

Sb - FEATHERMOSS - BLUEBELLS

VEGETATION

Tree Layer: 50% cover
Black spruce, (tamarack)

Shrub Layer: 35% cover
Rosa acicularis
Ledum groenlandicum
Betula neoalaskana
black spruce

(prickly rose)
(Labrador tea)
(Alaska paper birch)

Herb Layer: 40% cover
Equisetum sylvaticum
Equisetum arvense
Cornus canadensis
Vaccinium vitis-idaea
Rubus chamaemorus
Orthilia secunda
Petasites palmatus

(wood horsetail)
(common horsetail)
(bunchberry)
(lingonberry)
(cloudberry)
(one-sided wintergreen)
(palmate coltsfoot)

Moss Layer: 90% cover
Pleurozium schreberi
Hylocomium splendens
Ptilium crista-castrensis
Sphagnum girgensohnii
Aulacomnium palustre
Philonotis fontana
Pohlia nutans

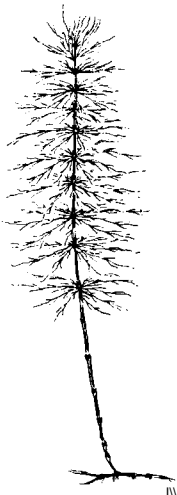
(red-stemmed feathermoss)
(step moss)
(knight's plume)
(glow moss)



black spruce



Ledum groenlandicum



Equisetum sylvaticum

SOIL AND SITE

Moisture Regime:
Nutrient Regime:
* Slope Gradient (%):
* Slope Position:
Parent Material:

subhygric - hygric
medium - poor

* Soil Texture:

0-12
lower
morainal, lacustrine,
occasionally organic
fine to moderately fine;
fibric (organic soil)

DISTRIBUTION: common

SB - FEATHERMOSS - BLUEBELLS (BWBSmw2/06)

INTERPRETATIONS

Management objectives: - non-commercial at this time

Lt - HORSETAIL

VEGETATION

Tree Layer: 65% cover
Black spruce, tamarack, white spruce

Shrub Layer: 25% cover

Ledum groenlandicum (Labrador tea)
Viburnum edule (highbush-cranberry)
Rosa acicularis (prickly rose)
Salix bebbiana (Bebb's willow)
Alnus incana ssp. tenuifolia (mountain alder)
Ribes triste (red swamp currant)
black spruce



tamarack

Herb Layer: 75% cover

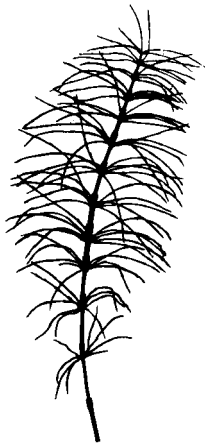
Equisetum arvense (common horsetail)
Equisetum pratense (meadow horsetail)
Equisetum sylvaticum (wood horsetail)
Equisetum scirpoides (dwarf scouring-rush)
Cornus canadensis (bunchberry)
Mitella nuda (common mitrewort)
Carex disperma (soft-leaved sedge)
Vaccinium vitis-idaea (lingonberry)
Smilacina trifolia (three-leaved false Solomon's-seal)
Moneses uniflora (single delight)
Orthilia secunda (one-sided wintergreen)
Linnaea borealis (twinflower)
Rubus pubescens (trailing raspberry)
Mertensia paniculata (tall bluebells)
Goodyera repens (dwarf rattlesnake orchid)
Platanthera orbiculata (round-leaved rein-orchid)
Calamagrostis canadensis (bluejoint)



Ledum groenlandicum

Moss Layer: 80% cover

Hylocomium splendens (step moss)
Ptilium crista-castrensis (knight's plume)
Pleurozium schreberi (red-stemmed feathermoss)
Aulacomnium palustre (glow moss)



Equisetum arvense

SOIL AND SITE

Moisture Regime: hygic (-subhydic)
Nutrient Regime: rich
* Slope Gradient (%): 0-3
* Slope Position: level
Parent Material: morainal, fluvial, organic
* Soil Texture: medium to coarse

DISTRIBUTION: common

LT-HORSETAIL (BWBSmw2/07)

INTERPRETATIONS

Management objectives: - non-commercial at this time

Sb - CLOUDBERRY - SPHAGNUM

VEGETATION

Tree Layer: 0-20% cover
(Black spruce, tamarack)



black spruce

Shrub Layer: 65% cover
Ledum groenlandicum
Chamaedaphne calyculata
black spruce
tamarack

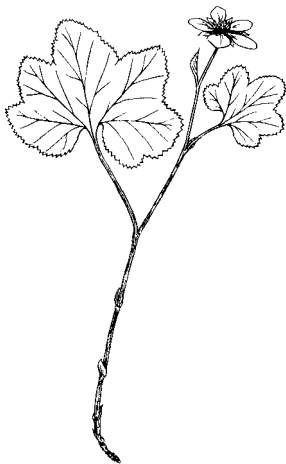
(Labrador tea)
(leatherleaf)

Herb Layer: 25% cover
Vaccinium vitis-idaea
Rubus chamaemorus
Vaccinium microcarpum
Drosera rotundifolia
Andromeda polifolia

(lingonberry)
(cloudberry)
(dwarf bog cranberry)
(round-leaved sundew)
(bog-rosemary)

Moss Layer: 95% cover
Sphagnum fuscum
Cladina spp.
Pleurozium schreberi
Cladonia spp.
Dicranum undulatum
Imadophila ericetorum
Mylia anomala
Peltigera canina

(common brown sphagnum)
(red-stemmed feathermoss)
(dog lichen)



Rubus chamaemorus

SOIL AND SITE

Moisture Regime: hygric - subhydryc
Nutrient Regime: very poor - poor
* Slope Gradient (%): 0
* Slope Position: level
* Parent Material: organic
Soil Texture: fibric

DISTRIBUTION: very common



Sphagnum fuscum

SB - CLOUDBERRY - SPHAGNUM (BWBSmw2/08)

INTERPRETATIONS

Management objectives: - non-commercial at this time

Sb - WILLOW

VEGETATION

Tree Layer: very poorly developed
(Black spruce)



black spruce

Shrub Layer: 75% cover

Ledum groenlandicum

(Labrador tea)

Salix novae-angliae

(New England willow)

Salix arbusculoides

(northern bush willow)

Salix myrtilifolia

(bilberry willow)

black spruce

Herb Layer: 65% cover

Vaccinium vitis-idaea

(lingonberry)

Equisetum scirpoides

(dwarf scouring-rush)

Equisetum arvense

(common horsetail)

Pedicularis labradorica

(Labrador lousewort)

Epilobium angustifolium

(fireweed)

Arctostaphylos rubra

(red bearberry)

Rubus pubescens

(trailing raspberry)

Mertensia paniculata

(tall bluebells)

Senecio lugens

(black-tipped groundsel)

Cornus canadensis

(bunchberry)

Vaccinium microcarpum

(dwarf bog cranberry)

Carex dioica

(yellow bog sedge)



Salix spp.

Moss Layer: 90% cover

Aulacomnium palustre

(glow moss)

Hylocomium splendens

(step moss)

Tomentypnum nitens

(golden fuzzy fen moss)

Peltigera spp.

Cladina spp.

SOIL AND SITE

Moisture Regime:

hygic - subhydic

Nutrient Regime:

(poor -) medium

* Slope Gradient (%):

0

* Slope Position:

level

* Parent Material:

fluvial, organic/fluvial

Soil Texture:

variable

DISTRIBUTION: uncommon



Aulacomnium palustre

SB-WILLOW (BWBSmw2/09)

INTERPRETATIONS

Management objectives: - non-commercial at this time

Lt - BUCKBEAN

VEGETATION

Tree Layer: 25% cover
Tamarack

Shrub Layer: 85% cover
Betula glandulosa
Chamaedaphne calyculata
Ledum groenlandicum
Myrica gale
tamarack
black spruce

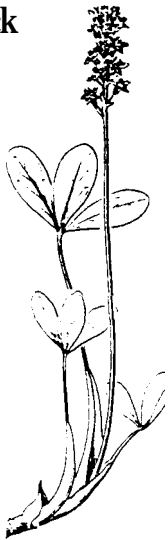
(scrub birch)
(leatherleaf)
(Labrador tea)
(sweet gale)



tamarack

Herb Layer: 70% cover
Menyanthes trifoliata
Vaccinium oxycoccus
Pyrola asarifolia
Carex paupercula
Carex dioica
Carex aquatilis
Carex interior
Drosera rotundifolia

(buckbean)
(bog cranberry)
(pink wintergreen)
(poor sedge)
(yellow bog sedge)
(water sedge)
(inland sedge)
(round-leaved sundew)



Menyanthes trifoliata

Moss Layer: 90% cover
Sphagnum capillaceum
Sphagnum recurvum
Aulacomnium palustre
Calliergon stramineum
Calliergon giganteum
Paludella squarrosa
Drepanocladus revolvens
Bryum pseudotriquetrum
Meesia triquetra
Tomenthypnum nitens

(common red sphagnum)
(glow moss)

(golden fuzzy fen moss)

SOIL AND SITE

Moisture Regime:
Nutrient Regime:
* Slope Gradient (%):
* Slope Position:
* Parent Material :
Soil Texture:

(hygric) - subhydric
medium - rich
0
level
organic
mesic

DISTRIBUTION: common



Sphagnum capillaceum

LT-BUCKBEAN (BWBSmw2/10)

