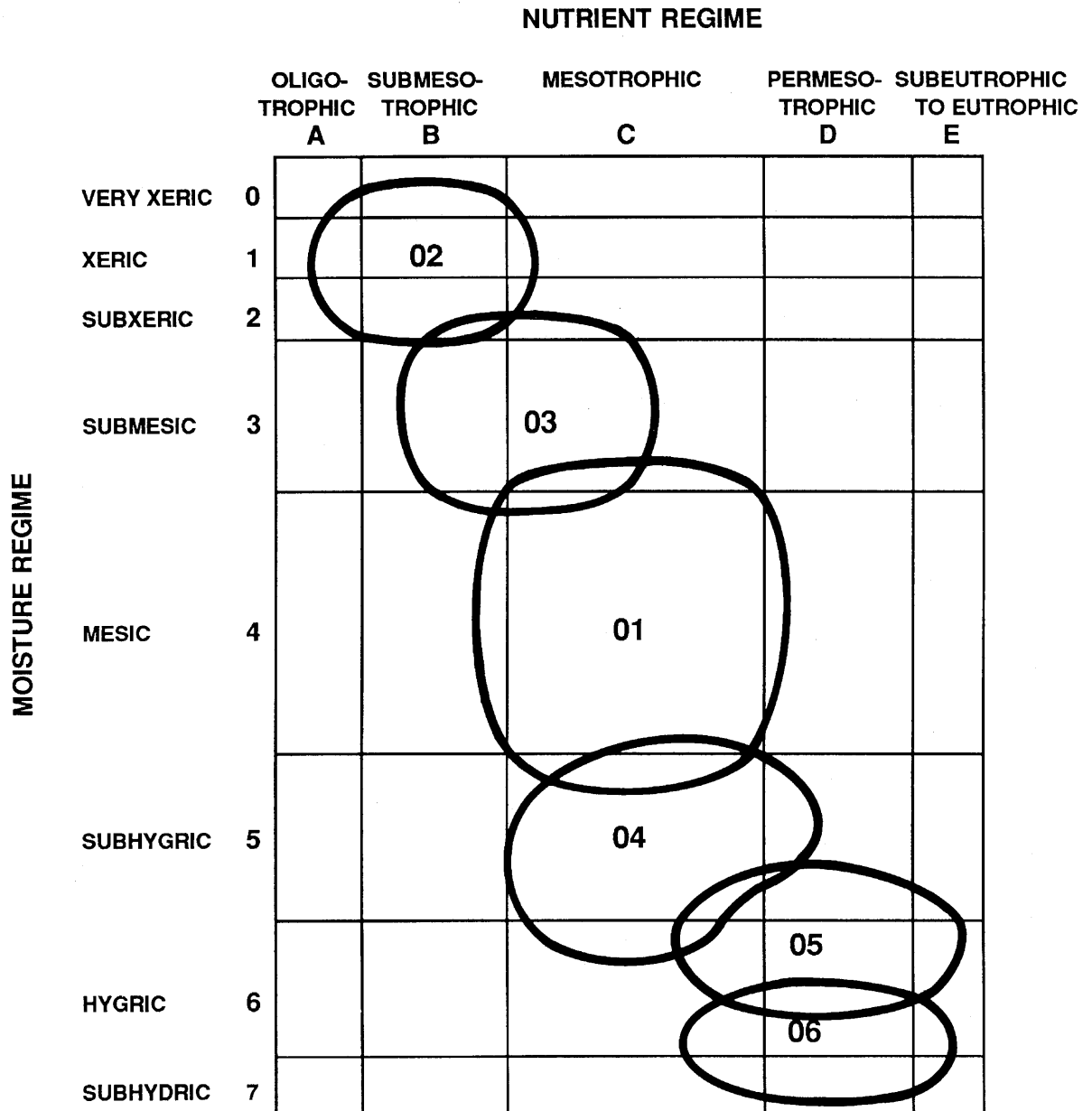


FIGURE 12. Edatopic grid of the ESSFI.

## 6.2 Key to Site Units of the ESSFI

- A Poorly drained sites with water table present at or near the surface; *Equisetum* spp. dominate herb layer  
HORSETAIL (ESSFI/06)
- AA Water table absent, or sometimes present at depth; *Equisetum* spp. absent, or present but with less than 5% cover ..... B
- B Upper slopes, or middle to lower slopes on coarse-textured, well to rapidly drained parent materials; ferns and *Mnium* spp. sparse or absent ..... C
- C Rapidly drained, often gravelly parent materials; whitebark pine common in tree canopy; lichens dominate moss layer; driest sites in the subzone  
WHITEBARK PINE — LICHEN (ESSFI/02)
- (i) Middle, upper, crest slope positions; colluvial and morainal veneers overlying bedrock  
Lithic phase [ESSFI/02(a)]
- (ii) Middle, lower, level slope positions; very coarse fluvial and glaciofluvial blankets  
Fluvial phase [ESSFI/02(b)]
- CC Well drained but usually not gravelly parent materials; whitebark pine uncommon in tree canopy; lichens common in moss layer, but co-dominant with mosses and liverworts  
LICHEN — MOSS (ESSFI/03)
- BB Middle to toe slopes on moderately well to imperfectly drained parent materials; ferns and *Mnium* spp. often present ..... D
- D Middle to lower slopes on moderately well drained parent materials; seepage usually absent; ferns and *Mnium* spp. infrequent  
HUCKLEBERRY — QUEEN'S CUP — MOSS (ESSFI/01)
- DD Lower to toe slopes on moderately well to imperfectly drained parent materials; seepage often present in lower B horizons; ferns and *Mnium* spp. frequent and often abundant (greater than 5% cover each) ..... E
- E Moderately well drained, moist soils with or without mottling; *Oplopanax horridus* rare or absent in shrub layers; *Gymnocarpium dryopteris* dominates herb layer  
OAK FERN (ESSFI/04)
- EE Imperfectly drained soils usually with mottling; *Oplopanax* dominates shrub layers; several ferns (*Gymnocarpium*, *Athyrium*, *Dryopteris*) common in herb layer  
DEVIL'S CLUB (ESSFI/05)

