

TABLE 8 Summary of climate data for biogeoclimatic units within the guide area^a

Climatic characteristics		ICH mm	ICH wk1	ICH wk3	SBS dh	SBS vk ^b	ESSF mm1	ESSF wk1 ^b	ESSF wc3 ^b
Annual precipitation (mm)	Mean	N/A	1214.1	N/A	609.4	1249.6	N/A	1043.9	1408.5
	Range	N/A	867.7–1725.4	N/A	503.1–678.5	989.7–1635.5	N/A	N/A	1177.1–1624.7
Growing-season precipitation (mm)	Mean	280.5	385.4	382.5	237.3	472.0	354.3	426.1	510.3
	Range	232.7–328.2	325.0–460.5	280.9–479.1	177.4–289.1	404.6–583.4	339.4–369.1	378.5–490.9	401.6–631.0
Annual snowfall (cm)	Mean	N/A	587.6	N/A	210.5	N/A	N/A	538.4	782.1
	Range	N/A	374.8–1090.0	N/A	180.3–234.8	N/A	N/A	N/A	N/A
Annual temperature (°C)	Mean	N/A	4.4	4.8	3.7	2.6	N/A	-0.1	-1.0
	Range	N/A	2.3–6.9	3.2–6.2	2.8–4.2	1.3–4.0	N/A	-1.5–1.4	-3.1–1.1
Growing degree-days (>5°C)	Mean	N/A	1364	n/a	1237	N/A	N/A	748	671
	Range	N/A	991–1808	n/a	1134–1332	N/A	N/A	N/A	N/A
Frost-free period (days)	Mean	N/A	121	N/A	92	N/A	N/A	48	75
	Range	N/A	104–149	N/A	76–116	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 For., Research Branch, Victoria, B.C. Unpublished report.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 The SBSvk, ESSFwk1, and ESSFwc3 are included for comparison. No long-term climate data exist for the ICHwk4 and ESSFwc2 biogeoclimatic units.

Handbook 29 (ESSFwk2, ESSFwc3), or from the Cariboo Region field guide (ICHwk4). The Alpine Tundra zone is not covered within this field guide as site units have not as yet been described.

TABLE 9 *Some important wildlife species that use biogeoclimatic units in the Rocky Mountain trench guide area*

	Occurrence in variants ^a					
	ICH mm	ICH wk1	ICH wk3	SBS dh	ESSF mm1	ESSF wc2
Moose (winter range)	M	M	M	H	–	–
Mule deer (winter range)	L	L	L	M	–	–
White-tailed deer	–	–	–	M	–	–
Elk	–	–	–	L	–	–
Caribou ^b	M	M	M	–	H	H
Grizzly bear ^b	H	H	H	M	VH	VH
Furbearers	M	M	M	H	H	H

a L = Low; M = Medium; H = High; VH = Very High

b Denotes species “blue listed” in 1989 by the Ministry of Environment. Because of major declines in their populations, they are considered sensitive and/or deserving of management attention.

4.1 Moist Mild Interior Cedar-Hemlock

Location

The ICHmm occurs on the lower valley walls above Kinbasket Reservoir from Hugh Allen Creek to Valemount, on the southwest side of the valley between Albreda and Dunster, and again on both walls of the Rocky Mountain Trench between Dunster and the McKale River.

Elevation range

750–1250 m

Climate

The ICHmm is the driest of the ICH subzones in the Prince George Region (Table 8). Although the seasonal precipitation is only slightly less than that of the ICHwk₁, the annual precipitation is much less because of much lower snow accumulations. The ICHmm is also drier than the ICHwk₃ because it occurs in an area of greater rainshadow due to the Premier Range to the west. In comparison to the ESSFwc₂ and ESSFmm₁, the ICHmm is drier, has a longer growing season, and has warmer temperatures.

Forests

The dominant climax tree species in the ICHmm are western red-cedar and western hemlock. They are co-dominant in most stands with minor components of hybrid white spruce and subalpine fir. Douglas-fir, lodgepole pine, and trembling aspen are the most common seral species. Western white pine is uncommon, reaching its northern limit in the southern portion of this unit. Paper birch is scattered throughout the subzone while cottonwood is relatively uncommon.

There are more seral stands in this subzone of the ICH than any other in the region for two possible reasons: the drier climate leads to drier forest fuel during the summer lightning season; and a number of fires were lit during the railroad construction approximately 70 years ago.

