


# Forest Ecosystem Classification for Nova Scotia (2022): Field Guide





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Peter Neily, Sean Basquill, Eugene Quigley, Kevin Keys,  
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Forestry and Wildlife Branch  
Natural Resources and Renewables

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# Introduction

Ecological classification is an analytical tool developed for recognizing and explaining repeating patterns in nature. Approaches for ecological classification can vary widely, reflecting different management and research objectives and/or the data and methods used to generate them. In Nova Scotia, considerable effort has been made to ensure provincial classifications are compatible. Towards this goal, they have been published as a series of companion reports. These classifications are intended to inform a wide range of natural resource management, biodiversity conservation, and research applications. They are comprised of the Ecological Land Classification for Nova Scotia (Neily et al. 2017), Forest Ecosystem Classification for Nova Scotia (Neily et al. 2013), Barrens Ecosystems in Nova Scotia (Porter et al. 2020), and the soon to be released Predictive Ecosystem Mapping Classification (Basquill et al. [in prep.]). Other related classification efforts are summarized in Neily et al. (2017).

This updated Nova Scotia Forest Ecosystem Classification (FEC) summarizes current knowledge on the diversity of forest ecosystems occurring in Nova Scotia. The first provincial Forest Ecosystem Classification (Neily et al. 2013) described 88 Vegetation Types (VT) and 22 variants, 19 Soil Types (ST) with 6 phases, and 28 ecosites. It was developed from over 1500 field plots sampled between 2000 and 2010.

Since the first FEC was released, more than 1000 additional plots have been surveyed. These new data have improved our understanding of forest ecosystem variation and distribution in Nova Scotia. We have added new ecosystems to the classification, refined our descriptions, and changed aspects of the overall classification structure. The new FEC describes 17 Forest

Groups, 122 Vegetation Types with 24 variants, 18 Soil Types with 5 phases, and 27 Ecosites. The highest level in the classification is the Macrogroup, which differentiates Acadian and Maritime Boreal Forest ecosystems. This upper level follows Canadian classification standards (Baldwin et al. 2019b) and ecosystem variations recognized in eastern North America (Chapman et al. 2020, Basquill and Baldwin 2020). Macrogroups express broad-scale climatic drivers that have an overriding influence on ecosystem patterns at regional scales.

## Why Classify Forest Ecosystems

At a landscape level, ecosystem classification provides a framework for landscape analysis and planning which can then be ecologically linked to stand-level planning and management (Sims et al. 1995). Nova Scotia's Ecological Land Classification (ELC) is a hierarchical system that ranges from ecoregions to ecodistricts, ecoregions, and finally to ecosites—the level where the ELC and FEC systems converge.

At a stand level, classifying forest ecosystems based on vegetation, soil and site attributes allows users to recognize similar ecosystem units on the ground and to develop a common understanding of these units (Baldwin and Meades 1999; Ponomarenko and Alvo 2001). Combining both biotic (vegetation) and abiotic (site) data better expresses the range of factors shaping patterns of ecosystem diversity and distribution. This allows for ongoing development of guidelines and management interpretations directly linked to biophysical features and related ecosystem function, thereby promoting more predictable and sustainable forest management.

## Relationships among Ecological Classifications in Nova Scotia

Nova Scotia has several ecological classifications that have been developed as companion products, and which have various research and management applications. The schematic below illustrates linkages between the **Ecological Land Classification (ELC)** and **Forest Ecosystem Classification (FEC)** systems.

ELC is a method for identifying and mapping ecologically homogenous areas of landscape geography. It is structured as a hierarchy, emphasizing various ecological factors at each level. While vegetation is considered in ELC, units are primarily derived from enduring features (e.g. climate, topography, geology, and soil). The Nova Scotia ELC includes four main levels: ecoregion, ecodistrict, ecosection, and ecosite (Neily et al. 2017).

FEC is a method for distinguishing forest ecosystems based on vegetation, soil, and site attributes. Unlike ELC, FEC units emphasize existing forest conditions that recur in relatively consistent ways. In the FEC, vegetation types are the base unit for differentiating ecosystems. Higher order classification units include alliances (not currently classified in Nova Scotia), forest groups, and macrogroups.

Being able to map terrestrial ecosystems enhances natural resource management. The Province is currently developing a **Predictive Ecosystem Mapping (PEM)** tool (Basquill et al. [in prep.]) to predict and map the current geographic distribution of various ecosystem types across Nova Scotia, including FEC units.

### Ecological Land Classification



Ecosite, the smallest unit of the ELC, informs the Vegetation Type, the finest unit of the FEC

### Forest Ecosystem Classification



The FEC was developed from field survey data. Survey effort was relatively high, spanning major topographic gradients across every ecoregion of the province. We sought to survey the breadth of different forests across their inherent provincial ranges. Some ecosystems were common and widespread, others less common and/or range limited.

This field guide is one of three parts of the Nova Scotia Forest Ecosystem Classification (2022). It classifies units (including vegetation, soils and ecosites), and includes a series of keys for identifying VTs, STs, and ecosites, as well as fact sheets that provide detailed information on VT characteristics and their geographic distribution. The second part of the FEC is a technical guide that explains methods and technical specifications employed in the classification. It also includes more detail on soil type and ecosite characteristics (and related terminology). The final part includes management interpretations related to various FEC units and is intended to be regularly updated as new interpretations and tools are developed.

## Forest Geography

The forest ecosystems of Nova Scotia are relatively diverse, and a number are unique within the Acadian Forest region (Baldwin et al. 2019a, Basquill and Baldwin 2020). The province also supports boreal forest, which is largely limited to higher elevations and colder coastal areas. A moderately-rich regional flora and distinct (and often abrupt) changes along ecological gradients have produced a varied combination of forest ecosystems and complex forest geographic patterns. Forest covers approximately 76% of the province, extending across all but the most extreme environments. Distinct forest ecosystems range from pure coniferous to pure deciduous, stunted

woodland to tall closed-canopied forests, and fertile wetlands to dry rock outcrops. They occur at all elevations, excluded only from the highest summits and most exposed coastal settings. For a small province (55,000 km<sup>2</sup>) levels of ecosystem diversity are relatively high.

Forest ecosystem diversity is shaped by numerous factors including broad-scale climate drivers, species composition, site variability, species-site relationships, and past disturbances. Ecosystems vary at local scales across topographic and soil gradients, and at broader scales, across regional climatic zones. Patterns of disturbance and succession also drive changes in ecosystem expression over time. The FEC encompasses all these factors and related successional stages.

Most of Nova Scotia falls in the Acadian Forest region (Rowe 1972) or what has more recently been called the Acadian Temperate Forest (Baldwin et al. 2019a) or the Wabanaki-Acadian Forest. These temperate forests extend throughout much of the Maritimes, northward into the Gaspé peninsula of Quebec, and westward into the state of Maine. The Acadian Forest is the easternmost cool temperate forests found in Canada and is characterized by both temperate and boreal species (Basquill and Baldwin 2020). These forests occur in a heavily maritime-influenced continental climate. They are similar to cool temperate mixedwood forests found in more continental climates to the west (i.e. in cool temperate areas of Quebec and Ontario). There are few, if any, plant species limited to the Acadian Forest, although several forest-dwelling lichens show very high fidelity to this region. Compared to temperate mixedwood forests found westward, the Acadian Forest is characterized by higher relative levels of red spruce. Other trees such as black spruce are slightly more prevalent here, while sugar maple, yellow birch, and white spruce are somewhat less so.



Nova Scotia also supports boreal forest (termed Maritime Boreal in the FEC). These forests mark the southern limits of boreal forest in eastern Canada. This generally cold-weather forest of northern Canadian latitudes is limited to colder parts of the province. These forests are heavily influenced by maritime climatic processes and are generally distinguished by the absence of temperate species like red spruce, yellow birch, maple, white pine, hemlock, and understory species such as striped maple. Compared to areas of Acadian Forest, boreal forests of Nova Scotia support higher relative levels of balsam fir and (showy and American) mountain ash.

## Physiography

Nova Scotia is part of the Appalachian Mountains, a broad physiographic region extending from southern Quebec to Alabama and including the Maritime provinces and the island of Newfoundland. The Appalachians are hundreds of millions of years old, shaped and eroded over the eons by past weathering, volcanic activity, and, in northern latitudes, by successive cycles of glacial advancement and retreat. Appalachian summits were once as high as the Rockies, but the contemporary mountain range, particularly in Nova Scotia, is dominated by low rounded ridges and flat plateaus, interspersed by broad valleys. Distinguished by its particularly low elevation, gentle relief, and peninsular geography, Nova Scotia is one of the least mountainous areas of Appalachian topography. Here, the effects of glaciation, as recent as 11,000 years before present, have been significant, leaving no area unmarked.

## Bedrock Geology

The geological foundation of Nova Scotia is made up of a wide variety of rock types, many from different geological time periods. The youngest rocks in the Maritime provinces underlie the

North Mountain and Annapolis Valley ecodistricts (with outliers along the Parrsboro Shore ecodistrict), while the oldest rocks in the region are found towards the northern tip of Cape Breton (ecodistricts 100, 210, and 220).

Bedrock may also be categorized by its class of origin: sedimentary, igneous, and metamorphic rocks. Much of the Nova Scotia Uplands ecoregion and the lowland ecoregions (Northumberland/Bras d'Or, Valley and Central) are sedimentary. Siltstone, sandstone, shale, arkose, coal, limestone, gypsum, and conglomerates are among the more prevalent rock types found. Two types of igneous rock are recognized: plutonic and volcanic. Plutonic rocks (e.g. granite, granodiorite and gabbro) are more widespread. They are found in the South Mountain ecodistrict and in parts of the Cobequid Hills and Cape Breton Highlands ecodistricts. Volcanic rocks (e.g. basalt, rhyolite) are largely limited to parts of the Pictou-Antigonish Highlands, Cape Breton Highlands, and North Mountain ecodistricts. Metamorphic bedrock is mainly found on Cape Breton Island (Cape Breton Coastal and Bras d'Or Lowlands ecodistricts; Cape Breton Highlands ecoregion), and in the Western and Eastern ecoregions. Slate, gneiss, amphibolite, schist, and marble are among the characteristic metamorphic rocks.

## Soil

Many forest ecosystems are strongly influenced by soil gradients, particularly at local scales. Distinctions between, and variation within, uplands and wetlands, softwood and hardwood stands, and productive and non-productive forests can often be directly attributed to differences in soil properties (e.g. texture, depth, and stoniness). Much of Nova Scotia is characterized by relatively acidic soils, with Humo-Ferric and Ferro-Humic Podzols being the dominant forest soils found across the province. Some of these soils are

also naturally cemented, especially in western Nova Scotia where sandy outwash deposits and granitic glacial till deposits are common. Gray Luvisols can also be found under forests in central and eastern regions of the province where parent materials are higher in clay, but many of these areas have also been altered by past agricultural use. High precipitation and variable topography have contributed to poorly drained Gleysols and Organic soils being found throughout the province, usually as inclusions within better drained uplands. Finally, past glacial advances and retreats have led to the occurrence of many stony and/or shallow soils. These so-called “Rockland” soils can be locally important in parts of western Nova Scotia and Cape Breton, and along the Atlantic coast.

## Climate

Similar to the other Maritime provinces, the cool temperate, humid continental climate of Nova Scotia is strongly controlled by westerly winds. However, being surrounded by ocean on three sides, Nova Scotia’s climate is also tempered by oceanic influences. It has the wettest climate in the Maritime provinces, with relatively high levels of annual precipitation, fog, and strong winds. Winters are long and summer temperatures are somewhat cool, especially near exposed coastal areas and at higher elevations. Coastal and mountainous areas are generally the most humid and some parts of the Atlantic Coastal and Fundy Shore eco-regions are extremely humid.

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Sailor Cove, Inverness County



## Definitions

Definitions for provincial FEC units are given below. A glossary (Appendix C) contains definitions for other ecological terms found in this guide.

**Forest Macrogroups**—the highest classification level in the FEC. Macrogroups represent forests that reflect regional variations in climate as expressed by different ecosystems found on zonal sites.

**Forest Groups**—a mid-level classification unit representing groups of forest vegetation types (VTs) with similar species composition, site conditions and successional pathways. The group level is useful for understanding, reporting on, and guiding management activities for ecologically related VTs.

**Vegetation Types**—the base classification unit in the FEC. They are recurring and identifiable forest plant communities that reflect differences in site conditions, disturbance regimes and/or successional stage.

**Variants**—used to classify stands that differ from, and are less common than, the “typic” or average VT condition, but still have ecological significance. They are classified based on minor variations in species composition and/or site features.

**Soil Types**—soils differentiated based on texture, drainage, fertility, and depth. These factors all influence forest ecosystem composition, function, and productivity.

**Phases**—used to identify features within a soil type that are important for ecological and management interpretations, but which do not warrant establishment of a separate unit.

**Ecosites**—units that represent ecosystems that have developed under a variety of conditions and influences, but which have similar moisture and nutrient regimes. An ecosite is associated with a finite range of soil and site conditions and a finite range of VTs that grows naturally under those conditions.



near Alder River, Guysborough County

# Part I: Vegetation Types

## Introduction

This section describes currently recognized Forest Groups and Vegetation Types (VTs) in the province and is designed to be used in conjunction with Soil Type and Ecosite sections to fully classify forest ecosystems across Nova Scotia.

More details on Soil Type and Ecosite characteristics, assessment and related terminology including fact sheets can be found in the companion FEC Technical Guide. In addition, management interpretations related to FEC units can be found on the Nova Scotia Department of Natural Resources and Renewables website.

Vegetation Types were derived from 2,379 provincial FEC field plots sampled between 2000 and 2022. Data from an additional 102 non-FEC plots assessed by the Atlantic Canada Conservation Data Centre and NSDNR Wildlife Division were also used (Basquill 2001–2008; Basquill and Benjamin 2009). A total of 17 Forest Groups and 122 Vegetation Types with 24 variants have been identified (Table 2).

The majority of current Forest Groups and Vegetation Types have been carried over from the original FEC guide (Neily et al. 2013), with a few notable changes:

- There is now stronger characterization of the two macroclimatic groups found in Nova Scotia – **Acadian Forest** and **Maritime Boreal Forest**, with their associated Vegetation Types and Ecosites.
- An Acadian Coastal Forest Group has been created and includes **CO3** (Red spruce / Mountain-ash / Foxberry), renamed as **CA1**.
- The **Cedar Forest Group** has been dissolved with CE1 now part of the Wet Coniferous Forest group (WC10) and CE2 part of the Mixedwood Forest Group (MW13).
- Spruce Pine mixedwoods **SP6**, **SP8** and **SP9** have been moved to the Mixedwood Forest Group and appear as MW9, MW10 and MW11 respectively.
- Mixedwood VTs in the Wet Deciduous Forest Group are in a new **Wet Mixedwood Forest Group**.
- A new Forest Group – **Planted Forests** – has been created to include plantations of native and exotic species, including Christmas tree production areas.

Adjustments to Forest Groups and the addition of 34 new Vegetation Types has required modification to the original classification scheme. Table 1 lists 27 VTs that have been re-numbered, 7 VTs where the name was changed, and 4 VTs that were deleted after having had their data incorporated with other VTs.

## Determining Vegetation Type

Vegetation keys based on overstory tree species and selected ground vegetation have been developed to aid Forest Group and Vegetation Type (VT) identification. Where necessary, site features are also used to aid classification. These keys are designed for use in relatively intact stands that have developed beyond the sapling stage. Managed stands can be assessed as long as users recognize that tree species abundance and diversity may have been altered by silviculture treatments. Younger stands that have reached free-to-grow status can also be assessed, using adjacent older stands on similar sites and soils to confirm results.

Vegetation keys are best used between June and October when understory vegetation is most easily identified. However, since these keys rely mainly on trees and understory species that are identifiable year-round (excluding times with snow coverage), they may be used outside of the ideal season with appropriate care.

Vegetation keys are designed to be used in sequence. Users first determine the Forest Group using the **Key to Forest Groups (Figure 1)**. This directs the user to the appropriate Forest Group home page where a Vegetation Type key and Concept description of the Forest Group is presented.

Beginning with Figure 1, proceed through the key. Each step (number) involves two decision points (labelled **a.** and **b.**). Read each statement and choose the one which best fits the stand

condition. This statement will lead to another pair of statements, or to the name of the Forest Group. To reduce the likelihood of errors, users are reminded to pay close attention to cover class definitions and thresholds used in the keys.

Once a Forest Group has been determined, users will follow the same procedure outlined above for the Vegetation Type key. When a Vegetation Type has been determined, users should consult the appropriate VT fact sheet to verify the decision. If the fact sheet does not represent the stand being sampled, the unit should be re-assessed. Borderline conditions associated with decision points within the keys could lead to more than one possible VT determination. Therefore, fact sheets should be consulted to make the final determination.

When selecting a spot in the stand to determine Vegetation Type, it is important to select an area representative of overall stand conditions. It is also recognized that some stands may be a complex of more than one VT. In these cases, it is appropriate to recognize each VT rather than assign an “average” condition.

Finally, users of this guide are reminded that information on soil types (see page 289) is also required for complete stand assessment. Benefits from using the FEC system can only be fully realized when both vegetation and soil types are assessed. Users should refer to Part II: Soil Types for more details on soil type assessment and interpretation.

**TABLE 1.**

**Changes to the Forest Group and Vegetation Type (VT) classification scheme for 2022**

Changed Code Number (2022)		Formerly
CA1	Red spruce / Mountain-ash / Foxberry	C03
CB1	Black spruce – Balsam fir / Foxberry / Plume moss	C01
CB2	White spruce – Balsam fir / Foxberry / Twinflower	C02
CB2a	Black crowberry Headland variant	C02a
CB3	Balsam fir / Foxberry – Twinflower	C04
CB4	White birch – Balsam fir / Foxberry – Wood aster	C05
CB6	White spruce / Bayberry / Beech Grass Dune	C07
HL5	White birch (Heart-leaf birch) – Balsam fir / Wood fern – Wood-sorrel	HL1a
IH2	Red oak / Witch hazel – Lambkill	IH2a
IH2a	Red maple variant	IH2
MW7	Balsam fir – Red maple / Wood-sorrel – Goldthread	MW4
MW8	White birch – Balsam fir / Starflower	MW5
MW9	Black spruce – Red maple / Bracken – Sarsaparilla	SP6
MW10	Black spruce – Aspen / Bracken – Sarsaparilla	SP8
MW11	Red oak – White pine / Teaberry	SP9
MW13	Eastern white Cedar – Balsam fir / Stair step moss	CE2
OW3	Red pine – White pine / Broom crowberry / Reindeer lichen	OW4
OW4	Red spruce / Red berried elder / Rock polypody	OW3
OW5	White ash – Red oak / Marginal wood fern – Herb Robert	OW6
SH5a	Sphagnum variant	SH6
SH6	White spruce – Balsam fir / Broom moss	SH10
SP6	Black spruce – Balsam fir / Blueberry	SH9
SP9	Tamarack / Wild raisin / Schreber’s moss	SP10
WC10	Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum	CE1
WM1	Red maple – Balsam fir / Wood aster / Sphagnum	WD6
WM2	Red spruce – Red maple / Wood-sorrel – Sensitive fern	WD8
WM3a	Red maple / Huckleberry – Inkberry / Sphagnum	WD4a

Name Changes (2022 Revision)		Deleted Units * (2022 Revision)	
HL3	Yellow birch – Balsam fir / Mountain wood fern – Wood-sorrel	C06	Red maple – Birch / Bunchberry – Sarsaparilla
SP5	Black spruce / Feathermoss	FP2a	(Sugar maple variant)
SP7	Black spruce / Mountain holly – Wild raisin – Lambkill	SH4a	(Red spruce variant)
TH5	Beech / Leaf litter	SP3a	(Black spruce variant)
WC2a	Inkberry variant		
WC7a	Inkberry variant		
WD1	White ash / Sensitive fern – Lady fern		

\* units have been incorporated into other VTs

**TABLE 2.**

**Summary of Forest Groups, Vegetation Types (VTs) and VT Variants within the provincial forest ecosystem classification (FEC) system**

Forest Group Name	Group Code	Number of VTs	Number of Variants	Variants code(s)
<b>Acadian</b>	<b>13</b>	<b>101</b>	<b>19</b>	
Coastal Acadian	<b>CA</b>	2	0	
Floodplain Forest	<b>FP</b>	9	0	
Intolerant Hardwood	<b>IH</b>	9	5	IH1a, 2a, 4a, 6a, 6b
Karst Forest	<b>KA</b>	4	0	
Mixedwood	<b>MW</b>	13	2	MW2a, 4a
Old Field	<b>OF</b>	9	0	
Open Woodlands	<b>OW</b>	5	0	
Spruce Hemlock	<b>SH</b>	8	2	SH5a, 5b
Spruce Pine	<b>SP</b>	10	4	SP1a, 2a, 4a, 4b
Tolerant Hardwood	<b>TH</b>	9	3	TH1a, 2a, 8a
Wet Coniferous	<b>WC</b>	11	2	WC2a, 7a
Wet Deciduous	<b>WD</b>	5	0	
Wet Mixedwood	<b>WM</b>	5	1	WM3a
<b>Maritime Boreal</b>	<b>3</b>	<b>17</b>	<b>1</b>	
Coastal Boreal	<b>CB</b>	6	1	CB2a
Highland	<b>HL</b>	7	0	
Wet Boreal	<b>WB</b>	4	0	
<b>Planted Forest</b>	<b>1</b>	<b>6</b>	<b>4</b>	
Planted Forest	<b>PF</b>	6	4	PF4a, 4b, 5a, 5b
<b>Totals</b>	<b>17</b>	<b>122</b>	<b>24</b>	



# Terminology and Conventions

Terms used to describe Forest Group and Vegetation Type features are defined in the glossary (Appendix C). For clarification and context, additional information on some of these terms is provided below.

## Edatopic Grid

An edatopic grid is a two-dimensional diagram used to plot ecosystems (and subsequently ecosites) with respect to their relative moisture and nutrient regimes.

## Moisture Regime

Soil moisture regime (SMR) represents average moisture availability for plant growth. It is assessed by integrating moisture supply (as related to climate) with drainage and soil moisture holding capacities. In general, very dry to dry regimes are associated with severe to moderate moisture deficits, fresh to moist regimes are associated with little to no moisture deficits, and wet regimes are associated with excess moisture during the growing season.

## Nutrient Regime

Soil nutrient regime (SNR) represents the relative availability of nutrients for plant growth. Estimation of SNR requires consideration and integration of several features including soil texture, soil depth, soil parent material, humus form, and seepage class.

## Percent Cover

Percent cover is given by the vertical projection of tree crown or plant shoot area as a percentage of stand area (Dunster and Dunster 1996). Percent cover is readily determined for understory species by looking downward and estimating the amount of ground covered as a percentage of the total plot area. For tree species, the user must look upward through the canopy and estimate ground cover from below. It is possible

for species cover within a layer of overlapping vegetation to total more than 100%. Charts to aid estimation of percent cover are given in Appendix A.

## Forest versus Woodland

In this guide, **forests** are sites that can (and normally do) support a minimum of 30% crown closure by trees.

**Open woodlands** are upland ecosystems where natural disturbances (e.g. frequent fires) and/or site conditions (e.g. sandy soils, excessive surface stoniness, bedrock exposures) generally limit the establishment of trees to less than 30% crown closure. In some cases, open woodlands containing hardwoods (especially red oak) can have more than 30% crown closure despite having low tree densities. These sites may still meet the definition of open woodland with respect to VT determination.

## Overstory and Understory Vegetation

**Overstory** refers to trees that occupy the dominant, co-dominant and intermediate canopy positions.

**Understory vegetation** is grouped into three categories:

**Shrub layer:** Woody shrubs and regenerating trees usually less than 2 m in height, but occasionally taller.

**Herb layer:** Dwarf woody plants plus ferns, club-mosses and other herbaceous plants.

**Bryophytes and Lichens:** Mosses, liverworts and lichens.

**FIGURE 1.****Key to the forest groups of Nova Scotia**

In this key, **tree cover** refers to the relative percent cover—the percentage of total overstory cover. **Ground vegetation cover** refers to the absolute percent cover—the total area covered on the ground.

<b>Cover Classes:</b>	Sparse	< 10%
	Scattered	10–25%
	Abundant	26–50%
	Dominant	> 50%

<p><b>1a.</b> Stands with &gt; 30% planted trees  ... <b>Planted Forests (PF)</b>  (page 284)</p>	<p><b>7a.</b> Stands adjacent to lakes, rivers and smaller watercourses that are subject to regular or periodic flooding  ... <b>FLOODPLAIN FOREST (FP)</b>  (page 30)</p>
<p><b>1b.</b> Not as above ... <b>2</b></p>	<p><b>7b.</b> Not as above ... <b>8</b></p>
<p><b>2a.</b> Stands on poorly drained or borderline poorly drained soils with conspicuous hydrophytic ground vegetation ... <b>3</b></p>	<p><b>8a.</b> Stands on karst topography with bedrock exposures often with a unique assemblage of plants common to calcium enriched soils  ... <b>KARST FOREST (KA)</b>  (page 68)</p>
<p><b>2b.</b> Stands on rapidly to imperfectly drained soils with little or no hydrophytic vegetation ... <b>6</b></p>	<p><b>8b.</b> Not as above ... <b>9</b></p>
<p><b>3a.</b> Stands located in Atlantic Coastal or Highland Ecoregions  ... <b>WET BOREAL (WB)</b>  (page 274)</p>	<p><b>9a.</b> Stands in an open woodland condition where natural disturbances or site have limited the establishment of trees to less than 30% crown closure or stands with excessively stony, steep slopes of colluvium interspersed with pockets of talus  ... <b>OPEN WOODLAND (OW)</b>  (page 122)</p>
<p><b>3b.</b> Not as above ... <b>4</b></p>	<p><b>9b.</b> Not as above ... <b>10</b></p>
<p><b>4a.</b> Stands with &gt; 75% softwood in the overstory  ... <b>WET CONIFEROUS FOREST (WC)</b>  (page 194)</p>	<p><b>10a.</b> Stands usually restricted to high elevations of the Cape Breton Plateau (Ecoregion 100 and Ecodistrict 210) and characterized by balsam fir and various amounts of white birch, white spruce and heart-leaf birch  ... <b>HIGHLAND FOREST (HL)</b>  (page 258)</p>
<p><b>4b.</b> Stands with &lt; 75% softwood in the overstory ... <b>5</b></p>	<p><b>10b.</b> Not as above ... <b>11</b></p>
<p><b>5a.</b> Stands with &gt; 75% hardwood in the overstory  ... <b>WET DECIDUOUS FOREST (WD)</b>  (page 218)</p>	
<p><b>5b.</b> Stands with &lt; 75% hardwood in the overstory  ... <b>WET MIXEDWOOD FOREST (WM)</b>  (page 230)</p>	
<p><b>6a.</b> Stands occurring on abandoned fields and pastures where natural features such as microtopography have been altered by past agricultural practices  ... <b>OLD FIELD FOREST (OF)</b>  (page 106)</p>	
<p><b>6b.</b> Not as above ... <b>7</b></p>	

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**11a.** Stands located in coastal areas that are influenced by fog and cool, moisture laden on-shore winds. Heart-leaf birch, mountain ash, downy alder, bayberry, black crowberry, foxberry, large-leaved goldenrod, starry false Solomon's seal, and a thick duff layer are indicators, though not always present. There is a distinct absence of sugar maple, beech, hemlock and pines ... **12**

**11b.** Not as above ... **13**

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**12a.** Stands typical of the Atlantic Coastal Ecoregion (800), more exposed areas of the Victoria Lowlands (220), Bras d'Or Lowlands (510), and Claire (730) and the outer Bay of Fundy (920)  
... **COASTAL BOREAL FOREST (CB)**  
(page 244)

**12b.** Stands found on warmer, more sheltered, coastal areas (inner Bay of Fundy, Tusket Islands (840), Northumberland Strait and Gulf of St. Lawrence)  
... **COASTAL ACADIAN FOREST (CA)**  
(page 24)

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**13a.** Stands with > 75% softwood in the overstory ... **14**

**13b.** Stands with < 75% softwood in the overstory ... **15**

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**14a.** Nutrient poor ecosites (Azonal) dominated by black spruce and/or pines with an understory of acid loving plants (ericaceous shrubs, bracken, pink lady's slipper, cow-wheat, pyrola)  
... **SPRUCE PINE FOREST (SP)**  
(page 152)

**14b.** Not as above. Medium nutrient ecosites (Zonal) dominated by red spruce, fir & hemlock  
... **SPRUCE HEMLOCK FOREST (SH)**  
(page 134)

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**15a.** Stands with > 25% softwood in the overstory  
... **MIXEDWOOD FOREST (MW)**  
(page 78)

**15b.** Stands with < 25% softwood in the overstory ... **16**

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**16a.** Stands dominated by a combination of early-successional hardwoods (large-tooth aspen, trembling aspen, white birch, red oak, or red maple when NOT in combination with sugar maple or yellow birch)  
... **INTOLERANT HARDWOOD FOREST (IH)**  
(page 48)

**16b.** Stands dominated by northern hardwoods (sugar maple, yellow birch, beech, white ash, ironwood)  
... **TOLERANT HARDWOOD FOREST (TH)**  
(page 174)

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# Vegetation Fact Sheets

# Sample Fact Sheet

## CB1

### Black spruce – Balsam fir / Foxberry

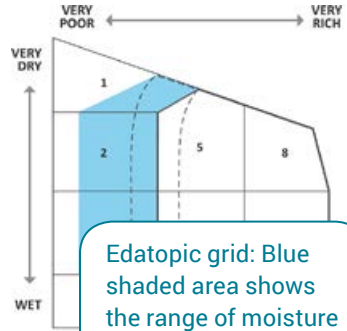
*Picea mariana* – *Abies balsamea*  
*Ptilium crista-castrensis*

**Concept:** This Vegetation Type has a closed canopy (40-75%), dominated by balsam fir as a common, but l... The shrub, herb and bryophyte layers have variable cover but typically coniferous tree species regeneration and bryophyte cover are usually extensive. Black spruce – Balsam fir / Foxberry / Plume moss is the dominant coniferous forest found on fresh-moist, nutrient poor Atlantic coastal sites in Nova Scotia.

General description with key characteristics that define the Vegetation Type (VT)

Unique identifier (forest group code and number) for the Vegetation Type, followed by its Common name and scientific name. When present, similar information is listed for associated variant(s)

...ch, downy alder, bayberry, ... are indicators of nearby ... these species are not ... bryophyte coverage and a ... the forest floor.



Edatopic grid: Blue shaded area shows the range of moisture and nutrient regime conditions for the VT

#### Site & Soil Characteristics

Slope Position:	Upper <sup>4</sup> Middle <sup>3</sup> Level <sup>2</sup> Lower <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>4</sup>
Drainage:	Imperfect <sup>6</sup> Moderately Well <sup>2</sup> Well <sup>1</sup> Poor <sup>1</sup>
Common Soil Types:	3, 6, 16C, 3C,
Rooting Depth (cm):	(< 30) <sup>6</sup> (30–4
Forest Floor (cm):	(11–20) <sup>6</sup> (21–
Humus Form:	Hemimor <sup>5</sup> H

Summary of site and soil data collected during field sampling

**Vegetation:** Tamarack and white spruce (more common in western Nova Scotia) are occasional overstory associates with scattered red maple and white birch (if present) typically in an intermediate canopy position. The shrub layer is dominated by regenerating balsam fir and/or black spruce along with lambkill. Other common shrub species include wild raisin, mountain holly and mountain-ash. Herbaceous layer diversity is low, with bunchberry, creeping snowberry and twinflower often dominant. S... cinnamon fern also... micro depressions... extensive bryophyte... stair-step moss, b...

General description of characteristic vegetation, including common, dominant and diagnostic species that define the VT



Typical stand-level photograph of the VT

Arnold, Shelburne County

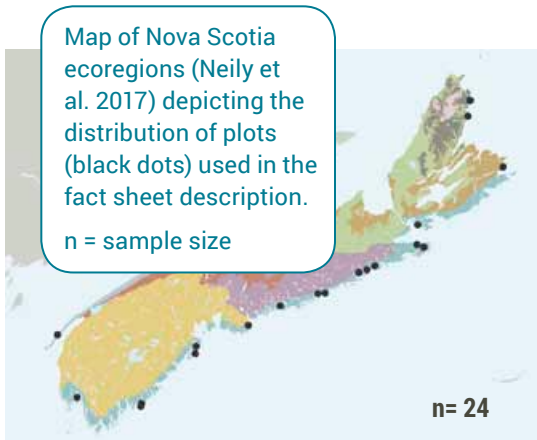
Characteristic Plants	CB1	
	Freq. (%)	Cover (%)
Black spruce	100	39
Balsam fir	83	13
White birch	38	3
Red maple	33	2
Tamarack	21	3
White spruce	17	12
<b>Tree Layer (Mean % Cover)</b>		<b>55</b>
Black spruce	96	5
Lambkill	92	6
Mountain holly	92	0.8
Wild raisin	88	0.6
Balsam fir	79	12
Mountain-ash	58	1
Serviceberry	42	0.3
White birch	38	0.3
Velvet-leaf blueberry	33	5
Huckleberry	29	2
Red maple	29	0.9
		0.3
		0.1
		0.5
		0.3
		<b>26</b>
		12
		4
		3
		0.5
		4
		5
		1
		7
		0.6
		2
Bluebead lily	33	5
Ghost pipe	21	0.1
Mayflower	17	1
Wood-sorrel	17	1
Black crowberry	8	0.8
<b>Herb Layer (Mean % Cover)</b>		<b>30</b>
Schreber's moss	92	50
Bazzania	92	15
Wavy dicranum	71	4
Ladies' tresses	71	2
Stair-step moss	67	11
Broom moss	63	3
Plume moss	54	4
Grey reindeer lichen	50	0.5
Cup lichens	38	0.2
Log moss	33	3
Naugehyde liverwort	17	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>78</b>

List of the most common plants found during field sampling—typically includes all trees with Frequency >10% and other vegetation with Frequency >20%

**Freq. (%)** percentage of plots

**Cover (%)** mean percent cover in plots where species was found

**Mean (%) Cover** mean percent cover of all species in each layer



**Environmental Setting:** CB1 is fresh-moist to moist, nutrient poor soils. These soils are generally medium to fine textured and are often stony. The majority of this forest is located in the Atlantic Coastal ecoregion. High winds and exposure limit the potential for taller trees in CB1 stands.

General description of site features and geographic information

**Successional Dynamics:** This VT has nutrient poor soils, supporting an edaphic climax community dominated by black spruce. The even-aged forest typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation. In the absence of these types of disturbances, black spruce and balsam fir (if present) are expected to live to about 100 years. Tree senescence will initiate advanced regeneration, creating a new stand appearance with old forest structure. In this ecological setting (close to the ocean), CB1 does not usually shift to other vegetation types after disturbance.

Description of successional status and trends, natural disturbance regimes and disturbance agents

**Ecological Features:** This edaphic climax forest often occurs as a matrix, and its longevity is a function of both canopy tree senescence (especially in older stands), and the frequency of catastrophic stand disturbances (usually hurricanes). Persistently high humidity throughout the growing season, presence of moss abundance, and the occurrences of epiphytic species, particularly in older, undisturbed forests develop abundant old manna grass. This provides nest material for some warblers, and winter food for deer and other mammals.

Description of landscape setting, patch size, stand characteristics, special habitats, and wildlife use

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# Acadian Forest Groups



# CA

## Coastal Acadian Forest Group

### Concept

Two groups of coastal forest Vegetation Types (VTs) are recognized from areas along the salt water coastlines of Nova Scotia. Forests adjacent to the Bay of Fundy, Northumberland Strait, Gulf of Maine and Gulf of St. Lawrence are influenced by oceanic climatic conditions that are less extreme and more closely restricted to the shoreline than those found along the outer Atlantic Coast of Nova Scotia. The moderated coastal climate in these areas supports Acadian coastal forests. In contrast, the cooler, somewhat moister and windier climates, which characterizes coastlines along the Atlantic Ocean, gives rise to a group of boreal VTs; these are indicative of Maritime Boreal ecosites. A suite of plants are characteristic of coastal conditions, although some (e.g. heart-leaf birch, showy mountain ash) are more characteristic of boreal VTs, while others (e.g. American mountain-ash, downy alder, bayberry and foxberry)

are common to both Acadian and Boreal VTs. Red, white and black spruce, balsam fir and yellow birch form closed canopy forests in this group. These small- to large-patch forests occur as a narrow band in coastal landscapes where they are influenced by exposure to coastal winds, salt spray and elevated humidity. Natural disturbances are comparable to other similar Acadian forest VTs. Dune forest ecosystems are somewhat rare and localized but occur along all coastlines of Nova Scotia (See CB6 – White spruce / Bayberry / Beach grass dune).

Coastal forests provide important habitat for many birds (e.g. osprey, blackpoll warbler, fox sparrow, boreal chickadee, Tennessee warbler), particularly those that travel along the coast during spring and fall migration. Near-shore and island stands are used as nesting sites and roosts for great blue herons and seabirds.



Photo: **Cape Chignecto,  
Cumberland County**  
(Len Wagg/CNS)

## Coastal Acadian (CA) Key

- 
- 1a. White spruce on marine sands  
and dunes ... CB6
- 1b. Not as above ... 2
- 

- 
- 2a. Red spruce abundant to dominant ... CA1
- 2b. Black spruce dominant with white  
spruce and/or balsam fir. Bayberry  
is a strong indicator ... CA2
- 

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

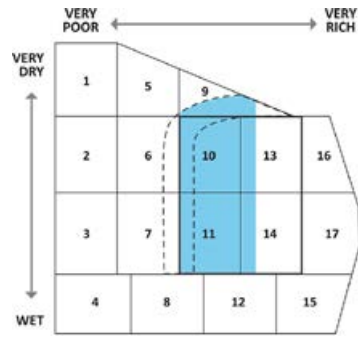
## CA1

Red spruce / Mountain-ash /  
Foxberry / Bazzania

*Picea rubens* / *Sorbus americana* /  
*Vaccinium vitis-idaea* / *Bazzania trilobata*

**Concept:** A tightly closed canopy of red spruce dominates this coastal Vegetation Type (VT). It is primarily found close to the cool waters of the Bay of Fundy, where fog banks are common and where relative atmospheric humidity is generally elevated. In addition to the presence of typical coastal upland forest species (e.g. mountain-ash and foxberry), CA1 differs from other Acadian red spruce dominated VTs by its relatively thick duff layer and extensive bazzania cover. The absence of hemlock, which is typically a component of zonal red spruce forests, is also a distinguishing feature of CA1.

**Vegetation:** Balsam fir and white birch are common overstory associates. The poorly-developed shrub layer is dominated by regenerating balsam fir and red spruce with a scattering of woody shrubs. A moderately abundant herbaceous layer of upland forest flora includes wood-sorrel, foxberry and twinflower. Creeping snowberry, small clumps of Cinnamon fern and three seeded sedge, reflect moist coastal climatic influences.



#### Site & Soil Characteristics

Slope Position: Lower<sup>3</sup> Middle<sup>3</sup> Upper<sup>3</sup> Level<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> nd<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> nd<sup>2</sup>  
 Microtopography: Moderately<sup>4</sup> Slightly<sup>4</sup> Strongly<sup>1</sup> nd<sup>1</sup>  
 Drainage: Imperfect<sup>7</sup> Moderately Well<sup>2</sup> Well<sup>1</sup>

Common Soil Types: 3, 3C, 2, 6  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>2</sup> nd<sup>5</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (11–20)<sup>6</sup> nd<sup>2</sup>  
 Humus Form: Hummor<sup>5</sup> Hemimor<sup>3</sup> Resimor<sup>1</sup> nd<sup>1</sup>

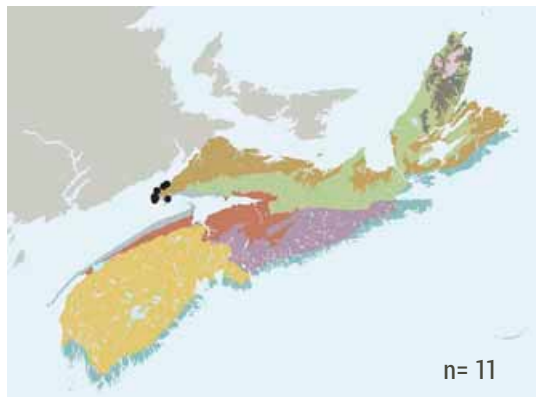
The well-developed bryophyte layer is significantly dominated by bazzania and by moderately prominent, but typically localized, patches of sphagnum moss; these are both similarly indicative of elevated ambient moisture.

**Environmental Setting:** CA1 is mainly associated with fresh-moist to moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured and well to imperfectly drained. Red spruce / Mountain-ash / Foxberry / Bazzania occurs primarily in a narrow band along the Bay of Fundy (Fundy Shore ecoregion) with good examples on coastal facing slopes at Cape Chignecto. High winds and exposure may limit tree heights in CA1 stands.

**Successional Dynamics:** CA1 is a late-successional VT dominated by red spruce. It typically follows stand-replacing, or small-patch disturbances, such as windthrow, insect infestation and harvesting. Red spruce's longevity and high shade tolerance promotes development of uneven-aged forests, maintained by gap disturbances. CA1 is expected

Keyhole Brook, Cape Chignecto,  
Cumberland County

Characteristic Plants	CA1	
	Freq. (%)	Cover (%)
Red spruce	100	59
Balsam fir	73	18
White birch	18	12
Heart-leaf birch	18	3
Red maple	18	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>76</b>
Balsam fir	100	4
Red spruce	91	2
Lambkill	55	0.8
Velvet-leaf blueberry	55	0.6
Mountain holly	55	0.1
Mountain-ash	55	0.1
Heart-leaf birch	45	0.1
White birch	36	4
Wild raisin	27	0.3
Fly-honeysuckle	27	0.1
Red maple	23	0.1
Huckleberry	18	3
Serviceberry	18	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>10</b>
Bunchberry	91	6
Goldthread	82	3
Wild lily-of-the-valley	82	0.6
Creeping snowberry	73	4
Wood-sorrel	73	1
Painted trillium	64	0.3
Foxberry	64	0.2
Starflower	64	0.2
Starflower	62	0.1
Sarsaparilla	55	0.7
Bluebead lily	55	0.4
Pink lady's-slipper	55	0.1
Twinflower	54	1
Cinnamon fern	46	0.1
Three seeded sedge	46	0.1
Mountain wood fern	36	0.3
Ghost pipe	27	0.1
Wood aster	27	0.1
Partridge-berry	18	1
<b>Herb Layer (Mean % Cover)</b>		<b>15</b>
Bazzania	100	49
Schreber's moss	100	14
Ghost pipe	91	4
Broom moss	91	2
Ladies' tresses	82	9
Plume moss	55	0.8
Grey reindeer lichen	46	0.9
Common green sphagnum	27	2
Greater broom moss	27	0.5
Hair-cap moss	18	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>78</b>



to follow earlier successional VTs, found on zonal Acadian ecosites, similar to those types preceding SH5 (Red spruce – Balsam fir / Schreber's moss – Stair-step moss). However, tree species that can tolerate Acadian Coastal climatic influences (such as balsam fir, white spruce and white birch and to lesser extents red maple and mountain-ash) will more likely be dominant in these early-successional VTs. Forests of CA1, that originate after harvesting, may initially be dominated by pin cherry, raspberry, white birch, heart-leaf birch, occasionally yellow birch and mountain-ash, but will rapidly transition into nearly pure softwood stands.

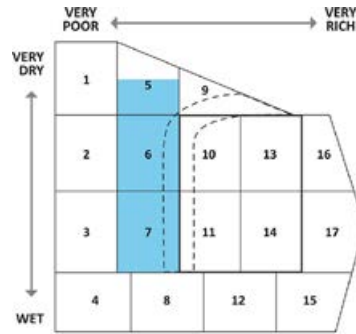
**Ecological Features:** CA1 is a large patch coastal equivalent of SH5 (Red spruce – Balsam fir / Schreber's moss – Stair-step moss), with generally similar stand vertical structures and processes, but a distinct understory, shaped by proximate coastal influences. Some of the oldest red spruce in the world have been recorded from this VT, including a 445-year-old tree at Fundy National Park in New Brunswick. Mature forests often develop abundant old man's beard, a lichen used as nest material by warblers and other species, and a winter food for deer foraging on fallen trees. Mountain ash can form a significant component of early- to mid-developmental stages of CA1 with frequent large crops of berries providing an important food source for black bear, fox, coyote, cedar and Bohemian waxwings, and many other avian species. As a zonal climax forest, larger diameter snags, legacy trees and significant levels of coarse woody material are typical and collectively offer stand-level habitat and various microhabitat features, for a broad spectrum of wild flora and fauna. Locally high humidity is important for many invertebrates, fungi and lichens.

## CA2 Black spruce – White spruce / Bayberry / Poison Ivy

*Picea mariana* – *Picea glauca* / *Morella pensylvanica* / *Toxicodendron radicans*

**Concept:** A narrow, intermittent, band of mixed spruce-fir forest follows the coastline of northern Nova Scotia. Canopy closure can be quite variable depending on stand age and wind damage. Understory shrub coverage may be extensive where crown closure is minimal. Herbs typically have sparse cover and low species diversity.

**Vegetation:** Black spruce, white spruce, balsam fir, and occasionally white pine dominate overstory. More open stands are characterized by increased shrub (usually bayberry) cover with mountain holly, downy alder and wild raisin. Huckleberry is one of the more common of several ericaceous species that may be present. Poison ivy is usually found close to the coastal edge of the stand. Herbs are typically sparse



### Site & Soil Characteristics

Slope Position: Level<sup>8</sup> Middle<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>6</sup> Level<sup>4</sup>  
 Drainage: Imperfect<sup>4</sup> Well<sup>3</sup> Moderately Well<sup>2</sup> Rapid<sup>1</sup>

Common Soil Types: 3, 2, 1, 5, 2C, 3C, 6, 7  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>1</sup> nd<sup>5</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>4</sup> (11–20)<sup>2</sup> (21–40)<sup>1</sup> nd<sup>1</sup>  
 Humus Form: Hemimor<sup>6</sup> Humimor<sup>1</sup> nd<sup>3</sup>

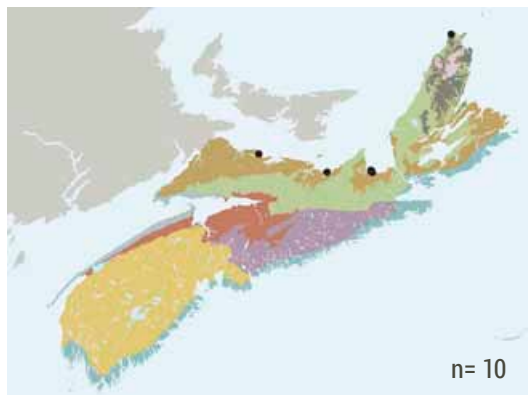
with bunchberry, starflower and sarsaparilla the most common species. On moist sites, cinnamon fern, creeping snowberry, certain sedge species and sphagnum mosses may be present.

**Environmental Setting:** CA2 is mainly associated with fresh-moist to moist, nutrient medium soils of glacial origin. It is found in coastal areas along the Northumberland Strait and the Gulf of St. Lawrence. When it occurs on level topography, soils tend to be moister but on headlands, above the high tide mark, soils are well drained. This VT seldom extends inland for more than 50 m. Tree height and development is strongly influenced by wind exposure. Beyond this influence, CA2 will transition into Acadian stands dominated by black spruce.

**Successional Dynamics:** Successional dynamics, of this coastal forest in Nova Scotia, are not well understood. However, stands are expected to be shaped by frequent wind disturbances, with later successional stages dominated by the same tree species. Earlier successional stages of intolerant hardwood are also unexpected. Limitations imposed

Monk's Head Provincial Park,  
 Antigonish County

Characteristic Plants	CA2	
	Freq. (%)	Cover (%)
Black spruce	100	26
Balsam fir	70	20
White spruce	60	22
White birch	30	2
White pine	20	17
Trembling aspen	20	5
Gray birch	20	4
Red maple	20	4
Tamarack	20	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>59</b>
Bayberry	90	9
Black spruce	80	3
Balsam fir	60	10
Lowbush blueberry	60	5
Huckleberry	50	17
Red maple	50	0.6
Serviceberry	50	0.2
Mountain holly	40	1
Gray birch	40	0.1
Lambkill	30	3
Wild raisin	30	0.2
Winterberry	20	3
Downy alder	20	0.3
Western poison ivy	20	0.1
Heart-leaf birch	10	0.1
Roses	10	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>31</b>
Bunchberry	70	3
Starflower	70	0.6
Sarsaparilla	60	3
Cinnamon fern	40	3
Bracken	40	1
Wild lily-of-the-valley	40	1
Pink lady's slipper	40	0.2
Wood aster	40	0.1
Creeping snowberry	30	3
Poverty grass	30	0.3
Twinflower	20	4
Black crowberry	20	3
Three seeded sedge	20	1
Tall white aster	20	0.4
Hawkweeds	20	0.3
Ghost pipe	20	0.2
Interrupted fern	20	0.2
Blueflag	20	0.1
Goldthread	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>12</b>
Schreber's moss	70	17
Broom moss	60	3
Pale fat-leaved sphagnum	30	30
Wavy dicranum	30	21
Ladies' tresses	30	11
Common green sphagnum	20	16
Pin cushion moss	20	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>40</b>



by salt spray may allow more salt-tolerant species, like white spruce, bayberry and poison ivy, to establish in some stands. In the absence of stand-level disturbance, this VT may transition to stands with higher coverages of black spruce and balsam fir. Significant woody shrub cover may develop following stand-level disturbances and delay development of a closed canopy forest.

**Ecological Features:** Vertical and horizontal stand structure is variable and most occurrences have a moderately open canopy and high shrub cover. Stands provide favourable habitat for several birds breeding in coastal forests (e.g. fox sparrow, blackpoll warbler, boreal chickadee), epiphytic and ground lichens, and various invertebrates. Coarse woody material is often high, due to frequent windthrow, in this coastal fringe VT. Pole-sized to mature stands may provide blue heron colony nesting opportunities. This edaphic climax VT is shaped by a localized climate with higher relative annual temperatures, and less extreme moisture fluctuations, than what is common for VTs occurring along the Atlantic and Bay of Fundy coastlines. It is structurally similar to SP10 (Black spruce – White spruce / Twinflower / Schreber's moss), but has a distinct understory shaped by prominent coastal climatic influences. CA2 has been heavily impacted by land-use practices (e.g. farming, residential and cottage development, recreation) and is now relatively rare, thereby creating conservation challenges.



Bayberry

# FP

## Floodplain Forest Group

### Floodplain (FP) Key

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1a. Hardwoods dominant	... 2
1b. Not as above	... 7

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2a. Sugar maple, yellow birch and/or ash dominant	... 3
2b. Not as above	... 4

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3a. White ash dominant	... FP7
3b. Not as above	... FP1

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4a. Red oak and/or red maple dominant	... 5
4b. Not as above	... 6

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5a. Red oak scattered to dominant	... FP2
5b. Red oak absent or sparse	... FP3

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6a. Balsam poplar scattered to dominant	... FP4
6b. Black cherry scattered to dominant	... FP5

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7a. Red spruce and/or hemlock dominant. Refer to SPRUCE HEMLOCK FOREST (SH)	
7b. White spruce abundant to dominant	... FP6

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Additional floodplain vegetation types without fact sheets:

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FP8	Black ash / Hawthorne / Jack-in-the-pulpit
FP9	Ironwood / Choke cherry / Wood goldenrod

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COVER CLASSES: Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

## Concept

These (usually) hardwood forests develop on riparian floodplains, most of which are annually flooded and enriched by alluvial sediments. Sugar maple, red maple, red oak, white ash, ironwood, balsam poplar, black cherry and white spruce are typical overstory species in generally closed canopy stands. Elm is occasionally found, but Dutch elm disease has significantly reduced its former dominance and once prominent ecological role. Beaked hazel, chokecherry, wild raisin and regenerating tree species are common in the shrub layer. The understory is characterized by a species-rich herbaceous layer of spring ephemerals, meadow-rue, ostrich fern, sensitive fern, dwarf raspberry, jewelweed and jack-in-the-pulpit, among numerous other species. Bryophyte/lichen cover is usually low or absent.

Soils are fresh to fresh-moist (occasionally wetter) and rich to very rich. These alluvial deposits are usually deep, of variable texture and stone free (although fine gravel layers are often encountered). Earthworms are common in these soils, providing prey for vermivores such as woodcock.

This ecosystem can be as narrow as a few meters or up to several hundred meters wide and occurs as small to large linear patches along riparian corridors. Most stands have been reduced in size by past land-use activities.

This forest ecosystem contributes significantly to the maintenance of local riparian and landscape level biodiversity. It provides numerous microhabitats such as seasonally active channels, vernal pools, levees and ox-bow ponds. At the landscape level, forest floodplains serve as travel corridors and increase structural connectivity for a broad range of wildlife species. Healthy tracts of flood plain forests enhance water quality, help ensure streambank stability by buffering riparian disturbances such as flooding and ice scour; regulate water flow and reduce erosion; provide soil organic matter and nutrients; contribute structure and woody material to aquatic systems; and help maintain riparian ecosystem functioning.

Floodplain forests have the highest plant species diversity of any forest group in Nova Scotia. Periodic recharge of nutrient and water reserves produce rich soils and dynamic, productive forests. Many wildlife species are strongly dependent on riparian forests and the forest–shoreline interface. Floodplain forests have exceptional biodiversity value, supporting numerous rare plants (e.g. Canada lily, wild leek, blue cohosh, wild coffee), reptiles (e.g. wood turtle), mammals (e.g. mink, otter, beaver and muskrat), birds (e.g. northern waterthrush, alder flycatcher, belted kingfisher) and invertebrates (dragonfly, damselfly).



# FP1

## Sugar maple – White ash / Ostrich fern – Wood goldenrod

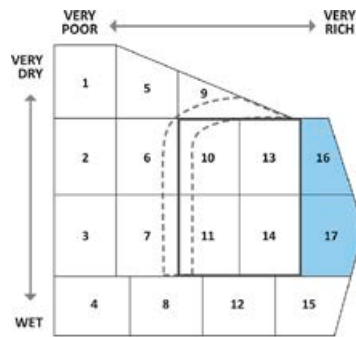
FP

*Acer saccharum* – *Fraxinus americana* /  
*Matteuccia struthiopteris* – *Solidago flexicaulis*

**Concept:** This late-successional forest is characterized by a well-developed canopy of sugar maple. Herbaceous plants usually dominate the species-rich understory, but shrub development can be moderate to high in younger or disturbed stands. The low elevation deciduous forest is the last stage of successional development on most large, well drained floodplains. Evidence of annual flooding is usually apparent. Seasonally active channels are common.

**Vegetation:** The overstory may feature one or more layers, depending on stand age structure and successional history. Although many occurrences of FP1 originate with floodplain formation, the inherently dynamic nature of riparian forests often results in pockets of either younger or older trees embedded within the main canopy. This closed canopy ecosystem has well-developed layers of sugar maple and/or white ash. Other trees species (e.g. ironwood, white spruce, elm, yellow birch, black cherry) may be found in small clumps or sparsely scattered. Elm has yet to recover its historical prominence, due to Dutch elm disease, but noteworthy individuals of seed-bearing age have been

Brickton, Annapolis Country



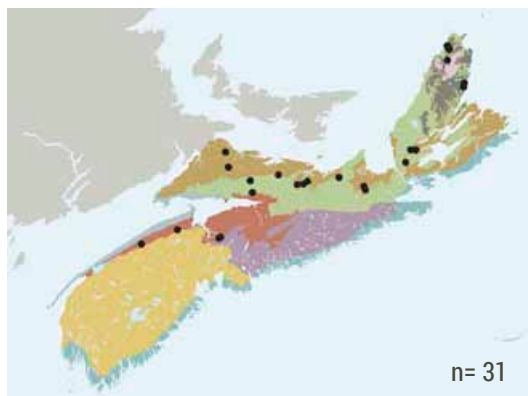
### Site & Soil Characteristics

Slope Position:	Level <sup>10</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>7</sup> (Slightly – Moderately) <sup>1</sup> nd <sup>2</sup>
Microtopography:	Level <sup>6</sup> Slightly <sup>2</sup> Moderately <sup>1</sup> nd <sup>1</sup>
Drainage:	Well <sup>7</sup> Rapid <sup>1</sup> Moderately Well <sup>1</sup> Other <sup>1</sup>
Common Soil Types:	8, 8C, 11
Rooting Depth (cm):	(30–45) <sup>1</sup> (> 45) <sup>5</sup> nd <sup>4</sup>
Forest Floor (cm):	(0–5) <sup>5</sup> (6–10) <sup>1</sup> nd <sup>4</sup>
Humus Form:	Vermimull <sup>4</sup> Mormoder <sup>1</sup> Mull <sup>1</sup> nd <sup>4</sup>

observed in the upper canopy of some surveyed stands. The species-rich understory is typically dominated by a very well-developed herbaceous layer of plants typical of riparian floodplains, including ostrich fern, Jack-in-the-pulpit, meadow-rue and nodding trillium. Shrub cover is variable but usually reduced, except in younger or disturbed stands. Ground lichens and mosses are scarce, if present at all.



Characteristic Plants	FP1	
	Freq. (%)	Cover (%)
Sugar maple	100	47
White ash	58	21
Yellow birch	52	18
White spruce	39	6
Ironwood	32	8
Elm	23	6
Red maple	19	11
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>
Sugar maple	90	14
White ash	74	5
Beaked hazelnut	45	1
Striped maple	45	1
White spruce	39	3
Yellow birch	39	2
Choke cherry	35	10
Balsam fir	35	5
Ironwood	32	4
Mountain maple	32	0.7
Alternate-leaved dogwood	32	0.5
Black cherry	23	14
<b>Shrub Layer (Mean % Cover)</b>		<b>36</b>
Meadow-rue	81	0.5
Ostrich fern	77	29
Wood goldenrod	77	0.9
Nodding trillium	58	0.5
Sensitive fern	52	7
Jewelweed	52	6
Dwarf raspberry	52	3
Northern beech fern	48	2
Lady fern	45	3
Evergreen wood fern	42	6
Oak fern	42	2
Wild lily-of-the-valley	42	0.4
Drooping wood sedge	39	0.5
Rose twisted stalk	39	0.4
Herb-Robert	35	4
Sarsaparilla	35	1
Bladder sedge	35	0.9
Jack-in-the-pulpit	35	0.8
Small enchanter's nightshade	35	0.8
Graceful sedge	35	0.6
Christmas fern	35	0.5
Cow parsnip	32	1
Red baneberry	32	0.3
Starflower	32	0.2
Silvery spleenwort	29	10
Violets	29	2
Wood-sorrel	29	2
Rough goldenrod	29	0.6
Spinulose wood fern	26	2
Braun's holly fern	26	0.7
Wood reed	26	0.3
Tall white aster	26	0.2
White lettuce	26	0.1
New York fern	23	17
Interrupted fern	23	1
Bloodroot	19	13
<b>Herb Layer (Mean % Cover)</b>		<b>63</b>



**Environmental Setting:** FP1 is mainly associated with fresh to fresh-moist, nutrient very rich alluvial soils. This Vegetation Type (VT) is most often found along rivers in central and northern Nova Scotia, but can also be found in parts of western Nova Scotia and Cape Breton. Most occurrences are on level or gently sloping floodplains. Soils are usually deep, medium textured, have low coarse fragment content and minimal humus development. Annual or biannual flood cycles are typical. The majority of stands have been reduced in size by past land-use activities and/or natural river disturbances.

**Successional Dynamics:** This stable mature forest is the last stage of successional development on rich, actively flooded and well drained riparian soils. It can develop from several early- to mid-successional VTs dominated by red maple, black cherry, or balsam poplar. On especially rich river deposits, White ash / Sensitive fern – Meadow-rue (FP7) may play a larger role in stand history, acting as an earlier successional stage before sugar maple advances to dominate or co-dominate the canopy. Disturbance agents include flood events, ice scour, insect predation and disease, and various human activities including farming, cottage and trail development and tree harvest.

**Ecological Features:** Plant species richness is the highest of any provincial forest ecosystem and may include numerous rare plants (e.g. Canada lily, blue cohosh, wild leek, thimbleweed, Canada wood-nettle, hairy sedge, blunt-leaved bedstraw, anise-root and Wiegand's wild rye). FP1 may include large diameter cavity trees and snags, offering nesting sites for kingfishers and larger raptor species. Black ash (a legally protected species) may occur as a component of FP1. Old growth forests of impressive stature may develop.

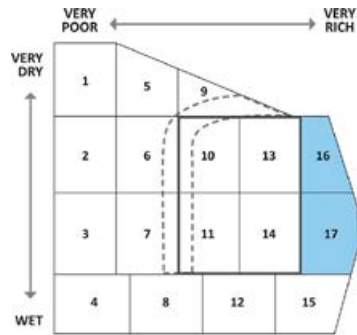
# FP2

## Red maple – Red oak / Bellwort – Nodding trillium

*Acer rubrum* – *Quercus rubra* / *Uvularia sessilifolia* – *Trillium cernuum*

**Concept:** Red maple – Red oak / Bellwort – Nodding trillium forest is characterized by an overstory primarily of red maple and red oak. Occasionally sugar maple will co-dominate the canopy indicating a somewhat richer site and/or progression to a later successional stage. White ash and elm are uncommon. This forest is prominent on larger floodplains. In many locales, red oak trees are confined to a narrow edge along watercourses. This pattern reflects historical land use practices where these trees were left for livestock shading. Floodplain features such as seasonally active channels and debris piles are evident.

**Vegetation:** Other tree species less common in the overstory include black cherry, ironwood, elm, white spruce and largetooth aspen. The understory is open and often sparse, except in young or recently disturbed stands where shrub cover is promoted by available sunlight. Herbaceous cover is moderately heavy with many species of the *Asteraceae* family (asters, goldenrods) and common floodplain species like nodding trillium, late goldenrod, graceful sedge and brome-like sedge. The annual flooding and



### Site & Soil Characteristics

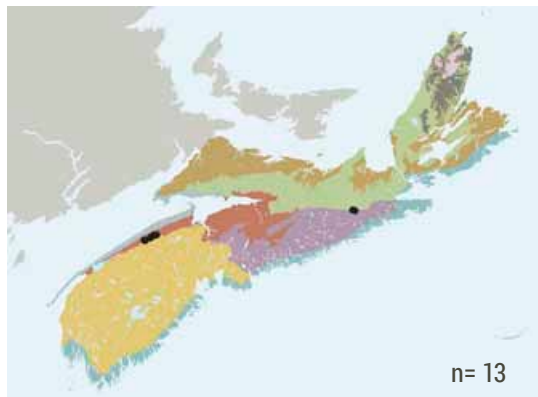
Slope Position:	Level <sup>9</sup> Upper <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>9</sup> (Moderately) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Level <sup>5</sup> Slightly <sup>3</sup> Other <sup>2</sup>
Drainage:	Well <sup>7</sup> Rapid <sup>1</sup> Moderately Well <sup>1</sup> nd <sup>1</sup>
Common Soil Types:	8, 8C
Rooting Depth (cm):	(>45) <sup>3</sup> nd <sup>7</sup>
Forest Floor (cm):	(0–5) <sup>9</sup> (6–10) <sup>1</sup>
Humus Form:	Vermimull <sup>5</sup> Mull <sup>1</sup> Mullmoder <sup>1</sup> Rhizomull <sup>1</sup> nd <sup>2</sup>

deposition of sediment is usually sufficient to prevent any significant establishment of bryophytes on the forest floor.

Greenwood, Kings County



Characteristic Plants	FP2	
	Freq. (%)	Cover (%)
Red oak	100	33
Red maple	100	32
Ironwood	69	7
Sugar maple	38	18
Black cherry	31	3
Large-tooth aspen	23	14
White birch	23	5
White spruce	23	4
Beech	23	2
Serviceberry	15	3
Elm	15	2
White ash	15	1
<b>Tree Layer (Mean % Cover)</b>		<b>86</b>
Red maple	69	7
Ironwood	62	8
Red oak	62	4
Black cherry	62	2
Choke cherry	54	4
Sugar maple	46	2
Balsam fir	38	4
Beech	38	3
White meadowsweet	38	2
Hawthorns	38	1
White spruce	38	1
Beaked hazelnut	31	5
Western poison ivy	23	1
Highbush cranberry	15	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>27</b>
Lady fern	77	2
Wild lily-of-the-valley	69	2
Meadow-rue	69	1
Bladder sedge	69	0.7
Bellwort	62	3
Nodding trillium	62	2
Graceful sedge	62	0.9
Rough goldenrod	54	7
Sensitive fern	54	6
Calico aster	54	2
Drooping wood sedge	54	1
Wild rye grass	46	2
Late goldenrod	46	1
Starflower	46	0.3
Sarsaparilla	38	7
Brome-like sedge	38	4
New York fern	38	0.2
Short husk	31	18
Ostrich fern	31	11
Lion's paw	31	2
False Solomon's seal	31	0.9
Heart-leaved aster	31	0.8
Partridge-berry	31	0.8
Live-forever	31	0.3
Jack-in-the-pulpit	31	0.1
Oak fern	23	4
Hair fescue	23	2
Wild leek	15	8
Blue cohosh	15	3
<b>Herb Layer (Mean % Cover)</b>		<b>60</b>



**Environmental Setting:** FP2 is mainly found on fresh to fresh-moist, nutrient rich to very rich alluvium soils. Most occurrences are on flat or gently sloping floodplains. FP2 sites are often broken up by seasonally active channels and small depressions. Soils are very deep and largely free of coarse fragments. This Vegetation Type (VT) is primarily found in the western ecoregion (along the Annapolis River and its major tributaries), but may occur in other warm ecoregions with sandy riparian soils. It is common along the West River and the St. Mary's River. Annual or bi-annual flood cycles are typical.

**Successional Dynamics:** This ecosystem can be expressed at a variety of successional stages. Typical stands are relatively stable but expected to transition to the later successional stage described by Sugar maple – White / Ostrich fern – Wood goldenrod (FP1). Most known occurrences have been heavily impacted by past land use activity, including cultivation, land clearing and tree harvest. Natural disturbance agents include flooding, ice scour, insect predation and disease.

**Ecological Features:** Plant species richness is generally lower than most other floodplain forests but several rare plants have been documented (Canada wood-nettle, false nettle, wild leek, hooked agrimony and blue cohosh). Small ox bow swamps and inactive riparian channels are often embedded within this ecosystem, imparting favourable habitat for a variety of insects and vertebrates. This ecosystem often includes larger trees including those (e.g. oak, black cherry and white ash) which produce mast and form cavities. For example, red oak produces hard mast crops that are important food sources for many species. Deer and black bear, in particular, seek out these valuable seasonal energy sources.

# FP3

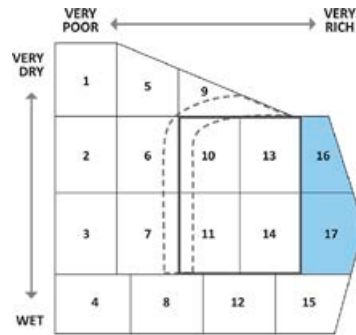
## Red maple / Sensitive fern – Rough goldenrod

FP

*Acer rubrum* / *Onoclea sensibilis* – *Solidago rugosa*

**Concept:** This early- to mid-successional ecosystem is the most nutrient-limited floodplain forest classified in Nova Scotia. The low elevation deciduous forest is characterized by red maple canopy dominance and by a moderately broad group of herbaceous species. Typical understory plants include a mix of floodplain and wetland species. This floodplain vegetation type can develop across a heterogeneous complex of well to poorly drained sites usually with well-defined seasonally active channels and depressions.

**Vegetation:** Canopy layers are usually closed but some stands feature more widely-spaced trees. Red maple is the only dominant canopy species, but trace amounts of yellow birch, ironwood, white ash and several conifers may be scattered throughout. The woody understory is usually open with scattered individuals or pockets of wild raisin, beaked hazelnut and regenerating trees. Herbaceous cover is moderate to high depending on available moisture. Sensitive fern, dwarf raspberry, sensitive fern, rough goldenrod, meadow-rue and bladder sedge are common species.



### Site & Soil Characteristics

Slope Position: Level<sup>10</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>1</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Level<sup>6</sup> Slightly<sup>2</sup> Other<sup>2</sup>  
 Drainage: Well<sup>4</sup> Moderately Well<sup>3</sup> Imperfect<sup>1</sup> Poor<sup>1</sup> nd<sup>1</sup>

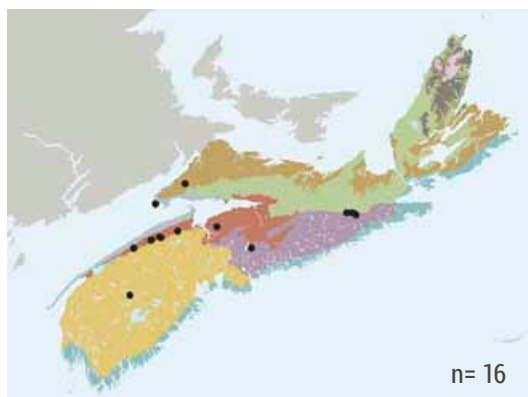
Common Soil Types: 8, 8C, 9, 10  
 Rooting Depth (cm): (30–45)<sup>1</sup> (> 45)<sup>7</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>9</sup> Other<sup>1</sup>  
 Humus Form: Vermimull<sup>3</sup> Mormoder<sup>1</sup> Rhizomull<sup>1</sup> nd<sup>5</sup>

Cinnamon fern is scattered but a good indicator. Some occurrences of FP3 support high levels of short husk. Ground bryophyte and lichen cover is absent or reduced.

Crowsnest, Guysborough County



Characteristic Plants	FP3	
	Freq. (%)	Cover (%)
Red maple	100	53
Sugar maple	44	7
White birch	31	5
White spruce	31	4
Balsam fir	25	6
Hemlock	25	4
White pine	25	2
Yellow birch	19	22
Black cherry	19	13
Red oak	19	6
Elm	19	3
Red spruce	19	3
Ironwood	19	1
White ash	13	7
<b>Tree Layer (Mean % Cover)</b>		<b>73</b>
Red maple	69	3
Balsam fir	69	3
Virgins bower	44	2
Serviceberry	44	1
White meadowsweet	44	0.9
Sugar maple	38	5
White spruce	38	3
Speckled alder	31	9
Wild raisin	31	9
Beaked hazelnut	25	6
Poison ivy	25	2
Highbush cranberry	19	0.4
<b>Shrub Layer (Mean % Cover)</b>		<b>30</b>
Meadow-rue	100	2
Sensitive fern	69	8
Dwarf raspberry	69	4
Rough goldenrod	63	2
Wild lily-of-the-valley	63	0.9
Bedstraws	63	0.5
Lady fern	56	2
Bladder sedge	56	0.6
Short husk	50	27
Sarsaparilla	50	3
Starflower	50	1
New York fern	44	13
Evergreen wood fern	44	0.5
Calico aster	38	0.9
Tall white aster	38	0.6
Blue flag	38	0.1
Fringed sedge	38	0.1
Nodding trillium	38	0.1
Graceful sedge	31	2
Jewelweed	31	2
Cinnamon fern	31	0.7
Small enchanter's nightshade	31	0.4
Wood aster	31	0.3
Canada goldenrod	25	6
Violets	25	1
Jack-in-the-pulpit	19	2
Ostrich fern	13	7
<b>Herb Layer (Mean % Cover)</b>		<b>63</b>
Shaggy moss	19	0.9
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>2</b>



**Environmental Setting:** FP3 is mainly associated with fresh to moist, nutrient rich alluvium soils. This Vegetation Type (VT) can be found on active floodplains, low riparian slopes and on inactive terraces. Active sites typically flood annually. Most FP3 sites occur in the middle reaches of rivers found across the province. Rooting zone texture is variable, but sandy loams are most common.

**Successional Dynamics:** FP3 is an early- to mid-successional VT. Moister occurrences are expected to persist as an edaphic climax, while stands on better drained sites may succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod). Stands on inactive floodplains or glaciofluvial soils may succeed to an upland forest type. Successional development will depend on available seed sources, site conditions, disturbance regime and geographic location. Disturbance agents include flood events, ice scour, insects and disease, farming and harvesting.

**Ecological Features:** This forest ecosystem is usually on moister floodplains. Rare plants include hooked agrimony, Canada wood-nettle and black ash. Fern species richness is also notably high, comparable to levels found in FP1. The VT supports habitat for numerous riparian vertebrates, while red maple (that flowers before spring leaf out) provides one of the most important early and reliable pollen sources. The open canopy structure, compared to other FP vegetation types, supports greater vertical structural diversity, providing nesting, brooding and feeding habitat for many small bird species associated with mid-canopy layers. Old growth potential is low, except where FP3 forms an edaphic climax on moist sites; here a unique form of old growth may develop.

# FP4

## Balsam poplar – White spruce / Ostrich fern – Cow-parsnip

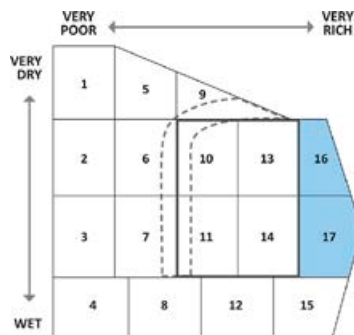
FP

*Populus balsamifera* – *Picea glauca* /

*Matteuccia struthiopteris* – *Heracleum maximum*

**Concept:** Prominent levels of balsam poplar in the canopy are featured with this vegetation Type (VT) with lesser but frequent white spruce, and a well-developed understory. The ecosystem has some boreal affinity, but temperate species like white ash, sugar maple, sensitive fern and alternate-leaved dogwood differentiate it from true boreal floodplains. Many stands have been disturbed and/or reduced in size by human activity, resulting in relatively high shrub density and the frequent presence of plants like wild apple and coltsfoot.

**Vegetation:** This closed canopy forest is dominated by balsam poplar, with lesser white spruce, white ash and sugar maple. These latter three tree species have



### Site & Soil Characteristics

Slope Position: Level<sup>10</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>10</sup>  
 Drainage: Rapid<sup>6</sup> Well<sup>2</sup> Moderately well<sup>1</sup> Imperfect<sup>1</sup>

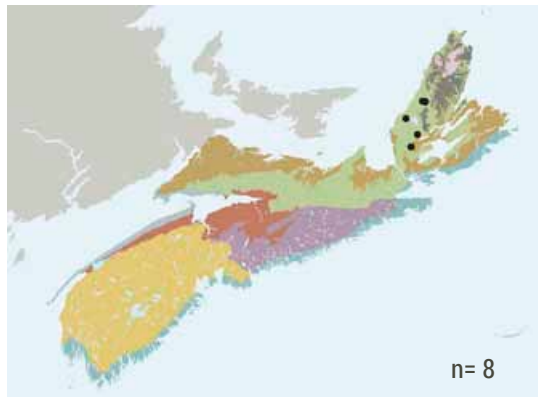
Common Soil Types: 8C, 8, 9  
 Rooting Depth (cm): (30–45)<sup>3</sup> (>45)<sup>7</sup>  
 Forest Floor (cm): (0–5)<sup>7</sup> nd<sup>3</sup>  
 Humus Form: Vermimull<sup>9</sup> nd<sup>1</sup>

low cover and may be restricted to the understory. Balsam poplar trees have a relatively small crown and most stands have been disturbed. Both of these factors increase available light and promote shrub development. Average choke cherry cover is one of the highest of any flooded forests in Nova Scotia. Alternate-leaved dogwood, red osier dogwood and cow-parsnip also occur more frequently than in other flooded forests. The herbaceous layer is well developed with high fern cover. Ostrich fern, wood goldenrod and cow-parsnip are characteristic. Bryophyte cover is reduced due to annual flooding and sediment deposition.

**Environmental Setting:** FP4 is mainly associated with fresh to moist, deep nutrient rich alluvium. It occurs on actively-flooded floodplains and low riparian slopes. Evidence of regular flooding is apparent with woody debris piles. This VT is primarily found in Cape Breton, but can also occur in central and northern areas of the mainland. Annual or biannual flooding is typical, but longer return intervals have been observed.

Skye Glen, Inverness County

Characteristic Plants	FP4	
	Freq. (%)	Cover (%)
Balsam poplar	100	40
White spruce	100	17
Sugar maple	75	6
White ash	63	17
Elm	38	6
Red maple	25	5
<b>Tree Layer (Mean % Cover)</b>		<b>77</b>
Choke cherry	100	12
White ash	88	12
Sugar maple	88	7
Balsam poplar	88	5
Speckled alder	50	9
Elm	50	5
Wild apple	50	4
White spruce	50	3
Alternate-leaved dogwood	50	1
Red raspberry	38	0.7
Serviceberry	38	0.5
Red osier dogwood	38	0.3
Beaked hazelnut	25	2
Ironwood	25	2
White meadowsweet	25	0.8
Highbush cranberry	25	0.3
Striped maple	25	0.1
Virgins bower	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>46</b>
Ostrich fern	100	31
Sensitive fern	88	10
Wood goldenrod	75	2
Agrimony	75	2
Cow parsnip	63	7
Meadow-rue	63	2
Coltsfoot	63	2
Creeping buttercup	63	0.7
Late goldenrod	50	0.9
Long-stalked sedge	50	0.8
Lady fern	50	0.3
Calico aster	50	0.1
Jewelweed	38	3
Small enchanter's nightshade	38	3
Tall white aster	38	1
Climbing nightshade	38	0.7
Dwarf raspberry	38	0.4
Bladder sedge	38	0.1
Field horsetail	38	0.1
Ribless woodland sedge	38	0.1
Tall buttercup	38	0.1
Large enchanter's nightshade	25	3
White avens	25	1
Bloodroot	25	0.5
Wild coffee	25	0.5
Brome grass	25	0.3
Herb-Robert	25	0.2
Graceful sedge	25	0.1
Yellow violet	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>58</b>
Shaggy moss	63	24
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>24</b>



**Successional Dynamics:** This balsam poplar floodplain forest is an early- to mid-successional VT. In cooler areas of the province it may persist as a late-successional stage, but elsewhere it will succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod). On less active floodplains, the VT may transition to FP6 (White spruce / Wood goldenrod / Shaggy moss). This dynamic ecosystem follows herb and shrub dominated vegetation types on newly formed floodplains. Disturbance agents include flood events, ice scour, insects and disease, agriculture, cottage development and tree harvesting.

**Ecological Features:** This northern floodplain ecosystem supports numerous rare plants, many of which are largely limited to Cape Breton. These include northern wild licorice, small flowered wood rush, male fern, long-bracted green orchid, squash berry, wild coffee and giant rattlesnake plantain. The gummy buds of balsam poplar attracts wasps and bees and the resin has been extracted for medicinal use. FP4 sites have complex vertical structure resulting in diverse nesting, breeding, brooding and cover habitats. These support a wide variety of birds and small mammals, as well as many other vertebrate and invertebrate species. Balsam poplar is a rather short-lived species reducing the likelihood of large-diameter snags and cavity trees.



Wild Coffee

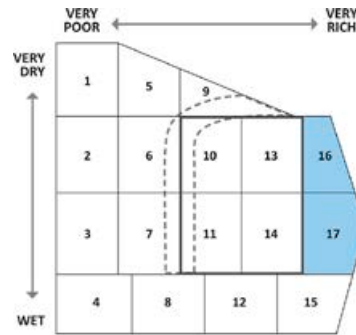


# FP5 Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit

*Prunus serotina* – *Acer rubrum* / *Solidago rugosa* – *Arisaema stewardsonii*

**Concept:** This relatively uncommon temperate deciduous forest is found on floodplains and river terraces across northern mainland Nova Scotia. It is an early- to mid-successional forest characterized by prominent black cherry and by a moderately broad group of floodplain and upland understory species.

**Vegetation:** Canopy layers are well developed in most FP5 sites, but younger or poorly-developed stands have lower densities of, more widely-spaced, trees. Black cherry is prominent but may co-dominate with red maple or, less often, white spruce. Other tree species are less common and may be restricted to the understory. The shrub layer is very well developed with the highest mean cover of any flooded forest in Nova Scotia. Black cherry, choke cherry and beaked hazelnut are characteristic of the woody understory. Herbaceous cover is high but composed of a somewhat variable mix of upland and floodplain species. Many associated plants are tolerant of disturbance and may be found on fresh to moist upland soils (e.g. rough goldenrod, dwarf raspberry, red raspberry, tall white aster). Bryophyte development is usually reduced except in less actively flooded sites, where shaggy moss cover may be high.



## Site & Soil Characteristics

Slope Position: Level<sup>10</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>2</sup> nd<sup>1</sup>  
 Drainage: Well<sup>7</sup> Moderately Well<sup>1</sup> Imperfect<sup>1</sup> Other<sup>1</sup>

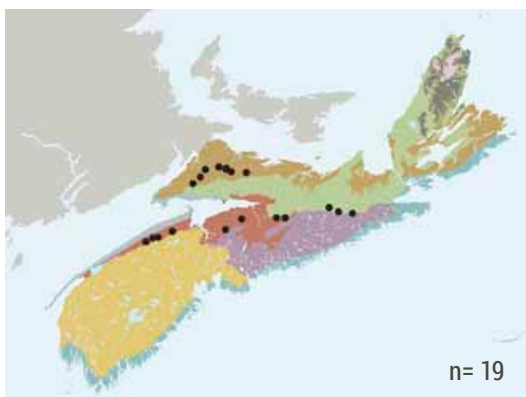
Common Soil Types: 8, 9, 12, 2L  
 Rooting Depth (cm): (30–45)<sup>1</sup> (> 45)<sup>4</sup> nd<sup>5</sup>  
 Forest Floor (cm): (0–5)<sup>8</sup> (6–10)<sup>1</sup> (11–20)<sup>1</sup>  
 Humus Form: Vermimull<sup>4</sup> Mull<sup>2</sup> Mullmoder<sup>1</sup> nd<sup>3</sup>

**Environmental Setting:** FP5 occurs on fresh to moist, nutrient rich to very rich alluvium soils. Soil depth, texture and coarse fragment content are somewhat variable, but moderately deep loams, with

Reynold’s Bridge, Upper Stewiacke,  
 Colchester County



Characteristic Plants	FP5	
	Freq. (%)	Cover (%)
Black cherry	100	42
Red maple	58	9
White spruce	37	8
White ash	26	12
Serviceberry	21	8
Red oak	21	6
Elm	16	11
Balsam fir	16	5
White pine	16	5
Ironwood	16	2
White birch	16	2
Wild apple	11	10
<b>Tree Layer (Mean % Cover)</b>	<b>66</b>	
Black cherry	79	27
Red raspberry	63	7
Speckled alder	63	4
Beaked hazelnut	58	11
Red maple	58	6
Hawthorns	58	2
Wild raisin	58	1
Choke cherry	47	32
Common blackberry	47	2
Highbush cranberry	47	2
Virgins bower	42	3
Alternate-leaved dogwood	37	0.9
White meadowsweet	37	0.9
Red-berried elder	21	0.3
<b>Shrub Layer (Mean % Cover)</b>	<b>65</b>	
Sensitive fern	89	9
Meadow-rue	84	3
Rough goldenrod	79	12
Dwarf raspberry	74	9
Bladder sedge	68	4
Bedstraw	58	1
Lady fern	58	1
Jack-in-the-pulpit	58	0.3
Tall white aster	53	4
Nodding trillium	53	2
Live-forever	53	0.3
Ostrich fern	42	7
Late goldenrod	37	6
Graceful sedge	37	3
Brome-like sedge	37	1
Strawberry	37	0.9
Evergreen wood fern	37	0.5
Wild lily-of-the-valley	37	0.2
Canada goldenrod	32	7
White-edge sedge	32	2
Calico aster	32	1
Ribless woodland sedge	32	1
Violets	32	0.5
Cut-leaved avens	32	0.1
Wild rye grass	26	3
Jewelweed	26	2
Small enchanter's nightshade	26	1
<b>Herb Layer (Mean % Cover)</b>	<b>59</b>	
Shaggy moss	42	18
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>20</b>	



few coarse fragments and reduced humus accumulation, are typical. The majority of sites are flooded annually or biannually, but some stands occur on infrequently flooded terraces. Most occurrences are in central and northern areas but some are in the Annapolis Valley ecodistrict. Black cherry has been found scattered on floodplains of southern Cape Breton, but because of the small percentage of black cherry on these site, they are not classified as FP5.

**Successional Dynamics:** The Black cherry – Red maple / Rough goldenrod – Jack-in-the-pulpit forest is expressed at early- to mid-successional stages. It may persist, as described, for long durations but most occurrences are expected to succeed to FP1 (Sugar maple – White ash / Ostrich fern – Wood goldenrod) or possibly FP2a (Red maple – Red oak / Bellwort – Nodding trillium variant Sugar maple). The majority of stands are found near agriculture or other disturbed areas. Disturbance agents include flooding, land clearing, cottage development, domestic animal grazing, ice scour and disease (especially black knot fungus).

**Ecological Features:** The dense, well-developed, woody understory provides important forage, nesting, breeding, brooding and cover habitat for riparian wildlife. Black cherry, choke cherry, highbush cranberry, and an assortment of other riparian shrubs, produce soft mast (fruits) that are highly prized by many wildlife species, notably birds. The seeds of these same species along with beaked hazelnut and serviceberry provide hard mast crops, fall and winter food sources for squirrels, chipmunks, ruffed grouse and blue jays. A few rare plants are documented (e.g. early leaf brome grass, Philadelphia panic grass, black ash and Canada wood nettle).

# FP6

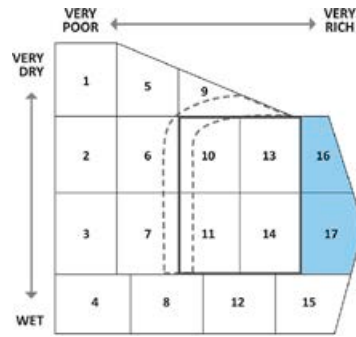
## White spruce / Wood goldenrod / Shaggy moss

FP

*Picea glauca* / *Solidago flexicaulis* / *Rhytidiadelphus triquetrus*

**Concept:** The White spruce / Wood goldenrod / Shaggy moss forest features prominent white spruce, variable shrub and herb development, and moderate to high bryophyte cover. This forest floods less frequently and/or for shorter durations than other flooded forest ecosystems in Nova Scotia. The ecosystem has some boreal affinity but differs from true boreal floodplain forests because of the temperate species it supports (e.g. white ash, sugar maple, and plants such as sensitive fern and wood goldenrod).

**Vegetation:** Canopy layers are heavily dominated by white spruce. Elm, white and yellow birch, white ash, sugar maple and balsam fir may be scattered with low cover or restricted to the understory. Black ash is an infrequent associate. Shrub cover is low to moderate depending on disturbance history, stand size and adjacent land use. Compared to most other flooded forests of Nova Scotia, herbaceous development is relatively low, but more actively flooded, usually moister and more northern stands support higher herb cover. Mean bryophyte cover is the highest of any flooded forest type. Shaggy moss is the only common species, but some stands support high levels of *Atrichum* mosses.



### Site & Soil Characteristics

Slope Position: Level<sup>10</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>8</sup> Slightly<sup>2</sup>  
 Drainage: Well<sup>4</sup> Imperfect<sup>3</sup> Moderately well<sup>2</sup> Rapid<sup>1</sup>

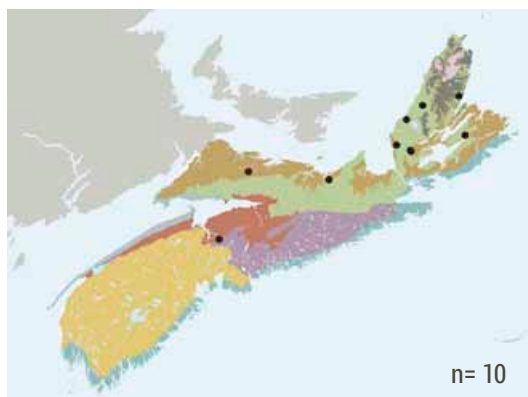
Common Soil Types: 8, 9, 8C, 11  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>5</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>9</sup> (6–10)<sup>1</sup>  
 Humus Form: Vermimull<sup>3</sup> Hydromoder<sup>1</sup> Mormoder<sup>1</sup> Mull<sup>1</sup> nd<sup>4</sup>

**Environmental Setting:** FP6 occurs on fresh to fresh-moist, nutrient rich alluvium soils. This Vegetation Type (VT) is most often found in Cape Breton, but can also occur in central and northern

Wallace River, Lower Wentworth, Cumberland County



Characteristic Plants	FP6	
	Freq. (%)	Cover (%)
White spruce	100	51
White ash	60	7
Balsam fir	30	10
White birch	30	9
Yellow birch	30	7
Elm	30	2
Black cherry	20	17
White pine	20	8
Red maple	20	4
Balsam poplar	10	3
<b>Tree Layer (Mean % Cover)</b>		<b>72</b>
Sugar maple	90	4
White ash	80	16
Balsam fir	60	4
Red maple	50	2
Speckled alder	40	1
Fly-honeysuckle	40	0.6
Wild raisin	40	0.1
Striped maple	30	3
Choke cherry	30	3
Hawthorns	30	1
Beaked hazelnut	30	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>24</b>
Buttercups	80	0.5
Wood goldenrod	70	1
Bladder sedge	70	0.8
Sensitive fern	60	4
Drooping wood sedge	60	1
Meadow-rue	60	0.9
Starflower	60	0.1
Ostrich fern	50	3
Tall white aster	50	2
Short husk	50	1
Common speedwell	50	0.8
Wild lily-of-the-valley	50	0.5
Calico aster	50	0.4
Coltsfoot	40	4
Lady fern	40	3
Evergreen wood fern	40	2
Dwarf raspberry	40	0.8
Wood-sorrel	40	0.8
Red baneberry	40	0.1
Violets	30	20
Northern beech fern	30	6
Long-stalked sedge	30	2
New York fern	30	2
Jewelweed	30	0.5
Small enchanter's nightshade	30	0.2
Woodland horsetail	30	0.2
Bloodroot	20	3
Jack-in-the-pulpit	20	2
Cow parsnip	20	1
Hooked agrimony	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>32</b>
Shaggy moss	80	32
Schreber's moss	40	9
Stair-step moss	30	19
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>38</b>



areas of Nova Scotia. Flood cycles are intermittent or of short duration. Soils are usually deep with low coarse fragment content and a thin forest floor.

**Successional Dynamics:** The White spruce / Wood goldenrod / Shaggy moss forest is an early to mid-successional ecosystem. Stands may succeed from shrub and herb dominated vegetation, after floodplain formation, or after some level of human disturbance (usually agriculture). On most sites FP6 is expected to persist as described, or transition to FP4 (Balsam poplar – White spruce / Ostrich fern – Cow-parsnip). Stands on relatively inactive floodplains may eventually succeed to an upland forest type. Disturbance agents include flood events, insects and disease (especially spruce bark beetle) and tree harvesting.

**Ecological Features:** The closed canopy of these stands provides thermal protection (cooler summer temperatures and winter shelter) with close proximity to a water source. Deer wintering areas often occur in FP6 stands in Cape Breton and northern Nova Scotia. White spruce cone crops provide forage for red squirrels, siskins, crossbills, sparrows, chickadees, nuthatches and others seed-eating birds and small mammals. Rich site conditions can lead to very large diameter white spruce which often succumb to bark beetle infestations at a relatively young age. These snags provide food sources for avian insectivores such as woodpeckers and brown creeper. Large diameter snags afford denning, cavity and stick nest sites. When located next to water sources, they also provide perches for belted kingfisher, osprey and bald eagles.

# FP7

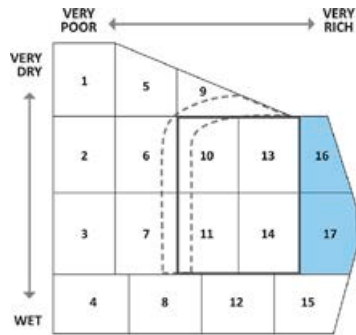
## White ash / Sensitive fern – Meadow rue

FP

*Picea glauca* / *Onoclea sensibilis* – *Thalictrum pubescens*

**Concept:** White ash strongly dominates this flood-plain community which includes a highly diverse understory of shrubs and herbs reflecting very rich soil conditions, enhanced by periodic flooding. Sugar maple can be abundant in the understory and will gradually reduce the abundance of white ash as this mid-successional ecosystem develops. Remnants of earlier successional stages include black cherry, aspen and white spruce. Low bryophyte cover and the presence of brush dams indicate the forest floor is flooded frequently.

**Vegetation:** Understory development is not restricted significantly by the closed canopy. Spring ephemerals, most notably bloodroot, are followed later in the summer by a lush carpet of herbaceous species, including sensitive fern, jewelweed, enchanter’s nightshade, goldenrods and a diverse assemblage of sedge species. The occasional presence of young elm trees provide hope that resistance to Dutch elm disease may be present in some individuals. Compared to other flooded forests of Nova Scotia, herbaceous diversity



### Site & Soil Characteristics

Slope Position: Level<sup>9</sup> Lower<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>9</sup> nd<sup>1</sup>  
 Drainage: Well<sup>5</sup> Moderately Well<sup>3</sup> Imperfect<sup>1</sup> nd<sup>1</sup>

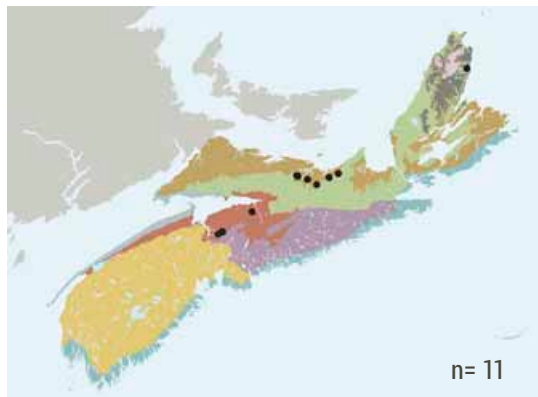
Common Soil Types: 8, 8C, 9  
 Rooting Depth (cm): (30–45)<sup>2</sup> (> 45)<sup>7</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>10</sup>  
 Humus Form: Vermimull<sup>7</sup> Mull<sup>1</sup> nd<sup>2</sup>

is relatively low. Bryophytes are sparse and shaggy moss is a common species that may be scattered across the forest floor.

Middle River, Pictou County



Characteristic Plants	FP7	
	Freq. (%)	Cover (%)
White ash	100	65
Sugar maple	64	9
Ironwood	64	8
White spruce	45	6
White birch	36	3
Black cherry	27	2
Balsam fir	18	13
Serviceberry	18	5
Trembling aspen	18	5
Elm	18	3
<b>Tree Layer (Mean % Cover)</b>		<b>85</b>
White ash	82	5
Choke cherry	73	22
Sugar maple	64	9
Alternate-leaved dogwood	55	0.2
Beaked hazelnut	45	1
Highbush cranberry	45	0.2
Hawthorns	36	0.8
Red raspberry	36	0.8
White spruce	27	0.8
Common blackberry	27	0.5
<b>Shrub Layer (Mean % Cover)</b>		<b>34</b>
Sensitive fern	73	13
Meadow-rue	73	0.6
Jack-in-the-pulpit	64	0.3
Ostrich fern	55	9
Large enchanter's nightshade	55	7
Jewelweed	45	16
Tall buttercup	45	2
Cow parsnip	36	2
Small enchanter's nightshade	36	1
Bladder sedge	36	0.3
Nodding trillium	36	0.3
White avens	36	0.3
Wood goldenrod	36	0.1
Bloodroot	27	15
Rough goldenrod	27	4
Canada goldenrod	27	2
Large-leaved avens	27	0.9
Common speedwell	27	0.5
Evergreen wood fern	27	0.5
Hooked agrimony	27	0.5
Calico aster	27	0.2
Lady fern	27	0.2
Yellow wood-sorrel	27	0.2
Brome-like sedge	18	1
Live-forever	18	1
Pubescent sedge	18	1
Long-stalked sedge	18	0.9
Graceful sedge	18	0.6
Drooping wood sedge	18	0.3
Hop sedge	18	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>40</b>
Shaggy moss	55	4
Shaded wood moss	27	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>4</b>



**Environmental Setting:** FP7 is mainly associated with fresh to fresh-moist, nutrient rich alluvial soils. It is found throughout Nova Scotia along the shores or islands of both small and large watercourses. On smaller streams, it can be quite narrow—often extending less than 20 m landward from the water's edge. Flood cycles are intermittent and/or of short duration. Soils are usually deep with low coarse fragment content and a thin forest floor.

**Successional Dynamics:** The White ash / Sensitive fern – Meadow rue forest is a mid-successional ecosystem transitioning from short-lived forests of black cherry, aspen and white spruce. Stands are advancing to a later successional stage where sugar maple will be the dominant overstory species, associated with lesser levels of white ash and elm. Disturbance agents that may create small openings in the canopy include flood events, insects and disease.

**Ecological Features:** White ash is a nutrient demanding species and on floodplains it can attain very large diameters. With the potential to develop large cavity trees (with openings created by early onset heart-rot) it provides one of the best opportunities for nesting and denning sites. Frequent white ash seed crops provide soft mast for numerous wildlife species (finches, grosbeaks, squirrels), the foliage is browsed by deer, and the bark of young trees is highly favoured by beavers, porcupines and hare. Ruffed grouse will browse ironwood buds during the winter.



Meadow rue

**Concept:** This extremely rare vegetation type is characterized by abundant to dominant levels of black ash in the canopy. The rarity of the vegetation type reflects black ash's status as a species at risk. Extensive utilization and cultivation of floodplains has reduced the occurrence of this ecosystem along the province's larger waterways across lowland ecodistricts, such as the Northumberland (530), Annapolis Valley (610) and Central (630). Early-successional tree associates include black cherry, white ash, white spruce and elm. Understory shrub growth can be prolific and include chokecherry, black cherry, hawthorn and alder. With very few known occurrences, it is difficult to determine the exact

function and formative circumstances of this forest, within the broader ecological range and character of larger floodplain ecosystems in Nova Scotia. However, FP8 appears to be closely tied to the most active floodplain segments, as indicated by its proximity to streambanks, levees and ephemeral channel meanders. Even with annual overbank flooding, soils are typically well drained for the majority of the growing season. Herbs such as ostrich fern, jack-in-the-pulpit, nodding trillium and meadow-rue carpet the forest floor, reflecting nutrient rich substrates. As with all floodplain VTs, biodiversity values are very high.

Bloodroot



# FP9

## Ironwood / Choke cherry / Wood goldenrod

*Ostrya virginiana* / *Prunus virginiana* / *Solidago flexicaulis*

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**Concept:** Ironwood seedlings and saplings are very shade-tolerant and can be extensive in the understory of most floodplain forests. Overstory disturbances, either natural or through tree harvesting activities, provides an opportunity for ironwood to move into the upper canopy. This positioning is short term as ironwood seldom exceeds 12 m height and taller tree species such as sugar maple, red maple and white ash will eventually re-establish dominance in the overstory. Ironwood floodplain forests are uncommon. The understory is strongly dominated by woody shrubs such as choke cherry, alder and willow

as well as seedlings and saplings of later seral stages. Common floodplain herbs are present, such as nodding trillium, ostrich fern, bloodroot, meadow-rue and numerous sedge and fern species. Ironwood is also known as “hop-hornbeam” as the cluster of fruit sacs is reminiscent of hops. These trees, along with numerous other deciduous tree and riparian shrub species, provide regular soft mast forage crops for many wildlife species. As with all floodplain VTs, biodiversity values are very high.

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Blue cohosh





# IH

## Intolerant Hardwood Forest Group

### Concept

This group is comprised of early- to mid-successional, closed canopy hardwood Vegetation Types. Stands are found mainly on zonal sites and classified within the Acadian Macrogroup. Red maple, white birch, grey birch and aspens are the dominant trees occurring in pure or mixed combinations, often with scattered residuals from previous successional stages. The shrub layer can be extensive with regenerating trees and typical upland forest woody shrub species, such as wild raisin and honeysuckle. On poorer sites, witch-hazel and ericaceous species are often present. Herb diversity is usually high but variable depending on site and overstory conditions. Poorer sites typically support bracken, mayflower and teaberry, whereas sites with higher nutrient availability often maintain species such as sarsaparilla and various asters and goldenrods. Reduced bryophyte and ground lichen cover are typical. Soil moisture and nutrient regimes range from dry to moist and poor to rich. This wide variation is due (in part) to the general ability

of successional hardwood tree species in this group to adapt rooting habits to diverse site conditions. These small- to large-patch, generally short-lived, even-aged forests result from stand-level disturbance events. They colonize sites rapidly after disturbance and act as a 'nurse crop' helping to facilitate the establishment of later successional tree species. Many of the early-successional tree species characteristic of this group can 'stump-sprout' and/or 'root-sucker' enabling stands to persist with relatively similar tree composition after repeated disturbances. Regenerating stands provide important browse for deer, moose and snowshoe hare. Stands adjacent to streams are used by beavers to provide food and raw materials for lodge and dam building. Stands generally provide suitable habitat for numerous birds associated with younger hardwood forests (e.g. chestnut-sided warbler, rose-breasted grosbeak, Nashville warbler, among many others).

## Intolerant Hardwood (IH) Key

1a. Aspen abundant to dominant (often with red oak or white ash) ... 2	9a. Red maple and/or white birch abundant to dominant and ericaceous shrubs absent to abundant, yellow birch absent or sparse ... 10
1b. Aspen absent to scattered ... 7	9b. Not as above ... 13
2a. Large-tooth aspen abundant to dominant ... 3	10a. Red maple and white birch dominant, aspen absent ... IH6
2b. Trembling aspen abundant to dominant ... 5	10b. Not as above ... 11
3a. Bracken, lambkill and other ericaceous plants abundant ... 4	11a. Aspen scattered to abundant ... IH6a
3b. Bracken, lambkill and other ericaceous plants absent to sparse ... IH3	11b. Not as above ... 12
4a. Red oak absent or sparse ... IH1	12a. White birch dominant ... IH6b
4b. Red oak scattered to abundant ... IH1a	12b. Not as above ... 13
5a. White ash absent ... 6	13a. Ericaceous shrubs dominant ... IH8
5b. White ash sparse to abundant ... IH5	13b. Not as above ... 14
6a. Red maple absent to scattered ... IH4	14a. Birch dominant, maple absent or sparse ... 15
6b. Red maple abundant to dominant ... IH4a	14b. Not as above ... 16
7a. Red oak abundant to dominant ... 8	15a. White birch and yellow birch dominant ... TH7
7b. Red oak absent to scattered ... 9	15b. Grey birch dominant ... IH9
8a. Red oak dominant ... IH2	16a. Red maple dominant, birch and sugar maple absent to sparse ... IH7
8b. Red oak abundant ... IH2a	16b. Not as above ... 17
	17a. Red maple and yellow birch dominant ... TH8
	17b. Red maple and sugar maple dominant ... TH9

COVER CLASSES: Sparse < 10% Scattered 10–25% Abundant 26–50% Dominant > 50%

# IH1

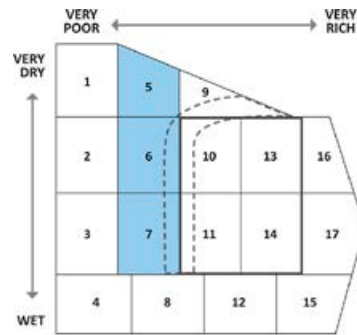
## Large-tooth aspen / Lambkill / Bracken

*Populus grandidentata / Kalmia angustifolia / Pteridium aquilinum*

### IH1a Red oak variant *Quercus rubra*

**Concept:** This Vegetation Type (VT) has a closed canopy dominated by large-tooth aspen. The IH1a variant describes stands where red oak is scattered to abundant. IH1 has a well-developed understory of disturbance-tolerant woody and herbaceous plants, but reduced bryophyte cover. Most large-tooth aspen originates through vegetative regeneration from root suckers.

**Vegetation:** Large-tooth aspen and red maple are dominant overstory trees, but the latter species is usually less abundant. White birch, white pine and red oak are common associates – with red oak co-dominant in variant IH1a. The shrub layer is well developed, including wild raisin, serviceberry, velvet-leaf blueberry and bush-honeysuckle; witch-hazel can also be present and commonly co-occurs with red oak. Regenerating balsam fir, red maple, red oak, white pine and black spruce indicate possible future successional stages of this ecosystem. In the herbaceous layer, species indicative of poor, dry conditions include bracken, teaberry, round-leaved pyrola, mayflower, pink lady's slipper and/or princes'-pine. The bryophyte layer is poorly developed.



#### Site & Soil Characteristics

Slope Position: Upper<sup>4</sup> Level<sup>3</sup> Middle<sup>2</sup> Crest<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Slightly<sup>5</sup> Moderately<sup>3</sup> Strongly<sup>1</sup> Other<sup>1</sup>  
 Drainage: Well<sup>6</sup> Moderately well<sup>2</sup> Imperfect<sup>1</sup> Rapid<sup>1</sup>

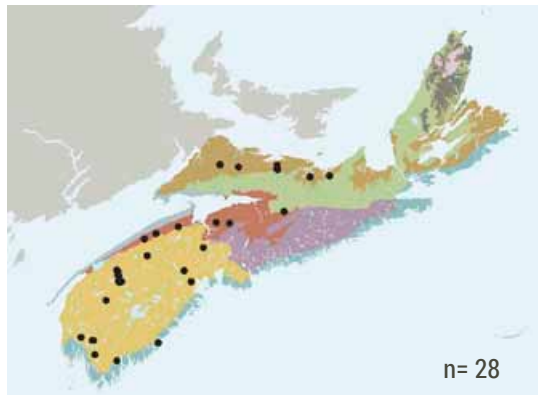
Common Soil Types: 2, 1, 2L, 6  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>4</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>4</sup> (6–10)<sup>4</sup> (11–20)<sup>1</sup> (21–40)<sup>1</sup>  
 Humus Form: Mormoder<sup>2</sup> Hemimor<sup>1</sup> Humi-Fibrimor<sup>1</sup>  
 Other<sup>2</sup> nd<sup>4</sup>

**Environmental Setting:** IH1 is mainly associated with dry to fresh, nutrient poor soils of glacial origin. Soils and sites are often stony. This VT is commonly found in the Western ecoregion (700), but is also

Black River Road, Cumberland County



Characteristic Plants	IH1		IH1a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Large-tooth aspen	100	66	100	39
Red maple	89	15	89	23
White birch	42	4	33	8
White pine	37	7	33	5
Red oak	32	4	100	22
White spruce	32	3	11	3
Black spruce	26	4	22	8
Balsam fir	16	10	11	7
Trembling aspen	16	0.1	11	5
Red spruce	11	19	11	3
Gray birch	11	1	11	4
Red pine	5	0.1	11	0.1
<b>Tree Layer (Mean % Cover)</b>	<b>91</b>		<b>91</b>	
Red maple	95	5	78	6
Balsam fir	79	5	89	3
Serviceberry	79	0.7	56	0.1
Velvet-leaf blueberry	74	3	67	5
Wild raisin	74	2	56	0.4
Lambkill	68	11	89	16
Red oak	68	2	89	0.7
Lowbush blueberry	53	3	33	0.5
Black spruce	53	2	67	8
White pine	53	1	56	0.8
Witch-hazel	37	2	44	17
Striped maple	37	1		
Bush-honeysuckle	37	0.3		
Huckleberry	26	38	44	30
Beaked hazelnut	26	4		
White spruce	26	2		
Large-tooth aspen	26	0.2	56	0.8
Red spruce	21	1	22	0.8
Fly-honeysuckle	21	0.2	22	0.8
Inkberry			22	25
<b>Shrub Layer (Mean % Cover)</b>	<b>40</b>		<b>59</b>	
Bracken	95	12	89	8
Sarsaparilla	95	5	67	8
Wild lily-of-the-valley	89	1	67	1
Starflower	74	2	100	1
Teaberry	63	13	89	7
Partridge-berry	63	5	33	0.5
Bunchberry	63	3	56	3
Ground pine	42	1		
Mayflower	42	1	22	0.1
Pink lady's-slipper	42	0.1	56	0.1
Round-leaved pyrola	37	0.5		
Ghost pipe	37	0.1		
Wood aster	32	1	22	0.2
Cucumber root	32	0.2	22	0.3
Painted trillium	32	0.1		
Bluebead lily	21	0.5	67	0.2
Cow wheat	21	0.1	22	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>35</b>		<b>23</b>	
Schreber's moss	68	0.7	56	0.5
Broom moss	63	0.7	56	0.8
Log moss	53	0.8	56	2
Wavy dicranum	11	1	56	0.2
Stair-step moss	11	0.1	22	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>2</b>		<b>3</b>	



scattered across mainland Nova Scotia on a variety of soils with low nutrient status. Large tooth aspen is generally limited to somewhat warmer areas of the province.

**Successional Dynamics:** IH1 is an early-successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and harvesting. IH1 stands are typically dominated by even-aged, large-tooth aspen of clonal-origin. Short-lived aspen rapidly deteriorate due to natural senescence, with their mortality further accelerated by insect predation, disease and/or wind damage. Possible later successional VTs include IH2 (Red oak / Witch-hazel – Lambkill) and MW11 (Red oak – White pine / Teaberry).

**Ecological Features:** Regenerating aspen stands provide cover and forage for many wildlife species. Moose and deer feed on aspen leaves and twigs, ruffed grouse eat its winter buds, snowshoe hare and mice consume bark and twigs from the tree, and beavers make the bark a dietary staple. Resin from aspen buds is the primary source for bee propolis, an essential hive material. Older aspen trees provide soft snags and cavities for several bird and smaller mammal species. Aspen also support many insects, most notably the forest tent caterpillar, which is an important food for many birds and small mammals. Tree species richness is notably high.



Lambkill in flower

# IH2

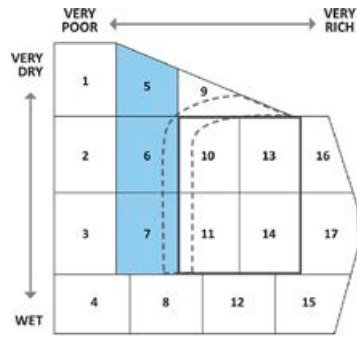
## Red oak / Witch-hazel – Lambkill

*Quercus rubra* / *Hamamelis virginiana* – *Kalmia angustifolia*

### IH2a Red maple variant *Acer rubrum*

**Concept:** A partial to closed canopy (35-80%) of red oak dominates this Vegetation Type (VT). The red maple variant (IH2a) describes an overstory dominated by shade-intolerant hardwoods and less abundant red oak. Red oak / Witch-hazel – Lambkill usually follows stand-replacing disturbance and is common in the Western ecoregion. Occurrences of the woodland OW5 (Red oak / Huckleberry / Cow-wheat – Rice grass / Reindeer lichen) are sometimes embedded within an IH2 stand.

**Vegetation:** White birch, large-tooth aspen and a scattering of black spruce and white pine are associated with the dominant overstory species. Often white pine occur as a super canopy. These relict



#### Site & Soil Characteristics

Slope Position: Upper<sup>6</sup> Middle<sup>3</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>4</sup>  
 (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>4</sup> Slightly<sup>4</sup> Other<sup>2</sup>  
 Drainage: Well<sup>7</sup> Moderately well<sup>2</sup> Other<sup>1</sup>

Common Soil Types: 2, 2L, 6, 1, 5, 2C  
 Rooting Depth (cm): (<30)<sup>1</sup> (30–45)<sup>3</sup> (>45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>4</sup> (6–10)<sup>4</sup> (11–20)<sup>1</sup> nd<sup>1</sup>  
 Humus Form: Mormoder<sup>4</sup> Hemimor<sup>2</sup> Humimor<sup>2</sup> Other<sup>2</sup>

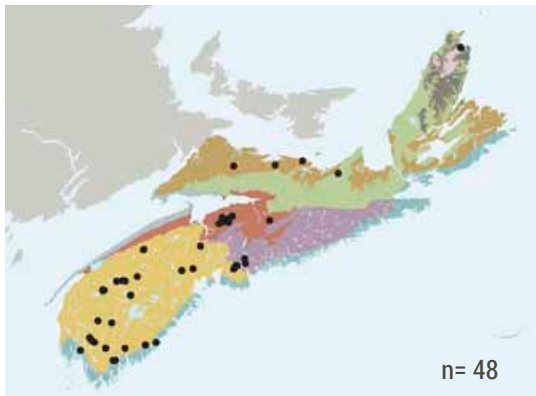


trees are usually survivors of past disturbance events. The shrub layer is well developed, often including wild raisin, velvet-leaf blueberry, witch-hazel and lambkill, along with regenerating trees (especially red oak, red maple, balsam fir and white pine). In the herbaceous layer, species indicative of poor, dry conditions include bracken, teaberry, round-leaved pyrola, mayflower, pink lady's slipper and. princes'-pine. The bryophyte layer is poorly developed.

**Environmental Setting:** IH2 is mainly associated with dry to fresh, nutrient poor soils of glacial origin. Surface stoniness, especially from granite boulders, can be quite common and extensive. This VT is abundant throughout the Western ecoregion, especially in the South Mountain, Western Barrens and Sable ecodistricts. It is also occasionally found in central Nova Scotia on a variety of soils with low nutrient availability.

