An Introduction to Ecosites

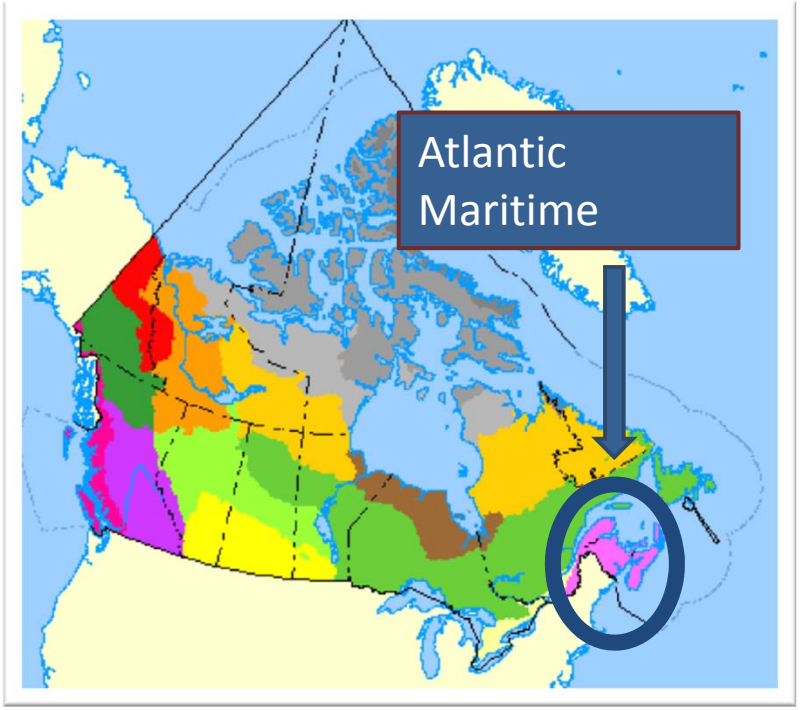
Open File Report Ext 2012 - 4

An Introduction to Ecosites

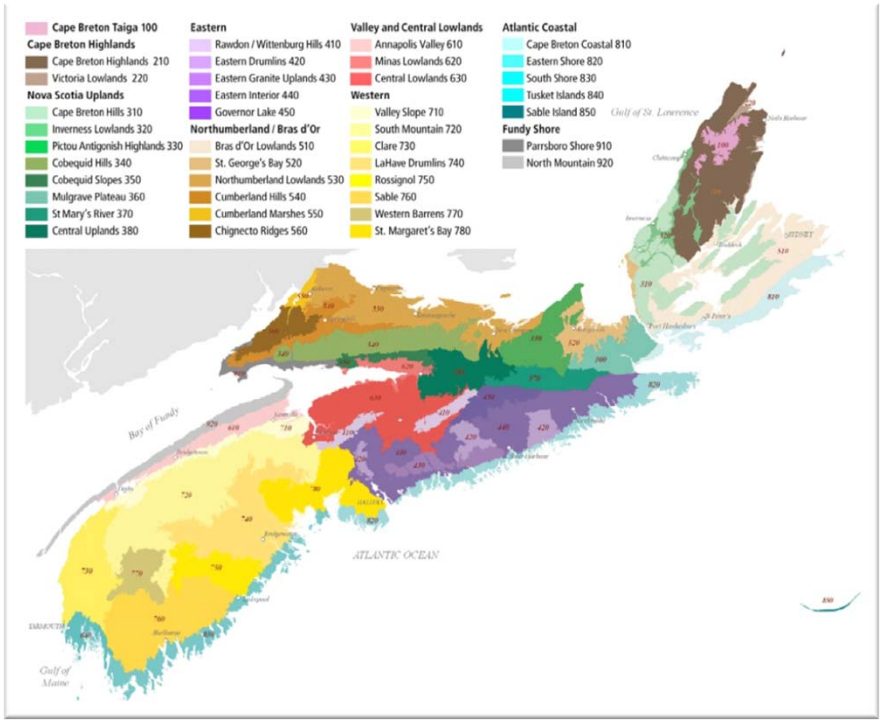
How to use Nova Scotia's new Forest Ecosystem Classification manual to identify ecosites, and use this information to help manage your forested land.

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.