Soils, geology, and landforms

Much of this subzone is underlain by deep unconsolidated deposits in the Rocky Mountain Trench and major tributary valleys. Bedrock is seldom exposed, and consists mostly of Precambrian metamorphic and sedimentary rocks. Surficial deposits and soils consist predominantly of sandy colluvial and morainal deposits (Humo-Ferric Podzols), although at lower elevations, this subzone includes sediments and soils typical of the floor of the Trench: clayey glaciolacustrine (Gray Luvisols) and sandy glaciofluvial terraces (Humo-Ferric Podzols).

Distinguishing the ICHmm from adjoining biogeoclimatic units

ESSFmm₁ has:

- Engelmann spruce present in the canopy;
- no western hemlock or western redcedar present in the canopy;
- white-flowered rhododendron present on submesic sites; and
- less devil's club present on wet sites.

SBSdh has:

- prickly rose present on most sites;
- velvet-leaved blueberry present on dry sites;
- Douglas-fir present in the canopy of subxeric to mesic sites;
- no western hemlock or western redcedar present in the canopy on mesic sites;
- no devil's club or false azalea present in the shrub layer on mesic sites; and
- little or no oak fern present in the herb layer on mesic sites.

ICHwk₃ has:

- less falsebox present on dry sites;
- more Douglas maple present in the shrub layer of wet sites;
- more lady fern present on subhygric to hygric sites; and
- less false azalea present on wet sites.

ICHwk₁ has:

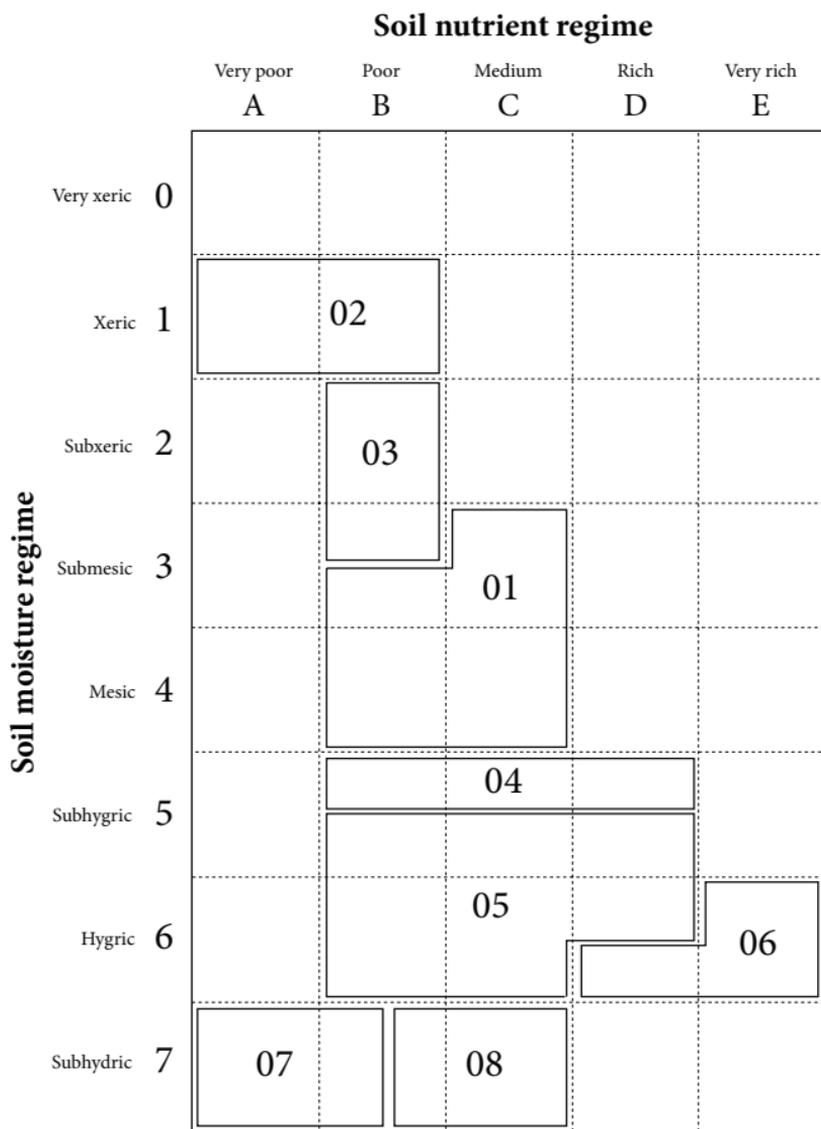
- more red-osier dogwood present on wet sites;
- more oval-leaved blueberry present on dry sites; and
- more falsebox present on submesic sites.

