Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS NORTHERN PLATEAU ECODISTRICT 100

PART 3: Landscape Analysis for Forest Ecosystem Planners

ELA 2015-100

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 100: Northern Plateau

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ISBN 978-1-55457-572-5

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.

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This in-depth Ecological Landscape Analysis (ELA) report is a lightly edited version of the original ELA produced by the Department of Natural Resources (DNR) as an internal document to assist with Crown land planning. The report provides information for planners, forest managers, ecologists, technicians, and woodland owners seeking detailed planning resources. In coming years, the DNR will continue to develop landscape planning approaches and introduce additional tools to support sustainable management and biodiversity conservation. The Department is working with stakeholders to explore novel planning approaches using these methods.

The ELA provides tools to recognize and pursue common goals for sustaining ecosystem values across all ownerships within the province's diverse landscapes. The ELA is not a plan, but instead supports planning by providing a framework of ecosystem mapping, indicators, fine-scaled features, and landscape functions that help describe landscapes as ecological systems. The report comprises the four major sections outlined below, along with theme maps and appendices containing detailed data summaries:

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Understanding the Landscape as an Ecological System

(Appendices 1, 2a, 2b; Map 2)

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, which were interpreted through analysis using the ecosection layer of the Ecological Land Classification (ELC) for Nova Scotia. Elements are described by their potential vegetation (e.g. climax forest type) and physical features (e.g. soil, landform). These characteristics help determine historical vegetation patterns and promote an understanding of present distributions and potential habitat

development. Across the province about three dozen elements were identified in the ELAs and mapped to show their distribution across ecodistricts and ecoregions.

Elements Within Landscapes (Map 2)

The landscape analysis identified and mapped four distinctive elements in the Northern Plateau Ecodistrict – one matrix, two patches, and a corridor. A matrix is the dominant element. Patches are smaller yet still distinctive elements. Corridors are natural linear elements, such as river valleys, that extend across ecodistricts (see connectivity section for full discussion of matrix, patch and corridor concepts).

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.

Flow – Element Interactions (Appendix 1; Map 2)

Flow phenomena are the features that move across and through landscapes. They can be energy or material, living or non-living. Diaz and Apostol (1992) suggest that the most relevant flows for landscape analysis may include water, wind, fire, animals, plants, and humans. The following flows were considered in the analysis of this ecodistrict and are described in Appendix 1: moose, water, humans, marten, and lynx.

The main purpose in describing flows, and their relationship to the elements, is to provide insight into the role of each element. This will inform understanding of each element's contribution to overall landscape function.

River corridors promote connectivity.

Landscape Connectivity (Appendices 2a, 2b; Map 2)

Connectivity refers to the ease or difficulty that resources, such as water, animals, or even events – such as fires – can move within an area. As a basic ecological requirement, the ability to move without excessive risk is of critical importance for maintaining biodiversity at all levels, including genetic, individual, species, population, community, and ecosystem.

Connectivity takes many forms and operates at a wide range of scales. Among the structural ecosystem components that support movement, three major systems can be identified:

Matrix Ecosystems – Matrix implies large areas of broadly similar habitat in which movement is not constrained to particular routes. The slow spreading and mixing of species through the dominant community characterizes the ecosystem matrix. This "percolation" is dependent on the large patch conditions, which may be vulnerable to fragmentation. Interior habitat is often an important feature of matrix ecosystems.

Patch Ecosystems – The movement of species among patches of suitable habitat is dictated by the arrangement and size of patches and by a number of species' specific measures. Patches of suitable habitat must occur at acceptable distances over time. Some patch habitats have critical functions and must be continuously sustained, such as wetlands for migrating birds, feeding areas for deer and calving grounds for moose. Other patches may be dynamic, shifting about the landscape as ecosystems evolve. Edge and interior habitat conditions are important features of patch ecosystems, as well as natural isolation.

Linear Corridor Ecosystems – Flow along popular routes is dictated by enduring physical features, such as river valleys. Linear flow often requires continuous connection, such as rivers. Breaks in the connection serve as obstacles. It is a characteristic of continuous linear features that they often serve as connective corridors for some species and barriers for others.

The absence of resource management and extraction in the Northern Plateau, due to the protected status of most of the lands, provides little hazard or compromise to the continuing integrity of the natural connectivity structure already inherent in the landscape. The current high moose population has been a serious detriment to the re-establishment of the spruce budworm-killed balsam fir forests and this may be impacting those wildlife species that prefer large areas of interior forest conditions.

The mandate of the National Park to maintain the natural processes and functions of the ecosystem continues to ensure that connectivity in this ecodistrict is secure.

Management practices to enhance landscape connectivity could include:

- Enhancing connectivity among conservation areas by applying appropriate medium and high biodiversity emphasis standards when managing areas with natural linkage potential.
- Improving ecoregional connectivity by sustaining and restoring natural conditions at important linkage points among ecodistricts.

Links to Neighbouring Ecodistricts (Appendices 1, 2a; Map 2)

Moose are the most significant flow with linkages to the adjacent ecodistricts. Travelling from the Northern Plateau to the lower elevations of the Cape Breton Hills, Inverness Lowlands, and Victoria Lowlands is done at various times of the year for food and shelter. People provide limited linkages due to the restricted development of transportation options in the national park with most linkage occurring along the Cabot Trail which winds its way through the above three ecodistricts.

Water links with the adjacent ecodistricts as the Northern Plateau is the headwater source for many rivers and brooks flowing off the plateau and onto the lowlands before emptying into the Atlantic Ocean or Northumberland Strait. However, due to the plateau escarpment, the movement of fish is restricted.

Landscape Indicators (Appendices 3, 6, 7, 8, 9, 10, 11; Maps 3, 4, 5, 9, 10)

Indicators provide standard measures for assessing landscape conditions. Indicators can be used to develop goals, identify priority actions, assess trends, and support the evaluation of scenarios.

Forest Composition Indicators (Appendices 8, 10; Maps 4, 9, 10)

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. A number of additional approaches and planning tools are being developed which will be integrated with objectives defined in the ELA protocol.

Human activities, such as forest harvesting, can shape the structure and composition of the forested landscape and should be planned to help support landscape composition goals.

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 class indicators 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 / Old Forest Policy)

Seral stage indicators 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 (seral score 10 to 23)
- mid (seral score 24 to 37)
- late (seral score 38 to 50)

A look-up table (see Appendix 8) assigns each species in the forest inventory a value from one to five representing its position on the successional scale. These values are applied to the species composition data in the forest inventory to calculate a seral score, which may range from 10 to 50.

Covertype indicators 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%)

Target Ranges for Composition Indicators

Table 7 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. This guidance can be used to assess how land holdings contribute to the overall ecodistrict structure by referring to the element analysis section which summarizes the levels of these indicators.

A full description of definitions and mapping of Nova Scotia's disturbance regimes is contained in 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 7 - 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%

Forest Vegetation Types for Seral Stages in Each Element

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)*** (http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp) is helpful in identifying forest plant communities. Table 8 presents a description of the vegetation types likely to be found within elements, along with the current percentage of each seral stage.

Table 8 – Forest Vegetation Types[1] Within Elements in Northern Plateau

Element	Seral Stage			
	Early - Middle	%	Late	%
Highland Spruce Fir	HL1a, HL2	4.0	**HL1,** HL3	52.0
Highland Barrens	OW2, SP6, SP7	1.0	**HL1**, SP5	80.0
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.

Land Use Indicators (Appendices 3, 4, 5; Maps 6, 7)

Two indices (Ecological Emphasis Index and Road Index) have been developed to measure the relative pressure that current human land use exerts on ecosystems.

Ecological Emphasis Index (Appendices 11, 12; Map 3)

A variety of land management practices occur across landscapes, ranging from natural reserve areas to highly modified urban environments. Conserving biodiversity requires a balancing of land use practices to sustain ecological integrity.

To assist in assessing land use intensities and develop appropriate practices, four levels of ecological integrity are defined based on the degree that the conservation of natural conditions is emphasized in the management practices and policies applied to the land:

- Reserve, such as parks or wilderness areas
- Extensive, which are lands managed or restored for multiple values using ecosystem-based techniques
- Intensive, optimizing resource production by management techniques that may reduce biological diversity, such as plantations; but also meet the Wildlife Habitat and Watercourses Protection Regulations (NSDNR, 2002) (see http://www.gov.ns.ca/natr/wildlife/habitats/protection)
- Converted, lands altered for agriculture, roads, or other human activities

All lands within the ecodistrict are assessed at the stand level and assigned one of these four ecological emphasis classes (EEC) based on past practices. These classes are mapped over all areas of the landscape using a one hectare grid. The Ecological Emphasis Index (EEI) is determined by assigning a weighting value to each class: Reserve (100), Extensive (75), Intensive (25), and Converted (0). An overall index value may be calculated for any area of

interest, such as element, ecosection, ecodistrict, or ecoregion, by averaging the index values within the area to provide a relative indication of land use pressure.

The overall EEI for Northern Plateau is 94 to 95. This high index value reflects the large amount of land under the control of the provincial Crown (21%) or federal government (76%).

About 15% of the land falls in the extensive EEC. This implies land managed for multiple values using ecosystem-based techniques that conserve biodiversity and natural ecosystem conditions and practices.

Less than 1% of the ecodistrict has been converted. This is land that has been changed to an unnatural state for human use, mostly settlements, farms, urban development, and transportation and utility corridors.

The reserve class accounts for 82% of the area and is divided into two categories: legal reserves and policy reserves. The legal reserves are those areas that have legal status under the IUCN (The International Union for the Conservation of Nature and Natural Resources) codes of I, II, or III such as wilderness areas, protected beaches, and designated provincial parks. The second type of reserves are those set aside under various provincial policies, such as the Old Forest Policy.

Less than 1% of the ecodistrict falls in the intensive class, representing lands managed intensively to optimize resource production from sites maintained in a native forested state. Management may eliminate or reduce the duration of some development processes, particularly old forest stages, and may include exotic species, old field spruce, and monoculture plantations. Despite intensive practices, these lands are an important component of landscape structure and composition.

DNR will continue to develop and evaluate other measures of conservation risk.

Road Index (Appendices 6, 7; Map 5)

The GIS-based "Road Index" provides a standard assessment and mapping of road distributions across ecodistricts to assist planners to objectively explore options for managing road networks and assess the intersection of road affects with other features of the landscape. Density, distance, and type of linear feature (e.g. road types, power lines) are used to calculate index values that indicate relative road pressure. The index value is mapped over all areas of the landscape using a one hectare grid. The overall index may be calculated for any area of interest, such as element, ecosection, ecodistrict, or ecoregion, by averaging the index values within the area to provide a relative indication of land use pressure. The index provides a numerical indicator of road influence that can be used to monitor temporal changes and compare different landscapes.

In discussing road ecology, Forman (2004) describes five distinctive landscape types in North America: city-suburb, agricultural, forestry, arid-grassland, and natural landscape. Each landscape type has a characteristic pattern of road networks with distinctive ecological effects and planning considerations (Forman & Hersperger 1996). These were adapted in Nova Scotia to classify five Road Index Benchmark Ranges associated with particular land use settings:

- Remote Landscape (RI 0 to 6): Unpopulated with few roads, trails, or other linear features
- Forest Resource (RI 7 to 15): Forest access roads are the primary linear feature
- Mixed Rural (RI 16 to 24): Mixed land use of rural settlement, forestry, and agriculture
- Agriculture/Suburban (RI 25 to 39): Suburban settlement and/or open agricultural fields
- Urban (RI 40 to 100): Urban environment with high building densities, roads, and few tracts of undeveloped land outside municipal parks

Road, trail, and utility corridors are vital components of human land use. However, transportation systems are expensive and produce many undesirable environmental effects, such as chronic siltation, invasion routes for exotic species, fragmentation, loss of productive land, and increased human presence.

Low road density areas are important features for biodiversity conservation. Planning should consider block scheduling options, life expectancy, class requirements, decommissioning strategies, and overall landscape function, in order to develop efficient access systems designed to minimize environmental impacts.

Northern Plateau has an overall Road Index value of approximately 0.3%, which falls within the Remote range of 0 to 6 (Appendix 7). Ninety-five percent of the ecodistrict has a Remote Road Index.

