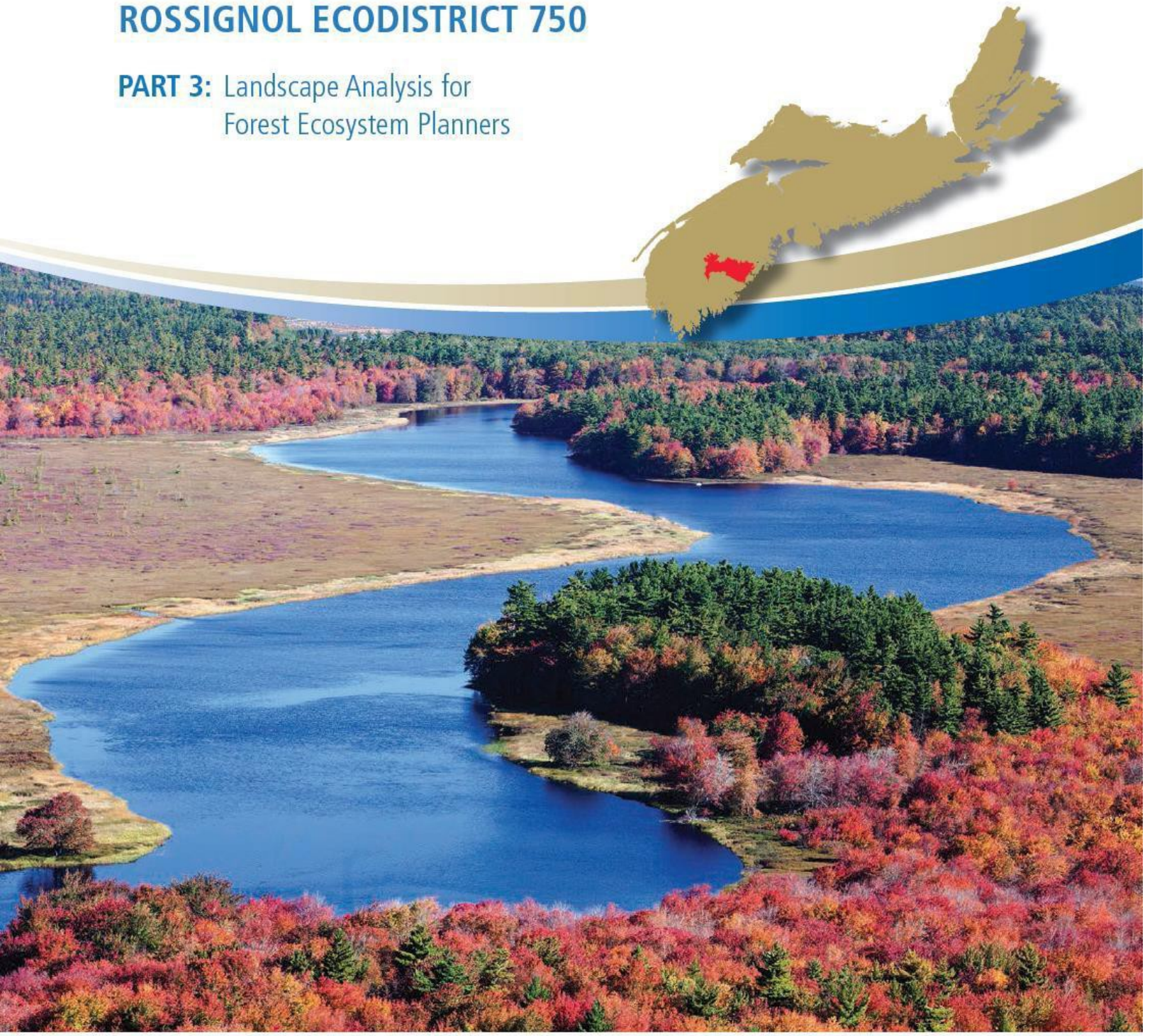
Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS ROSSIGNOL ECODISTRICT 750

PART 3: Landscape Analysis for Forest Ecosystem Planners



ELA 2014-750

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 750: Rossignol

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

The 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 (2002) – 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.

REPORT FOR ELA 2014-750

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Part 3: Landscape Analysis of Rossignol – *For Forest Ecosystem Planners*

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

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

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Understanding the Landscape as an Ecological System

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

Landscapes are large areas that function as ecological systems and respond to a variety of influences. Landscapes are composed of smaller ecosystems, known as elements, which were interpreted through analysis using the ecosection layer of the Ecological Land Classification (ELC) for Nova Scotia. Elements are described by their potential vegetation (e.g. climax forest type) and physical features (e.g. soil, landform). These characteristics help determine historical vegetation patterns and promote an understanding of present distributions and potential habitat

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

Elements Within Landscapes (Map 2)

The landscape analysis identified and mapped seven distinctive elements in the Rossignol Ecodistrict – one matrix, five 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 Hemlock Pine Hummocks and Hills is the matrix element comprising a little more than half of the ecodistrict. This element features a tolerant softwood climax community, comprising red spruce, eastern hemlock and white pine.

The largest patch is **Spruce Pine Flats**, with black spruce as the main species on fairly flat land. In the **Spruce Pine Hummocks** element, white pine is present on better drained sites. The **Wetlands** element includes large areas near Lake Rossignol with forests dominated by black spruce. **Tolerant Mixedwood Drumlins** features well-drained drumlins and includes the only tolerant mixedwood climax community in the ecodistrict. **Floodplain** is the smallest element and occurs along the Medway River near Mill Village.

Valley Corridors is a corridor element found along three major rivers – Mersey, Medway, and Shelburne – and features forests of mature or multi-aged softwood or mixedwood.

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, forest products, aggregate, water, fish, raptors, furbearers, and coastal plain flora.

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.

The forested landscape of Rossignol is generally intact and is thought to be well connected and supports the natural movement of species and water. However, the Mersey River hosts a series of hydro dams that are managed by Nova Scotia Power. This impedes the movement of fish and people along this waterway. The dams have also created one of the largest lakes in Nova Scotia in Lake Rossignol.

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.

The matrix in Rossignol, because of its extent and distribution throughout the ecodistrict, plays an important connective function. Although there has been a long history of logging, the matrix is currently well-forested and does not appear to be unduly fragmented.

The ability of many species to move through the matrix has not likely been compromised. There has been, since the settlement of Europeans, changes in forest characteristics. These include species' composition, development class, and stand size which would likely have had an impact on the connective function of the matrix.

The extensive riparian zone along the many watercourses, besides being important habitat, provides critical connections of ecosystem elements. The many dams in the ecodistrict affect fish

migration and have an impact on riparian zone structure and function. A permeable matrix is necessary to connect various riparian zones.

An additional concern in ecological planning is the maintenance of connectivity between conservation areas, such as wilderness, old growth, and ecological reserves which are often not ecologically related.

Connectivity may be sustained by applying the natural disturbance regime (NDR) guidelines for landscape composition by development class, seral stage, and covertype, and recognizing natural linkage opportunities. Other aspects of landscape management may also need to be considered to promote connectivity for particular resource values.

Appendix 2a identifies management strategies and practices for various features in the ecodistrict. These strategies attempt to enhance connectivity by sustaining and restoring natural patterns within the ecodistrict.

Issues to be addressed in landscape design include:

- Adopting forest management practices that encourage the development of the appropriate climax species.
- Enhancing connectivity between conservation areas by applying appropriate medium and high biodiversity emphasis standards when managing areas with natural linkage potential.
- Mitigating potentially negative barrier effects of concentrated land use by attempting to restore natural communities where it is feasible.
- Improving ecoregional connectivity by sustaining and restoring natural conditions at important linkage points between ecodistricts.

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

The most obvious linkage is the forest itself. This ecodistrict and adjoining ones are generally a mosaic of connected vegetation types allowing for the movement of many species. Linkages have been reduced due to the establishment of farms, homes, and roads. The adjacent LaHave Drumlins Ecodistrict has been altered significantly due to farming which has reduced the connectivity between ecodistricts.

The hydrological system, an important component of this ecodistrict, provides significant linkages. Two of the major river systems, the Medway and Mersey, have some of their headwaters (system of lakes, streams, and wetlands) originating outside Rossignol in the South Mountain and LaHave Drumlins ecodistricts. These two rivers both pass through the South Shore Ecodistrict before emptying into the Atlantic Ocean. The Shelburne River system originates in the Western Barrens Ecodistrict before passing through the South Mountain Ecodistrict, entering Lake Rossignol and becoming part of the Mersey River system.

The hydrological system, through its links to the Atlantic Ocean, also provides a passageway for anadromous fish, such as salmon and gaspereau. People, through their recreational activities and industrial pursuits, provide linkages with the adjoining ecodistricts.

The road network, highlighted by Highway 103 (along the ecodistrict's eastern boundary), Highway 8 (through the interior of the ecodistrict), Highway 210 (on the northern portion of the ecodistrict), and roads along the Mersey and Medway rivers all interconnect and provide linkages to the LaHave Drumlins, South Shore, South Mountain, and Sable ecodistricts.

Forest planning within this ecodistrict should focus on establishing zones of 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 Rossignol

Element	Successional Stage					
	Early	% *	Middle	%	Late	%
Floodplain	IH5, IH6, OF1, MW4, MW5	10.0	SH5, SH6	41.0	**FP3, MW1, MW3, SH1**, SH2, SH3, SH4	48.0
Spruce Pine Flats		3.0		33.0	**SP7**	59.0
Spruce Pine Hummocks	IH1, SP2, SP8	4.0	IH2, IH6, SP3, SP4, SP6, SH9	36.0	**SP5, SP7,** SP9	54.0
Spruce Hemlock Pine Hummocks and Hills	IH5, IH4, IH6, MW4, MW5	4.0	SH5, SH6, MW2	36.0	**SH1, SH2, SH3, SH4,** MW1, MW3	53.0
Tolerant Mixedwood Drumlins[2]	OF3, OF4, IH4, IH5	4.0	IH6, IH7, MW2, MW4, SH5, SH6	25.0	TH1, TH2, TH3, TH5, **TH6,** TH8, **MW1, MW3,** SH1, SH2, SH3, SH4	61.0
Wetlands	FP3, WC1, WC2, WC4, WC5, WC6, WC7, WC8, WD1, WD2, WD3, WD4, WD6, WD7, WD8, SP7					

View forest groups and vegetation types at
http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp
To help with identification of vegetation types, the 14 forest groups in Nova Scotia designated by DNR are: Cedar (CE), Coastal (CO), Flood Plain (FP), Highland (HL), Intolerant Hardwood (IH), Karst (KA), Mixedwood (MW), Old Field (OF), Open Woodland (OW), Spruce Hemlock (SH), Spruce Pine (SP), Tolerant Hardwood (TH), Wet Coniferous (WC), Wet Deciduous (WD)
Bolded vegetation types indicate typical late successional community
[1] Forest Ecosystem Classification for Nova Scotia (2010)
[2] Red oak can be a component of this element.
*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) (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 Rossignol is 69 to 73. This suggests a relatively higher state of "naturalness" and that habitat is generally favourable for biodiversity. This rating is an indication that overall land use intensity has a low conservation risk status. NSDNR will evaluate how this EEI rating compares to other measures of conservation risk, developed by NSDNR's Wildlife Division.

In Rossignol, 76% of the land is in the extensive class and 10% is in the reserve class, which are the two classes with the least amount of ecological pressures. These are followed by unclassified (8.2%), converted (5.5%), and intensive (0.3%).

Based on Ecological Land Classification mapping, Rossignol has a little more than 96,327 hectares of land used in determining EEC, excluding wetlands and non-terrestrial conditions. About three-quarters of the area falls in the extensive EEC. This implies land is managed for multiple values using ecosystem-based techniques that conserve biodiversity and natural ecosystem conditions.

The reserve class accounts for 10% of the area. The reserve class is divided into two categories: legal reserves and policy reserves (Appendix 5). The legal reserves are those areas that have legal statues under IUCN (the International Union for the Conservation of Nature and Natural Resources) codes of I, II, III such as wilderness areas and designated provincial parks. The second type of reserve is those set aside under various provincial policies, such as the Old Forest Policy. Wilderness areas (e.g. Lake Rossignol) account for most of the reserve area in Rossignol.

The intensive EEC (0.3%) is land managed intensively to optimize resource production from sites maintained in a native forested state. 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.

Less than 6% of the ecodistrict is in the converted class.

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 1 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.

Rossignol has an overall average Road Index Value of approximately 7, which falls within the "Forest Resource" classification values range of 7 to 15. The majority of the ecodistrict (45.2%) falls in the "Remote" category. The Floodplain element, being a more settled area, has the highest index value.