Holden Lake,  
Lunenburg County

Characteristic Plants	IH2		IH2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red oak	100	58	100	25
Red maple	97	13	100	32
White birch	42	7	71	11
White pine	39	4	50	5
Black spruce	36	4	29	7
Large-tooth aspen	24	9	21	10
Balsam fir	21	7	57	9
Red spruce	9	2	21	8
Trembling aspen	6	3	14	8
Yellow birch	3	15	29	4
Beech	3	15	14	17
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>		<b>85</b>
Red maple	94	4	93	3
Lambkill	82	9	43	8
Red oak	79	3	100	2
Wild raisin	64	1	57	0.3
Velvet-leaf blueberry	61	7	64	4
Balsam fir	61	4	71	8
White pine	61	3	71	0.7
Lowbush blueberry	58	9	21	4
Black spruce	58	6	57	4
Witch-hazel	55	9	36	15
Huckleberry	46	21	29	20
Serviceberry	42	0.2	50	0.4
Striped maple	21	3	50	6
Red spruce	21	1	50	2
Mountain holly	12	0.1	29	0.3
Beech	9	3	29	4
<b>Shrub Layer (Mean % Cover)</b>		<b>49</b>		<b>39</b>
Starflower	94	1	86	0.9
Bracken	91	8	86	9
Teaberry	82	12	64	3
Sarsaparilla	79	2	93	3
Bunchberry	61	1	79	3
Wild lily-of-the-valley	55	0.7	86	1
Mayflower	49	0.9	50	0.2
Partridge-berry	46	0.5	57	0.3
Ghost pipe	42	0.1	29	0.1
Cucumber root	39	0.3	57	0.1
Rice grass	39	0.1	7	0.1
Bluebead lily	27	0.1	43	0.4
Cow wheat	24	0.1		
Pink lady's-slipper	21	0.1	36	0.1
Princes'-pine	15	2	29	0.2
Goldthread	12	3	71	1
Wood aster	12	0.3	57	0.3
Hay-scented fern	6	22	36	2
Cinnamon fern	6	0.1	36	1
Rose twisted stalk	6	0.1	36	0.1
Ground pine			36	2
<b>Herb Layer (Mean % Cover)</b>		<b>29</b>		<b>25</b>
Schreber's moss	73	2	64	3
Broom moss	73	1	71	2
Log moss	61	4	64	3
Hair-cap moss	39	1	50	1
Stair-step moss	24	0.6	50	2
Grey reindeer lichen	21	4	14	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>7</b>		<b>7</b>



**Successional Dynamics:** Relatively dry, nutrient poor soils create an edaphic climax community dominated by red oak, white pine and black spruce. Historically, light understory fires reduced fuel loads and maintained a red oak and white pine overstory. Although the role of low intensity fires in red oak regeneration and development is not well understood, it appears to be an important component of successional history in some stands. IH2 can develop from early-successional stands dominated by large-tooth aspen and white birch and once established it can persist, as described, or transition to SP9 (Red oak – White pine / Teaberry). As the potential role of fire is reduced through fire suppression, the abundance of white pine and black spruce are predicted to increase.

**Ecological Features:** Red oak is a valuable hard mast food source for small mammals, bear, ruffed grouse and deer. This tree is also capable of attaining significant height and diameter promoting the development of large diameter cavity trees, snags, and eventually large coarse woody material; these stand features collectively provide key habitat, nutrient recycling, and moisture retention functions. Oak is the preferred host of maitake (or hen-of-the-woods) mushroom. Cancer root, a rare parasitic plant that steals nutrients and water from the roots of its host (usually red oak), is occasionally found in this ecosystem. Tree species richness is notably high.



Witch hazel  
in flower

# IH3

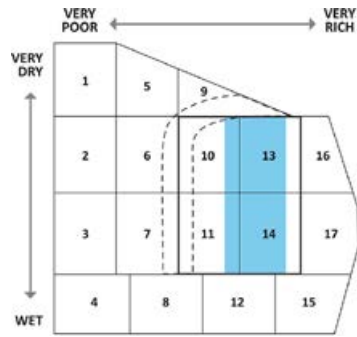
## Large-tooth aspen / Christmas fern – New York fern

*Populus grandidentata* /  
*Polystichum acrostichoides* – *Parathelypteris noveboracensis*

IH

**Concept:** These closed canopy forest are strongly dominated by large-tooth aspen, though the VT is sometimes mixed with trembling aspen. It is similar to IH1 (Large-tooth aspen / Lambkill / Bracken) but is found on richer sites, and supports different herbaceous and tree species composition. Large-tooth aspen / Christmas fern – New York fern usually follows stand-replacing disturbance events such as fire, windthrow or clear-cutting. Most large-tooth aspen originates as vegetative regeneration from root suckers.

**Vegetation:** Red maple is usually scattered in most stands, co-occurring with sugar maple, yellow birch, white ash, balsam fir and red spruce (among other tree species). The shrub layer is moderately developed and includes regenerating trees, fly-honeysuckle, striped maple and wild raisin. The herbaceous layer includes many plants indicative of moist and/or fertile site conditions, including interrupted fern, New York fern, sensitive fern, bladder sedge, Christmas fern, lady fern, oak fern and large-leaved aster. The bryophyte layer is poorly developed.



### Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Middle<sup>4</sup> Lower<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>1</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>4</sup> Strongly<sup>3</sup> Moderately<sup>1</sup> Other<sup>2</sup>  
 Drainage: Moderately Well<sup>5</sup> Imperfect<sup>2</sup> Well<sup>1</sup> Other<sup>2</sup>

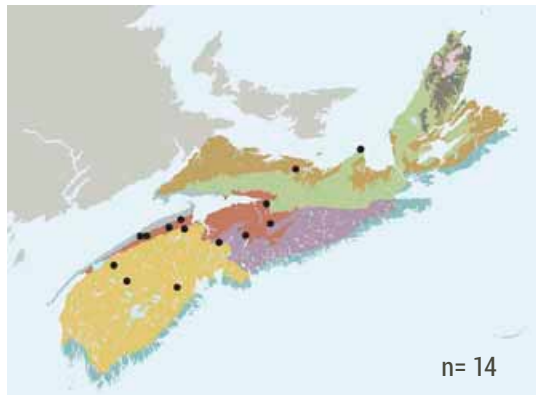
Common Soil Types: 12, 8, 2L, 11, 9  
 Rooting Depth (cm): (30–45)<sup>4</sup> (> 45)<sup>4</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>5</sup> (6–10)<sup>4</sup> nd<sup>1</sup>  
 Humus Form: Mull<sup>1</sup> Hydromull<sup>1</sup> Vermimull<sup>1</sup> Mormoder<sup>1</sup> nd<sup>6</sup>

**Environmental Setting:** IH3 is mainly associated with fresh to moist, nutrient medium to rich soils of variable texture on middle to lower slope

Lily Lake, Annapolis County



Characteristic Plants	IH3	
	Freq. (%)	Cover (%)
Large-tooth aspen	100	55
Red maple	86	11
Balsam fir	57	8
Red spruce	43	7
Sugar maple	43	6
White ash	43	5
Yellow birch	36	6
Red oak	36	5
White birch	36	4
Beech	29	13
White pine	29	2
Trembling aspen	14	38
White spruce	14	8
Hemlock	14	1
<b>Tree Layer (Mean % Cover)</b>	<b>93</b>	
Balsam fir	93	4
Red maple	79	0.4
Fly-honeysuckle	64	0.7
Striped maple	57	3
Beech	50	3
Sugar maple	50	0.8
White pine	50	0.1
Red spruce	43	2
Large-tooth aspen	43	1
Serviceberry	43	0.4
Wild raisin	43	0.2
Red oak	43	0.1
White ash	36	2
Yellow birch	29	7
Velvet-leaf blueberry	21	0.4
<b>Shrub Layer (Mean % Cover)</b>	<b>14</b>	
Wild lily-of-the-valley	93	2
Starflower	86	1
Sarsaparilla	79	3
Hay-scented fern	64	3
New York fern	64	1
Christmas fern	64	1
Wood aster	64	0.5
Bracken	57	2
Bluebead lily	57	1
Interrupted fern	50	0.7
Drooping wood sedge	43	0.2
Evergreen wood fern	43	0.1
Violets	43	0.1
Oak fern	36	1
Asters	29	0.1
Rose twisted stalk	29	0.1
Bristly club-moss	21	0.7
Sensitive fern	21	0.5
Herb Layer (Mean % Cover)	14	
Broom moss	79	0.5
Hair-cap moss	71	0.4
Schreber's moss	64	0.5
Stair-step moss	57	3
Log moss	43	0.6
Fern moss	36	0.1
Wavy dicranum	29	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>6</b>	



positions, where seepage contributes to soil enrichment. This VT is found primarily in the Western ecoregion (700) and is scattered elsewhere in central Nova Scotia.

**Successional Dynamics:** IH3 is an early-successional VT that follows stand-level disturbances. Typical disturbance agents include fire, windthrow and harvesting. IH3 stands are usually dominated by even-aged, large-tooth aspen of clonal-origin. These short-lived trees eventually deteriorate due to natural senescence, with their mortality further accelerated by insect predation, disease and/or wind damage. A mix of shade-tolerant softwoods and hardwoods in the shrub layer allows for a range of possible successional pathways resulting in subsequent softwood or mixedwood forests dominated by red spruce and yellow birch. Transition to late-successional tolerant hardwood forests is also possible.

**Ecological Features:** Many of the same species that use IH1 also use this VT for cover and foraging. Heart rot is common in older aspen and this feature promotes the development of large diameter snags and cavity trees that can be used for nesting and denning habitat.

Once these large trees fall, they also provide habitat for amphibians, small mammals, invertebrates, fungi, lichen and various bryophytes.



New York fern  
(John Gillis)



# IH4

## Trembling aspen / Wild raisin / Bunchberry

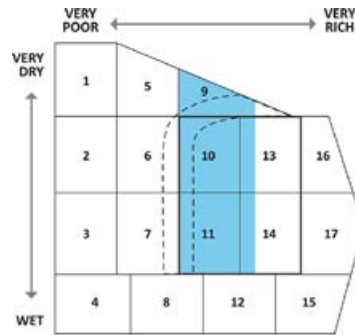
*Populus tremuloides* / *Viburnum cassinoides* / *Cornus canadensis*

IH

### IH4a Red maple variant *Acer rubrum*

**Concept:** This closed canopy forest follows stand-replacing disturbances events such as fire, windthrow or clearcutting and is strongly dominated by trembling aspen. The variant IH4a occurs when red maple is abundant to co-dominant. There is a well-developed understory of woody shrubs and herbaceous plants, but reduced bryophyte cover.

**Vegetation:** Red maple, white birch, and sometimes large-tooth aspen, are the most common hardwoods associated with this VT. However, most stands have a small presence of softwood species in the overstory such as balsam fir, red, white and/or black spruce, and white pine; these trees are often remnants from the previous successional stage. The shrub layer includes



#### Site & Soil Characteristics

Slope Position:	Level <sup>5</sup> Upper <sup>3</sup> Lower <sup>1</sup> Middle <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Slightly <sup>4</sup> Moderately <sup>2</sup> Strongly <sup>2</sup> Other <sup>2</sup>
Drainage:	Imperfect <sup>5</sup> Moderately Well <sup>3</sup> Well <sup>2</sup>
Common Soil Types:	6, 2, 3
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>5</sup> (> 45) <sup>1</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>5</sup> (11–20) <sup>1</sup> nd <sup>2</sup>
Humus Form:	Mormoder <sup>3</sup> Hemimor <sup>3</sup> Humimor <sup>3</sup> Mullmoder <sup>1</sup>



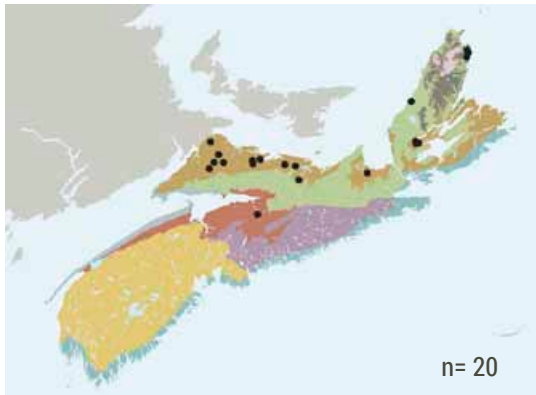
wild raisin, lambkill and blueberry species as well as balsam fir and red maple regeneration. The most abundant herbs are common upland forest flora including bunchberry, starflower and wild lily-of-the-valley. Bryophyte establishment is limited by deciduous tree leaf litter and poorly developed, but Schreber’s moss and broom moss are usually present with low abundance.

**Environmental Setting:** IH4 is mainly associated with fresh to moist, nutrient medium soils of glacial origin. This VT is found primarily in the Valley/Central and Northumberland/Bras d’Or Lowlands ecoregions, where it may cover extensive areas, depending on the extent of the originating disturbance.

**Successional Dynamics:** IH4 is an early-successional VT that typically follows stand-level disturbances in softwood forests. Disturbance agents include fire, windthrow and harvesting.

Bayhead, Colchester County

Characteristic Plants	IH4		IH4a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Trembling aspen	100	54	100	38
Red maple	87	8	100	29
Balsam fir	60	18	50	9
White spruce	53	2	83	8
White birch	47	12	50	7
Black spruce	40	6	33	10
Red spruce	27	8	17	4
Large-tooth aspen	20	7	17	4
White pine	20	3	17	4
White ash	20	0.1	17	0.1
<b>Tree Layer (Mean % Cover)</b>	<b>85</b>		<b>85</b>	
Red maple	93	8	100	6
Balsam fir	87	7	100	4
Wild raisin	87	2	67	0.5
Trembling aspen	60	3	100	0.7
Velvet-leaf blueberry	40	14	50	9
Lambkill	40	5	67	6
Serviceberry	40	0.5	33	0.3
White pine	40	0.4	33	0.3
Lowbush blueberry	33	4	50	3
Black spruce	33	1	67	2
White ash	33	0.5	33	0.3
Striped maple	27	10	67	2
Bush-honeysuckle	27	2		
Mountain holly	27	0.3	33	1
Mountain-ash	27	0.1	33	0.1
White spruce	20	2	67	2
Red oak	20	0.1	50	0.2
Beaked hazelnut	13	2	50	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>34</b>		<b>25</b>	
Bunchberry	80	13	83	9
Wild lily-of-the-valley	80	1	100	6
Starflower	80	0.7	100	2
Wood aster	60	0.6	33	0.4
Twinflower	53	4	17	4
Sarsaparilla	53	2	83	6
Bracken	47	9	83	15
Evergreen wood fern	40	0.6	50	0.9
Bluebead lily	40	0.4	33	2
Goldthread	40	0.1	67	0.3
Cinnamon fern	33	5	33	0.1
Interrupted fern	33	0.8	83	1
Shinleaf	33	0.1	17	0.1
Large-leaved aster	27	18	17	0.1
Teaberry	27	4	50	1
Dwarf raspberry	27	0.6	33	0.6
Drooping wood sedge	27	0.1		
Partridge-berry	20	0.8	67	8
New York fern	20	0.1	50	2
<b>Herb Layer (Mean % Cover)</b>	<b>29</b>		<b>45</b>	
Schreber's moss	67	3	83	3
Broom moss	60	0.6	50	0.5
Stair-step moss	53	2	67	0.6
Bazzania	53	0.9	33	0.2
Shaggy moss	40	2	50	0.5
Wavy dicranum	40	0.2	33	0.4
Hair-cap moss	33	4	67	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>7</b>		<b>5</b>	



IH4 stands are usually dominated by even-aged, trembling aspen of clonal-origin. These short-lived aspen eventually deteriorate, due to natural senescence, with their mortality further accelerated by insect predation (e.g. forest tent caterpillar), disease (e.g. hypoxylon canker) and/or wind damage. Possible successional forests, following this VT, include those of the Spruce Hemlock and Spruce Pine Forest Groups. Balsam fir can have a significant presence in both in the overstory and understory, facilitating the VT's transition to a later successional stage.

**Ecological Features:** Trembling aspen ecosystems provide similar biodiversity values as those dominated by large-tooth aspen. Dense, younger stands supply nesting, rearing and protective habitat for many bird (several warbler species and other song birds) and small mammal species. The tree also acts as a “nurse crop” for later successional tree species that usually grow up through the declining aspen. This successional pattern results in two-layered stands, increasing vertical structure and providing unique mid-canopy habitat conditions, before the aspen component is overtaken and dies out. The short life span of aspen and rapid decomposition of dead and downed materials characterizes the tree's exemplary role as a nutrient recycler within this early-successional ecosystem.



Bunchberry

# IH5

## Trembling aspen – White ash / Beaked hazelnut / Christmas fern

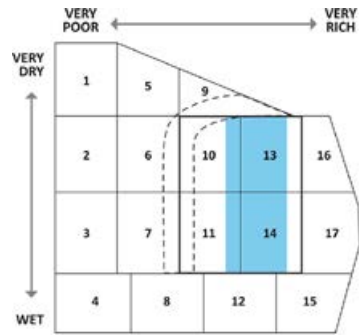
*Populus tremuloides* – *Fraxinus americana* /  
*Corylus cornuta* / *Polystichum acrostichoides*

IH

**Concept:** This closed canopy Vegetation Type (VT) has an overstory co-dominated by trembling aspen and white ash with lesser amounts of red maple and yellow birch. It is similar to IH4 (Trembling aspen / Wild raisin / Bunchberry) but is found on somewhat richer sites, as evidenced by associated shifts in herbaceous and tree species composition. Trembling aspen – White ash / Beaked hazelnut / Christmas fern usually follows stand-replacing disturbance events such as fire, windthrow or clearcutting.

**Vegetation:** Red maple and balsam fir are common associates in the overstory with scattered occurrences of later successional tree species such as sugar maple, yellow birch, red spruce and hemlock. The shrub layer is moderately developed and includes regenerating white ash and balsam fir along with beaked hazelnut and fly-honeysuckle. The herbaceous layer has many plants indicative of moist and/or fertile site conditions including interrupted fern, New York fern, sensitive fern, Christmas fern, large-leaved aster and dwarf raspberry. Although the bryophyte layer is poorly developed, shaggy moss and stair-step moss are usually present.

**Environmental Setting:** IH5 is mainly associated with moist, nutrient medium to rich soils of variable texture. The diverse fern layer is indicative of higher soil fertility. This VT is found primarily in the Valley/Central and Northumberland/Bras d’Or Lowlands ecoregions.



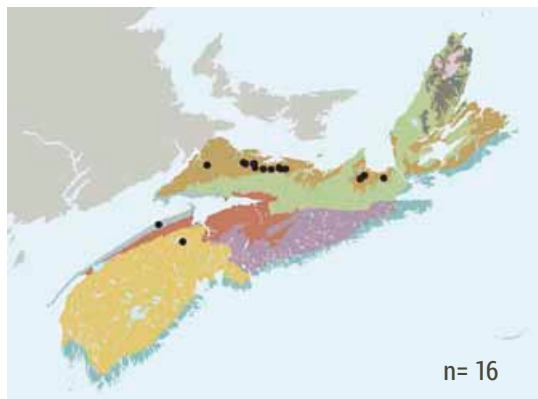
### Site & Soil Characteristics

Slope Position:	Middle <sup>6</sup> Lower <sup>3</sup> Level <sup>1</sup> Upper <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>9</sup> (Moderately) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Slightly <sup>5</sup> Moderately <sup>4</sup> Strongly <sup>1</sup>
Drainage:	Imperfect <sup>7</sup> Moderately Well <sup>2</sup> Well <sup>1</sup>
Common Soil Types:	6, 9, 12, 8
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>1</sup> nd <sup>6</sup>
Forest Floor (cm):	(0–5) <sup>6</sup> (6–10) <sup>3</sup> nd <sup>1</sup>
Humus Form:	Mormoder <sup>3</sup> Vermimull <sup>3</sup> Mullmoder <sup>2</sup> Hemimor <sup>1</sup> Other <sup>1</sup>



Angevine Lake,  
Cumberland County

Characteristic Plants	IH5	
	Freq. (%)	Cover (%)
Trembling aspen	100	60
Red maple	88	18
White ash	75	8
Balsam fir	63	22
White spruce	38	7
Yellow birch	38	2
Red spruce	31	6
Hemlock	31	5
Sugar maple	25	2
White birch	25	2
Ironwood	13	2
<b>Tree Layer (Mean % Cover)</b>	<b>98</b>	
Balsam fir	94	7
White ash	88	5
Trembling aspen	69	2
Fly-honeysuckle	63	2
Beaked hazelnut	56	3
Red maple	56	2
Serviceberry	50	0.4
Striped maple	50	0.4
Wild raisin	50	0.1
Red spruce	44	0.5
Sugar maple	25	4
White spruce	25	2
White pine	25	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>20</b>	
Interrupted fern	94	2
Wild lily-of-the-valley	94	1
Starflower	88	0.4
New York fern	69	8
Sarsaparilla	69	3
Evergreen wood fern	69	2
Wood aster	63	4
Bunchberry	63	1
Christmas fern	63	0.4
Oak fern	56	0.9
Lady fern	50	6
Large-leaved aster	50	0.2
White panicle aster	44	0.4
Northern beech fern	38	4
Dwarf raspberry	38	2
Goldthread	38	1
Bracken	38	1
Partridge-berry	38	0.8
Short husk	38	0.5
Common speedwell	31	0.1
Sensitive fern	25	8
Bluebead lily	25	0.2
Cinnamon fern	25	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>27</b>	
Shaggy moss	63	5
Stair-step moss	56	8
Broom moss	56	0.4
Schreber's moss	50	3
Log moss	44	3
Bazzania	44	0.5
Hair-cap moss	25	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>11</b>	



**Successional Dynamics:** IH5 is an early- to mid-successional VT that follows stand-level disturbances in both softwood and hardwood forests. Typical disturbance agents include fire, windthrow and tree harvesting. IH5 stands are typically dominated by even-aged, trembling aspen of clonal-origin. Depending on the intensity of disturbance, aspen may perpetuate as an overstory component with little successional advancement of the stand. However, short-lived aspen deteriorate quickly due to natural senescence, insect predation, disease and/or wind damage. Later successional VTs are likely to remain hardwood dominated although over time; the presence of balsam fir and red spruce may move some stands to a mixedwood forest condition.

**Ecological Features:** This forest ecosystem typically occurs on moist, rich soils where organic matter has been incorporated into the upper soil horizon by earthworms. Earthworms are an important food source for moles, shrews, woodcock, robins and other vermivores. In addition, this VT provides similar habitat values as IH4. Tree species richness is relatively high.



Bristly club-moss

# IH6

## White birch – Red maple / Sarsaparilla – Bracken

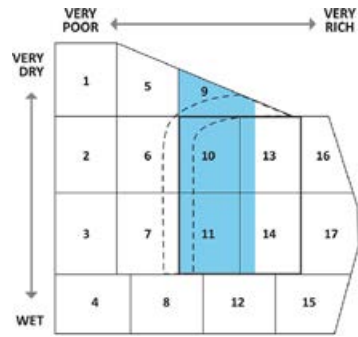
*Betula papyrifera* – *Acer rubrum* / *Aralia nudicaulis* – *Pteridium aquilinum*

### IH6a Aspen variant

*Populus grandidentata* – *Populus tremuloides*

### IH6b White birch variant *Betula papyrifera*

**Concept:** Shade-intolerant hardwood dominate this closed canopy Vegetation Type (VT). The typical community is predominantly white birch and red maple. The IH6a variant describes stands where aspen (trembling and/or large-tooth) is abundant and co-dominant with birch and maple. Variant IH6b is strongly dominated by white birch to the near exclusion of red maple and aspen. The VT establishes after stand-level disturbance events such as fire, windthrow or clearcutting on well drained ecosites of moderate fertility. IH 8 (White birch – Red maple / Huckleberry – Lambkill / Bracken) has a similar overstory but is found on very poor ecosites with significant ericaceous woody shrub cover.



### Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Middle <sup>3</sup> Lower <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> Other <sup>1</sup>
Microtopography:	Moderately <sup>5</sup> Slightly <sup>3</sup> Strongly <sup>2</sup>
Drainage:	Well <sup>6</sup> Moderately Well <sup>2</sup> Imperfect <sup>1</sup> Other <sup>1</sup>
Common Soil Types:	2, 2L, 3, 1, 6, 8, 3L, 5, 2C
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>3</sup> (> 45) <sup>3</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>4</sup> (6–10) <sup>4</sup> nd <sup>2</sup>
Humus Form:	Mormoder <sup>3</sup> Hemimor <sup>2</sup> Humimor <sup>1</sup> Other <sup>4</sup>

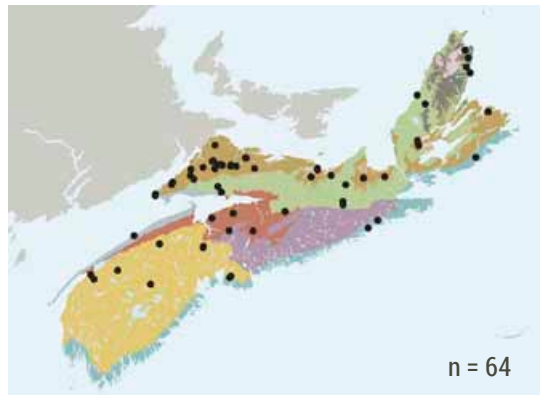


**Vegetation:** In addition to the dominant, shade-intolerant hardwood overstory, softwood species such as balsam fir, white spruce and black spruce are common. Other species such as red spruce, white pine and yellow birch can be present, occurring as remnants of previous stands. The shrub layer is well developed and includes regenerating tree species and a variety of tall woody shrubs such as striped maple, wild raisin and beaked hazelnut. Upland forest flora such as bunchberry, sarsaparilla, bracken and club-mosses are common. The bryophyte layer is usually poorly developed, but often contains patches of Schreber’s moss, log moss and hair-cap moss on recently disturbed soil.

**Environmental Setting:** IH6 is associated with a range of site conditions ranging from relatively dry, coarse textured soils of medium fertility to relatively moist, richer, fine textured soils. This VT is common and widespread throughout the province and is the most common white birch VT in the Acadian Forest of Nova Scotia.

Black Lake, Cumberland County

Characteristic Plants	IH6		IH6a		IH6b	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red maple	100	33	92	32	91	10
White birch	97	35	92	26	100	60
Balsam fir	42	13	33	13	36	14
Yellow birch	33	8	25	12	18	16
Sugar maple	27	8	17	9	18	9
White spruce	27	7	17	4		
White pine	24	2	8	4	9	0.1
Red spruce	18	5	33	8	46	5
Beech	15	7	8	5		
Trembling aspen	15	5	42	24		
Black spruce	15	3	8	10	18	1
Gray birch	9	7	25	8		
Large-tooth aspen	9	3	67	19	18	9
<b>Tree Layer (Mean % Cover)</b>	<b>84</b>		<b>93</b>		<b>84</b>	
Balsam fir	79	7	67	6	100	5
Red maple	67	10	75	4	73	1
Striped maple	67	5	50	6	64	2
Wild raisin	58	2	83	2	55	1
Lowbush blueberry	49	2	42	2	27	10
Serviceberry	46	0.3	83	0.6	64	0.9
Sugar maple	42	2			18	2
White pine	39	1	42	0.2	27	0.7
Velvet-leaf blueberry	36	7	58	5	73	12
Fly-honeysuckle	36	0.2			9	0.1
Black spruce	33	4	50	0.7	64	5
Lambkill	33	4	67	6	73	8
Red spruce	27	4	33	2	73	4
Beaked hazelnut	27	2	58	6	27	0.2
Red oak	21	2	58	0.2	18	0.1
Witch-hazel	12	5	42	0.2	18	8
Bush-honeysuckle	12	0.2	42	0.1	9	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>31</b>		<b>26</b>		<b>35</b>	
Wild lily-of-the-valley	91	2	100	1	73	3
Starflower	88	1	75	1	91	0.5
Sarsaparilla	76	2	83	4	82	3
Bunchberry	70	11	75	2	91	14
Evergreen wood fern	61	4	42	0.7	9	0.1
Bracken	55	11	92	11	82	7
Wood aster	55	0.5	33	0.4	64	0.5
Bluebead lily	50	2	42	0.2	36	0.4
Goldthread	49	5	42	1	27	7
Ground pine	49	0.4	75	0.1	46	2
Bristly club-moss	46	2	17	0.3	46	3
Twinflower	42	2	17	0.3	27	7
Partridge-berry	39	0.2	83	2	36	18
Painted trillium	36	0.1	42	0.1	27	0.1
New York fern	27	7	25	11	18	0.1
Hay-scented fern	24	10	8	2	55	18
Teaberry	15	13	58	14	36	18
Round-leaved pyrola	9	0.5	42	0.1	9	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>37</b>		<b>34</b>		<b>55</b>	
Schreber's moss	79	3	75	1	82	7
Broom moss	73	0.8	83	1	91	1
Hair-cap moss	61	1	83	1	55	2
Log moss	58	1	58	2	46	0.6
Bazzania	39	1	25	0.3	46	0.5
Stair-step moss	30	1	25	0.3	36	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>6</b>		<b>5</b>		<b>10</b>	



**Successional Dynamics:** IH6 is an early-successional VT of shade-intolerant hardwoods that follows stand-level disturbances in both softwood and hardwood forests. Regeneration is by seed or coppice. Typical disturbance agents include fire, windthrow and tree harvesting. With time, short-lived white birch and aspen deteriorate due to natural senescence, and the effects of insects and disease and/or wind damage. These factors contribute to the creation of canopy openings, facilitating recruitment of shade-tolerant, late-successional species in the understory.

White birch stems are sensitive to rapid increases in sunlight and heat (which most often occurs after a partial stand disturbance), and which eventually leads to tree mortality. Red maple has greater longevity and shade tolerance, both of which facilitate its persistence into later successional stages. The presence of other canopy and understory species, particularly residual trees from pre-disturbance conditions, should be used to assess likely successional trends.

**Ecological Features:** Red maple flowers before most other spring plants, providing an early and abundant source of pollen and nectar for a wide range of insects. Both dominant canopy species, but red maple in particular, are favoured as browse for deer and moose. In younger developmental classes, IH6 can form dense thickets that provide important nesting habitat for a wide variety of birds including many migratory species. IH6 is often the first VT to occupy sites following severe disturbance, and the rapid growth, deep rooting habit and abundant leaf litter characteristic of canopy tree species, helps maintain overall site nutrient retention.

# IH7

## Red maple / Hay-scented fern – Wood-sorrel

*Acer rubrum* / *Dennstaedtia punctilobula* – *Oxalis montana*

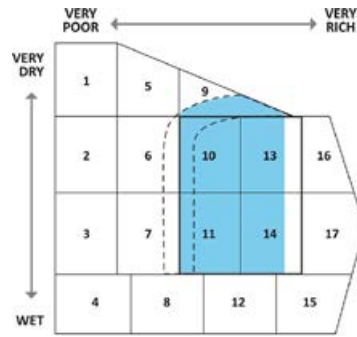
IH

**Concept:** A closed canopy dominated by red maple and lesser amounts of several shade-tolerant associates, including sugar maple, yellow birch and/or red spruce, defines this common and widespread Vegetation Type (VT). A well-developed and diverse herbaceous layer is indicative of mesic Nova Scotia late-successional hardwood forests. Red maple / Hay-scented fern – Wood-sorrel usually follows stand-replacing disturbances events such as fire, windthrow or clearcutting, but it can also result from partial harvesting within hardwood forests.

**Vegetation:** A variety of associates may occupy a minor proportion of the canopy including yellow birch, white birch, white ash and balsam fir. The shrub layer is moderately developed and includes regenerating trees (including balsam fir), fly-honeysuckle, mountain holly and striped maple. The herbaceous layer is dominated by several species of ferns, most notably hay-scented fern which can strongly dominate in open, disturbed sites, reducing success of tree seedlings. Other common species include New York fern, evergreen wood fern, rose twisted stalk, cucumber root, wood aster, wood-sorrel, bristly and shining club-moss, and various violet species. The bryophyte layer is poorly developed.

**Environmental Setting:** IH7 is associated with fresh to fresh-moist, nutrient medium to slightly rich soils of variable texture. This VT is found scattered throughout Nova Scotia, and is particularly common on middle to upper slope positions.

**Successional Dynamics:** IH7 is usually expressed as an early- to mid-successional VT that follows stand-level disturbance events in hardwood forests. However red maple's longevity and relatively high shade-tolerance facilitates its persistence into later successional stages on some ecosites; in these circumstances, the VT is considered a mid-late successional forest. The main disturbance



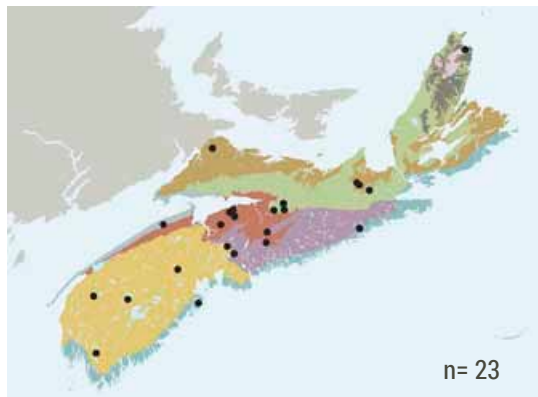
### Site & Soil Characteristics

Slope Position:	Level <sup>3</sup> Middle <sup>3</sup> Upper <sup>3</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Slightly <sup>4</sup> Moderately <sup>3</sup> Strongly <sup>2</sup> Other <sup>1</sup>
Drainage:	Moderately Well <sup>4</sup> Well <sup>3</sup> Imperfect <sup>3</sup>
Common Soil Types:	2L, 6, 5, 12, 2,
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>4</sup> (> 45) <sup>3</sup> nd <sup>2</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>3</sup> (11–20) <sup>4</sup> nd <sup>1</sup>
Humus Form:	Mormoder <sup>3</sup> Hemimor <sup>2</sup> Humimor <sup>2</sup> Other <sup>3</sup>



Tyndal Road, Cumberland County

Characteristic Plants	IH7	
	Freq. (%)	Cover (%)
Red maple	100	68
Yellow birch	43	7
Balsam fir	38	7
Red spruce	33	4
White ash	19	6
White birch	19	4
Black spruce	14	4
Sugar maple	14	3
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>
Balsam fir	95	6
Red maple	81	1
Yellow birch	67	2
Red spruce	48	3
White pine	48	0.8
Striped maple	43	2
White spruce	38	3
Mountain holly	38	0.6
Sugar maple	33	5
Velvet-leaf blueberry	33	4
Fly-honeysuckle	33	0.3
Wild raisin	29	0.7
Serviceberry	29	0.1
White ash	24	5
Beech	24	0.5
Lowbush blueberry	24	0.3
Beaked hazelnut	24	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>24</b>
Starflower	86	0.8
Evergreen wood fern	76	5
Goldthread	71	2
Wild lily-of-the-valley	67	1
Violets	67	0.5
Bunchberry	62	5
Partridge-berry	62	0.5
Hay-scented fern	57	42
New York fern	52	4
Cinnamon fern	52	0.6
Bluebead lily	52	0.1
Wood-sorrel	48	2
Sarsaparilla	48	0.9
Bracken	43	6
Wood aster	43	0.9
Ground pine	43	0.5
Cucumber root	43	0.3
Painted trillium	38	0.1
Bristly club-moss	33	4
Rose twisted stalk	33	0.1
Pink lady's-slipper	29	0.1
Short husk	29	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>53</b>
Log moss	57	2
Broom moss	57	1
Hair-cap moss	57	0.4
Bazzania	43	0.9
Schreber's moss	38	9
Stair-step moss	38	4
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>9</b>



agents are windthrow and harvesting, including partial harvesting treatments with low retention. These can all promote coppice red maple regeneration. Hay-scented fern's tendency to dominate the herbaceous layer, thereby limiting tree species regeneration, can be aggravated with canopy removal. This characteristic pattern of hay-scented fern growth will or may restrict and/or delay establishment of hardwood species such as sugar maple and yellow birch. With sufficient time, between disturbance events, this VT may succeed to later successional forests dominated by shade-tolerant hardwood and softwood, with a component of red maple. In more eastern regions of the province, red maple occupies an ecological niche similar to sugar maple, and replaces this species in late-successional hardwood forests including stands of old growth.

**Ecological Features:** Red maple regenerates quickly as coppice following stand-level disturbances creating a favoured browse of deer and moose. The tree also flowers before most other spring plants, providing an early and abundant source of pollen and nectar. Red maple is prone to breakage in storms. This creates an entry for heart-rot, for which the tree is highly susceptible. Heart-rot promotes the development of hollow stems suitable for vertebrate cavity nesting and denning. These hollows also create ideal locations for fungi, along with a variety of small vertebrates and invertebrates that utilize sheltered, cool and damp microhabitats.



Hay-scented fern



# IH8

## White birch – Red maple / Lambkill – Huckleberry

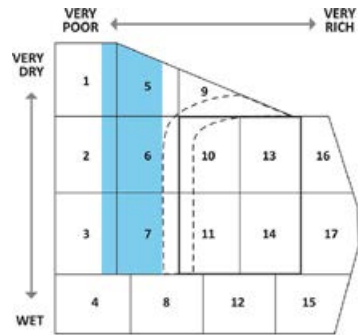
*Betula papyrifera* – *Acer rubrum* /  
*Kalmia angustifolia* – *Gaylussacia baccata*

IH

**Concept:** Shade-intolerant hardwoods dominate this partially closed canopy Vegetation Type (VT), which is further characterized by an extensive understory of ericaceous woody shrubs. Droughty, nutrient-limited soils are a major factor limiting tree growth. These conditions are reflected by the short stunted trees, many of which are excessively branched and of poor form, typically found in stands of IH8. Soils can be shallow to bedrock, with rock outcrops and surface boulders common. This VT follows stand-level disturbance events such as fire. IH6 (White birch – Red maple / Sarsaparilla – Bracken) has a similar overstory component but is found on upland ecosites with higher nutrient and moisture availability.

**Vegetation:** Other species, associated with the overstory of red maple and white birch, may include red oak and aspen and scattered pine (jack, red and white). The abundance and vigour of the ericaceous woody shrub layer is directly proportional to canopy openness. Witch hazel is also a frequent component of the shrub layer. Upland forest flora such as bracken, teaberry, pink lady's-slipper, mayflower and round-leaved pyrola further reflect the nutrient and moisture limitations of these sites. Leaf litter is a factor restricting bryophyte development but patches of Schreber's moss, log moss and hair-cap moss on recently disturbed soil are common.

Harrison Lake,  
Cumberland County

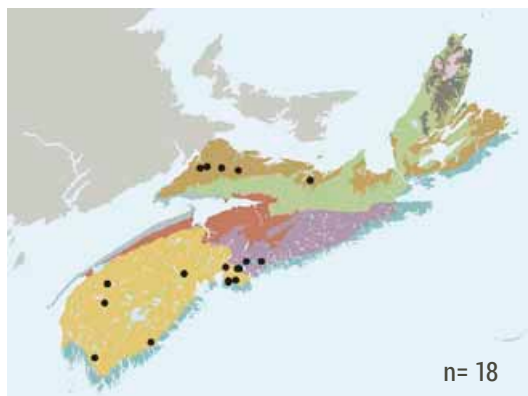


### Site & Soil Characteristics

Slope Position:	Upper <sup>6</sup> Middle <sup>3</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>3</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>3</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>7</sup> (Slightly – Moderately) <sup>3</sup>
Microtopography:	Slightly <sup>5</sup> Moderately <sup>3</sup> Level <sup>1</sup> Other <sup>1</sup>
Drainage:	Well <sup>6</sup> Moderately Well <sup>2</sup> Rapid <sup>1</sup> Other <sup>1</sup>
Common Soil Types:	2, 15, 1
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>3</sup> (> 45) <sup>1</sup> nd <sup>4</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>2</sup> (11–20) <sup>3</sup> (> 40) <sup>1</sup> nd <sup>2</sup>
Humus Form:	Humimor <sup>2</sup> Hemimor <sup>2</sup> Mormoder <sup>2</sup> Peaty Mor <sup>1</sup> nd <sup>3</sup>



Characteristic Plants	IH8	
	Freq. (%)	Cover (%)
Red maple	89	31
White birch	74	25
Black spruce	42	3
Red oak	32	22
White pine	26	5
White spruce	26	2
Gray birch	21	9
Trembling aspen	21	5
Large-tooth aspen	16	7
Heart-leaf birch	11	9
Balsam fir	11	5
Jack pine	11	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>64</b>
Lambkill	100	22
Velvet-leaf blueberry	89	14
Wild raisin	89	4
Huckleberry	74	45
Red maple	63	6
Black spruce	58	2
Balsam fir	53	2
Serviceberry	53	0.9
White pine	47	4
Witch-hazel	42	9
Red oak	42	5
Lowbush blueberry	37	7
Mountain holly	37	2
Gray birch	26	0.8
White spruce	21	3
Red spruce	21	3
Striped maple	21	0.4
Willows	21	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>93</b>
Bracken	100	19
Starflower	95	0.9
Bunchberry	89	6
Sarsaparilla	79	3
Teaberry	74	15
Pink lady's-slipper	74	0.4
Wild lily-of-the-valley	63	0.5
Mayflower	37	2
Goldthread	32	1
Partridge-berry	32	1
Cinnamon fern	26	3
Wood aster	26	0.5
Ground pine	26	0.1
Bluebead lily	21	0.4
Round-leaved pyrola	21	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>42</b>
Schreber's moss	89	2
Broom moss	47	2
Wavy dicranum	47	0.2
Log moss	42	6
Grey reindeer lichen	37	3
Hair-cap moss	26	0.5
Ladies' tresses	21	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>8</b>



**Environmental Setting:** IH8 is associated with upland ecosites ranging from very dry to fresh, and very poor to poor. Soils are coarse textured and often shallow to bedrock and/or with extensive surface coverage of stones and boulders. This VT is common throughout the Eastern (400) and Western (700) eco-regions and conspicuous along the Atlantic Coast (ecoregion 800).

**Successional Dynamics:** Although comprised of early-successional tree species, IH8 is unlikely to advance to late-successional ecosystems, comprised of shade-tolerant and long-lived trees, due to the extremely poor soils typical of this VT. In the absence of fire, this ecosystem will eventually deteriorate with old age, and the effects of insects, disease and windthrow. If disturbances create suitable seedbeds, black spruce, white pine and/or red oak may increase their presence on these ecosites. Otherwise the ericaceous layer will continue to increase in density, eventually limiting opportunities for forest renewal.

**Ecological Features:** This forest ecosystem may occur where abundant levels of granite and/or quartzite boulders occur near or at the surface. It is also common on landform complexes, characterized by alternating patterns of ridged bedrock (often called 'whalebacks') and poorly drained shrub or treed swamps. Cool, moist crevices among surface rocks provide excellent habitat for a variety of small rodents, snakes and amphibians. Larger rock complexes may provide sites for porcupine dens. Stands of this VT have not been well studied for rare plants, lichens, bryophytes or invertebrates. Birds such as the whip-poor-will and eastern towhee may prefer open stands of this VT. Tree and lichen species richness is relatively high.

# IH9

## Grey birch / Tall white aster / Hair-cap moss

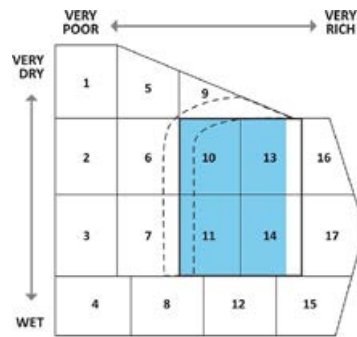
*Betula populifolia* / *Doellingeria umbellata* / *Polytrichum commune*

IH

**Concept:** This Vegetation Type (VT) is a pioneer community characterized by a prominent closed canopy of short-lived grey birch and a well-developed understory of perennial species, most of which are associated with agricultural land use. This VT is very quick to establish on clear-cut harvested old field forests but may also be found where pine and black spruce dominate pre-disturbance forests.

**Vegetation:** Other short-lived overstory associates include choke cherry, pin cherry and aspen. Neither the shrub or herbaceous layer has extensive coverage, although pockets of short shrubs and herbs can be prominent in larger canopy openings. Wild raisin, blueberries and meadowsweet are often present, but the diversity of shrub species on some sites can be notably higher. Similar patterns are expressed in the herbaceous layer, with asters, goldenrods, grasses,

Conns Mills, Cumberland County



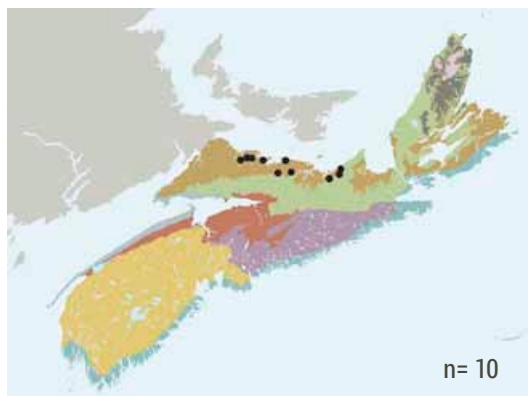
### Site & Soil Characteristics

- Slope Position: Level<sup>4</sup> Lower<sup>3</sup> Middle<sup>2</sup> Upper<sup>1</sup>
- Surface Stoniness: (Non - Slightly)<sup>10</sup>
- Bedrock Outcrop: (Non-rocky)<sup>10</sup>
- Microtopography: Moderately<sup>3</sup> Slightly<sup>3</sup> Level<sup>2</sup> Other<sup>2</sup>
- Drainage: Imperfect<sup>6</sup> Well<sup>2</sup> Moderately Well<sup>2</sup>
- Common Soil Types: 6, 8, 12, 9, 2, 2L
- Rooting Depth (cm): (< 30)<sup>3</sup> (30-45)<sup>3</sup> (> 45)<sup>1</sup> nd<sup>3</sup>
- Forest Floor (cm): (0-5)<sup>8</sup> (6-10)<sup>1</sup> nd<sup>1</sup>
- Humus Form: Vermimull<sup>2</sup> Mormoder<sup>1</sup> nd<sup>7</sup>

sedges and wild strawberry reflecting past agricultural land use. Hair-cap moss typifies recent soil disturbance and is usually the most abundant bryophyte.



Characteristic Plants	IH9	
	Freq. (%)	Cover (%)
Gray birch	100	64
Trembling aspen	70	6
Red maple	40	10
White birch	30	8
Balsam fir	30	6
Choke cherry	20	5
Pin cherry	10	6
White spruce	10	5
Red spruce	10	0.1
Tamarack	10	0.1
White pine	10	0.1
Yellow birch	10	0.1
<b>Tree Layer (Mean % Cover)</b>	<b>78</b>	
Red maple	100	0.7
Balsam fir	80	4
Gray birch	70	1
White meadowsweet	70	1
Trembling aspen	70	0.4
Wild raisin	60	3
Lowbush blueberry	60	2
Serviceberry	60	0.1
Velvet-leaf blueberry	40	1
Winterberry	40	0.5
Lambkill	40	0.3
White ash	40	0.2
Choke cherry	40	0.1
White spruce	30	9
Red raspberry	30	0.8
Mountain holly	30	0.7
<b>Shrub Layer (Mean % Cover)</b>	<b>17</b>	
Starflower	100	1
Tall white aster	90	8
Wild lily-of-the-valley	80	5
Rough goldenrod	80	2
Wood aster	80	1
Hawkweeds	70	1
Sarsaparilla	60	7
Evergreen wood fern	50	0.8
Strawberry	50	0.5
Dwarf raspberry	40	1
Bracken	40	0.4
Trailing blackberry	40	0.4
Common speedwell	40	0.3
Drooping wood sedge	40	0.3
Cinnamon fern	40	0.2
Bunchberry	30	7
Poverty grass	30	4
White-edge sedge	30	1
Calico aster	30	0.4
Wood rushes	30	0.3
<b>Herb Layer (Mean % Cover)</b>	<b>30</b>	
Schreber's moss	90	8
Hair-cap moss	80	18
Shaggy moss	60	1
Broom moss	50	0.8
Wavy dicranum	30	0.9
Ladies' tresses	30	0.4
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>26</b>	



**Environmental Setting:** IH9 is associated with upland ecosites ranging from fresh to moist, with medium fertility, and underlain by coarse to fine textured soils. This VT is common in the lowland ecoregions – Northumberland/Bras d’Or (500) and Valley and Central (600). It is very uncommon on Cape Breton Island.

**Successional Dynamics:** Due to the short longevity of grey birch, and other associates such as pin cherry, this VT is followed by other early-successional vegetation types, with species such as aspen, red maple and white birch. Late-successional tree species typical of the ecosite are usually present in the understory. The VT stabilizes sites following stand-level disturbances, although it has the shortest longevity of any VT in the group—usually less than 40 years.

**Ecological Features:** Grey birch, and associates such as pin cherry and choke cherry, are quick to pioneer disturbed sites, their roots helping to hold bare soil in place. Grey birch is often considered a nurse crop species as the moderate shade it provides protects seedlings of other longer lived trees. Choke cherry and pin cherry are important food sources for wildlife—at least 23 bird species have pin cherry in their diet. Although cherry fruit are edible, cyanic acid in their twigs and bark is poisonous. The seeds of grey birch are a soft mast crop eaten by many birds. When IH9 occurs on old-field/pasture sites, earthworms are commonly present and are a food source for moles, shrews, woodcock, robins and other vermivores.

# KA

## Karst Forest Group

### Karst (KA) Key

1a. Stands dominated by late-successional species (Hemlock, Red spruce, Sugar maple, Yellow birch, Beech) ... 2

1b. Stands dominated by early successional species (White spruce, Balsam fir, White birch, Aspen) ... KA4

2a. Stands with > 75% softwood in the overstory and where hemlock and red spruce are the most abundant late-successional species ... KA1

2b. Not as above ... 3

3a. Stands with < 25% softwood in the overstory and where sugar maple, yellow birch and beech are the most abundant late-successional species ... KA2

3b. Stands with 26 – 74% softwood in the overstory ... KA3

**CAUTION:** The dynamic nature of karst topography creates geohazards, for both people and wildlife, and extreme care should be taken when traversing these landforms. A “Karst Risk Map of Nova Scotia” is available on-line.

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



Photo: **Plaster Ponds,**  
**near McKinnons Harbour,**  
**Victoria County**  
(Len Wagg/CNS)

## Concept

This group is distinguished by its development on karst topography and by the scattered presence of vascular plants associated with highly calcareous soils. In Nova Scotia, most karst topography originates over gypsum bedrock, but similar landforms have been observed over limestone and dolomite. Groundwater dissolves these soluble bedrock types producing a highly irregular surface relief called karst, which is characterized by steep sided sinkholes, caves, cliffs and exposed rock outcrops. Bedrock surface exposures are common, but surface stoniness is normally low. Sites where the influence of karst on soil and plant communities is reduced by thick glacial till deposits (i.e. sites with sinkholes but no exposed bedrock) were excluded from this group. Late-successional Vegetation Types in this group are typically closed canopy forests dominated by hemlock, red spruce, white pine, yellow birch and/or sugar maple, but other species may be present. Earlier successional vegetation types may have more open canopies dominated by species such as white spruce, balsam fir, white birch, trembling and large tooth aspen. The shrub layer often includes striped maple and round-leaf dogwood, with Christmas fern, wood goldenrod and

white baneberry found in the herb layer. Several uncommon or rare plants, including yellow lady slipper, ram's head lady slipper, ebony sedge and bulblet bladder fern, are diagnostic of this group but are not necessarily found in every stand. Most sites range from fresh to moist, with medium to rich soil fertility. Vegetation types form small- to medium-sized patches on the landscape. This group is found in the Northumberland/Bras d'Or Lowlands (500) and Valley & Central Lowlands (600) ecoregions, and in the Victoria Lowlands (220), Cape Breton Hills (310) and Inverness Lowlands (320) ecodistricts (with scattered occurrences in the Pictou Antigonish Highlands (330) ecodistrict). Temperate gypsum karst forests are rare in Canada with most occurrences in Nova Scotia. The high erodibility and solubility of gypsum bedrock makes karst both structurally and ecologically dynamic. Karst landscapes contain a diverse mix of microhabitats ranging from dry hill crests and actively collapsing sinkholes, to small alkaline ponds and wetlands. Their rarity presents conservation challenges, many of which are strongly exacerbated by gypsum mining pressures and other localized land uses.

# KA1

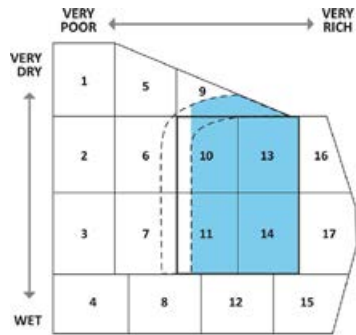
## Hemlock / Christmas fern – White lettuce – Wood goldenrod

*Tsuga canadensis* / *Polystichum acrostichoides* –  
*Nabalus altissimus* – *Solidago flexicaulis*

**Concept:** Hemlock / Christmas fern – White lettuce – Wood goldenrod forest is characterized by its unique karst topography, canopy composition, and by the scattered presence of vascular plants associated with calcareous bedrock. The closed canopy softwood overstory is dominated by hemlock. Like other forests dominated by hemlock, our longest living and most shade-tolerant conifer, this Vegetation Type (VT) has a high potential to develop old forest characteristics, maintained by gap disturbances. Several rare plants including yellow lady slipper, ram’s head lady slipper and Bulblet bladder fern are associated with this group but are not necessarily found in every stand.

**Vegetation:** White pine, red spruce and balsam fir may be important co-dominants in some stands. Understory layers are usually sparse and species-poor, although several species show high frequency (e.g. striped maple, white lettuce, Christmas fern, wood goldenrod, drooping wood sedge). Bryophyte cover is reduced. Plant species locally associated with karst may not be present in plot data because many

Brooklyn, Hants County



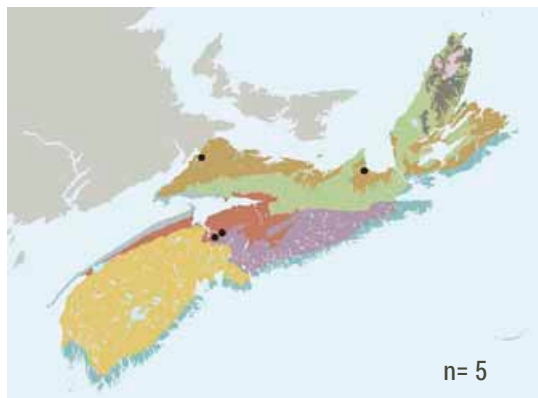
### Site & Soil Characteristics

Slope Position:	Middle <sup>8</sup> Upper <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>2</sup> (Slightly – Moderately) <sup>4</sup> (Very – Excessively) <sup>4</sup>
Microtopography:	Ultra <sup>4</sup> Extremely <sup>2</sup> Slightly <sup>2</sup> Strongly <sup>2</sup>
Drainage:	Imperfect <sup>4</sup> Well <sup>4</sup> nd <sup>2</sup>
Common Soil Types:	12, 2L, 17
Rooting Depth (cm):	(<30) <sup>4</sup> (30–45) <sup>2</sup> (> 45) <sup>4</sup>
Forest Floor (cm):	(6–10) <sup>2</sup> (11–20) <sup>2</sup> nd <sup>6</sup>
Humus Form:	Mormoder <sup>4</sup> Rhizomull <sup>4</sup> nd <sup>2</sup>

of these species are only sparsely scattered across karst landscapes and are generally more common on exposed bedrock outcrops, cliffs, and talus slopes. On deeper soils, where alkaline bedrock is further from the rooting zone, nutrient enrichment is weakened, further limiting the prominence of karst plants.



Characteristic Plants	KA1	
	Freq. (%)	Cover (%)
Hemlock	100	47
White pine	60	11
Balsam fir	40	5
Red maple	40	3
Yellow birch	40	4
White birch	40	5
Red spruce	40	18
Grey birch	20	1
White ash	20	2
Ironwood	20	1
White spruce	20	15
Large-tooth aspen	20	10
Trembling aspen	20	1
Red oak	20	10
<b>Tree Layer (Mean % Cover)</b>		<b>75</b>
Balsam fir	80	8
Hemlock	80	3
Striped maple	60	2
Round-leaved dogwood	60	3
White ash	60	1
Sugar maple	40	2
Mountain maple	40	0.4
Alternate-leaved dogwood	40	0.3
Beech	40	1
Red spruce	40	1
Trembling aspen	40	1
Mountain-ash	40	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>19</b>
Sarsaparilla	60	2
Wild lily-of-the-valley	60	1
Common speedwell	60	0.1
Red baneberry	40	0.1
Drooping wood sedge	40	0.1
Dewey's sedge	40	0.1
Bulblet bladder fern	40	0.1
Spinulose wood fern	40	0.3
Evergreen wood fern	40	1
Oak fern	40	2
Hawkweeds	40	0.1
Mouse eared hawkweed	40	0.1
Common wood rush	40	0.5
Christmas fern	40	0.3
White lettuce	40	0.1
White goldenrod	40	0.1
Wood goldenrod	40	0.1
Calico aster	40	0.1
Starflower	40	0.1
Bristle-leaved sedge	20	2
Ram's-head lady's-slipper	20	0.2
Yellow lady's-slipper	20	0.1
Balsam groundsel	20	2
<b>Herb Layer (Mean % Cover)</b>		<b>7</b>
Log moss	100	0.1
Broom moss	60	2
Stair-step moss	60	0.7
Schreber's moss	60	1
Shaggy moss	60	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>5</b>



**Environmental Setting:** KA1 occurs on fresh to moist and nutrient medium to rich soils. This VT is mainly found in the Central Lowlands and Bras d'Or Lowlands ecodistricts. Microtopography is usually weakly expressed due to the shallow surficial soil deposits that limit rooting potential.

**Successional Dynamics:** Depending on disturbance history, this late-successional VT can be even-aged, but will develop an uneven-aged canopy structure as it matures. Disturbance agents include wind, insects/disease, tree harvesting and karst forming processes (e.g. bedrock dissolution, soil subsidence and sinkhole formation). These processes can open relatively large canopy gaps and expose mineral soil, promoting shade-intolerant hardwoods. This VT has good potential to support old growth composed of a variety of climax species, however, stand dynamics are not well understood.

**Ecological Features:** Many rare plants, including yellow and ram's head lady's slippers, bulblet bladder fern, shepherdia and leatherwood are found in this forest ecosystem. Ram's head lady's slipper is very rare and listed as endangered under the Nova Scotia Endangered Species Act. Karst also provides a variety of microhabitats for other types of biodiversity. Caves may be used by porcupine, creating unique cave faunal communities associated with porcupine dung. Karst caves also offer some of the province's most important bat hibernacula, with some extending up to several hundred meters underground. Many other small mammals, reptiles and amphibians use cracks and smaller openings in karst formations for denning and hibernation. The calcareous soils also support the greatest diversity of land snails in the province.



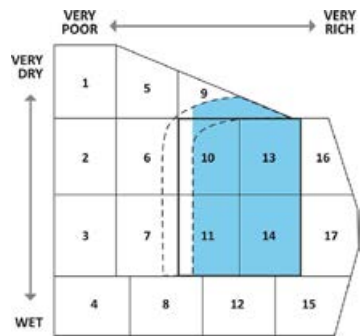
# KA2 Sugar maple / Christmas fern – Rattlesnake fern – Bulblet bladder fern

*Acer saccharum* / *Polystichum acrostichoides* –  
*Botrypus virginianus* – *Cystopteris bulbifera*

**Concept:** Sugar maple / Christmas fern – Rattlesnake fern – Bulblet bladder fern forest is distinguished by its unique karst topography, canopy composition, and the scattered presence of vascular plants associated with karst habitat. This closed canopy hardwood Vegetation Type (VT) is dominated by sugar maple with lesser yellow birch, beech and white ash. Rare plant species (e.g. bulblet bladder fern, ram’s-head lady’s-slipper, shepherdia, hyssop-leaved fleabane, leatherwood, yellow lady’s slipper) commonly associated with karst are sparsely scattered across karst landscapes. In addition, some are generally more common on exposed bedrock outcrops, cliffs, and talus slopes.

**Vegetation:** The canopy supports moderate to high crown closure and is usually dominated by sugar maple. Beech, yellow birch /or white birch can be locally abundant, while white ash and balsam fir are somewhat frequent but occur with reduced cover. The understory supports low to moderate levels of woody and bryophyte species but higher herbaceous cover. Characteristic plants include striped maple, round-leaved dogwood, oak fern, Christmas fern, white baneberry and marginal wood fern. Plant species commonly associated with karst may not be present on deeper soils, where alkaline bedrock is further from the rooting zone and nutrient enrichment is reduced.

**Environmental Setting:** KA2 is associated with fresh to moist, nutrient medium to rich soils found in karst landscapes usually associated with gypsum bedrock, and occasionally observed over limestone, anhydrite and dolomite. These landscapes are typically rugged with scattered bedrock exposures, steep sided sinkholes and low surface stoniness. This VT is mainly found in the Central Lowlands and Bras d’Or Lowlands ecodistricts. KA2 occurs at low elevation on karst flats, short slopes and within shallow depressions; microtopography is moderate. Rooting potential can be strongly limited by shallow surficial soil deposits.



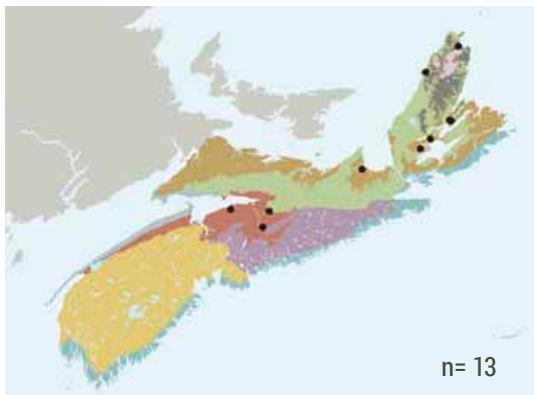
## Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Lower <sup>2</sup> Other <sup>3</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>1</sup> (Slightly – Moderately) <sup>5</sup> (Very – Excessively) <sup>4</sup>
Microtopography:	Ultra <sup>3</sup> Moderately <sup>3</sup> Level <sup>2</sup> Other <sup>2</sup>
Drainage:	Well <sup>7</sup> Moderately Well <sup>2</sup> Imperfect <sup>1</sup>
Common Soil Types:	11, 8, 12
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>4</sup> (> 45) <sup>3</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>8</sup> (6–10) <sup>1</sup> nd <sup>1</sup>
Humus Form:	Vermimull <sup>6</sup> Mullmoder <sup>2</sup> Other <sup>2</sup>



Brookfield, Colchester County

Characteristic Plants	KA2	
	Freq. (%)	Cover (%)
Sugar maple	100	39
Yellow birch	92	18
White birch	62	16
White ash	54	16
Balsam fir	54	11
White spruce	46	2
Beech	39	10
Ironwood	39	5
Hemlock	31	6
Red maple	15	13
<b>Tree Layer (Mean % Cover)</b>	<b>92</b>	
Balsam fir	92	2
White spruce	77	2
Sugar maple	69	9
Fly-honeysuckle	69	0.7
Striped maple	62	2
Red-berried elder	62	0.4
White ash	46	2
Mountain maple	46	0.8
Hemlock	39	2
Yellow birch	39	0.6
Alternate-leaved dogwood	39	0.2
Beaked hazelnut	23	3
Round-leaved dogwood	15	2
<b>Shrub Layer (Mean % Cover)</b>	<b>18</b>	
Christmas fern	92	6
Oak fern	69	9
Evergreen wood fern	69	4
Common speedwell	69	0.3
Wild lily-of-the-valley	62	3
Northern beech fern	62	1
Violets	46	7
Wood goldenrod	46	2
Starflower	46	1
Marginal wood fern	46	1
Sarsaparilla	46	1
Red baneberry	46	0.9
Lion's paw	46	0.1
Bulblet bladder fern	39	6
Lady fern	39	0.8
Drooping wood sedge	39	0.2
Cucumber root	39	0.1
Shinleaf	39	0.1
White baneberry	39	0.1
Wood reed	39	0.1
New York fern	31	1
Rattlesnake fern	31	0.2
<b>Herb Layer (Mean % Cover)</b>	<b>40</b>	
Shaggy moss	69	3
Fern moss	46	9
Schreber's moss	46	2
Stair-step moss	46	1
Smooth cap moss	46	0.5
Hair-cap moss	46	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>18</b>	



**Successional Dynamics:** KA2 is a late-successional, uneven-aged VT dominated by sugar maple. Excluding tree harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind, ice damage or karst processes. Bedrock dissolution, sinkhole formation and soil erosion, and subsidence are common ecosystem processes in karst landscapes. Where stand-level disturbances have occurred, early-successional karst forests may be found in conjunction with KA2 stands. This VT of long-lived, shade-tolerant trees has good potential to develop old forest characteristics, maintained by gap disturbances, however, stand dynamics are not well understood.

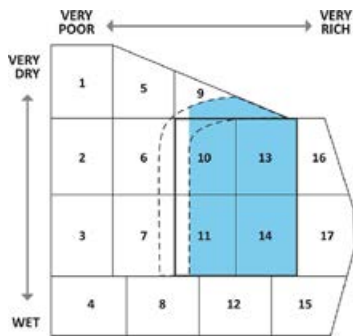
**Ecological Features:** This ecosystem has many of the rare and unusual calciphiles (plants or lichens with a preference for calcareous soils) found in KA1. Dog or pelt lichens (*Peltigera* species) are often found on karst. Recent karst surveys in Nova Scotia revealed calciphilous lichen species not previously known in the province. Karst landforms contain a diverse mix of microhabitats ranging from dry hill crests and actively collapsing sinkholes, to small alkaline ponds and wetlands. Many small mammals, reptiles and amphibians use cracks and smaller openings in karst formations for denning and hibernation.



Bulblet bladder fern  
(underside)

# KA3 Hemlock – Sugar maple – Yellow birch/ Hawkweed – Marginal wood fern

*Tsuga canadensis* – *Acer saccharum* – *Betula alleghaniensis* /  
*Hieracium* spp. – *Dryopteris marginalis*



**Concept:** Hemlock – Sugar maple – Yellow birch / Hawkweed – Marginal wood fern mixedwood forest has a closed canopy overstory of shade-tolerant, late-successional species such as hemlock and sugar maple. Like other karst Vegetation Types (VT), it is associated with areas underlain with gypsum but can be found in areas where anhydrite, dolomite and limestone occur near the surface. Plants with affinities for karst habitat are more abundant where exposed gypsum outcrops occur and are often generally more prevalent in open areas near cliffs and steep slopes. The presence of earlier successional tree species in the canopy, such as large-tooth aspen, indicates more recent disturbances.

**Vegetation:** Other shade-tolerant overstory species include yellow birch, white ash and red spruce. Large-tooth aspen, white spruce and white birch will often establish when gaps in the canopy form due to disturbances. Red oak may be present in more western locales for this VT. The woody understory is primarily regenerating tree species although round-leaf and alternate-leaved dogwoods are common. Low levels of herbaceous cover are not unusual and can be very sparse at times; the VT is typified by several fern species, sarsaparilla, and an assortment of hawkweed species. Bryophyte cover is moderate and mostly composed of shaggy, Schreber’s and stair-step mosses. Plant species commonly associated with karst may be present, including bulblet bladder fern, yellow lady’s slipper, round-leaved

## Site & Soil Characteristics

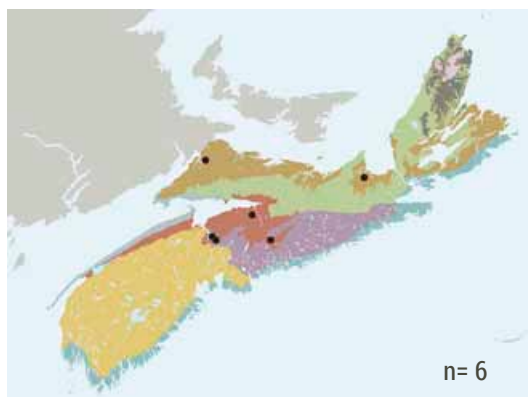
Slope Position: Crest<sup>3</sup> Level<sup>3</sup> Upper<sup>2</sup> nd<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>2</sup> (Slightly – Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>5</sup>  
 Microtopography: Level<sup>5</sup> Ultra<sup>3</sup> Extremely<sup>2</sup>  
 Drainage: Well<sup>7</sup> Rapid<sup>2</sup> Moderately Well<sup>1</sup>  
 Common Soil Types: 17, 11, 8  
 Rooting Depth (cm): (<30)<sup>3</sup> (> 45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>10</sup>  
 Humus Form: Vermimull<sup>7</sup> nd<sup>3</sup>

dogwood and shepherdia. However, these species are often only sparsely distributed, especially when soil accumulation over underlying gypsum bedrock is deeper, thereby lowering nutrient availability.



Lake Egmont Nature Reserve, Halifax County

Characteristic Plants	KA3	
	Freq. (%)	Cover (%)
Hemlock	100	24
Sugar maple	83	8
Large-tooth aspen	67	21
White spruce	67	7
Yellow birch	50	12
Red spruce	50	10
White ash	50	7
White birch	50	2
Red oak	33	8
White pine	33	6
Ironwood	33	2
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>
Balsam fir	100	1
Hemlock	83	6
Fly-honeysuckle	83	0.4
Mountain maple	67	2
Red spruce	67	1
White ash	67	0.9
Ground hemlock (Yew)	67	0.3
Round-leaved dogwood	50	6
Serviceberry	50	2
Striped maple	50	0.5
Red-berried elder	50	0.1
Alternate-leaved dogwood	33	0.3
Hobble-bush	33	0.1
Sheperdia	17	0.3
Highbush cranberry	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>17</b>
Hawkweeds	100	2
Sarsaparilla	83	4
Evergreen wood fern	83	3
Wood goldenrod	83	1
Common speedwell	83	1
Christmas fern	83	0.6
Starflower	83	0.2
Marginal wood fern	67	5
Wild lily-of-the-valley	67	0.9
Lady fern	67	0.9
Oak fern	67	0.3
Red baneberry	67	0.2
Helleborine	67	0.1
Bluebead lily	50	0.3
Bulblet bladder fern	50	0.2
Wood aster	50	0.1
Drooping wood sedge	50	0.1
Kidney-leaved buttercup	33	2
Northern beech fern	33	1
Large leaved aster	33	0.6
Yellow-green sedge	33	0.5
Balsam groundsel	33	0.1
Yellow lady's-slipper	17	0.8
Ram's-head lady's-slipper	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>26</b>
Shaggy moss	67	10
Schreber's moss	67	8
Stair-step moss	67	0.9
Fern moss	50	10
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>23</b>



**Environmental Setting:** KA3 is associated with fresh to fresh-moist, nutrient medium to rich soils found in karst landscapes underlain by gypsum, limestone or anhydrite. This VT is mainly found in the Central Lowlands and Bras d'Or Lowlands ecodistricts. KA3 occurs at low elevation on karst flats, short slopes and shallow depressions; microtopography is moderate. Rooting potential can be strongly limited by shallow soil surficial deposits.

**Successional Dynamics:** KA3 is a middle- to late-successional, uneven-aged VT dominated by hemlock and tolerant hardwood species. Excluding tree harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind, ice damage or karst processes. Bedrock dissolution, sinkhole formation and soil erosion, and subsidence are common ecosystem processes in karst landscapes. Larger canopy openings may favour higher levels of large-tooth aspen and other early-successional species. This VT has notable potential to develop old forest characteristics composed of a variety of climax species maintained by gap disturbances.

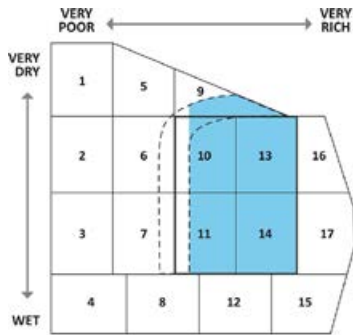
**Ecological Features:** Similar to the other forest ecosystems in this group, KA3 supports many uncommon and rare calciphiles. Karst landscapes typically include caves, cracks and fissures—features that support bat hibernacula and provide denning and hibernation habitat for many other small vertebrates. The bottom of karst sinkholes is often waterfilled, or plugged with branches and leaf litter that hide the lower depths of these pits. Black ash is sometime present in treed wetlands adjacent to these karst areas where soils are moist or wet.

# KA4 White spruce / Round-leaved dogwood / Bulblet bladder fern – Wood goldenrod

*Picea glauca* / *Cornus rugosa* / *Cystopteris bulbifera* – *Solidago flexicaulis*

**Concept:** This mixed canopy forest (30–70% closure) is distinguished from other provincial forests by its unique site conditions, overstory composition, and by the presence of understory plants locally associated with karst topography. The overstory generally has a component of white spruce and/or balsam fir shared with several species of shade-intolerant hardwoods. Extensively exposed areas of gypsum and/or shallow soils over bedrock are prevalent in this Vegetation Type (VT) and provide substrate for many pioneer shrubs and herbs.

**Vegetation:** The canopy supports a moderately well-developed mix of early-successional species, including white birch and trembling aspen. On drier soils, especially along cliff edges where there is more



### Site & Soil Characteristics

- Slope Position: Upper<sup>10</sup>
- Surface Stoniness: (Non – Slightly)<sup>10</sup>
- Bedrock Outcrop: (Very – Excessively)<sup>10</sup>
- Microtopography: Ultra<sup>B</sup> Level<sup>2</sup>
- Drainage: Well<sup>10</sup>
- Common Soil Types: 15, 17, 15L, 11
- Rooting Depth (cm): (<30)<sup>7</sup> (>45)<sup>2</sup> nd<sup>1</sup>
- Forest Floor (cm): (0–5)<sup>10</sup>
- Humus Form: Vermimull<sup>5</sup> Hemimor<sup>2</sup> nd<sup>3</sup>

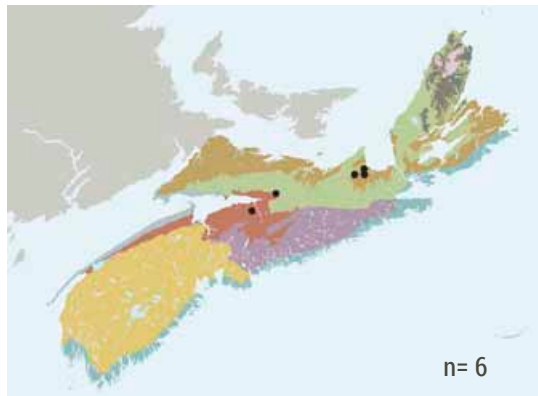


extreme karst topography, a dryish community of black spruce, white pine or less often red pine and ground juniper may be encountered. Round-leaved dogwood is typically abundant. As the soils of this VT are thin and poorly developed, herbs that are less demanding of higher soil nutrients and moisture, and generally more tolerant of disturbance, can be prominent (e.g. hawkweeds, asters and goldenrods, daisy and dandelion). Plant species commonly associated with karst may not be frequent due to the recent establishment of these stands and/or the absence of nearby seed sources. Bryophytes and lichens are more developed in this VT compared to other karst communities, with moderate coverage. Shaggy moss is the most dominant species.

**Environmental Setting:** KA4 is associated with fresh to moist, nutrient medium to rich soils found in karst landscapes. These landscapes are typically rugged with abundant bedrock exposures and steep sided sinkholes. This VT is mainly found in the Central Lowlands and Bras d’Or Lowlands

Hayes Caves, Latties Brook,  
Hants County

Characteristic Plants	KA4	
	Freq. (%)	Cover (%)
White spruce	100	11
Balsam fir	67	16
White birch	67	9
White ash	50	4
Trembling aspen	33	36
Red spruce	33	10
Hemlock	33	4
Sugar maple	33	2
<b>Tree Layer (Mean % Cover)</b>		<b>55</b>
Round-leaved dogwood	83	13
Balsam fir	83	4
White ash	83	3
White spruce	67	2
White birch	67	2
Mountain maple	67	0.4
Sugar maple	67	0.1
Hemlock	50	0.3
Red maple	50	0.1
Asters	33	0.1
Ground hemlock (Yew)	33	1
Bush-honeysuckle	33	0.1
Red-berried elder	33	0.1
Hobble-bush	17	2
Fly-honeysuckle	17	0.5
Alternate-leaved dogwood	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>23</b>
Hawkweeds	83	10
Sarsaparilla	83	0.8
Dandelion	83	0.4
Bulblet bladder fern	67	0.1
Marginal wood fern	50	5
Wood goldenrod	50	2
Balsam groundsel	50	2
Common speedwell	50	0.2
Northern beech fern	33	4
Evergreen wood fern	33	0.3
Red baneberry	33	0.3
Starflower	33	0.3
Wild lily-of-the-valley	33	0.1
Black bentgrass	17	5
Christmas fern	17	1
Bristle-leaved sedge	17	0.5
Helleborine	17	0.1
Yellow Lady's-Slipper	17	0.1
Canada anemone	17	0.1
Pussytoes	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>17</b>
Shaggy moss	83	12
Stair-step moss	50	22
Schreber's moss	50	13
Log moss	50	4
Bazzania	33	3
Concentric pelt	17	7
Flat neckera	17	0.1
Twisted moss	17	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>32</b>



ecodistricts. KA4 occurs at low elevation on karst flats, short slopes and shallow depressions; microtopography is moderate. Rooting potential can be strongly limited by shallow surficial soil deposits.

**Successional Dynamics:** KA4 is an early-successional, even-aged VT dominated by shade-intolerant species. Excluding tree harvesting, stand-level disturbance events are rare with gaps or small patches usually created by individual tree mortality, wind, storm damage or karst processes. Bedrock dissolution, sinkhole formation and soil erosion, and subsidence are common ecosystem processes in karst landscapes. Later successional karst VTs (e.g. KA1, KA2, KA3) will develop from shade-tolerant species that slowly establish in the understory.

**Ecological Features:** Although considered an early-successional stage of karst forest, this ecosystem still supports many of the rare plant, lichen and bryophyte species associated with karst landscapes, and generally provides similar habitat for mammals, amphibians and reptiles. The flowers of rare and unusual plants are best observed in the spring. Certain karst plants are restricted to crumbling cliff faces such as hyssop-leaved fleabane and balsam groundsel, although they are occasionally under forest cover.

Calcium build-up on the surface of calciferous lichens and bryophytes is commonly observed.



Balsam groundsel

# MW

## Mixedwood Forest Group

### Concept

Mixedwood forests embody features of both coniferous and deciduous ecosystems, composed of either shade-tolerant or intolerant canopy species, depending on the mechanism of stand origin. These large patch to matrix scale forests have complex canopy structures including softwood or hardwood inclusions or, more commonly, a relatively even blend of both growth forms. This diverse group of closed canopy forests includes early- to late-successional mixedwood Vegetation Types (VTs) classified within the Acadian Macrogroup. Earlier successional forests typically included red maple, white birch, grey birch, aspen(s), and/or balsam fir. In turn, later successional forests are characterized by yellow birch, sugar maple, red spruce, white spruce and/or hemlock. Often residuals (trees or clumps of trees) that have survived past stand-level disturbances (harvesting, windthrow, insect/disease, fire) are present. Understory plant composition tends to be shaped by overstory structure, soil attributes, and disturbance history. Deciduous trees promote shrub and herbaceous cover. The shrub layer consists mainly of regenerating trees, while the herbaceous layer is comprised of common upland forest species. (Herbaceous coverage can be extensive, especially in the yellow birch mixedwoods.) The presence of numerous fern species is not unusual on more fertile ecosites.

Early and mid-successional stages are usually even-aged, whereas late-successional stages can develop uneven-aged characteristics due to the longevity of dominant tree species. The extent of bryophyte cover depends on the abundance of hardwood species and the related loss of spore germination and dispersal due to leaf litter.

VTs in this forest group are found across a range of moisture and nutrient regimes. Red maple can occur on most upland ecosites. Black spruce, white pine and red oak are more probable on ecosites of lower nutrient availability, whereas red spruce, hemlock and yellow birch are more nutrient demanding. Various mixedwood VTs form matrix forest or large patches in many ecodistricts.

In general, mixedwood forests provide a broad spectrum of habitat features and ecological services. Vertical stand structure in mixedwood forests is usually well developed. Stands are used by numerous wildlife species, including those associated with both hardwood and softwood forests. Few fauna are exclusive to mixedwood forests, but some recur frequently, especially in mature stands. Among the best known mixedwood associates are birds (e.g. northern goshawk, black-throated blue warbler, black and white warbler, black-throated green warbler, oven-bird and Blackburnian warbler).

## Mixedwood (MW) Key

1a. Eastern white cedar present (excluding escapes) ... MW13	8a. Aspen absent or sparse ... MW9
1b. Eastern white cedar absent ... 2	8b. Aspen scattered to abundant ... MW10
2a. Spruces most common softwoods ... 3	9a. Hemlock most common softwood ... 10
2b. Not as above ... 9	9b. Not as above ... 12
3a. Red spruce most common softwood ... 4	10a. Tolerant hardwoods are the most common hardwoods ... MW3
3b. Not as above ... 6	10b. Not as above ... 11
4a. Yellow birch and/or sugar maple are the most common hardwoods ... MW1	11a. Aspen absent to sparse ... MW4
4b. Not as above ... 5	11b. Aspen scattered to abundant ... MW4a
5a. Aspen absent or sparse ... MW2	12a. Balsam fir most common softwood ... 13
5b. Aspen scattered to abundant ... MW2a	12b. White pine most common softwood ... 14
6a. White spruce most common softwood ... 7	13a. Red maple most common hardwood ... MW7
6b. Black spruce most common softwood ... 8	13b. White birch most common hardwood ... MW8
7a. Sugar maple and yellow birch are the most common hardwoods ... MW5	14a. Red oak most common hardwood ... MW11
7b. Red maple, white birch and aspen are the most common hardwoods ... MW6	14b. Red maple most common hardwood ... MW12

COVER CLASSES: Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



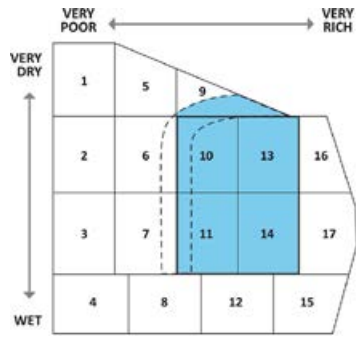
# MW1 Red spruce – Yellow birch / Evergreen wood fern

*Picea rubens* – *Betula alleghaniensis* / *Dryopteris intermedia*

**Concept:** This closed canopy mixedwood Vegetation Type (VT) has an overstorey co-dominated by red spruce and yellow birch, with lesser amounts of mostly shade-tolerant trees. It is similar to MW3 (Hemlock – Yellow birch / Evergreen wood fern), but characterized by greater red spruce prominence. Understorey layers of shrubs, herbs and mosses can be variable depending on overstorey composition and particularly the relative ratio hardwood and softwood species.

**Vegetation:** A suite of other shade-tolerant trees (e.g. sugar maple, hemlock, beech, balsam fir, red maple, white pine, white ash) may also be present to varying degree. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly-honeysuckle. Several fern species along with wood-sorrel, wood aster and widespread upland forest flora are common in the well-developed herbaceous layer. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstorey. Common bryophytes include bazzania (often on rotting coarse woody material), broom moss, stair-step moss and Schreber’s moss.

Shepherders Junction, Colchester County



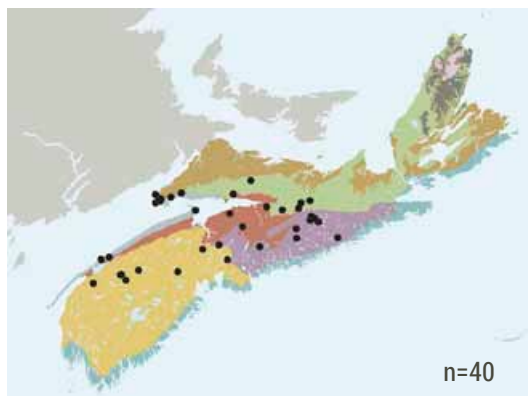
## Site & Soil Characteristics

Slope Position: Upper<sup>4</sup> Lower<sup>2</sup> Middle<sup>2</sup> Crest<sup>1</sup> Level<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>4</sup>  
 (Very – Excessively)<sup>1</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>4</sup> Strongly<sup>3</sup> Slightly<sup>2</sup> nd<sup>1</sup>  
 Drainage: Well<sup>5</sup> Moderately Well<sup>4</sup> Other<sup>1</sup>

Common Soil Types: 2, 2L, 3L, 5, 6, 8, 9  
 Rooting Depth (cm): (30–45)<sup>4</sup> (> 45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>6</sup> (11–20)<sup>2</sup> nd<sup>1</sup>  
 Humus Form: Humimor<sup>2</sup> Hemimor<sup>1</sup> Mormoder<sup>1</sup>  
 Humi-Fibrimor<sup>1</sup> nd<sup>5</sup>

**Environmental Setting:** MW1 is mainly associated with fresh, nutrient medium soils of variable texture. This tolerant mixedwood may occupy transitional sites between softwood dominated lower slopes and tolerant hardwood dominated upper

Characteristic Plants	MW1	
	Freq. (%)	Cover (%)
Red spruce	100	41
Yellow birch	98	23
Red maple	68	11
Balsam fir	45	10
White birch	30	7
Sugar maple	30	6
Beech	20	7
Hemlock	13	9
White ash	10	9
White pine	10	3
<b>Tree Layer (Mean % Cover)</b>		<b>83</b>
Balsam fir	88	7
Red spruce	78	4
Yellow birch	70	1
Red maple	65	2
Striped maple	60	5
Fly-honeysuckle	55	0.6
Sugar maple	50	1
Beech	43	3
Hemlock	23	2
Mountain maple	23	2
Mountain-ash	20	0.9
Hobble-bush	15	0.3
<b>Shrub Layer (Mean % Cover)</b>		<b>18</b>
Starflower	95	0.8
Wild lily-of-the-valley	88	4
Evergreen wood fern	78	6
Sarsaparilla	75	2
Wood-sorrel	65	9
Bunchberry	63	4
Goldthread	58	3
Wood aster	53	0.7
Hay-scented fern	48	9
New York fern	48	6
Bluebead lily	45	0.5
Partridge-berry	45	0.2
Ground pine	43	0.5
Cucumber root	40	0.1
Twinflower	35	2
Shining club-moss	35	1
Painted trillium	33	0.1
Northern beech fern	30	0.8
Christmas fern	30	0.7
Rose twisted stalk	30	0.2
Mountain wood fern	25	10
Interrupted fern	23	0.7
Violets	23	0.4
Bristly club-moss	18	1
Spinulose wood fern	18	1
<b>Herb Layer (Mean % Cover)</b>		<b>35</b>
Bazzania	85	5
Stair-step moss	75	10
Broom moss	75	1
Schreber's moss	70	4
Log moss	70	2
Fern moss	38	0.8
Hair-cap moss	28	0.9
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>19</b>



slopes. It occurs throughout mainland Nova Scotia, but is most common in central and western sections of the province and along the Bay of Fundy.

**Successional Dynamics:** MW1 is a climax Acadian mixedwood VT found on zonal sites. It can develop from several early- and mid-successional softwood and mixedwood VTs dominated by red spruce, balsam fir, red maple and/or white birch. Early-successional stages can be bypassed if, at the time of disturbance, advanced red spruce and yellow birch regeneration is present and retained. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged structure as it matures. Between large-scale disturbance events, the VT will maintain itself through gap replacement dynamics or transition to mixedwoods stands with hemlock and sugar maple.

**Ecological Features:** The shade tolerance and longevity of red spruce and yellow birch promote development of uneven-aged canopy structures (vertical) and eventually old growth features. Large diameter snags provide cavity and stick nesting sites for pileated woodpecker, barred owl and northern goshawk, along with denning opportunities for many small- to medium-sized mammals. Coarse woody material, often largely comprised of balsam fir, is usually abundant and generally follows a cyclical pattern of accumulation and decomposition. It provides cover for red-backed salamander, other amphibians and small mammals, and microhabitat for a host of bryophytes, fungi and lichens, as well as seedbeds for vascular plants (including trees). Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. However, birch trees in these forests may be deformed and sometimes killed, by birch cinder conch, a fungal species occasionally harvested for Chaga tea.

# MW2

## Red spruce – Red maple – White birch / Goldthread

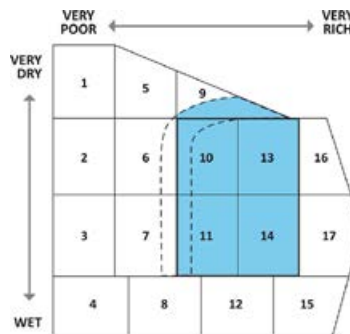
*Picea rubens* – *Acer rubrum* – *Betula papyrifera* / *Coptis trifolia*

### MW2a Aspen variant

*Populus grandidentata* – *Populus tremuloides*

**Concept:** This closed canopy mixedwood Vegetation Type (VT) is characterized by red spruce accompanied by red maple or, less often, large-tooth or trembling aspen. MW2 usually occurs after partial harvesting or windthrow and scattered remnants of late-successional species such as yellow birch, sugar maple and hemlock are often present. This VT is a commonly found throughout mainland Nova Scotia.

**Vegetation:** White birch and balsam fir are regularly represented in the overstory. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly-honeysuckle. The herbaceous layer is moderately developed with typical mixedwood flora including starflower,



### Site & Soil Characteristics

Slope Position:	Middle <sup>4</sup> Upper <sup>3</sup> Lower <sup>1</sup> Level <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>5</sup> Slightly <sup>2</sup> Strongly <sup>1</sup> Other <sup>2</sup>
Drainage:	Moderately Well <sup>5</sup> Well <sup>4</sup> Other <sup>1</sup>
Common Soil Types:	2, 2L, 6, 3L, 5, 3
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>3</sup> (> 45) <sup>2</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>4</sup> (11–20) <sup>3</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>4</sup> Humi-Fibrimor <sup>1</sup> Other <sup>1</sup> nd <sup>4</sup>



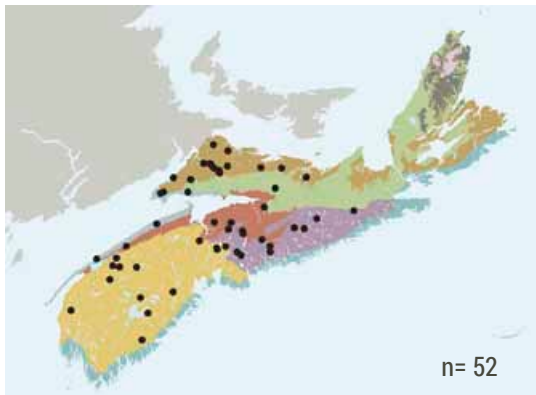
sarsaparilla and several fern species. Bryophyte development varies with coverage directly correlated with relative softwood abundance in the overstory; bazzania, Schreber’s moss and broom moss are the main species.

**Environmental Setting:** MW2 is mainly associated with fresh to fresh-moist, nutrient medium soils of variable texture. This VT occurs on mainland Nova Scotia wherever red spruce forests are found.

**Successional Dynamics:** MW2 is a mid-successional VT that follows partial stand disturbances such as windthrow and harvesting. Earlier successional VTs include shade-intolerant hardwood forests of trembling aspen, red maple and white birch. Following MW2, later successional forests include softwood and mixedwood VTs of hemlock, yellow birch and red spruce. Early-successional stages can be bypassed if, at the time of disturbance, advanced red spruce regeneration

Tidney River Wilderness Area,  
Queens County

Characteristic Plants	MW2		MW2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red spruce	100	36	100	38
Red maple	96	21	100	16
Balsam fir	60	10	29	9
Yellow birch	53	7	29	2
White birch	49	15	43	6
White pine	24	9	29	3
Hemlock	18	13	43	5
Sugar maple	18	5		
Beech	16	6	14	0.1
Trembling aspen	9	4	57	24
Red oak	7	17	29	3
Large-tooth aspen	7	5	57	26
<b>Tree Layer (Mean % Cover)</b>		<b>84</b>		<b>92</b>
Balsam fir	89	8	100	9
Red spruce	84	4	71	4
Red maple	76	2	86	1
Wild raisin	44	0.6	43	0.1
Yellow birch	42	1	14	0.1
Striped maple	40	0.9	71	2
Velvet-leaf blueberry	33	0.4	43	0.7
White pine	33	0.4	43	0.2
Beech	31	2	29	0.1
Fly-honeysuckle	31	0.2	43	0.1
Lambkill	29	1	43	1
Lowbush blueberry	27	2	14	0.3
Serviceberry	24	0.3	71	0.1
Red oak	18	0.2	29	0.3
Hemlock	16	1	57	0.3
Trembling aspen	4	0.1	29	0.4
Large-tooth aspen	2	0.1	29	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>17</b>		<b>15</b>
Wild lily-of-the-valley	87	1	100	4
Starflower	82	2	100	1
Sarsaparilla	58	2	86	4
Goldthread	56	3	43	0.5
Bracken	51	3	57	11
Evergreen wood fern	51	2	43	0.3
Painted trillium	49	0.1	57	0.1
Bunchberry	44	3	57	3
Hay-scented fern	40	3	14	0.1
Bluebead lily	38	0.7	86	0.1
Partridge-berry	38	0.1	29	0.1
Ground pine	36	0.1	29	0.1
Cucumber root	33	0.3	43	0.1
New York fern	24	12	57	0.6
Twinflower	24	1	29	0.8
Wood-sorrel	22	4	14	2
Interrupted fern	13	3	29	2
Bristly club-moss	11	0.2	29	0.5
Christmas fern	9	0.5	29	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>19</b>		<b>19</b>
Bazzania	87	5	86	2
Broom moss	84	2	71	0.4
Schreber's moss	78	10	100	8
Log moss	76	2	71	1
Stair-step moss	73	6	86	12
Wavy dicranum	38	3	29	5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>21</b>		<b>23</b>



is present and maintained. Depending on disturbance history, this VT can be even-aged, but it will acquire an uneven-aged canopy structure as it matures. Evidence of pre-disturbance conditions can be determined by the presence of residual trees in the overstory. When present, they should be considered when assessing possible successional trends.

**Ecological Features:** Establishing after partial stand disturbances, this mid-successional ecosystem facilitates nutrient cycling, rapid site revegetation, and the establishment of nurse crops for late-successional species such as red spruce, hemlock and yellow birch. Residual trees (survivors from previous seral stages) are common and may provide notable wildlife habitat values and increased forest structural complexity. Large diameter snags can provide cavity and stick nesting sites for several raptor species, along with denning locations for small- to medium-sized mammals. Coarse woody material is usually abundant, providing cover for red-backed salamanders, other amphibians and small mammals, along with microhabitat for bryophytes, fungus and lichens. This downed woody material also serves as a critical seedbed for overstory trees such as hemlock and yellow birch. A favourite food source of ruffed grouse are the buds and catkins of white birch and aspen.



Goldthread  
(John Gillis)

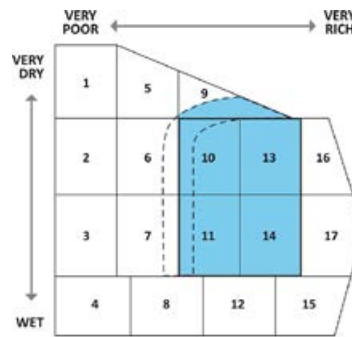
# MW3

## Hemlock – Yellow birch / Evergreen wood fern

*Tsuga canadensis* – *Betula alleghaniensis* / *Dryopteris intermedia*

**Concept:** Hemlock usually dominates the overstory of this closed canopy mixedwood forest of shade-tolerant trees, such as yellow birch and sugar maple. This Vegetation Type (VT) is similar to MW1 (Red spruce – Yellow birch / Evergreen wood fern), but has greater hemlock prominence. The longevity and shade tolerance of the dominant overstory trees in this VT facilitates the development of old forest characteristics, which are maintained by gap disturbances. Hemlock – Yellow birch / Evergreen wood fern is a climax Acadian mixedwood VT found on zonal sites.

**Vegetation:** A suite of other shade-tolerant trees (e.g. red spruce, beech, balsam fir and white ash) may also be present to varying degrees. The shrub layer is moderately developed and includes mainly regenerating trees, striped maple and fly-honeysuckle. The herb layer is represented by common upland mixedwood forest flora. A variety of ferns and club-mosses co-occur with flowering perennials such as cucumber root, partridge-berry and wood aster. Richer ecosites will support Christmas fern, lady fern and northern beech fern. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory.



### Site & Soil Characteristics

Slope Position: Lower<sup>5</sup> Level<sup>3</sup> Middle<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>4</sup> Slightly<sup>4</sup> Strongly<sup>2</sup>  
 Drainage: Well<sup>5</sup> Imperfect<sup>3</sup> Moderately Well<sup>2</sup>

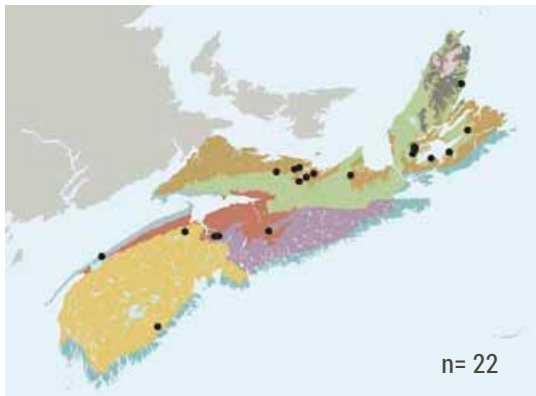
Common Soil Types: 2, 2L, 8, 3L, 12  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>4</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>4</sup> (6–10)<sup>4</sup> (11–20)<sup>1</sup> nd<sup>1</sup>  
 Humus Form: Mormoder<sup>2</sup> Humimor<sup>1</sup> Hemimor<sup>1</sup>  
 Humi-Fibrimor<sup>1</sup> Vermimull<sup>1</sup> Mullmoder<sup>1</sup> nd<sup>3</sup>

**Environmental Setting:** MW3 is mainly found on fresh to moist, nutrient medium to rich glacial soils of variable texture. This VT can be found throughout mainland Nova Scotia, with scattered occurrences in Cape Breton Island.

Durham, Pictou County



Characteristic Plants	MW3	
	Freq. (%)	Cover (%)
Hemlock	100	39
Yellow birch	95	13
Sugar maple	77	12
Red maple	68	13
Balsam fir	50	8
Beech	45	7
White ash	41	8
Red spruce	36	6
Ironwood	27	6
White pine	18	5
White birch	18	2
White spruce	14	2
<b>Tree Layer (Mean % Cover)</b>	<b>86</b>	
Balsam fir	100	2
Hemlock	86	2
Striped maple	86	1
Beech	73	2
Sugar maple	64	0.5
Red spruce	50	2
Red maple	41	0.6
Yellow birch	36	4
White pine	36	1
Fly-honeysuckle	36	0.4
White ash	32	0.1
White spruce	27	3
Hobble-bush	27	0.2
Serviceberry	27	0.1
Mountain maple	23	2
Ground hemlock (Yew)	18	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>12</b>	
Wild lily-of-the-valley	95	2
Evergreen wood fern	91	4
Starflower	82	0.9
Christmas fern	50	0.9
Cucumber root	45	0.1
Rose twisted stalk	45	0.1
Sarsaparilla	41	6
New York fern	36	6
Bluebead lily	36	0.1
Wood aster	36	0.1
Northern beech fern	32	1
Goldthread	27	0.4
Lady fern	27	0.4
Partridge-berry	27	0.1
Wood-sorrel	23	0.4
Drooping wood sedge	23	0.1
Painted trillium	23	0.1
Bristly club-moss	18	0.4
Shining club-moss	18	0.3
Ground pine	18	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>16</b>	
Broom moss	73	0.8
Stair-step moss	68	16
Bazzania	64	2
Schreber's moss	55	2
Log moss	55	0.9
Shaggy moss	23	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>16</b>	



**Successional Dynamics:** MW3 is a late-successional zonal climax mixedwood forest co-dominated by hemlock and shade-tolerant hardwoods. It can develop from several early and mid-successional VTs dominated by intolerant hardwoods, balsam fir, white spruce and/or red spruce. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged canopy structure as it matures. Between large-scale disturbance events, most typically windstorm and hurricanes, this VT will maintain itself through gap replacement as shade-tolerant understory species reach into the canopy.

**Ecological Features:** This shade-tolerant mixedwood forest occurs as a matrix in central Nova Scotia and as a large patch elsewhere. It often occupies transitional areas between softwood dominated lower slopes and tolerant hardwood dominated upper slopes. Hemlock and yellow birch are both shade-tolerant and long-lived, promoting the development of uneven-aged canopy structures and eventually old growth features. Northern goshawk prefer large hardwood trees with strong triple-branch main forks, a common feature of yellow birch.

Birch cinder conch produces a fungal growth on yellow birch, often harvested for Chaga tea.



Chaga

# MW4

## Hemlock – Red maple / Wood fern – Starflower

*Tsuga canadensis* – *Acer rubrum* / *Dryopteris* spp. – *Lysimachia borealis*

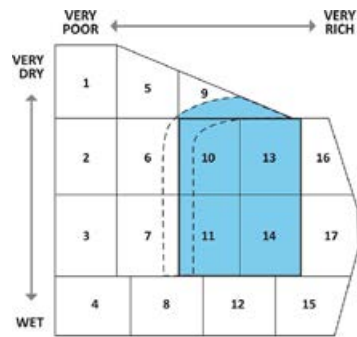
### MW4a Aspen variant

*Populus grandidentata* – *Populus tremuloides*

**Concept:** This closed canopy mixedwood Vegetation Type (VT) has an overstorey co-dominated by hemlock and shade-intolerant hardwoods, such as red maple, white birch and aspen. It is similar to MW3 (Hemlock – Yellow birch / Evergreen wood fern) a mixedwood VT which is differentiated from MW4 by the presence of shade-tolerant hardwoods which are co-dominant with hemlock. A single variant of MW4 is recognized (MW4a), characterized by abundant to dominant levels of aspen (trembling and/or large-tooth). MW4 usually occurs after partial harvesting, windthrow, or by the loss of red spruce, from the canopy, due to a species-specific disturbance agent, such as bark beetle.

**Vegetation:** Shade-tolerant trees such as yellow birch, red spruce and balsam fir are minor associates in the canopy. White pine and red oak have a localized presence in western Nova Scotia. The shrub layer is moderately developed and includes regenerating shade-tolerant trees, striped maple and fly-honeysuckle. A moderately sparse herbaceous layer is represented by typical upland mixedwood forest flora such as starflower, sarsaparilla, evergreen wood fern, cucumber root and ground pine. Bryophyte development varies, with coverage directly related to the relative level of softwood abundance in the overstorey. Schreber’s and stair-step mosses are the main species. *Bazzania* can also be common where coarse woody material accumulates on the forest floor.

Milton Fire Tower,  
Queens County



### Site & Soil Characteristics

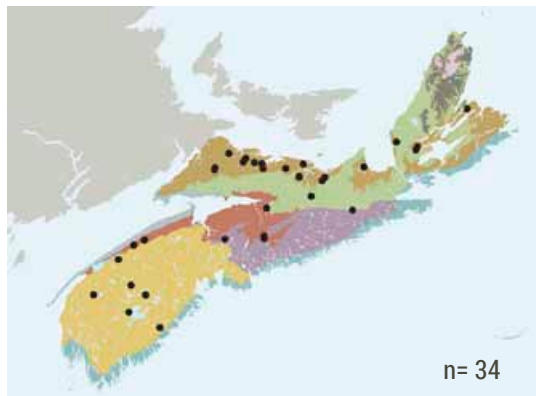
Slope Position: Level<sup>3</sup> Upper<sup>3</sup> Lower<sup>2</sup> Middle<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Moderately<sup>5</sup> Strongly<sup>3</sup> Slightly<sup>2</sup>  
 Drainage: Well<sup>4</sup> Moderately Well<sup>4</sup> Other<sup>2</sup>

Common Soil Types: 2, 2L, 6, 3L, 12, 5  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>3</sup> nd<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>3</sup> (6–10)<sup>5</sup> (11–20)<sup>1</sup> Other<sup>1</sup>  
 Humus Form: Hemimor<sup>3</sup> Mormoder<sup>2</sup> Humimor<sup>1</sup>  
 Humi-Fibrimor<sup>1</sup> nd<sup>3</sup>

**Environmental Setting:** MW4 is mainly associated with fresh to fresh-moist, nutrient medium soils of variable texture. This VT typically occurs as large patches following stand- or patch-scale



Characteristic Plants	MW4		MW4a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Hemlock	100	41	100	38
Red maple	96	21	100	15
Red spruce	68	14	67	6
Yellow birch	68	6	33	2
Balsam fir	48	6	56	9
White birch	44	17	33	4
White pine	36	9	33	1
Sugar maple	24	4	22	6
Red oak	12	15		
White spruce	12	4	11	0.1
White ash	12	1	11	0.1
Trembling aspen	8	2	56	35
Ironwood	8	0.1	11	0.1
Large-tooth aspen	4	3	67	17
<b>Tree Layer (Mean % Cover)</b>		<b>92</b>		<b>99</b>
Balsam fir	84	6	89	2
Hemlock	76	2	67	1
Red maple	72	2	78	0.4
Striped maple	64	1	67	0.1
Red spruce	56	3	56	0.7
Fly-honeysuckle	48	0.3	44	0.1
White pine	40	4	22	0.1
Yellow birch	32	2		
Beech	32	0.9	11	0.1
White ash	32	0.1	11	0.1
Sugar maple	24	0.1	11	0.1
Wild raisin	20	0.1	56	0.1
Trembling aspen	4	0.1	44	0.3
Large-tooth aspen			44	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>14</b>		<b>4</b>
Starflower	92	0.9	78	0.3
Wild lily-of-the-valley	88	4	89	0.8
Sarsaparilla	60	3	44	0.5
Evergreen wood fern	60	2	22	0.1
Bluebead lily	60	0.4	22	0.4
Cucumber root	52	0.1		
Ground pine	48	0.6	11	0.1
Rose twisted stalk	48	0.1		
Wood aster	44	0.2	33	0.2
Ghost pipe	44	0.1	22	0.1
New York fern	36	5	11	3
Partridge-berry	36	0.8	22	0.1
Painted trillium	36	0.1	11	0.1
Cinnamon fern	32	0.7	22	0.2
Goldthread	32	0.4		
Northern beech fern	28	1	11	0.1
Christmas fern	28	0.5	33	0.7
Bunchberry	24	5	11	0.1
Hay-scented fern	24	0.8		
Wood-sorrel	24	0.8		
Interrupted fern	20	0.5	56	1
<b>Herb Layer (Mean % Cover)</b>		<b>16</b>		<b>3</b>
Stair-step moss	88	5	78	2
Bazzania	80	4	56	2
Schreber's moss	76	5	44	2
Broom moss	72	0.9	56	0.9
Log moss	68	3	44	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>15</b>		<b>6</b>



disturbances such as clearcutting or partial harvesting. Red maple regeneration is by seed or coppice. MW4 is a common mixedwood VT found on zonal ecosites throughout central Nova Scotia and scattered elsewhere, including Cape Breton Island.

**Successional Dynamics:** MW4 is a mid-successional VT that follows partial overstorey loss in mature hemlock – red spruce forests. Severe stand-level disturbance can result in development of earlier successional VTs dominated by white birch, red maple and aspen. Later successional VTs following MW4 include SH3 (Red spruce – Hemlock / Wild lily-of-the-valley) and MW3. Early-successional stages can be bypassed if, at the time of disturbance, advanced hemlock and red spruce regeneration is present and maintained. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged stand structure as it matures and the shorter-lived intolerant species, with which it is mixed, begin to decline. Residual trees in the overstorey can provide evidence of pre-disturbance conditions and should be considered when assessing possible successional trends.

**Ecological Features:** This VT has many of the same ecological features as MW2 (Red spruce – Red maple – White birch / Goldthread). Residual trees (survivors from previous seral stages) are common and may contribute notable wildlife habitat values and increased forest structural complexity. They provide cavity and stick nesting sites, and perching sites for several bird species, along with denning opportunities for small-to medium-sized mammals. The buds and catkins of shade-intolerant hardwoods like aspen and white birch are a favourite food source for ruffed grouse.



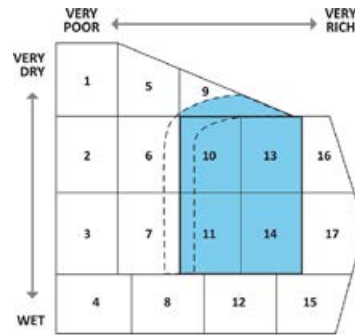
# MW5

## White spruce – Yellow birch / Bunchberry – Wood fern

*Picea glauca* – *Betula alleghaniensis* /  
*Cornus canadensis* – *Dryopteris* spp.

**Concept:** This Vegetation Type (VT) is a closed canopy mixedwood forest characterized by white spruce, balsam fir and yellow birch. It is very similar to MW1 (Red spruce – Yellow birch / Evergreen wood fern) but is typically associated with eastern Nova Scotia, a somewhat cooler region where red spruce is less common. White spruce in this VT generally has greater longevity than when it occurs on abandoned farmlands.

**Vegetation:** A suite of other shade-tolerant trees (e.g. sugar maple, hemlock, beech, red maple and white pine) may also be present to varying degrees. The shrub layer is sparsely developed and includes mainly regenerating trees, striped maple and fly-honeysuckle. Several fern species are common in the moderately well-developed herbaceous layer and may include evergreen wood fern, northern beech fern and New York fern. Bunchberry, sarsaparilla, wood-sorrel and wood aster are also common. Bryophyte development varies, with coverage directly related to relative softwood abundance in the overstory. Schreber's moss, broom moss and stair-step moss are the main species. *Bazzania* can also be common where coarse woody material has accumulated on the forest floor.



### Site & Soil Characteristics

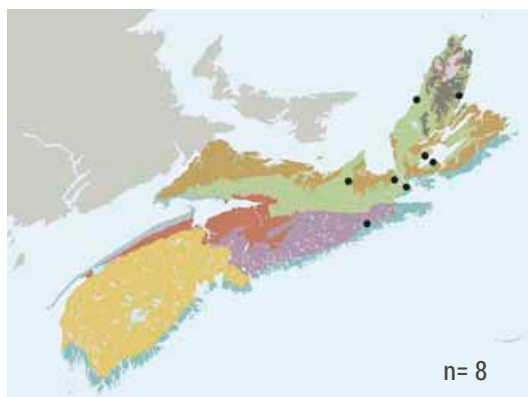
- Slope Position: Middle<sup>5</sup> Upper<sup>3</sup> Lower<sup>1</sup> Toe<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>3</sup> (Very – Excessively)<sup>1</sup>
- Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>
- Microtopography: Slightly<sup>6</sup> Moderately<sup>3</sup> Strongly<sup>1</sup>
- Drainage: Well<sup>5</sup> Moderately Well<sup>4</sup> Imperfect<sup>1</sup>
- Common Soil Types: 2, 8, 6, 2L
- Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>3</sup> (> 45)<sup>1</sup> nd<sup>5</sup>
- Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>4</sup> (11–20)<sup>2</sup> nd<sup>3</sup>
- Humus Form: Hemimor<sup>4</sup> Mormoder<sup>3</sup> Vermimull<sup>1</sup> Fibri-Humimor<sup>1</sup> Humimor<sup>1</sup>

**Environmental Setting:** MW5 is mainly associated with fresh, nutrient medium soils of variable texture. This VT is found on zonal ecosites particularly in eastern portions of the province where white spruce replaces red spruce and/or hemlock as the softwood

Roberta, Richmond County



Characteristic Plants	MW5	
	Freq. (%)	Cover (%)
White spruce	100	20
Balsam fir	88	26
Yellow birch	75	31
Red maple	63	8
Sugar maple	38	22
White birch	25	2
Beech	13	25
Hemlock	13	8
White pine	13	8
Trembling aspen	13	5
<b>Tree Layer (Mean % Cover)</b>	<b>85</b>	
Red maple	75	2
Balsam fir	63	6
Yellow birch	50	3
Striped maple	50	2
Sugar maple	38	0.6
Fly-honeysuckle	38	0.2
Serviceberry	38	0.1
White spruce	25	2
Mountain maple	25	0.1
Mountain-ash	25	0.1
Wild raisin	25	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>11</b>	
Starflower	75	0.3
Ghost pipe	75	0.1
Wild lily-of-the-valley	75	0.1
Evergreen wood fern	63	3
Bunchberry	63	0.9
Sarsaparilla	50	11
New York fern	50	4
Northern beech fern	50	0.9
Wood-sorrel	38	2
Wood aster	38	1
Mountain wood fern	38	0.5
Violets	38	0.5
Twinflower	38	0.3
Dwarf raspberry	25	5
Goldthread	25	2
Hay-scented fern	25	2
Cinnamon fern	25	1
Christmas fern	25	0.6
Tall buttercup	25	0.5
Common speedwell	25	0.2
Drooping wood sedge	25	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>20</b>	
Bazzania	75	5
Schreber's moss	75	3
Broom moss	75	2
Stair-step moss	63	14
Log moss	63	3
Shaggy moss	38	2
Hair-cap moss	38	0.2
Pin cushion moss	38	0.1
Plume moss	25	0.3
Grey reindeer lichen	25	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>22</b>	



component of mid- to late-successional mixedwood stands. It is strongly associated with the Antigonish Lowlands and Mulgrave Plateau ecodistricts.

**Successional Dynamics:** MW5 is a climatic climax Acadian mixedwood VT. It is dominated by white spruce and yellow birch and often occurs with lesser amounts of other late-successional trees such as sugar maple and beech. MW5 can develop from several early and mid-successional VTs comprised of red maple, white birch, balsam fir and/or white spruce. Early-successional stages can be bypassed if, at the time of disturbance, advanced white spruce and yellow birch regeneration is present and retained. White spruce has a lower shade tolerance than balsam fir and red spruce but will respond to release after many years of suppression in the understory. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged canopy structure as it matures. Old growth potential is at least moderate in most stands.

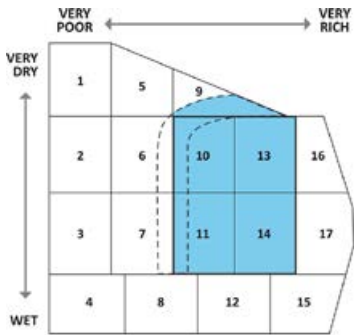
**Ecological Features:** MW5 is a large patch forest primarily found in the cooler climatic conditions of eastern Nova Scotia. In these circumstances, white spruce is longer-lived and in this respect, the tree plays a similar role in stand successional dynamics, as red spruce does in slightly milder south-central and western regions. The potential for development of uneven-aged canopy structures is high. Large diameter snags can provide cavity and stick nesting sites for pileated woodpecker, barred owl and northern goshawk, along with denning opportunities for many small- to medium-sized mammals (e.g. American marten). Yellow birch is an abundant source of seed during the winter for many species of birds and small mammals. In these forests yellow birch may be deformed and sometimes killed, by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

# MW6 White spruce – Red maple (White birch)/ Starflower / Schreber’s moss

*Picea glauca* – *Acer rubrum* (*Betula papyrifera*) /  
*Lysimachia borealis* / *Pleurozium Schreberi*

**Concept:** These closed canopy mixedwood forests are dominated by white spruce and red maple with other species present with lower cover. The VT is very similar to MW2 (Red spruce – Red maple – White birch / Goldthread) but is more strongly associated with eastern Nova Scotia, a somewhat cooler region where red spruce is less common. MW6 usually occurs as a result of partial harvesting, windthrow, or loss of the softwood canopy component due to insect mortality (typically spruce bark beetle) or disease.

