

- CO1 Black spruce – Balsam fir / Foxberry / Plume moss
- CO2 White spruce – Balsam fir / Foxberry – Twinflower . . . CO2a Black crowberry Headland variant
- CO3 Red spruce / Mountain-ash / Foxberry
- CO4 Balsam fir / Foxberry – Twinflower
- CO5 White birch – Balsam fir / Foxberry – Wood aster
- CO6 Red maple – Birch / Bunchberry – Sarsaparilla
- CO7 White spruce / Bayberry

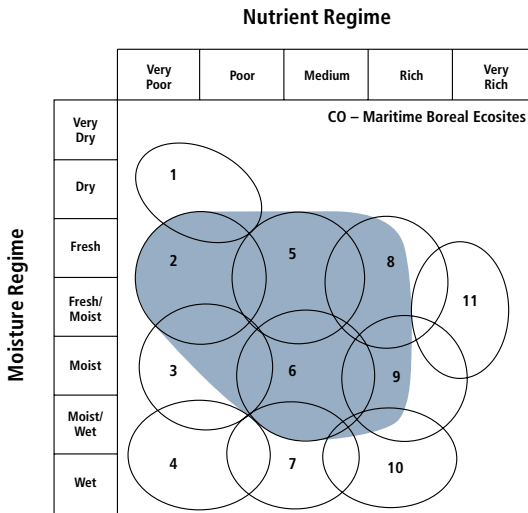
**Concept:** The composition and vigour of coastal forest Vegetation Types (VT) are influenced by cool, moist climate conditions and exposure associated with the Atlantic Coastal ecoregion and Bay of Fundy shore. These VTs have strong boreal affinities and are considered indicative of Maritime Boreal ecosites. Several plant species are used to indicate this maritime influence. Krummholtz and wave forest conditions are also known to occur in association with coastal VTs. The krummholtz condition is currently recognized as a variant, while more data are needed to characterize the wave forest condition. Acadian Ecosite VTs can sometimes be found in sheltered areas within coastal ecoregion boundaries, but these are not recognized as Coastal Forest group VTs.

**Vegetation:** Crown closure can vary within and between VTs of this group. Black spruce, white spruce and balsam fir are the main overstory species. Red maple and white birch will also reach the upper canopy on more sheltered or distant sites. A suite of plants can be used to indicate coastal influence including heart-leaf birch, mountain-ash, downy alder, bayberry and foxberry. Red spruce, sugar maple, beech, hemlock and to a lesser extent white pine are seldom found in the coastal forest group (except along the Bay of Fundy and Tusket Islands where red spruce is found).

**Environmental Setting:** Vegetation types are mainly found on upper and middle positions of gentle slopes. Soils are mainly derived from glacial till deposits and surface stoniness and exposed bedrock can be variable. Cool, moist climate conditions slow decomposition rates resulting in sites with unusually thick duff layers. Softwood dominated VTs form large patches or matrix forests on the landscape whereas hardwood dominated VTs form small to medium patches. This group is found throughout the Atlantic Coastal (800) ecoregion and along the Bay of Fundy shore, with scattered occurrences along the Northumberland Strait.

**Successional Dynamics:** Vegetation types in this group include both zonal and edaphic climax types. The most common disturbance agents are coastal winds and storms. The level of physical disturbance can be variable with both small and large patches of windthrow and breakage common. Balsam fir susceptibility to insects and disease is also increased in stands weakened by high winds. In more exposed areas, white spruce krummholtz or balsam fir wave forest conditions are found. In the absence of physical disturbance, natural senescence in both softwood and hardwood species limits stand age to 100 to 125 years.

## Edatopic Grid



## Ecological Features

These forests form large patch and matrix stands along the Atlantic and Fundy coasts. Cool temperatures, high winds, salt spray, and elevated humidity and fog are the strongest determinants of stand composition and structure. Most occurrences have dense canopies and well developed bryophyte layers. On more exposed sites, trees may be stunted and wind shorn; in extreme circumstances, krummholtz canopy structures can form. Outside the Cape Breton highlands ecoregion, these are the coldest forests in the province. Most have some boreal affinity, which may or may not be expressed in the understory. Coastal forests provide important habitat for many birds (e.g. black-crowned night heron, osprey, blackpoll warbler, sharp-tailed sparrow, fox sparrow), particularly for 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. Older stands may support uncommon orchids and cyanolichens. There is low potential for this group to develop and sustain old growth conditions.

## CO1

### Black spruce – Balsam fir / Foxberry / Plume moss

*Picea mariana* – *Abies balsamea* / *Vaccinium vitis-idaea* /  
*Ptilium crista-castrensis*

n=10



Second Lake,  
Halifax County

**Concept:** This edaphic climax Vegetation Type (VT) has an overstory dominated by black spruce and balsam fir. White spruce may also be common in western parts of the province. Coniferous tree species regeneration and moss cover are usually extensive. Black spruce – Balsam fir / Foxberry / Plume moss represents the dominant forest found on fresh-moist, nutrient poor coastal sites in Nova Scotia.

**Vegetation:** Black spruce and balsam fir are the dominant overstory trees, with lesser amounts of white spruce and tamarack. (White spruce may be more common in western Nova Scotia, where balsam fir cover is reduced.) Scattered red maple and white birch (if present) are 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, false holly and mountain-ash. Herb layer diversity is low, with bunchberry, creeping snowberry and twinflower often dominant. Scattered foxberry can also be found, with cinnamon fern also common on wetter sites. Schreber's moss dominates the extensive bryophyte layer with lesser amounts of stair-step moss, bazzania and plume moss.

#### Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Stands near the

coast or on islands are used as nesting sites and roosts for great blue herons and various seabirds. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration. Mature forests develop abundant old man's beard, a lichen that

**Environmental Setting:** CO1 is mainly associated with 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 tree height potential in CO1 stands. This VT likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

**Successional Dynamics:** This VT has nutrient poor soils that give rise to an edaphic climax community dominated by black spruce and balsam fir. 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 years, after which tree senescence will initiate renewal through advanced regeneration. Due to its unique ecological setting, CO1 does not usually shift to other vegetation types after disturbance. However, on higher fertility sites, CO1 may succeed from (or revert to) CO4 (Balsam fir / Foxberry – Twinflower). Between stand-level disturbances, natural tree senescence can create uneven age class distribution and other stand structures.

provides important nest material for warblers and other species, and winter food for deer grazing on fallen trees. Old, undisturbed stands with balsam fir may house the endangered boreal felt lichen and other uncommon cyanolichens.

