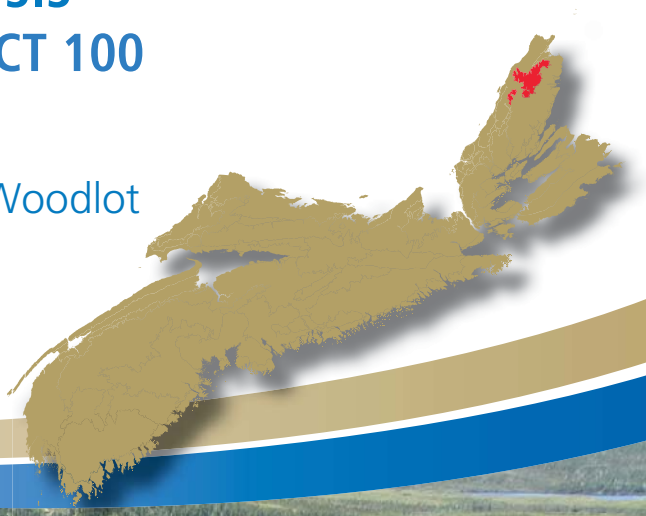
Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS NORTHERN PLATEAU ECODISTRICT 100

PART 1: Overview of Ecodistrict
PART 2: Linking the Landscape to the Woodlot



ELA 2015-100

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 100: Northern Plateau

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This report, one of 38 for the province, provides descriptions, maps, analysis, photos and resources of the Northern Plateau Ecodistrict.

The Ecological Landscape Analyses (ELAs) were analyzed and written from 2005 – 2009. They provide baseline information for this period in a standardized format designed to support future data updates, forecasts, and trends. The original documents are presented in three parts: Part 1 – *Learning About What Makes this Ecodistrict Distinctive* – and Part 2 – *How Woodland Owners Can Apply Landscape Concepts to Their Woodland.* Part 3 – *Landscape Analysis for Forest Planners* – will be available as a separate document.

Information sources and statistics (benchmark dates) include:

- Forest Inventory (1997 to 1999) – stand volume, species composition
- Crown Lands Forest Model landbase classification (2006) – provides forest inventory update for harvesting and silviculture from satellite photography (2005), silviculture treatment records (2006), and forest age increment (2006)
- Roads and Utility network – Service Nova Scotia and Municipal Relations (2006)
- Significant Habitat and Species Database (2007)
- Atlantic Canada Data Conservation Centre (2013)

Conventions

Where major changes have occurred since the original ELA report was written, the new information will be provided in *italics,* so that the reader can see how some conditions have changed since the benchmark date of the ELA.

A glossary of definitions is provided for words that are underlined.

REPORT FOR ELA 2015-100

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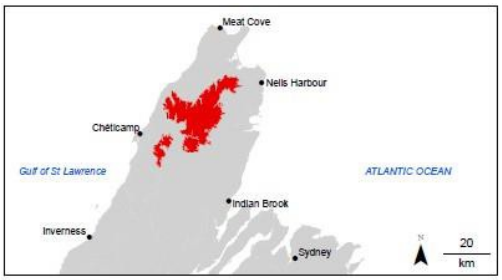


An objective of ecosystem-based management is to manage landscapes in as close to a natural state as possible. The intent of this approach is to promote biodiversity, sustain ecological processes, and support the long-term production of goods and services. Each of the province's 38 ecodistricts is an ecological landscape with distinctive patterns of physical features. (Definitions of underlined terms are included in the print and electronic glossary.)

This Ecological Landscape Analysis (ELA) provides detailed information on the forest and timber resources of the various landscape components of Northern Plateau Ecodistrict 100. The ELA also provides brief summaries of other land values, such as minerals, energy and geology, water resources, parks and protected areas, wildlife and wildlife habitat.

Most of the Northern Plateau Ecodistrict, which also forms a similarly named ecoregion, is located within the boundaries of the Cape Breton Highlands National Park. The ecodistrict includes a separate area known as the Jim Campbells Barren Wilderness Area, southeast of Chéticamp. The total area of this ecodistrict is 44,434 hectares, or 1% of the province.

The maximum elevation is 535 metres at White Hill, the highest point in Nova Scotia, while much of the region exceeds 425 metres. The terrain is gently undulating with large expanses of exposed bedrock, treeless bogs, and stunted conifer forests. This ecodistrict forms the headwaters for several major rivers in northern Cape Breton – including the Chéticamp, North Aspy, Middle Aspy, South Aspy, Ingonish, and Black – and contains the Chéticamp Flowage, a key component in the Wreck Cove hydroelectric project.

The Northern Plateau landscapes includes generally a flat terrain with extensive wetlands, barrens and forests of stunted balsam fir and black spruce. (J.-F. Bergeron, Enviro foto)

The climate of Northern Plateau is one of the coldest and wettest in Nova Scotia, with harsh, long winters of heavy snowfall, short growing seasons and almost constant winds.

The barrens of the Northern Plateau are made up of areas of exposed bedrock – primarily composed of igneous and metamorphic rocks (granitic) – that may be completely devoid of vegetation or may be covered in lichens. Where a thin layer of mineral soil has developed on this bedrock, various mosses and other plants have become established.

Moose pastures or meadows.
(J.-F. Bergeron, Enviro foto)

The habitat of the ecodistrict is favourable to moose. Highly elevated moose population levels have created "moose pastures and meadows". These are areas where intense moose browsing has prevented regeneration of balsam fir following the spruce budworm epidemic of the late 1970's.

Stunted black spruce and balsam fir form scattered patches where soil availability permits. Wetter areas are dominated by black spruce and eastern larch, whereas upper slopes contain predominantly balsam fir. Dwarf trees, only a metre or less in height but that may reach ages of 150 years, are common.

Federal land ownership accounts for 76% of area of the Northern Plateau Ecodistrict, with 21% under provincial Crown management.

Landscapes are large areas that function as ecological systems and respond to a variety of influences. Landscapes are composed of smaller ecosystems, known as elements. These elements are described by their physical features – such as soil and landform – and ecological features – such as climax forest type. These characteristics help determine vegetation development.

Element descriptions promote an understanding of historical vegetation patterns and the effects of current disturbances. This landscape analysis identified and mapped four key landscape elements – one dominant matrix element, two smaller patch elements, and a corridor element – in Northern Plateau.

Highland Spruce Fir is the matrix element, accounting for nearly 71% of the ecodistrict. Balsam fir and black spruce are the main species in this element.

In the Highland Barrens patch element, the most widely distributed barren type is the dwarf shrub spruce heath type, which occurs as a patchwork of low mounds or hummocks. The Wetlands element comprises freshwater bogs, fens, swamps, and poorly drained areas. Valley Corridors is a small linear element associated with major watercourses in the ecodistrict.

Forest Ecosystem Management
For Northern Plateau Ecodistrict

The primary ecological goals of ecosystem-based management are to maintain and conserve ecosystem biodiversity, productivity, and resilience. Integration of economic, ecological, and social values within a single planning process provides opportunities for creative solutions to meet the challenges of sustainable resource management. By maintaining their integrity, ecosystems can better adapt to environmental stressors such as extended cycles of climate change, atmospheric pollution, and changes in land use and vegetation cover.

This ELA provides detailed information on the resources and descriptions of various components of the landscape for Northern Plateau Ecodistrict 100. Resources and their components include the natural elements that make up the landscape and may affect functions like connectivity – how a landscape enables or impedes movement of resources, such as water and animals – as well as conditions of forest composition, road density, and land use intensity.

Only brief summaries are presented for other land values, including minerals, energy and geology, water resources, parks and protected areas, wildlife and wildlife habitat. These summaries are included in the document to present the range of land values that must be balanced during the design stage of the land management process and are not intended to be exhaustive treatments of the respective land values. Where possible, the reader will be referred to additional sources for detailed information.

Application

The data in this ELA does not represent current inventory, but instead provides baseline conditions for the time when the report was researched, which in the case of the Northern Plateau Ecodistrict was up to 2006. These baseline measurements can be used to assess trends through comparison with present and future inventories.

