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

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

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 For., Research Branch, Victoria, B.C., unpublished report.

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

[c] Standard deviation of the mean.

## 9 TAKLA WET COOL SUB-BOREAL SPRUCE (SBSwk3)[1]

### Location
The SBSwk3 occurs in the main and side drainages of the valley occupied by Takla Lake and the Driftwood River. It occurs as far south as Trembleur Lake and as a far north as the Sustut River.

### Elevation range
750 – 1100 m

### Climate
According to long-term climate records, the SBSwk3 has lower mean annual precipition and mean seasonal precipitation than the SBSmk2 (Table 4.1). However, according to PRISM data, it is intermediate between the SBSmk2 and SBSwk2 (Table 4.1). It is similar in temperature regime to the other sub-boreal units but warmer than the ESSFmv3, which replaces it at higher elevations.

### Distinguishing the SBSwk3 from adjoining biogeoclimatic units

BWBSdk1, SBSmk1, and SBSmc2 have:
- more prickly rose in the shrub layer on mesic sites; and
- less oak fern in the herb layer on mesic sites.

SBSwk3a has:
- Douglas-fir occurring over a wider range of moisture regimes; and
- more Hooker's fairybells in the herb layer on mesic sites.

ESSFmc and ESSFmv3 have:
- more white-flowered rhododendron and/or false azalea but less black twinberry and/or thimbleberry in the shrub layer on mesic sites; and
- less oak fern in the herb layer on mesic sites.

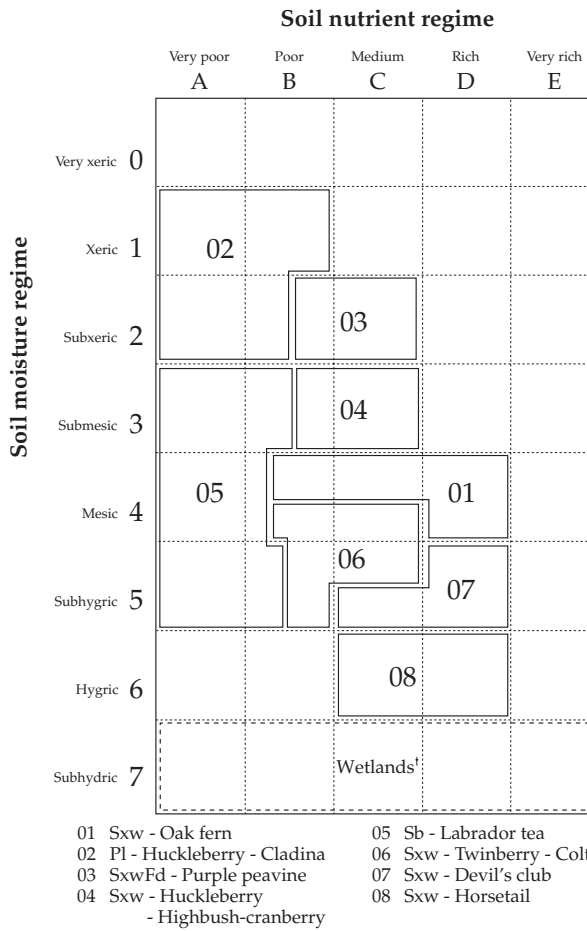
### Forests
Due to the lower frequency of stand replacement events in this variant, forested areas are often climax forests dominated by hybrid white spruce and subalpine fir. Lodgepole pine is common

[1] Formerly SBSn

on sites drier than mesic. Black spruce occurs in wetlands, and with lodgepole pine on gently sloping upland sites with a cool aspect. Homogeneous stands of trembling aspen occur primarily along the shores of Takla Lake. Black cottonwood occurs along streams and rivers and is often associated with hybrid white spruce.

**Wildlife**

This variant provides very good moose winter range habitat. The wetlands are important to waterfowl for breeding and migration staging. Grizzly and black bear use this variant. Bears and bald eagles concentrate along waterways during the sockeye spawning period. Aquatic furbearer habitat is plentiful.