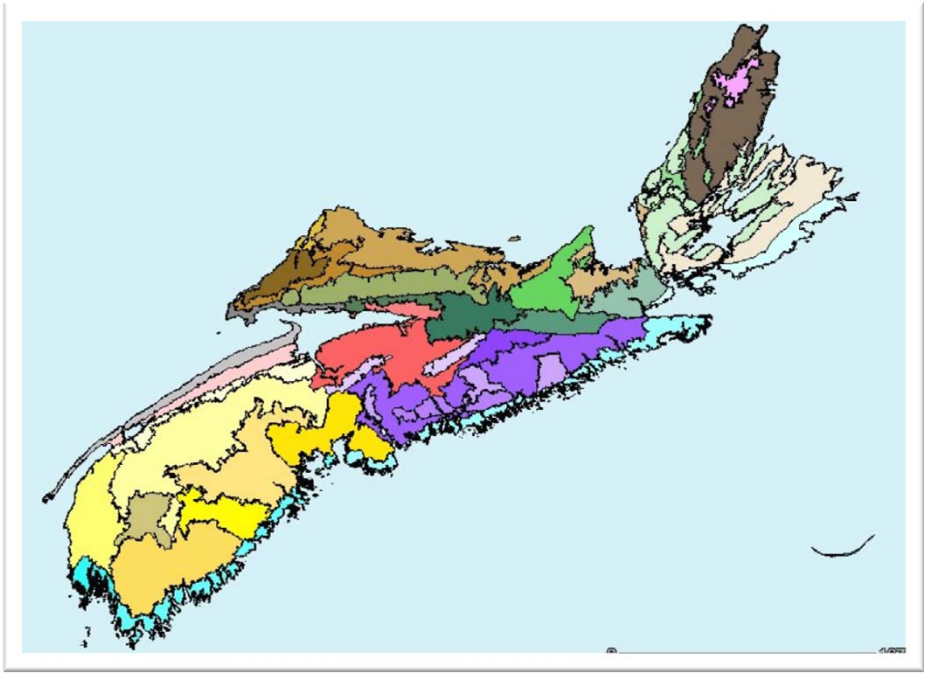
The land area of Canada is divided into 15 ecozones. Nova Scotia is in the *Atlantic Maritime* ecozone, which is known as the *Acadian* ecozone in the provincial Ecological Land Classification system.



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.

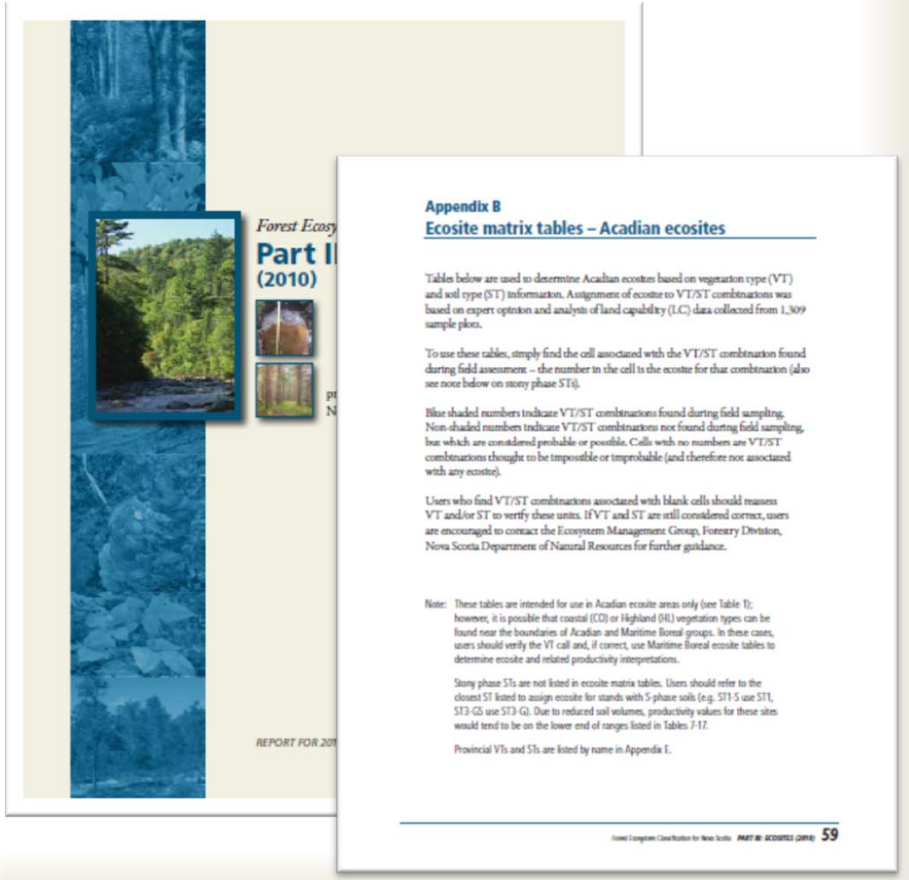
In theory, each ecoregion could have its own set of ecosites. However, because the same ecosites appear in different ecoregions, NSDNR has determined that Nova Scotia can be represented by 28 ecosites.