The ELA supports an approach to maintaining healthy ecosystems by mimicking natural conditions. The report describes the inherent natural structure and condition of landscapes based on enduring physical features, such as elements. It goes on to show how this structure may influence ecosystem functions, such as wildlife movement and connectivity. The ELA summarizes conditions of ecosystems such as forest composition, land use intensity, and road density at the time the report was written.

Finally, the relationship between inherent structure and existing conditions is used to guide future direction. The ELA is part of an ecosystem approach that will expand to encompass other initiatives of the Department of Natural Resources (DNR), such as The Path We Share: A Natural Resources Strategy for Nova Scotia 2011 – 2020
(see http://novascotia.ca/natr/strategy/pdf/Strategy_Strategy.pdf).

The intention is to describe important ecological characteristics to consider during resource planning – the ELA is not a plan in itself.

Part 1: An Overview of Northern Plateau – *Learning About What Makes This Ecodistrict Distinctive*

This first part of the report provides an overview of the ecodistrict for a broad readership. By reviewing several key topics, the reader will have a better understanding of the features that help give the area its character and set it apart as a distinct and unique ecodistrict.

Ecodistrict Characteristics

The area of the Northern Plateau Ecodistrict is 444 square kilometres, which is the same for the ecoregion since it is composed of only this one ecodistrict.

In Northern Plateau, the higher, more exposed, northern elevations of the Cape Breton plateau have been separated from the lower elevations (such as those in the Cape Breton Highlands Ecodistrict) in most land classifications due to a distinct vegetation character. Here the typical Highland Fir Spruce forests are confined to swales, gulches, and sheltered slopes. The landscape at large is covered mainly by heath-like woody shrubs, reindeer mosses, krummholz forests of scrubby stunted fir and spruce, swamps, and bogs.

The average daily temperature is about 6^{o} C, with an annual precipitation estimated to be 1,600 millimetres, one of the largest amounts in Nova Scotia. In sheltered areas, isolated patches of snow can be found in July.

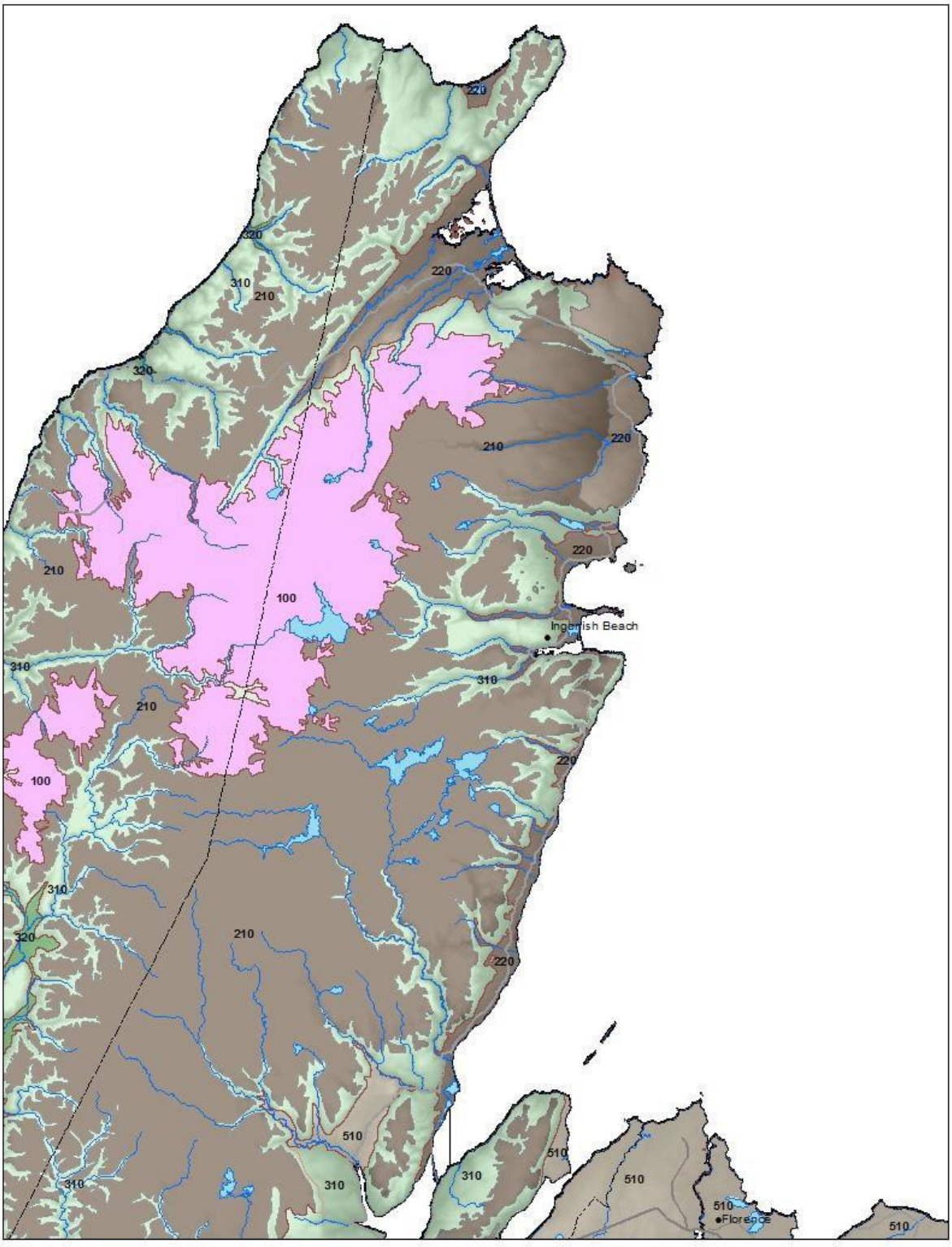
The reasons for the formation of this distinct barren community can be attributed to either a climatic influence or an influence of soil and site conditions. The formation of the barren community is exacerbated directly or indirectly by the conditions of exposure, topography, and soil.

The tendency for different vegetation types to merge into one another is so pronounced on the Northern Plateau that it is difficult to separate the vegetation of uplands and that of swamps, bogs, and wetlands.

In 1936, much of the area became part of the Cape Breton Highlands National Park. In the late 1970s water was diverted as the area surrounding Chéticamp Lake was flooded to establish a hydroelectric power generating station at Wreck Cove.

There is no history of logging since the stunted trees of the ecoregion are of no commercial importance.

See map on following page for overview of the Northern Plateau Ecodistrict, including adjacent ecodistricts, locations of area towns and villages, county boundaries, and major waterways.



Northern Plateau 100, much of which includes the Cape Breton Highlands National Park, is an inland ecodistrict in northwestern Cape Breton Island.
(From Ecodistricts of Nova Scotia map 2007 *Revised*)

Land Area

The ecodistrict is remote with 97% of the area owned by the federal government (76%) or provincial Crown (21%) as shown in Table 1. Only 0.1% is privately owned, the lowest percentage among all of the ecodistricts in the province.

Table 1 – Land Area by Ownership in the Northern Plateau Ecodistrict*

Ownership	Area (hectares)	Percent of Total Area
Provincial Crown land	9,297	20.9
Private	66	0.1
Federal	33,798	76.1
Aboriginal	0.0	0.0
Other (Includes inland water bodies and transportation corridors)	1,273	2.9
Total	**44,434**	**100**

*Note: Figures may vary slightly from table to table because of rounding, averaging, and overlapping of categories and other factors.

IRM Resource Classification for Provincial Crown Lands

The Integrated Resource Management (IRM) classification for Crown lands was developed through a public consultation process during the strategic phase of IRM completed in 2002.

Table 2 provides a summary of Crown lands designated as either C1, General Resource Use; C2, Multiple and Adaptive Use (allows most uses, but special management may be required); or C3, Protected and Limited Use (such as beaches and sites of cultural and historic significance).

In Northern Plateau, the largest category is C2 (82%), followed by C3 (18%).

Table 2 – IRM Land Use Categories for Provincial Crown Lands in Ecodistrict

IRM Land Use Category	Hectares	Percent of Crown Lands
C1 – General Resource Use	0	0
C2 – Multiple and Adaptive Use	7,582	81.6
C3 – Protected and Limited Use	1,715	18.4
Unclassified	0	0
Total	**9,297**	**100**

Forests

Within Northern Plateau, 47% is forested, 34% is wetland, and 14% is barrens (Table 3).

