HL Highland Forest Group

(n = 51)

HL1 Balsam fir / Mountain-ash / Large-leaved goldenrod. . . . **HL1a** White birch / Wood sorrel variant
HL2 White spruce / Wood aster
HL3 Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel
HL4 Birch / Wood fern – Wood sorrel

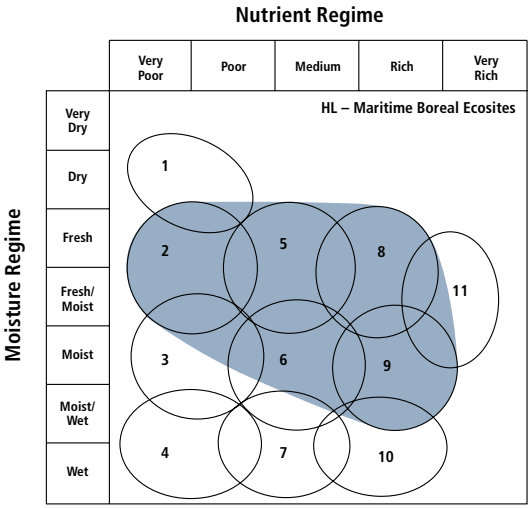
Concept: The composition and vigour of highland forests are influenced by moist, cold climate conditions and exposure associated with the Cape Breton Taiga and Cape Breton Highlands ecoregions. These Vegetation Types (VT) have strong boreal affinity and are considered indicative of Maritime Boreal ecosites. Several plant species are used to indicate this highland influence. Krummholtz and wave forest conditions are also known to occur in association with highland VTs. Fact sheets for these units will be developed as more data are collected. Acadian Ecosite VTs can sometimes be found in sheltered areas within Highland ecoregion boundaries, but these are not recognized as Highland Forest group VTs.

Vegetation: Vegetation types are closed canopy forests. Softwood VTs are dominated by balsam fir and/or white spruce; with yellow birch, white birch and red maple dominating hardwood VTs. Heart-leaf birch is common throughout the group, and mountain-ash can reach tree size in some stands (both species are indicators of highland conditions). In the herb layer, the presence of large-leaf goldenrod is also indicative of this group. The bryophyte layer can be diverse, but the dominant species are Schreber's moss followed by stair-step moss and broom moss.

Environmental Setting: Vegetation types are mainly found on upper flats or upper and middle slopes of variable steepness. High winds associated with these sites generally limit tree growth to under 15 m. Most sites are non-rocky, but surface stoniness can be variable. Soils are mainly derived from glacial till or colluvium deposits. Cool, moist climate conditions slow decomposition rates resulting in sites with unusually thick duff layers. Balsam fir dominated stands form the matrix forest on the Highland plateau, with a transitional balsam fir / yellow birch mixedwood forest found on the shoulder (this mixedwood condition grades into Acadian tolerant hardwood VTs further down slope). The Highland Forest group is restricted to the Cape Breton Taiga (100) ecoregion and Cape Breton Highlands (210) ecodistrict.

Successional Dynamics: This group is associated with Maritime Boreal zonal VTs. Balsam fir dominated forests are even-aged and frequently renewed by either spruce budworm epidemics or through natural senescence (these stands seldom exceed 75 years in age). In yellow birch / balsam fir mixedwood forests, two or more age classes are common – an older yellow birch cohort and a younger balsam fir cohort. Windthrow can be extensive in hardwood dominated ecosystems creating seedbeds for both birch and balsam fir. In more exposed areas, white spruce krummholtz or balsam fir wave forest conditions can be found. Early successional stands mainly contain short-lived pioneer species (pin cherry, mountain ash, raspberry).

Edatopic Grid



Ecological Features

Most ecosystems in this group are boreal, occurring at the southeastern limit of this expansive Canadian forest region. Their closest analogs are in insular Newfoundland and northern New Brunswick. This isolation is one of the group's key characteristics, with significant implications for landscape function, species persistence, migration, and ecosystem integrity. Highland forests collectively form a matrix, occupying well drained sites across the Cape Breton plateau. Balsam fir is a characteristic and often dominant tree in each of the four highland vegetation types. This tree's relatively short life span, coupled with its susceptibility to spruce budworm epidemics, strongly contributes to the dynamics and structure of the boreal landscape. Old growth conditions are largely dependent on yellow birch, supporting a distinctive birch – fir dynamic with limited distribution. The group provides habitat for a number of rare species including American marten, Canada lynx, Bicknell's thrush, boreal felt lichen and black backed woodpeckers; rare plant species are less common.