Fine Scale Features (Appendices 3, 4, 5; Maps 6, 7)

Data on the status and location of priority species, ecological land classification, representivity analysis, and other landscape characterization themes were used to identify special occurrences, rare ecosections, and ecological representivity. These fine scale features, which occur at a sub-landscape level, may require special management practices to conserve their uncommon characteristics.

Lindenmayer and Franklin (2002) refer to the importance of identifying “midspatial-scale” features and “patch-level habitats,” including: 1) aquatic ecosystems, such as streams, lakes, and ponds; 2) wildlife corridors; 3) specialized habitats, such as cliffs, caves, thermal habitats, meadows, and vernal pools; 4) biological hotspots or places of intense biological activity, such as calving sites, over wintering grounds, and spawning habitats; and 5) remnants of old forest.

Priority Species and Other Special Occurrences (Appendix 3; Map 6)

Landscapes and ecosystems comprise many species of plants, animals, and other organisms. Some of these species are given priority in planning, management, and stewardship because they are rare, and/or at risk of going extinct locally or on a larger scale. The status and location of these species are important and data are collected, compiled, and assessed on an ongoing basis.

The primary species data used in this report are from the Atlantic Canada Conservation Data Centre and DNR’s Significant Habitat Database. Efforts are made to ensure data are as accurate and up-to-date as possible. Lists and maps indicate what is currently known. Due diligence tied to planning, management, and stewardship may require that surveys be carried out to update

information or to fill gaps in our knowledge. Priority species may require special actions in terms of forest management and other activities that alter habitat and the landscape. If more information is required or if management specific to a priority species needs to be developed, a regional biologist, Wildlife Division staff, or other species experts should be contacted.

This section includes species at risk (refer to Table 1a, Appendix 3), species of conservation concern (Table 1b, Appendix 3), other conservation features (Table 1c, Appendix 3), and heritage features (Table 1d, Appendix 3, where available). *The list of species at risk and species of conservation concern was obtained from the Atlantic Canada Conservation Data Centre (ACCDC) databases, current to 2013*.

Species at Risk

The term "species at risk" is generally used to describe those species that are, to some extent, protected under provincial or federal endangered species legislation. Usually these species are protected where they occur on provincial, federal, and private lands. In Nova Scotia, the two main pieces of endangered species legislation are the Nova Scotia Endangered Species Act (NSESA) and the federal Species at Risk Act (SARA). Species can be classified as "endangered," "threatened," "vulnerable/special concern," or as "extinct" or "extirpated." In most cases for species at risk, recovery planning and special management are in place, as well as legal protection (see http://novascotia.ca/natr/wildlife/biodiversity/at-risk-overview.asp).

Species of Conservation Concern

The term "species of conservation concern" refers to those species that are a high priority for conservation and special attention during planning, management, and stewardship. These species may be rare and/under a variety of threats but the threats do not currently warrant species at risk designation. In some cases, these species could meet the criteria for a species at risk but a formal species at risk assessment has not been done. Species of conservation concern are a priority in landscape planning because a focus on them now can prevent these species from becoming species at risk later.

Species Ranking and Coding Systems

A number of ranking and coding systems identify and convey the status of species at risk and species of conservation concern. Some of this information is provided in Appendix 3 and Map 6 and is routinely used in planning, management, and stewardship activities.

Colour-coded "traffic light" systems are used provincially and nationally. These systems use "red to orange/yellow to green" categories to indicate the most at risk species (red) to the least at risk species (green). Details of these systems are available from the Wildlife Division.

A second system commonly used is NatureServe Conservation Data Centre system. This system uses numbers from one (extremely) to five (widespread, abundant) to denote the relative rarity and conservation concern for species. At the provincial scale numbers are prefixed with "S" to indicate that this is a state/provincial level rank. Ranks at the National (N) and Global (G) levels

are also available for all species. In Nova Scotia, the Atlantic Canada Conservation Data Centre (http://www.accdc.com/) works with partners to provide ranks and data on species' occurrence.

As of 2013, in the Northern Plateau Ecodistrict 100, there are documented occurrences (under the NSESA) of four endangered formally listed species at risk. Endangered species found in the ecodistrict include two mammal species – American marten (*Martes americana*) and Canada lynx (*Lynx canadensis*) – and two bird species – rusty blackbird (*Passerella iliaca*) and Bicknell's thrush (*Catharus bicknelli*). As well, Atlantic salmon (*Salmo salar*) – eastern Cape Breton population and Gaspé-Southern Gulf of St. Lawrence population – is ranked as endangered under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Long-tailed shrew (*Sorex dispar*) is listed as being of special concern under COSEWIC.

In addition to the listed species, the national General Status process also identifies 22 orange-status species, 40 yellow-status species, and 15 green-status species for a total of 77 other species of conservation concern in this ecodistrict. As well there are six species that are ranked as undetermined, generally for a lack of information.

Old Forest

The Interim Old Forest Policy requires a minimum of 8% of Crown land within each ecodistrict be identified and protected. The stands are selected to provide representation of landscape elements with the best old forest and old forest restoration opportunities. *In 2012, DNR released an updated Old Forest Policy, containing new Integrated Resource Management (IRM) decision-making procedures (see http://novascotia.ca/natr/library/forestry/reports/Old-Forest-Policy-2012.pdf).*

In Northern Plateau, 3,072 hectares of old forest, or 33% of Crown land, is protected.

Wildlife and Wildlife Habitat

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 (CBHNP) 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.

Mammals

The mammal fauna of Cape Breton Island is somewhat less diverse than that of mainland Nova Scotia. Species common on the mainland but not present on Cape Breton Island include striped skunk (*Mephitis mephitis*), woodchuck (*Marmota monax*), and porcupine (*Erethizon dorsatum*). Raccoons (*Procyon lotor*) are a relatively more recent addition to the mammal fauna, having been recorded as not present in Cape Breton at least up until the late 1950s and probably later.

In 2002, the first fisher (*Martes pennanti*) was trapped in the Margaree area. Since then the fisher has been sighted across the northern section of the island. The eastern coyote (*Canis latrans*), the most recent addition to Nova Scotia's mammal fauna, was first recorded on Cape Breton in the early 1980s. Fisher and the coyote are now common in Cape Breton Hills.

Moose (*Alces alces*) 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 1928 and 1929, seven mainland moose were introduced into the highlands but this introduction was unsuccessful. In 1947 and 1948, 18 moose from Elk Island National Park in Alberta were released in the Cape Breton National Park. This introduction was successful.

The population showed a slow increase until the late 1970s and the early 1980s. At this time a severe spruce budworm (*Choristoneura fumiferana*) outbreak changed the habitat by killing a large percentage of the mature balsam fir. The resulting increase in regeneration provided an abundance of food for the moose and the population exploded. Moose presently number in the thousands, direct descendants of the last reintroduction.

Presently, moose are common throughout the ecodistrict with the highest concentration north of the CBHNP. The second highest concentration is within CBHNP which includes most of the Northern Plateau Ecodistrict. High moose densities have had a severe effect on the habitat. Many areas that were deforested by the budworm have been heavily browsed and areas have returned as grassland. There is a large moose wintering area on South Mountain.

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 which has been going on over a number of years.

Canada lynx (*Lynx canadensis*), listed as endangered in Nova Scotia, is also a resident of the Northern 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. A special management practice (SMP) is in place that requires 100 metre buffers on all bogs within the lynx known home range. The lynx population size tends to follow the cycle of its main prey, the snowshoe hare. As hare population

size decreases, so does the lynx population size. At present, the population of hare seems to be on the increase and so an increase in lynx numbers is expected to follow.

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 highlands. Evidence of marten has been found in the Island Barren, Caribou Barren, and Rocky Barren in Northern Plateau. Population estimates put the marten population at fewer than 50 animals remaining on the island in 2005.

Marten were trapped extensively throughout Nova Scotia since the 1700s until the trapping season was closed in the early 1900s due to low numbers. The species was thought to have been extirpated from the mainland and several re-introductions were attempted in the past.

There have been recent records of marten in southwest Nova Scotia. However, the status of the marten on the mainland is considered "data deficient." Historically known in Cape Breton only from the highlands, a marten population augmentation program was conducted between 2007 and 2010 when 135 marten from New Brunswick were released into Cape Breton. A SMP (see http://novascotia.ca/natr/wildlife/habitats/terrestrial/) is in place to help maintain suitable marten habitat on the highlands.

Long tailed shrew was recently collected during small mammal trapping in the area around Glasgow Lakes in the CBHNP.

Birds

There are two birds listed as species at risk in Northern Plateau Ecodistrict 100: rusty blackbird (*Euphagus carolinus*) and Bicknell's thrush (*Catharus bicknellii*). As well, birds of special conservation concern include two orange-listed, eight yellow-listed, and one green-listed species. One species is listed as undetermined as there is insufficient data to determine the rank at present.

Rusty blackbird (*Euphagus carolinus*) is one of North America's most rapidly declining species. It is listed as endangered in Nova Scotia. The rusty blackbird is a bird of the wetlands and wet boreal forest and has been found in at Hilltop Lake and near the headwaters of Fishing Cove River in the CBHNP.

Bicknell's thrush breeds in the stunted softwood forests at higher elevations generally above 300 metres. 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. This bird is found in many sites within the ecodistrict including French Mountain, White Hill Lake, and Glasgow Lakes. A set of guidelines has been developed to help protect the bird's nests and nesting habitat during forest harvesting.

Common loon (*Gavia immer*) and pine grosbeak (*Pinicola enucleator*) are both listed as orange (may be at risk) under the NSESA. Common loon is an expert swimmer and diver. Its feet are located far back on the body resulting in restricted mobility on land. The loon builds its nest along

the shore close to water or on a floating mass of vegetation attached to reeds. Loons can be found nesting at a number of the lakes in this ecodistrict including Trout Lakes and Chéticamp Lake.

Pine grosbeak is a small bird about 25 centimetres in length. The male has a rose coloured head, back, and breast. It breeds in coniferous forests and eats mainly seeds, buds, and fruit. It is recorded on the Everlasting Barren just north of Chéticamp Lake, near Fishing Cove Lake, and at Artemise Brook.

Of the eight yellow-listed birds, greater yellowlegs (*Tringa melanoleuca*) is a shorebird that frequents bogs in this ecodistrict. It may be found at French Mountain, Fishing Cove Lake, and White Hill Lake. Boreal chickadee (*Poecile hudsonica*; yellow-listed) is worthy of its name. It is one of a very few passerine species with a range almost completely restricted to the boreal forest of Canada. In this ecodistrict, boreal chickadee is recorded near Hilltop Lake and Fishing Cove Lake.

The other yellow-listed birds include spotted sandpiper (*Actitis macularius*), bay-breasted warbler (*Dendroica castanea*), blackpoll warbler (*Dendroica striata*), Cape May warbler (*Dendroica tigrina*), yellow-bellied flycatcher (*Empidonax flaviventris*), and Wilson's snipe (*Gallinago delicata*).

Boreal owl (*Aegolius funereus*; undetermined) is one of Nova Scotia's smallest owl species. Due to its shyness and evasive reaction to human activities, nocturnal habits, and preferred inaccessible taiga forest habitat, it ranks as one of the least known owls in Nova Scotia. Boreal owl is a cavity nester. It is recorded in the Sunday Lake area and along Big Southwest Brook in the CBHNP.

Dragonflies and Damselflies

A considerable amount of data has been amassed on dragonflies and damselflies (collectively Odonates) for Cape Breton Island, largely by the efforts of a few very dedicated collectors. The most extensive Odonate collections for Cape Breton are available from Inverness and Victoria counties including Northern Plateau.

Of the species collected, ringed emerald (*Somatochlora albicincta*) and Canada whiteface (*Leucorrhinia patricia*) are listed as may be at risk in the provincial general status. All the Somatochlorids are beautiful dragonflies with bright green eyes. *S. albicincta* is recorded in the Everlasting Barren north of Chéticamp Lake. *L. patricia* is found in the Big Barren just off the Park Spur Road. Two yellow-listed species, muskeg emerald (*Somatochlora septentrionalis*), and black meadowhawk (*Leucorrhinia patricia*) are also found at the Everlasting Barren site. Eastern red damsel is listed as uncommon and is recorded at Big Southwest Brook and Caribou Barren in the CBHNP.