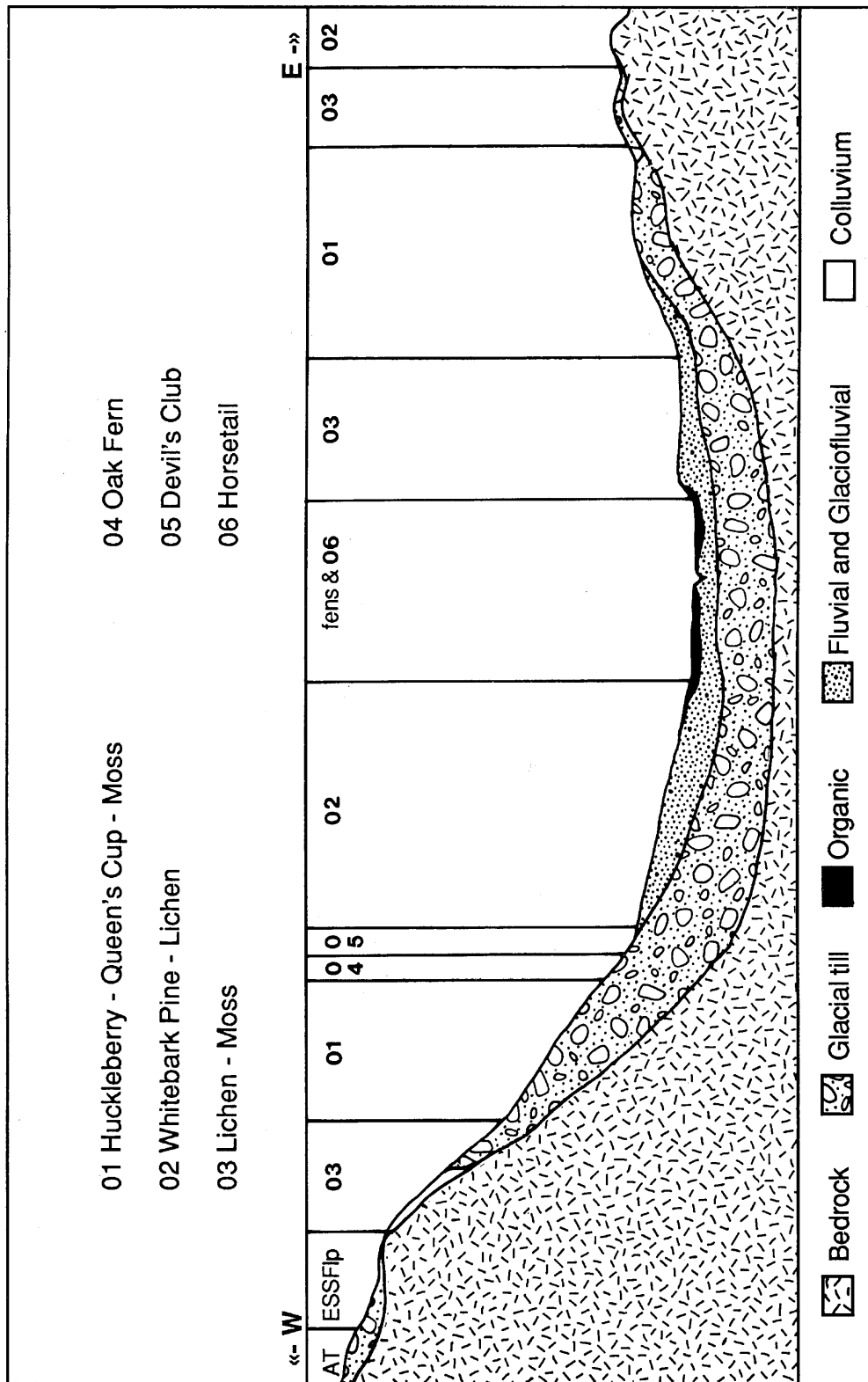


FIGURE 13. Schematic sequence of ecosystems in the ESSFI landscape within the Taitsa Ranges.

### 6.3 Description of Site Units of the ESSFI

Selected environmental features associated with the site units are presented in Table 7 (p.71). Table 8 (p.73) summarizes preferred and acceptable species for site units of the ESSFI.