## Characteristic Plants

C01

	Freq. (%)	Cover (%)
Black spruce	100	25.4
Balsam fir	100	18.6
White birch	63	4.0
Tamarack	38	5.3
Red maple	25	5.0
White spruce	25	5.0
<b>Tree Layer (Mean % Cover)</b>		<b>51</b>
Balsam fir	100	11.1
Lambkill	100	3.6
Black spruce	100	2.0
Wild raisin	88	1.1
Mountain-ash	88	0.9
False holly	88	0.4
Velvet-leaf blueberry	63	0.3
White birch	50	0.3
Huckleberry	38	0.4
Lowbush blueberry	38	0.2
Serviceberry	38	0.1
Heart-leaf birch	25	0.8
<b>Shrub Layer (Mean % Cover)</b>		<b>20</b>
Bunchberry	100	3.6
Starflower	88	0.6
Wild lily-of-the-valley	75	0.7
Foxberry	75	0.1
Creeping snowberry	63	8.2
Bluebead lily	63	7.3
Twinflower	63	2.3
Bracken	63	1.9
Goldthread	63	0.9
Sarsaparilla	63	0.3
Cinnamon fern	25	6.0
Indian pipe	25	0.1
Mayflower	25	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>20</b>
Schreber's moss	100	62.4
Stair-step moss	100	12.6
Bazzania	100	9.9
Plume moss	100	4.3
Wavy dicranum	88	3.1
Broom moss	75	1.9
Ladies' tresses	75	1.6
Cup lichens	63	0.3
Grey reindeer lichen	50	0.8
Hypnum moss	38	1.5
Naugehyde liverwort	25	0.6
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>96</b>

## Distinguishing Features

This coastal softwood forest has abundant black spruce in the overstory. Mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. Extensive moss coverage and a thick duff layer characterize the forest floor.



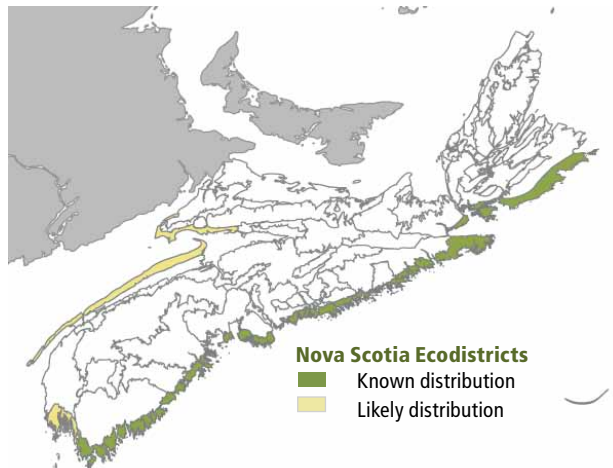
Plume moss

## Site Characteristics

Slope Position:	Upper <sup>5</sup> Middle <sup>3</sup> Level <sup>2</sup>
Surface Stoniness:	(Very - Excessively) <sup>4</sup> (Non - Slightly) <sup>3</sup> (Moderately) <sup>3</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly - Moderately) <sup>1</sup> (Very - Excessively) <sup>1</sup>
Elevation Range:	8 - 116m
Slope Gradient:	Gentle <sup>7</sup> Level <sup>2</sup> Moderate <sup>1</sup>
Aspect:	North <sup>4</sup> East <sup>3</sup> South <sup>1</sup> West <sup>1</sup> None <sup>1</sup>
Exposure:	Exposed <sup>8</sup> Mod. exposed <sup>2</sup>
Microtopography:	Slightly <sup>6</sup> Level <sup>4</sup>
Drainage:	Imperfect <sup>7</sup> Moderately well <sup>3</sup>

## Soil Characteristics

Soil Type:	ST3 <sup>4</sup> ST3-L <sup>3</sup> ST6 <sup>2</sup> ST2-L <sup>1</sup>
Parent Material:	Glacial till <sup>9</sup> Till/Bedrock <sup>1</sup>
Rooting Depth (cm):	(<30) <sup>7</sup> (30-45) <sup>3</sup>
Duff Thickness (cm):	(11-20) <sup>7</sup> (21-40) <sup>3</sup>



### Nova Scotia Ecodistricts

- Known distribution
- Likely distribution

## CO2

### White spruce – Balsam fir / Foxberry – Twinflower

*Picea glauca* – *Abies balsamea* /  
*Vaccinium vitis-idaea* – *Linnaea borealis*

#### CO2a

### Black crowberry Headland variant

*Empetrum nigrum*

n=6



Colin's Cove,  
Richmond County

**Concept:** This mid to late successional Vegetation Type (VT) has an overstory dominated by white spruce, with a component of balsam fir. Strong winds, salt spray and harsher climatic conditions, along more exposed headlands and shorelines, often create a severely stunted canopy structure called krummholtz. The CO2a variant defines a krummholtz vegetation type. White spruce – Balsam fir / Foxberry – Twinflower is scattered along the Nova Scotia coast and is typically closer to the shore than other VTs in this group.

**Vegetation:** White spruce is the dominant overstory tree along with balsam fir. Black spruce, white birch and red maple are minor associates. The shrub layer is often poorly developed, but includes mountain-ash, wild raisin, false holly, blueberries and lambkill (along with regenerating balsam fir). The well-developed herb layer includes typical upland forest flora such as bunchberry, twinflower, wild lily-of-the-valley, wood sorrel and starflower. For the exposed CO2a variant, ground juniper, sweet gale, bayberry, chokeberry and black crowberry are also common. Schreber's moss and stair-step moss dominate the well-developed bryophyte layer.

#### Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Stands close to the coast or

on islands are used as nesting sites and roosts for great blue herons and various seabirds. 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 the native softwood species

and acts as a protective belt for balsam fir. Krummholtz (trees stunted by severe wind and salt spray exposure) is common at the coastline especially on headlands. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration.

**Environmental Setting:** CO2 is mainly associated with fresh-moist to moist, nutrient poor to nutrient-medium soils of glacial origin. These soils are generally medium to coarse textured and potentially shallow to bedrock in some locations. This VT is mainly found near shorelines on exposed headlands, hills and ridges, as well as off-shore islands. High winds and salt spray limit tree height potential in this VT, especially in CO2a stands. The VT occurs in more exposed coastal areas of both New Brunswick and Prince Edward Island.