Butterflies

The Maritime Butterfly Atlas has been ongoing since 2010 and the last year of data collection will be 2015. These efforts have provided a considerable amount of information on butterflies in all areas of the Maritimes. Currently there are 71 species of butterflies in Nova Scotia, many of which occur on Cape Breton. Due to the remoteness of the area, there are not as many records for the Northern Plateau as there are for other areas on Cape Breton.

Two species of conservation concern in the ecodistrict are Arctic fritillary (*Boloria chariclea*), recorded at Sunday Lake and in the Island Barren, and Arctic jutta (*Oeneis jutta*), a spring butterfly occurring in colonies in bogs and fens. Due to its mottled brown colour, it can be difficult to observe. Records show it in bogs at North Mountain, French Lake, Jim Campbells Barren Wilderness Area, and the Everlasting Barren, north of Chéticamp Lake.

When the Maritime Butterfly Atlas comes to an end in 2015 and the data is processed, more information on species distribution and abundance can be expected for the Northern Plateau Ecodistrict.

Fish

Atlantic salmon (*Salmo salar*) is a fish of great importance to the local area. Salmon start their life as an egg in their home river. They spend from one to eight years in the river. Salmon begin a process called smoltification when ready to head to sea. This gets them prepared for their life in salt water. Salmon spend several years at sea. When large enough, the salmon return to their natal rivers, as grilse, to spawn.

The Northeast Margaree River is renowned for Atlantic salmon angling. This recreational fishery adds a great deal to the local economy. The Chéticamp and North Aspy rivers have salmon runs during the year. Some of the headwaters of all these rivers originate in the Northern Plateau Ecodistrict.

Salmon can also be found in all the other main rivers in the ecodistrict but in much smaller numbers. Salmon are designated in this area into two units. The Gaspé – Southern Gulf of St. Lawrence population, for rivers draining into the Gulf of St. Lawrence (e.g. Northeast Margaree River and Chéticamp River), has salmon designated as endangered by COSEWIC. The Eastern Cape Breton population, for rivers draining into the area from Meat Cove to Canso (e.g. North Aspy River) has salmon designated as special concern by COSEWIC.

Speckled trout (*Salvelinus fontinalis*) are found in all the rivers, streams, and lakes of the ecodistrict and provide another important recreational fishery. Locations like Trout Lakes are used by anglers on a year-round basis.

Plants

Records show that there are 17 orange-status (may be at risk), 28 yellow-status (sensitive), and four undetermined (insufficient data for ranking) species of conservation concern in the ecodistrict. As well, there are 11 species that are ranked as (uncommon) for a total of 60 species. The majority of these plants are found in three surveyed sites: Glasgow Lakes area, French Mountain/French Lake area, and between Chéticamp Lake and Big Southwest Brook.

The Glasgow Lakes area hosts five species of conservation concern: one orange and four yellow – listed species. Northern blueberry (*Vaccinium boreale*; orange-listed) is found at this site, in the Jim Campbells Barren Wilderness Area and in several other sites in the ecodistrict.

Yellow-listed plants found here include pink crowberry (*Epetrum eammii*), alpine bilberry (*Vaccinium uliginosum*), northern commandra (*Geocaulon lividum*), and menzie's rattlesnake plantain (*Goodyera oblongifolia*).

Two orange-ranked species and six yellow-ranked species are found in the French Mountain/French Lake area. Field locoweed (*Oxytropis campestris var. johannensis*; orange) and multi-rayed goldenrod (*Solidago multiradiata*; orange) are both located in this area. The latter is also found in the Jim Campbells Barren Wilderness Area. The yellow-ranked species from French Mountain include scirpuslike sedge (*Carex scirpoidea*), yellow lady's-slipper (*Cypripedium parviflorum*), and squashberry (*Viburnum edule*).

At the third site, in the area between Chéticamp Lake and Big Southwest Brook, there are four orange and nine yellow-listed species listed. Orange-listed species are northern blueberry, glandular birch (*Betula glandulosa*), wiegand's sedge (*Carex wiegandii*), and laurentian bladder fern (*Cystopteris laurentiana*). Dwarf bilberry (*Vaccinium caespitosum*), Robinson's hawkweed (*Hiercium robinsinii*), and Hornemann's willowherb (*Epilobium hornemannii*) are some of the yellow-ranked species found at this site.

More surveys in this ecodistrict should yield better distribution of the plants species as well as adding more species.

Lichens

Crinkled snow lichen, listed as sensitive, is located near Rocky Brook. Two moss species, *Seligeria diversifolia* and *Anomobryum filiforme*, are ranked extremely rare and are recorded in the Big Southwest Brook area.

Rare Ecosections (Appendices 3, 12b; Map 7)

The Ecological Land Classification for Nova Scotia (Neily et al. 2003) classifies ecosections based on similar characteristics of landform, soils, and vegetation. These are the smallest mapped unit, and they repeat within ecodistricts. Ecosections have characteristic natural disturbance regimes and climax types.

Landscape elements were identified by combining ecosections with similar characteristics. Table 9 provides explanations of ecosections and their relationship to elements.

Ecosections that are rare (< 2% of ecodistrict area) or under high land use pressure (> 75% land conversion) are identified in Appendix 3.

Within the Northern Plateau Ecodistrict there are three ecosections – ICHO, WCKK, and WCRD – that each comprise less than 2% of the area (Appendix 3, Table 2). These three ecosections combined total about 1,000 hectares, or 2% of the ecodistrict.

Opportunities for future management are to implement existing policies and develop additional, effective practices to address fine filter conservation issues such as:

- Conserving uncommon forest species for which genetic viability may be threatened as indicated by DNR's General Status of Wildlife rating system, NSESA, or SARA and many of these have recovery plans in place to direct conservation actions.
- Identifying fine filter management opportunities related to conservation of significant habitats.
- Conserving uncommon community conditions (e.g. old age, large live and dead trees and species associations).

Table 9 – Elements, Ecosections, Disturbance Regimes and Climax Types

100 Northern Plateau Ecodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Highland Fir Spruce (Matrix)	IMHO IMKK IMRD WMHO WMKK	Frequent	balsam Fir (bF), white Spruce (wS), black Spruce (bS)
Highland Barrens (Patch)	ICHO WCHO WCKK WCRD	Open Seral (Frequent)	N/A
Wetlands (Patch)	WTLD	Open Seral (Frequent)	bS, red Maple (rM), tamarack (tL)
Valley Corridors (Corridor)	Various	Various	Various

***Ecosection Explanations**: For example, in **WMHO**, **W** stands for Well-drained under Soil Drainage **M** stands for Medium-textured under Soil Texture and **HO** stands for Hummocky under Topographic Pattern

Soil Drainage: **W –** Well-drained **I –** Imperfectly drained **P** – Poorly drained **WTLD** – Wetland

Soil Texture: **C** – Coarse-textured soils (e.g. sands) **M** – Medium-textured soils (e.g. loams) **F** – Fine-textured soils (e.g. clays)

Topographic Pattern: **SM** – Smooth or flat **KK** – Hills **HO** – Hummocky **DM** – Drumlinoid **RD** – Ridges **DS** – Canyons and steep slopes

Ecological Representivity (Appendices 4, 5)

Ecological representivity describes the degree that the range of natural ecosystem diversity (elements, ecosections) is secured within reserve systems (e.g. Parks, Wilderness, Old Growth Policy).

The overall goal is biodiversity conservation through protection of natural habitat diversity. Ecological representation is employed as a "coarse scale" ecosystem planning concept. The analysis evaluated and identified the reserve status of the ecosections and climax communities

located within the ecodistrict where two levels of reserves were recognized: legally protected reserves, such as Wilderness Areas, and policy protected reserves under the IRM classification to include old forest, Eastern Habitat Joint Venture Sites, non-designated provincial park reserves, and non-designated sites of ecological significance.

Protected and Limited Use Lands

Among the protected areas identified in a provincial lands database are portions of two wilderness areas: Jim Campbells Barren and Margaree River. Most of Jim Campbells Barren Wilderness Area is in this ecodistrict but onlya small part of the Margaree River Wilderness Area is found here.

The Cape Breton Highlands national Park forms about 76% of the ecodistrict. This includes most of the northern portion of Northern Plateau.

Legal reserves, accounting for 35,513 hectares (Appendix 5), represent 80% of this ecodistrict. The provincial Old Growth Policy protects another 3,072 hectares of forest on Crown land.

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

ELA Summary

Element Interpretation (All appendices and maps)

The higher, more exposed northern elevations of the Northern Plateau have been separated from the lower elevations 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 country at large is covered mainly by heath-like woody shrubs, reindeer mosses, scrubby stunted fir and spruce, krummholz, swamps, and bogs. The reasons for this distinct barren community can be attributed to either a climatic influence or edaphic conditions exacerbated directly or indirectly, to conditions of exposure, topography, and soil.

Dr. George E. Nichols (1918) made an early descriptive study of the Northern Plateau and strongly suggested that it was edaphic conditions, not climate, that gave rise to the various community types. He suggested that the abundance of moisture and lower transpiration losses created a uniformity of vegetation character and distribution due to the soils being kept constantly moist. He stated …. *that owing largely to the prolific development of mosses and liverworts and the copious accumulation of humus, not only is the substratum kept constantly moist, but it is invariably acid to litmus, thus approximating the conditions which prevail in bogs and in the majority of swamps.*

Thus, the tendency for different edaphic 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. Nichols' work still seems to stand the test of time but further sampling of this unique ecosystem is required to delineate and verify our classification of this area and to expand our understanding of the processes that influence the response of vegetation to these sites and conditions.

Most of the Northern Plateau Ecodistrict is located within the boundaries of the Cape Breton Highlands National Park. The ecodistrict also includes the disjunctive area known as Jim Campbells Barren, southeast of Chéticamp. The terrain is gently undulating with large expanses of exposed bedrock, ombrotrophic bogs – that receive water and nutrients from precipitation – and stunted conifers.

This ecodistrict forms the headwaters for several major rivers in northern Cape Breton and contains the Chéticamp Flowage, a key component in the Wreck Cove hydroelectric project. The bedrock is primarily composed of igneous and metamorphic rocks (granitic).

The maximum elevation is 535 metres at White Hill, the highest point in Nova Scotia, while much of the region exceeds 425 metres. The total area of this ecoregion is 444 square kilometres, or 1% of the province.

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

The barrens of the Northern Plateau are made up of areas of exposed bedrock that may be completely devoid of vegetation or may be covered in lichens predominately of the genus *Cladina*. Where a thin layer of mineral soil has developed on this bedrock, various mosses and other plants, including rock polypody, bracken, and three-toothed cinquefoil will establish as well as vigorous populations of ericaceous (heath-like) vegetation such as black crowberry, alpine whortleberry, lowbush blueberry, and mountain cranberry.

Stunted black spruce and balsam fir form scattered patches where soil availability permits. Wetter areas are dominated by black spruce and eastern larch. Upper slopes are predominately balsam fir.

Nichols (1918) found it common for dwarf trees, only a metre high, to be 50 years old with some trees reaching ages of at least 150 years. 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.

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

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 Ecodistrict. Recent GIS analysis of inventory data and field sampling by ecologists with Parks Canada has suggested a fire origin for many of the forests in Northern Plateau. 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. Woodland caribou, which would have used the area for summer grazing, were extirpated by hunting in the mid-1920s.

Highland Fir Spurce

(Matrix) (IMHO, IMKK, IMRD, WMHO and WMKK ecosections) (30,622 ha)

This 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. It is the matrix level element of the Northern Plateau but when compared with the unbroken forest of Highland Fir Spruce on the lower elevations of the plateau (Cape Breton Highlands Ecodistrict) this element is considerably more mottled with smaller stands of balsam fir and white spruce.