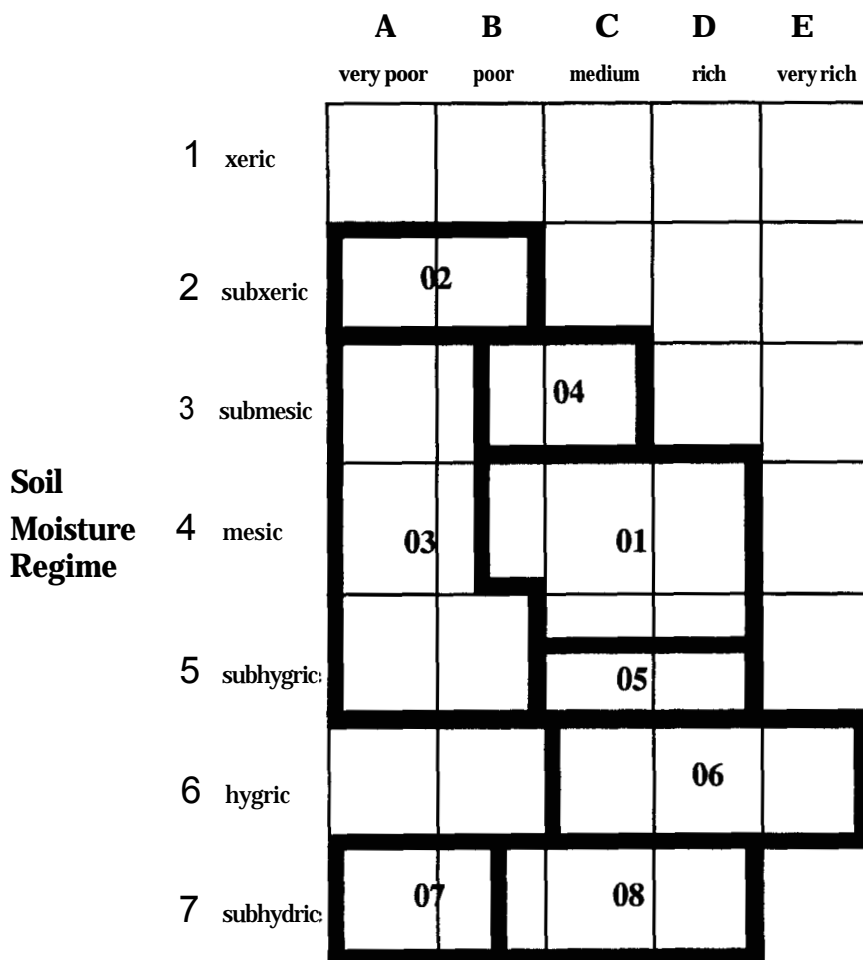
INTERPRETATIONS

Management objectives: - non-commercial at this time

6 THE BWBSwk1 VARIANT

BWBSwk1 Murray BWBSwk

Soil Nutrient Regime



Site Series
01 Sw - Huckleberry - Step moss
02 Pl - Lingonberry - Velvet-leaved blueberry
03 Sb - Lingonberry - Coltsfoot
04 Sw - Wildrye - Peavine
05 Sw - Currant - Bluebells
06 Sw - Currant - Horsetail
07 Sb - Horsetail - Sphagnum
08.Sb - Willow - Glow moss

FIGURE 4. Edatopic grid displaying site series in the BWBSwk1 variant.

SIMPLIFIED KEY TO ECOSYSTEM UNITS OF BWBSwk1

- 1a Canopy dominated by black spruce; toe of slope or depression
- 2a Usually organic soils; moss layer dominated by Sphagnum spp. (p. 63) ⁸ BWBSwk1/07
- 2b Usually mineral soils; moss layer dominated by feather mosses BWBSwk1/08
- 1b Black spruce, if present in canopy, with lodgepole pine; upper to lower slope or depression
- 3a White spruce in canopy
- 4a Mid to upper slope; Lonicera involucrata (p. 9) and Ribes lacustre (p.11) rare or absent BWBSwk1/01
- 4b Mid to lower slope or depression; Lonicera involucrata and Ribes lacustre common and often abundant
- 5a Viburnum edule (p. 15) and Pleurozium schreberi (p. 61) abundant, Equisetum spp. (p. 24) low cover (<5%) or absent BWBSwk1/05
- 5b Viburnum edule and Pleurozium schreberi rare or absent, Equisetum spp. high cover (>20%) BWBSwk1/06
- 3b White spruce generally absent from canopy, canopy dominated by lodgepole pine or lodgepole pine - black spruce
- 6a Tree canopy sparse (<20% cover); lichens main ground cover BWBSwk1/02
- 6b Tree canopy well developed (>30% cover); lichens low cover

⁸ Page numbers refer to the publication "Some Common Plants of the Sub-Boreal Spruce Zone" (Pojar et al. 1982).

7a Canopy of lodgepole pine only;
Shepherdia canadensis (p. 13)
abundant(>10%)

BWBSwk1/04

7b Canopy of lodgepole pine-black
spruce; Shepherdia canadensis
low cover (usually <5%) or absent

BWBSwk1/03

BWBSwk1/01

Sw - HUCKLEBERRY - STEP MOSS

VEGETATION

Tree Layer: 50% cover
Lodgepole pine, white spruce

Shrub Layer: 60% cover
Alnus viridis ssp. sinuata
Vaccinium membranaceum
Rosa acicularis
Spiraea betulifolia
subalpine fir

(Sitka alder)
(black huckleberry)
(prickly rose)
(birch-leaved spirea)

Herb Layer: 35% cover

Cornus canadensis
Epilobium angustifolium
Linnaea borealis
Arnica cordifolia
Rubus pubescens
Pyrola asarifolia
Petasites palmatus
Lycopodium annotinum
Calamagrostis canadensis
Orthilia secunda

(bunchberry)
(fireweed)
(twinfleur)
(heart-leaved arnica)
(trailing raspberry)
(pink wintergreen)
(palmate coltsfoot)
(stiff clubmoss)
(bluejoint)
(one-sided wintergreen)

Moss Layer: 60% cover

Pleurozium schreberi
[Ptilium crista-castrensis]
[Hylocomium splendens]

(red-stemmed feathermoss)
(knight's plume)]
(step moss)]

SOIL AND SITE

Moisture Regime:
Nutrient Regime:
Slope Gradient (%):
* Slope Position:
* Parent Material:
Soil Texture:
Coarse Fragments (%):

(submesic) - mesic
(poor) - medium - (rich)
0-67, usually less than 20
upper to mid
morainal, (glacio)fluvial
variable
0-35

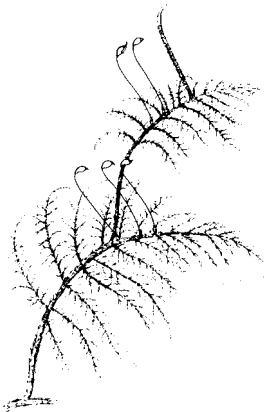
DISTRIBUTION: common



Alnus viridis ssp.
sinuata



V. membranaceum



Hylocomium splendens

SW - HUCKLEBERRY - STEP MOSS (BWBSwk1/01)

INTERPRETATIONS

- Logging:
- clearcut
 - harvest fine-textured moraines when soils dry or frozen
 - trafficability may be a problem if long durations of heavy rainfall occurs

Site preparation:

- Objective
- promote natural regeneration; prepare planting spots; improve planter access; increase soil temperature; reduce heavy slash; minimize future brush competition

- Mechanical
- drag scarify*; patch scarify; mix humus with mineral

- Prescribed fire
- pile and burn

Species choice:

- Preferred
- Sw
- Acceptable
- PI

- Brush hazard:
- moderate (Sitka alder, bluejoint)
 - brush competition will likely occur within 3 years of harvesting; sites should be inspected at 3 years to determine if any further treatment is required

- Reforestation:
- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If seed supply is adequate, mechanically treat the site. If seed is insufficient, plant PI or Sw stock.
 - plant as soon as the frost is out of the ground
 - thinning of over-dense PI may be required

Concerns:

PI - LINGONBERRY - VELVET-LEAVED BLUEBERRY

VEGETATION

Tree Layer: 15% cover
Lodgepole pine, (black spruce)

Shrub Layer: 25% cover
Vaccinium myrtilloides (velvet-leaved blueberry)
black spruce



lodgepole pine

Herb Layer: 10% cover
Lycopodium complanatum (ground cedar)
Arctostaphylos uva-ursi (kinnikinnick)
Vaccinium vitis-idaea (lingonberry)

Moss Layer: 85% cover
Cladina rangiferina (reindeer lichen)
Peltigera spp.

SOIL AND SITE

Moisture Regime: subxeric
Nutrient Regime: (very poor) - poor
* Slope Gradient (%): 0-2
* Slope Position: level
Parent Material: glaciofluvial
* Soil Texture: medium (to coarse)
Coarse Fragments (%): 55



Vaccinium myrtilloides

COMMENTS: Based on very limited data.

DISTRIBUTION: rare



Lycopodium complanatum

PL - LINGONBERRY - VELVET-LEAVED BLUEBERRY (BWBSwk1/02)

INTERPRETATIONS

Logging:

- clearcut
- full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if managing for naturals

Site preparation:

Objective

- promote natural regeneration; prepare planting spots; improve planter access; improve moisture status

Mechanical

- drag scarify*; disc trench

Prescribed fire

- do not burn

Species choice:

Preferred
Acceptable

- PI

Brush hazard:

- low

Reforestation:

- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. Plant PI if necessary, but expect heavy mortality due to droughty conditions.