Issues in the management of roads and trails could include:

- For Crown blocks of development of road and trail plans, where the far-reaching implications of construction on the ecological landscape are considered, proper planning can reduce the effects of construction on fragmentation, aquatic ecosystems, sensitive sites, and protected areas.

- Development of road and trail maintenance plans to ensure that deterioration does not cause negative ecological effects.
- Road decommissioning. Road systems should be analysed to determine where decommissioning might be implemented. Factors such as resource management scheduling, recreational activities, connectivity, and closeness to reserve areas might be considered. Decommissioning implies returning the road to a natural a state as possible, removal of bridges and culverts, restoration of chainage, and establishment of a new forest.
- Minimizing the impact of road and trail construction by ensuring that best management practices are used in all facets of road and trail construction.
- Encouraging the sharing of road networks should lessen the amount of road construction required.

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

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

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

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

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

The primary species data used in this report are from the Atlantic Canada Conservation Data Centre and DNR's Significant Habitat Database. Efforts are made to ensure data are as accurate and up-to-date as possible. Lists and maps indicate what is currently known. Due diligence tied to planning, management, and stewardship may require that surveys be carried out to update information or to fill gaps in our knowledge. Priority species may require special actions in terms of forest management and other activities that alter habitat and the landscape. If more information is required or if management specific to a priority species 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 were 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 (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.

Old Forest

Provincial Old Forest Policy requires that 8% of the Crown land area within each ecodistrict, by climax species association, be identified and protected. The three climax species in Rossignol are black spruce-white pine, red spruce-eastern hemlock-white pine, and red spruce-eastern hemlock-

white pine-sugar maple-yellow birch and beech. Each of these species' association has had greater than 8% of the Crown land identified and protected. The total area amounts to 6,373 hectares, or 43%, of the Crown land in the ecodistrict. Almost all the old forest is located in Kejimkujik National Park or Lake Rossignol Wilderness Area.

In 2*012, DNR released an Old Forest Policy, under which staff will identify old growth and the best old forest restoration opportunities on at least eight percent of publicly owned forested land in each of the province's 38 ecodistricts* (http://novascotia.ca/natr/library/forestry/reports/Old-Forest-Policy-2012.pdf).

Atlantic Coastal Plain Flora and Other Plants

A large number of the rare species in the Rossignol Ecodistrict belong to a group of plant species known as Atlantic Coastal Plain Flora (ACPF). These plants became established in southwestern Nova Scotia as a result of a land bridge which existed between Nova Scotia and Massachusetts about 10,000 to 14,000 years ago. Sea level was likely 110 metres lower than today, exposing a broad plain along the Atlantic coast (now under water). A rise in sea level from melting glaciers eventually cut off the bridge, leaving some populations of plants geographically and genetically isolated from more southern populations.

Nova Scotia has over 90 species considered to be ACPF with over one-third of these plants found nowhere else in Canada. Ten of these are listed under the Nova Scotia Endangered Species Act (four endangered, three threatened, three vulnerable). Eleven are listed as species at risk under the federal Species at Risk Act and the provincial NS Endangered Species Act; and 25 are listed as red "at risk" species under the NS General Status Ranks.

Within the Rossignol Ecodistrict, about 40 species of coastal plain plants have been identified. Of these plants, six are legally protected under the Nova Scotia Endangered Species Act and the Federal Species at Risk Act, and the remaining 34 are noted as Species of Conservation Concern. The most important sites of occurrence tend to be along gently sloping, gravelly lake shorelines in the Mersey River and Medway River watersheds as well as an assortment of wetlands.

Water pennywort (*Hydrocotyle umbellata*), a lakeshore plant, has been designated endangered in Nova Scotia and has been assigned the national status of threatened. Water pennywort has also been given a G5 ranking globally, which means it is secure worldwide, but its S1 ranking means it is in peril nationally or sub-nationally. It is only known in Canada from two lakes in southwestern Nova Scotia.

Golden crest (*Lophiola aurea*) is a provincially vulnerable ACPF species is. It is only known from six wetlands in southwestern Nova Scotia and this comprises the entire Canadian population. The entire Canadian population of Carolina redroot (*Lachnanthes caroliniana*) (NS 'vulnerable'; National 'special concern'), another Atlantic Coastal Plain plant, is contained along the shores of a small number of lakes in southwest Nova Scotia.

Two additional legally protected ACPF species known from the Rossignol Ecodistrict are Eastern lilaeopsis (*Lilaeopsis chinensis*) (NS 'vulnerable'; National 'special concern') which has been found in only four estuaries in the province, and Long's bulrush (*Scirpus longii*), listed as

provincially vulnerable and nationally of special concern. In Nova Scotia, Long's bulrush is currently only known from ten sites. Tubercle spike-rush (*Eleocharis tuberculosa*) is provincially vulnerable and nationally of special concern.

As of 2014, most (18) of the 34 ACPF provincial Species of Conservation Concern noted for the Rossignol Ecodistrict are considered to be green (secure). There are eight that are classed as red or orange (at risk), and eight that are classified as yellow (sensitive).

Orange (8):
Coastal Plain Joe-pye-weed *Eupatorium dubium*
Blunt-leaved Bedstraw *Galium obtusum*
Intermediate Mermaidweed *Proserpinaca intermedia*
Silky Willow Salix *sericea*
Inverted Bladderwort *Utricularia resupinata*
Southern Twayblade *Listera australis*
Spotted Pondweed Potamogeton *pulcher*
Coastal Plain Blue-eyed-grass Sisyrinchium *fuscatum*

Yellow (8):
Smooth Alder Alnus *serrulata*
Common Buttonbush Cephalanthus *occidentalis*
Swamp Loosestrife Decodon *verticillatus*
Comb-leaved Mermaidweed *Proserpinaca pectinata*
Netted Chain Fern Woodwardia *areolata*
Grassleaf Rush Juncus *marginatus*
Redtop Panic Grass *Panicum rigidulum var. pubescens*
Southern Rein Orchid *Platanthera flava var. flava*

Green (18):
Yellow Bartonia *Bartonia virginica*
Stout Smartweed *Polygonum robustius*
Marsh Mermaidweed *Proserpinaca palustris*
Marsh Mermaidweed *Proserpinaca palustris var. crebra*
Virginia Meadow Beauty Rhexia *virginica*
Swamp Rose Rosa *palustris*
Elliott's Goldenrod *Solidago latissimifolia*
Little Floating Bladderwort *Utricularia radiata*
Zigzag Bladderwort *Utricularia subulata*
Highbush Blueberry *Vaccinium corymbosum*
Southern Bog Clubmoss *Lycopodiella appressa*
Little Curlygrass Fern *Schizaea pusilla*
Toothed Flatsedge *Cyperus dentatus*
Eaton's Witchgrass *Dichanthelium spretum*
Narrow-leaved Blue-eyed-grass *Sisyrinchium angustifolium*
Eastern Blue-Eyed-Grass Sisyrinchium *atlanticum*
Round-leaved Greenbrier Smilax *rotundifolia* (Atlantic pop.)

Eastern Skunk Cabbage Symplocarpus *foetidus*

Fish

Atlantic salmon (*Salmo salar*) are in the Mersey River system. This species, once fairly common, is now considered to have depleted numbers within this ecodistrict. The Atlantic salmon has been designated endangered nationally by COSEWIC, but as of 2014 is not formally protected provincially or nationally. Acid rain is believed to be the major cause of salmon declines in the rivers of southwestern Nova Scotia and elsewhere in the province. One other fish species in the Rossignol Ecodistrict considered to be at risk in Nova Scotia is the American eel (*Anguilla rostrata*), a COSEWIC-listed threatened species.

Mainland Moose

In Nova Scotia, the mainland moose has been designated an endangered species under the Nova Scotia Endangered Species Act. Mainland moose are genetically distinct from those on Cape Breton Island, where moose populations are healthy. One of the remnant populations of moose on the mainland is centred in the Tobeatic Wilderness Area, within the nearby Western Barrens Ecodistrict. Moose are known to occur in the western part of the Rossignol Ecodistrict, with some even venturing to the extreme eastern and southern parts of the ecodistrict on occasion.

Moose are commonly associated with forested landscape habitats that have been altered by a disturbance regime, such as fire, wind, disease, or timber harvesting. The habitat requirements of moose are largely dependent on successional forest stages. Early successional trees and shrubs provide important browse while mature conifer cover is valuable for shelter and protection in winter and summer.

The Forestry / Wildlife Guidelines and Standards and the Wildlife Habitat and Watercourse Protection Regulations provide minimum habitat specifications for moose on Crown land through the 8% retention for old growth, maintenance of a minimum 20 metre buffer zone along water courses and through the maintenance of a varied development class distribution.

Additional measures to provide for specific habitat needs of moose have been identified and special management practices addressing thermal refugia, aquatic feeding sites, calving areas, and clump size, are used on Crown lands where appropriate. These may be required to some extent on Crown land harvests on the western side of the ecodistrict adjacent to the Tobeatic Wilderness Area. It is important to note that because moose occur in low numbers throughout a wide range in southwestern Nova Scotia, large areas of Crown land have been designated C2 because of a potential need for moose considerations in forest harvesting. The intent is to ensure that considerations for moose enter into management decisions at appropriate locations.

In 2012, DNR developed and implemented the Mainland Moose Special Management Practice which guides forest harvesting practice on provincial Crown lands.

American Marten

American marten, once widespread throughout Nova Scotia, had declined to a few scattered populations by 1900. In recent years, several projects undertaken by DNR's Wildlife Division have aimed at shedding some light on the current distribution, abundance, and habitat selection of marten in the southwestern part of the province.

Although historically described as a species of mature softwood, information so far suggests that they are also occupying mixedwood forests and younger-aged softwood stands, possibly related to the relatively moderate winter weather in southwestern Nova Scotia. Potential prey sources such as mice, voles, and red squirrels (*Tamiasciuris hudsonicus*) would be available to marten in these stands, but denning requirements likely have to be met within mature softwood stands. Many of the ecosections in Rossignol appear capable of providing suitable habitat for marten, so it will be important to address marten habitat considerations in Crown land forest management decisions.

American marten in Rossignol are most likely descendants of New Brunswick marten stock that was legally released in Kejimkujik National Park in the 1980s as part of a formal reintroduction program. It is also possible that these animals may have bred with remnants of the original southwest Nova Scotia population. The American marten is legally protected as an endangered species in Nova Scotia. The Cape Breton population is also listed as endangered, but more information on the status of marten in southwest Nova Scotia is needed before the mainland population of American marten receives a possible designation under the NS Endangered Species Act.

Blanding's Turtles and Eastern Ribbonsnakes

Blanding's turtle (*Emyboidea blandingii*) is listed as endangered under the NS Endangered Species Act. Most of the Rossignol Ecodistrict is outside the known distribution area for Blanding's turtles. However, a few individual turtles are known from an area along the Mersey River and also from areas in the northern portion of the ecodistrict in and around Kejimkujik Lake and Cannon Brook – both inside Kejimkujik National Park.

Eastern ribbonsnakes (*Thamnophis sauritus*) have also been found in a few areas in the northern part of the ecodistrict. Further field research is needed to fully assess the geographical distribution and abundance of both of these species at risk. Ribbonsnakes are listed as threatened in Nova Scotia.

Southern Flying Squirrels

Southern flying squirrels (*Glaucomys volans*) have been documented in the northern area of this ecodistrict. This species at risk has been assigned a provincial yellow status. The southern flying squirrel is associated with mature mixedwood stands having a red oak, beech, and eastern hemlock component. Further field research within the Rossignol Ecodistrict is needed to fully assess the status of rare species occurring in this area.

Other Species at Risk

Few field inventories are currently completed for many wildlife species such as bats, rodents, lichens, mosses, amphibians, reptiles, or most invertebrates. Assessing species abundance and geographic distribution is a dynamic ongoing process. Further field research within the Rossignol Ecodistrict is needed to fully assess the status of rare species occurring with this area.

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

The Ecological Land Classification for Nova Scotia (Neily et al. 2003) classifies ecosections based on similar characteristics of landform, soils, and vegetation.

