Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS NORTHUMBERLAND LOWLANDS ECODISTRICT 530

PART 3: Landscape Analysis for Forest Ecosystem Planners

ELA 2014-530

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 530: Northumberland Lowlands

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

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

Information sources and statistics (benchmark dates) include:

- Forest Inventory (1995) – stand volume, species composition
- Crown Lands Forest Model landbase classification (2006) – provides forest inventory update for harvesting and silviculture from satellite photography
- (2005), silviculture treatment records (2006) and forest age increment (2006)
- Roads and Utility network – Service Nova Scotia and Municipal Relations (2006)
- Significant Habitat and Species Database (2007)
- Atlantic Canada Data Conservation Centre (2013)

Conventions

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

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This in-depth Ecological Landscape Analysis (ELA) report is a lightly edited version of the original ELA produced by 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.

The current landscape patterns in the Northumberland Lowland Ecodistrict are influenced by past land use (settlement, farming, shipbuilding), insects and diseases (including beech bark disease from 1920 to 1950, followed by the fungus, birch decline in the 1930s and 1940s, white marked-tussock moth infestation in the 1970s and 1980s, and the spruce budworm in the 1980s), forest harvesting, repeated fires, and wind. Most of the ecodistrict is characterized by imperfect drainage.

Elements Within Landscapes (Map 2)

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

Spruce Pine Hummocks is the matrix element, representing 49% of the ecodistrict. This element naturally supports a softwood forest of red and black spruce and white pine, but fragmentation has left only 40% of the forest with these community types.

Red Spruce Hummocks, the largest patch element, has had about one-third of its area converted to agriculture and other human uses. Other patch elements, in order of size, are **Tolerant Mixedwood Hills**, **Red and Black Spruce Hummocks**, **Jack Pine Hummocks and Ridges**, and **Wetlands**. *Two other tiny patch elements, Coastal Beach and Salt Marsh, are also found in the ecodistrict.* **Valley Corridors** is a linear element associated with several prominent river corridors in the ecodistrict.

Comparisons with the current conditions determined that much of the ecological structure has been altered in the ecodistrict. The Spruce Pine Hummocks element of black spruce, red spruce, and white pine is still the dominant covertype. However, this forest community is less extensive than in the past, due primarily to land settlement, insect infestation, and harvesting.

As part of the Valley Corridors element, numerous corridor systems follow the main river valleys and provide linkages to the Cumberland Hills, Cobequid Hills, Central Uplands, and the Pictou Antigonish Highlands ecodistricts. The forests within most of these corridors, such as for River Philip, Pugwash River, Wallace River, Waughs River, northern sections of River John, West River, Middle River, East River, and upper sections of Sutherlands River have been significantly altered by human land use, settlement, farming, urbanization, transportation systems, and forestry.

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, water, deer, furbearers, eagles, wood turtles, riparian zone plants, salmon/trout, and waterfowl.

As an example of the flow – element interactions, deer use the large red spruce forests for habitat, cover, and travel. This softwood covertype has been altered by human intervention (settlement, agriculture, harvesting) and is now changed to an early and mid-seral mixedwood and hardwood dominated patch. One objective would be to reduce the early and mid-seral species to favour the red and black spruce, hemlock, white pine, and any tolerant hardwoods by employing forest management strategies that include pre-commercial and commercial thinning and the creation of larger stand sizes. This will also increase browse for deer and moose.

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

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

River corridors promote connectivity.

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

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

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

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

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

The Northumberland Lowlands is now dominated by a much changed structure that does not represent the inherent natural conditions that once characterized this landscape. Human land use, transportation systems, and utility corridors have fragmented most of the element types, reducing the connective function of the corridors for some species and may also increase the barrier effect of the corridors for species that must move across.

An additional concern in ecological planning is the maintenance of connectivity among conservation areas (including wilderness, old growth, provincial parks, and ecological reserves), which are often not ecologically related. At the landscape scale of planning, connectivity among these areas is supported by the dominant forest structure. Connectivity will be sustained by applying the natural disturbance regime (NDR) guidelines for landscape composition and recognizing natural linkage opportunities.

Landscape design will address and consider, where possible, issues such as:

- Mitigating the potentially negative barrier effects of concentrated land use in the valley corridors by sustaining and restoring natural communities in key areas, such as those identified during the landscape analysis.
- Enhancing connectivity among conservation areas by applying appropriate medium and high biodiversity emphasis standards when managing areas with natural linkage potential.
- Improving ecoregional connectivity by sustaining and restoring natural conditions at important linkage points among ecodistricts.

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

Five of the landscape flows – people, water, deer, fish (salmon/trout), and furbearers – are identified with major linkages to adjacent areas or ecodistricts (Map 2). The hydrological system provides the most obvious physical connection among Northumberland Lowlands and its surroundings. This plain tends to be a catchment area containing numerous small to medium sized wetlands and small lakes linked to small, first to third order streams.

The major river corridors are the Wallace River, Waughs River, River John, and Toney River that move from south to north and are partially tidal. The Dewar River, Caribou River, and French River move east to west and are also partially tidal. Other important corridors that dissect this lowland ecodistrict and act as corridors and linkages for furbearers and fish are Three Brooks, Middle River, East River, Sutherlands River, French River, Barneys River, Tignish River, Shinimicas River, River Philip, and Pugwash River. The dynamics of these water linkages have downstream effects that start at the wetlands – which capture, filter, and store water – to their connection to the overall hydrological system.

Most of these river corridors and estuaries are important nesting areas for bald eagles, habitat for wood turtles, and anadromous fish, which leave the sea to spawn in rivers, such as the Atlantic salmon. A number of these major river systems contain uncommon plants, such as the Canada lily and blue cohosh.

Deer flow in and out of this lowland area, migrating in harsh winter conditions from the Pictou Antigonish Highlands and Cumberland Hills to the northern edge of the Northumberland Lowlands where there are reduced snow levels.

People provide linkages among the neighbouring ecodistricts of Cumberland Hills, Cobequid Hills, Central Uplands, and Pictou Antigonish Highlands to the Northumberland Lowlands through their many activities (recreation, transportation, fishing, forest management, utilities, development, and settlements). The major linkages are located at Amherst, Nappan area, Springhill, Oxford, Wentworth, Nuttby, Westville, Stellarton, New Glasgow, Pugwash, Tatamagouche, Pictou (at the ferry terminal), and Barneys River.

Transportation linkages among Northumberland Lowlands and adjoining ecodistricts bring national and international tourists to the area's warm sandy coastal beaches and nature-based outdoor recreational opportunities along the Sunrise Trail.

The Tolerant Mixedwood Hills patch element is a linkage or extension of the tolerant hardwoods that dominate neighbouring Cobequid Hills Ecodistrict and probably has connections to the Central Uplands Ecodistrict.

Future management activities should recognize significant links to neighbouring ecodistricts and manage forests to enhance and sustain connectivity.

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

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

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

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

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

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

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

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

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

- early (seral score 10 to 23)
- mid (seral score 24 to 37)
- late (seral score 38 to 50)

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

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

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

Target Ranges for Composition Indicators

Table 7 provides target ranges for development class and seral stage composition appropriate for different disturbance regimes. These ranges have been derived from the professional judgment of DNR forest ecologists to guide composition objectives for large landscape areas. This guidance can be used to assess how land holdings contribute to the overall ecodistrict structure by referring to the element analysis section which summarizes the levels of these indicators.

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

Table 7 - Landscape Composition Target Ranges (by Development Class / Disturbance Regime)				
Natural Disturbance Regime	**Development Class**			
	Forest Establishment	**Young Competing Forest**	**Mature Forest (including multi-aged and old forest)**	**Multi-aged and Old Forest**
Frequent Stand Initiating	5 - 30%	5 - 30%	>40% early, mid, and late seral representation	>8%
Infrequent Stand Initiating	5 - 20%	5 - 20%	>60% most in mid and late seral stages	>16%
Gap Replacement	0 - 15%	0 - 15%	>70% most in late seral stage	>24%

Forest Vegetation Types for Seral Stages in Each Element

Each element contains a number of forest stands that can be classified by vegetation, soil, and ecosites. The DNR publication ***Forest Ecosystem Classification for Nova Scotia, Part I: Vegetation Types (2010)*** (http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp) is helpful in identifying forest plant communities. Table 8 presents a description of the vegetation types likely to be found within elements, along with the current percentage of each seral stage.

Table 8 – Forest Vegetation Types[1] Within Elements in Northumberland Lowlands

Element	Seral Stage					
	Early	% *	Middle	%	Late	%
Jack Pine Hummocks and Ridges	IH1, IH6, OW1, OW2, OW4, SP1, SP2	29.0	CE2, SP3, SP4, SP6, SP8	23.0	**SP5**	23.0
Spruce Pine Hummocks	IH1, IH2, IH4, IH6, OW2, OW4, SP1, SP2, SP10	27.0	CE2, SP3, SP4, SP6, SP8	25.0	**SP5**, SP7, SP9	28.0
Red Spruce Hummocks	IH1, IH3, IH4, IH5, IH6	37.0	MW2, MW4, MW5, SH5, SH6, SH7, SH8, SH10	26.0	**SH1**, SH2, **SH3**, SH4	19.0
Red and Black Spruce Hummocks	IH1, IH4, IH5, IH6, SP10	24.0	MW4, MW5, SH5, SH6, SH7, SH8, SH10, SP4, SP6, SP8	30.0	SH1, SH2, **SH3**, SH4, **SP5**, SP7	26.0
Tolerant Mixedwood Hills	IH3, IH5, IH6	39.0	IH7, MW2, MW4, MW5, SH5, SH6, SH8, SH10	27.0	**MW1, MW3**, SH1, SH2, SH3, TH1, TH2, TH3, TH4, TH8	17.0
Salt Marshes	Grasslands of *Spartina spp.*					
Coastal Beaches	CO7, beach grass, bayberry, rose spp., white spruce					
Wetlands	CE1, WC1, WC2, WC3, WC4, WC5, WC6, WC7, WD1, WD2, WD3, WD5, WD6, WD7, WD8					

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

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

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

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

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

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

- Reserve, such as parks or wilderness areas

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

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

A summary of land use intensities provides an overall EEI of 49 to 57 for the ecodistrict (Appendices 12a and 12b). This would suggest that overall intensity of land use for the Northumberland Lowland Ecodistrict is currently at a changed state affecting both the structure and function to support habitat (for all species) and for biodiversity conservation.

A GIS-based classification of current land use indicates that 57% of the total land area falls within the extensive management class.

An additional 6% of lands fall in the intensive EEC and are intensively managed 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, 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.

The remaining lands are split between the reserve class (1%) and the converted class (21%). The reserve class is divided into legal reserves and policy reserves. Legal reserves are areas that have legal status under IUCN (International Union for the Conservation of Nature) codes of I, II or III, such as wilderness areas, protected beaches, and designated provincial parks. The second type of reserve is for areas under various provincial policies, such as old forests or the Eastern Habitat Joint Venture lands.

Reserve representation within Northumberland Lowlands is relatively low because of the small percentage of Crown land holdings. There is an opportunity to add additional lands to the reserve class under the Old Forest Policy by selecting community types that presently have insufficient representation or community types that are rare within the ecodistrict and/or ecoregion.

Converted lands are those areas that have been altered by human settlement, farming, urban development, and transportation and utility corridors. These converted lands are predominately located around the major river corridors, villages, and towns. These lands are given a zero EEI class in their present state but some locations, especially along the river corridors, show opportunity for restorative measures to the predicted climax stands of spruce, elm, sugar maple, and white ash.

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

Road Index (Appendices 6, 7; Map 5)

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

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

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

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

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

Currently, the Northumberland Lowlands Ecodistrict has an overall RI value of 15 (Appendix 7, Table 3). This average falls within the Forest Resource RI range of 7 to 15 and may be described as moderately low. Only 5% of the ecodistrict has a Remote RI of 0 to 6 (Appendix 7, Table 2).

Sixty-two percent of the ecodistrict area has road indices occurring in the Forest Resource and Mixed Rural categories.

As expected, the highest road densities occur around the settlements, town, and main transportation systems. An RI of 31 in these areas place them in the Agriculture and Suburban category. These high road indices bisect the ecodistrict in numerous areas because of the number of river corridors and human settlement contributing to habitat fragmentation.

Roads can contribute to habitat fragmentation and environmental degradation. Since more than 90% of land ownership in the ecodistrict is in private hands, efforts could be made to:

- Conserve the relatively low road densities in the matrix (RI of 11) through strategic scheduling of new access and decommissioning where possible. Private woodland owners may be able to decommission select roads and share access.
- Access systems must be scheduled for regular maintenance or decommissioning, particularly where connectivity or additional reserves are to be established.
- Recreational trails should utilize old abandoned trails or logging roads before additional trails are established.
- Seek to improve the distribution and connectivity among the few low road density areas (e.g. Little River, Amherst area, Chignecto Isthmus, Lower Wentworth, and Mine Brook) where this may improve connectivity among natural areas and linkages to neighbouring ecodistricts.