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

FIGURE 9.1 *Edatopic grid displaying site units of the SBSwk3 variant.*

| Site Series | 02 | 03 | 04 | 01 | 05 | 06 | 07 | 08 | |
|---|---|---|---|---|---|---|---|---|---|
| **Trees** | | | | | | | | | |
| *Pinus contorta* | 5 | 1 | 3 | 3 | 2 | | 1 | 1 | lodgepole pine |
| *Pseudotsuga menziesii* | | 3 | | | | | | | Douglas-fir |
| *Picea mariana* | | | | | 3 | | | | black spruce |
| *Picea glauca × engelmannii* | | 2 | 3 | 3 | | 4 | 3 | 4 | hybrid white spruce |
| **Shrubs** | | | | | | | | | |
| *Shepherdia canadensis* | 3 | 1 | | | | 1 | | | soopolallie |
| *Vaccinium membranaceum* | 3 | | 3 | 2 | 2 | 1 | 1 | | black huckleberry |
| *Amelanchier alnifolia* | | 2 | | | | | | | saskatoon |
| *Spiraea betulifolia* | | 1 | 1 | | | 1 | | | birch-leaved spirea |
| *Rubus parviflorus* | | | 2 | 2 | | 2 | 2 | | thimbleberry |
| *Lonicera involucrata* | | | 1 | 2 | 2 | 2 | 1 | 2 | black twinberry |
| *Salix* spp. | | | | | 3 | | | 1 | willows |
| *Oplopanax horridus* | | 1 | | | | | 3 | | devil's club |
| *Viburnum edule* | | | 2 | 2 | 2 | 1 | 1 | 3 | highbush-cranberry |
| **Herbs and Dwarf Shrubs** | | | | | | | | | |
| *Gaultheria hispidula* | 1 | | | | | | | | creeping-snowberry |
| *Lathyrus nevadensis* | | 3 | | | | | | | purple peavine |
| *Linnaea borealis* | 2 | | 1 | 1 | 2 | 2 | | 2 | twinberry |
| *Cornus canadensis* | 1 | 1 | 2 | 3 | 1 | 3 | 2 | 3 | bunchberry |
| *Maianthemum racemosum* | | 2 | | 1 | | 1 | | | false Solomon's-seal |
| *Rubus pubescens* | | 1 | 1 | 1 | 2 | 3 | | 2 | trailing raspberry |
| *Streptopus amplexifolius* | | | | | | 1 | 1 | | clasping twistedstalk |
| *Gymnocarpium dryopteris* | | | | 3 | | | 3 | | oak fern |
| *Equisetum arvense* | | | | 1 | 3 | | | 4 | common horsetail |
| **Mosses and Lichens** | | | | | | | | | |
| *Cladina* spp. | 3 | | | | | | | | cladina lichens |
| *Pleurozium schreberi* | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | red-stemmed feathermoss |
| *Ptilium crista-castrensis* | 1 | 2 | 3 | 3 | | 3 | 3 | 4 | knight's plume |
| *Mnium* spp. | | | | 1 | | | 1 | | leafy mosses |

Prominence class: 1 2 3 4 5

FIGURE 9.2 *SBSwk3 vegetation table.*

1a Canopy dominated by Douglas-fir or lodgepole pine; *Amelanchier alnifolia* (p. 46)[2] or *Cladina* spp. (p. 334) present; slope position upper or level; soil texture coarse

2a Canopy dominated by Douglas-fir

**SBSwk3/03**

2b Canopy dominated by lodgepole pine

**SBSwk3/02**

1b Canopy generally dominated by mixtures of lodgepole pine and white or black spruce; *Amelanchier alnifolia* and *Cladina* spp. low cover (<1%) or absent; slope position variable; soil texture variable

3a Canopy dominated by a combination of lodgepole pine and black spruce; slope gradient less than 10%, often flat; *Aulacomnium palustre* (p. 311) present

**SBSwk3/05**

3b Canopy dominated by hybrid white spruce, sometimes in combination with lodgepole pine; slope gradient variable; *Aulacomnium palustre* usually absent

4a Level or depression; parent material fluvial or lacustrine; *Equisetum* spp. (p. 281–284) abundant (usually >30% cover)

**SBSwk3/08**

4b Slope position variable; parent material variable; *Equisetum* spp. low cover (<5%) or absent