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

750 Rossignol Ecodistrict			
Landscape Element and Type	**Ecosections* and Proportion of Element**	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Spruce Hemlock Pine Hummocks and Hills (Matrix)	WMHO IMDM WMRD	Infrequent	red Spruce (rS), eastern Hemlock eH), white Pine (wP)
Spruce Pine Flats (Patch)	IMSM (100%)	Frequent	black Spruce (bS), wP
Spruce Pine Hummocks (Patch)	IMHO IMRD	Frequent	bS, wP
Wetlands (Patch)	WTLD	Open seral (Frequent)	bS, red Maple (rM), tamarack (tL)
Tolerant Mixedwood Drumlins (Patch)	WMDM	Gap	sM, yellow Birch (yB), beech (Be), rS, eH, wP
Floodplain (Patch)	ICSM	Infrequent / Gap	sM, yB, rS, eH,
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. gravel) **M** – Medium-textured soils (e.g. loam) **F** – Fine-textured soils (e.g. clay)

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

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.

Rossignol contains three ecosections that fall in the rare category – ICSM, IMRD, and WMRD. IMDM, although occupying 5.5% of the ecodistrict, makes up 1.5% of the ecoregion.

In Rossignol, ICSM near Mill Village, IMRD at Wentworth Lake, and WMRD at Salters Lake each occur as single isolated patches. WMDM is generally found around the periphery of the ecodistrict where it appears to be similar to drumlins in adjoining ecodistricts although islands in Lake Rossignol also contain WMDM. IMDM is generally found in two larger patches near the ecodistrict's western boundary.

ICSM is the only section with an appreciable amount of converted area – 38% of the ecosection.

Issues and opportunities in the management of the ecodistrict might include:

- Conservation of species that are threatened as indicated by DNR's General Status Ranks of Wild Species in Nova Scotia (yellow and red listed) or those listed as S1, S2 or S3 in the Atlantic Canada Conservation Data Centre rankings.
- Conservation of significant habitats.
- Identification and mapping of sites of cultural importance.

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 Integrated Resource Management classification to include old forest, Eastern Habitat Joint Venture Sites, non-designated provincial park reserves, and non-designated sites of ecological significance.

Legally protected reserves include a portion of the Tobeatic Wilderness Area, Lake Rossignol Wilderness Area, sites of ecological significance under Moratorium (Shelburne River), and any area under the Special Places Act (Ponhook Lake Nature Reserve).

Policy protected reserves are under the integrated resource management classification and include old forest set aside under the Provincial Old Growth Policy, designated provincial parks and park reserves (Ten Mile Lake), and operational non-designated parks and reserves (Medway).

Areas under reserve total 9,664 hectares.

Opportunities might exist to improve representation in those ecodistricts with little representation - WMRD, IMRD, ICSM, and IMHO.

ELA Summary

Element Interpretation (All appendices and maps)

The Rossignol Ecodistrict is largely made up of low hills with elevations between 100 to 130 metres above sea level. Freshwater in rivers, lakes, and streams constitutes 18.3 %, or 21,583 hectares, of the ecodistrict and includes Lake Rossignol, the largest lake on mainland Nova Scotia. Nearly all the ecodistrict is drained by the Mersey and Medway rivers, which originate in the granite areas to the northwest in South Mountain Ecodistrict 720.

The ecodistrict is bounded on the northeast by LaHave Drumlins Ecodistrict 740, on the southwest by the hills forming the valley of the Mersey River, part of Sable Ecodistrict 760, and on the east by the coastal forests of South Shore Ecodistrict 830.

This part of western Nova Scotia, along with the Sable and Clare ecodistricts, has the earliest and warmest springs in the province. The ecodistrict receives about 1,470 mm precipitation annually, but experiences a high summer moisture deficit.

The ecodistrict is underlain by bedrock comprised mostly of quartzite and slate and the soils are derived from glacial drift. The soils tend to be moderately coarse, stony and shallow making them unsuitable for agriculture. Bogs are common in the depressions of the undulating topography. Freshwater lakes and rivers make up 18.3% of the ecodistrict, with another 5.6% in wetland ecosections underlain with poorly drained, medium-textured soils on smooth or level topography.

Even though it is one of the more humid areas of the province, forests in this ecodistrict are vulnerable to fire due to the drying of the sandy soils in the summer. Wind damage to the forests is common and hurricanes have caused considerable blowdown in the past. Fires are also common, but the effects have not been so severe as to cause the extensive barrens located further southwest.

Hardwood forests will be found on the larger hills, especially on sites where seepage enriches the site. Here sugar maple, yellow birch, scattered white ash, hemlock, and red spruce will be found. Sugar maple and yellow birch will also be found on the crests and upper slope positions of some drumlins. On sites that have been frequently disturbed by fire, red oak is fairly common. The role of beech in the forest has been reduced to an understory role due to the beech canker. White pine

and red spruce are often mixed with the hardwoods. On lower slopes and better-drained sites between hills, the climax forest is hemlock, red spruce, and white pine. Black spruce becomes dominant on imperfectly drained sites and treeless bogs are found on the wettest sites.

Spruce Hemlock Pine Hummocks and Hills
(Matrix) (WMHO, IMDM, WMRD ecosections) (56,973 ha)

Most of the matrix is located on well-drained medium-textured soils. The westerly extremities of this element are characterized by imperfectly drained drumlins and there is a section of well-drained ridged topography near Salters Lake.

Historically, this element was dominated by tolerant softwoods (red spruce, white pine, hemlock). The majority of the forest is late seral mature or multi-aged softwoods of red spruce, white pine and some hemlock. Most of the mixedwood covertype is also mature or multi-aged with the majority being mid seral and comprising red spruce or white pine with intolerant hardwoods (usually red maple). There are some mixedwoods containing tolerant hardwoods.

Red oak stands occasionally occur but this species more often is a minor component of other stands. The hardwood covertype is usually red maple with scattered stands of tolerant softwoods and some red oak.

The ecodistrict has a long history of logging and the area in the past appears to have regenerated well. Since the matrix occupies a large portion of the ecodistrict, movement through it by organisms is an important function. The matrix currently appears to be well connected and not fragmented.

Flows

People (hunting, fishing, trapping, OHV, cranberries, canoeing, prospecting); forest products; water (feeder streams); fish (nursery streams); raptors and furbearers (habitat); Coastal Plain Flora (along wetlands and lakeshores).

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)
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
	11%	7%	82% (49 Mat + 33 OF)	33%
Seral Stage	Early	Mid	Late	Unclassified
	4%	36%	53%	7%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	48%	8%	42%	2%

Desired Condition

Predominately mature age class with some younger age classes. Mature forest mostly mid or late seral species with some old growth. Late seral species, old growth, and tolerant softwoods.

Issues

Forest management could strive to ensure that the range of development classes, seral stages, and covertypes appropriate to the natural disturbance regime are present. Tolerant softwoods are the climax species, efforts could be directed towards encouraging them. This will likely mean partial cutting in both covertypes that currently have a high climax species component as well as intolerant stands with a minor tolerant component. Wildlife habitat requires a range of patch sizes based on covertype and successional stage. Because large patch size is lacking in some areas, patch aggregation could be encouraged.

Spruce Pine Flats

(Patch) (IMSM ecosection) (14,479 ha)

This patch type, well distributed throughout the ecodistrict, supports three different climax species association, often a reflection of soil drainage. Black spruce would occur on the flatter, less well-drained portions of the element. Improvements in drainage resulted in white pine or tolerant softwood communities. Wetlands occupy about 20% of the area.

The largest cluster of wetlands in the patch is located south of Ponhook Lake. Presently the forest of this patch is largely mature or multi-aged. Late seral softwood species of white pine and black spruce are the dominant species with lesser amounts of red spruce. Mixedwoods, on roughly one-third of the area, are usually mid seral mature white pine or spruce with red maple. The hardwood covertype is relatively scarce. Red maple is most often present with a few scattered stands of trembling aspen, red oak, or tolerant hardwoods.

Flows

People (trapping, hunting, fishing); forest products; cranberries; water; fish (nursery streams); raptors and furbearers (habitat); possibly Coastal Plain Flora.

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Spruce Pine Flats

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	7%	9%	84% (42 Mat + 42 OF)	42%
Seral Stage	Early	Mid	Late	Unclassified
	3%	33%	59%	5%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	61%	3%	35%	1%

Desired Condition

Black spruce and white pine-dominated element in a variety of patch sizes and developmental stages. Inclusions, on some of the higher ground of tolerant softwoods, mostly mature with mid and late seral species. Scattered tolerant hardwood or oak stands. Undisturbed wetlands.

Issues

Recognition that this ecosection has more than one climax species association and that management practices to perpetuate or bring back the climax associations may differ between associations. Care needs to be taken around wetlands to ensure their integrity is maintained. More late succession species could be encouraged by appropriate harvesting practices in mid seral mixedwoods. Maintain interior habitat conditions in patches.

Spruce Pine Hummocks

(Patch) (IMHO, IMRD ecosections) (13,053 ha)

This patch element, located primarily on imperfectly drained, medium-textured soils on hummocky terrain (a small area of ridged topography exists near Wentworth Lake) supports a black spruce-white pine climax community. The forest is dominated by late seral mature softwoods – mostly black or red spruce with lesser amounts of white pine on the better-drained areas. Mature mixedwoods of intolerant hardwoods (red maple) with white pine or spruce are common. The hardwood covertype does not occur often and is usually early seral red maple. Oak is present near Wentworth Lake. This element is characterized by an abundance of streams and brooks. Soils are often rocky and shallow.

Flows

People (fishing, hunting, canoeing, trapping, prospecting, bird watching); forest products; water; fish; raptors and furbearers (habitat); possibly Coastal Plain Flora.

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Spruce Pine Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	8%	9%	83% (45 Mat + 38 OF)	38%
Seral Stage	Early	Mid	Late	Unclassified
	4%	36%	54%	6%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	60%	5%	34%	1%

Desired Condition

Black spruce and white pine dominated in a variety of patch sizes and developmental stages.

Issues

Similar to the matrix, efforts could be made to ensure that the range of developmental classes, seral stages and covertypes is appropriate for the natural disturbance regime. The patch has relatively little area in the establishment and young competing forest stages. There is also a small amount of the mature forest in the early seral stage. Forest harvesting could help remedy these situations.

Thinnings, or partial cuts, particularly in the mixedwood communities with a tolerant softwood component, could encourage more late seral climax species in the mixedwood stands.

Wetlands

(Patch) (WTLD ecosection) (6,288 ha)

The wetlands element, one of the larger patches, is distributed throughout the ecodistrict. The larger wetlands occur to the west near Lake Rossignol.

The wetlands element is often associated with existing waterways. Black spruce and white pine are the climax species. Interspersed throughout the wetlands is a mature or multi-aged forest of mostly black spruce with white pine occupying some of the higher ground. There is also a substantial area of mature mid or late seral mixedwoods (approximately 30%) of generally white pine and black spruce with red maple.

These wetlands play a critical role in water collection, filtering, and ground water recharge.

Flows

People (trapping, hunting); water (storage, filtration, ground water recharge); fish (nursery streams); raptors and furbearers (habitat); Coastal Plain Flora (possible along wetland edges).

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	3%	11%	86% (41 Mat + 45 OF)	45%
Seral Stage	Early	Mid	Late	Unclassified
	4%	34%	60%	2%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	63%	4%	32%	1%

Desired Condition

Relatively undisturbed and well-connected wetlands amidst a black spruce-white pine forest with a variety of developmental stages.

Issues

Because of the important ecological functions they perform, maintenance of wetland integrity is always a concern. Consideration could be given to maintenance of riparian zones around wetlands and connectivity between wetlands, both riparian and upland, should be maintained. Any potential forest harvesting near riparian corridors should consider practices to ensure the integrity of the riparian corridor.

Tolerant Mixedwood Drumlins

(Patch) (WMDM ecosection) (2,004 ha)

These well-drained drumlins occur in a few small patches southeast of Wentworth Lake and in a larger patch around Spectacle Lake in the ecodistrict's north-eastern corner.

These fertile soils have tolerant mixedwoods (red spruce, white pine, eastern hemlock, sugar maple, yellow birch, and beech) as a climax association. Late seral mature and multi-aged softwood types containing tolerant softwoods, such as red spruce and white pine with scattered hemlock, are abundant.

Black spruce is present on wetter areas in flats between drumlins. Mature mid seral mixedwoods of white pine or spruce, most often with red maple, also occur. Hardwood types (less than 10% of the area) are usually red maple, sometimes with aspen or red oak. A few tolerant hardwood stands are present, often with yellow birch, the dominant species.

Flows

People (hunting); forestry; water (natural source); raptors and furbearers (habitat).

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Tolerant Mixedwood Drumlins

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	10%	2%	88% (63 Mat + 25 OF)	25%
Seral Stage	Early	Mid	Late	Unclassified
	4%	25%	61%	10%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	60%	10%	29%	1%

Desired Condition

Continuous uneven-aged mixedwood forest of late seral red spruce, eastern hemlock, white pine, sugar maple, yellow birch, and beech.