There is no land designated as agricultural or for urban use.

Stunted black spruce, balsam fir, and eastern larch are the main species in the ecodistrict.

It has been reported that it is common for dwarf trees, only a metre in height, to be up to 150 years old.

These krummholz associations develop into relatively closed stands, which are difficult to pass through. They are often devoid of the lichens and ericaceous plants that are common on the barrens. Instead, these plants are replaced with other herbaceous plants, including blue bead lily, goldthread and twinflower, and other mosses and liverworts typical of most coniferous forests.

Table 3 – Area Distribution by Land Category for All Owners

Category	Hectares	Percent
Forested	21,002	47.3
Wetland	15,046	33.9
Agriculture	0	0
Barrens	6,417	14.4
Urban	0	0
Road, Trail, Utility	7	<0.1
Other	1,962	4.4
Total	**44,434**	**100**

Alder, dwarf birch, and mountain ash form buffers along streams. Sedge and moss bogs are another common association of the Northern Plateau. They occur in the form of raised bogs, flat bogs, sloping bogs, and depressions where a great variety of sphagnum moss species occur in association with low ericaceous plants and sedges.

The average Land Capability (LC) of forested land in this ecodistrict is estimated to be 4.1 cubic metres per hectare per year (m^3/ha/yr), based on the ratings in Table 4. The average forest LC for the province is 4.9 m^3/ha/yr.

Some areas are not suitable for trees. These non-forested areas consist mainly of rock outcrops and barren lands.

Table 4 – Area of Forested Land by Land Capability Rating

Land Capability (LC) Rating (m^3/ha/yr)*	Hectares	Percent
2 or less	223	1.1
3	3,732	17.8
4	10,700	51
5	6,300	30
6	42	0.2
7 or more	4	<0.1
Total	**21,002**	**100**

*Based on growth potential for softwood species.

Balsam fir, black spruce, and other softwood species dominate the forests of the Northern Plateau Ecodistrict.

Water Resources

The Northern Plateau wetlands are the headwaters of many of the northern Cape Breton rivers, including the Chéticamp, North Aspy, Middle Aspy, South Aspy, Ingonish, and Black.

Water is an important provincial resource that must be considered in the context of IRM in general, and specifically within individual ecosystems.

The ecodistrict includes lakes and the plateau wetlands that are the headwaters of many northern Cape Breton rivers.

The Environmental Goals and Economic Prosperity Act, which was enacted in early 2007, has committed the province to prepare a comprehensive water strategy. This strategy will include a high-level evaluation of water resources. *Nova Scotia's water strategy can be found at http://www.novascotia.ca/nse/water.strategy/docs/WaterStrategy_Water.Resources.Management.Strategy.pdf*

Minerals, Energy and Geology

Some of the oldest rocks in Nova Scotia are found in the Plateau–Taiga Region (Northern Plateau Ecodistrict and Ecoregion). Over a long history characterized more by periods of erosion than

deposition, these previously deeply buried rocks which now form the highest elevations in the province were exposed.

Geologically, the Plateau–Taiga is part of the Cape Breton highlands fault block, and it has only a few of the several rock types which are found in complex relationships throughout the larger area. The bedrock is predominantly composed of severely altered rocks, some of which have been distinguished as the George River Group. These rocks were originally deposited during Precambrian times, possibly as marine sediments. During subsequent deep burial, they were severely altered by heat and pressure to form hard, banded crystalline rocks called schists and gneisses.

The schists and gneisses are cut by granites in a complex way. The granites range in age from Precambrian to Devonian-Carboniferous. The intrusive nature of the granite, and especially its cross-cutting contact with surrounding rocks, can be seen in several places.

Any sediments deposited above these basement rocks were long ago removed by erosion. Almost certainly, Carboniferous sediments thickly covered this area at one time. Carboniferous cover is still found as patches on the slopes of the Cape Breton highlands block and as a more or less continuous fringe at lower elevations. This indicates that the present landscape was created prior to the Carboniferous, and that the cliffs, slopes, and plateau are all exhumed features of an ancient landscape.

– Section excerpts from *Natural History of Nova Scotia, Volume II: Theme Regions*.

Potential geohazards, such as abandoned mine openings, potential karst areas, flood risk areas, sulphide-bearing slates, and underground coal workings, can be viewed at the following web sites:
http://gis4.natr.gov.ns.ca/website/nsgeomap/viewer.htm
http://gis4.natr.gov.ns.ca/website/mrlu83/viewer.htm
Please report any additional geohazards found on Crown lands to your nearest Natural Resources office.

Parks and Recreation / Protected Areas

Parts of Jim Campbells Barren Wilderness Area, Margaree River Wilderness Area, and the Cape Breton Highlands National Park are legal reserves accounting for 35,513 hectares, or 80% of this ecodistrict.

The provincial Old Growth Policy protects another 3,072 hectares of forest on Crown land under policy reserves.

This amounts to 38,585 hectares, or 87% of the ecodistrict, with legal or policy reserve protection.

The most current and up-to-date information for parks and protected areas in this ecodistrict can be found at: http://novascotia.ca/parksandprotectedareas/plan/interactive-map/.

Most of the Northern Plateau Ecodistrict is located within the boundaries of the Cape Breton Highlands National Park.

Wildlife and Wildlife Habitat

Wildlife in the Northern Plateau Ecodistrict includes relatively common species of plants, animals, and other organisms, along with some species that are rare and/or at risk in Nova Scotia.

Wildlife information for Northern Plateau and other ecodistricts comes from a number of sources, including surveys, harvest statistics, hunter and trapper reports (abundance rankings), biological collections from harvested and road killed animals, and observations and reports from the public and DNR staff. Information on important sites is documented by DNR in the Significant Habitats Database and by the Atlantic Canada Conservation Data Centre in Sackville, N.B.

The main forest type in Northern Plateau is highlands spruce-fir. There are large areas of barrens and wetlands (mostly bogs) intermixed with the spruce-fir.

Most of the plateau (76%) is located within the boundaries of the Cape Breton Highlands National Park and under federal management. Provincial management controls 21%, of which approximately 20% is in a wilderness area.

The climate is one of the coldest and wettest in Nova Scotia, with harsh, long winters of heavy snowfall, short growing seasons, and almost constant winds. The barrens of the Northern Plateau are made up of areas of exposed bedrock – primarily composed of igneous and metamorphic rocks (granitic) – that may be completely devoid of vegetation or may be covered in lichens. Where a thin layer of mineral soil has developed on this bedrock, various mosses and other plants have become established. The habitat is favourable for moose.

Species at risk or of conservation concern found in the ecodistrict include Canada lynx, American marten, long-tailed shrew, Bicknell's thrush, rusty blackbird, and two populations of Atlantic salmon.

There are several plant species of conservation concern in the ecodistrict. Due to the remoteness of the area not many wildlife or plant surveys have been completed. Several surveys in the French Mountain, Caribou Barren, and Ingonish River areas have produced significant concentrations of rare plant records. Some of the plants include Robinson's hawkweed, field locoweed, northern meadowsweet, and alpine timothy.

Moose were an abundant and dominant animal in the region prior to the arrival of the first European settlers. By 1825, as a result of over-harvesting for commercial and subsistence purposes, the population was in serious decline. Moose appears to have disappeared from Cape Breton by the early 20th century. In 1947 and 1948, eight moose from Alberta were released in the Cape Breton National Park. This introduction was successful and has resulted in the present population, which numbers in the thousands.

Currently, moose are common in the ecodistrict. The barren and wetland areas are important calving habitat and the wetlands may be used for both food and thermal regulation in summer.

There has been a licensed lottery hunt for the moose in Inverness and Victoria counties since 1986. At present, 345 licenses are issued and the overall success rate has been around 90%. There is also a First Nations harvest that has been going on for a number of years.

Moose are abundant in the Northern Plateau Ecodistrict. (J.-F. Bergeron, Enviro foto)

The Cape Breton population of the American marten, listed as endangered in Nova Scotia, can be found in low numbers in some of the mature and over-mature softwood areas in the ecodistrict. Population estimates put the marten population at fewer than 50 animals remaining on the island.

A provincial marten recovery team has a recovery plan in place. Among the items that the plan proposes is augmenting the present population with animals live-trapped from other jurisdictions.