**Vegetation:** Balsam fir and white birch are usually present with moderate cover. Late-successional trees such as yellow birch and red spruce are often found scattered as residuals from past disturbances. The shrub layer is moderately developed and includes



## Site & Soil Characteristics

Slope Position: Upper<sup>3</sup> Level<sup>2</sup> Middle<sup>2</sup> Crest<sup>1</sup> Lower<sup>1</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>4</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Slightly<sup>5</sup> Moderately<sup>3</sup> Level<sup>1</sup> Strongly<sup>1</sup>  
 Drainage: Moderately Well<sup>5</sup> Well<sup>4</sup> Imperfect<sup>1</sup>

Common Soil Types: 3, 2L, 2, 12, 5  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>3</sup> (> 45)<sup>1</sup> nd<sup>5</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>5</sup> (11–20)<sup>1</sup> nd<sup>2</sup>  
 Humus Form: Hemimor<sup>3</sup> Humimor<sup>2</sup> Mormoder<sup>2</sup> Mullmoder<sup>1</sup>  
 Vermimull<sup>1</sup> nd<sup>1</sup>

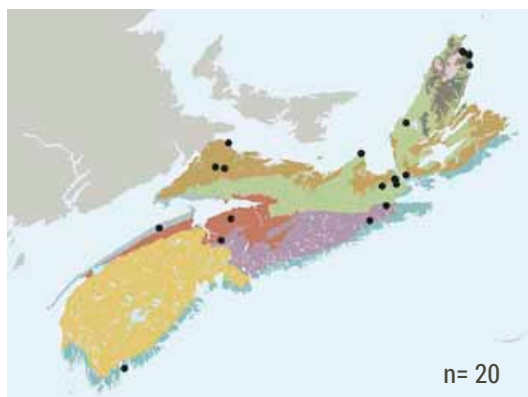
mainly regenerating trees, wild raisin and mountain holly. Some sites have patches of lowbush and velvet-leaf blueberry and kalmia. The herbaceous layer is well developed with scattered individuals of typical upland forest plants such as starflower, wild-lily-of-the-valley and sarsaparilla, with bunchberry and bracken found locally with more extensive coverage. Bryophyte development is typically low and coverage directly related to relative softwood abundance in the overstory. Schreber’s moss, broom moss and stair-step moss are the main species with bazzania common where downed coarse woody material has accumulated.

**Environmental Setting:** MW6 is mainly associated with fresh to fresh-moist, nutrient medium soils of variable texture. This mixedwood VT is found on zonal ecosites particularly in eastern mainland Nova Scotia and on Cape Breton Island, but is strongly associated with the Antigonish Lowlands and Mulgrave Plateau ecodistricts.



Long Lake,  
Guysborough County

Characteristic Plants	MW6	
	Freq. (%)	Cover (%)
White spruce	100	29
Red maple	85	25
White birch	65	13
Balsam fir	65	8
Yellow birch	40	12
Black spruce	30	6
Trembling aspen	25	9
Red spruce	15	7
Sugar maple	10	4
<b>Tree Layer (Mean % Cover)</b>		<b>78</b>
Balsam fir	80	6
Red maple	80	4
Wild raisin	60	2
White spruce	55	4
Velvet-leaf blueberry	45	3
Mountain holly	45	1
Serviceberry	45	0.6
Striped maple	40	1
Lambkill	35	13
Mountain-ash	35	0.1
White birch	30	3
Yellow birch	30	3
White ash	30	2
Lowbush blueberry	20	2
Black spruce	20	0.7
Beaked hazelnut	20	0.3
Beech	15	3
<b>Shrub Layer (Mean % Cover)</b>		<b>27</b>
Starflower	90	0.4
Wild lily-of-the-valley	80	4
Sarsaparilla	70	4
Bunchberry	60	26
Bracken	55	17
Evergreen wood fern	55	3
Goldthread	55	2
Twinflower	50	7
Bluebead lily	45	0.3
Ghost pipe	40	0.2
New York fern	35	3
Cinnamon fern	35	1
Wood aster	35	0.9
Hay-scented fern	30	0.6
Interrupted fern	25	0.7
Pink lady's-slipper	25	0.2
Wood-sorrel	25	0.2
Partridge-berry	20	0.2
Lady fern	15	8
Mountain wood fern	15	2
Northern beech fern	15	0.3
<b>Herb Layer (Mean % Cover)</b>		<b>43</b>
Schreber's moss	75	4
Broom moss	75	1
Bazzania	60	5
Stair-step moss	45	4
Log moss	40	0.9
Hair-cap moss	35	3
Wavy dicranum	30	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>12</b>



**Successional Dynamics:** MW6 is an even-aged early- to mid-successional VT dominated by white spruce and red maple, with other shade-intolerant trees such as white birch and aspen. The abundance of these early-successional trees is dependent on past stand-level disturbance events. The presence of late-successional trees, such as shade-tolerant sugar maple, yellow birch and hemlock, provides insight into earlier stand composition. Early-successional stages can be bypassed if, at the time of disturbance, advanced white spruce and yellow birch regeneration is present and retained. Red maple regeneration is by seed or coppice. White spruce has lower shade tolerance than either balsam fir or red spruce, but will respond to release after many years of suppression in the understory.

**Ecological Features:** MW6 is known from eastern and central Nova Scotia, where it occurs as a large patch, early-successional forest. The VT provides several ecological functions including nutrient cycling and rapid site revegetation after disturbance. Residual trees, from previous successional stages, can provide notable wildlife habitat values and increased forest structural complexity. For example, large diameter snags can serve as cavity and stick nesting sites for pileated woodpecker and several raptor species, such as northern goshawk and barred owl, along with denning opportunities for small- to medium-sized mammals (e.g. American marten). Coarse woody material is often abundant in early and later developmental stages, and is largely tied to the occurrence of short-lived trees such as balsam fir and white birch.

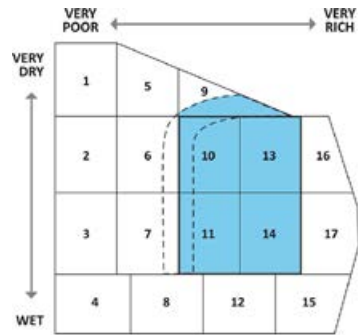
# MW7

## Balsam fir – Red maple / Wood-sorrel – Goldthread

*Abies balsamea* – *Acer rubrum* / *Oxalis montana* / *Coptis trifolia*

**Concept:** This closed canopy mixedwood forest of balsam fir and red maple occurs across a wide range of soil moisture conditions. MW7 is a broadly defined Vegetation Type (VT) that follows stand-replacing disturbance events such as windthrow, fire or harvesting. Due to balsam fir's short longevity, this VT often has significant levels of coarse wood material and/or numerous snags, as stands transition to later successional stages. Balsam fir – Red maple / Wood-sorrel – Goldthread is a commonly found VT in eastern Nova Scotia.

**Vegetation:** Other shade-intolerant hardwoods, associated with the dominant cohort, include white birch and aspen. A few scattered white and black spruce are possible. Remnants from the previous stand may include red spruce, yellow birch and hemlock. The shrub layer is moderately developed and includes mainly regenerating trees (especially balsam fir and red maple). Herb coverage can be extensive and is usually dominated by common upland forest flora (e.g. wild lily-of-the-valley, bunchberry, goldthread and wood-sorrel). Several fern species are prominent including bracken, evergreen wood fern and New York fern—the presence and relative abundance of the latter two species reflects available soil moisture. Bryophyte development varies,



### Site & Soil Characteristics

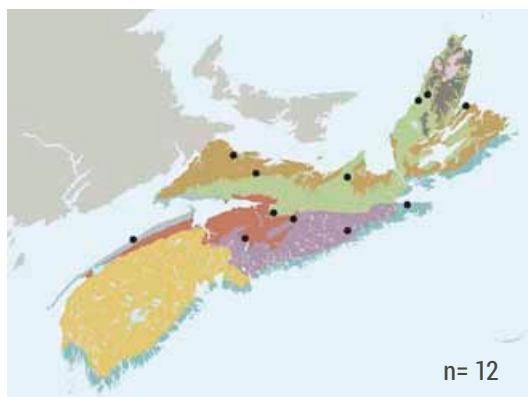
Slope Position:	Level <sup>3</sup> Upper <sup>3</sup> Lower <sup>2</sup> Middle <sup>1</sup> Toe <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Moderately <sup>4</sup> Slightly <sup>3</sup> Strongly <sup>1</sup> Other <sup>2</sup>
Drainage:	Imperfect <sup>4</sup> Moderately Well <sup>3</sup> Well <sup>2</sup> Other <sup>1</sup>
Common Soil Types:	6, 6C, 5, 9C, 12, 9, 2, 2L
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>3</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>4</sup> (11–20) <sup>2</sup> nd <sup>2</sup>
Humus Form:	Mormoder <sup>3</sup> Hemimor <sup>2</sup> nd <sup>5</sup>

with coverage directly related to relative softwood abundance in the overstory. Schreber's moss, stair-step moss and broom moss are the main species. Bazzania can also be common where coarse woody material has accumulated on the forest floor.

Moose River, Pictou County



Characteristic Plants	MW7	
	Freq. (%)	Cover (%)
Balsam fir	100	31
Red maple	100	26
White birch	58	7
Yellow birch	50	7
Black spruce	33	7
Red spruce	33	7
White spruce	33	5
Mountain-ash	25	1
Hemlock	17	9
Trembling aspen	17	8
<b>Tree Layer (Mean % Cover)</b>		<b>78</b>
Balsam fir	100	4
Red maple	100	4
Mountain-ash	42	1
Striped maple	42	1
Yellow birch	42	1
Velvet-leaf blueberry	42	0.7
White birch	42	0.4
Serviceberry	33	0.2
Fly-honeysuckle	33	0.1
Red spruce	25	9
Beech	25	6
Wild raisin	25	0.2
Hemlock	17	0.5
Sugar maple	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>15</b>
Wild lily-of-the-valley	92	2
Starflower	92	0.8
Bunchberry	83	6
Goldthread	75	4
Evergreen wood fern	67	8
Sarsaparilla	67	1
Wood-sorrel	58	15
New York fern	58	13
Wood aster	58	0.8
Cinnamon fern	50	0.7
Bluebead lily	50	0.4
Mountain wood fern	33	12
Bracken	33	3
Northern beech fern	33	0.4
Painted trillium	33	0.2
Ghost pipe	33	0.1
Interrupted fern	25	2
Ground pine	25	0.1
Shining club-moss	17	7
Hay-scented fern	17	0.5
Bristly club-moss	17	0.3
Drooping wood sedge	17	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>42</b>
Bazzania	92	4
Schreber's moss	83	11
Broom moss	75	0.6
Log moss	75	0.5
Stair-step moss	67	17
Hair-cap moss	33	0.1
Wavy dicranum	25	1
Common green sphagnum	25	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>28</b>



**Environmental Setting:** MW7 occurs primarily on fresh to moist, nutrient medium soils of variable texture, on zonal ecosites. This VT is common throughout eastern Nova Scotia and is scattered elsewhere.

**Successional Dynamics:** MW7 is an early- to mid-successional VT dominated by balsam fir and red maple. It is an even-aged forest that usually follows stand-level disturbances such as windthrow, fire and harvesting. MW7 can sometimes renew itself through natural stand deterioration (facilitated by minor insect predation, disease and senescence) followed by development of advanced regeneration. Over time, this VT will transition to late-successional forests of longer-lived, shade-tolerant trees such as red spruce, yellow birch and hemlock. Scattered trees, from previous successional stages, may occur as residuals in the overstory, providing evidence of pre-disturbance conditions. They provide clues for assessing successional trends.

**Ecological Features:** This matrix-forming forest occurs on zonal sites in the Acadian Macrogroup. It is found province-wide as a variably-sized patch ecosystem. Typically following stand-level disturbances, the VT provides several ecological functions including rapid site revegetation, nutrient cycling, and the establishment of nurse crops for later successional trees, such as red spruce, hemlock, yellow birch, white pine and white spruce. Residual trees, from previous successional stages, are common and increase structural complexity. Mixedwood forests, in general, provide both shelter and food for overwintering deer, snowshoe hare and moose. Red maple provides one of the most important early and abundant sources of pollen and nectar for a wide range of insects.

# MW8

## White birch – Balsam fir / Starflower

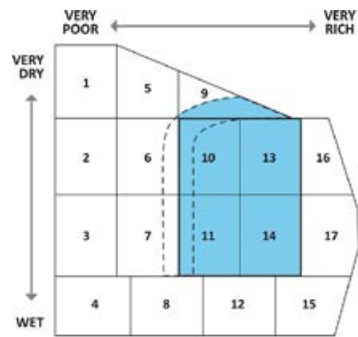
*Betula papyrifera* – *Abies balsamea* / *Lysimachia borealis*

**Concept:** This closed canopy mixedwood Vegetation Type (VT) has an overstory co-dominated by white birch and balsam fir. MW8 is a broadly defined VT that follows stand-replacing disturbance events such as windthrow, fire, or harvesting. Due to the short-lived nature of balsam fir, this VT often has significant levels of coarse wood material and/or numerous snags as the stand transitions to later successional stages. White birch – Balsam fir / Starflower is mostly found in eastern Nova Scotia.

**Vegetation:** Other hardwood trees associated with the dominant cohort are sparse if present and may include red maple, striped maple, mountain ash and pin cherry. Remnants from previous successional stages may include red spruce, yellow birch and hemlock. The shrub layer is sparse and primarily comprised of regenerating trees (especially balsam fir and red maple). Herbaceous cover is well developed as the birch component of the overstory provides only light shade. Common plants include starflower, wood-sorrel and bunchberry with abundant evergreen and mountain wood ferns. Bryophyte development is generally low with coverage directly related to softwood overstory abundance.

**Environmental Setting:** MW8 mainly develops on fresh, nutrient poor to medium soils of variable texture. This VT has not been well sampled but appears to occur throughout eastern Nova Scotia and is likely scattered elsewhere.

**Successional Dynamics:** MW8 is an early-successional VT dominated by white birch and balsam fir. It is an even-aged VT that usually follows stand-level disturbances such as



### Site & Soil Characteristics

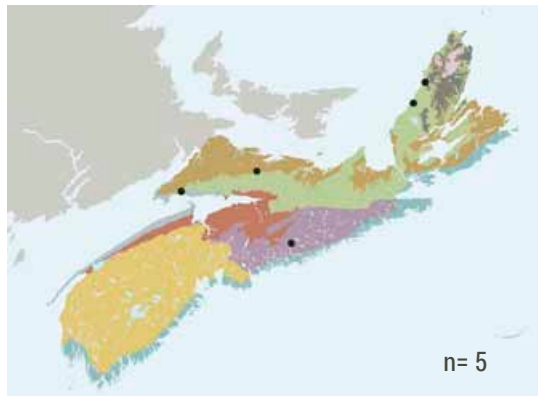
Slope Position: Upper<sup>6</sup> Middle<sup>4</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Strongly<sup>4</sup> Level<sup>2</sup> Moderately<sup>2</sup> Slightly<sup>2</sup>  
 Drainage: Well<sup>10</sup>

Common Soil Types: 2, 2C  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>2</sup> (> 45)<sup>2</sup> nd<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>6</sup> (6–10)<sup>4</sup>  
 Humus Form: Hemimor<sup>6</sup> Mormoder<sup>4</sup>



Fox River,  
Cumberland County

Characteristic Plants	MW8	
	Freq. (%)	Cover (%)
White birch	100	35
Balsam fir	100	30
Red maple	80	2
Red spruce	60	10
White spruce	60	5
Yellow birch	40	7
Hemlock	40	0.1
Striped maple	20	12
Sugar maple	20	12
<b>Tree Layer (Mean % Cover)</b>		<b>84</b>
Balsam fir	100	2
Red maple	60	0.6
Mountain-ash	60	0.1
Black spruce	40	4
Yellow birch	40	1
Striped maple	40	0.5
Fly-honeysuckle	40	0.3
Sugar maple	40	0.3
Beech	40	0.1
Serviceberry	40	0.1
Velvet-leaf blueberry	40	0.1
White pine	40	0.1
Wild raisin	40	0.1
White spruce	20	3
White birch	20	2
Mountain holly	20	0.5
Hemlock	20	0.1
Lambkill	20	0.1
Mountain maple	20	0.1
Red spruce	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>6</b>
Starflower	100	0.3
Evergreen wood fern	80	6
Wild lily-of-the-valley	80	2
Wood-sorrel	60	33
Mountain wood fern	60	15
Bunchberry	60	10
Ghost pipe	60	0.1
Bracken	40	5
Shining club-moss	40	2
Sarsaparilla	40	0.4
Goldthread	20	4
Wood aster	20	0.8
Violets	20	0.5
Twinflower	20	0.3
Bluebead lily	20	0.1
Drooping wood sedge	20	0.1
Dwarf raspberry	20	0.1
New York fern	20	0.1
Painted trillium	20	0.1
Rose twisted stalk	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>46</b>
Broom moss	80	3
Stair-step moss	80	3
Schreber's moss	60	7
Bazzania	60	5
Log moss	60	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>13</b>



windthrow, fire and harvesting. As white birch (a short-lived and shade-intolerant species) starts to lose overstory dominance, this VT will transition to late-successional forests of longer-lived, shade-tolerant trees such as red spruce, yellow birch, and hemlock. Residuals in the overstory can provide evidence of pre-disturbance conditions and should be considered when assessing possible successional trends.

**Ecological Features:** Following stand-level disturbances, this VT has many of the same ecological features as MW7 (Balsam fir – Red maple / Wood-sorrel – Goldthread). It is a variably-sized patch ecosystem and occurs province-wide on zonal sites in the Acadian Macrogroup. Mixedwood forests, in general, provide both shelter and food for overwintering deer, snowshoe hare and moose. The buds and catkins of white birch are a favourite food source for ruffed grouse.



Starflower



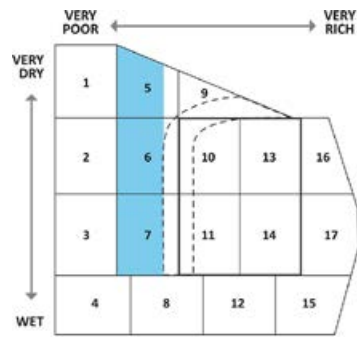
# MW9

## Black spruce – Red maple / Bracken – Sarsaparilla

*Picea mariana* – *Acer rubrum* / *Pteridium aquilinum* – *Aralia nudicaulis*

**Concept:** Black spruce is the dominant overstory tree, but red maple (with its greater potential for broad crown development) occupies a large proportion of the canopy. Overall, this mixedwood overstory has only moderate canopy closure thereby supporting a relatively broad suite of herbaceous plants, compared to other black spruce dominated VTs. Black spruce – Red maple / Bracken – Sarsaparilla usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.

**Vegetation:** White birch and balsam fir can be abundant in this VT, as (less often) can hybrid (red/black) spruce and white pine. The well-developed shrub layer is co-dominated by lambkill, velvet-leaf and lowbush blueberry, huckleberry and regenerating trees, especially black spruce and balsam fir. Bracken,



### Site & Soil Characteristics

Slope Position: Middle<sup>3</sup> Upper<sup>3</sup> Lower<sup>2</sup> Crest<sup>1</sup> Level<sup>1</sup>

Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>2</sup>  
(Very – Excessively)<sup>4</sup>

Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>

Microtopography: Slightly<sup>6</sup> Moderately<sup>3</sup> Level<sup>1</sup>

Drainage: Well<sup>5</sup> Imperfect<sup>3</sup> Moderately Well<sup>2</sup>

Common Soil Types: 2, 3L, 2B

Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>1</sup> (> 45)<sup>2</sup> nd<sup>6</sup>

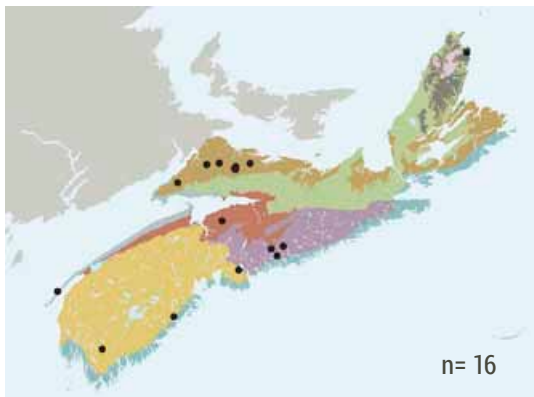
Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>4</sup> (11–20)<sup>2</sup> nd<sup>2</sup>

Humus Form: Hemimor<sup>5</sup> Humimor<sup>1</sup> Resimor<sup>1</sup> Mormoder<sup>1</sup>  
nd<sup>2</sup>

Thomson Station, Cumberland County



Characteristic Plants	MW9	
	Freq. (%)	Cover (%)
Black spruce	100	32
Red maple	100	20
White birch	69	13
Balsam fir	50	12
White pine	31	7
White spruce	25	4
Red spruce	19	13
Tamarack	13	4
Red oak	13	4
Large-tooth aspen	13	2
<b>Tree Layer (Mean % Cover)</b>		<b>77</b>
Lambkill	88	7
Balsam fir	81	10
Black spruce	81	8
Red maple	75	2
Velvet-leaf blueberry	63	1
Wild raisin	56	1
Mountain holly	50	1
White pine	50	0.3
Red oak	50	0.1
Lowbush blueberry	44	6
Huckleberry	31	4
Serviceberry	31	0.1
White birch	19	3
<b>Shrub Layer (Mean % Cover)</b>		<b>31</b>
Starflower	100	0.8
Bunchberry	94	4
Bracken	75	5
Wild lily-of-the-valley	75	1
Sarsaparilla	69	0.6
Goldthread	63	2
Pink lady's-slipper	50	0.2
Teaberry	44	4
Bluebead lily	44	0.2
Cinnamon fern	31	0.7
Partridge-berry	31	0.5
Interrupted fern	25	1
Twinflower	25	0.9
Mayflower	25	0.4
Bristly club-moss	25	0.3
Creeping snowberry	25	0.2
New York fern	25	0.2
Painted trillium	19	0.3
Cucumber root	19	0.2
Ground pine	19	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>15</b>
Schreber's moss	100	16
Bazzania	75	10
Broom moss	69	1
Stair-step moss	56	7
Log moss	56	5
Wavy dicranum	50	2
Ladies' tresses	38	13
Hair-cap moss	38	0.8
Grey reindeer lichen	31	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>39</b>



bunchberry and teaberry can be the most abundant species in the herbaceous layer, but a variety of other plants can also be found including sarsaparilla, starflower and goldthread. Bryophyte coverage is generally low with leaf litter dominating the forest floor.

**Environmental Setting:** Fresh to moist, nutrient poor soils characterize MW9, although sites may be slightly richer when hybridized (red/black) spruce are present. This VT can be found throughout Nova Scotia on a variety of soils with low nutrient availability.

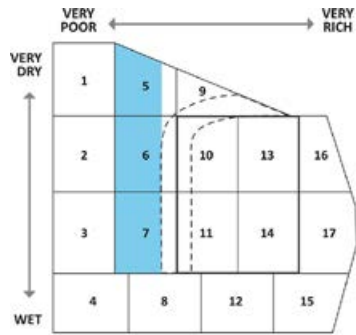
**Successional Dynamics:** Nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. This generally even-aged VT usually follows stand-replacing disturbances, with harvesting the most common cause. In the absence of similar disturbance events, MW9 may succeed to softwood VTs dominated by black spruce and white pine. However, succession to mixedwood forests of white pine with red maple and red oak may also be possible, especially in western Nova Scotia.

**Ecological Features:** This forest occurs as small to large patches in many parts of the province. It's often found on sites with high surface stoniness. Mature forests develop abundant old man's beard, a lichen sought for nest material by Northern parula and other species, and as a winter food by deer foraging on fallen trees. When MW9 occurs on slightly richer upland ecosites (edaphic types dominated by black spruce), a broader suite of species and habitat features may be supported, contrasting with black spruce coniferous or mixedwood forests found on poorer ecosites.

# MW10 Black spruce – Aspen / Bracken – Sarsaparilla

*Picea mariana* – *Populus tremuloides* – *Populus grandidentata* /  
*Pteridium aquilinum* – *Aralia nudicaulis*

**Concept:** MW10 is co-dominated by black spruce, and either trembling or large tooth aspen, in this partially-closed to closed-canopy mixedwood Vegetation Type (VT). Trees from pre-disturbance successional stages are often found scattered throughout, including large over-topping white pine, red oak and hemlock. These residuals have important ecological and biodiversity value and can be employed as potential indicators of later successional stages. Black spruce – Aspen / Bracken – Sarsaparilla usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.



## Site & Soil Characteristics

Slope Position: Level<sup>5</sup> Upper<sup>3</sup> Other<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Moderately<sup>6</sup> Strongly<sup>2</sup> Slightly<sup>1</sup> Level<sup>1</sup>  
 Drainage: Imperfect<sup>4</sup> Moderately Well<sup>3</sup> Well<sup>3</sup>

Common Soil Types: 6, 3, 2, 2C, 5  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>4</sup> (> 45)<sup>2</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>3</sup> (6–10)<sup>6</sup> (11–20)<sup>1</sup>  
 Humus Form: Hemimor<sup>6</sup> Humi-Fibrimor<sup>1</sup> Humimor<sup>1</sup>  
 Mormoder<sup>1</sup> nd<sup>1</sup>

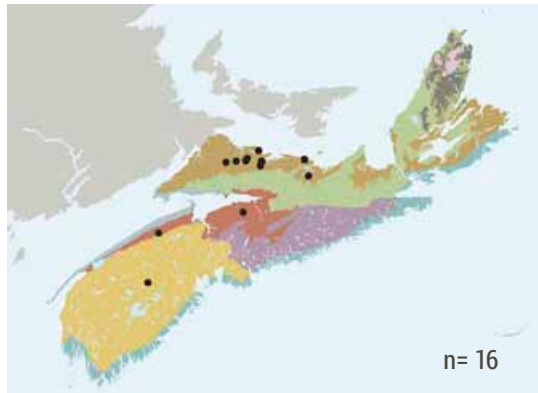
**Vegetation:** Other early-successional trees in the overstory often include red maple, balsam fir, red oak and hybrid spruce (red/black). A moderately well-developed shrub layer is mixed with regenerating trees and woody shrubs such as lambkill, wild raisin, and velvet-leaf and lowbush blueberry. Black spruce and balsam fir regeneration can be extensive. The herb layer is often well developed with characteristic upland forest flora such as sarsaparilla, bunchberry and wild-lily-of-the-valley. Herbs indicative of less fertile ecosites include bracken, teaberry and mayflower. Schreber's moss, wavy dicranum and broom moss typify a sparse bryophyte layer.

**Environmental Setting:** Dry to moist, nutrient poor soils are typical of MW10. This VT is commonly found in the Northumberland/Bras d'Or (500) and Western (700) ecoregions but can occur throughout Nova Scotia on a variety of soils with low nutrient status.



Mount William,  
Pictou County

Characteristic Plants	MW10	
	Freq. (%)	Cover (%)
Black spruce	100	25
Red maple	94	13
Balsam fir	81	10
Trembling aspen	56	24
Large-tooth aspen	44	26
Red oak	31	12
White pine	31	5
Hemlock	31	3
White spruce	31	3
Red spruce	25	5
White birch	25	0.1
Grey birch	13	3
Tamarack	13	2
<b>Tree Layer (Mean % Cover)</b>		<b>81</b>
Lambkill	94	4
Balsam fir	88	6
Wild raisin	88	0.5
Black spruce	75	2
Red maple	75	0.5
Serviceberry	69	0.3
White pine	63	0.3
Lowbush blueberry	56	0.9
Velvet-leaf blueberry	50	4
Red oak	50	0.2
Trembling aspen	44	0.7
Mountain holly	31	0.1
Large-tooth aspen	31	0.1
Red spruce	19	0.7
Beaked hazelnut	19	0.1
Bush-honeysuckle	19	0.1
Hemlock	19	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>16</b>
Bracken	94	6
Starflower	94	2
Wild lily-of-the-valley	88	7
Sarsaparilla	88	4
Bunchberry	75	4
Teaberry	63	2
Interrupted fern	50	2
Bluebead lily	44	0.9
Painted trillium	31	0.2
Mayflower	25	0.2
Partridge-berry	25	0.2
Ghost pipe	25	0.1
Twinflower	19	2
Ground pine	19	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>30</b>
Schreber's moss	100	5
Wavy dicranum	69	0.8
Broom moss	63	1
Stair-step moss	56	3
Bazzania	38	0.5
Log moss	38	0.3
Common green sphagnum	31	1
Shaggy moss	25	0.3
Hair-cap moss	19	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>9</b>



**Successional Dynamics:** Nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and successional patterns. MW10 is primarily an even-aged, early-successional VT that follows stand-level disturbances such as fire, windthrow or harvesting. The relative abundance of black spruce, white pine and/or red oak typically increases in later successional stages.

**Ecological Features:** This forest forms variably-sized patches following stand-level disturbances. Aspen regenerates profusely from root suckers, when disturbed, producing extensive clonal colonies which may also support large fungal associates such as shoe-string root rot (honey mushroom). Aspen is an important tree for cavity nesting birds, and its buds provide winter food for ruffed grouse. Other bird species that may be found in this habitat are red eyed vireo and ovenbird. Similar to MW9, this VT may occupy richer portions of black spruce dominated (edaphic) ecosites, and support a different and often broader suite of floral species and habitat features.



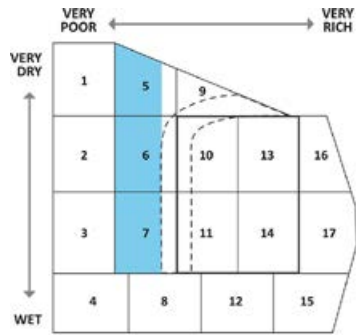
Round-leaved  
pyrola

# MW11 Red oak – White pine / Teaberry

*Quercus rubra* – *Pinus strobus* / *Gaultheria procumbens*

**Concept:** This partial to closed (50–95%) canopy mixedwood Vegetation Type (VT) has abundant white pine and red oak combined with a varied overstory of other tree associates, typical of low fertility ecosites. The shrub layer can be extensive, depending on the amount of shade, composed of both regenerating trees and ericaceous woody plants. Red oak – White pine / Teaberry usually follows stand-replacing disturbances such as fire, windthrow or harvesting.

**Vegetation:** Shade-intolerant hardwoods in the overstory include red maple, white birch and largetooth aspen. White pine may also occur in a super-canopy position – residual survivors from past disturbance events. The shrub layer is primarily velvet-leaf blueberry, lowbush blueberry, lambkill and huckleberry. Regenerating white pine, red oak, red maple, black spruce and balsam fir can be extensive. Other woody shrubs may include witch-hazel and wild raisin. The herbaceous layer is moderately developed and has many species associated with dry, poor sites such as teaberry, bracken, mayflower, cow-wheat, princes'-pine, poverty grass and round-leaved pyrola. The bryophyte layer is poorly developed.



## Site & Soil Characteristics

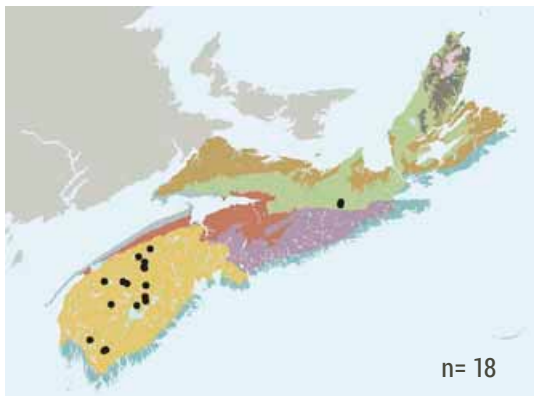
Slope Position:	Upper <sup>7</sup> Crest <sup>1</sup> Level <sup>1</sup> Middle <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>2</sup> (Moderately) <sup>6</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Slightly <sup>5</sup> Moderately <sup>3</sup> Level <sup>2</sup>
Drainage:	Well <sup>6</sup> Rapid <sup>3</sup> Moderately Well <sup>1</sup>
Common Soil Types:	2
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>3</sup> (> 45) <sup>3</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>4</sup> (6–10) <sup>3</sup> (11–20) <sup>2</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>3</sup> Humi-Fibrimor <sup>3</sup> Humimor <sup>1</sup> Vermimull <sup>1</sup> Mormoder <sup>1</sup> nd <sup>1</sup>

**Environmental Setting:** MW11 is mainly associated with dry to fresh, nutrient poor soils derived from granitic glacial till. Most sites also have moderate

Round Lake, Queens County



Characteristic Plants	MW11	
	Freq. (%)	Cover (%)
White pine	100	28
Red oak	100	25
Red maple	94	9
White birch	56	6
Black spruce	39	9
Large-tooth aspen	33	14
Beech	17	10
Red pine	17	7
Balsam fir	11	6
White spruce	11	4
<b>Tree Layer (Mean % Cover)</b>		<b>78</b>
Red oak	94	4
White pine	89	5
Red maple	89	2
Velvet-leaf blueberry	83	9
Lambkill	78	5
Balsam fir	67	7
Black spruce	67	7
Wild raisin	67	0.8
Lowbush blueberry	50	6
Witch-hazel	44	3
Serviceberry	39	1
Huckleberry	33	22
Beech	33	12
Striped maple	28	2
Large-tooth aspen	17	0.5
<b>Shrub Layer (Mean % Cover)</b>		<b>49</b>
Bracken	89	8
Teaberry	89	7
Bunchberry	89	4
Partridge-berry	78	2
Sarsaparilla	78	1
Mayflower	78	0.7
Wild lily-of-the-valley	72	0.8
Starflower	72	0.4
Pink lady's-slipper	44	0.3
Ghost pipe	44	0.1
Twinflower	39	0.6
Painted trillium	39	0.1
Bluebead lily	33	0.4
Princes'-pine	33	0.1
Rice grass	28	0.2
Cucumber root	28	0.1
Round-leaved pyrola	28	0.1
Lady's thumb	22	0.4
Cow-wheat	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>21</b>
Broom moss	83	2
Log moss	83	1
Schreber's moss	78	3
Bazzania	39	4
Grey reindeer lichen	39	1
Stair-step moss	39	1
Wavy dicranum	28	2
Cup lichens	28	0.3
Pin cushion moss	22	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>8</b>



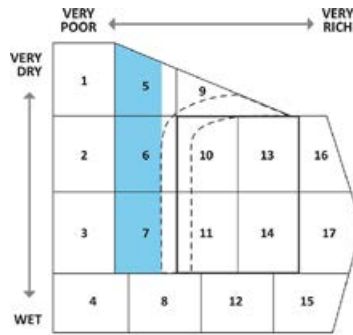
to extreme surface stoniness. This VT is abundant throughout the Western ecoregion, especially in the South Mountain, Western Barrens, Rossignol and Sable ecodistricts.

**Successional Dynamics:** This VT may persist as a late-successional forest, although it is strongly shaped by past disturbances and the relatively dry, nutrient poor soils where it occurs. Historically, stand maintaining fires would have reduced understory fuel loads and promoted white pine and red oak dominance. Earlier successional VTs associated with MW11 would include mixedwood and hardwood VTs with shade-intolerant trees such as large-tooth aspen, white birch, red oak and red maple coupled with conifers including black spruce and white pine.

**Ecological Features:** This variably-sized patch forest may approach matrix extents in western Nova Scotia. Both red oak and white pine are longer lived trees, promoting the potential for old growth. Red oak is a valuable mast tree for wildlife including squirrel, bear, ruffed grouse and deer. Oak is the preferred host of maitake, or hen-of-the-woods, a prized edible mushroom. Both red oak and white pine are capable of significant heights and diameters, which may result in large long-standing snags and super-canopy trees in MW11 stands; these trees provide cavity nesting and denning sites for many vertebrate species. Large diameter coarse woody materials, accumulating following tree demise, are also common. These provide important microhabitat for a variety of species, and make valuable contributions to nutrient budgets on nutrient-limited sites of this VT. Cancer root, a rare parasitic plant that steals nutrients and water from the roots of its host (usually red oak), is occasionally found in this ecosystem.

# MW12 White pine – Red maple / Velvet-leaf blueberry / Bracken

*Pinus strobus* – *Acer rubrum* /  
*Vaccinium myrtilloides* – *Pteridium aquilinum*



**Concept:** This closed canopy mixedwood Vegetation Type (VT) has abundant to dominant levels of white pine and red maple in the canopy, with a lesser component of shade-intolerant hardwoods. A well-developed shrub layer has high ericaceous cover, and quite often witch-hazel is present. The VT occurs on azonal ecosites where low moisture and nutrient availability are limiting factors. This VT often follows stand-level disturbances such as fire, or follows partial stand disturbances caused by windthrow and harvesting.

**Vegetation:** Large-tooth aspen, white birch, and occasionally a small component of red oak are overstory associates. A few white pine may occur as super-canopy



## Site & Soil Characteristics

Slope Position: Lower<sup>4</sup> Level<sup>2</sup> Middle<sup>2</sup> Crest<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>3</sup> (Moderately)<sup>2</sup>  
 (Very – Excessively)<sup>3</sup> nd<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>6</sup> (Slightly – Moderately)<sup>2</sup> nd<sup>2</sup>  
 Microtopography: Moderately<sup>4</sup> Slightly<sup>3</sup> Strongly<sup>2</sup> Level<sup>1</sup>  
 Drainage: Well<sup>6</sup> Moderately Well<sup>3</sup> Imperfect<sup>1</sup>

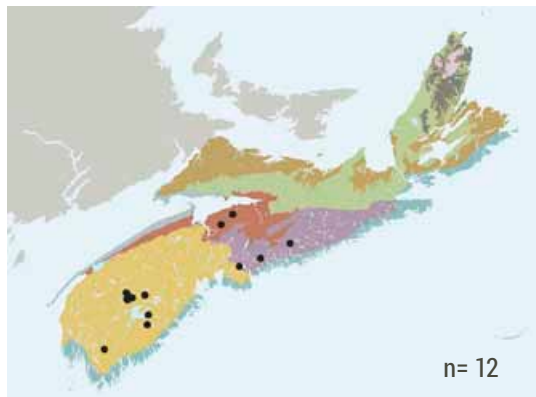
Common Soil Types: 2  
 Rooting Depth (cm): (30–45)<sup>1</sup> (> 45)<sup>2</sup> nd<sup>7</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>3</sup> (11–20)<sup>3</sup> nd<sup>3</sup>  
 Humus Form: Mormoder<sup>2</sup> Hemimor<sup>2</sup> Humimor<sup>2</sup> nd<sup>4</sup>

trees—residual survivors from past disturbance events. Woody shrubs such as velvet-leaf and low bush blueberry, lambkill and huckleberry can be very prominent along with regenerating white pine, balsam fir, black spruce and red maple. The herbaceous layer includes many species associated with dry, poor sites such as teaberry, bracken, mayflower, rice grass and round-leaved pyrola. The bryophyte layer is poorly developed with broom moss, Schreber’s moss and wavy dicranum typical.

**Environmental Setting:** MW12 is mainly associated with dry to fresh, nutrient poor soils derived from glacial tills comprised of granites and quartzites. Most sites also have moderate to extreme surface stoniness. This VT is abundant throughout the Western ecoregion, especially in the South Mountain, Western Barrens, Rossignol and Sable ecodistricts.

Stanley, Hants County

Characteristic Plants	MW12	
	Freq. (%)	Cover (%)
White pine	100	36
Red maple	100	27
Red oak	67	5
Large-tooth aspen	42	10
Red spruce	33	10
Black spruce	33	9
White birch	25	7
Balsam fir	25	4
Red pine	17	6
<b>Tree Layer (Mean % Cover)</b>		<b>81</b>
Balsam fir	92	9
Velvet-leaf blueberry	92	9
Red maple	92	2
Lambkill	83	5
White pine	83	3
Black spruce	83	2
Huckleberry	75	6
Wild raisin	75	2
Red oak	67	0.2
Witch-hazel	50	7
Lowbush blueberry	33	16
Red spruce	33	2
Serviceberry	33	0.2
Mountain-ash	25	0.3
Mountain holly	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>45</b>
Starflower	100	1
Bracken	92	7
Bunchberry	83	17
Teaberry	67	6
Partridge-berry	58	4
Sarsaparilla	58	2
Wild lily-of-the-valley	58	0.8
Pink lady's-slipper	50	0.1
Goldthread	42	5
Cucumber root	33	0.5
Mayflower	33	0.5
Bluebead lily	33	0.1
Cinnamon fern	33	0.1
Ghost pipe	33	0.1
Hay-scented fern	25	3
Painted trillium	25	0.2
Rice grass	25	0.2
Twinflower	25	0.1
Wood aster	25	0.1
Creeping snowberry	17	0.8
Round-leaved pyrola	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>36</b>
Bazzania	83	0.6
Schreber's moss	75	7
Broom moss	75	0.6
Log moss	58	2
Wavy dicranum	42	4
Stair-step moss	42	1
Hair-cap moss	33	0.8
Ladies' tresses	25	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>11</b>



**Successional Dynamics:** This early- to mid-successional VT is strongly shaped by past disturbances and by the relatively dry, nutrient poor soils typical of the sites where it occurs. Historically, stand maintaining fires would have reduced understory fuel loads and promoted white pine and red oak dominance. (Although the role of low intensity fires in red oak development is not well understood, it appears to promote this species in stands observed within this unit's range). Over time, this VT will transition to stands with greater proportions of white pine, red oak and black spruce in the overstory. In these circumstances, old growth forest features may develop.

**Ecological Features:** This VT may occur as either a small- to large-patch forest, depending on past stand-level disturbances. Red maple provides an abundant early source of pollen and soft mast for many wildlife species. When red oak is a minor stand component, it offers hard mast for species such as squirrel, bear, ruffed grouse and deer. White pine are capable of attaining significant heights and diameters, affording opportunity for large diameter, long-standing snags and super-canopy trees; these trees provide cavity nesting and denning sites for many wildlife species. Several bird species such as the ovenbird, red-eyed vireo, white-breasted nuthatch, yellow-bellied sapsucker and pine warbler (in older stands) may use this forest as nesting habitat. Large diameter coarse woody materials accumulate with tree demise, providing numerous floral and faunal microhabitats, along with a valuable nutrient source on sites which are otherwise often dry and impoverished.

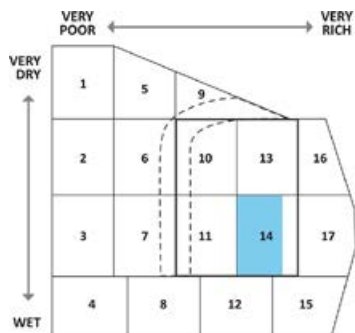


# MW13 Eastern white cedar – Balsam fir / Stair-step moss

*Thuja occidentalis* – *Abies balsamea* / *Hylocomium splendens*

**Concept:** This Vegetation Type (VT) has an overstory dominated by a variety of trees, but consistently includes a relatively significant component of eastern white cedar. It is cedar’s presence, in either the canopy or high shrub layer, which characterizes this otherwise variable VT. MW13 stands can be classed as either softwood or mixedwood depending on tree species composition. Canopy closure can be similarly variable. It is an uncommon VT and is the only upland cedar forest found in the province.

**Vegetation:** Eastern white cedar is co-dominant with several other trees including red spruce, balsam fir, white pine, hemlock, red maple and/or white ash. Other less common associates are white birch, trembling aspen and white spruce. Shrub development is variable, but usually includes regenerating trees and a variety of woody shrubs (e.g. beaked hazel, speckled alder, winterberry and fly-honeysuckle, although none typically have abundant coverage). The herbaceous layer is diverse, well developed, and generally dominated by a variety of fern species (e.g. interrupted fern, bracken, lady fern, wood fern species, cinnamon fern, oak fern).



## Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Lower<sup>3</sup> Upper<sup>3</sup>  
 Surface Stoniness: (Non – Slightly)<sup>7</sup> (Moderately)<sup>3</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>4</sup> Moderately<sup>4</sup> Strongly<sup>2</sup>  
 Drainage: Imperfect<sup>9</sup> Moderately Well<sup>1</sup>

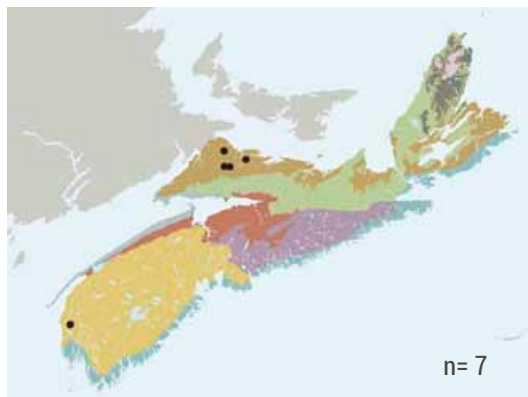
Common Soil Types: 6, 12, 9  
 Rooting Depth (cm): (30–45)<sup>6</sup> (> 45)<sup>1</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (11–20)<sup>4</sup> nd<sup>4</sup>  
 Humus Form: Mormoder<sup>3</sup> Vermimull<sup>1</sup> Hemimor<sup>1</sup> nd<sup>4</sup>

These species are indicative of the range of moisture and nutrient conditions characteristic of MW13. The well-developed bryophyte layer is dominated by stair-step moss, Schreber’s moss and bazzania.

Oxford Junction, Cumberland County



Characteristic Plants	MW13	
	Freq. (%)	Cover (%)
Eastern white cedar	100	30
Balsam fir	86	9
Red spruce	71	10
Red maple	71	8
White pine	43	13
White birch	43	3
Yellow birch	43	1
Hemlock	29	9
White ash	29	8
Sugar maple	29	4
Trembling aspen	14	24
White spruce	14	16
Black spruce	14	2
<b>Tree Layer (Mean % Cover)</b>		<b>69</b>
Balsam fir	86	4
Red maple	71	0.9
Red spruce	57	3
Beaked hazelnut	57	2
Eastern white cedar	43	6
Gooseberry family	43	0.3
Fly-honeysuckle	29	2
Trembling aspen	29	2
Mountain maple	29	0.6
White ash	29	0.3
Serviceberry	29	0.2
Lambkill	29	0.1
Round-leaved dogwood	14	0.2
Poison ivy	14	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Starflower	100	1
Sarsaparilla	86	1
Wild lily-of-the-valley	71	9
Goldthread	71	3
Bracken	57	13
Interrupted fern	43	17
Cinnamon fern	43	6
Dwarf raspberry	43	2
Oak fern	43	2
Twinflower	43	2
Bluebead lily	43	1
Wood aster	43	0.1
Lady fern	29	6
Wood-sorrel	29	1
Spinulose wood fern	29	0.8
Christmas fern	29	0.5
Partridge-berry	29	0.5
Woodland horsetail	29	0.4
Mitrewort	29	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>40</b>
Stair-step moss	86	14
Bazzania	86	7
Schreber's moss	71	17
Log moss	57	2
Wavy dicranum	43	0.4
Shaggy moss	29	8
Broom moss	29	2
Ladies' tresses	29	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>38</b>



**Environmental Setting:** Fresh-moist to moist, nutrient medium to rich soils of variable texture are typical. MW13 is an uncommon VT that occurs mainly in western Nova Scotia in the Clare, Annapolis Valley and Valley Slope ecodistricts. It is also found scattered in northern Nova Scotia within the Northumberland Lowlands ecodistrict. It is often found adjacent to stands of WC10 (Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum).

**Successional Dynamics:** MW13 is considered mid-successional, but pathways are not fully understood. As a shade-tolerant tree, eastern white cedar will regenerate and persist in the understory until an opening in the canopy allows it to grow further. In the absence of stand-level disturbance events, it is likely that cedar will maintain itself as a dominant canopy species. Earlier successional stages may include shade-intolerant mixedwoods on moist ecosites. Depending on disturbance history, MW13 can be even-aged but it will develop uneven-age class structures as it matures.

**Ecological Features:** MW13 is a small-patch ecosystem, and occurrences rarely cover a hectare. Cedar occurs as an intermediate-sized tree in this partial to closed canopy forest. It is a favoured browse species for both deer and moose, while snowshoe hare eat the foliage and gnaw young tree bark. Cedar are long-lived and resistant to disease and insects. The oldest sampled trees in Nova Scotia exceed 250 years. Cedar wood is also very decay resistant resulting in dead trees (snags and fallen) that may persist for many decades. Cedar is legally protected and listed as vulnerable under the Nova Scotia Endangered Species Act. MW13 is a rare, range-limited ecosystem, found in small, isolated patches. In Nova Scotia, conservation of cedar is complicated by its rarity and shallow genetic pool. The basis for cedar rarity in Nova Scotia is not well understood.

# OF

## Old Field Forest Group

### Concept

These forests originate on abandoned farmland where past agricultural practices, including the incorporation of organic matter by tillage or grass cover, results in substantial soil enrichment. The closed canopy forests are early-successional and typically dominated by softwood species such as white spruce, tamarack and/or white pine. The prolonged natural re-establishment of forest on old fields creates patchiness and age variation. There is usually a sparse understory of shrubs and herbs, and a needle carpet or moss-dominated forest floor. Non-native herbs associated with agricultural landscapes are common. These short-lived, even-aged forests often succumb to insects and disease. Many sites have been cleared of surface rocks, which have been left piled (stone dumps) or constructed into rock walls often along property lines. Sites that were tilled or pastured generally have minimal microtopography and a visible Ap (plough layer) soil horizon. Clearcut harvesting of mature stands is likely to initiate another early-successional stage dominated by shade-intolerant hardwood species such as grey birch, aspen, pin cherry and/or white birch. Stands that

deteriorate more slowly may provide an opportunity for establishment of shade-tolerant tree species if seed sources are nearby. It is expected that several successional stages will be required before forest composition more closely approximating pre-agricultural conditions re-establishes on old field sites. These distinctive forest patches add structural diversity to the landscape, often providing transitional cover between fields and natural forests. Old field forests have a simplified ecological make-up, reflected by low tree diversity, structural complexity and deadwood volume. Dense, mature stands provide wildlife with winter thermal cover. Vegetation Types in this group mainly occur in the Acadian Forest, with several also found in the Maritime Boreal.

**CLASSIFICATION NOTE:** The effects of past agricultural practices on soil and biodiversity often linger for several rotations. However, once there are adequate indications of a transition beyond old field monoculture conditions, then a non-old field VT should be used to describe the ecosystem. Such indicators include the presence of ecosite-specific species.

Photo: **Eigg Mountain – James River  
Wilderness Area, Antigonish County**  
(Len Wagg/CNS)

## Old Field (OF) Key

1a. White spruce and/or tamarack dominant	... 2
1b. Not as above	... 3
2a. Tamarack absent to scattered	... OF1
2b. Tamarack abundant to dominant	... OF2
3a. White pine dominant	... OF3
3b. Not as above	... 4
4a. Balsam fir dominant	... OF4
4b. Not as above	... 5

5a. Aspen dominant	... OF5
5b. Not as above	... 6
6a. White ash dominant	... OF6
6b. Grey birch dominant	... IH9

Additional old field vegetation types  
without fact sheets:

- OF7 Red oak – Red maple / Hawkweed –  
Speedwell
- OF8 Eastern white cedar / Lady fern –  
Jack-in-the-pulpit
- OF9 Black cherry / Hawthorn –  
Meadow-sweet / Evergreen wood fern

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

# OF1

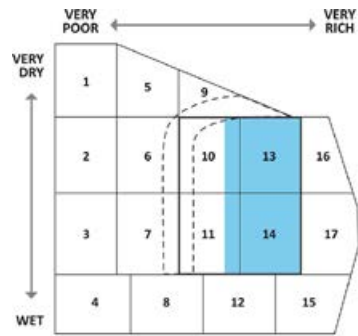
## White spruce / Aster – Goldenrod / Shaggy moss

*Picea glauca* / *Aster* spp. – *Solidago* spp. / *Rhytidiadelphus triquetrus*

**Concept:** This even-aged forest is characterized by abundant white spruce, often with a minor component of balsam fir. OF1 stands usually develop closed overstory canopies resulting in needle carpet and/or moss-dominated forest floors with minimal shrub and herb cover. OF1 is the most common softwood forest found on abandoned agricultural lands in central and eastern Nova Scotia.

**Vegetation:** White spruce is the dominant overstory tree and common canopy associates include balsam fir, red maple and tamarack. Both the shrub and herb layers can be species rich, but they are usually poorly developed under mature cover. Hawkweeds, goldenrods, asters and several grass species are indicative of past agricultural practices. Other common but seldom abundant species include strawberry, common speedwell, tall buttercup and bedstraws. Moss cover can be variable and interspersed with needle carpet. Shaggy moss is generally found in these forests, and may be extensive.

Farmville, Lunenburg County



Refer to page 242 for Maritime Boreal edatopic grid.

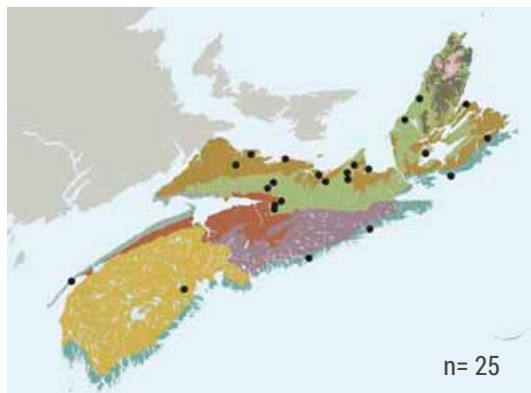
### Site & Soil Characteristics

Slope Position: Lower<sup>4</sup> Level<sup>2</sup> Middle<sup>2</sup> Upper<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>2</sup> Other<sup>1</sup>  
 Drainage: Well<sup>6</sup> Moderately Well<sup>3</sup> Imperfect<sup>1</sup>

Common Soil Types: 8, 2L, 9C, 2  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>4</sup> (> 45)<sup>4</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>5</sup> (6–10)<sup>5</sup>  
 Humus Form: Rhizomull<sup>4</sup> Hemimor<sup>2</sup> Humimor<sup>1</sup> Vermimull<sup>1</sup>  
 Resimor<sup>1</sup> Other<sup>1</sup>

**Environmental Setting:** OF1 is usually on fresh to fresh-moist, nutrient medium to rich soils of variable texture. It is strongly associated with upland ecodistricts (e.g. Cobequid Hills, Cobequid Slopes, Cape Breton Hills,

Characteristic Plants	OF1	
	Freq. (%)	Cover (%)
White spruce	100	64
Balsam fir	52	12
White birch	16	2
White pine	12	6
Red maple	12	4
Grey birch	12	2
White ash	8	0.5
Tamarack	8	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Balsam fir	72	1
Red maple	64	0.2
Wild raisin	36	0.2
Mountain-ash	24	0.6
White ash	24	0.2
Serviceberry	24	0.1
White birch	20	0.1
Speckled alder	16	0.8
Lowbush blueberry	16	0.2
Velvet-leaf blueberry	16	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>2</b>
Wild lily-of-the-valley	80	3
Starflower	76	1
Bunchberry	44	5
Evergreen wood fern	44	3
Violets	40	2
Wood aster	36	0.7
Goldthread	28	2
Common speedwell	28	0.2
Ghost pipe	28	0.1
Hawkweeds	24	4
Sarsaparilla	24	1
Rough goldenrod	24	0.3
Fibrous-root sedge	20	0.5
Tall buttercup	20	0.1
Strawberry	16	0.2
Stinking Willie	12	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>14</b>
Schreber's moss	84	26
Hair-cap moss	76	6
Broom moss	76	3
Stair-step moss	52	16
Shaggy moss	44	13
Log moss	36	0.9
Plume moss	32	0.3
Wavy dicranum	20	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>45</b>



Pictou Antigonish Highlands). Sites that have been tilled or pastured have level micro-topography and a visible Ap (plough layer) soil horizon.

**Successional Dynamics:** OF1 is an early-successional forest of short-lived white spruce. Natural disturbance agents include insects (e.g. bark beetles, tussock moth, spruce budworm) and windthrow. Subsequent successional stages usually include species indicative of pre-agricultural forest cover, especially if seed sources are nearby. Stands that slowly deteriorate are more likely to create conditions suitable for later successional species such as sugar maple, white ash and yellow birch. Clearcut harvesting may initiate an earlier successional stage dominated by grey birch, pin cherry, aspen, red maple, white birch and/or other woody shrubs. Many OF1 sites have been converted for wild blueberry production by enhancing blueberry propagation with cultural practices such as burning and mowing.

**Ecological Features:** Rock walls and stone piles may provide habitat for small cavity dwellers including rodents, snakes, and certain insects such as wasps and bees. The frequent presence of apple and other fruit trees may attract deer, red fox, coyotes, red squirrels, field mice or voles, and birds including ruffed grouse, waxwings, crows and blue jays. OF1 provides excellent growing conditions for mycorrhizal mushrooms such as chanterelle and boletes which are allied with white spruce; these fungi usually emerge in late summer and fall. Following canopy collapse, levels of coarse woody material and snags rapidly increase, creating microhabitats for many floral, fungal and faunal species. Relative to other VTs in the group, tree and herb species richness is relatively high.

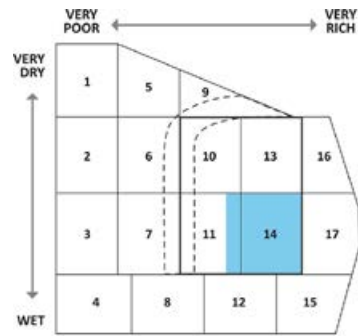
# OF2 Tamarack / Speckled alder / Rough goldenrod / Shaggy moss

*Larix laricina* / *Alnus incana* / *Solidago rugosa* / *Rhytidiadelphus triquetrus*

**Concept:** This even-aged forest has abundant tamarack and white spruce. It is similar to White spruce / Aster – Goldenrod / Shaggy moss (OF1) and is found throughout the province on moist, imperfectly drained soils. OF2 stands typically have closed canopies resulting in needle carpet and/or moss-dominated forest floors, with reduced shrub and herb cover.

**Vegetation:** Black spruce, balsam fir and red maple are common canopy associates. The poorly to moderately-developed shrub layer consists mainly of regenerating trees along with wild raisin and speckled alder. The herb layer is better developed, with many species like hawkweeds and goldenrods reflecting agricultural land-use. Cinnamon fern, interrupted fern and sedges are indicative of moister soils. Moss cover can be variable and interspersed with needle carpet. Shaggy moss is generally common in these forests with pockets of *Sphagnum* on wetter microsites.

Sugar Camp Brook Quarry, Inverness County



Refer to page 242 for Maritime Boreal edatopic grid.

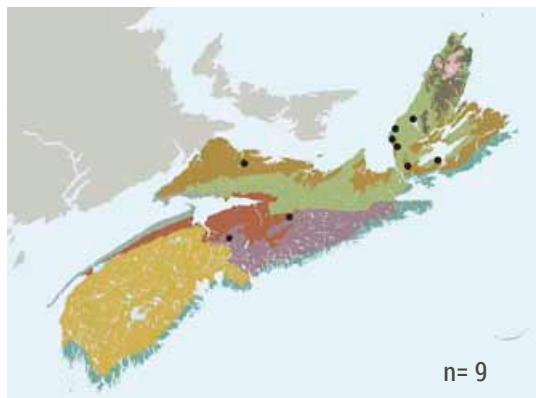
## Site & Soil Characteristics

Slope Position: Level<sup>3</sup> Lower<sup>2</sup> Middle<sup>2</sup> Toe<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>6</sup> Slightly<sup>4</sup>  
 Drainage: Imperfect<sup>6</sup> Poor<sup>2</sup> Moderately Well<sup>2</sup>

Common Soil Types: 12, 3L, 7, 9, 13  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>3</sup> (> 45)<sup>1</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>8</sup> (6–10)<sup>1</sup> (11–20)<sup>1</sup>  
 Humus Form: Mull<sup>4</sup> Moder<sup>3</sup> Hemimor<sup>1</sup> other<sup>2</sup>

**Environmental Setting:** OF2 is mainly found on moist to moist-wet, nutrient medium to rich soils of variable texture. This forest is scattered throughout Nova Scotia on imperfectly drained old field sites.

Characteristic Plants	OF2	
	Freq. (%)	Cover (%)
Tamarack	100	36
White spruce	78	29
Balsam fir	44	4
Black spruce	33	12
Red maple	22	23
Grey birch	22	8
White birch	11	4
<b>Tree Layer (Mean % Cover)</b>		<b>72</b>
Balsam fir	89	1
Red maple	56	2
White spruce	44	1
Wild raisin	44	0.2
Speckled alder	33	2
Black spruce	33	2
Bristly black currant	33	0.2
Lambkill	33	0.2
Choke cherry	33	0.1
Velvet-leaf blueberry	22	0.8
<b>Shrub Layer (Mean % Cover)</b>		<b>5</b>
Starflower	100	0.7
Wild lily-of-the-valley	78	12
Rough goldenrod	67	0.8
Dwarf raspberry	56	10
Violets	56	0.5
Tall white aster	56	0.2
Bunchberry	44	4
Common speedwell	44	3
Drooping wood sedge	44	0.3
Bladder sedge	44	0.1
Evergreen wood fern	44	0.1
Goldthread	44	0.1
Tall buttercup	33	2
Three seeded sedge	33	2
Cinnamon fern	33	1
Crested wood fern	33	0.8
Poverty grass	33	0.8
Sarsaparilla	33	0.2
Sensitive fern	33	0.2
Common wood rush	33	0.1
New York fern	33	0.1
Lady fern	22	3
Spinulose wood fern	22	3
Strawberry	22	2
Hawkweeds	22	0.4
Stinking Willie	22	0.3
White panicle aster	22	0.3
<b>Herb Layer (Mean % Cover)</b>		<b>33</b>
Schreber's moss	78	39
Shaggy moss	78	16
Stair-step moss	56	11
Wavy dicranum	56	2
Hair-cap moss	44	1
Common green sphagnum	33	14
Broom moss	33	0.4
Ladies' tresses	22	10
Shaded wood moss	22	5
Fern moss	22	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>59</b>



Sites that have been tilled or pastured have level microtopography and a visible Ap (plough layer) soil horizon.

**Successional Dynamics:** OF2 is an early successional forest. The short life span of tamarack and associated tree species on these sites, and their reduced ability to re-establish themselves under their own canopy cover, are factors which eventually lead to the successional replacement of the ecosystem. Natural disturbance agents include insects (e.g. larch sawfly, larch casebearer, bark beetles, tussock moth, spruce budworm) and windthrow. Subsequent successional stages usually include species indicative of pre-agricultural forest cover, especially if suitable seed sources are nearby. Clearcut harvesting may trigger an earlier successional stage dominated by grey birch, pin cherry, aspen, white birch and/or other woody shrubs. mid-successional stages may develop towards a mixedwood forest of white spruce, balsam fir and shade-intolerant hardwoods. Later successional stages will usually reflect a mixedwood condition of shade-tolerant species with balsam fir and white spruce and black spruce occurring on wetter sites.

**Ecological Features:** This VT has many of the same features of a past agricultural land use as OF1, thus providing similar habitat and food sources. Most old field forest sites have enriched Ah soil horizons that support earthworms, nematodes and other invertebrates. Together with alder patches that commonly occur in this forest, stands provide suitable habitat for woodcock. OF2 supports excellent growing conditions for mycorrhizal mushrooms including chanterelle and hollow foot suillus, allied with spruce and larch, respectively.

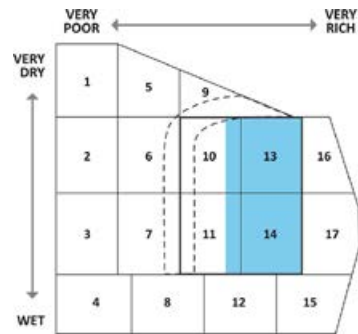


# OF3 White pine – Balsam fir / Shinleaf – Pine-sap

*Pinus strobus* – *Abies balsamea* / *Pyrola elliptica* – *Hypopitys monotropa*

**Concept:** This even-aged forest has a closed canopy of white pine with only a scattered mix of other tree species. OF3 stands usually develop a closed overstory resulting in needle carpet and/or moss dominated forest floors, with reduced shrub and herb cover. It is a forest that frequently establishes on abandoned farmlands throughout western Nova Scotia.

**Vegetation:** Common trees species include white pine, white spruce, red maple and red spruce. Scattered sugar maple and black cherry can also be found in some stands. The shrub layer is usually poorly developed with balsam fir regeneration providing most cover. Herb layer development is also restricted, with typical forest flora such as wild lily-of-the-valley and starflower. Moss cover can be variable and interspersed with needle carpet.



## Site & Soil Characteristics

Slope Position: Middle<sup>3</sup> Upper<sup>3</sup> Level<sup>2</sup> Lower<sup>1</sup> Toe<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>4</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>4</sup> Strongly<sup>2</sup> Moderately<sup>2</sup> Other<sup>2</sup>  
 Drainage: Well<sup>5</sup> Moderately Well<sup>4</sup> Imperfect<sup>1</sup>

Common Soil Types: 8, 2L, 9, 11  
 Rooting Depth (cm): (30–45)<sup>6</sup> (> 45)<sup>3</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>7</sup> (6–10)<sup>3</sup>  
 Humus Form: Rhizomull<sup>4</sup> Mull<sup>2</sup> Mormoder<sup>1</sup> Mullmoder<sup>1</sup> nd<sup>2</sup>

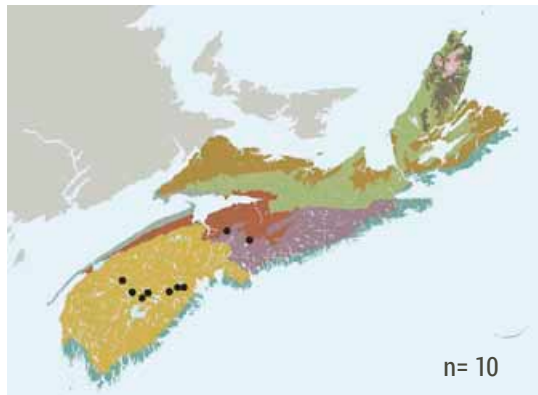
**Environmental Setting:** OF3 is mainly found on fresh to fresh-moist, nutrient medium to rich soils of medium to coarse texture (although finer textures sometimes occur). This VT is found mainly in western Nova Scotia, often on drumlins. Sites that have been tilled or pastured have level microtopography and a visible Ap (plough layer) soil horizon.

**Successional Dynamics:** OF3 is an early- to mid-successional VT. As a long-lived species, white pine will generally maintain its presence in these stands as they develop over time. Usually balsam fir is the first to become prolific in the understorey, but eventually other shade-tolerant species (such as red spruce, hemlock, sugar maple and beech) also appear, especially if suitable seed sources are nearby. Natural disturbance agents include insects and disease (e.g. white pine weevil, white pine blister rust), fire and windthrow. Clearcut harvesting may trigger an earlier successional stage dominated by



Horne Settlement,  
Hants County

Characteristic Plants	OF3	
	Freq. (%)	Cover (%)
White pine	100	69
Red maple	50	9
White spruce	40	9
Grey birch	40	0.8
Red spruce	30	3
Black spruce	20	10
Red oak	20	3
<b>Tree Layer (Mean % Cover)</b>		<b>83</b>
Balsam fir	100	5
White pine	70	0.6
Red maple	60	0.9
Wild raisin	50	0.1
Velvet-leaf blueberry	40	1
White ash	40	0.7
Red spruce	30	1
Red oak	30	0.1
Serviceberry	30	0.1
Lowbush blueberry	20	0.8
White meadowsweet	20	0.2
Black cherry	20	0.1
Hemlock	20	0.1
Mountain-ash	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Wild lily-of-the-valley	90	3
Starflower	60	0.9
Common speedwell	50	0.3
Shinleaf	50	0.2
Partridge-berry	50	0.1
Teaberry	40	0.3
Common wood rush	40	0.2
Bracken	40	0.1
Pink lady's-slipper	40	0.1
Goldthread	30	0.8
Poverty grass	30	0.3
Checkered rattlesnake plantain	30	0.1
Pine-sap	30	0.1
Sedges	20	20
Hay-scented fern	20	15
Sarsaparilla	20	2
Violets	20	2
Interrupted fern	20	0.4
Ground pine	20	0.3
Drooping wood sedge	20	0.2
Evergreen wood fern	20	0.1
Cucumber root	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>14</b>
Schreber's moss	80	23
Hair-cap moss	70	4
Log moss	60	1
Broom moss	50	0.3
Wavy dicranum	50	0.2
Pin cushion moss	40	0.6
Shaggy moss	20	3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>23</b>



aspen, white birch and/or red maple). Depending in part on the level of advanced regeneration at time of harvest, OF3 can transition to Balsam fir – White spruce / Evergreen wood fern – Wood aster (OF4). On many drumlins, the long and intense history of agricultural land use often masks, or excludes, signs of original forest composition. However, available evidence suggests that most sites likely supported a climax hemlock-beech mixedwood ecosystem similar to Hemlock – Yellow birch / Evergreen wood fern (MW3).

**Ecological Features:** Past cultivation has leveled most pre-disturbance microtopography, while rock walls, stone piles, old foundations and abandoned wells provide additional evidence of previous agricultural land use. These features, in addition to the presence of apple and other fruit trees, attract a variety of wildlife similar to old field forests of white spruce and tamarack. In recent years, many old field forests of white pine have been affected by glossy buckthorn, an invasive alien shrub. This alder-like shrub has the potential to completely, or nearly, eliminate native understory vegetation and ultimately affect natural successional pathways and outcomes.



Partridge-berry

# OF4

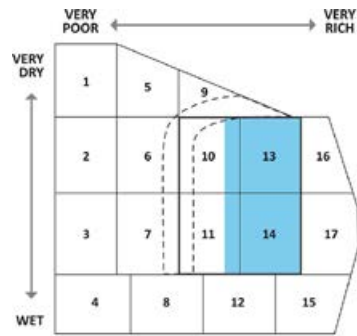
## Balsam fir – White spruce / Evergreen wood fern – Wood aster

*Abies balsamea* – *Picea glauca* / *Dryopteris intermedia* – *Oclemena acuminata*

**Concept:** Balsam fir with a strong presence of white spruce characterizes the canopy of this even-aged forest. Typically it is a second-generation old field forest which develops following harvesting or stand level mortality of other old field forest types such as White spruce / Aster – Goldenrod / Shaggy moss (OF1). Understory flora are more abundant, and representative of natural forest conditions, than those represented in other old field forest types. This VT could be confused with Balsam fir / Wood fern / Schreber’s moss (SH8) which does not have an agricultural history.

**Vegetation:** Red maple, tamarack and white birch are common canopy associates. The shrub layer is dominated by regenerating trees, especially balsam fir, with lesser red maple, yellow birch and sugar maple. The presence of striped maple and mountain maple indicates a return to, or remnants of, more natural vegetation conditions. In the herb layer, few species indicative of past agricultural land use are typically found. Instead, evergreen wood fern, wood aster, sarsaparilla and other flora common to natural stands, are present. Moss cover is variable, with Schreber’s moss abundant.

Rory Neils Lake, Richmond County



Refer to page 242 for Maritime Boreal edatopic grid.

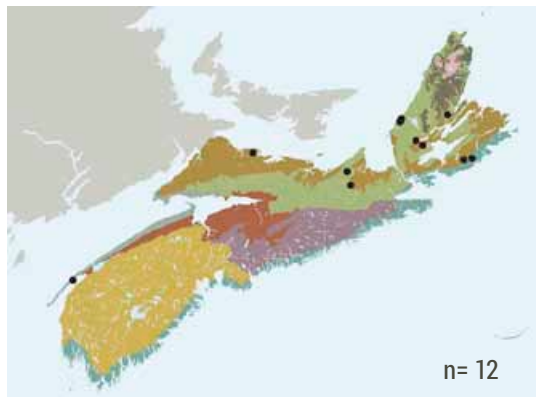
### Site & Soil Characteristics

Slope Position: Level<sup>3</sup> Middle<sup>3</sup> Upper<sup>3</sup> Lower<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Level<sup>6</sup> Slightly<sup>2</sup> Moderately<sup>1</sup> Strongly<sup>1</sup>  
 Drainage: Well<sup>9</sup> Imperfect<sup>3</sup> Moderately Well<sup>2</sup>

Common Soil Types: 8, 2L, 9  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>2</sup> (> 45)<sup>2</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>3</sup> (6–10)<sup>2</sup> (11–20)<sup>4</sup> nd<sup>1</sup>  
 Humus Form: Mormoder<sup>3</sup> Hemimor<sup>3</sup> Vermimull<sup>1</sup>  
 Humi-Fibrimor<sup>1</sup> Humimor<sup>1</sup> nd<sup>1</sup>

**Environmental Setting:** OF4 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of variable texture. This VT is found throughout Nova Scotia but most occurrences are in the upland ecodistricts (e.g. Cobequid Hills, Cobequid Slopes,

Characteristic Plants	OF4	
	Freq. (%)	Cover (%)
Balsam fir	100	57
White spruce	92	20
White birch	42	0.6
Tamarack	25	5
Red maple	17	7
Grey birch	17	2
Black spruce	17	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>79</b>
Balsam fir	100	2
Red maple	58	2
Mountain-ash	58	0.1
Yellow birch	33	0.9
Velvet-leaf blueberry	33	0.1
Mountain maple	25	0.7
Striped maple	25	0.4
Wild raisin	25	0.2
Speckled alder	17	13
Sugar maple	17	0.5
Beaked hazelnut	17	0.3
Fly-honeysuckle	17	0.1
Lowbush blueberry	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>7</b>
Wild lily-of-the-valley	92	4
Evergreen wood fern	92	2
Starflower	92	0.7
Bunchberry	83	2
Sarsaparilla	58	1
Wood aster	58	0.2
Goldthread	50	2
Dwarf raspberry	50	0.4
Common speedwell	33	9
Spinulose wood fern	33	1
Drooping wood sedge	33	0.4
Rough goldenrod	33	0.3
Ghost pipe	33	0.1
Bluebead lily	25	0.3
Hay-scented fern	25	0.2
Canada goldenrod	25	0.1
Interrupted fern	25	0.1
New York fern	25	0.1
Wood-sorrel	17	4
Twinflower	17	3
Mountain wood fern	17	0.5
Short husk	17	0.3
Ground pine	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>16</b>
Schreber's moss	83	29
Hair-cap moss	83	3
Stair-step moss	75	26
Broom moss	67	2
Plume moss	42	1
Shaggy moss	33	19
Wavy dicranum	33	0.4
Bazzania	25	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>56</b>



Cape Breton Hills, Pictou Antigonish Highlands). Sites that were tilled or pastured may still have a visible Ap (plough layer) soil horizon. Level microtopography may still be the dominant condition but windthrow and uprooting are slowly diversifying the structure of the forest floor.

**Successional Dynamics:** OF4 is an early- to mid-successional forest originating from advanced regeneration established under first generation old field forests. Natural disturbance agents include insects (bark beetles, tussock moth, spruce budworm) and windthrow. Later successional stages will generally include species from the original forest cover, often tolerant hardwood forest, especially if seed sources are nearby. Clearcut harvesting may initiate an earlier successional stage dominated by grey birch, pin cherry, aspen, white birch and other woody shrubs.

**Ecological Features:** The habitat value of rock piles and rock walls may change over time, but they remain useful to rodents, snakes, and insects like wasps and bees. OF4 forests may afford shelter, rearing, and/or feeding habitat for deer, red fox, coyote, snowshoe hare, red squirrels and pileated woodpeckers. The abundance of short-lived balsam fir trees greatly increases coarse woody materials, including small to medium diameter snags.



Rock wall

(photo: John Gillis)

# OF5

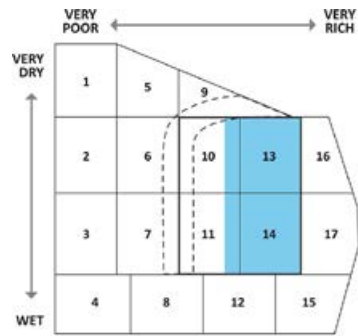
## Trembling aspen – Grey birch / Rough goldenrod – Strawberry

*Populus tremuloides* – *Betula populifolia* /  
*Solidago rugosa* – *Fragaria virginiana*

**Concept:** Trembling aspen (and occasionally largetooth aspen) create a closed canopy even-aged forest on former fields and pastures. This aspen forest is found with a range of moisture conditions, but is more common on moister sites and previously cleared riparian forests. Shrub and herb layers are usually better developed than on other old field sites.

**Vegetation:** Grey birch is often abundant in younger stands but is soon overtopped by aspen. Other over-story components include white birch, red maple, balsam fir and white spruce. The well-developed shrub layer includes both regenerating tree species and a variety of woody shrubs such as chokecherry and wild raisin. Herb layer species are mainly those indicative of past agricultural land use, including strawberry, goldenrods, asters, grasses and sedges. Leaf litter limits bryophyte development (although species richness may be high). Shaggy moss is occasionally abundant, while Sphagnum species can be found on wetter microsites.

Telford, Pictou County



### Site & Soil Characteristics

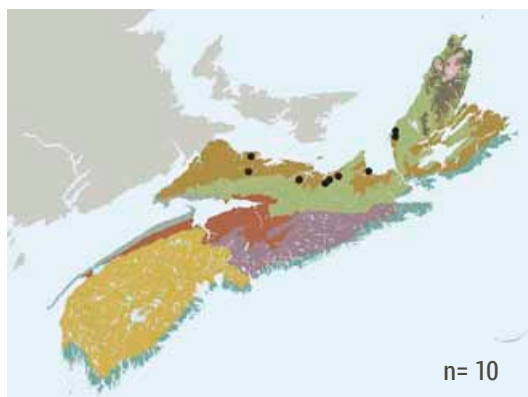
Slope Position: Level<sup>6</sup> Upper<sup>3</sup> Toe<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>3</sup>  
 Drainage: Moderately Well<sup>4</sup> Imperfect<sup>3</sup> Poor<sup>2</sup> Well<sup>1</sup>

Common Soil Types: 12, 7, 8, 3, 9, 11  
 Rooting Depth (cm): (30–45)<sup>6</sup> (> 45)<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>8</sup> (6–10)<sup>1</sup> (11–20)<sup>1</sup>  
 Humus Form: Mull<sup>6</sup> Moder<sup>4</sup>

**Environmental Setting:** OF5 is mainly on with fresh-moist to moist-wet, nutrient medium to rich soils of fine to medium texture. This forest is found province-wide, but is most common in lowland ecoregions (Valley and Central Lowlands, Northumberland / Bras d'Or Lowlands). OF5 sites that have been



Characteristic Plants	OF5	
	Freq. (%)	Cover (%)
Trembling aspen	100	57
White birch	50	7
Grey birch	50	5
Balsam fir	40	15
Red maple	40	14
Black spruce	30	12
White spruce	30	8
Large-tooth aspen	20	19
White ash	20	8
Red spruce	20	4
<b>Tree Layer (Mean % Cover)</b>		<b>88</b>
Balsam fir	70	11
Trembling aspen	70	6
Red maple	70	2
White ash	70	1
Serviceberry	50	0.9
Common blackberry	40	3
White spruce	40	3
Choke cherry	40	0.2
Wild raisin	40	0.1
Beaked hazelnut	30	2
Alternate-leaved dogwood	30	2
White birch	30	0.7
<b>Shrub Layer (Mean % Cover)</b>		<b>23</b>
Wild lily-of-the-valley	70	6
Bunchberry	60	7
Starflower	60	0.7
Rough goldenrod	50	18
Strawberry	50	1
Common speedwell	50	0.6
Tall white aster	40	2
New York fern	40	2
Sarsaparilla	40	2
White panicle aster	40	2
Violets	40	0.7
Wood aster	40	0.1
Yellow hawkweed	30	16
Shinleaf	30	2
Poverty grass	30	1
Cinquefoil	30	1
Calico aster	30	0.9
Evergreen wood fern	30	0.5
Drooping wood sedge	30	0.2
Sweet vernal grass	20	18
Rough hawkweed	20	6
Bracken	20	6
Bristly stalked sedge	20	1
Fringed sedge	20	0.8
<b>Herb Layer (Mean % Cover)</b>		<b>43</b>
Schreber's moss	70	1
Broom moss	70	0.5
Shaggy moss	60	16
Log moss	50	0.7
Hair-cap moss	40	2
Stair-step moss	40	2
Ladies' tresses	30	1
Fern moss	20	4
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>17</b>



tilled or pastured will also have level microtopography and a visible Ap (plough layer) soil horizon. This horizon may also be enhanced by earthworm activity on these hardwood-dominated sites.

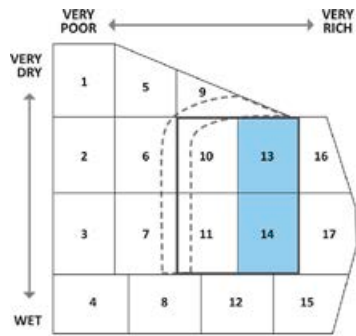
**Successional Dynamics:** OF5 is an early-successional of short-lived, shade-intolerant hardwood species—factors that will eventually lead to the replacement of this seral stage. Natural disturbance agents include insects and disease (e.g. tent caterpillar, tussock moth, hypoxylon canker) and windthrow. Subsequent successional stages will begin to include species from the pre-agricultural forest, especially if suitable seed sources are nearby. Stands that slowly deteriorate are more likely to transition to such forest conditions, as shade-tolerant species regenerate on site. Clearcut harvesting may lead to re-establishment of aspen and grey birch along with other pioneer tree species (e.g. pin cherry, white birch, red maple).

**Ecological Features:** Older aspen trees may provide soft snags and cavities for several species of birds, including the pileated woodpecker. Resin from aspen buds is a leading source for bee propolis, an essential hive material. Enriched Ah soil horizons support earthworms, nematodes and other invertebrates, all providing forage for woodcock. Wild apple and other fruit trees can attract a variety of wildlife species such as deer, raccoons and game birds. Aspen's short longevity greatly increases accumulation of coarse woody materials and snags. In recent years, many old field forests of aspen along the Northumberland Shore have been affected by glossy buckthorn, an invasive alien shrub with the potential to completely, or nearly, eliminate native understory vegetation.

# OF6

## White ash / Choke cherry / Tall Buttercup

*Fraxinus americana* / *Prunus virginiana* – *Ranunculus acris*



**Concept:** This even-aged vegetation type is mainly dominated by white ash in the overstory, and has a diverse and extensive understory of woody shrubs and regenerating trees. Herbs largely reflect the agricultural history of the site and include several species of asters, goldenrods and hawkweeds. Sites typically have level microtopography and a soil profile that shows an enriched A horizon and a typical plough depth of 20 cm. Stands are more common in warmer lowland areas of the province and in the North Mountain ecodistrict (920).

**Vegetation:** White spruce, trembling aspen and black cherry are common associates in the overstory. There is high species diversity in the understory, including regenerating trees and shrubs, similar to those found in OF5. However, shrub cover is more dominant and choke cherry can be very well developed. The herb layer is also comparable to OF5 but typically has lower cover and no single dominant species. Leaf litter limits bryophyte development with only shaggy moss, which is commonly found on old-field sites, abundant.

**Environmental Setting:** OF6 is mainly found on fresh-moist to moist-wet, nutrient medium to rich soils of fine to medium texture. This VT occurs province-wide, but is most common on lower slopes with seepage potential. OF6 sites typically show minimal microtopographic variation and have a visible Ap (plough layer) soil horizon, with further organic enrichment by earthworm activity.

**Successional Dynamics:** OF6 is an early-successional VT forest. As shade-tolerant tree species such as white ash and sugar maple establish in the understory, a gradual shift to sugar maple dominated hardwood forests is likely. Natural disturbance agents include insects (leaf miners, midges

### Site & Soil Characteristics

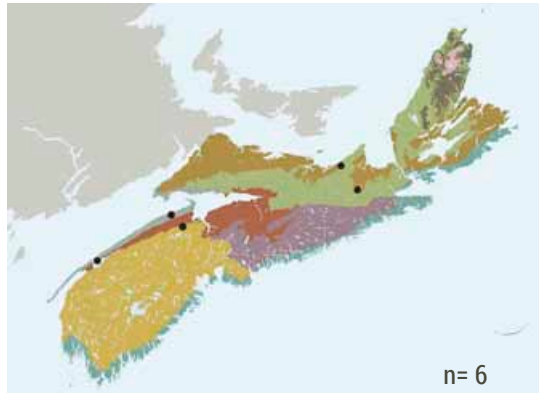
Slope Position: Lower<sup>5</sup> Middle<sup>3</sup> Upper<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Level<sup>10</sup>  
 Drainage: Moderately Well<sup>6</sup> Imperfect<sup>2</sup> Well<sup>2</sup>

Common Soil Types: 11, 8, 9, 12  
 Rooting Depth (cm): (30–45)<sup>7</sup> (> 45)<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>10</sup>  
 Humus Form: Mull<sup>2</sup> nd<sup>8</sup>



North Alton, Kings County

Characteristic Plants	OF6	
	Freq. (%)	Cover (%)
White ash	100	65
Red maple	50	13
White spruce	50	10
Black cherry	33	7
Trembling aspen	17	20
Tamarack	17	4
White pine	17	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>83</b>
White ash	100	7
Choke cherry	83	20
Serviceberry	67	4
Red maple	67	1
Sugar maple	50	5
Hawthorns	50	3
Roses	50	2
White spruce	50	0.9
Highbush cranberry	50	0.2
Bristly black currant	50	0.1
Wild apple	50	0.1
Balsam fir	33	2
Downy alder	33	1
Beaked hazelnut	33	0.8
Red raspberry	33	0.8
Mountain-ash	33	0.2
Red-berried elder	33	0.2
Common blackberry	33	0.1
Red osier dogwood	33	0.1
Speckled alder	17	7
<b>Shrub Layer (Mean % Cover)</b>		<b>48</b>
Tall buttercup	83	2
Rough goldenrod	83	2
Tall white aster	50	2
Evergreen wood fern	50	1
Common speedwell	50	0.4
Dwarf raspberry	50	0.1
Strawberry	50	0.1
Cinquefoil	33	2
Starflower	33	0.4
Asters	33	0.1
Dandelion	33	0.1
Graceful sedge	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>21</b>
Shaggy moss	50	40
Plait moss	33	3
Broom moss	33	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>28</b>



and mites, fall webworm, sawflies, wood borers) and diseases (leaf spots, rusts and cankers) none of which typically cause stand level mortality. White ash trees are relatively windfirm. The invasive emerald ash borer has the potential to cause stand-level mortality. Clearcut harvesting may lead to re-establishment of white ash with increasing amounts of other early-successional species such as grey birch, cherries, white birch and aspen.

**Ecological Features:** This old field forest is usually adjacent to open farming fields and active farm yards. Wild apple and other fruit trees can attract a variety of wildlife species such as deer, raccoons and certain game birds. Most old field white ash sites have moist, enriched Ah soil horizons that support earthworms, nematodes and other invertebrates. These all provide forage for woodcock. White ash seeds are eaten by purple finch, pine grosbeak, wood duck and other birds. The shoots are browsed by beaver and deer, while porcupine feed on white ash bark.



Rock wall



## OF7 Red oak – Red maple / Hawkweed – Speedwell

*Quercus rubra* – *Acer rubrum* /  
*Hieracium* spp. – *Veronica officinalis*

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**Concept:** Although somewhat uncommon, red oak is occasionally found regenerating on abandoned agricultural lands. These stands are small and although dominated by red oak, they may include softwood associates such as white pine and white spruce. Both shrub and herb layers are strong to species that often establish following abandonment of agricultural land. Other trees and shrubs include serviceberry, bush-honeysuckle and black cherry. A variety of sedge and grass species can be present, as well as common speedwell, hemp nettle, hawkweeds and lion's paw. Leaf litter and other organic debris are quickly incorporated into the soil by earthworms, enhancing the fertility and aeration of the upper soil layer. Mosses and lichens are sparse to absent.

## OF8 Eastern white cedar / Lady fern – Jack-in-the-pulpit

*Thuja occidentalis* /  
*Athyrium filix-femina* – *Arisaema stewardsonii*

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**Concept:** Eastern white cedar is a species at risk in Nova Scotia and is typically found in wetlands, and occasionally along brooks and rivers in Yarmouth, Digby, Annapolis and Cumberland counties. Where it occurs adjacent to abandoned agricultural lands, cedar can form a minor understory component of old field forest vegetation types. Occasionally cedar can be the dominant overstory species. Known examples of this latter condition occur along the Annapolis River and on the North Mountain near Parker's Cove. OF8 stands are small and strongly dominated by cedar with a sparse understory of shrubs, herbs and mosses. Cedar has also been noted on abandoned fields near homes, where it has been planted for landscaping.

## OF9 Black cherry / Hawthorn – Meadow-sweet / Evergreen wood fern

*Prunus serotina* / *Crataegus* spp. – *Spiraea alba* / *Dryopteris intermedia*

---

**Concept:** Black cherry old field forests are usually on alluvial soils of floodplains and larger streams. This vegetation type is uncommon and most occurrences would be expected in the Northumberland Lowlands (530), Cumberland Hills (540), Central Lowlands (620) and Annapolis Valley (610) ecodistricts. Black cherry is rare on Cape Breton Island. Rabbits and deer account for much damage to seedlings and sprouts, and birds and squirrels consume large quantities of the fruit. In common with other wild and cultivated cherry species, black cherry twigs and foliage contain a compound which releases cyanic acid when eaten. Domestic livestock has been poisoned by it while deer can eat the foliage without ill effects. Black knot disease is common and can cause branch mortality and large cankerous swellings can disfigure the trunk.

# Invasive Alien Plant Species in Forest Ecosystems

Invasive alien plant species (IAS) have become increasingly common over the past few years in forest ecosystems. The Canadian Food Inspection Agency now lists Nova Scotia as having over 300 IAS. Some IAS are known to have originated as early as the 1800s. Many are a result of purposefully introduced species for landscape and horticultural purposes, while others have escaped from agricultural fields or ports of entry for a variety of foreign products and goods.

Glossy buckthorn (*Frangula alnus*) is one such IAS that has quickly become a serious problem in Nova Scotia. It is incredibly aggressive, having the ability to invade and hold a site, preventing the natural successional development of forest ecosystems and their associated native plant species, and altering ecosystem processes, functions, and services.

Glossy buckthorn spreads primarily through deposition of seed by birds and small mammals. Seed crops occur annually in significant volumes with viable seed being produced within a year of establishment. Cut stems will propagate by stump sprouting and root suckering, furthering its ability to fully invade a site.

Agricultural lands that have reverted to forests are particularly vulnerable, perhaps due in part to enriched soil conditions resulting from past agricultural practices. Proximity to seed sources is also a known factor in the ability of this species to spread.



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Glossy Buckthorn at Maccan, Cumberland County



# OW

## Open Woodland Forest Group

### Open Woodland (OW) Key

- |   |   |         |
|---|---|---------|
| 1a. Upland areas with < 10% natural crown closure<br>... Refer to Barrens Ecosystems in Nova Scotia (NSDLF Biodiversity Reference Guide 2020-001) | 3a. Jack pine present   | ... OW1 |
| 1b. Not as above  | 3b. Jack pine absent  | ... 4   |
| 2a. Open stands on level or gentle slopes   | 4a. Black spruce abundant to dominant, broom crowberry absent           | ... OW2 |
| 2b. Stands of variable crown closures on excessively stony, steep, colluvium slopes   | 4b. Red and/or white pine abundant to dominant, broom crowberry present | ... OW3 |
|   | 5a. Softwoods dominant  | ... OW4 |
|   | 5b. Hardwoods dominant  | ... OW5 |

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



## Concept

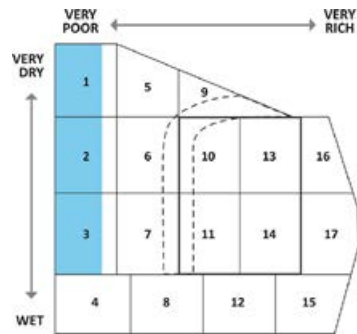
Woodland ecosystems are characterized by open canopies (usually 20–60%) due to limiting site conditions and/or frequent natural disturbances. Tree growth and density (i.e. canopy closure) are constrained by site qualities such as low soil fertility, moisture deficits, shallow soils, abundant stoniness and/or high levels of exposed bedrock. Stunted tree growth, a well-developed shrub layer, and at times extensive reindeer lichen (*Cladina spp.*) cover, are typical for this group. Species tolerant of dry, poor and often shallow soils over bedrock are characteristic for this group. Pine, black spruce, red maple and red oak are common tree species. Huckleberry, lambkill, rhodora, blueberry and wild raisin often dominate the shrub layer. Dwarf heath species are also common, including broom and black crowberry. The herbaceous layer is often poorly developed but can include bracken, cow-wheat, rice grass and poverty grass. High reindeer lichen cover is a characteristic feature, except on talus (OW4 and OW5). Many reindeer lichens can take decades to dominate ground cover. These small-patch ecosystems are usually found on or near sharp crests and ridges, cliffs, rocky outcrops, shallow

glacial tills, colluvium, and sandy outwash plains. Woodlands are edaphic climax associations typically found on dry, nutrient poor soils. Windthrow and fire are the main natural disturbance agents and stands may display a range of development stages depending on the frequency of disturbance, natural tree senescence, and the relative limitations of site conditions. While climate can be a factor in woodland or krummholz formation (e.g. CB2, CB5, CB6, HL7, WC11), units included in the open woodland group only include those found on sites with edaphic constraints.

Wildlife habitat values vary considerably among units. For example, talus forests can support several uncommon small mammal and land snail species. Boreal and subarctic plants are associated with cooler woodlands. Some coastal open woodland may support upland Atlantic Coastal Plain Flora. Open temperate woodlands, found in the interior of the province, provide habitat for night hawk and vesper sparrow. Most of this group are unlikely to support old growth, however they may exhibit other features of long-term ecological continuity.

# OW1 Jack pine / Huckleberry – Broom crowberry / Reindeer lichen

*Pinus banksiana / Gaylussacia baccata – Corema conradii / Cladonia spp.*



Refer to page 242 for Maritime Boreal edatopic grid.

## Site & Soil Characteristics

Slope Position:	Crest <sup>4</sup> Level <sup>3</sup> Upper <sup>2</sup> Lower <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>3</sup> (Slightly – Moderately) <sup>2</sup> (Very – Excessively) <sup>4</sup> nd <sup>1</sup>
Microtopography:	Level <sup>7</sup> Slightly <sup>2</sup> nd <sup>1</sup>
Drainage:	Rapid <sup>5</sup> Imperfect <sup>2</sup> Well <sup>1</sup> Moderately Well <sup>1</sup> nd <sup>1</sup>
Common Soil Types:	15, 2, 6
Rooting Depth (cm):	(< 30) <sup>8</sup> (30–45) <sup>2</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>5</sup> (11–20) <sup>2</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>3</sup> Resimor <sup>1</sup> nd <sup>6</sup>

**Concept:** This open coniferous woodland is characterized by jack pine canopy dominance, thin acidic soils and prominent reindeer lichen, broom crowberry and huckleberry cover. It is found on exposed bedrock ridges or thin glacial till, where it may co-occur with SP1 (Jack pine / Bracken – Teaberry forest). OW1 is typically on very-dry to dry sites, but occasionally occurs on moister soil, usually with thicker organic layers.

**Vegetation:** The canopy has low to moderate crown closure and is usually dominated by jack pine or co-dominated by jack pine and black spruce. Few other tree species are represented. The very well-developed woody understory features high levels of huckleberry cover, with lesser but frequent low bush blueberry and broom crowberry, among other heath species. Herbaceous cover and species richness is reduced, although black crowberry is characteristic in coastal areas. The dense lichen layer is characterized by grey, green, lesser green and star-tipped reindeer lichen species.

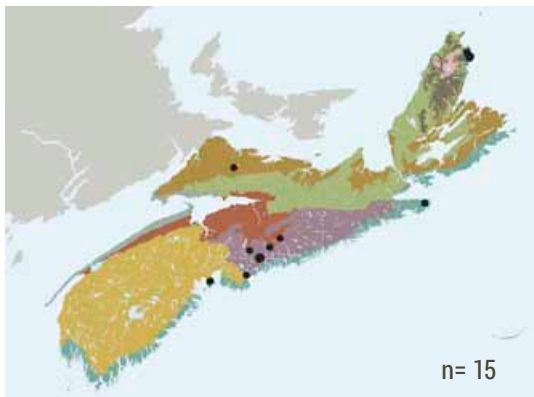
**Environmental Setting:** This low elevation ecosystem is found in areas where thin acidic soils, exposed bedrock and cool climatic conditions limit plant productivity and species richness. It occurs on upper slopes and crests of rocky hill crests and ridges, and on flatter, usually thin, glacial deposit. Soils are usually dry, nutrient very poor, coarse textured and stony. Microtopography is reduced, while site exposure is very high. This relatively uncommon ecosystem occurs in the Atlantic Coastal and Eastern ecoregions, with outliers on the coastal fringe of the Cape Breton Highlands. It is very rare in New Brunswick and is not known from anywhere else in Canada.

**Successional Dynamics:** The Jack pine / Huckleberry – Broom crowberry / Reindeer lichen woodland is expressed as an edaphic climax which means it will persist as described because of limiting site conditions. While individual trees



Blanford, Lunenburg County

Characteristic Plants	OW1	
	Freq. (%)	Cover (%)
Jack pine	93	18
Black spruce	73	5
Red maple	27	5
Tamarack	20	2
White pine	13	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>22</b>
Lambkill	100	12
Huckleberry	87	45
Lowbush blueberry	80	6
Jack pine	73	3
Wild raisin	73	1
Broom crowberry	67	11
Rhodora	67	6
Black spruce	67	5
Serviceberry	67	0.4
Mountain holly	60	4
Red maple	60	0.5
Chokeberries	33	0.9
Velvet-leaf blueberry	27	5
White pine	20	1
Downy alder	20	1
Sweet gale	20	0.6
Black chokeberry	20	0.2
Bayberry	13	1
Ground juniper	13	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>81</b>
Bracken	93	8
Teaberry	87	4
Bunchberry	47	4
Mayflower	47	0.6
Wild lily-of-the-valley	40	0.6
Starflower	40	0.1
Cow wheat	33	0.1
Three-toothed cinquefoil	27	1
Black crowberry	27	0.6
Pink lady's-slipper	27	0.1
Poverty grass	20	1
Trailing blackberry	13	0.1
White-haired panic grass	13	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>14</b>
Grey reindeer lichen	93	22
Schreber's moss	73	22
Star-tipped reindeer lichen	67	3
Wavy dicranum	47	1
Lesser green reindeer lichen	33	11
Broom moss	33	1
Ladies' tresses	27	0.3
Cup lichens	20	4
Bazzania	20	0.7
Hair-cap moss	20	0.7
Dicranums	20	0.5
Pelt lichens	13	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>46</b>

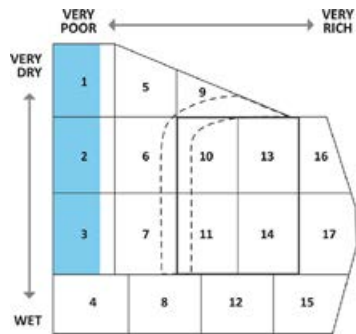


may grow older, the structure and overall age structure of OW1 stands will not be changed markedly. Shallow, nutrient very poor soils and exposure generally prevent the transition to other pine or black spruce vegetation types. While the VT persists as an edaphic climax, it is also strongly shaped by harsh climatic factors (e.g. strong desiccating (drying) winds, cool temperatures and sometimes salt spray). Fire is a component of stand history in some stands but is not required for ecosystem persistence, because serotinous (refers to cones which remain closed until opened by excessive heat, usually from fires) jack pine cones often open and release seed without fire in these woodlands. Other disturbances include windthrow and breakage.

**Ecological Features:** This nationally unique, range-limited ecosystem is one of the least common VTs in Nova Scotia; it is largely isolated to cool dry ridges and hill tops. These sites are somewhat prone to lightning strikes that may help maintain jack pine dominance. The most remarkable features of this rocky woodland include its rarity, restricted distribution, and relatively specific environmental requirements. These collectively contribute to high ecosystem vulnerability, presenting unique conservation challenges. The Jack pine / Huckleberry - Broom crowberry / Reindeer lichen woodland supports uncommon habitat conditions, but closely associated animal and epiphytic lichen species are undocumented. As a small-patch ecosystem, it provides habitat for uncommon plants such as mountain sandwort, red crowberry and upland Atlantic Coastal Plain Flora (e.g. inkberry, broom crowberry and pine barren goldenheather). Stands support an open, sometimes stunted, canopy with abundant shrub and ground lichen cover. Productivity, tree age, canopy height and old growth potential are all low.

# OW2 Black spruce / Lambkill / Reindeer lichen

*Picea mariana* / *Kalmia angustifolia* / *Cladonia* spp.



Refer to page 242 for Maritime Boreal edatopic grid.

## Site & Soil Characteristics

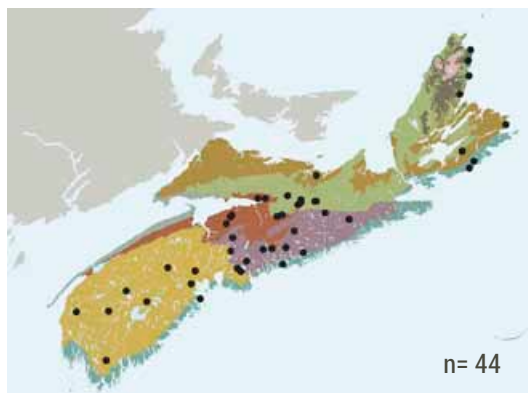
Slope Position:	Level <sup>5</sup> Crest <sup>3</sup> Middle <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>5</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>2</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>6</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>3</sup>
Microtopography:	Level <sup>7</sup> Slightly <sup>2</sup> nd <sup>1</sup>
Drainage:	Imperfect <sup>3</sup> Rapid <sup>3</sup> Well <sup>2</sup> Moderately Well <sup>1</sup> Other <sup>1</sup>
Common Soil Types:	15, 3, 15C, 6, 1, 2C, 3C
Rooting Depth (cm):	(< 30) <sup>6</sup> (30–45) <sup>1</sup> (> 45) <sup>1</sup> nd <sup>2</sup>
Forest Floor (cm):	(6–10) <sup>2</sup> (11–20) <sup>4</sup> (21–40) <sup>1</sup> Other <sup>3</sup>
Humus Form:	Hemimor <sup>3</sup> Humimor <sup>2</sup> Resimor <sup>1</sup> Other <sup>4</sup>

glacial tills. Soil moisture increases with organic accumulation, particularly where near-surface bedrock is present or cemented (orstein) soil horizons

Riversdale, Colchester County



Characteristic Plants	OW2	
	Freq. (%)	Cover (%)
Black spruce	93	13
White pine	48	5
Tamarack	30	4
Balsam fir	25	4
Red pine	20	6
Red maple	18	3
Grey birch	11	5
White birch	11	2
<b>Tree Layer (Mean % Cover)</b>	<b>20</b>	
Lambkill	98	27
Wild raisin	98	3
Black spruce	86	13
Mountain holly	86	3
Red maple	68	3
Rhodora	61	9
Lowbush blueberry	57	12
Huckleberry	50	26
Velvet-leaf blueberry	52	5
Serviceberry	48	0.2
Balsam fir	45	3
Labrador tea	36	7
Grey birch	30	3
White pine	27	3
Ground juniper	25	2
Chokeberries	23	0.2
Mountain-ash	20	0.1
Red oak	9	0.2
Heart-leaf birch	9	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>81</b>	
Teaberry	86	5
Bracken	73	12
Bunchberry	68	3
Mayflower	48	0.5
Pink lady's-slipper	39	0.1
Wild lily-of-the-valley	34	0.2
Starflower	32	0.5
Creeping snowberry	27	1
Cow wheat	23	0.1
Black crowberry	20	16
Goldthread	18	0.6
Three-toothed cinquefoil	14	0.1
Foxberry	11	0.2
Trailing blackberry	9	0.4
Bearberry	7	0.7
<b>Herb Layer (Mean % Cover)</b>	<b>20</b>	
Grey reindeer lichen	95	27
Schreber's moss	89	27
Star-tipped reindeer lichen	61	7
Wavy dicranum	43	2
Ladies' tresses	41	10
Lesser green reindeer lichen	34	7
Broom moss	27	2
Cup lichens	27	0.9
Hair-cap moss	27	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>66</b>	



reduce drainage. Site exposure is moderate to high, while surface microtopography and stoniness is low. It occurs throughout the province but is especially common in the Eastern and Western ecoregions. OW2 is uncommon but widespread across the Maritimes. Although this Vegetation Type (VT) is similar to boreal lichen woodlands from eastern Canada, national analyses have confirmed its restricted geographic range.

**Successional Dynamics:** This early-successional ecosystem is largely maintained by exposure and limiting soil conditions. It will not succeed to latter successional stages (e.g. other black spruce or pine vegetation types) and is considered a type of edaphic climax. Possible disturbances include fire, windthrow and limb or crown breakage. Black spruce will regenerate on OW2 sites by seed and/or layering. Most stands have uneven-age class structures.

**Ecological Features:** The Black spruce / Lambkill / Reindeer lichen is unique to the east coast of Canada, occurring as a small-patch ecosystem in each of the three Maritime Provinces. This relatively uncommon woodland has boreal vegetation characteristics, but the presence of northern temperate species (e.g. huckleberry, rhodora and chokeberry) differentiates the VT from its boreal analogs in Quebec and Ontario. OW2 has a limited distribution in Nova Scotia, which may present conservation challenges. This ecosystem supports unique habitat conditions, but associated animal, plant and epiphytic lichen species are undocumented. It features a very open canopy, and high shrub and lichen cover. Productivity, tree age, canopy height and old growth potential are all low.

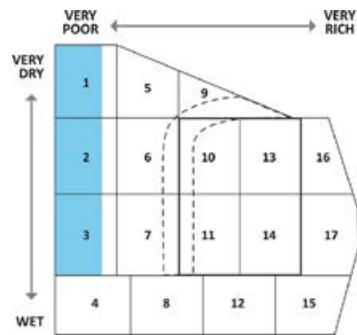


# OW3 Red pine – White pine / Broom crowberry / Grey reindeer lichen

*Pinus resinosa* – *Pinus strobus* / *Corema conradii* / *Cladonia rangiferina*

**Concept:** This sparsely treed coniferous woodland is a transitional successional stage, encompassing species of both open heathland and closed canopy pine forest usually SP2 (Red pine / Blueberry / Bracken). The ecosystem is characterized by low crown closure, frequent red pine, and high broom crowberry cover; reindeer lichens are abundant in some occurrences. The Red pine – White pine / Broom crowberry / Grey reindeer lichen woodland is found on dry sandy or coarse loamy soils with low humus accumulation and reduced nutrient availability. Many occurrences originate with fire.

**Vegetation:** The open evergreen canopy is dominated by red pine and/or white pine, but the latter condition is less common. On somewhat moister soils, black spruce and/or larch may be prominent, while pine is absent or sparse. Deciduous tree species (e.g. red oak, grey birch, large tooth aspen) may be found scattered but most are uncommon. Non-native trees species (e.g. Scotch



## Site & Soil Characteristics

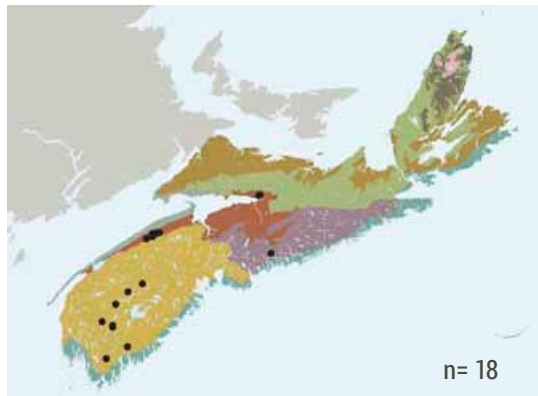
Slope Position:	Level <sup>7</sup> Crest <sup>1</sup> Middle <sup>1</sup> Upper <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>4</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>4</sup> Slightly <sup>2</sup> nd <sup>4</sup>
Drainage:	Well <sup>5</sup> Rapid <sup>5</sup>
Common Soil Types:	1, 15
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>2</sup> (> 45) <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>3</sup> (11–20) <sup>2</sup> nd <sup>4</sup>
Humus Form:	Hemimor <sup>2</sup> Resimor <sup>1</sup> nd <sup>7</sup>

pine, Black locust) are rapidly spreading in some occurrences and threatening ecosystem persistence. Lower strata are dominated by low shrubs including broom crowberry, sweet fern and lowbush blueberry. Broom crowberry is abundant in all occurrences but is typically excluded under denser tree crowns. Herbaceous cover is reduced except near exposed sand and around disturbed sites (i.e. often caused by all-terrain vehicle traffic). Forest species (e.g. wild lily-of-the-valley, starflower, pink lady’s slipper, bluebead lily and checkered rattlesnake plantain) occur under tree or tall shrub cover. Reindeer lichen abundance is moderate to high.

**Environmental Setting:** OW3 is mainly found on dry, sandy, nutrient very poor soils associated with glaciofluvial deposits or shallow, gravelly and/or coarse textured glacial tills. Most soils are deep and well drained but the presence of cemented (orstein) soil horizons in some sites can impede drainage and increase available moisture in the rooting zone. This Vegetation Type (VT) is found in warmer areas and is excluded from the coast. It is found in the Valley and

Hibernia, Queens County

Characteristic Plants	OW3	
	Freq. (%)	Cover (%)
Red pine	72	14
Black spruce	56	10
White pine	56	9
Grey birch	39	5
Tamarack	22	2
Red maple	11	3
Red oak	11	2
<b>Tree Layer (Mean % Cover)</b>		<b>25</b>
Broom crowberry	100	54
Lowbush blueberry	94	5
Lambkill	78	8
Black spruce	72	5
White pine	67	2
Sweetfern	67	0.9
Red pine	56	2
Grey birch	44	2
Red maple	44	2
Huckleberry	39	15
Ground juniper	39	4
Rhodora	33	2
Serviceberry	33	0.3
Bayberry	28	4
Smooth serviceberry	28	0.6
Wild raisin	28	0.6
Chokeberries	22	6
Inkberry	22	0.1
Black chokeberry	17	0.6
Bearberry	11	5
Purple chokeberry	11	1
<b>Shrub Layer (Mean % Cover)</b>		<b>85</b>
Teaberry	83	2
Bracken	78	6
Bearberry	56	12
Starflower	50	0.1
Old-field goldenrod	33	0.4
Umbel-like sedge	33	0.4
Common hair grass	33	0.3
Ground cedar	33	0.2
Lion's paw	28	0.2
Mayflower	28	0.2
Golden heather	28	0.1
Wild lily-of-the-valley	28	0.1
Cow wheat	22	0.4
White goldenrod	22	0.2
Poverty grass	22	0.1
Rice grass	22	0.1
Trailing blackberry	22	0.1
Three-toothed cinquefoil	11	0.1
Cinquefoil	6	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>14</b>
Grey reindeer lichen	89	14
Schreber's moss	67	5
Star-tipped reindeer lichen	50	3
Lesser green reindeer lichen	33	4
Juniper polytrichum	22	0.8
Wavy dicranum	22	0.5
Hair-cap moss	22	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>20</b>



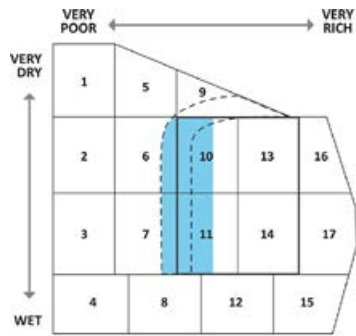
Central Lowlands (600) and Western (700) ecoregions. This VT is nationally, if not globally, unique. It is not found outside Nova Scotia in Canada.

**Successional Dynamics:** This is an early-successional woodland community. It is the first treed successional stage expressed in broom crowberry heathland on mainland Nova Scotia. The ecosystem often occurs on the edges of open barrens as a transition to closed forest. In other sites, trees may be more evenly and widely scattered. Fire is a component of stand history in most occurrences, but long-standing fire suppression programs have promoted trees such as black spruce, white pine and red oak, contributing to the loss of open broom crowberry heathland. Occurrences of OW3 on slightly richer ecosites may succeed to SP2 as stocking increases.

**Ecological Features:** Global occurrences of this provincially uncommon ecosystem are limited to Nova Scotia. The most remarkable features of this often sandy small-patch woodland include its rarity, restricted distribution, and relatively specific environmental requirements (including a potential dependency on fire for establishment and maintenance). These factors collectively contribute to the ecosystem's high vulnerability, which presents unique conservation challenges. Unlike some of the other uncommon woodlands known from Nova Scotia, many occurrences of this ecosystem are threatened by human activities, including aggregate mining, commercial and residential development, fire suppression, and invasive species. OW3 supports extraordinarily unique habitat conditions. Recent research documents its importance for vesper sparrow, arrowleaved violet, Case's ladies'-tresses, Canada mountain-ricegrass, rock-rose, pine barren goldenheather and dixie reindeer lichen. Many of these are species of high conservation concern.

# OW4 Red spruce / Red-berried elder / Rock polypody

*Picea rubens* / *Sambucus racemosa* / *Polypodium virginianum*



**Concept:** This somewhat uncommon woodland is characterized by its moderately open coniferous canopy, low species richness and unique talus substrate. It is found only in areas where topography and bedrock outcropping allow the formation of stony colluvial deposits and related talus slopes. Sites often contain only patches of vegetation across a broader talus matrix. Red spruce, black spruce and/or hemlock are common canopy dominants, and the understory is similarly variable. OW4 is comparable to OW5 (White ash – Red oak / Marginal wood fern – Herb-Robert), but is generally associated with less fertile substrates.

**Vegetation:** The poorly-developed canopy may be dominated by a number of evergreen tree species, but sampled stands support high levels of red spruce or hemlock. Understory associates include vascular plants common to acidic conifer forest and/or rocky substrates (e.g. foxberry, rock polypody, marginal wood fern), but most of these species are infrequent. Bryophyte cover is usually low. On older sites, shrubs and bryophytes may form a mat over underlying talus. Ground lichens were not adequately sampled during field surveys, and may be more common than shown in data summaries.