Issues

Investigate possibility of increasing the amount of uneven-aged, tolerant, mixedwood stands through the use of appropriate harvesting and siliviculture techniques such as selection cuts and thinnings. Opportunities may exist to promote a new crop of late seral species in intolerant hardwood types which have a minor tolerant species component.

Floodplain

(Patch) (ICSM ecosection) (236 ha)

This floodplain element, the smallest of all the patches, is located along the lower reaches of the Medway River. The area is characterized by imperfectly drained coarse-textured soils. Due to settlement, about 34% of the area has been converted from natural forest conditions.

Historically, the climax species was a red spruce, white pine, eastern hemlock community. The forest now consists of mostly mature stands of either softwood or mixedwood. Softwoods are dominantly late seral species, such as white pine and red spruce, with black spruce found on the more poorly drained areas. Mid seral species such as balsam fir and white spruce are a component of some of these late seral stands. Mixedwoods usually comprise red maple in combination with white pine or spruce. The hardwood covertype represents only 3.1% of the area and is usually red maple. A few stands are reported to be tolerant hardwoods.

Flows

People (fishing, canoeing, hunting, trapping, birdwatching, OHV); water (Medway River); raptors (osprey); furbearers (habitat); Coastal Plain Flora (along Medway).

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Floodplain

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	3%	15%	82% (37 Mat + 45 OF)	45%
Seral Stage	Early	Mid	Late	Unclassified
	10%	41%	48%	1%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	54%	3%	43%	0%

Desired Condition

A mix of altered features among natural forest conditions. Special emphasis on maintaining forest cover along riparian zone of Medway River.

Issues

The element has a relatively large percentage of area which has been converted from forest. A primary consideration will likely be efforts taken to ensure that any future conversion does not negatively impact the riparian corridor along the Medway River.

Valley Corridors

(Corridor) (Various ecosections) (19,426 ha)

The Rossignol Ecodistrict contains a large number of streams, rivers, lakes, and wetlands. Approximately 18% of the ecodistrict is inland water. The riparian corridors around this water are extremely important for biodiversity and ecosystem function. Many species utilize both aquatic and terrestrial habitats.

Historically, forest harvesting often took place in the riparian zone and this has influenced current forest communities. Most of the corridors pass through mature forests of softwood or mixedwood covertypes. White pine is a common softwood species along with red spruce and some hemlock. Hardwoods are red maple with occasional red oak. The riparian zone along the Mersey River and Lake Rossignol has been altered by dam construction.

There are camps located along some of the riparian corridors.

Flows

People (power generation, canoeing, fishing, camps, wilderness experience); water (major waterways); fish (salmon, gaspereau, trout); raptors (osprey, eagle); semi-aquatic furbearers (habitat); Coastal Plain Flora (possible along shoreline and wetlands).

Desired Condition

Generally continuous cover of natural forest conditions emphasizing lower impact resource management.

Composition

Rossignol Ecodistrict 750 (based on statistics up to 2007)

Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	3%	3%	94% (65 Mat + 29 OF)	29%
Seral Stage	Early	Mid	Late	Unclassified
	6%	33%	61%	<1%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	45%	12%	42%	1%

Issues

Valley and riparian corridors play an important role in the ecological functioning of waterways and are also important as habitat. Consideration could be given to sustaining natural forest conditions in the corridors. Management of adjacent forest communities to the riparian corridor might take into account its effect on maintaining corridor integrity. Road systems could be designed that minimize damage to riparian corridors.

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Rossignol 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:

- Managing climax forest communities in relation to the natural disturbance regime, development class, and seral stage.
- Investigating the possibility of implementing the appropriate partial cuts in intolerant hardwood or mixedwood stands with a minor tolerant species component. Increased tolerant species regeneration will result.
- Favouring tolerant species in all silviculture thinning treatments.
- Looking for opportunities to increase the number of large (>100 ha) patch sizes to benefit interior-dwelling wildlife species.
- Recognizing the importance of riparian corridors on all water courses both as protectors of aquatic ecosystems and as habitat. Look into maintaining the integrity of corridors through appropriate management practices both within the corridor and in adjacent areas.
- Protection of existing wetlands and wetland complexes. Ensure wetland integrity is not compromised by resource management activity. Recognize the importance of wetland-adjacent land relationships for biodiversity.
- Development of road plans for Crown blocks. Assess the impact of road construction on ecological concerns such as fragmentation, aquatic ecosystems, sensitive sites, and protected areas. Develop a road maintenance plan to ensure road deterioration does not become a problem. Encourage sharing of road networks to minimize new construction.
- Looking for opportunities to inform the public about ecosystem management. Most of Rossignol is held in private ownership. The participation of private owners would be required to implement ecosystem management.
- Improving representivity in the ecodistrict by considering additional ecosections WMRD, IMRD, ICSM, IMHO for protection.
- Obtaining more information on cultural sites.

Issues to be addressed in landscape design include:

- Adopting forest management practices that encourage the development of the appropriate climax species.
- Enhancing connectivity between conservation areas by applying appropriate medium and high biodiversity emphasis standards when managing areas with natural linkage potential.

- Mitigating potentially negative barrier effects of concentrated land use by attempting to restore natural communities where it is feasible.
- Improving ecoregional connectivity by sustaining and restoring natural conditions at important linkage points between ecodistricts.

Issues and opportunities in the management of the ecodistrict might include:

- Conservation of species that are threatened as indicated by DNR's General Status Ranks of Wild Species in Nova Scotia (yellow and red listed) or those listed as S1, S2 or S3 in the Atlantic Canada Conservation Data Centre rankings.
- Conservation of significant habitats.
- Identification and mapping of sites of cultural importance.

Appendix 1: Flow – Element Interactions

Element	People	Forest Products	Aggregate	Water	Fish	Raptors	Furbearers	Coastal Plain Flora
Matrix **Spruce Hemlock Pine Hummocks and Hills** (WMHO, IMDM, WMRD) Red spruce white pine, hemlock Climax	- cranberry picking, OHV, hunting, prospecting, fishing, trapping, canoeing, wilderness areas	- forestry, mushrooms	- some	- nutrients, feeder streams	- nursery streams, food source	- habitat	- habitat	- habitat along wetlands and lakeshores
Patches **Floodplain** (ICSM) Red spruce, white pine, hemlock climax	- fishing, canoeing, hunting, trapping, prospecting, bird watching OHV - altered element	- forestry	- some	- Medway flows through, nutrient source	———	- osprey, other raptors habitat	- habitat	- along Medway and adjacent wetlands
Tolerant Mixedwood Drumlins (WMDM) Red spruce, white pine, hemlock, sugar maple, yellow birch, beech climax	- hunting	- forestry	———	- nutrient source	———	- habitat	- habitat	- possible along adjacent streams and wetlands

Appendix 1: Flow – Element Interactions

Element	People	Forest Products	Aggregate	Water	Fish	Raptors	Furbearers	Coastal Plain Flora
Spruce Pine Hummocks (IMHO, IMRD)	- fishing, canoeing, hunting, trapping, prospecting, bird watching, OHV	- forestry, mushrooms	- minor	- wetlands (storage, filtration quality, ground water recharge) - feeder streams	- native species, salmon, trout, gaspereau, shad - nursery streams	- habitat	- habitat	- possible along Mersey, Medway Rivers and wetlands
Spruce Pine Flats (IMSM) Black spruce, white pine Tolerant Softwood Climax	- trapping, hunting, fishing	- forestry, cranberries	———	- wetlands (storage, filtration, ground water recharge) - feeder streams	- nursery streams	- habitat	- habitat	- possible along wetland edges
Wetlands	- trapping, hunting	———	———	- wetlands (storage, filtration, ground water recharge) - feeder streams	- nursery streams	- habitat (food)	- habitat	- possible along wetland edges

Appendix 1: Flow – Element Interactions

Element	People	Forest Products	Aggregate	Water	Fish	Raptors	Furbearers	Coastal Plain Flora
Valley Corridors Mersey	- power generation	———	———	- major waterway - Blanding's turtles	- native species (salmon, gaspereau, trout)	- ospreys, eagles	- habitat for semi-aquatic	- possible along shoreline and edges of wetland
Medway	- canoeing, fishing, camps, tubing festival	———	———	———	- native species (salmon, gaspereau, trout)	- osprey, eagles	- habitat for semi-aquatic	- possible along shoreline and wetlands
Shelburne	- canoeing, fishing - wilderness experience	———	———	- Heritage River	- native species (salmon, gaspereau, trout)	- osprey, eagles	- habitat for semi-aquatic	- possible along shoreline and 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
Spruce Hemlock Pine Hummocks and Hills Matrix	Matrix	High	WMHO IMDM WMRD	Landscape	Infrequent	- climax of tolerant softwood - currently tolerant softwood with some mixedwood and scattered hardwood	IMHO, IMRD, IMSM Riparian corridors	- fragmentation not an issue - increase in amount of intolerant hardwoods	- lack of large (> 100 ha) patch size - possible harvesting practices	- patch aggregation - follow Natural Disturbance Regime in tolerant stands - favour tolerant species in mixedwood thinning and regeneration cuts
Spruce Pine Flats	Patch	High	IMSM	Landscape	Frequent	- climax of black spruce and white pine with patches of tolerant softwood and wetlands scattered throughout - currently red/black spruce white pine, intolerant hardwoods	WMHO IMHO	- internal composition - loss of wetland integrity	- percent of intolerant hardwood - potential harvesting adjacent to numerous wetlands	- promote climax species in silviculture and harvesting prescriptions - follow wildlife and watercourse protection regulations

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 Pine Hummocks	Patch	High	IMHO IMRD	Landscape	Frequent	- climax of black spruce and white pine - currently black spruce white pine with intolerant hardwood mixedwoods	- WMHO, IMSM wetlands, WMDM	- Internal composition - areas of fragmentation - integrity of all riparian corridors	- percent of intolerant hardwoods - harvesting within element linking Mersey and Medway rivers	- promote climax species in silviculture and harvest prescriptions - maintain connective function - follow wildlife and watercourse protection regulations
Wetlands	Patch	High	WTLD Rocky Lake	Landscape	Open Seral	- bog species black spruce, larch	WMHO IMHO IMSM	- integrity of wetlands	- potential harvesting adjacent to wetlands	- promote climax species in silviculture and harvest prescriptions - maintain connective function - follow wildlife and watercourse protection regulations

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
Tolerant Mixedwood Drumlins	Patch	High (scarcity)	WMDM - islands in Lake Rossignol - southeast of Wentworth Lake - Jordan Lake	Local	Gap	- climax of red spruce, white pine, hemlock, sugar maple, yellow birch and beech - currently red spruce, pine or intolerant hardwood mixedwoods	WMHO IMSM waterways	- internal composition - isolation	- percent of intolerant hardwoods - connectivity between patches	- promote climax species in silvilculture and harvest prescriptions - appropriate practices in intervening elements
Floodplain	Patch	High	ICSM - Mill Village	Local	Infrequent	- climax red spruce, white pine, hemlock - currently intolerant hardwood, mixedwoods and red spruce and white pine	WMHO IMHO riparian corridors	- fragmentation of element	- land conversion - coastal plain flora	- conservation practices
Valley Corridors	Corridors	High	Mersey, Medway, Shelburne Rivers	Landscape	- dependent on climax community through which corridors pass	- Tolerant softwoods - mixedwoods	WMHO IMHO IMSM	- hydroelectric dams on Mersey - conversion or riparian zone or adjacent vegetation near Mill Village	- fish migration - integrity of riparian corridor	- fish ladders

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
Lake Rossignol		High		Landscape			WMHO IMSM wetlands	Lake (increased area caused by flooding to produce power)	- loss of land bridges between previously existing lakes	- maintenance of applicable cover around lake

