ICHgla: UPPER NASS BASIN VARIANT: AMABILIS FIR PHASE

/03 DEVIL'S CLUB - OAK FERN ECOSYSTEM ASSOCIATION (216)

ECOLOGICAL MOISTURE REGIME: subhygric

ECOLOGICAL NUTRIENT REGIME: mesotrophic - permesotrophic

DISTRIBUTION: found throughout the ICHgla, but not covering as much area as the zonal ecosystem association.

PHYSIOGRAPHIC FEATURES:
Slope position: middle to lower slopes, minor snowmelt pockets and drainages, (valley floors); positions receiving some seepage.
Slope range: level to steep, but usually gently sloping.
Surface shape: irregular, concave to straight, rarely convex.
Landforms: morainal and colluvial blankets, frequently washed; fluvial deposits.
ICHgla/03 DEVIL'S CLUB - OAK FERN ECOSYSTEM ASSOCIATION

VEGETATION:

Trees: all species growing well.
western hemlock (Tsuga heterophylla) — either one may dominate cover
amabilis fir (Abies amabilis)
[hybrid spruce (Picea glauca x sitchensis ? x engelmannii)] — scattered, out
excellent growth

Shrubs: moderately- to well-developed layer; advance regeneration not abundant.
devil's club (Oplopanax horridus) — characteristic but not always dominant
oval-leaved blueberry (Vaccinium ovalifolium)
black gooseberry (Ribes lacustre) — characteristic but inconspicuous

Herbs: usually fairly well-developed layer, moderate species diversity.
oak fern (Gymnocarpium dryopteris) — characteristic dominant
foamflowers (Tiarella trifoliata, T. unifoliata) — consistently present, good indicators
twistedstalks (Streptopus streptopoides, S. roseus, S. amplexifolius) — consistently present, good vigour,
bunchberry (Cornus canadensis)
five-leaved bramble (Rubus pedatus)
[spiny wood fern (Dryopteris assimilis)] — small pockets common
[lady fern (Athyrium filix-femina)] — mon, moderate vigour

Moss layer: usually moderately developed carpet of feather mosses, leafy (Mniuion) mosses common in depressions.
Hylocomium splendens
Ptilium crista-castrensis
Pleurozium schreberi
Mniuion spp.
[Brachythecium spp.]
[Rhytidiothecium loreus]
[Barbillophozia spp.]

Remarks: This is a productive ecosystem association for hemlock, amabilis fir, and spruce. Although spruce is not a major species in climax stands, it is normally the largest tree in the stand. Subalpine fir is occasionally present, particularly in areas of cold air drainage, but does not reach the dimensions of the other tree species.

Devil's club is common and conspicuous but rarely totally dominates the shrub layer. Instead it usually occurs in mixture with Vaccinium spp. and false azalea. Depressional microsites within the Devil's club - oak fern e.g. may often be wetter and contain indicator species from the Devil's club - lady fern - oak fern e.g. (ICHgla/04).
SOILS: Soils within this ecosystem association have developed in receiving positions where plentiful moisture is available for most of the growing season. Yellowish red to brown B horizons are common, with some profiles also showing darker reddish brown surface horizons indicative of organic matter accumulation (Bhf). Profile textures are generally loamy throughout, with high coarse fragment volumes (greater than 40%). Mottles (bright, blotchy patches) may occur in lower mineral horizons, suggesting temporary saturation with water. Surface organic layers are relatively thin, ranging from 4 to 6 cm in depth.

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

Humus Form Classification: dominantly Orthihemimors with minor Orthimormoders.

Schematic Profile:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>moderately decomposed organic horizon; dark brown; plentiful fine, medium roots; common white, yellow mycelia and/or insects.</td>
</tr>
<tr>
<td>Ae</td>
<td>pale brown; loamy sand; few coarse roots; acidic.</td>
</tr>
<tr>
<td>Bhf</td>
<td>dark reddish brown; sandy loam; plentiful medium, coarse roots.</td>
</tr>
<tr>
<td>Bf</td>
<td>yellowish brown to yellowish red; loamy sand; few to plentiful fine, medium roots; structureless.</td>
</tr>
<tr>
<td>BC, (BCg)</td>
<td>yellowish to olive brown; loamy sand to loam; few fine roots; may contain significant volume of coarse fragments; may contain mottling and/or seepage.</td>
</tr>
</tbody>
</table>

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

Average pH: mineral horizons - 4.5
organic horizons - 4.3

Key Characteristics:
- these soils are often found at lower slope positions on morainal, fluvial and colluvial deposits.
- the coarse fragment content is high on colluvial blankets.
- mottling may occur in lower soil horizons (BCg, Cg).
- development of leached Ae horizon at the mineral surface.
- relatively thin humus forms that are usually decomposing rapidly.
ECOLOGICAL MOISTURE REGIME:
(subhygic) - hygic

ECOLOGICAL NUTRIENT REGIME:
permesotrophic - eutrophic

DISTRIBUTION: small pockets of this ecosystem association are found on mountain sides throughout the ICHgla. Larger stands are uncommon and restricted to valley floors.

PHYSIOGRAPHIC FEATURES:
Slope position: valley floor, lower and toe slopes, gulleys and drainage channels; sites receiving abundant seepage.
Slope range: level to moderately sloping, usually gentle (0 - 25%).
Surface shape: concave to straight.
Landforms: fluvial; colluvial or morainal deposits, usually washed.
ICHgla/04 DEVIL'S CLUB - LADY FERN - OAK FERN ECOSYSTEM ASSOCIATION

VEGETATION:

Trees: large, generally widely spaced, composition variable; little advance regeneration.