The element occurs on hummocky and hilly terrain with well to imperfectly drained soils of medium texture. However, the moist cool conditions of the plateau tend to create a uniformity of vegetation regardless of drainage making it difficult to separate the upland sites from the edaphic 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 the frequent stand-level 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, black spruce, and 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. Black spruce tends to take a prostrate krummholz form and is devoid of a trunk. Tamarack seems to withstand the wind and snow and develops a gnarly, scraggly appearance.

On Northern Plateau, Highland Fir Spruce is a permanent even-aged late successional community. Earlier successional stages include pin cherry, white birch, raspberry, mountain ash, and other woody shrubs. However, succession takes place rapidly with the trees of the climax forest, balsam fir in particular, being present at the outset which quickly overtakes these early species.

The main stand-level disturbance agents are either spruce budworm defoliation or windthrow. In the absence of defoliation the lifespan of balsam fir in this ecosystem is about 75 years, after which tree senescence initiates renewal through advanced regeneration. In sheltered areas, balsam fir can be expected to reach 125 years of age.

Heavy browsing of young fir and hardwood saplings by moose following the last spruce budworm epidemic in the 1970s is influencing successional patterns by creating open grasslands with stunted regeneration.

Flows

Human (limited recreational access); moose (travel, cover (winter / summer), balsam fir regeneration for food, fir forests for calving and breeding); lynx (breeding, denning, travel, food in regenerating areas), furbearers (primary habitat, prey primary range, mature plus course woody debris, food, home range, denning, breeding, regenerating stands provide potential habitat); water (catchment, filter groundwater).

Composition

Northern Plateau Ecodistrict 100 (based on statistics up to 2006)
Composition of Highland Fir Spruce

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	66%	22%	12% (4 Mat + 8 OF)	8%
Seral Stage	Early	Mid	Late	Unclassified
	1%	3%	52%	44%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	50%	2%	3%	45%

Desired Condition

Balsam fir-dominated forests with a small component of white spruce and scattered residual large diameter white birch with a quantity of coarse woody debris to provide habitat.

Issues

- Repeated defoliation and mortality of balsam fir forests by the spruce budworm causes significant fluctuation in habitat availability for many species.
- The high moose population that has occurred, due to the absence of both natural and human predators (no hunting is allowed in the Cape Breton Highland National Park where most of this ecodistrict occurs) has caused excessive browsing of regenerating fir forests. This in turn has resulted in significant ecosystem modification as these browsed areas have developed into grass-like meadows.
- The success of recovery plans for the lynx and pine marten are unknown at this time and may be jeopardized inside the park due to the loss of regenerating fir forests.
- The National Park may have to provide temporary control of the moose population if fir forests are to re-establish within the park.

Highland Barrens

(Patch) (ICHO, WCHO, WCKK and WCRD ecosections) (7,336 ha)

Highland Barrens 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 than 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.

Where sites have bare ground and exposed bedrock, soils support only the scantiest kind of vegetation – a dwarf shrub heath type. Plants include reindeer mosses, black crowberry, foxberry, and blueberry species. Haircap mosses are common. Labrador tea, kalmia, common juniper, and rhodora are common. When conditions are similar but less exposed, soils support a cover of sedges and grasses with a variety of flowering plants such as bunchberry, aster, and goldenrod. Reindeer mosses are abundant and sphagnum mosses are often present. Heath shrubs are scattered, small and inconspicuous.

The most widely distributed barren type is the dwarf shrub spruce heath type. It occurs as a patch work of low mounds or hummocks (one to three metres in diameter and half a metre in height). They are densely overgrown with reindeer mosses and have a thick growth of low ericaceous shrubs. Depressed black spruce seldom reaches a metre in height but spread laterally for two or more metres. Scattered tamarack occurs. Reindeer moss carpets the ground between the hummocks. The hummocks consist of raw humus derived from the lichens and leaves and sometimes sphagnum moss.

A krummholz type has dwarf bushy trees in a closed stand with little reindeer moss and the ericaceous shrubs in a subordinate understory role. The undergrowth is typical of coniferous forest (mosses, herbs, and shrubs similar) and the site is more mesophytic (well-drained). Krummholz here is found on somewhat sheltered sites and is thought to be due to the combined effects of snow and winter wind. Exposed areas are swept clean of snow which is deposited on the more sheltered situations. Tree shoots that extend above the snow are killed by excessive transpiration or sand blasted by the winds and snow. Tamarack krummholz and fir have been aged at 150 years and half a metre high black spruce is commonly 50 years old.

Forest scrub type is a weather beaten forest of fir, black spruce, and tamarack. Balsam fir tend to develop as short trees with excessive diameters and wide spreading crowns often with several dead leaders, the length depending on time between severe winters. Black spruce tends to take a prostrate krummholz form and is devoid of a trunk. Tamarack seems to withstand the wind and snow and develops a gnarly, scraggly appearance.

Low woodland type occurs on sheltered, but moist, well-drained slopes and supports a forest of black spruce with balsam fir. Similar species as found on the well-drained forest occur here as well but tree height is considerably shorter. Swamp species dominate the undergrowth, including cinnamon fern and sphagnum mosses.

Flows

Human (limited recreational access); moose (travel, balsam fir regeneration for food); lynx (barriers to dispersion and travel), furbearers (barriers to dispersion); water (Catchment).

Composition

Northern Plateau Ecodistrict 100 (based on statistics up to 2006)
Composition of Highland Barrens

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	49%	28%	23% (10 Mat + 13 OF)	13%
Seral Stage	Early	Mid	Late	Unclassified
	0%	1%	80%	19%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	79%	1%	2%	18%

Desired Condition

A complex of several shrub and stunted tree communities including: exposed bedrock with mosses and lichens; dwarf shrub spruce heath; krummholz - dwarf bushy trees; weather beaten forest of fir, black spruce, and tamarack; and low woodland communities of short fir and spruce.

Issues

- Fire has been considered a potential natural disturbance; the fire suppression strategy of the national park may have to be reconsidered if fire dependent ecosystems are to continue to be a component of this element.

Wetlands

(Patch) (WTLD ecosection) (4,907 ha)

The Wetlands element is a patch ecosystem and comprising freshwater bogs, fens, swamps, and poorly drained areas. On the Northern Plateau Ecodistrict, the element 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.

This element is strongly embedded within the other elements and, when combined with the tendency for different edaphic vegetation types to merge into one another, becomes so pronounced that it is difficult to separate the vegetation of uplands and that of bogs and swamps. The type of wetlands is quite varied and can include well-drained swamps as would occur along the shorelines of lakes.

However, most of the wetlands are poorly drained and include several species of sphagnum moss, leather leaf, cranberry, Myrica gale, bog rosemary, and sedges. Wetlands are generally treeless, sparsely forested woodlands of stunted black spruce or poorly drained forests mostly of black spruce with red maple and tamarack and an understory of alder and typical swamp species such as cinnamon fern and sphagnum mosses.

Raised bogs are common on the Northern Plateau and as a bog is unique because they are higher toward the centre than toward the margin resulting in a convex surface with the appearance of an inverted saucer.

Small ponds can be frequently encountered on these raised bogs. The vegetation on raised bogs is primarily sphagnum mosses which form the basis of the mass and the most prominent plants are low ericaceous shrubs and sedges. Raised bogs can be roughly categorized as bog meadows (sedges and grasses), wet bogs (sedges, leather leaf, bog rosemary, cranberry), and dry bogs (black crowberry, teaberry, blueberry, and bake apple).

For the most part sites are underlain by poorly drained mineral soils derived from glacial tills or organic soils derived from peat (sphagnum mosses) or sedges. 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 ground water recharge.

Flows

Human (limited recreational access); moose (travel, balsam fir regeneration for food); lynx (travel, food), furbearers (some barriers to travel, food along edges); water (catchment, storage, filter, recharge of river systems).

Composition

Northern Plateau Ecodistrict 100 (based on statistics up to 2006)

Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	55%	22%	23% (13 Mat + 10 OF)	10%
Seral Stage	Early	Mid	Late	Unclassified
	0%	1%	73%	26%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	74%	0%	1%	25%

Desired Condition

Undisturbed bog and fen complexes with patches of black spruce and balsam fir on the better-drained hummocks would be the desired condition.

Issues

- Wetlands are well protected within the national park and currently no cause of habitat loss or conversion is known.

Valley Corridors

(Corridor) (Various ecosections) (299 ha)

This small linear element is associated with major watercourses in the ecodistrict, such as those found in the Wetlands element.

Flows

Human (limited recreational access); moose (travel, winter cover, some barrier to travel, balsam fir regeneration for food); lynx (travel, some barriers to dispersion), furbearers (travel, some barriers to dispersion); water (filter, recharge, discharge).

Composition

Northern Plateau Ecodistrict 100 (based on statistics up to 2006)

Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	31%	38%	31% (21 Mat + 10 OF)	10%
Seral Stage	Early	Mid	Late	Unclassified
	0%	0%	75%	25%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	75%	0%	0%	25%

Desired Condition

Sufficient natural forests cover to maintain flows for wildlife with no restrictions/impairments to connectivity within the ecodistrict or between ecodistricts. Conditions within the national park are not expected to impact connectivity as this is a prominent function that is safe-guarded by the park mandate.

Issues

- Human activities within corridors in the National park are not expected to impact connectivity as this is a prominent function that is safe-guarded by the Park mandate.

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Northern Plateau Ecodistrict should focus on forest biodiversity conservation across the range of spatial scales. General principles could include maintenance of connectivity, maintenance of landscape heterogeneity, maintenance of stand structural complexity, and maintenance of the integrity of aquatic systems (Lindenmayer and Franklin 2002). Actions taken toward these principles could consider:

- Extractive natural resource management is not a factor in this ecodistrict since most of the area is within the boundaries of Cape Breton Highlands National Park or provincial wilderness areas. Therefore, ecosystems can be monitored and compared to those outside the protected areas with the intent to mimic natural processes and functions in resource development activities.
- The exploding population of moose in the national park is putting pressure on the regenerating balsam fir forests that are trying to re-establish following the last spruce budworm epidemic in the late 1970s. Currently the fir forest is not at a level where it can contribute to habitat requirements of endangered species such as the Canada lynx and the pine marten.
- The national park policy of suppressing naturally occurring wild fires may reduce fire-dependent ecosystems within the park. Current research is examining historical records and field evidence to determine the role of fire in the Northern Plateau.

Appendix 1: Flow - Element Interactions

Element	Moose	Water	Humans	Marten	Lynx
Matrix Highland Fir Spruce (IMHO, IMKK, IMRD, WMHO, WMKK)	Travel, cover (winter / summer) Regeneration for food, calving, breeding	Catchment, filter groundwater	Forestry, hunting, fishing, ATVs/snowmobiles, silviculture in regeneration, mineral / petroleum / aggregate exploration and development	Primary habitat, prey primary range, mature and coarse woody debris, food, home range, denning, breeding, regenerating stands provide potential habitat	Breeding, denning, Travel, food (in regenerating areas)
Patches Highland Barrens (ICHO, WCHO, WCKK, WCRD)	Travel, food	Catchment	Recreational travel, mineral / petroleum / aggregate exploration and development	Barriers to dispersion	Barriers to dispersion and travel
Wetlands (WTLD)	Food, travel	Catchment, storage, filter, recharge river systems	Hunting, fishing, rare plants, mineral / petroleum / aggregate exploration and development	Some barriers to travel, food along edges	Travel, food
Valley Corridors (Various ecosections)	Food, travel, winter cover, Some barrier to travel	Filter, recharge, discharge	ATVs / snowmobiles, fishing, hunting, some barriers to travel, mineral / petroleum / aggregate exploration and development	Travel, some barriers to dispersion	Travel, some barriers to dispersion