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

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

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

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

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

The primary species data used in this report are from the Atlantic Canada Conservation Data Centre and DNR’s Significant Habitat Database. Efforts are made to ensure data are as accurate

and up-to-date as possible. Lists and maps indicate what is currently known. Due diligence tied to planning, management, and stewardship may require that surveys be carried out to update information or to fill gaps in our knowledge. Priority species may require special actions in terms of forest management and other activities that alter habitat and the landscape. If more information is required or if management specific to a priority species needs to be developed, a regional biologist, Wildlife Division staff, or other species experts should be contacted.

This section includes species at risk (refer to Table 1a, Appendix 3), species of conservation concern (Table 1b, Appendix 3), other conservation features (Table 1c, Appendix 3), and heritage features (Table 1d, Appendix 3, where available). *The list of species at risk and species of conservation concern 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 (See http://novascotia.ca/natr/wildlife/biodiversity/at-risk-overview.asp).

Species of Conservation Concern

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

Species Ranking and Coding Systems

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

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

A second system commonly used is NatureServe Conservation Data Centre system. This system uses numbers from one (extremely) to five (widespread, abundant) to denote the relative rarity

and conservation concern for species. At the provincial scale numbers are prefixed with "S" to indicate that this is a state/provincial level rank. Ranks at the National (N) and Global (G) levels are also available for all species. In Nova Scotia, the Atlantic Canada Conservation Data Centre (http://www.accdc.com/) works with partners to provide ranks and data on species' occurrence.

As of 2013 in the Northumberland Lowlands Ecodistrict, there are documented occurrences (under the NSESA) of the following number of formally listed species: eight endangered, five threatened, and five vulnerable. In addition to the listed species, the National General Status process also identifies one red species, 47 orange species, 78 yellow species, 60 green species, and 12 undetermined species for a total of 198 other species of conservation concern in this ecodistrict.

Designated species at risk found within the Northumberland Lowlands include black ash, eastern lilaeopsis, eastern white cedar, moose, little brown bat, brook floater mussel, ram's head lady slipper, snapping turtle, wood turtle, and several species of birds (red knot, chimney swift, piping plover, common nighthawk, olive-sided flycatcher, eastern wood-pewee, bobolink, barn swallow, and Canada warbler).

Other species of conservation concern known in the Northumberland Lowlands Ecodistrict include spotted sandpiper and common loon (birds); cuckoo flower, blue cohosh, and northern bog violet (dicots); lance-leaf grape-fern and meadow horsetail (ferns and their allies); taiga bluet and salt marsh copper (insects); eastern lampmussel and tidewater mucket (mollusks); canada lily and showy lady slipper (monocots); four-toed salamander (amphibians); atlantic salmon (fish).

Old Forest

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

Birds

As of 2013, 12 species of birds found to be present in the ecodistrict are designated at risk. Nine of these are listed under the NSESA: the red knot, chimney swift, piping plover, barn swallow, and Canada warbler as endangered; the common nighthawk, olive-sided flycatcher as threatened; the bobolink and eastern wood-pewee as vulnerable.

Nationally, seven species are listed under SARA: piping plover as endangered; the chimney swift, common nighthawk, olive-sided flycatcher, and Canada warbler as threatened; and the short-eared owl and Barrow's goldeneye as special concern. COSEWIC has designated 12 species: the piping plover as endangered; the chimney swift, common nighthawk, olive-sided flycatcher, Canada warbler, bobolink, barn swallow, and bank swallow as threatened; the short-eared owl, eastern wood pewee, and Barrow's goldeneye as special concern.

Generally there has been a nationwide decline in aerial insectivores, which are commonly attributed to a decline in flying insects. Most likely the population decline is influenced by multiple causes such as habitat loss, change across the landscape, and a decline in insects.

The common nighthawk prefer open habitats such as beaches, dunes, grasslands, barrens, pastures, recently cleared lands, and flat graveled roof tops in urban areas. The decline in the common nighthawk population is likely attributed to habitat loss and modifications along with reduced availability of flying insects.

The olive-sided flycatcher prefers spruce and fir swamps and bogs with open water. This species has experienced long term declines attributed to habitat loss in wintering grounds, a decline in insects, and climate change.

Eastern wood-pewee can be found in deciduous forests typically along the edges and clearing with closed canopy and open understory conditions. This species has declined over the past few decades and almost exclusively feeds on flying insects. The decline in population is most likely attributed to a combination of loss of habitat in the wintering range, current forestry practices, and climate change.

The bobolink is associated with large open grasslands and hayfields. Declines are due to mortality from agricultural practices, habitat loss and fragmentation, and bird control methods.
Barn swallows have declined across North America since the 1980s. They nest at artificial sites such as barns, under bridges, culverts near farmlands, marshes, lakes, and rural areas. The loss of important artificial nesting substrates and changes to farming practices may be implicated with population declines.

The bank swallow has shown a decline over the past number of years. They nest in exposed bank faces that include river banks, hardened sawdust piles, coastal bluffs, and gravel pits. Declines are attributed to loss of nesting, breeding and foraging habitat.

The Canada warbler has shown significant declines over the past few decades. They can be found to occupy a variety of different habitat types, but prefer mixed forests with dense undergrowth. Population declines are not well understood but habitat loss in the wintering range is most likely a significant influence.

The chimney swift historically nested in large hollow trees which they still do today, but they also prefer abandoned chimneys that maintain a constant temperature. They have undergone a significant decline in the last several years that is not well understood but likely involves habitat changes, pesticide application, and a change in insect populations.

The short-eared owl has declined over the past 40 years, most likely the result of habitat loss on its wintering grounds and continued habitat loss on breeding grounds. It is found primarily in meadows, marshes, and open woodlands. In the Northumberland Lowlands most occurrences are associated with coastal marshes.

Piping plover are small shorebirds found on coastal beaches of sand and pebble that are open or with little vegetation. Low population numbers are blamed on deterioration or loss of nesting habitat due to natural events, human disturbances, and predation by birds and mammals.

In the Northumberland Lowlands Ecodistrict, many of the observations are along the coast of Pictou County where more desirable habitat occurs such as James Beach, Big Island, Melmerby Beach, Sinclairs Island Beach, and Lighthouse Beach.

Although specific population trends for Barrow's goldeneye are unknown, it is believed that the eastern population had declined during the 20th century and still is. They nest in cavities and adapt easily to nest boxes. The barrow's goldeneye feeds on aquatic insects in inland waters during the breeding season while during the winter they target mollusks and crustaceans in coastal waters. Loss of habitat to breeding and nesting grounds from forestry activities is believed to be a threat to this species as well as fish stocking programs on inland lakes.

Cormorants are a common sight on the shore or on the piers of the Harvey A. Veniot Causeway in Pictou.

Dicots

Two species at risk are documented for the Northumberland Lowlands: black ash and eastern lilaeopsis.

In 2006, eastern lilaeopsis was listed under the NSESA as vulnerable. It is a semi-aquatic perennial plant that is found in the intertidal zone and it is highly restricted geographically, only documented at three estuaries in the province. It's occurrence in the Northumberland Lowlands is associated with the River Philip. All indications are that the population has remained stable over the last 15 years and does not appear to have any immediate threats. Populations are susceptible to future shoreline development which could degrade the habitat.

In 2013, black ash was listed under the NSESA as threatened; there are an estimated 1,000 individuals and only 12 mature trees in the province. There are a few occurrences of black ash reported in the Northumberland Lowlands Ecodistrict, that are, for the most part associated with the major watersheds.

Gymnosperms

In 2006, eastern white cedar was listed under NSESA as vulnerable; only 32 stands are identified provincially. The population is fragmented and comprised of small stands that appear genetically separate from each. This species is typically found in riparian areas, woodland forests, and old pastures preferring nutrient rich, cool, moist habitats. In the Northumberland Lowlands Ecodistrict, most of the occurrences are in the Oxford area.

Insects

Monarch butterflies are designated by COSEWIC and listed under SARA as special concern but have no provincial listing. They are grouped with the milkweed butterflies of the family Danaidae, which also includes the viceroy. The monarch is the most common of this group, occurring throughout the U.S. and Southern Canada and it is also one of the few butterflies that are migratory. Monarch habitat in Nova Scotia includes fields, meadow, abandoned farmland, and along roadsides that have a presence of milkweed. Monarchs will only lay their eggs on the leaves of milkweed, which is the primary food for the developing caterpillars. The monarch may occasionally be observed in the Northumberland Ecodistrict.

Mammals

Moose on the mainland of Nova Scotia have been listed as endangered under the Nova Scotia Endangered Species Act (2003). Mainland moose are genetically distinct from those on Cape Breton Island, where moose populations are healthy. The Northumberland Lowlands Ecodistrict is an important area for moose, much of it falls within a large area that has been identified as a significant concentration area for mainland moose. This area is considered to be "occupied moose habitat" (an area with recurrent observations of moose over time), and moose are occasionally observed in low numbers.

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

emergent vegetation are used for both feeding and cooling during the summer. The availability of suitable habitat for endangered mainland moose is important in maintaining its future presence. Special management practices for mainland moose are applied for forestry activities on Crown land in designated concentration areas.

(See http://novascotia.ca/natr/wildlife/habitats/terrestrial/pdf/SMP_Mainland_Moose.pdf).

Application of these practices during forest management planning specifically aim to conserve calving areas, aquatic feeding areas, and thermal refugia. The Forest / Wildlife Guidelines and Standards provide minimal habitat specifications for moose on Crown land through the 8% retention for old growth and maintenance of reasonable age class distribution.

In 2013, the little brown myotis was listed under the NSESA as endangered. The population has experienced an alarming decline due to a disease known as white-nose syndrome caused by the fungus *Pseudogymnoascus destructans*. This disease has killed nearly seven million bats in eastern North America in the past eight years and estimates of a 90% decline in Nova Scotia over three years. Currently there is no known cure for the disease and it effects all bats that hibernate in caves and abandoned mines during the winter. There is one documented hibernation site near New Glasgow within this ecodistrict.

Reptiles

Wood Turtle is designated by COSEWIC as threatened and listed under the federal SARA and NSESA as the same. Based on species occurrence information, the Northumberland Lowlands Ecodistrict is not likely to support a large number of wood turtle. Infrequent sighting reports are associated with several watersheds in this ecodistrict. Threats to the population include loss of habitat and degradation from development along rivers, translocation by people, and road mortality.

The snapping turtle population is relatively stable and in most watersheds in the province they remain fairly common. However, populations are under increasing threats that includes illegal harvest, road mortality, nest failures, low recruitment, and high juvenile mortality. The snapping turtle is listed as vulnerable under the NSESA and special concern under the federal SARA and COSEWIC.

Mollusks

Only one species of mollusk species at risk is documented for the Northumberland Lowlands, the brook floater. In 2013, this freshwater mussel was listed under the NSESA as threatened with only five known locations in the province. The brook floater prefers shallow rivers or streams with a moderate to high water flow; occasionally they have been found to occur in small lakes with a sandy bottom.

Threats to this species include changes to water quality and quantity, often the result of shoreline development, sedimentation, and agricultural practices.

Two locations in the central portion of this ecodistrict have reports of brook floater presence, one of these dates back to the mid-seventies and therefore further surveys would be required to confirm.

Monocots

The ram's head lady slipper is listed as endangered under the NSESA, and has no designation or listing under COSEWIC or SARA. It is a small, herbaceous perennial orchid found in open forest with cool soils and a neutral pH. In Nova Scotia the ram's head lady slipper has only been found in Hants and Cumberland counties and is associated with gypsum bedrock and sinkholes.

Threats to this species include loss and destruction of habitat due to gypsum mining, forestry, agriculture, and development. Competition with exotic species, off-highway vehicle (OHV) disturbance, and collection by humans are also potential threats. Currently there is one known area of significance in the Northumberland Lowlands Ecodistrict, near Lower Wentworth, where the ram's head lady slipper is documented.

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

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

Landscape elements were identified by combining ecosections with similar characteristics. Table 9 provides explanations of ecosections and their relationship to elements. Ecosections that are rare (< 2% of ecodistrict area) or under high land use pressure (> 75% land conversion) are identified in Appendix 3.

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

530 Northumberland Lowlands Ecodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Spruce Pine Hummocks (Matrix)	IMHO IFHO IFDM IMDM	Frequent	black Spruce (bS), white Pine (wP)
Red Spruce Hummocks (Patch)	WFHO WFRD WMHO WMRD	Frequent	red Spruce (rS)
Tolerant Mixedwood Hills (Patch)	WFKK WMKK WCKK IFKK WCDS	Gap	rS, wP, sugar Maple (sM), yellow Birch (yB), Beech (Be)
Red and Black Spruce Hummocks (Patch)	IFRD IMRD	Frequent	rS, bS, wP
Jack Pine Hummocks and Ridges (Patch)	ICHO WCHO WCRD	Frequent	bS, wP, jack Pine (jP), red Pine (rP)
Wetlands (Patch)	WTLD	Open Seral (Frequent)	rM, bS, tamarack (tL)
Valley Corridors (Corridor)	Various	Various	Various

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

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

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

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

A majority of the ecosections (ICSM, IFDM, IFKK, IFSM, IMDM, IMSM, WCDS, WCKK, WCRD, WCSM, WFHO, WFRD WMRD, and WTLD) found in Northumberland Lowlands Ecodistrict 530 each comprise 2% or less of the ecodistrict (Appendix 3, Table 2).