Cheticamp Plateau,
CBHNP, Inverness County

HL1

Balsam fir / Mountain-ash / Large-leaved goldenrod

Abies balsamea / Sorbus americana / Solidago macrophylla

HL1a

White birch / Wood sorrel variant

Betula papyrifera / Oxalis acetosella

n=32

Concept: This late successional Vegetation Type (VT) has abundant balsam fir with scattered white spruce and birch. The HL1a variant describes stands where white and/or heart-leaf birch co-dominate with balsam fir, in a mixedwood condition. HL1 has stronger boreal affinity than any other mesic VT in Nova Scotia. Balsam fir / Mountain-ash / Large-leaved goldenrod is restricted to elevations over 300 meters and is the dominant VT found in the Cape Breton Highlands.

Vegetation: Balsam fir is the dominant overstory tree. Common canopy associates include white spruce, white birch, heart-leaf birch and/or, less often, yellow birch. In variant HL1a, white and/or heart-leaf birch is co-dominant with balsam fir; here, scattered maple (red, sugar, striped) can also occur. The poorly developed shrub layer consists mainly of regenerating balsam fir with lesser mountain-ash. In contrast, the herb layer is often well developed, including bunchberry, wood aster, wild lily-of-the-valley, goldthread, wood sorrel, sarsaparilla, bluebead lily and scattered ferns. These same understory species occur in variant HL1a, accompanied by more extensive fern cover (especially wood ferns) and increased sedge presence. Large-leaved goldenrod is characteristic of this VT; it is typically scattered throughout most stands. The bryophyte layer is usually well developed. Schreber's moss is the main species along with broom moss and bazzania. Stair-step moss and sphagnum species may also be found in wetter microsites.

Environmental Setting: HL1 is mainly associated with fresh to moist, nutrient medium soils derived from glacial till. This VT is found over most of the rolling topography of the Cape Breton Highland plateau. Wind and exposure significantly limit tree growth. This ecosystem is common in northern New Brunswick and Quebec's southern boreal forest.

Successional Dynamics: HL1 is an even-aged, late successional VT usually dominated by balsam fir. The main stand-level disturbance agents are spruce budworm defoliation and harvesting. In the absence of defoliation or harvesting events, the lifespan of balsam fir in this ecosystem approaches about 75 years, after which tree senescence initiates renewal through advanced regeneration. Clearcut harvesting or, less commonly, fire may initiate an earlier successional stage dominated by pin cherry, white and/or heart-leaf birch, raspberry, mountain-ash and other woody shrubs. Heavy browsing by the moose population is also shaping balsam fir successional patterns, particularly in young post-budworm stands. In most of these, young balsam fir and hardwood saplings have been stripped out, leaving an open grassland of bluejoint and stunted regeneration and limiting HL1 development in the Cape Breton Highlands.

Ecological Features

This matrix community is primarily associated with the Maritime Boreal Cape Breton plateau. The forest's longevity is a function of either natural tree senescence (approximately 75-100 years) or the frequency of spruce budworm epidemics, creating a landscape matrix dominated by a single development stage. Fauna and ground vegetation are characterized by reduced species richness. Subnivean habitat (the space under the snow) is especially critical for the many small mammals, and their predators, found in this forest. The forest floor structure is enhanced by abundant coarse woody debris, raised stumps, and the deep moss characteristic of this VT. These forest conditions are home to snowshoe hare, moose, spruce grouse, boreal chickadee, raven and black-backed woodpecker. Small populations of American marten, Canada lynx and Bicknell's thrush (all listed as species at risk) are restricted largely to these highlands. Mountain-ash, an important component of highland forests, often reaches tree size, and provides abundant fruit and browse.