**Successional Dynamics:** CO2 is a mid to late successional VT dominated by white spruce. On relatively sheltered sites, this even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage and harvesting. CO4 (Balsam fir / Foxberry – Twinflower) may be an earlier successional stage on these sites. On the more exposed CO2a sites, gap or patch disturbance may be more typical because stunted white spruce are less prone to windthrow. CO2a does not tend to shift to other VTs, but does change in development stage. Between stand-level disturbances, natural tree senescence can create uneven age class distribution and other stand structures.

## Characteristic Plants

C02

	C02	
	Freq. (%)	Cover (%)
White spruce	100	44.2
Balsam fir	100	15.7
Black spruce	83	4.2
White birch	50	4.0
Red maple	17	17.0
Choke cherry	17	0.1
Mountain-ash	17	0.1
<b>Tree Layer (Mean % Cover)</b>		<b>68</b>
Balsam fir	83	1.3
False holly	83	0.1
White birch	67	0.2
Lowbush blueberry	67	0.1
Velvet-leaf blueberry	50	0.4
Lambkill	50	0.1
Sweet gale	33	1.5
Mountain-ash	33	0.2
Common blackberry	33	0.1
Red raspberry	33	0.1
Wild red currant	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>15</b>
Bunchberry	83	12.4
Wild lily-of-the-valley	83	6.6
Starflower	83	1.2
Twinflower	67	12.3
Wood-sorrel	67	1.4
Foxberry	67	0.6
Cinnamon fern	67	0.1
Wood aster	67	0.1
Sarsaparilla	50	13.3
Goldthread	50	1.3
Bent-grass	50	0.1
Poverty grass	34	0.4
Black crowberry	33	7.5
Eastern spreading wood fern	33	1.5
Bracken	33	0.8
Evergreen wood fern	33	0.6
Creeping snowberry	33	0.1
Dwarf raspberry	33	0.1
Northern beech fern	33	0.1
Pink lady's slipper	33	0.1
White panicle aster	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>35</b>
Schreber's moss	83	63.0
Stair-step moss	83	14.1
Bazzania	67	1.3
Broom moss	67	0.9
Pin cushion moss	50	0.1
Shaggy moss	33	2.8
Hypnum moss	33	0.6
Grey reindeer lichen	33	0.4
Plume moss	33	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>67</b>

## Distinguishing Features

Abundant white spruce in the overstory is required to classify this coastal softwood forest. Mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. The variant, CO2a, is usually open grown and typical of headlands. Under open conditions black crowberry and common juniper grow in large patches.



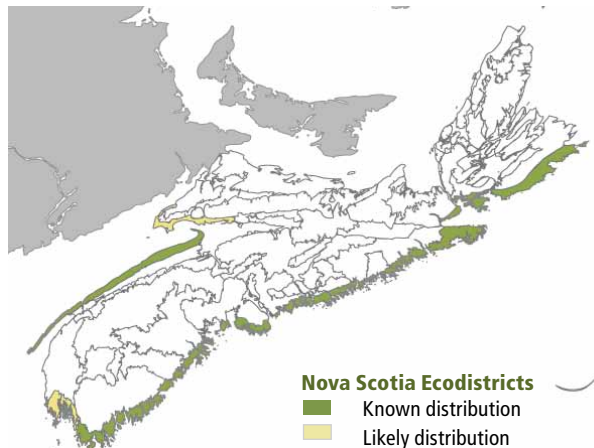
Headland

## Site Characteristics

Slope Position:	Middle <sup>5</sup> Upper <sup>5</sup>
Surface Stoniness:	(Non - Slightly) <sup>7</sup> (Moderately) <sup>3</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly - Moderately) <sup>2</sup>
Elevation Range:	18 - 58m
Slope Gradient:	Gentle <sup>6</sup> Moderate <sup>2</sup> nd <sup>2</sup>
Aspect:	East <sup>5</sup> West <sup>5</sup>
Exposure:	Exposed <sup>7</sup> Mod. exposed <sup>3</sup>
Microtopography:	Slightly <sup>5</sup> Level <sup>3</sup> Moderately <sup>2</sup>
Drainage:	Moderately well <sup>5</sup> Well <sup>5</sup>

## Soil Characteristics

Soil Type:	ST2 <sup>8</sup> ST2-L <sup>1</sup> ST8 <sup>1</sup>
Parent Material:	Glacial till <sup>10</sup>
Rooting Depth (cm):	(<30) <sup>3</sup> (30-45) <sup>7</sup>
Duff Thickness (cm):	(0-5) <sup>3</sup> (6-10) <sup>5</sup> (11-20) <sup>2</sup>



### Nova Scotia Ecodistricts

- Known distribution
- Likely distribution

## CO3

### Red spruce / Mountain-ash / Foxberry

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

n=10



Keyhole Brook,  
Cape Chignecto,  
Cumberland County

**Concept:** This late successional Vegetation Type (VT) has an overstory dominated by red spruce with a component of balsam fir. CO3 is the only Maritime Boreal VT dominated by red spruce. Besides the presence of typical coastal forest species (e.g. mountain-ash and foxberry), CO3 differs from Acadian red spruce vegetation types by its relatively thick duff layer and extensive bazzania cover. The absence of hemlock, which is typically a component of Nova Scotia red spruce forests, is also a distinguishing feature of CO3. Red spruce / Mountain-ash / Foxberry is mainly found along the Bay of Fundy slopes.

**Vegetation:** Red spruce is the dominant overstory tree, with balsam fir and white birch as common associates. Yellow birch, black spruce, red maple and heart-leaf birch are also found in some stands. The poorly-developed shrub layer is dominated by regenerating trees along with mountain-ash and velvet-leaf blueberry. The herb layer shows more development and includes typical upland flora such as twinflower, bunchberry, goldthread and sarsaparilla. Scattered foxberry can also be found, with cinnamon fern and three seeded sedge on wetter sites. Bazzania dominates the bryophyte layer.

**Environmental Setting:** CO3 is mainly associated with fresh to moist, nutrient medium soils of glacial origin. These soils are generally medium to coarse textured. CO3 and earlier successional stages cover most of the well to imperfectly drained slopes along the Bay of Fundy. The best examples are found along Cape Chignecto where steep slopes limited the conversion of forest to agricultural land (as happened on the more gentle North Mountain slopes). This VT can also be found in the Tusket Islands ecodistrict. High winds and exposure limit tree height potential in CO3 stands. The VT occurs on the Fundy coast of New Brunswick.

