An Introduction to Ecosites

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An Introduction to Ecosites

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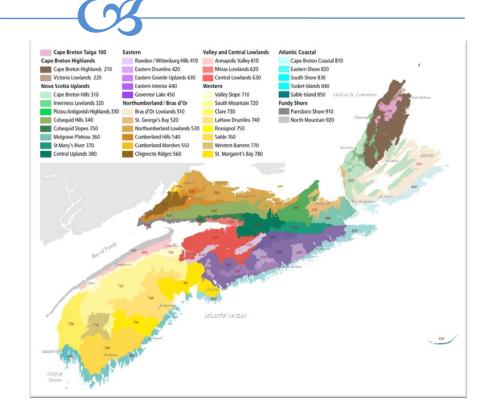
How to use Nova Scotia's new Forest Ecosystem Classification manual to identify ecosites, and use this information to help manage your forested land.

For management purposes, ecosystems are often broken into different classifications based on size and other considerations. Large ecosystems are referred to as *ecozones*. This classification is used for planning, conservation and other purposes.

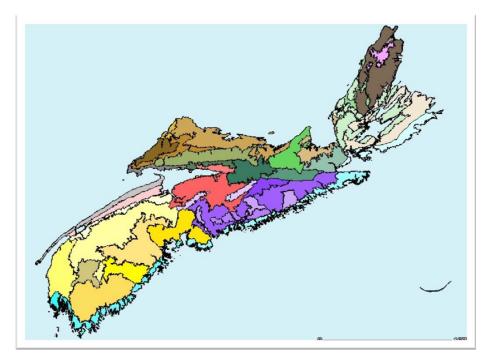
The land area of Canada is divided into 15 ecozones. Nova Scotia is in the Atlantic Maritime ecozone, which is known as the Acadian ecozone in the provincial Ecological Land Classification system.



Ecozones are divided into ecoregions. Nova Scotia has nine ecoregions, classified according to climate.



Within these ecoregions there are 39 ecodistricts.



Ecodistricts are divided into ecosections. And within ecosections are *ecosites*.

Ecosites are the smallest level of ecological land classification, distinguished from one another based on vegetation, soil and other site attributes.

Classifying a forest into ecosites allows the manager to recognize similar ecosystems on the ground and develop a common understanding of the ecosystems at work on the woodlot. This is useful for forest-level planning.

In theory, each ecoregion could have its own set of ecosites. However, because the same ecosites appear in different ecoregions, NSDNR has determined that Nova Scotia can be represented by 28 ecosites.

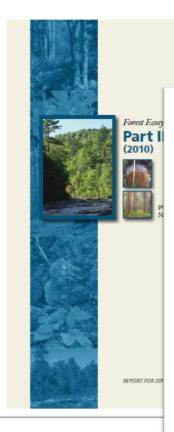
Nova Scotia's 28 ecosites are divided into two main ecosite groups: the Acadian group and the Maritime Boreal group. These groups are associated with distinctive differences in naturally occurring vegetation types and potential productivity.

Maritime Boreal ecosites are found in parts of the Cape Breton Highlands, Cape Breton Taiga and Atlantic Coastal ecoregions. Ecosites found elsewhere are in the Acadian Ecosite Group.

To determine what ecosites are found on a woodlot, first determine vegetation and soil type using parts I and II of the FEC manual.



This information is used with tables found in Appendices B and C (pages 59-74) of Part III: Ecosites.



Appendix B Ecosite matrix tables – Acadian ecosites

Tables below are used to determine Acadian ecosites based on vogetation type (VT) and soil type (ST) Information. Assignment of ecosite to VT/ST combinations was based on expert opinion and analysts of land capability (LC) data collected from 1,809 sample piots.

To use these tables, simply find the cell associated with the VT/ST combination found during field assessment – the number in the cell is the ecosite for that combination (also see note below on stony phase STs).

Bloe 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 or possible. Cell with no numbers are VT/ST combinations thought to be impossible or improbable (and therefore not associated with any existing).

Users who find VT/ST combinations associated with blank cells should reassess VT and/or ST to verify these units. If VT and ST are still considered correx, users are encouraged to coreact the Ecosystem Management Group, Forestry Division, Nova Scotta Department of Natural Resources for further guidance.

Note: These tables are intended for use in Acadian ecosite areas only (see Table 1); between, it is possible that countid (CO) or Highland (FI) to operation types can be found now the boundaries of Acadian and Martine Bornal groups, in these cases, users should verify the VT call and, if correct, use Martine Bornal ecosite tables to determine ecosite and related productivity interportations.