5a Slope position mid to lower (occasionally upper on north aspects); *Oplopanax horridus* (p. 36) abundant (usually >15% cover)

**SBSwk3/07**

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

5b Slope position variable; *Oplopanax horridus* low cover (<5%) or absent

6a *Gymnocarpium dryopteris* (p. 293) moderate to high cover (usually >5%)

**SBSwk3/01**

6b *Gymnocarpium dryopteris* low cover (usually <2%) or absent

7a Usually mid to upper slope; lodgepole pine usually present in the canopy; *Rubus pubescens* (p. 91) usually very low cover (<1%) or absent

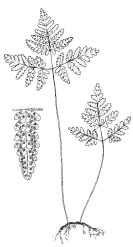
**SBSwk3/04**

7b Usually mid to lower slope; lodgepole pine usually absent from the canopy; *Rubus pubescens* usually low to moderate cover (>1%)

**SBSwk3/06**

*Lonicera involucrata*

*Ribes lacustre*



*Gymnocarpium dryopteris*

## VEGETATION

Tree Layer: 45% cover
Hybrid white spruce, lodgepole pine, subalpine fir

Shrub Layer: 45% cover

| | |
|---|---|
| *Lonicera involucrata* | (black twinberry) |
| *Ribes lacustre* | (black gooseberry) |
| *Vaccinium membranaceum* | (black huckleberry) |
| *Viburnum edule* | (highbush-cranberry) |
| *Rubus parviflorus* | (thimbleberry) |
| *Sorbus scopulina* | (western mountain-ash) |

subalpine fir, hybrid white spruce

Herb Layer: 80% cover

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

Moss Layer: 75% cover

| | |
|---|---|
| *Pleurozium schreberi* | (red-stemmed feathermoss) |
| *Ptilium crista-castrensis* | (knight's plume) |
| *Hylocomium splendens* | (step moss) |
| *Barbilophozia lycopodioides* | (common leafy liverwort) |

## SOIL AND SITE

| | |
|---|---|
| Moisture Regime: | 4 (mesic) |
| Nutrient Regime: | B–D (poor–rich) |
| Slope Gradient (%): | 13 (0–35; usually less than 20) |
| * Slope Position: | mid (lower to upper) |
| Parent Material: | glaciofluvial, fluvial, or morainal |
| * Soil Texture: | usually medium to moderately coarse |
| Coarse Fragments (%): | 40 (13–61) |

**DISTRIBUTION:** common

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

**INTERPRETATIONS**

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

Site preparation:
- see Section 12.

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

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

Reforestation:
- plant sturdy stock as soon after harvesting as possible.
- try to preserve advance regeneration if it is abundant and likely to release and form an acceptable stand.
- help maintain stand diversity on sites to be planted with Pl by mapping aspen patches prior to harvest and planting these areas to spruce.
- Act is not consistently productive on these sites.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.

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

*Vaccinium membranaceum*

*Shepherdia canadensis*

*Linnaea borealis*

**VEGETATION**

Tree Layer: 20% cover
Lodgepole pine

Shrub Layer: 20% cover

| | |
|---|---|
| *Vaccinium membranaceum* | (black gooseberry) |
| *Shepherdia canadensis* | (soopolallie) |
| *Rosa acicularis* | (prickly rose) |
| [*Amelanchier alnifolia* | (saskatoon)] |

subalpine fir, hybrid white spruce

Herb Layer: 15% cover

| | |
|---|---|
| *Linnaea borealis* | (twinflower) |
| *Cornus canadensis* | (bunchberry) |
| *Geocaulan lividum* | (bastard toad-flax) |
| *Epilobium angustifolium* | (fireweed) |
| *Vaccinium caespitosum* | (dwarf blueberry) |
| [*Chimaphila umbellata* | (prince's pine)] |
| [*Arctostaphylos uva-ursi* | (kinnikinnick)] |

Moss Layer: 75% cover

| | |
|---|---|
| *Pleurozium schreberi* | (red-stemmed feathermoss) |
| *Cladina mitis* | (green reindeer lichen) |
| *Cladina rangiferina* | (grey reindeer lichen) |
| *Dicranum fuscescens* | (curly heron's-bill moss) |
| *Peltigera aphthosa* | (freckle pelt lichen) |
| *Polytrichum juniperinum* | (juniper haircap moss) |
| *Ptilium crista-castrensis* | (knight's plume) |
| *Cladonia* spp. | (cladonia lichens) |
| *Dicranum polysetum* | (wavy-leaved moss) |

