ICHg1/04  DEVIL'S CLUB - OAK FERN - FEATHER MOSS ECOSYSTEM ASSOCIATION

SOILS: Soil profiles develop in positions receiving more moisture than mesic sites. Soils may or may not show mottling and/or gleyed colours but, in general, all soils provide adequate moisture throughout the growing season. Dark yellowish brown mineral horizons (Bf, Bm) commonly develop above deep, loamy to sandy textured, fluvial and washed morainal deposits. Many subsurface horizons (below 40 cm) are imperfectly to poorly drained, with abundant mottles and seepage. Evidence of both fungal and zoogenous activity can be found in organic layers, which are primarily Mors and Moders. Organic horizons may reach depths up to 20 cm.

Soil Classification: dominantly Orthic Humo-Ferric Podzols and Gleyed Humo-Ferric Podzols.

Humus Form Classification: Orthihemimors and Orthimormoders.

Schematic Profile:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>moderately decomposed; dark brown organic layer; plentiful fine, medium roots; fungal mycelia and/or insect droppings.</td>
</tr>
<tr>
<td>H</td>
<td>well-decomposed; black; plentiful medium, coarse roots; blocky to massive.</td>
</tr>
<tr>
<td>Ae</td>
<td>pale brown; sandy loam; few roots; acidic.</td>
</tr>
<tr>
<td>Bhf</td>
<td>dark reddish brown; loam; abundant medium, coarse roots; granular.</td>
</tr>
<tr>
<td>Bf</td>
<td>dark yellowish brown; sandy to loamy; plentiful medium roots.</td>
</tr>
<tr>
<td>BC</td>
<td>yellowish brown to olive brown; sandy to loamy; few fine roots; mottles may occur.</td>
</tr>
</tbody>
</table>

Orthic Humo-Ferric Podzol
(Gleyed Humo-Ferric Podzol)

Average pH: mineral horizons - 5.0
organic horizons - 3.5

Key Characteristics:
- seepage may be found at depths greater than 40 cm from the mineral surface.
- fluvial or washed morainal deposits have deep effective rooting.
- finer textured soils of this ecosystem association generally have shallow rooting depths and a lack of pores for free air and water movement.
- organic layers are often thicker than those of mesic ecosystems.
ECOLOGICAL MOISTURE REGIME:
subhygic - hygic

ECOLOGICAL NUTRIENT REGIME:
permesotrophic - (eutrophic)

DISTRIBUTION: common throughout the ICHgl, but more frequent at lower elevations. Stands are rarely of large extent.

PHYSIOGRAPHIC FEATURES:
Slope position: lower and toe slopes, depressions or gulleys, valley floors; positions receiving abundant seepage.
Slope range: flat to gently sloping (0-20%).
Surface shape: concave, irregular, or smooth; frequently hummocky.
Landforms: fluvial or washed morainal; (lacustrine).
ICHg1/05  DEVIL’S CLUB – FERN – LEAFY MOSS ECOSYSTEM ASSOCIATION

VEGETATION:

Trees: stands open; canopies irregular; trees large.
  subalpine fir  \textit{(Abies lasiocarpa)}
  hybrid spruce  \textit{(Picea glauca x sitchensis \textit{x engelmannii)}}
  \textbf{[western hemlock \textit{(Tsuga heterophylla)}]} - primarily an understory tree

Shrubs: a well-developed layer, especially tall and dense in stand openings.
  devil's club  \textit{(Oplopanax horridus)} - usually totally dominates
  black gooseberry  \textit{(Ribes lacustre)}
  oval-leaved blueberry  \textit{(Vaccinium ovalifolium)} - confined to hummocks and decaying wood
  
  red-osier dogwood  \textit{(Cornus sericea)} - a good indicator
  highbush-cranberry  \textit{(Viburnum edule)}
  thimbleberry  \textit{(Rubus parviflorus)}

Herbs: a well-developed, lush layer; diverse.
  oak fern  \textit{(Gymnocarpium dryopteris)} - dominates on most sites
  spiny wood fern  \textit{(Dryopteris assimilis)}
  lady fern  \textit{(Athyrium filix-femina)} - dominant on wettest, richest sites
  foamflowers  \textit{(Tiarella trifoliata, T. unifoliata)}
  twistedstalks  \textit{(Streptopus roseus, S. amplexifolius)}
  
  five-leaved bramble  \textit{(Rubus pedatus)} - excellent vigour,
  bunchberry  \textit{(Cornus canadensis)} - usually confined to elevated microsites
  
  \textbf{[violets \textit{(Viola spp.)}] - excellent indicat-}
  \textbf{[enchanter's nightshade \textit{(Circaea alpina)}] - or species when present}

Moss layer: poorly developed; leafy (\textit{Mnium}) mosses dominate, feather mosses confined to decaying wood and hummocks.
  \textit{Mnium} spp.
  \textit{Brachythecium} spp.