Two of these ecosections, IFDM, and WCRD, located within the Spruce Pine Hummocks and the Jack Pine Hummocks and Ridges elements, have the highest land use pressures at 53% and 70% respectively from being converted to human settlement, farming, and other development activities.

These same ecosections form more than two percent in the ecoregion and land use pressures for the IFDM ecosection is also greater than 50% within the ecoregion.

No ecosection is more than 70% converted. Old growth stands have been identified on 1,528 hectares, or 9%, of the Crown lands under the Old Forest Policy (Appendix 5). Two of the largest community types (black spruce, white pine, and red spruce) have adequate or more than adequate representation (>8%), according to targets outlined in the Old Growth Policy.

The policy targets note that elm, sugar maple, and white ash are rare at less than 1% of the total area within the ecodistrict and ecoregion. Red spruce, eastern hemlock, sugar maple, yellow birch, and beech are uncommon within this ecodistrict. Representation of these community types will be required from other ecodistricts within this ecoregion.

Practices or policies that might be implemented or devised to address conservation issues include:

- Support for uncommon forest species whose genetic viability may be threatened as indicated by DNR's endangered species rating system.
- Fine filter management opportunities related to conservation of significant habitats.
- Recognition of importance of uncommon community conditions (e.g. old age, large live and dead trees and species associations).
- Increased representivity of the uncommon old forest communities.
- Implementation of restorative measures in community types, such as elm, sugar maple, and ash stands along the river corridors or jack pine, black spruce, and white pine, where conversion to other species or uses is high.

Ecological Representivity (Appendices 4, 5)

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

The overall goal is biodiversity conservation through protection of natural habitat diversity. Ecological representation is employed as a "coarse scale" ecosystem planning concept. The analysis evaluated and identified the reserve status of the ecosections and climax communities located within the ecodistrict where two levels of reserves were recognized: legally protected reserves, such as Wilderness Areas; and policy protected reserves under the IRM classification to include old forest, Eastern Habitat Joint Venture Sites, non-designated provincial park reserves, and non-designated sites of ecological significance.

The IUCN is The World Conservation Union (formerly the International Union for the Conservation of Nature) which developed an international system for categorizing and reporting on the world's protected areas.

Protected beaches, sites of ecological significance under moratorium, and areas under the Special Places Act are legal reserves under the IUCN I, II, III, accounting for only 322 hectares, or 0.1%, of the ecodistrict (Appendix 4). There are no wilderness areas in Northumberland Lowlands.

An additional 2,414 hectares are defined as policy reserves, including old forest sites set aside under the provincial Old Forest Policy along with designated provincial parks and park reserves, national wildlife management areas, operational non-designated parks and park reserves, wildlife habitat sites under Eastern Habitat Joint Ventures, Ramsar Wetland Sites, and national wildlife sanctuaries. These legal and policy reserve classes account for 2,736 hectares, or 1%, of the area of Northumberland Lowlands (Appendices 4 and 5).

Since provincial Crown lands only represent about 6% of the ecodistrict, opportunities to improve representation will have to be directed to private lands in the form of programs offered by organizations such as Eastern Habitat Joint Venture, Nature Conservancy of Canada, and Nova Scotia Nature Trust. Priority sites and strategies to improve representation should include:

- Uncommon or rare climax community types, such as jack pine, black spruce, and white pine in the Jack Pine Hummocks and Ridges patch element; red spruce in the WFHO and WMRD ecosections which are under heavy land use pressures in the ecodistrict; and elm, sugar maple, and ash that form less than 2% in the ecodistrict and ecoregion (IMSM).
- Additional old forest area in all climax community types, with the exception of black spruce, white pine, and the red spruce.
- Connectivity among wetlands and river corridors.

ELA Summary

Element Interpretation (All appendices and maps)

This lowland area in northern Nova Scotia follows the Northumberland Strait coastline from the New Brunswick border in Cumberland County to northeastern Pictou County. The Northumerland Lowlands Ecodistrict is surrounded by the Cobequid Mountains, Pictou Antigonish Highlands, and the Cumberland Hills. On this low plain, elevations only exceed 50 metres in a few areas, including Leicester Ridge, Wallace Ridge, and Streets Ridge. The ecodistrict has a significant moisture deficit during the growing season second that is only to the Annapolis Valley.

The surficial till of the ecodistrict is derived from the underlying Carboniferous sedimentary rocks. The most prominent are the fine red sandstones, siltstones, and shales found on the cliffs along the Northumberland shore. Scattered throughout the ecodistrict are deposits of gypsum and salt.

The most notable karst topography – formed in areas where bedrock of carbonate-rich rock, such as limestone and gypsum, creates underground streams, fissures, and sinkholes – is near Oxford where many of the smaller sinkholes are filled with water.

Only the Nappan River watershed flows westward to the Cumberland Basin while the remaining watersheds drain north to the Northumberland Strait. Fresh water in lakes and rivers comprises only 1.6% of the ecodistrict.

Imperfectly drained reddish brown sandy loams, loams, and clay loam soils found on compact, slowly permeable, basal tills derived mainly from red sandstones and shales characterize the

ecodistrict. Due to the compacted nature of the subsoil most water is removed laterally or through evapotranspiration. Better-drained soils are found on the upper slopes on permeable sandy loam tills. Ridged topography, usually with a thick veneer of till, is prominent throughout the ecodistrict, especially in northern Colchester County.

The ecodistrict is dominated by coniferous forest, with black and red spruce the main species. Following disturbance, either by natural causes or forest harvesting, sites are usually invaded by early successional species, such as balsam fir, red maple, white birch, grey birch, and trembling and largetooth aspen.

Natural disturbances include fire and windthrow. The warm summers and significant moisture deficit that occurs in many parts of the ecodistrict create the conditions for fire. Fire-origin forests of jack pine, red pine, and black spruce are common near Oxford, Springhill, and Thomson Station.

Elsewhere, the imperfectly drained soils create shallow rooting conditions for trees making them susceptible to windthrow. On abandoned farmland, alders commonly establish, followed by forests of white spruce, tamarack, and aspen.

The better-drained, upper slopes and hilltops of the ecodistrict will support a forest of tolerant hardwoods but these are uncommon. Eastern white cedar is found scattered throughout the ecodistrict, most notably near Oxford and Pugwash on poorly and imperfectly drained soils.

Spruce Pine Hummocks

(Matrix) (IMHO, IFHO, IFDM and IMDM ecosections) (139,916 ha)

The matrix is now very fragmented. Only 29% of the forest has forest communities of late seral species, such as red spruce, black spruce, and white pine. Fifty-two percent of the matrix has early to mid-successional communities of grey birch, aspen, pin cherry, red maple, balsam fir, red spruce, and white spruce, as a result of insect infestation and harvesting. Approximately 30% of the matrix is dominated by intolerant hardwood stands or intolerant-dominated mixedwood stands.

The EEC indicates that the index for IMHO and IFHO is 54 to 63 and 50 to 57 respectively, indicating a fairly high land use pressure and conversion of the black spruce, red spruce, and white pine areas (Appendix 3, Table 2). This EEC of 50 to 64 and conversions of 20% are consistent across the ecoregion with these ecosection types, indicating that the better-drained sites are being converted to other land uses while other areas are being regenerated to white spruce.

Flows

People (roads, timber, recreation, hunting, fishing, trapping, mines, energy (power lines); water (catchment, filter, groundwater recharge, vernal pools); deer (year-round habitat, deer wintering area); furbearers (food, denning trees, habitat).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006) **Composition of Spruce Pine Hummocks**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	30%	14%	56% (45 Mat + 11 OF)	11%
Seral Stage	Early	Mid	Late	Unclassified
	26%	25%	29%	20%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	48%	17%	30%	5%

Desired Condition

Spruce and pine-dominated softwood stands in a variety of patch sizes and development stages as well as a minimum of 40% of the forest in the mature class. Improved connectivity of mature forests among the wetlands and the many river corridors is also desired. Inclusions of hardwood and mixedwood knolls as well as 10 to 15% hardwoods within the spruce or pine-dominated stands to increase fertility, add diversity, and reduce fire risk.

Issues

- Early and mid-seral species comprise 51% of the forested area (Appendix 4).
- Unclassified lands account for 20% of the total area of the element (Appendix 10).
- Conversion exceeds 50% for the IFDM ecosection (Appendix 3, Table 2).
- Less than 5% of the area is under administration and control of the Crown.
- Poor connectivity among wetlands.
- Poor public access to ocean shoreline.
- Less than 2% of this element is in the reserve class (Appendix 4).

Red Spruce Hummocks

(Patch) (WFHO, WFRD, WMHO and WMRD ecosections) (48,364 ha)

This red spruce patch element occurs as numerous small fragmented areas throughout the ecodistrict.

The development classes are fairly well-balanced with 30% in the establishment, 14% in the young, and 56% in the mature and multi-aged classes.

Only 41% of this patch type is now softwood with 55% in the mixedwood and hardwood covertypes. Only 19% of this red spruce patch is in the late seral stage, with red and black spruce, hemlock, and pine dominating. Sixty-three percent is in the early and mid-seral stage with grey birch, pin cherry, aspen, red maple, and balsam fir dominating. There are 2,961 hectares of white spruce that has naturally regenerated or was planted after harvest.

This patch element type is located on the better well-drained, medium to fine-textured and more fertile sites of the ecodistrict. It is apparent that land use pressures for these richer, better-drained soils is high as conversion rates exceed 30% for each of the ecosections and the EEC is relatively low, ranging from 34 to 47 for the four ecosections.

The ecosections WFRD, WFHO, and WMRD form less than 2% of the ecodistrict and less than 4% of the ecoregion.

Flows

People (settlement, agriculture, forestry, recreation); water (catchment, groundwater recharge, vernal pools, filter); deer (habitat, cover, travel); furbearers (den trees, food for fishers).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006)
Composition of Red Spruce Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	30%	14%	56% (44 Mat + 12 OF)	12%
Seral Stage	Early	Mid	Late	Unclassified
	37%	26%	19%	18%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	41%	24%	31%	4%

Desired Condition

A softwood dominated patch type of red and black spruce, hemlock, and white pine, with inclusions of hardwoods and mixedwoods. A variety of development classes for the NDR and at least 40% of the forest in the late seral stages is desired.

Issues

- Only 41% of this patch element type is now softwood.
- Early and mid-seral species account for 63% of the ecodistrict.
- Over 30% of this community type is converted to agriculture, settlement, and other uses.
- Artificial regeneration of white spruce may be minimized with increased emphasis on planting more suitable species, such as red spruce, within this element.
- Less than 5% of this forest community within these ecosections occurs on Crown lands.
- Representation accounts for less than 2% within the ecodistrict.
- There is no legal representation of this patch element type on Crown lands (Appendix 4).

Tolerant Mixedwood Hills

(Patch) (WFKK, WMKK, WCKK, IFKK and WCDS ecosections) (36,937 ha)

Historically, this element contained a mixture of tolerant hardwoods of sugar maple, yellow birch, and beech, along with late seral softwoods of eastern hemlock, red and black spruce, and white pine located on well-drained, fine to medium-textured soils.

This patch element type occurs in two general locations. The first location is a band that extends from Oxford Junction northeast to Malagash and the second is in the area of the East River in Pictou County, extending northeast to the Woodburn area.

The present forest composition is in a slightly unbalanced state with a slight over-abundance in the establishment and young development classes (Appendix 10). This patch type is now only 40% mixedwood with softwood comprising 32% and hardwood covertypes accounting for 25%. Four percent of the area is unclassified. Only 17% of the forest is in the late seral stage with early and mid-seral species of aspen, red spruce and balsam fir, tamarack and red maple comprising the remaining 73%.

Flows

People (farming, forestry, hunting, OHV, trapping); water (catchment, groundwater recharge, filter, vernal pools, evapotranspiration); deer (habitat, food, cover, wintering areas - south slopes); furbearers (general habitat, dens); wood turtles (possible food if near rivers); salmon (food, temperature).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006)

Composition of Tolerant Mixedwood Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	27%	15%	57% (46 Mat + 11 OF)	11%
Seral Stage	Early	Mid	Late	Unclassified
	39%	27%	17%	17%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	32%	25%	40%	4%

Desired Condition

Mixedwood community of late seral species of red spruce, sugar maple, yellow birch, hemlock, and white pine with at least 60% of the community in mature, multi-aged, and old growth development class.