**Successional Dynamics:** CO3 is a late successional VT dominated by red spruce. This VT typically follows stand-replacing disturbances such as windthrow, insect infestation and harvesting. The longevity and shade tolerance of red spruce provides an opportunity for the development of uneven-aged forests maintained by gap disturbances. CO4 (Balsam fir / Foxberry – Twinflower) can be a mid-successional stage. Forests that originate after harvesting may initially be dominated by pin cherry, raspberry, white birch, heart-leaf birch and mountain-ash.

### Ecological Features

This closed canopy, large patch forest is primarily associated with the Fundy Shore ecoregion. The best provincial examples are along the slopes of Cape Chignecto, where steep topography limited forest conversion to agriculture. Along the

more gentle Fundy slopes of the North Mountain, few stands have been spared from past and present farming. These forests feature some of the world's oldest red spruce, including the world record 445-year-old found at Fundy National

Park. Mature forests 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. The rare arctic kidney lichen is found in some stands.

## Characteristic Plants

C03

	Freq. (%)	Cover (%)
Red spruce	100	55.1
Balsam fir	90	14.5
White birch	50	7.2
Red maple	30	5.0
Heart-leaf birch	20	3.0
Yellow birch	10	16.0
Black spruce	10	13.0
White pine	10	10.0
<b>Tree Layer (Mean % Cover)</b>		<b>75</b>
Balsam fir	100	4.5
Red spruce	100	1.1
Velvet-leaf blueberry	70	0.3
Mountain-ash	70	0.1
Red maple	60	0.4
False holly	60	0.1
Heart-leaf birch	60	0.1
Lambkill	50	0.2
Yellow birch	40	0.8
Wild raisin	30	2.0
Fly-honeysuckle	30	0.4
White birch	30	0.1
Huckleberry	20	0.9
White pine	20	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>7</b>
Bunchberry	100	5.2
Goldthread	100	2.5
Wild lily-of-the-valley	70	0.4
Creeping snowberry	60	3.4
Twinflower	60	0.9
Painted trillium	60	0.1
Three seeded sedge	50	5.0
Foxberry	50	1.6
Sarsaparilla	50	1.0
Starflower	50	0.4
Clintonia	50	0.3
Pink lady's slipper	50	0.1
Cinnamon fern	40	10.1
Wood-sorrel	40	9.1
Eastern spreading wood fern	40	1.8
Wood aster	40	0.1
Bracken	30	1.3
Evergreen wood fern	20	0.4
<b>Herb Layer (Mean % Cover)</b>		<b>22</b>
Schreber's moss	100	14.8
Bazzania trilobata	90	49.8
Broom moss	80	1.8
Stair-step moss	70	2.1
Ladies' tresses	60	9.5
Common green sphagnum	50	6.6
Grey reindeer lichen	40	1.1
Ptilium ciliare	40	0.2
Hair-cap moss	40	0.1
Hypnum moss	30	1.7
Dicranum majus	20	0.8
Wavy dicranum	20	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>73</b>

## Distinguishing Features

Red spruce is diagnostic for this softwood forest found only along the Bay of Fundy and among the Tusket Islands.

The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, although they are not always present.



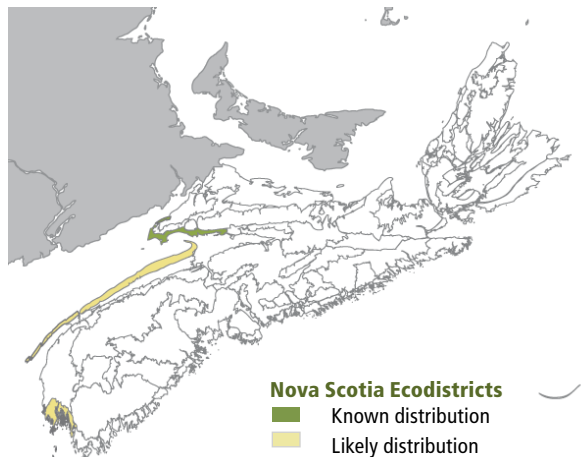
Bazzania

## Site Characteristics

Slope Position:	Upper <sup>4</sup> Middle <sup>3</sup> Lower <sup>2</sup> Level <sup>1</sup>
Surface Stoniness:	(Non - Slightly) <sup>10</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Elevation Range:	27 - 66m
Slope Gradient:	Gentle <sup>8</sup> Level <sup>1</sup> nd <sup>1</sup>
Aspect:	North <sup>2</sup> East <sup>2</sup> West <sup>3</sup> None <sup>1</sup>
Exposure:	Exposed <sup>6</sup> Mod. Exposed <sup>3</sup> Moderate <sup>1</sup>
Microtopography:	Moderately <sup>4</sup> Slightly <sup>4</sup> Level <sup>1</sup> Strongly <sup>1</sup>
Drainage:	Imperfect <sup>5</sup> Well <sup>3</sup> Moderately well <sup>1</sup> Poor <sup>1</sup>

## Soil Characteristics

Soil Type:	ST3 <sup>4</sup> ST2 <sup>3</sup> ST2-L <sup>1</sup> ST3-L <sup>1</sup> ST4 <sup>1</sup>
Parent Material:	Glacial till <sup>10</sup>
Rooting Depth (cm):	(<30) <sup>2</sup> (30-45) <sup>8</sup>
Duff Thickness (cm):	(11-20) <sup>9</sup> (21-40) <sup>1</sup>



### Nova Scotia Ecodistricts

- Known distribution
- Likely distribution



## CO4

### Balsam fir / Foxberry – Twinflower

*Abies balsamea* / *Vaccinium vitis-idaea* –  
*Linnaea borealis*

n=9



Halfway Island Cove,  
Guysborough County

**Concept:** This mid to late successional Vegetation Type (VT) has an overstory dominated by balsam fir. Balsam fir regeneration and moss cover are usually extensive. Balsam fir / Foxberry – Twinflower represents the dominant forest found on fresh/moist, nutrient medium sites along the Atlantic coast of Nova Scotia.