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.



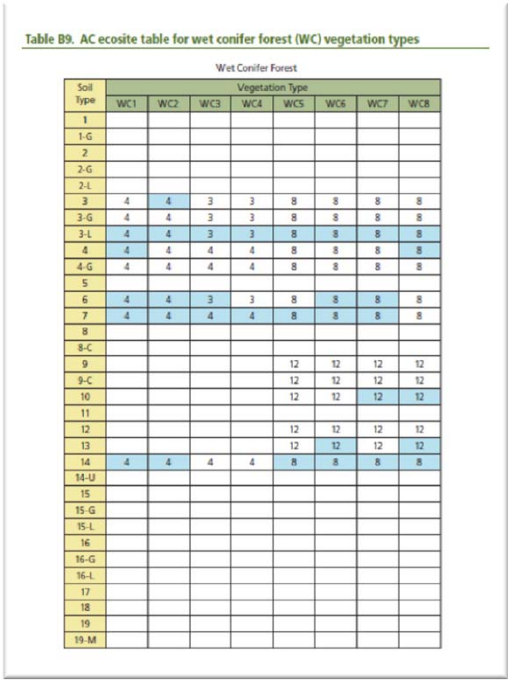
There is a table for each forest group. For example, this is the table for the Wet Coniferous Forest Group.

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

Wet Conifer Forest

Soil Type	Vegetation 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-L								
17								
18								
19								
19-M								

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.



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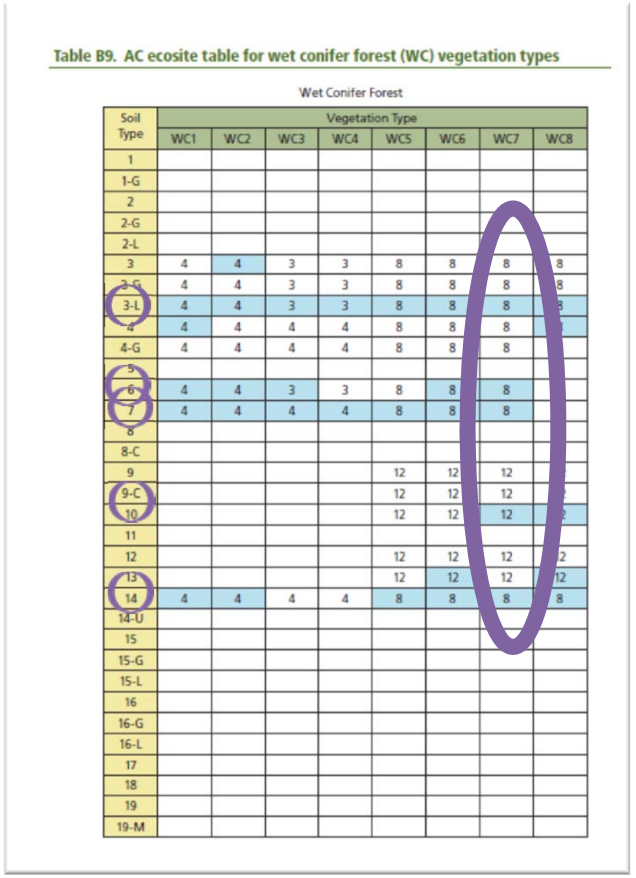
4-G	4	4	4	4	8	8	8	8
5								
6	4	4	3	3	8	8	8	8
7	4	4	4	4	8	8	8	8
8								
8-C								
9					12	12	12	12
9-C					12	12	12	12
10					12	12	12	12
11								
12					12	12	12	12
13					12	12	12	12
14	4	4	4	4	8	8	8	8
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								