Concerns:

- severe drought period
- mistletoe
- expect stocking levels to take 10 years to achieve
- because these sites are marginal for timber production, large silvicultural investment may be difficult to justify, and management must ensure that productivity is not further reduced

BWBSwk1/03

Sb - LINGONBERRY - COLTSFOOT

VEGETATION

Tree Layer: 45% cover
Lodgepole pine, (black spruce)



black spruce

Shrub Layer: 85% cover
Ledum groenlandicum (Labrador tea)
Vaccinium myrtilloides (velvet-leaved blueberry)
Rosa acicularis (prickly rose)
Vaccinium membranaceum (black huckleberry)
[Shepherdia canadensis (soopolallie)]
black spruce

Herb Layer: 25% cover
Cornus canadensis (bunchberry)
Linnaea borealis (twinline)
Vaccinium vitis-idaea (lingonberry)
Petasites palmatus (palmate coltsfoot)
Epilobium angustifolium (fireweed)
Arnica cordifolia (heart-leaved arnica)
Lycopodium annotinum (stiff clubmoss)

Moss Layer: 40% cover
Pleurozium schreberi (red-stemmed feathermoss)
Peltigera apthosa



Ledum groenlandicum

SOIL AND SITE

Moisture Regime: submesic - subhygric
Nutrient Regime: (very poor) - poor
* Aspect: generally northerly facing
* Slope Gradient (%): 0-40; generally less than 15
Slope Position: upper - (lower)
Parent Material: variable
Soil Texture: moderately fine to coarse
Coarse Fragments (%): 0-17



Vaccinium myrtilloides

DISTRIBUTION: very common

SB - LINGONBERRY - COLTSFOOT (BWBSwk1/03)

INTERPRETATIONS

- Logging:
- clearcut
 - full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if managing for naturals
- Site preparation:
- Objective
- promote natural regeneration; prepare planting spots; improve planter access
- Mechanical
- drag scarify*; disc trench; patch scarify; mix humus with mineral
- Prescribed fire
- do not burn
- Species choice:
- Preferred
Acceptable
- PI
- Brush hazard:
- low
- Reforestation:
- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If cone survey results indicate little seed, then plant PI.
- Concerns:
- mistletoe
 - expect 10 years to achieve stocking
 - moisture deficits will usually occur during the growing season on these sites
 - because these sites are marginal for timber production, silvicultural investment may be difficult to justify, and management must ensure that productivity is not further reduced

BWBSwk1/04

Sw - WILDRYE - PEAVINE

VEGETATION



S. canadensis

Tree Layer: 45% cover
Lodgepole pine

Shrub Layer: 40% cover
Shepherdia canadensis (soopolallie)
Rosa acicularis (prickly rose)
Ledum groenlandicum (Labrador tea)
Spiraea betulifolia (birch-leaved spirea)
Salix spp. (willows)

Herb Layer: 60% cover
Linnaea borealis (twinflower)
Aster conspicuus (showy aster)
Arnica cordifolia (heart-leaved arnica)
Epilobium angustifolium (fireweed)
Lathyrus ochroleucus (creamy peavine)
Cornus canadensis (bunchberry)
[Calamagrostis canadensis (bluejoint)]
[Elymus innovatus (fuzzy-spiked wildrye)]

Moss Layer: 15% cover
Pleurozium schreberi (red-stemmed feathermoss)



Elymus innovatus

SOIL AND SITE

Moisture Regime: submesic - mesic
Nutrient Regime: (poor) - medium
* Aspect: often southerly facing
Slope Gradient (%): 9-40
* Slope Position: mid - upper
Parent Material: morainal, (glacio)fluvial
Soil Texture: fine to coarse
Coarse Fragments (%): 7-49

DISTRIBUTION: uncommon



Lathyrus ochroleucus

SW - WILD RYE - PEAVINE (BWBSwk1/04)

INTERPRETATIONS

- Logging:
- clearcut
 - full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if you are managing for naturals
- Site preparation:
- Objective
- promote natural regeneration; prepare planting spots; improve planter access
- Mechanical
- drag scarify*; disc trench; patch scarify; mix humus with mineral
 - light drag scarify if logged in winter and cone crop survey indicates a good supply of seeds
- Prescribed fire
- do not burn
- Species choice:
- Preferred
- PI
- Acceptable
- Brush hazard:
- low
- Reforestation:
- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If cones are insufficient, PI stock could be planted without site preparation.
 - thinning of over-dense PI may be required
- Concerns:
- moisture deficits will usually occur during the growing season on these sites.

Sw - CURRANT - BLUEBELLS

VEGETATION

Tree Layer: 45% cover
White spruce, (balsam poplar)

Shrub Layer: 45% cover

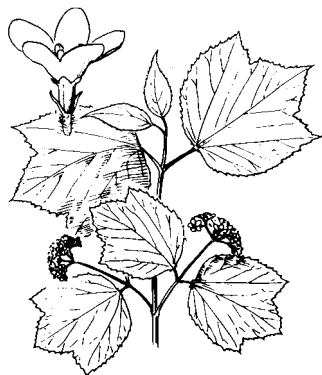
<u>Viburnum edule</u>	(highbush-cranberry)
<u>Lonicera involucrata</u>	(black twinberry)
<u>Ribes lacustre</u>	(black gooseberry)
<u>Rosa acicularis</u>	(prickly rose)
<u>Ribes triste</u>	(red swamp currant)

Herb Layer: 55% cover

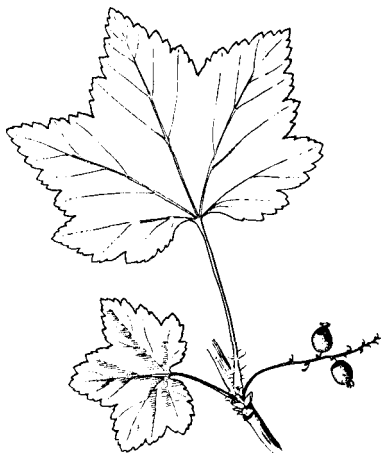
<u>Linnaea borealis</u>	(twinflower)
<u>Rubus pubescens</u>	(trailing raspberry)
<u>Epilobium angustifolium</u>	(fireweed)
<u>Petasites palmatus</u>	(palmate coltsfoot)
<u>Mertensia paniculata</u>	(tall bluebells)
<u>Mitella nuda</u>	(common mitrewort)
<u>Osmorhiza chilensis</u>	(sweet cicely)
<u>Cornus canadensis</u>	(bunchberry)
<u>Actaea rubra</u>	(baneberry)
<u>Fragaria virginiana</u>	(wild strawberry)
<u>Heracleum sphondylium</u>	(cow-parsnip)
<u>Arnica cordifolia</u>	(heart-leaved arnica)
<u>Delphinium glaucum</u>	(tall larkspur)
<u>Galium triflorum</u>	(sweet-scented bedstraw)
<u>Equisetum pratense</u>	(meadow horsetail)
<u>Corallorhiza trifida</u>	(yellow coralroot)

Moss Layer: 40% cover

<u>Pleurozium schreberi</u>	(red-stemmed feathermoss)
<u>Hylocomium splendens</u>	(step moss)]



Viburnum edule



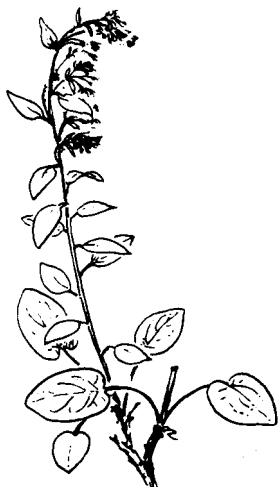
Ribes triste

SOIL AND SITE

Moisture Regime:	subhygric
Nutrient Regime:	medium - rich
* Slope Gradient (%):	5-18
* Slope Position:	mid - lower
Parent Material:	morainal, colluvial
Soil Texture:	moderately coarse to moderately fine
Coarse Fragments (%):	1-20

COMMENTS: Devil's club and oakfern can be abundant, especially on north-facing slopes.

DISTRIBUTION: uncommon



Mertensia paniculata

SW - CURRANT - BLUEBELLS (BWBSwk1/05)

INTERPRETATIONS

- Logging:
- clearcut
 - trafficability will be a problem on these sites when soils are not frozen
- Site Preparation:
- Objective
- reduce organic layers; reduce debris; prepare planting spots; increase soil temperature; improve planter access; minimize future brush competition
- Mechanical
- mix humus with mineral soil, mound, plow
- Prescribed fire
- pile and burn, broadcast burn*
- Species choice:
- Preferred
- Sw
- Acceptable
- Brush hazard:
- moderate (fireweed, Sitka alder, bluejoint)
 - moderate brush competition will likely occur within 3 years of harvesting; sites should be inspected at 3 years to determine if any further treatment is required
- Reforestation:
- use large planting stock
- Concerns:
- perched water table
 - windthrow

BWBSwk1/06

Sw - CURRANT - HORSETAIL

VEGETATION

Tree Layer: 45% cover
White spruce, (trembling aspen)

Shrub Layer: 10% cover
Lonicera involucrata (black twinberry)
Ribes lacustre (black gooseberry)
Rosa acicularis (prickly rose)
Ribes triste (red swamp currant)

Herb Layer: 75% cover
Rubus pubescens (trailing raspberry)
Heracleum sphondylium (cow-parsnip)
Mertensia paniculata (tall bluebells)
Osmorhiza chilensis (sweet cicely)
Mitella nuda (common mitrewort)
Delphinium glaucum (tall larkspur)
Equisetum pratense (meadow horsetail)
Equisetum arvense (common horsetail)
Cornus canadensis (bunchberry)
Linnaea borealis (twinflower)
Fragaria virginiana (wild strawberry)
Petasites palmatus (palmate coltsfoot)
Actaea rubra (baneberry)
Moneses uniflora (single delight)

Moss Layer: 15% cover
Hylocomium splendens (step moss)
Mnium spp. (leafy mosses)

SOIL AND SITE

Moisture Regime: subhygric - hygric
Nutrient Regime: medium - rich
Slope Gradient (%): 5-25
* Slope Position: mid - depression
Parent Material: morainal, lacustrine, fluvial
* Soil Texture: medium to moderately fine
Coarse Fragments (%): 0-18

DISTRIBUTION: uncommon



L. involucrata



Ribes lacustre



Equisetum pratense

SW - CURRANT - HORSETAIL (BWBSwk1/06)

INTERPRETATIONS

- Logging:
- clearcut
 - trafficability will be a problem on these sites when soils are not frozen
- Site preparation:
- Objective
- reduce organic layers; reduce debris; prepare raised planting spots; increase soil temperature; improve planter access; minimize future brush competition
- Mechanical
- mound or plow
- Prescribed fire
- broadcast burn
- Species choice:
- Preferred
Acceptable
- Sw
- Brush hazard:
- very high (black twinberry, fireweed)
 - brush competition will require post-planting inspections of harvested sites to determine the need for vegetation control
- Reforestation:
- plant as soon as frost is out of the ground
 - use large planting stock
- Concerns:
- windthrow
 - root rot
 - compaction
 - perched water table
 - this association is critical to the control of runoff and stream flow
 - water table will likely rise above the ground surface in the spring causing seedling mortality
 - herbicide use to control brush competition may conflict with wildlife needs

BWBSwk1/07

Sb - HORSETAIL - SPHAGNUM

VEGETATION

Tree Layer: 35% cover
Black spruce

Shrub Layer: 20% cover
Ledum groenlandicum
Salix spp.