Issues

- Predominately gap and infrequent stand-initiating disturbance with only 17% of the area in the late seral stage.
- Hardwood stands are being converted to softwoods.
- EEI ranging from 46 to 54.
- 23% of this patch type has been converted to other uses.
- Less than 1% of the area within this patch type has been identified for reserve status and less than 5% is owned by the Crown (Appendix 4).

Red and Black Spruce Hummocks

(Patch) (IFRD and IMRD ecosections) (21,027 ha)

This patch element is located in two general areas. The larger patch is around Wentworth extending to West New Annan and Tatamagouche to West Branch River John. The second and much smaller area is located at Riverton and Ferrona Junction, south of Westville. The development classes are fairly well-balanced with 26%, 9%, and 64% in the establishment, young, and mature and multi-aged categories respectively.

Fifty percent of this once softwood-dominated element is now mixedwood and hardwood with only 47% remaining as a softwood covertype. Three percent is unclassified.

Twenty-six percent of this element is in the late seral stage with red and black spruce, white pine, and hemlock dominating. Fifty four percent of the forest is in the early and mid-seral stages with grey birch, pin cherry, aspen, balsam fir, and red maple dominating. Twenty percent of this patch type is unclassified. Sixty-eight percent of the mid-seral species is located in the mixedwood stands and 54% of the early successional species, such as aspen, pin cherry, grey birch, red maple, and balsam fir, is in the hardwood covertypes. Approximately 700 hectares of white spruce is located within this patch element.

This patch type is located on imperfectly drained fine to medium-textured soils. Each of the two ecosections in the element only represent about 3.8% of the ecodistrict and 2.4% of the ecoregion but the community type of red and black spruce and white pine represents 34.3% percent of the ecodistrict (Appendix 3, Table 2) and 27.8% of the ecoregion.

Land use pressures are highest around Waughs River, Balfron, Tatamagouche, and the French River. Within this ridged patch conversion ranges from 5% in the IFRD ecosection to 14.6% in the IMRD ecosection. Conversion within the ecoregion is 6.3 for IFRD and 13.8 for IMRD. The ecological emphasis classes are 59 to 70 and 54 to 61 for the IFRD and IMRD respectively.

Flows

People (forestry, agriculture, settlement, recreation); water (filter, groundwater recharge, vernal pools); deer (habitat, food, cover, travel); furbearers (den trees).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006)
Composition of Red and Black Spruce Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	26%	9%	65% (50 Mat + 15 OF)	15%
Seral Stage	Early	Mid	Late	Unclassified
	24%	30%	26%	20%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	47%	15%	35%	3%

Desired Condition

Late seral softwood stands of red and black spruce and white pine along with softwood-dominated mixedwoods of spruce, pine, red maple, sugar maple, and ash with a variety of development classes appropriate to the frequent disturbance regime.

Issues

- Only 47% of this patch is now softwood.
- Fifty-four percent of the area comprises early and mid-successional species.
- Unclassified lands account for 20% of the total area.
- Approximately 700 hectares of plantations of white spruce occur within this ecodistrict.
- Artificial reforestation in the planting of white spruce may be minimized and increased emphasis to planting more suitable species.
- Mixedwood patch type that presently has less than 1% representation. All representation is located on Crown under policy reserves (Appendix 4).

Jack Pine Hummocks and Ridges

(Patch) (ICHO, WCHO and WCRD ecosections) (12,619 ha)

The Jack Pine Hummocks and Ridges patch element comprises several areas, the largest and most noticeable at Springhill, Oxford, and Durham. The soils are coarse-textured, imperfect to well-drained and dominated by red and black spruce, jack pine, and scattered white pine. The patch type is still predominately softwood (49%) but mixedwood and hardwood covertypes account for 45%. Six percent is unclassified. The development classes are fairly well-balanced for the natural disturbance regimes. The early and mid-seral species of red maple, aspen, balsam fir, and white and grey birch dominate with 52% of the successional stage. Late successional species of black and red spruce and pine (white, red, jack) account for only 23% of the seral stage, with 24% unclassified.

Flows

People (farming, trapping, forestry, OHV, hunting); water (vernal pools, groundwater recharge, catchment, filter); deer (habitat and cover); furbearers (general habitat, cats, and fisher).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006) **Composition of Jack Pine Hummocks and Ridges**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	33%	15%	52% (39 Mat + 13 OF)	13%
Seral Stage	Early	Mid	Late	Unclassified
	29%	23%	23%	24%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	49%	12%	33%	6%

Desired Condition

A patch condition of late seral softwood of jack pine, black and red spruce, white pine, and softwood-dominated mixedwoods with a variety of development classes consistent with frequent stand-initiating disturbances.

Issues

- Only 49% of this uncommon community type is now softwood (Appendix 10).
- Early and mid-seral species account for 52% of this patch type.
- Unclassified lands account for 24% of the total area.
- Frequency of this jP bS wP community group is relatively low on provincial Crown lands (less than 7% in both the ecodistrict and the ecoregion) and area set aside for reserve status is less than 1% (Appendix 4).

Wetlands

(Patch) (WTLD ecosection) (1,825 ha)

A series of small to fairly large freshwater and saltwater wetlands that are scattered over the entire ecodistrict. The smaller wetlands appear to be connected in chains forming a corridor.

Wetlands at Mansfield, Tyndall Road, East Branch River John, Rogers Siding, Caribou, and Meadowville are the most significant locations.

These wetlands have a high significance within the lowland ecodistrict in water collection, filtering, groundwater recharge, moose habitat (covering, thermal protection, and feeding). These wetland areas are characterized by imperfect to poorly drained soils, stunted black spruce bogs, open bogs and fens, shrub swamps, or rare rich marshes.

Flows

People (hunting, trapping, birding); water (catchment, groundwater recharge, vernal pool); deer (habitat, food); furbearers (habitat - rats, beaver, otter, mink); eagles (food); wood turtles (over-

winter, depending on location); riparian zone plants (habitat); salmon and trout (provides clean, clear water); waterfowl (nests young, food, concentrations in the fall).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006)
Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	26%	12%	62% (47 Mat + 15 OF)	15%

Seral Stage	Early	Mid	Late	Unclassified
	20%	27%	30%	23%

Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	61%	12%	26%	1%

Desired Condition

A series of wetlands or wetland complexes connected in chains and interconnected to hydrological systems.

Issues

- Increased wetland loss from agriculture and urbanization.
- Fragmentation of wetlands is ongoing.
- Element contains rare ecosection with less than 2% of the area in reserves.

Valley Corridors
(Corridor) (Various ecosections) (23,673 ha)

Numerous river corridors dissect the ecodistrict in several locations. These corridors are generally a late seral softwood-dominated red and black spruce, jack pine, and white pine community. The higher slopes and knolls are gap disturbed with elm, sugar maple, and ash as the expected community.

These corridors are now only 41% softwood with 31% mixedwood and 24% hardwood. Only 27% of the forested area is in the late seral stage with spruce, pine, sugar maple, and ash as the dominant species. Sixty-one percent of the area contains early and mid-seral species of aspen, red maple, balsam fir, and grey birch.

The development classes are fairly well-balanced for the NDR. However, the forest within these major river corridors have been extensively converted for human settlement, urbanization, and farming.

Flows

People (canoeing, fishing, hunting and trapping, forestry, Wallace Bay National Wildlife Area, birding, habitation - Waughs River, French River, River John, Toney River, Caribou River, West

River, Three Brooks, Middle River, East River, Pugwash River); water (partial tidal - Wallace River, Dewar River, French, Waughs River, River John, Toney River, Caribou River, West River, East River, Sutherlands River, French River, and Barneys River, drainage, sewage treatment - East River); deer (travel, food, winter habitat - Dewar River, French River, Waughs River, Three Brooks); furbearers (travel, habitat); eagles (nesting, travel, habitat, nesting); wood turtle (habitat - Three Brooks, West River); riparian zone plants (habitat); salmon and trout (travel to ocean, spawning - West River); waterfowl (habitat, fall concentrations, food).

Current Composition

Northumberland Lowlands Ecodistrict 530 (based on statistics up to 2006)
Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	19%	13%	68% (53 Mat + 15 OF)	15%
Seral Stage	Early	Mid	Late	Unclassified
	36%	25%	27%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	41%	24%	31%	4%

Desired Condition

Well-connected slopes and intervals in a natural forest condition.

Issues

- Element has high Road Index and low EEI (Appendix 7, Table 3, Appendix 12b).
- Sixty-one percent of the patch has early and mid-seral species.
- Narrow buffers are being left on smaller streams.
- Certain vegetation types being removed within these Valley Corridors.
- Less than 2% under reserve status in element.

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Northumberland Lowlands 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:

- Northumberland Lowlands is located in a relatively rural area that is heavily forested but it has a high intensity of land use as indicated by the EEI of 49 to 57, an average of 21% conversions and an average Road Index value of 14.

- Early and mid-seral species comprise as much as 52% of the forested area of some of the element types (Appendix 10).
- Unclassified lands account for 15 % of the total area of the ecodistrict (Appendix 12).
- Conversion of forest lands to other uses exceeds 50% for the IFDM ecosection (Appendix
- 3, Table 2).
- Less than 6% of the area is under administration and control of the Crown.
- Wetlands have poor connectivity.
- Only 17% of the area is in the late seral stage.
- Hardwood stands are being converted to softwoods.
- EEI has wide range, from 22 to 70.
- In the Tolerant Mixedwood Hills patch element, 23% has been converted to other uses.
- Poor public access to ocean shoreline in ecodistrict.
- Over 30% of the Red Spruce Hummocks element has been converted to other land uses.
- High percentage of reforestation efforts is with white spruce.
- Increased wetland loss from agriculture and urbanization.
- Certain vegetation types are being removed from the Valley Corridors element.
- Less than 2% of the matrix element is in the reserve class (Appendix 4).
- Predominately gap and infrequent stand-initiating disturbance within the Tolerant Mixedwood Hills element with only 17% of the area in the late seral stage.
- Frequency of the jP bS wP community group is relatively low on provincial Crown lands (less than 7% in both the ecodistrict and the ecoregion) and area set aside for reserve status is less than 1%.

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Furbearers (beaver, fisher, coyote, fox, bobcat)	Eagles	Wood Turtles	Riparian Zone Plants	Salmon/Trout	Waterfowl
Matrix Spruce Pine Hummocks IMHO, IFHO, FDM, IMDM	Timber, roads, OHV's recreation, hunting, fishing, trapping, mines, power lines	Catchment, filter, groundwater, vernal pools, recharge, evapotranspiration	Year round habitat - DWAs	Food, Denning Trees - Habitat		Feeding, habitat		Feeder streams, habitat	Habitat, nesting
Corridor Valley Corridors IMHO, WMHO, ICSM, IFHO, WCHO, IMSM, ICHO, IMRD, WCSM									
Wallace River	Recreation - canoeing, fishing, hunting, and trapping - residence Forestry/ Agriculture - travel	Movement - S to N - Partial Tidal - drainage	- Travel - Some wintering - Food	- Travel - Habitat water, furbearers - fisher, fox	- Travel - Habitat - Nesting	Possible habitat presence unknown	Habitat	travel to ocean - habitat	habitat - Fall/winter concentrations
Dewar River	Recreation - canoeing, fishing, hunting, and trapping - residence - Travel	Movement - East to West - Partial Tidal - drainage	Travel - Wintering	Travel - Habitat water furbearers	Habitat Food	Possible habitat presence unknown	Habitat	travel - Angevine Lake - Ocean	Habitat - breeding
Wallace Bay	Wallace Bay National Wildlife Area - Birding, hunting, trapping - trails	Tidal, Confinement		Habitat, Rats (upper end) otter, mink	Food			Habitat	- Fall concentrations

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Furbearers (beaver, fisher, coyote, fox, bobcat)	Eagles	Wood Turtles	Riparian Zone Plants	Salmon/Trout	Waterfowl
Wallace Bay	Wallace Bay National Wildlife Area - birding, hunting, trapping - trails	Tidal, Confinement	_____	Habitat, Rats (upper end) otter, mink	Food	_____	_____	Habitat	- Fall concentrations
French River	Recreation - fishing, hunting and trapping - forestry, agriculture, habitation - travel	Movement - East to West - tidal at mouth - drainage	Travel, habitat - D.A.	Travel, habitat muskrats, beaver, otter	travel - habitat (nests, food)	Possible habitat presence unknown	Habitat	Travel Habitat	Habitat
Waughs River	Travel - Habitation Agriculture/Forestry - Recreation - canoeing, fishing, hunting, and trapping	Movement - South to North -Tidal ~ three kilometres Drainage	Travel - Winter habitat	Travel, habitat muskrats, beaver fisher, fox	travel - habitat (nests, food)	Possible habitat presence unknown	Habitat	Travel/Habitat - Brown trout - Salmon - waterfowl barrier	Habitat - Fall concentrations at mouth
River John	Travel -Habitation - Agriculture/Forestry - Recreation - Hunting, fishing, paddling, birding	South to north movement - partial tidal - drainage	Travel habitat (winter)	Travel - habitat otter, fisher, mink, beaver, fox, raccoon	Important habitat - nesting/ food	Possible habitat presence unknown	Habitat	Travel - habitat	- Fall concentrations at mouth
Toney River	-Habitation - Agriculture/Forestry - Recreation -, fishing, fleet at mouth	South to north movement - partial tidal - drainage	Habitat	Travel - Habitat	Food	_____	Possible habitat	Trout habitat	Limited - Breeding
Caribou River	Tourism - Habitation - Fish, Trap, Hunt	East to west movement - partial tidal - drainage	Habitat	travel - habitat muskrat, otter, beaver	travel - habitat (nests, food)		Possible habitat	Trout habitat	- fall concentrations - breeding
Three Brooks	Fishing, Trapping, Settlement, Farming, Forestry	Drainage	travel corridor - D.A.	Habitat, Food, beaver	Food, Nesting	Habitat		Habitat	Food, habitat, nesting