ESSFwc2 has:

- Engelmann spruce present in the canopy of most sites;
- no western hemlock or western redcedar present in the canopy;
- white-flowered rhododendron present on subxeric to mesic sites;
and
- little or no devil's club on all sites.

Ecosystem management

These forest ecosystems were historically usually even-aged but extended post-fire regeneration periods produce stands that are un-even-aged and possess multi-storeyed canopies. Stand-destroying wildfires were often of moderate size (20–1000 ha) with patches of unburned areas due to chance, sheltering terrain features, or higher site moisture. Many larger fires occurred after periods of extended drought but the landscape was dominated by extensive areas of mature forest surrounding patches of younger forest. Return cycles for stand-initiating events were approximately 200 years.



- | | |
|------------------------------|-------------------------------------|
| 01 HwCw – Spruce – Step moss | 05 CwHw – Devil’s club – Oak fern |
| 02 CwSxw – Soopolallie | 06 CwSxw – Devil’s club – Horsetail |
| 03 HwCw – Step moss | 07 SbPl – Bog-laurel – Sphagnum |
| 04 CwHw – Oak fern | 08 CwSxw – Skunk cabbage – Sphagnum |

FIGURE 10 *Edatopic grid displaying site units in the ICHmm subzone.*

FIGURE 11 IChmm vegetation table.

Site Series	02	03	01	04	05	06	07	08	
Trees									
<i>Pseudotsuga menziesii</i>	■	■	■	■	■	■	■	■	Douglas-fir
<i>Picea glauca</i> × <i>engelmannii</i>	■	■	■	■	■	■	■	■	hybrid white spruce
<i>Thuja plicata</i>	■	■	■	■	■	■	■	■	western redcedar
<i>Tsuga heterophylla</i>	■	■	■	■	■	■	■	■	western hemlock
<i>Picea mariana</i>							■	■	black spruce
Shrubs									
<i>Paxistima myrsinites</i>	■	■							falsebox
<i>Vaccinium membranaceum</i>	■	■	■	■				■	black huckleberry
<i>Menziesia ferruginea</i>	■	■	■	■	■	■		■	false azalea
<i>Rubus parviflorus</i>			■		■	■			thimbleberry
<i>Oplopanax horridus</i>			■	■	■	■			devil's club
<i>Ledum groenlandicum</i>							■	■	Labrador tea
<i>Vaccinium ovalifolium</i>								■	oval-leaved blueberry
Herbs and Dwarf Shrubs									
<i>Chimaphila umbellata</i>	■	■	■						prince's pine
<i>Clintonia uniflora</i>			■	■	■	■			queen's cup
<i>Cornus canadensis</i>		■	■	■	■	■	■	■	bunchberry
<i>Aralia nudicaulis</i>		■	■	■	■	■			wild sarsaparilla
<i>Tiarella</i> spp.				■	■	■			foamflowers
<i>Gymnocarpium dryopteris</i>			■	■	■	■		■	oak fern
<i>Equisetum arvense</i>						■			common horsetail
<i>Lysichiton americanus</i>							■	■	skunk cabbage
<i>Carex</i> spp.							■	■	sedges
Mosses and Lichens									
<i>Dicranum polysetum</i>	■								wavy-leaved moss
<i>Pleurozium schreberi</i>	■	■	■	■	■	■	■	■	red-stemmed feathermoss
<i>Ptilium crista-castrensis</i>		■	■	■	■	■		■	knight's plume
<i>Rhytidiadelphus triquetrus</i>	■	■	■	■	■	■			electrified cat's-tail moss
<i>Sphagnum</i> spp.							■	■	sphagnum

Prominence class: ■ 1 ■ 2 ■ 3 ■ 4 ■ 5

- 1a Black spruce in canopy; organic soil; water table close to surface.
ICHmm/07
- 1b Black spruce low cover or absent; mineral soil; water table variable.
- 2a Canopy dominated by Douglas-fir; mid- to upper slope; slope greater than 50%; south to west aspect; *Paxistima myrsinites* (falsebox) (p. 44)⁶ moderate to high cover (>10%).
ICHmm/02
- 2b Canopy dominated by western redcedar, western hemlock, or a mixed canopy; mid- to lower slope or, if upper slope, canopy dominated by western hemlock; slopes usually less than 40%; aspect variable; *Paxistima myrsinites* low cover (<1%) or absent.
- 3a Tree canopy (western hemlock, western redcedar, hybrid white spruce) poorly developed and low cover (<30%); water table close to surface; *Lysichiton americanus* (p. 224) moderate to high cover (>10%).
ICHmm/08
- 3b Tree canopy well developed and moderate to high cover (>50%); water table not close to surface; *Lysichiton americanus* low cover (<1%) or absent.
- 4a Lower to toe slope; *Oplopanax horridus* (devil's club) (p. 36) moderate to high cover (>15%).
- 5a Canopy primarily western redcedar; humus thickness greater than 30 cm; permanent seepage; *Equisetum* spp. (horsetails) (pp. 281–284) moderate to high cover (usually >10%).
ICHmm/06