**Environmental Setting:** This ecosystem is found on talus deposits, including a mix of loose rock fragments combined with underlying glacial till. On steeper grades, and/or upper slope positions, talus can be unstable, but older downslope deposits are less mobile and more suitable for plant growth. Trees and other plants are sometimes rooted in underlying mineral soil, but more often in pockets of organic matter and weathered rock found among surface rock fragments. Mineral soil (if present) is usually acidic and dry. Exposure is moderate to extreme. Most occurrences are in the Cape Breton Highlands and Nova Scotia Uplands ecoregions.

## Site & Soil Characteristics

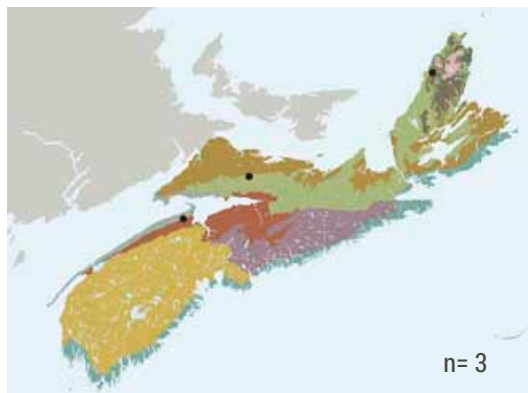
Slope Position: Crest<sup>3</sup> Middle<sup>3</sup> Upper<sup>3</sup>  
 Surface Stoniness: (Very – Excessively)<sup>10</sup>  
 Bedrock Outcrop: nd<sup>10</sup>  
 Microtopography: nd<sup>10</sup>  
 Drainage: nd<sup>10</sup>

Common Soil Types: nd<sup>10</sup>  
 Rooting Depth (cm): (<30)<sup>7</sup> nd<sup>3</sup>  
 Forest Floor (cm): nd<sup>10</sup>  
 Humus Form: nd<sup>10</sup>



Cheticamp River Valley, Cape Breton Highlands National Park, Inverness County

Characteristic Plants	OW4	
	Freq. (%)	Cover (%)
Red spruce	67	37
Hemlock	67	16
White birch	67	4
Red maple	67	2
Balsam fir	33	11
Black spruce	33	10
White pine	33	5
Yellow birch	33	5
Beech	33	2
Ironwood	33	1
Sugar maple	33	1
<b>Tree Layer (Mean % Cover)</b>		<b>51</b>
Red-berried elder	67	4
Velvet-leaf blueberry	67	2
Balsam fir	67	2
Red spruce	33	6
Mountain holly	33	5
Red raspberry	33	4
Hemlock	33	3
Striped maple	33	3
White pine	33	2
Beaked hazelnut	33	1
Fly-honeysuckle	33	1
Labrador tea	33	1
Lowbush blueberry	33	1
Red oak	33	1
Serviceberry	33	1
<b>Shrub Layer (Mean % Cover)</b>		<b>14</b>
Lady's thumb	67	2
Foxberry	33	10
Marginal wood fern	33	5
Creeping snowberry	33	3
Common hair grass	33	2
Sarsaparilla	33	2
Spinulose wood fern	33	2
Teaberry	33	2
White goldenrod	33	2
Rough goldenrod	33	1
Starflower	33	1
Poverty grass	33	0.5
Umbel-like sedge	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>11</b>
Cup lichens	100	2
Grey reindeer lichen	67	6
Schreber's moss	67	6
Pin cushion moss	67	0.8
Bazzania	33	1
Juniper polytrichum	33	1
Lesser green reindeer lichen	33	1
Stair-step moss	33	0.5
Wavy dicranum	33	0.5
Hair-cap moss	33	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>11</b>



**Successional Dynamics:** This ecosystem is an early- to mid-successional stage, but mechanisms for establishment and renewal of this VT are not well understood. As soils deepen over talus with time, the ecosystem will advance to include features more typical of upland conifer forest, but their expression will be weakened by inherent soil stoniness and related restrictions in rooting potential and nutrient availability.

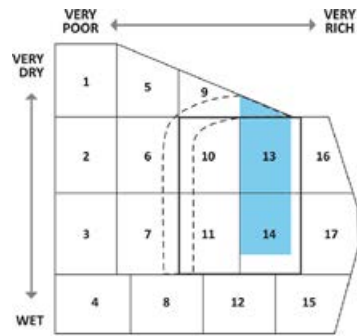
**Ecological Features:** Softwood talus woodlands are uncommon small-patch ecosystems. They are both under sampled and poorly understood in Nova Scotia. Plots were established in warmer areas of the province, where temperate flora are more common. Red spruce / Red-berried elder / Rock polypody woodland supports remarkably unique habitat conditions, but most associated animal, plant and lichen species are undocumented. Exceptions include the rock vole, long-tailed shrew, and particular land snail species, which are all documented from talus forests. Canopy closure is variable but stand structures tend to be complex, supporting diverse microhabitats. The ecosystem has limited potential to develop old growth where slopes have stabilized.

# OW5 White ash – Red oak / Marginal wood fern – Herb-Robert

*Fraxinus americana* – *Quercus rubra* /  
*Dryopteris marginalis* – *Geranium robertianum*

**Concept:** The White ash – Red oak / Marginal wood fern – Herb-Robert woodland is found on stony colluvium deposits and relatively stable talus slopes. OW5 is similar to OW4 (Red spruce / Red-berried elder / Rock polypody), but is generally associated with richer site conditions. OW5 is a rare woodland Vegetation Type (VT) found only in areas where steep topography and nearby richer bedrock outcropping has led to rich stony colluvium and talus deposits. Deciduous woodlands on more acidic deposits have not been surveyed.

**Vegetation:** Canopy composition is somewhat variable but usually includes white birch, red oak and/or white ash; any of these tree species may dominate. A less common variant of OW5 is characterized by high ironwood cover. Understory associates may include plants tolerant of disturbance (e.g. red raspberry, white goldenrod and poverty grass), droughty substrates (e.g. marginal wood fern, fibrous root sedge, hare-bell and hay-scented fern) and/or nutrient enrichment (e.g. herb-Robert, Solomon’s seal and maidenhair spleenwort). Bryophyte cover is strongly reduced.



## Site & Soil Characteristics

Slope Position: Lower<sup>3</sup> Middle<sup>3</sup> Upper<sup>3</sup>  
 Surface Stoniness: (Very – Excessively)<sup>2</sup> nd<sup>8</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>7</sup> (Slightly – Moderately)<sup>3</sup>  
 Microtopography: Level<sup>2</sup> nd<sup>8</sup>  
 Drainage: Rapid<sup>4</sup> Moderately Well<sup>3</sup> Well<sup>3</sup>

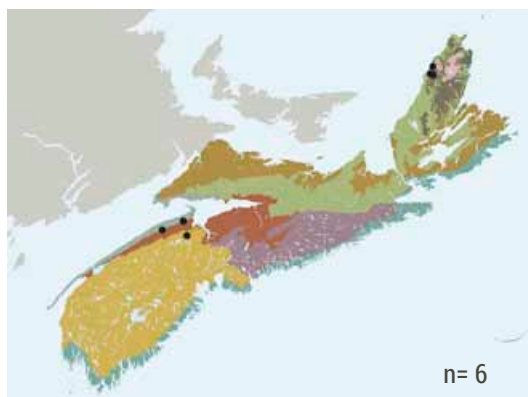
Common Soil Types: 8  
 Rooting Depth (cm): nd<sup>10</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> nd<sup>8</sup>  
 Humus Form: Vermimull<sup>2</sup> nd<sup>8</sup>

Ground lichens were not adequately sampled during field surveys, and may be more common than shown in data summaries.

North Mountain, Kings County



Characteristic Plants	OW5	
	Freq. (%)	Cover (%)
White ash	100	11
Red oak	83	28
White birch	83	13
Ironwood	67	9
Sugar maple	67	3
Beech	50	9
White spruce	17	14
Yellow birch	17	5
White pine	17	3
Balsam fir	17	2
Red maple	17	2
Red spruce	17	2
Hemlock	17	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>62</b>
Striped maple	67	1
Fly-honeysuckle	67	1
Beaked hazelnut	50	4
White ash	50	2
Red oak	50	2
Western poison ivy	33	20
Ironwood	33	13
Red-berried elder	33	8
Beech	33	5
White birch	33	4
Hemlock	33	2
Sugar maple	33	2
Mountain maple	33	1
White spruce	33	1
Smooth gooseberry	33	0.1
Witch-hazel	17	10
Bush-honeysuckle	17	0.5
<b>Shrub Layer (Mean % Cover)</b>		<b>28</b>
Marginal wood fern	83	3
Fibrous-root sedge	83	2
White goldenrod	67	4
Poverty grass	67	2
Wood goldenrod	67	1
Sarsaparilla	67	0.3
Herb-Robert	50	8
Common hair grass	50	5
Christmas fern	50	1
Rough hawkweed	50	0.5
Wood aster	33	5
Calico aster	33	1
Canada bluegrass	33	0.5
Common speedwell	33	0.3
Heart-leaved aster	33	0.3
Hemp-nettle	33	0.3
Maidenhair spleenwort	33	0.2
Stinking Willie	33	0.1
Wild lily-of-the-valley	33	0.1
Red baneberry	17	0.3
Brownish sedge	17	0.1
Colonial bentgrass	17	0.1
Pussytoes	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>21</b>
Cup lichens	17	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>0.6</b>



**Environmental Setting:** The ecosystem develops on stony colluvium or talus slopes. Talus fragments are usually angular and cobble to boulder sized. OW5 can sometimes develop on islands of stable talus found within a larger matrix of more active deposition. The ecosystem is found at moderate elevations on steeper slopes, particularly in areas with more rugged topography. Most stands are in the North Mountain ecodistrict, but outliers occur in parts of Cape Breton.

**Successional Dynamics:** An early- to mid-successional stage is described, but successional development is strongly limited by site constraints. On more stable talus, gaps between rock fragments may become in-filled with deeper mineral soil and humus providing a better medium for the development of upland tolerant hardwood forest. This could be marked by a full Vegetation Type change as site conditions improve.

**Ecological Features:** Hardwood talus woodlands are an uncommon small-patch ecosystem. They are both undersampled and poorly understood in Nova Scotia. Plots were established on nutrient rich talus, but OW5 has been observed on more acidic substrates. Acidic (low pH and nutrient availability) sites do not support white ash or ironwood, and have higher relative levels of beech, yellow birch and red maple. Similarly, stands from cooler areas are less likely to feature red oak or white ash. White ash – Red oak / Marginal wood fern – Herb-Robert woodland supports particularly unique habitat conditions, but most associated animal, plant and lichen species are undocumented. Some exceptions include the rock vole, long-tailed shrews, particular land snails, shepherdia and anise-root; these are all documented from talus forests. Canopy closure is variable but stand structures tend to be complex, supporting diverse microhabitats.

# SH

## Spruce Hemlock Forest Group

### Concept

This group represents mid- to late-successional, closed canopy, softwood forests found on zonal Acadian ecosites. Shade-tolerant red spruce and hemlock are typically the dominant trees. Balsam fir is found with higher relative dominance in earlier successional stages (e.g. SH8) but is consistently present at all stages of successional development. Regenerating overstory species, herbs typical of upland softwood forests, and an extensive bryophyte layer make up the understory.

Vegetation Types (VT) occur on soils with a wide range of moisture levels, but fertility levels are generally moderate. Soils are mainly derived from glacial till. Various VTs from this group form matrix forest, or occur as large patches. All Spruce Hemlock VTs are found in the Acadian Macrogroup.

Mid-successional stages usually have a significant component of balsam fir in the overstory along with red spruce and/or white spruce; they are typically even-aged. Late-successional stages are dominated by hemlock and red spruce with some white pine. And, between infrequent stand-level disturbance events,

they develop uneven-aged characteristics due to the longevity of hemlock and red spruce. Disturbance agents include hurricanes (windthrow), fire and insects.

These Acadian ecosystems occur prominently over much of mainland Nova Scotia's lowland and upland ecoregions. The high shade tolerance and longevity of the dominant trees support well-developed canopies, large and/or tall boles and snags, complex vertical structures and abundant coarse woody material. Many VTs in this group can persist as climax forests with inherent mechanisms of self renewal and old-growth development. The group can dominate in some landscapes, providing large expanses of interior habitat and high landscape connectedness. Flying squirrel, American marten, fisher, deer and moose, snowshoe hare, black bear, bats and diverse communities of birds and invertebrates use these forests for shelter, foraging and/or reproduction. Rare plants are somewhat uncommon but high invertebrate diversity, extensive fungal networks, and rare lichens may occur, particularly in older stands.

Photo: **Island Lake, Halifax County**  
(Len Wagg/CNS)

## Spruce Hemlock (SH) Key

1a. Eastern white cedar present (excl. escapes) ... MW13	7a. Red spruce abundant to dominant ... 8
1b. Eastern white cedar absent ... 2	7b. Red spruce absent to scattered ... 11
2a. Hemlock scattered to dominant ... 3	8a. Red spruce and balsam fir dominant ... 9
2b. Hemlock absent to sparse ... 6	8b. Red spruce and white spruce dominant ... SH7
3a. Black spruce scattered to abundant with hemlock ... SP8	9a. Balsam fir abundant to dominant ... SH5b
3b. Not as above ... 4	9b. Not as above ... 10
4a. White pine absent or sparse and hemlock > 60% of canopy ... SH1	10a. Sphagnum < 2% of groundcover ... SH5
4b. Not as above ... 5	10b. Sphagnum > 2% of groundcover ... SH5a
5a. White pine scattered to dominant ... SH2	11a. White spruce scattered to dominant ... 13
5b. Red spruce and hemlock dominant ... SH3	11b. Balsam fir dominant ... 12
6a. White pine scattered to abundant, hemlock absent ... SH4	12a. Trees actively managed for commercial production of Christmas trees ... PF4
6b. White pine absent or sparse ... 7	12b. Not as above ... SH8
	13a. Balsam fir > Black spruce ... SH6
	13b. Black spruce > Balsam fir ... SP10

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



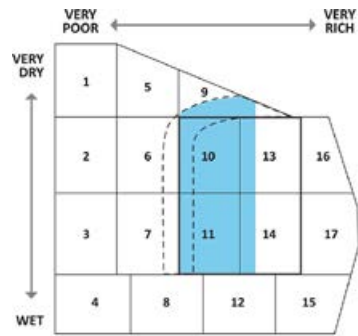
# SH1

## Hemlock / Needle carpet

*Tsuga canadensis*

**Concept:** This closed canopy Vegetation Type (VT) has an overstory dominated by hemlock (usually > 70%). Other species such as red spruce, white pine, and/or yellow birch are absent or occur with low abundance. The dense closed canopy allows little light to reach the forest floor and consequently, shrub, herbaceous and bryophyte layers are sparse, and may be absent altogether. Due to hemlock's longevity and high shade tolerance, this VT will develop old forest characteristics that are maintained by gap disturbances. SH1 is a characteristic late-successional Acadian softwood VT found on zonal sites.

**Vegetation:** Under the hemlock overstory, the shrub layer is primarily regenerating conifers. Hemlock develop well under these very low light conditions and can remain suppressed but healthy for decades. Despite their suppressed growth, hemlock understory saplings are usually well formed, often creating an



### Site & Soil Characteristics

Slope Position: Lower<sup>3</sup> Level<sup>2</sup> Middle<sup>2</sup> Upper<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Other)<sup>1</sup>  
 Microtopography: Moderately<sup>3</sup> Slightly<sup>3</sup> Strongly<sup>2</sup> Other<sup>2</sup>  
 Drainage: Well<sup>6</sup> Moderately Well<sup>3</sup> Other<sup>1</sup>

Common Soil Types: 2, 5, 6, 1, 2L, 8, 11, 8C, 2C, 3  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>3</sup> (> 45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>4</sup> (11–20)<sup>2</sup> (21–40)<sup>1</sup> nd<sup>1</sup>  
 Humus Form: Hemimor<sup>3</sup> Humi-Fibrimor<sup>1</sup> Humimor<sup>1</sup> Other<sup>1</sup>  
 nd<sup>4</sup>

understory layer of small trees with fairly full crowns. Herbaceous coverage is usually low and the forest floor is mostly needle carpet with low bryophyte coverage. The occurrence of bazzania can be significant where coarse woody material has accumulated on the forest floor.

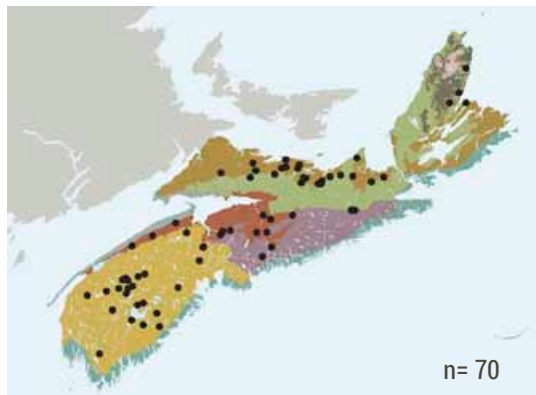
**Environmental Setting:** Dry to fresh, nutrient medium soils of glacial or glaciofluvial origin provide typical substrate. This VT can be found throughout mainland Nova Scotia and in Cape Breton where it occurs on steep slopes along major rivers, lower sheltered slopes of the Cape Breton Hills, and along the Bras d'Or Lakes. Hemlock – Needle carpet forests are more abundant in the Western ecoregion (700), where temperatures during the growing season are generally warmer.

**Successional Dynamics:** SH1 is a late-successional zonal climax VT dominated by hemlock. It can develop from several early and mid-successional VTs comprised of red maple,



Alma, Pictou County

Characteristic Plants	SH1	
	Freq. (%)	Cover (%)
Hemlock	100	72
Red spruce	69	10
Red maple	67	6
Yellow birch	54	4
White pine	40	5
White birch	36	3
Balsam fir	19	2
Red oak	13	3
White ash	10	1
<b>Tree Layer (Mean % Cover)</b>		<b>91</b>
Hemlock	83	3
Balsam fir	71	3
Red maple	71	0.3
Red spruce	66	2
White pine	46	0.2
Striped maple	37	0.6
Yellow birch	31	0.3
Red oak	30	0.1
Serviceberry	27	0.1
Fly-honeysuckle	24	0.3
Beech	21	2
Lowbush blueberry	16	0.2
Wild raisin	16	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Wild lily-of-the-valley	80	0.5
Starflower	61	0.5
Evergreen wood fern	53	0.4
Partridge-berry	43	3
Ghost pipe	41	0.1
Bluebead lily	36	0.1
Sarsaparilla	31	0.7
Bunchberry	26	0.8
Cucumber root	26	0.1
Goldthread	24	2
Bracken	23	0.5
Teaberry	21	2
Twinflower	21	0.5
Painted trillium	21	0.1
Rose twisted stalk	19	0.1
Creeping snowberry	17	0.9
New York fern	16	0.4
<b>Herb Layer (Mean % Cover)</b>		<b>5</b>
Stair-step moss	81	12
Schreber's moss	76	9
Bazzania	74	7
Log moss	69	2
Broom moss	60	1
Pin cushion moss	27	0.2
Wavy dicranum	17	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>25</b>



targettooth aspen, white birch, red spruce and balsam fir. Early-successional stages can be bypassed if, at the time of disturbance, advanced hemlock and red spruce regeneration is retained - as could happen after a stand-level disturbance such as windthrow or harvesting. This VT can develop as an even-aged forest, but an uneven-aged structure will establish as it matures. Between infrequent, large-scale disturbance events, SH1 is maintained through gap replacement.

**Ecological Features:** Stands typically form small to large patches. Mature forests usually have large diameter cavity trees, very decay-resistant snags and large coarse woody material. This forest may provide habitat for moose, deer, American marten, flying squirrels and diverse fungi including hemlock varnish shelf (reishi). During years with deeper snow cover, SH1 often provides refuge for bird and mammal species, as the dense canopy results in reduced snow depth on the ground, particularly on south-facing slopes. Downed coarse woody material may provide cover for red-backed salamander and small mammals, while large trees can provide pileated woodpecker, barred owl and northern goshawk nest sites. Boreal chickadee, pine siskin, and both white-winged and red crossbills eat hemlock seeds. Downy, checkered and creeping rattlesnake plantains are the only documented uncommon or rare plants. In recent years, an invasive pest, the hemlock woolly adelgid, has caused stand level mortality in western regions and poses a significant threat to hemlock stands throughout the province. Hemlock is the province's longest-lived conifer, with a high potential for establishing stands of old growth. The oldest known hemlock in Nova Scotia is 532 measured years old found near Panuke Lake.

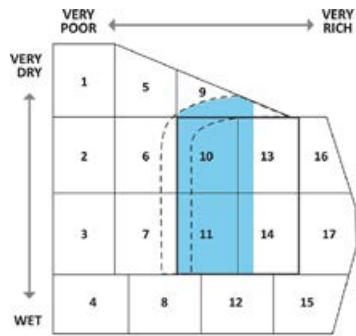
# SH2

## Hemlock – White pine / Sarsaparilla

*Tsuga canadensis* – *Pinus strobus* / *Aralia nudicaulis*

**Concept:** This closed canopy forest is co-dominated by hemlock and white pine, with minor levels of many other tree species. White pine may occur in a super-canopy position. Lower layers are generally sparse (< 15% cover) and contain few species. The shrub layer is primarily regenerating tree species, and common upland forest flora characterize the herbaceous layer. Due to hemlock’s longevity and high shade tolerance, this VT will develop old forest features that are maintained by gap disturbances. SH2 is a typical Acadian softwood VT found on zonal sites.

**Vegetation:** Red maple is frequent in the canopy but only occurs with sparse coverage. Other associated trees also occur with low cover, including red spruce, yellow birch and white birch. In canopy gaps, caused by disturbances, natural regeneration, especially hemlock



### Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Upper<sup>3</sup> Lower<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>6</sup> (Very – Excessively)<sup>3</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>1</sup> nd<sup>1</sup>  
 Microtopography: Slightly<sup>4</sup> Moderately<sup>3</sup> Strongly<sup>2</sup> Other<sup>1</sup>  
 Drainage: Moderately Well<sup>6</sup> Well<sup>4</sup>

Common Soil Types: 2, 5, 6C, 8C, 6  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>3</sup> (> 45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>2</sup> (11–20)<sup>4</sup> nd<sup>2</sup>  
 Humus Form: Hemimor<sup>3</sup> Humimor<sup>2</sup> Vermimull<sup>1</sup> Other<sup>4</sup>



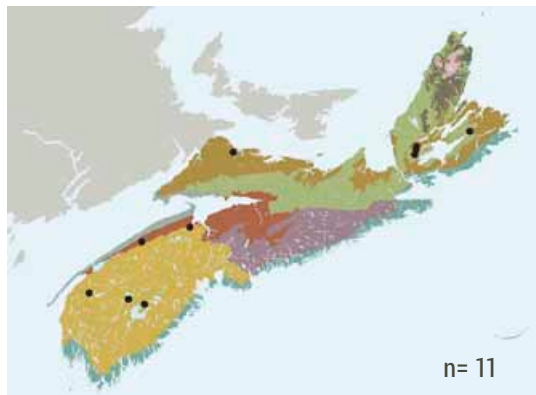
and balsam fir, can be abundant. Other shrubs may include striped maple and fly-honeysuckle. Herbaceous coverage is usually low (< 10%) and includes wild lily-of-the-valley, starflower, sarsaparilla, bunchberry and evergreen wood fern. Typical bryophytes occur with sparse cover, including Schreber’s moss, stair-step moss and bazzania.

**Environmental Setting:** SH2 is mainly associated with dry to fresh, nutrient medium soils of glacial origin. This VT can be found throughout mainland Nova Scotia and parts of Cape Breton. However, most stands occur within the Western ecoregion (700), where both hemlock and white pine are more prevalent.

**Successional Dynamics:** SH2 is a late-successional zonal climax forest shaped by partial stand-level disturbances. It can develop from several mid-successional softwood VTs comprised of red spruce and balsam fir. This VT develops an uneven-aged structure as it

Greenwich, Kings County

Characteristic Plants	SH2	
	Freq. (%)	Cover (%)
Hemlock	100	48
White pine	100	25
Red maple	91	6
Red spruce	45	5
Yellow birch	45	5
White birch	36	3
Red oak	27	1
<b>Tree Layer (Mean % Cover)</b>		<b>88</b>
Red maple	82	0.4
Hemlock	64	2
Red spruce	55	1
Red oak	55	0.1
Serviceberry	55	0.1
Striped maple	55	0.1
Balsam fir	45	9
White pine	45	0.6
Beech	36	0.3
White spruce	27	4
White ash	27	0.1
Sugar maple	18	2
Fly-honeysuckle	18	0.1
Velvet-leaf blueberry	18	0.1
Wild raisin	18	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Wild lily-of-the-valley	91	0.7
Starflower	82	0.5
Sarsaparilla	55	0.8
Bunchberry	45	2
Evergreen wood fern	45	0.7
Bracken	45	0.1
Ghost pipe	45	0.1
New York fern	36	4
Partridge-berry	36	2
Twinflower	36	0.7
Bluebead lily	36	0.2
Rose twisted stalk	36	0.1
Goldthread	18	3
<b>Herb Layer (Mean % Cover)</b>		<b>8</b>
Stair-step moss	73	7
Schreber's moss	73	6
Bazzania	73	5
Broom moss	55	0.4
Log moss	45	0.7
Common green sphagnum	27	0.8
Wavy dicranum	27	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>15</b>



matures, with canopy gaps created by the loss of red maple, white birch and balsam fir. Individual tree or small patches of tree mortality can be caused by insects/disease, windthrow, or senescence. Between large-scale disturbance events, such as hurricanes and/or fires, SH2 will continue or transition to other zonal climax forests with more or less red spruce, hemlock and/or white pine.

**Ecological Features:** This small- to large patch-sized forest ecosystem has similar ecological features as SH1. Hemlock is very shade-tolerant, responding to release after decades of understory suppression, whereas white pine (which has only intermediate shade tolerance) will not thrive as long without release. The longevity of hemlock and white pine promotes old growth development. Mature forests provide large cavity trees, decay resistant snags, and a super-canopy layer. Larger trees often form nest sites for pileated woodpecker, barred owl and northern goshawk. Downed coarse woody material (CWM) can be extensive as larger stems. These are slow to decay, persisting for many years. CWM provides habitat for many small mammals, amphibians, invertebrates, bryophytes, lichen and fungi, and assorted vascular plants. CWM also act as germination microsites for advanced tree regeneration. As small gap disturbances occur, advanced regeneration provides dense understory patches that provide cover and nesting habitat for many small bird species. Boreal chickadee, pine siskin and both white-winged and red crossbills eat hemlock and white pine seeds. Downy rattlesnake plantain is the only rare plant documented in ecosystem surveys.

# SH3 Red spruce – Hemlock / Wild lily-of-the-valley

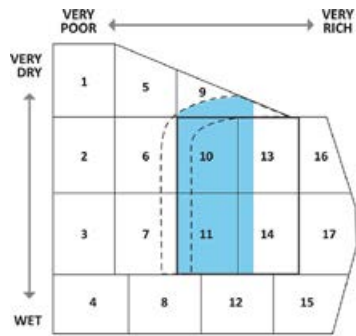
*Picea rubens* – *Tsuga canadensis* / *Maianthemum canadense*

**Concept:** These closed canopy forests are co-dominated by red spruce and hemlock, and either species may be relatively more abundant in a particular stand. Scattered white pine can also be found, especially in western Nova Scotia. Due to the longevity and shade-tolerance of the dominant tree species, this Vegetation Type (VT) will develop old forest features, maintained by gap disturbances. However, infrequent hurricanes and/or fires may periodically reset this VT to an earlier successional stage. SH3 is a typical Acadian softwood VT found on zonal sites.

**Vegetation:** Other overstory associates occur with sparse coverage and may include red maple, yellow birch and balsam fir. The moderately-developed shrub layer is primarily regenerating tree species such as hemlock, balsam fir, red spruce and red maple. Regeneration can be extensive depending on crown closure. Herbaceous layer density is usually low, but species richness can be relatively high. Typical species include wild lily-of-the-valley, bluebead lily, partridge-berry, starflower and painted trillium. Schreber’s moss and stair-step moss are the main bryophytes, and bazzania can also be significant where coarse woody material (CWM) has accumulated on the forest floor, or where atmospheric humidity is relatively high.

**Environmental Setting:** SH3 mainly occurs on fresh to fresh-moist, nutrient medium soils of glacial origin. This VT can be found throughout mainland Nova Scotia and on lower slopes in Cape Breton. However, it is mostly associated with the Western ecoregion due to hemlock affinity for warmer temperatures.

**Successional Dynamics:** SH3 is a late-successional climatic climax (zonal) VT dominated by red spruce and hemlock. It can develop from several early-successional VTs dominated



## Site & Soil Characteristics

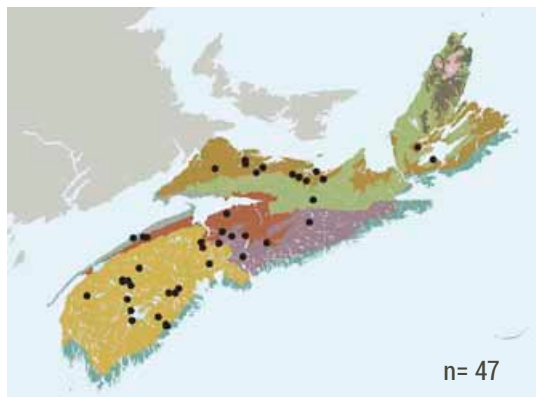
Slope Position: Level<sup>3</sup> Lower<sup>2</sup> Middle<sup>2</sup> Upper<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>5</sup> Slightly<sup>3</sup> Strongly<sup>2</sup>  
 Drainage: Moderately Well<sup>3</sup> Well<sup>3</sup> Imperfect<sup>3</sup> Other<sup>1</sup>

Common Soil Types: 2, 6, 3, 2L, 5, 3L, 8  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>4</sup> (> 45)<sup>3</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>3</sup> (11–20)<sup>5</sup> (21–40)<sup>1</sup>  
 Humus Form: Humimor<sup>4</sup> Mormoder<sup>2</sup> Vermimull<sup>1</sup> Resimor<sup>1</sup>  
 nd<sup>2</sup>



West Branch Lake, Pictou County

Characteristic Plants	SH3	
	Freq. (%)	Cover (%)
Red spruce	100	41
Hemlock	98	27
Red maple	77	6
White pine	53	7
Balsam fir	40	5
White birch	38	2
Yellow birch	28	5
Black spruce	13	14
Large-tooth aspen	11	3
<b>Tree Layer (Mean % Cover)</b>		<b>84</b>
Red maple	91	0.8
Balsam fir	89	5
Red spruce	79	2
Hemlock	74	3
White pine	53	0.1
Yellow birch	32	1
Serviceberry	30	0.1
Velvet-leaf blueberry	26	0.5
Striped maple	23	2
Lambkill	23	0.5
Red oak	23	0.1
Wild raisin	23	0.1
Witch-hazel	17	0.3
Lowbush blueberry	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Wild lily-of-the-valley	74	1
Starflower	70	0.5
Partridge-berry	51	0.2
Painted trillium	51	0.1
Bluebead lily	47	0.4
Goldthread	45	0.7
Bunchberry	36	2
Bracken	34	4
Ghost pipe	34	0.1
Evergreen wood fern	30	1
Sarsaparilla	30	1
New York fern	28	0.5
Hay-scented fern	26	2
Cinnamon fern	23	0.8
Wood aster	23	0.3
Teaberry	21	0.4
Cucumber root	21	0.3
Twinflower	19	2
Creeping snowberry	19	0.4
Interrupted fern	19	0.1
Pink lady's-slipper	19	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>7</b>
Schreber's moss	91	29
Stair-step moss	87	16
Bazzania	87	8
Log moss	72	2
Broom moss	68	1
Wavy dicranum	49	2
Pin cushion moss	32	0.1
Hair-cap moss	23	0.9
Ladies tresses	19	3
Grey reindeer lichen	19	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>53</b>



by intolerant hardwood species (e.g. white birch, aspen and/or red maple) that follow stand-level disturbances. Mid-successional VTs may include red maple but are primarily comprised of shade-tolerant softwood species such as balsam fir and red spruce. Early-successional stages can be bypassed if, at the time of disturbance, advanced red spruce and hemlock regeneration is retained—as could happen after a stand-level disturbance such as windthrow or harvesting. Depending on disturbance history, this VT can be even-aged, but it will develop an uneven-aged structure as it matures continuing or transitioning to hemlock dominated forest types (usually SH1) through gap replacement.

**Ecological Features:** This matrix to large patch forest ecosystem typically occurs over hundreds of hectares. The longevity of the dominant tree species promotes old growth development, uneven-aged structure and large amounts of coarse woody material. Scattered white pine are common, often occurring as super-canopy trees. The oldest stands support lichens, such as Northern coral lichen and Methuselah's beard lichen—indicators of ecological continuity. Both red spruce and hemlock are very shade-tolerant and respond well to release after decades of suppression. Mature forests typically have large diameter cavity trees and snags. These provide habitat for marten, flying squirrel, pileated woodpecker, barred owl and northern goshawk. Hemlock is very decay resistant and large dead trees persist for many decades. As small gap disturbances occur, advanced regeneration forms dense understory patches, that provide cover and nesting habitat for many small bird species. Boreal chickadee, pine siskin and both the white-winged and red crossbills eat hemlock and red spruce seeds. Creeping rattlesnake plantain is the only documented plant species of conservation concern.

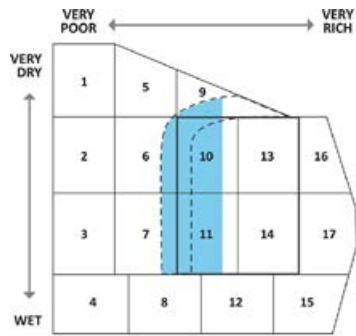
# SH4 Red spruce – White pine / Lambkill / Bracken

*Picea rubens* – *Pinus strobus* /  
*Kalmia angustifolia* / *Pteridium aquilinum*

**Concept:** These closed canopy forests are typically dominated by red spruce with abundant (26–50%) levels of white pine. Red spruce – White pine / Lambkill/ Bracken is found on zonal Acadian ecosites with slightly dryer soils and lower nutrient availability. Hemlock and yellow birch are absent to sparse on these ecosites.

**Vegetation:** Other overstory associates occur with scattered abundance (< 25% cover), including red maple, balsam fir and black spruce. Hybrid spruce trees are common in these stands. Regenerating balsam fir and red spruce are prominent in the sparsely-developed shrub layer, along with ericaceous species—primarily lambkill, velvet-leaf blueberry and low bush blueberry. Overall coverage and diversity of herbaceous plants is low with bracken the most prevalent species. Schreber’s moss, stair-step moss and bazzania are the dominant bryophytes, with small patches of reindeer lichens occurring on drier sites, which are often shallow to bedrock.

**Environmental Setting:** Dry to fresh, nutrient poor to medium soils of glacial origin support SH4. These soils are generally medium to coarse textured and often stony. Hybridization of red and black spruce is common



## Site & Soil Characteristics

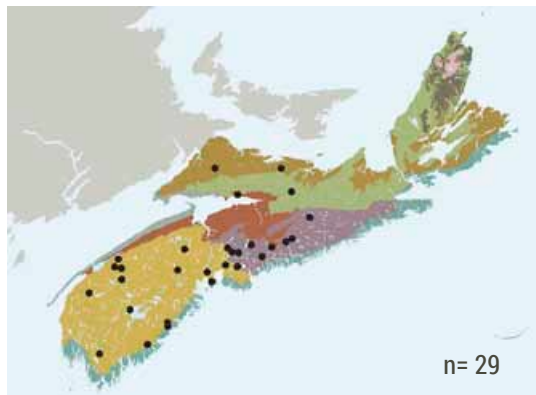
Slope Position:	Upper <sup>5</sup> Level <sup>2</sup> Crest <sup>1</sup> Lower <sup>1</sup> Middle <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>3</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>4</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Slightly <sup>6</sup> Moderately <sup>3</sup> Other <sup>1</sup>
Drainage:	Well <sup>5</sup> Rapid <sup>2</sup> Imperfect <sup>2</sup> Moderately Well <sup>1</sup>
Common Soil Types:	2, 15C, 3
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>4</sup> (> 45) <sup>3</sup> nd <sup>1</sup>
Forest Floor (cm):	(6–10) <sup>3</sup> (11–20) <sup>6</sup> (21–40) <sup>1</sup>
Humus Form:	Hemimor <sup>3</sup> Humi-Fibrimor <sup>2</sup> Humimor <sup>2</sup> nd <sup>3</sup>

where it occurs on soils transitional between edaphic and zonal ecosites. This VT is found throughout mainland Nova Scotia, and is considered uncommon on Cape Breton Island.

Madashack Lake, Yarmouth County



Characteristic Plants	SH4	
	Freq. (%)	Cover (%)
Red spruce	100	43
White pine	100	20
Red maple	79	6
Balsam fir	52	8
White birch	28	3
Black spruce	24	11
Hemlock	17	3
Large-tooth aspen	14	3
Yellow birch	14	2
<b>Tree Layer (Mean % Cover)</b>		<b>78</b>
Balsam fir	90	3
Red maple	86	0.4
Red spruce	79	3
Lambkill	66	4
White pine	59	0.2
Velvet-leaf blueberry	55	3
Wild raisin	55	0.1
Mountain holly	41	0.1
Huckleberry	34	0.6
Lowbush blueberry	31	0.5
Red oak	28	0.7
Witch-hazel	28	0.4
Serviceberry	28	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Bracken	72	4
Wild lily-of-the-valley	72	1
Bunchberry	59	1
Starflower	55	0.9
Bluebead lily	55	0.2
Painted trillium	55	0.1
Sarsaparilla	45	1
Ghost pipe	45	0.1
Goldthread	41	1
Cucumber root	34	0.1
Teaberry	31	0.6
Partridge-berry	28	1
Mayflower	28	0.1
Pink lady's-slipper	28	0.1
Creeping snowberry	21	0.1
Cow wheat	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>7</b>
Schreber's moss	100	29
Bazzania	97	14
Stair-step moss	76	5
Broom moss	69	1
Log moss	66	2
Wavy dicranum	62	3
Grey reindeer lichen	45	0.7
Pin cushion moss	31	0.2
Cup lichens	28	0.1
Ladies' tresses	24	0.9
Hair-cap moss	17	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>52</b>



**Successional Dynamics:** SH4 is a late-successional climatic climax VT dominated by red spruce and white pine. It can develop from several early-successional intolerant hardwood (e.g. white birch, aspen and/or red maple) VTs that follow stand-level disturbances. Mid-successional VTs may include red maple but will be primarily comprised of shade-tolerant softwood species such as balsam fir and red spruce as well as white pine (intermediate shade-tolerance). Early-successional stages can be bypassed if, at the time of disturbance, advanced softwood regeneration is retained—as could happen after a stand-level disturbance such as windthrow or harvesting. This VT is unlikely to shift to hemlock dominated VTs since hemlock prefers sites with better nutrient availability. Depending on disturbance history this VT can be even-aged, but it will develop an uneven-aged structure as it matures and will be maintained through gap replacement.

**Ecological Features:** This matrix forest typically occupies hundreds of hectares on mainland Nova Scotia and has many of the same ecological features as other red spruce dominated forest ecosystems. The longevity of red spruce and white pine supports old growth development. In old forests, white pine may develop as a super canopy often with hollow, large stemmed trees and dieback in the upper stem. This forest may provide cover for moose and deer, and habitat for fisher, American marten, flying squirrel and red squirrel. SH4 usually has a relatively open canopy structure, resulting in an extensive shrub layer characterized by significant advanced regeneration. This dense understory provides nesting and brood-rearing, habitat for many small bird species. Boreal chickadee, pine siskin and both the white-winged and red crossbills eat red spruce and white pine seeds. Creeping rattlesnake plantain is the only known rare plant.

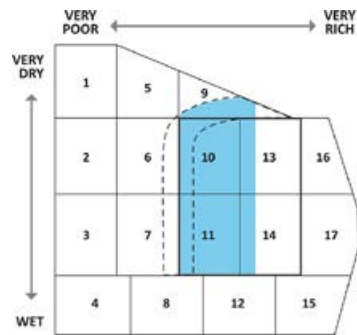


# SH5 Red spruce – Balsam fir / Schreber’s moss – Stair-step moss

*Picea rubens* – *Abies balsamea* /  
*Pleurozium schreberi* – *Hylocomium splendens*

**SH5a Sphagnum variant** *Sphagnum* spp.

**SH5b Balsam fir variant** *Abies balsamea*



**Concept:** This closed canopy Acadian forest is comprised of red spruce with varying levels of balsam fir. It is found on zonal sites throughout Nova Scotia. The SH5a variant describes those ecosites with somewhat moister soils, usually characterized by scattered patches of sphagnum moss and cinnamon fern. SH5b describes a variant where balsam fir is abundant (> 26%) to dominant in the overstory. The Acadian coastal VT, CA1 (Red spruce / Mountain ash / Foxberry / Bazzania) is similar to SH5 but occurs only along the Bay of Fundy and Gulf of Maine. Another VT, SH7 (White spruce – Red spruce / Blueberry / Schreber’s moss) has abundant red spruce but the presence of white spruce in the overstory distinguishes it from SH5.

**Vegetation:** Excluding the variant SH5b, balsam fir can be absent in the overstory. Red maple commonly occurs in the overstory but will be sparse if present. Other tree species with low cover include white pine, white birch and yellow birch. Hybrid (red/black) spruce can also be found where lower soil moisture and/or nutrient availability indicate soils transitional between azonal and zonal conditions. Both shrub and herb layers are sparsely developed due to the low levels of available light penetrating through from the closed canopy. However, regeneration of red spruce, balsam fir and red maple can be extensive. Common

## Site & Soil Characteristics

Slope Position:	Level <sup>3</sup> Upper <sup>3</sup> Lower <sup>2</sup> Middle <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>5</sup> Slightly <sup>2</sup> Strongly <sup>2</sup> Other <sup>1</sup>
Drainage:	Well <sup>4</sup> Moderately Well <sup>3</sup> Imperfect <sup>2</sup> Other <sup>1</sup>
Common Soil Types:	3, 6, 2L, 2, 3C, 3L, 16C, 16L, 5
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>4</sup> (> 45) <sup>2</sup> nd <sup>2</sup>
Forest Floor (cm):	(6–10) <sup>2</sup> (11–20) <sup>5</sup> (21–40) <sup>1</sup> Other <sup>2</sup>
Humus Form:	Hemimor <sup>3</sup> Humi-Fibrimor <sup>2</sup> Humimor <sup>2</sup> nd <sup>38</sup>

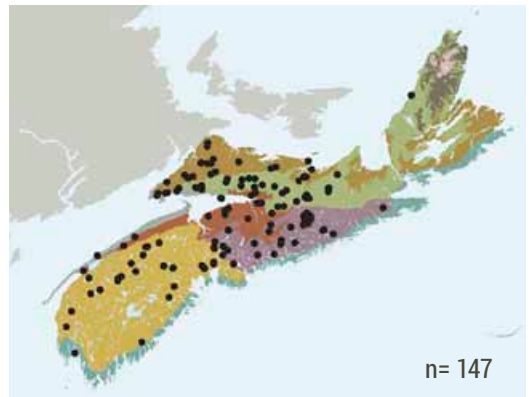
upland forest flora include wild lily-of-the-valley, gold-thread and bunchberry. A needle carpet is common under many stands, but coverage by Schreber’s moss, stair-step moss and bazzania can be extensive in some occurrences.

**Environmental Setting:** Fresh to moist, nutrient medium soils of glacial origin provide suitable substrate.



Big Indian Lake,  
Hants County

Characteristic Plants	SH5		SH5a		SH5b	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red spruce	100	68	100	62	100	39
Red maple	65	5	68	5	48	4
Balsam fir	45	7	64	6	100	30
White birch	32	3	27	2	24	6
Yellow birch	27	4	9	7	24	3
White pine	20	3	18	3	24	4
Black spruce	14	19	23	12	19	13
Hemlock	13	3	9	2	10	2
<b>Tree Layer (Mean % Cover)</b>	<b>81</b>		<b>74</b>		<b>77</b>	
Balsam fir	90	5	100	6	95	7
Red spruce	89	6	95	4	71	3
Red maple	78	0.4	77	0.8	76	0.3
Velvet-leaf blueberry	40	0.6	59	0.8	33	0.4
Lambkill	32	0.8	82	2	33	0.9
Wild raisin	32	0.2	45	0.4	29	0.1
Mountain holly	31	0.2	55	0.6	48	0.1
White pine	30	0.6	32	0.2	14	0.3
Yellow birch	27	0.4	14	1	29	0.9
Lowbush blueberry	23	0.7	27	0.4	14	0.1
Serviceberry	15	0.1	23	0.1	14	0.1
White birch	14	0.8	32	0.9	19	2
Mountain-ash	10	0.8	18	0.1	24	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>12</b>		<b>15</b>		<b>11</b>	
Wild lily-of-the-valley	63	0.3	64	0.2	76	0.5
Goldthread	51	1	82	2	81	3
Painted trillium	48	0.2	59	0.1	52	0.1
Starflower	45	0.2	50	0.3	43	0.2
Bunchberry	41	2	82	1	57	2
Bluebead lily	41	1	45	0.6	57	0.8
Bracken	34	5	59	1	33	1
Sarsaparilla	30	0.7	23	0.2	38	0.2
Evergreen wood fern	24	0.3	5	0.2	33	0.1
Wood-sorrel	22	0.5	18	0.4	38	0.8
Ghost pipe	20	0.1	5	0.1	19	0.1
Hay-scented fern	18	0.3	14	5	38	0.1
Teaberry	15	0.6	18	0.2	5	0.1
Creeping snowberry	15	0.5	59	0.8	19	0.3
Cinnamon fern	14	0.1	68	4	19	0.9
Twinflower	11	0.3	23	0.1	29	1
New York fern	9	0.7	23	2	14	4
Mountain wood fern	7	0.3	18	3	5	0.1
Three seeded sedge	1	0.1	27	0.2	10	1
<b>Herb Layer (Mean % Cover)</b>	<b>5</b>		<b>9</b>		<b>8</b>	
Schreber's moss	94	37	100	49	95	34
Bazzania	88	18	91	16	95	13
Stair-step moss	88	11	95	9	100	18
Broom moss	70	2	59	2	76	2
Log moss	68	2	59	3	67	1
Wavy dicranum	40	2	59	2	48	3
Grey reindeer lichen	35	0.4	36	0.2	14	0.8
Hair-cap moss	28	0.8	27	0.6	24	0.7
Pin cushion moss	20	0.1	14	0.1	5	0.1
Ladies' tresses	18	0.4	86	7	38	3
Cup lichens	14	0.1	23	0.1	5	0.1
Plume moss	13	0.7	18	0.6	33	0.6
Common green sphagnum	5	0.3	45	6	24	5
Pale fat-leaved sphagnum			27	1	10	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>65</b>		<b>86</b>		<b>70</b>	



Soils are generally medium to coarse textured, and often stony. This VT is found throughout mainland Nova Scotia and is uncommon on Cape Breton Island.

**Successional Dynamics:** SH5 is a predominantly even-aged, mid-successional VT dominated by red spruce. Usually SH5 develops from advanced regeneration, present at the time of stand-level disturbance. If advanced regeneration is not present (or has been destroyed), SH5 can also develop from early-successional VTs of the Intolerant Hardwood and Mixedwood Forest Groups. Red spruce can survive in the understory for decades before responding to canopy openings with rapid height and diameter growth. Due to red spruce's longevity, successive cohorts of balsam fir, a significantly shorter-lived species, will rise and fall throughout the progression to old growth conditions.

**Ecological Features:** Balsam fir and red spruce can occur over large areas forming matrix forests in many ecoregions. Good seed crops in red spruce start at age 35–45, providing a valuable food source for red and flying squirrels. Mature stages may provide habitat for marten, ruffed grouse and black-backed woodpecker. South facing slopes are often used for winter deer yards. Sapling stages are preferred cover and breeding habitat for snowshoe hare, and many other small mammal and bird species. Mature stages may form two or multi-cohort structure. This results from balsam fir cycling through the main canopy in short intervals, providing increased vertical structure, and promoting habitat complexity. Creeping rattlesnake plantain is the only plant species of conservation concern documented from this VT.

# SH6

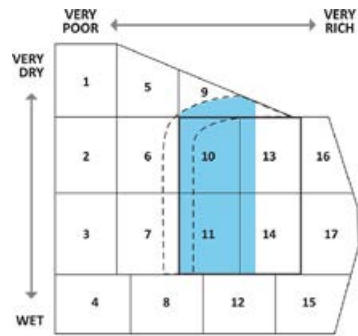
## White spruce – Balsam fir / Broom moss

*Picea glauca* – *Abies balsamea* / *Dicranum scoparium*

**Concept:** White spruce and balsam fir dominate this closed canopy Vegetation Type (VT) with only minor contributions by additional overstory associates. The VT is similar to other coniferous VTs on zonal sites, dominated by red spruce, but usually occurs in eastern Nova Scotia where this tree species is absent or uncommon. SH6 has a similar composition to old field forests such as OF4 (Balsam fir – White spruce / Evergreen wood fern – Wood aster) but the presence of an enriched 'A' soil horizon and smooth microtopography can be used to distinguish the VTs.

**Vegetation:** Red maple, white birch and yellow birch are scattered throughout this otherwise nearly pure softwood forest. A sparse shrub layer, primarily of red maple, balsam fir and yellow birch regeneration, is indicative of the next successional stage. The moderately-developed herb layer includes upland forest flora such as goldthread, bunchberry and twinflower. Bryophytes offer significant cover to the forest floor and include Schreber's moss, bazzania and stair-step moss.

South Merland, Guysborough County

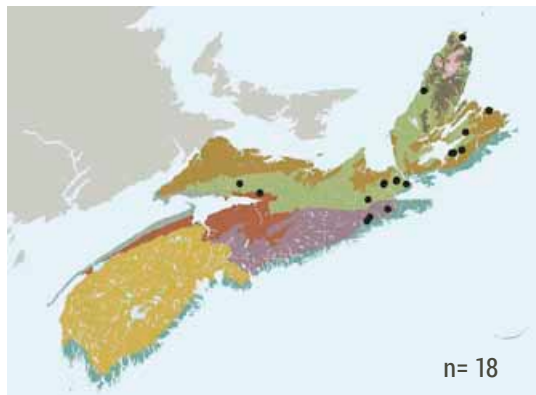


### Site & Soil Characteristics

Slope Position:	Upper <sup>4</sup> Lower <sup>3</sup> Level <sup>2</sup> Middle <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>4</sup> Slightly <sup>4</sup> Level <sup>1</sup> Strongly <sup>1</sup>
Drainage:	Moderately Well <sup>5</sup> Well <sup>3</sup> Imperfect <sup>2</sup>
Common Soil Types:	2, 3, 5, 6, 2L
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>4</sup> (> 45) <sup>1</sup> nd <sup>4</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>7</sup> (11–20) <sup>1</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>5</sup> Humimor <sup>3</sup> Humi-Fibrimor <sup>1</sup> nd <sup>1</sup>

**Environmental Setting:** SH6 is associated with fresh to fresh-moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured. Other VTs (such as SH5 and SH7) have similar moisture and nutrient requirements

Characteristic Plants	SH6	
	Freq. (%)	Cover (%)
Balsam fir	100	38
White spruce	100	34
Red maple	44	6
White birch	39	3
Yellow birch	33	6
Black spruce	22	4
White pine	17	1
Tamarack	11	8
Red spruce	11	3
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>
Red maple	83	0.7
Balsam fir	78	7
Yellow birch	56	0.4
Mountain-ash	44	0.5
Mountain holly	44	0.1
Wild raisin	44	0.1
White birch	33	0.9
Velvet-leaf blueberry	28	1
Fly-honeysuckle	22	0.1
Lambkill	22	0.1
Lowbush blueberry	17	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Goldthread	83	3
Starflower	78	1
Wild lily-of-the-valley	72	2
Bunchberry	67	3
Wood-sorrel	56	1
Twinflower	50	11
Evergreen wood fern	50	0.7
Ghost pipe	44	0.1
New York fern	28	2
Bluebead lily	28	2
Sarsaparilla	28	0.6
Mountain wood fern	28	0.5
Hay-scented fern	22	2
Bracken	22	0.4
Interrupted fern	22	0.3
Wood aster	22	0.1
Cinnamon fern	17	2
Creeping snowberry	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>18</b>
Schreber's moss	94	26
Stair-step moss	78	24
Bazzania	78	14
Broom moss	72	2
Log moss	44	1
Hair-cap moss	39	1
Plume moss	39	0.5
Common green sphagnum	33	7
Wavy dicranum	22	0.8
Ladies' tresses	22	0.1
Pin cushion moss	17	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>61</b>



but occur in somewhat warmer areas of the province, better suited to red spruce. This VT is most common on the eastern mainland and on Cape Breton Island.

**Successional Dynamics:** SH6 is a predominantly even-aged, mid-successional VT which follows stand-replacing disturbances. As these forests develop, several successional pathways are possible, each very dependent on disturbance severity. In stands of this VT, white spruce generally has greater longevity than trees of this species found on abandoned farmlands. Relative to white spruce, balsam fir has shorter longevity due to its susceptibility to tussock moth, spruce budworm and disease. In the absence of stand-level disturbance, SH6 may progress to mixedwood forests with yellow birch, red maple and white spruce with balsam fir as a minor canopy component.

**Ecological Features:** The longevity of white spruce in these large patch forest ecosystems is considerably longer than white spruce trees found on abandoned farmland. Mature forests may provide thermal and breeding cover for larger mammals, and foraging habitat for red and flying squirrels, finches, crossbills, kinglets, and a variety of other coniferous forest specialists. Sapling stages are preferred cover and breeding habitat for snowshoe hare, and many species of birds and other small mammals, as well as their predators. Large accumulations of coarse woody material, and small- to medium-diameter snags, originating from the shorter-lived balsam fir component, is common. Understory fir snags are favoured habitat for small cavity nesting and insectivorous songbirds. Plentiful coarse woody material provides increased vertical structure and habitat complexity. These forests may support abundant fruiting of mycorrhizal mushrooms, including chanterelles and boletes.

# SH7

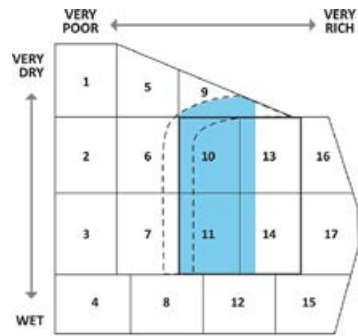
## White spruce – Red spruce / Blueberry / Schreber’s moss

*Picea glauca* – *Picea rubens* / *Vaccinium spp.* / *Pleurozium schreberi*

**Concept:** A closed canopy of white and red spruce characterizes this range-limited Vegetation Type (VT). It is similar to other coniferous VTs found on zonal sites with red spruce but is more strongly represented in upland areas of northern Nova Scotia. SH7 usually follows stand-replacing disturbance events such as fire, windthrow or harvesting.

**Vegetation:** Balsam fir is the primary associate in the overstory with scattered red maple and white birch creating canopy variation in this nearly pure softwood forest—their presence generally indicate a recent disturbance event. Hybrid (red/black) spruce can also be found on poorer sites. The shrub layer is sparsely developed and is primarily composed of regenerating softwoods, such as red spruce and balsam fir. Other shrubs include wild raisin and blueberry. The herb layer is also sparse, comprised of typical upland forest flora (e.g. wild lily-of-the-valley and starflower), but species richness is low. The bryophyte layer also has low species richness, but Schreber’s moss and stair-step moss coverage is high in some stands.

Blomidon, Kings County



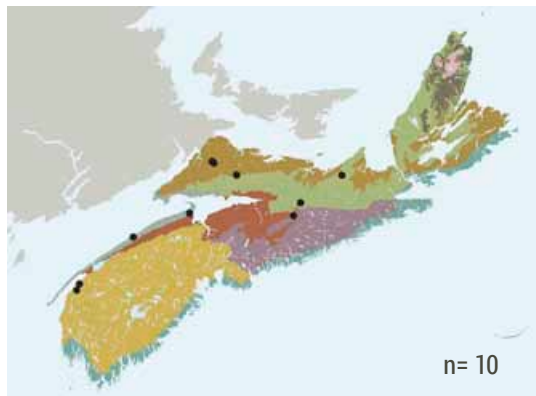
### Site & Soil Characteristics

Slope Position: Upper<sup>5</sup> Level<sup>2</sup> Lower<sup>2</sup> Crest<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>7</sup> (Moderately)<sup>2</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Strongly<sup>5</sup> Moderately<sup>4</sup> Slightly<sup>1</sup>  
 Drainage: Well<sup>6</sup> Imperfect<sup>3</sup> Moderately Well<sup>1</sup>

Common Soil Types: 2, 6, 15, 8, 9, 2L, 3L  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>4</sup> (> 45)<sup>1</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>6</sup> (11–20)<sup>3</sup>  
 Humus Form: Hummor<sup>3</sup> Hemimor<sup>2</sup> nd<sup>5</sup>

**Environmental Setting:** Fresh to fresh-moist, nutrient medium soils of glacial origin support SH7. These soils are generally medium to coarse textured and are sometimes shallow to bedrock. Other VTs such as SH 5 and SH 6 occur on similar ecosites but occur in areas with different climatic conditions.

Characteristic Plants	SH7	
	Freq. (%)	Cover (%)
Red spruce	100	39
White spruce	100	26
Balsam fir	80	8
Red maple	70	3
White birch	50	2
Yellow birch	20	9
Black spruce	10	7
Serviceberry	10	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>77</b>
Balsam fir	90	3
Red spruce	80	2
Red maple	80	0.2
Wild raisin	50	0.5
Mountain-ash	30	2
Beech	30	2
Lambkill	30	0.4
Lowbush blueberry	30	0.2
Yellow birch	30	0.1
Velvet-leaf blueberry	20	4
Striped maple	20	3
Mountain holly	20	0.1
Serviceberry	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Wild lily-of-the-valley	100	0.8
Starflower	80	0.2
Cinnamon fern	40	0.2
Evergreen wood fern	40	0.1
Painted trillium	40	0.1
Partridge-berry	40	0.1
Sarsaparilla	40	0.1
New York fern	30	14
Bluebead lily	30	1
Bunchberry	30	1
Bracken	30	0.9
Hay-scented fern	30	0.4
Interrupted fern	30	0.4
Wood aster	30	0.2
Goldthread	30	0.1
Pink lady's-slipper	30	0.1
Ground pine	20	0.1
Ghost pipe	20	0.1
Rose twisted stalk	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>7</b>
Schreber's moss	100	26
Stair-step moss	80	13
Hair-cap moss	80	0.8
Broom moss	80	0.6
Wavy dicranum	40	4
Bazzania	40	4
Log moss	40	1
Ladies' tresses	20	7
Pin cushion moss	20	0.8
Grey reindeer lichen	20	0.1
Shaggy moss	20	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>47</b>



This VT is most common in the Northumberland Lowlands and Cumberland Hills ecodistricts.

**Successional Dynamics:** SH7 is a predominantly even-aged, mid-successional VT that usually follows stand-replacing disturbances from fire, windthrow or harvesting. Possible early-successional VTs include those dominated by shade-intolerant hardwoods. In the absence of stand-level disturbance, white spruce and balsam fir will eventually succumb to disturbance agents (such as bark beetle, spruce budworm, tussock moth and disease) allowing red spruce and sometimes yellow birch to increase in dominance. However, white spruce trees, in this VT, have greater longevity than those found on abandoned farmland, and can therefore persist as a component of older stands with red spruce. White spruce co-occurring with red spruce, and lesser levels of balsam fir, are the distinguishing features of this softwood forest; it is a characteristic mid-successional component of northern Nova Scotia matrix softwood forests.

**Ecological Features:** This large patch forest ecosystem has a distribution limited to northern Nova Scotia. It has many of the same ecological features as SH5 and SH6. Mature forests may provide seasonal thermal and breeding cover for larger mammals, and feeding habitat for red squirrel and flying squirrels, finches, crossbills, kinglets and a variety of other coniferous forest associates. Sapling stages are preferred cover and breeding habitat for snowshoe hare, and many species of birds, and other small mammals and their predators. Mature stages may form two or multi-cohort structure which increases vertical stand structure and increased habitat complexity. This structure results from balsam fir cycling through the main canopy in short intervals. These forests often support abundant mycorrhizal mushrooms, including chanterelles and boletes.

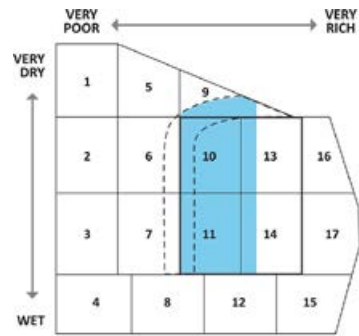
# SH8

## Balsam fir / Wood fern / Schreber's moss

*Abies balsamea* / *Dryopteris* spp. / *Pleurozium schreberi*

**Concept:** This closed canopy Vegetation Type (VT) is primarily composed of balsam fir and has minor amounts of other softwood and hardwood species. Due to balsam fir's short longevity, this VT is often supports significant levels of coarse wood material (CWM) and/or snags, as well as extensive balsam fir regeneration. Balsam fir / Wood fern / Schreber's moss usually follows stand-replacing disturbance events such as insect infestation, windthrow or harvesting.

**Vegetation:** Red maple, white birch and red spruce are overstory associates with scattered, larger, overstory remnants, from previous successional stages, including yellow birch, hemlock and/or white pine. Both shrub and herb layers are somewhat sparsely developed. Balsam fir regeneration can be extensive, with red maple usually present in lesser amounts. Other shrubs include mountain holly, wild raisin and mountain-ash. Typical herb species include evergreen wood fern, starflower, wild lily-of-the-valley, bunchberry, goldthread and wood-sorrel. The often extensive bryophyte layer is made up of Schreber's moss, stair-step moss, wavy dicranum, broom moss, log moss and bazzania.



### Site & Soil Characteristics

Slope Position: Lower<sup>3</sup> Upper<sup>3</sup> Level<sup>2</sup> Middle<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>3</sup>  
 (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Slightly<sup>6</sup> Moderately<sup>2</sup> Level<sup>1</sup> Other<sup>1</sup>  
 Drainage: Well<sup>4</sup> Imperfect<sup>3</sup> Moderately Well<sup>2</sup> Other<sup>1</sup>

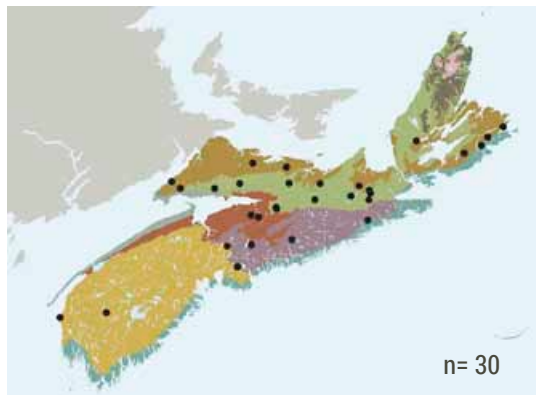
Common Soil Types: 2, 3, 3L, 6, 2L  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>3</sup> (> 45)<sup>2</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>4</sup> (11–20)<sup>3</sup> nd<sup>1</sup>  
 Humus Form: Hemimor<sup>4</sup> Humimor<sup>2</sup> Humi-Fibrimor<sup>1</sup> Other<sup>3</sup>

**Environmental Setting:** SH8 is mainly associated with fresh to moist, nutrient poor to medium soils of glacial origin. These soils are generally medium to

Buckshot Lake, Digby County



Characteristic Plants	SH8	
	Freq. (%)	Cover (%)
Balsam fir	100	59
Red maple	57	6
White birch	50	5
Red spruce	40	8
Yellow birch	40	4
Black spruce	30	5
White spruce	17	5
Hemlock	10	12
White pine	10	2
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Balsam fir	83	4
Red maple	83	1
Mountain holly	43	0.3
Yellow birch	30	0.6
Wild raisin	30	0.4
Mountain-ash	27	0.7
White birch	27	0.7
Red spruce	23	1
Velvet-leaf blueberry	23	1
Lambkill	20	4
Fly-honeysuckle	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Starflower	67	0.3
Bunchberry	57	3
Evergreen wood fern	57	1
Wild lily-of-the-valley	57	0.6
Goldthread	47	3
Ghost pipe	40	0.1
Wood-sorrel	37	2
Sarsaparilla	33	0.3
Pink lady's-slipper	30	0.1
Painted trillium	27	0.1
Bracken	23	7
Bluebead lily	23	0.5
Twinflower	23	0.4
Hay-scented fern	20	0.4
Spinulose wood fern	20	0.2
Cinnamon fern	17	0.3
Wood aster	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>8</b>
Schreber's moss	93	28
Stair-step moss	90	20
Bazzania	90	9
Broom moss	80	3
Log moss	57	2
Hair-cap moss	37	0.7
Wavy dicranum	30	3
Ladies' tresses	23	1
Plume moss	23	0.4
Grey reindeer lichen	17	0.1
Common green sphagnum	13	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>58</b>



coarse textured. This VT is found throughout mainland Nova Scotia and on the Cape Breton lowland, and is not associated with Atlantic coastal areas or the Cape Breton highland plateau.

**Successional Dynamics:** SH8 is a predominantly even-aged, early- to mid-successional VT dominated by balsam fir. This VT usually follows stand-replacing disturbances from insect infestation, windthrow or harvesting. Balsam fir is very shade-tolerant and can maintain a significant presence throughout successional development, especially in eastern Nova Scotia. Spruce budworm and tussock moth epidemics may cause a shift to an earlier successional stage dominated by white birch, red maple and aspen. SH8 is likely to succeed to later successional stages with red spruce, white spruce, hemlock and yellow birch.

**Ecological Features:** Balsam fir acts as a nurse species in this matrix and large-patch ecosystem, promoting regeneration of long-lived, intermediate to shade-tolerant tree species. The short life-span of balsam fir contributes substantial coarse woody material (CWM) to this ecosystem, often in pulses following insect outbreaks, disease or wind storms. Balsam fir CWM and snags are limited to small and medium-diameter stems, reducing the likelihood of nesting or denning opportunities for larger raptors or mammals. However, the frequency and abundance of balsam fir CWM provides ample microhabitats for many smaller species of fauna and flora, and their predators. The frequent disturbances, typical of this VT, also contribute to nutrient recycling. Mature forests may provide thermal and breeding habitat for numerous mammals, bird species, and lichens (including abundant old man's beard, an important food and nest material).



# SP

## Spruce Pine Forest Group

### Spruce Pine (SP) Key

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1a. Pines scattered to dominant	... 2
1b. Pines absent or sparse	... 10

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2a. Jack pine and black spruce dominant	... 3
2b. Not as above	... 4

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3a. Jack pine abundant to dominant	... SP1
3b. Jack pine sparse to scattered	... SP1a

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4a. Red pine and black spruce dominant	... 5
4b. Not as above	... 6

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5a. Red pine abundant to dominant	... SP2
5b. Red pine sparse to scattered	... SP2a

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6a. Red pine and white pine dominant	... SP3
6b. White pine or spruce dominant	... 7

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7a. Red spruce is the most common spruce	... SH4
7b. Not as above	... 8

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8a. Huckleberry is abundant to dominant	... SP4b
8b. Huckleberry is absent to scattered	... 9

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9a. White pine > Black spruce	... SP4
9b. White pine < Black spruce	... SP4a

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10a. Hemlock scattered to abundant with Black spruce	... SP8
10b. Not as above	... 11

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11a. Black Spruce and/or Balsam fir dominant	... 12
11b. Not as above	... 14

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12a. Black spruce > Balsam fir	... 13
12b. Balsam fir > Black spruce	... SP6

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13a. Understory open – mostly upland mosses	... SP5
13b. Not as above, herbs and shrubs conspicuous	... SP7

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14a. Black spruce and white spruce dominant	... SP10
14b. Tamarack abundant to dominant	... SP9

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COVER CLASSES: Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



## Concept

These nutrient poor forest ecosystems often occur as small to large patches and commonly form matrix forests in several ecodistricts. They are generally dominated by black spruce and pines, with an understory of plants tolerant of nutrient poor soils. The shrub layer is usually dominated by ericaceous species, such as lambkill, blueberry and huckleberry, along with black spruce regeneration (often through layering). Herbaceous cover is largely dependent on the amount of light reaching the forest floor, but bracken and teaberry are almost always present, sometimes only sparsely. Other herbs indicative of low fertility soils include mayflower, Prince's pine, round-leaved pyrola and cow-wheat. Bryophyte/lichen coverage is usually moderate to extensive. Reindeer lichens can be abundant on drier sites, especially in canopy openings. Overall species richness levels are among the lowest of any group in the classification. Spruce Pine units also have the lowest herbaceous species richness among the Acadian Forest Macrogroup.

Spruce Pine forests are found on a range of slope positions and are often associated with shallow soils on bedrock ridges and outcrops. Soils are mainly derived from coarse textured glacial till or glaciofluvial deposits. Soils and sites are often very to excessively stony, especially when associated with granitic glacial till deposits. Moisture levels

vary widely but soil moisture deficits are also common on many sites; fertility is consistently low.

SP Vegetation Types cover a range of successional stages, but all can lead to an edaphic climax dominated by black spruce. White pine often forms a super-canopy component that is prone to lightning strikes, facilitating the occurrence of fire. Persistent super-canopy trees provide long-term nesting sites for bald eagle and other raptors and flying squirrels. Relatively frequent natural disturbances include fire and windthrow. Historic burn intensities have varied greatly, ranging from severe crown to low intensity ground fires, each strongly shaping canopy and understory structure. Fire-scarred pine residuals are common. As the interval between stand-level disturbances increases, levels of black spruce and/or white pine become more prominent. In the absence of fire, ericaceous shrubs, especially lambkill, contribute to the development of thick duff layers with allelopathic properties (chemical interference with growth and germination), and dense understory conditions, both of which limit black spruce regeneration. When fire is suppressed, levels of red and jack pine may diminish over time. The acidity of the forest floor (due to the abundance of pine needles and ericaceous vegetation) reduces soil fauna, plant, vertebrate diversity and abundance, and overall site productivity.

# SP1

## Jack pine / Bracken – Teaberry

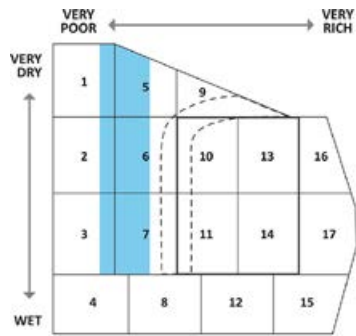
*Pinus banksiana* / *Pteridium aquilinum* – *Gaultheria procumbens*

### SP1a Black spruce variant *Picea mariana*

**Concept:** This closed canopy Vegetation Type (VT) supports abundant jack pine, lesser but frequent black spruce, and a small suite of shade-intolerant understory associates. The SP1a variant describes occurrences dominated by black spruce, with lesser jack pine. This variant typically occurs as a later successional stage as levels of jack pine diminish with stand age; in some cases it reflects lower levels of jack pine at the time of stand establishment. SP1 (Jack pine / Bracken – Teaberry) usually follows stand-replacing disturbance events such as fire or intensive timber harvesting.

**Vegetation:** Jack pine is the dominant overstory tree, with lesser amounts of black spruce and shade-intolerant hardwood tree species. The shrub layer may be dense and is characterized by black spruce regeneration, from layering, and ericaceous species such as lambkill, lowbush blueberry and rhodora. *Rhodora* is particularly indicative of low site fertility. Herb layer abundance and species richness is low, typically composed of bracken and teaberry. Schreber's moss dominates the bryophyte layer, with patches of reindeer lichens in more open areas.

**Environmental Setting:** SP1 occurs on dry, nutrient very poor to poor soils associated with glaciofluvial deposits, or shallow, gravelly and/or coarse textured, glacial tills. Most occurrences of this VT are found in the Cumberland County portion of the Northumberland Lowlands ecodestrict. The black spruce variant can be found scattered throughout the Eastern and



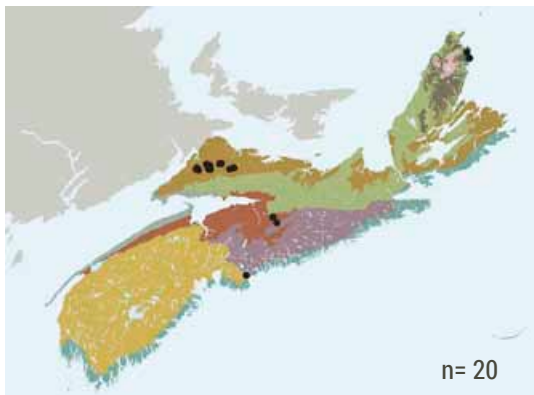
#### Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Level <sup>3</sup> Crest <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>3</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Slightly <sup>4</sup> Moderately <sup>4</sup> Level <sup>1</sup> Other <sup>1</sup>
Drainage:	Well <sup>3</sup> Moderately Well <sup>3</sup> Rapid <sup>2</sup> Imperfect <sup>2</sup>
Common Soil Types:	1, 2, 2C, 3C
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>2</sup> (> 45) <sup>5</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>5</sup> (11–20) <sup>3</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>6</sup> Humimor <sup>2</sup> nd <sup>2</sup>



Chase Lake,  
Cumberland County

Characteristic Plants	SP1		SP1a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Jack pine	100	42	100	12
Black spruce	79	14	100	44
Red maple	36	2	33	3
Red pine	29	2	50	1
White pine	14	9	33	7
White birch	14	0.5	17	0.1
<b>Tree Layer (Mean % Cover)</b>	<b>57</b>		<b>60</b>	
Lambkill	100	31	100	12
Black spruce	100	7	100	13
Wild raisin	86	0.9	67	0.9
Lowbush blueberry	79	7	100	9
Red maple	79	2	83	1
Mountain holly	64	0.7	67	1
Velvet-leaf blueberry	43	15	17	0.5
Rhodora	36	27	50	10
Huckleberry	36	15		
Balsam fir	36	0.6	17	0.1
Gray birch	36	0.2		
White pine	29	0.2	50	0.2
Serviceberry	21	0.3	33	0.3
White birch	14	0.5	33	0.1
Black chokeberry	7	0.1	17	0.1
Labrador tea			50	0.8
<b>Shrub Layer (Mean % Cover)</b>	<b>69</b>		<b>42</b>	
Teaberry	93	8	83	3
Bracken	79	23	50	22
Bunchberry	57	3	50	0.8
Mayflower	57	0.1	50	0.5
Pink lady's-slipper	21	0.5	67	0.1
Goldthread	21	0.1		
Starflower	14	0.2	17	2
Painted trillium	14	0.1	17	0.3
Creeping snowberry	7	0.5	17	2
Ghost pipe	7	0.1	17	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>28</b>		<b>15</b>	
Schreber's moss	100	48	100	77
Wavy dicranum	79	2	100	0.6
Grey reindeer lichen	71	2	50	2
Plume moss	36	0.2		
Cup lichens	36	0.1	33	0.1
Broom moss	29	1	17	0.5
Stair-step moss	29	0.6	67	3
Star-tipped reindeer lichen	21	12		
Hair-cap moss	21	1	83	0.4
Dicranums	7	0.1	33	0.8
Log moss	14	0.1	33	0.5
Naugehyde liverwort	14	1	33	2
Ladies' tresses	14	0.1	50	6
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>54</b>		<b>91</b>	



Atlantic Coastal ecoregions and is often interspersed with OW1 (Jack pine / Huckleberry – Black crowberry) on hummocky topography.

**Successional Dynamics:** Dry, nutrient poor soils and stand-replacing disturbances strongly shape both the canopy structure and early-successional patterns of SP1. Historically, SP1 stands originated from high intensity fires that initiated even-aged stands dominated by jack pine. Intensive harvesting with sufficient forest floor disturbance (duff and ericaceous shrub reduction) can initiate regeneration similar to stand-replacing wildfires, now less common due to fire suppression. The presence of jack pine decreases between disturbance events as it is replaced by black spruce—a species that has both greater longevity and the flexibility to regenerate either by seed or vegetative layering. As the potential effects of fire are reduced through suppression, white pine and black spruce dominance will increase.

**Ecological Features:** Jack pine is a short-lived, shade-intolerant, largely fire-dependent species. These features of the tree's life history means that fire suppression practices have, and will likely continue to, reduce the abundance and frequency of this small- to large-patch forest ecosystem across the provincial landscape. Fire scars on larger residual pine are often found scattered through SP1 stands. Jack pine retains most of its seed in tightly closed cones that open to release large seed crops, after they are heated by fire. Lesser amounts of seed can also be released when cones are on branches near the forest floor and during the heat of summer (especially in newly harvested areas or on sites with thin droughty soils).

# SP2 Red pine / Blueberry / Bracken

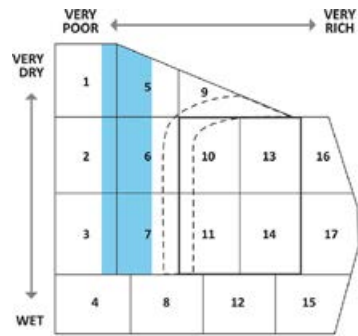
*Pinus resinosa* / *Vaccinium* spp. / *Pteridium aquilinum*

## SP2a Black spruce variant *Picea mariana*

**Concept:** This early- to mid-successional Vegetation Type (VT) has significant levels of red pine in the overstory and black spruce in one or more canopy positions. Stands dominated by black spruce, with lesser red pine, are defined by the SP2a variant. These variant stands either occur at a later successional stage, or are characterized by less red pine at the time of stand establishment. SP2 is similar to SP3 (Red Pine – White pine / Bracken – Mayflower), but is distinguished by a nearly homogeneous overstory of red pine. SP2 usually follows stand-replacing disturbance events such as fire or intensive harvesting practices.

**Vegetation:** Red pine is typically the dominant overstory tree, although levels of black spruce can also be significant. The shrub layer consists mainly of ericaceous species such as lambkill, velvet-leaf blueberry and lowbush blueberry, along with wild raisin. Black spruce and red maple regeneration can also be

Aldershot, Kings County



### Site & Soil Characteristics

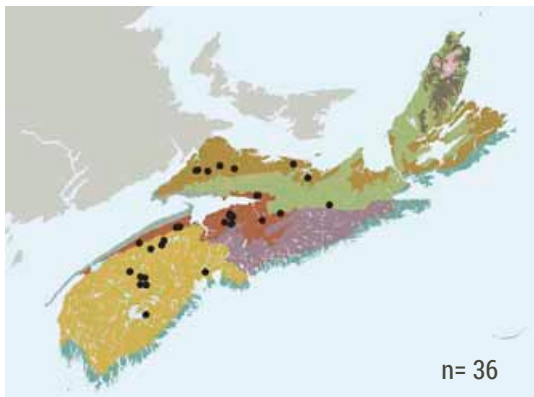
Slope Position: Upper<sup>4</sup> Level<sup>3</sup> Middle<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>7</sup> (Moderately)<sup>2</sup> (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Slightly<sup>6</sup> Moderately<sup>2</sup> Level<sup>1</sup> Strongly<sup>1</sup>  
 Drainage: Well<sup>4</sup> Imperfect<sup>2</sup> Moderately Well<sup>2</sup> Rapid<sup>2</sup>

Common Soil Types: 1, 2, 6, 2C  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>1</sup> (> 45)<sup>4</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>5</sup> (11–20)<sup>4</sup>  
 Humus Form: Hemimor<sup>5</sup> Humi-Fibrimor<sup>1</sup> Humimor<sup>1</sup> Other<sup>3</sup>

extensive. Herb layer diversity is low, typically dominated by bracken and teaberry. Abundant Schreber’s moss characterizes the bryophyte layer, and an extensive needle carpet can also be found in dense stands.



Characteristic Plants	SP2		SP2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Red pine	100	55	100	13
Black spruce	74	15	100	40
White pine	56	4	56	4
Red maple	30	2	33	3
Large-tooth aspen	15	3	11	3
Jack pine	11	4	11	3
White birch	11	0.1	11	7
Balsam fir	7	7	33	6
Red spruce	4	5	22	9
Tamarack	4	0.1	22	3
Hemlock	4	0.1	11	15
White spruce	4	0.1	11	3
<b>Tree Layer (Mean % Cover)</b>	<b>71</b>		<b>65</b>	
Black spruce	89	10	100	5
Red maple	89	2	89	2
Lambkill	85	17	100	21
Velvet-leaf blueberry	78	7	78	13
Lowbush blueberry	70	5	67	6
Wild raisin	67	1	89	2
Serviceberry	52	0.4	44	0.1
White pine	52	0.1	44	0.1
Mountain holly	48	1	11	6
Rhodora	30	4	33	3
Balsam fir	30	2	78	2
Huckleberry	26	2	33	2
Red oak	26	0.1	22	0.1
Gray birch	15	0.3	33	0.7
<b>Shrub Layer (Mean % Cover)</b>	<b>39</b>		<b>51</b>	
Bracken	89	29	100	26
Teaberry	70	3	67	0.3
Bunchberry	63	9	100	4
Mayflower	56	0.9	56	1
Wild lily-of-the-valley	33	2	56	0.3
Pink lady's-slipper	30	0.1	33	0.1
Starflower	26	0.1	56	0.1
Cow wheat	19	0.2	22	0.1
False violet	15	0.1	33	0.2
Painted trillium	15	0.1	33	0.1
Partridge-berry	15	0.1	33	0.1
Creeping snowberry	11	0.2	22	0.8
Goldthread	4	0.1	44	0.6
Interrupted fern			22	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>35</b>		<b>32</b>	
Schreber's moss	93	41	100	69
Wavy dicranum	81	4	100	2
Grey reindeer lichen	30	2	33	0.4
Bazzania	26	0.9	33	0.4
Stair-step moss	22	1	67	3
Ladies' tresses	22	0.9	44	3
Broom moss	19	0.1	33	0.3
Plume moss	7	0.1	33	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>43</b>		<b>76</b>	



**Environmental Setting:** SP2 occurs on dry to moist, nutrient very poor to poor soils. Drier sites are generally associated with glaciofluvial deposits, or with shallow, gravelly and/or coarse textured glacial tills, found in the Western ecoregion. Moist sites are mainly associated with finer textured soils (e.g. sandy clay loam) found in the Central Lowlands and Northumberland Lowlands ecodistricts. SP2 may be interspersed with OW3 (Red pine – White pine / Broom crowberry / Grey reindeer lichen) in some areas.

**Successional Dynamics:** Dry, nutrient poor soils and stand-replacing disturbances strongly shape both the canopy structure and early- to mid-successional patterns of SP2. Historically, most SP2 stands originated from residual trees that survived higher intensity fires. Fire scars can often be found on older trees in current stands. Occasional, low intensity fires could also maintain red pine presence by eliminating or reducing undergrowth competition. SP2 stands are predominantly even-aged until red pine diminishes with senescence, and is gradually replaced by black spruce, balsam fir, red oak and/or white pine. Dominance of these latter tree species increases over time, especially as the potential impacts of fire are suppressed.

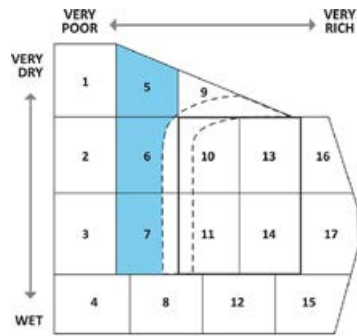
**Ecological Features:** Red pine is a shade-intolerant tree species and usually requires fire to form stands, which occur as small to large patches on the landscape. Fire scars on residual pine can lead to the formation of hollow trunks, thereby creating cavity nesting and denning opportunities for forest dwelling vertebrates. Seeds of red pine provide food for pine siskins, nuthatches and chickadees. Saffron milkcap is a well-known edible mushroom that forms a mycorrhizal relationship with red pine. Red pine stands are relatively uncommon in Nova Scotia, and are threatened by the province's long history, and on-going practice, of wildfire suppression.

# SP3 Red Pine – White pine / Bracken – Mayflower

*Pinus resinosa – Pinus strobus /  
Pteridium aquilinum – Epigaea repens*

**Concept:** This closed or open canopy Vegetation Type (VT) has an overstory dominated by both red and white pine. Lower layers of woody shrubs and herbs are generally sparse (< 30% cover) and contain few species. Red Pine – White pine / Bracken – Mayflower usually follows stand-replacing disturbance events such as fire or timber harvesting.

**Vegetation:** Red and white pine are the dominant overstory trees, usually co-occurring in similar amounts. Black spruce is the third most common canopy species, accompanied by the occasional presence of red maple, large-tooth aspen and red oak. The shrub layer consists mainly of ericaceous species such as lambkill, velvet-leaf blueberry and lowbush blueberry, along with wild



## Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Crest <sup>3</sup> Level <sup>1</sup> Middle <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>3</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>4</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>6</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>2</sup> nd <sup>1</sup>
Microtopography:	Slightly <sup>3</sup> Level <sup>3</sup> Moderately <sup>2</sup> nd <sup>2</sup>
Drainage:	Well <sup>5</sup> Rapid <sup>3</sup> Moderately Well <sup>1</sup> nd <sup>1</sup>
Common Soil Types:	2, 1
Rooting Depth (cm):	(<30) <sup>1</sup> (30–45) <sup>1</sup> (> 45) <sup>8</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>4</sup> (11–20) <sup>2</sup> nd <sup>3</sup>
Humus Form:	Humi-Fibrimor <sup>3</sup> Hemimor <sup>2</sup> Humimor <sup>1</sup> nd <sup>4</sup>



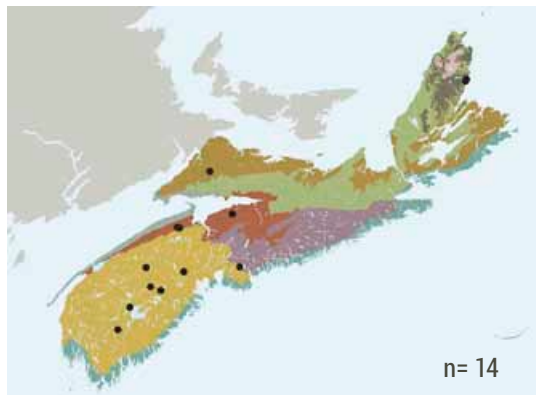
raisin. Black spruce and balsam fir regeneration can also be prominent in some stands. Herb layer diversity is relatively low, characterized by species such as pink lady's slipper, mayflower, starflower, bunchberry and sarsaparilla. Bryophyte cover is usually low. In dense stands, the forest floor may also be dominated by a needle carpet.

**Environmental Setting:** SP3 mainly occurs on dry to fresh, nutrient very poor to poor soils. This VT is found throughout mainland Nova Scotia, especially in the Western ecoregion, and particularly in lowland ecodistricts along the Minas Basin, Annapolis Valley and Northumberland Lowlands.

**Successional Dynamics:** Dry, nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and early- to mid-successional patterns. Historically, SP3 stands originated from fire disturbance creating mainly

Tuskapeake Brook near Butler Bog,  
Annapolis County

Characteristic Plants	SP3	
	Freq. (%)	Cover (%)
Red pine	100	31
White pine	100	26
Black spruce	71	8
Red maple	43	5
Large-tooth aspen	36	6
Red oak	29	3
White birch	21	6
Gray birch	14	1
<b>Tree Layer (Mean % Cover)</b>		<b>70</b>
Red maple	100	2
White pine	86	1
Black spruce	79	6
Lambkill	79	3
Velvet-leaf blueberry	71	4
Balsam fir	71	3
Lowbush blueberry	43	7
Wild raisin	43	1
Red oak	43	1
Mountain holly	43	0.3
Huckleberry	36	21
Serviceberry	36	0.1
White birch	36	0.1
Red pine	21	1
Striped maple	21	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>30</b>
Bracken	79	15
Teaberry	71	5
Starflower	71	1
Bunchberry	57	9
Wild lily-of-the-valley	50	4
Sarsaparilla	50	2
Mayflower	50	0.7
Pink lady's-slipper	43	0.2
Twinflower	29	3
Partridge-berry	29	0.3
Foxberry	29	0.1
Ghost pipe	29	0.1
Rice grass	21	0.5
Creeping snowberry	14	1
Cow wheat	14	0.1
Painted trillium	14	0.1
Round-leaved pyrola	14	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>26</b>
Schreber's moss	86	15
Wavy dicranum	57	1
Broom moss	50	0.5
Grey reindeer lichen	43	9
Bazzania	36	0.1
Log moss	29	6
Pin cushion moss	29	0.1
Hair-cap moss	21	0.7
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>23</b>



even-aged stands. In stands where fire has been reduced or eliminated through suppression efforts, white pine and black spruce will increase in dominance, possibly shifting the VT to SP4 (White pine / Blueberry / Bracken) over time, or directly to SP5 (Black spruce / Feathermoss), the edaphic climax for this successional pathway.

**Ecological Features:** Red pine is a shade-intolerant, fire-adapted tree species whose persistence, in this large patch ecosystem, is promoted by fire. White pine is a long-lived species of the Acadian Forest and, as one of the region's largest trees, may provide nesting cavities for birds, such as owls and woodpeckers, and, in lower openings, denning opportunities for mammals such as fisher and porcupine. Fire scars on residual pine are often found scattered through SP3 stands. White pine trees, in particular, often endure through multiple disturbance events, providing important contributions to vertical stand structure, and acting as a legacy seed source. Seeds of red pine may provide food for pine siskins, nuthatches and chickadees. Saffron milkcap, is a well-known edible mushroom that forms a mycorrhizal relationship with red pine.

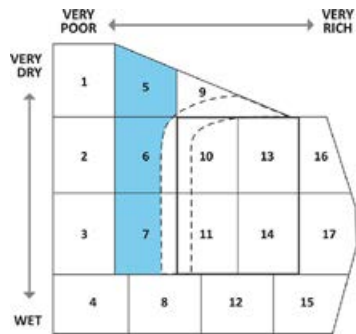


# SP4 White pine / Blueberry / Bracken

*Pinus strobus* / *Vaccinium spp.* / *Pteridium aquilinum*

**SP4a Black spruce variant** *Picea mariana*

**SP4b Huckleberry variant** *Gaylussacia baccata*



**Concept:** This closed canopy Vegetation Type (VT) has abundant levels of white pine, lesser but frequent black spruce and a small suite of shade-intolerant understory associates. In many stands, large diameter residual white pine persist after previous disturbance or harvest events. Variant SP4a describes a condition where black spruce is dominant in the overstory, indicating either a transitioning to a later successional stage or a recent response to a minor disturbance. Another variant, SP4b, typically has a white pine super canopy over admixtures of black spruce, red maple, white birch and/or red oak. These latter stands occur on sites of lower fertility, with conspicuously high levels of surface stones and boulders, and with a dense huckleberry understory. SP4 usually follows stand-replacing disturbance events such as fire or harvesting.

**Vegetation:** White pine is the dominant overstory tree (often in a super-canopy position), along with frequent black spruce and hybrid (red/black) spruce. Balsam fir, if present, is limited to the understory and is often damaged by balsam woolly adelgid (especially in western Nova Scotia). The shrub layer includes black spruce and balsam fir regeneration with moderate levels of ericaceous and other shrub species. Huckleberry responds well to light and heavier coverage occurs in stands with a more open canopy. Herb layer diversity is relatively low, characterized by species such as bracken, mayflower, teaberry and pink lady's slipper. Bryophyte cover is often extensive and includes Schreber's moss, broom moss and wavy dicranum.

**Environmental Setting:** SP4 occurs on dry to fresh-moist nutrient poor soils. White pine's deep rooting capability allows it to access moisture on sites where water deficits

## Site & Soil Characteristics

Slope Position: Level<sup>3</sup> Middle<sup>2</sup> Upper<sup>2</sup> Crest<sup>1</sup> Lower<sup>1</sup> nd<sup>1</sup>  
 Surface Stoniness: (Non - Slightly)<sup>5</sup> (Moderately)<sup>2</sup> (Very - Excessively)<sup>3</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (other)<sup>2</sup>  
 Microtopography: Slightly<sup>5</sup> Level<sup>2</sup> Moderately<sup>2</sup> Other<sup>1</sup>  
 Drainage: Well<sup>4</sup> Imperfect<sup>2</sup> Moderately Well<sup>2</sup> Other<sup>2</sup>

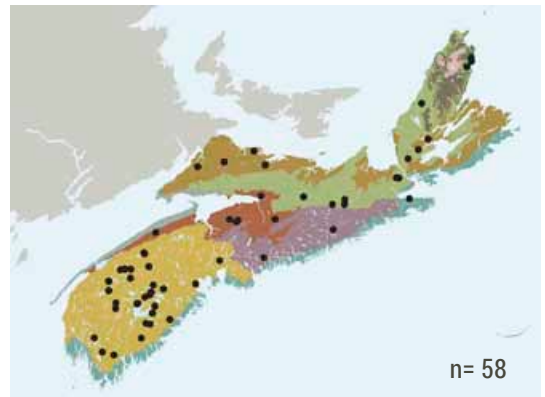
Common Soil Types: 2, 1, 3, 6, 2C, 2L, 5, 3C, 15L  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30-45)<sup>3</sup> (> 45)<sup>2</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0-5)<sup>1</sup> (6-10)<sup>4</sup> (11-20)<sup>4</sup> (21-40)<sup>1</sup>  
 Humus Form: Hemimor<sup>4</sup> Humi-Fibrimor<sup>2</sup> Humimor<sup>2</sup> Other<sup>2</sup>

are common during the growing season. This VT is usually associated with granitic tills in western Nova Scotia, but can be found scattered throughout the province wherever similar soil types occur. In north central Nova Scotia, SP4 can also be found on finer textured soils. The huckleberry variant SP4b is common throughout the Western ecoregion (700) and on the Eastern Granite Uplands ecodistrict (420).



Northeast Lake, Queens County

Characteristic Plants	SP4		SP4a		SP4b	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
White pine	100	58	100	14	100	40
Red maple	75	8	38	3	83	10
Black spruce	60	10	100	36	75	12
Red spruce	35	11	4	13		
Balsam fir	35	10	62	15	33	6
Red oak	30	5	8	3	33	4
White birch	25	6	23	0.5	50	4
Red pine	15	6	15	10	50	5
Large-tooth aspen	10	2			25	3
White spruce	5	3	12	7		
Gray birch	5	0.1	12	3		
Tamarack			19	2		
<b>Tree Layer (Mean % Cover)</b>		<b>81</b>		<b>65</b>		<b>66</b>
Red maple	85	4	73	2	92	3
Balsam fir	80	8	73	4	67	5
Lambkill	80	2	88	7	92	12
Black spruce	70	7	73	9	92	5
White pine	70	2	58	0.1	92	1
Velvet-leaf blueberry	65	6	69	6	58	10
Serviceberry	60	0.3	38	0.5	42	0.3
Wild raisin	55	0.4	65	0.4	58	0.7
Mountain holly	50	0.1	58	1	42	0.6
Lowbush blueberry	45	4	35	3	75	7
Red oak	40	0.7	19	0.1	67	5
Huckleberry	35	0.6	12	1	100	36
Red spruce	30	3	4	0.1		
Witch-hazel	20	0.6	4	0.2	58	3
White birch			23	0.7	17	0.1
Bayberry					33	2
Gray birch	5	0.2			25	0.7
Inkberry					17	2
<b>Shrub Layer (Mean % Cover)</b>		<b>25</b>		<b>23</b>		<b>77</b>
Bracken	90	11	81	17	100	12
Wild lily-of-the-valley	85	3	50	0.2	33	1
Bunchberry	80	6	77	6	75	12
Starflower	80	0.8	54	0.2	83	1
Sarsaparilla	65	2	31	0.6	83	1
Pink lady's-slipper	55	0.1	50	0.1	67	0.1
Twinflower	50	3	19	0.4	17	0.1
Bluebead lily	50	0.6	35	0.8	17	0.1
Teaberry	45	9	38	0.6	75	5
Partridge-berry	45	1	23	0.1	33	0.5
Mayflower	45	0.3	65	0.6	67	1
Ghost pipe	45	0.1	4	0.1	67	0.1
Goldthread	35	2	31	4		
Painted trillium	35	0.1	23	0.1	17	0.1
Cucumber root	30	0.2			33	0.1
Creeping snowberry	25	0.2	23	2	17	1
<b>Herb Layer (Mean % Cover)</b>		<b>27</b>		<b>21</b>		<b>29</b>
Schreber's moss	100	26	100	56	83	24
Bazzania	70	2	46	8	58	0.9
Wavy dicranum	65	2	73	6	75	4
Broom moss	60	0.9	31	2	50	0.8
Log moss	50	1	27	2	58	2
Stair-step moss	35	4	69	10	42	2
Grey reindeer lichen	20	0.2	35	3	17	2
Ladies' tresses	10	0.2	50	2	17	3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>32</b>		<b>74</b>		<b>28</b>



**Successional Dynamics:** Relatively dry, nutrient poor soils and stand-replacing disturbances strongly shape both VT canopy structure and mid-successional patterns. Historically, SP4 stands originated from fire disturbance. They are typically even-aged, although scattered white pine can be significantly older due to this species' greater longevity and resistance to windthrow and fire. Earlier successional stages may include a jack pine (SP1) or red pine (SP2) canopy component. Between stand-level disturbances, senescence and gap disturbances create opportunities for balsam fir, black spruce, red maple, red oak and/or white birch. This VT can persist for a relatively long time if disturbances are frequent, but stands may eventually succeed to SP5 (Black spruce / Lambkill / Bracken), the edaphic climax for this successional pathway. White pine has intermediate shade tolerance and may form an understory of young cohorts in early-successional red maple, white birch and aspen forests.

**Ecological Features:** White pine is a long-lived species (200+ years) and may provide habitat for cavity nesting birds, such as owls and woodpeckers, and denning sites for mammals (e.g. fisher, porcupine). White pine trees, in these large patch or matrix ecosystems, often form a super canopy, enduring through multiple disturbance events (evidenced by fire scars) and provide important vertical structure and legacy seed sources. Following fire, decay-resistant snags may persist for many decades, providing perch and nesting sites in post-disturbance stands. Multiple stemmed trees, often the result of white pine weevil damage during the sapling stage of development, are common. The huckleberry variant of this VT (SP4b) usually has reduced canopy density and a well defined shrub layer, offering increased understory structure and nesting and feeding habitat for many bird species.

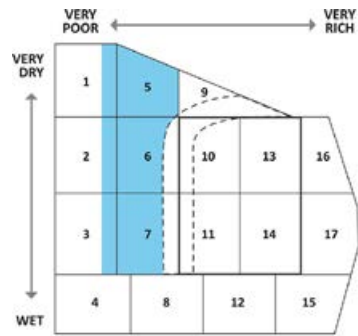
# SP5

## Black spruce / Feathermoss

*Picea mariana* / *Pleurozium schreberi* – *Hylocomium splendens* – *Ptilium crista-castrensis*

**Concept:** These near pure stands of open to closed canopy black spruce occur on well to imperfectly drained soils and have a sparse understory of shrubs and herbs with a well-developed carpet of mosses. This Vegetation Type (VT) is typically even-aged and follows stand-replacing disturbances such as fire, windthrow or forest harvesting. SP5 is similar to SP7 (Black spruce / Lambkill – Wild raisin – Mountain holly) but it lacks the typically dense abundant shrub and herb understory, increased presence of sphagnum moss, and the imperfectly drained soils associated with that latter VT.

**Vegetation:** Black spruce is the dominant overstory tree, with lesser amounts of balsam fir. Hybrid (red/black) spruce may also form a significant portion of the canopy. Red maple, white birch, white pine and tamarack are scattered throughout some stands.



### Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Upper<sup>3</sup> Lower<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>4</sup> Moderately<sup>4</sup> Strongly<sup>2</sup>  
 Drainage: Imperfect<sup>7</sup> Well<sup>2</sup> Rapid<sup>1</sup>

Common Soil Types: 3, 6, 6C  
 Rooting Depth (cm): (< 30)<sup>5</sup> (30–45)<sup>2</sup> (> 45)<sup>1</sup> nd<sup>2</sup>  
 Forest Floor (cm): (6–10)<sup>4</sup> (11–20)<sup>6</sup>  
 Humus Form: Hemimor<sup>9</sup> Humimor<sup>1</sup>

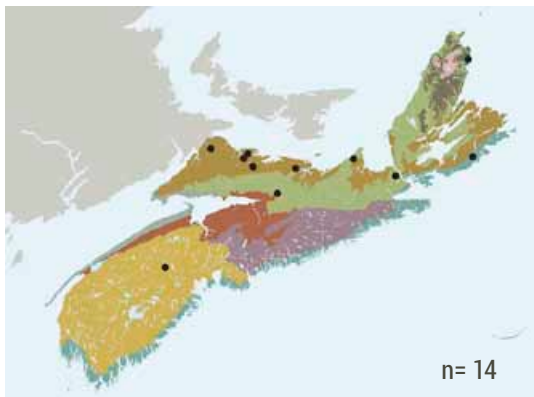


The sparse shrub layer, a characteristic of this VT, is primarily black spruce and balsam fir regeneration with very low levels of ericaceous and other shrub species. Herb and bryophyte diversity is generally low, with bracken the most common herb and minor occurrences of pink lady's slipper, cow-wheat and teaberry. Schreber's moss, wavy dicranum and stair-step moss usually dominate the forest floor. The presence of creeping snowberry, cinnamon fern, stair-step moss and small patches of sphagnum moss indicate somewhat elevated moisture levels.

**Environmental Setting:** SP5 is associated with fresh to moist, nutrient poor soils. Black spruce has intermediate shade tolerance and does not seed well under closed canopies. Thick duff layers are common and limit tree regeneration by seed sources, unless where localized disturbance events create exposed mineral soil micro-sites. Without disturbance, black spruce regeneration is usually by vegetative layering especially on sites with adequate soil moisture. This VT can be found throughout Nova Scotia on a variety of soils with low nutrient status.

Black Lake, Cumberland County

Characteristic Plants	SP5	
	Freq. (%)	Cover (%)
Black spruce	100	55
Red maple	57	5
Balsam fir	50	11
White birch	50	2
Red spruce	29	15
White pine	29	3
Trembling aspen	14	2
<b>Tree Layer (Mean % Cover)</b>		<b>70</b>
Balsam fir	100	5
Red maple	86	0.3
Black spruce	57	4
Lambkill	57	4
Mountain holly	57	0.1
Wild raisin	57	0.1
Velvet-leaf blueberry	50	0.1
White birch	43	0.2
Lowbush blueberry	36	1
Serviceberry	36	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Bunchberry	79	0.5
Starflower	64	0.1
Wild lily-of-the-valley	64	0.1
Goldthread	57	0.2
Bracken	50	1
Cinnamon fern	50	0.2
Twinflower	36	0.6
Creeping snowberry	36	0.5
Bluebead lily	36	0.1
Three seeded sedge	29	0.8
Ghost pipe	29	0.1
Sarsaparilla	29	0.1
Interrupted fern	21	0.2
Painted trillium	21	0.1
Wood aster	21	0.1
Mayflower	14	0.1
Pink lady's-slipper	14	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>3</b>
Schreber's moss	100	45
Stair-step moss	93	16
Wavy dicranum	86	3
Bazzania	71	13
Broom moss	64	3
Ladies' tresses	57	2
Grey reindeer lichen	43	5
Common green sphagnum	21	18
Plume moss	21	3
Log moss	21	0.8
Hair-cap moss	21	0.4
Cup lichens	21	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>83</b>



**Successional Dynamics:** Nutrient poor soils support an edaphic climax community dominated by black spruce. Historically, SP5 stands originated from fire disturbance events, creating mainly even-aged stands. With less frequent disturbance events, white pine may become more prominent in the overstory and ericaceous species, such as lambkill, will proliferate in the understory. Intensive harvesting, with sufficient forest floor disturbance, can initiate tree regeneration similar to stand-replacing wildfires, which are now less common with fire suppression. In some stands, white pine may also develop a super canopy, overtopping an even-aged lower canopy of black spruce. SP5 is the successional endpoint for many VTs in the Spruce Pine Forest Group.

**Ecological Features:** This large-patch, and sometimes matrix, forest often occurs on sites with excessive surface stoniness, a factor that limits canopy development. Spruce grouse eat conifer needles in winter and may be found in habitat provided by SP5 stands, particularly in cooler areas of Nova Scotia. Dwarf mistletoe sometimes creates dense clumps of witch's broom that are important nesting and resting sites for small mammals such as flying squirrel, and birds. Mature forests develop abundant old man's beard, a lichen sought for nest material by Northern parula and other species, and a winter food source used by deer foraging on fallen trees. Small tree diameters reduce the potential for snags and downed coarse woody material required for certain vertebrate species. SP5 often co-occurs with other vegetation types, typical of edaphic sites, many of which are from the Spruce Pine and Wet Coniferous forest groups.

# SP6

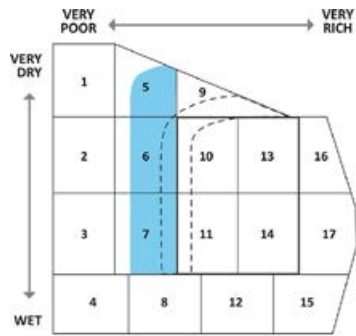
## Black spruce – Balsam fir / Blueberry

*Picea mariana* – *Abies balsamea* / *Vaccinium* spp.

**Concept:** A closed canopy dominated by balsam fir, with scattered to abundant black spruce describes this forest ecosystem. Most stands occur on well to moderately well drained soils. The shrub layer is sparse or patchy consisting mostly of tree regeneration and scattered ericaceous plants. The herb layer is also sparse. Black spruce – Balsam fir / Blueberry usually follows stand-replacing disturbance events such as insect infestation, windthrow or harvesting.

**Vegetation:** Balsam fir is the dominant overstory tree, accompanied by varying amounts of black spruce, hybrid (red/black) spruce, red maple and white pine. Residual white pine trees can also form a discontinuous super canopy. Understory layers have low species diversity, and only the shrub layer attains high cover. This layer is mostly composed of regenerating balsam fir, red maple and black spruce along with velvet-leaf blueberry and lambkill. Bracken and bunchberry are the most abundant herbs with Schreber’s moss

Cross Lake, Halifax County

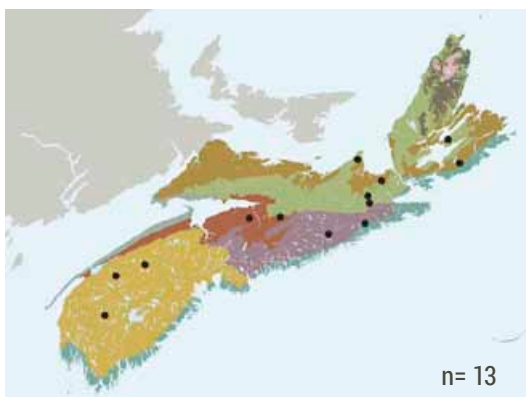


### Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Crest <sup>2</sup> Lower <sup>2</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>2</sup> Moderately <sup>2</sup>
Drainage:	Well <sup>4</sup> Moderately Well <sup>3</sup> Imperfect <sup>2</sup> Rapid <sup>1</sup>
Common Soil Types:	2, 3, 15
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>5</sup> (> 45) <sup>1</sup> nd <sup>2</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>4</sup> (11–20) <sup>5</sup>
Humus Form:	Hemimor <sup>7</sup> Humimor <sup>1</sup> Humi-Fibrimor <sup>1</sup> nd <sup>1</sup>

and stair-step moss the dominant bryophytes. Coverage of bazzania is influenced by the amount of CWM and ambient humidity.

Characteristic Plants	SP6	
	Freq. (%)	Cover (%)
Balsam fir	100	40
Black spruce	100	22
Red maple	38	7
White pine	38	6
White birch	31	6
Tamarack	15	18
White spruce	15	4
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Balsam fir	85	2
Red maple	85	1
Black spruce	77	2
Lambkill	62	2
Wild raisin	54	0.2
Mountain holly	54	0.1
Velvet-leaf blueberry	46	3
White pine	46	0.1
Lowbush blueberry	38	0.4
Yellow birch	23	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>7</b>
Wild lily-of-the-valley	77	2
Bracken	69	11
Bunchberry	69	3
Starflower	62	0.4
Twinflower	46	1
Sarsaparilla	31	0.4
Painted trillium	31	0.2
Mayflower	31	0.1
Bluebead lily	23	6
Goldthread	23	0.7
Cinnamon fern	23	0.1
Pink lady's-slipper	23	0.1
Teaberry	15	0.3
Cow wheat	15	0.1
Creeping snowberry	15	0.1
Poverty grass	15	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>14</b>
Schreber's moss	100	62
Stair-step moss	92	17
Bazzania	69	10
Broom moss	54	2
Grey reindeer lichen	46	0.3
Wavy dicranum	38	4
Hair-cap moss	38	0.9
Ladies' tresses	31	2
Plume moss	31	0.8
Log moss	23	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>89</b>



**Environmental Setting:** SP6 is mainly associated with dry to fresh, nutrient poor soils, of glacial origin. These soils are generally medium to coarse textured and often very stony. SP6 is often found in a transition zone between edaphic and zonal ecosites. Slightly elevated levels of balsam fir, hybridized red/black spruce, and the presence of species such as yellow birch and hemlock suggest a marginally more fertile ecosite. This VT is found throughout Nova Scotia.

**Successional Dynamics:** SP6 is a predominantly even-aged, early- to mid-successional VT dominated by black spruce and balsam fir. This VT usually follows stand-replacing disturbances such as insect infestation, windthrow or harvesting. In the absence of disturbances that promote balsam fir canopy cover, SP6 can succeed to either SP4 (White pine / Blueberry / Bracken) or SP5 (Black spruce / Feathermoss) on poorer sites.

**Ecological Features:** This forest ecosystem occurs in small to large patches within broader landscapes of spruce-pine forest. Due to balsam fir's relatively short longevity, this VT often produces significant pulses of coarse woody material and numerous snags. Extensive balsam fir regeneration is also frequent in stands, developing after regular and repeated insect outbreaks, disease, or wind storms. Balsam fir is very shade-tolerant, regenerating well in the understory. Black spruce typically regenerates by layering, forming small clonal groups without the need for stand re-initiating disturbances. SP6 stands provide suitable habitat conditions for red and flying squirrel, deer, moose, salamanders and other amphibians, songbirds and small mammals, among other species. Old man's beard lichen is often abundant in older stands, providing an important food and nest material. No plant or lichen species of conservation concern were found in available plot data for this VT.

# SP7

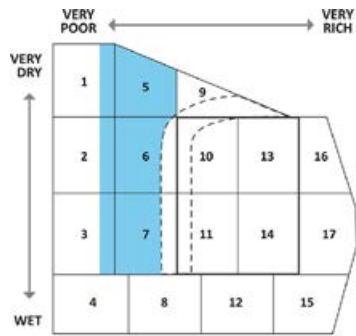
## Black spruce / Lambkill – Wild raisin – Mountain holly

*Picea mariana* / *Kalmia angustifolia* –  
*Viburnum cassinoides* – *Ilex mucronata*

**Concept:** This closed canopy Vegetation Type (VT) has abundant black spruce and an extensive woody shrub layer, which distinguishes it from SP5 (Black spruce / Feathermoss). Spruce may show evidence of hybridization particularly when soil nutrient levels are marginally better than what's otherwise typical for this VT. Black spruce / Lambkill – Wild raisin – Mountain holly usually follows stand-replacing disturbance such as fire, windthrow, or harvesting.

**Vegetation:** Black spruce is the dominant overstory tree along with lesser amounts of tamarack, red maple and balsam fir. Hybrid (red/black) spruce occurs on sites with slightly higher fertility. The shrub layer is occupied by ericaceous species such as lambkill and blueberry species, as well as other woody shrubs such as mountain holly and wild raisin. A variety of herb species may be present, but frequent species are limited to bunchberry, bracken and goldthread. Scattered sedges, creeping snowberry and cinnamon fern indicate relatively high soil moisture levels; while bracken, pink lady's slipper and mayflower are common on low nutrient sites. Both the shrub and herb layers are better developed than those in SP5 (Black spruce / Feathermoss). Bryophyte cover is dominated by Schreber's moss, while wavy dicranum, bazzania and stair-step moss are often present in lesser amounts. Pockets of sphagnum moss indicate elevated moisture levels and are generally more frequent and abundant than what's found in SP5.

**Environmental Setting:** SP7 is found throughout Nova Scotia on a variety of fresh to moist, nutrient poor soil types. Thick, ericaceous duff layers are common, limiting tree regeneration by seed unless disturbance creates more exposed microsites. Without disturbance, black spruce



### Site & Soil Characteristics

Slope Position:	Level <sup>7</sup> Upper <sup>2</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Other) <sup>1</sup>
Microtopography:	Slightly <sup>4</sup> Level <sup>3</sup> Moderately <sup>2</sup> Other <sup>1</sup>
Drainage:	Imperfect <sup>7</sup> Well <sup>1</sup> Moderately Well <sup>1</sup> Other <sup>1</sup>
Common Soil Types:	6, 3C, 3, 2, 1, 6C, 16, 14U, 3L
Rooting Depth (cm):	(< 30) <sup>5</sup> (30–45) <sup>1</sup> (> 45) <sup>1</sup> nd <sup>3</sup>
Forest Floor (cm):	(6–10) <sup>3</sup> (11–20) <sup>6</sup> (21–40) <sup>1</sup>
Humus Form:	Hemimor <sup>5</sup> Humimor <sup>1</sup> Other <sup>4</sup>

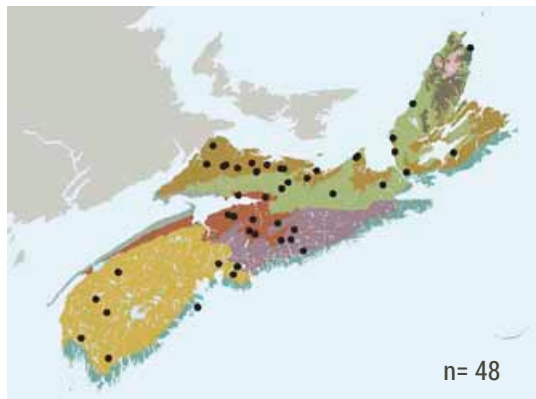


Greenville Station, Cumberland County

Characteristic Plants	SP7	
	Freq. (%)	Cover (%)
Black spruce	100	55
Balsam fir	50	9
Tamarack	40	4
Red maple	38	3
White pine	29	1
<b>Tree Layer (Mean % Cover)</b>		<b>64</b>
Lambkill	98	9
Black spruce	90	6
Wild raisin	83	0.7
Mountain holly	77	3
Red maple	75	0.9
Balsam fir	69	4
Velvet-leaf blueberry	67	4
Lowbush blueberry	48	2
Serviceberry	25	0.1
Labrador tea	21	1
<b>Shrub Layer (Mean % Cover)</b>		<b>25</b>
Bunchberry	90	6
Bracken	83	11
Creeping snowberry	50	0.7
Goldthread	46	2
Cinnamon fern	40	1
Mayflower	40	0.3
Teaberry	40	0.3
Wild lily-of-the-valley	40	0.2
Starflower	27	0.2
Pink lady's-slipper	27	0.1
Painted trillium	25	0.1
Three seeded sedge	19	0.8
Cow wheat	17	0.1
Twinflower	15	2
<b>Herb Layer (Mean % Cover)</b>		<b>18</b>
Schreber's moss	100	64
Wavy dicranum	85	4
Ladies' tresses	73	7
Bazzania	65	4
Stair-step moss	63	10
Grey reindeer lichen	60	0.9
Broom moss	44	4
Hair-cap moss	33	1
Plume moss	31	2
Cup lichens	31	0.5
Log moss	29	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>89</b>



Black spruce cones



regeneration is usually by vegetative layering. Sites supporting this VT tend to have minimal pit and mound microtopography.

