Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS EASTERN INTERIOR ECODISTRICT 440

PART 3: Landscape Analysis for Forest Ecosystem Planners

ELA 2014-440

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 440: Eastern Interior

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ISBN 978-1-55457-585-5

This report, one of 38 for the province, provides descriptions, maps, analysis, photos and resources of the Eastern Interior 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 (1995) – 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 bythe 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 nine distinctive elements in the Eastern Interior Ecodistrict – one matrix, seven 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).

Spruce Pine Hummocks is the widely dispersed matrix element on about one-quarter of the ecodistrict occurring on imperfectly drained soils on hummocky terrain. The inherent low soil fertility creates a forest of black spruce with white pine and – on better sites – red spruce. This element is frequently disturbed by windthrow and fire.

Tolerant Mixedwood Hills is a widely distributed large patch element occurring on hilly terrain. The well-drained soils support a mixed forest of Acadian species such as red spruce and yellow birch. Early successional species that follow after stand-level disturbances include red maple, white birch, and balsam fir.

Other patch elements, in order of size, are **Red and Black Spruce Hummocks**, **Tolerant Hardwood Drumlins and Hummocks**, **Spruce Hemlock Pine Hummocks and Hills**, **Wetlands**, **Spruce Pine Flats**, and **Salt Marsh.** *The ecodistrict also includes an Urban element.*

Valley Corridors is a linear element associated with the 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: people, deer, anadromous fish, migratory birds, wood turtles, raptors, and furbearers.

As an example of this flow – element interaction, the return of Atlantic salmon (anadromous fish) to spawn in the upper reaches of the St. Marys, Tangier, Moser, and Liscomb rivers, and possibly others, can be impacted by land use along the rivers.

In this ecodistrict, forest harvesting, hydropower dams, and transportation corridors are the most significant land uses that can influence water quality and quantity in the rivers and streams.

One goal would be to manage forest cover by watershed to ensure that an adequate mature cover of forest is maintained to limit impacts on water quality and quantity in rivers and streams used by anadromous fish.

In addition, careful location and construction of access roads, right of ways (power transmission, gas pipelines), and stream crossings is required to mitigate impacts on watercourses. The construction and maintenance of fish ladders around man-made obstacles such as hydropower dams is critical in maintaining and improving stocks of anadromous fish.

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.

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

River corridors promote connectivity.

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.

Eastern Interior is a large ecodistrict and the current forest maintains much of its inherent ecological integrity and attributes. However, where human land use, transportation systems, and utility corridors have become the dominant feature on the landscape (e.g. Sackville River watershed, Eastern Passage, and other suburban areas of metro Halifax) this fragmentation has

reduced the connective function of the corridors for some species and may also increase the barrier effect of the corridors for species that must move across them.

Inherent in all ecological planning is the maintenance of connectivity among conservation areas (including wilderness, old growth, provincial parks, and ecological reserves) that are often not ecologically related.

For the Eastern Interior Ecodistrict, maintaining connectivity with the inland conservation areas is important but there is also a need to maintain connectivity with the Eastern Shore Ecodistrict. The seasonal use of the coastal zone by species that also inhabit the inland zone is a feature that can be maintained by the dominant forest structure.

Within Eastern Interior, major watercourses such as the St. Marys provide connectivity within the ecodistrict and among adjacent ecodistricts. The connectivity value of the floodplains and riparian zones of these linear landscape features can be fragmented and broken by humanactivity. Settlement, agriculture, and transportation infrastructure can create barriers while forest harvesting may temporarily limit the flow of biodiversity.

Connectivity will be sustained by applying the natural disturbance regime (NDR) guidelines for landscape composition (Table 7) and recognizing natural linkage opportunities.

Connectivity issues and opportunities for Eastern Interior include:

- Mitigating the potentially negative barrier effects of concentrated land use in the river valley corridors by sustaining and restoring natural communities in key areas such as those identified during the landscape analysis.
- 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 conditionsat important linkage points among ecodistricts.
- Ensuring that infrastructure such as dams and transportation crossings do not impact the return of anadromous fish species. Proponents of other land uses, such as agriculture and forestry, should be aware of their impacts at the watershed level as well as the off-site movement of pollutants, such as sediment.

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

All of the landscape flows are identified with major linkages to adjacent areas or ecodistricts (Map 2). The hydrological system provides the most obvious physical connection among the Eastern Shore, Eastern Granite Uplands, and Eastern Interior ecodistricts.

Other significant linkages are the narrow peninsulas that connect the inland ecodistricts to the coastal zone. Extending inland for many kilometres are long narrow inlets and harbours (e.g. Petpeswick Inlet, Jeddore Harbour and Country Harbour) and brackish lakes (Porters Lake) that provide a route of flow for people, wildlife, and biodiversity.

Depending on the severity of the winter, deer move from the inland locations into their wintering areas along the Atlantic coast. Black bear also move seasonally between ecodistricts using the summer to forage for berries on the barrens along the coast before retreating inland to hibernate. The coastal islands are also used by many species of inland birds as overwintering areas and/or nesting areas returning later in the summer to their inland locales for feeding.

People provide linkages throughout the ecodistrict into adjoining ecodistricts through their many activities of recreation, transportation, fishing, hunting, forest management, utilities development, and settlements.

Future land management activities should recognize the significant linkages to those neighbouring ecodistricts and manage to enhance and sustain connectivity.

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 (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 Eastern Interior

Element	Seral Stage					
	Early	%*	Middle	%	Late	%
Spruce Pine Flats	OW2, SP8	13.0	SP4, SP6	27.0	SP5, **SP7**	44.0
Spruce Pine Hummocks	OW1, OW2, OW5, SP1, SP2, SP8	13.0	SP3, SP4, SP6	23.0	IH2, **SP5**, SP7, SP9	44.0
Red and Black Spruce Hummocks	IH4, IH5, IH6, MW4, MW5	11.0	SH5, SH6, SH8, SH9, SH10	26.0	MW1, MW2, MW3, SH1, SH2, **SH3, SH4**	51.0
Spruce Hemlock Pine Hummocks and Hills	IH4, IH5, IH6, MW4, MW5	21.0	SH5, SH6, SH8, SH9, SH10	30.0	MW1, MW2, MW3, SH1, SH2, **SH3, SH4**	32.0
Tolerant Hardwood Drumlins and Hummocks	IH6, OF1, OF2, OF3, OF4	23.0	IH7, TH7	33.0	TH1, TH2, TH3, **TH8**	26.0
Tolerant Mixedwood Hills	IH6, MW4, MW5	23.0	IH7, SH5, SH6, SH8, TH7	31.0	TH1, TH2, TH3, **TH8**	28.0
Salt Marsh	Grasslands of *Spartina spp.*					
Wetlands	WC1, WC2, WC3, WC5, WC6, WC7, WD1, WD2, WD3, WD6, WD7, WD8					

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 Eastern Interior ranges from 63 to 72 (Appendices 12a and 12b), which would suggest that overall intensity of land use in some parts of the ecodistrict is currently able to maintain the structure and function to support habitat for all species and for biodiversity conservation.

However, certain areas of the ecodistrict are being impacted by human activity and land use. Most notable is the area surrounding metro Halifax.

The EEI for the matrix element, Spruce Pine Hummocks, is 64 to 73 indicating a moderate to high level of ecological intactness. The two largest patch level elements, Tolerant Mixedwood Hills and Red and Black Spruce Hummocks, have similar EEIs of 62 to71 and 69 to 74, respectively. These three elements comprise 67% of the ecodistrict.

More than 70% of the lands fall within the extensive ecological emphasis class.

Converted lands are those areas that have been altered by human settlement, farming, urban development, and transportation and utility corridors. These converted lands are predominately located along the major rivers where floodplains and drumlins were put into farmland and settlement.

A more significant impact on the Eastern Interior Ecodistrict has been the expansion of Halifax and the many suburbs that have pushed into the forested landscape.

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.

Currently, the Eastern Interior Ecodistrict has an overall RI value of 11 (Appendix 7, Table 3). This average falls within the Forest Resource range of 7 to 15 (Appendix 7, Table 2) and may be described as moderately low. This low index value is influenced by the 29% of the ecodistrict that is in the Remote RI of 0 to 6 indicating that there are some very large areas which do not have roads, such as the Liscomb River, Boggy Lake, and The Big Bog wilderness areas, the Bruce Plain and areas within the Liscomb Game Sanctuary. Thirty-six percent of the ecodistrict has RI values in the Forest Resource class and 18% in the Mixed Rural class.

The highest road densities occur around settlements and main transportation systems with most of this near metro Halifax.

Roads can contribute to habitat fragmentation and environmental degradation. Efforts to reduce these impacts could include:

- Road densities are currently in the mid-range of the Forest Resource class (7-15) for the matrix (Spruce Pine Hummocks) and two dominant patch elements (Tolerant Mixedwood Hills and Red and Black Spruce Hummocks). Strategic scheduling of new access and decommissioning where possible should be attempted in these elements to keep the index within the Forest Resource range. Private woodland owners may be able to decommission select roads and share access.
- Accessing systems must be scheduled for regular maintenance or decommissioning, particularly where connectivity or additional reserves are to be established.
- Utilizing old abandoned trails or logging roads as recreational trails before additional trails are established.
- Using a central planning system to provide coastal access for resources, recreation, tourism, and summer homes to reduce road density.

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; Map6)

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 need 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 Eastern Interior Ecodistrict, there are documented occurrences (under the NSESA) of the following number of formally listed species at risk: 11 endangered, four

threatened, and five vulnerable. Nine species at risk that are either formally listed through SARA and/or designated by COSEWIC also occur in the ecodistrict. In addition to the listed species, the national General Status process also identifies two red-status species, 28 orange-status species, 65 yellow-status species, 48 green-status species, one exotic species, and ten species with undetermined status for a total of 154 other species of conservation concern in this district.

Designated species at risk found within the Eastern Interior Ecodistrict include Atlantic salmon, boreal and blue felt lichen, wood turtle, and several bird species (e.g. rusty blackbird, chimney swift, common nighthawk, and Canada warbler).

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 (seehttp://novascotia.ca/natr/library/forestry/reports/Old-Forest-Policy-2012.pdf).*

Eastern Interior has 6% of Crown land (12,665 ha) under old forest protection.

Birds

As of 2013, there are known occurrences for 11 at risk bird species in the ecodistrict. Nine are listed under the NSESA: red knot, piping plover, chimney swift, rusty blackbird, barn swallow, and Canada warbler as endangered; common nighthawk and olive-sided flycatcher as threatened; and eastern wood-pewee as vulnerable. Nationally, piping plover and roseate tern are listed as endangered; chimney swift, common nighthawk, olive-sided flycatcher, and Canada warbler as threatened; rusty blackbird as special concern; and bank swallow and wood thrush have neither provincial nor federal listing status but have been designated by COSEWIC as threatened.

Two shorebird species at risk, the red knot and the piping plover, are known to the ecodistrict as well as many other shorebirds of conservation concern. The red knot is a shorebird that breeds in Arctic Canada and winters in South America. These birds migrate thousands of kilometres between the breeding grounds and wintering areas. This subspecies has shown a 70% decline in abundance over the past 15 years. They have a stopover in Nova Scotia during migration to feed on horseshoe crab eggs, which is a critical food source. The primary cause of decline is attributed to the depletion of this food source.

The majority of shorebird species observations in the Eastern Interior Ecodistrict occurred during the spring and fall migratory periods and were made in the Cole Harbour and McNabs Island areas.

Piping plover is one of only a few shorebirds that nest on the beaches of Nova Scotia. Historically, piping plover have been observed to nest on a beach at McNabs Island as well as at Rainbow Haven Beach Provincial Park, but no nesting has been observed at either of these locations for several years. As ground-nesting species with precocious young, the shorebird group as a whole experiences low nesting success due to natural predation, extreme weather, and nest destruction by

humans – from all-terrain vehicles, beach walkers, and dogs off-leash on the nesting beaches. The province participates in monitoring and stewardship activities for nesting piping plover wherever they nest in the province.

There has been a nationwide decline in aerial insectivores such as olive-sided flycatcher, chimney swift, eastern wood-pewee, common nighthawk, barn swallow, and bank swallow, presumably due to declines in insect food species. Chimney swift and barn swallow are also threatened by the loss of human-made structures (old chimneys and barns, respectively). Declines in aerial insectivores as well as rusty blackbird and Canada warbler populations are also thought to be attributed, in part, to habitat loss and land use practices, particularly on wintering grounds.

Fish

Atlantic salmon have historically used the watersheds of the Eastern Shore Ecodistrict for spawning and rearing, and continue to make some use of the habitat available in these river systems. COSEWIC has assigned designatable units (DU) that refer to the populations of Atlantic salmon that should be assessed independently from one another. The DU that applies to the Atlantic salmon in the Eastern Shore Ecodistrict is called the Southern Uplands population, which is designated by COSEWIC as endangered but not listed under either the provincial or federal legislation.

Barriers to dispersal and acidification of many areas within watersheds historically used by Atlantic salmon are thought to have drastically reduced the amount of freshwater habitat that may be used by the species for spawning and rearing. Other threats to this species include environmental contaminants, habitat loss and degradation, lack of riparian buffers along waterways and lack of pools. Low returns from the marine environment, however, continue to be considered the most important factor in the decline of Atlantic salmon.

Striped bass is designated as endangered under COSEWIC but has no provincial or federal listing. Historical evidence identifies striped bass spawning in five rivers in Eastern Canada. Currently, however, known spawning only occurs in two rivers: Miramichi and Shubenacadie. The Shubenacadie River currently supports a relatively stable population. Perceived threats to the population include changes in water quality and flow, by-catch from commercial fisheries, and competition from introduced species (such as chain pickerel).