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

- 5b Canopy a mixture of western redcedar and western hemlock; humus thickness less than 30 cm; temporary seepage; *Equisetum* spp. low cover (usually <1%) or absent.

ICHmm/05

- 4b Mid- to lower slope; *Oplopanax horridus* low cover (<5%) or absent.

- 6a Mid- to lower slope; *Gymnocarpium dryopteris* (oak fern) (p. 293) moderate to high cover (>15%).

ICHmm/04

- 6b Usually mid- to upper slope, or level; *Gymnocarpium dryopteris* low cover (usually <5%) or absent.

- 7a Canopy of Hw, Cw, Sx, and Bl, often with a minor component of Fd or Pl; herb layer moderately developed (>15% cover), with *Clintonia uniflora* (queen's cup) (p. 131) present, and *Gymnocarpium dryopteris* often present.

ICHmm/01

- 7b Canopy of Hw, sometimes with a minor component of Cw; herb layer poorly developed (<10% cover), with some *Clintonia uniflora*; *Gymnocarpium dryopteris* absent.

ICHmm/03

VEGETATION

Tree Layer: 75% cover

western hemlock, western redcedar, hybrid white spruce, subalpine fir, [Douglas-fir]

Shrub Layer: 25% cover

<i>Vaccinium membranaceum</i>	(black huckleberry)
<i>Menziesia ferruginea</i>	(false azalea)
<i>Oplopanax horridum</i>	(devil's club)
<i>Spiraea betulifolia</i>	(birch-leaved spirea)
<i>Rubus parviflorus</i>	(thimbleberry)
[<i>Ribes lacustre</i>	(black gooseberry)]
western redcedar	
western hemlock	

Menziesia ferruginea

Herb Layer: 20% cover

<i>Cornus canadensis</i>	(bunchberry)
<i>Clintonia uniflora</i>	(queen's cup)
<i>Orthilia secunda</i>	(one-sided wintergreen)
<i>Linnaea borealis</i>	(twinflower)
<i>Maianthemum racemosum</i>	(false Solomon's-seal)
<i>Chimaphila umbellata</i>	(prince's pine)
<i>Goodyera oblongifolia</i>	(rattlesnake-plantain)
<i>Tiarella</i> spp.	(foamflowers)
<i>Gymnocarpium dryopteris</i>	(oak fern)
<i>Streptopus lanceolatus</i>	
var. <i>curvipes</i>	(rosy twistedstalk)
<i>Aralia nudicaulis</i>	(wild sarsaparilla)

Clintonia uniflora*Pleurozium schreberi*

Moss Layer: 75% cover

<i>Pleurozium schreberi</i>	(red-stemmed feathermoss)
<i>Ptilium crista-castrensis</i>	(knight's plume)
<i>Rhytidiadelphus triquetrus</i>	(electrified cat's-tail moss)
<i>Hylocomium splendens</i>	(step moss)

SOIL AND SITE

Moisture Regime:	3–4 (submesic–mesic)
Nutrient Regime:	B–C (poor–medium)
Slope Gradient (%):	19 (0–42)
* Slope Position:	usually mid
Parent Material:	(glacio) fluvial, morainal
* Soil Texture:	medium–coarse
Coarse Fragments (%):	29 (0–87)

COMMENTS: coarse-textured soils receive some seepage during the growing season

DISTRIBUTION: common

INTERPRETATIONS

- Site limitations: – sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; **attempt to regenerate naturally by retaining Pl cones and/or leaving Fd seed trees.**
- Silviculture system: – see Section 5.1.
- Site preparation: – see Section 5.2.
- Species choice: – Fd, Pl, Sx, [Cw, Hw, **Bl**].
- Vegetation potential: – low/moderate (thimbleberry, fireweed).
- Reforestation: – young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
– if Fd stems are present, conduct a stand evaluation to assess whether a partial-cutting system is feasible.
– if a partial-cutting system is used and abundant advance Fd regeneration is present, attempt to log in a manner that protects this regeneration.
– under a partial-cutting system, spruce regeneration requires mineral soil exposure and/or planting.
– advance Cw and Hw regeneration should only be preserved if it meets size and acceptability criteria (Section 5.1).
- Concerns: – sites within this unit with shallow and/or coarse-textured soils are vulnerable to nutrient deficiency if forest floors are reduced; **site preparation methods that reduce forest floor thickness, such as slashburning or brushblading, must be avoided.**