Following these two tables are descriptions of the various site units. Silvicultural prescriptions are not included because there has not been any logging in this subzone. Should interpretations be required, the user should refer to similar ecosystems in the ESSFk Subzone. As with the other subzones, a small edatopic grid and a textural triangle are included in the upper right-hand corner of the descriptive page to provide a quick reference of the usual moisture and nutrient regime and mineral soil texture for a given site series.

Species that are consistently present but with low cover, or present inconsistently with high cover, are enclosed within parentheses. Under the vegetation column, the figures that appear in brackets (e.g., [57]) indicate the average cover of the tree, shrub, herb, or moss layers as extracted from vegetation tables. Layer development may be indicated as sparse (less than 5% total cover), poorly developed (5–15%), moderately developed (15–35%), well developed (35–60%), or very well developed (60%+).

Species	Site Series					
	02	03	01	04	05	06
<b>Trees</b>						
<i>Abies lasiocarpa</i>	●	●	●	●	●	●
<i>Abies amabilis</i>	+	●	●	+	●	●
<i>Picea glauca x engelmannii</i>	●	+	+			●
<i>Tsuga mertensiana</i>	●	●	●	●	●	●
<i>Pinus albicaulis</i>	●	●	+			
<b>Shrubs</b>						
<i>Vaccinium membranaceum</i>	●	●	●	●	●	●
<i>Vaccinium ovalifolium</i>	+	+	●	●	●	●
<i>Menziesia ferruginea</i>	+	●	●		●	●
<i>Oplopanax horridus</i>					●	+
<b>Herbs</b>						
<i>Cassiope mertensiana</i>	●	+				
<i>Clintonia uniflora</i>		+	●	●		
<i>Rubus pedatus</i>			●	●	●	●
<i>Streptopus roseus</i>		+	●	●	●	●
<i>Gymnocarpium dryopteris</i>			+	●	●	●
<i>Tiarella</i> spp.		+	●	●	●	●
<i>Veratrum viride</i>			+	●	●	+
<i>Valeriana sitchensis</i>		+	●	●	●	●
<i>Athyrium filix-femina</i>			+	+	●	●
<i>Equisetum</i> spp.						●
<b>Lichens, mosses and liverworts</b>						
<i>Cladonia</i> spp.	●	●	+	+		
<i>Pleurozium schreberi</i>	●	●	●			●
<i>Dicranum fuscescens</i>	●	●	●	●	●	●
<i>Barbilophozia floerkei</i>	●	●	●	●	●	+
<i>Mnium</i> spp.			+	●	●	●
<i>Drepanocladus uncinatus</i>					●	●

FIGURE 14. Prominence values for major species of the ESSFI.

**TABLE 7.** Environmental features of site units in the ESSFI

Site unit	Moisture/ nutrient regimes	Slope gradient (%)	Parent materials <sup>a</sup>	Texture <sup>b</sup> class	Drainage class
/02 Whitebark Pine — Lichen	0-2/B				
/02(a) Lithic phase		5-80	Mv/R, Cv/R	S, L (gravelly)	rapidly
/02(b) Fluvial phase		0-15	Fb, FGb	S (gravelly)	rapidly
/03 Lichen — Moss	2-3/B-C	5-35	FGb, Mv, Cv/R, Mb	S, LS, SL L, CL	well
/01 Huckleberry — Queen's cup — Moss	4/C	5-50	Mb, Fb, Fv/M,Cb	SL, L	mod. well to well
/04 Oak Fern	5/C-D	10-25	Mb, Cb	LS, SL, S	mod. well
/05 Devil's Club	5-6/C-E	15-40	washed Cb, Ca, Ff	SL, LS, S	imperfectly
/06 Horsetail	6-7/C-E	0-15	Ov/Fb, Fb	SiL, S, LS	poorly

<sup>a</sup> Parent material abbreviations include: M — morainal; C — colluvium; FG — glaciofluvial; O — organic; F — fluvial; R — bedrock; v — veneer; b — blanket; f — fan; a — apron.

<sup>b</sup> Texture abbreviations include: S — sand; LS — loamy sand; SL — sandy loam; L — loam; CL — clay loam; SiL — silt loam.

TABLE 7. *Continued*

Site unit	Soil <sup>c</sup>	Humus form <sup>d</sup> and depth (cm)	Rooting depth <sup>e</sup> (cm)	Slope positions
/02 Whitebark Pine — Lichen	O.HFP, E.DYB	XR 1–10	5–75	middle to crest
/03 Lichen — Moss	O.HFP, DU.HFP	HR, XR 2–5	25–50	upper to crest
/01 Huckleberry — Queen's cup — Moss	O.HFP, DU.HFP	HR 2–6	30–60	lower to middle
/04 Oak Fern	O.HFP, GL.HFP	HR, HHR 5–10	30–60	lower to toe
/05 Devil's Club	GL.HFP, GLSM.HFP	MMD, HHR 8–15	30–50	lower to toe
/06 Horsetail	O.G, R.G, GL.HFP	HYR, HR 5–25	0–30	toe and depressions

<sup>c</sup> Abbreviations of soil classification: O.HFP — Orthic Humo-Ferric Podzols; GL.HFP — Gleyed Humo-Ferric Podzols; DU.HFP — Duric Humo-Ferric Podzols; O.G — Orthic Gleysols; R.G — Rego Gleysols; GLSM.HFP — Gleyed Sombric Humo-Ferric Podzols.