Characteristic Plants	HL1		HL1a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Balsam fir	100	59.9	100	42.0
White spruce	86	5.6	100	7.0
White birch / Heart-leaf birch	55	5.5	100	29.3
Yellow birch	24	3.9		
Red maple	7	2.5	33	4.0
Pin cherry	3	3.0	67	1.0
Mountain-ash	3	0.1	33	0.1
Striped maple	3	0.1	33	12.0
Sugar maple			33	12.0
Tree Layer (Mean % Cover)		**69**		**88**
Balsam fir	90	3.4	33	1.5
Mountain-ash	72	0.4	100	0.1
White birch / Heart-leaf birch	59	0.4		
False holly	45	0.7		
White spruce	34	0.3		
Yellow birch	24	0.5	33	2.0
Red maple	17	0.4	33	0.1
Wild red currant	17	0.1	33	0.1
Shrub Layer (Mean % Cover)		**5**		**2**
Bunchberry	93	14.1	100	22.7
Wild lily-of-the-valley	93	2.0	100	2.5
Sarsaparilla	90	1.6	67	1.1
Bluebead lily	83	2.5	67	0.1
Wood aster	83	1.8	100	6.3
Wood-sorrel	79	13.8	100	38.3
Goldthread	79	4.2	33	0.5
Starflower	79	0.5	100	0.5
Eastern spreading wood fern	76	3.0	100	25.0
Large-leaved goldenrod	59	0.3	67	0.1
Evergreen wood fern	55	4.3	67	9.0
Twinflower	45	3.3		
Cinnamon fern	45	2.2	67	1.4
Creeping snowberry	45	0.6		
Spinulose wood fern	41	4.6	33	3.0
Indian pipe	34	0.1	33	0.1
Northern beech fern	28	0.2	33	0.5
Hay-scented fern	24	5.9	67	0.8
Interrupted fern	24	0.5	33	0.5
New York fern	21	8.3	33	0.1
White twisted stock	14	0.2	67	0.2
Violets	14	0.1	67	0.3
Bladder sedge	7	0.1	33	0.1
Drooping wood sedge	7	0.1	67	0.1
Soft leaved sedge	7	0.1	33	0.1
Shining club-moss	3	0.1	67	0.1
Herb Layer (Mean % Cover)		**47**		**95**
Schreber's moss	97	40.6	67	15.0
Broom moss	90	5.0	67	12.5
Bazzania	59	5.7	33	0.8
Stair-step moss	48	5.8		
Plume moss	48	1.1		
Ladies' tresses	48	0.7	33	1.5
Hair-cap moss	48	0.5	67	0.4
Shaded wood moss	45	1.6	33	3.0
Wavy dicranum	41	1.4		
Hypnum moss	28	1.8	33	0.5
Common green sphagnum	24	1.4		
Bryo-Lichen Layer (Mean % Cover)		**55**		**21**

Distinguishing Features

This balsam fir dominated softwood forest is described for the Cape Breton Highland plateau. The variant, HL1a, has a significant component of white and/or heart-leaf birch. Large-leaved goldenrod and mountain-ash are usually present.

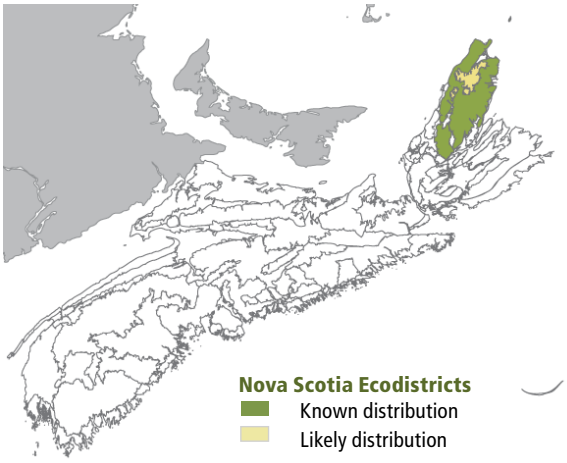
Wild lily-of-the-valley

Site Characteristics

Slope Position:	Level[3] Middle[3] Upper[3] Lower[1]
Surface Stoniness:	(Non - Slightly)[8] (Moderately)[2]
Bedrock Outcrop:	(Non-rocky)[10]
Elevation Range:	139 - 473m
Slope Gradient:	Gentle[5] Level[2] Moderate[2] Steep[1]
Aspect:	East[2] South[3] West[4] None[1]
Exposure:	Exposed[8] Mod. exposed[2]
Microtopography:	Moderately[6] Slightly[2] Level[1] Strongly[1]
Drainage:	Moderately well[4] Imperfect[3] Well[3]