VEGETATION

Tree Layer: 70% cover

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

Shrub Layer: 50% cover

Paxistima myrsinites (falsebox)
Menziesia ferruginea (false azalea)
Shepherdia canadensis (soopolallie)
Vaccinium membranaceum (black huckleberry)
Acer glabrum (Douglas maple)
Amelanchier alnifolia (saskatoon)
 western redcedar
 subalpine fir
 hybrid white spruce

Herb Layer: 8% cover

Chimaphila umbellata (prince's pine)
Orthilia secunda (one-sided wintergreen)
Linnaea borealis (twinflower)
Goodyera oblongifolia (rattlesnake-plantain)
Oryzopsis asperifolia (rough-leaved ricegrass)
Cornus canadensis (bunchberry)

Moss Layer: 50% cover

Pleurozium schreberi (red-stemmed feathermoss)
Barbilophozia spp. (leafy liverworts)
Rhytidiadelphus triquetrus (electrified cat's-tail moss)
Dicranum polysetum (wavy-leaved moss)
Peltigera spp. (peltigera lichens)

SOIL AND SITE

Moisture Regime: 1 (xeric)
 Nutrient Regime: A-B (very poor-poor)
 * Aspect: W to SSW
 * Slope Gradient (%): 64 (50-70)
 * Slope Position: upper-mid
 Parent Material: usually colluvial
 * Soil Texture: coarse
 Coarse Fragments (%): 70 (50-80)

COMMENTS: there is often a fairly high cover of cobbles and stones on the surface although most of them are covered with bryophytes or lichens; limited data because of the rarity of the ecosystem

DISTRIBUTION: uncommon

*Paxistima
myrsinites*



*Chimaphila
umbellata*



*Pleurozium
schreberi*

INTERPRETATIONS

- Site limitations: - sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; **attempt to regenerate naturally by retaining Pl cones and/or leaving Fd seed trees on site.**
- Silviculture system: - see Section 5.1.
- Site preparation: - see Section 5.2.
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.
- Species choice: - Fd, Pl, [Hw], (Cw, Sx, **Bl**).
- Vegetation potential: - low.
- Reforestation: - young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- if Fd stems are present, conduct a stand evaluation to assess if a partial-cutting system is feasible.
- if a partial-cutting system is used and abundant advance Fd regeneration is present, attempt to log in a manner that protects this regeneration.
- fill-planting may be required after partial cutting.
- Concerns: - sites within this unit with shallow and/or coarse-textured soils are vulnerable to nutrient deficiency if forest floors are reduced; **site preparation methods that reduce forest floor thickness, such as slashburning or brushblading, must be avoided.**
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; **woody debris and cones should be distributed across these sites (i.e., lop and scatter).**
- site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; **leave a shelterwood overstorey to reduce the severity of the drought hazard, or prescribe natural regeneration, which is generally more adapted to surviving these conditions, especially during establishment.**

VEGETATION

Tree Layer: 85% cover
western hemlock, western redcedar, [subalpine fir, Douglas-fir]

Shrub Layer: 30% cover
Menziesia ferruginea (false azalea)
Vaccinium membranaceum (black huckleberry)
western hemlock
western redcedar
[subalpine fir]

Menziesia ferruginea



Cornus canadensis

Herb Layer: 10% cover
Cornus canadensis (bunchberry)
Orthilia secunda (one-sided wintergreen)
Chimaphila umbellata (prince's pine)
Rubus pedatus (five-leaved bramble)
[*Linnaea borealis* (twinline)]

Moss Layer: 100% cover
Pleurozium schreberi (red-stemmed feathermoss)
Hylocomium splendens (step moss)
Ptilium crista-castrensis (knight's plume)
Peltigera spp. (peltigera lichens)



Pleurozium schreberi

SOIL AND SITE

Moisture Regime: 2-3 (subxeric-submesic)
Nutrient Regime: B (poor)
Slope Gradient(%): 35 (0-75)
* Slope Position: variable, commonly mid-crest
Parent Material: variable
* Soil Texture: coarse-moderately coarse
Coarse Fragments (%): 0-74 (usually greater than 20)