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



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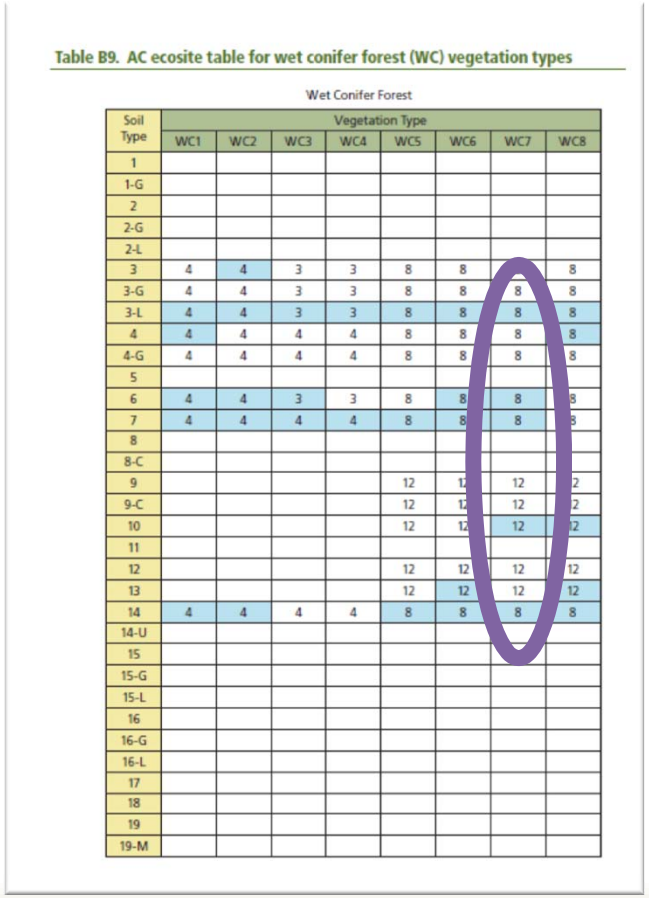
4-G	4	4	4	4	8	8	8	
5								
6	4	4	3	3	8	8	8	
7	4	4	4	4	8	8	8	
8								
8-C								
9					12	12	12	
9-C					12	12	12	
10					12	12	12	
11								
12					12	12	12	12
13					12	12	12	12
14	4	4	4	4	8	8	8	8
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								

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



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4-G	4	4	4	4	8	8	8	8
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7	4	4	4	4	8	8	8	8
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9					12	12	12	12
9-C					12	12	12	12
10					12	12	12	12
11								
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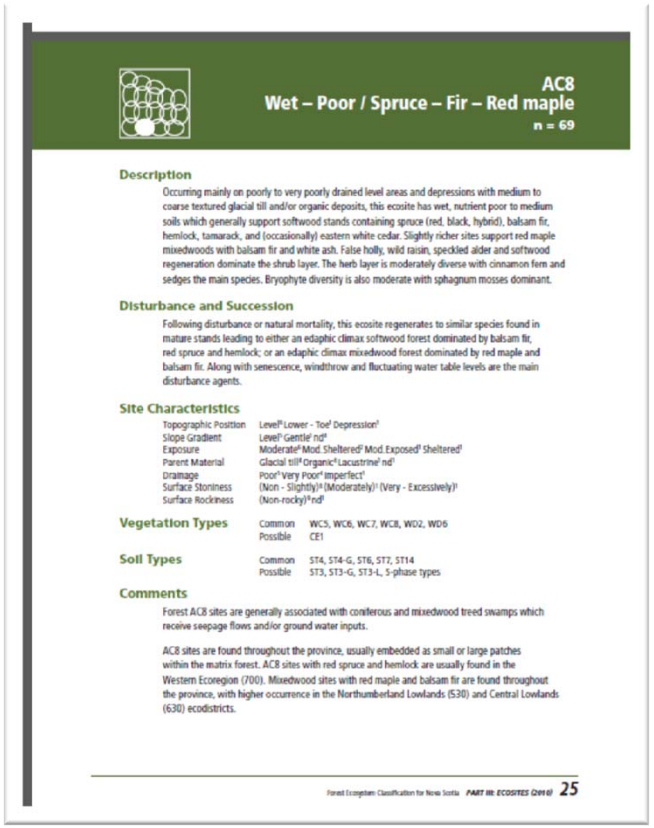
14-U								
15								
15-G								
15-L								
16								
16-G								
16-L								
17								
18								
19								
19-M								

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).