**SOIL AND SITE**

| | |
|---|---|
| Moisture Regime: | 1–2 (xeric–subxeric) |
| Nutrient Regime: | A–B (very poor to poor) |
| * Slope Gradient (%): | 0–70 (gentle, if fluvial) |
| * Slope Position: | level or upper |
| * Parent Material: | glaciofluvial, fluvial, or morainal over rock |
| * Soil Texture: | coarse |
| Coarse Fragments (%): | 25–80 |

**DISTRIBUTION:** uncommon except in rocky terrain or on upper terrace of large rivers

## 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.***<br>– sites within this unit with high coarse fragment content (>70%) will have significantly reduced soil moisture retention and will be extremely difficult to plant; ***attempt to regenerate naturally by retaining Pl cones.*** |
| Site preparation: | – minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.<br>– no site preparation |
| Species choice: | – Pl, (***Bl***, ***Sx***) |
| Vegetation potential: | – low |
| Reforestation: | – attempt to regenerate naturally if potential exists.<br>– if natural regeneration is not feasible, plant Pl without site preparation.<br>– Sx and Bl are generally significantly less productive than Pl on this unit and should be accepted only on moist microsites. |
| Concerns: | – full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***<br>– site and soil conditions of this unit result in drought hazard for a significant portion of the growing season; ***natural regeneration is generally better adapted to surviving these conditions, especially during establishment.***<br>– sites within this unit are vulnerable to nutrient deficiency if forest floors are reduced; ***site preparation methods that reduce forest floor thickness, such as slashburning or brushblading, must be avoided.*** |

Douglas-fir

*Amelanchier alnifolia*

*Lathyrus nevadensis*

**VEGETATION**

Tree Layer: 80% cover
Douglas-fir, (hybrid white spruce)

Shrub Layer: 20% cover

| | |
|---|---|
| *Amelanchier alnifolia* | (saskatoon) |
| *Spiraea betulifolia* | (birch-leaved spirea) |
| *Cornus stolonifera* | (red-osier dogwood) |
| *Ribes lacustre* | (black gooseberry) |
| *Acer glabrum* | (Douglas maple) |
| subalpine fir | |

Herb Layer: 35% cover

| | |
|---|---|
| *Lathyrus nevadensis* | (purple peavine) |
| *Aralia nudicaulis* | (wild sarsaparilla) |
| *Clintonia uniflora* | (queen's cup) |
| *Thalictrum occidentale* | (western meadowrue) |
| *Orthilia secunda* | (one-sided wintergreen) |
| *Aster conspicuus* | (showy aster) |
| *Maianthemum racemosum*** | (false Solomon's-seal) |
| *Goodyera oblongifolia* | (rattlesnake-plantain) |
| *Prosartes hookeri*** | (Hooker's fairybells) |

Moss Layer: 30% cover

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

**SOIL AND SITE**

| | |
|---|---|
| Moisture Regime: | 2 (subxeric) |
| Nutrient Regime: | B–C (poor–medium) |
| Slope Gradient (%): | 21 (2–40) |
| * Slope Position: | upper or level |
| * Parent Material: | morainal or colluvial |
| Soil Texture: | coarse |
| Coarse Fragments (%): | 55 (50–59) |

**DISTRIBUTION:** rare and usually small in size

**COMMENTS:** represents the northern extent of Douglas-fir.

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

**INTERPRETATIONS**

Site preparation:
- minimize or align large slash accumulations when logging to help meet site preparation objectives and reduce fire hazard.
- light scarification for seedbed preparation or summer logging with no site preparation.

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

Vegetation potential:
- low

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Fd stock grown from the most northern seedlot available.
- Sx is less productive than Fd or Pl on these sites.
- At and Ep are not consistently productive on these sites.