DISTRIBUTION: fairly common

INTERPRETATIONS

- Site limitations: – sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; **attempt to regenerate naturally by retaining Pl cones and/or leaving Fd seed trees on site.**
- 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: – see Section 5.2.
- Species choice: – Fd, Hw, Pl, (Cw, Sx, **Bl**).
- Vegetation potential: – low/moderate (thimbleberry, fireweed).
- Reforestation: – if Fd stems are present, conduct a stand evaluation to assess if a partial-cutting system is feasible.
– if a partial-cutting system is used and abundant advance Fd regeneration is present, attempt to log in a manner that protects this regeneration.
– young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
– Bl, Cw, and Sx will be significantly less productive than Fd, Hw, or Pl on these sites.
– fill-planting may be required after partial cutting.
- Concerns: – sites within this unit with shallow and/or coarse-textured soils are vulnerable to nutrient deficiency if forest floors are reduced; **site preparation methods that reduce forest floor thickness, such as slashburning or brushblading, must be avoided.**
– 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).**
– Pw will be subject to blister rust-induced mortality; **Pw should only be considered on a trial basis or as a minor component.**

VEGETATION

Tree Layer: 75% cover

western hemlock, western redcedar, [hybrid white spruce, subalpine fir]

Shrub Layer: 25% cover

Menziesia ferruginea (false azalea)
Vaccinium membranaceum (black huckleberry)
Oplopanax horridum (devil's club)
 western hemlock
 western redcedar
 subalpine fir

Menziesia ferruginea

Herb Layer: 55% cover

Gymnocarpium dryopteris (oak fern)
Cornus canadensis (bunchberry)
Tiarella spp. (foamflowers)
Orthilia secunda (one-sided wintergreen)
Clintonia uniflora (queen's cup)
Streptopus lanceolatus
 var. *curvipes* (rosy twistedstalk)
Moneses uniflora (single delight)
Rubus pedatus (five-leaved bramble)
 [*Aralia nudicaulis* (wild sarsaparilla)]

Gymnocarpium dryopteris*Hylocomium splendens*

Moss Layer: 60% cover

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

SOIL AND SITE

Moisture Regime: 4 (mesic)
 Nutrient Regime: B–D (poor–rich)
 * Slope Gradient (%): 23 (8–39)
 * Slope Position: usually mid
 Parent Material: variable
 Soil Texture: variable (moderately fine, medium, and moderately coarse)
 Coarse Fragments (%): 41 (0–91)
 * Seepage Water: may be present

DISTRIBUTION: common

INTERPRETATIONS

- Site limitations: – sites with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; plant stock that will achieve better lateral root development (e.g., Cu-treated), prescribe natural regeneration, or protect advance regeneration.
- Silviculture system: – see Section 5.1.
- Site preparation: – see Section 5.2.
- Species choice: – Sx, Cw, Hw [Pl, Bl, Fd], (Pw).
- Vegetation potential: – moderate (fireweed, thimbleberry, red raspberry).
- Reforestation: – advance Cw, Hw, and Bl regeneration should only be preserved if it meets size and acceptability criteria (Section 5.1).
 – young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
 – Fd should only be planted on sites with coarse-textured soils and low frost hazard.
 – fill-planting may be required after partial cutting.
- Concerns: – site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; **leaving a partial canopy, planting on raised microsites, and/or choosing a frost-resistant species (e.g., Pl) are advised.**
 – sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; **restrict traffic to winter operations or dry soil conditions.**
 – sites within this unit with silty soils are susceptible to frost heaving; **bareroot stock will likely resist frost heaving better than plug stock.**
 – Pw will be subject to blister rust-induced mortality; **Pw should only be considered on a trial basis or as a minor component.**



Oplopanax horridus



Gymnocarpium dryopteris

Mnium spp.