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Furbearers (beaver, fisher, coyote, fox, bobcat)	Eagles	Wood Turtles	Riparian Zone Plants	Salmon/Trout	Waterfowl
West River	Settlement, Agriculture, fishing, hunting, recreation - birding, trapping	Major drainage - partial tidal	habitat - wintering area, travel corridor	habitat, food, travel fisher, otter, mink	extensive use for nesting and food	Habitat	Canada lily and others	Fall spawning	Food, habitat, nesting
Middle River	Settlement, Agriculture, fishing (small mouth bass), hunting, recreation - birding, trapping	Non tidal (dam for Neenah Paper)	habitat - wintering area, travel corridor	habitat, food, travel otter, fisher, muskrats, mink	extensive use for nesting and food	Habitat	Canada lily and others	Fish ladder, limited run	Food, habitat, nesting
East River	Recreation - boating, birding trapping. - no small mouth bass - designated trails - most populated and developed	Stellarton's water supply - Tidal - Sewage treatment - Eureka, Trenton	habitat - wintering area, travel corridor	habitat, food, travel beaver, muskrats, fisher, otter, raccoon	extensive use for nesting and food	Habitat	Canada lily and others	Best river of three - fall fishing popular	Food, habitat, nesting
Sutherland River	Fishing (trout), trapping, swimming, hunting, birding	Drainage - Tidal	habitat - wintering area, travel corridor	habitat, food, travel fisher	extensive use for nesting and food	Habitat	Canada lily and others	Habitat	Food, habitat, nesting
French River (Pictou)	Fishing (Brown trout), hunting, trapping, forestry	Drainage - Tidal	habitat - wintering area, travel corridor	habitat, food, travel fisher, fox	extensive use for nesting and food	Habitat	Canada lily and others	_____	Food and Habitat
Barleys River	Fishing (Brown trout), hunting, trapping, - forestry aquaculture	Drainage - Tidal	habitat - wintering area, travel corridor	habitat, food, travel fisher, otter, fox	new nesting	Habitat	_____	Habitat	Habitat - food
Tignish River	Boating, recreational trails	Partial tidal drainage		Food, habitat travel beaver, fox		_____	_____	Habitat	Habitat - food
Shinimicas River	Wharf (fishing)	Partial tidal drainage		Travel and habitat beaver, fox	Nesting and food	_____	_____	Habitat	Habitat - food

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Furbearers (beaver, fisher, coyote, fox, bobcat)	Eagles	Wood Turtles	Riparian Zone Plants	Salmon/Trout	Waterfowl
Goose Creek				Habitat, travel muskrats			Rare plants	Habitat	habitat - food
River Philip	Recreation - canoeing, fishing, hunting and trapping - residence Forestry/ Agriculture - Travel	Drainage Partial tidal	Some wintering	habitat, travel beaver	Nesting and food	Possible habitat presence unknown	Plants and cedar	habitat travel to ocean	habitat - food, broods
Pugwash River	Habitat, fishing, wharf recreation, Yacht Club, sailing	Partial tidal drainage	some wintering	travel habitat beaver	Nesting, food	Possible habitat presence unknown		habitat travel to ocean	habitat - food broods
Patches Red Spruce Hummocks WMHO, WFRD WFHO, WMRD	Settlement Agriculture - Forestry, OHVs - Recreation	catchment, ground recharge, filter, vernal pool, evapotranspiration	habitat, cover, travel	Den trees - food - fisher	Nesting when near coast and rivers	_____	_____	Food - Temperature	_____
Red and Black Spruce Hummocks IFRD, IMRD	Settlement - Agriculture - Forestry - OHVs - Recreation	catchment, ground recharge, filter, vernal pool, evapotranspiration	Habitat Food, cover travel	den trees - fisher - bobcats	_____	_____	_____	Food - Temperature	_____
Jack Pine Hummocks and Ridges ICHO, WCHO, WCRD	Farming, Forestry, Hunting, OHVs, Trapping	catchment, ground recharge, filter, vernal pool, evapotranspiration	Habitat, Cover	General habitat Cats/Fisher	_____	_____	_____	Food Temperature	_____

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Furbearers (beaver, fisher, coyote, fox, bobcat)	Eagles	Wood Turtles	Riparian Zone Plants	Salmon/Trout	Waterfowl
Tolerant Mixedwood Hills WFKK, WCKK, WMKK, IFKK, WCDS	Farming, Forestry, Hunting, OHVs, Trapping	catchment, ground recharge, filter, vernal pool, evapotranspiration	Habitat - Food, cover - D.A. - south slopes	General habitat - dens - fox - fisher	Nesting if near coast and rivers.	possible food if near rivers	_____	Food Temperature	_____
Wetlands WTLD	Hunting, trapping, birding	catchment, ground recharge, filter, vernal pool, evapotranspiration	habitat food	Habitat - rats, beaver, otter, mink	food	overwinter - depends on location	habitat	provides clean, clear water	nests young, food, concentration in fall

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	Matrix	High	Waterfowl- Wallace, Caribou, Pictou, Merigomish Harbour - old forests, beaches, coastal flats - double crested cormorants - Waughs River, River Philip, West River	Large prominent matrix extending over the entire ecodistrict - variety of old forest patches - larger patches in the Mattatall Lake area	Frequent	Mixture of all covertypes dominated by mature late seral softwood rS and bF with mixedwood accounting for 30% in the mature mid-seral Stage - rM, rS and bF early successional aspen, rM and birch dominate the hardwood	Ocean - softwood and mixedwood patch of rS, rM, bS and scattered pine	Extensive road network - Numerous river corridors and valleys that dissect the ecodistrict	Quantity of early and mid-successional species - small percentage of land owned by the Crown - road network or road index	Increase crown ownership - promote mid and late seral species - decommission roads that are no longer used
Freshwater wetland	Patch	High	- Mansfield/ Tyndall Road - East Branch River John - Rogers Siding, Caribou, Meadowville	Across Landscapes - small to large majority of small wetlands are connected in chains (corridors)	Frequent	Dominant - treed bogs across the lowlands - open bogs and fens (2nd) - shrub swamps (3) - Rare - rich marshes	Imperfectly drained (IMHO, IFO) bS/wP, rS, bS.	River corridors/ valleys - East River industrial area - extensive road network in ecodistrict - ridged ecosections (IFRD, IMRD)	- wetland loss, degradation - New Glasgow, Pictou, Trenton, Stellarton, Oxford - Roads - extensive - Fragmentation	Maintain freshwater wetlands - Maintain in natural isolation - decrease losses to agriculture and urbanization
Saltwater wetlands	Patch	- Highly important in pockets - moderate landscape prominence	Coastal - River John, Wallace, Caribou, Fox Harbour	Merigomish Caribou, Little Harbour, River John, Pugwash, River Philip	Frequent	Spartina (invasive - cordgrass)	Ocean (salt and fresh water)	Dams, causeways - Middle and West River, Boat Harbour - Infilling	Infilling	

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
Red Spruce Hummocks	Patch	High	Intact - Fenwick, Stanley, Sutherland River Converted - East Wallace, Toney River, Marshville	Across landscapes - small to large - Most large patches converted to agriculture	Frequent	Red Spruce	Matrix Colchester, Cumberland, West Pictou - East Pictou - mix	Majority of WMHO is converted to Agriculture, farming, settlement - Fenwick/ Stanley (Not converted)	High capability land converted to agriculture/ settlement	Representivity- maintain non-converted - educate public on issues
Red and Black Spruce Hummocks	Patch	Medium	River John to Mattatall Lake (concentrated one location)	local	Frequent	- bS wP - rS bS	Matrix - dissected by River Corridors (Waughs/ French)	river corridors and transportation routes	Harvesting	Maintain non-converted - educate public on issues of harvesting and representivity
Tolerant Mixedwood Hills	Patch	High	Claremont north east to Malagash Mine	Local long patch type	Infrequent to Gap	rS sM yB Be eH	Matrix	river corridors and transportation routes	Conversion to - agriculture - settlement - softwood	Important mixedwood patch maintain non-converted areas, restore where possible reduce pressures on these ecosection types
Jack Pine Hummocks and Ridges	Patch	Medium	Oxford, Thomson Station, Conns Mills (Pictou), Six Mile Brook, Galt Brook	Local large patches	Frequent	jP bS wP	Mixedwood Hills and Matrix	transportation corridors	Development, regeneration of jack pine with fewer fires	maintain patch type using management strategies that will ensure regeneration of community type

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 530)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS				
Short-eared Owl	*Asio flammeus*	N/A	Special Concern	Special Concern
Barrow's Goldeneye - Eastern population	*Bucephala islandica (Eastern pop.)*	N/A	Special Concern	Special Concern
Red Knot rufa ssp	*Calidris canutus rufa*	Endangered	N/A	Endangered
Chimney Swift	*Chaetura pelagica*	Endangered	Threatened	Threatened
Piping Plover melodus ssp	*Charadrius melodus melodus*	Endangered	Endangered	Endangered
Common Nighthawk	*Chordeiles minor*	Threatened	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened	Threatened
Eastern Wood-Pewee	*Contopus virens*	Vulnerable	N/A	Special Concern
Bobolink	*Dolichonyx oryzivorus*	Vulnerable	N/A	Threatened
Barn Swallow	*Hirundo rustica*	Endangered	N/A	Threatened
Bank Swallow	*Riparia riparia*	N/A	N/A	Threatened
Canada Warbler	*Wilsonia canadensis*	Endangered	Threatened	Threatened
DICOTS				
Black Ash	*Fraxinus nigra*	Threatened	N/A	N/A
Eastern Lilaeopsis	*Lilaeopsis chinensis*	Vulnerable	Special Concern	Special Concern
GYMNOSPERMS				
Eastern White Cedar	*Thuja occidentalis*	Vulnerable	N/A	N/A
INSECTS				
Monarch	*Danaus plexippus*	N/A	Special Concern	Special Concern
MAMMALS				
Moose	*Alces americanus*	Endangered	N/A	N/A
Little Brown Myotis	*Myotis lucifugus*	Endangered	N/A	Endangered
MOLLUSKS				
Brook Floater	*Alasmidonta varicosa*	Threatened	N/A	Special Concern
MONOCOTS				
Ram's-Head Lady's-Slipper	*Cypripedium arietinum*	Endangered	N/A	N/A
REPTILES				
Snapping Turtle	*Chelydra serpentina*	Vulnerable	Special Concern	Special Concern
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 530)

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
Blue-winged Teal	*Anas discors*	May Be At Risk (Orange)	S3B
American Bittern	*Botaurus lentiginosus*	Sensitive (Yellow)	S3S4B
Brant	*Branta bernicla*	Sensitive (Yellow)	S3M
Purple Sandpiper Least	*Calidris maritima*	Sensitive (Yellow)	S3N
Sandpiper Semipalmated	*Calidris minutilla*	Secure (Green)	S1B,S5M
Sandpiper Northern	*Calidris pusilla*	Sensitive (Yellow)	S3M
Cardinal	*Cardinalis cardinalis*	Secure (Green)	S3S4
Pine Siskin	*Carduelis pinus*	Sensitive (Yellow)	S3S4B,S5N
Black Guillemot	*Cepphus grylle*	Secure (Green)	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	Secure (Green)	S1S2B,S5M
Killdeer	*Charadrius vociferus*	Sensitive (Yellow)	S3S4B
Black-billed Cuckoo	*Coccyzus erythropthalmus*	May Be At Risk (Orange)	S3?B
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	S3S4B
Gray Catbird	*Dumetella carolinensis*	May Be At Risk (Orange)	S3B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive (Yellow)	S3S4B
Wilson's Snipe	*Gallinago delicata*	Sensitive (Yellow)	S3S4B
Common Loon	*Gavia immer*	May Be At Risk (Orange)	S3B,S4N
Baltimore Oriole	*Icterus galbula*	May Be At Risk (Orange)	S2S3B
Ring-billed Gull	*Larus delawarensis*	Secure (Green)	S1?B,S5N
Hudsonian Whimbrel	*Numenius phaeopus hudsonicus*	Sensitive (Yellow)	S3M
Gray Jay	*Perisoreus canadensis*	Sensitive (Yellow)	S3S4
Cliff Swallow	*Petrochelidon pyrrhonota*	May Be At Risk (Orange)	S3B
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Sensitive (Yellow)	S3S4B
American Golden-Plover	*Pluvialis dominica*	Sensitive (Yellow)	S3M
Boreal Chickadee	*Poecile hudsonica*	Sensitive (Yellow)	S3