Appendix 2b: Connective Management Strategies

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

Appendix 3: Special Occurrences (Ecodistrict 750)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS	-			
Chimney Swift	*Chaetura pelagica*	Endangered	Threatened	Threatened
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
Barn Swallow	*Hirundo rustica*	Endangered	N/A	Threatened
Canada Warbler	*Wilsonia canadensis*	Endangered	Threatened	Threatened
DICOTS	-			
Black Ash	*Fraxinus nigra*	Threatened	N/A N/A	N/A
Long-branched Frostweed	*Helianthemum canadense*	Endangered	Threatened	N/A
Water-pennywort	*Hydrocotyle umbellata*	Endangered	Special Concern	Special Concern
Eastern Lilaeopsis	*Lilaeopsis chinensis*	Vulnerable		Special Concern
FISH	-			
American Eel	*Anguilla rostrata*	N/A	N/A	Threatened
Atlantic Salmon-southern upland population	*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
MAMMALS	-			
Eastern Pipistrelle	*Perimyotis subflavus*	Endangered	N/A	Endangered
MONOCOTS				
Tubercled Spike-rush	*Eleocharis tuberculosa*	Vulnerable	Special Concern	Special Concern
Redroot	*Lachnanthes caroliniana*	Vulnerable	Special Concern	Special Concern
Goldencrest	*Lophiola aurea*	Vulnerable	Special Concern	Special Concern
Long's Bulrush	*Scirpus longii*	Vulnerable	Special Concern	Special Concern
REPTILES	-			
Snapping Turtle	*Chelydra serpentina*	Vulnerable	Special Concern	Special Concern
Blanding's Turtle - Nova Scotia pop.	*Emydoidea blandingii*	Endangered	Endangered	Endangered
Eastern Ribbonsnake - Atlantic pop.	*Thamnophis sauritus pop. 3*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 750)

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	*Hemidactylium scutatum*	Secure (Green)	S3
BIRDS	-		
Spotted Sandpiper	*Actitis macularius*	Sensitive (Yellow)	S3S4B
American Bittern	*Botaurus lentiginosus*	Sensitive (Yellow)	S3S4B
Least Sandpiper	*Calidris minutilla*	Secure (Green)	S1B,S5M
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	S3S4B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive (Yellow)	S3S4B
Common Loon	*Gavia immer*	May Be At Risk (Orange)	S3B,S4N
Scarlet Tanager	*Piranga olivacea*	Undetermined (Undetermined)	S2B
Common Tern	*Sterna hirundo*	Sensitive (Yellow)	S3B
Willet	*Tringa semipalmata*	May Be At Risk (Orange)	S2S3B
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive (Yellow)	S3S4B
DICOTS			
Smooth Alder	*Alnus serrulata*	Sensitive (Yellow) May	S3
Canada Anemone	*Anemone canadensis*	Be At Risk (Orange)	S2
Swamp Milkweed	*Asclepias incarnata*	Secure (Green)	S3
Swamp Milkweed	*Asclepias incarnata ssp. pulchra*	Undetermined (Undetermined)	S2S3
Yellow Bartonia	*Bartonia virginica*	Secure (Green)	S3
Common Buttonbush	*Cephalanthus occidentalis*	Sensitive (Yellow)	S3
Swamp Loosestrife	*Decodon verticillatus*	Sensitive (Yellow)	S3
Coastal Plain Joe-pye-weed	*Eupatorium dubium*	May Be At Risk (Orange)	S2
Red Ash	*Fraxinus pennsylvanica*	May Be At Risk (Orange)	S1
Blunt-leaved Bedstraw	*Galium obtusum*	May Be At Risk (Orange)	S1S2
Bicknell's Crane's-bill	*Geranium bicknellii*	Secure (Green)	S3
Large St John's-wort	*Hypericum majus*	May Be At Risk (Orange)	S1
Southern Mudwort	*Limosella australis*	Sensitive (Yellow)	S3
Farwell's Water Milfoil	*Myriophyllum farwellii*	Sensitive (Yellow) Secure	S2
Stout Smartweed	*Polygonum robustius*	(Green)	S3S4
Intermediate Mermaidweed	*Proserpinaca intermedia*	May Be At Risk (Orange)	S1
Marsh Mermaidweed	*Proserpinaca palustris*	Secure (Green) Secure	S3
Marsh Mermaidweed	*Proserpinaca palustris var. crebra*	(Green) Sensitive	S3
Comb-leaved Mermaidweed	*Proserpinaca pectinata*	(Yellow) Secure (Green)	S3
Eastern Cudweed	*Pseudognaphalium obtusifolium*	Secure (Green) Secure	S3S4
Virginia Meadow Beauty	*Rhexia virginica*	(Green)	S3
Swamp Rose	*Rosa palustris*	Sensitive (Yellow)	S3
Bog Willow	*Salix pedicellaris*		S2

Appendix 3: Special Occurrences (Ecodistrict 750)

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***
Silky Willow	*Salix sericea*	May Be At Risk (Orange)	S2
Seaside Brookweed	*Samolus valerandi ssp. parviflorus*	Sensitive (Yellow) Secure	S2
Elliott's Goldenrod	*Solidago latissimifolia*	(Green) Sensitive	S3
Wavy-leaved Aster	*Symphyotrichum undulatum*	(Yellow) Secure (Green)	S2
Humped Bladderwort	*Utricularia gibba*	Secure (Green)	S3S4
Little Floating Bladderwort	*Utricularia radiata*	May Be At Risk (Orange)	S3
Inverted Bladderwort	*Utricularia resupinata*	Secure (Green) Secure	S1S2
Zigzag Bladderwort	*Utricularia subulata*	(Green) Secure (Green)	S3
Highbush Blueberry	*Vaccinium corymbosum*		S3
Blue Vervain	*Verbena hastata*		S3
FERNS AND THEIR ALLIES			
Acadian Quillwort	*Isoetes acadiensis*	Sensitive (Yellow)	S3
Southern Bog Clubmoss	*Lycopodiella appressa*	Secure (Green)	S3S4
Little Curlygrass Fern	*Schizaea pusilla*	Secure (Green)	S3
Netted Chain Fern	*Woodwardia areolata*	Sensitive (Yellow)	S2S3
FISH			
Striped Bass	*Morone saxatilis*	May Be At Risk (Orange)	S1
Atlantic Salmon	*Salmo salar*	May Be At Risk (Orange)	S2
INSECTS			
Mottled Darner	*Aeshna clepsydra*	Secure (Green)	S3
Ocellated Darner	*Boyeria grafiana*	Sensitive (Yellow)	S3
Eastern Pine Elfin	*Callophrys niphon*	Secure (Green)	S2
Vesper Bluet	*Enallagma vesperum*	Sensitive (Yellow)	S2S3
Prince Baskettail	*Epitheca princeps*	Sensitive (Yellow)	S2
Juvenal's Duskywing	*Erynnis juvenalis*	Secure (Green)	S2S3
Harlequin Darner	*Gomphaeschna furcillata*	Sensitive (Yellow)	S3
Elfin Skimmer	*Nannothemis bella*	Secure (Green)	S3
Brook Snaketail	*Ophiogomphus aspersus*	May Be At Risk (Orange)	S1
Riffle Snaketail	*Ophiogomphus carolus*	Secure (Green)	S3
Maine Snaketail	*Ophiogomphus mainensis*	May Be At Risk (Orange)	S1
Rusty Snaketail	*Ophiogomphus rupinsulensis*	May Be At Risk (Orange)	S1S2
Question Mark	*Polygonia interrogationis*	Secure (Green)	S3B
Forcipate Emerald	*Somatochlora forcipata*	May Be At Risk (Orange)	S2
Kennedy's Emerald	*Somatochlora kennedyi*	May Be At Risk (Orange)	S1S2
Clamp-Tipped Emerald	*Somatochlora tenebrosa*	Secure (Green)	S3
Carolina Saddlebags	*Tramea carolina*	Undetermined (Undetermined)	S1B
Ebony Boghaunter	*Williamsonia fletcheri*	May Be At Risk (Orange)	S1

Appendix 3: Special Occurrences (Ecodistrict 750)

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***
LICHENS			
Peppered Moon Lichen	*Sticta fuliginosa*	Sensitive (Yellow)	S3?
MAMMALS			
Fisher	*Pekania pennanti*	Sensitive (Yellow)	S2
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined (Undetermined)	SH
MONOCOTS			
Silvery-flowered Sedge	*Carex argyrantha*	Secure (Green)	S3S4
Hop Sedge Early	*Carex lupulina*	Secure (Green)	S3
Coralroot Toothed	*Corallorhiza trifida*	Secure (Green)	S3
Flatsedge	*Cyperus dentatus*	Secure (Green)	S3S4
Woolly Panic Grass	*Dichanthelium acuminatum var. lindheimeri*	Undetermined (Undetermined)	S1?
Eaton's Witchgrass	*Dichanthelium spretum*	Secure (Green)	S3S4
Russet Cotton-Grass	*Eriophorum chamissonis*	Secure (Green)	S3S4
Downy Rattlesnake-Plantain	*Goodyera pubescens*	May Be At Risk (Orange)	S2
Grassleaf Rush Southern	*Juncus marginatus*	Sensitive (Yellow)	S3
Twayblade Redtop Panic	*Listera australis*	May Be At Risk (Orange)	S2
Grass Tuckerman's Panic	*Panicum rigidulum var. pubescens*	Sensitive (Yellow)	S3
Grass Southern Rein-	*Panicum tuckermanii*	Sensitive (Yellow)	S2S3
Orchid Southern Rein	*Platanthera flava*	Sensitive (Yellow)	S2
Orchid Pale Green	*Platanthera flava var. flava*	Sensitive (Yellow) Secure	S2
Orchid Spotted	*Platanthera flava var. herbiola*	(Green)	S1S2
Pondweed	*Potamogeton pulcher*	May Be At Risk (Orange)	S1S2
Narrow-leaved Blue-eyed-grass	*Sisyrinchium angustifolium*	Secure (Green)	S3S4
Eastern Blue-Eyed-Grass	*Sisyrinchium atlanticum*	Secure (Green)	S3S4
Coastal Plain Blue-eyed-grass	*Sisyrinchium fuscatum*	May Be At Risk (Orange)	S1
Round-leaved Greenbrier	*Smilax rotundifolia (Atlantic pop.)*	Secure (Green)	S3
Case's Ladies'-Tresses	*Spiranthes casei var. casei*	May Be At Risk (Orange)	S1
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	Sensitive (Yellow) Secure	S2S3
Eastern Skunk Cabbage	*Symplocarpus foetidus*	(Green)	S3S4

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

Provincial General Status Ranks as assessed in 2010 (http://www.wildspecies.ca/wildspecies2010).

Appendix 3: Special Occurrences (Ecodistrict 750)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Loon Nesting Lakes	Bird Habitat	Significant Habitats of Nova Scotia Database (SHNSD)	Nova Scotia Environment Act Nova Scotia Forests Act (subsection: *Wildlife Habitat and Watercourses Protection Regulations*)
Eagle Nests	Bird Habitat	SHNSD	Nova Scotia Wildlife Act
Osprey Nests	Bird Habitat	SHNSD	Nova Scotia Wildlife Act
Blue Heron Nesting Colonies	Bird Habitat	SHNSD	Nova Scotia Wildlife Act
Wilderness Areas – Lake Rossignol; Tobeatic	Ecosystems/ Recreation	DNR Restricted Land Use Database	Nova Scotia Wilderness Areas Protection Act
Wildlife Management Area – Tobeatic	Habitat	DNR Restricted Land Use Database	Nova Scotia Wildlife Act
Nature Reserve – Ponhook Lake	Ecosystems	DNR Restricted Land Use Database	Nova Scotia Special Places Protection Act
Provincial Park – Ten Mile Lake, Medway River	Ecosystems/ Recreation	DNR Restricted Land Use Database	Nova Scotia Parks Act
National Park – Kejimkujik	Ecosystems/ Recreation	DNR Restricted Land Use Database	Canada National Parks Act
Designated Water Supply – Liverpool	Ecosystems	DNR Restricted Land Use Database	Nova Scotia Environment Act
Site of Ecological Significance – Shelburne River; Shingle Mill Bog; Mature hardwood stand on Jordan Lake Island	Ecosystems	DNR Restricted Land Use Database Local Knowledge	

Appendix 3: Special Occurrences (Ecodistrict 750)
Table 1d – Heritage Features

Feature	Type	Information Source
Indian Burial Grounds – Kejimkujik National Park	Cultural/Community Heritage	Aboriginal Traditional Knowledge Local Knowledge NSDNR Database
Native Artifacts – Lake Rossignol; Mersey River; Indian Gardens	Cultural/Community Heritage	Aboriginal Traditional Knowledge Local Knowledge NSDNR Database
Abandoned Mines	Geological and Cultural Heritage	NS Abandoned Mines Database
National Heritage River – Shelburne River	Cultural/ Recreational Heritage	Parks Canada
First Nations Reserve Lands – Medway; Ponhook Lake	Cultural	NSDNR Restricted Land Use Database