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Highland Spruce Fir	Matrix	High	IMHO IMKK IMRD WMHO WMKK	Landscape	Frequent	- Even-aged late successional softwood community - Current forest balsam fir, white spruce, pockets of black spruce, yellow birch	- All elements	- Condition in the matrix - interior conditions (patch sizes), change in species composition	- Spruce budworm outbreaks - Overabundance of moose (browse of balsam fir)	- Ecological restoration
Highland Barrens	Patch	High	ICHO WCHO WCKK WCRD	Landscape	Open Seral	- Open and treed barrens Limited spruce fir stands (stunted) or heath-like shrubs	- All elements	Infilling by natural regeneration	Moose abundance Fire suppression	----------
Wetlands	Patch	low	WTLD	Landscape	Open Seral	- Bogs, fens, swamps and marshes. Includes black spruce stands.	- Matrix - Dissections	- Aquatic connectivity can be affected by improper road construction	- Conversion - Infilling	- Seasonal access for harvesting to reduce site impacts. Maintain appropriate riparian and machine exclusion zone
Valley Corridors	Patch	Moderate	Various	Local	Various	- Late seral stage hardwood and softwood stands on steep slopes, red Maple, and white birch - On plateau white birch and yellow birch with balsam fir and white spruce	WMKK WFKK WFHO WMHO	- Conditions in the matrix - Interior conditions (patch sizes), change in species composition	- Spruce budworm outbreaks - Overabundance of moose (browse of balsam fir)	- ecological restoration

Appendix 2b: Connective Management Strategies

Structure Type	Attributes	Conditions of Concern	Management Strategies
Matrix	percolation, large patch, interior habitat	fragmentation, excessive edge	1. Promote contiguous forest structure using strategies such as patch aggregation and overstory-sustaining selection cutting 2. Promote large patch structure and interior conditions 3. Mitigate large-scale, long-term, fragmentation of the matrix that could impede percolation 4. Manage age and structure appropriate to natural disturbance regime (NDR). For gap and infrequently disturbed ecosections maintain 60% mature cover
Patch Ecosystems	patch size, nearest neighbour, edge / interior, intervening habitat condition	undesirable connections, internal composition, excessive separations, threats to key patch	1. Identify and map key patch representatives (high quality or critical link/distance) 2. Maintain natural isolations, as well as necessary "nearest neighbour" distances 3. Identify potential metapopulation habitat dynamics (if applicable)
Linear Corridors	continuous connection	barriers, interruptions, excessive edge	1. Mitigate unnatural barriers 2. Map and Manage along natural boundaries 3. Conserve "interior" conditions where appropriate through strategic management of neighbouring ecosystems 4. Sustain continuity, through management of overstory and interior structure appropriate to NDR 5. Follow habitat regulations for buffer management. Establish wider buffers with natural boundaries along major waterways

Appendix 3: Special Occurrences (Ecodistrict 100)

Table 1a: Species at Risk (species protected by endangered species legislation on all lands)

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS	-			
Bicknell's Thrush	*Catharus bicknelli*	Endangered	Threatened	Special Concern
Rusty Blackbird	*Euphagus carolinus*	Endangered	Special Concern	Special Concern
FISH				
Atlantic Salmon (Gaspé-Southern Gulf of St. Lawrence population)	*Salmo salar*	N/	N/A	Special Concern
Atlantic Salmon (Eastern Cape Breton population)	*Salmo salar*	A N/A	N/A	Endangered
MAMMALS				
Canadian Lynx	*Lynx canadensis*	Endangered	N/A	N/A
American Marten	*Martes americana*	Endangered	N/A	N/A
Long-tailed Shrew	*Sorex dispar*	N/A	N/A	Special Concern

Appendix 3: Special Occurrences (Ecodistrict 100)

Table 1b: Other Species of Conservation Concern (other species that are a priority for planning, management and stewardship action)

SPECIES		DESIGNATION	
Common Name	**Scientific Name**	**Provincial General Status Rank**	**ACCDC S-Rank***
BIRDS	-		
Spotted Sandpiper	*Actitis macularius*	Sensitive (Yellow)	S3S4B
Boreal Owl	*Aegolius funereus*	Undetermined	S1B
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	S3S4B
Blackpoll Warbler	*Dendroica striata*	Sensitive (Yellow)	S3S4B
Cape May Warbler	*Dendroica tigrina*	Sensitive (Yellow)	S3?B
Yellow-bellied Flycatcher	*Empidonaxflaviventris*	Sensitive (Yellow)	S3S4B
Wilson's Snipe	*Gallinago delicata*	Sensitive (Yellow)	S3S4B
Common Loon	*Gavia immer*	May Be At Risk (Orange)	S3B,S4N
Fox Sparrow	*Passerella iliaca*	Secure (Green)	S3S4B
Pine Grosbeak	*Pinicola enucleator*	May Be At Risk (Orange)	S3?B,S5N
Boreal Chickadee	*Poecile hudsonica*	Sensitive (Yellow)	S3
Greater Yellowlegs	*Tringa melanoleuca*	Sensitive (Yellow)	S3B,S5M
DICOTS			
Northern Arnica	*Arnica lonchophylla*	May Be At Risk (Orange)	S1
Glandular Birch	*Betula glandulosa*	May Be At Risk (Orange)	S1
Michaux's Dwarf Birch	*Betula michauxii*	Sensitive (Yellow)	S2
Bog Birch	*Betula pumila*	Sensitive (Yellow)	S2S3
Bog Birch	*Betula pumila var. pumila*	Sensitive (Yellow)	S2S3
Small-flowered Bittercress	*Cardamine parviflora var. arenicola*	Sensitive (Yellow)	S2
Diapensia	*Diapensia lapponica*	May Be At Risk (Orange)	S1
Norwegian Whitlow-Grass	*Draba norvegica var. clivicola*	May Be At Risk (Orange)	S1
Pink Crowberry	*Empetrum eamesii*	Sensitive (Yellow)	S3
Hornemann's Willowherb	*Epilobium hornemannii*	Sensitive (Yellow)	S3
Hyssop-leaved Fleabane	*Erigeron hyssopifolius*	Sensitive (Yellow)	S3
Northern Wild Licorice	*Galium kamtschaticum*	Secure (Green)	S3
Northern Comandra	*Geocaulon lividum*	Sensitive (Yellow)	S3
Robinson's Hawkweed	*Hieracium robinsonii*	Sensitive (Yellow)	S2
Field Locoweed	*Oxytropis campestris var. johannensis*	May Be At Risk (Orange)	S1
Common Butterwort	*Pinguicula vulgaris*	May Be At Risk (Orange)	S1
Mistassini Primrose	*Primula mistassinica*	Sensitive (Yellow)	S2
Pink Pyrola	*Pyrola asarifolia*	Secure (Green)	S3
Lesser Pyrola	*Pyrola minor*	Sensitive (Yellow)	S2
Yellow Mountain Saxifrage	*Saxifraga aizoides*	May Be At Risk (Orange)	S1
Multi-rayed Goldenrod	*Solidagomultiradiata*	May Be At Risk (Orange)	S1S2
Northern Meadowsweet	*Spiraea septentrionalis*	Undetermined	S1?

Appendix 3: Special Occurrences (Ecodistrict 100)

Table 1b: Other Species of Conservation Concern (other species that are a priority for planning, management, and stewardship action)

SPECIES		DESIGNATION	
Common Name	**Scientific Name**	**Provincial General Status Rank**	**ACCDC S-Rank***
Northern Blueberry	*Vaccinium boreale*	May Be At Risk (Orange)	S2
Dwarf Bilberry	*Vaccinium caespitosum*	Sensitive (Yellow)	S2
Alpine Bilberry	*Vaccinium uliginosum*	Sensitive (Yellow)	S2
Squashberry	*Viburnum edule*	Sensitive (Yellow)	S3
Northern Bog Violet	*Viola nephrophylla*	Sensitive (Yellow)	S2
FERNS AND THEIR ALLIES			
Maidenhair Spleenwort	*Asplenium trichomanes*	Sensitive (Yellow)	S2
Green Spleenwort	*Asplenium trichomanes-ramosum*	Sensitive (Yellow)	S2
Least Moonwort	*Botrychium simplex*	Sensitive (Yellow)	S2S3
Laurentian Bladder Fern	*Cystopteris laurentiana*	May Be At Risk (Orange)	S1
Appalachian Fir-Clubmoss	*Huperzia appalachiana*	Undetermined	S1S3
Northern Firmoss	*Huperzia selago*	Undetermined	S1S3
Ground-Fir	*Lycopodium sabinifolium*	Secure (Green)	S3?
Northern Holly Fern	*Polystichum lonchitis*	Sensitive (Yellow)	S2
Little Curlygrass Fern	*Schizaea pusilla*	Secure (Green)	S3
Low Spikemoss	*Selaginella selaginoides*	May Be At Risk (Orange)	S2
Alpine Cliff Fern	*Woodsia alpine*	May Be At Risk (Orange)	S1S2
Smooth Cliff Fern	*Woodsia glabella*	Sensitive (Yellow)	S2
INSECTS			
Eastern Red Damsel	*Amphiagrion saucium*	Secure (Green)	S3
Arctic Fritillary	*Boloria chariclea*	Sensitive (Yellow)	S2
Northern Pygmy Clubtail	*Lanthus parvulus*	Secure (Green)	S3
Canada Whiteface	*Leucorrhinia patricia*	May Be At Risk (Orange)	S1
Jutta Arctic	*Oeneis jutta*	May Be At Risk (Orange)	S1
Riffle Snaketail	*Ophiogomphuscarolus*	Secure (Green)	S3
Ringed Emerald	*Somatochloraalbicincta*	May Be At Risk (Orange)	S1
Muskeg Emerald	*Somatochlora septentrionalis*	Sensitive (Yellow)	S2
Black Meadowhawk	*Sympetrum danae*	Sensitive (Yellow)	S3
LICHENS			
Crinkled Snow Lichen	*Flavocetraria nivalis*	Sensitive (Yellow)	S2S3
MAMMALS			
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined	SH
Southern Bog Lemming	*Synaptomys cooperi*	Secure (Green)	S3S4

Appendix 3: Special Occurrences (Ecodistrict 100)

Table 1b: Other Species of Conservation Concern (other species that are a priority for planning, management, and stewardship action)

SPECIES		DESIGNATION	
Common Name	**Scientific Name**	**Provincial General Status Rank**	**ACCDC S-Rank***
MONOCOTS			
Atlantic Sedge	*Carex atlantica ssp. capillacea*	Undetermined	S2
Scabrous Black Sedge	*Carex atratiformis*	Sensitive (Yellow)	S2
Hairlike Sedge	*Carex capillaris*	Sensitive (Yellow)	S2
Chestnut Sedge	*Carex castanea*	May Be At Risk (Orange)	S2
Hidden-scaled Sedge	*Carex cryptolepis*	Secure (Green)	S3?
Bristle-leaved Sedge	*Carex eburnea*	Sensitive (Yellow)	S3
Scirpuslike Sedge	*Carex scirpoidea*	Sensitive (Yellow)	S2
Wiegand's Sedge	*Carex wiegandii*	May Be At Risk (Orange)	S1
Long-bracted Frog Orchid	*Coeloglossum viride var. virescens*	May Be At Risk (Orange)	S2S3
Early Coralroot	*Corallorhiza trifida*	Secure (Green)	S3
Russet Cotton-Grass	*Eriophorumchamissonis*	Secure (Green)	S3S4
Proliferous Fescue	*Festuca prolifera*	Sensitive (Yellow)	S1S2
Menzies' Rattlesnake-plantain	*Goodyera oblongifolia*	Sensitive (Yellow)	S3
Richardson's Rush	*Juncus alpinoarticulatus ssp. nodulosus*	May Be At Risk (Orange)	S1S2
Highland Rush	*Juncus trifidus*	Sensitive (Yellow)	S2
Small-flowered Woodrush	*Luzula parviflora*	Secure (Green)	S3S4
Alpine Timothy	*Phleum alpinum*	May Be At Risk (Orange)	S1
Hooker's Orchid	*Platanthera hookeri*	Secure (Green)	S3
Small Round-leaved Orchid	*Platantheraorbiculata*	Secure (Green)	S3
Glaucous Blue Grass	*Poa glauca*	Sensitive (Yellow)	S2S3
Narrow False Oats	*Trisetum spicatum*	Secure (Green)	S3S4

*Atlantic Canada Conservation Data Centre S-Ranks, where S1: extremely rare; S2: rare; S3: uncommon; S4: usually widespread, fairly common; S5: widespread, abundant; S#S#: A range between two consecutive ranks for a species/community denotes uncertainty about the exact rarity (e.g. S1S2); Consult http://www.accdc.com/en/ranks.html for descriptions of other ranks.
Provincial General Status Ranks as assessed in 2010 (http://www.wildspecies.ca/wildspecies2010).