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

# Sxw – Huckleberry – Highbush-cranberry

*Vaccinium membranaceum*

*Viburnum edule*

*Maianthemum racemosum*

## VEGETATION

Tree Layer: 40% cover
Lodgepole pine, hybrid white spruce, subalpine fir

Shrub Layer: 35% cover

| | |
|---|---|
| *Vaccinium membranaceum* | (black huckleberry) |
| *Viburnum edule* | (highbush-cranberry) |
| *Ribes lacustre* | (black gooseberry) |
| *Spiraea betulifolia* | (birch-leaved spirea) |
| subalpine fir | |

Herb Layer: 25% cover

| | |
|---|---|
| *Maianthemum racemosum*** | (false Solomon's-seal) |
| *Linnaea borealis* | (twinflower) |
| *Orthilia secunda* | (one-sided wintergreen) |
| *Cornus canadensis* | (bunchberry) |
| *Clintonia uniflora* | (queen's cup) |
| *Arnica cordifolia* | (heart-leaved arnica) |
| *Epilobium angustifolium* | (fireweed) |

Moss Layer: 90% cover

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

## SOIL AND SITE

| | |
|---|---|
| Moisture Regime: | 3–(4) (submesic–(mesic)) |
| Nutrient Regime: | B–C (poor–medium) |
| Slope Gradient (%): | 11 (4–20) |
| Slope Position: | variable |
| Parent Material: | morainal, glaciofluvial, (colluvial) |
| * Soil Texture: | coarse (medium) |
| * Coarse Fragments (%): | 43 (8–85); usually more than 30 |

**DISTRIBUTION:** uncommon

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

**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.***

Site preparation:
- light scarification for seedbed preparation or summer logging with no site preparation.
- see Section 12.

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

Vegetation potential:
- low

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Pl or Sx.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.

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

black spruce

*Salix* spp.

*Equisetum arvense*

**VEGETATION**

Tree Layer: 15% cover
Black spruce, lodgepole pine

Shrub Layer: 45% cover

| | |
|---|---|
| *Salix* spp. | (willows) |
| *Lonicera involucrata* | (black twinberry) |
| *Vaccinium membranaceum* | (black huckleberry) |
| *Viburnum edule* | (highbush-cranberry) |

Herb Layer: 95% cover

| | |
|---|---|
| *Equisetum arvense* | (common horsetail) |
| *Rubus pubescens* | (trailing raspberry) |
| *Fragaria virginiana* | (wild strawberry) |
| *Elymus glaucus* | (blue wildrye) |
| *Galium boreale* | (northern bedstraw) |

Moss Layer: 15% cover

| | |
|---|---|
| *Pleurozium schreberi* | (red-stemmed feathermoss) |
| *Hylocomium splendens* | (step moss) |
| *Aulacomnium palustre* | (glow moss) |

**SOIL AND SITE**

| | |
|---|---|
| Moisture Regime: | 3–5 (submesic–subhygric) |
| Nutrient Regime: | A–B (very poor–poor) |
| * Aspect: | northerly or flat |
| * Slope Gradient (%): | usually less than 10 |
| Slope Position: | mid to lower or level |
| * Parent Material: | glaciofluvial |
| * Soil Texture: | medium to coarse |
| * Coarse Fragments (%): | 0–40 |

**DISTRIBUTION:** rare

**INTERPRETATIONS**

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

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

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

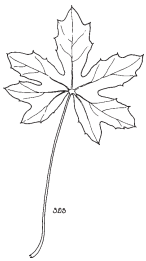
Vegetation potential:
- low

Reforestation:
- attempt to regenerate naturally if potential exists.
- if natural regeneration is not feasible, plant Pl.
- At, Sx and Sb are generally less productive than Pl on these sites.
- on sites with saturated soils, plant seedlings on naturally or artificially raised microsites.