Stony phase STs are not listed in ecoulte matrix tables. Users should refer to the closest ST listed to assign ecosite for stands with S-phase soils (e.g. ST1-S use ST1, ST3-GS use ST3-G). Due to reduced soil volumes, productivity values for these sites would tend to be on the lower end of ranges listed in Tables 7-17.

Proxincial VTs and STs are listed by name in Appendix E.



There is a table for each forest group. For example, this is the table for the Wet Coniferous Forest Group.

Table B9. AC ecosite table for wet conifer forest (WC) vegetation type

Coni		

Soil	Vegetation Type							
Type	WC1	WC2	MC3	WC4	WC5	WC6	WC7	WC8
1								
1-G								
2								
2-G								
2-L					-			
3	4	4	3	3	8	8	8	8
3-G	4	4	3	3	8	8	8	8
3-L	4	4	3	3	8	8	8	8
4	4	4	4	4	8	8	8	8
4-G	4	4	4	4	8	8	8	8
5								
6	4	4	3	3	8	8	8	8
7	4	4	4	4	8	8	8	8
8								
8-C								
9					12	12	12	12
9-C					12	12	12	12
10					12	12	12	12
11								
12					12	12	12	12
13					12	12	12	12
14	4	4	4	4	8	8	8	8
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								

U3

Blue-shaded cells are combinations of soil and vegetation types that are known to exist in Nova Scotia. Cells with numbers but no shading are considered probable or possible. Empty cells are considered improbable or impossible . If your combination of soil type and vegetation type falls into one of the empty areas, you may need to reassess.

			W	et Conifer	Forest			
Soil					ion Type			
Type	WC1	WC2	WC3	WC4	WC5	WC6	WC7	WC8
1								
1-G								
2								
2-G								
2-L								
3	4	4	3	3	8	8	8	8
3-G	4	4	3	3	8	8	8	8
3-L	4	4	3	3	8	8	8	8
4	-4	4	4	4	8	8	8	8
4-G	4	4	4	4	8	8	8	8
5								
6	4	4	3	3	8	8	8	8
7	4	4	4	4	8	8	8	8
8								
8-C								
9			-		12	12	12	12
9-C					12	12	12	12
10					12	12	12	12
11		_	-					
12					12	12	12	12
13		-	-		12	12	12	12
14	4	4	4	4	8	8	8	8
14-U	-		-			_	-	
15	_	_	-	_		_	_	
15-G		_	-	-		_	_	
15-L 16		_	-	_		_	_	
16-G	_	_	-	_			_	
16-G		-				-		
16-L. 17		_	-	-	-	_	-	-
18								
19	-		_					
19-M	_	_	_	_	-	_	_	_



This table indicates that for a WC7 vegetation type, the probable soil types are 3-L, 6, 7, 10 or 14.

Table B9. AC ecosite table for wet conifer forest (WC) vegetation types

Wet Conifer Fores

Soil				Vegetat	ion Type			
Type	WC1	WC2	MC3	WC4	WC5	WC6	WC7	WC8
1								
1-G								
2								
2-G							7	
2-L								
3	4	4	3	3	8	8	8	8
36	4	4	3	3	8	8	8	8
3-L	4	4	3	3	8	8	8	3
4	4	4	4	4	8	8	8	
4-G	4	4	4	4	8	8	8	
(3)								
6	4	4	3	3	8	8	8	
7	4	4	4	4	8	8	8	
8								
8-C								
9					12	12	12	
9-C					12	12	12	
10					12	12	12	2
11								
12					12	12	12	12
13					12	12	12	12
14	4	4	4	4	8	8	8	8
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								

The number in the square where vegetation type and soil type meet is the ecosite number.

Table B9. AC ecosite table for wet conifer forest (WC) vegetation types

Con			

Soil				Vegetat	tion Type			
Type	WC1	WC2	WC3	WC4	WC5	WC6	WC7	WC8
1								
1-G								
2								
2-G								
2-L								
3	4	4	3	3	8	8		8
3-G	4	4	3	3	8	8	8	8
3-L	4	4	3	3	8	8	8	8
4	4	4	4	4	8	8	8	8
4-G	4	4	4	4	8	8	8	8
5								
6	4	4	3	3	8	8	8	8
7	4	4	4	4	8	8	8	3
8								
8-C								
9					12	12	12	2
9-C					12	12	12	2
10					12	12	12	12
11								
12					12	12	12	12
13					12	12	12	12
14	4	4	4	4	8	8	8	8
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								



If we had previously determined a site was a WC7 vegetation type and that this is a Soil Type 3-L, the table would tell us that the this is Acadian ecosite number 8 (AC8).