VEGETATION

Tree Layer: 70% cover
western redcedar, western hemlock, [hybrid white spruce, subalpine fir]

Shrub Layer: 60% cover
Oplopanax horridus (devil’s club)
Ribes lacustre (black gooseberry)
Menziesia ferruginea (false azalea)
Rubus parviflorus (thimbleberry)
western hemlock
western redcedar

Herb Layer: 45% cover
Gymnocarpium dryopteris (oak fern)
Tiarella spp. (foamflowers)
Streptopus spp. (twistedstalks)
Cornus canadensis (bunchberry)
Maianthemum racemosa (false Solomon’s-seal)
Orthilia secunda (one-sided wintergreen)
Dryopteris expansa (spiny wood fern)
Clintonia uniflora (queen’s cup)
Rubus pedatus (five-leaved bramble)

Moss Layer: 40% cover
Mnium spp. (leafy mosses)
Pleurozium schreberi (red-stemmed feathermoss)
Ptilium crista-castrensis (knight’s plume)
Hylocomium splendens (step moss)
Rhytidiadelphus triquetrus (electrified cat’s-tail moss)

SOIL AND SITE

Moisture Regime: 5–6 (subhygric–hygric)
Nutrient Regime: B–D (poor–rich)
* Slope Gradient (%): 26 (4–75)
* Slope Position: commonly lower–toe
Parent Material: (glacio) fluvial and morainal
Soil Texture: predominantly medium and coarse-textured
Coarse Fragments (%): 36 (0–80)
Seepage Water: may be present

COMMENTS: coarse-textured soils compensated by seepage; all sites receive some seepage during the growing season

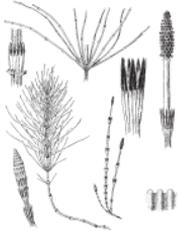
DISTRIBUTION: very common

INTERPRETATIONS

- Site limitations: – sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; **attempt to regenerate naturally and/or preserve advance regeneration.**
- Silviculture system: – see Section 5.1.
- Site preparation: – see Section 5.2.
- Species choice: – *Sx, Cw, Hw, [Bl, Fd, Pl]*.
- Vegetation potential: – high (thimbleberry, fireweed, lady fern).
- Reforestation: – advance Cw, Hw, and Bl regeneration should only be preserved if it meets size and acceptability criteria (Section 5.1).
 – under a partial-cutting system, spruce regeneration requires mineral soil exposure and/or planting.
 – young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
 – try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- Concerns: – site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; **leaving a partial canopy, planting on raised microsites, and/or choosing a frost-resistant species (e.g., Pl) are advised.**
 – sites with thick organic horizons reduce spring soil temperatures, slowing root development; **attempt to reduce organic horizon thickness during site preparation.**
 – sites within this unit with thick organic horizons (>10 cm) have increased windthrow hazard; **block layouts must have windfirm boundaries, or a wide buffer of standing timber must be left around such sites.**



*Oplopanax
horridus*



*Equisetum
arvense*



*Rhytidiadelphus
triquetrus*

VEGETATION

Tree Layer: 70% cover

western redcedar, [hybrid white spruce, subalpine fir,
western hemlock]

Shrub Layer: 40% cover

Oplopanax horridus (devil's club)
Acer glabrum (Douglas maple)
Viburnum edule (highbush-cranberry)
Ribes lacustre (black gooseberry)
 [*Rubus parviflorus* (thimbleberry)]
 western redcedar
 subalpine fir

Herb Layer: 75% cover

Equisetum arvense (common horsetail)
Gymnocarpium dryopteris (oak fern)
Cornus canadensis (bunchberry)
Mitella nuda (common mitrewort)
Equisetum scirpoides (dwarf scouring-rush)
Actaea rubra (baneberry)
Maianthemum racemosum (false Solomon's-seal)
Galium triflorum (sweet-scented bedstraw)
 [*Equisetum pratense* (meadow horsetail)
 [*Rubus pubescens* (trailing raspberry)]

Moss Layer: 50% cover

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

SOIL AND SITE

Moisture Regime: 6 (hygric)
 Nutrient Regime: D-E (rich-very rich)
 * Slope Gradient (%): 15 (0-30)
 * Slope Position: lower-toe
 Parent Material: lacustrine, or organic over
 fluvial
 Soil Texture: variable
 Coarse Fragments (%): usually 0
 * Seepage Water: present