The American eel is widespread in eastern Canada, but has experienced declines over a significant portion of its distribution and therefore was designated in 2012 as threatened by COSEWIC. Threats to this species include habitat alteration, dams, harvest, environmental changes, and parasites. The American eel is an important component of aquatic biodiversity, has the greatest range of any North American fish species and has supported commercial, recreational, and Aboriginal fisheries. The American eel can be found in many of the rivers and lakes in this ecodistrict.

Gymnosperms

Only one gymnosperm species at risk is documented for the Eastern Interior Ecodistrict: eastern white cedar. In 2006, eastern white cedar was listed under NSESA as vulnerable; only 32 stands are identified provincially. The population is fragmented and comprises small stands that appear genetically separate from each other. This species is typically found in riparian areas, woodland forests, and old pastures, preferring nutrient-rich, cool, moist habitats. Two eastern white cedar occurrences are known to the Eastern Interior Ecodistrict. They occur in Waverley and Dartmouth. Most occurrences of the species are located in western Nova Scotia with an estimated population of 13,000 to 15,000 trees. Threats to species are cutting for land clearing and forestry and poor recruitment of seedlings due to animal browsing.

Insects

Monarch butterflies are designated by COSEWIC and listed under SARA as special concern but have no provincial designation. Adults may occasionally be observed after the breeding season in the Eastern Interior Ecodistrict as they may in most other areas of the province. Areas with high concentrations of milkweed are used by breeding adults and larval development; there are no records of such areas in the ecodistrict.

Lichens

Three lichen species at risk are found in the ecodistrict. The Atlantic population of boreal felt lichen is designated by COSEWIC as endangered and listed under the federal SARA and NSESA as the same. Blue felt lichen is designated by COSEWIC as special concern and is listed federally as special concern and provincially as vulnerable. Graceful felt lichen is designated by COSEWIC and listed provincially as endangered.

The distribution of boreal felt lichen in Nova Scotia is largely limited to within tens of kilometres from the Atlantic coast, in high-humidity forested areas adjacent to or within wetlands that have a major balsam fir presence.

Blue felt lichen is known from 88 locations in Nova Scotia that represent a considerable portion of the entire range known in North America. In Nova Scotia, blue felt lichen is generally found in mixed forests containing red maple that are in wet depressions or adjacent to streams, rivers, or lakes in coastal areas up to 300 metres in elevation.

Graceful felt lichen is known to only five locations in Nova Scotia, two of which fall within the same general areas as the boreal and blue felt lichen occurrences are found.

All of these lichen species are considered cyanolichens, a group that is threatened by atmospheric pollutants and acid precipitation, which changes the chemistry of the bark on the trees on which the lichens grow and which can cause direct mortality or interfere with reproduction. Also, their habitats often overlap with areas otherwise suitable for forest harvesting activities, which can serve as threat to the species either by direct mortality or habitat loss.

The Eastern Interior Ecodistrict provides the conditions necessary to support a number of cyanolichen "hotspots" including a globally significant concentration of boreal felt lichen found near Cross and McPhail lakes in Halifax Regional Municipality. The ecodistrict is also subject to intense forestry activity on Crown land, which can conflict with the conservation of these species. Forestry activities on Crown land in areas where boreal felt lichen may occur are subject to special management practices for the species, which requires that surveys for the species be conducted, and, if found, an area buffering the occurrence will not be harvested.

For all lichen species at risk known to the ecodistrict, surveys in other potential habitat areas may reveal additional occurrences.

Mammals

Moose on the mainland of Nova Scotia have been designated as endangered under the Nova Scotia Endangered Species Act. Mainland moose are genetically distinct from those on Cape Breton Island, where moose populations are healthy.

Moose are commonly associated with forested landscape habitats that have been altered or disturbed by an event such as fire, wind (i.e. blowdown), disease or timber harvesting. The habitat requirements of moose are largely dependent on successional forest stages. Early successional hardwood trees and shrubs provide necessary browse vegetation while mature conifer cover is valuable for shelter, thermal cover, and protection in winter and summer. Natural disturbance to the moose habitat on the Crown land of the ecodistrict is only moderately supplemented with human-induced disturbance.

Since 2012, special management practices in support of moose have been made mandatory for forestry activities on Crown land in designated moose concentration areas. These practices aim to conserve thermal refugia, aquatic feeding sites, calving areas, and visible cover. A large portion of the Eastern Interior Ecodistrict (the majority of the eastern portion and a small area near the Chebucto peninsula) fall within a designated moose concentration area. Elsewhere in the ecodistrict, moose are occasionally reported because the ecodistrict often serves moose that are dispersing among more significant concentration areas.

In 2013, the little brown myotis, northern long-eared myotis, and tri-coloured bat were all listed under the NSESA as endangered.

The population of all three bat species, the most common of which in Nova Scotia is little brown myotis, has experienced an alarming decline due to a disease known as white-nose syndrome caused by the fungus *Pseudogymnoascus destructans.* This disease has killed nearly 7 million bats in eastern North America in the past eight years and estimates of a 90% decline in Nova Scotia over three years.

Currently, there is no known cure for the disease, which affects all bats that hibernate in caves and abandoned mines during the winter. Sightings of little brown myotis have been reported in the Eastern Interior Ecodistrict.

Reptiles

Two reptile species at risk, wood turtle and snapping turtle, are known to the Eastern Interior Ecodistrict. Wood turtle is listed as threatened under both the federal SARA and the NSESA. Wood turtles are uncommon province-wide, with the majority of observations occurring in a few main concentration areas. Such concentrations are associated with each of the Musquodoboit, Sackville and Shubenacadie rivers systems, which each have lower order tributaries that fall within the Eastern Interior Ecodistrict. Most wood turtle sightings in the ecodistrict are due to transient or foraging individuals rather than those nesting.

Snapping turtle is listed as vulnerable under the NSESA and as special concern under the SARA. While snapping turtles remain fairly common in most watersheds in Nova Scotia, populations are under increasing threats. Low recruitment of turtles to breed, high juvenile mortality, nest failures exacerbated by turtles nesting in highly disturbed environments (e.g. road edges and quarries), illegal harvest, and road mortality all are threats to the province's largest terrestrial/freshwater turtle.

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 ($\leq$ 2% of ecodistrict area) or under high land use pressure (> 75% land conversion) are identified in Appendix 3.

Thirteen of the 24 ecosections each comprise less than 2% of the ecodistrict (Appendix 3, Table 2). This high number of uncommon ecosections is expected for a couple of reasons. First, the Eastern Interior Ecodistrict is bordered by four ecoregions and nine ecodistricts which can account for small inclusions from other ecoregions and ecodistricts. Second, the size of the ecodistrict, almost 200 kilometres in length and approximately 8% of the province, increases the potential for changes in the enduring features of soil, topography, and moisture. As well, five ecosections – IMHO, IMRD, WFDM, WMHO, and WMKK – make up nearly 70% of the ecodistrict.

There are nine ecosections that each has less than 0.5% of the land base in the ecodistrict. Together, they represent only 1.4% of the ecodistrict. However, they all represent a climax forest condition that is well represented by other ecosections within the same element. Settlement and land use conversion have not been significant within the ecodistrict, other than in those areas near Halifax.

The conversion of the tolerant hardwood forests on the drumlin landscape along the Sackville River has localized the impact as this element is well represented elsewhere in the ecodistrict.

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

440 Eastern Interior Ecodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Spruce Pine Flats	IMSM WMSM ICSM IFSM	Frequent	black Spruce (bS), white Pine (wP)
Spruce Pine Hummocks	ICHO IFHO IMHO	Frequent	red Spruce (rS), bS, wP
Red and Black Spruce Hummocks	IMRD WMRD IFRD PMRD WFRD	Frequent	rS, bS, wP
Spruce Hemlock Pine Hummocks and Hills	WCHO WMHO WFHO	Infrequent to Frequent	rS, wP, eastern Hemlock (eH)
Tolerant Hardwood Drumlins and Hummocks	WFDM WMD M	Gap	sugar Maple (sM), red Maple (rM), yellow Birch (yB), Beech (Be)
Tolerant Mixedwood Hills	WMK K IMKK WCKK	Infrequent	sM, yB, rS
Salt Marsh	XXMS	Open Seral (tidal flooding)	*Spartina spp.* (cordgrass)
Wetlands	WTLD PMHO	Open Seral	bS, tamarack (tL), rM
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

Additional representation is required in a number of these community types although opportunities are limited because of present level of Crown ownership (nine ecosections have 1% or less Crown land) and high conversion rates related to the area or ecosection (e.g. WFRD, IFRD, and WCHO).

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

- Protection of uncommon forest species for which genetic viability may be threatenedas indicated by DNR's Endangered Species Rating System.
- Implementation of fine filter management opportunities related to conservation of significant habitats.
- Recognition of uncommon community conditions (e.g. old age, large live, and dead trees and species associations) and increase representivity in uncommon old forest communities.
- Implementation of restorative measures in community types such as sugar maple, yellow birch, and red maple (tolerant hardwoods) on drumlins where conversion to other species or uses is high.

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.

A total of 29,257 hectares of provincial Crown and federal lands has been set aside under legal and policy reserves within the Eastern Interior Ecodistrict (Appendix 5).

There are 12,665 hectares of old forest under the Old Forest Policy and in four wilderness areas – Alder Ground, Boggy Lake, Liscomb River, and The Big Bog – which are totally within the ecodistrict, as well as Waverley-Salmon River Long Lake and Clattenburgh Brook which are only partially within this ecodistrict.

Additional representation could come from private lands in the form of Eastern Habitat Joint Venture programs, Nature Conservancy of Canada, and Nova Scotia Nature Trust.

Priority sites and strategies to improve representation should include:

- Recognition that currently three ecosections – IMHO, WMKK, and WMHO – which make up almost half of the ecodistrict, are under-represented, with about 50% of the area on Crown lands. These ecosections, found in the Spruce Pine Hummocks (IMHO), Tolerant Mixedwood Hills (WMKK), and Spruce Hemlock Pine Hummocks and Hills (WMHO) elements, have less than 5% under legal reserves (Appendix 4).

ELA Summary

Element Interpretation (All appendices andmaps)

Eastern Interior is one of the largest ecodistricts in the province, stretching from Pockwock Lake in the west to the community of Guysborough in the east.

The bedrock is highly visible in many areas where the glacial till is very thin, exposing the ridged topography. Where the till is deeper, the ridged topography is masked and thick softwood forests of black spruce, red spruce, and white pine occur.

There are three distinct concentrations of drumlins in the ecodistrict, identified roughly by the watersheds of the three rivers that flow through them: Sackville, Tangier, and Moser. Although drumlins are scattered elsewhere in the eastern ecodistrict, these three areas represent the highest concentrations.

The Eastern Interior bedrock geology includes the metasedimentary rocks of the Meguma Group which covers approximately 90% of the ecodistrict. This group comprises the metasandstones of Goldenville Formation and overlying Halifax Formation slates and argillites. These strata were metamorphosed and folded into a series of upright north to northeast and southwest plunging anticlines and synclines.

The Halifax Formation consists mostly of black and grey slates that locally contain abundant pyrite, pyrrhotite, and arsenopyrite. The breakdown of these sulphides when exposed at surface can lead to acid drainage problems.

The Goldenville Formation comprises varying amounts of metasandstone and metasiltstones and is host to most of the gold deposits in Nova Scotia.

The predominant soils are sandy loams, often quite stony and well-drained on till derived from quartzites. The drumlins are derived from Carboniferous Period rocks from the north as well as material from the Cobequid Hills and Pictou Antigonish Highlands ecodistricts. There are a few drumlins and hills scattered throughout the ecodistrict with fine-textured soils derived from slates.

The composition of the forests in this ecodistrict strongly reflects the depth of the soil profile.

Repeated fires have impoverished the shallow soils and reduced forest cover to scrub hardwoods, such as red maple and white birch. Scattered white pine and black spruce are underlain by a dense layer of ericaceous vegetation.

On the deeper, well-drained soils, stands of red spruce will be found.

On the crests and upper slopes of hills, drumlins and some hummocks, stands of tolerant hardwood occur. Both beech and hemlock occur on these deeper, well-drained soils, but their presence is usually individual and seldom of a high percentage in any stand.

On the imperfectly and poorly drained soils, black spruce, tamarack, and red maple will dominate the stand composition. Frequent stand-initiating disturbances are responsible for the majority of tree mortality. As a result, fire barrens on the east and northeast of Halifax are covered with grey birch, red oak, and red maple.

This ecodistrict has several sites of ecological significance. Most of them are the estuaries and upper limits of inland harbours that are important breeding sites for seabirds that nest in colonies.

There are several large wetlands in the ecodistrict which provide significant habitat for migratory birds and act as filters for the headwaters of the several important rivers in the ecodistrict. Several of these wetlands are in wilderness protected areas such as The Big Bog, Boggy Lake, Alder Ground, and Clattenburg Brook.

Lakes are numerous in the ecodistrict and fresh water makes up 5% of the area. Freshwater wetlands occupy 3% of the ecodistrict.

Loons are common on the larger lakes from April to September, returning to the Atlantic coast to overwinter. Osprey and bald eagles have nesting sites along the larger inland harbours and rivers. Wood turtle populations are present along the St. Marys River and should be considered along some of the other major waterways of the ecodistrict.