The Canada lynx, listed as at risk and endangered in Nova Scotia, is also a resident of the highland plateau and several other upland areas on Cape Breton Island. Lynx require mature softwood areas for denning and are generally restricted to the higher elevations due to competition from their main competitors, bobcat and coyote. There is a provincial lynx recovery team in place developing a lynx recovery plan that should aid in maintaining the long term viability of the population.

Bicknell's thrush, listed as vulnerable in Nova Scotia, breed in the stunted softwood forests at higher elevations. Little is known about this reclusive bird. Bird Studies Canada – a national bird conservation organization – is studying the decline of Bicknell's thrush over most of its range.

Loons have been recorded breeding at several lakes.

Speckled trout are abundant in most of the lakes and streams within the area. Trout Lakes are one of the spots that are fished by anglers throughout the season. Headwaters of several salmon waterways – Chéticamp River, North Aspy River, Middle Aspy River, and South Aspy River – originate in the Northern Plateau.

Butterflies, dragonflies, and damselflies have been reported in this area as well. Arctic jutta, a bog species of conservation concern, was found in the Everlasting Barrens. Ringed emerald, a dragonfly of conservation concern, was also collected at this site.

For more detailed and current information on species at risk and species of conservation concern in this ecodistrict, refer to Appendix 3 and Map 6 in a separate Part 3 of this document. These species are important components of the landscape and are given priority attention in planning, management, and stewardship activities.

With much of the ecodistrict privately owned, effective wildlife management will to a great extent rely on active, informed stewardship by the many landowners. The DNR can assist private land stewardship by providing knowledge and information on various management strategies. Legislation such as the Wildlife Habitat and Watercourse Protection Regulations, the Endangered Species Act, and the Environment Act's Activities Designation Regulations address species and habitat concerns within the forest and wetland ecosystems.

Part 2: Linking the Landscape to the Woodlot – *How Woodland Owners Can Apply Landscape Concepts to Their Woodland*

This second part of the report provides information on how landscape concepts can be applied at the woodlot level. The starting point is an introduction to natural disturbances and succession to provide a foundation for better understanding forest ecosystems. The focus then shifts to elements that make up each ecodistrict and the forest groups and vegetation types at the stand level. This allows woodland owners to move between elements and stands to see how their woodland fits in with the larger landscape.

Forest Disturbances and Succession

Forest Disturbances

A disturbance can be described as an event, either natural or human-induced, that causes a change in the existing condition of an ecological system.

Disturbance pattern controls forest development classes (establishment, young, mature, multi-aged / old forest) and their distribution over area and time.

Due to the coastal location of Nova Scotia and its Maritime climate, the extent, intensity, and frequency of natural disturbances is difficult, for the most part, to predict. Prior to European settlement, natural disturbances were only curtailed by natural barriers such as water, climate, topography, and vegetation change. After about 400 years of activity by European settlers, the frequency, intensity, and magnitude of these natural processes has been affected.

New disturbances have been introduced as a result of human activity and include:

- clearing of forests for agriculture
- timber harvesting
- urbanization and development
- introduction of exotic animals, plants, and insects
- disease-causing agents, such as viruses or bacteria
- fire suppression in the forest
- and changes in the chemical and physical characteristics of the atmosphere

Understanding how ecosystems respond to disturbances is critical to understanding how they function and how they can be managed. This will assist woodland owners and forest managers in:

i. assessing the potential for old forest stands and development class distributions
ii. determining appropriate patch sizes and species composition to emulate natural structures and processes
iii. prescribing the appropriate rotation age and development class structure across a forested landscape

iv. projecting future changes to the forest due to climate change and human disturbances
v. maintaining and conserving biodiversity

Natural disturbances are agents that abruptly change existing conditions and initiate secondary succession to create new ecological communities.

By adapting forest management practices to create the structures and processes that emulate natural disturbances, woodland owners and forest managers can help shape forest landscapes.

One approach that closely mimics nature is to allow ecosystems to naturally develop without active management. This approach is particularly effective on lands with long-lived tree species, such as red spruce, white pine, hemlock, sugar maple, yellow birch, and beech. One of the roles of protected areas is to allow this to occur and to also provide a model to compare with managed forests.

Natural disturbances include the spruce budworm, windstorms, and fire. The most recent spruce budworm outbreak occurred from 1975 to 1981 and devastated most of the balsam fir forests of the Northern Plateau. Recent GIS analysis of inventory data and field sampling by ecologists with Parks Canada has suggested a fire origin for much of Northern Plateau.

Natural Succession

Succession refers to the changes in vegetation types (communities) following disturbance which, over time, often leads to a climax stage. Most changes follow a course of vegetation community development (seral stages) for a particular disturbance regime.

Climax vegetation refers to vegetation communities that are relatively long-lasting and self-replacing. Three types of climax vegetation can be described as follows:

Climatic climax – Vegetation types that are mainly a function of regional climate conditions; these occur on sites with average (mesic) moisture and nutrient conditions.

Disturbance climax – Vegetation types which, due to frequency of disturbance, do not progress to the climatic climax.

Edaphic climax – Vegetation types that are mainly a function of soil and site conditions (i.e. low or excess moisture, low or high fertility) which do not progress to the climatic climax.

Another Definition of Succession

Succession, as defined by Odum (1971), is an orderly process of community development that involves changes in species structure and community processes with time; it is reasonably directional and, therefore, predictable.

Successional development generally proceeds through a number of distinct seral stages (e.g. early, middle, late) that replace one another in a predictable sequence and which culminates in a relatively stable and self-perpetuating community condition called a climax.

– From *Part 1: Vegetation Types (2010) of Forest Ecosystem Classification for Nova Scotia*
http://www.gov.ns.ca/natr/forestry/veg-types

Northern Plateau – Elements Defined

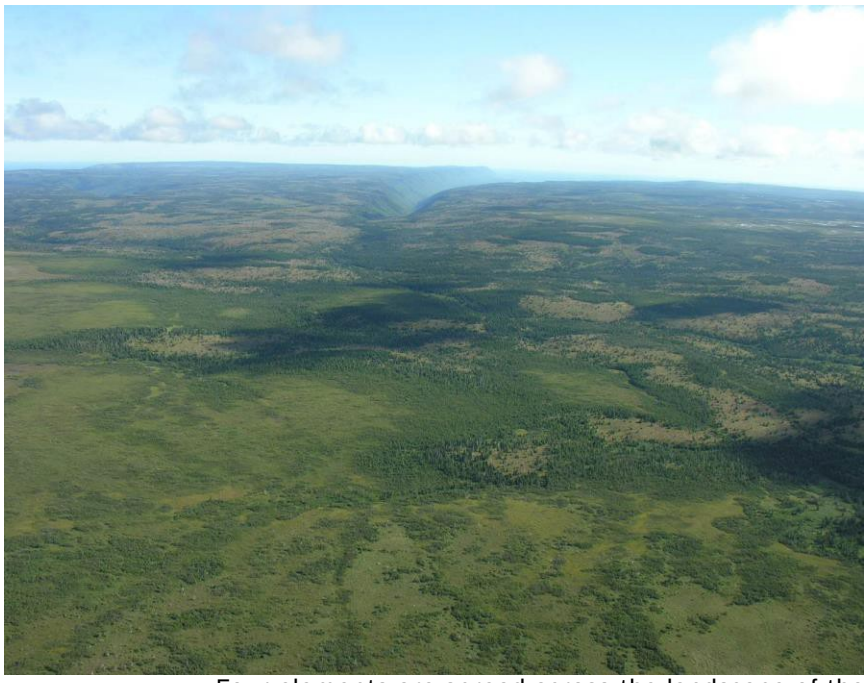
Landscapes are large areas that function as ecological systems and respond to a variety of influences. Landscapes are composed of smaller ecosystems, known as elements. These elements are described by their physical (e.g. soil, landform) and ecological features (e.g. climax forest type). These characteristics help determine vegetation development. Elements promote an understanding of historical vegetation patterns and present disturbances.

A landscape profile identified and mapped four distinctive elements in the Northern Plateau Ecodistrict – one matrix, two patches, and a corridor (Table 5a). A matrix is the dominant community type. Patches are smaller yet still distinctive community types. Corridors are natural linear communities, such as river valleys, that link parts of the ecodistrict.