<sup>d</sup> Abbreviations of humus form classification: HR — Hemimors; HHR — Hemihumimors; XR — Xeromors; MMD — Mormoders; HYR — Hydromors.

<sup>e</sup> Rooting depth measured from organic/mineral interface.

**TABLE 8.** Preferred and acceptable species for site units in the ESSFI<sup>a</sup>

Ecosystem unit	Species choice <sup>b</sup>	
	Pref.	Accept.
/02 AVOID LOGGING		Plc, Pa
/03	Plc	Pa
/01	Plc Sxw <sup>d</sup>	Bl <sup>e</sup> Ba <sup>e</sup>
/04	Sxw <sup>d</sup>	Plc, Bl
/05	Sxw <sup>d</sup>	Bl
/06	Sxw <sup>d</sup>	Bl

<sup>a</sup> Because no logging has occurred in the ESSFI subzone to date, silvicultural guidelines are presently restricted to species selection.

<sup>b</sup> A preferred species for a managed forest is ecologically appropriate to the site and best suited to management objectives. An acceptable species is also ecologically appropriate but less suited to management objectives.

<sup>c</sup> Conditional upon how well Pl eventually performs and withstands damage from the heavy moist snow of this subzone.

<sup>d</sup> Sxw not preferred (but still acceptable) in stands with incidence of tomentose root rot and unacceptable within infection centres. Replace with other preferred/acceptable species as required.

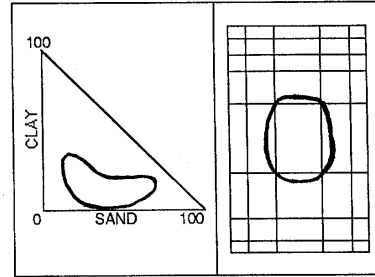
<sup>e</sup> Acceptable species but should comprise a minor component of the stand.

**HUCKLEBERRY — QUEEN'S CUP — MOSS  
(ESSFI/01)**

**SLOPE POSITIONS:** Middle and lower  
(slope length short) slopes

**SLOPE GRADIENT:** 5–50%

**ASPECT:** All



**VEGETATION LAYERS**

**SOILS**

**TREES [67]:**

Bl  
(Hm)  
(Ba)

**LANDFORM:**

Morainal blankets, fluvial  
veneers and blankets.

**SHRUBS [60]:** Well developed  
with abundant Bl and less  
frequent Ba and Hm advance regen.

*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
(*Menziesia ferruginea*)  
(*Sorbus sitchensis*)  
(*Sorbus scopulina*)

**TEXTURE:**

Sandy loam, loam.

**DRAINAGE:**

Moderately good to good.

**EFFECTIVE ROOTING:**

30–60 cm.

**HERB [25]:** Poorly to moderately  
developed.

*Clintonia uniflora*  
*Rubus pedatus*  
*Orthilia secunda*  
*Streptopus roseus*  
(*Cornus canadensis*)  
(*Valeriana sitchensis*)  
(*Tiarella* spp.)

**SOIL NAME:**

Orthic and Duric Humo-Ferric  
Podzols.

**HUMUS FORM AND DEPTH:**

Hemimors 2–6 cm.

**MOSS [55]:** Well developed;  
few feather-mosses.

*Dicranum fuscescens*  
*Barbilophozia floerkei*  
*Peltigera* spp.  
(*Barbilophozia lycopodioides*)  
(*Rhytidiopsis robusta*)  
(*Pleurozium schreberi*)

**OTHER FEATURES:**

Moderately deep soils (60–100 cm)  
without pronounced  
seepage; cemented horizons  
may restrict rooting at  
depths below 50 cm; mineral soil  
horizons with light colours and  
low organic matter content;  
humus forms have minimal H  
horizon development; soil  
moisture deficits expected.

**COMMENTS:** Most widespread site series of the ESSFI, although it occupies a relatively small geographical area compared to the other two subzones. Zonal sites are drier than in the ESSFi and k, and moisture deficits may occur. Soils are similar to those of mesic site series of the ESSFk. Forest productivity limited by short growing seasons marked by soil moisture deficits.

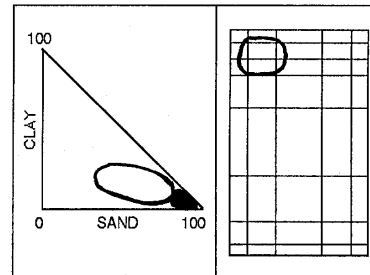
## WHITEBARK PINE — LICHEN (ESSFI/02)