**Vegetation:** Balsam fir is the dominant overstory tree along with lesser amounts of black spruce and white spruce. Tamarack can also be common on moister sites. Scattered red maple and white birch (if present) are typically in an intermediate canopy position. The shrub layer is dominated by regenerating balsam fir with scattered lambkill, false holly and mountain-ash. Herb layer diversity is low, with frequent bunchberry, wild lily-of-the-valley, sarsaparilla, twinflower and foxberry. Schreber's moss and bazzania dominate the extensive bryophyte layer, along with stair-step moss, broom moss and plume moss.

**Environmental Setting:** CO4 is mainly associated with fresh to fresh-moist, nutrient poor to medium soils of glacial origin. These soils are generally medium to coarse textured and often stony. The majority of this VT is found in the Atlantic

Coastal ecoregion. High winds and exposure limit tree height potential in CO4 stands. The VT likely occurs in more exposed coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

**Successional Dynamics:** CO4 is a mid to late successional VT dominated by balsam fir. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. In the absence of disturbance, the typical lifespan of balsam fir in this ecosystem is 100 years, after which tree senescence will initiate renewal through advanced regeneration. Depending in part on the level of advanced regeneration at time of disturbance, CO4 can perpetuate itself or possibly transition into CO1 (Black spruce – Balsam fir / Foxberry / Plume moss), CO2 (White spruce – Balsam fir / Foxberry – Twinflower) or CO3 (Red spruce / Mountain-ash / Foxberry). Succession to CO1 would be on poorer sites while movement to CO3 would only occur in geographic areas supporting this VT. CO4 may also transition to CO5 (White birch – Balsam fir / Foxberry – Wood aster) on more sheltered sites. Forests that originate after harvesting may initially be dominated by pin cherry, raspberry, white birch and mountain-ash.

### Ecological Features

This closed canopy matrix forest is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. The forest's longevity is a function of either canopy tree senescence or the frequency of catastrophic stand disturbances (usually hurricanes). Both create abundant snags, coarse woody debris,

and dense regenerating fir thickets – good cover for small mammals. Stands close to the coast or on islands are used as nesting sites and roosts for great blue herons and some seabirds. Coastal forests are often used by songbirds as they travel along the coast during spring and fall migration. Older stands with

balsam fir may have the endangered boreal felt lichen and other uncommon cyanolichens. Mature forests develop abundant old man's beard, a lichen used for nest material by warblers and other species, and winter food for deer foraging on fallen trees.

## Characteristic Plants

C04

	Freq. (%)	Cover (%)
Balsam fir	100	50.2
Black spruce	78	7.1
White spruce	67	10.8
White birch	44	1.3
Red maple	33	1.7
Tamarack	22	17.3
Grey birch	11	1.0
Red oak	11	1.0
<b>Tree Layer (Mean % Cover)</b>		<b>68</b>
Balsam fir	89	20.7
Lambkill	78	0.5
False holly	78	0.1
White birch	67	0.2
Mountain-ash	56	0.7
Lowbush blueberry	44	1.6
Wild raisin	44	0.9
Black spruce	33	1.7
Serviceberry	33	0.4
White spruce	22	2.0
Downy alder	22	0.2
<b>Shrub Layer (Mean % Cover)</b>		<b>23</b>
Twinflower	78	10.5
Bunchberry	78	1.6
Wild lily-of-the-valley	78	0.8
Foxberry	78	0.3
Sarsaparilla	67	4.2
Starflower	67	0.3
Creeping snowberry	44	7.6
Bluebead lily	44	2.4
Cinnamon fern	44	1.5
Wood-sorrel	44	1.4
Goldthread	44	0.5
Bracken	33	0.1
Evergreen wood fern	33	0.1
Indian pipe	33	0.1
Wood aster	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>20</b>
Schreber's moss	100	35.9
Stair-step moss	89	13.4
Broom moss	89	2.8
Bazzania	78	23.7
Plume moss	56	3.7
Hair-cap moss	44	10.5
Wavy dicranum	44	1.5
Hypnum moss	22	1.3
Ladies' tresses	22	0.5
Cup lichens	22	0.3
Pale fat-leaved sphagnum	22	0.1
Grey reindeer lichen	22	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>78</b>

## Distinguishing Features

Balsam fir is the dominant species in this coastal softwood forest. The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence, though they are not always present. Extensive moss coverage and a thick duff layer characterize the forest floor.



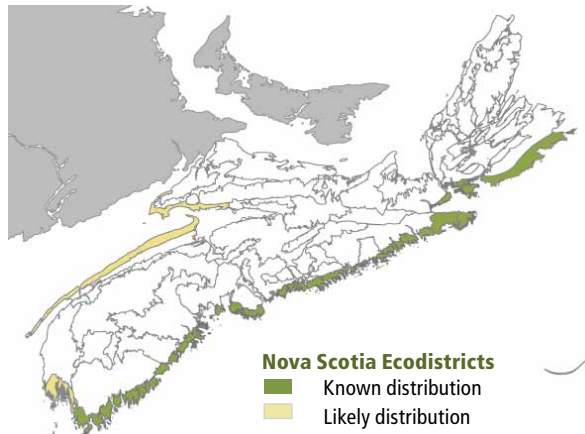
Twinflower

## Site Characteristics

Slope Position:	Upper <sup>5</sup> Level <sup>2</sup> Middle <sup>2</sup> nd <sup>1</sup>
Surface Stoniness:	(Non - Slightly) <sup>4</sup> (Moderately) <sup>3</sup> (Very - Excessively) <sup>2</sup> nd <sup>1</sup>
Bedrock Outcrop:	(Non-rocky) <sup>9</sup> (Slightly - Moderately) <sup>1</sup>
Elevation Range:	5 - 41m
Slope Gradient:	Gentle <sup>7</sup> Level <sup>1</sup> Moderate <sup>1</sup> Steep <sup>1</sup>
Aspect:	North <sup>3</sup> East <sup>2</sup> South <sup>3</sup> West <sup>1</sup> None <sup>1</sup>
Exposure:	Exposed <sup>9</sup> Mod. exposed <sup>2</sup>
Microtopography:	Slightly <sup>4</sup> Level <sup>2</sup> Moderately <sup>2</sup> Strongly <sup>2</sup>
Drainage:	Moderately well <sup>6</sup> Well <sup>3</sup> Imperfect <sup>1</sup>

## Soil Characteristics

Soil Type:	ST2 <sup>7</sup> ST3 <sup>1</sup> ST15 <sup>1</sup> nd <sup>1</sup>
Parent Material:	Glacial till <sup>9</sup> Till/Bedrock <sup>1</sup>
Rooting Depth (cm):	(<30) <sup>2</sup> (30-45) <sup>7</sup> nd <sup>1</sup>
Duff Thickness (cm):	(11-20) <sup>9</sup> nd <sup>1</sup>



## C05

### White birch – Balsam fir / Foxberry – Wood aster

*Betula papyrifera* – *Abies balsamea* / *Vaccinium  
vitis-idaea* – *Aster acuminatus*

n=2



Waddens Cove,  
Cape Breton County

**Concept:** This mid-successional Vegetation Type (VT) has an overstory dominated by white birch, usually with a strong component of balsam fir. In western Nova Scotia, trembling aspen, red maple and white spruce can also be common in the overstory. Extensive conifer regeneration often dominates the shrub layer. White birch – Balsam fir / Foxberry – Wood aster is usually associated with more sheltered sites across the Atlantic Coastal ecoregion.