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Eastern Phoebe	*Sayornis phoebe*	Sensitive (Yellow)	S3S4B
Common Tern	*Sterna hirundo*	Sensitive (Yellow)	S3B
Brown Thrasher	*Toxostoma rufum*	Undetermined	S1?B
Greater Yellowlegs	*Tringa melanoleuca*	Sensitive (Yellow)	S3B,S5M
Willet	*Tringa semipalmata*	May Be At Risk (Orange)	S2S3B
Solitary Sandpiper	*Tringa solitaria*	Secure (Green)	S1?B,S4S5M
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive (Yellow)	S3S4B
Tennessee Warbler	*Vermivora peregrina*	Sensitive (Yellow)	S3S4B
Wilson's Warbler	*Wilsonia pusilla*	Sensitive (Yellow)	S3S4B
BRYOPHYTES			
a Moss	*Leucodon andrewsianus*	Sensitive (Yellow)	S2S3
DICOTS			
Hooked Agrimony	*Agrimonia gryposepala*	Secure (Green)	S3
Running Serviceberry	*Amelanchier stolonifera*	Secure (Green)	S3?
Wood Anemone	*Anemone quinquefolia*	Sensitive (Yellow)	S2
Virginia Anemone	*Anemone virginiana*	May Be At Risk (Orange)	S2
a Pussytoes	*Antennaria parlinii*	May Be At Risk (Orange)	S1
Drummond's Rockcress	*Arabis drummondii*	Sensitive (Yellow)	S2
Swamp Milkweed	*Asclepias incarnata*	Secure (Green)	S3
Frankton's Saltbush	*Atriplex franktonii*	Secure (Green)	S3S4
Estuary Beggarticks	*Bidens hyperborea*	May Be At Risk (Orange)	S1
Yellow Marsh Marigold	*Caltha palustris*	Sensitive (Yellow)	S2
Marsh Bellflower	*Campanula aparinoides*	Sensitive (Yellow)	S3
Cuckoo Flower	*Cardamine pratensis var. pratensis*	May Be At Risk (Orange)	S1
Blue Cohosh	*Caulophyllum thalictroides*	May Be At Risk (Orange)	S2
Prickly Hornwort	*Ceratophyllum echinatum*	May Be At Risk (Orange)	S2?
Seaside Spurge	*Chamaesyce polygonifolia*	Secure (Green)	S3
Red Pigweed	*Chenopodium rubrum*	May Be At Risk (Orange)	S1?
Robinson's Hawthorn	*Crataegus robinsonii*	Undetermined	S1?

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Buttonbush Dodder	*Cuscuta cephalanthi*	May Be At Risk (Orange)	S1
Canada Tick-trefoil	*Desmodium canadense*	May Be At Risk (Orange)	S1
American Waterwort	*Elatine americana*	May Be At Risk (Orange)	S1
Purple-veined Willowherb	*Epilobium coloratum*	Sensitive (Yellow)	S2?
Downy Willowherb	*Epilobium strictum*	Sensitive (Yellow)	S3
Red Ash	*Fraxinus pennsylvanica*	May Be At Risk (Orange)	S1
Northern Comandra	*Geocaulon lividum*	Sensitive (Yellow)	S3
Bicknell's Crane's-bill	*Geranium bicknellii*	Secure (Green)	S3
Clammy Hedge-Hyssop	*Gratiola neglecta*	Sensitive (Yellow)	S1S2
American False Pennyroyal	*Hedeoma pulegioides*	Sensitive (Yellow)	S2S3
Round-lobed Hepatica	*Hepatica nobilis var. obtusa*	May Be At Risk (Orange)	S1S2
Kalm's Hawkweed	*Hieracium kalmii*	Undetermined	S2?
Woolly Beach-heath	*Hudsonia tomentosa*	May Be At Risk (Orange)	S1
Disguised St John's-wort	*Hypericum dissimulatum*	Sensitive (Yellow)	S2S3
Large St John's-wort	*Hypericum majus*	May Be At Risk (Orange)	S1
Canada Wood Nettle	*Laportea canadensis*	Sensitive (Yellow)	S3
Southern Mudwort	*Limosella australis*	Sensitive (Yellow)	S3
Yellow-seeded False Pimperel	*Lindernia dubia*	Secure (Green)	S3S4
Pale-Spiked Lobelia	*Lobelia spicata*	May Be At Risk (Orange)	S1
Water Beggarticks	*Megalodonta beckii*	Sensitive (Yellow)	S3
Farwell's Water Milfoil	*Myriophyllum farwellii*	Sensitive (Yellow)	S2
Smooth Sweet Cicely	*Osmorhiza longistylis*	May Be At Risk (Orange)	S2
Balsam Groundsel	*Packera paupercula*	Secure (Green)	S3
Rugel's Plantain	*Plantago rugelii*	Undetermined	S2
Blood Milkwort	*Polygala sanguinea*	Sensitive (Yellow)	S2S3
Halberd-leaved Tearthumb	*Polygonum arifolium*	Sensitive (Yellow)	S2
Small's Knotweed	*Polygonum buxiforme*	Undetermined	S2S3
Pennsylvania Smartweed	*Polygonum pensylvanicum*	Secure (Green)	S3

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Climbing False Buckwheat	*Polygonum scandens*	Sensitive (Yellow)	S3
Marsh Mermaidweed	*Proserpinaca palustris*	Secure (Green)	S3
Marsh Mermaidweed	*Proserpinaca palustris var. crebra*	Secure (Green)	S3
Pink Pyrola	*Pyrola asarifolia*	Secure (Green)	S3
Lesser Pyrola	*Pyrola minor*	Sensitive (Yellow)	S2
Gmelin's Water Buttercup	*Ranunculus gmelinii*	Secure (Green)	S3
Pennsylvania Buttercup	*Ranunculus pensylvanicus*	May Be At Risk (Orange)	S1
Alder-leaved Buckthorn	*Rhamnus alnifolia*	Sensitive (Yellow)	S3
Cut-Leaved Coneflower	*Rudbeckia laciniata*	Sensitive (Yellow)	S2
Triangular-valve Dock	*Rumex salicifolius var. mexicanus*	Sensitive (Yellow)	S2
Satiny Willow	*Salix pellita*	Undetermined	S2S3
Meadow Willow	*Salix petiolaris*	Secure (Green)	S3
Seaside Brookweed	*Samolus valerandi ssp. parviflorus*	Sensitive (Yellow)	S2
Bloodroot	*Sanguinaria canadensis*	Secure (Green)	S3S4
Clustered Sanicle	*Sanicula odorata*	May Be At Risk (Orange)	S1
Long-leaved Starwort	*Stellaria longifolia*	Sensitive (Yellow)	S3
Horned Sea-blite	*Suaeda calceoliformis*	Secure (Green)	S2S3
Fringed Blue Aster	*Symphyotrichum ciliolatum*	Sensitive (Yellow)	S2S3
Canada Germander	*Teucrium canadense*	Sensitive (Yellow)	S3
Heart-leaved Foamflower	*Tiarella cordifolia*	Sensitive (Yellow)	S2
Orange-fruited Tinker's Weed	*Triosteum aurantiacum*	Sensitive (Yellow)	S2
Humped Bladderwort	*Utricularia gibba*	Secure (Green)	S3S4
Blue Vervain	*Verbena hastata*	Secure (Green)	S3
Northern Bog Violet	*Viola nephrophylla*	Sensitive (Yellow)	S2
FERNS AND THEIR ALLIES			
Lance-Leaf Grape-Fern	*Botrychium lanceolatum var. angustisegmentum*	Sensitive (Yellow)	S2S3
Common Scouring-rush	*Equisetum hyemale var. affine*	Secure (Green)	S3S4
Meadow Horsetail	*Equisetum pratense*	Sensitive (Yellow)	S2
Dwarf Scouring-Rush	*Equisetum scirpoides*	Secure (Green)	S3S4
Variegated Horsetail	*Equisetum variegatum*	Secure (Green)	S3

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
FISH			
Atlantic Salmon	*Salmo salar*	May Be At Risk (Orange)	S2
INSECTS			
Lance-Tipped Darner	*Aeshna constricta*	Secure (Green)	S3
Milbert's Tortoiseshell	*Aglais milberti*	Secure (Green)	S2
Common Roadside-Skipper	*Amblyscirtes vialis*	Secure (Green)	S2
Ocellated Darner	*Boyeria grafiana*	Sensitive (Yellow)	S3
Taiga Bluet Prince	*Coenagrion resolutum*	May Be At Risk (Orange)	S1
Baskettail Baltimore	*Epitheca princeps*	Sensitive (Yellow)	S2
Checkerspot Harvester	*Euphydryas phaeton*	Secure (Green)	S3
Harpoon Clubtail	*Feniseca tarquinius*	Secure (Green)	S3S4
Common Branded Skipper	*Gomphus descriptus*	Sensitive (Yellow)	S2
Northern Pygmy Clubtail	*Hesperia comma*	Secure (Green)	S3
Northern Pearly-Eye	*Lanthus parvulus*	Secure (Green)	S3
Salt Marsh Copper	*Lethe anthedon*	Secure (Green)	S3
Bronze Copper	*Lycaena dospassosi*	At Risk (Red)	S2
Little Wood-satyr	*Lycaena hyllus*	Secure (Green)	S1
Elfin Skimmer	*Megisto cymela*	Secure (Green)	S3S4
Jutta Arctic	*Nannothemis bella*	May Be At Risk (Orange)	S3
Brook Snaketail	*Oeneis jutta*	May Be At Risk (Orange)	S1
Riffle Snaketail	*Ophiogomphus aspersus*	Secure (Green)	S1
Mustard White	*Ophiogomphus carolus*	Sensitive (Yellow)	S3
Green Comma	*Pieris oleracea*	Secure (Green)	S2
Hoary Comma	*Polygonia faunus*	Sensitive (Yellow)	S3
Question Mark	*Polygonia gracilis*	Secure (Green)	S1
Grey Comma	*Polygonia interrogationis*	Secure (Green)	S3B
Acadian Hairstreak	*Polygonia progne*	Undetermined	S3S4
Striped Hairstreak	*Satyrium acadica*	Undetermined	S1
Delicate Emerald	*Satyrium liparops*	Sensitive (Yellow)	S3
Kennedy's Emerald	*Somatochlora franklini*	May Be At Risk (Orange)	S1
	Somatochlora kennedyi		S1S2

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Clamp-Tipped Emerald	*Somatochlora tenebrosa*	Secure (Green)	S3
Northern Cloudywing	*Thorybes pylades*	Sensitive (Yellow)	S2
Ebony Boghaunter	*Williamsonia fletcheri*	May Be At Risk (Orange)	S1
MAMMALS			
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined	SH
MOLLUSKS			
Eastern Lampmussel	*Lampsilis radiata*	Sensitive (Yellow)	S2
Tidewater Mucket	*Leptodea ochracea*	Sensitive (Yellow)	S1
Creeper	*Strophitus undulatus*	May Be At Risk (Orange)	S1
MONOCOTS			
Short-awned Foxtail	*Alopecurus aequalis*	Sensitive (Yellow)	S2S3
Broad-Glumed Brome	*Bromus latiglumis*	May Be At Risk (Orange)	S1
Slim-stemmed Reed Grass	*Calamagrostis stricta ssp. stricta*	Sensitive (Yellow)	S1S2
Lesser Brown Sedge	*Carex adusta*	Sensitive (Yellow)	S2S3
Bebb's Sedge	*Carex bebbii*	May Be At Risk (Orange)	S1S2
Creeping Sedge	*Carex chordorrhiza*	May Be At Risk (Orange)	S1
Hidden-scaled Sedge	*Carex cryptolepis*	Secure (Green)	S3?
Fernald's Hay Sedge	*Carex foenea*	Secure (Green)	S3?
Pubescent Sedge	*Carex hirtifolia*	Sensitive (Yellow)	S2S3
Houghton's Sedge	*Carex houghtoniana*	Sensitive (Yellow)	S2?
Porcupine Sedge	*Carex hystericina*	May Be At Risk (Orange)	S2
Livid Sedge	*Carex livida var. radicaulis*	May Be At Risk (Orange)	S1
Hop Sedge	*Carex lupulina*	Secure (Green)	S3
Woolly Sedge	*Carex pellita*	May Be At Risk (Orange)	S1
Pennsylvania Sedge	*Carex pensylvanica*	Undetermined	S1S2
Rosy Sedge	*Carex rosea*	Secure (Green)	S3
Tender Sedge	*Carex tenera*	Sensitive (Yellow)	S1S2
Blunt Broom Sedge	*Carex tribuloides*	Secure (Green)	S3?