COMMENTS: limited data because of the rarity of the ecosystem

DISTRIBUTION: uncommon

INTERPRETATIONS

- Site limitations:
- very difficult sites to manage; ***serious consideration should be given to managing these sites as wildlife corridors.***
 - sites with medium- to fine-textured lacustrine soils often have poor soil structure, leading to poor root growth; ***plant stock that will achieve better lateral root development (e.g., Cu-treated), prescribe natural regeneration, or protect advance regeneration.***
 - sites with saturated soils are poorly aerated, which slows root development; ***plant seedlings on naturally or artificially raised microsites.***
- Silviculture system:
- 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:
- ***Cw, Hw, Pl, Sx, [Bl].***
- Vegetation potential:
- high (fireweed, black twinberry, thimbleberry).
- Reforestation:
- advance regeneration should be preserved and supplemented by planting sturdy stock in groups rather than evenly across the site.
 - young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
 - advance Cw and Hw regeneration should only be preserved if it meets size and acceptability criteria.
- Concerns:
- site conditions may lead to frost damage of regeneration, especially in any naturally or artificially created depressions; ***leaving a partial canopy, planting on raised microsites, and/or choosing a frost-resistant species (e.g., Pl) are advised.***
 - these units represent important wildlife habitat; ***discuss prescription with fish and wildlife personnel.***
 - windthrow risk after partial cutting will be high on sites where root-restricting layers occur at depths of <25 cm.
 - water table will likely rise above the ground surface in the spring, causing seedling mortality.
 - sites with thick organic horizons (>10 cm) have increased windthrow hazard; ***block layouts must have windfirm boundaries, or a wide buffer of standing timber must be left around such sites.***

VEGETATION

Tree Layer: 25% cover
black spruce, lodgepole pine

Shrub Layer: 20% cover
Ledum groenlandicum (Labrador tea)
Vaccinium myrtilloides (velvet-leaved blueberry)
western hemlock
lodgepole pine
black spruce
western redcedar
subalpine fir



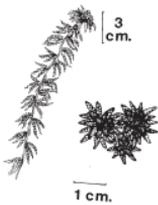
*Ledum
groenlandicum*

Herb Layer: 75% cover
Carex spp. (sedges)
Cornus canadensis (bunchberry)
Kalmia microphylla spp.
occidentalis (western bog-laurel)
Equisetum sylvaticum (wood horsetail)
Oxycoccus oxycoccus (bog cranberry)
Coptis trifolia (three-leaved goldthread)
Empetrum nigrum (crowberry)
Gaultheria hispidula (creeping-snowberry)



Carex spp.

Moss Layer: 90% cover
Sphagnum spp. (sphagnums)
Aulacomnium palustre (glow moss)
Pleurozium schreberi (red-stemmed feathermoss)



Sphagnum spp.

SOIL AND SITE

Moisture Regime: 7 (subhydric)
Nutrient Regime: A-B (very poor-poor)
Slope Gradient (%): 1
* Slope Position: depression
* Parent Material: organic
* Water Table (cm): 0-30
Coarse Fragments (%): 0

COMMENTS: bog and poor fen ecosystems are very rare in this subzone; nutrient-poorer bogs have a lower cover of sedges; limited data because of the rarity of the ecosystem

DISTRIBUTION: rare

INTERPRETATIONS

- Site limitations: – site and soil conditions of this unit result in marginal forest productivity; *serious consideration should be given to excluding logging from this unit.*
- Silviculture system: – avoid logging.

VEGETATION

Tree Layer: 25% cover

western hemlock, hybrid white spruce, [subalpine fir]

Shrub Layer: 60% cover

Vaccinium ovalifolium (oval-leaved blueberry)*Menziesia ferruginea* (false azalea)*Vaccinium membranaceum* (black huckleberry)*Oplopanax horridum* (devil's club)

western hemlock

western redcedar

hybrid white spruce

Herb Layer: 50% cover

Lysichiton americanus (skunk cabbage)*Carex* spp. (sedges)*Rubus pedatus* (five-leaved bramble)*Cornus canadensis* (bunchberry)*Gymnocarpium dryopteris* (oak fern)*Streptopus* spp. (twistedstalks)*Dryopteris expansa* (spiny wood fern)*Equisetum sylvaticum* (wood horsetail)*Lycopodium annotinum* (stiff club-moss)

Moss Layer: 95% cover

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

SOIL AND SITE

Moisture Regime: 7 (subhydric)

Nutrient Regime: B (poor)

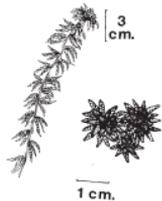
* Slope Gradient (%): 1

* Slope Position: depression

Parent Material: usually organic

Coarse Fragments (%): usually 0

* Seepage Water (cm): 0–30

COMMENTS: limited data because of the rarity of ecosystem;
seepage water moves very slowly through these sites**DISTRIBUTION:** rare*Vaccinium ovalifolium**Lysichiton americanus**Sphagnum* spp.

INTERPRETATIONS

- Site limitations: – site and soil conditions of this unit result in marginal forest productivity; *serious consideration should be given to excluding logging from this unit.*
- Silviculture system: – avoid logging.