Remarks: This is a very productive ecosystem association for spruce and subalpine fir. By comparison, hemlock grows rather poorly and is confined to subcanopy layers and elevated microsites. The productive capacity of
these sites is high, but timber volumes in existing old-growth stands are often low because of low stocking levels. There are many openings in the stands occupied by herbs and brush and there are often large numbers of snags. Advance regeneration of conifers is usually sparse and confined to decaying wood and other elevated microsites where competition with herbs and shrubs is not severe.

The Devil's club - fern - leafy moss e.a. can be distinguished from the drier, less rich Devil's club - oak fern - feather moss e.a. by:
1. predominance of spruce and subalpine fir over hemlock.
2. heavy cover of devil's club.
3. presence of lady fern and spiny wood fern along with oak fern.
4. dominance of leafy (Mnium) mosses with feather moss confined to decaying wood and hummocks.
SOILS: Both mineral and organic horizons are relatively rich, with higher pH and/or seepage waters. Soils have developed primarily on moisture-receiving, lower or toe slope positions. Dark brown mineral horizons occur near the surface of most soils (Ah, Bhf). These dark colours are indicative of soluble organic materials accumulating downslope. Compacted till may be found at depth, and mottles are common in subsurface mineral horizons. Organic materials are generally in an advanced stage of decomposition (H horizon predominating) and range in thickness from 5 to 20 cm.

Soil Classification: Orthic Gleysols and Gleyed subgroups of Luvisols and Podzols; also Orthic Eutric Brunisols.

Humus Form Classification: Amphimormoders; Orthihemihuminors.

Schematic Profile:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>weakly to moderately decomposed; brown to dark brown organic horizon; abundant fine, medium roots; very moist; contains insect and/or fungal mycelia.</td>
</tr>
<tr>
<td>H</td>
<td>well-decomposed; black organic horizon; plentiful medium, coarse roots; very moist to wet.</td>
</tr>
<tr>
<td>Ah</td>
<td>dark brown; silt loam; has high organic content; granular structure; abundant medium, coarse roots.</td>
</tr>
<tr>
<td>Bhf</td>
<td>dark reddish-brown; loam; subangular blocky structure; plentiful fine, medium roots.</td>
</tr>
<tr>
<td>Btg</td>
<td>brownish-gray; silty clay loam; few to abundant mottles; angular blocky to massive; few fine roots; few to abundant clay films.</td>
</tr>
</tbody>
</table>

Gleyed Podzolic Gray Luvisol

Average pH: mineral horizons - 5.1
organic horizons - 4.7

Key Characteristics:
- all soils are relatively rich, and very moist to wet for most of the growing season.
- seepage is common.
- all soil profiles sampled had surface mineral horizons (Ah, Bhf) enriched in organic matter, which aids in the retention of nutrients and water.
- effective rooting is fairly shallow (less than 35 cm) and restricted to upper, well-drained mineral horizons.
- massive or cemented layers often impede water flow fairly close to the mineral surface.
ECOLOGICAL MOISTURE REGIME:
hygic+ - subhydric

ECOLOGICAL NUTRIENT REGIME:
mesotrophic - permesotrophic

DISTRIBUTION: found throughout most of the ICHg1, primarily at lower elevations; not common, and generally restricted to small pockets.

PHYSIOGRAPHIC FEATURES:
Slope position: depressions on valley floor or slope benches; positions that receive or collect abundant moisture.
Slope range: level (0 - 2%).
Surface shape: flat to concave, often very hummocky.
Landforms: organic veneers over fluvial, lacustrine, or morainal deposits.
ICHg1/06 HORSE TAIL - (SKUNK CABBAGE) SWAMP ECOSYSTEM ASSOCIATION

VEGETATION:

Trees: stocking irregular, many stand openings; trees small to medium sized, confined to hummocks.

- subalpine fir (Abies lasiocarpa)
- hybrid spruce (Picea glauca x sitchensis ? x engelmannii)
- western hemlock (Tsuga heterophylla) - dominant cover in some stands

Shrubs: cover variable, well-developed in stand openings.