### SLOPE POSITIONS:

Lithic phase: middle, upper, crests  
 Fluvial phase: middle, lower, level

### SLOPE GRADIENT:

Lithic phase: 5–80%  
 Fluvial phase: 0–15%



### VEGETATION LAYERS

### SOILS

	Lithic phase [ESSFI/02(a)]	Fluvial phase [ESSFI/02(b)]
TREE [23]: Open canopy of small-diameter trees. Pa Bl (Hm) (Pl)	LANDFORM: Colluvial or morainal veneers over bedrock.	Fluvial and glacio-fluvial blankets.
SHRUB [48]: Moderately to well developed with Bl, (Pa), and (Hm) advance regen. <i>Vaccinium membranaceum</i> <i>Sorbus sitchensis</i> ( <i>Cladothamnus pyroliflorus</i> )	TEXTURE: Sandy and loamy skeletal.	Sandy skeletal.
HERB [10]: Poorly developed. ( <i>Cassiope mertensiana</i> ) ( <i>Empetrum nigrum</i> ) ( <i>Vaccinium caespitosum</i> ) ( <i>Antennaria neglecta</i> ) ( <i>Hieracium albiflorum</i> )	DRAINAGE: Good to rapid.	Rapid.
MOSS [73]: Very well developed; mosses and lichens co-dominate. <i>Cladina rangiferina</i> <i>Cladonia</i> spp. <i>Dicranum fuscescens</i> ( <i>Barbilophozia floerkei</i> )	EFFECTIVE ROOTING: 35–75 cm.	5–30 cm.
	SOIL NAME: Orthic Humo-Ferric Podzols; Eluviated Dystric Brunisols	
	HUMUS FORM AND DEPTH: Xeromors. 1–10 cm.	Xeromors. 2–5 cm.
	OTHER FEATURES: Only very coarse-textured or shallow gravelly soils are included in this series; highly permeable materials with low nutrient status.	

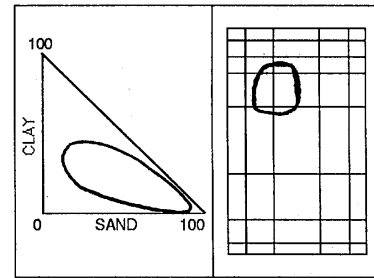
**COMMENTS:** Very low productivity site series that occupies considerable area in the rugged terrain of the Tahtsa and Sibola ranges. Insufficient fuels on these sites to carry a ground fire.

## LICHEN — MOSS (ESSFI/03)

**SLOPE POSITIONS:** Upper and crests

**SLOPE GRADIENT:** 5–35%

**ASPECT:** South and southwest



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### VEGETATION LAYERS

**TREE [40]:** Relatively dense stands but with open canopies.

Bl  
Hm  
(Pa)  
(Pl)  
(Ba)

**SHRUB [66]:** Well developed; common advance regen. of all species, particularly Hm, Bl.

*Vaccinium membranaceum*  
*Menziesia ferruginea*  
*Sorbus sitchensis*

**HERB [11]:** Sparse to poorly developed.

(*Empetrum nigrum*)  
(*Cornus canadensis*)  
(*Cassiope mertensiana*)  
(*Phylodoce empetriformis*)

**MOSS [75]:** Well developed; mosses, lichens, and liverworts co-dominate.

*Dicranum fuscescens*  
*Cladonia* spp.  
*Cladina rangiferina*  
*Barbilophozia floerkei*  
*Barbilophozia hatcheri*  
(*Pleurozium schreberi*)

### SOILS

**LANDFORM:**

Morainal and colluvial veneers and blankets overlying bedrock; glaciofluvial blankets.

**TEXTURE:**

Variable, sandy skeletal to clay loam (shallow soils).

**DRAINAGE:**

Good.

**EFFECTIVE ROOTING:**

25–50 cm.

**SOIL NAME:**

Orthic and Duric Humo-Ferric Podzols.

**HUMUS FORM AND DEPTH:**

Hemimors and Xeromors.  
2–5 cm.

**OTHER FEATURES:**

Shallower soils at upper slope positions, otherwise similar edaphically to mesic site series; water deficits significant in humus and upper mineral soil layers; cemented horizons and bedrock commonly restrict rooting.

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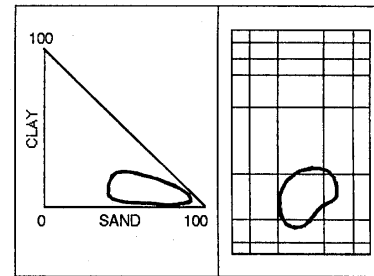
**COMMENTS:** Common site series in this subzone. Lichen cover is significant on submesic sites in the ESSFI, indicating that humus and mineral soil horizons dry out during the growing season. Submesic sites are more prominent in the ESSFI than in the other two ESSF subzones.

## OAK FERN (ESSFI/04)

**SLOPE POSITIONS:** Lower to toe

**SLOPE GRADIENT:** 10–25%

**ASPECT:** Variable



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### VEGETATION LAYERS

**TREE [43]:** Open stands of large trees.

BI  
(Hm) — understory

**SHRUB [50]:** Well developed; common BI advance regen. with less frequent Hm, Ba regen.

*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
*Rubus parviflorus*  
*Ribes lacustre*  
*Sorbus sitchensis*

**HERB [59]:** Well developed; quite diverse.

*Gymnocarpium dryopteris*  
*Valeriana sitchensis*  
*Veratrum viride*  
*Streptopus roseus*  
*Tiarella* spp.  
*Rubus pedatus*  
*Arnica cordifolia*  
(*Clintonia uniflora*)  
(*Cornus canadensis*)

**MOSS [25]:** Moderately developed cover of leafy mosses, liverworts, and *Dicranum*.

*Dicranum fuscescens*  
*Mnium* spp.  
*Barbilophozia floerkei*  
(*Brachythecium* spp.)  
(*Rhytidiopsis robusta*)

### SOILS

**LANDFORM:**

Morainal or colluvial blankets, commonly associated with fluvial activity.