Soil Characteristics

Soil Type:	ST2-L[3] ST3[3] ST2[2] ST3-L[2]
Parent Material:	Glacial till[10]
Rooting Depth (cm):	(<30)[4] (30-45)[5] (>45)[1]
Duff Thickness (cm):	(0-5)[1] (6-10)[5] (11-20)[4]



Otter Brook, Inverness County

HL2

White spruce / Wood aster

Picea glauca / Aster acuminatus

n=2

Concept: This early to mid-successional Vegetation Type (VT) features abundant white spruce with lesser balsam fir. Understory layers are usually poorly developed with needle carpet forest floors. Conditions that encourage the establishment and renewal of this VT are not well understood, but farmland abandonment is not considered a requirement, despite obvious canopy similarities between this VT and OF1 (White spruce / Aster – Goldenrod / Shaggy moss). White spruce / Wood aster is found scattered throughout the Cape Breton Highlands.

Vegetation: White spruce is the dominant overstory tree, with a component of balsam fir. Yellow birch is a common associate often with white birch, heart-leaf birch and/or red maple. The poorly-developed shrub layer consists mainly of regenerating trees and mountain-ash. Herb layer diversity and abundance are low; only evergreen wood fern and wood aster are common. Species associated with drier sites may also be present including hay-scented fern, drooping wood sedge and fibrous-root sedge. The bryophyte layer is poorly developed, but usually includes small patches of mainly hypnum moss and broom moss interspersed with needle carpet.

Environmental Setting: HL2 is mainly associated with fresh, nutrient medium soils derived from glacial till and/or colluvium deposits. This VT is found scattered throughout the Cape Breton Taiga ecoregion and Cape Breton Highlands ecodistrict, primarily on steep upper and middle slope positions. Wind and exposure significantly limit tree growth. This relatively uncommon VT is scattered through parts of northern New Brunswick and the southern boreal region of Quebec.

Successional Dynamics: HL2 is an even-aged, early to mid-successional VT dominated by white spruce. Besides harvesting, the main stand-level disturbance agents are insect infestation and windthrow. White spruce is somewhat resistant to spruce budworm defoliation, but secondary infestation by bark beetles could cause significant tree mortality. Suitable seedbeds for white spruce regeneration may arise when disturbed sites are re-vegetated by graminoid (grass-type) species (resulting in similar conditions as old field sites). White spruce stand development can also be encouraged by moose browsing (an important successional driver in the highlands) which reduces the presence of more palatable species like balsam fir and various hardwoods, which in turn gives the white spruce more opportunity to establish and thrive. Mid to late successional stages of HL2 may include HL1a (Balsam fir / Mountain-ash / Large-leaved goldenrod variant White birch / Wood sorrel) and HL4 (Birch / Wood fern – Wood sorrel). When found on steep, upper slope and crest positions succession to TH1 (Sugar maple / Hay-scented fern) or TH6 (Red oak – Yellow birch / Striped maple) may also be possible.

Ecological Features

This small to large patch forest is primarily associated with the Maritime Boreal Cape Breton plateau. The ecosystem's longevity is a function of either natural tree senescence (approximately 75-150 years) or the frequency of spruce budworm epidemics. These forest patches may survive budworm outbreaks and provide important remnants of mature forest on the highland landscape. Stands with closed canopies provide shelter for wildlife in winter. White spruce seeds are eaten by crossbills and finches, while small mammals both eat and cache white spruce seeds and cones.