Wet – Poor / Spruce – Fir – Red maple

Description

Occurring mainly on poorly to very poorly drained level areas and depressions with medium to coarse textured glacial till and/or organic deposits, this exosite has wet, nutrient poor to medium soils which generally support softwood stands containing spruce (red, black, hybrid), bulsiam fir, hemiook, tamarack, and (occasionally) eastern white cedar. Slightly richer sites support red maple misedwoods with bulsiam fir and white an Alfab Holly, with stains, specified after and softwood regeneration dominate the shrub Layer. The heet layer is moderately diverse with cinnamen fern and sedoes the main sprices. Bromothire devents is also moderate with schanama moses dominant.

Disturbance and Succession

Following disturbance or natural mortality, this ecosite regenerates to similar species found in mature stands leading on either an edaptic climas softwood furest dominated by slabam fit; red spruce and hemiod; or an edaptic climas misedwood forest dominated by red maple and balam fit. Along with sensescence, windthrow and fluctuating water table levels are the main disturbance agents.

Site Characteristics

Topographic Position Level*Lower - Toe' Depression*

Slope Gradient Level* Gentle' nd*

Exposure Moderate* Mod Sheltered* Mod Exposed* Sheltered*

Exposure Moderate* Mod Sheltered* Mod Exposed* Sheltered For Mod Exposed* Sheltered For Mod Exposed* Sheltered For Mod Exposed* Sheltered For Moderate* Mod Exposed* Sheltered For Mod E

Vegetation Types common wcs, wce, wcz, wce, wcz, wbs

Soil Types Common 514, 514-G, 516, 517, 5114
Possible 513, 513-G, 513-L, 5-phase types

Comments

Forest AC8 sites are generally associated with coniferous and mixedwood treed swamps which receive seepage flows and/or ground water inputs.

ACB sites are found throughout the province, usually embedded as small or large patches within the matrix forest. ACB sites with red spruce and hemiods are usually found in the Western Econogric (700). Misceleono dates with red maple and bulsam fir are found throughout the province, with higher occurrence in the Northumberland Lowlands (530) and Central Lowlands (670) an ordinaries.

Forest Ecosystem Classification for Nova Scotia PART III: ECOSITES (2016) 25

The fact sheet for this ecotype tells us that it has wet, poor soils and is associated with spruce, fir and red maple.



Wet - Poor / Spruce - Fir - Red maple

Description

Occurring mainly on poorly to very poorly drained level areas and depressions with medium to coarse textured glacial till and/or organic deposits, this ecosite has wet, nutrient poor to medium soils which generally support softwood stands containing spruce (red, black, hybrid), balsam fir, hemlock, tamarack, and (occasionally) eastern white cedar. Slightly richer sites support red maple mixedwoods with balsam fir and white ash. False holly, wild raisin, speckled alder and softwood regeneration dominate the shrub layer. The herb layer is moderately diverse with cinnamon fern and sedges the main species. Bryophyte diversity is also moderate with sphagnum mosses dominant,

Following disturbance or natural mortality, this ecosite regenerates to similar species found in mature stands leading to either an edaphic climax softwood forest dominated by balsam fir, red spruce and hemlock; or an edaphic climax mixedwood forest dominated by red maple and balsam fir. Along with senescence, windthrow and fluctuating water table levels are the main

Site Characteristics

Topographic Position
Slope Gradient
Exposure
Level' Lower - Toel Depression'
Level' Gentie' ndt
Exposure
Moderate' Mod. Sheltered' Mod. Exposed' Sheltered' Parent Material Glacial till Organic Lacustrine nd

Poor*Very Poor*Imperfect*
(Non - Slightly)*(Moderately)*(Very - Excessively)*
(Non-rocky)*nd*

Vegetation Types

Common WC5, WC6, WC7, WC8, WD2, WD6 Possible CE1

Soll Types Common 514, 514-G, 516, 517, 5114 Possible 513, 513-G, 513-L, S-phase types

Comments

Forest AC8 sites are generally associated with coniferous and mixedwood treed swamps which receive seepage flows and/or ground water inputs.