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	%		
ICSM	rS eH wP	324	0.3	63,580	53.9	42 to 45	38.4	37,858	2.2	616,727	36.6	76 to 79	2.5
IMDM	rS eH wP	6,439	5.5	63,580	53.9	78 to 82	1.5	25,961	1.5	616,727	36.6	64 to 69	9.9
IMHO	bS wP	12,748	10.8	22,590	19.2	69 to 73	3.0	222,050	13.2	419,644	24.9	70 to 73	3.0
IMRD	bS wP	407	0.3	22,590	19.2	73 to 75	0.0	5,948	0.4	419,644	24.9	76 to 79	1.5
IMSM	bS wP	14,887	12.6	22,590	19.2	75 to 78	3.8	92.050	5.5	419,644	24.9	71 to 74	3.7
WMDM	rS eH wP sM yB Be	2,472	2.1	2,472	2.1	64 to 68	11.9	132,982	7.9	187,322	11.1	58 to 63	13.5
WMHO	rS eH wP	50,580	42.9	63,580	53.9	67 to 72	5.0	154,580	9.2	616,727	36.6	64 to 69	7.5
WMRD	rS eH wP	1,836	1.6	63,580	53.9	65 to 74	1.3	5,087	0.3	616,727	36.6	68 to 74	1.0
WTLD	wetlands	6,636	5.6	0	0.0	67	19.6	87,241	5.2	0	0.0	77 to 78	3.0

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

Appendix 4: Ecological Representivity Worksheet

Ecosystem			Crown Responsibility	Legal Reserves		Policy Reserves (including unproclaimed legal reserve proposals)		Ecological Emphasis Classification "Reserve Class"					
Ecosection	Climax Type	Area (ha)	Percent of Area on Crown (%)	Crown Area (ha)	Private Area (ha)	Crown Area (ha)	Private Area (ha)	Crown		Private		Total Reserve	
								ha	% (EcoS)	ha	% (EcoS)	ha	% (EcoS)
WMHO	rS eH wP	50,580	15.9	1,927	0	420	0	2,347	4.6	0	0.0	2,347	4.6
XXWA	NONE	21,584	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
IMSM	bS wP	14,887	37.8	3,241	0	39	0	3,280	22.0	0	0.0	3,280	22.0
IMHO	bS wP	12,748	12.2	0	0	0	0	0	0.0	0	0.0	0	0.0
WTLD	wetlands	6,636	37.6	1,827	0	26	0	1,853	27.9	0	0.0	1,853	27.9
IMDM	rS eH wP	6,439	36.9	1,998	0	12	0	2,010	31.2	0	0.0	2,010	31.2
WMDM	Be rS eH wP sM yB	2,472	7.3	26	0	146	0	172	7.0	0	0.0	172	7.0
WMRD	rS eH wP	1,836	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
IMRD	bS wP	407	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
ICSM	rS eH wP	324	0.4	0	0	1	0	1	0.4	0	0.0	1	0.4
Total		**117,912**		**9,019**	**0**	**645**	**0**	**9,664**		**0**		**9,663**	

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	3,452	0	Operational Non Designated Parks and Reserves	7	0
National Historic Sites and Parks	5,559	0	Old Forest	6,373	0
Sites of Ecological Significance Under Moratorium	7	0	Designated Provincial Parks and Park Reserves	3	0
Areas under the Special Places Act	1	0			

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

Appendix 6: Description of Road Density Index

Road, trail, and utility corridors provide the background structure for transporting people and goods and are integral components of human land use. However, transportation systems are expensive and have a wide range of negative environmental impacts including water course 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, unroaded and lightly roaded areas 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 maps.

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.

Department of Natural Resources 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	489
Utility corridors	3	171
Gravel Roads and active railways	6	366
Paved streets and roads collectors	10	130
Highways	15	29

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	Range	Hectares	Percent
Remote	0 to 6	53,316	45.2%
Forest Resource	7 to 15	37,882	32.1%
Mixed Rural	16 to 24	17,042	14.5%
Agriculture Suburban	25 to 39	7,613	6.5%
Urban	40 to 100	2,065	1.8%
Total		**117,918**	**100**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Valley Corridors	19,426	6
Spruce Hemlock Pine Hummocks and Hills	56,973	7
Spruce Pine Hummocks	13,053	8
Spruce Pine Flats	14,479	6
Floodplain	236	39
Tolerant Mixedwood Drumlins	2,004	4
Wetlands	6,288	6
Total	**112,459***	**7**

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

Appendix 8: Development Classes and Seral Stages

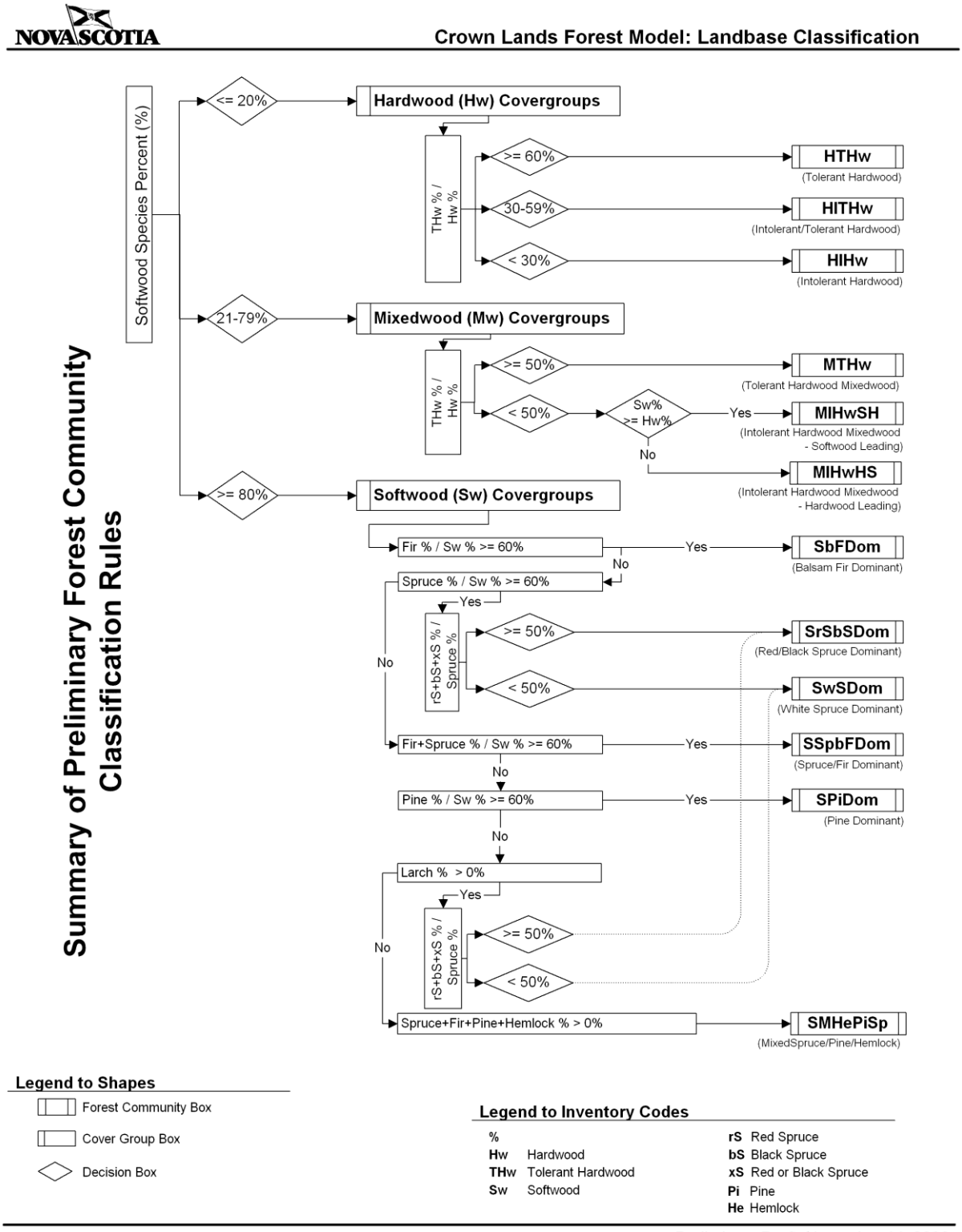
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6 m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade-intolerant "pioneer" species • peak seed production by forbs and shrubs • approximate age 0 to 25 years	Early Seral Species (Score 10 to 23) • new growth dominated by pioneer tree species or unclassified regeneration Mid Seral Species (Score 24 to 37) • regeneration composed of a mixture of pioneer, mid-climax, and climax species Late Seral Species (Score 38 to 50) • regeneration dominated by climax species
2. Young Forest (Height 7 to 11 m) • young forests with developing tree canopies characterized by vigorous self-thinning and crown differentiation • early tree seed production, no understory development • approximate age 25 to 40 years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer tree species Mid Seral Species (Score 24 to 37) • canopy composed of a mixture of pioneer, mid-climax, and climax species Late Seral Species (Score 38 to 50) • canopy dominated by climax species
3. Mature Forest (Height > 11 m) • stands dominated by upper canopy with full differentiation into dominance classes • self-thinning process reduced • tree seed production prominent and regular • individual tree mortality creates canopy gaps that are soon closed by neighbouring tree growth • increased light initiates regeneration and early understory development • approximate age 40 to 125 years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer species • over maturity initiates canopy breakup and understory development Mid Seral Species (Score 24 to 37) • climax species in mixture with pioneers in the overstory • often reflecting a transition to climax domination following a period of sub-canopy development Late Seral Species (Score 38 to 50) • canopy dominated by climax species • over maturity initiates gap dynamic processes leading to multi-aged and old growth conditions
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**																																							
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 and 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 one to five 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 ten, so the stand successional scores range from 10 to 50. These scores are subdivided into three successional categories: 10 to 23 early, 24 to 37 mid, and 38 to 50 late.

Appendix 9: Vegetation Community Classification – Forest Model



Note: 1) Exotic species (Norway Spruce, Japanese Larch, etc.) were grouped with similar native species where required.
2) Unclassified species were assigned based on supplementary information (i.e.: Wood Acquisition Program / Regional Services)

Preliminary Draft: November 14, 2006

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Rossignol 750)

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 (86.3%) IMDM (10.5%) WMRD (3.2%)	Softwood	rS, eH, wP	Infrequent	56,973; 100.0	Early	65	36	47	92	240	25,676: 48.4	EARLY	1,979; 3.7
						Mid	250	753	1,156	1,579	3,737			
						Late	578	1,208	11,218	7,312	20,316			
						Uncl	1,383	0	0	0	1,383			
		Mixedwood				Early	61	70	177	303	610	22,038; 41.5	MID	19,014; 35.8
						Mid	662	987	6,315	4,809	12,773			
						Late	86	164	3,600	3,193	7,043			
						Uncl	1,611	0	0	0	1,611			
		Hardwood				Early	120	178	574	82	954	4,465; 8.4	LATE	28,162; 53.0
						Mid	27	267	1,871	337	2,502			
						Late	2	7	741	52	802			
						Uncl	208	0	0	0	208			
		Unclassified				Early	176	0	0	0	176	922; 1.7	UNCL	3,949; 7.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	746	0	0	0	746			
Total					**56,973***	**# ha**	**5,974**	**3,670**	**25,699**	**17,758**	**53,101**			
						%	**11.3%**	**6.9%**	**48.4%**	**33.4%**	**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 (Rossignol 750)

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 (100.0%)	Softwood	bS, wP, rS, eH, wP	Frequent	11,584; 80.0	Early	14	20	15	13	62	7,796; 60.7	EARLY	341; 2.7
						Mid	60	233	306	610	1,209			
						Late	94	505	3,003	2,701	6,303			
						Uncl	222	0	0	0	222			
		Mixedwood				Early	0	41	37	53	131	4,503; 35.0	MID	4,226; 32.9
						Mid	11	338	1,066	1,390	2,805			
						Late	0	36	620	615	1,271			
						Uncl	296	0	0	0	296			
		Hardwood				Early	7	29	101	9	146	435; 3.4	LATE	7,623; 59.3
						Mid	1	11	171	29	212			
						Late	0	0	46	3	49			
						Uncl	28	0	0	0	28			
		Unclassified				Early	2	0	0	0	2	117; 0.9	UNCL	660; 5.1
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	115	0	0	0	115			
Total					**14,480***	**# ha**	**849**	**1,214**	**5,366**	**5,422**	**12,851**			
						%	**6.6%**	**9.4%**	**41.8%**	**42.2%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Rossignol 750)