- mountain alder (Alnus incana ssp. tenuifolia) - characteristic constant
- black twinberry (Lonicera involucrata)
- highbush cranberry (Viburnum edule)
- red-osier dogwood (Cornus sericea)
- [false azalea (Menziesia ferruginea)] - often significant cover but confined to elevated microsites
- [oval-leaved blueberry (Vaccinium ovalifolium)]
- [devil's club (Oplopanax horridus)] - consistently present but minor

Herbs: a well-developed layer; diverse and variable species condition.

- horsetails (Equisetum arvense, E. sylvaticum, E. pratense) - characteristic constant
- skunk cabbage (Lysichiton americanum)
- lady fern (Athyrium filix-femina)
- oak fern (Gymnocarpium dryopteris)
- foamflowers (Tiarella trifoliata, T. unifoliata)
- bunchberry (Cornus canadensis) - prominent on hummocks
- five-leaved bramble (Rubus pedatus)
- one-sided wintergreen (Orthilia secunda)
- [soft-leaved sedge (Carex disperma)] - an excellent indicator when present

Moss layer: variable, generally well-developed; feather mosses on hummocks.

- Hylocomium splendens - dominant on hummocks
- Mnium spp. - dominant in wet hollows
- [Sphagnum spp.]
Remarks: Tree growth in the Horsetail - (skunk cabbage) swamp ecosystem association is restricted by the high water table and poor soil aeration. Spruce and subalpine fir grow quite well when rooted in a favourable microsite (usually along the margins of the swamp), but hemlock grows very slowly in decaying wood or on mounds of organic matter.

Swamps with a heavy cover of skunk cabbage are found in western parts of the ICHgl, bordering on the Coastal Western Hemlock Zone (CWH), but over most of the ICHgl skunk cabbage is not common. Abundance of horsetail or soft-leaved sedge is a more reliable indicator.
ICHg1/06 HORSETAIL - (SKUNK CABBAGE) SWAMP ECOSYSTEM ASSOCIATION

SOILS: Soils within this ecosystem association are saturated with water for prolonged or indefinite periods of the growing season. Rooting is often impeded in both poorly aerated surface organic layers (O1, Om, Oh) and subsurface mineral and/or organic horizons, due to standing water. Wet and compacted dark grayish brown to olive subsurface mineral horizons are generally found within 50 cm of the soil surface. Intense mottling and seepage generally occur within 30 cm of the mineral surface.

Soil Classification: Orthic Gleysols and Terric Mesisols.

Humus Form Classification: Fermihistomor and Ferminydromor.

Schematic Profile:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S,L</td>
<td>moss plus wet litter.</td>
</tr>
<tr>
<td>Om-1</td>
<td>moderately to poorly aerated; moderately decomposed; dark brown; wet; few to plentiful roots.</td>
</tr>
<tr>
<td>Oh</td>
<td>poorly aerated; advanced stage of decomposition; very dark brown.</td>
</tr>
<tr>
<td>Bg</td>
<td>brownish gray; clay loam; common mottles; few, medium roots; angular to massive; wet.</td>
</tr>
<tr>
<td>Om-2</td>
<td>subsurface organic horizon; black; wet and mucky; very few roots.</td>
</tr>
<tr>
<td>Cg</td>
<td>olive gray; clay loam; abundant mottles and/or seepage; massive; wet.</td>
</tr>
<tr>
<td>Om-3</td>
<td>saturated organic layer; black; seepage or standing water common.</td>
</tr>
</tbody>
</table>

Terric Mesisol Orthic Gleysol

Average pH: mineral horizons - 4.9 (limited data)
organic horizons - 4.9 (limited data)

Key Characteristics:
- occur at the base (toe) of slope, or in depressions.
- thick, wet organic layers cover the soil surface.
- majority of roots are within the upper 10-20 cm of the soil surface.
- compacted, fine textured, subsurface mineral horizons (Cg) are common.
- frequent high water table and seepage (plus mottles in mineral soils).

Comments: The excessive moisture and mucky nature of these poorly aerated organic and/or mineral soils severely restricts root development and reduces trafficability.
ICHgl: UPPER NASS BASIN VARIANT

/07 FLOODPLAIN COTTONWOOD SERAL ECOSYSTEM ASSOCIATION (212)

Remarks: Stands of cottonwood are found on the active floodplains of the upper Nass, Skeena and Kispiox Rivers and a few of their major tributaries in the ICHgl, but they are neither as common nor as extensive as on the lower reaches of these rivers. The description and management interpretations of the Floodplain cottonwood seral ecosystem association in the ICHgl3 variant (ICHg3/11) also apply well to the floodplains found in the ICHgl. Note that in the ICHgl, cedar is absent and not recommended for introduction, whereas subalpine fir is more abundant and has better vigour than in the ICHg3.