(Labrador tea)
(willows)

Herb Layer: 40% cover
Carex spp.
Vaccinium vitis-idaea
Vaccinium oxycoccus
Equisetum spp.
Smilacina trifolia

(sedges)
(lingonberry)
(bog cranberry)
(horsetails)
(three-leaved false)
Solomon's-seal)
(palmate coltsfoot)
(heart-leaved twayblade)
(common mitrewort)
(one-leaved rein-orchid)

Moss Layer: 85% cover
Hylocomium splendens
Pleurozium schreberi
Aulacomnium palustre
Sphagnum spp.
Mnium spp.
Peltigera spp.

(step moss)
(red-stemmed feathermoss)
(glow moss)
(sphagnum mosses)
(leafy mosses)

SOIL AND SITE

Moisture Regime:
Nutrient Regime:
Slope Gradient (%):
* Slope Position:
* Parent Material:
* Soil Texture:

subhydric
very poor - poor
0-2
toe - depression
organic, lacustrine
mesic to fibric (organic soils),
fine (mineral soils)
0

Coarse Fragments (%):

DISTRIBUTION: common



black spruce



Equisetum arvense



Sphagnum spp.

SB - HORSETAIL - SPHAGNUM (BWBSwk1/07)

INTERPRETATIONS

Management objectives: - non-commercial at this time

BWBSwk1/08

Sb - WILLOW - GLOW MOSS

VEGETATION

Tree Layer: 35% cover
Black spruce



black spruce

Shrub Layer: 15% cover
Salix spp.
Ledum groenlandicum
Betula glandulosa

(willows)
(Labrador tea)
(scrub birch)

Herb Layer: 50% cover

Carex spp.
Linnaea borealis
Equisetum scirpoides
Equisetum pratense
Equisetum arvense
Mitella nuda
Cornus canadensis
Vaccinium vitis-idaea
Listera cordata
Mertensia paniculata
Petasites palmatus
Achillea millefolium

(sedges)
(twinflower)
(dwarf scouring-rush)
(meadow horsetail)
(common horsetail)
(common mitrewort)
(bunchberry)
(lingonberry)
(heart-leaved twayblade)
(tall bluebells)
(palmate coltsfoot)
(yarrow)



Salix spp.

Moss Layer: 80% cover

Hylocomium splendens
Pleurozium schreberi
Aulacomnium palustre
Sphagnum spp.
Mnium spp.
Peltigera spp.

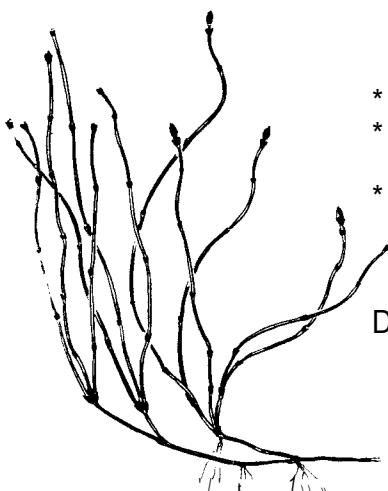
(step moss)
(red-stemmed feathermoss)
(glow moss)
(sphagnum moss)
(leafy mosses)

SOIL AND SITE

Moisture Regime:
Nutrient Regime:
Slope Gradient (%):
* Slope Position:
* Parent Material:
* Soil Texture:
Coarse Fragments (%):

(hygric -) subhydric
(poor) - rich
0-14
toe - depression
organic, occasionally
fluvial or morainal
organic, or moderately
fine mineral soil
0-8

DISTRIBUTION:



Equisetum scirpoides

SB - WILLOW - GLOW MOSS (BWBSwk1/08)

INTERPRETATIONS

Management objectives: - non-commercial at this time

7 THE BWBSwk2 VARIANT

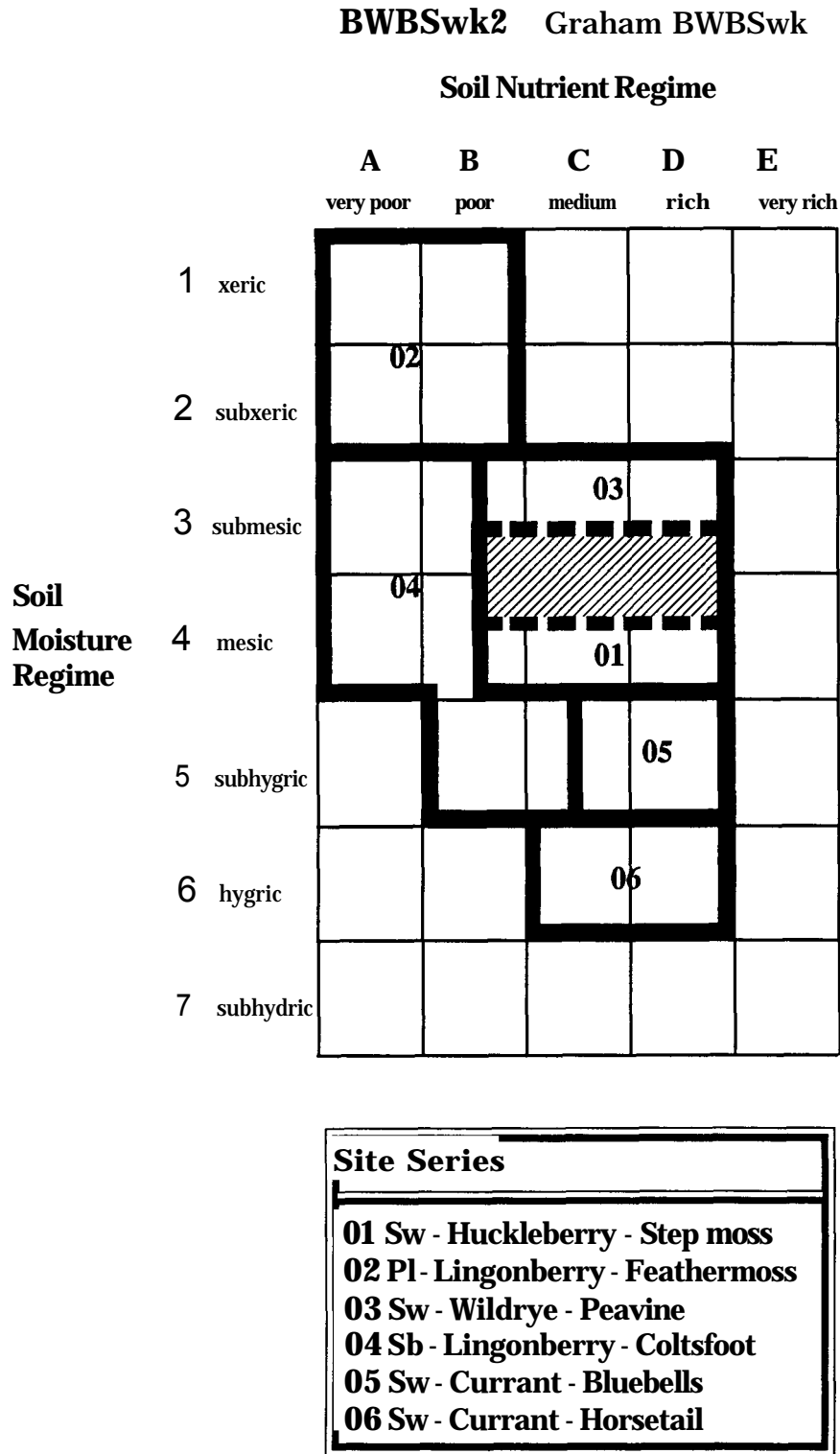


FIGURE 5. Edatopic grid displaying site series in the BWBSwk2 variant.

KEY TO ECOSYSTEM UNITS OF BWBSwk2

- 1a Canopy dominated by black spruce alone; toe of slope or depression
Bog Ecosystems
- 1b Black spruce, if present in canopy, with lodgepole pine; upper to lower slope or depression
- 2a Black spruce moderate cover (>5%) in either tree or shrub layer
- 3a Slope gradient usually <5%; aspect usually north or flat; Ledum groenlandicum (p. 9)⁹ and Vaccinium vitis-idaea (lingonberry) generally moderate cover (>5%)
BWBSwk2/04
- 3b Slope gradient usually >5%; aspect variable; Ledum groenlandicum (p. 9) and Vaccinium vitis-idaea (lingonberry) generally low cover (<5%) or absent
BWBSwk2/01
- 2b Black spruce low cover (<1%) or absent
- 4a Soils very coarse; herb layer very poorly developed (<10% cover); moderate cover (>5%) of lichens
BWBSwk2/02
- 4b Soils variable; herb layer well developed (>30% cover); lichens low cover (<5%) or absent
- 5a Often upper slope but if not, then soil is coarse textured; aspect generally southerly; Shepherdia canadensis (p. 13) and Elymus innovatus (fuzzy-spiked wildrye) usually moderate cover (>10%)
BWBSwk2/03
- 5b Usually not upper slope but if so then soil fine textured; aspect variable; Shepherdia canadensis and Elymus innovatus low cover (<5%) or absent

⁹ Page numbers refer to the publication "Some Common Plants of the Sub-Boreal Spruce Zone" (Pojar et al. 1982).