AC8
Wet – Poor / Spruce – Fir – Red maple
n = 69

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[1] Lower - Toe[2] Depression[3]
Slope Gradient	Level[1] Gentle[2] nd[4]
Exposure	Moderate[2] Mod. Sheltered[3] Mod. Exposed[4] Sheltered[5]
Parent Material	Glacial till[1] Organic[4] Lacustrine[5] nd[7]
Drainage	Poor[4] Very Poor[5] Imperfect[7]
Surface Stoniness	(Non - Slightly)[1] (Moderately)[2] (Very - Excessively)[3]
Surface Rockiness	(Non-rocky)[1] nd[4]

Vegetation Types

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

Soil Types

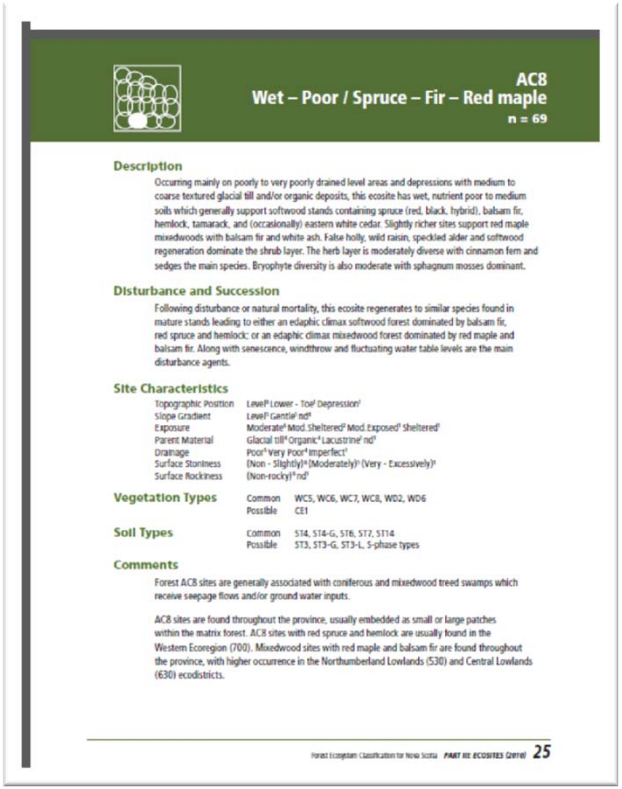
Common	ST4, ST4-G, ST6, ST2, ST14
Possible	ST3, ST3-G, ST3-L, 5-phase types

Comments

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

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.

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



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Site Characteristics

Topographic Position	Level[1] Lower - Toe[2] Depression[3]
Slope Gradient	Level[1] Gentle[2] nd[3]
Exposure	Moderate[1] Mod. Sheltered[2] Mod. Exposed[3] Sheltered[4]
Parent Material	Glacial till[1] Organic[2] Lacustrine[3] nd[4]
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Vegetation Types