Characteristic Plants	HL2	
	Freq. (%)	Cover (%)
White spruce	100	68.0
Balsam fir	100	11.5
Yellow birch	100	6.5
Heart-leaf birch	50	6.0
Red maple	50	3.0
Red oak	50	3.0
White birch	50	3.0
Pin cherry	50	0.1
Tree Layer (Mean % Cover)		**93**
Sugar maple	100	0.1
Balsam fir	50	1.0
Red oak	50	1.0
White birch	50	0.2
Beaked hazelnut	50	0.1
Fly-honeysuckle	50	0.1
Mountain-ash	50	0.1
Red maple	50	0.1
Red raspberry	50	0.1
Striped maple	50	0.1
White ash	50	0.1
Yellow birch	50	0.1
Shrub Layer (Mean % Cover)		**1**
Evergreen wood fern	100	2.5
Wood aster	100	0.9
Wild lily-of-the-valley	50	8.0
Bent-grass	50	3.0
Twinflower	50	2.5
Goldthread	50	2.0
Fibrous-root sedge	50	1.3
Rock polypody	50	1.0
Spinulose wood fern	50	1.0
Sarsaparilla	50	1.0
Wood-sorrel	50	1.0
Bluebead lily	50	0.5
Bunchberry	50	0.3
Large-leaved goldenrod	50	0.2
Drooping wood sedge	50	0.1
Hay-scented fern	50	0.1
Pearly everlasting	50	0.1
Starflower	50	0.1
Herb Layer (Mean % Cover)		**14**
Hypnum moss	100	7.5
Broom moss	100	3.5
Stair-step moss	50	1.0
Schreber's moss	50	0.5
Fern moss	50	0.1
Bryo-Lichen Layer (Mean % Cover)		**12**

Distinguishing Features

This white spruce dominated softwood forest is described for the Cape Breton Highland plateau and its upper slopes. Shrubs, herbs and mosses are poorly expressed. A needle carpet is common.

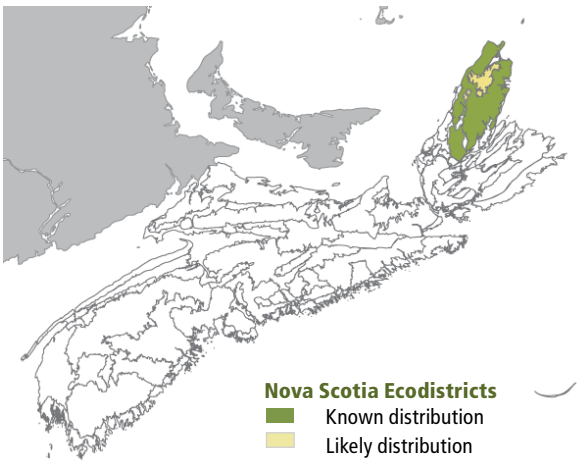
Wood aster

Site Characteristics

Slope Position:	Middle[5] Upper[5]
Surface Stoniness:	(Non - Slightly)[5] (Very - Excessively)[5]
Bedrock Outcrop:	(Non-rocky)[10]
Elevation Range:	246 - 324m
Slope Gradient:	Steep[5] nd[5]
Aspect:	South[10]
Exposure:	Exposed[10]
Microtopography:	Level[10]
Drainage:	Well[5] Rapid[5]

Soil Characteristics

Soil Type:	ST2[10]
Parent Material:	Glacial till[5] Colluvium[5]
Rooting Depth (cm):	(30-45)[5] (>45)[5]
Duff Thickness (cm):	(6-10)[10]



Warehouse Road,
Hunters Mountain,
Victoria County

HL3

Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel

Betula alleghaniensis – Abies balsamea / Dryopteris campyloptera – Oxalis acetosella

n=7

Concept: This mid to late successional Vegetation Type (VT) has an overstory co-dominated by yellow birch and balsam fir, both of which are also significant in the understory. An extensive herb layer dominated by eastern spreading wood fern is also characteristic, especially in more open stands. Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel is the dominant VT found in the Cape Breton Highlands transition zone, an informal ecological term used to describe the area where forest conditions blend between Acadian hardwood slopes and the balsam fir plateau.

Vegetation: Yellow birch and balsam fir are the dominant overstory trees. Common associates include white spruce, white birch, and occasionally red maple, sugar maple, white pine and hemlock. The shrub layer usually includes abundant balsam fir and yellow birch regeneration, as well as mountain maple, striped maple and mountain-ash. The extent and health of the balsam fir overstory strongly influences herb layer development. In more open stands dominated by yellow birch, coverage by eastern spreading wood fern can be abundant, co-occurring with lesser New York fern, evergreen wood fern and bracken. Generally common forest species like bunchberry, wood sorrel, sarsaparilla and bluebead lily may be more plentiful in closed mixedwood conditions. A moderately-developed bryophyte layer is dominated by Schreber's moss, bazzania and broom moss.