**TEXTURE:**

Coarse loams and sands.

**DRAINAGE:**

Moderately good.

**EFFECTIVE ROOTING:**

30–60 cm.

**SOIL NAME:**

Orthic Gleyed Humo-Ferric Podzols.

**HUMUS FORM AND DEPTH:**

Hemimors, Hemihumimors.  
5–10 cm.

**OTHER FEATURES:**

Variable seepage input to lower B horizons; B horizons darker than those of mesic or drier sites; no water deficits; cemented horizons may perch water table.

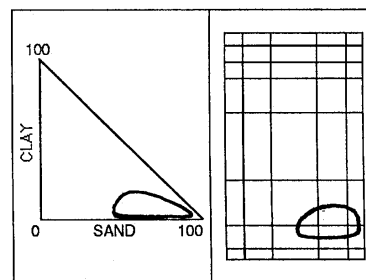
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**COMMENTS:** This site series is relatively uncommon in the ESSFI subzone. It represents very productive sites.

## DEVIL'S CLUB (ESSFI/05)

**SLOPE POSITIONS:** Lower and toe

**SLOPE GRADIENT:** 15–40%



### VEGETATION LAYERS

**TREE [50]:** Open stands of large decadent trees.

BI

**SHRUB [80]:** Very well developed; abundant BI advance regen. with less frequent Hm.

*Oplopanax horridus*

*Rubus spectabilis*

*Ribes lacustre*

*Vaccinium ovalifolium*

(*Vaccinium membranaceum*)

**HERB [85]:** Very well developed and diverse.

*Gymnocarpium dryopteris*

*Athyrium filix-femina*

*Dryopteris assimilis*

*Tiarella* spp.

*Actaea rubra*

*Streptopus roseus*

*Valeriana sitchensis*

*Veratrum viride*

*Osmorhiza purpurea*

*Rubus pedatus*

**MOSS [48]:** Dominated by leafy mosses.

*Brachythecium* spp.

*Mnium* spp.

*Pellia neesiana*

(*Drepanocladus uncinatus*)

### SOILS

**LANDFORM:**

Washed colluvial blankets and aprons; fluvial fans.

**TEXTURE:**

Variable, coarse loams to sandy skeletal; plentiful coarse fragments.

**DRAINAGE:**

Imperfect.

**EFFECTIVE ROOTING:**

30–50 cm.

**SOIL NAME:**

Gleyed Sombric Humo-Ferric Podzols;

Gleyed Humo-Ferric Podzols.

**HUMUS FORM AND DEPTH:**

Mormoders; Hemihumimors.  
8–15 cm.

**OTHER FEATURES:**

Permeable soils in upper horizons due in part to loose consistence and high coarse fragment content; loose moders often with Ah development; seepage in lower B horizons; dark-coloured, fertile soils.

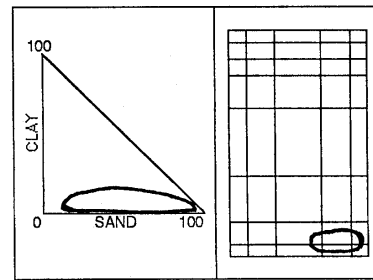
**COMMENTS:** The most productive site series for conifers in the ESSFI, but limited in extent.

## HORSETAIL (ESSFI/06)

**SLOPE POSITIONS:** Toe and slight depressions

**SLOPE GRADIENT:** 0–15%

**ASPECT:** N/A



### VEGETATION LAYERS

**TREE [45]:** Most trees growing on elevated hummocks.

Bl  
Hm  
(Sxw)  
(Ba)

**SHRUB [40]:** Well developed; abundant advance regen. of Bl and infrequent Sxw.

*Ribes lacustre*  
*Vaccinium membranaceum*  
*Vaccinium ovalifolium*  
*Menziesia ferruginea*  
(*Rubus spectabilis*)  
(*Lonicera involucrata*)  
(*Alnus viridis* ssp. *sinuata*)

**HERB [58]:** Diverse, dominated by horsetails.

*Equisetum arvense*  
*Tiarella* spp.  
*Valeriana sitchensis*  
*Gymnocarpium dryopteris*  
*Rubus pedatus*  
(*Athyrium filix-femina*)  
(*Parnassia fimbriata*)  
(*Senecio triangularis*)  
(*Leptarrhena pyrolifolia*)  
(*Sanguisorba canadensis*)

**MOSS [55]:**

*Mnium* spp.  
*Brachythecium* spp.  
*Drepanocladus uncinatus*  
*Marchantia polymorpha*  
*Pleurozium schreberi*  
*Barbilophozia* spp.

### SOILS

**LANDFORM:**

Fluvial blankets; organic veneers over fluvial blankets.

**TEXTURE:**

Mushy organics overlying silt loam to sandy skeletal material.

**DRAINAGE:**

Poor.

**EFFECTIVE ROOTING:**

Primarily in humus to as deep as 30 cm in mineral soil.

**SOIL NAME:**

Orthic and Rego Gleysols;  
Gleyed Humo-Ferric Podzols.