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

Soil Types

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

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Site Characteristics

Topographic Position	Level[8] Lower - Toe[1] Depression[1]
Slope Gradient	Level[5] Gentle[3] nd[4]
Exposure	Moderate[6] Mod.Sheltered[2] Mod.Exposed[1] Sheltered[1]
Parent Material	Glacial till[4] Organic[4] Lacustrine[1] nd[1]
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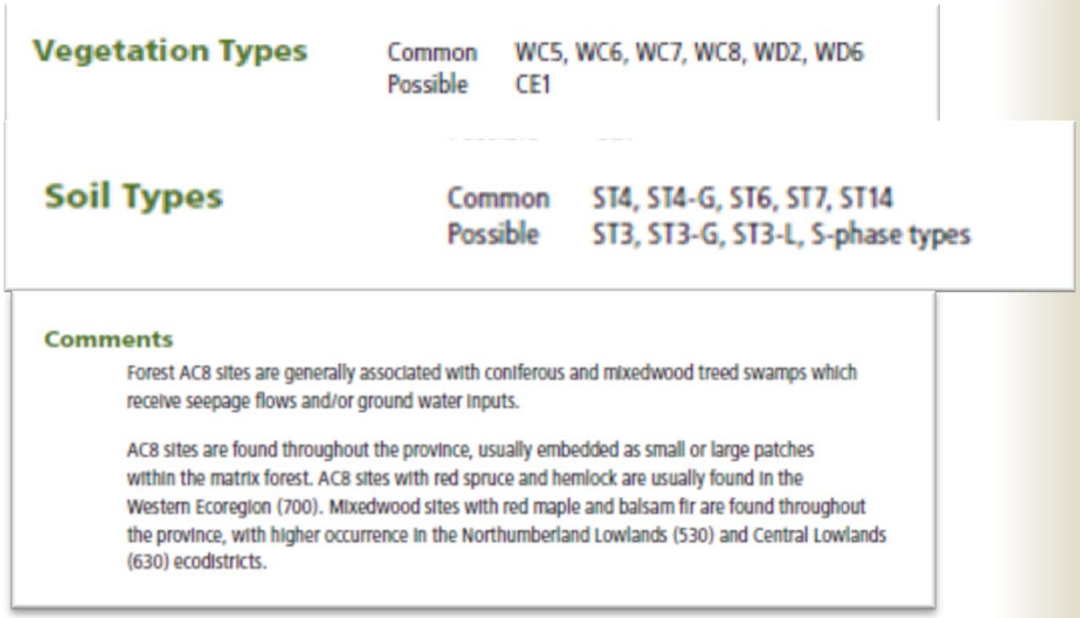
It lists vegetation and soil types associated with this ecosite, and provides additional comments.



Vegetation Types

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

Soil Types

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

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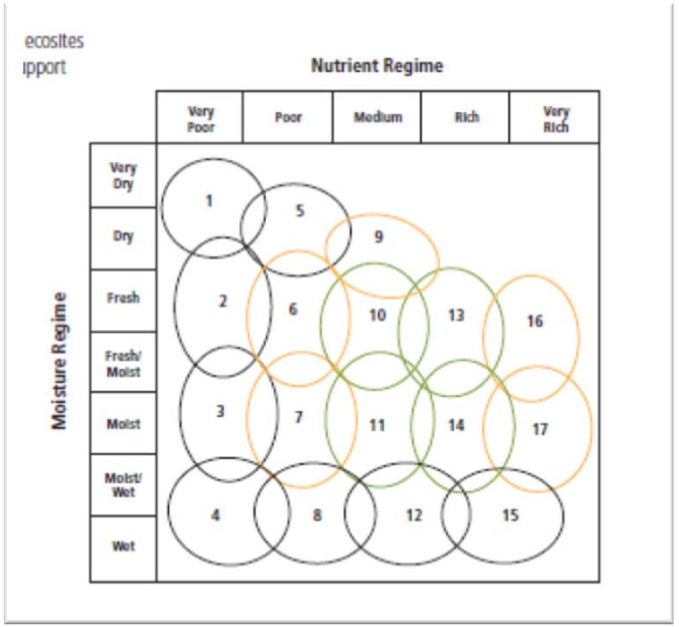
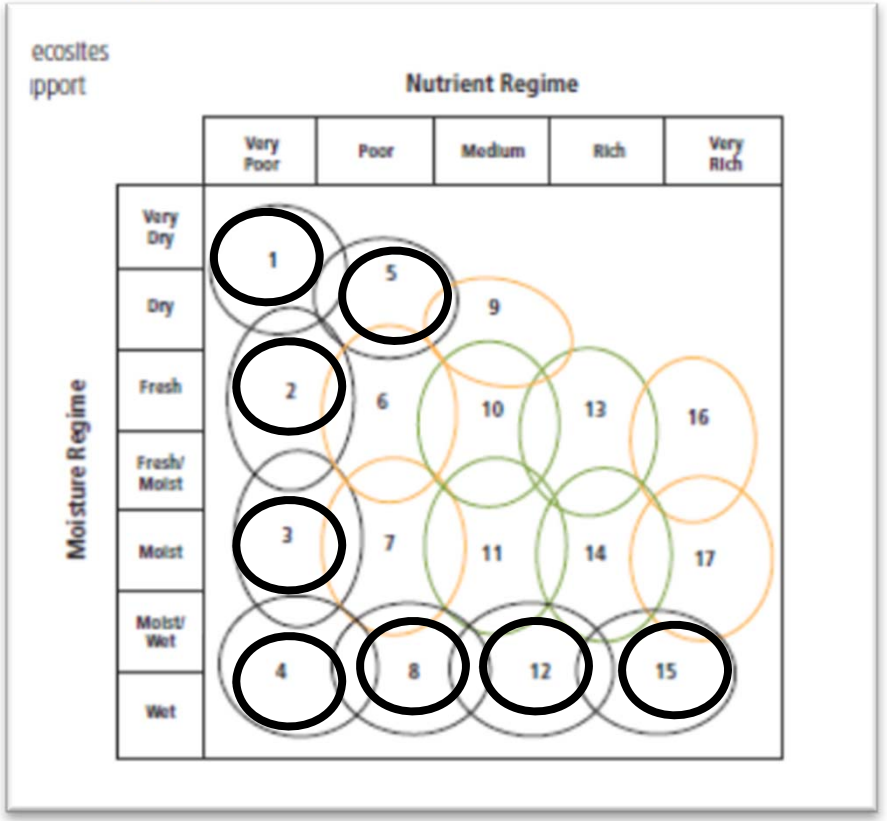
Knowing what ecosite you are in can provide useful management information, particularly information about what species of trees can grow on a particular site.