Appendix 3: Special Occurrences (Ecodistrict 100)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Moose Wintering Areas	Forest habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	
Loon nesting lakes	Freshwater lakes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Hawk and owl nesting areas	Forest habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Wildlife Act
Waterfowl breeding and staging areas	Freshwater wetlands, saltmarshes, and coastal waters	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Canada Lynx Habitat	Ecosystem	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Bicknell's Thrush Habitat	Ecosystem	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Fish habitat areas	Rivers, streams, and lakes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Canada Fisheries Act
Dragonfly, damselfly, and butterfly habitats	Upland and wetland habitats	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Marten Habitat	Ecosystem	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Rare plant habitat	Upland and wetland habitats	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Non-designated Water Supply	Ecosystem	DNR Restricted Land Use Database	Water Act
Wilderness Areas	Ecosystem / recreation	DNR Restricted Land Use Database	Nova Scotia Wilderness Areas Protection Act
Cape Breton Highlands National Park	Ecosystem/ Recreation	DNR Restricted Land Use Database	Federal Parks Act

Appendix 3: Special Occurrences (Ecodistrict 100)
Table 1d – Heritage Features

Feature	Type	Information Source
Heritage River - Headwaters of Margaree River	Heritage	Canadian Heritage River System
Significant Geological Features	Geological and Cultural Heritage	Local Knowledge

Appendix 3: Special Occurrences

Table 2: Comparison of Ecological Emphasis Classification Index by Ecosection (Within Ecodistrict and Ecoregion) Ecosections that form 2% or less of the ecodistrict and/or ecoregion area or are more than 75% converted are highlighted. The table provides a sense of how unique or uncommon an ecosection and its associated climax communities are within the ecodistrict and across the ecoregion. The EEC Index value conveys an indication of relative land use pressure on the ecosection.

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
ICHO	barrens	93	0.2	0	0.0	75	0.0	93	0.2	0.0	0.0	75	0.0
IMHO	bS bF	2,978	6.9	17,859	22.4	92 to 94	0.7	2,978	6.7	17,859	40.2	92 to 94	0.7
IMKK	bS bF	10,204	23.6	17,859	22.4	92 to 93	0.2	10,204	23.0	17,859	40.2	91 to 93	0.2
IMRD	bS bF	4,677	10.8	17,859	22.4	100	0.0	4,677	10.5	17,859	40.2	100	0.0
WCHO	barrens	6,334	14.7	0	0.0	93	0.0	6,334	14.3	0	0.0	93	0.0
WCKK	barrens	313	0.7	0	0.0	100	0.0	313	0.7	0	0.0	100	0.0
WCRD	barrens	608	1.4	0	0.0	100	0.0	608	1.4	0	0.0	100	0.0
WMHO	bF bS wS	1,842	4.3	13,006	16.3	83 to 90	0.0	1,842	4.1	13,006	29.3	83 to 90	0.0
WMKK	bF bS wS	11,164	25.9	13,006	16.3	98 to 99	0.3	11,164	25.1	13,006	29.3	98 to 99	0.3
WTLD	wetlands	4,953	11.5	0	0.0	93 to 94	0.2	4,953	11.1	0	0.0	93 to 94	0.2

*Area of Climax Type refers to the total area of the climax community in the ecodistrict and in the ecoregion.

Appendix 4: Ecological Representivity Worksheet

Ecosystem			Crown Responsibility	Legal Reserves		Policy Reserves (including unproclaimed legal reserve proposals)		Ecological Emphasis Classification "Reserve Class"					
Ecosection	Climax Type	Area (ha)	Percent of Area on Crown (%)	Crown Area (ha)	Private Area (ha)	Crown Area (ha)	Private Area (ha)	Crown		Private		Total Reserve	
								ha	% (EcoS)	ha	% (EcoS)	ha	% (EcoS)
WMKK	bF bS wS	11,164	3.7	0	0	0	0	0	0.0	0	0.0	0	0.0
IMKK	bS bF	10,204	35.8	1,052	0	0	0	1,052	10.3	0	0.0	1,052	10.3
WCHO	barrens	6,334	32.9	259	0	0	0	259	4.1	0	0.0	259	4.1
WTLD	wetlands	4,953	32.7	404	0	0	0	404	8.2	0	0.0	404	8.2
IMRD	bS bF	4,677	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
IMHO	bS bF	2,978	22.7	0	0	0	0	0	0.0	0	0.0	0	0.0
WMHO	bF bS wS	1,842	41.2	0	0	0	0	0	0.0	0	0.0	0	0.0
XXWA		1,270	0.3	0	0	0	0	0	0.0	0	0.0	0	0.0
WCRD	barrens	608	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WCKK	barrens	313	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
ICHO	barrens	93	100.0	0	0	0	0	0	0.0	0	0.0	0	0.0
Total		**44,436**		**1,715**	0	0	0	**1,715**		0		**1,715**	

See Appendix 12b for full Ecological Emphasis worksheet.

Appendix 5: Ecodistrict Reserves and Protected Areas Summary

Legal Reserves			Policy Reserves (including unproclaimed legal proposals)		
Act Designation	Area by Ownership		Policy Program	Area by Ownership	
	Crown (ha)	Private (ha)		Crown (ha)	Private (ha)
National Parks and Adjuncts	33,798	0	Old Forest	3,072	0
Wilderness Areas	1,715	0	Operational Non Designated Parks and Reserves	0	0

Source: Crown Lands Forest Model Landbase Classification
Some of these programs may occur in the same area. For example, much of the Old Forest Policy forests are located in the Wilderness Areas.

Appendix 6: Description of Road Density Index

Road, trail, and utility corridors provide the background structure for transporting people and goods and are integral components of human land use. However, transportation systems are expensive and have a wide range of negative environmental impacts including, watercourse siltation, habitat fragmentation, dispersal obstruction, plant and animal mortality, exotic species invasion, loss of productive land, and an overall increase in human presence (Forman & Deblinger 2000, Reed et. al. 1996, Lindenmayer & Franklin 2002).

In order to reduce conflicts with natural systems and improve transportation safety there is clearly a need to incorporate landscape ecology into the planning of transportation networks (Forman 2004, Forman & Hersperger 1996, Spellerberg 1998). The emerging science of road ecology advocates integrating spatial analysis of the transportation system with ecological landscape analysis as a fundamental step in transportation system planning (Forman 1999, Lindenmayer & Franklin 2002, Diaz & Apostol 1992).

Efficient access systems can be strategically designed to minimize environmental impacts by incorporating factors such as harvest scheduling, life expectancy, location, road class requirements, decommissioning, and mitigation measures (Lindenmayer & Franklin 2002, Forman, 2004). Selection of transportation routes should incorporate knowledge of landscape functions to improve compatibility with natural ecosystem flows and connectivity (Forman & Hersperger, 1996). Furthermore, areas without roads and/or few roads are important for biodiversity conservation and should be considered during planning (USDA Forest Service 1999).

The GIS-based "Road Index" procedure calculates and maps the spatial influence of the transportation network. It is a management tool designed to help planners gauge the relative influence of man-made linear features within landscapes. It was designed to help integrate the transportation system into an ecological landscape analysis process. In addition to mapping, the index provides a numerical indicator of road influence that can be used to monitor temporal changes and compare different landscapes.

Main Concepts

The influence of the transportation network on the ecological landscape varies with three main factors: 1) the type of transportation feature (e.g. highway, power line, trail, etc.); 2) the density of linear features in a given area; and 3) the distance of an area from transportation features (Forman 2004, Lindenmayer & Franklin 2002, Forman & Deblinger 2000). The Road Index is a weighting of these three factors reflecting their relative influence on ecosystem function.

Road density has a well-documented influence on many factors, including wildlife movements, fragmentation, human access, hydrology, and fire patterns (Forman and Hersperger, 1996). Forman & Deblinger (2000) report great variance in road effect zones, with average cumulative effects extending 300 metres from road edges, and some impacts penetrating up to a kilometre. Consequently, Index values are determined by assessing the transportation network within a one kilometre radius. The Index algorithm is applied to a grid of one hectare squares representing the landscape in question. The calculation provides a measure of the density of the transportation network and the specific distance to the transportation features.

The resulting Index values are scaled to provide a potential range of 0 to 100. For the purpose of map interpretation these values have been grouped into benchmark ranges that reflect characteristic patterns of land use in Nova Scotia.

In Nova Scotia, as in most populated jurisdictions, transportation networks are continuously changing as new roads and utilities are constructed and unused roads and trails deteriorate. As such, any analysis of the current state of these features must be based on reasonably up-to-date data. In this province, the Geomatics Centre, administered by Service Nova Scotia and Municipal Relations, is responsible for mapping transportation features which they include in their 1:10000 topographic series mapping.

On a provincial level, this work is updated on a ten-year repeat cycle and includes changes to existing features and the delineation of new features. Before undertaking road analysis, the Geomatics Centre should be contacted to ensure that the most current data is used to calculate the Road Index values. This data should be further updated using Landsat satellite imagery to add significant new roads and utilities that are over 500 metres in length on lands currently with a remote or forest resource index value.

DNR Forestry Branch maintains a table relating the topographic series attribute coding used by the Geomatics Centre to the feature categories used in the Road Index calculations, along with ArcView programs allowing the data to be formatted correctly. An inventory of recent Landsat satellite images is also available.

Full report contained in the Ecological Landscape Analysis Guidebook
http://www.gov.ns.ca/natr/library/forestry/reports/Procedural%20Guide%20For%20Ecological%20Landscape%20Analysis.pdf

Appendix 7: Road Density Index Worksheets

Road index values for all tables are benchmarks that will be monitored over time to evaluate trends.

Table 1: Length of Access Systems and Index Weighting for Different Road Types

Road Type	Road Index Weighting	Length (km)
Trails, tracks, abandoned roads, and railways	1	90
Utility corridors	3	0
Gravel Roads and active railways	6	24
Paved streets and roads collectors	10	3
Highways	15	0

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	**Range**	**Hectares**	**Percent**
Remote	0 to 6	42,321	95.2
Forest Resource	7 to 15	2,072	4.7
Mixed Rural	16 to 24	41	0.1
Agriculture Suburban	25 to 39	0	0
Urban	40 to 100	0	0.0
Total		**44,434**	**100**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Highland Fir Spruce	30,622	0.3
Valley Corridors	299	0.3
Highland barrens	7,336	0.2
Wetlands	4,907	0.6
Total	**43,164**	**0.3**

*Water is excluded from this table. Rounding, overlapping, and averaging of figures may lead to small differences in tables.