**Vegetation:** White birch is the dominant overstory tree, along with balsam fir and/or white spruce. Scattered red maple and black spruce are also typical and minor amounts of heart-leaf birch—a species usually confined to Nova Scotia’s coastal and highland ecoregions—is sometimes in the overstory. The shrub layer is often dominated by regenerating balsam fir. Other shrubs include wild raisin, velvet-leaf blueberry, lambkill, false holly and mountain-ash (which can sometimes attain overstory height and crown breadth). Herb layer diversity is low; only bunchberry, goldthread, creeping snowberry and foxberry are common. The bryophyte layer is well developed for a mixedwood VT, with Schreber’s moss the main species. *Bazzania* cover can also be high where coarse woody debris has accumulated on the forest floor.

#### Ecological Features

This mixedwood patch forest of white birch, red maple and balsam fir is primarily associated with the Maritime Boreal Atlantic Coastal ecoregion. It is usually found inland, protected by

seaward stands of spruce and fir forest or on sites sheltered from coastal winds and salt spray. The short longevity and shade intolerance of white birch, relative to red maple, can produce uneven-aged

canopy structures. Older stands with balsam fir may have the endangered boreal felt lichen and other uncommon cyanolichens.

**Environmental Setting:** C05 is associated with fresh to moist, 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 (C01 – C04). The VT likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

**Successional Dynamics:** C05 is a mid-successional VT dominated by white birch and balsam fir and/or white spruce. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. Although still influenced by wind and exposure, like other coastal VTs, increased shelter allows hardwood tree species to rise above or co-dominate the canopy with softwoods on C05 sites. Depending on the disturbance agent and its return interval, and on the degree of sheltering, C05 may succeed to C06 (Red maple – White birch / Bunchberry – Sarsaparilla) or transition to C04 (Balsam fir / Foxberry – Twinflower).

Characteristic Plants	C05	
	Freq. (%)	Cover (%)
White birch	100	41.5
Black spruce	100	4.5
Red maple	100	2.5
Balsam fir	50	30.0
White spruce	50	20.0
<b>Tree Layer (Mean % Cover)</b>		<b>74</b>
Velvet-leaf blueberry	100	3.8
Lambkill	100	3.3
Wild raisin	100	2.1
Black spruce	100	0.8
White birch	100	0.2
False holly	100	0.1
Balsam fir	50	15.0
White spruce	50	1.5
Bush-honeysuckle	50	0.8
Red maple	50	0.4
Red-berried elder	50	0.3
Mountain-ash	50	0.1
Serviceberry	50	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>20</b>
Bunchberry	100	9.5
Goldthread	100	3.3
Creeping snowberry	100	1.8
Foxberry	100	0.6
Starflower	100	0.6
Wild lily-of-the-valley	100	0.6
Twinflower	100	0.5
Wood aster	100	0.1
Bracken	50	1.0
Evergreen wood fern	50	0.5
Bluebead lily	50	0.1
Mayflower	50	0.1
Spinulose wood fern	50	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>18</b>
Schreber's moss	100	49.5
Broom moss	100	4.5
Hair-cap moss	100	2.0
Cup lichens	100	0.6
Bazzania	50	8.0
Stair-step moss	50	7.0
Grey reindeer lichen	50	3.0
Hypnum moss	50	0.5
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>66</b>

## Distinguishing Features

White birch and balsam fir are common in the overstory of this coastal mixedwood forest. The presence of mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence though not always present. Wood aster is common. Moss coverage on the forest floor is still extensive even with the hardwood overstory.



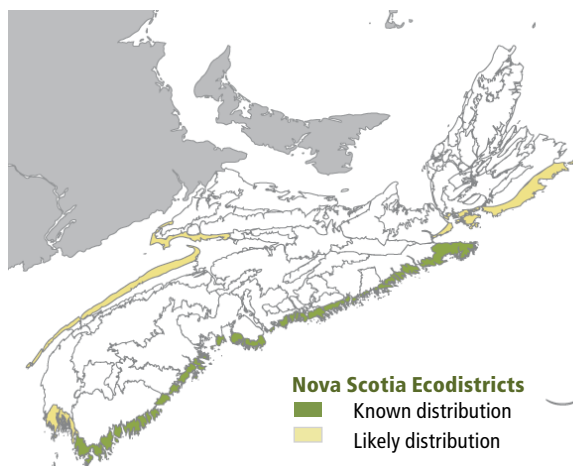
Foxberry  
(Breagh Quigley)

## Site Characteristics

Slope Position:	Middle <sup>5</sup> Upper <sup>5</sup>
Surface Stoniness:	(Very - Excessively) <sup>10</sup>
Bedrock Outcrop:	(Non-rocky) <sup>5</sup> (Slightly - Moderately) <sup>5</sup>
Elevation Range:	17 - 24m
Slope Gradient:	Gentle <sup>5</sup> Moderate <sup>5</sup>
Aspect:	West <sup>10</sup>
Exposure:	Exposed <sup>5</sup> Mod. exposed <sup>5</sup>
Microtopography:	Level <sup>5</sup> Slightly <sup>5</sup>
Drainage:	Well <sup>10</sup>

## Soil Characteristics

Soil Type:	ST <sup>2</sup> ST <sup>2</sup> -L <sup>5</sup>
Parent Material:	Glacial till <sup>5</sup> Till/Bedrock <sup>5</sup>
Rooting Depth (cm):	(30-45) <sup>10</sup>
Duff Thickness (cm):	(0-5) <sup>10</sup>



## C06

### Red maple – Birch / Bunchberry – Sarsaparilla

*Acer rubrum* – *Betula* spp. / *Cornus canadensis* –  
*Aralia nudicaulis*

n=6



Blanche,  
Shelburne County

**Concept:** This late successional Vegetation Type (VT) has an overstory dominated by red maple and/or white birch. Extensive conifer regeneration often dominates the shrub layer. Red maple – White birch / Bunchberry – Sarsaparilla is usually associated with more sheltered sites within the Atlantic Coastal ecoregion.