Highland Spruce Fir is the matrix element, accounting for nearly 71% of the ecodistrict. Balsam fir and black spruce are the main species in this element.

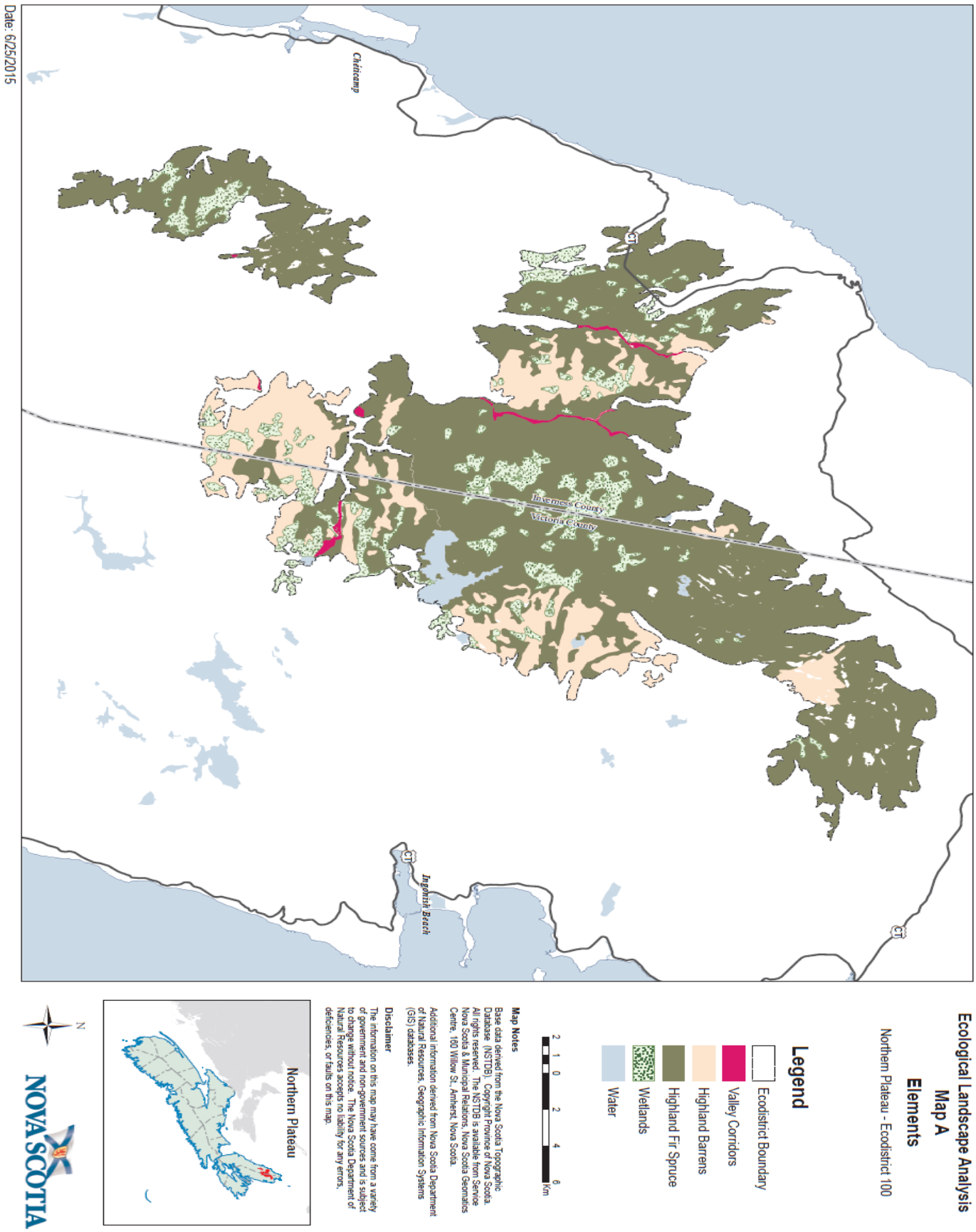
In the **Highland Barrens** patch element, the most widely distributed barren type is the dwarf shrub spruce heath type, which occurs as a patchwork of low mounds or hummocks. The **Wetlands** element comprises freshwater bogs, fens, swamps, and poorly drained areas.

Valley Corridors is a small linear element associated with major watercourses in the ecodistrict.



Four elements are spread across the landscape of the Northern Plateau Ecodistrict.

Map of Elements in Ecodistrict



Forest Stands Within Elements

Each element contains a number of forest stands that can be classified by vegetation, soil, and ecosites. The DNR publication ***Forest Ecosystem Classification for Nova Scotia, Part I: Vegetation Types (2010)*** (see http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp) is helpful in identifying forest plant communities.

Viewed online or available in print through DNR, woodland owners can learn about the characteristics of a particular forest community. Refer to Table 5a for descriptions of elements and Table 5b for forest vegetation types that are likely to be found within elements.

Table 5a – Elements Within Northern Plateau		
Element	**Size (Hectares)**	Element Description
Highland Fir Spruce (Matrix)	30,622 70.9%	This matrix element is most likely to occur as a complex with the two other highland elements, keeping the fir-spruce forest confined to the less exposed sites. Black spruce can be found on moist riparian soils and shallow stony soils over bedrock. White birch follows stand-level disturbances and a few remain as remnants in mature stands of fir. Occasionally a few large mountain ash will make it into the canopy. Due to the higher elevations and increased exposure to winds, the fir and spruce do not attain a similar height as found on the lower elevations of the plateau. The cool, moist climate also slows decomposition rates resulting in sites with unusually thick duff layers. Coarse woody debris loads are among the highest for any forested element in Nova Scotia due to frequent disturbances and slow decomposition. Where the element occurs on sites with increased exposure to winds and snow depth, a forest scrub type occurs where trees only reach heights of five to seven metres. The fir and black tamarack here are weather beaten. Balsam fir tend to develop as short trees with excessive diameters and wide spreading crowns often with several dead leaders, the length of the leader depending on time between severe winters.
Highland Barrens (Patch)	7,336 17%	This element is most prominent on the coarse-textured soils on hummocky and hilly terrain but is often embedded within the Highland Spruce Fir and Wetlands elements. These complexes are more commonly the rule as the exception. Several combinations of vegetation exist on the barrens and the reasons for the variability are often unique to the Northern Plateau environment and the conditions of exposure, topography, and soils. The most widely distributed barren type is the dwarf shrub spruce heath type, which occurs as a patchwork of low mounds or hummocks one to three metres in diameter and less than one metre in height. They are densely overgrown with reindeer mosses and have a thick growth of low ericaceous shrubs. Depressed black spruce seldom reach two-thirds of a metre in height but spread laterally.
Wetlands (Patch)	4,907 11.4%	This patch element comprises freshwater bogs, fens, swamps, and poorly drained areas. On the Northern Plateau, Wetlands occurs as a large wetland complex associated with small lakes, as narrow linear communities associated with flow accumulations and small streams, as a community of hydrophytic vegetation (sedges, sphagnum moss, false holly, and winterberry) associated with level terrain where drainage is impeded or as a depression in the landscape where water remains in excess year round. The plateau wetlands are the headwaters of many of the northern Cape Breton rivers including the Chéticamp, North Aspy, Middle Aspy, South Aspy, Ingonish, and Black. This element plays a critical role in water collection, filtering, and groundwater recharge.
Valley Corridors (Corridor)	299 0.7%	This small linear element is associated with major watercourses in the ecodistrict, such as those found in the Wetlands element.
Total	**43,164***	*Area is not the same as in Table 1 because water has not been included.