Appendix 8: Development Classes and Seral Stages

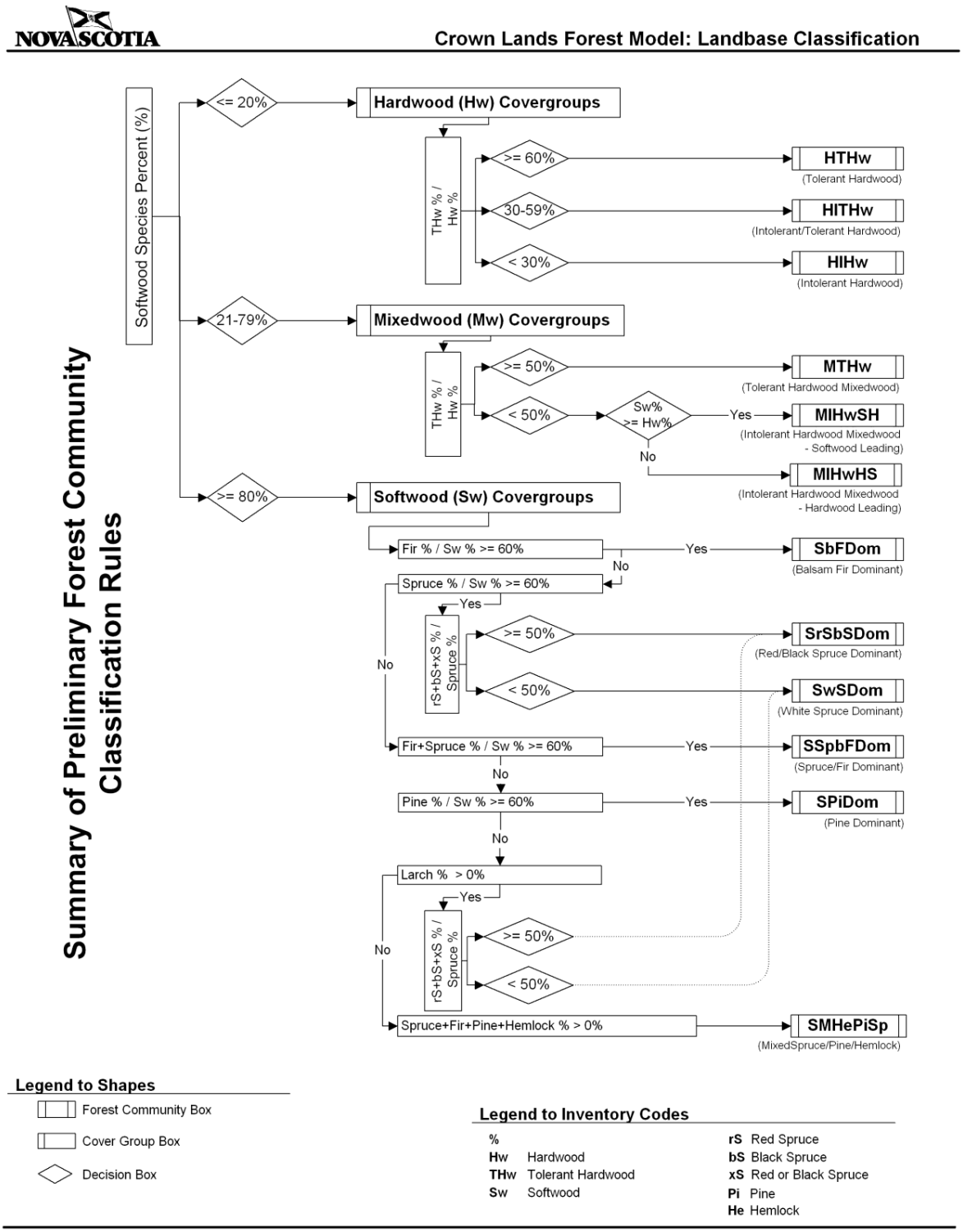
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6 m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade-intolerant "pioneer" species • peak seed production by forbs and shrubs • approximate age 0 to 25 years	Early Seral Species (Score 10 to 23) • new growth dominated by pioneer tree species or unclassified regeneration Mid Seral Species (Score 24 to 37) • regeneration composed of a mixture of pioneer, mid-climax, and climax species Late Seral Species (Score 38 to 50) • regeneration dominated by climax species
2. Young Forest (Height 7 to 11 m) • young forests with developing tree canopies characterized by vigorous self-thinning and crown differentiation • early tree seed production, no understory development • approximate age 25 to 40 years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer tree species Mid Seral Species (Score 24 to 37) • canopy composed of a mixture of pioneer, mid-climax, and climax species Late Seral Species (Score 38 to 50) • canopy dominated by climax species
3. Mature Forest (Height > 11 m) • stands dominated by upper canopy with full differentiation into dominance classes • self-thinning process reduced • tree seed production prominent and regular • individual tree mortality creates canopy gaps that are soon closed by neighbouring tree growth • increased light initiates regeneration and early understory development • approximate age 40 to 125 years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer species • over maturity initiates canopy breakup and understory development Mid Seral Species (Score 24 to 37) • climax species in mixture with pioneers in the overstory • often reflecting a transition to climax domination following a period of sub-canopy development Late Seral Species (Score 38 to 50) • canopy dominated by climax species • over maturity initiates gap dynamic processes leading to multi-aged and old growth conditions
4. Multi-aged and old growth forest (Varying height and age and Old Growth ID) • dominant overstory exhibiting a variety of crown sizes and canopy densities • canopy gaps promote development of multi-layered understory and recruitment to overstory	Early Seral Species (Score 10 to 23) • canopy likely to break up and be replaced by developing understory Mid Seral Species (Score 24 to 37) • pioneer dominated overstory with canopy recruitment from a climax species-dominated understory Late Seral Species (Score 38 to 50) • climax species-dominated overstory maintained through gap dynamic processes

Summary of species-level seral score values by ecodistrict (Source: NSDNR - January 2014 revision)

Species		Ecodistrict																																						
Code	**Name**	**100**	**210**	**220**	**310**	**320**	**330**	**340**	**350**	**360**	**370**	**380**	**410**	**420**	**430**	**440**	**450**	**510**	**520**	**530**	**540**	**550**	**560**	**610**	**620**	**630**	**710**	**720**	**730**	**740**	**750**	**760**	**770**	**780**	**810**	**820**	**830**	**840**	**910**	**920**
AS	ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
BA	black ash	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BC	black cherry	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BE	beech	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
BF	balsam fir	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	1	1
BP	balsam poplar	1	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	1
BS	black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EC	eastern cedar	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EH	eastern hemlock	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	exotic species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GB	grey birch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IH	intolerant hardwood	3	2	4	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2	2	4	3	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2
IW	ironwood	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
JP	jack pine	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LA	largetooth aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OH	other hardwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
OS	other softwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
PC	pin cherry	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RM	red maple	3	2	4	2	2	2	2	2	4	2	5	2	2	2	2	2	2	2	2	2	5	3	2	2	2	2	2	2	2	2	2	3	2	3	3	2	2	2	2
RO	oak	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
RP	red pine	3	3	3	3	3	3	3	3	3	4	3	3	3	4	3	3	3	3	4	4	4	4	4	4	4	3	4	3	3	3	4	4	3	4	4	3	3	3	3
RS	red spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
SM	sugar maple	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ST	striped maple	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TA	aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TH	tolerant hardwood	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TL	eastern larch	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
UC	unclassified	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WA	white ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
WB	white birch	3	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WE	white elm	2	2	4	2	4	2	2	2	2	2	2	2	2	2	2	2	4	4	4	2	2	2	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WP	white pine	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
WS	white spruce	4	4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	4	1	1
XS	red&black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
YB	yellow birch	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

A look-up table assigns each species in the forest inventory a value from 1 to 5 for its position on the successional scale.The look-up table may change by ecodistrict since climax on the coast or the Cape Breton Highlands differs from inland and lowland districts.This successional value is multiplied by the species' percent in the stand to give a stand successional score. Each stand may have up to four species, and the four percentages add to 10, so the stand successional scores range from 10 to 50. These scores are subdivided into three successional categories: 10 - 23 early, 24 - 37 mid and 38 - 50 late.

Appendix 9: Vegetation Community Classification – Forest Model



Appendix 10: Table 1: Forest Landscape Composition Worksheet (Northern Plateau 100)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Highland Fir Spruce	WMKK (35.9%) IMKK (33.2%) IMRD (15.3%) IMHO (9.6%) WMHO (6.0%)	Softwood	bS bF	Frequent	17,778; 58.0	Early	0	0	0	0	1	9,860; 50.6	EARLY	167; 0.9
						Mid	109	39	11	6	165			
						Late	3,717	4,008	546	1,360	9,631			
						Uncl	62	0	0	0	62			
		Mixedwood				Early	0	0	0	0	0	512; 2.6	MID	563; 2.9
						Mid	38	27	41	9	115			
						Late	158	110	37	90	395			
						Uncl	2	0	0	0	2			
		Hardwood				Early	1	0	0	0	1	395; 2.0	LATE	10,125; 52.0
						Mid	73	94	109	7	283			
						Late	0	10	84	6	100			
						Uncl	12	0	0	0	12			
		Unclassified				Early	164	0	0	0	164	8,713; 44.7	UNCL	8,625; 44.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	8,549	0	0	0	8,549			
Total					**30,622***	**ha**	**12,885**	**4,288**	**828**	**1,478**	**19,479**			
						%	**66.1%**	**22.0%**	**4.3%**	**7.6%**	**100.0%**			

Left side of table refers to "potential" forest, interpreted from the Ecological Land Classification. Right side refers to "current" forest condition, summarized from inventory in the Forest Model. All multi-aged stands can be considered mature and added to mature totals. *Total area of element.

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Northern Plateau 100)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Highland Barrens	WCHO (86.2%) WCRD (8.3%) WCKK (4.2%) ICHO (1.3%)	Softwood				Early	0	0	0	0	0	825; 79.3	EARLY	0.4; 0.0
						Mid	0	0	0	0	0			
						Late	301	291	98	120	810			
						Uncl	16	0	0	0	16			
		Mixedwood		Open Seral		Early	0	0	0	0	0	21; 2.0	MID	14; 1.3
						Mid	0	0	0	0	0			
						Late	3	0	0	18	21			
						Uncl	0	0	0	0	0			
		Hardwood				Early	0	0	0	0	0	14; 1.3	LATE	831; 79.8
						Mid	3	10	1	0	14			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	181; 17.4	UNCL	196; 18.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	180	0	0	0	180			
Total					**7,336***	**# ha**	**503**	**301**	**99**	**138**	**1,041**			
						%	**48.3%**	**28.9%**	**9.5%**	**13.2%**	**100.0%**			

Left side of table refers to "potential" forest, interpreted from the Ecological Land Classification. Right side refers to "current" forest condition, summarized from inventory in the Forest Model. All multi-aged stands can be considered mature and added to mature totals. *Total area of element.

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Northern Plateau 100)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Wetlands	WTLD (100%)	Softwood				Early	0	0	0	0	0	267; 73.9	EARLY	0.1; 0.0
						Mid	2	0	0	0	2			
						Late	100	81	46	37	264			
						Uncl	2	0	0	0	2			
		Mixedwood		Open Seral		Early	0	0	0	0	0	3; 0.9	MID	3; 0.7
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	3	0	0	0	3			
		Hardwood				Early	0	0	0	0	0	1; 0.3	LATE	263; 73.0
						Mid	0	0	1	0	1			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	90; 24.9	UNCL	95; 26.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	90	0	0	0	90			
Total					**4,907***	**# ha**	**197**	**81**	**47**	**37**	**362**			
						%	**54.5%**	**22.4%**	**13.0%**	**10.2%**	**100.0%**			

Left side of table refers to "potential" forest, interpreted from the Ecological Land Classification. Right side refers to "current" forest condition, summarized from inventory in the Forest Model. All multi-aged stands can be considered mature and added to mature totals. *Total area of element.

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Northern Plateau 100)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Valley Corridors	WMKK (53.8%) IMHO (15.8%) WTLD (15.2%) IMKK (11.2%) WCHO (24.2%) WCKK (1.3%)	Softwood	bS bF	Frequent	81; 27.0	Early	0	0	0	0	0	91; 75.1	EARLY	0; 0.0
						Mid	0	0	0	0	0			
						Late	8	46	25	12	91			
						Uncl	0	0	0	0	0			
		Mixedwood				Early	0	0	0	0	0	0; 0.0	MID	0; 0.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Hardwood				Early	0	0	0	0	0	0; 0.0	LATE	90; 75.1
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	30; 24.9	UNCL	30; 24.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	30	0	0	0	30			
Total					**299***	**# ha**	**38**	**46**	**25**	**12**	**121**			
						%	**31.4%**	**38.0%**	**20.7%**	**9.9%**	**100.0%**			

Left side of table refers to "potential" forest, interpreted from the Ecological Land Classification. Right side refers to "current" forest condition, summarized from inventory in the Forest Model. All multi-aged stands can be considered mature and added to mature totals. *Total area of element.