**Vegetation:** Red maple and white birch are the dominant overstory trees with balsam fir as a common associate. Heart-leaf birch (a species confined to the Coastal and Highland ecoregions) and yellow birch are sometimes found scattered in the overstory, while red oak, white pine and white spruce may also be present in western Nova Scotia. The shrub layer is often dominated by regenerating balsam fir. Other shrubs may include wild raisin, huckleberry, lambkill and mountain-ash (which can sometimes attain overstory height). Herb layer diversity is low, and bunchberry, goldthread, sarsaparilla, wood sorrel and bracken are common. The bryophyte layer is relatively well developed for a hardwood VT, dominated by Schreber's and hypnum mosses. *Bazzania* can also be found where coarse woody debris has accumulated on the forest floor.

### Ecological Features

This small patch white birch and red maple forest is principally associated with the Maritime Boreal Atlantic Coastal ecoregion. It is usually found further inland, protected by seaward stands of spruce and fir forest or on sites

sheltered from coastal winds and salt spray. Young red maple shoots are a food source favoured by deer. The canopy of red maples and white birch provide excellent nesting cover for many species of birds. Seeds of both species are eaten

**Environmental Setting:** C06 is associated with fresh to moist, 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 (C01 – C04). C06 likely occurs in coastal areas of both New Brunswick and Prince Edward Island, but has not been documented.

**Successional Dynamics:** C06 is a late successional VT dominated by red maple and white birch. This even-aged VT typically follows stand-replacing disturbances such as windthrow, breakage, insect infestation and harvesting. Although still influenced by wind and exposure, like other coastal VTs, increased shelter allows hardwood tree species to rise above softwoods on C06 sites. However, softwoods (particularly balsam fir) will often dominate disturbed areas until hardwoods become re-established. C05 (White birch – Balsam fir / Foxberry – Wood aster) is a mid-successional stage.

by a variety of small mammals that find cover in tree cavities and woody debris. Wild raisin, huckleberry, blueberry and mountain-ash provide important seasonal berry crops.

## Characteristic Plants

C06

	Freq. (%)	Cover (%)
Red maple	67	40.8
White birch	50	29.0
Balsam fir	33	13.0
Yellow birch	33	3.5
Heart-leaf birch	17	18.0
Black spruce	17	5.0
<b>Tree Layer (Mean % Cover)</b>		<b>51</b>
Balsam fir	83	8.6
Wild raisin	67	5.5
Lambkill	67	4.8
Velvet-leaf blueberry	67	1.5
Huckleberry	50	29.7
Mountain-ash	50	0.2
White birch	50	0.1
Black spruce	33	2.3
False holly	33	1.6
Red maple	33	1.0
Yellow birch	33	0.3
White spruce	33	0.2
Common blackberry	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>35</b>
Bunchberry	83	17.2
Goldthread	83	3.8
Sarsaparilla	67	4.6
Bracken	67	3.3
Starflower	67	0.1
Cinnamon fern	50	1.0
Evergreen wood fern	50	0.3
Wood-sorrel	33	40.3
Trailing blackberry	33	2.5
Eastern spreading wood fern	33	1.9
Wild lily-of-the-valley	33	1.0
Brownish sedge	33	0.5
Drooping wood sedge	33	0.1
Fibrous-root sedge	33	0.1
Pink lady's slipper	33	0.1
Spinulose wood fern	33	0.1
Wood aster	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>40</b>
Schreber's moss	67	5.5
Hypnum moss	50	6.0
Broom moss	50	0.7
Bazzania	33	1.4
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>12</b>

## Distinguishing Features

Red maple and white birch are common in the overstory of this coastal mixedwood forest. Though not always present, mountain-ash, heart-leaf birch, foxberry and bazzania are indicators of a coastal influence. Moss coverage on the forest floor is still extensive even with the hardwood overstory.



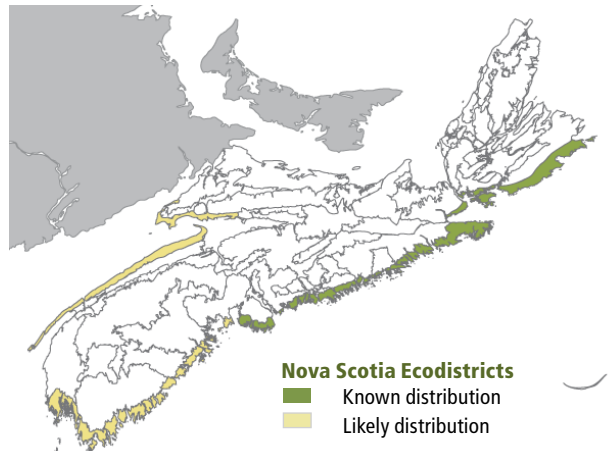
Mountain-ash

## Site Characteristics

Slope Position:	Middle <sup>5</sup> Upper <sup>3</sup> Level <sup>2</sup>
Surface Stoniness:	(Very - Excessively) <sup>5</sup> (Moderately) <sup>3</sup> (Non - Slightly) <sup>2</sup>
Bedrock Outcrop:	(Non-rocky) <sup>8</sup> (Slightly - Moderately) <sup>2</sup>
Elevation Range:	33 - 121m
Slope Gradient:	Moderate <sup>5</sup> Gentle <sup>3</sup> Level <sup>2</sup>
Aspect:	North <sup>2</sup> East <sup>2</sup> South <sup>2</sup> West <sup>2</sup> None <sup>2</sup>
Exposure:	Exposed <sup>8</sup> Mod. exposed <sup>2</sup>
Microtopography:	Slightly <sup>5</sup> Moderately <sup>3</sup> Strongly <sup>2</sup>
Drainage:	Moderately well <sup>5</sup> Imperfect <sup>3</sup> Well <sup>2</sup>

## Soil Characteristics

Soil Type:	ST2-L <sup>3</sup> ST3 <sup>3</sup> nd <sup>3</sup>
Parent Material:	Glacial till <sup>8</sup> Colluvium <sup>2</sup>
Rooting Depth (cm):	(<30) <sup>2</sup> (30-45) <sup>5</sup> (>45) <sup>1</sup> nd <sup>2</sup>
Duff Thickness (cm):	(6-10) <sup>3</sup> (11-20) <sup>3</sup> nd <sup>3</sup>



## White spruce / Bayberry

*Picea glauca* / *Myrica pensylvanica*

n=3



Carters Beach,  
Queens County

**Concept:** This white spruce dominated woodland is found on coastal sand dunes, where it marks the last stage of dune vegetation succession. Crown closure is variable but usually moderate. Woody species contribute largely to understory stand structure, except in mature occurrences where increased bryophyte cover is typical. 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 supports high white spruce cover, and occasionally includes minor to moderate levels of white pine, black spruce and/or balsam fir. 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 baltic rush 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.