6a Usually mid to upper slope; if lower slope or level then not receiving seepage; Vaccinium membranaceum (p. 14) moderate cover (>5%)

BWBSwk2/01

6b Usually lower slope to toe, if not then receiving seepage; Vaccinium membranaceum low cover (<5%) or absent

7a Water table often within 50 cm of surface; Equisetum arvense (p. 24) high cover (>10%)

BWBSwk2/06

7b Water usually not within 50 cm of surface; Equisetum arvense low cover (<5%) or absent

BWBSwk2/05

BWBSwk2/01

Sw - HUCKLEBERRY - STEP MOSS

VEGETATION



V. membranaceum

Tree Layer: 35% cover
White spruce, lodgepole pine

Shrub Layer: 35% cover
Vaccinium membranaceum (black huckleberry)
Rosa acicularis (prickly rose)
[Alnus viridis ssp. sinuata (Sitka alder)]
subalpine fir

Herb Layer: 35% cover
Cornus canadensis (bunchberry)
Linnaea borealis (twinflower)
Orthilia secunda (one-sided wintergreen)
Epilobium angustifolium (fireweed)
Lycopodium annotinum (stiff clubmoss)
Vaccinium vitis-idaea (lingonberry)
Petasites palmatus (palmate coltsfoot)



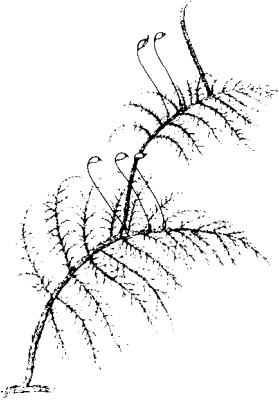
Cornus canadensis

Moss Layer: 80% cover
Pleurozium schreberi (red-stemmed feathermoss)
Hylocomium splendens (step moss)
Ptilium crista-castrensis (knight's plume)
Peltigera aphthosa

SOIL AND SITE

Moisture Regime: submesic - mesic
Nutrient Regime: (poor -) medium (- rich)
Slope Gradient (%): 0-60, usually less than 25
* Slope Position: upper to lower, usually mid
Parent Material: variable but usually morainal
* Soil Texture: medium - coarse
Coarse Fragments (%): 0-75
Site Index: PI 20 (17-27)
Sw 21 (20-27)

DISTRIBUTION: very common



Hylocomium splendens

SW - HUCKLEBERRY - STEP MOSS (BWBSwk2/01)

INTERPRETATIONS

Logging:

- clearcut
- full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if you are managing for naturals
- trafficability may be a problem if long durations of rainfall occur

Site preparation:

Objective

- promote natural regeneration; prepare planting spots; improve planter access; increase soil temperature; reduce heavy slash; minimize future brush competition

Mechanical

- drag scarify*; patch scarify; mix humus with mineral

Prescribed fire

- pile and burn

Species choice:

Preferred
Acceptable

- PI, Sw

Brush hazard:

- moderate (Sitka alder, bluejoint)
- moderate brush competition may occur within 3 years of harvesting; sites should be inspected at 3 years to determine further treatment

Reforestation:

- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If seed is insufficient, plant PI or Sw stock.
- plant as soon as the frost is out of the ground

Concerns:

- possible alder competition problem
- moderate grass competition at lower elevations

PI- LINGONBERRY - FEATHERMOSS

VEGETATION

Tree Layer: 30% cover
Lodgepole pine, (subalpine fir)



lodgepole pine

Shrub Layer: 20% cover
Alnus viridis ssp. sinuata (Sitka alder)
Juniperus communis (common juniper)
Shepherdia canadensis (soopolallie)
subalpine fir

Herb Layer: 5% cover
Vaccinium caesitosum (dwarf huckleberry)
Epilobium angustifolium (fireweed)
Pyrola chlorantha (green wintergreen)
Vaccinium vitis-idaea (lingonberry)
[Arctostaphylos uva-ursi (kinnikinnick)]

Moss Layer: 50% cover
Dicranum fuscescens (curly heron's-bill moss)
Pleurozium schreberi (red-stemmed feathermoss)
Hylocomium splendens (step moss)
Peltigera spp.
Cladina spp.



Alnus viridis ssp.
sinuata

SOIL AND SITE

Moisture Regime: (xeric) - subxeric
Nutrient Regime: very poor - poor
Slope Gradient (%): 0-60
* Slope Position: upper to crest or level
Parent Material: glaciofluvial or
colluvium over rock
* Soil Texture: coarse
Coarse Fragments (%): 50-85
Site Index: PI 17

COMMENTS: Based on very limited data.

DISTRIBUTION: rare



Juniperus communis

PL - LINGONBERRY - FEATHERMOSS (BWBSwk2/02)

INTERPRETATIONS

- Logging:
- clearcut
 - full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if managing for naturals
- Site preparation:
- Objective
- promote natural regeneration; prepare planting spots; improve planter access; improve moisture status
- Mechanical
- drag scarify*; disc trench
- Prescribed fire
- do not burn
- Species choice:
- Preferred
- PI
- Acceptable
- Brush hazard:
- low
- Reforestation:
- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If cone survey results indicate little seed, then plant PI, but expect heavy mortality due to droughty conditions.
- Concerns:
- severe drought period
 - mistletoe
 - expect 10 years to achieve stocking
 - because these sites are marginal for timber production, silvicultural investment may be difficult to justify, and management must ensure that productivity is not further reduced

BWBSwk2/03

Sw - WILDRYE - PEAVINE

VEGETATION



S. canadensis

Tree Layer: 30% cover
White spruce, lodgepole pine

Shrub Layer: 20% cover
Shepherdia canadensis (soopolallie)
Rosa acicularis (prickly rose)
Viburnum edule (highbush-cranberry)]

Herb Layer: 45% cover
Elymus innovatus (fuzzy-spiked wildrye)
Epilobium angustifolium (fireweed)
Linnaea borealis (twinflower)
Mertensia paniculata (tall bluebells)
Orthilia secunda (one-sided wintergreen)
Cornus canadensis (bunchberry)
Lathyrus ochroleucus (creamy peavine)
Moneses uniflora (single delight)

Moss Layer: 80% cover
Hylocomium splendens (step moss)
Pleurozium schreberi (red-stemmed feathermoss)
Peltigera aphthosa
Ptilium crista-castrensis (knight's plume)



Elymus innovatus

SOIL AND SITE

Moisture Regime: submesic - mesic
Nutrient Regime: (poor -) medium (- rich)
Slope Gradient (%): 5-60
* Slope Position: mid to upper
Parent Material: (glacio)fluvial, morainal
or lacustrine over bedrock
Soil Texture: fine - coarse
Coarse Fragments (%): 0-53
Site Index: PI 21 (17-26)
Sw 20 (17-23)



Lathyrus ochroleucus

DISTRIBUTION: common

SW - WILD RYE - PEAVINE (BWBSwk2/03)

INTERPRETATIONS

- Logging:
- clearcut
 - full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if managing for naturals
- Site preparation:
- Objective
- promote natural regeneration; prepare planting spots; improve planter access; improve moisture status
- Mechanical
- drag scarify*; disc trench
- Prescribed fire
- do not burn
- Species choice:
- Preferred
- PI
- Acceptable
- Brush hazard:
- low
- Reforestation:
- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If cones are insufficient, plant PI stock without site preparation.
 - drag scarification may be unnecessary if logged in summer and if cone crop survey indicates adequate seed
- Concerns:
- drought
 - moisture deficits will usually occur during the growing season on these sites

BWBSwk2/04

Sb - LINGONBERRY - COLTSFOOT

VEGETATION



black spruce

Tree Layer: 30% cover
Lodgepole pine, (black spruce)

Shrub Layer: 40% cover
Ledum groenlandicum (Labrador tea)
Rosa acicularis (prickly rose)
Alnus viridis ssp. sinuata (Sitka alder)
black spruce

Herb Layer: 35% cover
Vaccinium vitis-idaea (lingonberry)
Cornus canadensis (bunchberry)
Linnaea borealis (twinline)
Petasites palmatus (palmate coltsfoot)
Empetrum nigrum (crowberry)
Epilobium angustifolium (fireweed)

Moss Layer: 90% cover
Hylocomium splendens (step moss)
Peltigera aphthosa
Pleurozium schreberi (red-stemmed feathermoss)
Ptilium crista-castrensis (knight's plume)
Cladina spp.

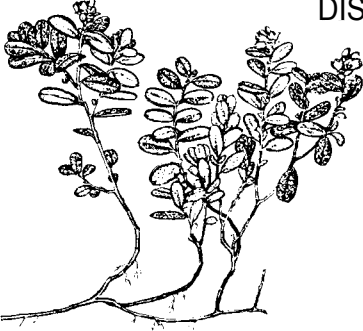


Ledum groenlandicum

SOIL AND SITE

Moisture Regime: submesic - subhygric
Nutrient Regime: (very poor -) poor
* Slope Gradient (%): 0-20
* Aspect: usually north if sloping
Slope Position: variable
Parent Material: variable
Soil Texture: fine to coarse
Coarse Fragments (%): 0-75 usually less than 10
Site Index: PI 17 (15-24)
Sw 17 (14-22)

DISTRIBUTION: common



Vaccinium vitis-idaea

SB - LINGONBERRY - COLTSFOOT (BWBSwk2/04)

INTERPRETATIONS

Logging:

- clearcut
- full tree harvesting may seriously reduce cones on a site; good cone distribution must be ensured if managing for naturals

Site Preparation:

Objective

- promote natural regeneration; prepare planting spots; improve planter access

Mechanical

- drag scarify; disc trench; patch scarify; mix humus with mineral

Prescribed fire

- do not burn

Species choice:

Preferred
Acceptable

- PI

Brush hazard:

- low

Reforestation:

- conduct a PI cone survey to determine seed adequacy for establishing a natural PI stand. If cone survey results indicate little seed, then plant PI, but expect mortality due to droughty conditions.