AC8 sites are found throughout the province, usually embedded as small or large patches within the matrix forest. AC8 sites with red spruce and hemlock are usually found in the Western Ecoregion (700). Mixedwood sites with red maple and balsam fir are found throughout the province, with higher occurrence in the Northumberland Lowlands (530) and Central Lowlands (630) ecodistricts.

Porest Ecosystem Classification for Nova Scots. PART RE ECOSYTES (2016) 25



The fact sheet provides a description, discussion of successional dynamics and discussion of site characteristics.

Description

Occurring mainly on poorly to very poorly drained level areas and depressions with medium to coarse textured glacial till and/or organic deposits, this ecosite has wet, nutrient poor to medium soils which generally support softwood stands containing spruce (red, black, hybrid), balsam fir, hemlock, tamarack, and (occasionally) eastern white cedar. Slightly richer sites support red maple mixedwoods with balsam fir and white ash. False holly, wild raisin, speckled alder and softwood regeneration dominate the shrub layer. The herb layer is moderately diverse with cinnamon fern and sedges the main species. Bryophyte diversity is also moderate with sphagnum mosses dominant.

Disturbance and Succession

Following disturbance or natural mortality, this ecosite regenerates to similar species found in mature stands leading to either an edaphic climax softwood forest dominated by balsam fir, red spruce and hemlock; or an edaphic climax mixedwood forest dominated by red maple and balsam fir. Along with senescence, windthrow and fluctuating water table levels are the main disturbance agents.

Site Characteristics

Topographic Position Level[®] Lower - Toe[®] Depression[®]

Slope Gradient Level⁵ Gentle¹ nd⁴

Exposure Moderate⁶ Mod.Sheltered³ Mod.Exposed¹ Sheltered³

Parent Material Glacial till Organic Lacustrine od Poor Very Poor Imperfect

Surface Stoniness (Non - Slightly)¹ (Moderately)¹ (Very - Excessively)¹

Surface Rockiness (Non-rocky)9 nd1

It lists vegetation and soil types associated with this ecosite, and provides additional comments.

Vegetation Types

Common WC5, WC6, WC7, WC8, WD2, WD6

Possible CE1

Soil Types

Common ST4, ST4-G, ST6, ST7, ST14

Possible ST3, ST3-G, ST3-L, S-phase types

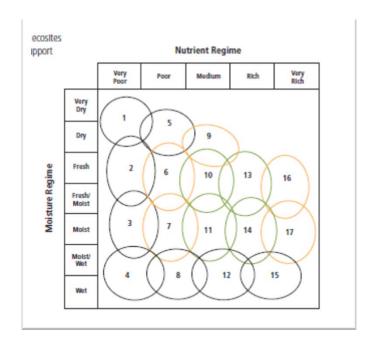
Comments

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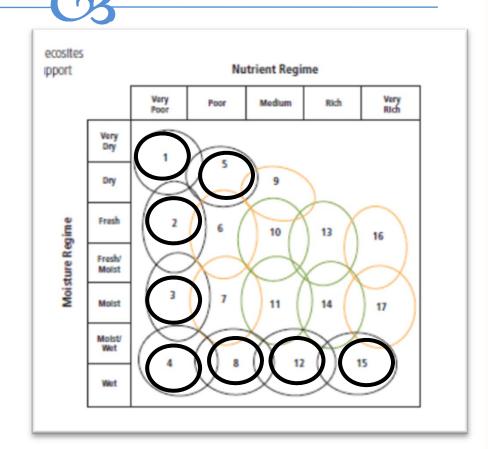
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Knowing what ecosite you are in can provide useful management information, particularly information about what species of trees can grow on a particular site.

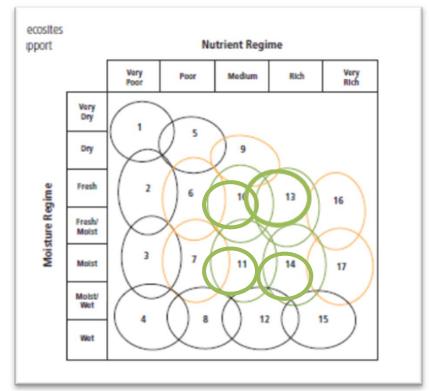
For instance, this is an edatopic grid of all the Acadian group ecosites. It shows how the ecosites are related to one another based on their relative availability of nutrients and moisture.