Several rivers in the ecodistrict have salmon runs, although populations are declining. The ecodistrict has long been recognized for the trout (brook, brown, and lake) fishery but populations have been reduced in recent years and healthy populations of all species are of concern.

Mainland moose, an endangered species, are found in some of the more remote parts of the ecodistrict. Forest harvesting to provide browse is beneficial to the moose. They also require extensive areas of mature softwood cover for thermal cover, both summer and winter. Buffer strips along streams and around wetlands should be maintained for moose habitat.

Several rare plants are found in the ecodistrict; most are associated with wetlands and should not be impacted by forestry. The boreal felt lichen is more common in the adjacent Eastern Shore Ecodistrict, but populations can be found where vegetation and site provide favourable conditions. If rare plants are encountered during forestry operations, legacy clumps should be established to protect them.

Private land ownership accounts for 46% of the total Eastern Interior Ecodistrict area of 457,493 hectares. Forty-five per cent of the ecodistrict is under provincial Crown management.

Spruce Pine Hummocks

(Matrix) (ICHO, IFHO and IMHO ecosections) (110,765 ha)

The Spruce Pine Hummocks element occurs primarily on imperfectly drained, coarse to fine-textured, nutrient poor soils derived from quartzite and slate glacial till. These moist poor soils support an even-aged forest of black spruce, white pine, and the hybrid red/black spruce with a significant understory of woody ericaceous shrubs.

White pine often forms a super canopy overtopping black spruce. This is the matrix forest for the ecodistrict and is found on hummocky to gentle terrain. It is also the dominant element between the hardwood drumlins.

Stand-initiating disturbances due to hurricanes and fire are frequent in this element. Due to the fuel nature of pine, spruce litter, and ericaceous vegetation, fires of severe intensity can have a significant negative impact on site productivity, especially those sites with a large number of stones and boulders or with shallow soils over bedrock.

Black spruce, a shallow rooting species, is very susceptible to windthrow on these moist sites. Early successional forests may include red maple and white birch. Where soils are shallow to bedrock or have been impoverished by repeated wildfires, low stocked woodlands of black spruce and white pine are more dominant.

Historically these sites were frequently disturbed by fire resulting in extensive areas of low stocking and/or barrens but suppression efforts are now encouraging natural infill.

Moist to wet soils of low fertility differentiates this softwood matrix forest of black spruce and white pine from the Acadian Forest of red spruce and tolerant hardwood forests found on better-drained and richer soils. With progressively poorer drainage, black spruce, tamarack, and red maple dominate the forest vegetation.

The softwood covertype makes up 72% of the element while mixedwood comprises 13% and the hardwood type, 7%. The remaining 8% of the element is unclassified.

Flows

People (forestry, mineral exploration and development, recreation, hunting, off-highway vehicles (OHV)); deer (seasonal cover/foraging, wintering areas); migratory birds (lakes and embedded wetlands, breeding), fish (trout, eel); furbearers (general habitat broadly accessible); raptors (low to nil habitat for goshawks); water (feeder streams spawning/cooling, storage headwater source of major streams and rivers).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)
Composition of Spruce Pine Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	30%	25%	45% (28 Mat + 17 OF)	17%
Seral Stage	Early	Mid	Late	Unclassified
	13%	23%	44%	20%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	72%	7%	13%	8%

Desired Condition

A black spruce-dominated softwood forest in a variety of area sizes, development stages, and seral stages consistent with a forest that is being frequently disturbed by windthrow and fire. To maintain white pine and other less abundant species in the overstory.

Issues

- Imperfectly drained soils are sensitive to harvesters and forwarders with soil hazards such as compaction, rutting, and erosion. Contractors building access roads and trails also need to be aware of site damage during construction.
- Forest area in reserve is 4%, of which all is Crown land. The Crown has ownership of 13% of this element.
- Maintenance of connectivity throughout the ecodistrict.
- Loss of fire as a renewal agent.

Tolerant Mixedwood Hills

(Patch) (IMKK, WCKK, WFKK and WMKK ecosections) (96,932 ha)

This large patch element occurs on the higher elevations of the ecodistrict (75 to 125 metres above sea level) with decreasing elevation closer to the Atlantic Ocean.

A late successional Acadian Forest of tolerant species dominates most sites, with the steeper upper slopes and crests favouring a forest of sugar maple and yellow birch.

As soil moisture increases on middle slopes and gentler terrain, mixedwood forests of yellow birch and red spruce become dominant and eventually stands of red spruce occupy lower and toe slope positions.

Natural disturbances are infrequent and include small gaps or patches created in the stand canopy by individual tree mortality or windthrow.

Due to the long life of the dominant species and the infrequent nature of stand-level disturbances, uneven-aged forests and old growth features can develop.

Forest harvesting has placed all forest development classes outside of the desired ranges. However, the EEI of this patch element is 62 to 71, indicating a high level of ecological integrity even though the forest is younger than would be desired.

Flows

People (forestry, mineral exploration and development, recreation, hunting, OHV); deer (seasonal cover/foraging, wintering areas); furbearers (general habitat broadly accessible, large denning trees in mature forest); raptors (high habitat for goshawks); water (feeder streams spawning/cooling headwater source, important for water quality, good bufferingcapacity).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)
Composition of Tolerant Mixedwood Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	24%	16%	60% (48 Mat + 12 OF)	12%
Seral Stage	Early	Mid	Late	Unclassified
	23%	31%	28%	18%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	44%	23%	25%	8%

Desired Condition

Mature mixedwood forests of red spruce and yellow birch on much of the element with stand-level harvesting used to create establishment and younger forests to support biodiversity. Where site conditions support a tolerant hardwood forest of sugar maple and yellow birch, mature cover can be maintained with partial harvesting. Both forest types should be within desired development class target levels.

Issues

- Over-harvesting of mixedwood forests using stand-level management practices.
- Only 3% of the element is protected, all of which is on Crown land.
- Crown ownership is 44% of the element.

Red and Black Spruce Hummocks

(Patch) (IFRD, IMRD, PMRD, WFRD and WMRD ecosections) (81,043 ha)

Red and Black Spruce Hummocks is a large patch element occurring primarily along the northern boundary of the ecodistrict on terrain that is primarily curvilinear ridging of the bedrock overtopped with varying depths of glacial till. Soils are mostly imperfectly drained medium-textured loams and sandy loams but finer-textured soils are found in the west near Sackville. Two dominant forest conditions can be found on this topography.

Where soils are shallow and therefore drier and poorer, forests are dominated by black spruce with white pine. Open woodlands with thick ericaceous woody shrub understories are also embedded within this condition and in some areas jack pine are a component of the forest.

Where soils are deeper and richer, productive forests of red spruce will occur with scattered hemlock and white pine. The level and wetter terrain between ridges is usually imperfectly to poorly drained and supports a forest of black spruce, tamarack, and red maple. Balsam fir is an early successional component of red spruce forests.

Following frequent stand-level natural disturbances, such as fire and hurricanes, early successional forests may include shade-intolerant hardwoods such as red maple and white birch.

The forest covertypes are similar to the Spruce Pine Hummocks matrix and Spruce Pine Flats elements with 69% softwood, 16% mixedwood, and 10% hardwood, with the remaining 5% unclassified. Red and Black Spruce Hummocks has one of the higher EEI ranges of 69 to 74, which is a reflection of the difficulty in harvesting some of the element where topography limits access.

Flows

People (forestry, mineral exploration and development, recreation, hunting, OHV); deer (seasonal cover/foraging, wintering areas); migratory birds (lakes and embedded wetlands, breeding); fish (trout, eel); furbearers (general habitat broadly accessible); raptors (low to nil habitat for goshawks); water (feeder streams spawning/cooling, storage headwater source of major streams and rivers).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)

Composition of Red and Black Spruce Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	19%	24%	57% (33 Mat + 24 OF)	24%
Seral Stage	Early	Mid	Late	Unclassified
	11%	26%	51%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	69%	10%	16%	5%

Desired Condition

A red spruce and black spruce-dominated softwood forest in a variety of area sizes, development stages, and seral stages consistent with a forest that is being frequently disturbed by windthrow and fire. To maintain white pine and other less abundant species in the overstory. Where site conditions and disturbance have created on the ridged topography a jack pine component, maintenance of this species on the landscape.

Issues

- Fire suppression may be changing the composition of this element.
- Forest management activity is often difficult in this element due to shallow soils over bedrock ridging and wet depressional areas between ridges. Low forest productivity is also a limiting factor to forest management.
- Crown land is 57% of the element.
- Almost 9% of Crown land is protected.

Tolerant Hardwood Drumlins and Hummocks

(Patch) (WFDM and WMDM ecosections) (44,938 ha)

This is a significant small patch element in the ecodistrict. Several large concentrations of drumlins occur along the Sackville, Tangier, and Moser rivers with scattered individual occurrences throughout.

The well-drained fertile soils of the crests and upper slopes support a climax Acadian Forest of tolerant hardwoods such as sugar maple and yellow birch with a strong component of red maple. Lower slopes tend to be mixedwoods of red spruce, balsam fir, and yellow birch.

Gaps created by mortality of individual trees or small patches in the tolerant hardwood forests create uneven-aged forests which can develop old growth characteristics over time. Stand-level disturbances are infrequent in the mixedwood and softwood components of this element and these forests can also develop uneven-aged characteristics.

Settlers and farmers have cleared some of the forest on the more accessible drumlins such as those near Mooseland and in the Sackville area. The EEI in these areas would be quite low but overall this element has an index between 61 and 70 indicating a high level of ecological integrity.

Forest development classes for this element are near the desired levels for the ecodistrict overall but intensive land use change in areas of the ecodistrict such as the Sackville drumlin field will create local index values well outside the desired range with potential impacts on the ecological integrity of the area.

Flows

People (forestry, mineral exploration and development, recreation, hunting, OHV); deer (seasonal cover/foraging, wintering areas); fish (Atlantic salmon, trout, shad, eel); furbearers (general habitat broadly accessible, large denning trees in mature forest); raptors (high habitat for goshawks); water (feeder streams spawning/cooling headwater source, important for water quality, good buffering capacity).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)

Composition of Tolerant Hardwood Drumlins and Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	31%	17%	52% (41 Mat + 11 OF)	11%
Seral Stage	Early	Mid	Late	Unclassified
	23%	33%	26%	18%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	42%	28%	20%	10%

Desired Condition

A shade-tolerant hardwood forest of sugar maple and yellow birch within the desired development class target levels. Mixedwood forests of red spruce and yellow birch on lower slopes should also be within similar target levels although stand-level harvesting can be used to create establishment and younger forests to support biodiversity.

Issues

- Only 7% of the element is protected, all on Crown land ownership which accounts for 41% of the element.
- Nine percent of the element has been converted to other land uses.
- Over-harvesting of hardwood forests using stand-level management practices.

Spruce Hemlock Pine Hummocks and Hills

(Patch) (WCHO, WFHO and WMHO ecosections) (44,642 ha)

Well-drained soils of medium fertility provide the zonal conditions for this typical softwood climax forest of the Acadian Forest region. Red spruce, hemlock, and white pine forests occur on gently hummocky terrain throughout the ecodistrict as a patch element. Stand-level disturbances are infrequent and uneven-aged forests can develop which will eventually progress towards old growth conditions. Hemlock is not an abundant species in this element but can be prominent on lower slopes and steep slopes along watercourses.

Forest harvesting has placed all forest development classes outside of the desired ranges with mature and multi-aged/old forest approximately 30% below target levels. However, the EEI of this patch element is 63 to 71 indicating a high level of ecological integrity even though the forest is younger than would be desired.

Flows

People (forestry, recreation, hunting); deer (seasonal cover/foraging, wintering areas); raptors (nesting, perching); furbearers (general habitat broadly accessible, large denning trees).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)
Composition of Spruce Hemlock Pine Hummocks and Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	30%	26%	44% (29 Mat + 15 OF)	15%
Seral Stage	Early	Mid	Late	Unclassified
	21%	30%	32%	17%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	56%	14%	23%	7%

Desired Condition

Mature forests of red spruce with hemlock and white pine within desired development class targets.

Issues

- The area in mature forest is below desired levels.
- Conservation of older and uneven-aged forests.
- Crown ownership is 44%.
- Only 2% of the element is protected, most on Crown land.

Wetlands

(Patch) (PMHO and WTLD ecosections) (14,279 ha)

Wetlands are a patch element occupying 3% of the ecodistrict. However, many smaller wetlands are embedded in other forested elements and the total area will be significantly larger than the mapped total.

Freshwater bogs, fens, swamps, and poorly drained depressions and flat terrain account for most of the element. Wetland occurrence is not always associated with level and depressional terrain, and in this ecodistrict much of the wetland is unmapped, especially on terrain where bedrock ridging is expressed and water drainage is impeded by the underlying bedrock.

Wetlands are generally treeless shrub lands of ericaceous species such as kalmia, leatherleaf, Labrador tea, and rhodora.

When wetlands are sparsely forested, black spruce and tamarack are common. Many of the soils are deep organic deposits derived from sphagnum mosses.

Wetlands are important to wildlife and often provide habitat for uncommon plants.

This element is critically important for water collection, filtering, and groundwater recharge.

The EEI range of 75 to 77 is the highest of all elements in the ecodistrict.

Flows

People (recreation, hunting, fishing, OHV traffic – when used to access hunting and fishing areas can cause a great deal of damage); deer (seasonal cover/foraging, wintering areas, deer that often pass through the wetland complexes in their travels from the interior to the coast); migratory birds (lakes and embedded wetlands, breeding); rare plants (sensitive sites to disturbance); water (collection, filtering, storage); furbearers (travel, food, habitat); wood turtles (potential metapopulations along streams and rivers, nesting, feeding).