Table 5b – Forest Vegetation Types[1] Within Elements in Northern Plateau				
Element	**Seral Stage**			
	Early - Middle	**%**	**Late**	**%**
Highland Spruce Fir	HL1a, HL2	4	**HL1,** HL3	52
Highland Barrens	OW2, SP6, SP7	1	**HL1**, SP5	80
Wetlands	WC1, WC2, WC6, WC7, SP7			

View forest groups and vegetation types at
http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp
To help with identification of vegetation types, the 14 forest groups in Nova Scotia designated by DNR are: Cedar (CE), Coastal (CO), Flood Plain (FP), Highland (HL), Intolerant Hardwood (IH), Karst (KA), Mixedwood (MW), Old Field (OF), Open Woodland (OW), Spruce Hemlock (SH), Spruce Pine (SP), Tolerant Hardwood (TH), Wet Coniferous (WC), Wet Deciduous (WD)
Bolded vegetation types indicate typical late successional community
[1] Forest Ecosystem Classification for Nova Scotia (2010)
*Percentage of element in each successional stage. Percentages may not total 100 due to unclassified lands (such as clearcuts and regenerating stands) not being included.

Photos Illustrating Vegetation Types in Elements

The following photos show some of the vegetation types expected to be found within their respective elements.

White spruce / Wood aster (HL2) is an early to mid-successional vegetation type found in the Highland Fir Spruce matrix element.

Balsam fir / Mountain ash / Large-leaved goldenrod (HL1) is a late successional vegetation type found in the Highland Barrens patch element.

Black spruce / Cinnamon fern / Sphagnum (WC1) is a vegetation type found in the Wetlands patch element.

Landscape Composition and Objectives

Landscapes contribute to the maintenance and conservation of native biodiversity. Managing landscapes for biodiversity requires a variety of planning approaches and tools. Sustaining forest composition diversity by reflecting natural patterns of disturbance and succession is one approach that DNR is employing to try and realize this objective. DNR is developing a number of additional approaches and planning tools which will be integrated with objectives defined in the ELA protocol.

Human activities, such as forest harvesting, can have a significant impact on the structure and composition of the forested landscape. Well-planned harvesting can provide a tool to achieve landscape composition goals.

Natural Disturbance Regimes

Three natural disturbance regimes dominate natural forests:

Frequent Stand Initiating – Disturbances usually occur more frequently than the average life span of the dominant species and are of sufficient intensity to kill most of the existing mature trees, thereby promoting the establishment of a new forest within a relatively short period. Some unharmed trees often survive the disturbance in pockets and/or as scattered individuals.

Infrequent Stand Initiating – The time between stand-initiating disturbances is usually longer than the average longevity of dominant species, thereby supporting processes of canopy gap formation and understory development in mature forests.

Gap Replacement – An absence of stand-initiating disturbances supports the development of a dominant overstory that is sustained through dynamic processes of canopy gap formation, understory development, and overstory recruitment. Gap formation ranges from individual tree mortality to the replacement of a small group of trees.

Frequent and open seral disturbance regimes are the most common in Northern Plateau. Frequent regimes are typical of black spruce and fir communities. The interval between stand- initiating events is shorter than the longevity of the climax species. This disturbance is intense enough that there is rapid mortality and a new even-aged forest becomes established. Another disturbance takes place before the stand becomes uneven-aged. Fire and wind are the usual disturbances.

Open seral regimes take place where site conditions restrict or limit tree growth, creating sparse forest cover. The Wetlands element in Northern Plateau, where excessive moisture or thick organic peat layers hinder tree growth, is a good illustration of the open seral regime.

Forest Composition

Forest disturbances lead to forest renewal and the development of young forest habitats with characteristic successional patterns. Management of landscapes to conserve biodiversity requires sustaining ecologically adequate representation of natural habitat diversity, among a number of other measures and planning approaches.

At a landscape planning scale, the variety of habitats can be broadly described in terms of the composition of development classes, seral stages, and covertypes.

Development Classes describe changes in structure and process as forests age and trees grow larger. For landscape management purposes, four development classes are recognized:

- forest establishment (0 to 6 m height)
- young competing forest (7 to 11 m height)
- mature forest (> 11 m height; including multi-aged and old forest)
- multi-aged / old forest (multiple layered)

Within this simplified description there is considerable variation in the processes and structures that evolve in particular stands. When the current forest inventory is used to classify development classes, the height criterion is used. When forecasting future conditions using the Forest Model, the age criterion is preferred.

Harvesting and silviculture activities, such as planting and thinning, have been ongoing on Crown land since the 1940s.

Seral Stages describe changes in species composition of forest communities as succession progresses from domination of early seral "pioneer" species following disturbance, toward late seral communities dominated by long-lived, shade-tolerant "climax" species. Seral stage is dependent on the composition of tree species of a forest, irrespective of age. For landscape management purposes, three seral stages are recognized:

- early
- mid
- late

Early successional species are those that do well in direct sunlight and include white and grey birch, aspen, poplar, white spruce, tamarack, pin cherry, jack pine, and red pine. These species grow quickly, but are usually short-lived.

They are replaced by mid-successional species that can tolerate moderate amounts of shade, such as white ash and red oak.

Late successional species generally have a high shade tolerance and include hemlock, red spruce, sugar maple, and beech, as well as yellow birch and white pine. The species often develop slowly in shaded understories and can be long-lived and form old growth.

Covertypes descriptions further refine landscape composition by distinguishing forests of different community conditions. Management generally recognizes three forest covertypes:

- softwood (overstory cover of softwood species is 75% or more)
- hardwood (overstory cover of hardwood species is 75% or more)
- mixedwood (overstory cover of either softwood or hardwood is between 25% and 75%)

Forest Composition Objectives

Within ecodistricts, the forest composition should contain a range of conditions that sustain the inherent forest communities and dominant natural disturbance regimes. Table 6 provides target ranges for development class and seral stage composition appropriate for different disturbance regimes. These ranges have been derived from the professional judgment of DNR forest ecologists to guide composition objectives for large landscape areas.

Woodland owners can use this guidance to assess how their holdings contribute to the overall ecodistrict structure by referring to the landscape element bar charts that illustrate where deficiencies exist. For example, landowners who have a large amount of mature forest in an element where this is in short supply can recognize the contribution of their holdings to the overall health of the landscape.

Four hundred years of European settlement in the Acadian region has left insufficient natural landscape structure to confirm these ranges. Facing similar challenges, a comprehensive modeling approach was used by the Ontario Ministry of Natural Resources to support "range of variation" targets for natural disturbance regimes in the Great Lakes St. Lawrence region (see http://www.ontario.ca/document/forest-management-great-lakes-and-st-lawrence-landscapes).

A full description of definitions and mapping of Nova Scotia's disturbance regimes is containedin the report "Mapping Nova Scotia's Natural Disturbance Regimes" available from the DNR website (see http://novascotia.ca/natr/library/forestry/reports/NDRreport3.pdf).

Table 6 - Landscape Composition Target Ranges (by Development Class / Disturbance Regime)

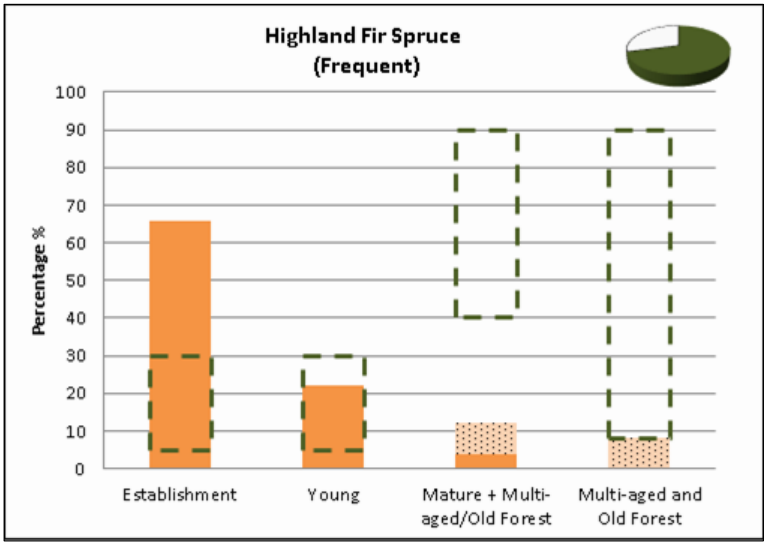
Natural Disturbance Regime	Development Class			
	Forest Establishment	Young Competing Forest	Mature Forest (including multi-aged and old forest)	Multi-aged and Old Forest
Frequent Stand Initiating	5 - 30%	5 - 30%	>40% early, mid, and late seral representation	>8%
Infrequent Stand Initiating	5 - 20%	5 - 20%	>60% most in mid and late seral stages	>16%
Gap Replacement	0 - 15%	0 - 15%	>70% most in late seral stage	>24%

Table 6 indicates that for frequent stand-initiating disturbances, both establishment and young development class forests would typically comprise between 5 and 30% of area, while mature forest – which includes multi-aged and old forest – would cover more than 40%. Mature forest should consist of a relatively even balance of early, mid and late successional stands. At least 8% of the mature forest should be in the multi-aged and old forest class. The targets for the other disturbance regimes are shown in Table 6. Forest planning should strive to maintain composition within these targets, and identify corrective and mitigating measures when outside these ranges.