Appendix 10: Table 2: Composition of Forest Communities (in Northern Plateau Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Highland Fir Spruce	IMHO IMKK IMRD WMHO WMKK	Frequent	bS bF bS bF wS	S	SrSbSDom	5,232	48.6%	L	**Well-drained** Early – Late VTs: bF, bS **Moist** Late VTs: bS, bF **Poorly Drained** Mid-Late VTs: bS, tL
				S	SbFDom	3,930	36.5%	L	
				S	SSpbFDom	511	4.7%	L	
				S	SwSDom	187	1.7%	E/M	
				M	MIHwSH	351	3.3%	E/M	
				M	MIHwHS	161	1.5%	E/M	
				H	HIHw	284	2.6%	E/M	
				H	HTHw	70	0.7%	L	
				H	HITHw	41	0.4%	L	
Total						**10,767**	**100.0%**		

*Forest Community Codes:			
	SrSbSDom-Red Black Spruce Dominant SwSDom-White Spruce Dominant SspbFDom-Spruce Fir Dominant SbFDom-Balsam Fir Dominant	SpiDom-Pine Dominant SMHePiSp-Mixed Spruce Pine Hemlock MIHwSH-Intolerant Hardwood Mixedwood S MIHwHS-Intolerant Hardwood Mixedwood H	MTHw-Tolerant Hardwood Mixedwood HIHw-Intolerant Hardwood HTHw-Tolerant Hardwood HITHw-Intolerant Tolerant Hardwood

Appendix 10: Table 2: Composition of Forest Communities (in Northern Plateau Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Highland Barrens	ICHO WCHO WCKK WCRD	Open Seral	Barrens	S	SrSbSDom	573	66.6%	L	**Well-drained** Early – Late VTs: bF, bS
				S	SbFDom	245	28.5%	L	
				S	SSpbFDom	8	0.9%	L	**Moist** Late VTs: bS, bF
				M	MIHwSH	21	2.4%	E/M	
				H	HIHw	12	1.4%	E/M	**Poorly Drained** Mid-Late VTs: bS, tL
				H	HITHw	1	0.1%	E/M	
Total						**860**	**100.0%**		

*Forest Community Codes:	SrSbSDom-Red Black Spruce Dominant SwSDom-White Spruce Dominant SspbFDom-Spruce Fir Dominant SbFDom-Balsam Fir Dominant	SpiDom-Pine Dominant SMHePiSp-Mixed Spruce Pine Hemlock MIHwSH-Intolerant Hardwood Mixedwood S MIHwHS-Intolerant Hardwood Mixedwood H	MTHw-Tolerant Hardwood Mixedwood HIHw- Intolerant Hardwood HTHw-Tolerant Hardwood HITHw-Intolerant Tolerant Hardwood

Appendix 10: Table 2: Composition of Forest Communities (in Northern Plateau Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	IMHO IMKK WCKK WMKK WTLD	Frequent	bS bF bS bF wS	S	SrSbSDom	60	65.9%	L	**Well-drained** Early VTs: pCh, mtnA, wB Mid VTs: bF, wB, wS Late VTs: bF, yB **Moist** Early-Mid VTs: bF, wB Late VTs: bS, bF **Poorly Drained** Mid-Late VTs: bS, tL
				S	SbFDom	31	34.1%	L	
Total						**91**	**100.0%**		

*Forest Community Codes:			
	SrSbSDom-Red Black Spruce Dominant	SpiDom-Pine Dominant	MTHw-Tolerant Hardwood Mixedwood
	SwSDom-White Spruce Dominant	SMHePiSp-Mixed Spruce Pine Hemlock	HIHw-Intolerant Hardwood
	SspbFDom-Spruce Fir Dominant	MIHwSH-Intolerant Hardwood Mixedwood S	HTHw-Tolerant Hardwood
	SbFDom-Balsam Fir Dominant	MIHwHS-Intolerant Hardwood Mixedwood H	HITHw-Intolerant Tolerant Hardwood

Appendix 10: Table 2: Composition of Forest Communities (in Northern Plateau Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Wetlands	WTLD	None	None	S	SrSbSDom	157	57.9%	L	**Moist** Early-Mid VTs: bF, wB Late VTs: bS, bF **Poorly Drained** Mid-Late VTs: bS, tL
				S	SbFDom	100	36.9%	L	
				S	SSpbFDom	8	3.0%	L	
				S	SwSDom	2	0.7%	L	
				M	MIHwHS	3	1.1%	E/M	
				H	HIHw	1	0.4%	E/M	
Total						**271**	**100.0%**		

*Forest Community Codes:	SrSbSDom-Red Black Spruce Dominant SwSDom-White Spruce Dominant SspbFDom-Spruce Fir Dominant SbFDom-Balsam Fir Dominant	SpiDom-Pine Dominant SMHePiSp-Mixed Spruce Pine Hemlock MIHwSH-Intolerant Hardwood Mixedwood S MIHwHS-Intolerant Hardwood Mixedwood H	MTHw-Tolerant Hardwood Mixedwood HIHw-Intolerant Hardwood HTHw-Tolerant Hardwood HITHw-Intolerant Tolerant Hardwood

Appendix 10:

Table 3: Summary of "Potential Climax" Forest Abundance (Based on ELC Interpretations)

Climax Type	Ecodistrict		Ecoregion	
	Hectares	Percent	Hectares	Percent
bS bF	17,859	40.2%	17,859	40.2%
bF bS wS	13,006	29.3%	13,006	29.3%
Total	**30,865**	**69.5%***	**30,865**	**69.5%****

*Total does not add up to 100% because wetlands not added.
**Total does not add up to 100% because not all climax vegetation types in region are found in this ecodistrict
Source: Crown Lands Forest Model Landbase Classification.

Appendix 11: Ecological Emphasis Classes and Index Values

The classification includes all upland conditions, both forested and non-forested, under all types of administration and land use practices. It does not include water or other non-terrestrial conditions.

Ecological Emphasis Class	Conservation Factor	Description
Reserve	**1**	• Reserved lands which meet biodiversity conservation goals through preservation of natural conditions and processes. Resource management activities are not usually permitted except where required to perpetuate desired natural conditions. This class is assigned based on the types of laws and policies governing the management (for example: Wilderness, Parks, Conservation Easement, Old Forest Policy).
Extensive	**0.75**	• Lands managed for multiple values using ecosystem-based techniques that conserve biodiversity, and natural ecosystem conditions and processes. • Forestry practices employ ecosystem-based prescriptions which consider natural disturbance regimes, successional trends, structure, and composition. Natural regeneration is favoured to provide the next forest. Practices may include protection from fire and insects. • Management complies with the Forest Code of Practice, and excludes the use of herbicides, exotic tree species, off-site native species, genetically modified organisms, and stand conversion.
Intensive	**0.25**	• Lands managed intensively to optimize resource production from sites maintained in a native state (e.g. forested). Despite intensive practices these lands are an important component of landscape structure and composition. • Management may eliminate or reduce the duration of some development processes, particularly mature old forest stages, and may result in non-natural succession. Practices may produce unnatural conditions such as exotic species, old field spruce, and monoculture plantations, or reduce structure and composition below ecologically desirable levels. Forests are protected from fire, insects, and competing vegetation. • Management adheres to environmental regulations and policies such as the Wildlife Habitat and Watercourse Protection Regulations, and Forest Code of Practice.
Converted	**0**	• Land converted to an unnatural state for human use, or areas where practices have significantly degraded site productivity (e.g. agriculture, urban development roads, Christmas trees, seed orchards, forest soil compaction).

Appendix 12a: Ecological Emphasis Index Worksheet – Elements

Landscape Element	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Highland Fir Spruce	30,545	26,164	3,506	8	73	794	28,994 to 29,391	95 to 96
Highland Barrens	7,336	5,429	1,881	0	0	25	6,846 to 6,859	93
Wetlands	4,907	3,690	1,182	2	11	23	4,583 to 4,594	93 to 94
Valley Corridors	299	230	67	0	0	2	281 to 282	94
Total	43,087	35,513	6,636	10	84	844	**40,704 to 41,125**	**94 to 95**

These classes have been given a weighting percentage representing their ecological emphasis level: Reserve (100), Extensive (75), Intensive (25), and Converted (0). These percentages are applied to the area of land in each class to determine the "effective area" which is divided by "total area" to calculate the index.

The Unclassified land is too young to determine if it is being managed extensively or intensively. Therefore, an EEI range is reported based on it being all one or the other.

Water was not included as an element type. Areas were rounded to the nearest hectare.

EEI values are benchmarks that will be monitored over time.

Appendix 12b: Ecological Emphasis Index Worksheet – Ecosections

Ecosection	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
ICHO	93	0	93	0	0	0	69	75
IMHO	2,978	2,300	538	0	21	119	2,733 to 2,793	92 to 94
IMKK	10,126	7,550	2,218	8	21	329	9,298 to 9,463	92 to 93
IMRD	4,677	4,677	0	0	0	0	4677	100
WCHO	6,334	4,512	1,796	0	0	25	5,866 to 5,878	93
WCKK	313	313	0	0	0	0	313	100
WCRD	608	608	0	0	0	0	608	100
WMHO	1,842	1,083	502	0	0	258	1,523 to 1,652	83 to 90
WMKK	11,164	10,745	297	0	32	90	10,990 to 11,035	98 to 99
WTLD	4,953	3,724	1,194	2	11	23	4,626 to 4,637	93 to 94
Total	**43,089**	**35,512**	**6,638**	**10**	**85**	**844**	**40,704 to 41,125**	**94 to 95**

For an explanation of calculations and other information to help better understand this table, please refer to the bottom of Appendix 12a.

Appendix 13:

Glossary B: Terms in Parts 1, 2, and 3

Aspect	The direction of a downhill slope expressed in degrees or as a compass point.
Atlantic Coastal Plain Flora (ACPF)	A group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens, and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes.
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.
Coarse Woody Debris (CWD)	Dead tree stems greater than 7.5 centimetres in diameter and laying horizontally at 45 degrees or less. Provides habitat for many species and is a source of nutrients for soil development.
Commercial thinning	Silviculture treatment that “thins” out an overstocked stand by removing trees that are large enough to be sold as products, such as poles or fence posts. This treatment is carried out to improve the health and growth rate of the remaining crop trees.

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 the Ecological Landscape Analysis 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.
Ecological integrity	The quality of a natural unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species, and ecosystem diversity assured for the future.
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.
Ecozone	The first of five levels in the Ecological Land Classification for Nova Scotia Volume 1. Ecozones are continental ecosystems characterized by the interactions of macroclimate, soils, geographic and physiographic features. The entire province is contained within the Acadian ecozone, one of 15 terrestrial ecozones in Canada.
Edge effect	Habitat conditions (such as degree of humidity and exposure to light or wind) created at or near the more-or-less well-defined boundary between ecosystems, as, for example, between open areas and adjacent forest.

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.
Extensive land use	Lands managed for multiple values using ecosystem-based techniques that conserve biodiversity and natural ecosystem conditions and processes.
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).
Fine filter approach	An approach to conserving biodiversity that is directed toward individual species and critical ecosystems that are typically rare or threatened. This approach is usually combined with the coarse filter approach to conserving natural ranges of habitat.
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.
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.
Intensive land use	Lands managed intensively to optimize resource production from sites maintained in a forested state.
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.
Long range management frameworks	A strategic, integrated resource plan at the subregional level. It is based on the principles of enhanced public involvement, consideration of all resource uses and values, consensus-based decision making, and resource sustainability.
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 growth. Mature forests include multi-aged and old growth. 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 growth.
Memorandum of understanding (MOU)	An agreement between ministers defining the roles and responsibilities of each ministry in relation to the other or others with respect to an issue over which the ministers have concurrent jurisdiction.
Mixed stand	A stand composed of two or more tree species.
Multiple use	A system of resource use where the resources in a given land unit serve more than one user.
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.)
Pre-commercial thinning	A silviculture treatment to reduce the number of trees in young stands before the stems are large enough to be removed as a forest product. Provides increased growing space and species selection opportunities to improve future crop tree growth.
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.
Road deactivation	Measures taken to stabilize roads and logging trails during periods of inactivity, including the control of drainage, the removal of sidecast where necessary, and the re-establishment of vegetation for permanent deactivation.
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 which 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.

Threatened species	A species that is likely to become endangered if the factors affecting its vulnerability are not reversed. A species declared as threatened under the federal or Nova Scotia species at risk legislation (NS Endangered Species Act or federal SARA).
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.
Vernal pool	A seasonal body of standing water that typically forms in the spring from melting snow and other runoff, dries out in the hotter months of summer, and often refills in the autumn.
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 landbase designated under the Wilderness Areas Protection Act (e.g. Canso Barrens).

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