Composition

Eastern Interior Ecodistrict 440 (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
	17%	28%	55% (33 Mat + 22 OF)	22%
Seral Stage	Early	Mid	Late	Unclassified
	11%	27%	54%	8%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	75%	8%	13%	4%

Desired Condition

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

Issues

- The Wetlands patch element is found dispersed across the ecodistrict and the very nature of the wetlands raises issues around road development, infilling, and drainage.
- Indiscriminate OHV use is harming sensitive wetland complexes. Public education on wetland ecological value is required. Developing ecosystem management techniques to ensure the conservation of this element will be required.
- Forty-four percent of the element is privately owned.
- Fourteen percent of the element is in protected areas, of which all is Crown land.

Spruce Pine Flats

(Patch) (ICSM, IFSM, IMSM and WMSM ecosections) (11,198 ha)

The forest condition of this patch element is similar to the matrix Spruce Pine Hummocks but occurs on imperfectly drained soils on level terrain. This element forms broad linear patches along larger streams and rivers such as the Twelve Mile Stream and Ecum Secum River.

Elsewhere it can form large flats associated with the headwaters of streams and rivers or as a complex of wetlands and small lakes as exemplified on the Bruce Plain. In the Sackville drumlin field, alder and woody shrubs occupy wetter soils along the streams before being replaced by forests. Typical forests include black spruce with mixtures of red maple, tamarack, and white pine.

As soil drainage gets progressively poorer, wet forests of red maple, alders, false holly, winterberry, and other woody shrubs are common. Embedded within this element are wet open woodlands where stocking to tree species can be very poor.

This element is frequently disturbed by windthrow, fire, and/or natural senescence which limit the potential for old growth forest development. Earlier successional forests will be of similar species composition to later stages.

The forest covertypes are very similar to the Spruce Pine Hummocks matrix with 74% softwood, 15% hardwood, and 7% mixedwood with the remaining 4% unclassified.

The EEI range of 64 to 70 is comparable to the Spruce Pine Hummocks matrix of 64 to 73, indicating that land management practices are sustaining ecological integrity of the element.

Flows

People (forestry, mineral exploration and development, recreation, hunting); deer (seasonal cover/foraging, wintering areas); migratory birds (lakes and embedded wetlands, breeding); fish (Atlantic salmon, trout, shad, eel); furbearers (general habitat broadly accessible); raptors (low to nil habitat for goshawks); water (feeder streams spawning/cooling, storage headwater source of major streams and rivers).

Composition

Eastern Interior Ecodistrict 440 (based on statistics up to 2006)
Composition of Spruce Pine Flats

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	21%	19%	60% (35 Mat +25 OF)	25%
Seral Stage	Early	Mid	Late	Unclassified
	13%	27%	44%	16%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	74%	7%	15%	4%

Desired Condition

A black spruce-dominated forest with a mixture of development classes and seral stages consistent with frequent stand-initiating disturbances. Forests underlain by poorly drained soils maintained for water quality issues.

Issues

- Forest management activity is limited in this element due to soil and site issues and the difficulty in forest access road construction. Low forest productivity is also a limiting factor to forest management.
- Forest area in reserve is 3%, of which all is Crown land. The Crown has ownership of 43% of this element.

Salt Marsh
(Patch) (XXMS ecosection) (119 ha)

The Salt Marsh element makes up two small but unique habitat areas of salt marsh at Cole Harbour and Chezzetcook.

Primary production from photosynthesis in salt marshes is exceedingly high even in temperate latitudes. Resulting nutrient enrichment from growth of plants and marine algae supports a rich and diverse assemblage of aquatic invertebrates and fish.

Salt marshes also support migratory birds, shorebirds, waterfowl, terns, herons, ospreys, and eagles, as well as furbearers such as otter and mink.

Although there has been a long history of loss of salt marsh throughout Nova Scotia, particularly through dyking and conversion to farmland, this has not occurred at these salt marshes.

Flows

People (fishing, trapping, settlement, roads, harbour development); water (coastal ponds, marine estuaries); deer (winter habitat and feeding); furbearers (travel, food, habitat); migratory birds (travel routes, summer habitat); seabirds (nesting).

Composition*

*Since the forested part of this element is very small, meaningful statistics on composition could not be compiled.

Desired Condition

A natural salt marsh ecosystem with a minimum of human intervention is preferred.

Issues

- Area of salt marsh under the administration and control of the Crown is only 0.1%.

Valley Corridors
(Corridor) (Various ecosections) (25,560 ha)

Linking the coastal ecodistricts to the inland ecodistricts, Valley Corridors of the Eastern Interior Ecodistrict provides a critical and significant service for the movement of biodiversity and people. These corridors are primarily situated within the riparian zones and associated wetlands of the major watercourses flowing through the ecodistrict.

Many of these corridors are entirely situated within the ecodistrict, such as the corridors associated with the Sackville River, West and East Sheet Harbour rivers, and the Moser River.

The Musquodoboit River corridor is highly significant in that it has headwaters coming from several inland ecodistricts (Rawdon Wittenburg Hills, Central Uplands, Central Lowlands, and the Eastern Interior) and passes through the Eastern Granite Uplands before entering the Atlantic Ocean through the Eastern Shore Ecodistrict.

All of the corridors in the ecodistrict, with the exception of two, link directly with the Atlantic Ocean.

The corridors associated with the Shubenacadie and Herbert rivers link with the Bay of Fundy through the Central Lowland Ecodistrict. The Shubenacadie corridor is particularly unique in that its headwater lake is less than one kilometre from Halifax Harbour.

The interface between salt water and fresh water is critical for anadromous fish species such as shad and striped bass and especially the endangered Atlantic salmon. These corridors extend into the spawning beds for these species where cool and clean fresh water is required.

Most of the corridors include forested elements dominated by wet mixedwood forests associated with the riparian zone. Red maple is the typical species but where corridors are banked with steeper slopes, red spruce, hemlock, and yellow birch occur. The Spruce Pine Flats and Wetlands elements are prominent where topography is level.

Land use has resulted in some land being converted to other uses, including settlement, agriculture, transportation, and resource development. The EEI range for this element is 44 to 47 – lowest for the ecodistrict – and indicates that the impacts on flows and connectivity of continuing land and forest resource use in these corridors needs to be included in the planning process.

Flows

People (recreation, fishing, hunting, exploration, canoeing, transportation); deer (travel, food, water, cover); trout (habitat); anadromous fish (salmon access to spawning beds, habitat); raptors (nesting for eagles and goshawks, food from rivers); migratory birds (breeding, resting); wood turtles (potential metapopulations along streams and rivers, nesting, feeding); furbearers (major travel routes with mature forest); water (cooling, power generation, drinking water).

Composition

Eastern Interior Ecodistrict 440 (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
	16%	22%	62% (41 Mat + 21 OF)	21%
Seral Stage	Early	Mid	Late	Unclassified
	19%	26%	46%	9%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	70%	11%	14%	5%

Desired Condition

Sufficient natural forests cover to maintain flows for wildlife with no restrictions/impairments to connectivity within the ecodistrict or among ecodistricts.

Issues

- Significant land conversion in localized areas is restricting connectivity.
- A large percentage of the corridor area is privately owned.
- Corridors are also a primary route for roads and utilities.

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Eastern Interior 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:

- EEI range for Eastern Interior is from 63 to 72 and could be improved to increase the ecological integrity of the ecodistrict. Areas near metro Halifax have been heavily impacted by conversion of forests to other land uses. Intensively managed forests have been localized in several areas. Currently the matrix element has an EEI range of 64 to 73.
- Additional Crown lands are of interest for wilderness areas as part of the 12% initiative.
- Maintenance of connectivity with the coastal Eastern Shore Ecodistrict is important due to the seasonal use of the coastal habitat for many terrestrial wildlife species.
- Monitoring of forest harvesting bywatershed would be beneficial for anadromous fish populations.

Appendix 1: Flow - Element Interactions

Element	People	Deer	Anadromous Fish	Migratory Birds	Wood Turtles	Raptors	Furbearers
Matrix Spruce Pine Hummocks	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	Embedded lakes and wetlands; breeding	---	Low to nil habitat	General habitat, broadly accessible
Patches Spruce Pine Flats	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	Embedded lakes and wetlands; breeding	---	Low to nil habitat	General habitat, broadly accessible
Red and Black Spruce Hummocks	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	Embedded lakes and wetlands; breeding	---	Low to nil habitat	General habitat, broadly accessible
Spruce Hemlock Pine Hummocks and Hills	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	---	---	Nesting, perching	General habitat, broadly accessible, large denning trees
Tolerant Hardwood Drumlins and Hummocks	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHV's)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	---	---	High habitat value	General habitat, broadly accessible; large denning trees

Appendix 1: Flow - Element Interactions

Element	People	Deer	Anadromous Fish	Migratory Birds	Wood Turtles	Raptors	Furbearers
Tolerant Mixedwood Hills	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Seasonal cover and foraging; Wintering areas; Travel ways	Water quality maintenance	---------	---------	High habitat value	General habitat, broadly accessible; large denning trees
Salt Marsh	Hunting	Winter habitat and feeding	Nutrient enrichment through primary production (photosynthesis); prey habitat	Seasonal habitat, migratory resting, foraging	---------	Foraging	Travel, food, habitat
Wetlands	Hunting	Deer (seasonal cover and foraging, wintering areas, deer often pass through in their travels from the interior to the coast)	Water quality maintenance; nursery areas; habitat cover	Seasonal habitat, migratory resting, foraging	Potential metapopulations along streams and rivers, nesting, feeding	Foraging	Travel, food, habitat
Corridor Valley Corridors	Forestry, Access Roads, Mineral Exploration, Outdoor Recreation (hunting, fishing, hiking, OHVs)	Travel ways; Food; Water; Cover	Water quality maintenance; riparian habitat; access to spawning beds; fish ladders around power dams	Breeding; resting	Potential metapopulations along streams and rivers, nesting, feeding	Nesting, food from rivers and streams	Major travel routes with mature forest

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
Matrix Spruce Pine Hummocks	Matrix	Low	Imperfectly drained terrain with thick ericaceous understory vegetation with forests and woodlands of black spruce.	Well distributed throughout ecodistrict.	Frequent	bS, wP	Areas of the landscape where drumlins are concentrated, wetlands and black spruce flats.	None	Maintenance of connectivity throughout the ecodistrict. Loss of fire as a renewal agent.	Stand-level disturbances with patch sizes similar to those created naturally. Renewal of fire ecosystems.
Patches Spruce Pine Flats	Patch	Low	Complex of wet spruce forest flats and wetlands, e.g. Bruce Plain, Mark Meadows. Also a linear feature of large streams and rivers, e.g. Twelve Mile Stream.	Localized representation throughout ecodistrict.	Frequent	bS, tL, rM	Spruce and pine forests on hummocky and ridged terrain.	Sensitivity to changing water levels (watercourse alterations, beavers).	Protection of watercourses and wetlands. OHV travel. Soil hazards influence operability.	Design of recreational access for OHV. Use best management practices for resource access on wet sites.
Red and Black Spruce Hummocks	Patch	Low	Cousins Lake, Long Lake (Hants County), Scraggy Lake, Head Lakes	Large patch forest on curvilinear ridging along northern boundary of ecodistrict.	Frequent	rS, bS	Spruce fir forests on moist, hummocky terrain.	None.	Loss of fire as a renewal agent.	Stand-level disturbances with patch sizes similar to those created naturally. Use best management practices for resource access on sites with shallow soils.

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
Spruce Hemlock Pine Hummocks and Hills	Patch	Moderate	Abraham Lake old growth. Areas underlain with fine-textured soils with yellow birch and red spruce hemlock mixedwoods.	Scattered in ecodistrict.	Frequent	rS, wP, eH, yB	Spruce pine forests on hummocky and moister sites. Well-drained hilly topography.	Over harvesting.	Conservation of older and uneven-aged forests.	Stand-level disturbances with patch sizes similar to those created naturally. Use of partial harvesting on suitable sites to maintain mature cover.
Tolerant Hardwood Drumlins and Hummocks	Patch	Low	Three dominant concentrations along the Sackville, Tangier, and Moser rivers.	Local concentrations of drumlins, scattered throughout.	Gap	yB, rM, sM	Imperfectly drained terrain associated with spruce pine hummocks and flats.	Isolation.	Over harvesting of forests using stand-level management practices.	Partial harvesting of quality hardwood and mixedwood stands.
Tolerant Mixedwood Hills	Patch	Low	Fine-textured hills near Dollar Lake yield diverse forest. Often as slope forests along larger streams and rivers.	Large patch forest throughout ecodistrict, often isolated, terrain mostly gently sloping.	Infrequent	yB, rM, sM, rS, eH, wP	Imperfectly drained sites of spruce pine forest on hummocky terrain	Over harvesting of the mature age class. The extent of intensively managed forest areas.	Over harvesting of forests using stand-level management practices. Intensive forest management of softwood species.	Partial harvesting of quality hardwood and mixedwood sites. Maintenance of existing mature class.