Concerns:
- full tree harvesting will lead to nutrient depletion and seriously reduce cones; ***woody debris and cones should be distributed across these sites (i.e., lop and scatter).***
- sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; ***restrict all traffic to winter operations or dry soil conditions.***
- these sites may be subject to severe growing-season frosts, especially in any naturally occurring or artificially created depressional microsites; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***

*Lonicera involucrata*

*Viburnum edule*



*Petasites frigidus* var. *palmatus*

**VEGETATION**

Tree Layer: 35% cover
Hybrid white spruce, subalpine fir, (trembling aspen)

Shrub Layer: 25% cover

| | |
|---|---|
| *Lonicera involucrata* | (black twinberry) |
| *Ribes lacustre* | (black gooseberry) |
| *Viburnum edule* | (highbush-cranberry) |
| *Rubus parviflorus* | (thimbleberry) |
| *Rosa acicularis* | (prickly rose) |
| [*Cornus stolonifera* | (red-osier dogwood)] |

subalpine fir, hybrid white spruce

Herb Layer: 30% cover

| | |
|---|---|
| *Cornus canadensis* | (bunchberry) |
| *Rubus pubescens* | (trailing raspberry) |
| *Linnaea borealis* | (twinflower) |
| *Thalictrum occidentale* | (western meadowrue) |
| *Maianthemum racemosum*** | (false Solomon's-seal) |
| *Petasites frigidus* var. *palmatus* | (palmate coltsfoot) |
| *Mitella nuda* | (common mitrewort) |
| *Osmorhiza berteroi*** | (mountain sweet-cicely) |
| *Pyrola asarifolia* | (rosy wintergreen) |

Moss Layer: 85% cover

| | |
|---|---|
| *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: | (4)–5 ((mesic)–subhygric) |
| Nutrient Regime: | B–C (poor–medium) |
| * Aspect: | generally not northerly |
| Slope Gradient (%): | 15 (2–30) |
| * Slope Position: | mid (upper to lower) |
| Parent Material: | glaciofluvial, (morainal) |
| * Soil Texture: | moderately coarse to medium |
| Coarse Fragments (%): | 36 (24–66) |

**DISTRIBUTION:** uncommon

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

**INTERPRETATIONS**

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

Site preparation:
- see Section 12.

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

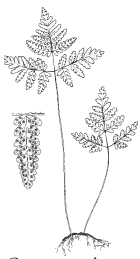
Vegetation potential:
- very high (fireweed, black twinberry)

Reforestation:
- plant sturdy stock as soon after harvesting as possible.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- help maintain stand diversity in areas to be planted with Pl by mapping aspen patches prior to harvest and planting these areas to spruce.
- Act is not consistently productive on these sites.

Concerns:
- sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; ***restrict traffic to winter operations or dry soil conditions.***
- site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***

*Oplopanax horridus*

*Rubus parviflorus*



*Gymnocarpium dryopteris*

**VEGETATION**

Tree Layer: 35% cover
Hybrid white spruce, subalpine fir, (lodgepole pine)

Shrub Layer: 60% cover

| | |
|---|---|
| *Oplopanax horridus* | (devil's club) |
| *Ribes lacustre* | (black gooseberry) |
| *Rubus parviflorus* | (thimbleberry) |
| *Viburnum edule* | (highbush-cranberry) |
| *Vaccinium membranaceum* | (black huckleberry) |
| *Lonicera involucrata* | (black twinberry) |
| subalpine fir | |

Herb Layer: 30% cover

| | |
|---|---|
| *Gymnocarpium dryopteris* | (oak fern) |
| *Streptopus amplexifolius* | (clasping twistedstalk) |
| *Actaea rubra* | (baneberry) |
| *Rubus pubescens* | (trailing raspberry) |
| *Cornus canadensis* | (bunchberry) |
| *Galium triflorum* | (sweet-scented bedstraw) |
| *Tiarella trifoliata* | (three-leaved foamflower) |
| *Dryopteris expansa* | (spiny wood fern) |
| *Lycopodium annotinum* | (stiff clubmoss) |

Moss Layer: 65% cover

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

**SOIL AND SITE**

| | |
|---|---|
| Moisture Regime: | (4)–65((mesic)–subhygric) |
| Nutrient Regime: | C–D (medium–rich) |
| Slope Gradient (%): | 26 (5–49) |
| * Slope Position: | usually mid to lower; may be upper on north aspects |
| Parent Material: | morainal, glaciofluvial |
| Soil Texture: | variable |
| Coarse Fragments (%): | 34 (18–66) |

**DISTRIBUTION:** fairly common

**INTERPRETATIONS**

Site limitations:
- sites within this unit with saturated soils are poorly aerated, which slows root development; ***plant seedlings on naturally or artificially raised microsites.***

Site preparation:
- see Section 12.