Concerns:

- may be high water table in spring
- expect period of drought during growing season
- mistletoe
- expect stocking levels to take 10 years to achieve
- because some of these sites are marginal for timber production, large silvicultural investment may be difficult to justify, and management must ensure that productivity is not further reduced

Sw - CURRANT - BLUEBELLS

VEGETATION

Tree Layer: 40% cover
White spruce, (balsam poplar)

Shrub Layer: 25% cover

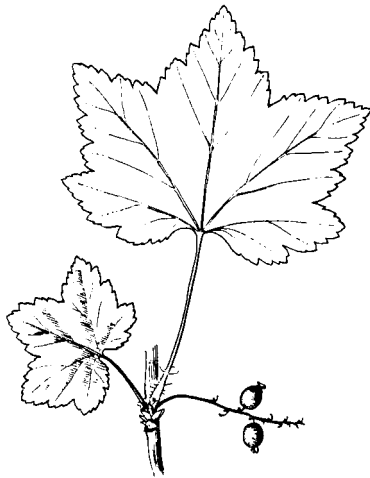
Ribes lacustre (black gooseberry)
Viburnum edule (highbush-cranberry)
Ribes triste (red swamp currant)
Rosa acicularis (prickly rose)
Alnus viridis ssp. sinuata (Sitka alder)
Sorbus scopulina (western mountain-ash)
(Oplopanax horridus) (devil's club)
subalpine fir



Ribes lacustre

Herb Layer: 75% cover

Cornus canadensis (bunchberry)
Mitella nuda (common mitrewort)
Mertensia paniculata (tall bluebells)
Petasites palmatus (palmate coltsfoot)
Epilobium angustifolium (fireweed)
Linnaea borealis (twinflower)
Rubus pubescens (trailing raspberry)
Orthilia secunda (one-sided wintergreen)
Arnica cordifolia (heart-leaved arnica)
Moneses uniflora (single delight)
Equisetum scirpoides (dwarf scouring-rush)
Equisetum arvense (common horsetail)
Heracleum sphondylium (cow-parsnip)
Elymus innovatus (fuzzy-spiked wildrye)
Galium triflorum (sweet-scented bedstraw)
[Gymnocarpium dryopteris (oak fern)]



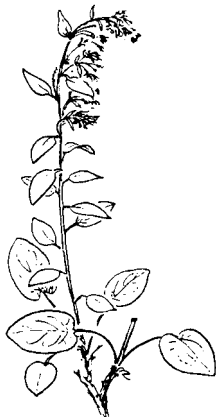
Ribes triste

Moss Layer: 40% cover

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

SOIL AND SITE

Moisture Regime: (mesic -) subhygric
Nutrient Regime: medium - rich
* Slope Gradient (%): 5-20
* Slope Position: mid to toe
Parent Material: morainal, (glacio)fluvial
Soil Texture: moderately coarse to fine
Coarse Fragments (%): 0-60
Site Index: Sw 22



Mertensia paniculata

COMMENTS: Devil's club and oakfern can be abundant especially on north-facing slopes.

DISTRIBUTION: uncommon

SW - CURRANT - BLUEBELLS (BWBSwk2/05)

INTERPRETATIONS

Logging:

- clearcut
- trafficability will be a problem on these sites when ground is not not frozen

Site preparation:

Objective

- reduce organic layers; reduce debris; prepare planting spots; increase soil temperature; improve planter access; minimize future brush competition

Mechanical

- mix humus with mineral soil, mound, plow

Prescribed fire

- pile and burn, broadcast burn*

Species choice:

Preferred
Acceptable

- Sw

Brush hazard:

- moderate (fireweed, trembling aspen, Sitka alder, bluejoint)
- brush competition will likely occur within 3 years of harvesting; sites should be inspected at 3 years to determine further treatment
- hack-and-squirt aspen if it is expected to be a brush problem before the site is harvested; then fall the aspen during logging

Reforestation:

- use large planting stock

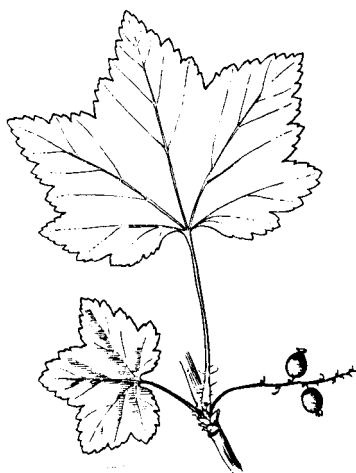
Concerns:

- perched water table
- windthrow

BWBSwk2/06

Sw - CURRANT - HORSETAIL

VEGETATION



Ribes triste

Tree Layer: 30% cover
White spruce

Shrub Layer: 30% cover

- Ribes triste (red swamp currant)
- Ribes lacustre (black gooseberry)
- Rosa acicularis (prickly rose)
- Shepherdia canadensis (soopolallie)
- white spruce

Herb Layer: 70% cover

- Equisetum arvense (common horsetail)
- Equisetum pratense (meadow horsetail)
- Mertensia paniculata (tall bluebells)
- Linnaea borealis (twinflower)
- Mitella nuda (common mitrewort)
- Petasites palmatus (palmate coltsfoot)
- Epilobium angustifolium (fireweed)
- Elymus innovatus (fuzzy-spiked wildrye)
- Equisetum scirpoides (dwarf scouring-rush)
- Cornus canadensis (bunchberry)
- Orthilia secunda (one-sided wintergreen)
- Moneses uniflora (single delight)
- Delphinium glaucum (tall larkspur)

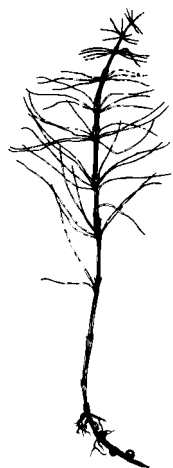


Ribes lacustre

Moss Layer: 80% cover

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

SOIL AND SITE



Equisetum arvense

- Moisture Regime: subhygric - hygric
- Nutrient Regime: medium - rich
- * Slope Gradient (%): 0-25 (usually less than 15)
- * Slope Position: mid to toe or depression
- * Parent Material: variable, usually fluvial
- Soil Texture: coarse to moderately fine (usually medium)
- Coarse Fragments (%): 0-70
- Site Index: Sw 23 (21-24)

DISTRIBUTION: uncommon

SW - CURRANT - HORSETAIL (BWBSwk2/06)

INTERPRETATIONS

Logging:

- clearcut
- trafficability will be a problem on these sites during the summer

Site preparation:

Objective

- reduce organic layers; reduce debris; prepare raised planting spots; increase soil temperature; improve planter access; minimize future brush competition

Mechanical

- mound*

Prescribed fire

- broadcast burn

Species choice:

Preferred
Acceptable

- Sw, PI

Brush hazard:

- very high (bluejoint, fireweed, willows)
- brush competition will require post-planting inspections of harvested sites to determine need for vegetation control

Reforestation:

- use large planting stock

Concerns

- root rot (if managing for Sw)
- compaction
- windthrow
- this association is critical to the control of runoff and stream flow
- water table will likely rise above the ground surface in the spring, causing seedling mortality
- herbicide use to control brush competition may conflict with wildlife needs