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
Salt Marsh	Patch	High	Large marshes near Cole Harbour and Chezzetcook	Isolated local patches of unique habitat	Open Seral (tidal)	Saltwater cordgrass	Brackish water (Cole Harbour), upland forests (Chezzetcook).	Water flow obstructions (alter fresh water and salt water contact), alteration of marsh and adjoining habitat, sedimentation.	Infilling and loss. Degradation due to land use.	Conserve and protect from offsite pollutants.
Wetlands	Patch	High	Musquodoboit River, Cope Plain, Redden Meadows, Alder Ground, The Big Bog	Both large and small distributed throughout the ecodistrict.	n/a	Wet black spruce, tamarack forests. Red maple fens. Stunted black spruce woodlands. Open shrub lands of ericaceous species.	Imperfectly drained ridged and hummocky terrain with black spruce forests.	Impacts due to OHV damage.	Impacts on water quality if off site pollutants (sediments) enter wetlands.	Maintain water quality and water recharge capabilities using best management practices when near wetlands.

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
Valley Corridors	Corridor	Moderate	Long narrow riparian zones linking the coastal and inland ecodistricts.	Linear connectors with the coastal and inland environments.	Frequent	Riparian forests of bF, bS, and rM.	Mixedwood forests of rM, yB, and rS, eH and wP on slopes along watercourses.	Fragmentation and continuity ofconnectivity.	Sedimentation and water quality degradation. Habitat loss.	Maintain appropriate riparian and machine exclusion zones. Reduce road access through corridors.

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 suchas patch aggregation and overstory-sustaining selection cutting 2. Promote large patch structure and interior conditions 3. Mitigate large-scale, long-term, fragmentation of the matrixthat could impede percolation 4. Manage age and structure appropriate to 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 qualityor 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 440)
Table 1a: Species at Risk (species protected by endangered species legislation on all lands)

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS				
Red Knot rufa ssp	*Calidris canutus rufa*	Endangered	N/A	Endangered
Chimney Swift	*Chaetura pelagica*	Endangered	Threatened	Threatened
Piping Plover melodus ssp	*Charadrius melodus melodus*	Endangered	Endangered	Endangered
Common Nighthawk	*Chordeiles minor*	Threatened	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened	Threatened
Eastern Wood-Pewee	*Contopus virens*	Vulnerable	N/A	Special Concern
Rusty Blackbird	*Euphagus carolinus*	Endangered	Special Concern	Special Concern
Barn Swallow	*Hirundo rustica*	Endangered	N/A	Threatened
Wood Thrush	*Hylocichla mustelina*	N/A	N/A	Threatened
Bank Swallow	*Riparia riparia*	N/A	N/A	Threatened
Canada Warbler	*Wilsonia canadensis*	Endangered	Threatened	Threatened
DICOTS				
Coast Pepper-Bush	*Clethra alnifolia*	Vulnerable	Special Concern	Special Concern
Black Ash	*Fraxinus nigra*	Threatened	N/A	N/A
Dense Blazing Star	*Liatris spicata*	N/A	Threatened	Threatened
FISH				
American Eel	*Anguilla rostrata*	N/A	N/A	Threatened
Striped Bass- Bay of Fundy pop.	*Morone saxatilis pop. 2*	N/A	N/A	Endangered
Atlantic Salmon - Inner Bay of Fundy pop.	*Salmo salar*	N/A	Endangered	Endangered
Atlantic Salmon - Southern Upland pop.	*Salmo salar*	N/A	N/A	Endangered
GYMNOSPERMS				
Eastern White Cedar	*Thuja occidentalis*	Vulnerable	N/A	N/A
INSECTS				
Monarch	*Danaus plexippus*	N/A	Special Concern	Special Concern
LICHENS				
Blue Felt Lichen	*Degelia plumbea*	Vulnerable	Special Concern	Special Concern
Graceful Felt Lichen	*Eriodermamollissimum*	Endangered	N/A	Endangered
Boreal Felt Lichen - Atlantic population	*Erioderma pedicellatum (Atlantic pop.)*	Endangered	Endangered	Endangered

Appendix 3: Special Occurrences (Ecodistrict 440)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
MAMMALS				
Moose	*Alces americanus*	Endangered	N/A	N/A
Little Brown Myotis	*Myotis lucifugus*	Endangered	N/A	Endangered
Northern Long-eared Myotis	*Myotis septentrionalis*	Endangered	N/A	Endangered
REPTILES				
Snapping Turtle	*Chelydra serpentina*	Vulnerable	Special Concern	Special Concern
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 440)

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***
AMPHIBIANS			
Four-toed Salamander	*Hemidactyliumscutatum*	Secure (Green)	S3
BIRDS			
Northern Goshawk	*Accipiter gentilis*	Secure (Green)	S3S4
Spotted Sandpiper	*Actitis macularius*	Sensitive(Yellow)	S3S4B
Long-eared Owl	*Asio otus*	May Be At Risk (Orange)	S2
Purple Sandpiper	*Calidris maritima*	Sensitive (Yellow)	S3N
Least Sandpiper	*Calidris minutilla*	Secure (Green)	S1B,S5M
Semipalmated Sandpiper	*Calidris pusilla*	Sensitive (Yellow)	S3M
Northern Cardinal	*Cardinalis cardinalis*	Secure (Green)	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	Secure (Green)	S1S2B,S5
Killdeer	*Charadrius vociferus*	Sensitive (Yellow)	M S3S4B
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	S3S4B
Blackpoll Warbler	*Dendroica striata*	Sensitive (Yellow)	S3S4B
Cape May Warbler	*Dendroica tigrina*	Sensitive (Yellow)	S3?B
Gray Catbird	*Dumetella carolinensis*	May Be At Risk (Orange)	S3B
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
Hudsonian Godwit	*Limosa haemastica*	Sensitive (Yellow)	S3M
Red-breasted Merganser	*Mergus serrator*	Secure (Green)	S3B,S5N
Hudsonian Whimbrel	*Numenius phaeopus hudsonicus*	Sensitive (Yellow)	S3M
Gray Jay	*Perisoreuscanadensis*	Sensitive(Yellow)	S3S4
Cliff Swallow	*Petrochelidonpyrrhonota*	May Be At Risk (Orange)	S3B
Red-necked Phalarope	*Phalaropus lobatus*	Sensitive (Yellow)	S2S3M
Black-backed Woodpecker	*Picoides arcticus*	Sensitive (Yellow)	S3S4
American Golden-Plover	*Pluvialis dominica*	Sensitive (Yellow)	S3M
Virginia Rail	*Rallus limicola*	Undetermined	S2B
Eastern Phoebe	*Sayornis phoebe*	Sensitive (Yellow)	S3S4B
Common Tern	*Sterna hirundo*	Sensitive (Yellow)	S3B
Arctic Tern	*Sterna paradisaea*	May Be At Risk (Orange)	S3B
Greater Yellowlegs	*Tringa melanoleuca*	Sensitive (Yellow)	S3B,S5M
Willet	*Tringa semipalmata*	May Be At Risk (Orange)	S2S3B
Tennessee Warbler	*Vermivora peregrina*	Sensitive (Yellow)	S3S4B
Warbling Vireo	*Vireo gilvus*	Undetermined	S1?B
Philadelphia Vireo	*Vireo philadelphicus*	Undetermined	S2?B
Wilson's Warbler	*Wilsonia pusilla*	Sensitive (Yellow)	S3S4B

Appendix 3: Special Occurrences (Ecodistrict 440)

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***
BRYOPHYTES			
a Feather Moss	*Hylocomiastrum pyrenaicum*	Sensitive (Yellow)	S2S3
a Moss	*Sematophyllum marylandicum*	Sensitive (Yellow)	S2?
DICOTS			
Nova Scotia Agalinis	*Agalinis neoscotica*	Secure (Green)	S3
Wood Anemone	*Anemonequinquefolia*	Sensitive (Yellow)	S2
Michaux's Dwarf Birch	*Betula michauxii*	Sensitive (Yellow)	S2
Cuckoo Flower	*Cardamine pratensis var. pratensis*	May Be At Risk (Orange)	S1
Red Ash	*Fraxinus pennsylvanica*	May Be At Risk (Orange)	S1
Common Bedstraw	*Galium aparine*	Exotic	
Spurred Gentian	*Halenia deflexa*	Sensitive (Yellow)	S1
Kalm's Hawkweed	*Hieracium kalmii*	Undetermined	S2S3
Pinebarren Golden Heather	*Hudsonia ericoides*	Sensitive (Yellow)	S2?
Disguised St John's-wort	*Hypericum*	Sensitive (Yellow)	S2
Large St John's-wort	*dissimulatum*	May Be At Risk (Orange)	S2S3
Southern Mudwort	*Hypericum majus*	Sensitive (Yellow)	S1
Water Beggarticks	*Limosella australis*	Sensitive (Yellow)	S3
Greenland Stitchwort	*Megalodonta beckii*	Sensitive (Yellow)	S3
Water Blinks	*Minuartiagroenlandica*	May Be At Risk	S2
Farwell's Water Milfoil	*Montia fontana*	(Orange)	
Rugel's Plantain	*Myriophyllum farwellii*	Sensitive (Yellow)	S1
Racemed Milkwort	*Plantago rugelii*	Undetermined	S2
Blood Milkwort	*Polygala polygama*	Undetermined	S2
Pennsylvania	*Polygala sanguinea*	Sensitive (Yellow)	S1
Smartweed	*Polygonum*	Secure (Green)	S2S3
Climbing False Buckwheat	*pensylvanicum*	Sensitive (Yellow)	S3
Comb-leaved Mermaidweed	*Polygonum scandens*	Sensitive (Yellow)	S3
Cursed Buttercup	*Proserpinacapectinata*	May Be At Risk	S3
Silky Willow	*Ranunculus sceleratus*	(Orange)	S1S2
Seaside Brookweed	*Salix sericea*	May Be At Risk	S2
Bloodroot	*Samolus valerandi ssp. parviflorus*	(Orange)	S2
Saltmarsh Starwort	*Sanguinaria canadensis*	Sensitive (Yellow)	S3S4
Wavy-leaved Aster	*Stellaria humifusa*	Secure (Green)	S2
Northern Blueberry	*Symphyotrichum undulatum*	Sensitive (Yellow)	S2
Dwarf Bilberry	*Vaccinium boreale*	Sensitive (Yellow)	S2
Highbush	*Vaccinium caespitosum*	May Be At Risk (Orange)	S2
Blueberry	*Vaccinium corymbosum*	Sensitive (Yellow)	S3
Arrow-Leaved Violet	*Viola sagittata var. ovata*	Secure (Green)	S3S
		Secure (Green)	4

Appendix 3: Special Occurrences (Ecodistrict 440)

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

SPECIES		DESIGNATION	
Common Name	**Scientific Name**	**Provincial General Status Rank**	**ACCDC S-Rank***
FERNS AND THEIR ALLIES			
Common Scouring-rush	*Equisetum hyemale var. affine*	Secure (Green)	S3S4
Variegated Horsetail	*Equisetumvariegatum*	Secure (Green)	S3
Acadian Quillwort	*Isoetes acadiensis*	Sensitive (Yellow)	S3
Southern Bog Clubmoss	*Lycopodiella appressa*	Secure (Green)	S3S4
Northern Clubmoss	*Lycopodium complanatum*	Secure (Green)	S3S4
Sitka Clubmoss	*Lycopodium sitchense*	Secure (Green)	S3?
Little Curlygrass Fern	*Schizaea pusilla*	Secure (Green)	S3
INSECTS			
Mottled Darner	*Aeshna clepsydra*	Secure (Green)	S3
Lance-Tipped Darner	*Aeshna constricta*	Secure (Green)	S3
Milbert's Tortoiseshell	*Aglais milberti*	Secure (Green)	S2
Pepper and Salt Skipper	*Amblyscirtes hegon*	Secure (Green)	S2
Common Roadside-Skipper	*Amblyscirtes vialis*	Secure (Green)	S2
Ocellated Darner	*Boyeria grafiana*	Sensitive (Yellow)	S3
Henry's Elfin	*Callophrys henrici*	Secure (Green)	S2
Bog Elfin	*Callophryslanoraieensis*	May Be At Risk (Orange)	S1S2
Eastern Pine Elfin	*Callophrys niphon*	Secure (Green)	S2
Hoary Elfin	*Callophrys polios*	Secure (Green)	S3S4
Taiga Bluet	*Coenagrion resolutum*	May Be At Risk (Orange)	S1
Orange Bluet	*Enallagma signatum*	May Be At Risk (Orange)	S1
Prince Baskettail	*Epitheca princeps*	Sensitive (Yellow)	S2
Juvenal's Duskywing	*Erynnis juvenalis*	Secure (Green)	S2S3
Baltimore Checkerspot	*Euphydryas phaeton*	Secure (Green)	S3
Harvester	*Feniseca tarquinius*	Secure (Green)	S3S4
Harlequin Darner	*Gomphaeschna furcillata*	Sensitive (Yellow)	S3
Common Branded Skipper	*Hesperia comma*	Secure (Green)	S3
Northern Pygmy Clubtail	*Lanthus parvulus*	Secure (Green)	S3
Northern Pearly-Eye	*Lethe anthedon*	Secure (Green)	S3
Bronze Copper	*Lycaena hyllus*	Secure (Green)	S1
Elfin Skimmer	*Nannothemis bella*	Secure (Green)	S3
Broadtailed Shadowdragon	*Neurocorduliamichaeli*	N/A	S1
Compton Tortoiseshell	*Nymphalis l-album*	Secure (Green)	S1S2
Jutta Arctic	*Oeneis jutta*	May Be At Risk (Orange)	S1
Riffle Snaketail	*Ophiogomphuscarolus*	Secure (Green)	S3
Rusty Snaketail	*Ophiogomphusrupinsulensis*	May Be At Risk (Orange)	S1S2
Spot-Winged Glider	*Pantala hymenaea*	Sensitive (Yellow)	S2B