Environmental Setting: HL3 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvium deposits. Richer versions of this VT occur where seepage enhances moisture and nutrient status. HL3 is generally confined to well drained upper slopes within the Cape Breton Highlands ecodistrict, usually at elevations ranging from 250-350 meters. Wind and exposure may significantly limit tree growth. This VT is common in northern New Brunswick and marks the northern limit of the temperate zone in the Gaspé Peninsula and other parts of Quebec.

Successional Dynamics: HL3 is a mid to late successional VT dominated by yellow birch and balsam fir. Besides harvesting, the main stand-level disturbance agents are spruce budworm defoliation, windthrow and ice damage. In the absence of defoliation or harvesting, balsam fir in this ecosystem may approach 75 years. After this time tree senescence will initiate stand renewal through advanced regeneration. Yellow birch will eventually succumb to windthrow, breakage and/or dieback associated with storm events and freeze-thaw cycles. HL3 stands are generally represented by two age classes: an older yellow birch cohort and a younger balsam fir cohort. Depending on disturbance history, transition to HL4 (Birch / Wood fern – Wood sorrel) is possible.

Ecological Features

This matrix forest characterizes the transitional zone between the Maritime Boreal Cape Breton plateau and the temperate hardwood slopes. Yellow birch is the province's longest-lived hardwood species (300+ years), and this, along with intermediate shade tolerance, promotes uneven-aged conditions with mature canopy. The balsam fir component is governed by spruce budworm epidemics, however in this mixed forest some fir trees typically survive, resulting in multiple cohorts with rare individuals living up to 175 years. Yellow birch in this ecosystem can grow 17m tall with diameters of 75 cm, many deformed by exposure. Large diameter, living, hollow trees provide good denning and cavity nesting sites, and continue to provide valuable wildlife habitat as large coarse woody debris after they fall. Great-horned owls may take over the former nests made by hawks or ravens in yellow birch. Songbirds such as common redpolls, American goldfinches and pine siskins eat yellow birch seeds, while ruffed grouse eat the seeds, catkins and buds available throughout the winter. These forests may provide nesting habitat for northern goshawk. Old growth potential is high.

Characteristic Plants	HL3	
	Freq. (%)	Cover (%)
Balsam fir	100	37.5
Yellow birch	100	24.8
White spruce	83	9.4
White birch	50	11.7
White pine	33	7.0
Red maple	33	6.0
Sugar maple	17	18.0
Hemlock	17	8.0
Tree Layer (Mean % Cover)		**85**
Balsam fir	100	4.6
Mountain maple	83	1.5
Yellow birch	83	1.4
Striped maple	67	0.4
Red maple	50	8.0
Sugar maple	50	1.6
White spruce	50	1.4
Mountain-ash	50	0.4
Fly-honeysuckle	33	0.1
Red-berried elder	33	0.1
Shrub Layer (Mean % Cover)		**16**
Eastern spreading wood fern	100	21.4
Sarsaparilla	100	3.6
Bunchberry	83	8.0
Bluebead lily	83	6.1
Wood aster	83	1.5
Starflower	83	0.2
Rose twisted stalk	83	0.1
Wood-sorrel	67	23.3
Northern beech fern	67	2.5
Wild lily-of-the-valley	67	0.5
Drooping wood sedge	50	0.1
New York fern	33	38.5
Bracken	33	10.0
Violets	33	0.6
Bladder sedge	33	0.1
Goldthread	33	0.1
Large-leaved goldenrod	33	0.1
Mayflower	33	0.1
Twinflower	33	0.1
Herb Layer (Mean % Cover)		**62**
Schreber's moss	67	4.3
Bazzania	67	2.3
Broom moss	50	1.8
Shaded wood moss	33	1.3
Stair-step moss	33	0.5
Hair-cap moss	33	0.2
Pin cushion moss	33	0.1
Grey reindeer lichen	33	0.1
Bryo-Lichen Layer (Mean % Cover)		**10**

Distinguishing Features

Yellow birch and balsam fir are dominant in the canopy of this mixedwood forest restricted to the upper slopes of the Cape Breton Highlands ecoregion. The canopy extent of balsam fir is influenced by the timing of the spruce budworm outbreaks. The fern component of the herb layer is well developed with wood fern species.