**Successional Dynamics:** Moist, nutrient poor soils lead to an edaphic climax community dominated by black spruce. SP7 can exhibit closed or open canopies, depending on past disturbances and the degree of surface stoniness, which is often excessive. This generally even-aged VT follows stand-replacing disturbances such as fire, windthrow and harvesting. Due to its unique ecological setting, this VT does not shift to other vegetation types after disturbance, but does change in development stage. Under less frequent disturbance events, natural senescence can create some unevenness in age classes and stand structure.

**Ecological Features:** This forest can occur as a small or large patch embedded in landscapes comprised of other SP group VTs. Black spruce has intermediate shade tolerance and does not seed well under closed canopies. Vegetative regeneration by layering is common especially where there is a thick duff layer. Many species associated with SP5 are also found here. These include spruce grouse, olive-sided flycatcher, mourning warbler, star-nosed mole, and many amphibians. When canopy closure is high, and with the moister site conditions typical of this VT, SP7 stands may provide thermal protection, increased nesting opportunities, and protective cover for many species of birds and small mammals from predators. Dwarf mistletoe sometimes creates dense witches brooms that may provide nest and rest areas for small mammals. Mature forests on moister and cooler sites may develop abundant old man's beard, a lichen that provides important nest and forage material for some vertebrate species.



# SP8

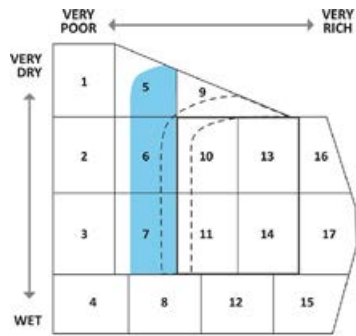
## Black spruce – Hemlock / Bracken / Schreber’s moss

*Picea mariana* – *Tsuga canadensis* /  
*Pteridium aquilinum* / *Pleurozium schreberi*

**Concept:** This closed canopy forest is characterized by abundant levels of black spruce and a minor component of hemlock in the canopy. Hemlock more often occurs on zonal ecosites, with other late-successional shade-tolerant tree species such as red spruce, sugar maple, beech and yellow birch. However, where this zonal condition transitions to an edaphic ecosite, typically where with pines and/or black spruce dominate, hemlock may also occur.

**Vegetation:** Black and/or hybridized spruce are the most common overstory trees, with hemlock scattered to sparse. White pine, red maple and balsam fir are frequent but minor components of the overstory. Woody shrubs are generally sparse but lambkill, low-bush blueberry, mountain holly and wild raisin are most abundant of represented species. Herbs with lower nutrient requirements are also prominent, such as bracken, teaberry, mayflower and pink lady’s slipper. The moss layer is extensive and is primarily Schreber’s moss, stair-step moss and various *Dicranum spp.*

**Environmental Setting:** SP8 is generally found on dry to moist soils but only where fertility levels are high enough to support hemlock, a slightly more nutrient demanding tree species. This VT is commonly found in the Northumberland Lowlands (530) ecodistrict but can be found throughout Nova Scotia, especially in the Western (700) and Eastern (400) ecoregions. On Cape Breton Island, where red spruce is nearly absent, black spruce occupies sites where red spruce would otherwise occur. Here the VT may occur on lower slopes of steep ravines of the Cape Breton Hills ecodistrict (310).



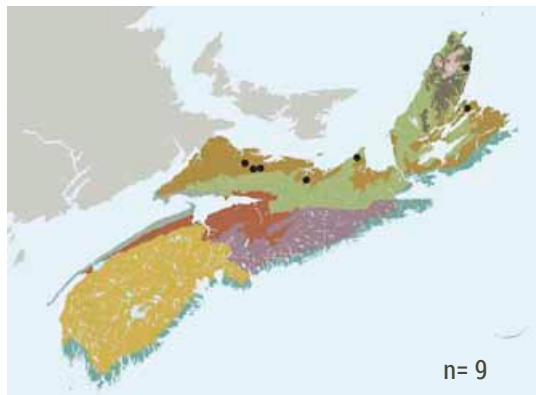
### Site & Soil Characteristics

Slope Position:	Level <sup>6</sup> Middle <sup>2</sup> Upper <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Slightly <sup>5</sup> Moderately <sup>2</sup> Strongly <sup>2</sup> Level <sup>1</sup>
Drainage:	Moderately Well <sup>4</sup> Well <sup>3</sup> Imperfect <sup>2</sup> Poor <sup>1</sup>
Common Soil Types:	2, 6, 5C, 3, 2C
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>4</sup> (> 45) <sup>2</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>8</sup> (11–20) <sup>1</sup>
Humus Form:	Hemimor <sup>8</sup> nd <sup>2</sup>



Franey Trail, Cape Breton Highlands  
National Park, Victoria County

Characteristic Plants	SP8	
	Freq. (%)	Cover (%)
Black spruce	100	43
Hemlock	100	18
White pine	78	4
Red maple	78	4
Balsam fir	44	6
Red spruce	44	6
White birch	33	2
Trembling aspen	11	6
Yellow birch	11	3
Gray birch	11	0.1
Large-tooth aspen	11	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Red maple	89	0.3
Black spruce	78	6
Balsam fir	78	4
Lambkill	78	2
Velvet-leaf blueberry	78	0.6
Wild raisin	78	0.3
Mountain holly	67	0.2
Lowbush blueberry	44	2
Serviceberry	44	0.1
Hemlock	33	0.2
White pine	33	0.1
Gray birch	22	0.1
Trembling aspen	22	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Bracken	78	5
Wild lily-of-the-valley	78	0.1
Bunchberry	67	2
Teaberry	67	0.5
Starflower	56	0.3
Cinnamon fern	44	0.1
Mayflower	33	0.1
Sarsaparilla	33	0.1
Twinflower	33	0.1
Bluebead lily	22	0.4
Creeping snowberry	22	0.3
Pink lady's-slipper	22	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>6</b>
Schreber's moss	100	59
Stair-step moss	89	14
Wavy dicranum	89	5
Bazzania	56	3
Broom moss	44	3
Plume moss	44	2
Ladies' tresses	33	1
Common green sphagnum	22	2
Log moss	22	0.4
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>82</b>



**Successional Dynamics:** Lower relative soil fertility is unlikely to support abundant levels of hemlock in SP8 stands. SP8 is primarily an even-aged, late-successional VT that follows stand-level disturbances such as fire, windthrow or harvesting. Partial canopy disturbances, whether natural or human-caused, may enhance the cover of ericaceous woody shrubs, thereby reducing natural regeneration of either black spruce or hemlock. Over time, the shorter longevity of black spruce may create opportunity for a two cohort stand with hemlock being the older cohort.

**Ecological Features:** SP8 stands occur as small patches in lowland forest landscapes where they contribute to habitat connectivity and ecological continuity. Black spruce's relatively short longevity may result in substantial coarse woody material; this material often accumulates in pulses following natural senescence, or wind storms. In mature stands, dense canopy conditions and reduced snow depths, provide important winter cover for several mammal species (e.g. deer), especially when adjacent to food sources. Bird species (including spruce grouse, boreal chickadee, pine siskin and crossbills) may utilize this VT for both breeding habitat and for winter cover. Lichens (including abundant old man's beard, an important food and nest material) are often common. No plant or lichen species of conservation concern were found in available plot data.

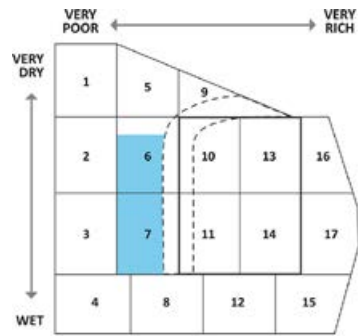
# SP9

## Tamarack / Wild raisin / Schreber's moss

*Larix laricina* / *Viburnum cassinoides* / *Pleurozium schreberi*

**Concept:** This closed canopy Vegetation Type (VT) has an overstory dominated by tamarack (also known as larch, hackmatack, or juniper) along with scattered white spruce. The susceptibility of tamarack to several defoliating insects reduces the likelihood this VT will attain advanced maturity. Tamarack / Wild raisin / Schreber's moss usually follows stand-replacing disturbances such as fire, windthrow or harvesting.

**Vegetation:** Tamarack is the dominant overstory tree. The shrub layer consists mainly of wild raisin and regenerating black spruce. Typical woodland flora are found in the herb layer, along with species associated with past harvesting (e.g. certain asters, goldenrods, grasses and sedges). The bryophyte layer includes Schreber's moss, hair-cap moss, plume moss and broom moss. Moss coverage is often interspersed with needle carpet.



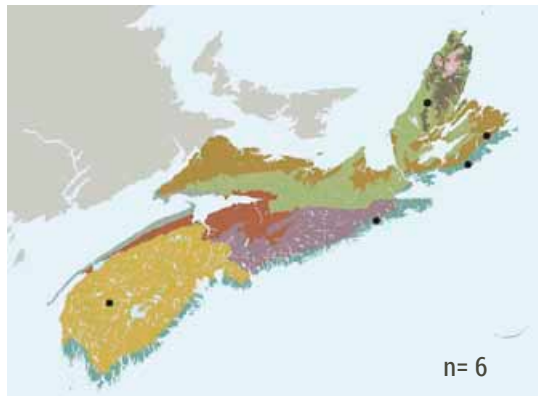
### Site & Soil Characteristics

- Slope Position: Level<sup>7</sup> Middle<sup>2</sup> Upper<sup>2</sup>
- Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>2</sup>  
(Very – Excessively)<sup>2</sup> nd<sup>1</sup>
- Bedrock Outcrop: (Non-rocky)<sup>8</sup> nd<sup>2</sup>
- Microtopography: Moderately<sup>5</sup> Slightly<sup>3</sup> nd<sup>2</sup>
- Drainage: Well<sup>5</sup> Moderately Well<sup>2</sup> Imperfect<sup>2</sup> nd<sup>1</sup>
- Common Soil Types: 2, 3, 2L, 2C
- Rooting Depth (cm): (30–45)<sup>5</sup> (> 45)<sup>3</sup> nd<sup>2</sup>
- Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>3</sup> (11–20)<sup>2</sup> nd<sup>3</sup>
- Humus Form: Hemimor<sup>7</sup> Humimor<sup>2</sup> nd<sup>1</sup>

Stubbart Road, Margaree, Inverness County



Characteristic Plants	SP9	
	Freq. (%)	Cover (%)
Tamarack	100	57
Black spruce	50	5
White spruce	50	3
Balsam fir	33	15
White birch	33	4
<b>Tree Layer (Mean % Cover)</b>		<b>68</b>
Wild raisin	100	3
Black spruce	83	4
Mountain holly	83	0.3
Lambkill	67	2
Lowbush blueberry	67	0.6
Red maple	50	3
Velvet-leaf blueberry	50	0.5
Balsam fir	33	4
Labrador tea	33	0.1
Mountain-ash	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Wild lily-of-the-valley	83	1
Starflower	83	0.1
Bunchberry	67	14
Goldthread	67	6
Bracken	50	4
Evergreen wood fern	50	0.3
Violets	33	3
Sarsaparilla	33	0.4
Dwarf raspberry	33	0.3
Cinnamon fern	33	0.2
Foxberry	33	0.1
Ground pine	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>19</b>
Schreber's moss	100	45
Broom moss	100	2
Hair-cap moss	100	0.8
Stair-step moss	83	9
Wavy dicranum	67	3
Plume moss	50	0.5
Bazzania	33	0.5
Grey reindeer lichen	33	0.4
Pin cushion moss	33	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>58</b>



**Environmental Setting:** SP9 is found on fresh to moist, nutrient poor to medium soils. This VT is mostly known from the Inverness Lowlands, Bras d'Or Lowlands and Northumberland Lowlands ecodistricts. It is relatively uncommon.

**Successional Dynamics:** Nutrient poor soils lead to an edaphic climax community dominated by black spruce. This even-aged early-successional VT follows stand-replacing disturbances, usually harvesting. In stands where tamarack succumbs to insect defoliation or senescence, SP9 will generally succeed to MW9 (Black spruce – Red maple / Bracken / Sarsaparilla) or directly to SP5 (Black spruce / Feathermoss), the edaphic climax for this successional pathway.

**Ecological Features:** This small-patch forest occurs primarily in eastern and northern Nova Scotia. Tamarack wood is dense and strong, with a high decay resistance, all factors which contribute to the development of substantial coarse woody material. Trees can grow to significant diameters which increase the probability of larger snags and cavity trees. Tamarack is very intolerant of shade and will not regenerate under a closed canopy but following sufficient disturbance, it will continue to be a stand component in this VT. Tamarack seeds are eaten by purple finch, and red and white-winged crossbill. Small mammals cache fallen cones, while porcupines and snowshoe hare eat tamarack bark. The larch sawfly periodically reaches epidemic levels, defoliating trees over successive years. The larch slippery jack fungus forms a mycorrhizal relationship with larch and often fruits abundantly in the fall.

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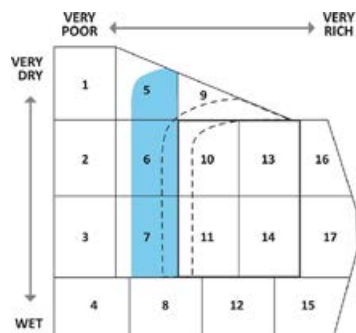
Tamarack

# SP10 Black spruce – White spruce / Twinflower / Schreber's moss

*Picea mariana* – *Picea glauca* / *Linnaea borealis* – *Pleurozium schreberi*

**Concept:** White spruce and black spruce co-dominate the overstory in this uncommon, closed canopy Vegetation Type (VT). It is similar to SH7 (White spruce – Red spruce / Blueberry / Schreber's moss) but occurs on less fertile ecosites and/or in areas of Nova Scotia where red spruce is absent or less common. Hybridized black and red spruce have been observed in surveyed stands and may be typical of this VT. A variety of other overstory associates are possible, particularly residuals from past stand-level disturbances.

**Vegetation:** Both shade-tolerant and shade-intolerant trees may be present as lesser associates in the canopy, depending on local disturbance history. Regenerating balsam fir, black spruce and red maple are usually well represented in the fairly sparse shrub layer. Other woody shrubs, occurring with low abundance, include kalmia, blueberry, wild raisin and mountain holly. The herbaceous layer is moderately well developed with typical upland woodland flora, such as wild lily-of-the-valley, twinflower, goldthread and bunchberry. Several ferns may be present including bracken, evergreen wood fern and cinnamon fern. The bryophyte layer can be extensive with stair-step moss and Schreber's moss the most common species.



## Site & Soil Characteristics

Slope Position: Middle<sup>6</sup> Crest<sup>2</sup> Lower<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>6</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>6</sup> Moderately<sup>2</sup> Level<sup>2</sup>  
 Drainage: Imperfect<sup>6</sup> Well<sup>4</sup>

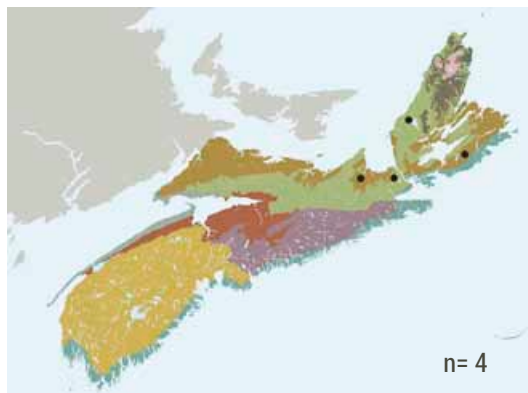
Common Soil Types: 2, 3, 6, 6C  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>2</sup> nd<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>6</sup> nd<sup>2</sup>  
 Humus Form: Hemimor<sup>4</sup> Humimor<sup>4</sup> Resimor<sup>2</sup>

**Environmental Setting:** SP10 is mainly associated with fresh to moist, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured. This VT is found primarily in eastern Nova Scotia in the Bras d'Or Lowlands (510), St. George's Bay (520) and Mulgrave Plateau (360) ecodistricts.

Grosvenor, Guysborough County



Characteristic Plants	SP10	
	Freq. (%)	Cover (%)
Black spruce	100	40
White spruce	100	24
Tamarack	75	3
White birch	50	11
Balsam fir	50	8
White pine	25	30
Trembling aspen	25	10
Red maple	25	5
<b>Tree Layer (Mean % Cover)</b>		<b>86</b>
Balsam fir	100	7
Black spruce	100	3
Red maple	100	1
Mountain holly	50	1
Wild raisin	50	0.5
Lambkill	50	0.4
Velvet-leaf blueberry	50	0.4
White birch	50	0.2
Lowbush blueberry	50	0.1
Serviceberry	25	0.2
Fly-honeysuckle	25	0.1
Mountain-ash	25	0.1
Trembling aspen	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Wild lily-of-the-valley	100	2
Bunchberry	75	16
Twinflower	75	3
Goldthread	75	2
Starflower	75	0.7
Sarsaparilla	75	0
Bracken	50	6
Cinnamon fern	50	5
Evergreen wood fern	50	3
Wood aster	50	0.2
New York fern	25	7
Hay-scented fern	25	3
Mayflower	25	0.5
Pink lady's slipper	25	0.2
Rough goldenrod	25	0.2
Shinleaf	25	0.2
Bluebead lily	25	0.1
Cow wheat	25	0.1
Ghost pipe	25	0.1
Interrupted fern	25	0.1
Painted trillium	25	0.1
Royal fern	25	0.1
Wood-sorrel	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>28</b>
Schreber's moss	100	26
Stair-step moss	100	19
Common green sphagnum	75	3
Wavy dicranum	75	2
Plume moss	75	1.0
Broom moss	50	1
Log moss	50	1
Bazzania	25	10
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>55</b>



**Successional Dynamics:** SH10 is a predominantly even-aged, mid-successional VT. It is dominated by white spruce and black spruce and follows stand-level disturbances, such as harvesting and windthrow. Late-successional stages, with longer-lived species, are not expected because of limiting site conditions (i.e. typical conditions are transitional between zonal and azonal ecosites). However in stands where white pine is present, the tree species may help to advance this VT to a later developmental stage. Overall, the VT is characterized by fluctuating patterns of overstory dominance, whereby early-successional species, including red maple, white birch and balsam fir, may periodically become more prevalent, due to the short longevity of the dominant conifer species, and generally slow rates of stand break-up after windthrow and other disturbance agents.

**Ecological Features:** This forest ecosystem typically occurs as small- to medium-sized landscape patches. Spruce grouse may be present in stands of this VT especially in the winter months, when they feed on conifer needles. Throughout its range of developmental stages, SP10 provides cover for a variety of wildlife species. Matures stages may provide habitat for marten, grouse, various woodpeckers, red and flying squirrel. South facing slopes may provide winter cover for deer as well as many other vertebrates. Sapling stages are preferred cover and breeding habitat for snowshoe hare, and many species of birds and other small mammals, including their respective predators. These forests may support abundant mycorrhizal mushrooms, including chanterelles and boletes. Higher levels of coarse woody material (CWM) are common. Repeated cycling of the short-lived tree species, characteristic of this VT, replenishes CWM regularly and provides numerous small-diameter snags that are habitat for many species of fungi, flora and fauna.

# TH

## Tolerant Hardwood Forest Group

### Tolerant Hardwood (TH) Key

1a. Red oak scattered to dominant	... TH6	6b. Stands usually on lower slopes, sometimes associated with seepage sites or small streams that lack significant floodplains. At least one of the above species present	... 11
1b. Not as above	... 2		
2a. White birch and yellow birch dominant, sugar maple absent or sparse	... TH7	7a. Beech dominant in the overstory	... TH5
2b. Not as above	... 3	7b. Not as above	... 8
3a. Red maple and yellow birch dominant, sugar maple absent or sparse	... 4	8a. Stands where New York fern, Northern beech fern, oak fern and lady fern (suggesting increasing fertility & moisture) comprise at least 2% ground cover	... 9
3b. Not as above	... 5	8b. Not as above	... 10
4a. White ash and/or ironwood absent or sparse	... TH8	9a. Sugar maple most common hardwood	... TH2
4b. White ash and/or ironwood scattered to abundant	... TH8a	9b. Yellow birch most common hardwood	... TH2a
5a. Red maple and sugar maple dominant	... TH9	10a. Sugar maple most common hardwood	... TH1
5b. Northern Hardwoods (sugar maple, beech, yellow birch, white ash, ironwood) > 60% of overstory	... 6	10b. Yellow birch is the most common hardwood	... TH1a
6a. Stands usually on upper and mid slopes (dry to fresh sites). White ash, ironwood, silvery spleenwort and hairy sweet cicely are usually absent	... 7	11a. Silvery spleenwort, ostrich fern and hairy sweet cicely absent	... TH3
		11b. At least one of the above species is present	... TH4

COVER CLASSES: Sparse < 10% Scattered 10–25% Abundant 26–50% Dominant > 50%

## Concept

These closed canopy forests comprise mid- to late-successional shade-tolerant hardwood Vegetation Types (VT) on zonal Acadian Forest ecosites. Stands are dominated by sugar maple, yellow birch and beech. White ash, ironwood, red maple (and in western Nova Scotia, red oak) are common associates. Scattered red and/or white spruce are also common, and balsam fir can be significant in the understory. The shrub layer is often extensive, but it is the diversity and abundance of ferns that best characterizes the understory. Bryophytes, if present, are largely confined to dead wood, surface stones, and lower boles of trees.

Soil moisture is typically fresh to moist, and fertility is generally medium to rich. Tolerant hardwood VTs form matrix forest in the Nova Scotia Uplands (300) ecoregion the North Mountain (920) ecodistrict. Some VTs also form small to medium patches in drumlin dominated ecodistricts throughout the province.

Stand-level disturbance events are rare and most VTs maintain themselves through gap replacement, leading to uneven-aged climax forests. Two historic, province-wide disturbance events have markedly influenced the current composition of forests in this group. The introduction of beech bark canker circa 1900 has reduced the overstory prominence of this tree species and relegated it to a (sometimes) prolific component of the lower canopy and

shrub layers. Birch dieback in the 1940s decreased the abundance of yellow birch in the overstory and led to an increase in sugar maple coverage in some affected areas.

These large patch and matrix forests typically occur over hundreds of hectares and have a high potential to form old-growth stands. Tolerant hardwood sites provide numerous microhabitats including: vernal pools, seeps, abundant leaf litter, and well-expressed surface relief. Larger trees may have broken tops, hollow boles, cavities and rough bark—attributes that provide shelter, foraging, perching and sites for forest dwelling wildlife. Vertical stand structural complexity is particularly important for aerial foragers and nesters, while other wildlife species are associated with patches of shrubs or ferns, conifer inclusions, or with particular stand age classes or species. Persistent snags and coarse woody materials are common, providing microhabitat for cavity nesting and denning species, small mammals, and invertebrates. The typically fertile soils support many rare plants, while nutrient-rich tree bark surfaces provide suitable substrate for bryophytes and lichens. Many bird species show moderate to high affinity for tolerant hardwood forests, including scarlet tanager, eastern wood-pewee, black-throated blue warbler, black-throated green warbler, white-breasted nuthatch and broad-winged hawk.



# TH1

## Sugar maple / Wood fern – Hay-scented fern

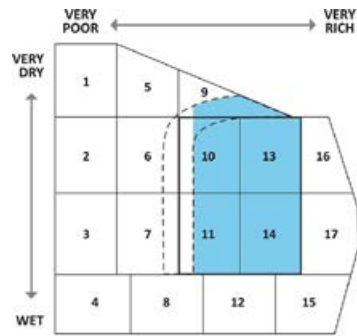
*Acer saccharum* / *Dryopteris intermedia* – *Dennstaedtia punctilobula*

### TH1a Yellow birch variant *Betula alleghaniensis*

**Concept:** This closed canopy forest is dominated by sugar maple, yellow birch and beech. It is similar to TH2 (Sugar maple / New York fern – Northern beech fern), but is generally associated with drier and/or slightly less fertile sites on crests and upper slopes. There is one variant: TH1a, which describes stands where yellow birch is dominant in the overstory.

**Vegetation:** Red maple, scattered red spruce and white spruce are minor associates in the tolerant hardwood canopy. White ash and ironwood are typically absent or very sparse. The shrub layer contains regenerating tree species along with striped maple, fly-honeysuckle and mountain maple. Beech and/or striped maple coverage in this layer can sometimes be extensive, strongly out-competing other woody species. Herbaceous coverage is diverse, but generally dominated by hay-scented fern and evergreen wood fern. Other common species include rose twisted stalk, cucumber root, wood-sorrel, drooping wood sedge and wood aster. Spring ephemerals may include spring-beauty, Dutchman’s breeches and dog tooth violet. The bryophyte layer is poorly developed, with moss and liverwort cover generally restricted to tree trunks, stones and downed woody material.

**Environmental Setting:** TH1 is mainly found on dry to fresh-moist, nutrient medium to rich soils, of glacial origin. This VT occurs on zonal ecosites throughout the province, especially in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts, and on the upper slopes of drumlins. TH1 is relatively uncommon in the lowland ecodistricts. Stands at high elevation (> 200 m) on crests and upper



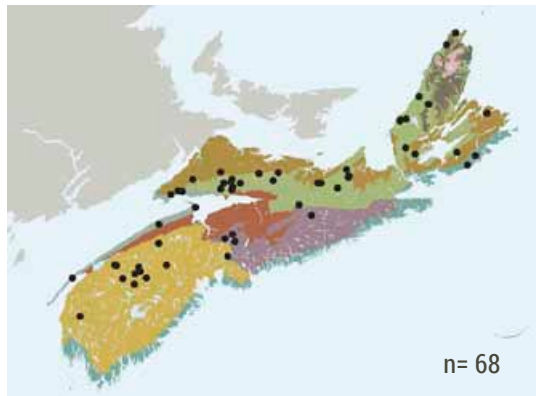
#### Site & Soil Characteristics

Slope Position:	Upper <sup>4</sup> Middle <sup>3</sup> Level <sup>2</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>5</sup> (Moderately) <sup>4</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>4</sup> Strongly <sup>3</sup> Slightly <sup>2</sup> Other <sup>1</sup>
Drainage:	Well <sup>6</sup> Moderately well <sup>3</sup> Other <sup>1</sup>
Common Soil Types:	2L, 2, 8
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>3</sup> (> 45) <sup>5</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>3</sup> (6–10) <sup>4</sup> (11–20) <sup>2</sup> Other <sup>1</sup>
Humus Form:	Mormoder <sup>3</sup> Vermimull <sup>1</sup> Humi-Fibrimor <sup>1</sup> Other <sup>1</sup> nd <sup>4</sup>



Lake Alma, Annapolis County

Characteristic Plants	TH1		TH1a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Sugar maple	100	59	100	19
Yellow birch	71	11	100	46
Beech	54	16	67	19
Red maple	32	10	17	9
Red spruce	25	6	8	5
White birch	14	13	8	5
Balsam fir	14	9	17	4
White spruce	13	4	8	5
<b>Tree Layer (Mean % Cover)</b>	<b>84</b>		<b>81</b>	
Beech	80	13	83	17
Sugar maple	80	7	75	5
Striped maple	61	6	75	10
Balsam fir	61	3	83	6
Yellow birch	50	3	83	2
Fly-honeysuckle	50	0.7	42	0.2
Red spruce	39	1	25	13
Red maple	38	2	42	1
Mountain maple	29	2	8	0.1
White spruce	29	0.7	33	1
Hobble-bush	27	2	17	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>27</b>		<b>37</b>	
Evergreen wood fern	82	12	92	12
Sarsaparilla	71	2	50	2
Hay-scented fern	64	18	75	10
Wild lily-of-the-valley	64	2	58	7
Starflower	63	0.2	83	0.2
Rose twisted stalk	59	0.3	50	0.1
Violets	52	2	75	0.7
Wood aster	50	2	33	2
Wood-sorrel	48	4	50	5
Drooping wood sedge	41	0.3	33	0.2
Cucumber root	39	0.4	17	0.1
Christmas fern	38	3	8	2
Northern beech fern	38	0.4	25	1
Wood reed	38	0.2	33	0.1
Mountain wood fern	36	14	25	29
New York fern	27	0.6	25	0.3
Fibrous-root sedge	27	0.5	25	0.7
Shining club-moss	25	0.9	25	3
Bluebead lily	25	0.7	42	3
Lion's paw	25	0.1	17	0.1
Painted trillium	25	0.1	8	0.1
Ghost pipe	21	0.1	33	0.1
Common speedwell	21	0.1	17	0.1
Spinulose wood fern	18	23	33	3
Bunchberry	13	0.2	25	2
Ground pine	11	1	50	0.1
Bristly club-moss	7	5	25	8
Goldthread	7	0.4	42	0.2
<b>Herb Layer (Mean % Cover)</b>	<b>44</b>		<b>43</b>	
Broom moss	61	1	83	2
Log moss	39	1	67	1
Hair-cap moss	36	0.7	33	1
Fern moss	25	1	42	2
Schreber's moss	14	0.9	42	2
Stair-step moss	14	0.9	42	0.6
Bazzania	9	0.1	42	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>2</b>		<b>6</b>	



slopes are exposed to strong winds, thus increasing their susceptibility to ice storms, blowdown and crown breakage. The yellow birch variant (TH1a) develops on moister sites.

**Successional Dynamics:** TH1 is a late-successional, uneven-aged climatic climax forest dominated by shade-tolerant hardwood tree species. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind events, or ice damage. In the characteristic seral pathway for this VT, early-successional stands of intolerant hardwoods, created after stand-level disturbances, can be bypassed if advanced sugar maple and yellow birch regeneration is present in the understory. With increased light availability caused by canopy disturbances, hay-scented fern can spread extensively and restrict tree regeneration.

**Ecological Features:** This matrix hardwood forest typically occurs over hundreds of hectares and provides interior forest habitat conditions. The longevity, shade tolerance and deep rooting of sugar maple and beech trees promotes stand continuity, high old-growth potential and uneven-aged stand structure. This forest provides habitat for fisher, flying squirrels, and many songbird species. Large diameter trees and snags provide nest sites for barred owl and northern goshawk, as well as denning opportunities for raccoons, porcupine, squirrels and other vertebrates. Downed coarse woody material provides habitat for red-backed salamanders, small mammals, and invertebrates, as well as microhabitats for bryophytes and fungi. Hard mast from beech and beaked hazelnut provides a notable food source for bears and other fauna. These forests host a variety of spring ephemeral plants providing early spring pollinators with concentrated pollen and nectar sources.

# TH2

## Sugar maple / New York fern – Northern beech fern

*Acer saccharum* / *Parathelypteris noveboracensis* – *Phegopteris connectilis*

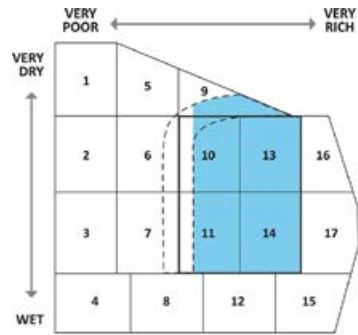
### TH2a Yellow birch variant *Betula alleghaniensis*

**Concept:** This closed canopy forest is very similar to TH1 but occurs on ecosites with higher moisture and nutrients levels. Sugar maple and yellow birch characterize the overstory. Yellow birch dominates in the variant TH2a, which often originates after disturbances (such as windthrow or harvesting) that have exposed mineral soil seedbeds.

**Vegetation:** Less common overstory associates include red maple, red spruce, white spruce and balsam fir. The shrub layer is moderately well developed and comprised of regenerating tree species, striped maple, fly-honeysuckle and mountain maple. Dense striped maple in this layer can sometimes exclude other woody species. Herbaceous coverage is diverse and generally dominated by ferns, including those preferring moister and slightly richer soils such as lady, New York, oak and northern beech ferns. Other characteristic ferns, sedges and herbs include those listed for TH1 (especially the spring ephemerals), as well as higher frequencies of shining club-moss and dwarf raspberry. The bryophyte layer is poorly developed, with cover generally restricted to tree trunks, stones and downed woody material.

**Environmental Setting:** TH2 is mainly associated with fresh-moist, nutrient medium to rich soils of glacial origin. This VT is found on zonal ecosites throughout the province especially in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts and on upper and middle drumlin slopes. TH2 is relatively uncommon on lowland ecodistricts. Stands at high elevation (> 200 m) on crests and upper slopes are exposed to strong winds and are susceptible to ice storms, blowdown and crown breakage. The yellow birch variant usually occurs on slightly moister sites.

Near Long Lake, Mulgrave Plateau, Guysborough County

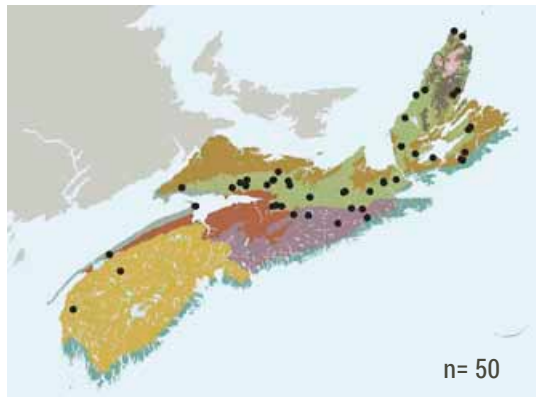


#### Site & Soil Characteristics

Slope Position:	Upper <sup>5</sup> Middle <sup>2</sup> Level <sup>1</sup> Lower <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>5</sup> (Moderately) <sup>4</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>5</sup> Strongly <sup>2</sup> Slightly <sup>2</sup> Other <sup>1</sup>
Drainage:	Moderately Well <sup>4</sup> Well <sup>4</sup> Imperfect <sup>2</sup>
Common Soil Types:	2L, 8, 2, 9, 12
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>4</sup> (> 45) <sup>3</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>4</sup> (6–10) <sup>4</sup> (11–20) <sup>2</sup>
Humus Form:	Mormoder <sup>4</sup> Mullmoder <sup>2</sup> Other <sup>4</sup>



Characteristic Plants	TH2		TH2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Sugar maple	100	61	100	20
Yellow birch	89	16	100	49
Beech	33	14	29	7
Red maple	33	11	71	14
White spruce	22	2	29	7
Balsam fir	19	7	57	7
Red spruce	14	9	7	5
White birch	3	35	36	4
<b>Tree Layer (Mean % Cover)</b>	<b>88</b>		<b>88</b>	
Sugar maple	86	9	86	2
Striped maple	81	2	71	3
Fly-honeysuckle	75	2	57	0.8
Balsam fir	75	2	86	3
Beech	67	7	57	6
Yellow birch	61	2	57	1
Mountain maple	53	3	21	2
Red maple	50	2	71	7
Beaked hazelnut	39	2	7	6
White spruce	39	0.4	43	5
Red spruce	28	2	14	2
Alternate-leaved dogwood	22	0.6		
<b>Shrub Layer (Mean % Cover)</b>	<b>23</b>		<b>19</b>	
Evergreen wood fern	92	10	93	8
Rose twisted stalk	81	0.2	21	0.1
Wood-sorrel	75	3	71	4
Northern beech fern	75	3	71	1
New York fern	72	35	86	37
Starflower	69	0.2	71	1
Sarsaparilla	67	2	43	4
Violets	64	2	43	0.9
Wild lily-of-the-valley	64	2	71	2
Wood aster	64	0.5	50	0.9
Wood reed	53	0.3	21	0.1
Mountain wood fern	50	10	50	6
Hay-scented fern	47	23	36	15
Dwarf raspberry	47	1	29	0.8
Shining club-moss	33	3	21	0.7
Christmas fern	33	2	50	3
Cucumber root	33	0.2	36	0.1
Spinulose wood fern	31	10	36	10
Bluebead lily	31	1	21	1
Drooping wood sedge	30	0.1	21	0.1
Lion's paw	28	0.2	14	0.1
Lady fern	25	0.5	14	1
Partridge-berry	22	1	29	0.2
Bunchberry	19	3	71	9
Shinleaf	17	0.2	36	0.3
Goldthread	14	3	71	2
Cinnamon fern	11	1	43	1
Interrupted fern	11	0.1	43	1
Twinflower	6	0.2	43	1
<b>Herb Layer (Mean % Cover)</b>	<b>71</b>		<b>73</b>	
Broom moss	53	0.8	79	0.6
Log moss	36	0.6	50	2
Fern moss	28	0.4	36	2
Hair-cap moss	25	0.4	43	0.5
Stair-step moss	11	5	64	3
Schreber's moss	11	0.3	64	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>2</b>		<b>6</b>	



**Successional Dynamics:** TH2 is a late-successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood tree species. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind or ice damage. Following stand-level disturbance, TH2 can develop from early-successional VTs dominated by intolerant hardwoods, especially red maple and white birch. mid-successional VTs with a high component of yellow birch (TH7, TH8) may slowly transition to TH1 or TH2.

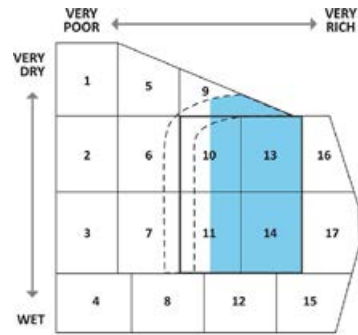
**Ecological Features:** This matrix hardwood forest typically occurs over hundreds of hectares and provides interior forest habitat conditions. The longevity, shade tolerance and deep rooting of sugar maple and beech trees promote stand continuity, high old growth potential and uneven-age structure. Vernal pools, seeps and springs are common, providing habitat for several amphibian (e.g. wood frog) and invertebrate species; they also contribute significantly to overall habitat complexity and diversity. Vertebrate species utilizing TH2 habitat are similar to those listed for TH1. Large diameter trees and snags may provide nest sites for barred owl and northern goshawk as well as denning opportunities for raccoon, squirrel and other wildlife species. Downed coarse woody material provides habitat for red-backed salamanders, small mammals (such as American marten) and invertebrates. It also provides microhabitats for bryophytes and fungi. Downed hardwood logs are favoured drumming sites for ruffed grouse. Hard mast from beech and beaked hazelnut provide a significant food source for bears, small mammals and many birds. These forests host a variety of spring ephemeral plants providing early spring pollinators with concentrated pollen and nectar sources.

# TH3 Sugar maple – White ash / Christmas fern

*Acer saccharum* – *Fraxinus americana* / *Polystichum acrostichoides*

**Concept:** This closed canopy VT usually occurs as a small patch within broader matrix forests of TH1 and TH2. The ecosystem is characterized by white ash or ironwood, sugar maple dominance, nutrient rich soils, and prominent seepage. Plant species richness is among the highest of any upland hardwood ecosystem in the province.

**Vegetation:** Lesser amounts of red maple and beech occur within the tolerant hardwood overstory. Scattered red spruce, white spruce, or hemlock provide structural diversity. Although ironwood and sometimes white ash are not dominant in the canopy, their presence is used to help distinguish this VT from other sugar maple and yellow birch VTs. The shrub layer is dominated by regenerating hardwood, balsam fir and striped maple, with less prominent amounts of alternate-leaved dogwood, hobble-bush and beaked hazelnut. Herb coverage is diverse with many sedge species and several rich site indicators including Christmas fern, oak fern, lady fern, shining club-moss and northern beech fern. Similar to other tolerant hardwood forests the bryophyte layer is poorly developed, but the wetter soils increases the presence of species such as fern moss, *Mniaceae spp.*, *Atrichum spp.* and *Sphagnum spp.*



### Site & Soil Characteristics

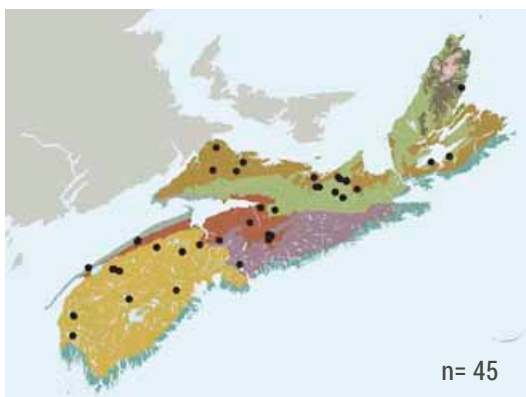
- Slope Position: Lower<sup>3</sup> Upper<sup>3</sup> Middle<sup>2</sup> Level<sup>1</sup> Other<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>3</sup> (Very – Excessively)<sup>3</sup>
- Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>
- Microtopography: Moderately<sup>4</sup> Strongly<sup>4</sup> Slightly<sup>2</sup>
- Drainage: Moderately Well<sup>4</sup> Well<sup>4</sup> Other<sup>2</sup>
- Common Soil Types: 8, 2L, 9, 12, 11, 2, 8C
- Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>4</sup> (> 45)<sup>3</sup> nd<sup>2</sup>
- Forest Floor (cm): (0–5)<sup>5</sup> (6–10)<sup>3</sup> (11–20)<sup>1</sup> Other<sup>1</sup>
- Humus Form: Vermimull<sup>3</sup> Mormoder<sup>2</sup> Mull<sup>2</sup> Other<sup>3</sup>

**Environmental Setting:** TH3 is mainly found on fresh-moist to moist, nutrient rich soils. These sites often occur in toe slope positions and mid-slope flats, but are sometimes also found on enriched upper

Lower Springfield, Antigonish County



Characteristic Plants	TH3	
	Freq. (%)	Cover (%)
Sugar maple	98	37
White ash	96	21
Yellow birch	84	10
Beech	47	13
Red maple	42	20
Ironwood	27	11
Balsam fir	24	7
Red spruce	20	5
White spruce	20	4
Hemlock	16	8
White birch	16	8
<b>Tree Layer (Mean % Cover)</b>		<b>88</b>
White ash	87	3
Sugar maple	82	8
Balsam fir	80	2
Striped maple	71	4
Beech	67	14
White spruce	53	2
Red maple	47	0.9
Red spruce	44	2
Fly-honeysuckle	44	0.5
Beaked hazelnut	36	2
Yellow birch	33	2
Ironwood	29	5
Mountain maple	22	2
Alternate-leaved dogwood	22	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>32</b>
Christmas fern	84	5
Evergreen wood fern	84	5
Starflower	73	0.9
Wild lily-of-the-valley	69	1
Northern beech fern	58	1
New York fern	56	13
Violets	53	2
Sarsaparilla	51	2
Cucumber root	49	0.1
Wood aster	47	0.2
Lion's paw	44	0.6
Drooping wood sedge	44	0.2
Rose twisted stalk	42	0.1
Partridge-berry	40	0.3
Lady fern	29	1
Oak fern	29	1
Hay-scented fern	27	6
Shining club-moss	27	0.8
Shinleaf	27	0.6
Calico aster	27	0.3
Ghost pipe	27	0.1
Wood reed	24	0.1
Wood-sorrel	22	1
Common speedwell	22	0.2
Ribless woodland sedge	22	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>29</b>
Broom moss	76	1
Fern moss	51	1
Log moss	49	2
Stair-step moss	38	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>4</b>



slopes. This VT is typically found embedded within larger tracts of TH1 and TH2 matrix forest. TH3 is found throughout the province on moist rich zonal ecosites in the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts, and on some drumlin sites.

**Successional Dynamics:** TH3 is a late-successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind or ice damage. Although TH3 stands generally maintain themselves through gap replacement, this VT can develop from early- and mid-successional intolerant hardwood vegetation types that follow stand-level disturbances.

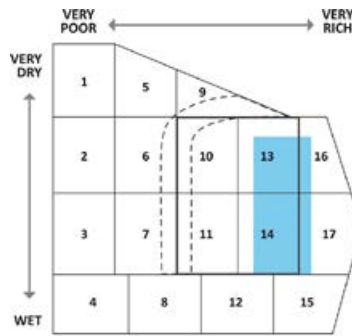
**Ecological Features:** This hardwood forest typically occurs in small patches (< 1 hectare up to 50 hectares), infrequently scattered as inclusions within broader hardwood matrix forest. Longevity of the overstory tree species increases the potential for old growth development. White ash boles are susceptible to rot and therefore, large diameter snags may develop cavities suitable for vertebrate nesting and denning. Vernal pools, moist surface depressions, seeps, and springs are common in this forest and provide habitat for red-backed salamanders, yellow-spotted salamanders and wood frogs, along with microhabitat for many invertebrate species. Seeds of ash, maple, ironwood and beech provide regular soft and hard mast crops for several species of birds, including evening grosbeaks, as well as many other species that utilize tree seeds and nuts. Plants that favour moist rich sites are common, including several rare or uncommon plant species (e.g. lance-leaved and little grapeferns, foamflower and anise-root). In southwest Nova Scotia this community supports southern flying squirrel.

# TH4 Sugar maple – White ash / Silvery spleenwort – Baneberry

*Acer saccharum* – *Fraxinus americana* /  
*Deparia acrostichoides* – *Actaea* spp.

**Concept:** This forest is the richest upland hardwood VT in Nova Scotia and excluding floodplain forests, supports the most diverse understory. The closed canopy overstory is dominated by sugar maple, white ash and yellow birch. TH4 primarily occurs on rich, moist sites with frequent surface seepage and ephemeral runs. It occurs as a small- to medium-size patch embedded within matrix scale forests of TH1 and TH2. The ecosystem is similar to TH3 (Sugar maple – White ash / Christmas fern), but is more fertile and supports numerous plants with affinities for rich sites.

**Vegetation:** The shrub layer is dominated by regenerating hardwood (mainly sugar maple) along with fly-honeysuckle, striped maple, mountain maple and beaked hazelnut. Alternate-leaved dogwood,



## Site & Soil Characteristics

Slope Position: Lower<sup>4</sup> Middle<sup>3</sup> Upper<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>4</sup>  
 (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>4</sup> Slightly<sup>3</sup> Strongly<sup>2</sup> Other<sup>1</sup>  
 Drainage: Moderately Well<sup>4</sup> Imperfect<sup>3</sup> Well<sup>3</sup>

Common Soil Types: 8, 9, 2L, 6, 8C, 12  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>4</sup> (> 45)<sup>3</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>5</sup> (6–10)<sup>3</sup> (11–20)<sup>1</sup> (21–40)<sup>1</sup>  
 Humus Form: Moder<sup>3</sup> Vermimull<sup>2</sup> nd<sup>5</sup>

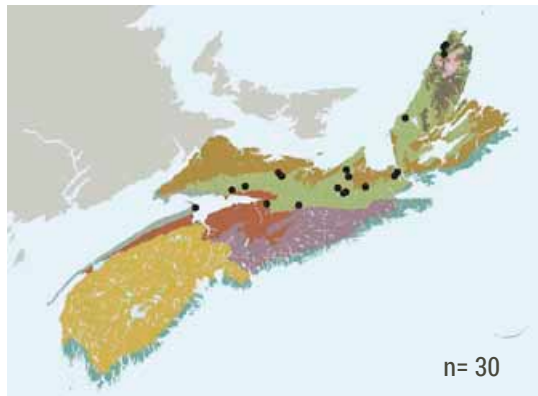


if present, is diagnostic of richer soils. Herbaceous coverage is diverse with both upland and wetland plants including many sedge species and an extensive suite of rich site indicators (e.g. lady fern, sweet cicely, silvery spleenwort, wood goldenrod, Christmas fern, northern beech fern, red and white baneberry and oak fern). Similar to other tolerant hardwood forests the bryophyte layer is poorly developed, but the wetter soils support bryophytes such as fern moss, *Mniaceae* spp., *Atrichum* spp. and certain *Sphagnum* spp.

**Environmental Setting:** TH4 is found on fresh-moist to moist, nutrient rich soils and is closely tied to surface and near-surface seepage. These sites often occur where there's an abrupt change in slope gradient (e.g. toe slopes and mid-slope flats). This VT is typically found within larger tracts of TH1 and TH2 matrix forest, and is often embedded within stands of TH3. It is strongly associated with the Cobequid Hills, North Mountain and Cape Breton Hills ecodistricts.

Sandy Gunn Lake,  
Pictou County

Characteristic Plants	TH4	
	Freq. (%)	Cover (%)
Sugar maple	97	55
Yellow birch	77	17
White ash	57	20
Red maple	23	9
White spruce	20	4
Beech	13	12
Balsam fir	10	9
<b>Tree Layer (Mean % Cover)</b>		<b>84</b>
Sugar maple	100	19
Fly-honeysuckle	90	0.9
Striped maple	70	3
Mountain maple	67	3
White ash	63	1
Yellow birch	60	5
Balsam fir	57	1
Beaked hazelnut	53	3
White spruce	53	0.6
Beech	50	12
Alternate-leaved dogwood	43	0.9
<b>Shrub Layer (Mean % Cover)</b>		<b>37</b>
Evergreen wood fern	97	9
Lady fern	80	5
Silvery spleenwort	77	6
Northern beech fern	77	4
Sarsaparilla	73	3
Violets	73	2
Wood aster	70	4
Wood-sorrel	70	2
Rose twisted stalk	70	0.4
Christmas fern	67	3
Wild lily-of-the-valley	63	2
Wood reed	63	0.3
Starflower	60	0.4
Drooping wood sedge	57	0.2
Wood goldenrod	50	7
Dwarf raspberry	50	3
Red baneberry	50	0.4
Oak fern	40	3
White lettuce	40	0.1
Hairy sweet cicely	37	2
Lion's paw	37	0.6
Jewelweed	33	3
White baneberry	33	0.5
Bluebead lily	33	0.1
Nodding trillium	33	0.1
New York fern	30	11
Braun's holly fern	30	0.4
Bladder sedge	30	0.2
Mountain wood fern	27	6
Mitrewort	27	1
Rattlesnake fern	27	0.7
Sensitive fern	27	0.7
Small enchanter's nightshade	27	0.6
Spinulose wood fern	23	10
Ostrich fern	23	3
<b>Herb Layer (Mean % Cover)</b>		<b>58</b>
Fern moss	23	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>3</b>



**Successional Dynamics:** TH4 is a late-successional, uneven-aged climatic climax VT dominated by shade-tolerant hardwood. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind, or ice damage. Although TH4 sites generally maintain themselves through gap replacement, this VT can develop from early- and mid-successional forests of intolerant hardwood, in particular moist-rich aspen forests that follow stand-level disturbances. In the absence of stand-scale disturbance, this VT will develop old forest characteristics.

**Ecological Features:** TH4 is a similar hardwood forest to TH3, typically occurring as small patches (< 1 hectare up to 10 hectares). It has many of the same ecological features as TH3 but is often found on richer and moister soils. Vernal pools, seeps and springs are common and create habitat for red-backed salamanders, yellow-spotted salamanders and wood frogs, along with microhabitat for many invertebrate species. Maintaining these unique habitats help promote connectivity for species requiring moist to wet environments across terrestrial landscapes. This forest has the highest fern diversity of all VTs in the TH group, with a total of 21 recorded species, 15 of which were present, in survey data, at least 20% of the time. Outside of floodplain forests, this VT is one of the few which may include ostrich fern. It also supports the greatest species richness (i.e. of sampled vascular plant, lichen, and bryophyte species) of any tolerant hardwood forest, only surpassed in overall richness by some karst and wet forest VTs.



Red baneberry



# TH5

## Beech / Sarsaparilla / Leaf litter

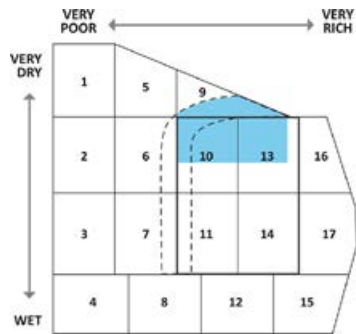
*Fagus grandifolia* / *Aralia nudicaulis*

**Concept:** Beech is dominant in this closed canopy forest and often has a significant presence in all strata. Other than beech, shrub and herbaceous coverage is sparse; the forest floor is primarily beech leaf litter. Prior to the introduction of beech bark canker, beech's longevity and shade tolerance promoted the development of old forest characteristics, maintained by gap disturbances. However, Beech / Sarsaparilla / Leaf litter is now relatively uncommon in the province, and while some mature stands are extant, examples of old growth are very rare.

**Vegetation:** Beech is the dominant overstory tree, with minor amounts of sugar maple, red maple, yellow birch and, less often, ironwood. Species diversity and coverage in the shrub and herbaceous layers are typically very low—a condition likely related to the phytotoxicity (toxicity to plants) of beech litter leachate. Somewhat increased shrub and herb cover can be found under mixed species portions of the canopy. Understory species include regenerating trees, striped maple, sarsaparilla and a variety of ferns. Beech drops, a parasitic plant on beech roots, is also usually present. The bryophyte layer is poorly developed, generally restricted to tree trunks, stones and downed woody material.

**Environmental Setting:** TH5 is found on dry to fresh, nutrient-medium soils derived from glacial till or colluvium. This VT is mainly found on the well to rapidly drained ridges of hilly topography in the Nova Scotia Uplands ecoregion, and in the North Mountain and South Mountain ecodistricts. It is often part of larger TH matrix forests, that include several VTs, occurring across a range of topographic positions. The hilltops where TH5 is frequently found are often subject to high wind and ice storm damage. TH5 can also occur on drumlin crests.

Dalem Lake Provincial Park,  
Cape Breton County



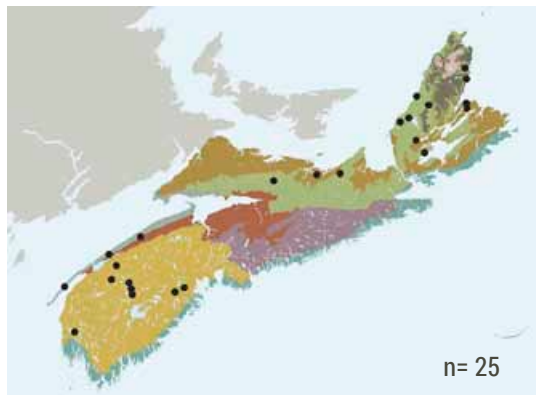
### Site & Soil Characteristics

Slope Position: Upper<sup>6</sup> Middle<sup>2</sup> Level<sup>1</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>2</sup>  
 (Very – Excessively)<sup>3</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Strongly<sup>4</sup> Moderately<sup>4</sup> Other<sup>2</sup>  
 Drainage: Well<sup>8</sup> Rapid<sup>1</sup> Other<sup>1</sup>

Common Soil Types: 2, 8, 2L  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>4</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>5</sup> (6–10)<sup>3</sup> (11–20)<sup>2</sup>  
 Humus Form: Mormoder<sup>4</sup> Vermimull<sup>2</sup> Mullmoder<sup>1</sup> Hemimor<sup>1</sup>  
 Other<sup>2</sup>



Characteristic Plants	TH5	
	Freq. (%)	Cover (%)
Beech	100	60
Red maple	68	12
Sugar maple	64	12
Yellow birch	64	11
White birch	44	9
Balsam fir	24	6
Red spruce	12	7
Hemlock	12	3
White ash	12	3
White spruce	12	2
<b>Tree Layer (Mean % Cover)</b>		<b>92</b>
Beech	96	18
Balsam fir	68	3
Striped maple	60	2
Red maple	56	2
Sugar maple	48	4
Fly-honeysuckle	28	0.2
White spruce	24	3
Red spruce	20	11
White pine	20	7
<b>Shrub Layer (Mean % Cover)</b>		<b>30</b>
Sarsaparilla	68	1
Starflower	68	0.3
Wild lily-of-the-valley	64	1
Wood aster	52	0.7
Evergreen wood fern	40	6
Ghost pipe	36	0.1
Hay-scented fern	32	1
Beech-drops	32	1
Christmas fern	28	3
Partridge-berry	28	0.1
Rose twisted stalk	28	0.1
Mountain wood fern	24	17
Bunchberry	24	1
Common speedwell	24	0.1
New York fern	20	4
Wood-sorrel	20	2
Drooping wood sedge	20	0.4
Goldthread	20	0.4
Violets	20	0.2
Bluebead lily	16	0.1
Ground pine	16	0.1
Lion's paw	16	0.1
Painted trillium	16	0.1
Twinflower	12	3
Hairy wood rush	12	1
Fibrous-root sedge	12	0.6
Pink lady's-slipper	12	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>16</b>
Broom moss	72	1
Hair-cap moss	56	0.7
Log moss	48	1
Schreber's moss	32	1
Fern moss	28	2
Bazzania	24	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>4</b>



**Successional Dynamics:** TH5 is a late-successional, climatic climax VT dominated by beech. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality, wind, or ice damage. This VT has been significantly impacted by beech bark canker, and its future in the Acadian forest is uncertain, especially with another introduced (ca 2012) invasive pest, beech leaf-mining weevil, which is causing widespread stand level mortality. Trends suggest that other shade-tolerant hardwoods will eventually establish on these sites. At present, most TH5 stands are even-aged, but eventual replacement by sugar maple, red maple and yellow birch will lead to more uneven-aged conditions.

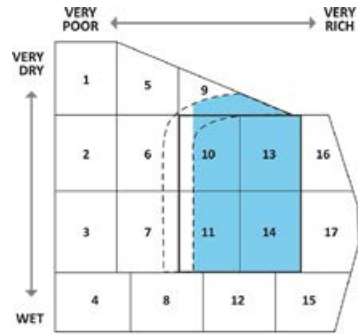
**Ecological Features:** This hardwood forest typically occurs in large patches. Beech is very shade-tolerant and the impact of the disease has largely reduced this species to an intermediate level or understory species, altering its ecological role in stand structure and dynamics. There is some evidence of genetic resistance to beech scale. Thus, mature, clean trees may present conservation and restoration opportunities; such occurrences should be considered important biodiversity and legacy features. Beech scale disease has decimated tree vigour and mast production in these forests. However, beech remains an important hard mast food source for bears, small mammals, and blue jays, among other bird species. Woodpeckers and yellow-bellied sapsuckers create cavities in the process of feeding and making nesting sites. Such cavities in tree stems, often initially created when branches break off, provide nesting and denning habitat for other vertebrate wildlife species. Beech wood is long lasting and provides snag and coarse woody material wherever the species occurs.

# TH6 Red oak – Yellow birch / Striped maple / Partridge-berry

*Quercus rubra* – *Betula alleghaniensis* /  
*Acer pensylvanicum* / *Mitchella repens*

**Concept:** This is a closed canopy upland forest composed of red oak and shade-tolerant hardwoods. Red maple is frequent. The shrub layer is predominantly regenerating hardwood species with scattered coverage (< 25%). The herbaceous layer is likewise sparse to scattered but can have a high species diversity.

**Vegetation:** Sugar maple, yellow birch and beech are commonly associated with red oak. Scattered softwoods are usually present with balsam fir, at times, locally abundant in the shrub layer. Balsam fir woolly adelgid often keeps this tree species from advancing into the overstory. Striped maple will typically be present with a variety of regenerating tree species (especially red oak) in the understory. The diverse and extensive herbaceous layer is characterized by sarsaparilla, cucumber root, partridge-berry, bunchberry and hay-scented fern. The bryophyte layer is discontinuous and species-poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.



## Site & Soil Characteristics

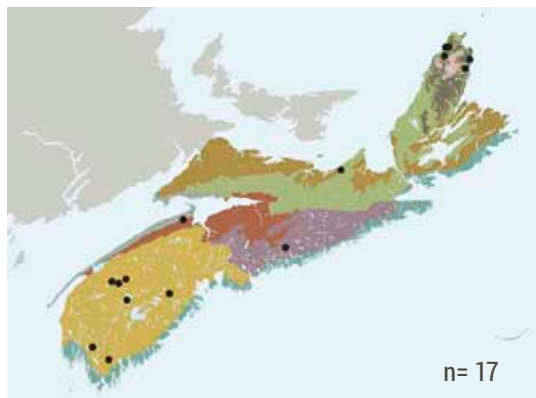
Slope Position:	Middle <sup>4</sup> Upper <sup>4</sup> Level <sup>1</sup> Crest <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>4</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Moderately <sup>3</sup> Slightly <sup>3</sup> Level <sup>1</sup> Severely <sup>1</sup> Other <sup>2</sup>
Drainage:	Well <sup>7</sup> Moderately well <sup>2</sup> Rapid <sup>1</sup>
Common Soil Types:	2, 8, 2L
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>5</sup> (> 45) <sup>3</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>5</sup> (6–10) <sup>3</sup> (11–20) <sup>1</sup> nd <sup>1</sup>
Humus Form:	Mormoder <sup>4</sup> Hemimor <sup>1</sup> Vermimull <sup>1</sup> Mullmoder <sup>1</sup> Mull <sup>1</sup> nd <sup>2</sup>

**Environmental Setting:** TH6 mainly occurs on dry to moist, nutrient medium soils of glacial origin. Surface stoniness is common and soils are of moderate depth and seldom shallow to bedrock. Stands occur

Baker Settlement, Lunenburg County



Characteristic Plants	TH6	
	Freq. (%)	Cover (%)
Red oak	100	22
Sugar maple	76	21
Yellow birch	71	25
Red maple	65	20
White birch	53	7
Balsam fir	41	8
Beech	35	18
White ash	29	9
Ironwood	18	5
Black spruce	12	16
Hemlock	12	6
<b>Tree Layer (Mean % Cover)</b>		<b>90</b>
Balsam fir	94	5
Red oak	88	3
Red maple	82	4
Striped maple	82	3
Sugar maple	71	9
White pine	65	0.8
Beech	47	5
White spruce	47	0.9
Yellow birch	47	0.3
White ash	35	1
Fly-honeysuckle	35	0.9
Serviceberry	35	0.2
Black spruce	29	3
Velvet-leaf blueberry	29	0.8
Wild raisin	29	0.4
<b>Shrub Layer (Mean % Cover)</b>		<b>27</b>
Partridge-berry	71	1
Starflower	71	0.8
Bunchberry	65	2
Sarsaparilla	59	2
Wild lily-of-the-valley	59	0.4
Bluebead lily	53	0.4
Ghost pipe	53	0.1
Evergreen wood fern	47	0.4
Cucumber root	47	0.2
Hay-scented fern	41	8
Christmas fern	41	7
Shinleaf	41	0.6
Wood aster	35	8
New York fern	35	5
Goldthread	35	2
Rose twisted stalk	35	0.2
Bracken	29	3
Bristly club-moss	29	0.5
Violets	29	0.3
False Solomon's seal	29	0.1
Lion's paw	29	0.1
Twinflower	24	5
<b>Herb Layer (Mean % Cover)</b>		<b>24</b>
Stair-step moss	65	3
Hair-cap moss	65	2
Broom moss	65	1
Schreber's moss	59	2
Log moss	47	2
Fern moss	29	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>7</b>



primarily on the upper and middle slopes of gentle to hilly terrain in the Western ecoregion, but may be scattered elsewhere.

**Successional Dynamics:** TH6 is a mid- to late-successional hardwood VT that may have even-aged or uneven-aged structure, depending on disturbance history. Tree species longevity and high shade tolerance promote old forest characteristics that are maintained by gap disturbances. Mechanisms for the maintenance of red oak in this VT are not fully understood, although low-intensity spring fires are thought to enhance understory regeneration. Increased presence of red maple and/or white birch generally indicates more intense and/or recent past disturbances. On drier sites TH6 may be the climax VT, while on more mesic sites—and in the absence of fire—TH6 may transition to vegetation types dominated by sugar maple and yellow birch.

**Ecological Features:** In western Nova Scotia, this forest occurs as a large-patch forest. It provides habitat for certain warblers, and more generally for other songbirds, flying squirrels and fisher. Large trees may provide nest sites for barred owl and northern goshawk, while downed coarse woody material can provide cover for red-backed salamanders and small mammals. Hard mast from oak and beaked hazelnut is a significant food source for bear, deer, squirrel, chipmunk, small mammals and birds. Oak regeneration is favoured as browse by deer. Oak is the preferred host of maitake, or hen-of-the-woods, a prized edible mushroom. Black trumpet mushrooms may also be found as mycorrhizal partners with oak and beech. Cancer root, a rare parasitic plant that steals nutrients and water from the roots of its host (usually red oak), is occasionally found in this ecosystem.

# TH7

## Yellow birch – White birch / Evergreen wood fern

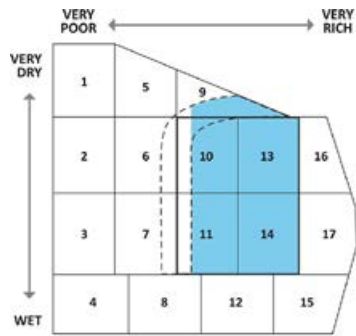
*Betula alleghaniensis* – *Betula papyrifera* / *Dryopteris intermedia*

**Concept:** Dominant levels of yellow birch and white birch, with lesser red maple comprise this closed canopy upland hardwood forest. Balsam fir is also common in both the overstory and understory – its dominance in either layer reflects the time elapsed since the last major insect disturbance (spruce budworm or tussock moth). Many stands have high levels of downed coarse woody material.

**Vegetation:** In addition to the canopy dominants listed above, scattered sugar maple, red or white spruce, and beech are also typical in the overstory. Balsam fir and sometimes red maple are prominent in the shrub layer, with striped maple also common in some stands. The herbaceous layer has extensive fern cover including wood ferns, hay-scented fern, northern beech fern, bracken and New York fern. Other common plants include several species of club-moss, sedges and typical woodland flora. The bryophyte later is discontinuous and species-poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.

**Environmental Setting:** TH7 mainly develop on fresh, nutrient medium soils of glacial origin. This VT is primarily found in eastern Nova Scotia and Cape Breton Island. TH7 is floristically similar to, but ecologically distinct from, the Maritime Boreal HL4 (Birch / Wood fern – Wood-sorrel), a transition forest occurring on upper slopes adjacent to the Cape Breton Highlands plateau. The frequency of white birch in TH7 stands not only reflects disturbance history, but also the effect of generally cooler climatic conditions, indicative of more the northern distribution of this VT in Nova Scotia.

Horne's Road,  
Cape Breton County

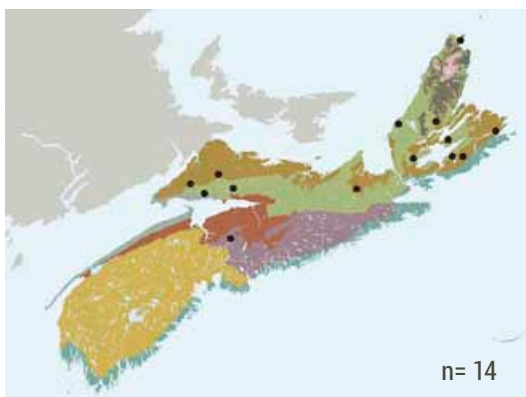


### Site & Soil Characteristics

Slope Position:	Upper <sup>6</sup> Middle <sup>4</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>4</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Moderately <sup>7</sup> Slightly <sup>1</sup> Strongly <sup>1</sup> Severely <sup>1</sup>
Drainage:	Moderately Well <sup>5</sup> Well <sup>4</sup> Rapid <sup>1</sup>
Common Soil Types:	2L, 2
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>3</sup> (> 45) <sup>4</sup> nd <sup>2</sup>
Forest Floor (cm):	(0–5) <sup>3</sup> (6–10) <sup>5</sup> (11–20) <sup>1</sup> nd <sup>1</sup>
Humus Form:	Mormoder <sup>6</sup> Humimor <sup>1</sup> nd <sup>3</sup>



Characteristic Plants	TH7	
	Freq. (%)	Cover (%)
Yellow birch	100	42
White birch	100	23
Balsam fir	71	9
Red maple	57	6
Sugar maple	36	9
White spruce	29	4
Beech	21	8
Red spruce	21	2
<b>Tree Layer (Mean % Cover)</b>		<b>83</b>
Balsam fir	93	6
Red maple	71	3
Striped maple	57	3
Sugar maple	57	1
Beech	29	22
White birch	29	3
Red spruce	29	0.9
Fly-honeysuckle	29	0.4
Mountain maple	29	0.3
White spruce	29	0.3
Velvet-leaf blueberry	29	0.1
Yellow birch	21	4
Mountain-ash	21	1
<b>Shrub Layer (Mean % Cover)</b>		<b>19</b>
Wild lily-of-the-valley	93	5
Evergreen wood fern	86	6
Bunchberry	79	11
Wood aster	71	1
Starflower	71	0.8
Wood-sorrel	64	4
Sarsaparilla	64	3
Mountain wood fern	57	19
Bluebead lily	57	0.9
Ghost pipe	57	0.1
Hay-scented fern	50	12
Goldthread	50	2
Bracken	43	7
New York fern	36	3
Northern beech fern	36	1
Twinflower	36	1
Spinulose wood fern	29	2
Drooping wood sedge	29	0.1
Ground pine	29	0.1
Fibrous-root sedge	21	0.2
Rose twisted stalk	21	0.2
Bladder sedge	21	0.1
Bristly club-moss	21	0.1
Shining club-moss	21	0.1
Brownish sedge	14	0.3
New England sedge	14	0.1
Soft leaved sedge	14	0.1
Running club-moss	14	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>49</b>
Schreber's moss	93	3
Broom moss	86	2
Stair-step moss	64	4
Bazzania	57	1
Log moss	43	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>9</b>



**Successional Dynamics:** TH7 is a mid-successional hardwood VT that follows partial stand-level disturbances in mixedwood forests such as MW1 (Red spruce – Yellow birch / Evergreen wood fern) and MW5 (White spruce – Yellow birch / Bunchberry – Wood fern). The softwood component in these mixedwood stands has been removed either by harvesting or insect/disease. TH7 may also originate after partial harvesting in sugar maple dominated tolerant hardwood forests, the yellow and white birch component revealing recent disturbances in the overstory.

**Ecological Features:** This closed canopy hardwood forest frequently occurs in small patches, most of which are inclusions within broader hardwood matrix forest. Yellow birch's longevity and intermediate shade tolerance facilitates the development of uneven-aged canopy structures, particularly as the prevalence of neighboring white birch trees diminishes through natural mortality. Yellow birch can produce stems more than 25 m tall with diameters of up to 100 cm or more, and the tree has the ability to withstand severe crown breakage and rotting. Yellow birch is often found growing on "stilts"—with open space between the roots and ground. This happens when a seed germinates and takes root on a rotting stump or log that later crumbles away. Large diameter, living, hollow trees are common in this forest type and provide good denning sites, cavity nest sites for songbirds, and canopy nest sites for broad-winged hawk and northern goshawk. Downed coarse woody material may provide cover for red-backed salamanders and small mammals. Birch seeds and catkins are an abundant food source during the winter for many species of birds (e.g. ruffed grouse) and small mammals. Birch trees may be deformed by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.

# TH8 Red maple – Yellow birch / Striped maple

*Acer rubrum* – *Betula alleghaniensis* / *Acer pensylvanicum*

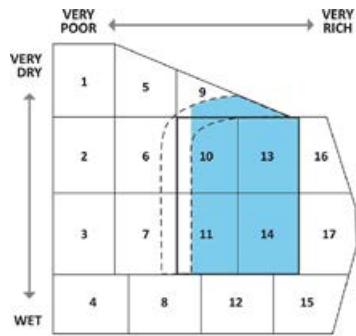
## TH8a White ash variant *Fraxinus americana*

**Concept:** These closed canopy forests are dominated by red maple and yellow birch. Sugar maples and beech are absent or only present as a minor structural component. The variant (TH8a) defines stands where white ash is present in the overstory, a reflection of increased moisture and/or fertility.

**Vegetation:** Most stands have a minor softwood component comprised of balsam fir, red spruce and/or white spruce within the predominantly hardwood overstory. In the shrub layer these roles reverse, with softwood regeneration dominant (especially balsam fir). Other shrubs include striped maple, mountain maple and fly-honeysuckle. The herbaceous layer has extensive fern cover including wood ferns, hay-scented fern and New York fern. Other common plants include bunchberry, wood-sorrel and gold thread. The bryophyte layer is discontinuous and species-poor, especially where the forest floor is characterized by leaf litter and/or where the softwood component is low.

**Environmental Setting:** TH8 mainly occurs on fresh to fresh-moist, nutrient medium to rich soils of glacial origin. It is found primarily in eastern Nova Scotia on upper and middle slopes of gentle terrain and on the drumlins of the Eastern Interior, Mulgrave Plateau and Bras d’Or Lowlands ecodistricts. However, the VT can be found scattered throughout Nova Scotia on similar sites.

**Successional Dynamics:** TH8 is a mid- to late-successional climatic climax hardwood VT dominated by red maple and yellow birch. Stands are predominantly even-aged but can develop uneven-aged canopy structures with time. Disturbance agents include wind, ice damage, insects, disease and forest harvesting. In the characteristic seral pathway for this



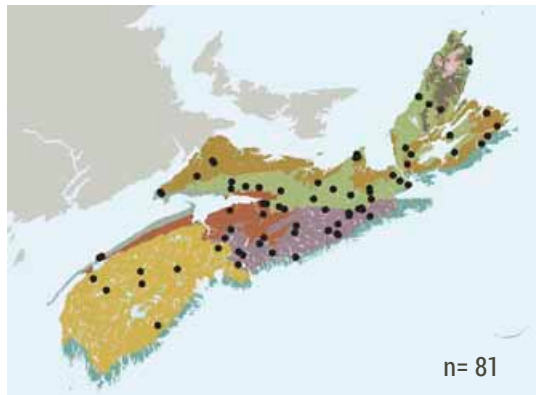
### Site & Soil Characteristics

Slope Position:	Upper <sup>4</sup> Middle <sup>3</sup> Level <sup>2</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>4</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Moderately <sup>4</sup> Strongly <sup>3</sup> Slightly <sup>2</sup> Other <sup>1</sup>
Drainage:	Well <sup>4</sup> Moderately Well <sup>3</sup> Imperfect <sup>2</sup> Other <sup>1</sup>
Common Soil Types:	2L, 2, 6, 5, 9, 8, 3L, 12, 8C
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>4</sup> (> 45) <sup>2</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>3</sup> (6–10) <sup>5</sup> (11–20) <sup>1</sup> Other <sup>1</sup>
Humus Form:	Mormoder <sup>4</sup> Vermimull <sup>1</sup> Other <sup>2</sup> nd <sup>3</sup>



Twin Lakes, Guysborough County

Characteristic Plants	TH8		TH8a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Yellow birch	100	33	88	10
Red maple	99	38	100	32
Sugar maple	47	7	38	9
Red spruce	33	8	38	8
Balsam fir	29	7	50	8
White birch	29	5	25	4
Beech	22	6	13	5
White spruce	16	5	38	0.1
White ash	7	4	100	29
Hemlock	3	3	25	10
Ironwood	1	0.1	38	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>83</b>		<b>85</b>
Balsam fir	92	8	100	6
Red maple	82	3	88	2
Yellow birch	81	2	75	0.5
Sugar maple	59	3	63	1
Striped maple	58	4	100	5
Red spruce	49	7	63	4
Fly-honeysuckle	41	0.8	63	2
Beech	40	4	13	0.1
White spruce	37	2	75	2
Mountain maple	25	2	38	0.7
Wild raisin	23	0.2	25	0.1
White ash	11	0.3	100	5
Serviceberry	10	0.1	25	0.1
Hemlock	5	0.4	25	0.4
Beaked hazelnut	4	1	25	3
Alternate-leaved dogwood	3	0.1	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>23</b>		<b>25</b>
Evergreen wood fern	90	10	100	7
Wild lily-of-the-valley	88	3	75	2
Hay-scented fern	67	18	25	38
Starflower	62	0.9	100	0.8
Goldthread	60	3	50	0.1
Bunchberry	59	8	25	0.1
Wood-sorrel	59	6	63	0.8
Sarsaparilla	58	2	63	2
New York fern	56	17	88	7
Wood aster	45	0.5	25	1
Rose twisted stalk	44	0.2	13	0.1
Violets	41	1	25	7
Northern beech fern	33	0.7	88	2
Cucumber root	33	0.1	25	0.1
Partridge-berry	30	0.6	38	0.1
Shining club-moss	30	0.5	13	0.3
Dwarf raspberry	26	1	25	11
Christmas fern	23	3	88	4
Interrupted fern	19	0.3	75	3
Drooping wood sedge	18	0.1	63	0.5
Lady fern	10	0.2	63	1
<b>Herb Layer (Mean % Cover)</b>		<b>54</b>		<b>44</b>
Broom moss	75	2	63	1
Stair-step moss	59	3	50	2
Log moss	58	2	63	6
Bazzania	56	3	50	3
Schreber's moss	42	2	38	0.5
Fern moss	37	1	75	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>9</b>		<b>20</b>



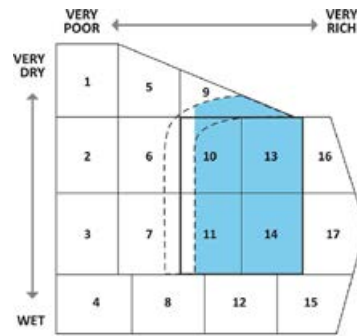
VT, early-successional stages of aspen, white birch and red maple can be bypassed if, at the time of disturbance, advanced red maple and yellow birch regeneration is retained. In eastern mainland Nova Scotia and lowland Cape Breton, red maple assumes a more shade-tolerant, long-lived role in tolerant hardwood ecosystems on zonal ecosites, likely a reflection of the cooler climatic conditions. In these areas, TH8 is a late-successional VT developing old growth forest characteristics over time; elsewhere it is considered mid-successional.

**Ecological Features:** Across eastern Nova Scotia, this closed canopy hardwood forest occurs as a large patch and can contribute interior forest habitat conditions. Yellow birch's longevity and shade tolerance facilitates the development of uneven-aged stand structures, with trees often exceeding 25 m in height and diameters up to 100 cm or more. Yellow birch has the ability to withstand severe crown breakage and rotting and when windthrown trees remain rooted, the downed bole can host several trees arising from epicormic branching. Yellow birch is often found growing on "stilts", with open space between the roots and ground. This happens when a seed germinates and takes root on a rotting stump or log that later crumbles away. In the TH8a variant, white ash can also contribute large diameter, living, hollow trees providing good denning opportunities, cavity nest sites for songbirds, and nest or perch sites for broad-winged hawks and northern goshawks. Yellow birch is an abundant seed source during the winter for many species of birds and small mammals, while red maple is an important early spring pollen source. Birch trees may be deformed by birch cinder conch, a fungal growth occasionally harvested for Chaga tea.



# TH9 Red maple – Sugar maple / Hay-scented fern – Evergreen wood fern

*Acer rubrum* – *Acer saccharum* /  
*Dennstaedtia punctilobula* – *Dryopteris intermedia*



**Concept:** These closed canopy forests are similar to other tolerant hardwood vegetation types, particularly TH1 (Sugar maple / Wood fern – Hay-scented fern) and TH2 (Sugar maple / New York fern – Northern beech fern), but are distinguished by relatively high levels of red maple. Yellow birch, beech and white ash are absent to sparse. The shrub layer is sparse to scattered and dominated by saplings of the main canopy species. The herbaceous layer can be very diverse and extensive, with fern species typically accounting for most of the plant cover. Moss and ground lichens are virtually absent.

**Vegetation:** Most stands host scattered occurrences of both coniferous and deciduous tree species in the overstory. Striped maple is prominent in the shrub layer and on some sites and usually a minor component of the overstory. Honeysuckle is often the only other shrub occurring regularly. Hay-scented fern and occasionally evergreen wood fern can often exceed 50% of ground cover. Eleven fern species are documented from sample plots. Sedge and club-moss diversity is also high in this VT.

**Environmental Setting:** TH9 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils of glacial origin. It can be found on upper and middle slopes of the Nova Scotia Uplands (300), and is scattered on similar sites throughout the province. The abundance of red maple likely indicates past partial stand-level disturbances, from either tree harvesting or a natural disturbance event, that created a suitable seedbed and/or increased light availability. These factors allow advanced regeneration to develop into the main canopy.

## Site & Soil Characteristics

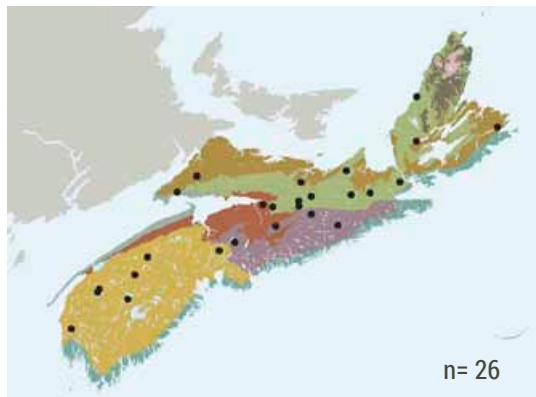
Slope Position: Upper<sup>4</sup> Middle<sup>3</sup> Crest<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>4</sup> (Moderately)<sup>4</sup>  
 (Very – Excessively)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Strongly<sup>4</sup> Moderately<sup>4</sup> Severely<sup>2</sup>  
 Drainage: Well<sup>6</sup> Moderately Well<sup>5</sup>

Common Soil Types: 2L, 2, 8  
 Rooting Depth (cm): (< 30)<sup>1</sup> (30–45)<sup>2</sup> (> 45)<sup>6</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>3</sup> (6–10)<sup>6</sup> (11–20)<sup>1</sup>  
 Humus Form: Mormoder<sup>3</sup> Mullmoder<sup>1</sup> Vermimull<sup>1</sup>  
 Humi-Fibrimor<sup>1</sup> nd<sup>4</sup>



Lake George,  
Yarmouth County

Characteristic Plants	TH9	
	Freq. (%)	Cover (%)
Red maple	100	37
Sugar maple	100	32
Yellow birch	77	13
Beech	31	10
White ash	19	6
Red spruce	19	2
White birch	12	3
White spruce	12	3
<b>Tree Layer (Mean % Cover)</b>		<b>86</b>
Sugar maple	92	8
Yellow birch	85	2
Red maple	85	2
Striped maple	73	4
Balsam fir	69	5
Fly-honeysuckle	65	0.7
Beech	58	2
Red spruce	46	2
White spruce	38	0.7
White ash	23	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>20</b>
Evergreen wood fern	96	9
Hay-scented fern	92	33
Wild lily-of-the-valley	81	3
Violets	81	2
Rose twisted stalk	81	0.3
Starflower	77	0.8
Wood-sorrel	65	4
New York fern	54	15
Sarsaparilla	54	1
Northern beech fern	54	0.9
Cucumber root	54	0.2
Painted trillium	54	0.1
Wood aster	50	0.3
Christmas fern	46	5
Drooping wood sedge	46	0.1
Goldthread	42	2
Wood reed	38	0.1
Bristly club-moss	35	0.6
Fibrous-root sedge	35	0.1
Ground pine	31	3
Shining club-moss	31	2
Bluebead lily	31	0.2
Lion's paw	31	0.1
Mountain wood fern	27	3
Partridge-berry	23	0.8
Shinleaf	23	0.2
Short husk	23	0.2
Running club-moss	19	0.2
Lady fern	17	4
White lettuce	15	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>65</b>
Broom moss	77	1
Log moss	62	1
Hair-cap moss	50	0.6
Stair-step moss	38	0.8
Fern moss	35	0.7
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>3</b>



**Successional Dynamics:** TH9 is a mid- to late-successional climatic climax hardwood VT dominated by red maple and sugar maple. Stands are predominantly even-aged but can develop uneven-aged canopy structures with time. The longevity of red maple in this ecosystem can rival that of sugar maple. Disturbance agents include wind, ice damage, insects, disease and harvesting. In the characteristic seral pathway for this VT, early-successional stages can be bypassed if, at the time of disturbance, advanced red maple and sugar maple regeneration is present.

**Ecological Features:** This closed canopy hardwood forest occurs as a small to large patch. Sugar maple's longevity and shade tolerance facilitates the development of uneven-aged stand structures. Stands occurring on higher relative elevation (greater than 200 m) crests and upper slopes are exposed to strong winds and have increased susceptibility to ice storms, blowdown and crown breakage. Large trees may provide nest sites for barred owls and northern goshawks, while large diameter snags provide cavity-nesting and denning opportunities for numerous other vertebrate species. Eventually snags become downed coarse woody material, providing cover for red-backed salamanders, many small mammals and invertebrates, and microhabitats for bryophytes, lichens and fungi. These latter three species groups are otherwise somewhat uncommon on the forest floor of hardwood stands. Downed hardwood logs are favoured drumming sites for ruffed grouse. Hard mast from beech and beaked hazelnut provides a significant food source for bears, white-tailed deer, and many other fauna. These forests host a variety of spring ephemeral plants providing pollinators with concentrated pollen and nectar sources early in the growing season.

# WC

## Wet Coniferous Forest Group

### Wet Coniferous (WC) Key

1a. Stands in an open woodland condition (10–30% crown closure) ... WC11	7a. Huckleberry absent or scattered ... WC2
1b. Stands in a forested condition (> 30% crown closure) ... 2	7b. Huckleberry abundant to dominant ... WC2a
2a. Tamarack abundant to dominant ... 3	8a. Jack pine and black spruce dominant ... WC3
2b. Tamarack absent to scattered ... 4	8b. Red pine and black spruce dominant ... WC4
3a. Coastal plain species (Inkberry, High bush blueberry) absent ... WC7	9a. Red spruce abundant to dominant ... WC5
3b. Coastal plain species present ... WC7a	9b. Red spruce absent to scattered ... 10
4a. Black spruce and/or pines abundant to dominant ... 5	10a. Balsam fir and/or White spruce dominant ... 11
4b. Black spruce and/or pines absent to scattered ... 9	10b. Not as above ... 12
5a. Pines absent or sparse ... 6	11a. White spruce absent or sparse ... WC6
5b. Pines scattered to dominant ... 8	11b. White spruce abundant to dominant ... WC9
6a. Shrubs absent or sparse ... WC1	12a. Hemlock abundant to dominant ... WC8
6b. Shrubs abundant to dominant ... 7	12b. Eastern white cedar present (excluding escapes) ... WC10

COVER CLASSES: Sparse < 10% Scattered 10–25% Abundant 26–50% Dominant > 50%

## Concept

For most of the growing season, these wet forest ecosystems have water at or near the ground surface. The closed to partially closed canopies are dominated by softwood species and a well-developed understory of plants tolerant of wet conditions across a range of nutrient regimes. These small- to large-patch forests develop on wet organic or mineral soils, with level to depressional topography, where water is received from precipitation, springs, seepage and/or surface flows. Water and nutrient inputs from adjacent sites are lower than those in wet deciduous forests, while peat accumulation is generally higher. All Vegetation Types (VT) are found in the Acadian Macrogroup, with several (WC3, WC6, WC7, WC11) also occurring in the Maritime Boreal Macrogroup.

The shrub layer is usually well developed and characterized by ericaceous species, mountain holly and winterberry. Typical herbaceous species include cinnamon fern, creeping snowberry and several sedge species (e.g. three seeded and tussock sedge). Sphagnum moss coverage is generally extensive. These wet coniferous forests are edaphic climax communities limited by high soil moisture and often low

fertility (high acidity). Fluctuating water levels, windthrow, insects and disease are significant disturbance agents. Stands of a given VT may display a range of development stages depending on disturbance history and natural senescence. Similar to other wet forest groups, bryophyte species richness is notably high.

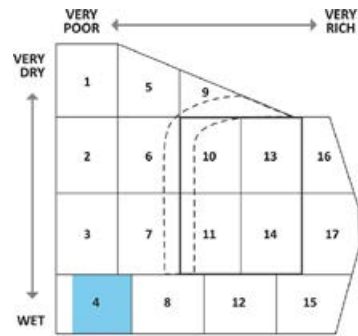
These forests make unique contributions to landscape composition and structure. Wet forests are also important sites for carbon storage, nitrogen cycling, and are often associated with headwaters, where they help regulate water flow, provide filtration, and recharge groundwater resources. They provide habitat for numerous plants, lichens, invertebrates and vertebrates, including moose, amphibians and birds (e.g. olive-sided flycatcher, rusty blackbird, swamp sparrow, winter wren, eastern kingbird, northern water thrush, American woodcock, and Wilson's, Canada and Nashville warblers). Edaphic climax forests in this group are self-sustaining, and many express indicators of long-term ecological continuity and unique forms of old growth. Wetter stands may persist as woodlands, with stunted and widely spaced trees.

# WC1 Black spruce / Cinnamon fern / Sphagnum

*Picea mariana* / *Osmundastrum cinnamomeum* / *Sphagnum* spp.

**Concept:** The Black spruce / Cinnamon fern / Sphagnum forest is characterized by black spruce canopy dominance, moderate to high herbaceous cover, and by a well-developed layer of sphagnum mosses. It is found on wet, nutrient poor soils and persists as an edaphic climax. This Vegetation Type (VT) is similar to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum), which is even further nutrient limited, has a more prominent shrubby understory, and is typically found on sites with further reduced ground and surface water flow.

**Vegetation:** Crown closure is moderate to high with a canopy heavily dominated by black spruce and lesser amounts of balsam fir. Other trees are sparsely scattered with low cover. The woody understory is scattered (10–25% cover) with ericaceous species and layered black spruce. Herbs are usually dominant (> 40% cover) and characteristic vascular plants include mountain holly, cinnamon fern, creeping snowberry, goldthread and three seeded sedge. Bryophyte development is high, composed of sphagnum mosses and lesser amounts



## Site & Soil Characteristics

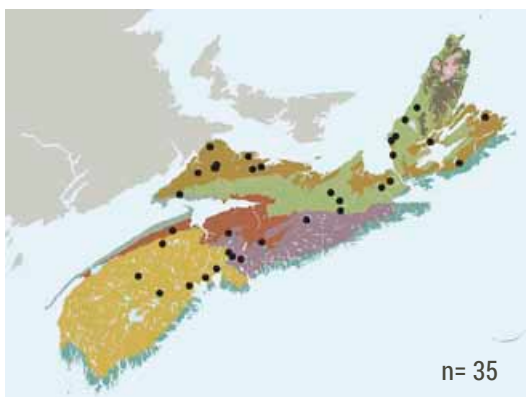
Slope Position:	Level <sup>8</sup> Depression <sup>1</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>7</sup> Slightly <sup>3</sup>
Drainage:	Poor <sup>7</sup> Very Poor <sup>3</sup>
Common Soil Types:	4, 7, 14
Rooting Depth (cm):	(<30) <sup>7</sup> (30–45) <sup>1</sup> nd <sup>2</sup>
Forest Floor (cm):	(6–10) <sup>1</sup> (11–20) <sup>4</sup> (21–40) <sup>3</sup> (> 40) <sup>2</sup>
Humus Form:	Hydromor <sup>2</sup> Hemimor <sup>2</sup> Peaty Mor <sup>1</sup> Saprimoder <sup>1</sup> Fibrimor <sup>1</sup> Other <sup>3</sup>

of common upland species. Ladies' tresses and/or pale fat-leaved sphagnum, with small pockets of common green or flat topped sphagnum, are common.

Tyndal Road, Cumberland County



Characteristic Plants	WC1	
	Freq. (%)	Cover (%)
Black spruce	100	54
Balsam fir	51	11
Red maple	49	5
Tamarack	34	3
White pine	26	7
<b>Tree Layer (Mean % Cover)</b>		<b>65</b>
Black spruce	94	5
Mountain holly	91	1
Lambkill	89	2
Red maple	89	0.7
Balsam fir	71	4
Velvet-leaf blueberry	63	1
Wild raisin	60	1
Lowbush blueberry	43	0.9
Labrador tea	37	0.5
Serviceberry	23	0.1
White pine	20	0.1
Huckleberry	17	2
<b>Shrub Layer (Mean % Cover)</b>		<b>14</b>
Bunchberry	91	5
Cinnamon fern	89	17
Goldthread	71	3
Creeping snowberry	69	2
Three seeded sedge	60	13
Bracken	49	9
Pink lady's-slipper	34	0.2
Starflower	31	0.2
Twinflower	29	4
Sarsaparilla	29	1
Painted trillium	29	0.1
Wild lily-of-the-valley	26	0.2
Ghost pipe	23	0.1
Teaberry	20	0.1
Bluebead lily	17	0.6
Three-leaved false Solomon's seal	14	0.3
<b>Herb Layer (Mean % Cover)</b>		<b>43</b>
Schreber's moss	100	28
Ladies' tresses	77	21
Stair-step moss	71	9
Bazzania	66	4
Wavy dicranum	60	2
Pale fat-leaved sphagnum	46	35
Flat topped sphagnum	37	24
Hair-cap moss	37	1
Grey reindeer lichen	34	0.6
Common green sphagnum	31	27
Broom moss	31	2
Log moss	31	1
Plume moss	23	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>94</b>



**Environmental Setting:** This is a nutrient poor wet forest. Soils are usually derived from glacial till or organic deposits with minor ground and/or surface water flow. It is found in shallow depressions and on flats and gentle slopes with very little microtopography. Sloped occurrences are usually cooler aspects. Rooting potential is strongly limited by high water levels. Most stands are in the Eastern and Northumberland/Bras d'Or ecoregions, with outliers scattered throughout the remainder of the province.

**Successional Dynamics:** This ecosystem can be expressed at a variety of development stages. It is a type of edaphic climax, largely maintained by limiting site conditions. Tree windthrow and uprooting are the primary mechanisms of renewal, but many stands have a history of timber harvest. WC1 does not shift to other vegetation types after major disturbance, but does change to an earlier developmental stage of the same VT. Between stand-level disturbance events, natural senescence can create uneven-aged stand structure. Vegetative layering is the dominant form of black spruce regeneration.

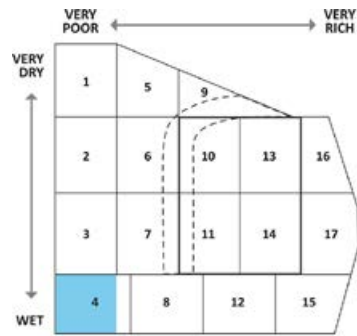
**Ecological Features:** This small-patch ecosystem has variable crown closure and height, but with consistently dense herbaceous and bryophyte cover. Herbivore forage is limited, but the VT provides important thermal cover for moose and deer, habitat for amphibians, and other notable habitat values, especially for nesting birds. These forests can sustain old growth conditions, which are easily overlooked due to the slow growing, smaller trees that characterize stands. The VT can support prominent levels of dwarf mistletoe and associated witches broom.

# WC2 Black spruce / Lambkill – Labrador tea / Sphagnum

*Picea mariana* / *Kalmia angustifolia* –  
*Rhododendron groenlandicum* / *Sphagnum* spp.

## WC2a Inkberry variant *Ilex glabra*

**Concept:** This nutrient poor to very poor coniferous forest is characterized by black spruce canopy dominance and by high shrub and sphagnum moss cover. It is found on poorly drained mineral or organic deposits, and persists as an edaphic climax. The ecosystem is the most acidic, wet black spruce forest in Nova Scotia. Stands with coastal plain species like inkberry and/or moderate to high levels of huckleberry distinguish the variant WC2a. WC2 is similar to WC1 (Black spruce / Cinnamon fern / Sphagnum), another wet black spruce forest with higher relative herbaceous cover and slightly less acidic soils.



### Site & Soil Characteristics

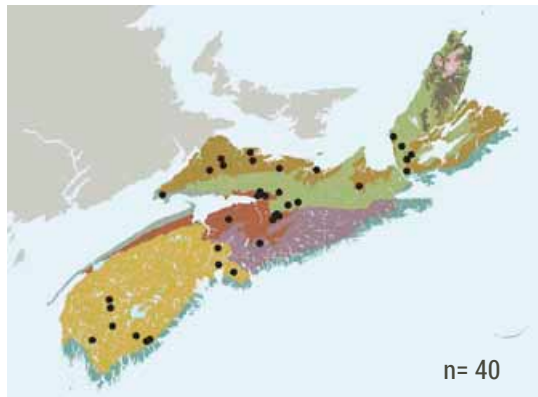
Slope Position:	Level <sup>9</sup> Other <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>9</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>6</sup> Slightly <sup>1</sup> Moderately <sup>1</sup> Other <sup>2</sup>
Drainage:	Poor <sup>5</sup> Very Poor <sup>3</sup> nd <sup>1</sup>
Common Soil Types:	14, 7, 4
Rooting Depth (cm):	(< 30) <sup>7</sup> (30–45) <sup>1</sup> nd <sup>2</sup>
Forest Floor (cm):	(6–10) <sup>1</sup> (11–20) <sup>4</sup> (21–40) <sup>2</sup> (> 40) <sup>3</sup>
Humus Form:	Hydromor <sup>2</sup> Saprimoder <sup>1</sup> Hemimor <sup>1</sup> Other <sup>1</sup> nd <sup>5</sup>

**Vegetation:** Crown closure is low to moderate, which increases light availability to lower strata and promotes shrub abundance. The overstory is dominated by black spruce. In younger, more exposed, or extremely wet stands, the canopy may be formed by stunted trees in the tall shrub layer. The woody understorey is thick with lambkill and scattered Labrador tea, rhodora, wild raisin and mountain holly. Creeping snowberry, goldthread and three seeded sedge characterize the sparse herbaceous layer. The dense bryophyte carpet is dominated by sphagnum moss. Ladies' tresses and flat topped sphagnum are common. Red fat-leaved sphagnum is much more frequent than in other coniferous wet forests of the province; the species is indicative of very poor drainage (with anaerobic rooting conditions for the majority of the growing season) and very low nutrient availability.

**Environmental Setting:** This ecosystem usually occurs on poorly drained flats, underlain by coarse textured glacial tills or peat. Ground and surface water flow is minimal and low in nutrients. Rooting potential is limited by compacted and/or saturated soils. Sites

Black Lake, Cumberland County

Characteristic Plants	WC2		WC2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Black spruce	100	46	100	28
Tamarack	38	4	75	6
Red maple	28	6	50	9
Balsam fir	25	5	13	7
White pine	6	4	25	5
<b>Tree Layer (Mean % Cover)</b>	<b>51</b>		<b>39</b>	
Lambkill	100	10	100	6
Black spruce	100	10	100	9
Mountain holly	97	5	75	13
Wild raisin	94	2	100	4
Red maple	91	2	88	5
Velvet-leaf blueberry	72	4	50	3
Labrador tea	69	5	75	6
Balsam fir	63	3	50	1
Rhodora	50	7	25	4
Lowbush blueberry	44	4	25	2
Serviceberry	41	0.3	50	0.6
Huckleberry	22	8	63	9
Winterberry	22	1	13	4
Tamarack	19	0.3	38	2
Chokeberries	16	0.3	25	2
Inkberry			75	30
<b>Shrub Layer (Mean % Cover)</b>	<b>45</b>		<b>72</b>	
Bunchberry	100	8	75	11
Goldthread	88	2	75	1
Creeping snowberry	78	2	63	3
Three seeded sedge	66	4	50	13
Cinnamon fern	53	14	50	3
Bracken	53	9	63	10
Pink lady's-slipper	50	0.1	38	0.5
Wild lily-of-the-valley	34	1	25	0.1
Teaberry	25	4	25	0.1
Painted trillium	22	0.2	13	0.1
Sarsaparilla	16	2	38	0.3
Starflower	16	0.6	50	0.1
Trailing blackberry	13	0.2	38	0.7
Bog aster	13	0.1	25	0.1
Partridge-berry	9	0.1	50	0.2
Blue joint	9	0.1	25	0.5
Round-leaved sundew	9	0.1	25	0.1
Pitcher-plant	3	1	38	1
Button sedge			25	1
Elliott goldenrod			25	0.3
<b>Herb Layer (Mean % Cover)</b>	<b>31</b>		<b>28</b>	
Schreber's moss	97	41	100	15
Stair-step moss	78	4	13	0.1
Ladies' tresses	75	32	63	10
Bazzania	59	5	50	0.1
Wavy dicranum	56	2	13	20
Flat topped sphagnum	53	13	25	6
Grey reindeer lichen	50	1	50	0.1
Cup lichens	44	0.2	38	0.1
Broom moss	34	2	38	2
Pale fat-leaved sphagnum	25	20	25	5
Red fat-leaved sphagnum	25	19	50	12
Plume moss	22	0.5	38	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>98</b>		<b>44</b>	



are moderately exposed, with very little microtopography. Sloped occurrences are usually found on cooler aspects. Most stands are found in the Northumberland/Bras d'Or and Valley & Central Lowland ecoregions, but some extend into upland and even highland areas. Occurrences of WC2a are largely limited to the Western ecoregion.

**Successional Dynamics:** This forest is a type of edaphic climax, meaning it is maintained by limiting site conditions including soil saturation and shallow rooting potential. Tree windthrow and uprooting are common mechanisms of renewal, but fire can sometimes play a role. This ecosystem can be expressed at a variety of developmental stages. WC2 does not shift to other vegetation types after major disturbance, but does change in development stage. Uneven-age class distributions are typically developed between these disturbances. Vegetative layering is the dominant form of black spruce regeneration.

**Ecological Features:** The understory of this small-patch forest is dense with shrubs and regenerating trees. These collectively increase overall vertical structure and provide nesting, rearing and cover habitat for a variety of vertebrates. Plant species richness and site productivity is reduced, limiting habitat diversity and rare species potential. However, WC2a, the huckleberry-inkberry variant, occasionally supports somewhat uncommon Atlantic Coastal Plain plants, like button sedge and Elliott's goldenrod. The presence of allelopathic plants (those that produce biochemicals that limit the growth of nearby plants), like lambkill, can negatively influence black spruce regeneration and growth, resulting in lower canopy cover. This ecosystem provides many of the same habitat features listed for WC1. Unique old growth conditions are easily overlooked due to the generally small trees that are common in WC2 stands.

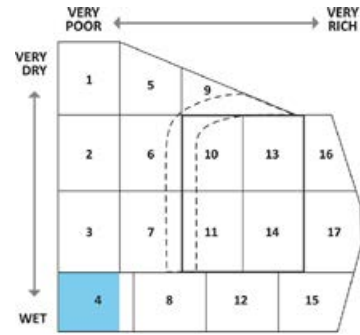


# WC3 Jack pine – Black spruce / Rhodora / Sphagnum

*Pinus banksiana* – *Picea mariana* /  
*Rhododendron canadense* / *Sphagnum* spp.

**Concept:** The Jack pine – Black spruce / Rhodora / Sphagnum VT is the wettest jack pine forest in Nova Scotia. Most occurrences are on poorly to very poorly drained soil, derived from acidic glacial till or, far less commonly, organic deposits. The overstory is dominated by jack pine, or co-dominated by jack pine and black spruce.

**Vegetation:** Tamarack and/or red maple are infrequent associates in the overstory. Limiting site conditions and the prevalence of inherently small crowned conifers reduces canopy closure and promotes shrub abundance. Rhodora is present and usually dominant in most stands, further indicating very low soil nutrient availability. Admixtures of lambkill and/or Labrador tea compliment the dense ericaceous shrub layer typical of this VT. Huckleberry is less common but abundant in some occurrences. Jack pine regeneration is low or absent from the understory. Herbaceous cover is reduced, largely comprised of scattered teaberry, mayflower and



Refer to page 242 for Maritime Boreal edatopic grid.

### Site & Soil Characteristics

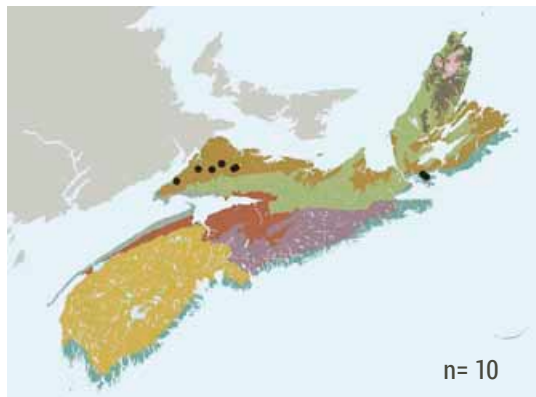
- Slope Position: Level<sup>8</sup> Lower<sup>1</sup> Upper<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>9</sup> nd<sup>1</sup>
- Bedrock Outcrop: (Non-rocky)<sup>10</sup>
- Microtopography: Level<sup>9</sup> nd<sup>1</sup>
- Drainage: Poor<sup>7</sup> Very Poor<sup>2</sup> nd<sup>1</sup>
  
- Common Soil Types: 4, 7
- Rooting Depth (cm): (< 30)<sup>7</sup> (30–45)<sup>1</sup> nd<sup>2</sup>
- Forest Floor (cm): (6–10)<sup>1</sup> (11–20)<sup>9</sup> (21–40)<sup>1</sup> nd<sup>1</sup>
- Humus Form: Hydromor<sup>3</sup> Fibrimor<sup>2</sup> Hemimor<sup>2</sup> Hydromoder<sup>2</sup> nd<sup>1</sup>

other common forest species. Schreber’s moss, hair-cap moss and wavy dicranum are more frequent than in any other wet coniferous forest in Nova Scotia. Sphagnum moss, particularly ladies’ tresses, is typical in the well-developed bryophyte layer.

Thomson Station, Cumberland County



Characteristic Plants	WC3	
	Freq. (%)	Cover (%)
Jack pine	100	28
Black spruce	100	16
Tamarack	20	7
Red maple	20	1
Balsam fir	10	3
Grey birch	10	0.1
Red pine	10	0.1
White birch	10	0.1
<b>Tree Layer (Mean % Cover)</b>	<b>46</b>	
Lambkill	100	15
Black spruce	100	7
Red maple	100	3
Rhodora	90	33
Labrador tea	90	7
Mountain holly	80	7
Lowbush blueberry	80	2
Wild raisin	70	1
Huckleberry	60	15
Serviceberry	60	0.4
Velvet-leaf blueberry	50	2
Chokeberries	50	0.2
Leather-leaf	30	2
Ground juniper	20	2
Speckled alder	20	2
Willows	20	2
Downy alder	20	0.2
Tamarack	20	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>80</b>	
Teaberry	80	11
Bunchberry	70	4
Pink lady's-slipper	70	0.2
Bracken	60	9
Mayflower	60	2
Goldthread	60	0.5
Cinnamon fern	30	9
Creeping snowberry	30	3
Three seeded sedge	30	1
Wild lily-of-the-valley	30	0.6
Starflower	30	0.4
Ghost pipe	20	0.1
Ground pine	20	0.1
Round-leaved sundew	20	0.1
Three-leaved false Solomon's seal	20	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>22</b>	
Schreber's moss	100	46
Ladies' tresses	90	21
Wavy dicranum	80	3
Hair-cap moss	80	0.9
Flat topped sphagnum	40	24
Grey reindeer lichen	40	3
Pale fat-leaved sphagnum	30	15
Stair-step moss	30	4
Cup lichens	30	0.1
Bazzania	20	4
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>90</b>	



**Environmental Setting:** The Jack pine – Black spruce / Rhodora / Sphagnum forest usually occurs on poorly drained, acidic, mineral soils with reduced rooting potential. This low elevation ecosystem is usually on moderately exposed flats but may be found in lower topographic positions of gentle slopes or in shallow depressions with very little microtopography. Sloped occurrences are usually found on cooler aspects. This uncommon forest is largely limited to northern and central parts of the mainland and parts of Cape Breton.

**Successional Dynamics:** This early- to mid-successional forest usually originates with fire, promoting jack pine regeneration. Extreme weather events can dry litter, surface soil horizons, and the somewhat flammable ericaceous plant layer to allow these normally wet stands to burn. However, such conditions are uncommon, and stands often regenerate through seed from adjacent uplands. The Jack pine – Black spruce / Rhodora / Sphagnum forest will succeed to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum) in the absence of fire.

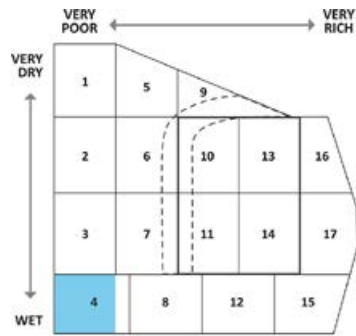
**Ecological Features:** An open canopy of narrow-crowned conifers characterizes this very uncommon small-patch ecosystem. The woody understory is dense with ericaceous shrubs and black spruce, providing vertical complexity in many stands. Site productivity is low; few rare plant species are expected, and old growth potential is very low to nil. This wet forest is often a transition between open wetlands and upland coniferous forest. Occurrences may provide locally important habitat for various invertebrates, birds, amphibians, small mammals, reptiles and lichens. By virtue of its rarity, restricted Canadian range and fire dependency, this ecosystem presents unique conservation challenges.

# WC4 Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum

*Pinus resinosa* – *Picea mariana* /  
*Gaylussacia baccata* – *Rhododendron canadense* / *Sphagnum* spp.

**Concept:** This uncommon wet forest is characterized by red pine canopy dominance, a well-developed shrub layer, and prominent sphagnum moss cover. The early- to mid-successional ecosystem is the wettest red pine forest found in Nova Scotia. Most occurrences are initiated by (and may be maintained through) fire, but windthrow can also expose mineral soil and promote red pine recruitment.

**Vegetation:** Black spruce or white pine can be associates in the canopy. Crown closure is typically low but increases on less saturated soil. The understory is well developed, with moderate to high shrub and bryophyte cover. Acid tolerant shrubs including huckleberry, rhodora, low bush blueberry, wild raisin and Labrador tea, among others, are frequent. Red pine recruitment is low to absent beneath the canopy. The herb layer is reduced except in stands with prominent bracken. Bryophyte cover is well developed but species poor. Ladies’ tresses is the only prominent sphagnum



## Site & Soil Characteristics

Slope Position: Level<sup>8</sup> Middle<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Level<sup>8</sup> Moderately<sup>2</sup>  
 Drainage: Poor<sup>8</sup> Very Poor<sup>2</sup>

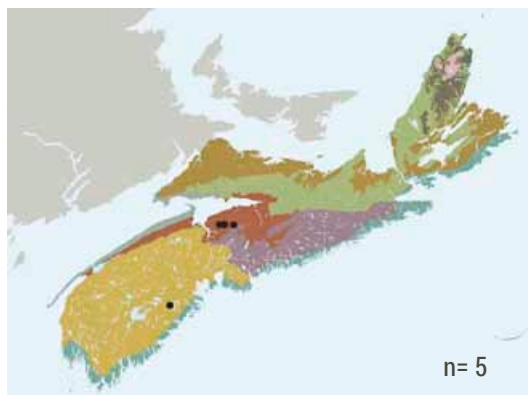
Common Soil Types: 7  
 Rooting Depth (cm): (< 30)<sup>8</sup> nd<sup>2</sup>  
 Forest Floor (cm): (6–10)<sup>4</sup> (11–20)<sup>4</sup> (21–40)<sup>2</sup>  
 Humus Form: Fibrimor<sup>2</sup> Hemimor<sup>2</sup> nd<sup>6</sup>

species. Shrub and bryophyte species richness values are respectively higher and lower than in any other wet coniferous VT in NS, while bog goldenrod and small patches of reindeer lichen occur more frequently.

Anthony Lake, Hants County



Characteristic Plants	WC4	
	Freq. (%)	Cover (%)
Red pine	100	24
Black spruce	80	13
White pine	60	7
Red maple	40	6
Tamarack	40	1
<b>Tree Layer (Mean % Cover)</b>		<b>42</b>
Lambkill	100	30
Black spruce	100	8
Lowbush blueberry	100	6
Rhodora	80	20
Huckleberry	80	11
Red maple	80	8
Wild raisin	80	3
Tamarack	80	0.8
Velvet-leaf blueberry	60	7
Speckled alder	60	0.2
Serviceberry	60	0.2
Labrador tea	60	0.1
Grey birch	40	3
Mountain holly	40	3
Chokeberries	40	0.3
White meadowsweet	40	0.3
Willows	40	0.2
White pine	40	0.1
Dwarf huckleberry	20	2
Leather-leaf	20	1
Pale laurel	20	1
White meadowsweet	20	0.5
<b>Shrub Layer (Mean % Cover)</b>		<b>85</b>
Teaberry	100	10
Bunchberry	80	15
Bracken	60	33
Mayflower	60	2
Small cranberry	60	0.8
Goldthread	60	0.4
Wild lily-of-the-valley	60	0.2
Creeping snowberry	40	3
Cinnamon fern	40	0.3
Bog-goldenrod	40	0.1
Trailing blackberry	40	5
Bog aster	20	0.5
Swamp candles	20	0.5
Blue flag	20	0.3
Blue joint	20	0.3
Canada rush	20	0.3
Little club-spur orchid	20	0.3
Dragon's mouth	20	0.1
Northern yellow-eyed grass	20	0.1
Round-leaved sundew	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>54</b>
Ladies' tresses	80	55
Schreber's moss	80	18
Grey reindeer lichen	60	5
Wavy dicranum	40	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>71</b>



**Environmental Setting:** The Red pine – Black spruce / Huckleberry – Rhodora / Sphagnum forest occurs on moderately exposed flats and gentle slopes. Soils are poorly drained glacial tills with low rooting potential and usually high organic layer accumulation. This forest is largely known from the Western eco-region on moderately exposed flats and gentle slopes. Microtopography is slight to moderate and aspect is variable.

**Successional Dynamics:** This early- to mid-successional forest originates with fire or windthrow, both of which may promote red pine regeneration. Tree uprooting resulting from windthrow often exposes mineral soil, thus promoting red pine seed germination. Red pine's presence decreases between disturbance events. This favours black spruce, a tree species which has the flexibility to regenerate through either seeding or layering. In the absence of fire, the ecosystem will eventually succeed to WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum).