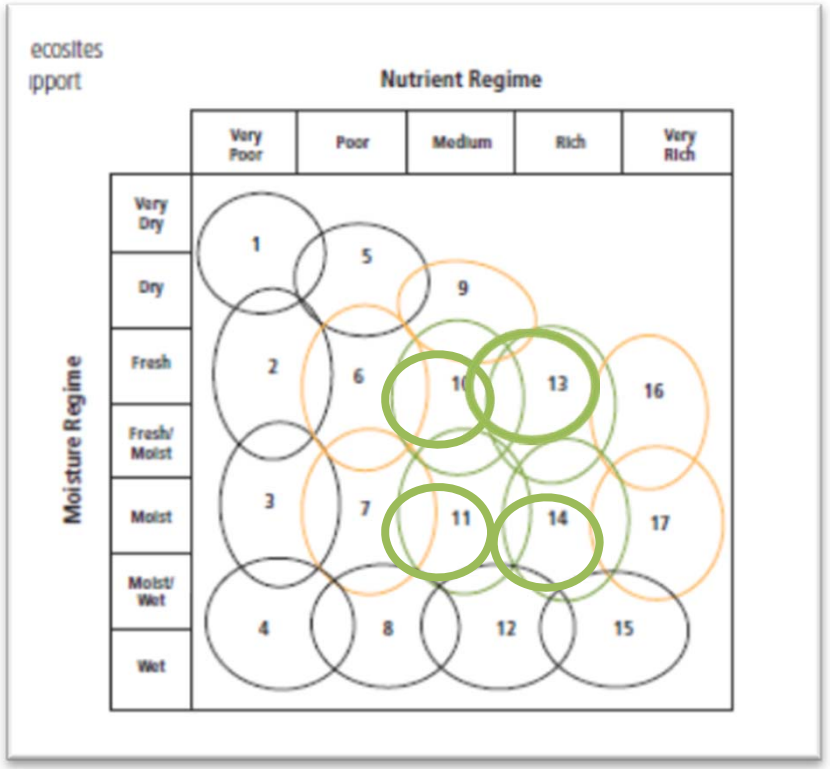
For instance, this is an edatopic grid of all the Acadian group ecosites. It shows how the ecosites are related to one another based on their relative availability of nutrients and moisture.