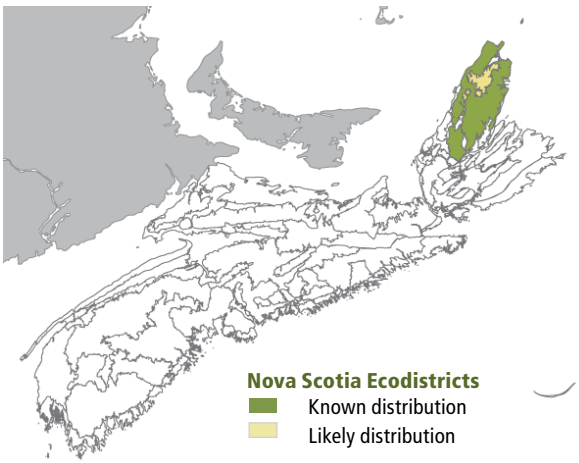
Wood sorrel

Site Characteristics

Slope Position:	Upper[6] Level[3] Middle[1]
Surface Stoniness:	(Moderately)[6] (Non - Slightly)[3] (Very - Excessively)[1]
Bedrock Outcrop:	(Non-rocky)[7] (Slightly - Moderately)[3]
Elevation Range:	174 - 374m
Slope Gradient:	Gentle[5] Steep[3] Moderate[1] Extreme[1]
Aspect:	East[3] South[1] West[6]
Exposure:	Mod. exposed[6] Exposed[4]
Microtopography:	Moderately[5] Slightly[4] Level[1]
Drainage:	Well[9] Moderately well[1]

Soil Characteristics

Soil Type:	ST2[5] ST2-L[4] ST2-G[1]
Parent Material:	Glacial till[7] Colluvium[3]
Rooting Depth (cm):	(<30)[1] (30-45)[2] (>45)[6] nd[1]
Duff Thickness (cm):	(6-10)[5] (11-20)[4] nd[1]



Cape Clear,
Inverness County

HL4

Birch / Wood fern – Wood sorrel

Betula spp. / Dryopteris spp. – Oxalis acetosella

n=10

Concept: This mid to late successional Vegetation Type (VT) has an overstory dominated by birch (yellow, white and occasionally heart-leaf) and an extensive herb layer featuring high wood fern cover. Birch / Wood fern – Wood sorrel often co-occurs with HL3 in the transition zone, an informal ecological term used to describe the blended area where Acadian hardwood slopes and the balsam fir plateau meet in the Cape Breton Highlands ecoregion.

Vegetation: One or more birch species are the dominant overstory trees. Common canopy associates include balsam fir, white spruce and red maple – with fir and spruce sometimes occupying small evergreen pockets established after patch-size disturbances. The shrub layer includes regenerating trees, mountain maple, striped maple and mountain-ash. High red raspberry cover may indicate a relatively recent stand-level disturbance. The diverse and well-developed herb layer includes extensive coverage of three wood ferns – eastern spreading, evergreen and spinulose. Sarsaparilla, wood sorrel, wood aster and bunchberry are also commonly found. The bryophyte layer is poorly developed.

Environmental Setting: HL4 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvium deposits. Richer versions of this VT occur where seepage enhances moisture and nutrient status. HL4 is generally confined to well drained upper slopes within the Cape Breton Highlands ecodistrict, usually at elevations ranging from 250-350 meters. Wind and exposure may significantly limit tree growth. This VT is common in northern New Brunswick and in both the Saguenay and Gaspé regions of Quebec.

Successional Dynamics: HL4 is a mid to late successional VT usually dominated by yellow birch and white birch. Besides harvesting, the main stand-level disturbance agents are windthrow, storm damage and dieback associated with freeze-thaw cycles. An earlier successional stage may include HL2 (White spruce / Wood aster). Depending on disturbance history and the availability of advanced regeneration, transition to HL3 (Yellow birch – Balsam fir / Eastern spreading wood fern – Wood sorrel) is possible. HL4 stands are usually even-aged, but they may show age class breaks, depending on disturbance history.