**Ecological Features:** This small-patch forest is an uncommon ecosystem characterized by low canopy closure and by high shrub and bryophyte cover. Soils are acidic with low surface and ground water flow. These factors contribute to reduced microhabitat variability, vegetation productivity and species richness. Improved forage opportunities for vertebrate wildlife species exist where huckleberry forms a significant component of the shrub layer. These forests can have an older cohort of fire-scarred red pine "parent trees", frequently with cavities and hollow trunks. Rare plants are not documented from the ecosystem and old growth potential is very low. This wet forest is rare in Nova Scotia, and particularly with its fire dependency, presents conservation challenges.

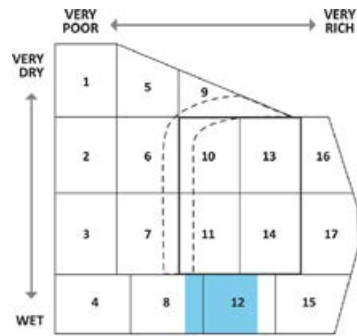
# WC5 Red spruce – Balsam fir/ Cinnamon fern / Sphagnum

*Picea rubens* – *Abies balsamea* /  
*Osmundastrum cinnamomeum* / *Sphagnum* spp.

**Concept:** This mature coniferous ecosystem is the only wet red spruce forest found in Nova Scotia. WM2 is a comparable wet mixedwood Vegetation Type (VT) with low to moderate levels of both red spruce and red maple. Red spruce – Balsam fir/ Cinnamon fern / Sphagnum forest is found on soils with reduced rooting potential and relatively low nutrient availability, but sites are generally more productive than those supporting wet black spruce forests (i.e. WC1 and WC2). The presence of red spruce and other mineratrophic plants are indicative of at least moderately enriched, well-oxygenated, subsurface water flow. WC5 is a low-elevation ecosystem characterized by red spruce dominance and high sphagnum moss cover.

**Vegetation:** The evergreen canopy is dominated by red spruce with lesser but frequent balsam fir and red maple. Few other tree species are frequent in the canopy, but it is well developed with moderate to high crown closure. Woody shrub and herbaceous cover is low to moderate. Forest plants common to wet forests are present (e.g. cinnamon fern). This VT (along with WC6 and WC9) hosts more upland forest species (e.g. wood-sorrel, wild sarsaparilla, bluebead lily) than other forests in the wet coniferous group. Sphagnum mosses largely dominate the dense bryophyte layer. Similar to other moderately-productive, wet coniferous VTs (i.e. WC6, WC8), common green sphagnum is characteristic. Bryophyte species richness is relatively high, second only to WC9.

**Environmental Setting:** The Red spruce – Balsam fir/ Cinnamon fern / Sphagnum forest is found on lowland plains and gently rolling uplands. It is common on moderately exposed flats, depressions and in lower and toe positions of gentle slopes; slope and aspect are variable. Soils are usually derived from fine to moderately textured glacial tills with low to moderate nutrient availability. Peat accumulation can be high, and while some stands grow on organic soil, most are on mineral deposits with



## Site & Soil Characteristics

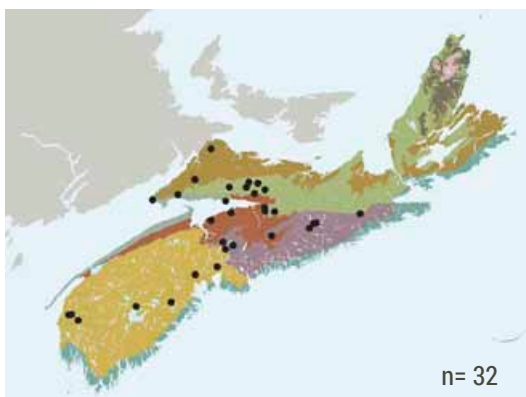
Slope Position: Level<sup>7</sup> Depression<sup>1</sup> Lower<sup>1</sup> Toe<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>1</sup>  
 (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>4</sup> Level<sup>3</sup> Moderately<sup>2</sup> Strongly<sup>1</sup>  
 Drainage: Poor<sup>3</sup> Very poor<sup>2</sup>

Common Soil Types: 4, 7, 14  
 Rooting Depth (cm): (< 30)<sup>8</sup> (30–45)<sup>1</sup> nd<sup>1</sup>  
 Forest Floor (cm): (6–10)<sup>1</sup> (11–20)<sup>4</sup> (21–40)<sup>4</sup> (> 40)<sup>1</sup>  
 Humus Form: Hydromor<sup>2</sup> Peaty Mor<sup>1</sup> Saprimoder<sup>1</sup>  
 Hummor<sup>1</sup> Other<sup>1</sup> nd<sup>4</sup>



Castlereagh, Colchester County

Characteristic Plants	WC5	
	Freq. (%)	Cover (%)
Red spruce	100	49.8
Balsam fir	88	14.8
Red maple	72	6.9
Black spruce	28	19.2
Yellow birch	28	3.9
White birch	22	2.3
Hemlock	16	5.2
White pine	13	2.0
<b>Tree Layer (Mean % Cover)</b>	<b>77.1</b>	
Balsam fir	91	5.7
Red spruce	84	4.4
Red maple	75	0.7
Mountain holly	47	0.2
Lambkill	44	0.6
Velvet-leaf blueberry	38	0.3
Yellow birch	31	0.9
Wild raisin	31	0.3
Lowbush blueberry	28	0.5
Striped maple	22	0.2
Mountain-ash	22	0.1
<b>Shrub Layer (Mean % Cover)</b>	<b>11.4</b>	
Goldthread	97	2.1
Cinnamon fern	94	9.4
Bunchberry	91	1.6
Starflower	69	0.2
Wood-sorrel	56	2.8
Creeping snowberry	56	0.7
Three seeded sedge	50	2.9
Bluebead lily	50	0.3
Sarsaparilla	47	1.5
Twinflower	47	1.0
Wild lily-of-the-valley	47	0.3
New York fern	41	3.8
Evergreen wood fern	38	1.5
Wood aster	31	0.3
Bracken	25	3.0
Dwarf raspberry	25	1.6
Ghost pipe	25	0.1
Painted trillium	25	0.1
Interrupted fern	22	6.1
Woodland horsetail	22	0.7
Violets	22	0.1
Crested wood fern	19	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>25.5</b>	
Bazzania	97	14.2
Schreber's moss	94	17.9
Stair-step moss	94	13.1
Common green sphagnum	63	23.4
Ladies' tresses	56	15.1
Pale fat-leaved sphagnum	53	14.1
Hair-cap moss	47	0.4
Log moss	44	1.5
Broom moss	41	1.1
Grey reindeer lichen	31	0.2
Wavy dicranum	28	2.2
Flat topped sphagnum	22	5.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>88.3</b>	



significant redox features. Sites are slightly to moderately mounded and generally have more microtopography than other wet coniferous forests in Nova Scotia. The VT is found throughout Nova Scotia, but is more common in the Eastern and Western ecoregions of the mainland.

**Successional Dynamics:** This mid- to late-successional ecosystem is a type of edaphic climax, renewed by tree senescence, windthrow and other small- to intermediate-scaled disturbance agents. Between such disturbances, natural senescence can shape overall age class structure, favoring uneven-aged conditions. Windthrow and harvesting are the main stand-level disturbance agents. Abundant red spruce and balsam fir (both shade-tolerant species) regeneration in the understory will maintain this VT following disturbance, although red maple prominence may increase, depending on the severity of the disturbance.

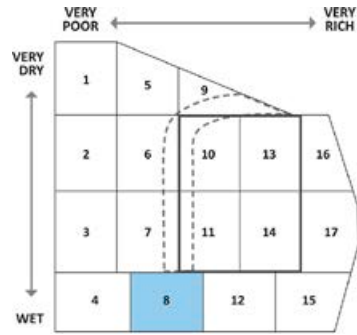
**Ecological Features:** This relatively common ecosystem occurs as a small patch in larger upland matrix forests, at the edge of open wetlands, or adjacent to other wet forest types. It is a temperate wet forest, characterized by high canopy closure, low woody understory cover, and by high bryophyte cover. Herbaceous development is variable. Overall species richness is high relative to other VTs in the group. Sites are somewhat acidic with only moderate microhabitat variability. Wet red spruce forests are generally found on more productive sites than similar wet black spruce forests, but few rare plants are documented. Unlike WC3 and WC4, where seed crops are irregular, red spruce trees consistently produce seed that may be consumed by a wide variety of wildlife. These ecosystems provide important thermal cover for moose and deer in summer, and habitat for amphibians.

# WC6 Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum

*Abies balsamea* / *Osmundastrum cinnamomeum* –  
*Carex trisperma* / *Sphagnum* spp.

**Concept:** This coniferous forest is characterized by balsam fir canopy dominance and high sphagnum moss cover. The early- to mid-successional ecosystem is generally associated with wet soils. Low to moderate nutrient availability is typical but this Vegetation Type (VT) is usually on richer sites than wet black spruce or black spruce – pine forests (units WC1 – WC4).

**Vegetation:** Canopy layers are usually well developed, but some stands are open with stunted and/or more widely-spaced trees. The canopy is heavily dominated by balsam fir. Other important co-dominants may include spruce (red, white and/or black) and/or red maple. The shrub layer is variably developed but usually supports low to moderate cover. Few woody shrubs are frequent. Mountain holly, wild raisin and/or lambkill may be sparsely scattered but they are not especially prominent. Herbaceous cover is moderate, largely comprised of wet site species (e.g. cinnamon fern, three seeded sedge) and common upland coniferous forest plants. Sphagnum species dominate the dense bryophyte layer with common green and ladies' tresses sphagnum mosses typical.



Refer to page 242 for Maritime Boreal edatopic grid.

## Site & Soil Characteristics

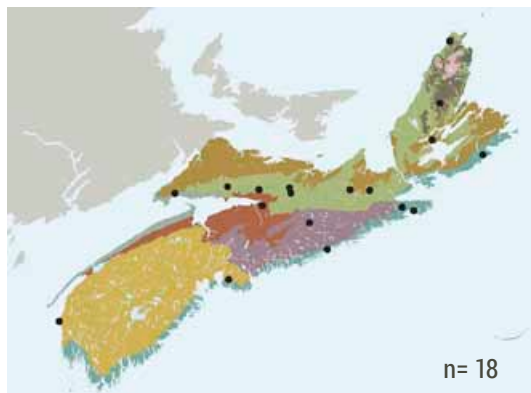
Slope Position:	Level <sup>7</sup> Lower <sup>1</sup> Middle <sup>1</sup> Toe <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>6</sup> Slightly <sup>3</sup> nd <sup>1</sup>
Drainage:	Poor <sup>7</sup> Very poor <sup>2</sup> nd <sup>1</sup>
Common Soil Types:	14, 4, 7
Rooting Depth (cm):	(< 30) <sup>6</sup> (30–45) <sup>2</sup> (> 45) <sup>1</sup> nd <sup>1</sup>
Forest Floor (cm):	(11–20) <sup>3</sup> (21–40) <sup>2</sup> (> 40) <sup>4</sup> nd <sup>1</sup>
Humus Form:	Saprimoder <sup>2</sup> Hydromor <sup>1</sup> Hemimor <sup>1</sup> Fibrimor <sup>1</sup> nd <sup>5</sup>

**Environmental Setting:** The Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum forest occurs on poorly drained flats, in shallow depressions and

Mount Thom, Pictou County



Characteristic Plants	WC6	
	Freq. (%)	Cover (%)
Balsam fir	100	45
Black spruce	78	12
Red maple	56	5
White birch	28	4
Red spruce	17	4
Yellow birch	17	2
White spruce	11	12
White pine	11	3
<b>Tree Layer (Mean % Cover)</b>		<b>62</b>
Balsam fir	83	10
Mountain holly	83	2
Black spruce	67	2
Red maple	67	1
Wild raisin	50	1
Lambkill	44	5
Mountain-ash	44	0.3
Velvet-leaf blueberry	39	2
White birch	33	3
Yellow birch	33	0.2
Lowbush blueberry	28	0.1
Serviceberry	28	0.1
Fly-honeysuckle	22	0.6
Downy alder	17	0.4
<b>Shrub Layer (Mean % Cover)</b>		<b>18</b>
Cinnamon fern	94	22
Bunchberry	89	4
Sarsaparilla	83	2
Creeping snowberry	78	5
Starflower	78	0.4
Twinflower	72	5
Goldthread	72	3
Wood-sorrel	72	1
Three seeded sedge	67	5
Wood aster	50	0.3
Bluebead lily	44	2
Wild lily-of-the-valley	39	0.8
Evergreen wood fern	33	1
Dwarf raspberry	33	0.6
Ghost pipe	33	0.1
New York fern	28	12
Foxberry	22	0.1
Woodland horsetail	17	0.7
<b>Herb Layer (Mean % Cover)</b>		<b>48</b>
Stair-step moss	83	20
Schreber's moss	83	10
Bazzania	78	4
Common green sphagnum	61	38
Pale fat-leaved sphagnum	33	41
Flat topped sphagnum	33	12
Broom moss	33	2
Ladies' tresses	22	6
Log moss	22	1
Plume moss	22	0.9
Wavy dicranum	22	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>88</b>



on gentle to moderate slopes. Most sites are at least moderately exposed and have very little micro-topography. Cooler slopes are favoured, but aspect is somewhat variable. Soils are usually derived from glacial tills, but organic deposits also provide suitable habitat. Low to moderate nutrient availability is typical. The VT is primarily found scattered throughout central and eastern Nova Scotia.

**Successional Dynamics:** In cooler highland and coastal ecoregions, the forest may persist as a type of edaphic climax. Elsewhere, depending on disturbance severity and the time since disturbance, this forest may shift to favour longer lived species such as red spruce and hemlock, and perhaps to more red maple in the canopy. Natural senescence can also shape age class, favouring uneven-aged stand structure. Common disturbance agents are tree mortality caused by windthrow, timber harvest, and spruce budworm defoliation.

**Ecological Features:** This small-patch forest ecosystem occurs in larger upland conifer or mixedwood forests, at the edge of open wetlands, or adjacent to other types of wet forest. It is characterized by moderate to high canopy development, usually sparse woody understory cover and generally dense herbaceous and bryophyte cover. Stands of WC6 support some of the highest provincial concentrations of epiphytic cyanolichens, including species at risk (e.g. boreal felt lichen). These ecosystems provide important thermal cover for moose and deer, and habitat for amphibians. Coarse woody materials (downed and standing snags) are consistently available due to the short longevity of the fir trees in the overstory.



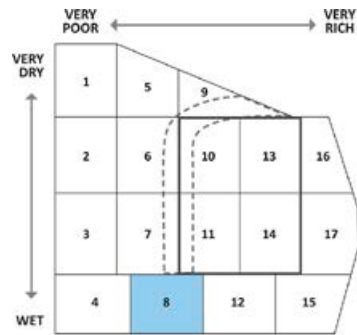
# WC7 Tamarack – Black spruce / Lambkill / Sphagnum

*Larix laricina* – *Picea mariana* / *Kalmia angustifolia* / *Sphagnum* spp.

## WC7a Inkberry variant *Ilex glabra*

**Concept:** These open to semi open wet coniferous forests (30–65% canopy, occasionally to 80%) are characterized by tamarack canopy dominance or co-dominance, high sphagnum cover, and a high diversity of graminoids. The VT is the only wet tamarack forest ecosystem classified from Nova Scotia. Stands with coastal plain species like inkberry and/or moderate to high levels of huckleberry distinguish the inkberry variant WC7a. Most of these occur in the Western ecoregion. WC7 is common on poorly drained flats and depressions, with low to moderate nutrient availability.

**Vegetation:** Canopy layers are usually well developed but trees may be widely spaced and restricted to the tall shrub layer (approximately 2–10 m). Some stands have enough red maple to support mixedwood canopy



Refer to page 242 for Maritime Boreal edatopic grid.

### Site & Soil Characteristics

Slope Position: Level<sup>7</sup> Depression<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>8</sup> Other<sup>2</sup>  
 Drainage: Very Poor<sup>6</sup> Poor<sup>3</sup> nd<sup>1</sup>

Common Soil Types: 14, 7, 4  
 Rooting Depth (cm): (< 30)<sup>5</sup> (30–45)<sup>2</sup> nd<sup>3</sup>  
 Forest Floor (cm): (21–40)<sup>3</sup> (> 40)<sup>6</sup> nd<sup>1</sup>  
 Humus Form: Saprimoder<sup>3</sup> Peaty Mor<sup>1</sup> Mesimor<sup>1</sup> Fibrimor<sup>1</sup> nd<sup>4</sup>

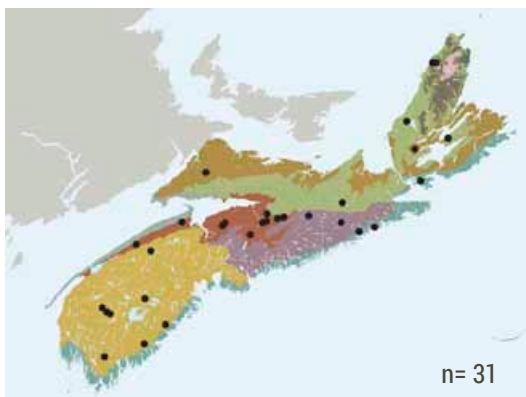


structures. Many stands are co-dominated by black spruce, while occurrences in western Nova Scotia may support scattered white pine. The understory is well developed but herb and shrub cover is variable. Generally, stands with high shrub cover support lower herbaceous cover and vice versa. Characteristic woody shrub species include lambkill and wild raisin. Few herbs are frequent, however, this Vegetation Type (VT) has the highest total species richness of any in the wet coniferous forest group. At times three seeded sedge and tussock sedge create an extensive grass-like layer. The dense bryophyte layer is largely dominated by pale fat-leaved sphagnum and flat topped sphagnum.

**Environmental Setting:** The Tamarack – Black Spruce / Sphagnum forest usually occurs on poorly to very poorly drained flats or shallow depressions. Most stands are supported by organic soil, derived from sphagnum moss, but gleyed or strongly mottled till (and, less commonly, lake or river deposits) are similarly typical. Most sites have little if any microtopography and variable exposure.

Otter Brook, Colchester County

Characteristic Plants	WC7		WC7a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Tamarack	100	37	100	27
Black spruce	85	22	100	21
Red maple	30	10	75	13
Balsam fir	30	9	25	5
Grey birch	11	3		
White pine	4	3	50	6
<b>Tree Layer (Mean % Cover)</b>	<b>62</b>		<b>62</b>	
Black spruce	93	9	75	4
Lambkill	81	2	75	3
Red maple	70	4	75	5
Wild raisin	70	2	75	4
Labrador tea	63	2	100	0.6
Mountain holly	56	13	100	3
Balsam fir	52	2	75	1
Speckled alder	41	14		
Winterberry	33	4	25	1
Velvet-leaf blueberry	33	0.6	50	0.4
Rhodora	30	13	50	0.3
Tamarack	30	2		
Leather-leaf	30	0.8		
Lowbush blueberry	30	0.6	25	0.1
Roses	26	0.3		
White meadowsweet	22	4		
Chokeberries	22	0.1		
Huckleberry	11	3	25	50
Inkberry			100	5
<b>Shrub Layer (Mean % Cover)</b>	<b>39</b>		<b>35</b>	
Bunchberry	67	6	75	0.2
Cinnamon fern	52	11	75	27
Three seeded sedge	44	7	75	3
Creeping snowberry	44	4	25	2
Goldthread	44	2	100	4
Three-leaved false Solomon's seal	44	0.5	25	0.1
Blue joint	37	2		
Pitcher-plant	33	0.4	50	0.7
Blue flag	33	0.2		
Starflower	30	1	75	0.1
Wild lily-of-the-valley	30	0.5		
Tussock sedge	26	39	25	5
Twinflower	26	3	25	0.7
Bog aster	26	1	25	0.5
Swamp candles	26	0.4		
Trailing blackberry	22	0.2	25	0.1
Marsh fern	22	0.1		
Dwarf raspberry	19	16	25	0.1
Bracken	15	5	25	0.1
Teaberry	7	0.8	50	0.1
False violet	4	0.3	25	0.1
Massachusetts fern			25	0.1
<b>Herb Layer (Mean % Cover)</b>	<b>48</b>		<b>30</b>	
Sphagnum moss	100	64	100	61
Schreber's moss	81	15	75	17
Bazzania	52	4	75	4
Stair-step moss	37	6		
Broom moss	30	1	50	0.5
Log moss	11	0.5	50	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>83</b>		<b>78</b>	



Occurrences are often at low elevation, but may be found up to 400 meters, or higher. Tamarack – Black spruce / Sphagnum forest is widespread and relatively common, but the WC7a variant is limited to western Nova Scotia.

**Successional Dynamics:** This is an early- to mid-successional ecosystem that may persist as an edaphic climax. It can follow stand-replacing timber harvest or severe windthrow, or succeeds open wetland vegetation types in peatland successional sequences. Between disturbance events, natural senescence can create uneven-aged stands and promote increased black spruce cover. Higher relative soil fertility usually limits this VT from fully transitioning to WC1 (Black spruce / Cinnamon fern / Sphagnum) or WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum). However, on poorer sites WC7a may succeed to WC2a.

**Ecological Features:** This wet coniferous forest is the only tamarack ecosystem in Nova Scotia found on organic soils. It is relatively common, often found fringing open wetlands or developing after black spruce peatlands are disturbed by harvesting. This VT may form a transitioning zone between open and treed wetlands. Here it provides edge habitat for species that utilize both open and closed wet coniferous forest habitat. The usually open canopy allows abundant light to the forest floor, promoting understory development and supporting wildlife that requires dense low cover, moist soils and/or small pools, or tracts, of standing water. These include numerous bird, amphibian and invertebrate wildlife species. Documented rare plants include showy lady's slipper, black ash and alder-leaved buckthorn. Canadian occurrences of WC7a, with Atlantic Coastal Plain species, are limited to Nova Scotia, representing a particularly important element of provincial biodiversity.

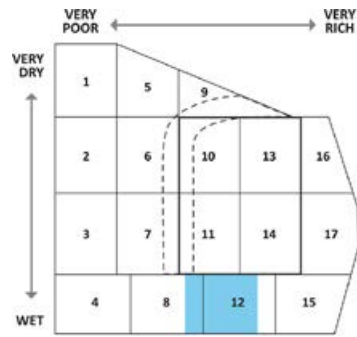
# WC8 Hemlock / Cinnamon fern – Sensitive fern / Sphagnum

*Tsuga canadensis* / *Osmundastrum cinnamomeum* – *Onoclea sensibilis* / *Sphagnum* spp.

**Concept:** Poor to very poorly drained mineral soils support the relatively uncommon Hemlock / Cinnamon fern – Sensitive fern / Sphagnum forest. This is the wettest hemlock forest in Nova Scotia. It occurs in warmer ecoregions persisting as an edaphic climax. WC8 is characterized by hemlock canopy dominance and prominent cinnamon fern, sensitive fern and common green sphagnum.

**Vegetation:** Crown closure is high in the typically evergreen canopy. Most stands are strongly dominated by hemlock, but some are co-dominated by moderate amounts of red maple. Other trees (e.g. red spruce, yellow birch) are frequent but very sparsely scattered. The understory is relatively open, with low woody and herbaceous density but high sphagnum cover. Characteristic species include cinnamon fern, sensitive fern, wood aster, common green sphagnum and common upland plants.

**Environmental Setting:** Most occurrences are on poorly drained mineral soil derived from glacial till deposits, but organic sites are occasionally occupied. Soils have moderate nutrient availability, largely maintained by the flow of ground water and sometimes surface water. This ecosystem occurs on sites that are more sheltered than most coniferous wetlands of Nova Scotia. It occurs in protected basins, sometimes near open wetlands, but more often as a small-to moderate-sized patch in upland matrix forest. The VT is somewhat restricted to the warmer western ecoregion, but may also be found in the eastern ecoregion.



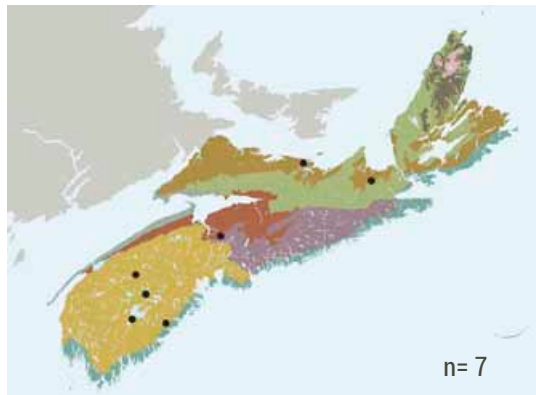
### Site & Soil Characteristics

- Slope Position: Level<sup>9</sup> Toe<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>1</sup> (Very – Excessively)<sup>3</sup>
- Bedrock Outcrop: (Non-rocky)<sup>10</sup>
- Microtopography: Level<sup>8</sup> Slightly<sup>1</sup> Moderately<sup>1</sup>
- Drainage: Poor<sup>9</sup> Very poor<sup>1</sup>
- Common Soil Types: 4, 14, 7, 13
- Rooting Depth (cm): (< 30)<sup>9</sup> nd<sup>1</sup>
- Forest Floor (cm): (6–10)<sup>1</sup> (11–20)<sup>6</sup> (> 40)<sup>3</sup>
- Humus Form: Peaty Mor<sup>3</sup> Saprimoder<sup>3</sup> Hydromoder<sup>1</sup> nd<sup>3</sup>



Caribou, Pictou County

Characteristic Plants	WC8	
	Freq. (%)	Cover (%)
Hemlock	100	49
Red maple	86	10
Red spruce	71	16
Yellow birch	71	3
White pine	43	5
Balsam fir	29	18
Black spruce	14	12
Large-tooth aspen	14	10
White ash	14	4
White spruce	14	2
White birch	14	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>82</b>
Hemlock	100	1
Balsam fir	86	6
Red spruce	86	3
Red maple	86	0.7
White pine	57	0.1
Winterberry	43	0.4
Serviceberry	43	0.1
Lambkill	29	3
Yellow birch	29	1
Velvet-leaf blueberry	29	0.8
Mountain holly	29	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Cinnamon fern	100	8
Goldthread	86	0.4
Bunchberry	71	0.5
Evergreen wood fern	71	0.2
Wild lily-of-the-valley	71	0.1
Sarsaparilla	57	0.6
Three seeded sedge	57	0.4
Starflower	57	0.3
Sensitive fern	43	0.7
Partridge-berry	43	0.2
Wood aster	43	0.2
Painted trillium	43	0.1
Twinflower	43	0.1
New York fern	29	19
Teaberry	29	0.5
Water-horehound	29	0.5
Trailing blackberry	29	0.2
Creeping snowberry	29	0.1
Royal fern	29	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>19</b>
Bazzania	100	14
Stair-step moss	100	7
Schreber's moss	100	5
Ladies' tresses	43	5
Log moss	43	4
Common green sphagnum	43	2
Pale fat-leaved sphagnum	29	30
Red fat-leaved sphagnum	29	30
Hair-cap moss	29	2
Wavy dicranum	29	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>71</b>



**Successional Dynamics:** This is a mid- to late-successional ecosystem, typically supporting uneven-aged stands. Most occurrences are maintained by gap dynamics, but some stands show evidence of small-scale timber harvest. Windthrow and harvesting are the main stand-level disturbance agents. Depending on disturbance history and nearby stand composition, WC8 may transition from WC5 (Red spruce – Balsam fir/ Cinnamon fern / Sphagnum). Stand-level disturbances caused by fire or severe blowdown will reset the successional pathway for this VT to earlier seral stages dominated by red maple and balsam fir.

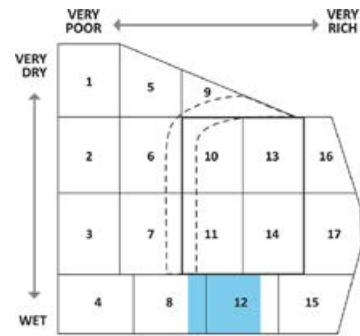
**Ecological Features:** A common ecosystem in northern New England, this provincially uncommon ecosystem is the most temperate coniferous wet forest in Nova Scotia. The dense canopy overtops a sparse woody and herbaceous understory but there is usually extensive bryophyte cover. In western Nova Scotia, where most stands occur, this ecosystem provides thermal cover for moose and deer, locally reduced snow depths, foraging habitat for numerous birds, and shelter for invertebrates, amphibians and reptiles. Old growth potential is moderate to high. Individual trees can attain considerable height and diameter, relative to other wet forests, creating opportunity for the development of large diameter snags and coarse woody materials, both of which may persist for decades.

# WC9 White spruce – Balsam fir / Lady fern / Prickly sphagnum

*Picea glauca* – *Abies balsamea* /  
*Athyrium filix-femina* / *Sphagnum squarrosum*

**Concept:** WC9 is an exceptionally diverse wet coniferous forest associated with seepage sites, flow channels and toe slopes. White spruce and balsam fir are the dominant overstory species providing moderate canopy closure. This early- to mid-successional ecosystem supports many plants indicative of moist/wet rich soils. With increasing presence of red maple and yellow birch in the overstory, this VT can be similar to WM4 (White spruce – Yellow birch / Cinnamon fern – Dwarf raspberry).

**Vegetation:** Red maple, hemlock and white ash are common associates in the overstory. The shrub layer is poorly developed and, excluding scattered beaked hazel, is mostly composed of regenerating tree species including balsam fir and later successional species, such as sugar maple, white ash, red maple and yellow birch. For a coniferous forest ecosystem, the understory of herbs and mosses is exceptionally well developed and diverse. Of the 13 fern species found in this VT, the most common are cinnamon, northern beech, sensitive, evergreen wood fern, lady and New York. The moss layer is also diverse and includes not only several species of sphagnum, but many other mosses with affinities for damp conditions including those of the *Mniaceae* family, stair-step moss and plume moss.



## Site & Soil Characteristics

Slope Position: Level<sup>5</sup> Lower<sup>3</sup> Middle<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>2</sup> nd<sup>1</sup>  
 Drainage: Poor<sup>8</sup> Very Poor<sup>2</sup>

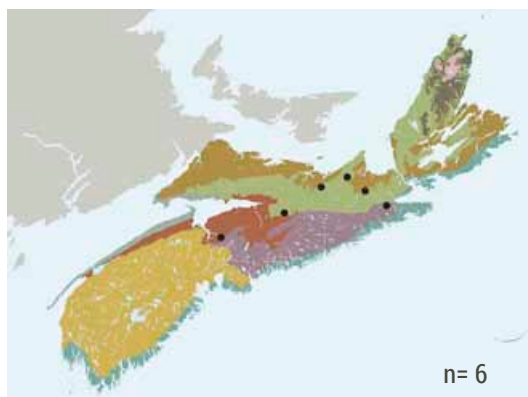
Common Soil Types: 13, 4, 14  
 Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>5</sup> nd<sup>2</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (6–10)<sup>5</sup> (11–20)<sup>2</sup> (> 40)<sup>1</sup>  
 Humus Form: Hydromor<sup>3</sup> Hydromoder<sup>2</sup> nd<sup>5</sup>

**Environmental Setting:** WC9 is associated with wet, nutrient medium to rich, fine to medium textured soils. The VT is typically found on lower slope or level sites, with little to no microtopography and little exposed bedrock or surface stones. This small-patch VT is found in upland terrain where ground water is

Eight Mile Lake, Guysborough County



Characteristic Plants	WC9	
	Freq. (%)	Cover (%)
Balsam fir	100	31
White spruce	100	26
Red maple	100	7
Hemlock	33	8
Yellow birch	33	8
White ash	33	3
Black spruce	17	3
Tamarack	17	3
<b>Tree Layer (Mean % Cover)</b>		<b>72</b>
Balsam fir	83	7
Red maple	83	1
White ash	67	1
Beaked hazelnut	67	0.4
Yellow birch	67	0.4
Sugar maple	67	0.2
Mountain maple	50	0.2
Bristly black currant	50	0.1
Fly-honeysuckle	33	0.6
<b>Shrub Layer (Mean % Cover)</b>		<b>11</b>
Cinnamon fern	100	9
Wood-sorrel	100	4
Wild lily-of-the-valley	100	2
Starflower	100	0.5
Sarsaparilla	83	10
Dwarf raspberry	83	3
Goldthread	83	1
New York fern	67	11
Northern beech fern	67	6
Sensitive fern	67	4
Lady fern	67	3
Evergreen wood fern	67	2
Bunchberry	67	1
Rough goldenrod	67	0.5
Crested wood fern	67	0.3
Small enchanter's nightshade	50	4
Buttercups	50	1
Mountain wood fern	50	1
Partridge-berry	50	0.7
Woodland horsetail	50	0.4
Wood aster	50	0.1
Three seeded sedge	33	3
Jewelweed	33	2
Bracken	33	1
Blue joint	33	0.9
Bladder sedge	33	0.6
Violets	33	0.6
Purple-stemmed aster	33	0.4
Drooping wood sedge	33	0.3
Meadow-rue	33	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>59</b>
Sphagnum moss	100	44
Stair-step moss	100	27
Schreber's moss	100	8
Bazzania	100	3
Fern moss	50	2
Mniaceae spp.	50	0.7
Shaggy moss	33	7
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>90</b>



close to the surface and where, sometimes, streams are beginning to initiate in flow channels. These sites have high nutrient availability, largely maintained by enriched seepage inputs.

**Successional Dynamics:** Increasing tolerant hardwood species in the understory indicate a successional advancement to wet mixedwood forests with sugar maple, yellow birch and white ash. Tree senescence, windthrow and insect/disease are the primary disturbance agents. WC9 may not shift directly to other vegetation types after disturbance but transition slowly into a mixedwood condition (WM4 White spruce – Yellow birch / Cinnamon fern – Dwarf raspberry) with yellow birch and red maple gradually entering the overstory.

**Ecological Features:** Coniferous seepage forests, such as WC9, are unusual on the landscape. This small-patch ecosystem is typically found embedded within larger tolerant hardwood matrix forests. As such, it contributes to landscape-level diversity and provides habitat for a number of bird species preferring coniferous forests, including black-backed woodpecker, yellow-rumped, cape may and black-throated green warblers, Northern parula, grey jay, boreal chickadee, Swainson's thrush, and red and white-winged crossbills, among other bird species. The soils are generally saturated with cold, well-oxygenated groundwater which is ideal habitat for most salamander species including red-backed salamanders. The diverse ground flora may include orchids such as early coralroot, heart-leaved twayblade, showy lady's slipper and dwarf rattlesnake plantain. Old growth potential is low in this VT. Large quantities of coarse woody material can accumulate due to the short longevity of balsam fir and white spruce.

# WC10 Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum

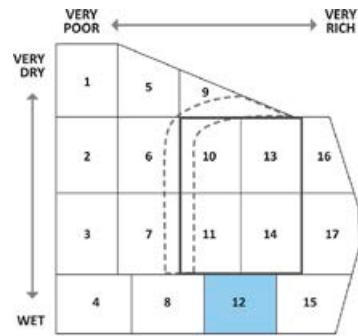
*Thuja occidentalis* / *Alnus incana* /  
*Osmundastrum cinnamomeum* / *Sphagnum* spp.

**Concept:** This mid- to late-successional ecosystem is the only wet cedar forest found in Nova Scotia. The very uncommon Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum forest is characterized by cedar canopy dominance and moderate to high levels of sphagnum. Atlantic Coastal Plain Flora (ACPF) may occur within this forest across parts of western Nova Scotia.

**Vegetation:** Canopy layers are well developed, with moderate to high levels of cedar and lesser amounts of red maple, black spruce and white ash. Woody understory and herbaceous layers are variably developed. Common species include speckled alder, winterberry, cinnamon fern and three seeded sedge. ACPF, when present, may include poison ivy, huckleberry, inkberry, skunk cabbage, Elliott’s goldenrod, catbriar and/or button sedge, as well as other species. The typically dense bryophyte layer includes prominent common green sphagnum.

**Environmental Setting:** The Eastern white cedar / Speckled alder / Cinnamon fern / Sphagnum forest usually occurs on poorly to very poorly drained flats and depressions, scattered at low elevation across western and northern Nova Scotia. Most stands are supported by nutrient medium to rich organic soil, but poorly drained mineral soil also provides suitable habitat. Sites are moderately exposed with little microtopography or surface stoniness. In Yarmouth and Digby counties, lakeside stands can occur on elevated terraces or ridges called ice ramparts. These terraces are formed by the shoreward movement and pushing action of ice during winter freeze-up.

**Successional Dynamics:** Successional patterns of this mid- to late-successional Vegetation Type are not fully understood. Most occurrences are maintained by gap



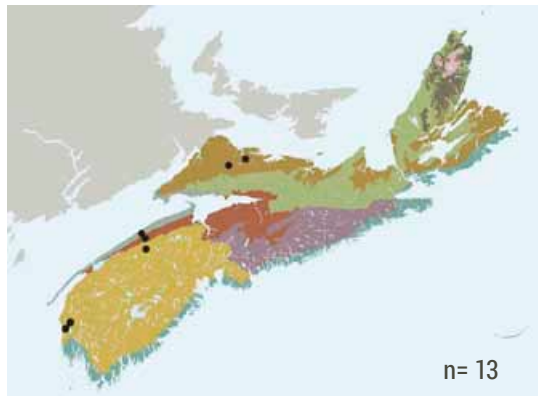
## Site & Soil Characteristics

- Slope Position: Level<sup>7</sup> Depression<sup>2</sup> Other<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>7</sup> (Moderately)<sup>2</sup> (Very – Excessively)<sup>1</sup>
- Bedrock Outcrop: (Non-rocky)<sup>10</sup>
- Microtopography: Level<sup>5</sup> Slightly<sup>3</sup> Other<sup>2</sup>
- Drainage: Poor<sup>6</sup> Very Poor<sup>4</sup>
- Common Soil Types: 14, 13
- Rooting Depth (cm): (< 30)<sup>5</sup> (30–45)<sup>1</sup> nd<sup>4</sup>
- Forest Floor (cm): (6–10)<sup>2</sup> (21–40)<sup>1</sup> (> 40)<sup>7</sup>
- Humus Form: Saprimoder<sup>2</sup> Peaty Mor<sup>1</sup> Hydromor<sup>1</sup> Fibrimor<sup>1</sup> Hydromor<sup>1</sup> nd<sup>4</sup>



Oxford Junction, Cumberland County

Characteristic Plants	WC10	
	Freq. (%)	Cover (%)
Eastern white cedar	100	47
Red maple	92	11
White ash	69	7
Black spruce	54	15
Balsam fir	54	10
Red spruce	38	4
Tamarack	31	7
White pine	31	5
<b>Tree Layer (Mean % Cover)</b>	<b>86</b>	
Red maple	85	2
Balsam fir	77	7
Eastern white cedar	69	5
Winterberry	69	0.4
Speckled alder	62	0.8
White ash	38	0.7
Lambkill	38	0.1
Poison ivy	31	2
Huckleberry	31	2
Fly-honeysuckle	31	0.3
Red spruce	23	2
Bayberry	23	0.9
Highbush blueberry	23	0.7
Mountain holly	23	0.4
<b>Shrub Layer (Mean % Cover)</b>	<b>20</b>	
Cinnamon fern	85	17
Wild lily-of-the-valley	77	0.8
Sarsaparilla	54	2
Starflower	54	1
Three seeded sedge	46	3
Sensitive fern	46	2
Dwarf raspberry	46	0.8
Royal fern	46	0.5
Bluebead lily	38	1
Oak fern	38	1
Twinflower	38	0.7
Crested wood fern	38	0.2
Goldthread	31	0.6
Partridge-berry	31	0.5
Bladder sedge	31	0.3
Bunchberry	31	0.1
Creeping Snowberry	31	0.1
Wood aster	31	0.1
Northern beech fern	23	1
New York fern	23	0.9
Skunk cabbage	23	0.5
Massachusetts fern	15	0.5
<b>Herb Layer (Mean % Cover)</b>	<b>23</b>	
Common green sphagnum	62	13
Stair-step moss	54	22
Shaggy moss	54	4
Bazzania	54	4
Pale fat-leaved sphagnum	31	18
Ladies' tresses	31	6
Fern moss	31	2
Broom moss	31	0.8
Flat topped sphagnum	23	7
Prickly sphagnum	23	0.2
<b>Bryo-Lichen Layer (Mean % Cover)</b>	<b>41</b>	



dynamics, but some stands show evidence of small-scale timber harvest, a disturbance agent that generally favours black spruce, balsam fir and/or tamarack regeneration. Windthrow, harvesting, and flooding are potential stand-level disturbance agents. Depending on disturbance regime, site fertility and local seed sources, WC10 could transition from WD4 (Red maple / Poison ivy / Sphagnum). Between major disturbance events, natural tree senescence promotes uneven-age class development and related changes in stand structure.

**Ecological Features:** This small-patch ecosystem rarely spans a hectare. The variably composed overstory provides moderate to dense canopy cover. Deer may browse cedar heavily in winter, while snowshoe hare eat the foliage and gnaw young tree bark. Cedar are long-lived and resistant to disease and insect predation. The oldest cedar trees documented in Nova Scotia exceed 250 years, making old-growth potential high. Cedar wood is very decay resistant resulting in dead trees that may persist for many decades. Cedar is legally protected and listed as vulnerable under the Nova Scotia Endangered Species Act. Cedar ecosystems are extremely rare in Nova Scotia, representing a particularly important element of provincial biodiversity. Several rare and uncommon plants have been observed including skunk cabbage, Massachusetts fern and heart-leaved twayblade.

Whitewash lichen commonly found on cedar



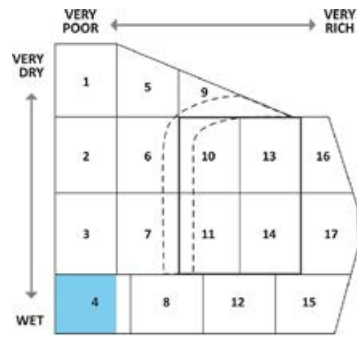


# WC11 Black spruce Woodland Bogs

*Picea mariana*

**Concept:** This wet open woodland ecosystem occurs with less than 30% tree cover and is characterized by stunted black spruce. It typically occurs on peatland soils with well-developed shrub and bryophyte layers, respectively dominated by various ericaceous and sphagnum moss species. Sites on wet mineral soils (minerotrophic) are characterized by the general absence of heath shrubs and higher herb and moss species diversity. This Vegetation Type (VT) is similar to black spruce dominated wet forests WC1 and WC2, but has lower canopy closure due to site conditions restricting tree establishment.

**Vegetation:** Balsam fir and tamarack are occasionally present on peatland occurrences but may be more abundant on minerotrophic sites. The shrub layer, including small trees, can be extensive (> 60% cover). Lambkill, huckleberry, leather-leaf, Labrador tea and mountain holly are characteristic species. Pale laurel and bog rosemary are indicative of peatlands.



Refer to page 242 for Maritime Boreal edatopic grid.

## Site & Soil Characteristics

Slope Position: Level<sup>8</sup> Depression<sup>2</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> nd<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> Other<sup>1</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>1</sup> Other<sup>2</sup>  
 Drainage: Poor<sup>5</sup> Very poor<sup>5</sup>

Common Soil Types: 14, 7, 4  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>1</sup> (> 45)<sup>1</sup> nd<sup>4</sup>  
 Forest Floor (cm): (6–10)<sup>1</sup> (11–20)<sup>1</sup> (21–40)<sup>2</sup> (> 40)<sup>5</sup> nd<sup>1</sup>  
 Humus Form: Saprimoder<sup>1</sup> Fibrimor<sup>1</sup> Mesimor<sup>1</sup> nd<sup>7</sup>

Herb diversity is low on peatland occurrences, where cinnamon fern and creeping snowberry are the most common species. Other species indicative of saturated soils include pitcher plant, round-leaved sundew, three-leaved false Solomon’s seal, small cranberry, tawny cotton-grass and a variety of sedge species. Herbs are notably more diverse on mineral soil substrates. Aside from the frequency and high cover of sphagnum species, Schreber’s moss and stair-step moss are common.

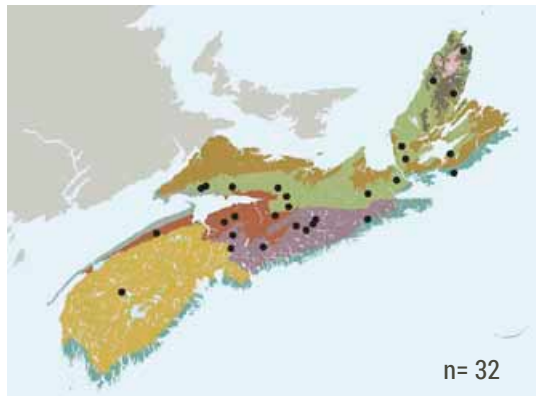
**Environmental Setting:** WC11 develops on wet, nutrient poor soils, which are primarily organic (> 40 cm) deposits derived from sphagnums and sedges. Mineral sites usually occur around the margins of peatlands where they may receive supplementary nutrients from adjacent sources. Most sites are depressional settings and with cooler microclimates. This VT occurs throughout Nova Scotia.

**Successional Dynamics:** This small-patch VT is self-perpetuating and largely maintained by site limiting conditions. Senescence may be accelerated



Big Lake, near Kemptown, Colchester County

Characteristic Plants	WC11	
	Freq. (%)	Cover (%)
Black spruce	75	17
Balsam fir	31	11
Tamarack	28	4
Red maple	13	4
White pine	13	2
Red pine	9	2
<b>Tree Layer (Mean % Cover)</b>		<b>18</b>
Black spruce	88	17
Mountain holly	88	7
Wild raisin	84	2
Lambkill	84	13
Labrador tea	66	7
Red maple	69	3
Rhodora	56	5
Balsam fir	56	8
Tamarack	47	2
Velvet-leaf blueberry	53	1
Leather-leaf	41	14
Speckled alder	38	3
Lowbush blueberry	28	3
Pale laurel	25	0.5
Huckleberry	25	12
Chokeberries	13	0.3
Bog Rosemary	9	0.2
Roses	9	0.4
Winterberry	13	3
<b>Shrub Layer (Mean % Cover)</b>		<b>62</b>
Bunchberry	81	6
Creeping snowberry	69	5
Cinnamon fern	66	13
Goldthread	59	2
Three-leaved false Solomon's seal	44	10
Three seeded sedge	44	9
Small cranberry	41	1
Teaberry	28	1
Bracken	25	6
Twinflower	22	4
Starflower	22	0.4
Foxberry	22	0.1
Pink lady's-slipper	22	0.1
Tawny cotton-grass	16	2
Bog aster	16	0.1
Pitcher-plant	16	0.9
Round-leaved sundew	19	0.1
Bog-goldenrod	9	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>41</b>
Schreber's moss	75	16
Flat topped sphagnum	59	29
Grey reindeer lichen	50	7
Ladies' tresses	47	18
Red fat-leaved sphagnum	44	19
Stair-step moss	38	4
Bazzania	28	3
Pale fat-leaved sphagnum	22	27
Sphagnum moss	22	27
Brown fat-leaved sphagnum	22	13
Bog hair-cap moss	22	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>82</b>



due to limited nutrient availability and excessive moisture. Vegetative layering is the dominant form of black spruce regeneration. In landscapes with subdued relief, this VT can be associated with larger matrix forests of SP5 (Black spruce / Feathermoss) and SP7 (Black spruce / Lambkill – Wild raisin – Mountain holly).

**Ecological Features:** These ecosystems often occur as a narrow fringe where they occupy a transition zone between upland forest and larger open peatland complexes. Here moderated temperatures and low perches support species with affinities for wet open coniferous habitat, such as the olive-sided flycatcher, rusty blackbird and yellow-bellied flycatcher. Small mammals, including a variety of mice, voles and shrews frequently inhabit wooded peatlands. Larger mammals such as black bear along with coyote and fox seek blueberries and cranberries that are often abundant in this ecosystem. The acidic water and cold saturated site conditions are unsuitable for many reptiles and amphibians but the four-toed salamander will use patches of sphagnum moss, over-hanging open water, to lay its eggs; afterwards, the eggs hatch and slide into the water below. The open conditions of these wet woodlands are also favoured as both breeding and foraging habitat for many dragonfly species. Insectivorous peatland plants such as pitcher plant and round-leaved sundew catch insects to augment low levels of available soil nutrients. Occasionally cloudberry, also known as bake apple, can be found in this VT; its fruit is frequently sought by both wildlife and humans. Woodland bogs and swamps contribute to carbon and nitrogen budgets and are often associated with headwaters, functioning to regulate water flow, provide filtration and recharge groundwater.

# WD

## Wet Deciduous Forest Group

### Concept

Wet deciduous forest ecosystems are characterized by water at or near the ground surface for most of the growing season. These partly open to closed canopy forests are generally dominated by red maple, sometimes with lesser amounts of white ash. The shrub layer mainly contains regenerating tree species, speckled alder, winterberry and mountain holly. A well-developed herbaceous layer includes many species of ferns and sedges. Bryophyte abundance is low to moderate with sphagnum species the most common. Vegetation Types (VT) are associated with moderate to high nutrient availability, with elevated richness reliably indicated by the presence of white ash. VTs occur primarily on level to depressional topography or within riparian zones, with soils derived from glacial till, fluvial, lacustrine and/or organic deposits. Soil fertility is enhanced by ground water or seepage flow. Most sites have little (if any) surface stoniness or exposed bedrock. These wet hardwood forests are edaphic climax associations strongly shaped by high soil moisture. Fluctuating water levels, windthrow, insects and disease are significant disturbance agents. All Wet Deciduous VTs are classified in the Acadian Macrogroup.

Wet deciduous forests are relatively common small-patch ecosystems, making unique contributions to landscape composition and structure, local hydrological regimes, and habitat diversity. Stands often feature small pools of standing water, irregular surface topography and slow moving streams. Organic accumulation is usually lower than levels in wet coniferous forests, while water flow and nutrient availability is generally higher. Extremely wet stands may persist as woodlands with stunted trees and shrub swamp understory species. Wet deciduous forests provide specialized habitat for many invertebrates, amphibians (e.g. wood frog, yellow and blue spotted salamander), reptiles (e.g. wood turtle, ribbon snake), and certain mammals (e.g. moose, water shrew), lichens (e.g. blue felt lichen), plant species (e.g. manna grasses, marsh and Massachusetts ferns) and birds (e.g. swamp sparrow, common yellow throat, American woodcock, rusty blackbird, olive-sided flycatcher, Canada warbler and northern waterthrush). Edaphic climax forests in this group are self-sustaining, and many express long-term ecological continuity. However, stand dynamics and features of old-growth development are not well understood.

## Wet Deciduous (WD) Key

- 
- |  |     |  |     |
|--|-----|--|-----|
| 1a. White ash abundant to dominant ... | WD1 | 4a. Atlantic Coastal Plain Flora present ... | WD4 |
| 1b. White ash absent to scattered ...  | 2   | 4b. Atlantic Coastal Plain Flora absent ...  | 5   |
- 
- |  |     |   |     |
|--|-----|---|-----|
| 2a. Red maple abundant to dominant ...       | 3   | 5a. Stands with understory plants indicating enriched conditions (sensitive fern, lady fern, dwarf raspberry, violets, jewelweed) ...   | WD3 |
| 2b. Trembling aspen abundant to dominant ... | WD5 | 5b. Stands with the above species absent or nearly so, indicating a poorer condition, cinnamon fern usually > 10% cover with the following upland species (bunchberry, bracken, teaberry) often present ... | WD2 |
- 
- |  |     |  |  |
|--|-----|--|--|
| 3a. Stands with uncommon and rare calcareous-loving plants (calciphile). e.g. Black ash, alder-leaved buckthorn, shrubby cinque-foil, showy lady's-slipper, marsh fern and yellow lady's-slipper ... | WM5 |  |  |
| 3b. Not as above ...   | 4   |  |  |
- 

COVER CLASSES: Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

# WD1 White ash / Sensitive fern – Lady fern

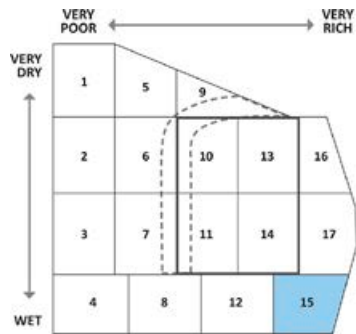
*Fraxinus americana / Onoclea sensibilis – Athyrium filix-femina*

**Concept:** White ash / Sensitive fern – Lady fern forest is characterized by a closed canopy of white ash and red maple and a species-rich herbaceous understory. It is typically found on poorly drained mineral deposits with high nutrient availability. It is one of the richest wet forests in the province.

**Vegetation:** Yellow birch and sugar maple are frequent in the canopy but seldom abundant. Some stands also support moderate to high balsam fir and white spruce in the overstory. Shrub cover and species richness is reduced with regenerating trees making up most of the diversity. The herbaceous layer is well developed and diverse, frequently including sensitive fern, lady fern, dwarf raspberry, New York fern and Christmas fern, among other species. Bryophyte development is low to moderate, composed of small pockets of upland species and nutrient demanding wetland mosses (e.g. prickly sphagnum).

**Environmental Setting:** This is primarily a wet forest with ground and surface water flow and/or seepage contributing to high moisture and nutrient inputs. Both mineral and/or organic soils can be found, but medium to fine textured mineral substrates are most common. It occurs at very low elevation on flats and lower topographic positions of gentle slopes, in shallow depressions, and adjacent to streams and other water bodies. Surface stones, microtopography and exposed bedrock are typically low. Organic matter accumulation is low to moderate.

**Successional Dynamics:** The ecosystem is a type of edaphic climax and is expected to persist as described. Stand composition and structure are usually maintained by small- to intermediate-sized disturbance events and limiting site conditions.



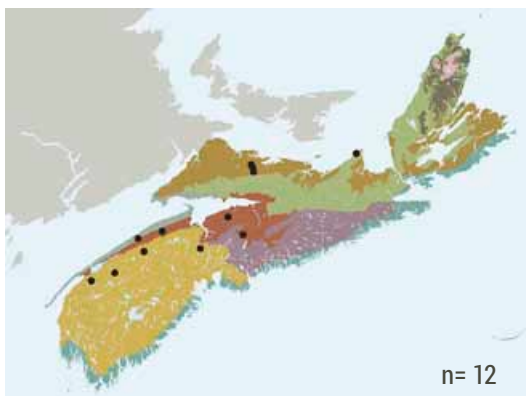
## Site & Soil Characteristics

Slope Position:	Level <sup>7</sup> Lower <sup>3</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>3</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>7</sup> Slightly <sup>2</sup> Moderately <sup>1</sup>
Drainage:	Poor <sup>7</sup> Very poor <sup>3</sup>
Common Soil Types:	10, 13, 14
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>4</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>3</sup> (11–20) <sup>2</sup> (21–40) <sup>2</sup> (> 40) <sup>1</sup>
Humus Form:	Hydromoder <sup>3</sup> Hydromull <sup>2</sup> Mull <sup>2</sup> Mullmoder <sup>1</sup> nd <sup>2</sup>



Angevine Lake,  
Cumberland County

Characteristic Plants	WD1	
	Freq. (%)	Cover (%)
White ash	100	41
Red maple	100	20
Yellow birch	75	8
Balsam fir	58	16
White spruce	33	12
Red spruce	33	8
White birch	33	1
Sugar maple	25	11
<b>Tree Layer (Mean % Cover)</b>		<b>89</b>
Balsam fir	100	6
White ash	92	5
Striped maple	58	2
Red maple	50	3
Sugar maple	42	4
Yellow birch	42	0.8
Mountain maple	42	0.3
Red spruce	33	1
<b>Shrub Layer (Mean % Cover)</b>		<b>19</b>
Sensitive fern	83	19
Cinnamon fern	83	7
Sedges	83	9
Violets	83	4
Dwarf raspberry	75	7
New York fern	75	1
Lady fern	67	4
Sarsaparilla	67	1
Wild lily-of-the-valley	67	0.5
Starflower	67	0.1
Northern beech fern	58	3
Evergreen wood fern	58	2
Goldthread	58	2
Christmas fern	58	0.9
Wood-sorrel	58	0.7
Interrupted fern	50	2
Lion's paw	50	0.1
Jewelweed	42	7
Bladder sedge	42	5
Oak fern	42	3
Short husk	42	0.9
Wood aster	42	0.7
Bunchberry	42	0.6
Partridge-berry	42	0.2
Bluebead lily	42	0.1
Three seeded sedge	33	4
Water-horehound	33	2
Bugleweed	33	2
Crested wood fern	33	0.6
Asters	33	0.1
Mitrewort	33	0.1
Wood reed	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>67</b>
Fern moss	67	2
Stair-step moss	58	2
Prickly sphagnum	50	5
Common green sphagnum	42	10
Bazzania	42	2
Log moss	33	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>32</b>



Due to its ecological setting, WD1 does not shift to other vegetation types after disturbance, but it does change in development stage. Red maple cover can also fluctuate over time. Excluding harvesting, stand-level disturbance events are rare, with gaps or small patches usually created by individual tree mortality through senescence, wind or ice scour.

**Ecological Features:** This wet forest ecosystem has high species richness, complex stand structures, and a broad diversity of microhabitats. As a mature small-patch forest it is characterized by temperate tree and herbaceous species (e.g. white ash, Christmas fern). Rare plants noted in surveys include black ash, and numerous other species may be supported. In spring and early summer, sites are inundated with water, most of which is concentrated in small pools or channels, providing habitat for amphibians and other wildlife. Canada warbler and olive-sided flycatcher are known to use this VT during the breeding season. Later in the growing season, surface and ground water levels fall below the rooting zone. Old growth potential is moderate and may be higher in sheltered areas, or on somewhat drier soils.



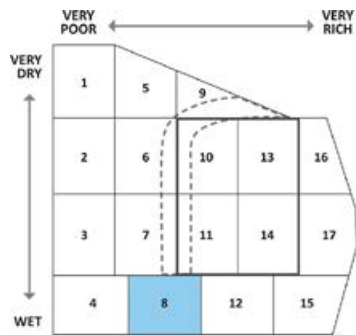
Sensitive fern

# WD2 Red maple / Cinnamon fern / Sphagnum

*Acer rubrum* / *Osmundastrum cinnamomeum* / *Sphagnum* spp.

**Concept:** This common and widespread ecosystem is one of three wet red maple forests (WD2, WD3 and WD4) classified from Nova Scotia. It has lower tree and herbaceous species richness and soil fertility than WD3, and it lacks the Atlantic Coastal Plain Flora that sets it apart from WD4. The Red maple / Cinnamon fern / Sphagnum is a partially open to closed canopy forest found on peat or poorly drained mineral soil, with low to moderate nutrient availability. It persists as an edaphic climax.

**Vegetation:** Canopy development is almost entirely dominated by red maple. Other tree species are far less frequent and seldom abundant (e.g. balsam fir and black spruce). The woody understory supports moderate cover but is species-poor and largely occupied by regenerating trees with scattered wild raisin, speckled alder, mountain holly, winterberry and kalmia. The herbaceous layer is better developed but species diversity is low. Ferns, especially cinnamon fern, are dominant. Coverage of common upland forest flora (e.g. starflower, bunchberry, goldthread) is low. Bryophyte development is moderate, composed of sphagnum and lesser amounts of common upland moss and liverwort species. Flat topped sphagnum is characteristic.



## Site & Soil Characteristics

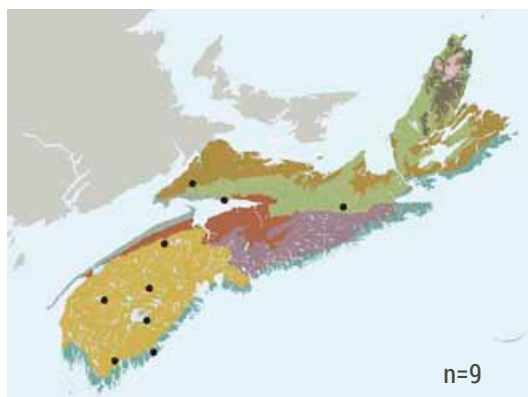
Slope Position:	Level <sup>8</sup> Depression <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Level <sup>7</sup> Strongly <sup>1</sup> nd <sup>2</sup>
Drainage:	Poor <sup>6</sup> Very poor <sup>2</sup> nd <sup>2</sup>
Common Soil Types:	14, 10, 7, 4
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>1</sup> (> 45) <sup>1</sup> nd <sup>4</sup>
Forest Floor (cm):	(11–20) <sup>2</sup> (21–40) <sup>1</sup> (> 40) <sup>7</sup>
Humus Form:	Peaty Mor <sup>2</sup> Hydromor <sup>1</sup> nd <sup>7</sup>

**Environmental Setting:** Soils are usually organic deposits or poorly drained mineral soils, of varying texture. Low levels of ground and surface water flow, coupled with poorly-decomposed organic material,

Burnt Dam Flowage, Kings County



Characteristic Plants	WD2	
	Freq. (%)	Cover (%)
Red maple	100	57
Balsam fir	44	18
Black spruce	33	12
Yellow birch	22	10
Large-tooth aspen	22	6
Red spruce	22	4
Grey birch	22	3
Tamarack	22	2
White birch	11	10
White spruce	11	5
<b>Tree Layer (Mean % Cover)</b>		<b>76</b>
Red maple	89	4
Wild raisin	89	2
Black spruce	67	4
Lambkill	67	2
Balsam fir	56	4
Speckled alder	44	4
Winterberry	44	3
Mountain holly	44	3
White pine	44	0.9
Velvet-leaf blueberry	44	0.6
Huckleberry	33	4
Black chokeberry	22	3
Yellow birch	22	2
Labrador tea	22	0.4
Lowbush blueberry	22	0.4
Serviceberry	22	0.3
Shining rose	22	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>23</b>
Cinnamon fern	100	30
Starflower	89	0.4
Bunchberry	67	0.4
Goldthread	67	0.3
Trailing blackberry	56	12
Three seeded sedge	56	0.5
Wild lily-of-the-valley	56	0.3
Wood aster	44	0.5
New York fern	33	29
Evergreen wood fern	33	18
Wood-sorrel	33	3
Sarsaparilla	33	2
Bracken	33	1
Creeping snowberry	33	0.1
Crested wood fern	33	0.1
Partridge-berry	33	0.1
Dwarf raspberry	22	2
<b>Herb Layer (Mean % Cover)</b>		<b>64</b>
Flat topped sphagnum	67	4
Pale fat-leaved sphagnum	56	42
Schreber's moss	44	2
Stair-step moss	44	1
Common green sphagnum	33	16
Red fat-leaved sphagnum	33	13
Bazzania	33	2
Log moss	33	2
Broom moss	22	1
Ladies' tresses	22	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>52</b>



limit nutrient availability, but some sites have at least moderate soil richness. Flats, shallow depressions and lower topographic positions of gentle slopes provide suitable sites across lowland and upland ecoregions of Nova Scotia. Microtopography, surface stoniness and exposed bedrock are minimal.

**Successional Dynamics:** This early- to mid-successional ecosystem is a type of edaphic climax, largely maintained by saturated soil and reduced rooting potential. It is expected to persist as described, but after disturbance, it could transition to conifer dominated wet forests of red and/or white spruce and/or balsam fir. Windthrow and tree harvesting are the main stand-level disturbance agents but in their absence, mortality of individuals and patches of trees through senescence, ice scour, flooding and/or other minor events, can create uneven-aged stands.

**Ecological Features:** WD2 is the most common wet deciduous forest in Nova Scotia. It is found in small- to moderate-sized basins or depressions, usually featuring small pools or narrow channels of standing, or slowly moving, water. Sites rarely support notable microrelief, however trees are often limited to low hummocks. This is a moderately fertile ecosystem, but few rare plants are documented. Similar to other wet deciduous forests, WD2 supports unique habitat values (e.g. as an important early source of nectar and pollen), complex stand structures, and important biogeochemical and landscape functions. Canada warbler and olive-sided flycatcher, two species at risk, may use this forest as breeding habitat. Canopy tree senescence and uprooting are relatively common and are often followed by vigorous stump sprouting. This successional pattern may result in a uniquely persistent and poorly understood form of old growth.



# WD3 Red maple / Sensitive fern – Lady fern / Sphagnum

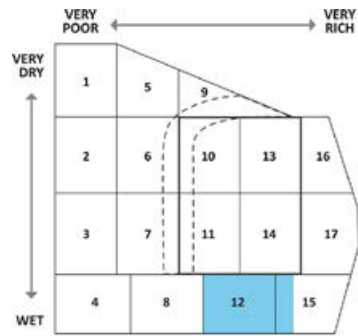
*Acer rubrum* / *Onoclea sensibilis* –  
*Athyrium filix-femina* / *Sphagnum* spp.

**Concept:** The relatively common Red maple / Sensitive fern – Lady fern / Sphagnum is one of three wet red maple forests (WD2, WD3 and WD4) classified in Nova Scotia. This low elevation ecosystem is more nutrient and species rich than WD2, and it lacks the Atlantic Coastal Plain Flora that characterize WD4. It is usually found on peat or poorly to very poorly drained mineral deposits, persisting as an edaphic climax. The forest is characterized by red maple canopy dominance and a species-rich herbaceous understory.

**Vegetation:** The partially open to closed canopy is strongly dominated by red maple with far less prominent amounts of yellow birch, white ash and/or balsam fir. The woody understory is sparse and largely comprised of regenerating canopy species with frequent but low levels of balsam fir, beaked hazelnut and wild raisin. Herbaceous and bryophyte cover are less than levels reported for other deciduous wet forests of Nova Scotia, but moderately species-rich. Notable species include sensitive fern, lady fern, dwarf raspberry, log moss and pale fat-leaved sphagnum.

**Environmental Setting:** Flats, shallow depressions and, less often, lower positions of gentle slopes provide suitable habitat. Sites have low to moderate exposure with little microtopography, exposed bedrock or surface stoniness. The low elevation ecosystem develops on both organic deposits and poorly drained mineral soil of varied origin and texture. Glacial and post-glacial river and lake plains are common landforms. Enriched surface and/or ground water inputs provide moderate to high nutrient availability. This Vegetation Type (VT) is found scattered throughout provincial lowlands and uplands, but is particularly prominent in the Northumberland/Bras d’Or and Eastern ecoregions.

Wallace Bay,  
Cumberland County



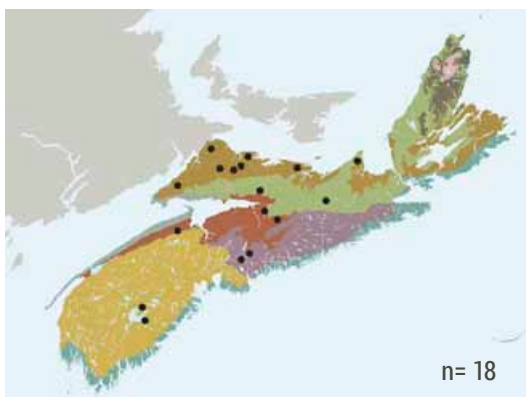
## Site & Soil Characteristics

Slope Position: Level<sup>7</sup> Depression<sup>1</sup> Lower<sup>1</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Very – Excessively)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Level<sup>6</sup> Slightly<sup>3</sup> Moderately<sup>1</sup>  
 Drainage: Poor<sup>8</sup> Very poor<sup>2</sup>

Common Soil Types: 10, 4, 13, 7, 14  
 Rooting Depth (cm): (< 30)<sup>5</sup> (> 45)<sup>1</sup> nd<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>1</sup> (11–20)<sup>3</sup> (21–40)<sup>2</sup> (> 40)<sup>2</sup> nd<sup>1</sup>  
 Humus Form: Hydromull<sup>2</sup> Hydromor<sup>1</sup> Peaty Mor<sup>1</sup>  
 Saprimoder<sup>1</sup> nd<sup>5</sup>



Characteristic Plants	WD3	
	Freq. (%)	Cover (%)
Red maple	100	44
White ash	67	8
Yellow birch	56	17
Balsam fir	50	10
White spruce	28	7
Sugar maple	22	14
Trembling aspen	17	15
Red spruce	17	11
Hemlock	17	4
<b>Tree Layer (Mean % Cover)</b>		<b>76</b>
Balsam fir	83	5
Red maple	78	3
White ash	61	2
Beaked hazelnut	39	2
Wild raisin	39	1
Speckled alder	33	12
Fly-honeysuckle	28	1
Striped maple	28	0.2
Winterberry	22	4
<b>Shrub Layer (Mean % Cover)</b>		<b>17</b>
Sensitive fern	89	16
Cinnamon fern	89	4
Dwarf raspberry	83	5
Starflower	78	0.6
Lady fern	72	3
Violets	67	3
Wild lily-of-the-valley	67	0.5
New York fern	61	14
Crested wood fern	61	0.3
Wood aster	56	2
Goldthread	56	1
Bunchberry	56	0.9
Sarsaparilla	50	0.9
Bladder sedge	50	0.5
Interrupted fern	44	6
Three seeded sedge	39	8
Jewelweed	39	2
Evergreen wood fern	39	2
Woodland horsetail	39	2
Northern beech fern	39	1
Wood-sorrel	39	0.3
Fringed sedge	33	3
Oak fern	33	0.4
Short husk	28	15
Tall white aster	28	2
Ribless woodland sedge	28	0.1
Small enchanter's nightshade	22	1
<b>Herb Layer (Mean % Cover)</b>		<b>64</b>
Log moss	61	2
Pale fat-leaved sphagnum	56	3
Common green sphagnum	50	30
Prickly sphagnum	50	7
Fern moss	50	4
Stair-step moss	44	1
Schreber's moss	39	2
Shaggy moss	28	2
Ragged moss	28	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>32</b>



**Successional Dynamics:** This forest can be expressed at a variety of successional stages, but is typically mid-successional. It is a type of edaphic climax and is expected to persist as described, although, depending on disturbances and nearby seed sources, it could transition to mixedwood forests with balsam fir, white and/or red spruce, white ash and red maple as associates. Windthrow and harvesting are the main stand-level disturbance agents but between events, caused by these agents, tree senescence and other minor disturbances can promote development of uneven-aged stands.

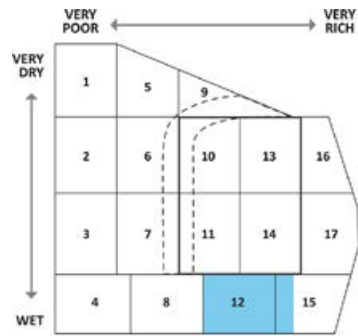
**Ecological Features:** This is the richest wet red maple forest in Nova Scotia, and the second richest among all wet deciduous forests, after WD1. Productivity is high but this potential may not be fully expressed by either tree height or age, both of which tend to be limited by saturated soil conditions. Like all wet deciduous forests, soil and groundwater nutrient richness increase understory development, species diversity and associated habitat complexity. Canada warbler and olive-sided flycatcher (two species at risk) may use this forest as breeding habitat. Few rare plants (e.g. meadow horsetail, black ash) are documented, but the ecosystem provides valuable habitat for numerous wildlife species (e.g. as an important early source of nectar and pollen). Small pools or tracts of standing water are common in the spring and early summer, but usually dry up later. Canopy tree senescence and uprooting are relatively common, and are often followed by vigorous stump sprouting. This successional pattern may result in a uniquely persistent and poorly understood form of old growth.

# WD4 Red maple / Poison ivy / Sphagnum

*Acer rubrum* / *Toxicodendron radicans* / *Sphagnum* spp.

**Concept:** This Vegetation Type (VT) is distinguished from other wet red maple forests (WD2 and WD3) by the presence of Atlantic Coastal Plain Flora, like eastern poison ivy, catbriar, inkberry, Elliot’s goldenrod and others. Frequent levels of black huckleberry are also diagnostic. WD4 is found in wet organic depressions or on wet mineral flats, where it persists as an edaphic climax. Small- to intermediate-scale disturbances, including windthrow, flooding, ice-scour and timber harvest are common components of stand history.

**Vegetation:** Partially open to closed canopy layers are strongly dominated by red maple. In some stands, low to moderate levels of balsam fir, black spruce, tamarack and/or white pine may be supported. Black ash and/or white ash are infrequent canopy components. The well-developed woody understory is largely comprised of regenerating trees, scattered black huckleberry and poison ivy with small pockets of winterberry, and/or speckled alder. Cinnamon fern is the only frequent wetland herb, but sedges and graminoids can dominate some sites. Other coastal plain species (e.g. highbush blueberry, Massachusetts fern, skunk cabbage, button sedge, Virginia chain fern, Torrey’s Sphagnum, etc.)



### Site & Soil Characteristics

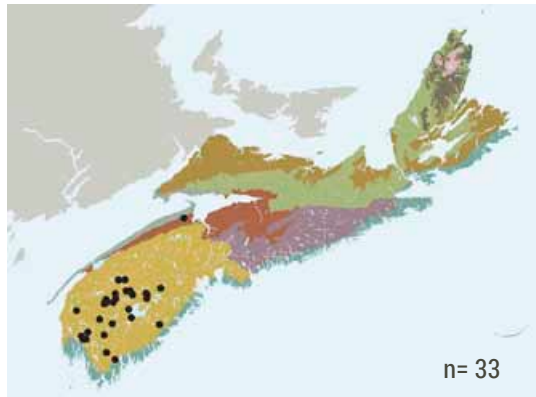
- Slope Position: Level<sup>8</sup> Depression<sup>1</sup> Lower<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>6</sup> (Moderately)<sup>1</sup> (Very – Excessively)<sup>1</sup> nd<sup>2</sup>
- Bedrock Outcrop: (Non-rocky)<sup>3</sup> (Slightly – Moderately)<sup>1</sup>
- Microtopography: Level<sup>5</sup> Other<sup>2</sup> nd<sup>3</sup>
- Drainage: Very Poor<sup>5</sup> Poor<sup>4</sup> nd<sup>1</sup>
- Common Soil Types: 14, 4
- Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>2</sup> (> 45)<sup>1</sup> nd<sup>5</sup>
- Forest Floor (cm): (21–40)<sup>1</sup> (> 40)<sup>8</sup> Other<sup>1</sup>
- Humus Form: Saprimoder<sup>3</sup> Peaty Mor<sup>2</sup> Mesimor<sup>1</sup> Hemimor<sup>1</sup> nd<sup>3</sup>

seldom co-occur with great frequency, but one or more species are usually present in each stand. Bryophyte cover is very high and usually dominated by pale fat-leaved sphagnum and flat top sphagnum.

Sixth Lake Stream, Queens County



Characteristic Plants	WD4	
	Freq. (%)	Cover (%)
Red maple	100	59
Black spruce	54	4
Balsam fir	51	8
Tamarack	34	5
White pine	31	5
Yellow birch	20	7
Black ash	11	15
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Red maple	91	5
Balsam fir	71	3
White pine	71	2
Huckleberry	69	4
Lambkill	66	4
Black spruce	66	4
Wild raisin	66	2
Speckled alder	63	8
Winterberry	49	5
Poison ivy	40	13
Mountain holly	40	1
Lowbush blueberry	37	5
Velvet-leaf blueberry	37	0.9
Leather-leaf	31	2
Labrador tea	31	1
Inkberry	29	4
White meadowsweet	26	0.5
Western poison ivy	23	4
<b>Shrub Layer (Mean % Cover)</b>		<b>38</b>
Cinnamon fern	94	13
Wild lily-of-the-valley	69	0.4
Goldthread	63	2
Starflower	54	0.8
Sarsaparilla	49	3
Trailing blackberry	46	5
Bunchberry	43	7
Tussock sedge	37	32
Blue flag	37	0.3
Blue joint	34	10
Bugleweed	31	3
Marsh fern	31	0.7
Dwarf raspberry	29	3
Three seeded sedge	29	0.9
Massachusetts fern	26	2
Partridge-berry	26	0.9
Button sedge	23	19
Sensitive fern	23	4
Creeping snowberry	23	0.8
Crested wood fern	23	0.4
Swamp candles	23	0.4
Elliott goldenrod	20	0.9
<b>Herb Layer (Mean % Cover)</b>		<b>58</b>
Pale fat-leaved sphagnum	61	23
Bazzania	48	1
Flat topped sphagnum	45	19
Log moss	39	2
Ladies' tresses	30	2
Red fat-leaved sphagnum	27	12
Common green sphagnum	21	6
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>36</b>



**Environmental Setting:** WD4 is mainly found in western Nova Scotia. This low elevation ecosystem is usually on poorly drained flats or in shallow depressions, with moderate exposure. WD4 can be found on riverside or lakeside deposits or on glacial tills, but most stands develop on organic deposits. Low surface microtopography, exposed bedrock and surface stoniness are typical.

**Successional Dynamics:** This forest is usually expressed at mid-successional stages and persists as an edaphic climax. It is maintained by small- to intermediate-scale canopy disturbances (e.g. windthrow, flooding, ice-scour and timber harvest) and limiting site conditions. Depending on disturbance history and local conditions, transition to disturbance dominated wet forests is possible. Windthrow, harvesting and flooding are potential stand-level disturbance agents, while natural senescence can create uneven-age class and stand structures between larger disturbance events.

**Ecological Features:** WD4 supports higher numbers of Atlantic Coastal Plain Flora (ACPF) species than any other VT in Nova Scotia. Productivity, surface water accumulation, and structural heterogeneity of this ecosystem are variable, but most occurrences are at least moderately fertile, supporting well-developed canopy heterogeneity, moist micro-depressions and tall patches of ferns. Stands along slow moving rivers are prone to ice scour as well as longer periods of flooding and soil saturation. Numerous rare and/or range-limited ACPF plants (e.g. catbrier, smooth alder, Atlantic manna grass, buttonbush) have been documented from this small-patch ecosystem. Eastern ribbonsnake and Blanding's turtle, both species at risk, may use this wet forest where it occurs adjacent to open freshwater bodies and/or streams. Canopy tree senescence and uprooting are often followed by vigorous stump sprouting, which may produce a uniquely persistent and poorly understood form of old growth.

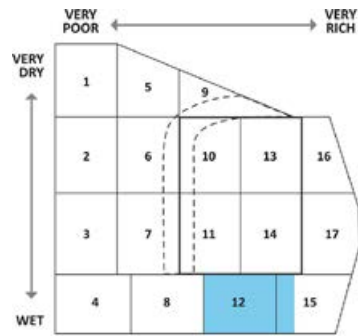
# WD5 Trembling aspen / Beaked hazelnut / Interrupted fern / Sphagnum

*Populus tremuloides* / *Corylus cornuta* /  
*Claytosmunda claytoniana* / *Sphagnum* spp.

**Concept:** Poorly drained flats and gentle slopes support this relatively uncommon wet forest. It is characterized by a partially open to closed canopy of trembling aspen and high sphagnum cover. This is the wettest trembling aspen forest in Nova Scotia. It is found on poorly drained mineral soil, with moderate nutrient availability. In the absence of sphagnum mosses, patches of dark water-stained leaves, found scattered on the forest floor, that are commonly associated with this Vegetation Type (VT) can be used as indicators of wet soils.

**Vegetation:** Red maple is a frequent but lesser canopy component, while balsam fir and/or spruce (black, red and/or white) are occasionally present with low cover. Understory woody layers are moderately well developed but largely dominated by regenerating canopy species. Frequently present shrubs include beaked hazelnut, wild raisin and speckled alder. Interrupted fern, wood aster, dwarf raspberry and several common upland forest species comprise the sometimes sparse herbaceous layer. Bryophyte abundance is similar, and only common green sphagnum is prominent.

Wallace Bay, Cumberland County



## Site & Soil Characteristics

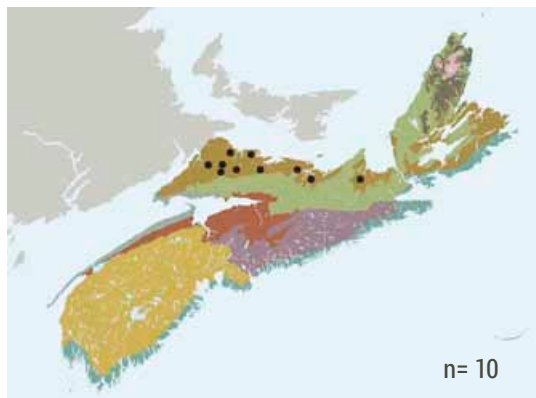
Slope Position: Level<sup>7</sup> Lower<sup>3</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>5</sup> Slightly<sup>4</sup> Strongly<sup>1</sup>  
 Drainage: Poor<sup>10</sup>

Common Soil Types: 7, 4  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>6</sup> (11–20)<sup>2</sup> nd<sup>1</sup>  
 Humus Form: Hydromor<sup>5</sup> Hydromoder<sup>2</sup> Mormoder<sup>2</sup> nd<sup>1</sup>

**Environmental Setting:** WD5 is mainly found in the Northumberland/Bras d’Or ecoregion, but can occur in other parts of mainland Nova Scotia. This low elevation ecosystem is usually on poorly drained flats or lower slopes, with moderate exposure. Most sites have little surface stoniness or exposed



Characteristic Plants	WD5	
	Freq. (%)	Cover (%)
Trembling aspen	100	53
Red maple	100	17
Balsam fir	50	11
Black spruce	30	4
Red spruce	20	20
White birch	20	0.1
White spruce	20	0.1
Hemlock	10	5
Large-tooth aspen	10	5
White ash	10	5
<b>Tree Layer (Mean % Cover)</b>		<b>84</b>
Red maple	100	3
Balsam fir	70	3
Trembling aspen	70	0.6
Serviceberry	70	0.1
Black spruce	60	6
Beaked hazelnut	60	1
Speckled alder	50	6
Wild raisin	50	1
Lambkill	40	7
White ash	40	3
White meadowsweet	40	1
Winterberry	30	3
Grey birch	30	1
White spruce	30	0.5
Lowbush blueberry	20	21
Willows	20	1
<b>Shrub Layer (Mean % Cover)</b>		<b>26</b>
Interrupted fern	90	3
Sarsaparilla	90	2
Wild lily-of-the-valley	80	2
Bunchberry	70	2
Starflower	70	1
Bracken	60	10
Wood aster	60	0.5
Dwarf raspberry	50	9
Cinnamon fern	50	4
Goldthread	50	1
Lady fern	40	0.5
Evergreen wood fern	40	0.2
New York fern	30	4
Strawberry	30	2
White panicle aster	30	1
Crested wood fern	30	0.3
Ground pine	30	0.1
Sensitive fern	20	3
Short husk	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>28</b>
Schreber's moss	90	1
Flat topped sphagnum	70	22
Stair-step moss	70	3
Broom moss	60	2
Hair-cap moss	60	1
Common green sphagnum	50	20
Pale fat-leaved sphagnum	30	5
Log moss	30	0.8
Shaggy moss	30	0.7
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>34</b>



bedrock, but slight microtopography. WD5 sites are associated with moderate nutrient availability, shallow to moderate rooting potential and moderate humus accumulation. Mineral soils are often fine textured. This VT is not known to occur on organic soils.

**Successional Dynamics:** This is an early-successional forest that persists as an edaphic climax, largely maintained by the wet soils that limit its potential for successional development. Depending on disturbance history, site fertility and nearby seed sources, WD5 could maintain itself or succeed to later successional, wet mixedwood forest VTs dominated by red maple, white ash, balsam fir and/or red spruce. Windthrow and harvesting are the main stand-level disturbance agents. This VT usually originates from agricultural land clearing, forest harvesting, or fires.

**Ecological Features:** This relatively scarce, small-patch wet forest ecosystem makes a unique contribution to landscape composition and structure, local hydrological regimes, and habitat diversity. Where it occurs in agricultural landscapes, young seral forests, such as WD5, provide valuable habitat for pheasants and ruffed grouse and nesting sites for many species of birds including raptors, such as the red-tailed hawk. Aspen leaves, twigs and bark are highly nutritious, providing an important food source (e.g. for porcupine), while the tree's relatively soft wood is easily excavated by cavity nesters. This ecosystem's potential for self-renewal from root suckering is high. The VT occurs in small- to medium-sized basins or in small perched depressions. Stands are usually very productive, but no species of conservation concern were found in available plot data. Similar to other wet forests, WD5 contributes to carbon, nitrogen and water budgets and helps regulate groundwater quality and flow.

# W M

## Wet Mixedwood Forest Group

### Wet Mixedwood (WM) Key

- |   |  |
|---|--|
| 1a. Eastern white cedar present (excluding escapes) ... WC10  | 4a. Red maple and balsam fir dominant ... WM1      |
| 1b. Not as above ... 2  | 4b. Not as above ... 5                             |
| 2a. Stands with uncommon and rare calcareous-loving plants (calciphiles). Indicator species include black ash, alder-leaved buckthorn, shrubby cinquefoil, showy lady's-slipper, marsh fern and yellow lady's-slipper ... WM5 | 5a. Red maple and red spruce dominant ... WM2      |
| 2b. Not as above ... 3  | 5b. Not as above ... 6                             |
| 3a. Atlantic Coastal Plain Flora present ... WM3a   | 6a. Red maple and black spruce dominant ... WM3    |
| 3b. Not as above ... 4  | 6b. White spruce and yellow birch dominant ... WM4 |

COVER CLASSES: Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%



## Concept

Wet forest ecosystems are characterized by water at or near the ground surface for most of the growing season. These partly open to closed canopy forests are generally dominated by red maple, spruce and balsam fir, often with a component of white ash and yellow birch. The shrub layer mainly contains regenerating tree species, winterberry, mountain holly and speckled alder. A well-developed and diverse herbaceous layer includes many species of ferns and sedges, and other plants common to wet sites (e.g. dwarf raspberry and jewelweed). Bryophyte abundance is moderate with sphagnum species the most common. Vegetation Types (VT) in this group are associated with moderate to high nutrient availability, with increasing richness reliably indicated by white ash presence. They occur primarily on level to depressional topography or within riparian zones. Soils are derived from glacial till, fluvial, lacustrine and/or organic deposits. Fertility is enhanced by ground water or seepage inputs. Most sites have little (if any) surface stoniness or exposed bedrock. Wet mixedwood forests are edaphic mid-successional associations strongly shaped by excessive moisture. Fluctuating

water levels, windthrow, insects and disease are notable disturbance agents. All VTs in this group are classified as part of the Acadian Macrogroup.

Wet mixedwood forests may support vertebrate and invertebrate species associated with both coniferous and deciduous forest wetlands. These small-patch forests are found embedded within larger patch or matrix forested ecosystems. Here they provide locally distinct habitat conditions and may act as a “stepping-stone” for forest wetland dependent species moving across the landscape. Windthrow disturbance creates sites that are at least slightly mounded, serving to increase microhabitat variability. The cool, well-oxygenated soils of these mixedwoods, and the small pools or narrow channels of standing or very slowly moving water, provide important habitat for amphibians (e.g. wood frog, spring peeper, yellow-spotted and blue-spotted salamanders, four-toed salamander) and some turtle species. This forest group provides suitable habitat for Canada warbler and olive-sided flycatcher. Several uncommon plants may occur, including coralroots, rattlesnake ferns, yellow and showy lady’s slipper and black ash.



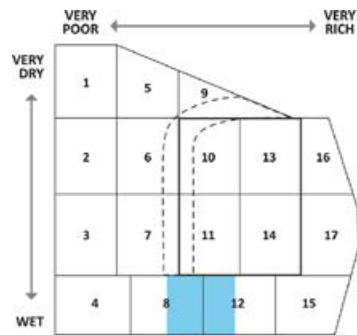
# WM1 Red maple – Balsam fir / Wood aster / Sphagnum

*Acer rubrum* – *Abies balsamea* / *Oclemena acuminata* / *Sphagnum* spp.

**Concept:** Red maple – Balsam fir / Wood aster / Sphagnum is one of three wet red maple-conifer mixedwood forests recognized in Nova Scotia. These Vegetation Types (VTs) are distinguished, from one another, by major differences in canopy composition and minor differences in soil fertility and understory composition. This relatively common Vegetation Type (VT) is characterized by a closed canopy of red maple and balsam fir, high herbaceous cover and a well-developed bryophyte layer of sphagnum moss.

**Vegetation:** Crown closure is moderate to high, although some stands support more widely spaced trees. Other tree species such as yellow birch, red spruce, black spruce and tamarack are infrequent and seldom abundant. The understory supports low levels of woody species and includes regenerating red maple and balsam fir, mountain holly and speckled alder. The diverse and abundant herbaceous layer is characterized by cinnamon fern, dwarf raspberry, lady fern, sensitive fern and violets. Bryophytes include several sphagnum mosses and lesser amounts of common upland forest species.

MacElmons Pond, Belmont, Colchester County



## Site & Soil Characteristics

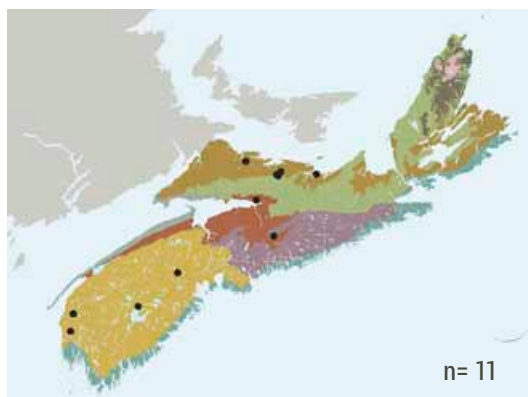
Slope Position: Level<sup>9</sup> Lower<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>9</sup> (Moderately)<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>7</sup> Slightly<sup>3</sup>  
 Drainage: Very Poor<sup>5</sup> Poor<sup>4</sup> Imperfect<sup>1</sup>

Common Soil Types: 10, 4, 13, 14, 7  
 Rooting Depth (cm): (< 30)<sup>8</sup> (30–45)<sup>1</sup> nd<sup>1</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>3</sup> (11–20)<sup>3</sup> (21–40)<sup>1</sup> (> 40)<sup>2</sup>  
 Humus Form: Saprimoder<sup>3</sup> Hydromor<sup>2</sup> Peaty Mor<sup>1</sup>  
 Hydromoder<sup>1</sup> nd<sup>3</sup>

**Environmental Setting:** This VT is found primarily on wet, poor to medium mineral soils derived from glacial deposits, of varying texture, with at least some ground and/or surface water flow; organic deposits are also possible. The ecosystem



Characteristic Plants	WM1	
	Freq. (%)	Cover (%)
Balsam fir	100	24
Red maple	91	25
White ash	73	14
Yellow birch	73	11
Red spruce	45	11
Black spruce	36	10
White spruce	36	7
<b>Tree Layer (Mean % Cover)</b>		<b>81</b>
Balsam fir	73	8
White ash	64	4
Red maple	45	1
Striped maple	45	1
Mountain holly	45	0.1
Mountain maple	36	7
Winterberry	36	3
Sugar maple	36	1
Yellow birch	36	1
<b>Shrub Layer (Mean % Cover)</b>		<b>20</b>
Cinnamon fern	100	10
Goldthread	91	3
Sarsaparilla	82	3
Dwarf raspberry	82	2
Bunchberry	82	1
Wood aster	73	0.4
Wild lily-of-the-valley	64	3
Lady fern	64	2
Starflower	64	0.6
Sensitive fern	55	15
Northern beech fern	55	11
Woodland horsetail	55	0.4
Bluebead lily	55	0.1
New York fern	45	38
Violets	45	2
Wood-sorrel	45	1
Mitrewort	45	0.5
Evergreen wood fern	45	0.4
Three seeded sedge	45	0.4
Partridge-berry	45	0.3
Crested wood fern	45	0.1
Manna-grass	45	0.1
Twinflower	45	0.1
Oak fern	36	6
Small enchanter's nightshade	36	0.4
Bladder sedge	36	0.1
Jewelweed	27	6
Interrupted fern	27	4
Rough sedge	27	2
<b>Herb Layer (Mean % Cover)</b>		<b>3</b>
Bazzania	82	2
Stair-step moss	73	4
Fern moss	73	1
Pale fat-leaved sphagnum	64	18
Shaggy moss	55	4
Common green sphagnum	36	58
Tree moss	36	1
Prickly sphagnum	27	8
Leafy moss	27	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>55</b>



occurs at low elevation in shallow depressions and on flats with little microtopography. Rooting potential is strongly limited by high water levels, and sometimes compacted soils. Most occurrences are in the Western and Valley/Central Lowland ecoregions but outlying stands are found scattered throughout the remainder of the mainland and lowland areas of Cape Breton.

**Successional Dynamics:** This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional. It is a type of edaphic climax (i.e. largely persisting because of limiting site conditions). Depending on the local ecological context and disturbance regime, WM1 could maintain itself, as described, or transition to a wet red maple dominated VT (e.g. WD2 Red maple / Cinnamon fern / Sphagnum). Tree senescence and windthrow are the primary disturbance agents. Between disturbance events, uneven-aged stands can develop through tree mortality from senescence.

**Ecological Features:** This is a moderately productive wet mixedwood forest, with a well-developed canopy and often dense understory strata. Small pools or narrow channels of standing, or very slowly moving, water are typical, and may provide habitat for amphibians and other wildlife. Temporary water bodies (without resident fish populations) are used by spring peepers and wood frogs during the breeding season. Red-backed salamanders prefer damp, mixed forest environments with abundant woody debris and leaf litter. This small-patch ecosystem supports similar biodiversity features as those listed for red maple dominated wet deciduous Vegetation Types (WD2, WD3, WD4).

# WM2

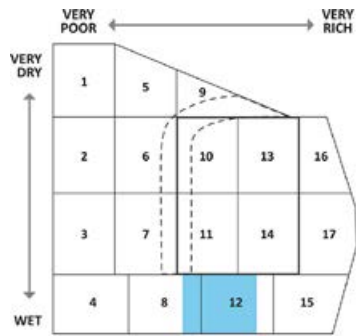
## Red maple – Red spruce / Wood-sorrel – Sensitive fern

*Acer rubrum* - *Picea rubens* / *Oxalis montana* – *Onoclea sensibilis*

**Concept:** This ecosystem is one of three wet red maple-conifer mixedwood forests recognized in Nova Scotia. These Vegetation Types (VTs) are mostly distinguished, from one another, by differences in canopy composition and minor differences in soil fertility and understory composition. This mature closed canopy forest ecosystem is characterized by red maple and red spruce co-dominance, high herbaceous cover and a moderately-developed bryophyte layer.

**Vegetation:** Frequent overstory associate species are indicative of later successional stages. These include yellow birch, hemlock and white ash, with lesser balsam fir. Low to moderate cover is typical in the woody understory, where regenerating trees are characteristic with shrub species including fly-honeysuckle, striped maple and mountain maple. The well-developed and diverse herbaceous layer includes characteristic wet forest plants such as cinnamon fern, sensitive fern, three seeded sedge, creeping snowberry, dwarf raspberry, violets and lady fern among other common upland plants. Bryophytes include several species of sphagnum moss, bazzania and stair-step moss.

Miller Lake, Lunenburg County



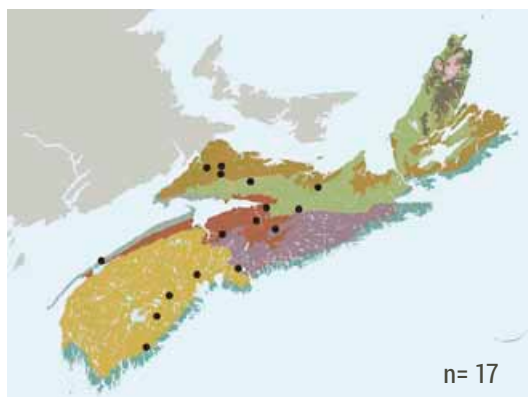
### Site & Soil Characteristics

Slope Position:	Level <sup>8</sup> Other <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>8</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Level <sup>6</sup> Slightly <sup>2</sup> nd <sup>2</sup>
Drainage:	Poor <sup>6</sup> Very Poor <sup>2</sup> Imperfect <sup>1</sup> nd <sup>1</sup>
Common Soil Types:	14, 4, 7, 10
Rooting Depth (cm):	(< 30) <sup>4</sup> (30–45) <sup>2</sup> nd <sup>4</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>1</sup> (11–20) <sup>2</sup> (21–40) <sup>1</sup> (> 40) <sup>4</sup> nd <sup>1</sup>
Humus Form:	Hydromor <sup>2</sup> Hydromoder <sup>1</sup> Saprimoder <sup>1</sup> Mesimor <sup>1</sup> Fibrimor <sup>1</sup> Lignomor <sup>1</sup> nd <sup>3</sup>

**Environmental Setting:** This low elevation forest occurs on moist to wet, nutrient medium ecosites. Soils are either poorly drained glacial tills of varying texture or organic deposits, with



Characteristic Plants	WM2	
	Freq. (%)	Cover (%)
Red maple	100	21
Red spruce	94	25
Yellow birch	88	6
Balsam fir	82	10
Hemlock	59	14
White ash	59	11
Black spruce	24	13
White spruce	18	5
White birch	12	4
<b>Tree Layer (Mean % Cover)</b>		<b>79</b>
Balsam fir	94	6
Red spruce	82	2
Red maple	65	0.9
Fly-honeysuckle	47	0.8
Striped maple	47	0.8
Hemlock	41	4
Mountain maple	35	7
White ash	35	0.9
Winterberry	29	12
Speckled alder	29	2
Lowbush blueberry	29	0.1
Sugar maple	24	0.5
Mountain holly	24	0.1
White pine	24	0.1
Wild raisin	24	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>19</b>
Cinnamon fern	94	9
Wild lily-of-the-valley	94	0.6
Sarsaparilla	76	2
Sensitive fern	71	7
Wood-sorrel	71	2
Goldthread	71	1
Starflower	71	0.4
Three seeded sedge	65	2
Bunchberry	65	2
Wood aster	65	0.3
Creeping snowberry	65	0.2
New York fern	53	20
Dwarf raspberry	53	12
Evergreen wood fern	53	0.8
Northern beech fern	47	1
Violets	47	0.2
Lady fern	41	2
Woodland horsetail	35	2
Bladder sedge	35	0.2
Interrupted fern	29	7
Small enchanter's nightshade	29	0.3
Jack-in-the-pulpit	24	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>52</b>
Bazzania	88	8
Stair-step moss	76	10
Schreber's moss	65	5
Common green sphagnum	53	14
Pale fat-leaved sphagnum	47	8
Shaggy moss	41	9
Prickly sphagnum	35	14
Flat topped sphagnum	29	11
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>51</b>



limited ground and/or surface water inputs. Flats, shallow depressions and gentle slopes with little microtopography are typical sites. Most occurrences are in the Nova Scotia Uplands and Western ecoregions.

**Successional Dynamics:** This edaphic vegetation type can be expressed at a variety of successional stages, but most stands are mid-successional. It is maintained by limiting site conditions and typically small- to intermediate-scaled disturbances (e.g. tree mortality, windthrow and timber harvest events). Wet soils generally limit the potential for successional development, but depending on the ecological context and disturbance regime, WM2 could either maintain itself or transition to hemlock or red spruce dominated wet softwood forests. Transition to a red maple dominated hardwood VT is also possible on richer sites. Stand-level disturbances are uncommon, but windthrow and timber harvest are possible mechanisms of renewal. Tree mortality through senescence can promote uneven-aged stands.

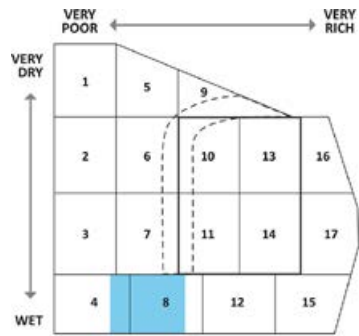
**Ecological Features:** This small-patch forest often occurs in a transition zone between open wetland and upland forest, providing distinct if not important landscape functions. In WM2, hardwood canopy components are often associated with past disturbance events or areas with increased surface and/or subsurface water. This is a moderately productive mixedwood forest, with a well-developed canopy and often dense herbaceous and bryophyte layers. Over time, these forests may develop features associated with long-term continuity, including old growth characteristics. Outside of their breeding season, wood frogs can be found in damp deciduous and mixedwood forests adjacent to WM2 and other wet mixedwood Vegetation Types. In western Nova Scotia the threatened eastern ribbon snake may be found in WM2 and similar habitats.

# WM3 Red maple – Black spruce / Lambkill / Cinnamon fern / Sphagnum

*Acer rubrum* – *Picea mariana* / *Kalmia angustifolia* / *Osmundastrum cinnamomea* / *Sphagnum* spp.

## WM3a Red maple / Huckleberry – Inkberry / Sphagnum variant

*Acer rubrum* / *Gaylussacia baccata* – *Ilex glabra* / *Sphagnum* spp.



**Concept:** WM3 is one of the three wet red maple – conifer mixedwoods in Nova Scotia. This Vegetation Type (VT) has the lowest nutrient availability in the wet mixedwood forest group, as indicated by black spruce in the overstory and the presence of ericaceous woody shrubs in the understory. This mature closed canopy forest is characterized by moderate to high shrub and herbaceous cover and by a well-developed sphagnum moss layer. The variant, WM3a, is distinguished by the presence of Atlantic Coastal Plain Flora like poison ivy, catbrier, inkberry and others.

**Vegetation:** Scattered tamarack, balsam fir, and/or white pine characterize the overstory. Black spruce regeneration, usually from layering, can be prominent in the understory as well as abundant red maple and balsam fir. A variety of shrubs may occur including lambkill, mountain holly, winterberry, huckleberry, and both lowbush and velvet-leaf blueberries. Herb diversity is not as high as in the other wet red maple mixedwoods but it is still well developed and includes cinnamon fern, creeping snowberry, three seeded sedge, bracken, and tussock sedge, and a variety of upland forest flora. Atlantic Coastal Plain Flora commonly found with the variant include inkberry, bayberry, catbrier, highbush blueberry, button sedge and Massachusetts fern. Sphagnum moss can be very extensive with noticeably lesser amounts of common upland moss and liverwort species.

**Environmental Setting:** This low elevation forest occurs on poorly drained sites dominated by either wet mineral or deep organic deposits. Regardless of their origin, soils receive limited ground and/or surface water inputs, and have only

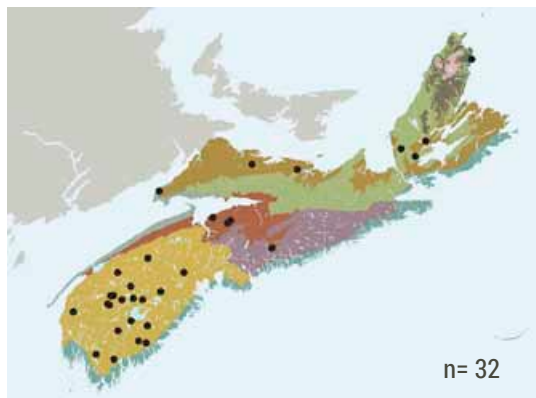
### Site & Soil Characteristics

- Slope Position: Level<sup>8</sup> Depression<sup>1</sup> Other<sup>1</sup>
- Surface Stoniness: (Non – Slightly)<sup>7</sup> (Moderately)<sup>1</sup> nd<sup>2</sup>
- Bedrock Outcrop: (Non-rocky)<sup>7</sup> (Slightly – Moderately)<sup>1</sup> nd<sup>2</sup>
- Microtopography: Level<sup>7</sup> Slightly<sup>1</sup> nd<sup>2</sup>
- Drainage: Poor<sup>4</sup> Very Poor<sup>4</sup> Other<sup>2</sup>
- Common Soil Types: 14, 4, 7
- Rooting Depth (cm): (< 30)<sup>3</sup> (30–45)<sup>2</sup> nd<sup>5</sup>
- Forest Floor (cm): (6–10)<sup>1</sup> (11–20)<sup>2</sup> (21–40)<sup>1</sup> (> 40)<sup>5</sup> nd<sup>1</sup>
- Humus Form: Peaty Mor<sup>3</sup> Saprimoder<sup>1</sup> Hemimor<sup>1</sup> Hydromoder<sup>1</sup> nd<sup>4</sup>



Madashack Lake, Yarmouth County

Characteristic Plants	WM3		WM3a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
Black spruce	100	29	71	19
Red maple	100	22	100	34
Balsam fir	72	10	64	10
Tamarack	44	5	57	12
White pine	28	3	57	8
White birch	22	4		
Hemlock			14	6
<b>Tree Layer (Mean % Cover)</b>		<b>65</b>		<b>68</b>
Black spruce	89	7	79	7
Lambkill	78	6	64	6
Balsam fir	72	6	86	4
Red maple	72	4	71	7
Wild raisin	56	3	50	1
Mountain holly	56	2	50	2
Serviceberry	50	0.2	29	2
Lowbush blueberry	39	1	29	1
Huckleberry	33	3	64	14
Winterberry	33	3	50	2
White pine	33	0.2	50	7
Speckled alder	28	5	29	5
Velvet-leaf blueberry	28	3	43	2
Red oak	28	0.2	29	0.5
Labrador tea	22	0.7	43	1
Chokeberries			50	0.6
Inkberry			36	18
Rhodora			21	2
Western poison ivy			21	6
<b>Shrub Layer (Mean % Cover)</b>		<b>29</b>		<b>46</b>
Bunchberry	89	2	71	3
Cinnamon fern	78	29	93	21
Goldthread	78	5	64	3
Creeping snowberry	78	1	50	10
Starflower	78	0.6	57	0.8
Wild lily-of-the-valley	72	0.8	43	0.3
Sarsaparilla	56	2	36	0.5
Three seeded sedge	50	4	57	2.0
Bluebead lily	39	0.5	14	0.2
Bracken	33	9	21	3
Dwarf raspberry	33	3	14	3
Partridge-berry	28	0.6	43	0.5
Pink lady's-slipper	28	0.6	21	0.4
Tussock sedge	23	26	43	29
Wood aster	22	0.6	36	0
Blue joint	17	3	50	6
Blue flag	17	0.4	36	0.5
Marsh fern			21	3
<b>Herb Layer (Mean % Cover)</b>		<b>56</b>		<b>56</b>
Schreber's moss	72	9	43	6
Bazzania	67	4	50	3
Stair-step moss	61	2	36	4
Flat topped sphagnum	56	16	64	17
Ladies' tresses	56	7	43	11
Pale fat-leaved sphagnum	50	34	43	33
Broom moss	50	1	36	0.6
Common green sphagnum	33	35	21	32
Log moss	28	1	36	3
Red fat-leaved sphagnum			36	28
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>65</b>		<b>58</b>



intermediate nutrient availability. Flats, shallow depressions and gentle slopes with negligible micro-topography are typical. This forest community is widely distributed throughout the province. However, the variant is primarily restricted to the southwestern ecodistricts of Clare, Sable, Rossignol and LaHave.

**Successional Dynamics:** This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional. It is maintained by limiting site conditions and typically small- to intermediate-scaled disturbances (e.g. senescence, windthrow, insect/disease). Edaphic conditions generally limit the potential for successional development. Transition to red maple dominated wet forest may occur following a mortality event in the softwood component. Stand-level disturbances are uncommon, but windthrow and timber harvest are possible mechanisms of renewal. Tree mortality through senescence can promote uneven-aged stands.

**Ecological Features:** This small-patch forest is found embedded within larger patch or matrix forested ecosystems. Here it provides locally distinct habitat conditions, and may act as a stepping stone for wetland dependent species moving across the landscape. Hardwood canopy components are often associated with areas of increased surface and/or subsurface water. Pools of open water (without resident fish populations) and peaty hummocks provide breeding habitat for a variety of amphibians including blue-spotted and four-toed salamander, and wood frog. In western Nova Scotia the presence of Atlantic Coastal Plain Flora, many of which are at least uncommon if not threatened or vulnerable, are associated with WM3a.

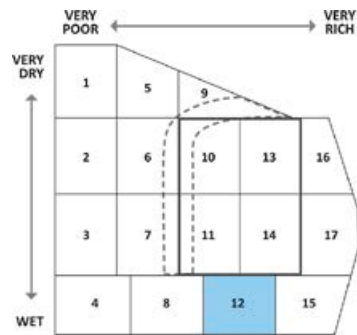
# WM4 White spruce – Yellow birch / Cinnamon fern – Dwarf raspberry

*Picea glauca* – *Betula alleghaniensis* /  
*Osmundastrum cinnamomeum* – *Rubus pubescens*

**Concept:** White spruce and yellow birch form moderate to dense canopy (60–90%) wet mixedwoods that overtop a diverse and well-developed herb layer. This small ecosystem occurs on toe slopes and adjacent bottoms where seepage waters enhance nutrient availability, as reflected by the presence of numerous plants indicative of moist, fertile soils.

**Vegetation:** Balsam fir, red maple and white ash are usually present in the overstory. Sugar maple, red spruce and hemlock are occasional. The understory is normally open (< 5% cover) with few shrubs and sparse tree regeneration. The herb layer can be extensive with a diverse assortment of species reflecting variable moisture levels and nutrient availability. Cinnamon fern, sensitive fern, bladder sedge, water-pennywort and crested wood fern occur on the wettest sites. Oak fern, northern beech fern, lady fern and wood goldenrod indicate high soil fertility. Bryophyte development is moderately well developed and includes a diverse mix

Georgeville, Antigonish County



## Site & Soil Characteristics

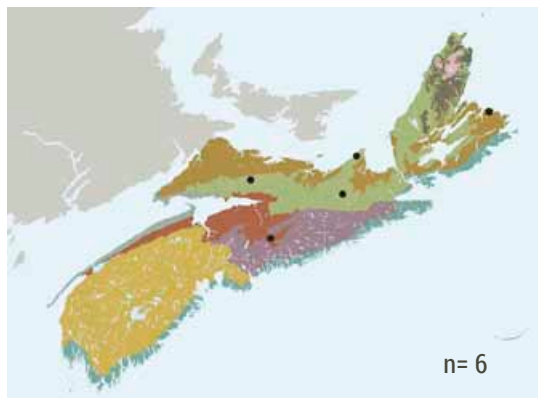
Slope Position: Level<sup>8</sup> Depression<sup>1</sup> Lower<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Slightly<sup>7</sup> Level<sup>3</sup>  
 Drainage: Poor<sup>7</sup> Very Poor<sup>3</sup>

Common Soil Types: 13, 4, 7, 10, 14  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>2</sup> nd<sup>6</sup>  
 Forest Floor (cm): (0–5)<sup>2</sup> (11–20)<sup>3</sup> (21–40)<sup>3</sup> (> 40)<sup>2</sup>  
 Humus Form: Hydromoder<sup>3</sup> Saprimoder<sup>2</sup> Hydromor<sup>2</sup> nd<sup>3</sup>

of mosses and liverworts typically found on moist to wet, rich soils. This layer includes several sphagnum species including prickly sphagnum, as well as members of the Mniaceae family (*Mniaceae spp.*, *Plagiomnium spp.* and *Rhizomnium spp.*).



Characteristic Plants	WM4	
	Freq. (%)	Cover (%)
White spruce	100	20
Yellow birch	100	15
Balsam fir	100	15
Red maple	83	13
White ash	83	8
White birch	33	11
Sugar maple	17	12
Hemlock	17	5
Mountain maple	17	4
Red spruce	17	4
Black spruce	17	3
Black ash	17	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>76</b>
Fly-honeysuckle	67	0.9
Balsam fir	67	0.4
Red maple	50	2
Mountain-ash	50	0.1
Sugar maple	50	0.1
Speckled alder	33	24
White ash	33	1
Alternate-leaved dogwood	33	0.6
Bristly black currant	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Cinnamon fern	100	28
Dwarf raspberry	100	12
Sensitive fern	67	11
Oak fern	67	10
Lady fern	67	7
Northern beech fern	67	2
Bunchberry	67	1
Sarsaparilla	67	0.7
Wild lily-of-the-valley	67	0.6
Twinflower	50	2
Goldthread	50	1
Bladder sedge	50	1
American water-pennywort	50	1
Three seeded sedge	50	0.9
Wood aster	50	0.3
Crested wood fern	50	0.1
Small enchanter's nightshade	50	0.1
Wood goldenrod	33	8
Interrupted fern	33	7
Meadow-rue	33	3
Wood-sorrel	33	2
Evergreen wood fern	33	1
Jack-in-the-pulpit	33	0.3
Woodland horsetail	33	0.2
Christmas fern	33	0.1
Drooping wood sedge	33	0.1
False violet	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>73</b>
Pale fat-leaved sphagnum	67	15
Shaggy moss	67	12
Prickly sphagnum	50	12
Fern moss	50	5
Stair-step moss	33	20
Broom moss	33	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>45</b>



**Environmental Setting:** WM4 is expected in upland topography as a small patch adjacent to swales and flow accumulation zones; it is also known at lower elevations along small streams. Soils are wet, moderately rich to very rich glacial tills of varying texture. Some sites might grade from wetland to upland as one moves upslope. This uncommon forest community is primarily known from central and eastern Nova Scotia.

**Successional Dynamics:** WM4 is not expected to succeed to other late-successional wet forest VTs. The ecosystem may transition to include a larger percentage of longer lived tree species, such as hemlock and sugar maple. Shorter-lived tree species such as white spruce and balsam fir will cycle in and out of the overstory temporarily increasing the hardwood component of the canopy. Stand-level disturbances are rare and most species loss will occur due to windthrow. Balsam fir and white spruce are vulnerable to a variety of insects and fungi and, at times, this ecosystem will experience stand level loss of these species. Tree mortality through senescence can promote uneven-aged stands, enabling the VT to persist as a type of edaphic climax.

**Ecological Features:** This small-patch forest often occupies less than one hectare and occurs embedded within larger matrix forests, where it provides a locally distinct habitat. Many sites are adjacent to land with a long settlement history and have likely been partially harvested, pastured, and/or influenced by invasive species. As such, successful efforts to conserve this ecosystem will depend, in part, on maintaining some surrounding forest cover upslope and downslope as a buffer. The cool, well-oxygenated soils of these mixedwoods provide habitat for salamanders, wood frogs, and other amphibians. Several uncommon plants may occur, including coralroots, rattlesnake ferns, yellow lady's slipper and black ash.



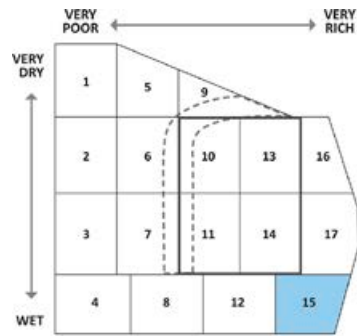
# WM5 Ash / Alder-leaved buckthorn / Shaggy moss

*Fraxinus spp.* / *Endotropis alnifolia* / *Rhytidiadelphus triquetrus*

**Concept:** Ash / Alder-leaved buckthorn / Shaggy moss is a circumneutral seepage swamp with a somewhat open to moderately closed canopy and a rich, diverse herb layer influenced by calcium-rich groundwater seepage. This relatively uncommon Vegetation Type (VT) is characterized by red maple and balsam fir co-dominance, high herbaceous cover and a well-developed bryophyte layer of sphagnum moss. Black and white ash may be present in either the overstory or understory layers.