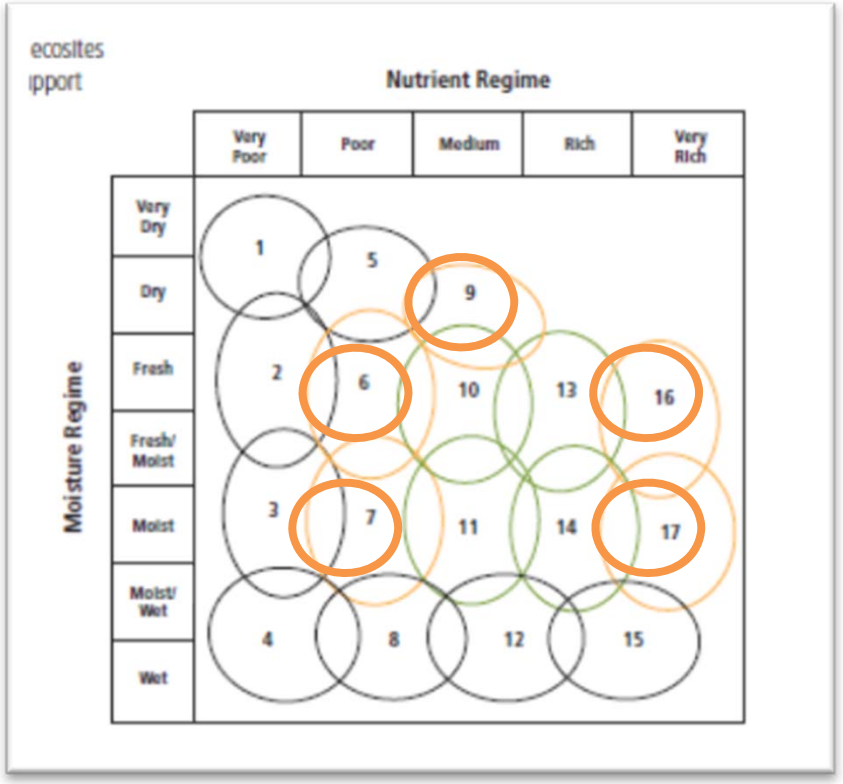
Ecosites that are circled in black are either too dry or too wet to support species other than black spruce, balsam fir, tamarack, red maple, white ash and red and jack pine.



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
- AC7: Moist-Poor/Black spruce-white pine
- AC9: Dry-Medium/Red maple-spruce
- AC10: Fresh-Medium/Red spruce-hemlock
- AC11: Moist-Medium/Red spruce-yellow birch
- AC 13: Fresh-Rich/Sugar maple-yellow birch
- AC14: Moist-Rich/Sugar maple-yellow birch
- AC16: Fresh-Very Rich/Sugar maple-white ash
- AC17: Moist-Very Rich/Sugar maple-white ash

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.

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

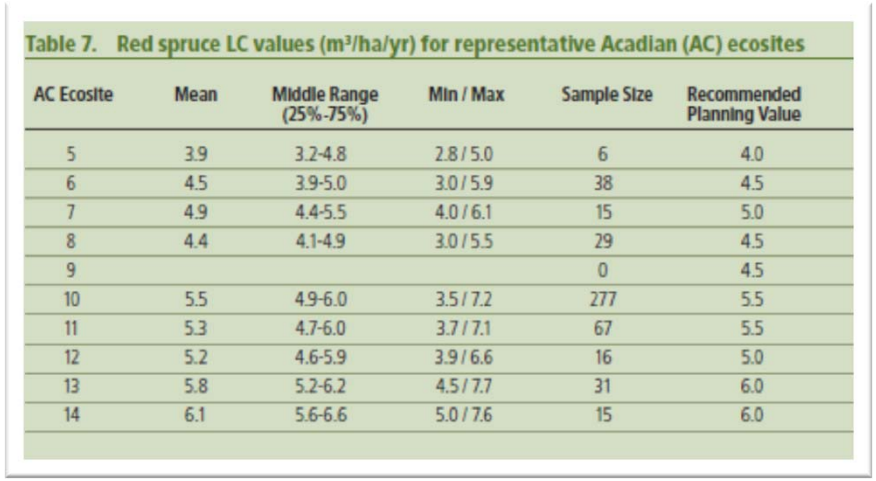


Table 7. Red spruce LC values (m^3/ha/yr) for representative Acadian (AC) ecosites

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

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.