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Tuckerman's Sedge	*Carex tuckermanii*	May Be At Risk (Orange)	S1
Early Coralroot	*Corallorhiza trifida*	Secure (Green)	S3
Hop Flatsedge	*Cyperus lupulinus ssp. macilentus*	May Be At Risk (Orange)	S1
Yellow Lady's-slipper	*Cypripedium parviflorum*	Sensitive (Yellow)	S2S3
Showy Lady's-Slipper	*Cypripedium reginae*	May Be At Risk (Orange)	S2
Woolly Panic Grass	*Dichanthelium acuminatum var. lindheimeri*	Undetermined	S1?
Ovate Spikerush	*Eleocharis ovata*	Sensitive (Yellow)	S2?
Canada Waterweed	*Elodea canadensis*	Secure (Green)	S3?
Wiegand's Wild Rye	*Elymus wiegandii*	May Be At Risk (Orange)	S1
Russet Cotton-Grass	*Eriophorum chamissonis*	Secure (Green)	S3S4
Slender Cottongrass	*Eriophorum gracile*	Sensitive (Yellow)	S2
Sharp-Fruit Rush	*Juncus acuminatus*	Sensitive (Yellow)	S3S4
Dudley's Rush	*Juncus dudleyi*	May Be At Risk (Orange)	S2?
Greene's Rush	*Juncus greenei*	May Be At Risk (Orange)	S1S2
Vasey Rush	*Juncus vaseyi Lilium*	Sensitive (Yellow)	S1
Canada Lily	*canadense Liparis*	Secure (Green)	S2S3
Loesel's Twayblade	*loeselii Panicum*	Sensitive (Yellow)	S3S4
Tuckerman's Panic Grass	*tuckermanii*	Sensitive (Yellow)	S2S3
Southern Rein-Orchid	*Platanthera flava*	Secure (Green)	S2
Pale Green Orchid	*Platanthera flava var. herbiola*	Secure (Green)	S1S2
Hooker's Orchid	*Platanthera hookeri*	Secure (Green)	S3
Small Round-leaved Orchid	*Platanthera orbiculata*	Sensitive (Yellow)	S3
Blunt-leaved Pondweed	*Potamogeton obtusifolius*	Sensitive (Yellow)	S2S3
White-stemmed Pondweed	*Potamogeton praelongus*	May Be At Risk (Orange)	S3?
Richardson's Pondweed	*Potamogeton richardsonii*	Sensitive (Yellow)	S2S3
Flat-stemmed Pondweed	*Potamogeton zosteriformis*	Undetermined	S2S3
Stalked Bulrush	*Scirpus pedicellatus*	Secure (Green)	S1
Narrow-leaved Blue-eyed-grass	*Sisyrinchium angustifolium*	Secure (Green)	S3S4
Small Burreed	*Sparganium natans*		S3

Appendix 3: Special Occurrences (Ecodistrict 530)

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***
Shining Ladies'-Tresses	*Spiranthes lucida*	May Be At Risk (Orange)	S2
Eastern Skunk Cabbage	*Symplocarpus foetidus*	Secure (Green)	S3S4
Narrow False Oats	*Trisetum spicatum*	Secure (Green)	S3S4
Wild Celery	*Vallisneria americana*	May Be At Risk (Orange)	S2

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

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

Appendix 3: Special Occurrences (Ecodistrict 530)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Barrier Beach Ponds	Habitat	NS Significant Species & Habitats	NS Environment Act
Bat Hibernaculum	Habitat	NS Significant Species & Habitats	NS Endangered Species Act
Deer Wintering Areas	Habitat	NS Significant Species & Habitats	
Fossil Sites	Ecosystem	Local	ACT
IBP Site- Fenwick	Ecosystem	NS Significant Species & Habitats	Special Places Protection Act
Salt Marsh Mud Flats	Ecosystem	NS Significant Species & Habitats	Beaches Act NS Environment Act
Waterfalls	Community	Local	
Waterfowl Concentration Area	Ecosystem	NS Significant Species & Habitats	
Wetlands	Habitat	NS Significant Species & Habitats	NS Environment Act
Acquaculture	Habitat	Provincial Database	
Aggregate	Occurrence	Crown Database	
Osprey Nests	Habitat	Local	NS Wildlife Act
Eagle Nests	Habitat	NS Significant Species & Habitats	NS Wildlife Act
Goat Island	Habitat	EHJV	NS Wildlife Act
Abercrombie Wildlife Management Area	Habitat	Provincial Database	NS Wildlife Act
Beatty Marsh, Merigomish, Chance Harbour	Habitat	Provincial Database	Beaches Protection Act
Provincial Parks – Tidnish Dock, Heather Beach, Waterside Beach, Melmerby Beach, Caribou-Munroes Island, etc.	Recreation	Provincial Database	NS Provincial Parks Act
Chignecto Isthmus Wilderness Area (portion of)	Ecosystem	Provincial Database	NSE, Protected Area
Brule Point Game Sanctuary	Ecosystem	Provincial Database	NS Wildlife Act

Appendix 3: Special Occurrences (Ecodistrict 530)
Table 1d – Heritage Features

Feature	Type	Information Source
Abandoned Rail	Heritage	NSDNR Database
Balmoral Grist Mill (1873)	Heritage	NS Museum
Log Church - Loch Broom	Heritage	Local Source
Mining (Coal, Salt)	Heritage	Crown Database
Old Sawmill Sites (mid 1880s)	Heritage	NS Museum
Old Strip Mining Sites	Heritage	Local Source

Appendix 3: Special Occurrences

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

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
ICHO	jP bS wP	8,157	2.8	18,436	6.4	47 to 57	21.0	56,672	6.7	30,087	3.5	60 to 68	7.0
ICSM	wetlands	2,174	0.8	0	0.0	47 to 50	37.6	3,235	0.4	0	0.0	47 to 50	28.7
IFDM	bS wP	2,101	0.7	98,313	34.3	29 to 33	52.6	3,010	0.4	233,738	27.8	37 to 41	40.5
IFHO	bS wP	38,698	13.5	98,313	34.3	50 to 57	21.4	80,337	9.5	233,738	27.8	53 to 59	16.3
IFKK	rS sM yB Be	2,380	0.8	30,451	10.6	44 to 53	23.2	22,278	2.6	31,499	3.7	47 to 55	17.0
IFRD	bS wP	11,202	3.9	98,313	34.3	59 to 70	5.0	14,050	1.6	233,737	27.8	57 to 67	6.3
IFSM	bS	491	0.2	26,318	9.2	61 to 68	6.3	8,567	1.0	96,810	11.5	41 to 46	28.8
IMDM	bS wP	1,465	0.5	98,313	34.3	47 to 55	23.0	5,022	0.6	233,738	27.8	50 to 56	14.5
IMHO	bS wP	104,291	36.4	98,313	34.3	54 to 63	12.9	160,603	19.1	233,738	27.8	56 to 63	12.5
IMRD	bS wP	10,923	3.8	98,313	34.3	54 to 61	14.6	16,644	2.0	233,737	27.8	55 to 61	13.8
IMSM	aE sM wA	1,328	0.5	2,408	0.8	45 to 47	32.8	10,506.0	1.3	9,091.0	1.1	52 to 55	24.9
WCDS	rS eH sM yB Be	46	0.0	46	0.0	50 to 67	6.3	1,053.0	0.1	3,789.0	0.5	64 to 72	3.7
WCHO	jP bS wP	7,120	2.5	18,436	6.4	40 to 47	30.7	53,699.0	6.4	30,086.0	3.6	50 to 56	19.2
WCKK	rS sM yB Be	5,097	1.8	30,451	10.6	44 to 51	22.9	46,460.0	5.5	31,499.0	3.8	54 to 62	12.1
WCRD	jP bS wP	214	0.1	18,436	6.4	22.0	69.7	6,330.0	0.8	30,086.0	3.6	64 to 69	5.0
WCSM	jP bS wP	964	0.3	18,436	6.4	49 to 55	25.7	1,128.0	0.1	30,086.0	3.6	47 to 54	25.2

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

Appendix 3: Special Occurrences

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

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
WFHO	rS	1,641	0.6	97,462	34.0	43 to 47	33.5	18772	2.2	13278	15.8	46 to 52	19.2
WFKK	rS sM yB Be	17,080	6.0	30,451	10.6	46 to 52	25.8	70718	8.4	31500	3.8	43 to 51	20.1
WFRD	rS eH wP	2,666	0.9	1,866	0.7	40 to 47	30.3	3417	0.4	18170	2.2	35 to 43	31.4
WMHO	rS	46,320	16.1	97,462	34.0	39 to 45	36.2	78352	9.3	132798	15.8	43 to 48	30.4
WMKK	rS sM yB Be	12,727	4.4	30,451	10.6	49 to 57	19.6	75415	9.0	31500	3.8	47 to 54	21.1
WMRD	rS	1,061	0.4	97,462	34.0	34 to 47	31.1	10364	1.2	132798	15.8	49 to 55	17.8
WTLD	wetlands	2,217	0.8	0	0.0	65 to 69	8.1	15767	1.9	0	0.0	70 to 73	3.6

*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)
IMHO	bS wP	14,291	8.0	131	34	1,053	74	1,184	1.2	107	0.1	1,291	1.2
WMHO	rS	46,320	3.2	0	34	304	23	304	0.7	57	0.1	362	0.8
IFHO	bS wP	38,698	5.7	0	13	428	0	428	1.1	13	0	441	1.1
WFKK	rS sM yB Be	17,080	3.4	0	0	7	0	7	0.0	0	0	7	0.0
WMKK	rS sM yB Be	12,727	5.0	0	0	34	0	34	0.3	0	0	34	0.3
IFRD	bS wP	11,202	18.6	0	0	64	0	64	0.6	0	0	64	0.6
IMRD	bS wP	10,923	2.1	0	0	0	0	0	0.0	0	0	0	0.0
ICHO	jP bS wP	8,157	5.7	0	1	21	0	21	0.3	1	0	22	0.3
WCHO	jP bS wP	7,120	2.4	0	0	18	0	18	0.3	0	0	18	0.3
WCKK	rS sM yB Be	5,097	1.1	0	0	5	0	5	0.1	0	0	5	0.1
WFRD	rS eH wP	2,666	5.0	0	0	38	0	38	1.4	0	0	38	1.4
IFKK	rS sM yB Be	2,380	0.0	0	0	0	0	0	0.0	0	0	0	0.0
ICSM	wetlands	2,174	0.7	0	0	2	0	2	0.1	0	0	2	0.1
IFDM	bS wP	2,101	1.2	0	0	7	0	7	0.3	0	0	7	0.3
WTLD	wetlands	2,217	7.3	0	0	60	0	60	2.7	0	0	60	2.7
XXMS	salt marsh	1,741	12.0	5	0	194	5	199	11.4	5	0.3	204	11.7
WFHO	rS	1,641	7.5	0	0	9	0	9	0.6	0	0	9	0.6
IMDM	bS wP	1,465	0.0	0	0	0	0	0	0.0	0	0	0	0.0
IMSM	aE sM wA	1,328	9.1	0	0	10	0	10	0.8	0	0	10	0.8
WMRD	rS	1,061	0.0	0	0	0	0	0	0.0	0	0	0	0.0

See Appendix 12b for full Ecological Emphasis worksheet.