**Vegetation:** Crown closure is moderate to high (40–90%), although some stands support more widely spaced trees. Other associated trees may include yellow birch, white ash, black spruce, tamarack and/or white spruce—any of which may be prominent. Shrub cover varies with canopy cover and can be quite dense and diverse. Typical species include alder-leaved buckthorn, speckled alder and red osier dogwood. The diverse herb layer is characterized by many fern and sedge species and plants favouring the near neutral pH soils (calciphiles) such as star sedge, showy and yellow lady’s slippers, marsh fern and inland sedge. Bryophyte cover is high and includes shaggy moss and stair-step moss. However, sphagnum species tend to have higher cover and include prickly, ladies tresses and pale fat-leaved sphagnum.

**Environmental Setting:** This wet mixedwood forest occurs along small streams or headwater swamps influenced by calcium-rich groundwater seepage. Sites with mineral soils typically have a humus enriched “A” horizon. Soils are typically saturated and derived from glacial deposits, of varying texture, with at least some ground and/or surface water flow (organic deposits are also possible); nutrient availability is low to medium. The ecosystem occurs at low elevation in shallow depressions and on flats and cool gentle slopes



## Site & Soil Characteristics

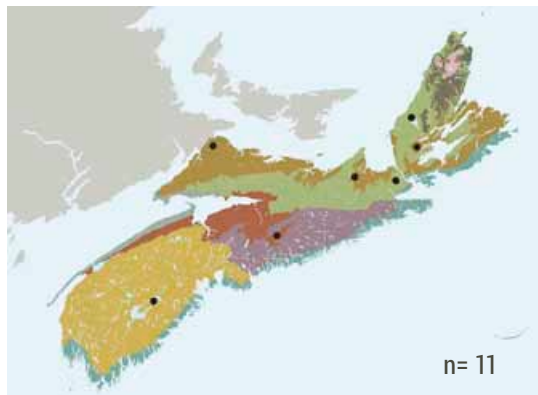
Slope Position: Level<sup>10</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>8</sup> Slightly<sup>2</sup>  
 Drainage: Poor<sup>5</sup> Very poor<sup>5</sup>

Common Soil Types: 14, 13, 7, 10  
 Rooting Depth (cm): (< 30)<sup>3</sup> nd<sup>7</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>1</sup> (11–20)<sup>2</sup> (> 40)<sup>6</sup>  
 Humus Form: Saprimoder<sup>4</sup> Hydromor<sup>2</sup> nd<sup>4</sup>



Beside TransCanada Highway, west of Antigonish, Antigonish County

Characteristic Plants	WM5	
	Freq. (%)	Cover (%)
Red maple	82	22
Balsam fir	64	21
Yellow birch	55	8
Black ash	45	17
Black spruce	36	9
White spruce	27	34
Tamarack	27	14
White ash	27	9
White pine	27	6
Sugar maple	18	6
<b>Tree Layer (Mean % Cover)</b>		<b>64</b>
Alder-leaved buckthorn	88	2
Speckled alder	75	19
Labrador tea	75	6
Red maple	75	1
Bristly black currant	75	0.1
Red osier dogwood	63	3
Balsam fir	63	2
Black spruce	50	4
Black ash	50	3
Fly-honeysuckle	50	1
White ash	50	1
Winterberry	38	0.9
Mountain holly	38	0.7
Bush-honeysuckle	38	0.5
Beaked hazelnut	38	0.3
Swamp red currant	38	0.1
Poison ivy	25	15
Shrubby cinquefoil	25	4
<b>Shrub Layer (Mean % Cover)</b>		<b>39</b>
Cinnamon fern	100	24
Sarsaparilla	100	4
Dwarf raspberry	88	13
Bunchberry	88	7
Violets	75	5
Three-leaved false Solomon's seal	75	4
Sensitive fern	63	6
Royal fern	63	5
Goldthread	63	1
Showy lady's-slipper	63	0.4
Lady fern	50	5
Northern beech fern	50	3
Oak fern	50	3
Meadow-rue	50	2
Avens	50	2
Marsh fern	50	1
Mitrewort	50	0.6
Woodland horsetail	38	9
Black snakeroot	38	1
Yellow lady's-slipper	38	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>114</b>
Shaggy moss	100	14
Stair-step moss	100	10
Prickly sphagnum	50	9
Schreber's moss	50	5
Fern moss	50	2
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>73</b>



with little microtopography. Rooting potential is strongly limited by high water levels. Most occurrences are associated with the Windsor Group, a geological formation characterized by underlying siltstones, shale, gypsum and anhydrite.

**Successional Dynamics:** This ecosystem can be expressed at a variety of successional stages, but most stands are mid-successional. It is a type of edaphic climax (i.e. largely persisting because of limiting site conditions). Depending on the local disturbance regime, WM5 could maintain itself, as described, or transition to a wet deciduous forest dominated by red maple. Tree senescence, insect/disease, and windthrow are the primary disturbance agents. Between disturbance events, uneven-aged stands can develop through tree mortality originating with senescence.

**Ecological Features:** Small pools, or narrow channels, of standing or very slowly moving water are typical, and may provide habitat for amphibians such as wood frog, spring peeper, yellow-spotted and blue-spotted salamanders, and some turtle species. As with other wet mixedwoods, this VT provides suitable habitat for Canada warbler and olive-sided flycatcher, among other bird species. Black ash, a species at risk in Nova Scotia, is often present in the understory and occasionally extends into the canopy. Other species of conservation concern, that may be encountered, include yellow and showy lady's slippers.

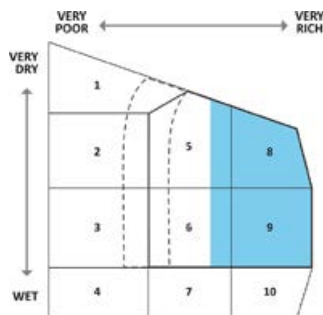


Dwarf raspberry

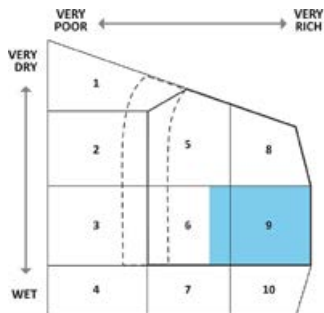
# Edatopic Grids of Acadian Vegetation Types found in the Maritime Boreal

Some vegetation types listed in Acadian Macrogroup also occur on Maritime Boreal (MB) ecosites. The following MB edatopic grids apply to the VTs, as listed.

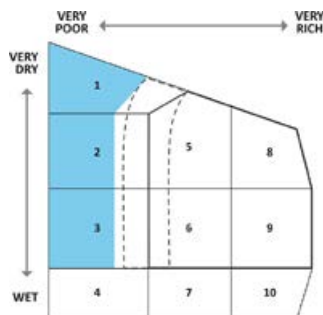
**OF1, OF4**



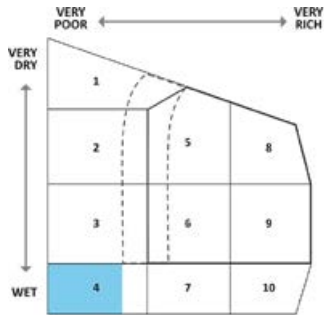
**OF2**



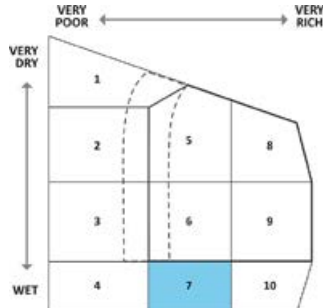
**OW1, OW2**



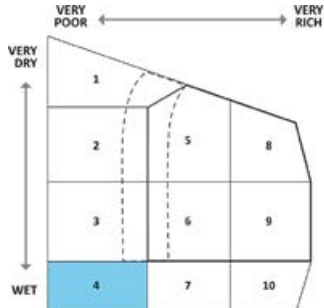
**WC3**



**WC6**



**WC7, WC11**



# Maritime Boreal Forest Groups

# CB

## Coastal Boreal Forest Group

### Coastal Boreal (CB) Key

- |   |  |
|---|--|
| 1a. Softwoods > 75% ... 2   | 5a. Marine sands and dunes ... CB6                     |
| 1b. Softwoods < 75% ... CB4                                       | 5b. Scattered trees on cobble beaches ... CB5          |
| 2a. Black spruce abundant to dominant ...CB1                      | 6a. Stands well developed, usually > 30% cover ... CB2 |
| 2b. Black spruce absent to scattered ... 3                        | 6b. Stands open grown, typical of headlands ... CB2a   |
| 3a. White spruce abundant to dominant ... 4                       |  |
| 3b. Balsam fir dominant, white spruce absent to scattered ... CB3 |  |
| 4a. On marine sands and dunes or cobble beaches ... 5             |  |
| 4b. Not as above ... 6  |  |

If you are in the Atlantic Coastal Ecoregion (800), but don't appear to be in one of the above stand types, then go back to the **Figure 1 key** and see if you can find a better path.

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

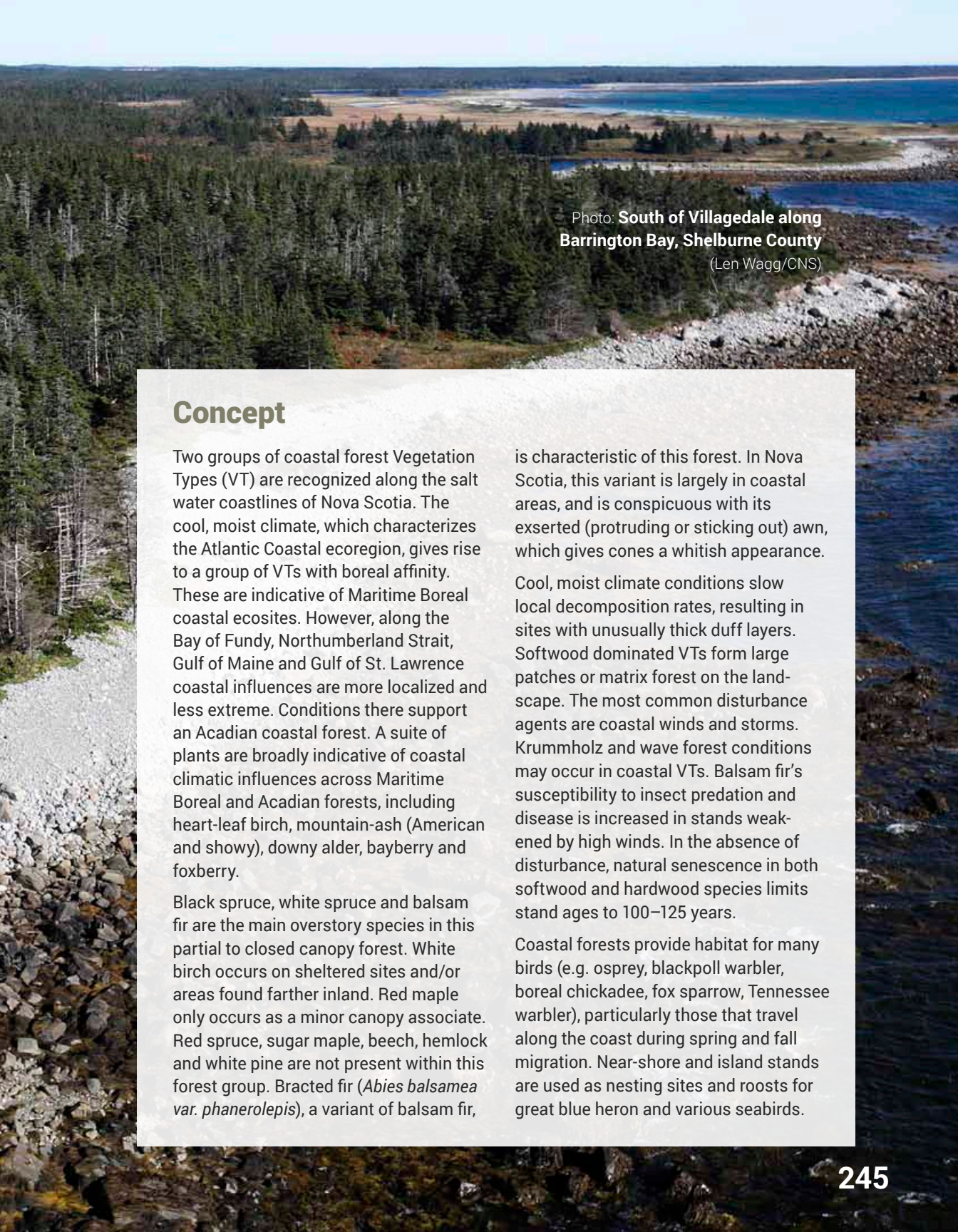


Photo: **South of Villagedale along Barrington Bay, Shelburne County**  
(Len Wagg/CNS)

## Concept

Two groups of coastal forest Vegetation Types (VT) are recognized along the salt water coastlines of Nova Scotia. The cool, moist climate, which characterizes the Atlantic Coastal ecoregion, gives rise to a group of VTs with boreal affinity. These are indicative of Maritime Boreal coastal ecosites. However, along the Bay of Fundy, Northumberland Strait, Gulf of Maine and Gulf of St. Lawrence coastal influences are more localized and less extreme. Conditions there support an Acadian coastal forest. A suite of plants are broadly indicative of coastal climatic influences across Maritime Boreal and Acadian forests, including heart-leaf birch, mountain-ash (American and showy), downy alder, bayberry and foxberry.

Black spruce, white spruce and balsam fir are the main overstory species in this partial to closed canopy forest. White birch occurs on sheltered sites and/or areas found farther inland. Red maple only occurs as a minor canopy associate. Red spruce, sugar maple, beech, hemlock and white pine are not present within this forest group. Bracted fir (*Abies balsamea* var. *phanerolepis*), a variant of balsam fir,

is characteristic of this forest. In Nova Scotia, this variant is largely in coastal areas, and is conspicuous with its exerted (protruding or sticking out) awn, which gives cones a whitish appearance.

Cool, moist climate conditions slow local decomposition rates, resulting in sites with unusually thick duff layers. Softwood dominated VTs form large patches or matrix forest on the landscape. The most common disturbance agents are coastal winds and storms. Krummholz and wave forest conditions may occur in coastal VTs. Balsam fir's susceptibility to insect predation and disease is increased in stands weakened by high winds. In the absence of disturbance, natural senescence in both softwood and hardwood species limits stand ages to 100–125 years.

Coastal forests provide habitat for many birds (e.g. osprey, blackpoll warbler, boreal chickadee, fox sparrow, Tennessee warbler), particularly those that travel along the coast during spring and fall migration. Near-shore and island stands are used as nesting sites and roosts for great blue heron and various seabirds.

# CB1

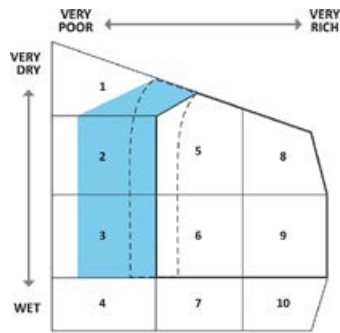
## Black spruce – Balsam fir / Foxberry / Plume moss

*Picea mariana* – *Abies balsamea* /  
*Vaccinium vitis-idaea* / *Ptilium crista-castrensis*

**Concept:** This Vegetation Type (VT) has a partially closed canopy (40–75%) dominated by black spruce with balsam fir a common, but less abundant, associate. The shrub, herb and bryophyte layers have somewhat variable cover but coniferous tree species regeneration and bryophyte cover are usually extensive. Black spruce – Balsam fir / Foxberry / Plume moss is the dominant coniferous forest found on fresh-moist, nutrient poor Atlantic coastal sites in Nova Scotia. Mountain-ash, heart-leaf birch, downy alder, bayberry, black crowberry and foxberry are indicators of nearby coastal influences, although these species are not always present. Extensive bryophyte coverage and a thick duff layer characterize the forest floor.

**Vegetation:** Tamarack and white spruce (more common in western Nova Scotia) are occasional overstory associates with scattered red maple and white birch (if present) typically in an intermediate canopy position. The shrub layer is dominated by regenerating balsam fir and/or black spruce along with lambkill. Other common shrub species include wild raisin, mountain holly and mountain-ash. Herbaceous layer diversity is low, with bunchberry, creeping snowberry and twinflower often dominant. Scattered foxberry can occur, with cinnamon fern also common on wetter sites, or in micro depressions. Schreber’s moss dominates the extensive bryophyte layer with lesser amounts of stair-step moss, bazzania and plume moss.

**Environmental Setting:** CB1 is mainly found on fresh-moist to moist, nutrient poor soils of glacial origin. These soils are generally medium to coarse textured and are often stony. The majority of this VT is found in the Atlantic Coastal ecoregion. High winds and exposure limit the potential for taller trees in CB1 stands.



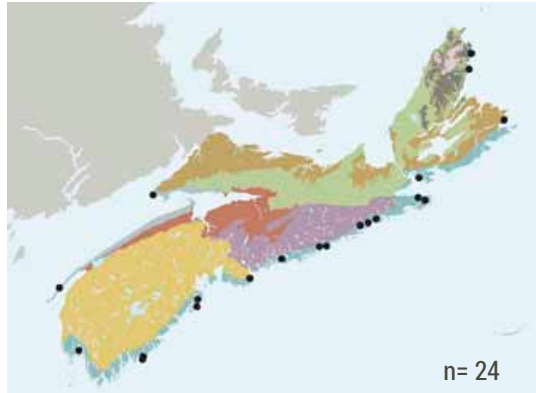
### Site & Soil Characteristics

Slope Position:	Upper <sup>4</sup> Middle <sup>3</sup> Level <sup>2</sup> Lower <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>4</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>4</sup>
Drainage:	Imperfect <sup>6</sup> Moderately Well <sup>2</sup> Well <sup>1</sup> Poor <sup>1</sup>
Common Soil Types:	3, 6, 16C, 3C, 3L, 2L
Rooting Depth (cm):	(< 30) <sup>6</sup> (30–45) <sup>2</sup> nd <sup>2</sup>
Forest Floor (cm):	(11–20) <sup>6</sup> (21–40) <sup>3</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>5</sup> Humimor <sup>2</sup> Resimor <sup>1</sup> Other <sup>2</sup>



Arnold, Shelburne County

Characteristic Plants	CB1	
	Freq. (%)	Cover (%)
Black spruce	100	39
Balsam fir	83	13
White birch	38	3
Red maple	33	2
Tamarack	21	3
White spruce	17	12
<b>Tree Layer (Mean % Cover)</b>		<b>55</b>
Black spruce	96	5
Lambkill	92	6
Mountain holly	92	0.8
Wild raisin	88	0.6
Balsam fir	79	12
Mountain-ash	58	1
Serviceberry	42	0.3
White birch	38	0.3
Velvet-leaf blueberry	33	5
Huckleberry	29	2
Red maple	29	0.9
Lowbush blueberry	21	0.3
Downy alder	21	0.1
Heart-leaf birch	13	0.5
Bayberry	12	0.3
<b>Shrub Layer (Mean % Cover)</b>		<b>26</b>
Bunchberry	88	12
Foxberry	71	4
Wild lily-of-the-valley	71	3
Starflower	71	0.5
Twinflower	67	4
Bracken	63	5
Sarsaparilla	58	1
Creeping snowberry	50	7
Goldthread	46	0.6
Cinnamon fern	38	2
Bluebead lily	33	5
Ghost pipe	21	0.1
Mayflower	17	1
Wood-sorrel	17	1
Black crowberry	8	0.8
<b>Herb Layer (Mean % Cover)</b>		<b>30</b>
Schreber's moss	92	50
Bazzania	92	15
Wavy dicranum	71	4
Ladies' tresses	71	2
Stair-step moss	67	11
Broom moss	63	3
Plume moss	54	4
Grey reindeer lichen	50	0.5
Cup lichens	38	0.2
Log moss	33	3
Naugehyde liverwort	17	0.8
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>78</b>



**Successional Dynamics:** This VT is associated with nutrient poor soils, supporting an edaphic climax community dominated by black spruce. The even-aged forest typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. In the absence of these types of disturbances, black spruce and balsam fir (in this ecosystem) are expected to live to about 100–125 years, after which tree senescence will initiate a slow renewal, through advanced regeneration, creating an uneven-age appearance with old forest structures. Due to its unique ecological setting (close to the ocean), CB1 does not usually shift to other vegetation types after disturbance.

**Ecological Features:** This edaphic climax forest often occurs as a matrix, and its longevity is a function of both canopy tree senescence (especially in older stands), and the frequency of catastrophic stand disturbances (usually hurricanes). Persistently high humidity, throughout the growing season, promotes bryophyte abundance, and the occurrences of several rare lichen species (e.g. boreal felt lichen, voles ears and blue felt lichen), particularly in older, undisturbed stands. Mature forests develop abundant old man's beard, a lichen that provides nest material for some warblers and other bird species, and winter food for deer browsing.



Foxberry



# CB2

## White spruce – Balsam fir / Foxberry – Twinflower

*Picea glauca* – *Abies balsamea* / *Vaccinium vitis-idaea* – *Linnaea borealis*

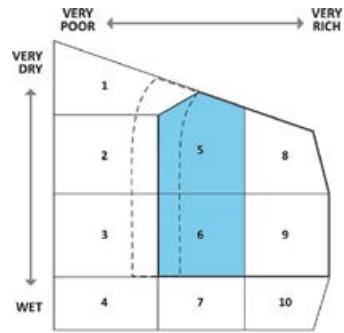
### CB2a Black crowberry Headland variant

*Empetrum nigrum*

**Concept:** This moderately closed canopy (50–80%) forest is dominated by white spruce with lesser balsam fir. Strong winds, salt spray and relatively harsh climatic conditions, along more exposed headlands and shorelines, often create severely stunted stands called krummholz. The CB2a variant defines such a krummholz condition. White spruce – Balsam fir / Foxberry – Twinflower is scattered along the Nova Scotia coast, typically closer to the seashore than other VTs in this group.

**Vegetation:** Black spruce, white birch and red maple are minor associates. The shrub layer is poorly developed (< 10%), but includes mountain-ash, wild raisin, mountain holly, blueberries and lambkill (along with regenerating balsam fir). A well-developed herbaceous layer includes upland forest flora such as bunchberry, twinflower, wild lily-of-the-valley and starflower. The shrub layer in CB2a is strongly developed with ground juniper and bayberry prominent. Schreber’s moss dominates a diverse and well-developed bryophyte layer in CB2, which is nearly absent in the Headland variant (CB2a).

**Environmental Setting:** Fresh, nutrient poor to nutrient-medium soils of glacial origin, with generally medium to coarse texture, provide suitable substrate. This VT is mainly found near ocean shorelines on exposed headlands, hills and ridges, as well as on off-shore islands. High winds and salt spray limit tree height potential in this VT, especially in CB2a stands which are also subjected to storm surge.



#### Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Upper<sup>3</sup> Middle<sup>2</sup> Lower<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>1</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Level<sup>4</sup> Slightly<sup>4</sup> Moderately<sup>2</sup>  
 Drainage: Well<sup>5</sup> Moderately Well<sup>3</sup> Imperfect<sup>2</sup>

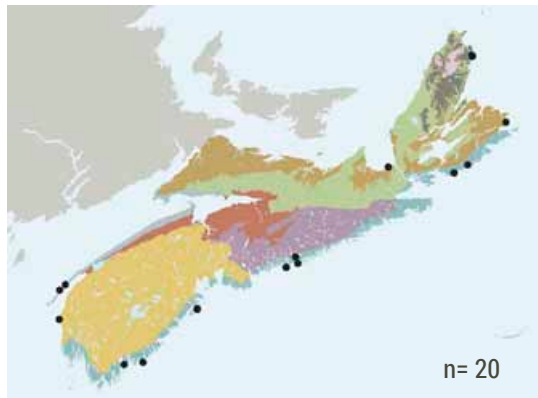
Common Soil Types: 2, 2L, 2C  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>3</sup> nd<sup>3</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>2</sup> (11–20)<sup>3</sup> (21–40)<sup>3</sup> nd<sup>1</sup>  
 Humus Form: Hemimor<sup>4</sup> Resimor<sup>1</sup> Humimor<sup>1</sup> Mormoder<sup>1</sup> nd<sup>3</sup>



Colin’s Cove,  
Richmond County

CB

Characteristic Plants	CB2		CB2a	
	Freq. (%)	Cover (%)	Freq. (%)	Cover (%)
White spruce	100	50	83	38
Balsam fir	86	11	33	2
Black spruce	64	8	33	0.1
White birch	43	4		
Red maple	21	7		
Mountain-ash	14	2		
<b>Tree Layer (Mean % Cover)</b>		<b>69</b>		<b>32</b>
Balsam fir	64	2	50	4
Mountain-ash	64	0.9		
Mountain holly	57	0.2	33	0.1
Wild raisin	50	0.3	67	0.3
Lambkill	50	0.1	50	0.5
Lowbush blueberry	43	3	83	7
Downy alder	29	2	33	0.4
Red maple	29	0.9	17	0.1
White birch	29	0.3	17	0.1
Black spruce	21	1	33	18
Velvet-leaf blueberry	21	0.5	33	0.2
White spruce	21	0.2	33	5
Bayberry	14	2	83	28
Sweet gale	7	0.1	17	3
Ground juniper			83	22
Huckleberry			17	2
<b>Shrub Layer (Mean % Cover)</b>		<b>5</b>		<b>64</b>
Wild lily-of-the-valley	86	4	67	1
Starflower	79	1	67	0.2
Bunchberry	71	11	100	15
Twinflower	64	11	50	0.5
Goldthread	57	3		
Sarsaparilla	50	12	67	1
Wood-sorrel	50	1	17	0.1
Evergreen wood fern	43	6	33	0.8
Wood aster	43	4	33	1
Foxberry	43	1	83	2
Mountain wood fern	36	2		
Cinnamon fern	36	0.1	67	0.2
Bracken	29	1	17	7
Dwarf raspberry	29	0.8	17	5
Common hair grass	21	26	50	0.9
Bent-grass	21	0.1	17	2
Blue joint	21	0.1		
Creeping snowberry	21	0.1	17	10
Ghost pipe	21	0.1		
Pink lady's-slipper	21	0.1		
Small enchanter's nightshade	14	7	33	0.3
Violets	14	5	17	0.2
Black crowberry	14	2	100	15
Three-toothed cinquefoil			67	2
<b>Herb Layer (Mean % Cover)</b>		<b>42</b>		<b>44</b>
Schreber's moss	79	51	17	3
Broom moss	64	2		
Bazzania	64	1		
Stair-step moss	50	14		
Log moss	36	0.7	17	0.5
Wavy dicranum	29	1		
Shaggy moss	21	10	17	2
Plume moss	21	0.1		
Pale fat-leaved sphagnum	14	8		
Ladies' tresses	14	0.1		
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>59</b>		<b>6</b>



**Successional Dynamics:** CB2 is a mid- to late-successional VT, found on zonal ecosites and dominated by white spruce. Coastal climatic influences combined with frequent, and often significant, disturbance events, limits the potential for development of old forest characteristics. Following disturbances from wind, insects, fire or harvesting, these VTs usually re-establish in an ordered sequence. This sequence begins with pioneer tree and shrub species, which are subsequently over-topped by white spruce and balsam fir, returning the stand to pre-disturbance canopy composition in relatively little time. On exposed CB2a sites, gap or patch disturbance may be more typical because stunted white spruce are less prone to windthrow.

**Ecological Features:** CB2 often occurs as a complex of small-patch stands, within a larger matrix forest. The longevity of this forest is a function of both canopy tree senescence (especially in older stands) and the frequency of catastrophic stand disturbances (usually hurricanes). Stand horizontal structure is often dense, with extensive tree branching that persists well after branch senescence, particularly in the CB2a variant. This growth habit often creates virtually impenetrable stands, providing excellent conditions for the rearing of young vertebrates, and shelter for many bird and mammal species. Older stands with balsam fir may host the endangered boreal felt lichen and other uncommon cyanolichens. White spruce is the most salt-tolerant and wind resistant of our native softwood species, and acts to form a protective belt, benefitting landward balsam fir trees. Under open conditions, black crowberry and common juniper grow in large patches. This VT can help prevent or slow coastal erosion by securing limited soil resources with its dense rooting network.

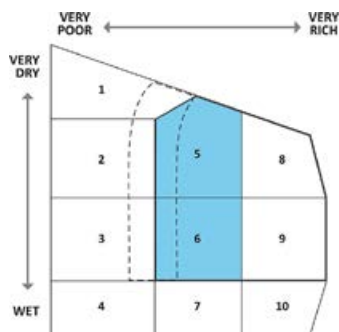
# CB3 Balsam fir / Foxberry – Twinflower

*Abies balsamea / Vaccinium vitis-idaea – Linnaea borealis*

**Concept:** This somewhat variable, closed canopy coastal softwood, forest has an overstory strongly dominated by balsam fir, with usually a component of white spruce and/or black spruce. Balsam fir regeneration, extensive bryophyte cover, and a thick forest floor are characteristic of this Vegetation Type (VT). Balsam fir / Foxberry – Twinflower is the dominant softwood forest on fresh/moist, nutrient medium sites along the Atlantic coast of Nova Scotia. Coastal plant indicators are not always present but are usually nearby where canopy conditions and/or disturbance have created favourable growing conditions.

**Vegetation:** Scattered red maple and white birch (if present) are typically in an intermediate canopy position. Tamarack can also be common on moister sites. The shrub layer is dominated by regenerating balsam fir with scattered lambkill, mountain holly and mountain-ash. Herb layer diversity is moderate, with frequent twinflower, wild lily-of-the-valley, sarsaparilla, bunchberry and foxberry. Schreber’s moss and bazzania dominate the extensive bryophyte layer, along with stair-step moss, broom moss and plume moss.

Halfway Island Cove, Guysborough County

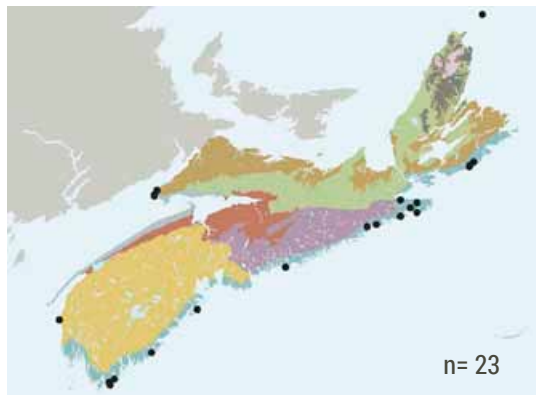


## Site & Soil Characteristics

Slope Position:	Level <sup>4</sup> Middle <sup>3</sup> Upper <sup>2</sup> Lower <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>2</sup> Moderately <sup>1</sup> Other <sup>1</sup>
Drainage:	Imperfect <sup>4</sup> Moderately Well <sup>3</sup> Well <sup>3</sup>
Common Soil Types:	2, 3, 3L
Rooting Depth (cm):	(< 30) <sup>5</sup> (30–45) <sup>3</sup> nd <sup>2</sup>
Forest Floor (cm):	(11–20) <sup>7</sup> (21–40) <sup>2</sup> (> 40) <sup>1</sup>
Humus Form:	Hemimor <sup>6</sup> Resimor <sup>2</sup> Humimor <sup>1</sup> nd <sup>1</sup>

**Environmental Setting:** CB3 is mainly associated with fresh to fresh-moist, nutrient poor to medium soils of glacial origin. Soils are generally medium to coarse textured and often stony. This VT is found extensively in the Atlantic Coastal ecoregion and on

Characteristic Plants	CB3	
	Freq. (%)	Cover (%)
Balsam fir	100	54
White spruce	65	8
Black spruce	61	8
White birch	35	2
Red maple	22	1
Mountain-ash	17	3
Tamarack	13	13
<b>Tree Layer (Mean % Cover)</b>		<b>67</b>
Balsam fir	91	12
Mountain-ash	87	2
Lambkill	78	1
Mountain holly	74	0.6
Wild raisin	57	2
White birch	43	1
Black spruce	35	1
Lowbush blueberry	30	1
Serviceberry	30	0.5
White spruce	22	1
Downy alder	17	1
Velvet-leaf blueberry	17	0.4
<b>Shrub Layer (Mean % Cover)</b>		<b>18</b>
Twinflower	91	16
Wild lily-of-the-valley	87	1
Sarsaparilla	83	7
Bunchberry	78	3
Starflower	78	1
Wood-sorrel	61	3
Foxberry	61	0.3
Creeping snowberry	57	11
Goldthread	52	3
Wood aster	43	3
Ghost pipe	43	0.1
Bracken	39	0.5
Mountain wood fern	35	3
Bluebead lily	30	2
Evergreen wood fern	30	1
Cinnamon fern	26	2
Creeping rattlesnake plantain	22	0.1
Partridge-berry	17	0.2
Pink lady's-slipper	17	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>41</b>
Schreber's moss	91	34
Bazzania	83	26
Stair-step moss	74	20
Broom moss	70	2
Plume moss	65	2
Ladies' tresses	48	5
Wavy dicranum	43	3
Shaggy moss	26	7
Cup lichens	26	0.2
Hair-cap moss	22	8
Greater broom moss	22	1
Log moss	22	1
Pale fat-leaved sphagnum	22	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>79</b>



the more exposed coastal areas of the Bay of Fundy. High winds and exposure limit tree height potential in stands.

**Successional Dynamics:** CB3 is a mid- to late-successional, zonal VT dominated by balsam fir. This even-aged forest typically follows stand-replacing disturbances such as windthrow, crown and limb breakage, insect infestation and harvesting. In the absence of disturbance, the typical maximum lifespan of balsam fir, in this ecosystem, is approximately 100 years, after which tree senescence will initiate stand renewal (self-replacement) through advanced regeneration. Forests that originate after stand-level disturbances may contain sparse to abundant levels of pioneer species such as pin cherry, raspberry, white birch and mountain-ash. These species quickly die out, allowing balsam fir to re-establish dominance.

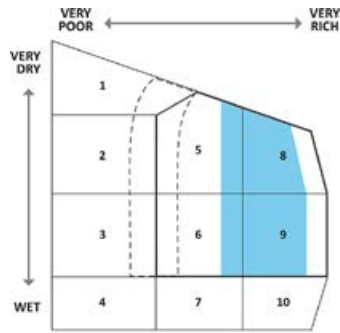
**Ecological Features:** This matrix zonal forest is strongly shaped by the short longevity of the dominant tree species. Balsam fir usually dies through natural senescence or with significant stand disturbances (often hurricanes or insect attack). Abundant snags, coarse woody material, and dense regenerating fir thickets, provide good rearing habitat and shelter for many small bird and mammal species. Coastal forests are often used by songbirds, as they travel near or along the coast, during spring and fall migration. High atmospheric humidity, throughout the growing season, creates conditions suitable for many bryophytes and promotes occurrences of rare epiphytic (growing on plants, especially trees) lichens (e.g. boreal felt lichen, voles ears and blue felt lichen), particularly in older, undisturbed stands. Dense bryophyte cover provides habitat for amphibians and invertebrates. Old man's beard is a lichen commonly found in mature coastal forests and is used for nest material by some warblers and other bird species, and is a winter food for deer.

# CB4 White birch – Balsam fir / Foxberry – Wood aster

*Betula papyrifera* – *Abies balsamea* /  
*Vaccinium vitis-idaea* – *Oclemena acuminata*

**Concept:** CB4 is a moderately closed canopy mixed-wood coastal forest dominated by white birch and/or heartleaf birch with a strong component of balsam fir and white spruce. This VT is typically more prevalent somewhat further inland, or otherwise on sites sheltered from direct coastal winds and salt spray. In these circumstances, hardwood trees sustain less breakage from on-shore winds. Extensive conifer regeneration often dominates the shrub layer. White birch – Balsam fir / Foxberry – Wood aster is associated with the Atlantic Coastal ecoregion. Coastal plants such as mountain-ash, heart-leaf birch, bayberry and foxberry are characteristic but not present in every stand.

**Vegetation:** Red maple and black spruce are minor associates in the overstory. In western areas of the Atlantic Coastal Ecoregion, CB4 may support a higher proportion of red maple, in response to slightly increased temperatures. However, abundant red maple is generally more indicative of temperate climatic conditions (more common inland), where IH6 (White birch – Red maple / Sarsaparilla – Bracken), an Acadian Forest VT, and close equivalent of CB4, is more typical. The shrub layer is often dominated by regenerating balsam fir. Other shrubs include mountain holly, lambkill, and mountain-ash (which can sometimes attain overstory height). Herbaceous layer diversity is low with upland forest flora such as starflower, bunchberry, wood aster, twinflower and goldthread. The bryophyte layer is well developed for a mixedwood VT, with Schreber’s moss the main species. Bazzania cover can also be high where downed coarse woody material has accumulated.



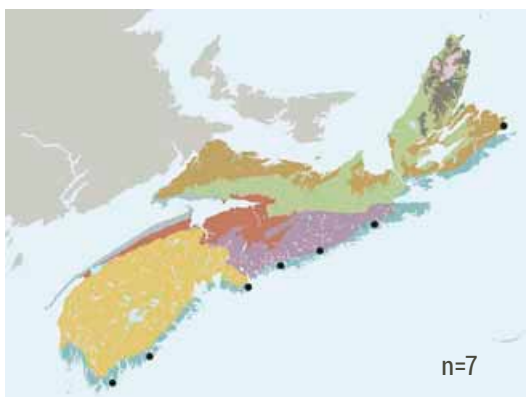
## Site & Soil Characteristics

Slope Position:	Middle <sup>4</sup> Upper <sup>4</sup> Level <sup>1</sup>
Surface Stoniness:	(Non – Slightly) <sup>3</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>4</sup>
Bedrock Outcrop:	(Non-rocky) <sup>7</sup> (Slightly – Moderately) <sup>3</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>3</sup> Moderately <sup>1</sup>
Drainage:	Well <sup>7</sup> Imperfect <sup>2</sup> Moderately Well <sup>1</sup>
Common Soil Types:	2, 2L, 3
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>6</sup> nd <sup>1</sup>
Forest Floor (cm):	(0–5) <sup>3</sup> (6–10) <sup>1</sup> (11–20) <sup>3</sup> (21–40) <sup>2</sup> nd <sup>1</sup>
Humus Form:	Hemimor <sup>6</sup> Resimor <sup>2</sup> Humimor <sup>1</sup> nd <sup>1</sup>



Waddens Cove,  
Cape Breton County

Characteristic Plants	CB4	
	Freq. (%)	Cover (%)
Red maple	100	14
White birch	86	24
Balsam fir	86	35
White spruce	71	9
Black spruce	43	3
Heart-leaf birch	14	20
<b>Tree Layer (Mean % Cover)</b>		<b>76</b>
Mountain holly	100	0.2
Balsam fir	71	15
Lambkill	71	2
Wild raisin	71	1
Red maple	71	0.3
Mountain-ash	71	0.1
Black spruce	57	1
White spruce	43	0.5
White birch	43	0.3
Velvet-leaf blueberry	29	4
Lowbush blueberry	14	0.4
Huckleberry	14	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>15</b>
Starflower	100	1
Bunchberry	86	18
Wood aster	86	0.2
Goldthread	71	10
Twinflower	71	5
Creeping snowberry	71	0.8
Wild lily-of-the-valley	71	0.3
Wood-sorrel	57	4
Sarsaparilla	57	3
Bracken	57	1
Foxberry	57	0.3
Ghost pipe	43	0.1
Mountain wood fern	29	0.6
Evergreen wood fern	29	0.3
Bluebead lily	29	0.1
Cinnamon fern	29	0.1
Mayflower	29	0.1
Spinulose wood fern	29	0.1
Hay-scented fern	14	0.1
Cucumber root	14	0.1
Northern beech fern	14	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>34</b>
Schreber's moss	100	17
Broom moss	100	3
Bazzania	86	16
Stair-step moss	86	7
Log moss	57	6
Grey reindeer lichen	43	1
Hair-cap moss	29	2
Shaggy moss	29	0.7
Cup lichens	29	0.6
Pin cushion moss	29	0.3
Wavy dicranum	14	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>44</b>



**Environmental Setting:** CB4 is associated with fresh, nutrient medium to rich soils of glacial origin. These soils are generally medium to coarse textured. This VT occurs on relatively well drained upper and middle slopes of gentle terrain along the Atlantic coastline. Sites are generally more sheltered than those associated with softwood dominated VTs in this group (CB1–CB3).

**Successional Dynamics:** CB4 is a mid-successional, even-aged VT that typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. Although markedly influenced by oceanic wind and exposure, CB4 occurs further inland and/or on sheltered sites, which allows white birch to co-dominate the canopy with softwood species. After disturbance, this VT may be temporarily dominated by hardwoods until balsam fir re-establishes in the canopy, once it recovers from natural mortality due to insects, disease or natural senescence.

**Ecological Features:** This mixedwood patch forest of white birch and balsam fir is usually found somewhat inland from the coast. Balsam fir and white birch provide ample snag and coarse woody material, at relatively young developmental stages, although stems have reduced diameter and quickly decay. This pattern may occur in relative short turn-over intervals, with prevailing natural disturbance mechanisms. High-humidity levels throughout most of the growing season benefit many bryophyte species and microfauna. Coastal climatic influence result in frequent, and often significant, disturbance events and limit the potential for old forest characteristics. Older stands with balsam fir may support the endangered boreal felt lichen and other uncommon cyanolichens.

# CB5

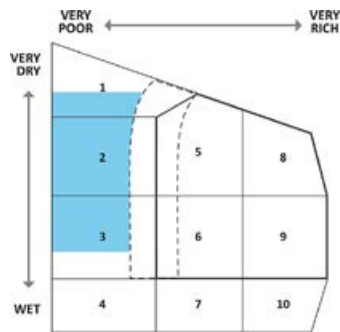
## White spruce / Bayberry / Beach pea Cobble Beach

*Picea glauca* / *Morella pensylvanica* / *Lathyrus japonicus*

**Concept:** This sparsely forested woodland of stunted and wind-swept white spruce is found on narrow, elongated, ridges, rising slightly above the high tide mark and extending generally parallel with the shoreline. These ridges are formed from marine deposits of cobble and/or gravel. Woody shrubs include bayberry, ground juniper and downy alder. Under denser canopy growth, understory vegetation is usually sparse and discontinuous.

**Vegetation:** Aside from occasional balsam fir, white spruce's high salt tolerance is well exhibited by this VT. Other shrub species including native roses, downy alder and mountain ash, reflecting the influence of coastal climatic conditions on vegetation composition. The irregular structure of the white spruce overstory creates openings suitable for a variety of herbs including beach pea, foxberry, common hair grass and various aster and goldenrod species. Reindeer lichens are commonly present but overall bryophyte coverage and diversity is low.

Ingonish Beach, Cape Breton Highlands National Park, Victoria County



### Site & Soil Characteristics

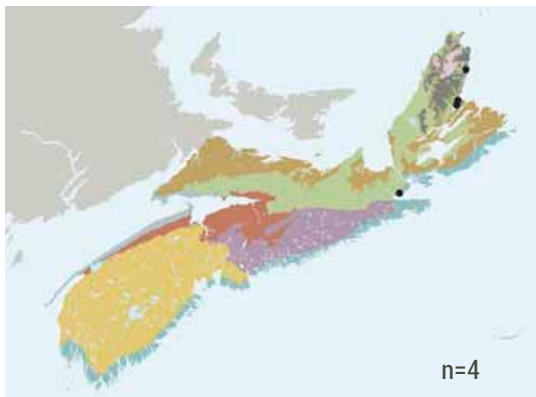
Slope Position: Level<sup>5</sup> Lower<sup>3</sup> Middle<sup>3</sup>  
 Surface Stoniness: (Non – Slightly)<sup>10</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>10</sup>  
 Microtopography: Level<sup>2</sup> Slightly<sup>3</sup> Moderately<sup>3</sup> Strongly<sup>2</sup>  
 Drainage: Rapid<sup>10</sup>

Common Soil Types: 1  
 Rooting Depth (cm): nd<sup>10</sup>  
 Forest Floor (cm): (6–10)<sup>3</sup> nd<sup>7</sup>  
 Humus Form: Hemimor<sup>3</sup> nd<sup>7</sup>

**Environmental Setting:** Cobble beach woodlands occur on very gravelly to cobbly substrate with little mineral soil development; these sites are formed by marine processes. Gradual organic accumulation helps provide a suitable substrate for plant establishment.



Characteristic Plants	CB5	
	Freq. (%)	Cover (%)
White spruce	100	16
Balsam fir	25	5
<b>Tree Layer (Mean % Cover)</b>		<b>17</b>
White spruce	100	12
Bayberry	75	10
Downy alder	50	5
Ground juniper	50	4
Wild rose	50	3
Pin cherry	50	2
Lowbush blueberry	50	2
White birch	50	2
Red maple	50	0.5
Balsam fir	25	3
Creeping juniper	25	1
Mountain-ash	25	0.5
Red raspberry	25	0.5
Smooth gooseberry	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>29</b>
Foxberry	75	8
Common hair grass	75	2
New York aster	75	0.7
Red fescue	75	0.4
Beach pea	75	0.2
Scotch lovage	50	6
Three-toothed cinquefoil	50	2
Rough bentgrass	50	2
Quackgrass	50	0.6
Black crowberry	25	4
Wood aster	25	4
Tick quack grass	25	2
Bunchberry	25	1
Twinflower	25	1
Downy goldenrod	25	0.5
Strawberry	25	0.5
White goldenrod	25	0.5
American harebell	25	0.3
Blue flag	25	0.3
Black knapweed	25	0.1
Evening primrose	25	0.1
Field sow thistle	25	0.1
Blunt-leaved sandwort	25	0.1
Ladies'-tresses	25	0.1
Small Pussy-Toes	25	0.1
Starflower	25	0.1
Tall white aster	25	0.1
Tufted vetch	25	0.1
Yarrow	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>17</b>
Wavy dicranum	75	5
Grey reindeer lichen	50	5
Bering reindeer lichen	50	2
Naugehyde liverwort	25	2
Schreber's moss	25	1
Hair-cap moss	25	0.1
Woolly fringe-moss	25	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>11</b>



**Successional Dynamics:** Cobble beach woodlands in Nova Scotia represent an early-successional community on a very dynamic environmental setting. These woodlands are always susceptible to extreme wind exposure and high tides which will cause tree damage and/or mortality. Over time, litter and humus accumulation may increase available moisture and promote species that are more characteristic of mesic coastal forests but storm surge generally limits their overall persistence.

**Ecological Features:** Vertical and horizontal structure in the White Spruce/ Bayberry / Beach pea Cobble beach forest ecosystem is variable, due to the discontinuous structure of this linear ecosystem. On more extensive barrier beaches, CB5 stands are sometime the only locally available forest cover and may provide important coastal bird habitat. Species such as fox sparrow and blackpoll warblers may utilize these areas, especially where sporadic tree cover is interspersed with dense shrub layers. These forests provide important nesting and brooding habitat. Epiphytic and ground lichens, as well as various invertebrates, may utilize microhabitats created by the limited amounts of coarse woody materials. This VT may play an important role in stabilizing barrier beaches and headlands, protecting coastal lagoons and salt water marshes and their associated ecosystem functions. Many cobble beach woodlands in Nova Scotia have been impacted by recreational activities and other land uses. The relative rarity of CB5 presents an important conservation challenge.



# CB6

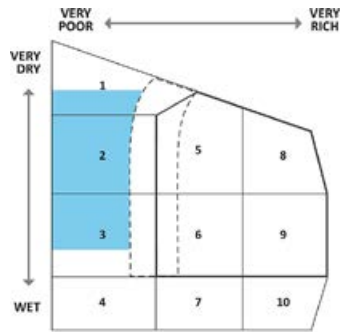
## White spruce / Bayberry / Beach grass Dune

*Picea glauca* / *Morella pensylvanica* / *Ammophila breviligulata*

**Concept:** This white spruce dominated open woodland is found on coastal sand dunes, where it marks the last stage of dune vegetation succession. Crown closure is variable but usually moderate to high. Woody species contribute largely to understory stand structure, except in mature occurrences where increased bryophyte cover is typical. Under more open canopy conditions, beach grass and other seashore plants are common but not usually abundant. Stands with high lichen cover have been observed but have not been surveyed and are not currently recognized in this classification. Under denser canopy growth, understory vegetation is usually sparse and discontinuous.

**Vegetation:** The evergreen canopy is dominated by white spruce cover; other tree species are seldom present, except in western Nova Scotia where scattered white pine may occur. Stands have either open or closed canopies, depending on their age and degree of exposure. More open stands are characterized by increased shrub (usually bayberry) cover and scattered herbaceous plants like goldenrods, asters, hawkweeds and beach grass. Terric (ground dwelling) lichen cover is not characteristic except on the edges of open areas, more heavily dominated by reindeer lichen species.

**Environmental Setting:** Dune forests are found at low elevation on flat, ridged, or hummocky terrain, occurring on both wind and marine deposited sands. These relatively young deposits show little mineral soil development, but evidence of leaching (thin Ae, Ahe and Bfj horizons) can be found in some profiles. In addition, mature CB6 stands often have continuous forest floor and bryophyte cover. Moist and wet dune forests have not been sampled, but may occur on the sides of higher dunes in lower slope positions, or in linear depressions (slacks) found between dunes. Exposure is high; exposed stones and bedrock are very low. CB6 occurs sporadically, in larger dune complexes, along most of Nova Scotia's 13,000 km coastline; it is absent from the Bay of Fundy.



### Site & Soil Characteristics

Slope Position: Level<sup>7</sup> Crest<sup>1</sup> Middle<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non - Slightly)<sup>7</sup> nd<sup>3</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>7</sup> nd<sup>3</sup>  
 Microtopography: Level<sup>7</sup> Moderately<sup>2</sup> Strongly<sup>1</sup>  
 Drainage: Rapid<sup>8</sup> Well<sup>2</sup>

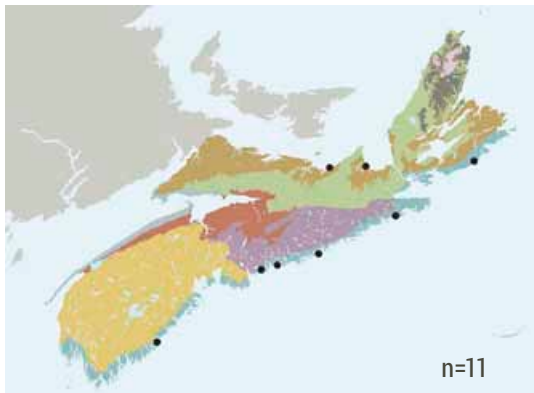
Common Soil Types: 1, 3  
 Rooting Depth (cm): (30-45)<sup>1</sup> (> 45)<sup>2</sup> nd<sup>7</sup>  
 Forest Floor (cm): (0-5)<sup>3</sup> (6-10)<sup>3</sup> (11-20)<sup>2</sup> nd<sup>2</sup>  
 Humus Form: Hemimor<sup>6</sup> Resimor<sup>1</sup> nd<sup>3</sup>



Conrad's Beach, Halifax County

Characteristic Plants	CB6	
	Freq. (%)	Cover (%)
White spruce	100	43
<b>Tree Layer (Mean % Cover)</b>		<b>45</b>
Bayberry	91	14
White spruce	64	17
Lowbush blueberry	55	4
Roses	46	5
Serviceberry	36	2
Gooseberry family	36	0.5
Downy alder	27	2
Western poison ivy	18	1
Red maple	18	0.2
Red oak	18	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>31</b>
Beach grass	46	1
Foxberry	36	1
Rough goldenrod	36	1
New York aster	36	0.2
Bunchberry	27	27
Sarsaparilla	27	18
Dwarf raspberry	27	2
Rough bentgrass	27	2
Starry false Solomon's seal	27	0.6
Autumn bentgrass	27	0.4
Small enchanter's nightshade	27	0.1
Yarrow	27	0.1
Seaside goldenrod	18	0.3
Tradescant's aster	9	2
Baltic rush	9	1
Beach pea	9	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>19</b>
Schreber's moss	55	29
Wavy dicranum	46	2
Stair-step moss	27	1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>25</b>

**Successional Dynamics:** Successional dynamics of dune forests in Nova Scotia are poorly understood. This ecosystem is considered the final stage of succession on aeolian and marine landforms, but little discussion or investigation of its longer-term persistence has been documented. Increased litter and humus under these older closed canopy dune forests may increase available moisture and promote species that are more characteristic of mesic coastal forests. If this scenario is valid, dune evergreen forests may advance to coastal black spruce (CB1) or coastal white spruce (CB2), depending



on soil structure, nutrient and moisture availability, and slope position. Older dune forests (e.g. Pomquet Provincial Park) may be undergoing this particular type of transition but more research is necessary to confirm these trends. Storm surge associated with hurricanes and tropical storms can cause extensive damage to both dunes and forest.

**Ecological Features:** Vertical and horizontal structure in the White Spruce/ Bayberry ecosystem is variable, and many occurrences have an open canopy and high shrub and/or herbaceous cover. On more extensive dune complexes, CB6 stands sometime provide the only locally available forest cover. CB6 may provide important coastal bird habitat (e.g. for fox sparrow; and blackpoll warblers), and promote occurrences of coastal epiphytic and ground lichens and various invertebrates, among other taxonomic groups. Snags are often of medium diameter and fairly persistent, offering perch sites for many transient seasonal shorebirds. Coarse woody materials contribute to soil formation, and improve soil moisture retention, especially in relatively young, generally impoverished soils. Records from available plot data show very few rare plant species (e.g. adders-tongue, checkered rattlesnake plantain) and no lichen species of conservation concern. Many dune woodlands in Nova Scotia have been impacted by recreational activities, buildings and roads, and past land-use practices (e.g. anthropogenic fire, tree harvest and farming). These impacts, and the relative rarity of CB6, present important conservation challenges.

# HL

## Highland Forest Group

### Highland (HL) Key

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1a. Softwoods > 75%	... 2
1b. Softwoods < 75%	... 5

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2a. Mature canopy height exceeds 5 m	... 3
2b. Stunted, dense thickets (generally less than 5 m tall) of balsam fir, black spruce and/or larch	... 7

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3a. Balsam fir dominant and black spruce absent to sparse	... HL1
3b. Not as above	... 4

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4a. White spruce the most common softwood	... HL2
4b. Not as above	... HL6

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5a. Hardwoods > 75%	... HL4
5b. Hardwoods < 75%	... 6

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6a. Stands of balsam fir and yellow birch (which may exhibit uneven distribution of the two species), often creating pockets of pure fir that should not be misinterpreted as small pockets of HL1. This VT represents a transitional forest between the temperate Acadian and the Boreal and is, for the most part, located in shoulder positions of the Highlands	... HL3
6b. Yellow birch absent to sparse	... HL5

---

7a. Mature canopy height > 2 m	... HL7
7b. Mature canopy height < 2 m	... See Barrens Ecosystems in Nova Scotia (NSDLF Biodiversity Reference Guide 2020-001)

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If you don't appear to be in one of the above vegetation types, go to **Figure 1 key** to look for a better path among Acadian Vegetation Types.

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

## Concept

The composition and structure of highland forest Vegetation Types (VT) is strongly shaped by the moist, cold climatic conditions and high exposure characteristic of the Northern Plateau (100) ecoregion and the Cape Breton Highlands (210) ecodistrict. Closed canopy balsam fir dominated stands form the matrix forest on zonal sites, with a transitional balsam fir / yellow birch mixedwood forest found on shoulder slopes. These grade into Acadian tolerant hardwood VTs occurring further down slope where the climate is milder. Highland VTs have strong boreal affinity and are indicative of Maritime Boreal ecosites.

Heart-leaf birch is common throughout the group and mountain-ash can reach tree size in some stands (both species are indicators of boreal conditions). Tree species richness is notably lower than Acadian Forest groups. In the herbaceous layer, the presence of large-leaf goldenrod is characteristic.

Vegetation types are mainly found on upper flats, or on upper and middle slopes of variable steepness. High winds typical of these sites generally limit tree growth to under 15 m. Most sites have little to no exposed bedrock, 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 forests are even-aged and frequently renewed by spruce budworm epidemics and natural senescence. (These stands seldom exceed 75 years in age.) In yellow birch / balsam fir mixedwood forests, stands usually have an older yellow birch cohort accompanied by younger balsam fir. Windthrow can be extensive in hardwood dominated ecosystems, creating seedbeds for both birch and balsam fir. In more exposed areas, stunted fir/spruce krummholz or balsam fir wave forest can be found. Early-successional stands mainly contain short-lived pioneer species (pin cherry, mountain ash, raspberry).

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 geographic isolation is one of the group's key characteristics, with significant implications for landscape function, species persistence and dispersal, and the maintenance of ecosystem integrity. The group provides habitat for several rare species including American marten, Canada lynx and Bicknell's thrush; rare plant species are less common.

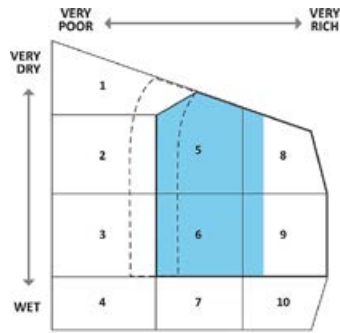
# HL1

## Balsam fir / Mountain-ash / Large-leaved goldenrod

*Abies balsamea* / *Sorbus americana* / *Solidago macrophylla*

**Concept:** These closed, or sometimes moderately open, canopy forests are dominated by balsam fir, typically with few other tree species present in any of the layers. Depending on stand age and canopy closure, shrub cover may be sparse to moderate and herbaceous cover may be sparse to very dense. Bryophyte cover is generally moderate to high. HL1 has stronger boreal affinity than any other mesic Vegetation Type (VT) in Nova Scotia. This matrix forest is restricted to elevations over 300 meters and is the dominant VT in the Cape Breton Highlands (210) ecodistrict.

**Vegetation:** White spruce is usually present comprising about 5–7% of the canopy. Only a scattering of white and/or heart-leaf birch and yellow birch are present. The poorly-developed shrub layer consists mainly of regenerating balsam fir with scattered mountain-ash. In contrast, the herbaceous layer is often well developed, including bunchberry, wood aster, wild lily-of-the-valley, goldthread, wood-sorrel, sarsaparilla, bluebead lily and scattered ferns. 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



### Site & Soil Characteristics

Slope Position: Level<sup>4</sup> Upper<sup>3</sup> Middle<sup>2</sup> Other<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
 Microtopography: Moderately<sup>5</sup> Slightly<sup>5</sup>  
 Drainage: Well<sup>4</sup> Moderately Well<sup>3</sup> Imperfect<sup>3</sup>

Common Soil Types: 3, 2L, 2, 3L, 3C, 2C, 1  
 Rooting Depth (cm): (< 30)<sup>2</sup> (30–45)<sup>3</sup> (> 45)<sup>1</sup> nd<sup>4</sup>  
 Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>4</sup> (11–20)<sup>3</sup> nd<sup>2</sup>  
 Humus Form: Hemimor<sup>5</sup> Humimor<sup>3</sup> Other<sup>2</sup>

moss and bazzania. Stair-step moss and Sphagnum species may also be found in wetter microsites.

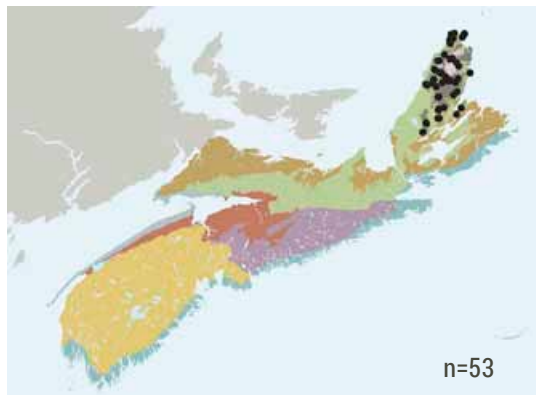
**Environmental Setting:** HL1 is mainly associated with fresh to moist, nutrient medium soils derived from glacial till. This VT is found over most of the rolling topography of the Cape Breton Highlands.



HL

Characteristic Plants	HL1	
	Freq. (%)	Cover (%)
Balsam fir	100	61
White spruce	81	8
White birch / Heart-leaf birch	28	0.2
Yellow birch	17	3
<b>Tree Layer (Mean % Cover)</b>		<b>70</b>
Balsam fir	81	4
Mountain-ash	77	0.8
White birch / Heart-leaf birch	44	0.4
Mountain holly	38	0.4
Lowbush blueberry	28	0.4
White spruce	26	0.7
Serviceberry	26	0.5
Swamp red currant	25	0.1
Wild raisin	23	0.2
Yellow birch	21	0.6
Red maple	21	0.2
Velvet-leaf blueberry	17	0.7
<b>Shrub Layer (Mean % Cover)</b>		<b>6</b>
Bunchberry	94	18
Wild lily-of-the-valley	92	2
Sarsaparilla	91	3
Bluebead lily	81	3
Goldthread	79	4
Wood aster	77	2
Starflower	75	0.5
Wood-sorrel	70	10
Mountain wood fern	66	4
Large-leaved goldenrod	64	0.5
Twinflower	55	3
Evergreen wood fern	49	4
Cinnamon fern	43	2
Creeping snowberry	43	1
Spinulose wood fern	40	5
Bracken	34	14
Northern beech fern	34	0.4
Interrupted fern	32	1
New York fern	25	7
Ghost pipe	25	0.1
Mayflower	19	0.4
<b>Herb Layer (Mean % Cover)</b>		<b>54</b>
Schreber's moss	98	35
Broom moss	79	5
Stair-step moss	53	5
Plume moss	51	1
Bazzania	49	10
Ladies' tresses	49	3
Hair-cap moss	40	0.7
Wavy dicranum	34	1
Shaded wood moss	26	1
Grey reindeer lichen	19	0.3
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>50</b>

(facing page) Two kilometers south of Cape Breton Highlands National Park boundary, near Inverness/Victoria County Line



Wind significantly limits tree growth with height decreasing with increasing elevation and exposure. This effect is particularly noticeable in Cape Breton Highlands National Park (Northern Plateau Ecoregion (100).

**Successional Dynamics:** HL1 is an even-aged, late-successional VT dominated by balsam fir. The main stand-level disturbances are spruce budworm defoliation and tree 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 moose is also shaping balsam fir successional patterns, particularly in young post-budworm stands. In most of these, balsam fir and hardwood saplings have been stripped out, leaving an open grassland comprised mostly of bluejoint and stunted regeneration, thereby limiting development towards HL1.

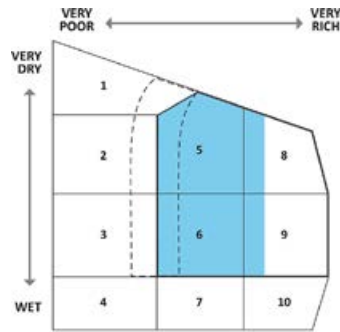
**Ecological Features:** This matrix forest supports snowshoe hare, moose, spruce grouse, boreal chickadee, black-backed woodpecker and three species at risk: American marten, Canada lynx and Bicknell's thrush. Deep snow levels (often > 3 m) are typical, creating sub-nivean habitat that is especially important for the many small mammals and their predators. The forest floor is typified by abundant coarse woody material, raised stumps (created by stem breakage following mortality from spruce budworm predation), and deep moss growth. Levels of live and dead trees and snags varies considerably following spruce budworm epidemics, and most survivors succumb to subsequent wind storms. Mountain-ash, an important component of highland forests, often reaches tree size and provides abundant fruit and browse for wildlife.

# HL2 White spruce / Wood aster

*Picea glauca* / *Oclemena acuminata*

**Concept:** These closed, and at times patchy, canopy forests are dominated by white spruce with lesser balsam fir. Few other tree species are present in any of the layers. Understory layers are usually poorly developed with needle carpet forest floors. HL2 has strong boreal affinity and is restricted to elevations over 300 meters in the Maritime Boreal forest (Northern Plateau ecoregion (100) and Cape Breton Highlands ecodistrict (210)).

**Vegetation:** White birch and heart-leaf birch are common associates. The poorly-developed shrub layer consists mainly of regenerating trees and mountain-ash. Herbaceous layer diversity and abundance are low with typical woodland flora including sarsaparilla, evergreen wood fern and wood aster. Species associated with drier sites may also be present including hay-scented fern



## Site & Soil Characteristics

Slope Position:	Middle <sup>4</sup> Upper <sup>3</sup> Level <sup>2</sup> Lower <sup>2</sup>
Surface Stoniness:	(Non – Slightly) <sup>7</sup> (Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>1</sup> (Very – Excessively) <sup>1</sup>
Microtopography:	Slightly <sup>5</sup> Level <sup>4</sup> Moderately <sup>1</sup>
Drainage:	Well <sup>6</sup> Moderately Well <sup>2</sup> Imperfect <sup>1</sup> Rapid <sup>1</sup>
Common Soil Types:	2L, 2
Rooting Depth (cm):	(30–45) <sup>1</sup> (> 45) <sup>1</sup> nd <sup>8</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (6–10) <sup>5</sup> (11–20) <sup>3</sup>
Humus Form:	Humimor <sup>3</sup> Hemimor <sup>2</sup> nd <sup>5</sup>



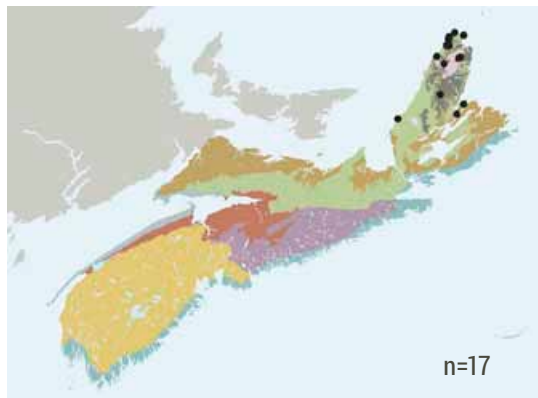
and fibrous-root sedge. The bryophyte layer is poorly developed, but usually includes small patches of mainly log moss and broom moss interspersed with needle carpet.

**Environmental Setting:** HL2 is mainly associated with fresh, nutrient medium soils derived from glacial till and/or colluvial deposits. This VT is found scattered throughout the highland Maritime Boreal forest, primarily on steep upper and middle slope positions. Wind and exposure significantly limit tree growth.

**Successional Dynamics:** HL2 is an even-aged, mid- to late-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 can cause significant tree

Near MacKenzie Mountain,  
Cape Breton Highlands National  
Park, Inverness County

Characteristic Plants	HL2	
	Freq. (%)	Cover (%)
White spruce	100	45
Balsam fir	88	19
White birch / Heart-leaf birch	53	2
Black spruce	24	25
Yellow birch	18	5
Pin cherry	18	0.1
Red maple	12	5
<b>Tree Layer (Mean % Cover)</b>		<b>71</b>
Balsam fir	65	3
Mountain-ash	65	0.4
White spruce	35	1
Mountain holly	35	0.3
Lowbush blueberry	24	7
Red maple	24	6
Sugar maple	24	6
Downy alder	24	2
Serviceberry	24	0.4
Red raspberry	24	0.2
Pin cherry	18	2
Velvet-leaf blueberry	18	2
Black spruce	18	2
Wild raisin	18	1
Fly-honeysuckle	18	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Bunchberry	76	22
Sarsaparilla	76	5
Wild lily-of-the-valley	76	2
Wood aster	65	8
Bluebead lily	59	1
Goldthread	59	0.4
Evergreen wood fern	53	4
Twinflower	47	1
Starflower	47	0.3
Bent-grass	41	2
Wood-sorrel	41	0.4
Mountain wood fern	35	6
Violets	29	4
Dwarf raspberry	29	4
Large-leaved goldenrod	29	0.6
Northern beech fern	29	0.5
Blue joint	29	0.3
Lion's paw	29	0.1
Bracken	24	12
Rough goldenrod	24	6
Mayflower	24	0.1
Cinnamon fern	18	2
Spinulose wood fern	18	1
Strawberry	18	1
Creeping snowberry	18	1
Rose twisted stalk	18	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>45</b>
Schreber's moss	71	22
Broom moss	53	2
Bazzania	35	14
Stair-step moss	35	4
Plume moss	24	4
Ladies' tresses	18	4
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>33</b>



mortality. Suitable seedbeds for white spruce regeneration may arise when disturbed sites are re-vegetated by graminoid (grass-like) 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 hardwoods. These, in turn, give white spruce more opportunity to establish and thrive. Although not as shade tolerant as balsam fir, white spruce responds well to release and with longer relative longevity, levels of the species could increase over time in the absence of spruce budworm attacks.

**Ecological Features:** This variably-sized patch forest often survives spruce budworm outbreaks and provides an important remnant of mature forest, especially immediately following these disturbances, on the highland landscape. White spruce seeds are eaten by crossbills and finches, while small mammals both eat and cache white spruce seeds and cones. Subnivean habitat is important for the many small mammals, and their predators, found in this forest.

This VT provides habitat for many of the same species found in the balsam fir matrix forest.



Wood aster



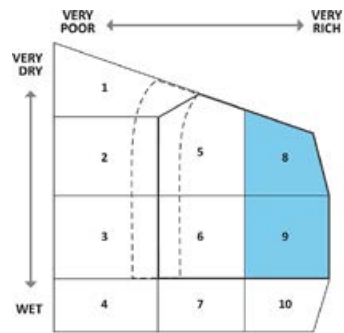
# HL3 Yellow birch – Balsam fir / Mountain wood fern – Wood-sorrel

*Betula alleghaniensis* – *Abies balsamea* /  
*Dryopteris campyloptera* – *Oxalis montana*

**Concept:** This Vegetation Type (VT) has a closed canopy, co-dominated by yellow birch and balsam fir, both of which are also significant in the understory. However, depending on the time elapsed since the last spruce budworm infestation, the fir may not be in a co-dominant canopy position. In these circumstances, the VT may be ecologically similar to HL4 (Birch / Wood fern / Wood-sorrel). An extensive herbaceous layer dominated by mountain wood fern is also characteristic, especially in more open stands. This is the dominant VT found in the Cape Breton Highlands transition zone, an informal ecological term used to describe the area where forest conditions intergrade between Acadian Forest hardwood slopes and the balsam fir dominated stands of the Cape Breton Highlands. The Acadian Forest VT, MW5 (White spruce – Yellow birch/ Bunchberry–Wood fern), can share similar features as HL3.

**Vegetation:** Common overstory associates include white spruce and white birch. The near absence of sugar maple is a strong indicator of the transition zone between Acadian and Maritime Boreal forests. The shrub layer usually includes mountain maple, striped maple and mountain-ash. In more open stands dominated by yellow birch, mountain wood fern can be abundant, co-occurring with lower levels of 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. The moderately-developed bryophyte layer is dominated by Schreber's moss, bazzania, broom moss and stair-step moss.

**Environmental Setting:** HL3 is mainly associated with fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvial deposits. HL3 is generally confined to well drained upper slopes leading to the plateau of the Cape Breton Highlands ecodistrict, usually at elevations ranging from 250-350 meters. Thus, it could also be expected at upper elevations in the Cape Breton Hills (310) ecodistrict. Wind and exposure may significantly limit tree growth.



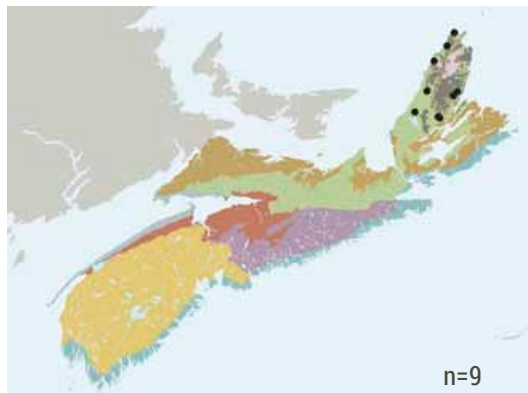
## Site & Soil Characteristics

Slope Position:	Upper <sup>7</sup> Level <sup>3</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>3</sup> (Very – Excessively) <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Moderately <sup>6</sup> Slightly <sup>3</sup> Level <sup>1</sup>
Drainage:	Well <sup>8</sup> Imperfect <sup>1</sup> Moderately Well <sup>1</sup>
Common Soil Types:	2L, 2
Rooting Depth (cm):	(< 30) <sup>1</sup> (30–45) <sup>1</sup> (> 45) <sup>5</sup> nd <sup>3</sup>
Forest Floor (cm):	(0–5) <sup>1</sup> (6–10) <sup>6</sup> (11–20) <sup>3</sup>
Humus Form:	Hemimor <sup>5</sup> Mormoder <sup>3</sup> Mullmoder <sup>1</sup> Humimor <sup>1</sup>

Warehouse Road, Hunters Mountain, Victoria County



Characteristic Plants	HL3	
	Freq. (%)	Cover (%)
Balsam fir	100	35
Yellow birch	100	31
White spruce	78	7
Red maple	44	5
White birch / Heart-leaf birch	33	12
<b>Tree Layer (Mean % Cover)</b>		<b>80</b>
Balsam fir	89	4
Mountain maple	78	2
Yellow birch	78	2
Mountain-ash	67	0.7
Red maple	56	6
White spruce	44	0.8
Fly-honeysuckle	44	0.4
Sugar maple	33	1
Striped maple	33	0.4
Red raspberry	22	8
Serviceberry	22	0.3
Beaked hazelnut	22	0.1
Common blackberry	22	0.1
Pin cherry	22	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>13</b>
Mountain wood fern	100	26
Bluebead lily	100	5
Wood-sorrel	89	12
Bunchberry	89	7
Sarsaparilla	89	6
Wood aster	78	1
Starflower	78	0.2
Rose twisted stalk	78	0.1
Wild lily-of-the-valley	67	4
Large-leaved goldenrod	67	0.1
Northern beech fern	56	2
Evergreen wood fern	44	10
Shining club-moss	44	1
Violets	44	0.5
Drooping wood sedge	44	0.1
New York fern	33	27
Cinnanon fern	33	2
Bladder sedge	33	0.1
Goldthread	33	0.1
Bracken	22	10
Spinulose wood fern	22	5
Bent-grass	22	1
Lady fern	22	0.5
Ghost pipe	22	0.1
Mayflower	22	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>78</b>
Broom moss	56	2
Stair-step moss	44	11
Schreber's moss	44	8
Bazzania	44	5
Shaded wood moss	44	0.9
Hair-cap moss	33	0.5
Log moss	22	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>15</b>



**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. Yellow birch can 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 occurs as a mix of balsam fir and hardwood, often with small patches (inclusions) of pure fir or hardwood. This patchiness can be a function of disturbance severity or the inhibiting effect of fern growth on tree regeneration (especially after disturbance). Balsam fir in mixedwood forests is often spared the extensive defoliation and mortality typical of spruce budworm events, and rare individuals may reach 175 years of age. Yellow birch may exceed 300 years of age thereby creating multiple cohort forests of birch and fir. Yellow birch is prone to heart rot and large diameter (often exceeding 75 cm) hollow trees provide good denning and cavity nesting sites. Following their mortality, these large trees continue to provide valuable wildlife habitat for amphibians, fungi and bryophytes, as large coarse woody on the forest floor. Yellow birch canopies are favoured sites for stick nests of many species, especially northern goshawk. Great-horned owls may use the former nests made by hawks or ravens in yellow birch trees. 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. Birch cinder conk (chaga) is often found on both living and dead yellow birch.

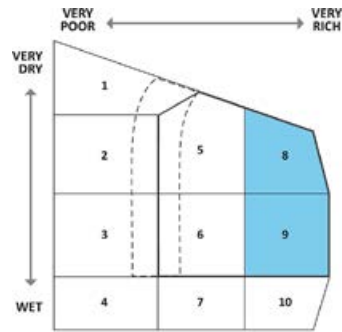
# HL4

## Birch / Wood fern – Wood-sorrel

*Betula spp. / Dryopteris spp. – Oxalis montana*

**Concept:** This closed canopy hardwood forest is dominated by birch (yellow, white and occasionally heart-leaf) and features an extensive herbaceous layer with 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 area where Acadian Forest hardwood slopes meet the Cape Breton Highlands fir forest.

**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, in some occurrences, may indicate relatively recent stand-level disturbance. The diverse and well-developed herbaceous layer includes extensive coverage of three wood ferns—mountain, evergreen and spinulose. Sarsaparilla, wood-sorrel, wood aster and bunchberry are also commonly found. The bryophyte layer is poorly developed.



### Site & Soil Characteristics

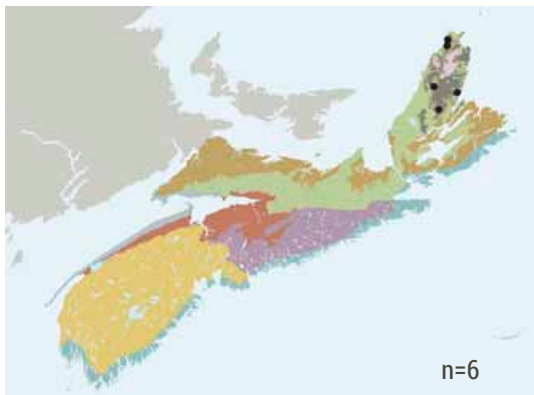
Slope Position:	Middle <sup>5</sup> Upper <sup>5</sup>
Surface Stoniness:	(Non – Slightly) <sup>6</sup> (Moderately) <sup>2</sup> (Very – Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Microtopography:	Moderately <sup>5</sup> Slightly <sup>3</sup> Level <sup>2</sup>
Drainage:	Well <sup>7</sup> Moderately well <sup>3</sup>
Common Soil Types:	2, 15, 8, 2L
Rooting Depth (cm):	(< 30) <sup>3</sup> (30–45) <sup>5</sup> (> 45) <sup>2</sup>
Forest Floor (cm):	(6–10) <sup>5</sup> (11–20) <sup>5</sup>
Humus Form:	Mormoder <sup>3</sup> Hemimor <sup>3</sup> Leptomoder <sup>2</sup> Humimor <sup>2</sup>

**Environmental Setting:** HL4 is mainly found on fresh to fresh-moist, nutrient medium to rich soils derived from glacial till and/or colluvial deposits. Richer versions of this Vegetation Type (VT) occur



Characteristic Plants	HL4	
	Freq. (%)	Cover (%)
White birch / Heart-leaf birch	100	29
Yellow birch	83	48
Balsam fir	50	8
White spruce	33	8
Pin cherry	17	8
Sugar maple	17	5
White pine	17	4
<b>Tree Layer (Mean % Cover)</b>		<b>79</b>
Balsam fir	83	2
Mountain maple	83	2
Yellow birch	67	2
Red raspberry	67	2
White spruce	67	0.2
Red-berried elder	50	0.7
White birch / Heart-leaf birch	33	3
Red maple	33	0.9
Mountain-ash	33	0.2
Sugar maple	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>8</b>
Wood aster	100	5
Mountain wood fern	83	42
Wood-sorrel	83	14
Bunchberry	83	9
Northern beech fern	83	1
Spinulose wood fern	67	20
Sarsaparilla	67	2
Violets	67	0.9
Evergreen wood fern	50	27
New York fern	50	4
Cinnamon fern	50	0.9
Green twisted stalk	50	0.4
Starflower	50	0.2
Bracken	33	15
Hay-scented fern	33	4
Wild lily-of-the-valley	33	4
Lady fern	33	2
Wood goldenrod	33	1
Bluebead lily	33	0.8
Large-leaved goldenrod	33	0.3
Drooping wood sedge	33	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>100</b>
Hair-cap moss	67	0.1
Shaded wood moss	50	1
Broom moss	50	0.7
Stair-step moss	33	0.5
Schreber's moss	33	0.3
Log moss	33	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>3</b>

(facing page) Cape Clear,  
Inverness County



where seepage increases available moisture and nutrients. 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 height.

**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. Depending on disturbance history and the availability of advanced regeneration, transition to HL3 (Yellow birch – Balsam fir / Mountain wood fern – Wood-sorrel) is possible.

**Ecological Features:** This patch level forest is the only pure hardwood ecosystem on the Highlands, thereby contributing a unique role at stand and landscape scales. Differences in turn-over rates between short-lived white birch and longer-lived yellow birch, may result in an uneven-aged stand structure. This heterogeneous age structure can promote an open canopy, with a dense layer of ferns, sedges, goldenrods and other herbaceous species. The understory provides ideal habitat for numerous insects and other invertebrates, along with their predators. It also furnishes ground cover for nesting birds. 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. Vireos may be found in this habitat using small strips of birch bark to construct their nests. Large diameter, living, hollow yellow birch trees provide good denning and cavity nesting sites, and stick nest sites for many species including goshawks, among other raptors. Birch cinder conk (chaga) is often found on both living and dead yellow birch and, occasionally, white birch.

# HL5 White birch (Heart-leaf birch) – Balsam fir / Wood fern – Wood-sorrel

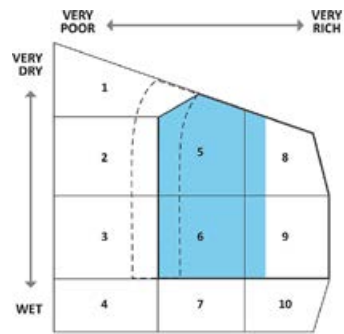
*Betula papyrifera* (*B. cordifolia*) –  
*Abies balsamea* / *Dryopteris* spp. / *Oxalis montana*

**Concept:** White and/or heart-leaf birch co-dominate with balsam fir in this closed canopy mixedwood forest. This high elevational Vegetation type (VT) is scattered throughout the Cape Breton Highlands but appears to be more prominent on the western highlands under very exposed conditions. White spruce may replace balsam fir as the dominant conifer species. Soils are generally well drained and of medium fertility. The shrub layer is typically sparse but there is a well-developed herbaceous layer of ferns and woodland flora.

**Vegetation:** White spruce is a relatively frequent canopy associate. The shrub understory includes several smaller deciduous tree species such as mountain ash, striped maple and mountain maple. The composition of the forest floor is greatly influenced by the typically abundant leaf litter which promotes herbaceous species such as wood aster, wood-sorrel and especially ferns, but inhibits bryophytes and lichens; their coverage is generally very low.

**Environmental Setting:** HL5 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 Highlands. Wind and exposure significantly limit tree growth.

**Successional Dynamics:** HL5 is an even-aged VT dominated by balsam fir and white birch. The main stand-level disturbance agents are spruce budworm defoliation, wind and storm damage (which are the only factors affecting hardwood



## Site & Soil Characteristics

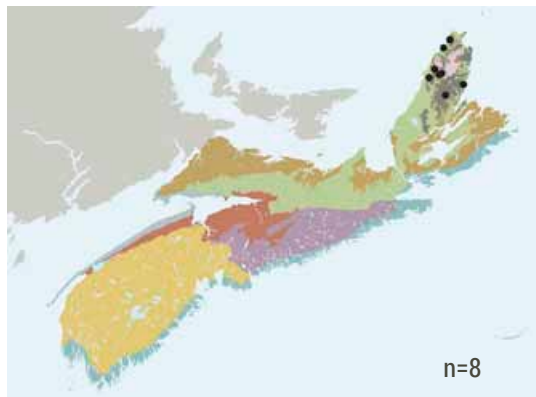
Slope Position: Middle<sup>7</sup> Upper<sup>3</sup>  
Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>1</sup>  
(Very – Excessively)<sup>1</sup>  
Bedrock Outcrop: (Non-rocky)<sup>9</sup> (Slightly – Moderately)<sup>1</sup>  
Microtopography: Slightly<sup>5</sup> Strongly<sup>3</sup> Moderately<sup>2</sup>  
Drainage: Well<sup>6</sup> Moderately Well<sup>4</sup>

Common Soil Types: 2, 6, 3C, 8, 2L, 3  
Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>1</sup> (> 45)<sup>1</sup> nd<sup>4</sup>  
Forest Floor (cm): (0–5)<sup>1</sup> (6–10)<sup>5</sup> (11–20)<sup>1</sup> (21–40)<sup>3</sup>  
Humus Form: Hemimor<sup>6</sup> Humimor<sup>3</sup> nd<sup>1</sup>



In Cape Breton Highlands  
National Park off Park Spur Road,  
Inverness County

Characteristic Plants	HL5	
	Freq. (%)	Cover (%)
White birch / Heart-leaf birch	100	40
Balsam fir	88	30
White spruce	88	6
Red maple	25	8
White pine	13	5
Yellow birch	13	5
Pin cherry	13	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>75</b>
Balsam fir	88	2
Mountain-ash	75	3
White birch / Heart-leaf birch	63	0.3
White spruce	50	2
Striped maple	38	2
Red maple	38	0.8
Mountain maple	38	0.1
Mountain holly	25	0.1
Fly-honeysuckle	13	3
Downy alder	13	2
Red-berried elder	13	0.8
Pin cherry	13	0.5
Ground hemlock (Yew)	13	0.1
Red oak	13	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>7</b>
Bunchberry	100	6
Wood-sorrel	88	10
Bluebead lily	88	2
Starflower	88	0.3
Mountain wood fern	75	18
Sarsaparilla	75	2
Goldthread	75	1
Wild lily-of-the-valley	75	1
Evergreen wood fern	63	24
Wood aster	63	7
Large-leaved goldenrod	63	0.4
Cinnamon fern	50	2
Northern beech fern	50	1
Green twisted stalk	50	0.5
Hay-scented fern	38	3
Bracken	38	2
Spinulose wood fern	25	13
Twinflower	25	0.5
Ghost pipe	25	0.2
Bristly club-moss	13	2
Lady fern	13	0.8
Bladder sedge	13	0.5
Interrupted fern	13	0.5
Wood goldenrod	13	0.2
Wood reed	13	0.2
<b>Herb Layer (Mean % Cover)</b>		<b>61</b>
Schreber's moss	88	4
Broom moss	75	3
Shaded wood moss	75	0.8
Bazzania	50	0.8
Stair-step moss	38	1
Wavy dicranum	25	0.8
Log moss	13	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>8</b>



tree species), and harvesting. In the absence of defoliation, balsam fir decline, due to senescence, initiates stand renewal through advanced regeneration. White birch dieback usually follows fir mortality, as exposure increases. 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 moose influences balsam fir successional patterns, particularly in young post-budworm stands where balsam fir and hardwood saplings have been stripped out. In many areas, this has resulted in an open grassland of bluejoint and stunted tree regeneration. HL5 is a mid-seral VT, which precedes HL1 or HL2.

**Ecological Features:** This uncommon patch-level community is likely an early developmental stage of HL1. It usually occurs in circumstances where white birch longevity is a function of winter exposure. Ground vegetation is characterized by reduced species richness, especially as the stand matures. These forests support snowshoe hare, moose, spruce grouse, boreal chickadee and black-backed woodpecker. Mountain-ash, an important component of highland forests, often reaches tree size, and provides abundant fruit and browse for moose, black bear, coyote, fox, and a variety of bird species.

# HL6 Black spruce – Balsam fir / Mountain holly / Schreber's moss

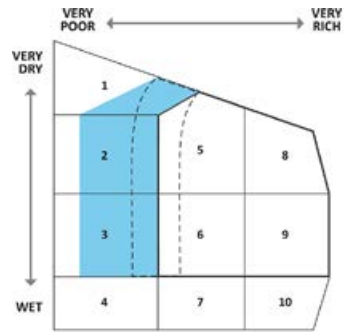
*Picea mariana* – *Abies balsamea* /  
*Ilex mucronata* / *Pleurozium schreberi*

**Concept:** These partial canopy forests (usually less than 60% overstory cover) support a mix of balsam fir and black spruce. They occur on soils that are usually less fertile, and/or moister, than those that characterize most other highland VTs. Beneath the canopy, the strongly-developed shrub layer is dominated by black spruce regeneration, mostly from layering, and by mountain holly and winterberry. The forest floor is characterized by a prolific bryophyte layer; generally composed of feather-mosses, sphagnum mosses and liverworts, especially bazzania.

**Vegetation:** There are very few other tree associates in the black spruce – balsam fir overstory. A fair cover of ericaceous shrubs such as blueberry and lambkill complement the larger woody shrubs. The herbaceous layer is primarily low-woody herbs such as bunchberry, creeping snowberry and mayflower. Bracken is the most typical fern species. The bryophytes are extensive with Schreber's moss the most prominent and if sites are moist, ladies tresses sphagnum can be locally abundant.

**Environmental Setting:** HL6 is mainly associated with fresh to moist, nutrient poor soils derived from glacial till. This forest community is found near large headwater wetlands and riparian areas of highland streams. Wind and exposure significantly limit tree growth. Black spruce – Balsam fir / Mountain holly / Schreber's moss is restricted to elevations over 300 meters in the Cape Breton Highlands (210) and Northern Plateau (100).

**Successional Dynamics:** HL6 is primarily an even-aged, late-successional VT but black spruce, due to its greater longevity and lower susceptibility to spruce budworm (than balsam fir), may extend overstory cover until fir has



## Site & Soil Characteristics

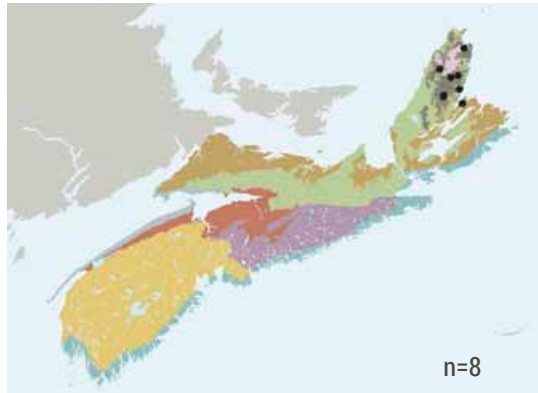
Slope Position: Level<sup>8</sup> Middle<sup>1</sup> Upper<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>8</sup> (Moderately)<sup>2</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> (Slightly – Moderately)<sup>2</sup>  
 Microtopography: Slightly<sup>5</sup> Level<sup>5</sup>  
 Drainage: Imperfect<sup>6</sup> Rapid<sup>2</sup> Poor<sup>1</sup> Moderately Well<sup>1</sup>

Common Soil Types: 3, 3L, 2C, 1, 16  
 Rooting Depth (cm): (< 30)<sup>4</sup> (30–45)<sup>4</sup> nd<sup>2</sup>  
 Forest Floor (cm): (6–10)<sup>5</sup> (11–20)<sup>5</sup>  
 Humus Form: Humimor<sup>5</sup> Resimor<sup>1</sup> Hemimor<sup>1</sup> Hydromor<sup>1</sup>  
 Other<sup>2</sup>



North of McMillan Flowage,  
Victoria County

Characteristic Plants	HL6	
	Freq. (%)	Cover (%)
Black spruce	100	25
Balsam fir	100	16
White spruce	13	12
Red maple	13	4
Showy mountain-ash	13	0.1
White birch / Heart-leaf birch	13	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>43</b>
Black spruce	100	22
Balsam fir	100	8
Mountain holly	100	5
Wild raisin	88	2
Velvet-leaf blueberry	63	19
Red maple	63	2
Ground hemlock (Yew)	63	0.9
Lambkill	50	4
Lowbush blueberry	50	2
Mountain-ash	50	0.2
Labrador tea	25	1
White birch	25	0.1
Yellow birch	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>54</b>
Bunchberry	100	15
Mayflower	100	3
Creeping snowberry	88	7
Bluebead lily	88	5
Goldthread	88	4
Twinflower	88	1
Bracken	75	5
Sarsaparilla	75	1
Wild lily-of-the-valley	75	0.9
Cinnamon fern	50	7
Starflower	38	0.4
New York fern	25	0.5
Large-leaved goldenrod	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>46</b>
Schreber's moss	100	38
Bazzania	88	6
Stair-step moss	75	8
Ladies' tresses	63	17
Wavy dicranum	63	2
Plume moss	50	1
Grey reindeer lichen	50	0.3
Broom moss	38	0.7
Cup lichens	38	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>71</b>



re-established following spruce budworm epidemics. 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. Heavy browsing of fir regeneration by moose may also impact the proportion of fir in the subsequent overstory following spruce budworm mortality.

**Ecological Features:** This patch-level community is associated with moist to wet soils. It usually occurs along riparian areas and in the interface between uplands and wetlands. Two-cohort stands are common as the black spruce component often persists through subsequent development of a balsam fir cohort, before it eventually declines from natural senescence. The well-developed shrub layer provides nesting and rearing habitat, and generally provides shelter for many small mammals, birds and invertebrates. Herbaceous vegetation is characterized by reduced species richness. These forests support snowshoe hare, moose, spruce grouse, boreal chickadee and black-backed woodpecker. American marten and Canada lynx may frequent HL6 stands for prey. Old growth potential is low.



Mayflower

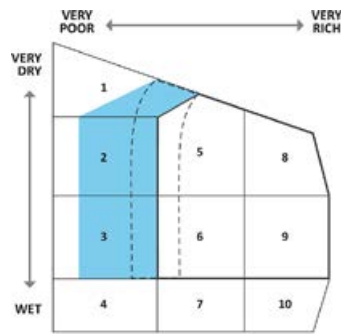


*Abies balsamea* / *Ilex mucronata* / *Pteridium aquilinum*

**Concept:** On the highest elevations of the Cape Breton Highlands, high winds and harsh winter conditions strongly limit tree growth. This stunted softwood krummholz is dominated by balsam fir and black spruce trees that only reach heights of 2–5 m. Ecosystems with trees that are even more stunted (less than 2 m and usually 50 cm tall) are classified as highland barrens (Porter et al. 2020).

**Vegetation:** Balsam fir trees are short with large diameters and wide spreading, multi-leadered crowns. They often have several dead leaders—the height of the dominant live leader depending on seasonal duration between severe winters. Tree shoots that extend above winter snow depths are subjected to excessive desiccation and are damaged by very strong winds, heavy snow, and ice build-up. In krummholz stands, black spruce, in turn, tends to grow with a prostrate form, largely devoid of a trunk. Tamarack often withstands wind and snow damage but develops a gnarly, scraggly appearance. Shrubs such as wild raisin, mountain holly and rhodora occupy areas not covered by stunted trees and they are also prone to the same limiting climatic factors. Bracken and bunchberry dominate openings and several of the common boreal forest herbs grow beneath the stunted trees (e.g. bluebead lily, twinflower). Low bryophyte coverage develops primarily in shaded conditions beneath the spruce and fir. Reindeer lichens are quite common.

**Environmental Setting:** HL7 can occur on dry to moist soils but all sites have low nutrient availability. Soils are primarily coarse textured and often shallow to bedrock. The characteristically cool moist climate, combined with lingering snow in the spring, create more than adequate soil



### Site & Soil Characteristics

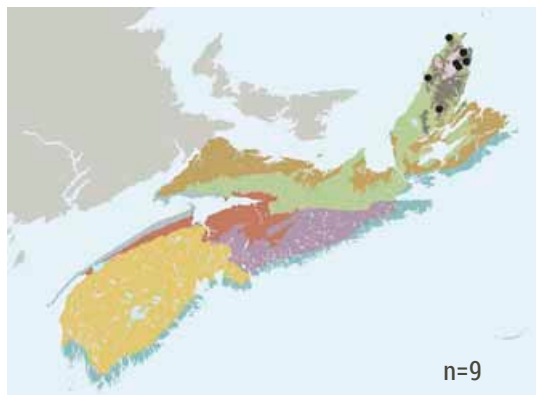
Slope Position:	Level <sup>3</sup> Middle <sup>3</sup> Upper <sup>2</sup> Lower <sup>1</sup>
Surface Stoniness:	(Non-Slightly) <sup>8</sup> (Very- Excessively) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Very - Excessively) <sup>1</sup>
Microtopography:	Level <sup>7</sup> Moderately <sup>2</sup> Slightly <sup>1</sup>
Drainage:	Well <sup>4</sup> Rapid <sup>2</sup> Imperfect <sup>2</sup> Poor <sup>1</sup> Moderately Well <sup>1</sup>

Common Soil Types:	3, 15C, 1, 2, 15, 14U
Rooting Depth (cm):	(< 30) <sup>2</sup> (30–45) <sup>2</sup> nd <sup>6</sup>
Forest Floor (cm):	(6–10) <sup>5</sup> (11–20) <sup>4</sup> (> 40) <sup>1</sup>
Humus Form:	Humimor <sup>3</sup> Resimor <sup>1</sup> nd <sup>6</sup>



North Barren, Cape Breton Highlands  
National Park, Victoria County

Characteristic Plants	HL7	
	Freq. (%)	Cover (%)
Balsam fir	100	14
Mountain holly	100	4
Wild raisin	100	2
Black spruce	78	34
Rhodora	67	17
Lowbush blueberry	67	12
Lambkill	67	6
Velvet-leaf blueberry	56	2
Ground hemlock (Yew)	56	0.3
Red maple	44	3
Downy alder	44	0.1
Mountain-ash	44	0.1
Serviceberry	33	0.3
White birch / Heart-leaf birch	22	3
Leather-leaf	22	1
Labrador tea	22	0.2
Striped maple	22	0.1
White spruce	11	26
Tamarack	11	15
Pale laurel	11	5
White pine	11	5
Bartram shadbush	11	0.3
Ground juniper	11	0.1
Squashberry	11	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>84</b>
Bunchberry	100	11
Bracken	78	22
Sarsaparilla	67	0.9
Creeping snowberry	67	0.5
Twinflower	67	0.5
Bluebead lily	56	0.5
Starflower	56	0.1
Goldthread	44	2
Wild lily-of-the-valley	44	0.8
Mayflower	44	0.1
Cinnamon fern	22	0.5
Foxberry	11	3
<b>Herb Layer (Mean % Cover)</b>		<b>32</b>
Schreber's moss	89	25
Grey reindeer lichen	67	6
Wavy dicranum	44	6
Bazzania	33	3
Hair-cap moss	33	0.1
Stair-step moss	22	5
Broom moss	22	0.5
Cup lichens	22	0.1
Ladies' tresses	22	0.1
Bering reindeer lichen	11	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>32</b>



moisture levels. Wind and exposure significantly limit tree growth. HL7 is restricted to elevations over 300 m and is prominent on the Northern Plateau ecoregion (100).

**Successional Dynamics:** HL7 is an edaphic climax vegetation type comprised of short-lived conifers. Mortality due to chronic wind stress is prevalent. However, with the ability conifer species have to develop new terminals at breakage points, and if also protected from desiccating winter winds by deep snow, individual trees may exceed otherwise typical levels of longevity; 100-plus-year individuals are not uncommon. Stand-level disturbances are rare. Single tree and small gap disturbances create opportunities for stand renewal and multi-aged ecosystems. Spruce budworm outbreaks can be a threat to balsam fir and white spruce trees found embedded in krummholz ecosystems.

**Ecological Features:** The longevity of this small- to large-patch community is a function of natural tree senescence and physical disturbances, such as windthrow and/or repeated crown breakage by snowloads, ice storms and wind. Fauna and ground vegetation are characterized by reduced species richness. Relict arctic-alpine plants such as dwarf birch and alpine whortleberry are associated with this ecosystem. These forests support spruce grouse, boreal chickadee and Bicknell's thrush (a species at risk). They provide nesting and fledgling habitat for bird species and offer shelter in the dense, nearly impenetrable compact canopy. HL7 represents a unique forest condition in Nova Scotia, persisting with specific and relative localized climatic conditions.

# WB

## Wet Boreal Forest Group

### Wet Boreal (WB) Key

- 
- 1a. Jack pine and black spruce dominant ... **WC3**
- 1b. Not as above ... **2**
- 
- 2a. Balsam fir dominant and spruce absent or sparse ... **WC6**
- 2b. Not as above ... **3**
- 
- 3a. Tamarack abundant to dominant ... **4**
- 3b. Not as above ... **5**
- 
- 4a. Coastal plain species (inkberry, high bush blueberry) absent ... **WC7**
- 4b. Coastal plain species present ... **WC7a**
- 

- 
- 5a. Stands in an open woodland condition (10–30% crown closure) ... **WC11**
- 5b. Not as above ... **6**
- 
- 6a. Stands located in the Coastal Ecoregion ... **WB1**
- 6b. Stands located in the Highland Ecoregions ... **7**
- 
- 7a. White spruce scattered to abundant ... **WB2**
- 7b. Not as above ... **WB3**
- 

Additional Wet Boreal vegetation type without a fact sheet:

**WB4** Tamarack / Labrador tea / Pitcher Plant

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

## Concept

These small- to large-patch, edaphic climax forests generally occur within larger wetland complexes (comprised of forested and unforested ecosystems) in boreal coastal or highland regions of Nova Scotia. Sites are characterized by water at or near the ground surface for most of the growing season. Canopies are closed to partially closed and generally dominated by black spruce, balsam fir and/or tamarack, with an understory of plants tolerant of wet, usually acidic and nutrient poor soils.

The shrub layer is moderately developed and characterized by regenerating softwood species, wild raisin, mountain holly and lambkill. Characteristic herbaceous species include cinnamon fern, creeping snowberry and three seeded sedge. High atmospheric humidity throughout the growing season promotes bryophyte abundance and occurrences of several rare lichen species (e.g. boreal felt lichen, voles ears and blue felt lichen), particularly in older, undisturbed stands. Sphagnum moss is generally extensive.

These wet coniferous forests are edaphic climax communities shaped by high soil moisture and low soil fertility.

They develop on wet organic or mineral soils, in areas of level to depressional topography, where water is received from precipitation, springs, seepage and/or surface flows.

Fluctuating water levels, windthrow, insects and disease are significant disturbance agents. The forest's longevity is a function of both canopy tree senescence (especially in older stands) and the frequency of catastrophic stand disturbances (usually hurricanes along the Atlantic coast and spruce budworm defoliation on the Cape Breton Highlands).

These forests make important contributions to landscape composition and structure. Wet forests are also important sites for carbon retention and nitrogen cycling. They are often associated with stream headwaters, where they help regulate water flow, provide filtration and recharge groundwater resources. Edaphic climax forests in this group are self-sustaining. Many express indicators of long-term ecological continuity and support a unique form of old growth. Especially wet stands may persist as woodlands, with stunted and widely spaced canopy trees.

# WB1 Black spruce / Mountain ash / Foxberry / Sphagnum

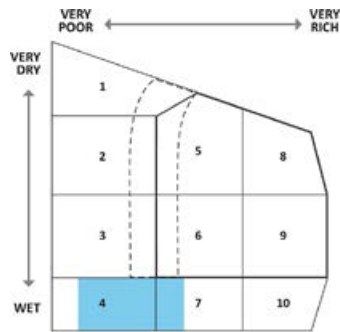
*Picea mariana* / *Sorbus americana* /  
*Vaccinium vitis-idaea* / *Sphagnum* spp.

**Concept:** Black spruce / Mountain ash / Foxberry / Sphagnum is a coastal wet conifer Vegetation Type (VT) characterized by a dominant black spruce overstory. This moderately closed canopy (30–70%) forest has a prominent bryophyte layer mostly comprised of Sphagnum mosses. The shrub and herb layers can have variable coverage ranging from sparse to extensive. This VT is the most frequently encountered wet forest in the Atlantic Coastal ecoregion (800).

**Vegetation:** Balsam fir occurs frequently with low cover while tamarack is only occasionally present and usually very sparse. In the shrub layer, species richness is reduced and regenerating black spruce and fir usually occupy the majority of cover. Lambkill, mountain holly, wild raisin and mountain-ash are the more frequent woody shrubs. The moderately diverse herbaceous layer typically includes cinnamon fern, bunchberry, goldthread, three seeded sedge and twinflower. Plants indicative of coastal influences are often encountered (e.g. mountain-ash, bayberry, downy alder and foxberry). Sphagnum mosses dominate the extensive bryophyte layer with lesser amounts of upland bryophyte species such as Schreber’s and stair-step moss.

**Environmental Setting:** MB1 is generally found on wet, nutrient poor soils of glacial origin. These soils may be fine to coarse textured and are often stony. This VT is primarily associated with the Atlantic Coastal ecoregion (800) and it may be found on extremely exposed sites along Canadian coasts in the Gulf of Maine. High winds and exposure limit tree heights in WB1 stands.

Cape St. Marys,  
Digby County



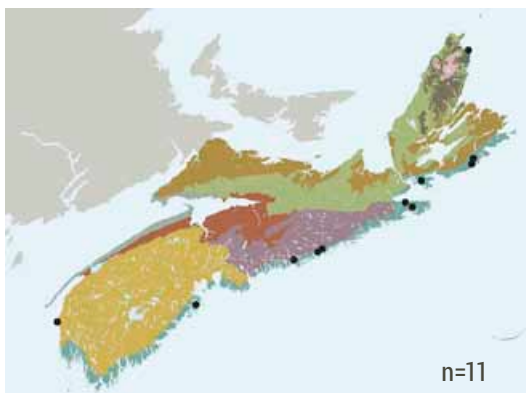
## Site & Soil Characteristics

Slope Position: Level<sup>5</sup> Lower<sup>3</sup> Upper<sup>2</sup> Depression<sup>1</sup>  
 Surface Stoniness: (Non – Slightly)<sup>5</sup> (Moderately)<sup>1</sup>  
 (Very – Excessively)<sup>3</sup> nd<sup>1</sup>  
 Bedrock Outcrop: (Non-rocky)<sup>8</sup> nd<sup>2</sup>  
 Microtopography: Level<sup>6</sup> Slightly<sup>2</sup> Other<sup>2</sup>  
 Drainage: Poor<sup>6</sup> Very Poor<sup>2</sup> Imperfect<sup>1</sup> nd<sup>1</sup>

Common Soil Types: 4, 7  
 Rooting Depth (cm): (< 30)<sup>5</sup> (30–45)<sup>1</sup> nd<sup>4</sup>  
 Forest Floor (cm) (6–10)<sup>1</sup> (11–20)<sup>4</sup> (21–40)<sup>4</sup> (> 40)<sup>1</sup>  
 Humus Form: Hydromor<sup>3</sup> Humimor<sup>1</sup> Saprimoder<sup>1</sup>  
 Hydromoder<sup>1</sup> nd<sup>4</sup>



Characteristic Plants	WB1	
	Freq. (%)	Cover (%)
Black spruce	100	40
Balsam fir	82	12
Tamarack	55	5
Red maple	36	5
White spruce	18	5
<b>Tree Layer (Mean % Cover)</b>		<b>55</b>
Lambkill	100	7
Balsam fir	91	4
Mountain holly	91	1
Black spruce	82	5
Mountain-ash	73	2
Wild raisin	73	2
Red maple	55	2
Labrador tea	45	1
White birch	36	0.1
Velvet-leaf blueberry	27	2
Huckleberry	27	0.8
Black chokeberry	27	0.1
Downy alder	18	0.8
Bayberry	9	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>22</b>
Cinnamon fern	91	13
Bunchberry	91	6
Goldthread	82	6
Starflower	82	0.4
Three seeded sedge	73	7
Twinflower	73	2
Wild lily-of-the-valley	73	1
Foxberry	55	2
Creeping snowberry	55	2
Sarsaparilla	45	4
Bracken	45	3
Ghost pipe	45	0.1
New York fern	27	8
Wood aster	27	0.4
Pink lady's-slipper	27	0.1
Partridge-berry	18	0.2
Bluebead lily	18	0.1
Bog aster	18	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>39</b>
Schreber's moss	100	29
Ladies tresses	82	16
Stair-step moss	82	6
Bazzania	82	3
Broom moss	73	2
Flat topped sphagnum	64	25
Pale fat-leaved sphagnum	64	15
Common green sphagnum	45	25
Hair-cap moss	36	0.3
Wavy dicranum	27	3
Plume moss	27	2
Grey reindeer lichen	27	0.5
Cup lichens	18	0.8
Log moss	18	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>92</b>



**Successional Dynamics:** This edaphic climax community is expected to persist as described. The even-aged forest typically follows stand-replacing, or partial stand, disturbances through windthrow, breakage, or insect infestation. In the absence of these types of disturbances, black spruce can live to about 100–125 years, after which tree senescence initiates slow stand renewal, through advanced regeneration, creating uneven-age stands with old forest structures. Due to its unique ecological setting (close to the ocean), WB1 does not usually shift to other vegetation types after disturbance.

**Ecological Features:** This small- to large-patch edaphic climax forest generally occurs within larger wetland complexes (comprised of forested and unfor-ested ecosystems) in the Maritime Boreal Atlantic Coastal ecoregion (800). The forest's longevity is a function of both canopy tree senescence (especially in older stands) and the frequency of catastrophic stand disturbances (usually hurricanes). Stand use by animals varies seasonally, including many transient and migrating species. Most coastal VTs are shaped by persistently high humidity throughout the growing season. These climatic conditions promote bryophyte abundance and occurrences of several rare lichen species, such as the boreal felt lichen, voles ears and blue felt lichen, particularly in older, undisturbed stands.

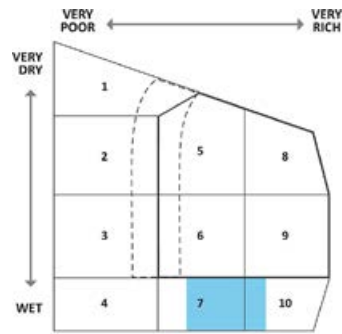
# WB2 White spruce – Balsam fir / Speckled alder / Blue joint

*Picea glauca* – *Abies balsamea* /  
*Alnus incana* / *Calamagrostis canadensis*

**Concept:** This wet coniferous Vegetation Type (VT) is confined to the Cape Breton Highlands and is characterized by a moderately closed canopy of balsam fir and white spruce. Speckled alder is a notable component of the understory, indicating elevated soil fertility. White spruce – Balsam fir / Speckled alder / Blue joint occurs in riparian areas and is often adjacent to alder wetlands associated with the headwaters of highland streams.

**Vegetation:** Occasionally white spruce will dominate the upper canopy but balsam fir is more typical. Speckled alder is abundant in canopy gaps, creating a patchy pattern of canopy trees broken by shrub clumps. In the woody understory, regenerating fir and spruce are scattered with other woody shrubs such as mountain holly, mountain ash and swamp red currant. The near absence of ericaceous shrubs is another indication of higher soil fertility. Aside from typical upland forest flora, such as bunchberry and wood aster, there is a strong presence of wetland flora such as cinnamon fern, three seeded sedge, blue joint, meadow-rue and manna grass. Large-leaved goldenrod, a herb with affinity for the highlands, is usually present. Bryophyte coverage can be quite variable with sphagnum species at times very extensive. When grass and sedge species are abundant bryophyte cover may be significantly reduced.

**Environmental Setting:** MB2 is found on wet, nutrient medium soils of glacial and/or organic origin. Mineral soils are generally medium to coarse textured. This VT is found in the Cape Breton Plateau ecoregion (100) and the Cape Breton Highland ecodistrict (210). High winds and exposure limit the potential for taller trees.



## Site & Soil Characteristics

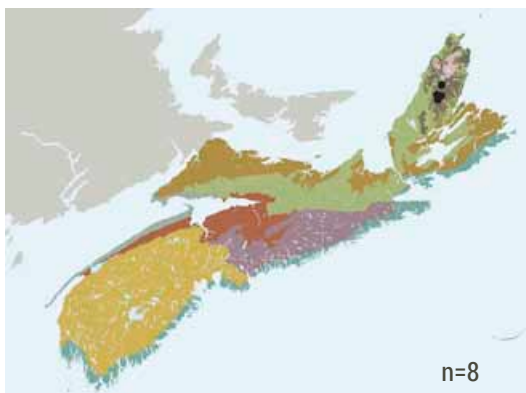
Slope Position:	Level <sup>10</sup>
Surface Stoniness:	(Non – Slightly) <sup>9</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly – Moderately) <sup>1</sup>
Microtopography:	Level <sup>10</sup>
Drainage:	Poor <sup>9</sup> Very Poor <sup>1</sup>
Common Soil Types:	4, 14
Rooting Depth (cm):	(< 30) <sup>5</sup> nd <sup>5</sup>
Forest Floor (cm):	(0–5) <sup>3</sup> (11–20) <sup>3</sup> (21–40) <sup>4</sup>
Humus Form:	Saprimoder <sup>4</sup> Mesimor <sup>3</sup> Hydromor <sup>3</sup> Hemimor <sup>1</sup>

**Successional Dynamics:** As an edaphic climax community, dominated by balsam fir and white spruce, this VT is expected to persist as described. Stand-replacing disturbances are unlikely with



Centre Road, Cape Breton Highlands,  
Inverness County

Characteristic Plants	WB2	
	Freq. (%)	Cover (%)
Balsam fir	100	40
White spruce	100	19
White / Heart-leaf birch	38	0.1
Red maple	13	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>58</b>
Speckled alder	100	13
Balsam fir	75	2
Red raspberry	50	5
White spruce	50	2
Mountain-ash	50	0.7
Swamp red currant	38	1
Red maple	38	0.2
Black spruce	25	0.3
Wild raisin	25	0.2
Heart-leaf birch	25	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>21</b>
Bunchberry	100	9
Wood aster	100	5
Mountain wood fern	88	6
Starflower	88	0.5
Cinnamon fern	75	20
Three seeded sedge	75	10
Sarsaparilla	75	9
Twinflower	75	8
Evergreen wood fern	75	4
Bluebead lily	75	3
Large-leaved goldenrod	75	1
Wild lily-of-the-valley	75	0.9
Wood-sorrel	75	0.5
Blue joint	63	10
Goldthread	63	7
Dwarf raspberry	50	4
Meadow-rue	50	0.6
Rough goldenrod	38	3
Purple-stemmed aster	38	0.9
Woodland horsetail	25	10
Spinulose wood fern	25	4
Lady fern	25	3
Manna-grass	25	3
Violets	25	2
Three-leaved false Solomon's seal	25	0.4
Rough aster	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>84</b>
Ladies tresses	88	24
Schreber's moss	75	10
Flat topped sphagnum	38	25
Shaded wood moss	38	8
Pale fat-leaved sphagnum	38	2
Hair-cap moss	38	0.5
Common green sphagnum	25	23
Broom moss	25	1
Wavy dicranum	25	0.7
Grey reindeer lichen	25	0.4
Plume moss	25	0.3
Stair-step moss	20	5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>50</b>



windthrow, breakage, and insect infestation more likely to create partial openings in the canopy. Due to the synchrony of bud flushing and spruce budworm larval development, white spruce are generally less susceptible than balsam fir to mortality from this disturbance agent. Therefore, partial canopy continuity in this VT can be expected until a new cohort of balsam fir is established. Both balsam fir and white spruce may live to about 100–125 years, after which tree senescence will initiate slow stand renewal, through advanced regeneration, creating an uneven-age stand structure.