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 (96.9%) IMRD (3.1%)	Softwood	bS, wP	Frequent	13,053; 100.0	Early	9	35	31	54	128	6,968; 60.0	EARLY	510; 4.4
						Mid	42	372	264	592	1,270			
						Late	66	284	2,522	2,319	5,190			
						Uncl	380	0	0	0	380			
		Mixedwood				Early	4	38	46	76	164	4,018; 34.6	MID	4,144; 35.7
						Mid	26	273	1,364	943	2,606			
						Late	0	66	540	410	1,015			
						Uncl	233	0	0	0	233			
		Hardwood				Early	40	15	129	18	201	537; 4.6	LATE	6,271; 54.0
						Mid	0	4	230	34	268			
						Late	0	2	63	0	65			
						Uncl	3	0	0	0	3			
		Unclassified				Early	18	0	0	0	18	90; 0.8	UNCL	689; 5.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	72	0	0	0	72			
Total					**13,053***	**# ha**	**893**	**1,088**	**5,188**	**4,445**	**11,614**			
						%	**7.7%**	**9.4%**	**44.7%**	**38.3%**	**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 (Rossignol 750)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Wetlands	WTLD (100.0%)	Softwood	bS, wP		1,885; 30.0	Early	0	18	1	11	30	1,482; 62.7	EARLY	95; 4.0
						Mid	3	94	45	112	255			
						Late	9	100	562	508	1,179			
						Uncl	18	0	0	0	18			
		Mixedwood				Early	0	13	2	33	48	769; 32.5	MID	811; 34.3
						Mid	8	37	183	253	480			
						Late	1	6	101	125	232			
						Uncl	9	0	0	0	9			
		Hardwood				Early	0	0	12	4	16	102; 4.3	LATE	1,421; 60.1
						Mid	0	1	67	8	76			
						Late	0	0	8	1	9			
						Uncl	1	0	0	0	1			
		Unclassified				Early	0	0	0	0	0	11; 0.5	UNCL	39; 1.6
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	11	0	0	0	11			
Total					**6,288* *Total area of element**	**# ha**	**60**	**268**	**981**	**1,055**	**2,364**			
						%	**2.5%**	**11.3%**	**41.5%**	**44.6%**	**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 (Rossignol 750)

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 Drumlins	WMDM (100.0%)	Softwood	rS, eH, wP, sM, yB, Be	Gap	2,004; 100.0	Early	0	3	6	2	11	1,119; 60.2	EARLY	80; 4.3
						Mid	1	10	41	80	132			
						Late	0	6	731	206	942			
						Uncl	34	0	0	0	34			
		Mixedwood				Early	6	0	4	6	16	546; 29.3	MID	470; 25.3
						Mid	0	13	165	118	296			
						Late	5	5	98	37	145			
						Uncl	88	0	0	0	88			
		Hardwood				Early	0	2	51	0	53	183; 9.8	LATE	1,139; 61.3
						Mid	0	0	37	5	42			
						Late	0	0	34	17	52			
						Uncl	37	0	0	0	37			
		Unclassified				Early	0	0	0	0	0	12; 0.7	UNCL	171; 9.2
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	12	0	0	0	12			
Total					**2004***	**# ha**	**182**	**39**	**1,167**	**472**	**1,860**			
						%	**9.8%**	**2.1%**	**62.8%**	**25.4%**	**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 (Rossignol 750)

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)				
Floodplain	ICSM (100.0%)	Softwood	rS, eH, wP	Infrequent	189; 80.0	Early	3	4	1	2	10	77; 54.1	EARLY	14; 9.6
						Mid	0	8	3	11	22			
						Late	0	0	25	20	45			
						Uncl	1	0	0	0	1			
		Mixedwood				Early	0	0	0	4	4	61; 42.8	MID	59; 41.5
						Mid	0	7	16	15	37			
						Late	0	3	4	13	19			
						Uncl	0	0	0	0	0			
		Hardwood				Early	0	0	0	0	0	4; 3.1	LATE	68; 48.1
						Mid	0	0	0	0	0			
						Late	0	0	4	0	4			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0		UNCL	1; 0.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**236***	**# ha**	**4**	**21**	**53**	**65**	**142**			
						%	**2.7**	**14.8**	**37.0**	**45.5**	**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 (Rossignol 750)

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	WMHO (7.2%) IMDM (2.4%) WMDM (2.4%) IMSM (2.1%) WTLD (1.9%) IMHO (0.5%) ICSM (0.5%) WMRD (0.0%)	Softwood	rS, eH, wP, bS, wP	Infrequent Frequent	2,484; 12.8	Early	0	1	2	3	5	664; 44.7	EARLY	83; 5.6
						Mid	1	14	25	7	46			
						Late	17	13	403	179	611			
						Uncl	1	0	0	0	1			
		Mixedwood	rS, eH, wP, sM, yB, Be	Gap	468; 2.4	Early	0	5	12	4	21	622; 41.9	MID	496; 33.4
						Mid	0	10	217	117	344			
						Late	0	1	150	106	257			
						Uncl	0	0	0	0	0			
		Hardwood				Early	1	3	32	6	41	181; 12.2	LATE	902; 60.7
						Mid	1	3	95	8	106			
						Late	0	0	30	4	34			
						Uncl	0	0	0	0	0			
		Unclassified				Early	15	0	0	0	15	18; 1.2	UNCL	4; 0.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	3	0	0	0	3			
Total					**19,426***	**# ha**	**39**	**49**	**964**	**432**	**1,485**			
						%	**2.6%**	**3.3%**	**64.9%**	**29.1%**	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Hemlock Pine Hummocks and Hills	WMHO IMDM WMRD	Infrequent	rS, wP, eH	S	SrSbS Dom	9,981	19.1%	M	**Well-drained** early – rM, wB, Aspen, mid – rS, bF, wP, late – rS, eH, wP **Impoverished by Fire** Early- rP, bF, wP, Spruce Pine Rocky Woodland Mid – bS, rP, wP Late- rS, wP **Moist** bS, Tamarack **Wet** rS- Sphagnum Wet Forest eH- Sphagnum Wet Forest
				S	Spi Dom	7,833	15.0%	L	
				S	SmHePiSp	4,944	9.5%	L	
				S	SSpbF Dom	2,675	5.1%	M	
				S	SbF Dom	162	0.3%	M	
				S	SwS Dom	81	0.2%	E	
				M	MIHwSH	12,235	23.4%	E	
				M	MIHwHS	6,309	12.1%	E	
				M	MTHw	3,495	6.7%	L	
				H	HIHw	2,595	5.0%	E	
				H	HITHw	1,003	1.9%	M	
				H	HTHw	868	1.7%	L	
Total						**52,181**	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Hummocks	IMHO IMRD	Frequent	bS, wP	S	SrSbS Dom	3,954	34.3%	L	**IMHO** **Well-drained** early – Aspen, wB, rM mid – rS, Schriebers Moss Forest, rS-bF, - Stair-step Moss Forest - rS- wP, Bracken Forest late – rS -wP - eH - eH - wP **IMRD** **Well-drained** early - rP - bS-Huckleberry Lichen Woodland - sP Rocky Woodland mid - bS Bracken Forest - rP- wP Mayflower Forest - wP late - rS-wP Bracken Forest **Moist** bS, Cinnamon Fern- Sphagnum Wet Forest bS, False Holly Wet Forest
				S	Spi Dom	1,460	12.7%	L	
				S	SMHePiSp	865	7.5%	L	
				S	SSpbF Dom	651	5.6%	M	
				S	SbF Dom	19	0.2%	M	
				S	SwS Dom	19	0.2%	E	
				M	MIHwSH	3,044	26.4%	E	
				M	MIHwHS	836	7.3%	E	
				M	MTHw	138	1.2%	L	
				H	HIHw	453	3.9%	E	
				H	HTHw	69	0.6%	L	
				H	HITHw	16	0.1%	M	
						11,523	**100.0%**		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Wetlands	WTLD			S	SrSbSDom	787	33.4%	L	**Moist** - bS, Cinnamon Fern- Sphagnum Wet Forest - bS-False Holly Wet Forest - Tamarack-Tussock Sedge Wet Forest **Wet** - Wetlands - rM, Alder Sphagnum Wet Forest - rM-Poison Ivy Wet Forest
				S	SPiDom	306	13.0%	L	
				S	SMHePiSp	302	12.8%	L	
				S	SSpbF Dom	86	3.7%	M	
				S	SwS Dom	1	0.1%	E	
				M	MIHwSH	504	21.4%	E	
				M	MIHwHS	192	8.2%	E	
				M	MTHw	73	3.1%	L	
				H	HIHw	87	3.7%	E	
				H	HTHw	9	0.4%	L	
				H	HITHw	6	0.3%	M	
Total						**2,353**	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Flats	IMSM	Frequent	bS, wP	S	SrSbSDom	3,044	23.9%	M	**Moist** - bS, Cinnamon Fern-Sphagnum Wet Forest - bS, False Holly Wet Forest, Tamarack, Tussock Sedge Wet Forest **Wet** - Wetlands - rM-Alder Sphagnum Wet Forest - rM, Poison Ivy Wet Forest
				S	SPiDom	2,264	17.8%	L	
				S	SMHePiSp	1,516	11.9%	L	
				S	SSpbFDom	916	7.2%	M	
				S	SbFDom	54	0.4%	M	
				S	SwSDom	2	0.0%	E	
				M	MIHwSH	2,924	23.0%	E	
				M	MIHwHS	1,090	8.6%	E	
				M	MTHw	489	3.8%	L	
				H	HIHw	337	2.6%	E	
				H	HTHw	61	0.5%	L	
				H	HITHw	37	0.3%	M	
						12,734	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Mixedwood Drumlins	WMDM	Gap	rS, wP, eH, sM, yB, Be	S	SrSbSDom	495	26.8%	L	**Well-drained** early – wB, rM mid – rS, Schriebers Moss Forest - rS - bF Stair-step Moss Forest - rS - wP Braken Forest late – eH Forest - rS - yB Wood Fern Forest - sM - yBHay-scented Fern Forest **Moist** - bS Cinnamon Fern Sphagnum Wet Forest - bS-False Holly Wet Forest - rS-Cinnamon Fern Sphagnum Wet Forest - eH Sphagnum Wet Forest
				S	SMHePiSp	418	22.6%	L	
				S	SSpbFDom	123	6.6%	M	
				S	SPiDom	74	4.0%	L	
				S	SwSDom	8	0.4%	E	
				S	SbFDom	1	0.1%	M	
				M	MIHwSH	350	18.9%	E	
				M	MIHwHS	123	6.7%	E	
				M	MTHw	73	3.9%	L	
				H	HTHw	98	5.3%	L	
				H	HIHw	67	3.6%	E	
				H	HITHw	19	1.0%	M	
Total						**1,848**	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Floodplain	ICSM	Infrequent	rS, eH, wP	S	SrSbSDom	25	17.6%	L	**Moist** early - wP mid – rS, wP – rS, wP, eH - eH, wP
				S	SPiDom	17	12.1%	L	
				S	SMHePiSp	14	10.2%	L	
				S	SSpbFDom	11	7.7%	M	
				S	SwSDom	8	5.8%	E	
				S	SbFDom	1	0.8%	M	
				M	MIHwSH	37	25.7%	E	
				M	MIHwHS	23	16.3%	E	
				M	MTHw	1	0.8%	L	
				H	HTHw	4	3.0%	L	
Total						**142**	**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 Rossignol Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	ICSM IMDM WMHO WMRD IMHO IMSM	Infrequent Frequent	rS, eH, wP bS, wP	S	SPiDom	235	16.1%	L	Varied
				S	SMHePiSp	232	15.8%	L	
				S	SrSbSDom	153	10.4%	L	
				S	SSpbFDom	37	2.5%	M	
				S	SwSDom	5	0.4%	E	
				S	SbFDom	1	0.1%	M	
				M	MIHwSH	354	24.1%	E	
				M	MIHwHS	166	11.3%	E	
				M	MTHw	102	7.0%	L	
				H	HIHw	91	6.2%	E	
				H	HITHw	55	3.8%	M	
				H	HTHw	35	2.4%	L	
Total						**1,467**	**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
rS eH wP	63,580	53.9%	616,727	36.6%
bS wP	22,590	19.2%	419,644	24.9%
rS eH wP sM yB Be	2,472	2.1%	187,322	11.1%
Total	**88,642**	**75.2%***	**1,223,693**	**72.6%****