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

Vegetation potential:
- very high (thimbleberry, fireweed)

Reforestation:
- if vigorous advance regeneration is present it should be preserved when feasible.
- plant sturdy stock as soon after harvesting as possible.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- due to the very high level of competition on theses sites it will be difficult to successfully regenerate them to Pl without high site treatment costs.
- Act is not consistently productive on these sites.

Concerns:
- sites within this unit with fine-textured soils are vulnerable to compaction under wet conditions; ***restrict traffic to winter operations or dry soil conditions.***
- site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***
- sites 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.***

*Viburnum edule*

*Lonicera involucrata*

*Equisetum arvense*

**VEGETATION**

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

Shrub Layer: 35% cover

| | |
|---|---|
| *Viburnum edule* | (highbush-cranberry) |
| *Lonicera involucrata* | (black twinberry) |
| *Rosa acicularis* | (prickly rose) |
| *Ribes lacustre* | (black gooseberry) |
| *Salix* spp. | (willows) |
| *Rubus parviflorus* | (thimbleberry) |
| *Vaccinium membranaceum* | (black huckleberry) |

Herb Layer: 60% cover

| | |
|---|---|
| *Equisetum* spp. *(arvense, sylvaticum)* | (horsetails) |
| *Cornus canadensis* | (bunchberry) |
| *Petasites frigidus* var. *palmatus* | (palmate coltsfoot) |
| *Mitella nuda* | (common mitrewort) |
| *Galium triflorum* | (sweet-scented bedstraw) |
| *Rubus pubescens* | (trailing raspberry) |
| *Linnaea borealis* | (twinflower) |
| *Rubus pedatus* | (five-leaved bramble) |

Moss Layer: 50% cover

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

**SOIL AND SITE**

| | |
|---|---|
| Moisture Regime: | 6 (hygric) |
| Nutrient Regime: | C–D (medium–rich) |
| * Slope Gradient (%): | 2 (0–5) |
| * Slope Position: | level or depression |
| * Parent Material: | fluvial or lacustrine |
| Soil Texture: | coarse to fine |
| Coarse Fragments (%): | variable |

**DISTRIBUTION:** common but generally small in size

**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 saturated soils are poorly aerated, which slows root development; ***plant seedlings on naturally or artificially raised microsites.***

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

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

Vegetation potential:
- high to very high (black twinberry, prickly rose, fireweed)

Reforestation:
- advance regeneration should be preserved.
- supplement advance regeneration by planting sturdy stock in groups on available raised microsites.
- young Bl regeneration (<3 m tall) may be susceptible to heavy browsing by moose.
- retain Ac veterans where possible for wildlife.

Concerns:
- these units may represent important wildlife habitat; ***discuss prescription with fish and wildlife personnel.***
- site conditions may lead to frost damage of regeneration, especially in any naturally occurring or artificially created depression; ***leaving a partial canopy and/or choosing a frost-resistant species (e.g., Pl) is advised.***
- sites 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.***
- water table will likely rise above the ground surface in the spring, causing seedling mortality on non-elevated sites.
- this association is critical to the control of runoff and streamflow.

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

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

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

TABLE 5.2.2 *Fen Species Importance Table*

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

*Betula nana – Menyanthes trifoliata – Carex limosa*

## General Description

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

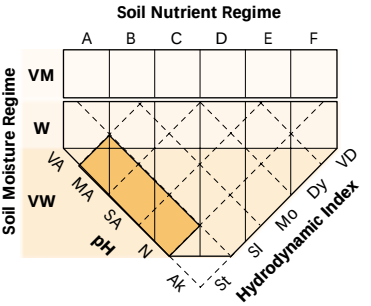
An open cover of *Betula nana* or *Salix pedicellaris* rooted on elevated microsites is distinctive. Low sedges such as *Carex chordorrhiza* and *C. limosa* are prominent throughout most sites, while *Comarum palustre* and *Menyanthes trifoliata* occupy inundated depressions. The composition of the well-developed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

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

## Characteristic Vegetation

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

## Wetland Edatopic Grid




## Comments

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

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