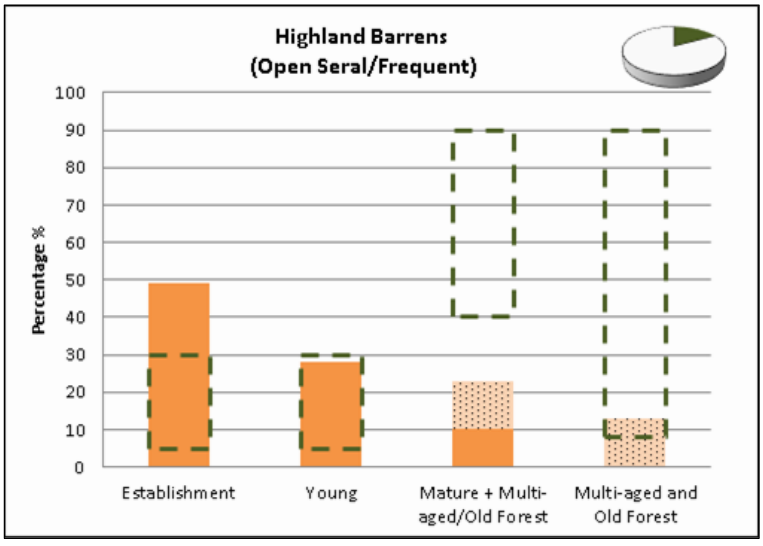
Development Class Targets by Element

The series of charts that follow combine data on development classes for each element with desired or target percentages, based on the type of natural disturbance regime. The target percentages (from Table 6) are represented by rectangles of broken green lines. The light brown bars show the percentage of each development class at the time the original data was gathered. The dotted area in the mature class shows the amount of multi-aged and old forest area included. The coloured portion of the small pie chart in the corner of the graphic shows the relative size of the element within the ecodistrict.

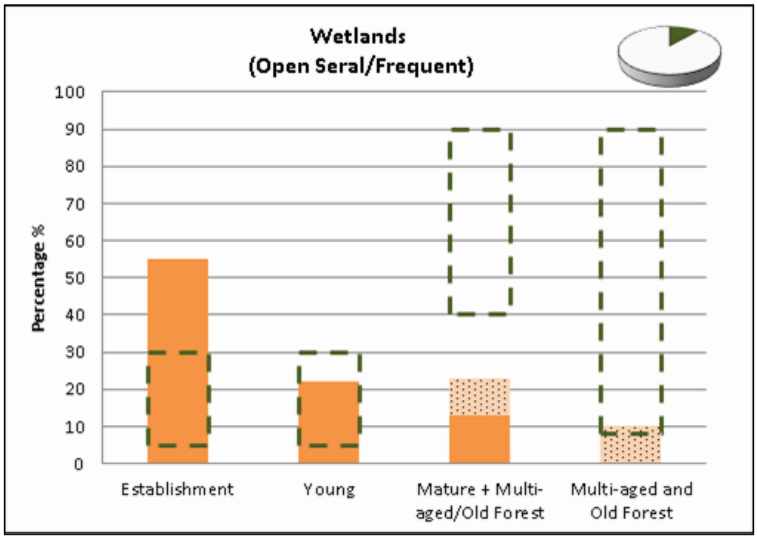
In the **Highland Fir Spruce** element repeated browsing of balsam fir regeneration by moose has kept much of the element in the establishment phase. Control of the moose population could lead to the re-establishment of fir in this element.



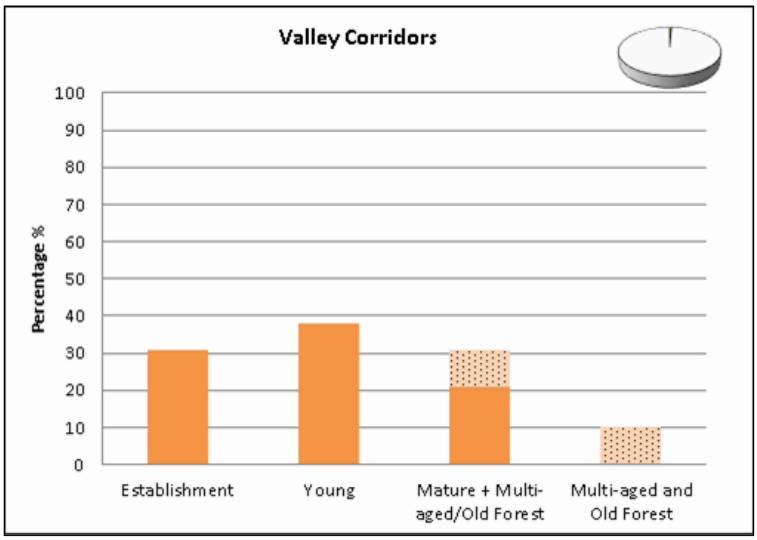
Productive forests in the **Highland Barrens** element are scattered throughout a landscape of barrens and wetlands. Many of these productive areas have had the regenerating forests of fir browsed extensively by moose, creating grasslands and poorly stocked forests.



The **Wetlands** element is variably composed of forest, interspersed with poorly stocked woodlands and open wetlands, many of which are associated with streams. Black spruce is a large component of this element and is significantly less susceptible to spruce budworm defoliation than fir. These stands often develop multi-aged features. The high amount of establishment forests may reflect height growth limitations in poor sites.



The **Valley Corridors** element includes parts of several elements and does not have a specific disturbance regime or composition target. The relatively high amount of establishment and young forests may reflect height growth limitations in poor sites.



Summary of Parts 1 and 2

This ends the first two parts of this report, which are available online to anyone who wants to view them. The intent was for the first part to provide a general overview of the ecodistrict for members of the public. The second part was designed for woodland owners to show how landscape ideas, such as elements, can be applied at the woodlot level.

The third part of the report, which includes more detailed information, maps, appendices, glossary, and literature citations, is designed for forest planners, managers, ecologists, analysts, and interested woodland owners.

Glossary A: Terms in Parts 1 and 2

Biodiversity	The diversity of plants, animals, and other living organisms, in all their forms and level of organization, including genes, species, ecosystems, and the evolutionary and functional process that link them.
Canopy	The uppermost continuous layer of branches and foliage in a stand of trees.
Climax forest community	A relatively stable and self-perpetuating forest community condition that maintains itself (more or less) until stand-level disturbance causes a return to an earlier successional stage. The final stage of natural succession for its environment.
Climax vegetation	A forest or non-forest community that represents the final stage of natural succession for its environment.
Coarse filter approach	A habitat-based approach to conserving biodiversity by maintaining a natural diversity of structures within stands, and representation of ecosystems across landscapes. The intent is to meet the habitat requirements of most native species over time. Usually combined with a fine filter approach to conserve specific rare species and ecosystems.
Composition	The proportion of biological components within a specified unit such as a stand or landscape: **Stand or Species Composition.** The proportion of each plant species in a community or stand. May be expressed as a percentage of the total number, basal area, or volume of all species in that community. **Landscape Composition.** The proportion of each community type within a landscape. Community type may be defined by vegetation type, covertype, seral stage, or development class (age).
Connectivity	The way a landscape enables or impedes movement of resources, such as water and animals.
Converted	Lands removed from a natural state (e.g. forest) and changed to other uses (e.g. agriculture, urban, settlement, road).
Corridor	Corridors are natural linear communities or elements, such as river valleys, that link parts of the ecodistrict. They are a fundamental feature of the “matrix, patch, corridor” concept of landscape structure.