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

Appendix 11: Ecological Emphasis Classes and Index Values

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

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

Appendix 12a: Ecological Emphasis Index Worksheet – Elements

Landscape Element	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Spruce Hemlock Pine Hummocks and Hills	56,944	4,139	44,871	214	1,991	5,729	39,278 to 42,142	69 to 74
Valley Corridors	3,299	412	1,431	9	1,399	48	1,499 to 1,523	45 to 46
Spruce Pine Flats	14,468	3,266	9,934	6	379	882	10,939 to 11,380	76 to 79
Spruce Pine Hummocks	13,050	0	11,719	31	369	930	9,030 to 9,495	69 to 73
Wetlands	6,248	1,816	3,356	4	1,041	67	4,351 to 4,384	69 to 70
Tolerant Mixedwood Drumlins	2,003	26	1,708	8	65	195	1,358 to 1,456	68 to 73
Floodplain	236	0	130	6	81	19	104 to 113	44 to 48
Total	**96,247**	**9,659**	**73,150**	**278**	**5,327**	**7,869**	**66,559 to 70,494**	**69 to 73**

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
ICSM	324	1	170	8	124	21	136 to 146	42 to 45
IMDM	6,439	2,010	3,839	7	98	485	5,012 to 5,255	78 to 82
IMHO	12,748	0	11,411	32	386	919	8,796 to 9,256	69 to 73
IMRD	407	0	395	0	0	12	299 to 305	73 to 75
IMSM	14,887	3,280	10,144	5	571	886	11,111 to	75 to 78
WMDM	2,471	172	1,800	8	293	198	1,574 to 1,673	64 to 68
WMHO	50,578	2,347	40,541	216	2,532	4,944	34,042 to	67 to 72
WMRD	1,837	0	1,467	0	25	345	1,186 to 1,359	65 to 74
WTLD	6,636	1,853	3,414	4	1,299	66	4,431 to 4,464	67
Total	**96,327**	**9,664**	**73,181**	**279**	**5,328**	**7,875**	**66,588 to 70,526**	**69 to 73**

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

Appendix 13:

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

Aspect	The direction of a downhill slope expressed in degrees or as a compass point.
Atlantic Coastal Plain Flora (ACPF)	A group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens, and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes.
Biodiversity	The diversity of plants, animals, and other living organisms, in all their forms and level of organization, including genes, species, ecosystems, and the evolutionary and functional process that link them.
Canopy	The uppermost continuous layer of branches and foliage in a stand of trees.
Climax forest community	A relatively stable and self-perpetuating forest community condition that maintains itself (more or less) until stand-level disturbance causes a return to an earlier successional stage. The final stage of natural succession for its environment.
Climax vegetation	A forest or non-forest community that represents the final stage of natural succession for its environment.
Coarse filter approach	A habitat-based approach to conserving biodiversity by maintaining a natural diversity of structures within stands, and representation of ecosystems across landscapes. The intent is to meet the habitat requirements of most native species over time. Usually combined with a fine filter approach to conserve specific rare species and ecosystems.
Coarse Woody Debris (CWD)	Dead tree stems greater than 7.5 centimetres in diameter and laying horizontally at 45 degrees or less. Provides habitat for many species and is a source of nutrients for soil development.
Commercial thinning	Silviculture treatment that “thins” out an overstocked stand by removing trees that are large enough to be sold as products, such as poles or fence posts. This treatment is carried out to improve the health and growth rate of the remaining crop trees.

Composition	The proportion of biological components within a specified unit such as a stand or landscape: **Stand or Species Composition.** The proportion of each plant species in a community or stand. May be expressed as a percentage of the total number, basal area or volume of all species in that community. **Landscape Composition.** The proportion of each community type within a landscape. Community type may be defined by vegetation type, covertype, seral stage, or development class (age).
Connectivity	The way a landscape enables or impedes movement of resources, such as water and animals.
Converted	Lands removed from a natural state (e.g. forest) and changed to other uses (e.g. agriculture, urban, settlement, road).
Corridor	Corridors are natural linear communities or elements, such as river valleys, that link parts of the ecodistrict. They are a fundamental feature of the "matrix, patch, corridor" concept of landscape structure.
Crown land and Provincial Crown land	Used in the Ecological Landscape Analysis to include all land under the administration and control of the Minister of Natural Resources under the Forests Act, Section 3; as well as the lands under the administration and control of the Minister of Environment under the Wilderness Areas Protection Act. Also includes Federal Parks in the accounting of protected area representation.
Covertype	Refers to the relative percentage of softwood versus hardwood species in the overstory of a stand. In this guide, covertype classes are: **Softwood:** softwood species compose 75% or more of overstory **Hardwood:** hardwood species compose 75% or more of overstory **Mixedwood:** softwood species composition is between 25% and 75%
Development class	The description of the structure of forests as they age and grow (e.g. establishment forest, young forest, mature forest, multi-aged / old forest).
Disturbance	An event, either natural or human-induced, that causes a change in the existing condition of an ecological system.
Ecodistrict	The third of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecoregions. Characterized by distinctive assemblages of relief, geology, landform, and vegetation. Used to define the landscape unit for these Ecological Landscape Analysis reports.

Ecological land classification	A classification of lands from an ecological perspective based on factors such as climate, physiography, and site conditions. The Ecological Land Classification for Nova Scotia Volume 1 delineates ecosystems at five hierarchical scales: ecozone, ecoregion, ecodistrict, ecosection, and ecosite.
Ecological integrity	The quality of a natural unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species, and ecosystem diversity assured for the future.
Ecoregion	The second level of the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecozone. Used to characterize distinctive regional climate as expressed by vegetation. There are nine ecoregions identified in Nova Scotia.
Ecosection	The fourth of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecodistricts. An ecological land unit with a repeating pattern of landform, soils, and vegetation throughout an ecodistrict.
Ecosite	The fifth of five levels in the Ecological Land Classification for Nova Scotia Volume 1, and a subdivision of ecosections. Characterized by conditions of soil moisture and nutrient regimes. Although not mapped, the Acadian and Maritime Boreal ecosites of the province are fully described in the Forest Ecosystem Classification for Nova Scotia (2010).
Ecosystem	A functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size – a log, pond, field, forest, or the earth's biosphere – but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation, such as a forest ecosystem, old-growth ecosystem or range ecosystem. Can also refer to units mapped in the DNR Ecological Land Classification system.
Ecozone	The first of five levels in the Ecological Land Classification for Nova Scotia Volume 1. Ecozones are continental ecosystems characterized by the interactions of macroclimate, soils, geographic and physiographic features. The entire province is contained within the Acadian ecozone, one of 15 terrestrial ecozones in Canada.
Edge effect	Habitat conditions (such as degree of humidity and exposure to light or wind) created at or near the more-or-less well-defined boundary between ecosystems, as, for example, between open areas and adjacent forest.

Element	A landscape ecosystem containing characteristic site conditions that support similar potential vegetation and successional processes. Elements were mapped by combining ecosections with similar climax vegetation and natural disturbance interpretations. Depending on their role in the ecosystem, elements may be described as matrix, patch or corridor.
Endangered species	A wildlife species facing imminent extirpation or extinction. A species listed as endangered under the federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal Species at Risk Act).
Even-aged	A forest, stand, or vegetation type in which relatively small age differences exist between individual trees. Typically results from stand-initiating disturbance.
Extensive land use	Lands managed for multiple values using ecosystem-based techniques that conserve biodiversity and natural ecosystem conditions and processes.
Extinct species	A species that no longer exists. A species declared extinct under federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal SARA).
Extirpated species	A species that no longer exists in the wild in Nova Scotia but exists in the wild outside the province. A species declared extirpated under federal or Nova Scotia endangered species legislation (Nova Scotia Species at Risk Act or federal SARA).
Fine filter approach	An approach to conserving biodiversity that is directed toward individual species and critical ecosystems that are typically rare or threatened. This approach is usually combined with the coarse filter approach to conserving natural ranges of habitat.
Forest management	The practical application of scientific, economic, and social principles to the administration and working of a forest for specified objectives. Particularly, that branch of forestry concerned with the overall administrative, economic, legal, and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection, and forest regulation.
Frequent stand initiating	Disturbances usually occur more frequently than the average lifespan of the dominant species and are of sufficient intensity to destroy most of the existing trees, promoting a new forest within relatively short periods of time.

Gap replacement	An absence of stand-initiating disturbances supports the development of a dominant overstory that is sustained through dynamic processes of canopy gap formation, understory development, and overstory recruitment. Gap formation ranges from individual tree mortality to periodic gap formation events that are rarely of a stand-initiating intensity.
Habitat	The place where an organism lives and/or the conditions of that environment including the soil, vegetation, water and food.
Infrequent stand initiating	The time between stand-initiating disturbances is usually longer than the average longevity of dominant species, thereby supporting processes of canopy gap formation and understory development in mature forests.
Inherent conditions	Refers to the natural condition of ecosystems based on their enduring physical features. This is the potential condition expected in the absence of human influence.
Integrated Resource Management (IRM)	A decision-making process whereby all resources are identified, assessed, and compared before land use or resource management decisions are made. The decisions themselves, whether to approve a plan or carry out an action on the ground, may be either multiple or single use in a given area. The application of integrated resource management results in a regional mosaic of land uses and resource priorities which reflect the optimal allocation and scheduling of resource uses.
Intensive land use	Lands managed intensively to optimize resource production from sites maintained in a forested state.
Land capability (LC)	LC values represent the maximum potential stand productivity (m^3/ha/yr) under natural conditions.
Landform	A landscape unit that denotes origin and shape, such as a floodplain, river terrace, or drumlin.
Landscape	An expanse of natural area, comprising landforms, land cover, habitats, and natural and human-made features that, taken together, form a composite. May range in scale from a few hectares to large tracts of many square kilometres in extent.
Long range management frameworks	A strategic, integrated resource plan at the subregional level. It is based on the principles of enhanced public involvement, consideration of all resource uses and values, consensus-based decision making, and resource sustainability.

Matrix	A widespread vegetation forest community which dominates the landscape and forms the background in which other smaller-scale communities (patches) occur. The most connected or continuous vegetation type within the landscape, typically the dominant element. (Matrix is a fundamental feature of the “matrix, patch, corridor” concept of landscape structure).
Mature forest	A development class within the sequence of: 1) forest establishment; 2) young forest; 3) mature forest; and 4) multi-aged and old growth. Mature forests include multi-aged and old growth. Forests are typically taller than 11 metres, have an upper canopy fully differentiated into dominance classes, and regularly produce seed crops. Mature forests may develop over long periods, transitioning from early competitive stages where canopy gaps from tree mortality soon close, to later stages where openings persist and understories develop to produce multi-aged and old growth.
Memorandum of understanding (MOU)	An agreement between ministers defining the roles and responsibilities of each ministry in relation to the other or others with respect to an issue over which the ministers have concurrent jurisdiction.
Mixed stand	A stand composed of two or more tree species.
Multiple use	A system of resource use where the resources in a given land unit serve more than one user.
Natural disturbance	A natural force that causes significant change in forest stand structure and/or composition such as fire, wind, flood, insect damage, or disease.

Natural disturbance regimes	The patterns (frequency, intensity, and extent) of fire, insects, wind, landslides, and other natural processes in an area. Natural disturbances inherently influence the arrangement of forested ecosystems and their biodiversity on a given landscape. Three disturbance regimes recognized in Nova Scotia are: **Frequent:** Disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even age. The time interval between stand-initiating events typically occurs more frequently than the longevity of the climax species that would occupy the site – therefore, evidence of gap dynamics and understory recruitment is usually absent. This regime results in the establishment and perpetuation of early to mid-successional vegetation types. **Infrequent:** Stand-initiating disturbances which result in the rapid mortality of an existing stand and the establishment of a new stand of relatively even-age, but the time interval between disturbance events is normally longer than the average longevity of the dominant species – allowing gap dynamics and understory recruitment to evolve and become evident (eventually creating uneven-aged stands). This regime generally leads to the establishment and/or perpetuation of mid to late successional vegetation types. **Gap replacement:** Stand-initiating disturbances are rare. Instead, disturbances are characterized by gap and small patch mortality, followed by understory recruitment, resulting in stands with multiple age classes. This regime generally leads to the establishment and/or perpetuation of late successional vegetation types.
Old growth	Climax forests in the late stage of natural succession, the shifting mosaic phase, marked by mature canopy processes of gap formation and recruitment from a developed understory. Typical characteristics include a multi-layered canopy of climax species containing large old trees, decadent wolf trees, and abundant snags and coarse woody debris. In Nova Scotia, stands older than 125 years are classed as old growth.
Patch	A discrete community or element nested within a surrounding landscape, which is often a matrix forest. (Patch is a fundamental feature of the "matrix, patch, corridor" concept of landscape structure.)
Precommercial 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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