**HUMUS FORM AND DEPTH:**

Hydromors: dominate wet areas.  
Hemimors: on drier hummocks.  
5–25 cm.

**OTHER FEATURES:**

Poorly drained soils, often saturated below 10–35 cm; intense mottling and dull grey colours common.

## 7 LITERATURE CITED

- Canadian Soil Survey Committee (CSSC). 1978. The Canadian system of soil classification. Can. Dep. Agric., Publ. 1646.
- Coates, D., and S. Haeussler. 1987. Guide to the use of mechanical site preparation equipment in north central British Columbia. Second edition. B.C. Min. For./Northern Silv. Committee/Canada-B.C. Forest Resource Development Agreement. FRDA Handb.002.
- Coupé, R., C.A. Ray, A. Comeau, M.V. Ketcheson, and R.M. Annas (compilers). 1982. A guide to some common plants of the Skeena area, British Columbia. B.C. Min. For., Land Manage. Handb. No. 4.
- Klinka, K., R.N. Green, R.L. Trowbridge, and L.E. Lowe. 1981. Taxonomic classification of humus forms in ecosystems of British Columbia. First approx. B.C. Min. For., Land Manage. Rep. No. 8.
- Pojar, J. 1988. Biogeoclimatic and ecoregion units of the Prince Rupert Forest Region. B.C. Min. For., Maps (2) @ 1: 500 000.
- Pojar, J., K. Klinka, and D.V. Meidinger. 1987. Biogeoclimatic ecosystem classification in British Columbia. For. Ecol. Manage. 22: 119–154.
- Pojar, J., R. Love, D.Meidinger, and R. Scagel. 1982. Some common plants of the Sub-Boreal Spruce Zone. B.C. Min. For., Land Manage. Handb. No. 6.

## APPENDIX 1 Tree species symbols used in the guide

Tree symbol	Latin name	Common name
Acb	<i>Populus balsamifera</i> <i>ssp. balsamifera</i>	balsam poplar
Act	<i>Populus balsamifera</i> <i>ssp. trichocarpa</i>	black cottonwood
At	<i>Populus tremuloides</i>	trembling aspen
Ba	<i>Abies amabilis</i>	amabilis fir
Bl	<i>Abies lasiocarpa</i>	subalpine fir
Cw	<i>Thuja plicata</i>	western redcedar
Dr	<i>Alnus rubra</i>	red alder
Ep	<i>Betula papyrifera</i>	paper birch
Hm	<i>Tsuga mertensiana</i>	mountain hemlock
Hw	<i>Tsuga heterophylla</i>	western hemlock
Pa	<i>Pinus albicaulis</i>	whitebark pine
Pl	<i>Pinus contorta</i>	lodgepole pine
Sw	<i>Picea glauca</i>	white spruce
Sx	<i>Picea</i> (any or all of the three hybrids below)	hybrid spruce (undifferentiated)
Sxs	<i>Picea glauca</i> × <i>sitchensis</i>	Roche spruce
Sxw	<i>Picea glauca</i> × <i>engelmannii</i>	hybrid white spruce
Sxx	<i>Picea glauca</i> × <i>engelmannii</i> × <i>sitchensis</i>	three-way hybrid spruce

## APPENDIX 2. List of plant names used in the guide

<i>Abies amabilis</i>	amabilis fir
<i>Abies lasiocarpa</i>	subalpine fir
<i>Actaea rubra</i>	baneberry
<i>Alnus rubra</i>	red alder
<i>Alnus viridis</i> ssp. <i>sinuata</i>	Sitka alder
<i>Antennaria neglecta</i>	field pussytoes
<i>Antennaria</i> spp.	pussytoes
<i>Arctostaphylos uva-ursi</i>	kinnikinnick
<i>Arnica cordifolia</i>	heart-leaved arnica
<i>Arnica latifolia</i>	mountain arnica
<i>Artemisia arctica</i>	mountain sagewort
<i>Athyrium filix-femina</i>	lady fern
<i>Aulacomnium palustre</i>	glowmoss
<i>Barbilophozia floerkei</i>	
<i>Barbilophozia hatcheri</i>	
<i>Barbilophozia lycopodioides</i>	common leafy liverwort
<i>Barbilophozia</i> spp.	
<i>Betula glandulosa</i>	scrub birch
<i>Betula papyrifera</i>	paper birch
<i>Brachythecium</i> spp.	
<i>Calamagrostis canadensis</i>	bluejoint
<i>Cassiope mertensiana</i>	white mountain-heather
<i>Castilleja parviflora</i>	small-flowered paintbrush
<i>Chimaphila umbellata</i>	prince's pine
<i>Cladina mitis</i>	
<i>Cladina rangiferina</i>	reindeer lichen
<i>Cladina</i> spp.	
<i>Cladonia gracilis</i>	
<i>Cladonia</i> spp.	
<i>Cladothamnus pyroliflorus</i>	copperbush
<i>Clintonia uniflora</i>	queen's cup
<i>Cornus canadensis</i>	bunchberry
<i>Corylus cornuta</i>	hazelnut
<i>Dicranum fuscescens</i>	curly heron's-bill moss
<i>Dicranum</i> spp.	
<i>Drepanocladus uncinatus</i>	sickle moss
<i>Dryopteris assimilis</i>	spiny wood fern
<i>Empetrum nigrum</i>	crowberry
<i>Epilobium anagallidifolium</i>	alpine willowherb
<i>Equisetum arvense</i>	common horsetail
<i>Equisetum scirpoides</i>	dwarf scouring-rush
<i>Equisetum</i> spp.	horsetails
<i>Erigeron peregrinus</i>	subalpine daisy
<i>Festuca altaica</i>	Altai fescue
<i>Galium triflorum</i>	sweet-scented bedstraw
<i>Goodyera oblongifolia</i>	rattlesnake-plantain
<i>Gymnocarpium dryopteris</i>	oak fern
<i>Heracleum sphondylium</i>	cow-parsnip
<i>Hieracium albiflorum</i>	
<i>Hylocomium splendens</i>	stepped feathermoss
<i>Juniperus communis</i>	common juniper
<i>Leptarrhena pyrolifolia</i>	leatherleaf saxifrage
<i>Linnaea borealis</i>	twinflower
<i>Listera cordata</i>	heart-leaved twayblade
<i>Lonicera involucrata</i>	black twinberry
<i>Lupinus arcticus</i>	arctic lupine
<i>Lycopodium annotinum</i>	stiff clubmoss
<i>Marchantia polymorpha</i>	
<i>Menziesia ferruginea</i>	false azalea
<i>Mitella nuda</i>	common mitrewort
<i>Mitella pentandra</i>	five-stamened mitrewort
<i>Mitella</i> spp.	
<i>Mnium</i> spp.	leafy mosses