Crown land and Provincial Crown land	Used in these Ecological Landscape Analysis reports to include all land under the administration and control of the Minister of Natural Resources under the Forests Act, Section 3; as well as the lands under the administration and control of the Minister of Environment under the Wilderness Areas Protection Act. Also includes Federal Parks in the accounting of protected area representation.
Covertype	Refers to the relative percentage of softwood versus hardwood species in the overstory of a stand. In this guide, covertype classes are: **Softwood:** softwood species compose 75% or more of overstory **Hardwood:** hardwood species compose 75% or more of overstory **Mixedwood:** softwood species composition is between 25% and 75%
Development class	The description of the structure of forests as they age and grow (e.g. establishment forest, young forest, mature forest, multi-aged / old forest).
Disturbance	An event, either natural or human-induced, that causes a change in the existing condition of an ecological system.
Ecodistrict	The third of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecoregions. Characterized by distinctive assemblages of relief, geology, landform, and vegetation. Used to define the landscape unit for these Ecological Landscape Analysis reports.
Ecological land classification	A classification of lands from an ecological perspective based on factors such as climate, physiography, and site conditions. The Ecological Land Classification for Nova Scotia Volume 1 delineates ecosystems at five hierarchical scales: ecozone, ecoregion, ecodistrict, ecosection, and ecosite.
Ecoregion	The second level of the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecozone. Used to characterize distinctive regional climate as expressed by vegetation. There are nine ecoregions identified in Nova Scotia.
Ecosection	The fourth of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecodistricts. An ecological land unit with a repeating pattern of landform, soils, and vegetation throughout an ecodistrict.
Ecosite	The fifth of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecosections. Characterized by conditions of soil moisture and nutrient regimes. Although not mapped, the Acadian and Maritime Boreal ecosites of the province are fully described in the Forest Ecosystem Classification for Nova Scotia (2010).

Ecosystem	A functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size – a log, pond, field, forest or the Earth's biosphere – but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, such as a forest ecosystem, old-growth ecosystem, or range ecosystem. Can also refer to units mapped in the DNR Ecological Land Classification system.
Element	A landscape ecosystem containing characteristic site conditions that support similar potential vegetation and successional processes. Elements were mapped by combining ecosections with similar climax vegetation and natural disturbance interpretations. Depending on their role in the ecosystem, elements may be described as matrix, patch, or corridor.
Endangered species	A wildlife species facing imminent extirpation or extinction. A species listed as endangered under the federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal Species at Risk Act).
Even-aged	A forest, stand, or vegetation type in which relatively small age differences exist between individual trees. Typically results from stand-initiating disturbance.
Extinct species	A species that no longer exists. A species declared extinct under federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal SARA).
Extirpated species	A species that no longer exists in the wild in Nova Scotia but exists in the wild outside the province. A species declared extirpated under federal or Nova Scotia endangered species legislation (Nova Scotia Species at Risk Act or federal SARA).
Forest management	The practical application of scientific, economic, and social principles to the administration and working of a forest for specified objectives. Particularly, that branch of forestry concerned with the overall administrative, economic, legal, and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection, and forest regulation.
Frequent stand initiating	Disturbances usually occur more frequently than the average lifespan of the dominant species and are of sufficient intensity to destroy most of the existing trees, promoting a new forest within relatively short periods of time.

Gap replacement	An absence of stand-initiating disturbances supports the development of a dominant overstory that is sustained through dynamic processes of canopy gap formation, understory development, and overstory recruitment. Gap formation ranges from individual tree mortality to periodic gap formation events that are rarely of a stand-initiating intensity.
Habitat	The place where an organism lives and/or the conditions of that environment including the soil, vegetation, water, and food.
Impact assessment	A study of the potential future effects of resource development on other resources and on social, economic, and/or environmental conditions.
Infrequent stand initiating	The time between stand-initiating disturbances is usually longer than the average longevity of dominant species, thereby supporting processes of canopy gap formation and understory development in mature forests.
Inherent conditions	Refers to the natural condition of ecosystems based on their enduring physical features. This is the potential condition expected in the absence of human influence.
Integrated Resource Management (IRM)	A decision-making process whereby all resources are identified, assessed, and compared before land use or resource management decisions are made. The decisions themselves, whether to approve a plan or carry out an action on the ground, may be either multiple or single use in a given area. The application of integrated resource management results in a regional mosaic of land uses and resource priorities which reflect the optimal allocation and scheduling of resource uses.
Land capability (LC)	LC values represent the maximum potential stand productivity (m^3/ha/yr) under natural conditions.
Landform	A landscape unit that denotes origin and shape, such as a floodplain, river terrace, or drumlin.
Landscape	An expanse of natural area, comprising landforms, land cover, habitats, and natural and human-made features that, taken together, form a composite. May range in scale from a few hectares to large tracts of many square kilometres in extent.
Matrix	A widespread vegetation forest community which dominates the landscape and forms the background in which other smaller scale communities (patches) occur. The most connected or continuous vegetation type within the landscape, typically the dominant element. (Matrix is a fundamental feature of the "matrix, patch, corridor" concept of landscape structure.)

Mature forest	A development class within the sequence of: 1) forest establishment, 2) young forest, 3) mature forest; and 4) multi-aged and old forest. Mature forests include multi-aged and old forest. Forests are typically taller than 11 metres, have an upper canopy fully differentiated into dominance classes, and regularly produce seed crops. Mature forests may develop over long periods, transitioning from early competitive stages where canopy gaps from tree mortality soon close, to later stages where openings persist and understories develop to produce multi-aged and old forest.
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.
Natural disturbance regimes	The patterns (frequency, intensity, and extent) of fire, insects, wind, landslides, and other natural processes in an area. Natural disturbances inherently influence the arrangement of forested ecosystems and their biodiversity on a given landscape. Three disturbance regimes recognized in Nova Scotia are: **Frequent:** Disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even age. The time interval between stand-initiating events typically occurs more frequently than the longevity of the climax species that would occupy the site – therefore, evidence of gap dynamics and understory recruitment is usually absent. This regime results in the establishment and perpetuation of early to mid-successional vegetation types. **Infrequent:** Stand-initiating disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even-age, but the time interval between disturbance events is normally longer than the average longevity of the dominant species – allowing gap dynamics and understory recruitment to evolve and become evident (eventually creating uneven-aged stands). This regime generally leads to the establishment and/or perpetuation of mid to late successional vegetation types. **Gap replacement:** Stand-initiating disturbances are rare. Instead, disturbances are characterized by gap and small patch mortality, followed by understory recruitment, resulting in stands with multiple age classes. This regime generally leads to the establishment and/or perpetuation of late successional vegetation types.
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 debris. In Nova Scotia, stands older than 125 years are classed as old growth.

Patch	A discrete community or element nested within a surrounding landscape, which is often a matrix forest. (Patch is a fundamental feature of the "matrix, patch, corridor" concept of landscape structure.)
Reserve	An area of forest land that, by law or policy, is usually not available for resource extraction. Areas of land and water set aside for ecosystem protection, outdoor and tourism values, preservation of rare species, gene pool and wildlife protection (e.g. wilderness areas, parks).
Riparian	Refers to area adjacent to or associated with a stream, floodplain, or standing water body.
Seral stage	Any stage of succession of an ecosystem from a disturbed, unvegetated state to a climax plant community. Seral stage describes the tree species composition of a forest within the context of successional development.
Species	A group of closely related organisms that are capable of interbreeding, and which are reproductively isolated from other groups of organisms; the basic unit of biological classification.
Species at risk	Legally recognized designation for species at federal and/or provincial levels that reflects varying levels of threats to wildlife populations. The four categories of risk are extirpated, endangered, threatened, and species of special concern.
Succession	An orderly process of vegetation community development that over time involves changes in species structure and processes.
Tolerance	The ability of an organism or biological process to subsist under a given set of environmental conditions. The range of these conditions, representing its limits of tolerance, is termed its ecological amplitude. For trees, the tolerance of most practical importance is their ability to grow satisfactorily in the shade of, and in competition with, other trees.
Vulnerable species	A species of special concern due to characteristics that make it particularly sensitive to human or natural activities or natural events. May also be referred to as "species of special concern." A species declared vulnerable under the federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal SARA).
Wilderness area	A part of the provincial land base designated under the Wilderness Areas Protection Act (e.g. Canso Barrens).