Ecosites that are circled in black are either too dry or too wet to support species other than black spruce, balsam fir, tamarack, red maple, white ash and red and jack pine.

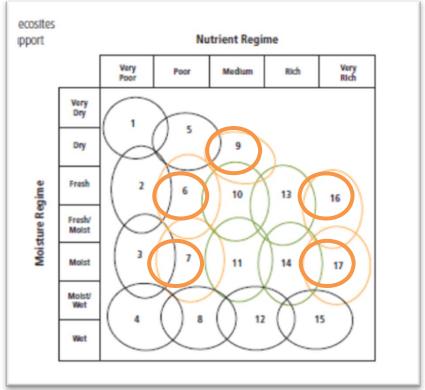


Ecosites that are circled in green are associated with long-lived, shade-tolerant species such as red spruce, hemlock, sugar maple, yellow birch and beech.



Ecosites that are circled in orange are transitional and may contain both mixes of species.





From a commercial perspective, the most productive ecosites are those with medium to very rich fertility that are somewhat dry to moist in terms of available moisture. Among Acadian ecosites, those numbered 6, 7, 9, 10, 11, 13, 14, 16 and 17 are most likely to produce financial benefit from efforts applied.

- AC6: Fresh-Poor/Black spruce-white pine

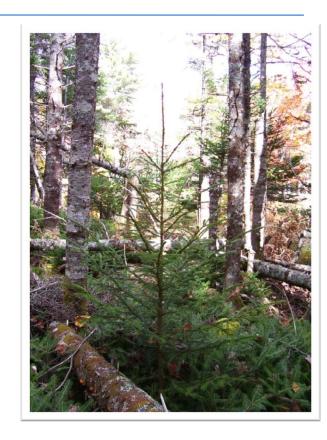
- AC14: Moist-Rich/Sugar maple-yellow birch
- AC17: Moist-Very Rich/Sugar maple-white ash

OS

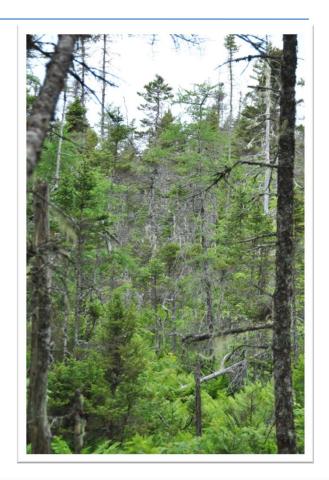
This is an example of an AC14 ecosite, with rich, fresh-moist soil, dominated by sugar maple and yellow birch. The ground cover vegetation includes striped maple, beaked hazelnut, Christmas fern and evergreen wood fern.



This is an example of an AC10 ecosite at an early stage of development. This is an old field site where red spruce is starting to fill in, and white pine and red maple are also present. This is a medium fertility site with fresh soil, also suitable to support yellow birch and hemlock.



This is an example of an AC4 ecosite. The soils in this area are wet, with poor fertility, and can only support black spruce, fir and larch.



U3

Tables 7-23 of the Ecosites manual provide information on the growth potential (land capability) for specific species or species groups on specific ecosites.

AC Ecosite	Mean	Middle Range (25%-75%)	Min / Max	Sample Size	Recommended Planning Value
5	3.9	3.2-4.8	2.8 / 5.0	6	4.0
6	4.5	3.9-5.0	3.0 / 5.9	38	4.5
7	4.9	4.4-5.5	4.0 / 6.1	15	5.0
8	4.4	4.1-4.9	3.0 / 5.5	29	4.5
9				0	4.5
10	5.5	4.9-6.0	3.5 / 7.2	277	5.5
11	5.3	4.7-6.0	3.7 / 7.1	67	5.5
12	5.2	4.6-5.9	3.9 / 6.6	16	5.0
13	5.8	5.2-6.2	4.5 / 7.7	31	6.0
14	6.1	5.6-6.6	5.0 / 7.6	15	6.0

These tables along with other information in the Ecosites manual are particularly helpful for landowners who are seeking an economic return from their management efforts. This information helps landowners:

- Focus management efforts for best return on investment.
- Choose which species to favor for future return.

Credits

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Written by Flora Johnson, Patricia Amero RPF and staff of the Nova Scotia Department of Natural Resources. Image on Slide 3 from The Atlas of Canada, Natural Resources Canada. Remaining images courtesy NSDNR except for photographs on slides 29 & 30, which are courtesy Picea Forestry Consultants.