- amabilis fir (Abies amabilis) -very common esp. at higher elevations
- subalpine fir (Abies lasiocarpa) -generally in sub-canopy layers
- western hemlock (Tsuga heterophylla) -largest tree
- hybrid spruce (Picea glauca x sitchensis x ? engelmannii)

Shrubs: generally a well-developed, tall layer, especially in stand openings.

- devil's club (Oplopanax horridus) -generally dominates shrub layer
- black gooseberry (Ribes lacustre) -consistently present but inconspicuous

[blueberry/huckleberry (Vaccinium spp.)] confined to decay ing wood and mounds
[false azalea (Menziesia ferruginea)]

[currants (Ribes spp.)] -good indicators when present
[salmonberry (Rubus spectabilis)]
[red elderberry (Sambucus racemosa)]
[thimbleberry (Rubus parviflorus)]

Herbs: a well-developed layer; fairly diverse species composition.

- lady fern (Athyrium filix-femina) -characteristic dominant
- oak fern (Gymnocarpium dryopteris) -usually dominant under devil's club
- spiny wood fern (Dryopteris assimilis)
- foamflowers (Tiarella trifoliata, T. unifoliata)
- twistedstalks (Streptopus streptopoides, S. roseus, S. amplexifolius)

[sweet-scented bedstraw (Galium triflorum)] -excellent indicators when present
[enchanter's nightshade (Circaea alpina)]
[common horsetail (Equisetum arvense)]
[violets (Viola spp.)]

Moss layer: dominated by leafy mosses and liverworts; feather mosses confined to decaying wood and elevated mounds.

- Mnium spp.
- Brachythecium spp.
- [Barbilophozia spp.]
- [Rhytidiadelphus loreus] -dominant cover
Remarks: This is the most productive ecosystem association in the ICHgla. Small patches of it develop wherever a drainage channel occurs; however, extensive stands are rare. All of the tree species occurring in the Amabilis fir phase grow well in this unit, although hemlock growth may be restricted on all but the best drained microsites. Subalpine fir is very common in these ecosystems because many of them occur in cold air drainages. Advance regeneration is sporadic, but spruce reproduction on decaying wood is more common here than in the other ecosystem associations.
SOILS: Soil profiles of this association have developed on slope positions that receive abundant moisture, leaving soils wet for a major portion of the growing season. Seepage waters and/or high water tables usually result in the occurrence of mottles, often within 30 cm of the mineral surface. Brownish (Bm) to reddish-brown (Bhf, Bf) mineral horizons occur near the surface of soil profiles. These horizons may be overlain by a very dark brown to black mineral horizon (Ah), often greater than 10 cm thick. Surface organic materials range 7-18 cm in depth, and often contain a well-decomposed black H horizon as the dominant layer.

Soil Classification: Orthic Gleysols and Gleyed subgroups of Brunisols, Regosols, and Podzols.

Humus Form Classification: Amphimormoders; Orthihemihuminers.

Schematic Profile:

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<tbody>
<tr>
<td>F</td>
<td>intermediate decomposition; dark brown organic layer; active fungal and zoogenous decomposition; loose structure common.</td>
</tr>
<tr>
<td>H</td>
<td>black to dark brown; well-decomposed organic horizon either well-aerated (H), or wet and saturated (Oh).</td>
</tr>
<tr>
<td>Ah</td>
<td>dark brown to black mineral horizon; silt loam to silty clay loam; granular structure; abundant medium, coarse roots.</td>
</tr>
<tr>
<td>Bm</td>
<td>brown (Bm) to strong brown (Bf); loam to clay; plentiful fine, medium roots.</td>
</tr>
<tr>
<td>BCg</td>
<td>dark grayish brown; loam to clay; seepage and/or mottling present; water table generally within 60 cm; massive.</td>
</tr>
</tbody>
</table>

Gleyed Dystric Brunisol

Key Characteristics:
- surface organic horizons are usually wet and moderately thick.
- subsurface mineral horizons may show evidence of being water-worked (sorted, coarser textured till).
- soil horizons are wet, often throughout the entire profile.
- drainage is usually restricted by high water tables which may be perched over compacted layers.
- lower horizons may have a hard massive structure that roots cannot penetrate.
Comments: Seepage waters are commonly found within 40 cm of the soil surface and may contain abundant available nutrients for vegetation. Depth of rooting is often restricted by excessive moisture, which in turn may lead to compacted soils lacking pores for free air movement. Surface organic and mineral horizons have a high capacity to hold water.
7.3 Classification of Ecosystem Units of the ICHg2: Lower Nass Basin Variant

/01 Zonal hemlock - (cedar) - moss ecosystem association
/02 Pine - lichen ecosystem association
/03 Dry hemlock - moss ecosystem association
/04 Devil's club - oak fern - feather moss ecosystem association
/05 Devil's club - fern - leafy moss ecosystem association
/06 Horsetail swamp ecosystem association

Seral ecosystem association:
/07 Floodplain cottonwood seral ecosystem association

Seral variations
ECOLOGICAL NUTRIENT REGIME

Oligotrophic Submesotrophic Meso- trophic Permesotrophic Subeutrophic to eutrophic

Very xeric

Xeric

Subxeric

Submesic

Mesic

Subhygric

Hygric

Subhydric

A  B  C  D  E

0  1  2  3  4  5  6  7

① ZONAL HEMLOCK - (CEDAR) - MOSS
② PINE - LICHEN
③ DRY HEMLOCK - MOSS
④ DEVIL'S CLUB - OAK FERN - FEATHER MOSS
⑤ DEVIL'S CLUB - FERN - LEAFY MOSS
⑥ HORSETAIL SWAMP
⑦ FLOODPLAIN COTTONWOOD

FIGURE 13. Edatopic grid of ecological moisture and nutrient regimes - ICHg2.