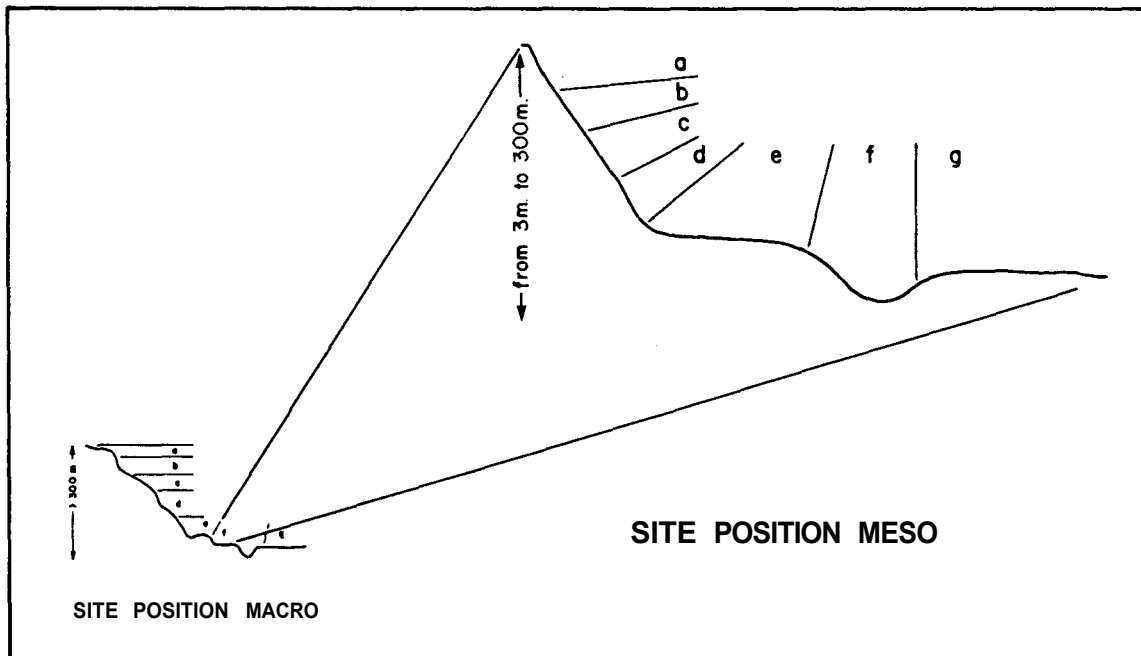
8 LITERATURE CITED

- Annas R.M. 1977. Boreal ecosystems of the Fort Nelson area of northeastern British Columbia. Ph.D. thesis. Univ. B.C., Vancouver, B.C. 409 p.
- Coates, D. and S. Haeussler. 1987. A guide to the use of mechanical site preparation equipment in north central British Columbia. 2nd ed. North. Silv. Committee and Canada/B.C. Economic and Regional Development Agreement, Victoria, B.C. FRDA Handb. No. 2. 64 p.
- Coupé, R., C.A. Ray, A. Comeau, M.V. Ketcheson, and R.M. Annas. 1982. A guide to some common plants of the Skeena area, British Columbia. B.C. Min. For., Victoria, B.C. Land Manage. Handb. No. 4. 215 p.
- DeLong C. 1988. A field guide for identification and interpretation of seral aspen ecosystems of the BWBSc1, Prince George Forest Region. B.C. Min. For., Victoria, B.C. Land Manage. Handb. No. 16. 36 p.
- Farstad, L., T.M. Lord, A.J. Green, and H.J. Hortie. 1965. Soil survey of the Peace River area in British Columbia. Can. Dep Agric. Ottawa, Ont. No. 8 of the B.C. Soil Survey. 114 p.
- Fenger, M., T. Lea, and B. Fuhr. 1989. Regional wildlife habitat maps. Peace North, Peace South. 1:500 000 maps. B.C. Min. Environ., Wildl. Branch, Victoria, B.C.
- Goward, T. 1987. Unpublished illustrations. Property of the Royal B.C. Museum, Victoria, B.C.
- Green, R.N., P.J. Courtin, K. Klinka, R.J. Slaco, and C.A. Ray. 1984. Site diagnosis, tree species selection and slashburning guidelines for the Vancouver Forest Region. B.C. Min. For., Victoria, B.C. Land Manage. Handb. No. 8. 143 p.
- Hale, M. 1979. How to know the lichens. 2nd ed. Wm. C. Brown Co. Publishers, Dubuque, Iowa. 246 p.
- Harcombe, A. 1978. Vegetation resources of the Northeast Coal Study Area, 1976-1977. B.C. Min. Environ., R.A.B. Kelowna, B.C., Canada. 46 p.
- Hitchcock, C., A. Cronquist, M. Ownbey, and J. Thompson. 1977. Vascular plants of the Pacific Northwest. Parts 1-5. Univ. Wash. Press, Seattle, Wash.
- Holland, S.S. 1976. Landforms of British Columbia. A physiographic outline. 2nd ed. B.C. Dep. Mines and Mineral Resources, Victoria, B.C. Bull. No. 48. 138 p.

- Meidinger, D. 1987. Recommended vernacular names for common plants of British Columbia. B.C. Min. For., Victoria, B.C. Res. Rep. RR87002-HQ. 64 p.
- Pojar, J., R. Love, D. Meidinger, and R. Scagel. 1982. Some common plants of the Sub-Boreal Spruce Zone. B.C. Min. For., Victoria, B.C. Land Manage. Handb. No. 6. 102 p.
- Pojar, J. 1983. Forest ecology. In *Forestry handbook for British Columbia*. S. Watts (editor). Univ. B.C., Faculty of Forestry, Forestry Undergraduate Society, Vancouver, B.C., pp. 221-318.
- Schofield, W. 1968. Some Mosses of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 28. 262 p.
- Szczawinski, A. 1959. The Orchids of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 16. 124 p.
- _____. 1962. The Heather family (Ericaceae) of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 19. 205 p.
- Taylor, T. 1966. The Lily family (Lilliaceae) of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 25. 109 p.
- _____. 1973a. The Ferns and Fern-Allies of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 12. 172 p.
- _____. 1973b. The Rose family (Rosaceae) of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 30. 223 p.
- _____. 1974a. The Figwort family (Scrophulariaceae) of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 33. 237 p.
- _____. 1974b. The Pea family (Leguminosae) of British Columbia. Royal B.C. Museum, Victoria, B.C. Handb. No. 32. 251 p.
- Taylor, R.L. and B. MacBryde. 1977. Vascular plants of British Columbia: a descriptive resource inventory. Univ. B.C. Press, Vancouver, B.C. 754 p.
- Valentine, K. W. G. 1971. Soils of the Fort Nelson area of British Columbia. Can. Dep. Agric. Res. Branch, Ottawa, Ont. Rep. No. 12. 60 p.
- Vold, T., R. Maxwell, and R. Hardy. 1977. Biophysical soil resources and land evaluation of the northeast coal study area, 1976-1977. Vol. 2. A technical supplement to the northeast coal study preliminary environmental report on proposed transportation links and townsites. B.C. Min. Environ., Victoria, B.C. 6 appendices.

APPENDIX 1. Meso slope position diagram

- a. Crest - the generally convex uppermost portion of a hill (meso scale); it is usually convex in all directions; no distinct aspect.
- b. Upper Slope - the generally convex upper portion of the slope of a hill (meso scale) immediately below the crest; it has a convex surface profile with a specific aspect.
- c. Middle Slope - the area of the slope of a hill between the upper slope and the lower slope, where the slope profile is not generally concave or convex; it has a straight or somewhat sigmoid surface profile with a specific aspect.
- d. Lower Slope - the area toward the base of the slope of the hill. It generally has a concave surface profile with a specific aspect.
- e. Toe - area defined by extent of homogeneous site of slight slope; clearly demarcated by an abrupt decrease in the slope (below and adjacent to the lower slope).
- f. Depression - any area that is concave in all directions; generally at the foot of a meso scale hill or in generally level area.
- g. Level - any level meso scale area not adjacent to a meso scale hill. The surface profile is generally horizontal with no significant aspect.



APPENDIX 2. Hand texturing field guide

Soil texture refers to the relative proportions of the sand, silt, and clay separates within a soil. These separates have their own distinctive properties of "feel", allowing one to estimate their proportions in a sample of soil by hand texturing. Texture can be estimated very roughly from a dry sample. Clayey materials are very hard, loamy and silty materials are slightly hard to soft, and sandy materials are loose grained. To be more precise, hand texturing should be done using the wet sample procedure given below.

Step 1

Obtain a small handful of soil, crush it in the hand, and remove coarse fragments (particles greater than 2 mm in diameter).

Step 2

Gradually add water to the soil and work it into a moist putty with a soil knife or fingers. The correct moisture content is important. If the putty flows with the force of gravity, then it is too wet. If it crumbles when rolled, then it is too dry. It should have the consistency of a filler putty.

Step 3

Determine stickiness of the soil putty by working it between the thumb and forefinger, pressing and then separating the fingers. An estimate of clay content can be made in this way. (Clay limits below are approximate.)

NONSTICKY: practically no soil material adheres to the thumb and forefinger (less than 10% clay).

SLIGHTLY STICKY: soil material adheres only to one of the fingers and comes off the other rather cleanly. The soil does not stretch appreciably when fingers are separated (less than 25% clay).

STICKY: soil material adheres to both fingers and stretches slightly before breaking when fingers are pulled apart (25-40% clay).

VERY STICKY: soil putty adheres strongly to both fingers and stretches distinctly before breaking (greater than 40% clay).

Step 4

Determine the grittiness of the soil putty by rubbing it between thumb and forefinger. An estimate of sand content can be made in this way. (Sand limits below are approximate.)

NONGRITTY: Little or no grit can be felt (less than 20% sand).

SLIGHTLY GRITTY: Some grit is felt but nongritty material (silt and clay) is dominant (20-50% sand).

GRITTY: Sand is felt as the dominant material. Some nongritty material can be felt between sand grains (50-80% sand).

VERY GRITTY: Sand is the only material that is felt. Little or no nongritty material present (greater than 80% sand).