### Ecological Features

Vertical and horizontal structure in the White Spruce/ Bayberry ecosystem is variable, but most occurrences have an open canopy and high shrub and/or herbaceous cover. On more extensive dune complexes, C07 stands sometime provide the only available forest cover. C07's occurrence at shorelines may

make it important coastal bird habitat (e.g. for fox and sharp-tailed sparrows; yellow-rumped and blackpoll warblers), epiphytic and ground lichens, and various invertebrates, among other taxonomic groups. Records from available plot data show very few 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 and past land-use practices (e.g. anthropogenic fire, tree harvest and farming). These impacts, and the relative rarity of C07, present important conservation challenges.

**Environmental Setting:** Dune forest is found at low elevation on flat and hummocky terrain. It occurs on both wind and marine deposited sands. These relatively young deposits show little mineral soil development, but evidence of leaching (thin Ae and Bfj horizons) can be found in some profiles. In addition, mature C07 stands often have continuous forest floor and moss cover. Moist dune forests have not been sampled, but may be possible on longer dunes in lower slope positions. Exposure is high; exposed stones and bedrock are very low. C07 occurs in eastern New Brunswick and on the north shore of Prince Edward Island.

**Successional Dynamics:** Successional dynamics of dune forest 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 is 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 white spruce (C01) or coastal black spruce forest (C02), depending on soil structure, nutrient and moisture availability, and topographic position.

## Characteristic Plants

C07

	Freq. (%)	Cover (%)
White spruce	100	31.7
Trembling aspen	33	6.0
White pine	33	5.0
Red maple	33	3.0
<b>Tree Layer (Mean % Cover)</b>		<b>36.3</b>
Bayberry	67	10.0
Wild rose	67	7.5
Serviceberries	67	1.0
Red maple	67	0.1
Red oak	67	0.1
White spruce	33	10.0
Western poison ivy	33	2.0
Choke cherry	33	1.0
Pin cherry	33	1.0
Gooseberry family	33	0.1
Red raspberry	33	0.1
<b>Shrub Layer (Mean % Cover)</b>		<b>17.2</b>
Sarsaparilla	33	40.0
Dwarf raspberry	33	3.0
Field horsetail	33	3.0
Mouse eared hawkweed	33	3.0
Canada bluegrass	33	2.0
Tall white aster	33	2.0
Baltic rush	33	1.0
Red fescue	33	1.0
Rough goldenrod	33	1.0
Spinulose wood fern	33	1.0
Bladder sedge	33	0.5
Beach grass	33	0.1
Bunchberry	33	0.1
Coltsfoot	33	0.1
Creeping bent-grass	33	0.1
Evening primrose	33	0.1
Millet grass	33	0.1
New York aster	33	0.1
Sheep-sorrel	33	0.1
Small enchanter's nightshade	33	0.1
Strawberry	33	0.1
Sweet-scented bedstraw	33	0.1
Wild carrot	33	0.1
Woodland horsetail	33	0.1
Yarrow	33	0.1
<b>Herb Layer (Mean % Cover)</b>		<b>19.7</b>
Wavy dicranum	67	0.5
Schreber's moss	33	15.0
Broom moss	33	2.0
Plume moss	33	0.5
Stair-step moss	33	0.5
Atrichum moss	33	0.1
Bazzania	33	0.1
Pin cushion moss	33	0.1
Shaggy moss	33	0.1
<b>Bryo-Lichen Layer (Mean % Cover)</b>		<b>6.5</b>

## Distinguishing Features

This coastal softwood woodland of white spruce is found on dunes and marine sands. Under very open conditions beach grass and other seashore plants are expected.



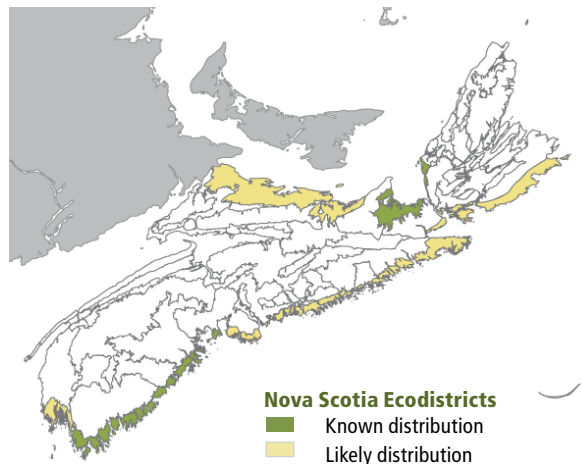
Bayberry

## Site Characteristics

Slope Position:	Level <sup>7</sup> Upper <sup>3</sup>
Surface Stoniness:	(Non - Slightly) <sup>10</sup>
Bedrock Outcrop:	(Non-rocky) <sup>10</sup>
Elevation Range:	2 - 25m
Slope Gradient:	Level <sup>7</sup> nd <sup>3</sup>
Aspect:	East <sup>3</sup> None <sup>7</sup>
Exposure:	Exposed <sup>7</sup> Mod. exposed <sup>3</sup>
Microtopography:	Level <sup>10</sup>
Drainage:	Rapid <sup>7</sup> Well <sup>3</sup>

## Soil Characteristics

Soil Type:	ST1 <sup>10</sup>
Parent Material:	Aeolian <sup>10</sup>
Rooting Depth (cm):	(>45) <sup>7</sup> nd <sup>3</sup>
Duff Thickness (cm):	(0-5) <sup>3</sup> (6-10) <sup>3</sup> nd <sup>3</sup>



### Nova Scotia Ecodistricts

- Known distribution
- Likely distribution