Appendix 3: Special Occurrences (Ecodistrict 440)

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***
Mustard White	*Pieris oleracea*	Sensitive	S2
Greenish Blue	*Plebejus saepiolus*	(Yellow)	S1
Eastern Comma	*Polygonia comma*	At Risk (Red)	S2
Green Comma	*Polygonia faunus*	At Risk (Red)	S3
Question Mark	*Polygonia interrogationis*	Secure (Green)	S3B
Grey Comma	*Polygonia progne*	Secure (Green)	S3S4
Satyr Comma	*Polygonia satyrus*	Secure (Green)	S1
Banded	*Satyrium calanus*	Sensitive (Yellow)	S2
Hairstreak Striped	*Satyrium liparops*	Undetermined	S3
Hairstreak	*Somatochlorabrevicincta*	Undetermined	S1
Quebec Emerald	*Somatochlora forcipata*	May Be At Risk (Orange)	S2
Forcipate Emerald	*Somatochlorafranklini*	May Be At Risk (Orange)	S1
Delicate Emerald	*Somatochlorakennedyi*	Sensitive (Yellow)	S1S2
Kennedy's Emerald	*Somatochloratenebrosa*	May Be At Risk (Orange)	S3
Clamp-Tipped Emerald	*Speyeria aphrodite*	Secure (Green)	S3S4
Aphrodite Fritillary	*Stylurus scudderi*	Secure (Green)	S1S2
Zebra Clubtail	*Sympetrum danae*	May Be At Risk (Orange)	S3
Black Meadowhawk		Sensitive (Yellow)	
LICHENS			
Black-foam Lichen	*Anzia colpodes*	Sensitive (Yellow)	S3?
Blistered Tarpaper Lichen	*Collema furfuraceum*	Sensitive (Yellow)	S3?
Blistered Tarpaper Lichen	*Collema nigrescens*	Sensitive(Yellow)	S2S3
Rimmed Shingles Lichen	*Fuscopannaria*	May Be At Risk (Orange)	S1S2
Blistered Jellyskin Lichen	*leucosticta Leptogium*	Sensitive (Yellow)	S2S3
Appressed Jellyskin Lichen	*corticola Leptogium*	Sensitive (Yellow)	S1S3
Beaded Jellyskin Lichen	*subtile Leptogium*	Sensitive (Yellow)	S2S3
Tree Pelt Lichen	*teretiusculum Peltigera*	Sensitive (Yellow)	S2S3
Bottlebrush Frost Lichen	*collina Physconia detersa*	Sensitive (Yellow)	S2S3
Ghost Antler Lichen	*Pseudeverniacladonia*	Sensitive (Yellow)	S2S3
Peppered Moon Lichen	*Sticta fuliginosa*	Sensitive (Yellow)	S3?
MAMMALS			
Hoary Bat	*Lasiurus cinereus*	May Be At Risk (Orange)	S1
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined	SH
MOLLUSKS			
Triangle Floater	*Alasmidonta undulata*	Secure (Green)	S2S3
Eastern Lampmussel	*Lampsilis radiata*	Sensitive (Yellow)	S2

Appendix 3: Special Occurrences (Ecodistrict 440)

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
Fernald's Hay Sedge	*Carex foenea*	Secure (Green)	S3?
Hop Sedge	*Carex lupulina*	Secure (Green)	S3
Pennsylvania Sedge	*Carex pensylvanica*	Undetermined	S1S2
Swan's Sedge	*Carex swanii*	Sensitive (Yellow)	S2S3
Early Coralroot	*Corallorhiza trifida*	Secure (Green)	S3
Deer-tongue Panic Grass	*Dichanthelium clandestinum*	Secure (Green)	S3
Eaton's Witchgrass	*Dichanthelium spretum*	Secure (Green)	S3S4
Yellow Spikerush	*Eleocharis olivacea*	Sensitive (Yellow)	S2S3
Sharp-Fruit Rush	*Juncus acuminatus*	Sensitive (Yellow)	S3S4
Dudley's Rush	*Juncus dudleyi*	Sensitive (Yellow)	S2?
Woods-Rush	*Juncus subcaudatus var. planisepalus*	Sensitive (Yellow)	S3
Canada Lily	*Lilium canadense*	Sensitive (Yellow)	S2S3
Southern Twayblade	*Listera australis*	May Be At Risk (Orange)	S2
Thread-Like Naiad	*Najas gracillima*	May Be At Risk (Orange)	S1S2
Canada Rice Grass	*Piptatherumcanadense*	Sensitive (Yellow)	S2
Large Purple Fringed Orchid	*Platantheragrandiflora*	Secure (Green)	S3
Richardson's Pondweed	*Potamogetonrichardsonii*	May Be At Risk (Orange)	S2S3
Narrow-leaved Blue-eyed-grass	*Sisyrinchium angustifolium*	Secure (Green)	S3S4
Wild Celery	*Vallisneria americana*	May Be At Risk (Orange)	S2

*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 440)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Loon Nesting Lakes	Habitat	Provincial Database	Nova Scotia Environment Act; Nova Scotia Forests Act (*Wildlife Habitat and Watercourses ProtectionRegulations*)
Eagle Nests	Habitat	Provincial Database	Nova Scotia Wildlife Act (NSWA)
Migratory Shorebird Roosts	Habitat	Local knowledge	Nova Scotia Wildlife Act
Moose Concentration Areas	Habitat	Provincial Database	Crown Lands Act
Deer Wintering Areas	Habitat	Provincial Database	Crown Lands Act
Nature Reserves - Bennery Lake; Cross Lake; Sackville River; Tait Lake; Little Soldier Lake; Cowan Brook; Rawdon River	Ecosystems/Habitat	Provincial Database	Special Places Protection Act
Wilderness Areas – Waverley-Salmon River Long Lake; Clattenburgh Brook; Alder Ground; Boggy Lake; Liscomb River; The Big Bog;	Ecosystems/ Recreation	Provincial Database	Nova Scotia Wilderness Areas Protection Act
Provincial Park – Dollar Lake; Moose River Gold Mines; Laurie Provincial Park; Mount Uniacke	Ecosystems/ Recreation	Provincial Database	Nova Scotia Parks Act
Designated Water Supply – Lake Major; Pockwock Lake; Bennery Lake; Chain Lakes; Tomahawk Lake; Lake Lamont; Musquodoboit River	Ecosystems	Provincial Database	Nova Scotia Environment Act

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	bS	6,015	1.3	210,752	46.1	63 to 69	8.2	22,923	3.6	222,732	34.7	76 to 80	2.4
ICSM	bS wP	458	0.1	1,145	0.3	60 to 68	7.6	1,276	0.2	18,110	2.8	64 to 72	3.3
IFHO	bS	5,998	1.3	210,752	46.1	59 to 65	14.9	6,777	1.1	222,732	34.7	58 to 64	15.1
IFRD	bS wP	757	0.2	1,145	0.3	49 to 50	38.4	757	0.1	18,110	2.8	49 to 50	38.4
IFSM	wetlands	308	0.1	0	0.0	58 to 59	17.6	308	0.0	0	0.0	57 to 58	17.6
IMHO	bS	104,402	22.8	210,752	46.1	64 to 73	3.4	133,870	20.8	222,732	34.7	63 to 73	3.2
IMKK	sM yB	1,437	0.3	862	0.2	63 to 70	7.2	1,437	0.2	862	0.1	63 to 70	7.2
IMRD	bS	62,046	13.6	210,752	46.1	70 to 75	2.7	62,910	9.8	222,732	34.7	70 to 75	2.7
IMSM	bS	11,645	2.5	210,752	46.1	64 to 70	7.4	12,386	1.9	222,732	34.7	63 to 69	7.7
PMHO	wetlands	699	0.2	0	0.0	74	0.8	1,072	0.2	0	0.0	73 to 74	0.5
PMRD	wetlands	170	0.0	0	0.0	72 to 75	0.0	170	0.0	0	0.0	72 to 75	0.0
WCHO	rS wP	2,221	0.5	46,334	10.1	53 to 57	22.8	8,109	1.3	52,293	8.1	72 to 76	7.3
WCKK	sM yB Be	6,695	1.5	52,291	11.4	34 to 36	0.7	33,442	5.2	89,022	13.9	73 to 80	0.8
WFDM	sM yB Be	28,116	6.1	52,291	11.4	60 to 68	11.9	29,685	4.6	89,022	13.9	60 to 69	11.4
WFHO	rS wP	5,640	1.2	46,334	10.1	61 to 70	6.5	5,640	0.9	52,293	8.1	61 to 70	6.5

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

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	%		
WFKK	rS sM yB Be	10,482	2.3	91,187	19.9	57 to 63	16.9	11,791	1.8	97,421	15.0	56 to 63	16.4
WFRD	rS sM yB Be	227	0.0	91,187	19.9	31 to 33	56.0	227	0.0	97,421	15.2	31 to 33	56.0
WMDM	sM yB Be	17,479	3.8	52,291	11.4	62 to 72	4.6	18,577	2.9	89,022	13.9	62 to 72	4.4
WMHO	rS wP	37,829	8.3	46,334	10.1	64 to 72	4.3	48,445	7.5	52,293	8.1	63 to 71	4.7
WMKK	rS sM yB Be	80,546	17.6	91,187	19.9	65 to 75	5.3	125,446	19.5	97,421	15.2	59 to 69	7.5
WMRD	rS wP	20,501	4.5	46,334	10.1	65 to 70	6.9	20,501	3.2	52,293	8.1	65 to 70	6.9
WMSM	bS	149	0.0	210,752	46.1	67 to 73	3.0	149	0.0	222,732	34.7	67 to 73	3.0
WTLD	wetlands	16,493	3.6	0	0.0	76 to 78	1.1	18,686	2.9	0	0.0	76 to 78	1.0

*Area of Climax Type refers to the total rea 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)
IMHO	bS	104,402	0.5	3,249	84	1,434	0	4,683	4.5	84	0.1	4,767	4.6
WMKK	rS sM yB Be	80,546	0.5	1,349	0	1,243	0	2,592	3.2	0	0.0	2,592	3.2
IMRD	bS	62,046	0.6	4,701	0	2,044	0	6,745	10.9	0	0.0	6,745	10.9
WMHO	rS wP	37,829	0.5	385	60	235	0	620	1.6	60	0.2	680	1.8
XXWA	NONE	32,585	0.0	1	0	0	0	1	0.0	0	0.0	1	0.0
WFDM	sM yB Be	28,116	0.5	2,230	0	747	0	2,977	10.6	0	0.0	2,977	10.6
WMRD	rS wP	20,501	0.3	504	0	118	49	621	3.0	49	0.2	670	3.3
WMDM	sM yB Be	17,479	0.3	304	0	4	0	308	1.8	0	0.0	308	1.8
WTLD	wetlands	16,493	0.7	1,972	0	349	0	2,322	14.1	0	0.0	2,322	14.1
IMSM	bS	11,645	0.4	22	0	147	0	169	1.4	0	0.0	169	1.4
WFKK	rS sM yB Be	10,482	0.1	569	0	52	0	621	5.9	0	0.0	621	5.9
WCKK	sM yB Be	6,695	0.3	0	0	254	0	254	3.8	0	0.0	254	3.8
ICHO	bS	6,015	0.6	92	0	220	0	312	5.2	0	0.0	312	5.2
IFHO	bS	5,998	0.3	237	0	3	0	239	4.0	0	0.0	239	4.0
WFHO	rS wP	5,640	0.2	25	0	91	0	116	2.1	0	0.0	116	2.1
XXUR	urban	4,479	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WCHO	rS wP	2,221	0.2	0	0	34	0	34	1.5	0	0.0	34	1.5
IMKK	sM yB	1,437	0.1	0	0	0	0	0	0.0	0	0.0	0	0.0
IFRD	bS wP	757	0.2	0	0	110	0	110	14.6	0	0.0	110	14.6
PMHO	wetlands	698	1.0	0	0	0	0	0	0.0	0	0.0	0	0.0
ICSM	bS wP	458	0.2	0	0	0	0	0	0.0	0	0.0	0	0.0
IFSM	wetlands	308	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WFRD	rS sM yB Be	227	0.0	0	0	1	0	1	0.0	0	0.0	1	0.0
PMRD	wetlands	170	0.9	0	0	0	0	0	0.0	0	0.0	0	0.0
WMSM	bS	149	0.6	0	0	0	0	0	0.0	0	0.0	0	0.0
XXMS	salt marsh	119	0.4	32	0	0	0	32	0.3	0	0.0	32	0.3
Total		**457,492**		**15,671**	**145**	**7,084**	**49**	**22,755**		**194**		**22,949**	

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)
Wilderness Areas	14,307	0	Old Forest	12,665	0
Designated Provincial Parks and Park Reserves	1,358	0	Operational Non Designated Parks and Reserves	6	0
Operational Non Designated Parks and Reserves	783	0	Designated Provincial Parks and Park Reserves	121	0
National Historic Sites and Parks	11	0	Areas under the Special Places Act	0	0
Nature Conservancy of Canada	0	135	Ramsar Wetland Sites	0	0
Sites of Ecological Significance Under Memorandum	0	0	Eastern Habitat Joint Venture	0	49
Protected Beaches	6				

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	3,502
Utility Corridors	3	596
Gravel roads and active railways	6	2,580
Paved streets and roads collectors	10	1,747
Highways	15	302