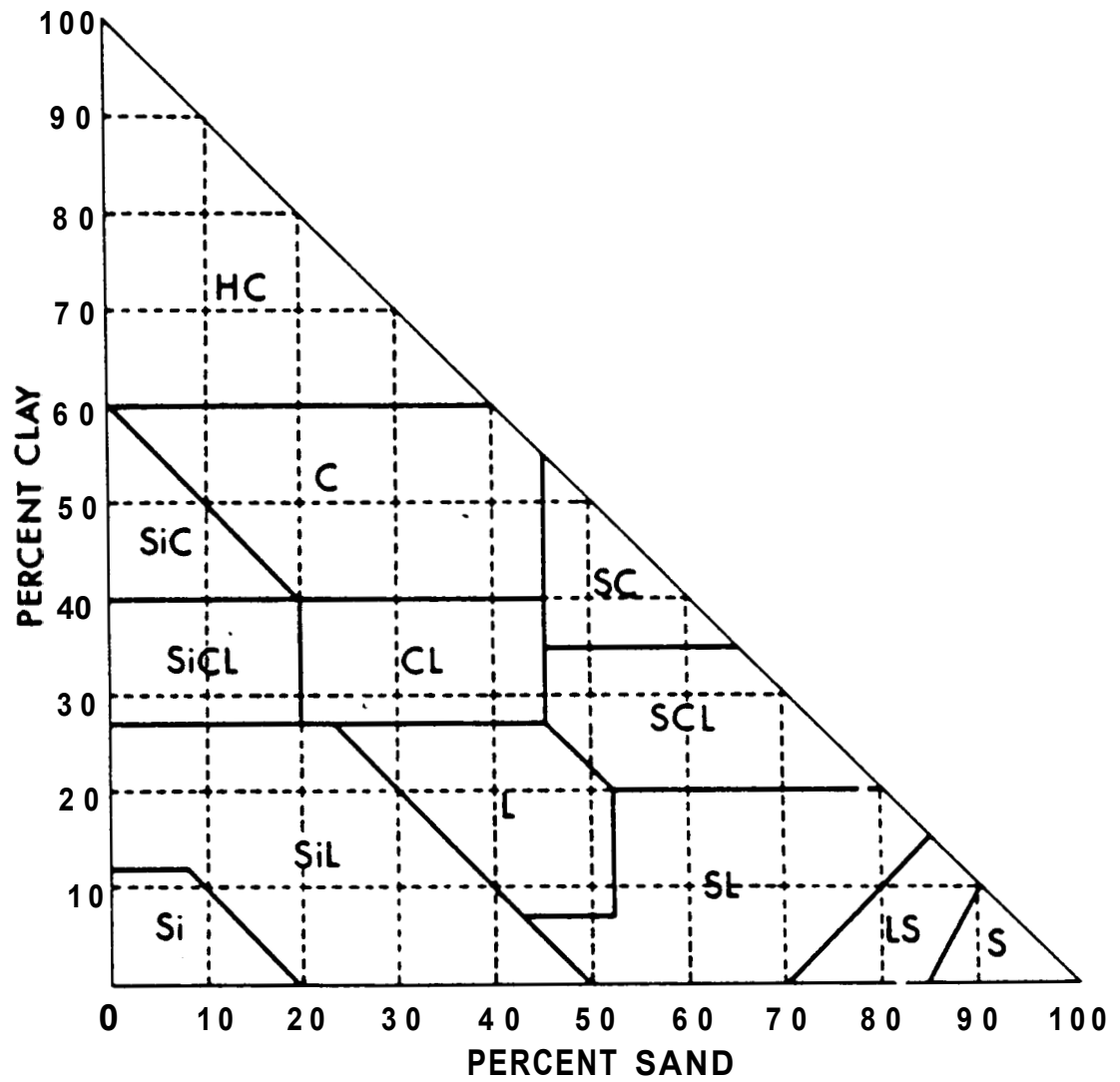
Step 5

After stickiness and grittiness have been determined, the hand texturing table can be used as an approximate guide to the textural class of the soil. The textural triangle (Figure 14) can be used for a more accurate determination of the textural class.

	NON GRITTY (<u><20% sand</u>) ^b	SLIGHTLY GRITTY (<u>20-50% sand</u>)	GRITTY (<u>50-80% sand</u>)	VERY GRITTY (<u>>80% sand</u>)
VERY STICKY (>40% clay) ^a	SILTY CLAY	CLAY	SANDY CLAY	--
STICKY (25-40% clay)	SILTY CLAY LOAM	CLAY LOAM	SANDY CLAY LOAM	--
SLIGHTLY STICKY (10-25% clay)	SILT LOAM or SILT	LOAM ^b	SANDY LOAM	--
NON STICKY (<10% clay)	--	--	--	LOAMY SAND or SAND

^a Sand and clay limits are approximate.

^b A loam is a textural class exhibiting physical properties intermediate between those of sand, silt, and clay.



Soil textural triangle.

APPENDIX3. Identification of upland humus forms

- Mors: - matted F horizon^a
 - common fungal mycelium (white or yellow)
 - little or no intermixing of organic and mineral materials
 - abrupt boundary between organic and mineral horizons
- Moders: - loosely arranged F horizon^a
 - friable
 - insect droppings
 - fungal mycelium and soil organisms (arthropods and occasional earthworms)
 - intermixing of organic and mineral horizons
 - gradual transition between mineral and organic horizons
- Mulls: - often no F^a or H horizons (thin if present)
 - insect droppings abundant
 - usually many soil organisms but may form from decomposition of a dense network of roots (usually abundant earthworms)
 - considerable intermixing of mineral and organic layers, with incorporation of organic matter into surface mineral soil (Ah horizon)
-

^aF horizon: horizon in which partial (rather than entire), macroscopically recognizable vegetative structures are dominant (i.e., the horizon is partially decomposed).

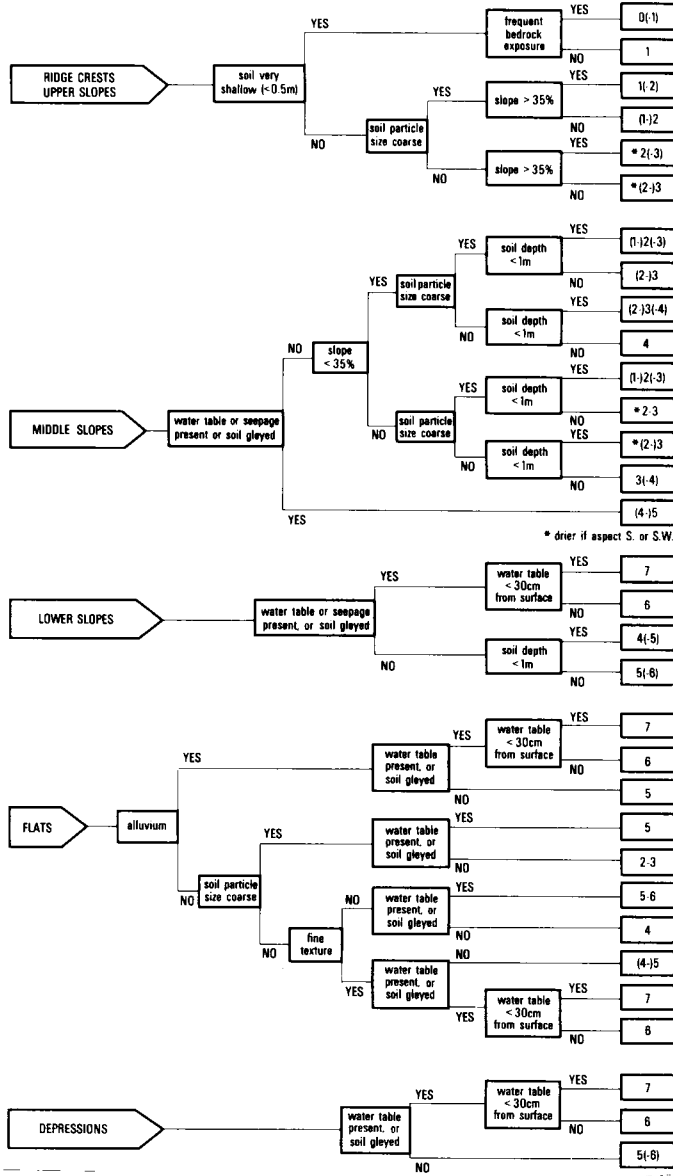
APPENDIX 4. Key to the identification of potential moisture regime (part 1)
(from Green *et al.* 1984)

This key was devised to aid field staff in identifying potential moisture regimes using readily observable environmental features. It should be applied with caution on ridge crests, upper slopes, and middle slopes which have soils with thick (>20 cm) organic layers. Moisture regime in these cases will generally be higher than indicated. The table below provides definitions for the categories used in the key.

Category	Definition
Ridge crest	height of land; usually convex slope shape.
Upper slope	the generally convex shaped, upper portion of a slope.
Middle slope	the portion of a slope between the upper and lower slopes; the slope shape is usually straight.
Lower slope	the area towards the base of a slope; the slope shape is usually concave. It includes toe slopes which are generally level areas located directly below and adjacent to the lower slope.
Flat	any level area (excluding toe slopes); the surface shape is generally horizontal with no significant aspect.
Alluvium	post-glacial, active floodplain deposits along rivers and streams in valley bottoms; usually a series of low benches and channels.
Depression	any area that is concave in all directions; usually at the foot of a slope or in flat topography.
Soil depth	depth from the mineral soil surface to a restricting layer such as bedrock, strongly compacted, or strongly cemented materials (e.g. "hardpan").
Gleyed	soils that have orange coloured mottles indicative of a fluctuating water table. Permanently gleyed soils are dull yellowish, blue, or olive in colour.
Soil particle size coarse	sandy ^a with > 35% volume of coarse fragments, or loamy ^a with > 70% volume of coarse fragments.
Fine texture	silty ^a or clayey ^a with a low coarse fragment volume.

^a Sandy - LS, S; loamy - SL, L, SCL; clayey - SiCL, CL, SC, SiC, C; silty - SiL, Si.

APPENDIX 4. Key to the identification of potential moisture regime (part 2)



APPENDIX 5. Key to the identification of soil nutrient regime^a

1a Coarse-textured

2a Very high coarse fragments (>50%) or very shallow (<30 cm) soil.

3a Mor humus form

Very Poor

3b Moder humus form

Poor - Medium

2b Low or zero coarse fragments, deep soil

4a Mor humus form

Poor

4b Moder humus form

Medium

4c Mull humus form

Rich - Very Rich

1b Moderately coarse- and medium-textured

5a Very high coarse fragments (>50%); or very shallow soil (<30 cm); or shallow rooting depth

6a Mor humus form

Poor

6b Moder

Medium

5b Low or zero coarse fragments without restricted rooting depth

^a The presence of base-rich parent materials (limestone, shales, basalt) may improve the nutrient status.

7a Mor humus form

Poor - Medium

7b Moder humus form

Medium - rich

7c Mull humus form

Very rich

1C Moderately fine- and fine-textured

8a Very high coarse fragments (rare); or very shallow soil; or shallow rooting depth (<15 cm)

9a Mor humus form

Poor - Very Poor

9b Moder humus form

Medium - Poor

9c Mull humus form

Rich

8b Low or zero coarse fragments, with good rooting depth (>20 cm)

10a Mor humus form

Medium

10b Moder humus form

Rich

10c Mull humus form

Very Rich