<i>Nephroma arcticum</i>	devil's club
<i>Oplopanax horridus</i>	one-sided wintergreen
<i>Orthilia secunda</i>	purple sweet-cicely
<i>Osmorhiza purpurea</i>	fringed grass-of-Parnassus
<i>Parnassia fimbriata</i>	falsebox
<i>Paxistima myrsinites</i>	
<i>Pellia neesiana</i>	
<i>Peltigera</i> spp.	
<i>Peltigera aphthosa</i>	
<i>Phleum alpinum</i>	alpine timothy
<i>Phylodoce empetriformis</i>	pink mountain-heather
<i>Picea</i> spp.	spruce
<i>Picea engelmannii</i>	Engelmann spruce
<i>Picea glauca</i>	white spruce
<i>Picea glauca</i> × <i>engelmannii</i> (?)	hybrid white spruce
× <i>sitchensis</i> (?)	Roche spruce
<i>Pinus albicaulis</i>	whitebark pine
<i>Pinus contorta</i>	lodgepole pine
<i>Pleurozium schreberi</i>	red-stemmed feather moss
<i>Polytrichum</i> spp.	haircap mosses
<i>Populus balsamifera</i> ssp.	
<i>balsamifera</i>	balsam poplar
<i>Populus balsamifera</i> ssp.	
<i>trichocarpa</i>	
<i>Populus tremuloides</i>	black cottonwood
<i>Ptilium crista-castrensis</i>	trembling aspen
<i>Rhododendron albiflorum</i>	knight's plume feathermoss
<i>Rhytidiadelphus loreus</i>	white-flowered rhododendron
<i>Rhytidiadelphus squarrosus</i>	lanky moss
<i>Rhytidiadelphus triquetrus</i>	bent-leaf moss
<i>Rhytidiopsis robusta</i>	electrified cat's-tail moss
<i>Ribes glandulosum</i>	pipecleaner moss
<i>Ribes lacustre</i>	skunk currant
<i>Rubus parviflorus</i>	black gooseberry
<i>Rubus pedatus</i>	thimbleberry
<i>Rubus spectabilis</i>	five-leaved bramble
<i>Salix</i> spp.	salmonberry
<i>Sanguisorba canadensis</i>	willows
<i>Saxifraga tricuspidata</i>	Sitka burnet
<i>Senecio triangularis</i>	three-toothed saxifrage
<i>Shepherdia canadensis</i>	arrowleaved groundsel
<i>Smilacina racemosa</i>	soopolallie
<i>Sorbus scopulina</i>	false Solomon's-seal
<i>Sorbusitchensis</i>	western mountain-ash
<i>Sorbus</i> spp.	Sitka mountain-ash
<i>Streptopus amplexifolius</i>	
<i>Streptopus roseus</i>	clasping-leaved twistedstalk
<i>Thalictrum occidentale</i>	rosy twistedstalk
<i>Thuja plicata</i>	western meadowrue
<i>Tiarella</i> spp.	western redcedar
<i>Tomenthypnum nitens</i>	foamflowers
<i>Trisetum cernuum</i>	golden fuzzy fen moss
<i>Tsuga heterophylla</i>	nodding trisetum
<i>Tsuga mertensiana</i>	western hemlock
<i>Vaccinium alaskaense</i>	mountain hemlock
<i>Vaccinium caespitosum</i>	Alaskan blueberry
<i>Vaccinium membranaceum</i>	dwarf blueberry
<i>Vaccinium ovalifolium</i>	black huckleberry
<i>Valerianaitchensis</i>	oval-leaved blueberry
<i>Veratrum viride</i>	Sitka valerian
<i>Viburnum edule</i>	Indian hellebore
<i>Viola glabella</i>	highbush-cranberry
<i>Viola</i> spp.	stream violet
	violets