Table 2: Distribution of Road Index Classes

Road Index		Area of Ecodistrict Affected	
Indication	Range	Hectares	Percent
Remote	0 to 6	131,798	28.8
Forest Resource	7 to 15	165,734	36.2
Mixed Rural	16 to 24	84,320	18.4
Agriculture Suburban	25 to 39	48,685	10.6
Urban	40 to 100	26,619	5.8
Total		**457,156**	**99.8**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Valley Corridors	25,538	19
Spruce Pine Hummocks	110,724	10
Tolerant Hardwood Drumlins and	44,921	12
Tolerant Mixedwood Hills	96,800	10
Spruce Pine Flats	11,198	14
Spruce Hemlock Pine Hummocks and Hills	44,590	10
Red and Black Spruce Hummocks	81,025	8
Salt Marsh	119	N/A
Wetlands	14,278	8
Total	**429,193**	**11**

*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

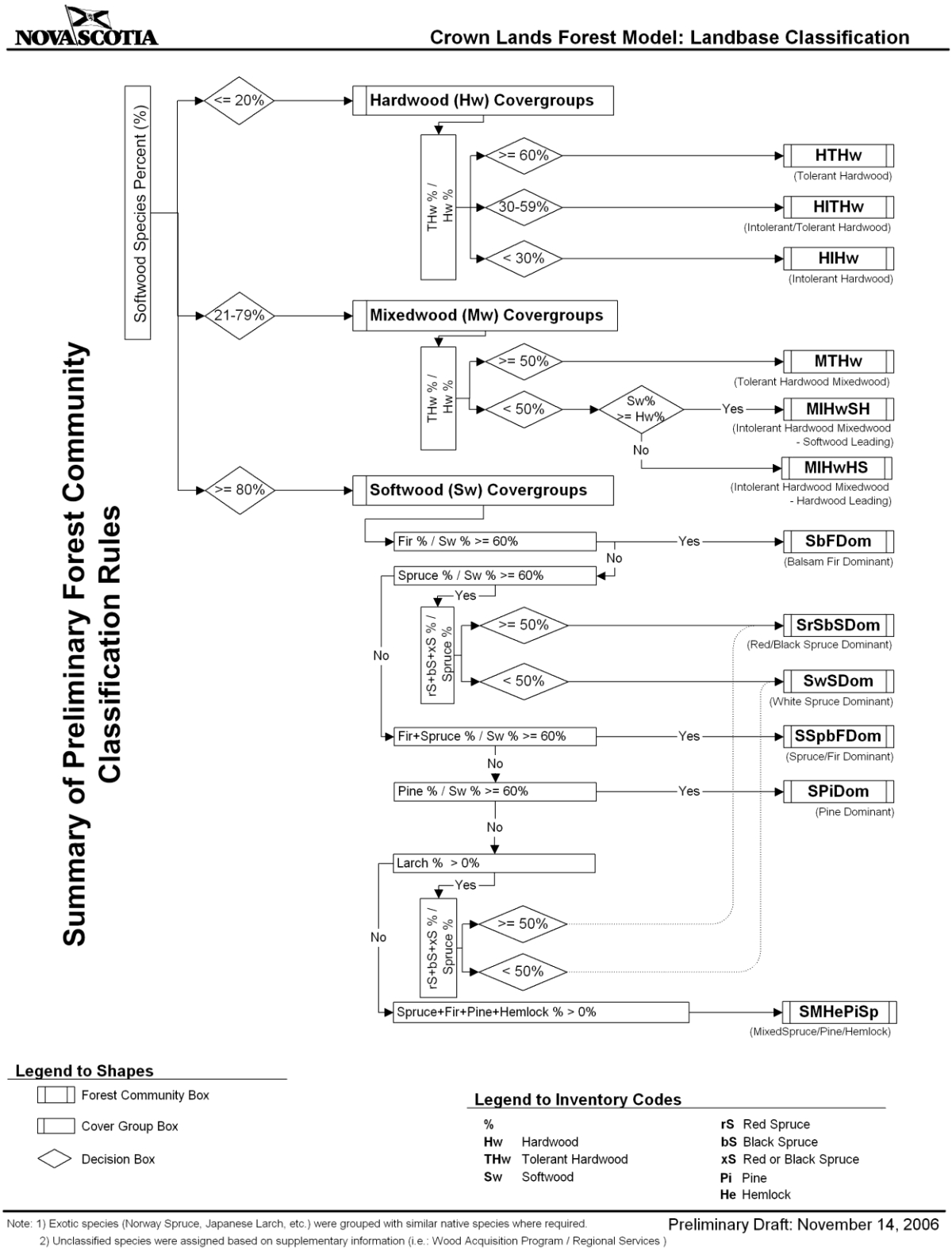
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade-intolerant "pioneer" species • peak seed production by forbs and shrubs • 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 (Eastern Interior 440)

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)				
Spruce Pine Hummocks	IMHO (90.0%) IFHO (5.0%) ICHO (5.0%)	Softwood	bS wP	Frequent	110,762; 100.0	Early	1,532	3,014	1,471	470	6,488	65,347; 72.0	EARLY	12,325; 13.5
						Mid	1,871	3,999	2,894	3,298	12,062			
						Late	2,775	12,107	13,477	9,097	37,456			
						Uncl	9,341	0	0	0	9,341			
		Mixedwood				Early	739	796	576	206	2,317	11,990; 13.0	MID	20,484; 22.6
						Mid	687	1,365	2,160	1,639	5,851			
						Late	61	229	926	554	1,769			
						Uncl	2,052	0	0	0	2,052			
		Hardwood				Early	219	730	1,103	141	2,193	5,881; 7.0	LATE	40,049; 44.2
						Mid	174	397	1,851	149	2,571			
						Late	12	90	643	78	823			
						Uncl	294	0	0	0	294			
		Unclassified				Early	881	86	271	0	1,238	7,303; 8.0	UNCL	17,753; 19.6
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	6,063	3	0	0	6,065			
Total					**110,765***	**# ha**	**26,702**	**22,815**	**25,372**	**15,632**	**90,520**			
						%	**29.5%**	**25.2%**	**28.0%**	**17.3%**	**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.

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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)				
Spruce Pine Flats	IMSM (93.0%) ICSM (3.0%) IFSM (2.0%) WMSM (1.0%)	Softwood	bS bS wP	Frequent	7,795; 70.0	Early	90	220	193	73	576	6,319; 73.5	EARLY	1,074; 12.5
						Mid	99	428	476	451	1,454			
						Late	121	801	1,342	1,182	3,446			
						Uncl	843	0	0	0	843			
		Mixedwood				Early	42	48	78	64	232	1,276; 14.8	MID	2,353; 27.4
						Mid	21	93	291	213	618			
						Late	0	7	143	63	213			
						Uncl	214	0	0	0	214			
		Hardwood	aE sM Wa	Gap	25; <1.0	Early	27	63	99	14	203	648 7.5	LATE	3,813; 44.4
						Mid	10	14	213	45	282			
						Late	0	4	140	10	154			
						Uncl	9	0	0	0	9			
		Unclassified				Early	22	7	34	0	63	352; 4.1	UNCL	1,354; 15.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	289	0	0	0	289			
Total					**11,198***	**# ha**	**1,787**	**1,685**	**3,008**	**2,115**	**8,594**			
						%	**20.8%**	**19.6%**	**35.0%**	**24.6%**	**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 (Eastern Interior 440)

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)				
Tolerant Mixedwood Hills	WMKK (85.0%) WFKK (11.0%) WCKK (3.0%) IMKK (2.0%)	Softwood	rS bS	Infrequent	25,174; 26.0	Early	151	583	271	90	1,095	37,422; 44.0	EARLY	19,426; 23.0
						Mid	238	491	543	486	1,758			
						Late	188	742	1,201	1,043	3,175			
						Uncl	885	0	0	0	885			
		Mixedwood	rS sM yB Be	Infrequent	10,349; 11.0	Early	253	287	211	61	812	21,272; 25.0	MID	26,662; 31.0
						Mid	150	166	502	197	1,015			
						Late	12	26	233	64	334			
						Uncl	400	0	0	0	400			
		Hardwood	sM yB Be sM yB	Gap	61,408; 63.0	Early	225	233	961	26	1,444	19,930; 23.0	LATE	23,768; 28.0
						Mid	58	173	3,708	85	4,024			
						Late	27	46	661	6	739			
						Uncl	104	0	0	0	104			
		Unclassified				Early	286	63	122	0	471	6,776; 8.0	UNCL	15,544; 18.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	1,306	0	0	0	1,306			
Total					**96,932***	**# ha**	**4,283**	**2,810**	**8,412**	**2,058**	**17,563**			
						%	**24.4%**	**16.0%**	**47.9%**	**11.7%**	**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 (Eastern Interior 440)

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)				
Tolerant Hardwood Drumlins and Hummocks	WFDM (62.0%) WMDM (38.8%)	Softwood				Early	670	1,458	620	239	2,987	16,314; 41.7	EARLY	9,017; 23.0
						Mid	891	935	1,040	890	3,757			
						Late	788	1,448	3,065	1,808	7,108			
						Uncl	2,462	0	0	0	2,462			
		Mixedwood				Early	679	731	668	208	2,286	7,961; 20.4	MID	13,062; 33.0
						Mid	503	501	1,626	726	3,357			
						Late	137	144	680	246	1,206			
						Uncl	1,112	0	0	0	1,112			
		Hardwood	sM yB Be;	Gap	44,938; 100.0	Early	468	736	1,606	73	2,883	10,844; 27.7	LATE	9,971; 26.0
						Mid	307	426	4,967	249	5,949			
						Late	93	116	1,414	33	1,656			
						Uncl	356	0	0	0	356			
		Unclassified				Early	522	85	254	0	861	3,995; 10.2	UNCL	7,064; 18.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	3,134	0	0	0	3,134			
Total					**44,938***	**# ha**	**12,122**	**6,580**	**15,941**	**4,472**	**39,114**			
						%	**31.0%**	**16.8%**	**40.8%**	**11.4%**	**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 (Eastern Interior 440)

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)				
Spruce Hemlock Pine Hummocks and Hills	WMHO (83.0%) WFHO (13.0%) WCHO (4.0%)	Softwood	rS wP; bS;	Frequent	44,642; 100.0	Early	1,038	1,710	564	214	3,525	20,839; 56.0	EARLY	7,990; 21.0
						Mid	1,022	1,916	901	1,200	5,039			
						Late	951	3,315	3,483	1,949	9,698			
						Uncl	2,577	0	0	0	2,577			
		Mixedwood				Early	517	529	471	180	1,696	8,657; 23.0	MID	11,046; 30.0
						Mid	565	914	1,583	1,037	4,099			
						Late	55	179	777	463	1,475			
						Uncl	1,388	0	0	0	1,388			
		Hardwood				Early	261	761	1,115	100	2,237	5,072; 14.0	LATE	11,989; 32.0
						Mid	79	373	1,216	241	1,908			
						Late	12	48	640	117	817			
						Uncl	111	0	0	0	111			
		Unclassified				Early	304	56	170	2	532	2,969; 7.0	UNCL	6,513; 17.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	2,437	0	0	0	2,437			
Total					**44,642***	**# ha**	**11,316**	**9,800**	**10,920**	**5,502**	**37,537**			
						%	**30.1%**	**26.1%**	**29.1%**	**14.7%**	**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 (Eastern Interior 440)

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	IMHO (20.0%) WTLD (12.0%) IMRD (9.0%) WMKK (8.0%) IMSM (5.0) WMHO (2.0%) ICHO (2.0%) WMDM (1.0%) WFDM (1.0%)	Softwood	bS bS, wP rS	Frequent	11,263; 44.1	Early	159	588	282	114	1,142	8,213; 70.0	EARLY	2,235; 19.0
						Mid	90	490	574	550	1,704			
						Late	190	1,126	2,088	1,435	4,839			
						Uncl	528	0	0	0	528			
		Mixedwood				Early	23	101	212	42	379	1,669; 14.0	MID	3,100; 26.0
						Mid	105	91	454	240	891			
						Late	1	22	208	65	296			
						Uncl	104	0	0	0	104			
		Hardwood	sM, yB, Be	Gap	2,067; 8.1	Early	14	126	369	13	522	1,239; 11.0	LATE	5,337; 46.0
						Mid	3	62	407	34	505			
						Late	0	1	192	9	203			
						Uncl	10	0	0	0	10			
		Unclassified				Early	179	0	14	0	193	624; 5.0	UNCL	1,074; 9.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	432	0	0	0	432			
Total					**25,560***	**# ha**	**1,837**	**2,608**	**4,800**	**2,501**	**11,745**			
						%	**15.6%**	**22.2%**	**40.9%**	**21.3%**	**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 (Eastern Interior 440)

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)				
Red and Black Spruce Hummocks	IMRD (74.0%) WMRD (25.0%) IFRD (1.0%) WFRD (<1.0%) PMRD (<1.0%)	Softwood	bS wP rS wP bS	Frequent	80,805; 99.7	Early	633	891	576	272	2,373	44,533; 69.0	EARLY	7,010; 11.0
						Mid	979	2,452	1,852	2,916	8,198			
						Late	1,528	8,548	11,318	7,901	29,295			
						Uncl	4,668	0	0	0	4,668			
		Mixedwood	rS sM yB Be	Frequent	134; <1.0	Early	216	313	431	157	1,116	10,256; 16.0	MID	16,917; 26.0
						Mid	443	998	2,721	2,218	6,381			
						Late	37	286	998	798	2,119			
						Uncl	639	0	0	0	639			
		Hardwood				Early	389	1,091	1,172	455	3,107	6,639; 10.0	LATE	32,527; 51.0
						Mid	114	432	1,462	330	2,338			
						Late	6	118	856	135	1,114			
						Uncl	79	0	0	0	79			
		Unclassified				Early	232	41	141	0	414	2,976; 5.0	UNCL	7,948; 12.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	2,562	0	0	0	2,562			
Total					**81,043***	**# ha**	**12,526**	**15,170**	**21,527**	**15,181**	**64,403**			
						%	**19.4%**	**23.6%**	**33.4%**	**23.6%**	**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 (Eastern Interior 440)