Ecological Features

Mixtures of white and yellow birch create a mid-successional matrix forest occurring in the transition zone between the Maritime Boreal Cape Breton plateau and adjacent temperate hardwood slopes. Differences in turn-over rates between short-lived white birch and longer-lived yellow birch may result in an uneven-aged stand structure. Yellow birch in this ecosystem can produce stems 17 meters tall with diameters of 75 cm. Large diameter, living, hollow trees are common and provide good denning and cavity nesting sites. They continue to provide valuable wildlife habitat (as large coarse woody debris) after they fall. Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. Yellow-bellied sapsuckers drill both species of birch, eating the sap and the insects attracted to it. At times ruby-throated hummingbirds may work in partnership, defending the holes from other birds. Vireos may be found in this habitat using small strips of birch bark to construct their nests.

Characteristic Plants	HL4	
	Freq. (%)	Cover (%)
Yellow birch	64	47.9
White birch	64	21.3
Balsam fir	64	9.6
White spruce	55	9.0
Heart-leaf birch	27	66.3
Red maple	27	9.0
White pine	18	4.5
Pin cherry	18	4.0
Sugar maple	9	5.0
Tree Layer (Mean % Cover)		**78**
Balsam fir	91	3.4
Mountain maple	64	3.2
White spruce	64	1.2
Yellow birch	55	2.6
Red maple	55	1.3
Red raspberry	45	1.4
Mountain-ash	45	1.1
Sugar maple	45	0.1
Fly-honeysuckle	27	1.1
Red-berried elder	27	0.7
Pin cherry	27	0.2
Shrub Layer (Mean % Cover)		**11**
Bunchberry	91	7.3
Wood-sorrel	82	13.1
Eastern spreading wood fern	73	27.6
Evergreen wood fern	73	27.3
Wood aster	73	5.4
Starflower	73	0.3
Sarsaparilla	64	2.5
Northern beech fern	64	1.3
Spinulose wood fern	55	17.7
Wild lily-of-the-valley	55	2.5
Bluebead lily	55	2.0
Goldthread	55	1.4
Large-leaved goldenrod	55	0.7
Violets	55	0.6
White twisted stock	45	0.4
Bracken	36	8.3
New York fern	36	3.6
Hay-scented fern	36	3.5
Cinnamon fern	36	1.2
Wood goldenrod	27	0.7
Drooping wood sedge	27	0.1
Herb Layer (Mean % Cover)		**72**
Broom moss	55	0.7
Schreber's moss	55	3.9
Shaded wood moss	55	0.8
Hair-cap moss	55	0.2
Stair-step moss	45	8.4
Hypnum moss	36	0.2
Bazzania	27	3.7
Bryo-Lichen Layer (Mean % Cover)		**9**

Distinguishing Features

Yellow birch, white birch and heart-leaf birch create the overstory of this hardwood forest restricted to the upper slopes of the Cape Breton Highlands ecoregion. Three wood ferns (evergreen, eastern spreading and spinulose) provide extensive coverage.

Fern layer

Site Characteristics

Slope Position:	Middle[6] Upper[4]
Surface Stoniness:	(Non - Slightly)[6] (Moderately)[2] (Very - Excessively)[2]
Bedrock Outcrop:	(Non-rocky)[9] (Slightly - Moderately)[1]
Elevation Range:	127 - 439m
Slope Gradient:	Gentle[4] Moderate[3] Steep[2] nd[1]
Aspect:	North[2] East[2] South[4] West[2]
Exposure:	Exposed[9] Mod. exposed[1]
Microtopography:	Moderately[5] Slightly[4] Level[1]
Drainage:	Well[6] Moderately well[4]

Soil Characteristics

Soil Type:	ST2[3] ST3[2] ST8[2] ST2-G[1] ST2-L[1] ST15[1]
Parent Material:	Glacial till[7] Till/Bedrock[2] Colluvium[1]
Rooting Depth (cm):	(<30)[3] (30-45)[4] (>45)[3]
Duff Thickness (cm):	(6-10)[5] (11-20)[4] (21-40)[1]