**Ecological Features:** This small- to large-patch edaphic climax forest generally occurs as part of larger linear wetland complexes, associated with streams and seepage channels, in the boreal forest of the Cape Breton Highlands. WB2 offers abundant browse for snowshoe hare, a primary food source of Canada lynx, an provincially endangered species in Nova Scotia. This VT also contributes to connectivity throughout the Highlands, serving to facilitate movement with adjacent areas of Acadian forest found in the Cape Breton Hills and Bras d'Or Lowlands. Moose, a keystone herbivore in the Cape Breton Highlands, use stands of WB2 for browsing, and many of its broad-leaved woody shrubs are favoured browse species. In winter, this VT may also be used as a “moose yard” or concentration area for small groups of two to six (or more) moose, and, in these areas, it is not uncommon to observe saplings and shrubs chewed off to form a “browse line”, about 2–3 metres off the ground. White spruce in this VT also provides red squirrels with a winter food source as they will cache large quantities of cones. Pine marten may also use this forest preying on small rodents and squirrels.



# WB3 Black spruce / Creeping snowberry / Sphagnum

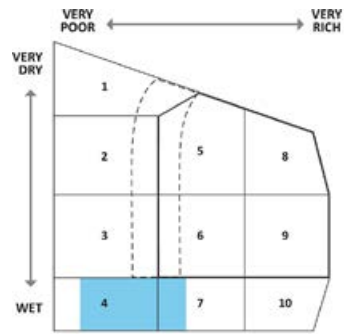
*Picea mariana* / *Gaultheria hispidula* / *Sphagnum* spp.

**Concept:** Black spruce / Creeping snowberry / Sphagnum is an open canopy (35–50%) wet forest dominated by black spruce and occurring on the Cape Breton Highlands. Both shrub and herb diversity is low although the herb layer can be well developed in some stands. This Vegetation Type (VT) is similar to WC11 (Black spruce Woodland Bog) which occurs elsewhere in temperate areas of Nova Scotia at lower elevation.

**Vegetation:** Balsam fir is a minor component of the canopy but may occur with greater abundance in the understory. Shrub development is moderate with prominent black spruce regeneration. Mountain holly, wild raisin and lambkill are the most common woody shrubs. Cinnamon fern, creeping snowberry and three seeded sedge are characteristic species and usually provide most of the herbaceous coverage. Bakeapple can be expected although it may be sparse and localized. The bryophyte layer has close to 100% cover and is mostly peat mosses.

### Environmental Setting:

This is one of the poorest wet conifer forests in the province. It may occur on medium to coarse textured mineral soils or deep organic deposits derived from peat mosses. WB3 is found in areas of severely exposed topography on flat summits of the Cape Breton Highlands. Microtopography is level and sites have minimal surface stoniness or exposed bedrock.



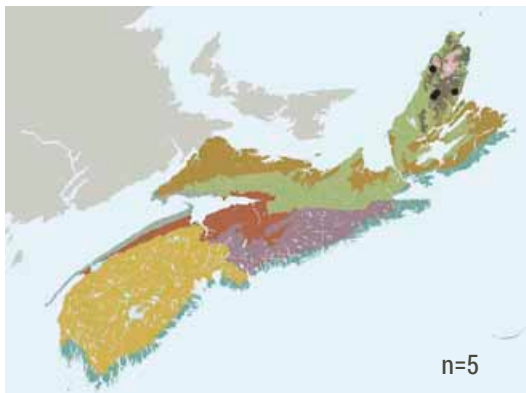
### Site & Soil Characteristics

Slope Position:	Level <sup>10</sup>
Surface Stoniness:	(Non – Slightly) <sup>10</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly – Moderately) <sup>2</sup>
Microtopography:	Level <sup>10</sup>
Drainage:	Poor <sup>6</sup> Very Poor <sup>4</sup>
Common Soil Types:	4, 14
Rooting Depth (cm):	(< 30) <sup>10</sup>
Forest Floor (cm):	(0–5) <sup>2</sup> (11–20) <sup>4</sup> (> 40) <sup>4</sup>
Humus Form	Saprimoder <sup>4</sup> Fibrimor <sup>2</sup> Hydromor <sup>2</sup> nd <sup>2</sup>



Centre Road,  
Cape Breton Highlands,  
Inverness County

Characteristic Plants	WB3	
	Freq. (%)	Cover (%)
Black spruce	100	39
Balsam fir	80	6
<b>Tree Layer (Mean % Cover)</b>		<b>44</b>
Black spruce	100	12
Mountain holly	100	4
Wild raisin	100	0.9
Lambkill	80	2
Balsam fir	60	7
Velvet-leaf blueberry	60	0.8
Red maple	60	0.1
Lowbush blueberry	40	3
Ground hemlock (Yew)	40	0.3
Mountain-ash	40	0.1
Speckled alder	20	2
Labrador tea	20	0.1
Striped maple	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>24</b>
Creeping snowberry	100	20
Three seeded sedge	100	17
Bluebead lily	100	2
Cinnamon fern	80	58
Goldthread	80	7
Bunchberry	80	6
Sarsaparilla	80	0.9
Mayflower	60	3
Twinflower	60	2
Three-leaved false Solomon's seal	60	0.1
New York fern	40	6
Wild lily-of-the-valley	40	0.3
Starflower	40	0.2
Cloudberry	40	0.1
Bracken	20	4
Bog aster	20	0.5
Cow wheat	20	0.1
Pink lady's slipper	20	0.1
Round-leaved sundew	20	0.1
Spinulose wood fern	20	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>103</b>
Schreber's moss	100	6
Ladies tresses	60	35
Flat topped sphagnum	60	23
Bazzania	60	7
Red fat-leaved sphagnum	60	3
Russ's sphagnum	40	35
Wavy dicranum	40	6
Naugehyde liverwort	40	1
Stair-step moss	40	0.1
Common green sphagnum	20	9
Cup lichens	20	1
Hair-cap moss	20	0.5
Broom moss	20	0.3
Brown fat-leaved sphagnum	20	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>66</b>



**Successional Dynamics:** The ecosystem is a type of edaphic climax and is expected to persist as described. Tree senescence, wind damage, and occasionally spruce budworm are more often to affect individual trees rather than result in complete stand level mortality. Regeneration of black spruce is primarily from vegetation layering in the thick, moist, forest floor.

**Ecological Features:** This small- to large-patch edaphic climax forest generally occurs embedded in larger wetland complexes in the Maritime Boreal forest of the Cape Breton Highlands. Moose, a keystone herbivore in the Cape Breton Highlands use this forest for browsing, where they target woody broad-leaved shrubs and balsam fir. This VT also provides habitat for many boreal bird species such as boreal chickadee, Canada jay and spruce grouse. Stands of WB3 may be stunted, particularly where soils are especially wet, and/or where exposure is high.

## WB4 Tamarack / Labrador tea / Pitcher-plant

*Larix laricina* / *Rhododendron groenlandicum* / *Sarracenia purpurea*

**Concept:** These open canopy woodlands of stunted tamarack seldom exceed 5 m in height and occur on peatlands in the Cape Breton Highlands, with possible occurrences along the Atlantic Coast. The understory, dominated by woody shrubs and stunted black spruce, is generally less than 2 m in height, and occurs with extensive (> 80%) cover. Typical woody species include Labrador tea, leather-leaf, chokeberry and rhodora. The herb layer is not strongly developed (< 30%) but is comprised of a

variety of species including numerous sedges (*Carex spp.*), tawny cotton grass, pitcher-plant, three-leaved false Solomon's seal, bake apple, blue flag and sundews. The bryophyte layer is mostly peat mosses, with red fat-leaved sphagnum dominant.

This Vegetation Type (VT) is uncommon. Known occurrences are on organic soils in depressional settings. The assemblage of plants with this VT is distinct across the larger Highland landscape and further study is required to determine its ecological role.

McKenzie Road, Cape Breton Highlands,  
Victoria County



# Planted Forest Groups

# PF

## Planted Forest Group

### Concept

Planted Forest Vegetation Types (VT) occupy an important forest group in both Acadian and Maritime Boreal Macrogroups. Many of these stands have been altered by silvicultural activities. The extent of alteration can vary greatly depending on local features including the particular tree species present, levels of stocking, the ecosite, additional tending practices (silvicultural inputs), and the extent of naturally occurring vegetation forming part of the vegetative community. Planted forests are defined as forested areas established by planting or sowing with native or alien species.

Planted forest types may contain a variety of naturally occurring vegetation and structural features (coarse woody materials, snags, cavity or other legacy trees). Levels of forest naturalness reflect a number of factors including local harvesting intensity (of the original forest stand) and subsequent silvicultural inputs (e.g. site preparation and weeding). In Nova Scotia, many (if not most) areas with

planted trees still retain many native species of trees, shrubs, and herbaceous plants indicative of the ecosite and successional linkages.

Planted forest types are found over a wide range of ecosites across most ecoregions of Nova Scotia. Typically, planted forest types occur on well to imperfectly drained soils with medium to high fertility. However, edaphic ecosites with lower fertility can be planted with appropriate species to supplement natural regeneration, maintain species composition on the landscape, or to advance successional development.

Plantings of native species can be used for ecosystem restoration, enhancement of natural successional development (with or without further silvicultural inputs), and high production forests. However, additional silvicultural activities appropriate to the ecosite may augment a return to more natural vegetative conditions and promote or accelerate natural successional pathways.

photo: **Weavers Mountain,**  
**Pictou County**  
(Len Wagg/CNS)

## Planted Forest (PF) Key

1a. Trees are regenerated or planted for Christmas tree production ... 6	6a. Trees naturally regenerated for the commercial production of Christmas trees ... PF4
1b. Not as above ... 2	6b. Trees planted for the commercial production of Christmas trees ... 7
2a. Planting sites that have not, in recent history, been forested (i.e. old field, mine reclamation) ... PF6	7a. Native species ... PF4a
2b. Not as above ... 3	7b. Exotic species ... PF4b
3a. Planted trees are conifers ... 4	8a. Species found on ecosites where they would not naturally be expected to form a dominant stand component ... PF5
3b. > 30% of planted trees are deciduous... 8	8b. Not as above ... 9
4a. Trees are native to Nova Scotia ... 5	9a. Native species ... PF5a
4b. Trees are exotic to Nova Scotia ... PF3	9b. Exotic species ... PF5b
5a. Trees planted on ecosites where they would naturally be expected to form a dominant stand component ... PF1	
5b. Not as above ... PF2	

**COVER CLASSES:** Sparse < 10%   Scattered 10–25%   Abundant 26–50%   Dominant > 50%

# PF1

## In Situ Conifer Planted Forest

**Concept:** This even-aged, closed canopy forest is characterized by plantings of the following native Nova Scotia conifers: red spruce, white spruce, black spruce, white pine, red pine, jack pine, tamarack, balsam fir and hemlock.

Stands occur on ecosites and within ecodistricts where these tree species would naturally form a dominant stand component. Areas that contain less than 70% canopy cover of planted trees are classified as natural forests based on the most appropriate vegetation type. In addition, and regardless of density, planted trees that are suppressed in the understory are excluded when determining the vegetation type.

# PF2

## Ex Situ Conifer Planted Forest

**Concept:** This even-aged, closed canopy forest is characterized by plantings of the following native Nova Scotia conifers: red spruce, white spruce, black spruce, white pine, red pine, jack pine, tamarack, balsam fir and hemlock.

However, these planted trees do not occur on an ecosite or in an ecodistrict where they would naturally form a dominant stand component. Areas that contain less than 30% canopy cover of planted trees are classified as natural forest based on the most appropriate vegetation type. In addition, and regardless of density, planted trees that are suppressed in the understory are excluded when determining the vegetation type.

# PF3

## Exotic Conifer Planted Forest

**Concept:** This even-aged, closed canopy forest is characterized by planted tree species (conifer) that are not native to Nova Scotia (e.g. Norway spruce, Japanese larch, Scots pine, Douglas fir, Sitka spruce). Areas that contain less than 30% canopy cover of planted trees are classified as natural forest based on the most appropriate vegetation type. In addition, and regardless of density, planted trees that are suppressed in the understory are excluded when determining the vegetation type.

# PF4

## Christmas Tree Production Forest

**Concept:** This vegetation type is dominated by naturally regenerating native conifers, planted native conifers (PF4a), or exotic conifers (PF4b) and is actively managed for the commercial production of Christmas trees. Christmas tree production areas comprised of any combination of natural regeneration or planted species can be classified by the most dominant component.

## PF5 Deciduous Planted Forest

**Concept:** This even-aged, closed canopy forest is characterized by plantings of native Nova Scotia deciduous hardwood trees (typically including sugar maple, red maple, white birch, yellow birch, red oak, black ash, white ash, beech, elm, black cherry and/or aspen species). Planted trees occur on an ecosite or in an ecodistrict where they would naturally form a dominant stand component. Areas that contain less than 30% canopy cover of planted trees are classified as natural forest based on the most appropriate vegetation type. In addition, and regardless of density, planted trees that are suppressed in the understory are excluded when determining the vegetation type.

Plantations of native deciduous species occurring on inappropriate ecosites (PF5a) or plantations of exotic species (PF5b) are also classified as part of this vegetation type.

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Brora Lake, Pictou County



## PF6 Afforestation

**Concept:** Establishing forests on recently abandoned old fields and/or fields that have reverted to shrubs (e.g. alders, willows, grey birch), open-pit mining sites, and other industrial land use areas is often the first step in restoring the natural forest. Forest cover is required to start the process of developing a forest floor condition that will eventually provide microsites for the establishment of shrubs, herbs, mosses and lichens typical of a forest. Silviculture can be applied to provide biodiversity features such as downed coarse woody material, vertical structure, openings, etc. Over time microtopography and soil properties will develop that will reflect more natural ecosite conditions.





# Part II: Soil Types

## Introduction

This section lists all currently recognized FEC Soil Types (STs) in the province, and is designed to be used in conjunction with Vegetation Type and Ecosite sections to fully classify forest ecosystems across Nova Scotia.

More details on ST characteristics, assessment and related terminology can be found in the companion FEC Technical Guide. In addition,

management interpretations related to FEC units can be found through the Nova Scotia Department of Natural Resources and Renewables website.

Soil types are mainly differentiated by dominant texture, dominant moisture condition (drainage class), fertility (as inferred by A-horizon type) and depth. A total of 18 soil types and 5 soil type phases are currently recognized (Table S1).

TABLE S1.  
Soil types (STs) and phases within the provincial FEC system

Code	Soil Type Name *	Code	Soil Type Name *
ST1	Dry – CT	ST10	Rich Wet – MT
ST2	Fresh – MT	ST11	Rich Fresh – FT
ST3	Moist – MT	ST12	Rich Moist – FT
ST4	Wet – MT	ST13	Rich Wet – FT
ST5	Fresh – FT	ST14	Organic
ST6	Moist – FT	ST15	Dry Shallow – MT
ST7	Wet – FT	ST16	Moist Shallow – MT
ST8	Rich Fresh – MT	ST17	Rich Dry Shallow – MT
ST9	Rich Moist – MT	ST18	Rich Moist Shallow – MT

Soil Type Phases	Applicable Soil Types
B Boulder phase	ST1, ST2, ST3, ST4, ST8, ST9, ST14, ST15, ST16
C Coarse phase	ST2, ST3, ST5, ST6, ST8, ST9, ST15, ST16
L Loamy phase	ST2, ST3, ST15, ST16
S Stony phase	All STs
U Upland phase	ST14

\* CT = coarse textured, MT = medium textured, FT = fine textured

The majority of current ST units have been carried over from the original FEC guide (Neily et al. 2013), with a few notable changes:

- **ST19 (Talus)** has been dropped from the system since soils in treed talus sites can be captured using stony phase calls.
- **Granite (G)** phase has been replaced by **boulder (B)** phase which now includes greywacke surface boulders as well as granite family rocks.
- A **coarse (C)** phase option has been added to ST5 and ST6 to differentiate typical ST5 and ST6 soils from those with distinctly coarser surface layers.
- As a compliment to **loamy (L)** phase soils, a **coarse (C)** phase option has been added to ST2, ST3, ST15, and ST16 to differentiate typical soils from those that have distinctly coarser surface layers.
- The **definition of ST1** has been narrowed to mainly represent well to rapidly drained sand dominated soils.

## Soil Type Phases

Phases are used to identify features within a soil type that are important for ecological and/or management interpretations, but which do not warrant establishment of a separate unit. Phases and their applicable soil types are listed in Table S1.

### Loamy Phase (L)

Loamy (L) phase soils are associated with a subset of medium to coarse-textured STs (ST2, ST3, ST15, ST16). They are characterized by having less than 50% sand in most of the upper 20 cm of soil for ST2 and ST3, or the majority of soil for ST15 and ST16. L-phase soils were identified because of their potential positive impact on fertility and negative impact on soil damage hazard ratings.

### Coarse Phase (C)

Coarse (C) phase soils are characterized by having distinctly coarser surface layers compared to typical ST conditions. C-phase soils were identified because of their potential positive impact on trafficability and negative impact on fertility.

- For fine to medium-textured ST5 and ST6 soils, C-phase applies when the top 30 cm of soil has both sand content > 50% and clay content < 20%.
- For medium to coarse-textured ST2, ST3, ST8 and ST9 soils, C-phase applies when most of the top 30 cm of soil has sand content > 75%, or the top 30 cm of soil has > 50% gravel (gravel = rocks 0.2 cm to 7.5 cm in diameter).
- For shallow ST15 and ST16 soils, C-phase applies when most of the soil has sand content > 75%, or the soil has > 50% gravel (gravel = rocks 0.2 cm to 7.5 cm in diameter).

### Upland Phase (U)

The U-phase is only associated with organic ST14 soils. The vast majority of ST14 soils are derived from hydrophytic vegetation (i.e. wetland vegetation). However, some upland forest floors can also become thick on cool, moist sites (e.g. imperfectly drained coastal areas or north-facing slopes). U-phase applies when the surface 40 cm of any organic soil is derived from upland vegetation sources, regardless of whether wetland organics are also found below this depth.

### Stony Phase (S)

Many soils have a stony (S) phase which can further impact management interpretations, especially nutrient status, windthrow hazard, and trafficability.

S-phase is applied to any ST when the upper 30 cm of mineral soil contains a combination of cobbles, stones, and/or boulders such that tree rooting into the soil is being **severely restricted** (or potentially severely restricted) by the presence of these coarse fragments. Although it is the effect on potential rooting that dictates the S-phase call, associated coarse fragment volumes in S-phase soils would generally be in the 70% plus range.

Assessment of S-phase includes **all** rock types but **does not** include surface stones unless surface stones form a continuous cover or are contiguous with the sub-surface stone restriction. Stony phase can also apply to organic soils (ST14 and ST14-U) in which case the upper 30 cm of organic soil is assessed.

cont'd

**Note:** Stoniness often begins at the interface between forest floor and mineral soil which can sometimes make it look like there is little to no mineral soil present. If these coarse fragments are below the forest floor, they mark the beginning (zero point) of the mineral soil layer. Coarse fragment content will often decrease with depth in S-phase soils since concentration of rock near the surface can be the result of both deposition and post-deposition processes such as frost heaving and surface stone weathering. Many S-phase soils show little obvious signs of stoniness on the surface.

### Boulder Phase (B)

Many parts of Nova Scotia contain large surface boulders that, when numerous, affect site fertility and trafficability. Boulder (B) phase is mainly associated with coarse-textured soils and is applied when a site has granite or greywacke SURFACE boulders (rocks  $\geq 60$  cm in diameter) that are on average about 2 m apart or less. Distance can be increased up to about 4 m apart for larger boulders  $\geq 120$  cm in diameter.

These surface boulders can be exposed or covered by vegetation (usually mosses).

B-phase ONLY includes granite family rocks (granite and granodiorite) and greywacke family rocks (greywacke and meta-greywacke—sometimes also called quartzite). These are mainly found in the Western and Eastern ecoregions, and parts of Cape Breton.

**Note:** Although B-phase soils are pre-disposed to stoniness, users should NOT equate B-phase with S-phase conditions since many B-phase soils do not have severe rooting restrictions associated with sub-surface stoniness. However, where both conditions are found, soils should be labelled as such.

### Multiple Phases

In some cases, soils may need to be assigned more than one phase designation. This would only occur in conjunction with boulder (B) and/or stony (S) phase soils. Table S2 lists all possible multi-phase options with their expected frequency.

TABLE S2.

#### Possible multi-phase combinations for FEC soil types with their expected frequency of occurrence

Phase Code	Name	Occurrence
CB	Coarse – Boulder phase	Common *
CS	Coarse – Stony phase	Common *
CSB	Coarse – Stony – Boulder phase	Uncommon
LB	Loamy – Boulder phase	Uncommon
LS	Loamy – Stony phase	Uncommon
LSB	Loamy – Stony – Boulder phase	Rare
SB	Stony – Boulder phase	Common *
UB	Upland – Boulder phase	Rare
US	Upland – Stony phase	Rare
USB	Upland – Stony – Boulder phase	Rare

\* Common with non-rich soils only, very rare or not found with rich soils.

## Soil Type Key

The soil type key (Figure S1) on the following page is hierarchical, with the user working down through decision points until ST is determined. The key has been updated and made simpler compared to the original FEC guide (Neily et al. 2013).

Soil drainage class is no longer determined by soil features alone. Rather, users determine drainage class by weight of evidence from all site features (vegetation, soils, slope position, etc.) and apply this information within the key.

Use of the ST keys requires checking soils in an area representative of the forest stand being assessed. Attention must be paid to slope position, microtopography, and presence of possible flow channels. Users should avoid obvious mounds, pits, or other areas with signs of local disturbance as this could lead to errors in ST classification.

## Soil Type Relationships

As outlined above, soil types are mainly differentiated by dominant texture, dominant moisture condition, fertility and depth. Relationships between STs can be shown using a matrix table (Figure S2), which allows users to see how all soils are related to each other by these features.

Figure S2 is particularly useful in assessing the impact of changing moisture conditions on soil trafficability. Moisture condition associated with each soil type is the typical (or dominant) growing season condition, but every soil can be in a dry, fresh, moist, or wet condition on any given day (based on season and weather). This concept is important for correctly interpreting and assigning soil compaction and rutting hazards during, for example, harvesting operations.

**Note** – It is also critical that users:

- Ensure they check up to the full 50 cm depth for clay content thresholds when needed. Not assessing deep enough is a common cause of errors in ST classification.
- Ensure they note when borderline conditions are found for texture, drainage, depth, B-phase, and/or S-phase.
- Ensure Ah or Ap horizons are well developed and continuous before making a rich ST call. This is accomplished by assessing A-horizon type at several locations away from the main sample point.
- Ensure shallowness is continuous before making a shallow ST call. This is accomplished by assessing depth at several locations away from the main sample point.
- Ensure that S-phase is not assigned based only on a few refusals when attempting to auger or dig into the soil. For S-phase to be applied, tree rooting into surface mineral soil must be severely restricted (or potentially severely restricted) by the increased presence of near-surface stones.



Full profile image of an ST2 soil

## FIGURE S1.

### Key to forest soil types in Nova Scotia

<b>1a.</b> Surface organic thickness is $\geq 40$ cm <b>Go to ORGANIC SOIL key</b>	<b>6a.</b> Majority of soil has SAND content $< 50\%$ <b>ST16-L</b>
<b>1b.</b> Not as above <b>Go to 2</b>	<b>6b.</b> Not as above <b>ST16</b>
<b>2a.</b> Average mineral soil depth is $\leq 30$ cm over bedrock or a fully cemented soil horizon <b>Go to SHALLOW SOIL key</b>	<b>7a.</b> Soil Is well drained <b>ST17</b>
<b>2b.</b> Not as above <b>Go to 3</b>	<b>7b.</b> Soil Is imperfectly drained <b>ST18</b>
<b>3a.</b> Soil has a $\geq 10$ cm thick layer starting within the top 50 cm of mineral soil with CLAY content $\geq 20\%$ <b>Go to FINE SOIL key</b>	<b>7c.</b> Soil Is poorly drained <b>ST10</b>
<b>3b.</b> Not as above <b>Go to COARSE SOIL key</b>	
<b>ORGANIC SOIL key *</b>	
<b>1a.</b> Some or all of the surface organic material in the top 40 cm is derived from wetland vegetation (e.g. <i>Sphagnum spp.</i> , <i>Carex spp.</i> , etc.) <b>ST14</b>	
<b>1b.</b> Not as above <b>ST14-U</b>	
<b>SHALLOW SOIL key *</b>	
<b>1a.</b> Soil has an unbroken Ah or Ap horizon $\geq 3$ cm thick <b>Go to 7</b>	
<b>1b.</b> Not as above <b>Go to 2</b>	
<b>2a.</b> Soil is moderately well drained or better <b>Go to 3</b>	
<b>2b.</b> Soil is Imperfectly drained <b>Go to 5</b>	
<b>2c.</b> Soil Is poorly drained <b>ST4</b>	
<b>3a.</b> Majority of soil has SAND content $> 75\%$ or GRAVEL content in soil is $> 50\%$ <b>ST15-C</b>	
<b>3b.</b> Not as above <b>Go to 4</b>	
<b>4a.</b> Majority of soil has SAND content $< 50\%$ <b>ST15-L</b>	
<b>4b.</b> Not as above <b>ST15</b>	
<b>5a.</b> Majority of soil has SAND content $> 75\%$ or GRAVEL content in soil is $> 50\%$ <b>ST16-C</b>	
<b>5b.</b> Not as above <b>Go to 6</b>	
<b>FINE SOIL key *</b>	
<b>1a.</b> Soil has an unbroken Ah or Ap horizon $\geq 3$ cm thick <b>Go to 5</b>	
<b>1b.</b> Not as above <b>Go to 2</b>	
<b>2a.</b> Soil is moderately well drained or better <b>Go to 3</b>	
<b>2b.</b> Soil is Imperfectly drained <b>Go to 4</b>	
<b>2c.</b> Soil Is poorly drained <b>ST7</b>	
<b>3a.</b> ALL of the top 30 cm of soil has SAND content $> 50\%$ and CLAY content $< 20\%$ <b>ST5-C</b>	
<b>3b.</b> Not as above <b>ST5</b>	
<b>4a.</b> ALL of the top 30 cm of soil has SAND content $> 50\%$ and CLAY content $< 20\%$ <b>ST6-C</b>	
<b>4b.</b> Not as above <b>ST6</b>	
<b>5a.</b> Soil is moderately well drained or better <b>ST11</b>	
<b>5b.</b> Soil is imperfectly drained <b>ST12</b>	
<b>5c.</b> Soil is poorly drained <b>ST13</b>	
<b>COARSE SOIL key *</b>	
<b>1a.</b> Soil has an unbroken Ah or Ap horizon $\geq 3$ cm thick <b>Go to 8</b>	
<b>1b.</b> Not as above <b>Go to 2</b>	
<b>2a.</b> Soil is moderately well drained or better <b>Go to 3</b>	
<b>2b.</b> Soil is Imperfectly drained <b>Go to 6</b>	
<b>2c.</b> Soil Is poorly drained <b>ST4</b>	

- |  |  |
|--|--|
| <p><b>3a.</b> Majority of top 50 cm of soil has SAND content &gt; 75% <b>ST1</b></p> <p><b>3b.</b> Not as above <b>Go to 4</b></p>   | <p><b>7a.</b> Majority of top 20 cm of soil has SAND content &lt; 50% <b>ST3-L</b></p> <p><b>7b.</b> Not as above <b>ST3</b></p>   |
| <p><b>4a.</b> Majority of top 30 cm of soil has SAND content &gt; 75% <u>or</u> GRAVEL content within top 30 cm of soil is &gt; 50% <b>ST2-C</b></p> <p><b>4b.</b> Not as above <b>Go to 5</b></p> | <p><b>8a.</b> Soil is moderately well drained or better <b>Go to 9</b></p> <p><b>8b.</b> Soil is Imperfectly drained <b>Go to 10</b></p> <p><b>8c.</b> Soil is poorly drained <b>ST10</b></p>    |
| <p><b>5a.</b> Majority of top 20 cm of soil has SAND content &lt; 50% <b>ST2-L</b></p> <p><b>5b.</b> Not as above <b>ST2</b></p>   | <p><b>9a.</b> Majority of top 30 cm of soil has SAND content &gt; 75% <u>or</u> GRAVEL content within top 30 cm of soil is &gt; 50% <b>ST8-C</b></p> <p><b>9b.</b> Not as above <b>ST8</b></p>   |
| <p><b>6a.</b> Majority of top 30 cm of soil has SAND content &gt; 75% <u>or</u> GRAVEL content within top 30 cm of soil is &gt; 50% <b>ST3-C</b></p> <p><b>6b.</b> Not as above <b>Go to 7</b></p> | <p><b>10a.</b> Majority of top 30 cm of soil has SAND content &gt; 75% <u>or</u> GRAVEL content within top 30 cm of soil is &gt; 50% <b>ST9-C</b></p> <p><b>10b.</b> Not as above <b>ST9</b></p> |

\* If soil meets stony phase definition, add S-phase to soil type call.

If surface stoniness meets boulder phase definition, add B-phase to soil type call.

FIGURE S2.

**Matrix table showing general relationships (logic connections) between soil type units**  
(excluding S-phase and B-phase soils)

Drainage Class	Typical Moisture Condition	Medium to Coarse Texture				Fine to Medium Texture		Organic
		Typic (Ae or Ahe)	Rich (Ah or Ap)	Shallow Typic (Ae or Ahe)	Shallow Rich (Ah or Ap)	Typic (Ae or Ahe)	Rich (Ah or Ap)	
Rapid Well	Dry	ST1		(ST15-C) ST15				
Well Mod. Well	Fresh	(ST2-C) ST2 (ST2-L)	(ST8-C) ST8	(ST15-L) ST16-C	ST17	(ST5-C) ST5	ST11	
Imperfect	Moist	(ST3-C) ST3 (ST3-L)	(ST9-C) ST9	ST16 (ST16-L)	ST18	(ST6-C) ST6	ST12	ST14-U
Poor Very Poor	Wet	ST4	ST10	ST4	ST10	ST7	ST13	ST14



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# Part III: Ecosites

# Introduction

This section lists currently recognized FEC ecosites in the province, and is designed to be used in conjunction with Vegetation Type and Soil Type sections to fully classify forest ecosystems across Nova Scotia. More details on FEC ecosite characteristics and related terminology can be found in the companion FEC Technical Guide. In addition, management interpretations related to FEC units can be found through the Nova Scotia Department of Natural Resources and Renewables website.

## Provincial Forest Macrogroups

Ecosites represent general productivity units and provide an ecological setting through which vegetation type (VT) and soil type (ST) combinations can be grouped and compared. By itself, ecosite classification is useful for forest management planning purposes such as growth and yield analysis, tree species suitability assessment, successional pathway prediction, wildlife habitat analysis, and biodiversity considerations.

Ecosites, as an expression of relative moisture and nutrient regimes, are influenced by regional climate conditions. Nine climate-based ecoregions have been identified in Nova Scotia’s ecological land classification (ELC) system (Neily et al. 2017). Theoretically, each ecoregion could have its own set of ecosites to represent relative moisture and nutrient regimes. However, it has been determined through analysis of tree species distribution and growth data that Nova Scotia can be effectively represented by two forest macrogroups: Acadian and Maritime Boreal (Table E1 and Fig. E1).

**TABLE E1.**  
FEC Macrogroups and associated ecoregion and ecodistrict units

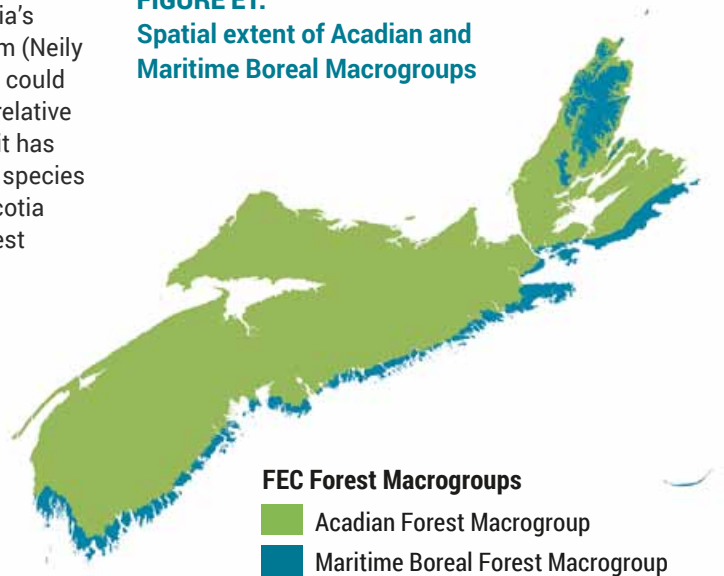
### Acadian Forest Macrogroup

Cape Breton Highlands ecoregion	(200)
220–Victoria Lowlands ecodistrict only	
Nova Scotia Uplands ecoregion	(300)
Eastern ecoregion	(400)
Northumberland / Bras d’Or ecoregion	(500)
Valley and Central Lowlands ecoregion	(600)
Western ecoregion	(700)
Fundy Shore ecoregion	(900)

### Maritime Boreal Forest Macrogroup

Cape Breton Taiga ecoregion	(100)
Cape Breton Highlands ecoregion	(200)
210–Cape Breton Highlands ecodistrict only	
Atlantic Coastal ecoregion	(800)

**FIGURE E1.**  
Spatial extent of Acadian and Maritime Boreal Macrogroups



Seventeen (17) Acadian and ten (10) Maritime Boreal ecosites have been identified (Tables E2 and E3). Each ecosite name describes the general moisture/nutrient condition and typical climax forest community associated with the ecosite.

**TABLE E2.**  
**Acadian Ecosites**

<b>Ecosite</b>	<b>Ecosite Name</b>
AC1	Dry-Very Poor / Jack pine-Black spruce
AC2	Fresh-Very Poor / Black spruce-Pine
AC3	Moist-Very Poor / Black spruce-Pine
AC4	Wet-Very Poor / Black spruce-Tamarack
AC5	Dry-Poor / White pine-Oak
AC6	Fresh-Poor / Black spruce-White pine
AC7	Moist-Poor / Black spruce-White pine
AC8	Wet-Poor / Spruce-Fir-Red maple
AC9	Dry-Medium / Red maple-Beech
AC10	Fresh-Medium / Red spruce-Hemlock
AC11	Moist-Medium / Red spruce-Yellow birch
AC12	Wet-Medium / Red maple-White ash-Fir
AC13	Fresh-Rich / Sugar maple-Beech
AC14	Moist-Rich / Sugar maple-Yellow birch
AC15	Wet-Rich / White ash-Red maple
AC16	Fresh-Very Rich / Sugar maple-White ash
AC17	Moist-Very Rich / Sugar maple-White ash

**TABLE E3.**  
**Maritime Boreal Ecosites**

<b>Ecosite</b>	<b>Ecosite Name</b>
MB1	Dry-Poor / Black spruce-Jack pine
MB2	Fresh-Poor / Black spruce
MB3	Moist-Poor / Black spruce
MB4	Wet-Poor / Black spruce
MB5	Fresh-Medium / Fir-Spruce
MB6	Moist-Medium / Fir-Spruce
MB7	Wet-Medium / Fir-Spruce
MB8	Fresh-Rich / Birch-Fir
MB9	Moist-Rich / Birch-Fir
MB10	Wet-Rich / White spruce

## Acadian Macrogroup

The Acadian (AC) Forest Macrogroup includes 17 ecosites representing a full range of forest site conditions (Figure E2).

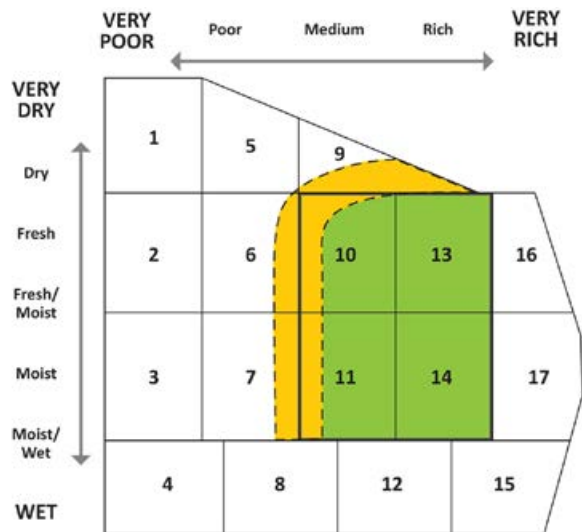
Zonal AC ecosites are associated with climatic climax forests containing mainly shade-tolerant and shade-intermediate species such as red spruce, hemlock, white pine, sugar maple, red maple, yellow birch, beech, white ash and white spruce. These are the ecosites associated with what is generally called “Acadian” forest. In contrast, vegetation on azonal (edaphic) ecosites are dictated by site factors such as low fertility, insufficient or excessive moisture, or richer floodplain conditions. Climax forests on azonal sites are dominated by species such as black spruce, white pine, red pine, jack pine, balsam fir, tamarack, red oak, red maple and white ash.

Several early- to mid-successional VTs are also associated with AC ecosites, with species such as trembling aspen, large-tooth aspen, red oak, white birch, grey birch, red maple, black cherry, balsam fir and white spruce.

The depiction of AC ecosite units (Figure E2) has been updated from the original FEC guide (Neily et al. 2013) to more clearly show the relative placement of upland zonal and azonal ecosites and the transition between these units. The transition zone between AC6/7 and AC10/11 is where black spruce presence or dominance transitions to red spruce presence or dominance. It is also where hybrid red and black spruce is most commonly found. The transition zone between AC9 and AC10/13 is where vegetation types found on richer, shallow soils transition from non-edaphic conditions.

**FIGURE E2.**  
Edatopic grid showing relative moisture and nutrient regimes for the Acadian Forest Macrogroup

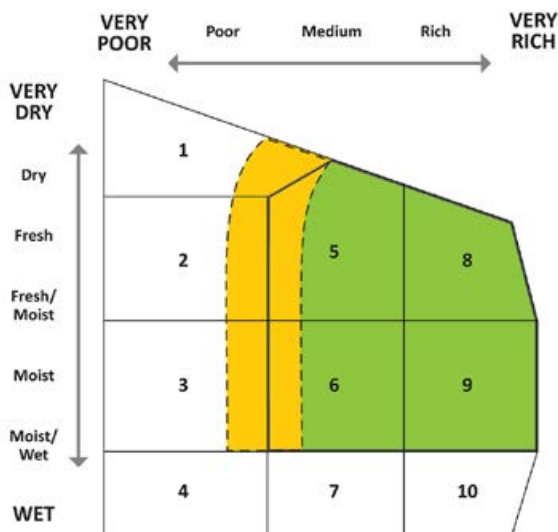
**GREEN** = zonal ecosites    **White** = azonal (edaphic) ecosites    **ORANGE** = area between upland azonal and zonal ecosites that support transitional vegetation types



1. Dry-Very Poor / Jack pine-Black spruce
2. Fresh-Very Poor / Black spruce-Pine
3. Moist-Very Poor / Black spruce-Pine
4. Wet-Very Poor / Black spruce-Tamarack
5. Dry-Poor / White pine-Oak
6. Fresh-Poor / Black spruce-White pine
7. Moist-Poor / Black spruce-White pine
8. Wet-Poor / Spruce-Fir-Red maple
9. Dry-Medium / Red maple-Beech
10. Fresh-Medium / Red spruce-Hemlock
11. Moist-Medium / Red spruce-Yellow birch
12. Wet-Medium / Red maple-White ash-Fir
13. Fresh-Rich / Sugar maple-Beech
14. Moist-Rich / Sugar maple-Yellow birch
15. Wet-Rich / White ash-Red maple
16. Fresh-Very Rich / Sugar maple-White ash
17. Moist-Very Rich / Sugar maple-White ash

**FIGURE E3.**  
**Edatopic grid showing relative moisture and nutrient regimes for the Maritime Boreal Forest Macrogroup**

**GREEN** = zonal ecosites **White** = azonal (edaphic) ecosites **ORANGE** = area between upland azonal and zonal ecosites that support transitional vegetation types



1. Dry-Poor / Black spruce-Jack pine
2. Fresh-Poor / Black spruce
3. Moist-Poor / Black spruce
4. Wet-Poor / Black spruce
5. Fresh-Medium / Fir-Spruce
6. Moist-Medium / Fir-Spruce
7. Wet-Medium / Fir-Spruce
8. Fresh-Rich / Birch-Fir
9. Moist-Rich / Birch-Fir
10. Wet-Rich / White spruce

## Maritime Boreal Macrogroup

The Maritime Boreal (MB) Forest Macrogroup includes 10 ecosites representing a range of forest site conditions, but with less precision than the Acadian Macrogroup (Figure E3). This is due, in part, to lower sampling intensity which currently does not allow for finer divisions within this group.

Climate and exposure differentiate the Maritime Boreal Forest Macrogroup from the Acadian Forest Macrogroup, with concomitant changes in climax forest conditions. Zonal MB climax forests mainly contain balsam fir, white spruce, black spruce and white birch. Yellow birch may also be found in some Boreal (Highland) ecosites where they transition to Acadian ecosites. Azonal (edaphic) ecosites contain mainly black spruce, white spruce and/or balsam fir. In both cases, tree species associated with early- to mid-successional communities are like those found in climax forests.

The depiction of MB ecosite units (Figure E3) has been updated from the original FEC guide (Neily et al. 2013) to more clearly show the relative placement of upland zonal and azonal ecosites and the transition between these units. The transition zone between MB1/2/3 and MB5/6 is where black spruce presence or dominance transitions to white spruce presence or dominance. In addition, ecosite MB11 from the original guide has been dropped and integrated into ecosite MB8.

## Determining Ecosites

In the field, ecosite is determined by first classifying stand-level VT and ST using the information found in **Part I: Vegetation Types** and **Part II: Soil Types**. Once VT and ST are known, users can quickly assign Acadian (AC) or Maritime Boreal (MB) ecosite using appropriate look-up tables (Ecosite Matrix Tables, pages 303–313).

**NOTE:** It's important to understand that vegetation does not dictate ecosite. Rather, it is the nutrient and moisture regimes associated with a particular ecosite that determine what VTs can naturally grow within the bounds of that unit. In this guide, relationships between VT, ST and ecosite have been established through detailed site assessments and analysis of tree growth from more than 2100 FEC plots. This allows ecosite to be assigned based on knowledge of VT and ST units alone without the need for additional site assessment.

**NOTE:** It is possible for zonal VTs normally associated with Acadian ecosites to be found in geographic areas mapped as Maritime Boreal and vice versa (Figure E1). This could occur, for example, in sheltered locations along the Atlantic coast or in transition areas between climate zones. Where there is potential for both AC and MB vegetation types to be found, vegetation and site indicators should be used to determine the best choice for classification.

However, six azonal VTs (OW1, OW2, WC3, WC6, WC7, WC11) and three zonal VTs (OF1, OF2, OF4) are recognized as occurring within both macrogroups. Additional field sampling and analysis is required to better define the response of these VTs to the different climatic conditions. This research will help clarify their inclusion within the macrogroups. See page 242 for edatopic grids of Acadian VTs found in the Maritime Boreal.

## Ecosite Tables

The following look-up tables allow classification of ecosite based on VT and ST data.

To use these ecosite tables:

- Determine whether you are in the Acadian (AC) or Maritime Boreal (MB) Macrogroup.
- Go to the appropriate Forest Group table within the AC or MB macrogroup.
- Look up the cell associated with the VT/ST combination found during field assessment (note that possible B-phase and S-phase soil units are not listed separately in the tables).
- The number in the cell is the ecosite for that combination.
- If the number has a (+) or (–) sign, it indicates the VT/ST combination is thought to be more often centered to the right (+) or left (–) side of the ecosite unit reflecting differences in nutrient regime. Note also that when a soil has a B-phase or S-phase designation, ecosite is generally on the poorer (left) side of unit.
- If two numbers are listed separated by (/), it indicates the VT/ST combination is thought to be more often centered in the moisture regime transition zone between ecosite units.

Blue shaded numbers indicate VT/ST combinations found during field sampling. Non-shaded numbers indicate VT/ST combinations not found during field sampling, but which are considered probable. Cells with no numbers are VT/ST combinations not thought to be possible or likely and therefore not associated with any ecosite. Users who find VT/ST combinations associated with blank cells should reassess VT and/or ST to verify these calls. If VT and ST are still considered correct, users are encouraged to contact Forestry Division (Truro), Nova Scotia Department of Natural Resources and Renewables, for further guidance.

		CA	
VT	ST *	CA1	CA2
	1		5
	2	10	6
	2 C	10	6
	2 L	10+	6+
	3	11	7
	3 C	11	7
	3 L	11+	7+
	4		
	5	10+	6+
	5 C	10	6+
	6	11+	7+
	6 C	11	7+
	7		
	8	13-	
	8 C	10+	
	9	14-	
	9 C	11+	
	10		
	11	13-	
	12	14-	
	13		
	14		
	14 U	11	
	15	9	
	15 C	9	
	15 L	9/10	
	16	10	
	16 C	10	
	16 L	10/11	
	17	9/10	
	18	10/11	

FP							VT
FP1	FP2	FP3	FP4	FP5	FP6	FP7	ST *
							1
							2
							2 C
							2 L
							3
							3 C
							3 L
							4
							5
							5 C
							6
							6 C
							7
16	16	16	16	16	16	16	8
16-	16-	16-	16-	16-	16-	16-	8 C
17	17	17	17	17	17	17	9
17-	17-	17-	17-	17-	17-	17-	9 C
							10
16	16	16	16	16	16	16	11
17	17	17	17	17	17	17	12
							13
							14
							14 U
							15
							15 C
							15 L
							16
							16 C
							16 L
							17
							18

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.
 
 known to occur
 

 presumed to occur
 

 soil type/vegetation type combination not expected to occur



		IH								
VT ST *	IH1	IH2	IH3	IH4	IH5	IH6	IH7	IH8	IH9	
1	5	5		9		9-	9	5-		
2	6	6	10+	10	10+	10	10	6-	10	
2 C	6	6		10-		10-	10-	6-		
2 L	6+	6+	13	10+	13	10+	13		10	
3	7	7	11+	11	11+	11	11+	7-	11	
3 C	7	7		11-		11-	11-	7-		
3 L	7+	7+	14	11+	14	11+	14		11	
4										
5	6+	6+	13	10+	13	10+	13	6-	10	
5 C	6	6	13	10+	13	10+	13	6-	10	
6	7+	7+	14	11+	14	11+	14	6-	11	
6 C	7	7	14	11+	14	11+	14	7-	11	
7										
8			13	13-	13	13-	13		13	
8 C				10+		10+	10+			
9			14	14-	14	14-	14		14	
9 C				11+		11+	11+			
10										
11			13	13-	13	13-	13		13	
12			14	14-	14	14-	14		14	
13										
14										
14 U							11-	7-		
15	5-	5-					9-	2+		
15 C	5-	5-						1+		
15 L	5	5					9/10-	5-		
16	6-	6-					10-	3+		
16 C	6-	6-						3+		
16 L	6	6					10/11-	6-		
17										
18										

				VT ST *
KA1	KA2	KA3	KA4	
				1
10+	10+	10+	10+	2
				2 C
13	13	13	13	2 L
11+	11+	11+	11+	3
				3 C
14	14	14	14	3 L
				4
13	13	13	13	5
13	13	13	13	5 C
14	14	14	14	6
14	14	14	14	6 C
				7
13	13	13	13	8
13-	13-	13-	13-	8 C
14	14	14	14	9
14-	14-	14-	14-	9 C
				10
13	13	13	13	11
14	14	14	14	12
				13
				14
				14 U
9+	9+	9+	9+	15
				15 C
9+	9+	9+	9+	15 L
10+	10+	10+	10+	16
				16 C
10+	10+	10+	10+	16 L
9/10+	9/10+	9/10+	9/10+	17
10/11+	10/11+	10/11+	10/11+	18

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.

MW														
VT ST *	MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10	MW11	MW12	MW13	VT ST *
1									5/6	5/6	5/6	5/6		1
2	10+	10+	10+	10+	10+	10+	10	10	6	6	6	6		2
2 C	10	10	10	10	10	10	10	10	6	6	6	6		2 C
2 L	13-	13-	13-	13-	13-	13-	10+	10+	6	6	6	6		2 L
3	11+	11+	11+	11+	11+	11+	11	11	7	7	7	7		3
3 C	11	11	11	11	11	11	11	11	7	7	7	7		3 C
3 L	14-	14-	14-	14-	14-	14-	11+	11+	7	7	7	7	14-	3 L
4														4
5	13-	13-	13-	13-	13-	13-	10+	10+	6	6	6	6		5
5 C	10+	10+	10+	10+	10+	10+	10	10	6	6	6	6		5 C
6	14-	14-	14-	14-	14-	14-	11+	11+	7	7	7	7	14-	6
6 C	11+	11+	11+	11+	11+	11+	11	11	7	7	7	7		6 C
7														7
8	13-	13-	13-	13-	13-	13-	10+	10+						8
8 C	10+	10+	10+	10+	10+	10+	10	10						8 C
9	14-	14-	14-	14-	14-	14-	11+	11+					14-	9
9 C	11+	11+	11+	11+	11+	11+	11	11						9 C
10														10
11	13	13	13	13	13	13	13	13						11
12	14	14	14	14	14	14	14	14					14	12
13														13
14														14
14 U									7-	7-	7-	7-		14 U
15	9	9	9	9	9	9	9	9	5	5	5	5		15
15 C									5	5	5	5		15 C
15 L	9/10	9/10	9/10	9/10	9/10	9/10	9/10	9/10	5/6	5/6	5/6	5/6		15 L
16	10	10	10	10	10	10	10	10	6	6	6	6		16
16 C									6	6	6	6		16 C
16 L	10/11	10/11	10/11	10/11	10/11	10/11	10/11	10/11	6/7	6/7	6/7	6/7		16 L
17	9/10	9/10	9/10	9/10	9/10	9/10	9/10	9/10						17
18	10/11	10/11	10/11	10/11	10/11	10/11	10/11	10/11						18

x known to occur     
 x presumed to occur     
   soil type/vegetation type combination not expected to occur

		OF					
VT		OF1	OF2	OF3	OF4	OF5	OF6
ST *							
1							
2	10+		10+	10+	10+		
2 C							
2 L	13		13	13	13	13+	
3	11+	11+	11+	11+	11+	13-	
3 C							
3 L	14	14	14	14	14	14+	
4							
5	13		13	13	13	13+	
5 C	13-		13-	13-	13-	13	
6	14	14	14	14	14	14+	
6 C	14-	14-	14-	14-	14-	14	
7		14/12			14/12	14/15	
8	13		13	13	13	13+	
8 C	13-		13-	13-	13-	13	
9	14	14	14	14	14	14+	
9 C	14-	14-	14-	14-	14-	14	
10							
11	13		13	13	13	13+	
12	14	14	14	14	14	14+	
13		14/12			14/12	14/15	
14							
14 U							
15							
15 C							
15L							
16							
16 C							
16 L							
17							
18							

					OW	
OW1	OW2	OW3	OW4	OW5	VT	ST *
1	1	1				1
2	2	2	10-			2
2-	2-	2-				2 C
2	2	2	10			2 L
3	3	3	11-			3
3-	3-	3-				3 C
3	3	3	11			3 L
						4
2	2					5
2	2					5 C
3	3					6
3	3					6 C
						7
				13		8
				13		8 C
				14		9
				14		9 C
						10
						11
						12
						13
						14
						14 U
1	1	1				15
1	1	1				15 C
1	1	1				15L
2	2	2				16
2-	2-	2-				16 C
2	2	2				16 L
				9/13		17
				13/14		18

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.

SH									
VT ST *	SH1	SH2	SH3	SH4	SH5	SH6	SH7	SH8	VT ST *
1	9/10	9/10	9/10	9-	9/10	9/10	9/10	9/10	1
2	10	10	10	10-	10	10	10	10	2
2 C	10		10	10-	10	10	10	10	2 C
2 L	10+	10+	10+	10	10+	10+	10+	10+	2 L
3	11	11	11	11-	11	11	11	11	3
3 C	11	11	11	11-	11	11	11	11	3 C
3 L	11+	11+	11+	11	11+	11+	11+	11+	3 L
4									4
5	10+	10+	10+	10	10+	10+	10+	10+	5
5 C	10	10	10	10	10	10	10	10	5 C
6	11+	11+	11+	11	11+	11+	11+	11+	6
6 C	11	11	11	11	11	11	11	11	6 C
7									7
8	13-	13-	13-		13-	13-	13-	13-	8
8 C	10+	10+	10+		10+	10+	10+	10+	8 C
9	14-	14-	14-		14-	14-	14-	14-	9
9 C	11+	11+	11+		11+	11+	11+	11+	9 C
10									10
11	13-	13-	13-		13-	13-	13-	13-	11
12	14-	14-	14-		14-	14-	14-	14-	12
13									13
14									14
14 U	11		11		11			11	14 U
15	9	9	9	9-	9	9	9	9	15
15 C				9-	9	9			15 C
15 L	9/10	9/10	9/10	9	9/10	9/10	9/10	9/10	15 L
16	10	10	10	10-	10	10	10	10	16
16 C				10-	10	10			16 C
16 L	10/11	10/11	10/11	10	10/11	10/11	10/11	10/11	16 L
17					9/10	9/10	9/10	9/10	17
18					10/11	10/11	10/11	10/11	18

x known to occur     
 x presumed to occur     
   soil type/vegetation type combination not expected to occur

SP											
VT ST *	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	VT ST *
1	5-	5-	5	5	5	5+	5	5+		5+	1
2	6-	6-	6	6	6	6+	6	6+	6	6+	2
2 C	6-	6-	6-	6-	6	6	6	6	6	6	2 C
2 L	6	6	6	6	6	6+	6	6+	6	6+	2 L
3	7-	7-	7	7	7	7+	7	7+	7	7+	3
3 C	7-	7-	7-	7-	7	7	7	7	7	7	3 C
3 L	7	7	7	7	7	7+	7	7+	7	7+	3 L
4											4
5	6	6	6	6	6	6+	6	6+	6	6+	5
5 C	6	6	6	6	6	6+	6	6+	6	6+	5 C
6	7	7	7	7	7	7+	7	7+	7	7+	6
6 C	7	7	7	7	7	7+	7	7+	7	7+	6 C
7											7
8											8
8 C											8 C
9											9
9 C											9 C
10											10
11											11
12											12
13											13
14											14
14 U					7-	7	7-				14 U
15	5-	5-	5	5	5	5	5	5		5	15
15 C	5-	5-	5-	5-	5	5	5				15 C
15 L	5	5	5/6	5/6	5/6	5/6	5/6	5/6		5/6	15 L
16	6-	6-	6	6	6	6	6	6	6	6	16
16 C	6-	6-	6-	6-	6	6	6		6		16 C
16 L	6	6	6/7	6/7	6/7	6/7	6/7	6/7	6/7	6/7	16 L
17											17
18											18

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.

		TH										
VT ST *	TH1	TH2	TH3	TH4	TH5	TH6	TH7	TH8	TH9	VT ST *		
1	9				9	9	9	9	9	1		
2	13-	13-	13		13-	13-	13-	13-	13-	2		
2 C	10	10			10	10	10	10	10	2 C		
2 L	13	13	13+	13+	13	13	13	13	13	2 L		
3	14-	14-	14			14-	14-	14-	14-	3		
3 C	11	11				11	11	11	11	3 C		
3 L	14	14	14+	14+		14	14	14	14	3 L		
4										4		
5	13	13	13+	13+	13	13	13	13	13	5		
5 C	13	13	13	13	13	13	13	13	13	5 C		
6	14	14	14+	14+		14	14	14	14	6		
6 C	14	14	14	14		14	14	14	14	6 C		
7				14/15						7		
8	13	13	13+	13+	13	13	13	13	13	8		
8 C	13-	13-	13	13	13-	13-	13-	13-	13-	8 C		
9	14	14	14	14+		14	14	14	14	9		
9 C	14-	14-	14	14		14-	14-	14-	14-	9 C		
10				14/15						10		
11	13	13	13+	16-	13	13	13	13	13	11		
12	14	14	14+	17-		14	14	14	14	12		
13				17/15						13		
14										14		
14 U										14 U		
15	9	9	9		9	9	9	9	9	15		
15 C										15 C		
15 L	9/10	9/10	9/10		9/10	9/10	9/10	9/10	9/10	15 L		
16	10	10	10			10	10	10	10	16		
16 C										16 C		
16 L	10/11	10/11	10/11			10/11	10/11	10/11	10/11	16 L		
17	9/10	9/10	9/10		9/10	9/10	9/10	9/10	9/10	17		
18	10/11	10/11	10/11			10/11	10/11	10/11	10/11	18		

x known to occur     
 x presumed to occur     
  soil type/vegetation type combination not expected to occur

Ecosite Matrix Tables – Acadian Ecosites

WC												
VT ST *	WC1	WC2	WC3	WC4	WC5	WC6	WC7	WC8	WC9	WC10	WC11	VT ST *
1												1
2												2
2 C												2 C
2 L												2 L
3												3
3 C												3 C
3 L												3 L
4	4+	4	4	4	8+	8	8	8+	8+	12	4	4
5												5
5 C												5 C
6												6
6 C												6 C
7	4+	4	4	4	12-	8	8	12-	12-	12	4	7
8												8
8 C												8 C
9												9
9 C												9 C
10					12	8+	8+	12	12	12		10
11												11
12												12
13					12	8+	8+	12	12	12		13
14	4+	4	4	4	8+	8	8	8+	8+	12	4	14
14 U												14 U
15												15
15 C												15 C
15 L												15 L
16												16
16 C												16 C
16 L												16 L
17												17
18												18

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.

		WD				
VT ST *	WD1	WD2	WD3	WD4	WD5	
	1					
2						
2 C						
2 L						
3						
3 C						
3 L						
4		8-	12	12	12+	
5						
5 C						
6						
6 C						
7	15	8-	12	12	12+	
8						
8 C						
9						
9 C						
10	15	8	12+	12+	15-	
11						
12						
13	15	8	12+	12+	15-	
14	15	8-	12	12		
14 U						
15						
15 C						
15 L						
16						
16 C						
16 L						
17						
18						

					WM	
WM1	WM2	WM3	WM4	WM5	VT ST *	
					1	
					2	
					2 C	
					2 L	
					3	
					3 C	
					3 L	
8+	12-	8-	12		4	
					5	
					5 C	
					6	
					6 C	
8+	12-	8-	12	15	7	
					8	
					8 C	
					9	
					9 C	
12-	12	8	12+	15+	10	
					11	
					12	
12-	12	8	12+	15+	13	
8+	12-	8-	12	15-	14	
					14 U	
					15	
					15 C	
					15 L	
					16	
					16 C	
					16 L	
					17	
					18	

x known to occur     
 x presumed to occur     
  soil type/vegetation type combination not expected to occur



		CB						HL							WB			
VT ST *	CB1	CB2	CB3	CB4	CB5	CB6	HL1	HL2	HL3	HL4	HL5	HL6	HL7	WB1	WB2	WB3	VT ST *	
	1	1/2	5-	5-		1/2	1/2	5-	5-			5-	1/2					
2	2	5	5	8-			5	5	8	8	5	2	2				2	
2 C	2-	5-	5-			2	5-	5-			5-	2	2				2 C	
2 L	2+	5+	5+	8			5+	5+	8	8	5+	2+	2+				2 L	
3	3	6	6	9-			6	6	9	9	6	3	3				3	
3 C	3-	6-	6-		3	3	6-	6-			6-	3	3				3 C	
3 L	3+	6+	6+	9			6+	6+	9	9	6+	3+	3+				3 L	
4														4+	7	4+	4	
5	2+	5+	5+	8			5+	5+	8	8	5+	2+	2+				5	
5 C	2	5	5	8			5	5	8	8	5	2	2				5 C	
6	3+	6+	6+	9			6+	6+	9	9	6+	3+	3+				6	
6 C	3	6	6	9			6	6	9	9	6	3	3				6 C	
7														4+	7	4+	7	
8		5+	5+	8				8-	8	8	8-						8	
8 C		5	5	8-				5+	8-	8-	5+						8 C	
9		6+	6+	9				9-	9	9	9-						9	
9 C		6	6	9-				6+	9-	9-	6+						9 C	
10															10-		10	
11																	11	
12																	12	
13															10-		13	
14														4+	7	4+	14	
14 U	3-	6-	6-	6+			6	6	9-	9-	6	3	3				14 U	
15	2	5-	5-	5+			5-	5-	8-	8-	5-	2	2				15	
15 C	1/2	5-	5-				5-	5-			5-	1/2	1/2				15 C	
15 L	2	5	5	5+			5	5	8-	8-	5	2	2				15 L	
16	3	6-	6-	6+			6-	6-	8-	8-	6-	3	3				16	
16 C	2/3	6-	6-				6-	6-			6-	2/3	2/3				16 C	
16 L	3	6	6	6+			6	6	9-	9-	6	3	3				16 L	
17		5	5	8-													17	
18		6	6	9-													18	

\* When soil has B-phase or S-phase, ecosite is on poorer side of unit.



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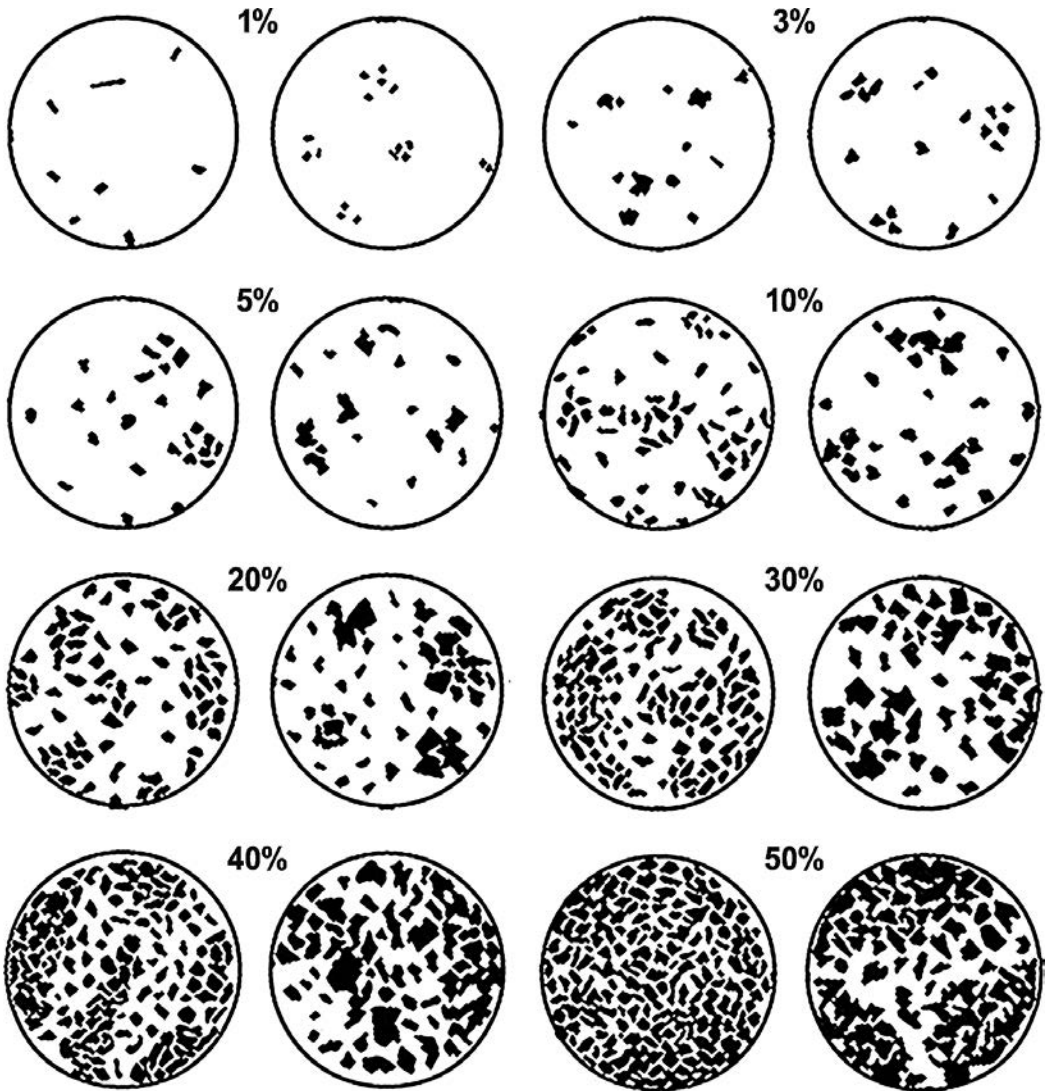
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# Appendices

- A Percent area / volume chart
- B Species List: Common and Scientific Names
- C Glossary
- D Literature Cited
- E Map of Ecoregions and Ecodistricts of Nova Scotia



## Plants

## Vascular Plants

		Common Name	Scientific name
Adder's-tongue	<i>Ophioglossum pusillum</i>	Brome grass	<i>Bromus spp.</i>
Agrimony	<i>Agrimonia spp.</i>	Brome-like sedge	<i>Carex bromoides</i>
Alder-leaved buckthorn	<i>Endotropis alnifolia</i>	Broom crowberry	<i>Carema conradii</i>
Alpine whortleberry	<i>Vaccinium uliginosum</i>	Brownish sedge	<i>Carex brunnescens</i>
Alternate-leaved dogwood	<i>Cornus alternifolia</i>	Bugleweed	<i>Lycopus uniflorus</i>
Anise-root	<i>Osmorhiza longistylis</i>	Bulblet bladder fern	<i>Cystopteris bulbifera</i>
Arrowleaved violet	<i>Viola sagittata</i>	Bunchberry	<i>Cornus canadensis</i>
Atlantic manna grass	<i>Glyceria obtusa</i>	Bush-honeysuckle	<i>Diervilla lonicera</i>
Autumn bentgrass	<i>Agrostis perennans</i>	Buttercup	<i>Ranunculus spp.</i>
Bakeapple (Cloudberry)	<i>Rubus chamaemorus</i>	Button sedge	<i>Carex bullata</i>
Balsam fir	<i>Abies balsamea</i>	Buttonbush	<i>Cephalanthus occidentalis</i>
Balsam groundsel	<i>Packera paupercula</i>	Calico aster	<i>Symphotrichum lateriflorum</i>
Balsam poplar	<i>Populus balsamifera</i>	Canada bluegrass	<i>Poa compressa</i>
Baltic rush	<i>Juncus balticus</i>	Canada goldenrod	<i>Solidago canadensis</i>
Bayberry	<i>Morella pensylvanica</i>	Canada lily	<i>Lilium canadense</i>
Beach grass	<i>Ammophila breviligulata</i>	Canada mountain-ricegrass	<i>Piptatheropsis canadensis</i>
Beach pea	<i>Lathyrus japonicus</i>	Canada rush	<i>Juncus canadensis</i>
Beaked hazelnut	<i>Corylus cornuta</i>	Canada wood-nettle	<i>Laportea canadensis</i>
Bearberry	<i>Arctostaphylos uva-ursi</i>	Cancer root	<i>Conopholis americana</i>
Bedstraw	<i>Galium spp.</i>	Case's ladies'-tresses	<i>Spiranthes casei</i>
Beech	<i>Fagus grandifolia</i>	Catbrier	<i>Smilax rotundifolia</i>
Beech-drops	<i>Epifagus virginiana</i>	Checkered rattlesnake plantain	<i>Goodyera tessellata</i>
Bellwort	<i>Uvularia sessilifolia</i>	Choke cherry	<i>Prunus virginiana</i>
Bent-grass	<i>Agrostis spp.</i>	Chokeberries	<i>Aronia spp.</i>
Black ash	<i>Fraxinus nigra</i>	Christmas fern	<i>Polystichum acrostichoides</i>
Black cherry	<i>Prunus serotina</i>	Cinnamon fern	<i>Osmundastrum cinnamomeum</i>
Black chokeberry	<i>Aronia melanocarpa</i>	Cinquefoil	<i>Potentilla simplex</i>
Black crowberry	<i>Empetrum nigrum</i>	Climbing nightshade	<i>Solanum dulcamara</i>
Black locust	<i>Robinia pseudoacacia</i>	Colonial bentgrass	<i>Agrostis capillaris</i>
Black snakeroot	<i>Sanicula marilandica</i>	Coltsfoot	<i>Tussilago farfara</i>
Black spruce	<i>Picea mariana</i>	Common blackberry	<i>Rubus allegheniensis</i>
Bladder sedge	<i>Carex intumescens</i>	Common hair grass	<i>Avenella flexuosa</i>
Bloodroot	<i>Sanguinaria canadensis</i>	Common speedwell	<i>Veronica officinalis</i>
Blue cohosh	<i>Caulophyllum thalictroides</i>	Common woodrush	<i>Luzula multiflora</i>
Blue flag	<i>Iris versicolor</i>	Cow parsnip	<i>Heracleum maximum</i>
Blue joint	<i>Calamagrostis canadensis</i>	Cow wheat	<i>Melampyrum lineare</i>
Bluebead lily	<i>Clintonia borealis</i>	Creeping bent-grass	<i>Agrostis stolonifera</i>
Blunt-leaved bedstraw	<i>Galium obtusum</i>	Creeping buttercup	<i>Ranunculus repens</i>
Blunt-leaved sandwort	<i>Moehringia lateriflora</i>	Creeping juniper	<i>Ranunculus horizontalis</i>
Bog-goldenrod	<i>Solidago uliginosa</i>	Creeping rattlesnake plantain	<i>Goodyera repens</i>
Bracken	<i>Pteridium aquilinum</i>	Creeping snowberry	<i>Gaultheria hispidula</i>
Braun's holly fern	<i>Polystichum braunii</i>	Crested wood fern	<i>Dryopteris cristata</i>
Bristle-leaved sedge	<i>Carex eburnea</i>	Cucumber root	<i>Medeola virginiana</i>
Bristly black currant	<i>Ribes lacustre</i>	Cut-leaved avens	<i>Geum laciniatum</i>
Bristly club-moss	<i>Lycopodium annotinum</i>	Dandelion	<i>Taraxacum officinale</i>
Bristly stalked sedge	<i>Carex leptalea</i>	Dewey's sedge	<i>Carex deweyana</i>
		Dog tooth violet	<i>Erythronium americanum</i>

Common Name	Scientific name	Common Name	Scientific name
Downy alder	<i>Alnus alnobetula</i>	Heart-leaf birch	<i>Betula cordifolia</i>
Downy goldenrod	<i>Solidago puberula</i>	Heart-leaved aster	<i>Symphyotrichum cordifolium</i>
Downy rattlesnake plantain	<i>Goodyera pubescens</i>	Heart-leaved twayblade	<i>Neottia cordata</i>
Dragon's mouth	<i>Arethusa bulbosa</i>	Helliborine	<i>Epipactis helleborine</i>
Drooping wood sedge	<i>Carex arctata</i>	Hemlock	<i>Tsuga canadensis</i>
Dutchman's breeches	<i>Dicentra cucullaria</i>	Hemp-nettle	<i>Galeopsis tetrahit</i>
Dwarf birch	<i>Betula minor</i>	Herb-Robert	<i>Geranium robertianum</i>
Dwarf huckleberry	<i>Gaylussacia bigeloviana</i>	Highbush blueberry	<i>Vaccinium corymbosum</i>
Dwarf mistletoe	<i>Arceuthobium pusillum</i>	Highbush cranberry	<i>Viburnum opulus</i>
Dwarf raspberry	<i>Rubus pubescens</i>	Hobble-bush	<i>Viburnum lantanooides</i>
Dwarf rattlesnake plantain	<i>Goodyera repens</i>	Hooked agrimony	<i>Agrimonia gryposepala</i>
Early coralroot	<i>Corallorhiza trifida</i>	Hop sedge	<i>Carex lupulina</i>
Early leaf brome grass	<i>Bromus latigumis</i>	Wild coffee	<i>Triosteum aurantiacum</i>
Eastern white cedar	<i>Thuja occidentalis</i>	Huckleberry	<i>Gaylussacia baccata</i>
Elliott's goldenrod	<i>Solidago latissimifolia</i>	Hybrid spruce	<i>Picea rubens x Picea mariana</i>
Elm	<i>Ulmus americana</i>	Hyssop-leaved fleabane	<i>Erigeron hyssopifolius</i>
Evening primrose	<i>Oenothera biennis</i>	Inkberry	<i>Ilex glabra</i>
Evergreen wood fern	<i>Dryopteris intermedia</i>	Inland sedge	<i>Carex interior</i>
False nettle	<i>Boehmeria cylindrica</i>	Interrupted fern	<i>Claytosmunda claytoniana</i>
False Solomon's seal	<i>Maianthemum racemosum</i>	Ironwood	<i>Ostrya virginiana</i>
False violet	<i>Rubus repens</i>	Jack pine	<i>Pinus banksiana</i>
Fibrous-root sedge	<i>Carex communis</i>	Jack-in-the-pulpit	<i>Arisaema stewardsonii</i>
Field horsetail	<i>Equisetum arvense</i>	Jewelweed	<i>Impatiens capensis</i>
Field sow thistle	<i>Sonchus arvensis</i>	Kidney-leaved buttercup	<i>Ranunculus abortivus</i>
Fly-honeysuckle	<i>Lonicera canadensis</i>	Labrador tea	<i>Rhododendron groenlandicum</i>
Foamflower	<i>Tiarella cordifolia</i>	Ladies'-tresses	<i>Spiranthes spp.</i>
Foxberry	<i>Vaccinium vitis-idaea</i>	Lady fern	<i>Athyrium filix-femina</i>
Fringed sedge	<i>Carex crinita</i>	Lady's thumb	<i>Persicaria maculosa</i>
Ghost pipe	<i>Monotropa uniflora</i>	Lambkill	<i>Kalmia angustifolia</i>
Giant rattlesnake plantain	<i>Goodyera oblongifolia</i>	Lance-leaved grapefern	<i>Botrychium lanceolatum</i>
Glossy buckthorn	<i>Fragula alnus</i>	Large enchanter's nightshade	<i>Circaea canadensis</i>
Goldenrods	<i>Solidago spp.</i>	Large-leaved aster	<i>Eurybia macrophylla</i>
Goldthread	<i>Coptis trifolia</i>	Large-leaved avens	<i>Geum macrophyllum</i>
Gooseberry family	<i>Ribes spp.</i>	Large-leaved goldenrod	<i>Solidago macrophylla</i>
Graceful sedge	<i>Carex gracillima</i>	Large-tooth aspen	<i>Populus grandidentata</i>
Green twisted stalk	<i>Streptopus amplexifolius</i>	Late goldenrod	<i>Solidago gigantea</i>
Grey birch	<i>Betula populifolia</i>	Leather-leaf	<i>Chamaedaphne calyculata</i>
Ground cedar	<i>Diphasiastrum tristachyum</i>	Leatherwood	<i>Dirca palustris</i>
Ground hemlock (Yew)	<i>Taxus canadensis</i>	Lion's paw	<i>Nabalus trifoliolatus</i>
Ground juniper	<i>Juniperus communis</i>	Little club-spur orchid	<i>Platanthera clavellata</i>
Ground pine	<i>Dendrolycopodium obscurum</i>	Little grapefern	<i>Botrychium simplex</i>
Hair fescue	<i>Festuca filiformis</i>	Live-forever	<i>Hylotelephium telephium</i>
Hairy sedge	<i>Carex hirtifolia</i>	Long-bracted green orchid	<i>Coeloglossum viride</i>
Hairy sweet cicely	<i>Osmorhiza claytoni</i>	Long-stalked sedge	<i>Carex pedunculata</i>
Hairy wood rush	<i>Luzula acuminata</i>	Lowbush blueberry	<i>Vaccinium angustifolium</i>
Hare-bell	<i>Campanula rapunculoides</i>	Maidenhair spleenwort	<i>Asplenium trichomanes</i>
Hawkweeds	<i>Hieracium spp.</i>	Male fern	<i>Dryopteris felix-mas</i>
Hawthorns	<i>Crataegus spp.</i>	Manna-grass	<i>Glyceria spp.</i>
Hay-scented fern	<i>Dennstaedtia punctilobula</i>	Marginal wood fern	<i>Dryopteris marginalis</i>

Common Name	Scientific name	Common Name	Scientific name
Marsh fern	<i>Thelypteris palustris</i>	Red raspberry	<i>Rubus idaeus</i>
Massachusetts fern	<i>Coryphopteris simulata</i>	Red spruce	<i>Picea rubens</i>
Mayflower	<i>Epigaea repens</i>	Red-berried elder	<i>Sambucus racemosa</i>
Meadow horsetail	<i>Equisetum palustre</i>	Rhodora	<i>Rhododendron canadense</i>
Meadow-rue	<i>Thalictrum pubescens</i>	Ribless woodland sedge	<i>Carex leptonevia</i>
Mitrewort	<i>Mitella nuda</i>	Rice grass	<i>Oryzopsis asperifolia</i>
Mountain holly	<i>Ilex mucronata</i>	Rock polypody	<i>Polypodium virginianum</i>
Mountain maple	<i>Acer spicatum</i>	Rock-rose	<i>Crocotanthemum canadense</i>
Mountain sandwort	<i>Mononeuria groenlandica</i>	Rose twisted stalk	<i>Streptopus lanceolatus</i>
Mountain wood fern	<i>Dryopteris campyloptera</i>	Roses	<i>Rosa spp.</i>
Mountain-ash	<i>Sorbus americana</i>	Rough aster	<i>Eurybia radula</i>
Mouse eared hawkweed	<i>Pilosella officinarum</i>	Rough bentgrass	<i>Agrostis scabra</i>
New England sedge	<i>Carex novae-angliae</i>	Rough goldenrod	<i>Solidago rugosa</i>
New York aster	<i>Symphotrichum novi-belgii</i>	Rough hawkweed	<i>Hieracium scabrum</i>
New York fern	<i>Parathelypteris noveboracensis</i>	Rough sedge	<i>Carex scabrata</i>
Nodding trillium	<i>Trillium cernuum</i>	Round-leaved dogwood	<i>Cornus rugosa</i>
Northern beech fern	<i>Phegopteris connectilis</i>	Round-leaved pyrola	<i>Pyrola americana</i>
Northern wild licorice	<i>Galium kamtschaticum</i>	Round-leaved sundew	<i>Drosera rotundifolia</i>
Northern yellow-eyed grass	<i>Xyris montana</i>	Royal fern	<i>Osmunda regalis</i>
Oak fern	<i>Gymnocarpium dryopteris</i>	Running club-moss	<i>Lycopodium clavatum</i>
Old-field goldenrod	<i>Solidago nemoralis</i>	Sarsaparilla	<i>Aralia nudicaulis</i>
Ostrich fern	<i>Matteuccia struthiopteris</i>	Scotch lovage	<i>Ligusticum scoticum</i>
Painted trillium	<i>Trillium undulatum</i>	Scotch pine	<i>Pinus sylvestris</i>
Pale laurel	<i>Kalmia polifolia</i>	Seaside goldenrod	<i>Solidago sempervirens</i>
Partridge-berry	<i>Mitchella repens</i>	Sedges	<i>Carex spp.</i>
Philadelphia panic grass	<i>Panicum philadelphicum</i>	Sensitive fern	<i>Onoclea sensibilis</i>
Pin cherry	<i>Prunus pensylvanica</i>	Serviceberry	<i>Amelanchier spp.</i>
Pine barren goldenheather	<i>Hudsonia ericoides</i>	Shepherdia	<i>Shepherdia canadensis</i>
Pine-sap	<i>Hypopitys monotropa</i>	Shining club-moss	<i>Huperzia lucidula</i>
Pink lady's slipper	<i>Cypripedium acaule</i>	Shining rose	<i>Rosa nitida</i>
Pitcher-plant	<i>Sarracenia purpurea</i>	Shinleaf	<i>Pyrola elliptica</i>
Poison ivy	<i>Toxicodendron radicans</i>	Short husk	<i>Brachyelytrum erectum</i>
Poverty grass	<i>Danthonia spicata</i>	Showy lady's slipper	<i>Cypripedium reginae</i>
Princes'-pine	<i>Chimaphila umbellata</i>	Showy mountain-ash	<i>Sorbus decora</i>
Pubescent sedge	<i>Carex hirtifolia</i>	Shrubby cinquefoil	<i>Dasiphora fruticosa</i>
Purple chokeberry	<i>Aronia x prunifolia</i>	Silvery spleenwort	<i>Deparia acrostichoides</i>
Purple crowberry	<i>Empetrum atropurpureum</i>	Skunk cabbage	<i>Symplocarpus foetidus</i>
Purple-stemmed aster	<i>Symphotrichum puniceum</i>	Small cranberry	<i>Vaccinium oxycoccos</i>
Pussytoes	<i>Antennaria neglecta</i>	Small enchanter's nightshade	<i>Circaea alpina</i>
Quackgrass	<i>Elymus repens</i>	Small flowered wood rush	<i>Luzula parviflora</i>
Ram's head lady's slipper	<i>Cypripedium arietinum</i>	Small pussy-toes	<i>Antennaria howellii</i>
Rattlesnake fern	<i>Botrypus virginianus</i>	Smooth alder	<i>Alnus serrulata</i>
Red baneberry	<i>Actaea rubra</i>	Smooth gooseberry	<i>Ribes hirtellum</i>
Red crowberry	<i>Empetrum rubrum</i>	Smooth serviceberry	<i>Amelanchier laevis</i>
Red fescue	<i>Festuca rubra</i>	Soft leaved sedge	<i>Carex disperma</i>
Red maple	<i>Acer rubrum</i>	Solomon's seal	<i>Polygonatum pubesens</i>
Red oak	<i>Quercus rubra</i>	Speckled alder	<i>Alnus incana</i>
Red osier dogwood	<i>Cornus sericea</i>	Spinulose wood fern	<i>Dryopteris carthusiana</i>
Red pine	<i>Pinus resinosa</i>	Spring beauty	<i>Claytonia caroliniana</i>



Common Name	Scientific name
Squashberry	<i>Viburnum edule</i>
Star sedge	<i>Carex echinata</i>
Starflower	<i>Lysimachia borealis</i>
Starry false Solomon's seal	<i>Maianthemum stellatum</i>
Stinking Willie	<i>Jacobaea vulgaris</i>
Strawberry	<i>Fragaria virginiana</i>
Striped maple	<i>Acer pensylvanicum</i>
Sugar maple	<i>Acer saccharum</i>
Swamp candles	<i>Lysimachia terrestris</i>
Swamp red currant	<i>Ribes triste</i>
Sweet gale	<i>Myrica gale</i>
Sweet vernal grass	<i>Anthoxanthum odoratum</i>
Sweetfern	<i>Comptonia peregrina</i>
Tall buttercup	<i>Ranunculus acris</i>
Tall white aster	<i>Doellingeria umbellata</i>
Tamarack	<i>Larix laricina</i>
Tawny cotton-grass	<i>Eriophorum virginicum</i>
Teaberry	<i>Gaultheria procumbens</i>
Thimbleweed	<i>Anemone virginiana</i>
Three seeded sedge	<i>Carex trisperma</i>
Three-leaved false Solomon's seal	<i>Maianthemum trifolium</i>
Three-toothed cinquefoil	<i>Sibbaldia tridentata</i>
Tick quack grass	<i>Thinopyrum pycnanthum</i>
Tradescant's aster	<i>Symphotrichum tradescantii</i>
Trailing blackberry	<i>Rubus hispidus</i>
Trembling aspen	<i>Populus tremuloides</i>
Tufted vetch	<i>Vicia cracca</i>
Tussock sedge	<i>Carex stricta</i>
Twinflower	<i>Linnaea borealis</i>
Umbel-like sedge	<i>Carex umbellata</i>
Velvet-leaf blueberry	<i>Vaccinium myrtilloides</i>
Violets	<i>Viola spp.</i>
Virginia chain fern	<i>Anchistea virginica</i>
Virgins bower	<i>Clematis virginiana</i>
Water pennywort	<i>Hydrocotyle umbellata</i>
Water-horehound	<i>Lycopus americanus</i>
Western poison ivy	<i>Toxicodendron radicans</i> <i>var. rydbergii</i>
White ash	<i>Fraxinus americana</i>
White avens	<i>Geum canadense</i>
White baneberry	<i>Actaea pachypoda</i>
White birch	<i>Betula papyrifera</i>
White goldenrod	<i>Solidago bicolor</i>
White lettuce	<i>Nabalus altissimus</i>
White meadowsweet	<i>Spiraea alba</i>
White panicle aster	<i>Symphotrichum lanceolatum</i>
White pine	<i>Pinus strobus</i>
White spruce	<i>Picea glauca</i>
White-edge sedge	<i>Carex debilis</i>
White-haired panic grass	<i>Dichanthelium villosissimum</i>

Common Name	Scientific name
Wiegand's wild rye	<i>Elymus wiegandii</i>
Wild apple	<i>Malus pumila</i>
Wild carrot	<i>Daucus carota</i>
Wild coffee	<i>Triosteum aurantiacum</i>
Wild leek	<i>Allium tricoccum</i>
Wild lily-of-the-valley	<i>Maianthemum canadense</i>
Wild raisin	<i>Viburnum cassinoides</i>
Wild rose	<i>Rosa virginiana</i>
Wild rye grass	<i>Elymus virginicus</i>
Willows	<i>Salix spp.</i>
Winterberry	<i>Ilex verticillata</i>
Witch-hazel	<i>Hamamelis virginiana</i>
Wood aster	<i>Oclemena acuminata</i>
Wood goldenrod	<i>Solidago flexicaulis</i>
Wood reed	<i>Cinna latifolia</i>
Wood rushes	<i>Luzula spp.</i>
Woodland horsetail	<i>Equisetum sylvaticum</i>
Wood-sorrel	<i>Oxalis montana</i>
Yarrow	<i>Achillea millefolium</i>
Yellow birch	<i>Betula alleghaniensis</i>
Yellow hawkweed	<i>Pilosella x floribunda</i>
Yellow lady's slipper	<i>Cypripedium parviflorum</i>
Yellow violet	<i>Viola pubescens</i>
Yellow wood-sorrel	<i>Oxalis stricta</i>
Yellow-green sedge	<i>Carex flava</i>

## Non-Vascular Plants

### Bryophytes

Bazzania	<i>Bazzania trilobata</i>
Broom moss	<i>Dicranum scoparium</i>
Brown fat-leaved sphagnum	<i>Sphagnum papillosum</i>
Common green sphagnum	<i>Sphagnum girgensohnii</i>
Dicranums	<i>Dicranum spp.</i>
Fern moss	<i>Thuidium delicatulum</i>
Flat neckera	<i>Neckera complanata</i>
Flat topped sphagnum	<i>Sphagnum fallax</i>
Greater broom moss	<i>Dicranum majus</i>
Hair-cap moss	<i>Polytrichum commune</i>
Juniper polytrichum	<i>Polytrichum juniperinum</i>
Ladies' tresses	<i>Sphagnum capillifolium</i>
Leafy moss	<i>Mniaceae Family</i>
Log moss	<i>Hypnum imponens</i>
Naugehyde liverwort	<i>Ptilidium spp.</i>
Pale fat-leaved sphagnum	<i>Sphagnum centrale</i>
Pin cushion moss	<i>Leucobryum glaucum</i>
Plait moss	<i>Hypnum spp.</i>
Plume moss	<i>Ptilium crista-castrensis</i>
Prickly sphagnum	<i>Sphagnum squarrosum</i>

Common Name	Scientific name
Ragged moss	<i>Brachythecium spp.</i>
Red bog-moss	<i>Sphagnum rubellum</i>
Red fat-leaved sphagnum	<i>Sphagnum magellanicum</i>
Russ's sphagnum	<i>Sphagnum russowii</i>
Schreber's moss	<i>Pleurozium schreberi</i>
Shaded wood moss	<i>Hylocomiastrum umbratum</i>
Shaggy moss	<i>Rhytidiadelphus triquetrus</i>
Smooth cap moss	<i>Atrichum spp.</i>
Sphagnum moss	<i>Sphagnum spp.</i>
Stair-step moss	<i>Hylocomium splendens</i>
Torrey's sphagnum	<i>Sphagnum torreyanum</i>
Tree moss	<i>Climacium dendroides</i>
Twisted moss	<i>Tortella spp.</i>
Wavy dicranum	<i>Dicranum polysetum</i>
Woolly fringe-moss	<i>Racomitrium lanuginosum</i>

### Lichens

Blue felt lichen	<i>Pectenia plumbea</i>
Boreal felt lichen	<i>Erioderma pedicellatum</i>
Concentric pelt	<i>Peltigera elisabethae</i>
Cup lichens	<i>Cladonia spp.</i>
Dixie reindeer lichen	<i>Cladonia subtenuis</i>
Flat neckera	<i>Neckera complanata</i>
Green reindeer lichen	<i>Cladonia arbuscula</i>
Grey reindeer lichen	<i>Cladonia rangiferina</i>
Lesser green reindeer lichen	<i>Cladonia mitis</i>
Methuselah's beard lichen	<i>Usnea longissima</i>
Northern coral lichen	<i>Sphaerophorus globosus</i>
Old man's beard	<i>Usnea spp.</i>
Pelt lichen	<i>Peltigera spp.</i>
Star-tipped reindeer lichen	<i>Cladonia stellaris</i>
Voles ear	<i>Erioderma mollissimum</i>
Wrinkled shingle lichen	<i>Pannaria lurida</i>
Whitewash lichen	<i>Phlyctis argena</i>

## Animals

### Birds

Alder flycatcher	<i>Empidonax alnorum</i>
American goldfinch	<i>Spinus tristis</i>
American kestrel	<i>Falco sparverius</i>
American redstart	<i>Setophaga ruticilla</i>
American woodcock	<i>Scolopax minor</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Bank swallow	<i>Riparia riparia</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Megasceryle alcyon</i>
Bicknell's thrush	<i>Catharus bicknelli</i>

Common Name	Scientific name
Black and white warbler	<i>Mniotilta varia</i>
Black-backed woodpecker	<i>Picoides arcticus</i>
Blackburnian warbler	<i>Setophaga fusca</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Blackpoll warbler	<i>Setophaga striata</i>
Black-throated blue warbler	<i>Setophaga caerulescens</i>
Black-throated green warbler	<i>Setophaga virens</i>
Blue jay	<i>Cyanocitta cristata</i>
Bohemian waxwing	<i>Bombycilla garrulus</i>
Boreal chickadee	<i>Poecile hudsonicus</i>
Brown creeper	<i>Certhia americana</i>
Canada warbler	<i>Cardellina canadensis</i>
Cape may warbler	<i>Setophaga tigrina</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Common redpoll	<i>Acanthis flammea</i>
Common yellow throat	<i>Geothlypis trichas</i>
Crow	<i>Corvus brachyrhynchos</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Eastern wood pewee	<i>Contopus virens</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Fox sparrow	<i>Passerella iliaca</i>
Gray jay	<i>Perisoreus canadensis</i>
Great blue heron	<i>Ardea herodias</i>
Great-horned owl	<i>Bubo virginianus</i>
Grey-cheeked thrush	<i>Catharus minimus</i>
Mourning warbler	<i>Geothlypis philadelphia</i>
Nashville warbler	<i>Leiostyris alpestris</i>
Nelson's sparrow	<i>Ammospiza nelsoni</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern parula	<i>Setophaga americana</i>
Northern waterthrush	<i>Parkesia noveboracensis</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Osprey	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Palm warbler	<i>Setophaga palmarum</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine grosbeak	<i>Pinicola enucleator</i>
Pine siskin	<i>Spinus pinus</i>
Pine warbler	<i>Setophaga pinus</i>
Purple finch	<i>Haemorhous purpureus</i>
Raven	<i>Corvus corax</i>
Red crossbill	<i>Loxia curvirostra</i>
Red eyed vireo	<i>Vireo olivaceus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Robin	<i>Turdus migratorius</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>

Common Name	Scientific name
Ruffed grouse	<i>Bonasa umbellus</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Scarlet tanager	<i>Piranga olivacea</i>
Spruce grouse	<i>Canachites canadensis</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Tennessee warbler	<i>Leiothlypis peregrina</i>
Three-toed woodpecker	<i>Picoides dorsalis</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Whip-poor-will	<i>Antrastomus vociferus</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
White-winged crossbill	<i>Loxia leucoptera</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Winter wren	<i>Troglodytes hiemalis</i>
Wood duck	<i>Aix sponsa</i>
Wood thrush	<i>Hylocichla mustelina</i>
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>

### Amphibians and Reptiles

Blanding's turtle	<i>Emydoidea blandingii</i>
Blue-spotted salamander	<i>Ambystoma laterale</i>
Eastern Ribbonsnake	<i>Thamnophis saurita</i>
Four-toed salamander	<i>Hemidactylium scutatum</i>
Red-backed salamander	<i>Plethodon cinereus</i>
Spring peeper	<i>Pseudacris crucifer</i>
Wood frog	<i>Lithobates sylvaticus</i>
Wood turtle	<i>Glyptemys insculpta</i>
Yellow-spotted salamander	<i>Ambystoma maculatum</i>

### Invertebrates

Balsam fir woolly adelgid	<i>Adelges piceae</i>
Beech leaf-mining weevil	<i>Orchestes fagi</i>
Damselfly	Family: <i>Coenagrionidae</i>
Dragonfly	Order: <i>Odonata</i>
Emerald ash borer	<i>Agrilus planipennis</i>
Fall webworm	<i>Hyphantria cunea</i>
Forest tent caterpillar	<i>Malacosoma disstria</i>
Hemlock woolly adelgid	<i>Adelges tsugae</i>
Larch casebearer	<i>Coleophora laricella</i>
Larch sawfly	<i>Pristiphora erichsonii</i>
Spruce bark beetle	<i>Dendroctonus rufipennis</i>
Spruce budworm	<i>Choristoneura fumiferana</i>
White pine weevil	<i>Pissodes strobi</i>
White-marked tussock moth	<i>Orgyia leucostigma</i>

Common Name	Scientific name
<b>Mammals</b>	
American marten	<i>Martes americana</i>
Beaver	<i>Castor canadensis</i>
Black bear	<i>Ursus americanus</i>
Bobcat	<i>Lynx rufus</i>
Canadian lynx	<i>Lynx canadensis</i>
Chipmunk	<i>Tamias striatus</i>
Coyote	<i>Canis latrans</i>
Deer	<i>Odocoileus virginianus</i>
Fisher	<i>Pekania pennanti</i>
Long-tailed shrew	<i>Sorex dispar</i>
Mink	<i>Vison vison</i>
Moose	<i>Alces alces americana</i>
Muskrat	<i>Ondatra zibethicus</i>
Porcupine	<i>Erethizon dorsata</i>
Raccoon	<i>Procyon lotor</i>
Red fox	<i>Vulpes vulpes</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
River otter	<i>Lontra canadensis</i>
Rock vole	<i>Microtus chrotorrhinus</i>
Snowshoe hare	<i>Lepus americanus</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Star-nosed mole	<i>Condylura cristata</i>

### Fungi

Common Name	Scientific name
Beech bark canker	<i>Neonectria faginata</i>
Beech scale disease	<i>Nectria ditissima</i>
Birch cinder conch (Chaga)	<i>Inonotus obliquus</i>
Black knot fungus	<i>Apiosporina morbosa</i>
Black trumpet mushrooms	<i>Craterellus fallax</i>
Boletes	<i>Boletaceae spp.</i>
Chanterelles	<i>Cantharellus cibarius</i>
Dutch elm disease	<i>Ophiostoma ulmi</i>
False morel	<i>Gyromitra infula</i>
Hemlock varnish shelf	<i>Ganoderma tsugae</i>
Hollow foot suillus	<i>Suillus cavipes</i>
Hypoxylon canker	<i>Entoleuca mammata</i>
Larch slippery jack	<i>Suillus grevillei</i>
Maitake (Hen-of-the-woods)	<i>Grifola frondosa</i>
Pine mushrooms	<i>Tricholoma magnivelare</i>
Saffron milkcap	<i>Lactarius deliciosus</i>
Shoe-string root rot (Honey mushroom)	<i>Armillaria spp.</i>
Slippery Jack fungus	<i>Suillus luteus</i>
White pine blister rust	<i>Cronartium ribicola</i>

Ecological and forest management related terms found in this guide are defined below. References are given where definitions (or portions thereof) have been taken directly from other sources.

## A

**A horizon** – a mineral soil horizon formed at or near the surface of the soil, generally immediately beneath the forest floor. It is usually formed by (derived from SCWG 1998):

- leaching or loss of iron and aluminum, clay and organic matter to form an Ae horizon,
- by natural accumulation of partially decomposed organic matter to form an Ah horizon,
- a combination of leaching and natural organic matter accumulation to form an Ahe horizon,
- incorporation of organic matter through human disturbance to form an Ap horizon, or
- additional influence of prolonged anaerobic conditions to form an Aeg, Ahg, Aheg or Apg horizon

**Advanced regeneration** – trees of variable age found in the understory shrub layer that are in a position to grow into the canopy when overstory competition has been removed by disturbance or natural mortality

**Aeolian** – see Parent material

**Alluvium** – see Parent material

**Aspect** – the direction of a downhill slope expressed in degrees or as a compass point

**Atlantic Coastal Plain Flora (ACPF)** – a group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes

**Azonal ecosite** – opposite of zonal. (Also, see Edaphic)

## B

**Bedrock** – Solid rock that underlies gravel, soil, or other surficial material (AGI 1984). (Also, see Parent material)

**Bog** – a type of wetland characterized by peat accumulation and virtually unaffected by runoff waters or ground water from surrounding mineral soils (NWWG 1997)

**Boulder phase** – see Soil Type Phases, pages 291–292  
Boulders are rocks greater than 60 cm in diameter

**Bryophytes** – mosses, hornworts and liverworts

## C

**Calciphile** – a plant that thrives in gypsum soil (calcareous habit)

**Canopy** – the uppermost continuous layer of branches and foliage in a stand of trees

**Cemented** – soils having a very hard or firm consistency because particles are held together by cementing substances such as iron and aluminum oxides, iron-aluminum-organic complexes, or calcium carbonate. Refer to FEC Technical Guide for more information

**Circumneutral** – having a ph close to neutral (approx. 7)

**Climatic climax forest** – see Zonal climax forest

**Climax community** – a relatively stable and self-perpetuating community condition that maintains itself (more or less) until stand-level disturbance causes a return to an earlier successional stage

**Coarse woody material (CWM)** – in this guide, dead wood larger than 7.5 cm in diameter and lying horizontally at 45 degrees or less

**Cobbles** – rocks that are 7.6 – 25 cm in diameter.  
See Stony Phase, page 291

**Co-dominant** – see Crown class

**Coarse phase** – see Soil Type Phases, pages 291–292

**Colluvium** – see Parent material

**Coniferous** – typically evergreen tree species, bearing cones, and having needle-shaped or scalelike leaves. Larch is a coniferous species but is not evergreen

**Covertyp e** – refers to the relative percentage of softwood (coniferous) versus hardwood (deciduous) species in the overstory of a stand. In this guide, covertyp e classes are:

**Softwood** – Overstory coverage of softwood species is 75% or more

**Hardwood** – Overstory coverage of hardwood species is 75% or more

**Mixedwood** – Overstory coverage of softwood and hardwood species is between 25% and 75%

**Crown class** – refers to groups of trees in a forest with crowns of similar development and occupying a similar position in the canopy (Dunster and Dunster 1996).

Three crown classes are defined:

**Dominant:** Defines trees with crowns extending above the general level of the main canopy receiving full light from above and partial light from the sides

**Co-dominant:** Defines trees with crowns forming the general level of the main canopy receiving full light from above and comparatively little light from the sides

**Intermediate:** Defines trees with crowns extending into the lower portion of the main canopy, but shorter in height than co-dominants. These trees receive little direct light from above and none from the sides

**Cyanolichen** – a lichen whose photosynthetic partner is a cyanobacterium (also called blue-green alga)

## D

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**Deciduous** – typically refers to broad-leaved tree species whose leaves are not persistent and fall off at the end of the growing season. Larch, a coniferous species, is deciduous

**Disturbance** – a discreet force that causes significant change in structure and/or composition of a forest (Dunster and Dunster 1996). (Also, see Natural disturbance)

**Dominant** – 1) In forest stand canopy position, see Crown class; 2) When describing cover class greater than 50%

**Drainage class** – drainage class reflects the length of time it takes water to be removed from a soil in relation to supply. Refer to FEC Technical Guide for more information on the six drainage classes used in this guide

**Drumlin** – A low, smoothly rounded, elongate hill of compact glacial till built under the margin of the ice and shaped by its flow. Its long axis is parallel to the direction of ice movement (AGI 1984)

## E

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**Ecodistrict** – a subdivision of ecoregion and the third level within the Nova Scotia ecological land classification system. It is based on distinct assemblages of relief, geology and landform

**Ecological Continuity** – ecosystems (forests) for which there has been a continuity of ecological processes for long periods of time. Long and uninterrupted development in the absence of catastrophic disturbance fosters structural and species complexity, often marked by the presence of indicator lichens and fungi sensitive to disturbance and requiring specialized microhabitats

**Ecological land classification** – a classification of lands from an ecological perspective based on factors such as climate, physiography and site conditions. It is a framework used to delineate ecosystems at different landscape scales and includes four main levels: ecoregion, ecodistrict, ecosection and ecosite

**Ecoregion** – the second level in the Nova Scotia ecological land classification system used to characterize a distinctive regional climate as expressed by vegetation. There are nine ecoregions identified in Nova Scotia

**Ecosite** – a unit that represent ecosystems that have developed under a variety of conditions and influences, but which have similar moisture and nutrient regimes. Ecosite is found in both the landscape-level ecological land classification and the stand-level forest ecosystem classification systems

**Edaphic** – refers to the influence of soil and site conditions on plant growth. In this guide, edaphic is used to express the dominance of site over climate in vegetation development

**Edaphic climax forest** – results when a forest community cannot progress to the zonal climax due to local extremes in site conditions

**Edatopic grid** – a two-dimensional diagram used to plot ecosystems (and subsequently ecosites) with respect to their relative moisture and nutrient regimes

**Epiphytic** – refers to a plant (lichen) that grows on the outside of another plant in a non-parasitic relationship

**Ericaceous** – plants in or related to the heath family (*Ericaceae*) usually found on acidic (nutrient poor) soils including *Kalmia spp.*, *Vaccinium spp.* and *Rhododendron spp.* (Dunster and Dunster 1996)

**Even-aged** – describes a forest, stand, or vegetation type in which relatively small age differences exist between individual trees

**Exposure** – the relative openness of a site to weather conditions, particularly wind and sun. Refer to FEC Technical Guide for more information.

## F

**Fluvial** – a general term to describe stream or river processes that involve the transport and deposition of sediment (Dunster and Dunster 1996). When used in this guide, fluvial refers to all flowing water deposits regardless of age or time since deposition

**Floodplain** – an area adjacent to a stream or river, consisting of alluvial sediments, that is periodically inundated during periods of high stream flow (Cauboue et al. 1996)

**Forest** – in this guide, sites that can (and normally do) support a minimum of 30% crown closure by trees. (See page 16 for more information.)

**Forest floor** – a general term encompassing the layer of undecomposed organic matter (leaves, twigs and plant remains in various stages of decomposition) lying on top of the mineral soil (Dunster and Dunster 1996). Often referred to as the duff layer

## G

**Gap disturbance** – natural disturbances are characterized by gap and small-patch mortality, followed by understory recruitment, resulting in stands with multiple age classes. This generally leads to the establishment and/or perpetuation of late-successional vegetation types

**Glacial till** – see Parent material

**Glaciofluvial** – see Parent material

**Gleyed** – a soil condition achieved when soils are under water saturation and prolonged anaerobic conditions. It is a condition generally associated with high water tables or saturation over a relatively impermeable layer (Cauboue et al. 1996). Gleyed is an older term replaced by redoximorphic features (redox features) in more current literature

**Graminoid** – grasses (*Poaceae* family) and grass-like plants such as sedges (*Carex spp.*) and rushes (*Juncus spp.*)

**Ground water** – that part of subsurface water that is in the zone of saturation, including underground streams (AGI 1984)

## H

**Hardwood** – see Covertypes

**Humus form** – a system for describing and classifying organic (forest floor) horizons. Refer to FEC Technical Guide for more information

**Hybrid spruce** – in Nova Scotia, a natural cross between red spruce and black spruce displaying features of both

## I

**Intermediate** – in reference to shade tolerance, a condition between intolerant and tolerant. (Also, see Crown class)

**Intolerant** – refers to shade tolerance and defines a condition whereby trees are not capable of successfully growing beneath the shading canopy of other or similar species

## K

**Karst** – surface and subsurface features created by the dissolving of soluble rock such as limestone and gypsum, which results in features such as caverns and sinkholes (Cauboue et al. 1996). In this guide, karst sites are limited to those that have gypsum or limestone bedrock exposures in addition to sinkholes and/or caverns

**Krummholz** – scrubby and stunted growth form in trees, often forming a characteristic zone at the limit of tree growth in mountains (Cauboue et al. 1996) or along coastlines and high elevation plateaus

## L

**Lacustrine** – see Parent material

**Landscape** – an expanse of land with landforms, land cover, habitats, and natural features which are repeated in similar form and that, taken together, form a composite (Dunster and Dunster 1996)

**Layering** – a form of vegetative reproduction where a branch buried in the forest floor develops roots and becomes independent of the parent tree (Dunster and Dunster 1996)

**Loamy phase** – see Soil Type Phases, see pages 291–292

## M

**Marine** – see Parent material

**Matrix forest** – a widespread forest community that dominates the landscape and forms the background in which other smaller scale communities occur (Thompson 2002)

**Mesic** – describes sites with average moisture conditions for a given climate (Cauboue et al. 1996)

**Microtopography** – refers to the expression of mound and pit surface terrain within a forest stand, the main cause being the uprooting and subsequent decay of trees. In this guide, microtopography classes are:

**Level:** Few or no mounds, or mounds less than 0.3 m high

**Slightly:** Mounds 0.3-1 m high and more than 7 m apart

**Moderately:** Mounds 0.3-1 m high and 3-7 m apart

**Strongly:** Mounds 0.3-1 m high and 1-3 m apart

**Severely:** Mounds 0.3-1 m high and 0.3-1 m apart

**Extremely:** Mounds more than 1 m high and more than 3 m apart

**Ultra:** Mounds more than 1 m high and less than 3 m apart

**Mixedwood** – see Coverttype

**Moisture regime** – represents average moisture in the soil available for plant growth. It is assessed by integrating moisture supply (as related to climate) with soil drainage and moisture holding capacities. Refer to FEC Technical Guide for more information

**Mycorrhizal** – the symbiotic relationship between the mycelium of a fungus and the roots of a host plant in which energy, water and nutrients flow between the two organisms

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## N

**Natural disturbance** – a natural force that causes significant change in forest stand structure and/or composition such as fire, wind, flood, insect damage or disease. A natural disturbance regime is the frequency and type of natural disturbances that influence the arrangement of forested ecosystems and their biodiversity on a given landscape

**Nutrient regime** – represents the relative availability of nutrients in the soil for plant growth. Determination of nutrient regime requires consideration and integration of several environmental features including forest floor humus form, soil type, seepage class, and ground water characteristics. Refer to FEC Technical Guide for more information

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## O

**Old growth** – climax forests in the late stage of natural succession, the shifting mosaic phase, marked by mature canopy processes of gap formation and recruitment from a developed understory. Typical

characteristics include a multi-layered canopy of climax species containing large old trees, decadent wolf trees and abundant snags and coarse woody material. For more information refer to An old-growth forest policy for Nova Scotia, 2022 (N.S. Dept. of Natural Resources and Renewables).

**Open woodland** – Open woodlands are upland sites where natural disturbances (e.g. frequent fires) and/or site conditions (e.g. sandy soils, excessive surface stoniness, bedrock exposures) generally limit the establishment of trees to less than 30% crown closure

**Organic** – A substance derived from living organisms or their products (Dunster and Dunster 1996). (Also, see Parent material)

**Organic/Bedrock** – see Parent material

**Overstory** – refers to trees that occupy the dominant, co-dominant and intermediate canopy positions. (Also, see Crown class)

**Oxbow** – a closely looping stream meander having an extreme curvature such that only a neck of land is left between the two parts of the stream (Cauboue et al. 1996)

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## P

**Parent material** – the unconsolidated and more or less chemically unweathered material from which a soil develops by soil formation (pedogenic) processes (Cauboue et al. 1996). Parent material types found in Nova Scotia include (adapted from ECSS 1983). Refer to FEC Technical Guide for more information

**Aeolian:** Material deposited by wind action. Aeolian deposits are usually high in silt and/or fine sand and may show internal structures such as cross-bedding

**Alluvium:** Sediments deposited by streams and rivers (floodplains, deltas, etc.). These deposits are younger than glacial deposits and may or may not contain rock (gravel/cobbles)

**Colluvium:** Deposits of sand, silt, clay, organic matter and/or rock that have reached their position by gravity-induced movement

**Glacial Till:** Unstratified deposits of sand, silt, clay and rock that have been released from glacier ice. Some glacial deposits also have recognizable landform features such as drumlins

**Glaciofluvial:** Deposits that were partly or wholly stratified by glacial meltwater. Glaciofluvial deposits are often high in sand and/or gravel

**Lacustrine:** Sediments deposited in quiet waters (lakes and ponds), which may or may not have been directly associated with glaciers. These deposits tend to be high in silt and clay and generally do not contain rock

**Marine:** Sediments deposited in salt or brackish water or through shoreline processes. Marine deposits are generally stratified, of variable texture, and may contain shells and gravel

**Organic:** Built-up plant debris that does not easily decompose because of high moisture and low soil temperatures

**Organic/Bedrock:** Combination of upland organic over weathered, near-surface bedrock

**Till/Bedrock:** Combination of thin glacial till over weathered, near-surface bedrock

**Patch forest** – a discrete forest community nested within a matrix forest. Both large and small patches are associated with ecological processes or environmental conditions, but small patches usually have several processes and conditions come together in a very precise way (Thompson 2002)

**Percent cover** – the vertical projection of tree crown or plant shoot area as a percentage of stand area (Dunster and Dunster 1996). (See page 16 for more information)

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## R

**Riparian** – refers to terrain, vegetation, or simply position adjacent to or associated with a stream, floodplain, or standing waterbody (Cauboue et al. 1996)

**Rockiness** – describes sites with bedrock exposure. Refer to FEC Technical Guide for more information.

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## S

**Seepage** – in this guide, all lateral subsurface water flow (includes precipitation and spring sources)

**Senescence** – generally, the process of aging in mature individuals (trees), typical toward the end of an organism's life (Dunster and Dunster 1996)

**Sinkhole** – a funnel-shaped depression common in karst topography caused by the dissolving of underlying limestone or gypsum bedrock

**Slope Gradient** – describes the percentage of vertical rise relative to horizontal distance. Zero percent slope describes a level site and 100% slope equates to a 45 degree angle. In this guide, slope classes are:

Level 0–3%    Gentle 4–15%    Moderate 16–30%  
Steep 31–60%    Extreme > 60%

**Slope Position** – describes the relative topographic position of a site within the landscape. Refer to FEC Technical Guide for more information

**Snags** – in this guide, dead trees larger than 7.5 cm in diameter at breast height (1.3 m) and standing at 45 degrees or more

**Softwood** – see Coverttype

**Soil texture** – the percentage of sand, silt and clay in a soil. In general, fine textured soils are relatively high in clay, medium textured soils are relatively high in silt, and coarse textured soils are relatively high in sand

**Spring ephemerals** – any of various species of wildflowers that bloom in the early spring for only a few weeks and then quickly die-back

**Stand** – in the case of forests, a group of trees in a specific area that are sufficiently uniform in composition, age, arrangement and condition to be distinguishable from adjacent forest areas (Dunster and Dunster 1996)

**Stones** – rocks that are 26–60 cm in diameter. See Stony Phase, pages 291

**Stony Phase** – see Soil Type Phases, pages 291–292

**Successional dynamics** – an orderly process of forest community development that involves changes in species structure and community processes with time (Odum 1971). A number of distinct successional stages (e.g. early, middle, late) replace one another in a predictable sequence. Refer to FEC Technical Guide for more information.

**Super canopy** – a canopy position above the normal overstory/canopy layer

**Swamp** – a treed or tall shrub dominated wetland that is influenced by ground water, either on mineral or organic soils (NWWG 1997)

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## T

**Talus** – a form of colluvium deposit, characterized by excessive surface stoniness, usually found at the base of steep slopes or cliffs (Dunster and Dunster 1996)

**Temperate** – having a climate intermediate between tropical and polar; moderate or mild in temperature; having four seasons

**Till/Bedrock** – see Parent material

**Tolerant** – refers to shade tolerance and defines a condition whereby trees are capable of successful growth and reproduction beneath the shading canopy of other or similar species



## U

**Understory** – refers to vegetation growing below the overstory grouped into three categories:

**Shrub layer:** Woody stemmed species and regenerating trees usually less than 2 m in height, but occasionally taller

**Herbaceous layer:** Dwarf woody plants plus ferns, club-mosses and other herbaceous plants

**Bryophytes and Lichens:** Mosses, hornworts, liverworts and lichens

**Uneven-aged** – describes a forest, stand, or vegetation type in which intermingling trees differ markedly in age

**Upland** – an area that is not a wetland

**Upland Phase** – see Soil Type Phases, pages 291–292

## V

**Vernal Pools** – a seasonal body of standing water that typically forms in the spring from melting snow and other runoff, dries out in the hotter months of summer, and often refills in the autumn

**Vermivore** – an animal that eats worms

## W

**Wave forest** – a wave-like pattern of dead and living trees found on highly exposed sites and created by wind damage and subsequent mortality

**Wetland** – land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments (Cauboue et al. 1996)

**Windthrow** – a disturbance where a tree (or trees) has been uprooted by the wind. Over time, windthrow leads to the development of mound and pit microtopography. Windthrow is synonymous with blowdown

**Woodland** – see Open woodland

## Z

**Zonal climax forest** – results when a forest community reflects regional climate norms and is not unduly affected by local extremes in site conditions

**Zonal ecosite** – in this guide, a site with conditions that could potentially support establishment of a zonal climax forest

## Appendix D

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