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 (95.0%) PMHO (5.0%)	Softwood	bS	Open Seral	5,712; 40.0	Early	84	147	53	21	305	4,284; 75.0	EARLY	637; 11.0
						Mid	113	295	251	242	900			
						Late	146	1,021	929	797	2,892			
						Uncl	187	0	0	0	187			
		Mixedwood				Early	28	38	48	17	131	753; 13.0	MID	1,573; 27.0
						Mid	42	87	209	100	437			
						Late	32	11	59	44	145			
						Uncl	39	0	0	0	39			
		Hardwood				Early	21	29	78	3	131	448; 8.0	LATE	3,094; 54.0
						Mid	5	6	212	13	235			
						Late	0	7	43	7	57			
						Uncl	25	0	0	0	25			
		Unclassified				Early	60	3	8	0	70	258; 4.0	UNCL	439; 8.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	188	0	0	0	188			
Total					**14,279***	**# ha**	**968**	**1,642**	**1,889**	**1,244**	**5,743**			
						%	**16.9%**	**28.6%**	**32.9%**	**21.7%**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Flats	ICSM IFSM IMSM WMSM	Frequent	bS bS, wP	S	SrSbSDom	4,671	56.7%	L	**Moist** Early – Late VT: bF, bS, tL, rM **Poor** Early - Late VT: bS, tL, rM **Floodplains** Early – Mid VT: bC, wS, wA, bP, rO Late VT: sM, yB, wA, aE
				S	SbFDom	757	9.2%	E	
				S	SSpbFDom	664	8.0%	L	
				S	SPiDom	118	1.4%	L	
				S	SMHePiSp	86	1.0%	L	
				S	SwSDom	24	0.3%	E	
				M	MIHwSH	720	8.7%	E/M	
				M	MIHwHS	367	4.4%	E/M	
				M	MTHw	189	2.3%	L	
				H	HIHw	405	4.9%	E/M	
				H	HTHw	143	1.7%	L	
				H	HITHw	100	1.2%	M/L	
Total						**8,242**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Hummocks	ICHO IFHO IMHO	Frequent	bS, bF	S	SrSbSDom	50,577	60.8%	L	**Dry to Well-drained** Early – Mid VT: bS, jP Late VT: bS, wP **Moist** Early – Late VT: bF, bS, tL, rM **Poor** Early - Late VT: bS, tL, rM
				S	SbFDom	8,178	9.8%	E	
				S	SSpbFDom	5,339	6.4%	M/L	
				S	SPiDom	566	0.7%	L	
				S	SMHePiSp	360	0.4%	L	
				S	SwSDom	328	0.4%	E	
				M	MIHwSH	7,009	8.4%	E/M	
				M	MIHwHS	3,731	4.5%	E/M	
				M	MTHw	1,249	1.5%	L	
				H	HIHw	4,007	4.8%	E/M	
				H	HITHw	951	1.1%	M/L	
				H	HTHw	924	1.1%	L	
Total						**83,218**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Mixedwood Hills	IMKK WCKK WFKK WMKK	Gap	sM, yB, Be rS, yB	S	SrSbSDom	10,320	29.4%	L	**Well-drained** Early VT: rM, wB Mid to Late VT: rM, yB, sM **Moist** Early to Mid-VT: bF, bS, tL, rM, tA, wB Late VT: rS, yB, eH, wP **Old Fields** Early VT: wS, tL
				S	SbFDom	3,824	10.9%	E	
				S	SSpbFDom	1,930	5.5%	M/L	
				S	SwSDom	101	0.3%	E	
				S	SMHePiSp	76	0.2%	L	
				S	SPiDom	64	0.2%	L	
				M	MIHwSH	3,946	11.2%	E/M	
				M	MIHwHS	2,806	8.0%	E/M	
				M	MTHw	1,209	3.4%	L	
				H	HIHw	5,948	16.9%	E/M	
				H	HITHw	3,131	8.9%	L	
				H	HTHw	1,765	5.0%	M/L	
Total						**35,119**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Hardwood Drumlins and Hummocks	WFDM WMDM	Gap	sM, yB, Be rS, yB	S	SrSbSDom	22,967	29.2%	L	**Well-drained** Early VT: rM, wB Mid to Late VT: rM, yB, sM **Moist** Early to Mid-VT: bF, bS, tL, rM, tA, wB Late VT: rS, yB, eH, wP **Old Fields** Early VT: wS, tL
				S	SbFDom	8,851	11.3%	E	
				S	SSpbFDom	4,178	5.3%	M/L	
				S	SMHePiSp	679	0.9%	L	
				S	SwSDom	485	0.6%	E	
				S	SPiDom	262	0.3%	L	
				M	MIHwSH	10,451	13.3%	E/M	
				M	MIHwHS	7,495	9.5%	E/M	
				M	MTHw	3,327	4.2%	L	
				H	HIHw	10,653	13.5%	E/M	
				H	HTHw	4,720	6.0%	L	
				H	HITHw	4,557	5.8%	M/L	
Total						**78,624**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Hemlock Pine Hummocks and Hills	WCHO WFHO WMHO	Infrequent	rS, eH, wP	S	SrSbSDom	13,544	39.2%	L	**Well-drained** Early – Mid VT: bF, rM, tA, wB Mid to Late VT: rS, wP, eH, yB **Moist** Early – Late VT: bS, tL, rM
				S	SbFDom	4,106	11.9%	E	
				S	SSpbFDom	2,632	7.6%	M/L	
				S	SwSDom	293	0.8%	E	
				S	SPiDom	170	0.5%	L	
				S	SMHePiSp	93	0.3%	L	
				M	MIHwSH	5,062	14.6%	E/M	
				M	MIHwHS	2,644	7.6%	E/M	
				M	MTHw	951	2.8%	L	
				H	HIHw	3,701	10.7%	E/M	
				H	HTHw	836	2.4%	L	
				H	HITHw	536	1.5%	M/L	
Total						**34,568**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	ICHO ICSM IFSM IMHO IMKK IMRD IMSM PMHO WCHO WCKK WFDM WFHO WFKK WFRD WMDM WMHO WMKK WMRD WTLD	Frequent	bS, wP rS, wP	S	SrSbSDom	5,806	52.2%	L	**Well-drained** Early – Mid VT: bF, wS, rM, wB, tA Late VT: rS, eH, wP, yB, sM, Be **Moist** Early – Late VT: bF, bS, rM **Poor** Early - Late VT: bF, bS, rM, tL **Floodplains** Early – Mid VT: bC, wS, wA, bP, rO Late VT: sM, yB, wA, aE
				S	SbFDom	1,184	10.6%	E	
				S	SSpbFDom	717	6.4%	M/L	
				S	SPiDom	332	3.0%	L	
				S	SMHePiSp	106	1.0%	L	
				S	SwSDom	69	0.6%	E	
				M	MIHwSH	928	8.3%	E/M	
				M	MIHwHS	524	4.7%	E/M	
				M	MTHw	217	1.9%	L	
				H	HIHw	823	7.4%	E/M	
				H	HTHw	233	2.1%	L	
				H	HITHw	183	1.6%	M/L	
Total						**11,121**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Red and Black Spruce Hummocks	IFRD IMRD PMRD WFRD WMRD	Frequent	bS, wP rS, wP	S	SrSbSDom	36,157	58.9%	L	**Dry to Well-drained** Early – Mid VT: bS, jP Late VT: bS, rS, wP **Moist** Early – Late VT: bF, bS, rS **Poor** Early - Late VT: bS, tL, rM
				S	SSpbFDom	3,531	5.7%	M/L	
				S	SbFDom	3,036	4.9%	E	
				S	SPiDom	943	1.5%	L	
				S	SMHePiSp	699	1.1%	L	
				S	SwSDom	167	0.3%	E	
				M	MIHwSH	5,715	9.3%	E/M	
				M	MIHwHS	3,468	5.6%	E/M	
				M	MTHw	1,073	1.7%	L	
				H	HIHw	4,345	7.1%	E/M	
				H	HITHw	1,148	1.9%	M/L	
				H	HTHw	1,146	1.9%	L	
Total						**61,427**	**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 Eastern Interior Grouped by Landscape Elements)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Wetlands	PMHO WTLD	Frequent	bS	S	SrSbSDom	3,661	66.8%	L	**Moist** Early – Late VT: bF, bS, rM **Poor** Early - Late VT: bF, bS, rM, tL
				S	SSpbFDom	288	5.2%	M/L	
				S	SbFDom	261	4.8%	E	
				S	SPiDom	41	0.7%	L	
				S	SMHePiSp	22	0.4%	L	
				S	SwSDom	11	0.2%	E	
				M	MIHwSH	466	8.5%	E/M	
				M	MIHwHS	225	4.1%	E/M	
				M	MTHw	62	1.1%	L	
				H	HIHw	278	5.1%	E/M	
				H	HITHw	114	2.1%	M/L	
				H	HTHw	56	1.0%	L	
Total						**5,485**	**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	210,752	46.1%	222,732	34.7%
rS sM yB Be	91,187	19.9%	97,421	15.2%
sM yB Be	52,291	11.4%	89,022	13.9%
rS wP	46,334	10.1%	52,293	8.1%
aE sM wA	2,360	0.5%	2,360	0.4%
bS wP	1,145	0.3%	18,110	2.8%
sM yB	862	0.2%	862	0.1%
Total	**404,930**	**88.5***	**482,799**	**75.2****

*Total does not add up to 100% because wetlands and urban lands 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 ForestPolicy).
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
Spruce Pine Hummocks	110,711	4,774	81,231	707	4,732	19,268	70,691 to 80,324	64 to 73
Tolerant Mixedwood Hills	96,932	3,345	69,006	837	5,943	17,754	59,748 to 68,625	62 to 71
Red and Black Spruce Hummocks	81,043	7,160	61,504	499	3,429	8,437	55,522 to 59,740	69 to 74
Tolerant Hardwood Drumlins and Hummocks	44,938	3,266	29,163	312	4,103	8,083	27,237 to 31,279	61 to 70
Spruce Hemlock Pine Hummocks and Hills	44,642	813	33,733	398	2,307	7,378	28,057 to 31,746	63 to 71
Valley Corridors	25,560	1,746	12,294	122	1,097	1,273	11,315 to 11,951	44 to 47
Wetlands	14,279	1,648	11,960	18	129	513	10,750 to 11,007	75 to 77
Spruce Pine Flats	11,198	163	8,834	29	711	1,457	7,160 to 7,888	64 to 70
Salt Marsh	119	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**429,423**	**22,915**	**307,725**	**2,923**	**22,451**	**64,161**	**270,655 to 302,739**	**63 to 70**

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	6,015	312	4,306	94	493	810	3,768 to 4,173	63 to 69
ICSM	458	0	335	7	35	81	273 to 313	60 to 68
IFHO	5,998	239	4163.1	7	892	697	3,538 to 3,886	59 to 65
IFRD	757	110	338.7	0	290	17	369 to 377	49 to 50
IFSM	308	0	229.8	17.7	54	6	178 to 181	58 to 59
IMHO	104,399	4,767	77,079	645	3,595	18,313	67,316 to 76,472	64 to 73
IMKK	1,437	0	1,134	0	103	199	901 to 1000	63 to 70
IMRD	62,042	6,745	46,849	309	1,676	6,464	43,574 to 46,806	70 to 75
IMSM	11,644	169	9,161	21	861	1,433	7,403 to 8,119	64 to 70
PMHO	699	0	682	3	6	8	514 to 518	74
PMRD	170	0	159	0	0	10	122 to 127	72 to 75
WCHO	2,221	34	1,444	53	506	184	1,176 to 1,268	53 to 57
WCKK	3,227	254	2,552	27	45	348	2,262 to 2,436	34 to 36
WFDM	28,116	2,988	16,904	171	3,348	4,706	16,884 to 19,237	60 to 68
WFHO	5,640	116	4,053	74	367	1,030	3,432 to 3,947	61 to 70
WFKK	10,482	621	6,582	164	1,773	1,343	5,934 to 6,605	57 to 63
WFRD	227	1	90	0	127	9	70 to 75	31 to 33
WMDM	17,479	308	12,764	142	806	3,458	10,782 to 12,511	62 to 72

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

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
WMHO	37,828.8	680.0	28,983.3	311.0	1,615.1	6,239.5	24,055 to 27,175	64 to 72
WMKK	84,013.9	2,592.1	60,348.3	663.0	4,248.7	16,161.9	52,060 to 60,140	65 to 75
WMRD	20,500.8	670.2	16,137.6	199.4	1,405.2	2,088.3	13,345 to 14,390	65 to 70
WMSM	148.7	0.0	128.0	0.0	4.4	16.2	100 to 108	67 to 73
WTLD	16,491.8	2,321.5	13,418.7	17.7	173.7	560.2	12,530 to 12,810	76 to 78
XXMS	119.1	32.2	62.8	0.0	22.2	1.9	80 to 81	67 to 68
Total	**420,419.8**	**22,959.2**	**308,030.4**	**2,924.6**	**26,798.0**	**64,189.2**	**270,665 to 302,756**	**64 to 72**

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 diversityof 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 activities 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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