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)
WCSM	jP bS wP	964	1.9	0	0	0	0	0	0	0	0	0	0
IFSM	bS	491	34.1	0	0	0	0	0	0	0	0	0	0
WCRD	jP bS wP	214	0	0	0	0	0	0	0	0	0	0	0
WCDS	rS eH sM yB Be	46	0	0	0	0	0	0	0	0	0	0	0
Total		192,104		136	82	2,254	102	2,390		178		2,284	
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)
Designated Provincial Parks and Park Reserves	135	0	Old Forest	1,528	0
Protected Beaches	29	80	Designated Provincial Parks and Park Reserves	616	0
Operational Non Designated Parks and Reserves	29	0	National Wildlife Management Areas	297	0
Sites of Ecological Significance Under Moratorium	0.1	0	Operational Non Designated Parks and Reserves	271	0
			Eastern Habitat Joint Venture	71	0.2
			Ramsar Wetland Sites	13	0
			National Wildlife Sanctuaries	12	0

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

Appendix 6: Description of Road Density Index

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

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

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

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

Main Concepts

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

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

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

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

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

DNR Forestry Branch maintains a table relating the topographic series attribute coding used by the Geomatics Centre to the feature categories used in the Road Index calculations, along with ArcView programs allowing the data to be formatted correctly. An inventory of recent Landsat satellite images is also available.
Full report contained in the Ecological Landscape Analysis Guidebook
http://www.gov.ns.ca/natr/library/forestry/reports/Procedural%20Guide%20For%20Ecological%20Landscape%20Analysis.pdf

Appendix 7: Road Density Index Worksheets

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

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

Road Type	Road Index Weighting	Length (km)
Trails, tracks, abandoned roads, and railways	1	2,992
Utility corridors	3	376
Gravel Roads and active railways	6	2,088
Paved streets and roads collectors	10	1,507
Highways	15	106

Table 2: Distribution of Road Index Classes

Road Index		Area of Ecodistrict Affected	
Indication	Range	Hectares	Percent
Remote	0 to 6	13,833	5
Forest Resource	7 to 15	88,830	31
Mixed Rural	16 to 24	89,070	31
Agriculture Suburban	25 to 39	79,814	28
Urban	40 to 100	14,394	5
Total		285,941	100

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Spruce Pine Hummocks	139,575	11
Valley Bottoms and Slopes	23,239	31
Jack Pine Hummocks and Ridges	12,600	19
Tolerant Mixedwood Hills	36,907	17
Red Spruce Hummocks	48,206	15
Red and Black Spruce Hummocks	21,025	8
Wetlands	1,825	14
Total	**283,377**	**15**

*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

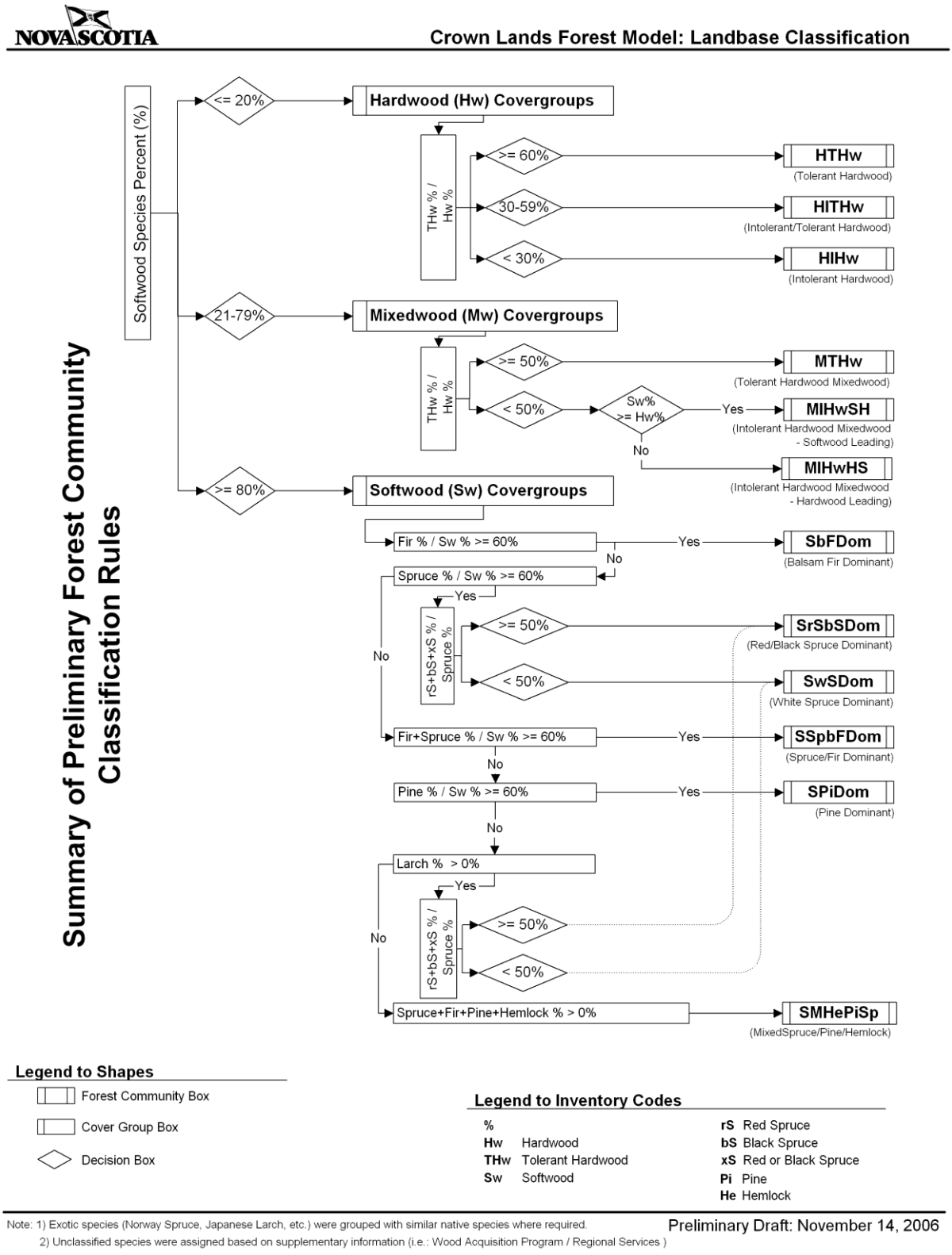
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6 m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade intolerant "pioneer" species • peak seed production by forbs and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

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

Species		Ecodistrict																																						
Code	**Name**																																							
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 10, 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



Appendix 10: Table 1: Forest Landscape Composition Worksheet (Northumberland Lowlands 530)

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 (70.0%) IFHO (27.0%) IFDM (2.0%) IMDM (1.0%)	Softwood	bS wP rS bS	Frequent	139,916; 100.0	Early	1,067	1,410	2,633	523	5,633	50,848; 48.0	EARLY	27,765; 26.0
						Mid	880	1,723	2,942	925	6,470			
						Late	2,968	4,851	16,644	2,859	27,322			
						Uncl	11,421	0	0	0	11,421			
		Mixedwood				Early	642	989	2,474	1,332	5,437	31,599; 30.0	MID	26,206; 25.0
						Mid	1,472	2,482	9,199	3,933	17,086			
						Late	119	337	2,233	420	3,109			
						Uncl	5,965	0	0	0	5,965			
		Hardwood				Early	1,144	2,211	9,205	1,692	14,252	17,939; 17.0	LATE	30,710; 29.0
						Mid	153	317	1,940	239	2,649			
						Late	3	16	246	12	277			
						Uncl	758	0	0	0	758			
		Unclassified				Early	2,048	128	265	0	2,441	4,945; 5.0	UNCL	20,650; 20.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	2,507	1	2	2	2,507			
Total					**139,916 ***	**# ha**	**31,147**	**14,465**	**47,783**	**11,937**	**105,332**			
						%	**29.6%**	**13.7%**	**45.4%**	**11.3%**	**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 (Northumberland Lowlands 530)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Tolerant Mixedwood Hills	WFKK (46.0%) WMKK (34.0%) WCKK (14.0%) IFKK (6.0%) WCDS (<1.0%)	Softwood	bS wP	Infrequent	6,586; 17.8	Early	452	486	907	169	2,014	8,320; 32.0	EARLY	10,036; 39.0
						Mid	174	263	705	115	1,257			
						Late	686	506	1,915	269	3,376			
						Uncl	1,673	0	0	0	1,673			
		Mixedwood	rS sM yB Be rS eH sM yB Be	Infrequent	30,207; 81.8	Early	176	382	1,114	485	2,157	10,344; 40.0	MID	6,973; 27.0
						Mid	190	749	3,177	1,069	5,185			
						Late	25	81	618	147	871			
						Uncl	2,131	0	0	0	2,131			
		Hardwood				Early	475	1,346	2,869	678	5,368	6,360; 25.0	LATE	4,372; 17.0
						Mid	53	113	311	54	531			
						Late	50	2	60	13	125			
						Uncl	332	0	3	0	335			
		Unclassified				Early	257	29	211	0	497	970; 4.0	UNCL	4,614; 18.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	474	0	0	0	474			
Total					**36,937 ***	**# ha**	**7,148**	**3,957**	**11,890**	**2,999**	**25,994**			
						%	**27.5%**	**15.2%**	**45.7%**	**11.5%**	**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 (Northumberland Lowlands 530)

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)				
Jack Pine Hummocks and Ridges	ICHO (54.0%) WCHO (45.0%) WCRD (<1.0%)	Softwood	jP bS wP	Frequent	12,619; 100.0	Early	126	162	344	75	707	4,302; 49.0	EARLY	2,586; 29.0
						Mid	62	155	350	106	673			
						Late	193	359	964	209	1,725			
						Uncl	1,197	0	0	0	1,197			
		Mixedwood				Early	97	116	455	232	900	2,909; 33.0	MID	2,062; 23.0
						Mid	69	219	593	347	1,228			
						Late	0	39	176	47	262			
						Uncl	519	0	0	0	519			
		Hardwood				Early	132	202	346	112	792	1,080; 12.0	LATE	2,049; 23.0
						Mid	27	9	94	31	161			
						Late	9	7	35	11	62			
						Uncl	64	0	0	0	64			
		Unclassified				Early	124	13	51	0	188	504; 6.0	UNCL	2,096; 24.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	317	0	0	0	317			
Total					**81***	**# ha**	**2,936**	**1,281**	**3,408**	**1,170**	**8,795**			
						%	**33.4%**	**14.6%**	**38.7%**	**13.3%**	**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 (Northumberland Lowlands 530)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Red Spruce Hummocks	WMHO (89.0%) WFRD (5.0%) WFHO (3.0%) WMRD (3.0%)	Softwood	rS rS eH wP bS wP	Frequent Frequent Frequent	48,364; 100.0	Early	525	595	1,282	234	2,636	11,187; 41.0	EARLY	10,041; 37.0
						Mid	276	363	664	190	1,493			
						Late	914	490	2,575	434	4,413			
						Uncl	2,646	0	0	0	2,646			
		Mixedwood				Early	417	307	757	361	1,842	8,521; 31.0	MID	7,174; 26.0
						Mid	233	592	2,546	1,207	4,578			
						Late	18	70	448	102	638			
						Uncl	1,463	0	0	0	1,463			
		Hardwood				Early	552	1,098	2,791	650	5,091	6,523; 24.0	LATE	5,094; 19.0
						Mid	35	116	880	72	1,103			
						Late	0	3	33	6	42			
						Uncl	288	0	0	0	288			
		Unclassified				Early	308	28	138	0	474	988; 4.0	UNCL	4,912; 18.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	518	0	0	0	518			
Total					**48,364 ***	**# ha**	**8,193**	**3,662**	**12,114**	**3,256**	**27,225**			
						%	**30.1%**	**13.5%**	**44.5%**	**12.0%**	**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 (Northumberland Lowlands 530)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Red and Black Spruce Hummocks	IFRD (53.0%) IMRD (47.0%)	Softwood	bS wP rS bS	Frequent	21,027; 100.0	Early	165	135	371	78	749	8,328; 47.0	EARLY	4,169; 24.0
						Mid	152	357	662	246	1,417			
						Late	376	394	2,809	587	4,166			
						Uncl	1,995	0	0	0	1,995			
		Mixedwood				Early	72	95	557	254	978	6,120; 35.0	MID	5,256; 30.0
						Mid	49	260	2,126	1,159	3,594			
						Late	1	35	333	139	508			
						Uncl	1,039	0	0	0	1,039			
		Hardwood				Early	145	235	1,622	250	2,252	2,618; 15.0	LATE	4,678; 26.0
						Mid	0	25	194	24	243			
						Late	0	0	3	0	3			
						Uncl	120	0	0	0	120			
		Unclassified				Early	144	0	46	0	190	618; 3.0	UNCL	3,581; 20.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	429	0	0	0	429			
Total					**21,027***	**# ha**	**4,687**	**1,536**	**8,723**	**2,737**	**17,683**			
						%	**26.5%**	**8.7%**	**49.3%**	**15.5%**	**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 (Northumberland Lowlands 530)

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)				
Wetland	WTLD	Softwood	bS	Open Seral	548; 30.0	Early	2	2	9	11	24	371; 61.0	EARLY	123; 20.0
						Mid	0	14	22	10	46			
						Late	9	27	105	37	178			
						Uncl	123	0	0	0	123			
		Mixedwood	N/A			Early	4	7	13	7	31	160; 26.0	MID	163; 27.0
						Mid	0	15	77	21	113			
						Late	0	2	0	0	2			
						Uncl	15	0	0	0	15			
		Hardwood	N/A			Early	1	14	86	9	110	70; 12.0	LATE	182; 28.0
						Mid	0	2	2	0	4			
						Late	0	0	0	0	0			
						Uncl	2	0	0	0	2			
		Unclassified				Early	2	0	2	0	4	7; <1.0	UNCL	141; 23.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	4	0	0	0	4			
Total					**1,825***	**# ha**	**162**	**83**	**316**	**95**	**656**			
						%	**24.7%**	**12.7%**	**48.2%**	**14.5%**	**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 (Northumberland Lowlands 530)

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 Corridor	IMHO (19.0%) WMHO (14.0%) ICSM (9.0%) IFHO (8.0%) WCHO (6.0%) IMSM (6.0%) ICHO (5.0%) IMRD (4.0%) WCSM (4.0%)	Softwood	rS bS jP bS wP	Frequent Open Seral Frequent	15,037; 63.0	Early	86	142	370	101	699	4,733; 41.0	EARLY	4,155; 36.0
						Mid	47	99	333	118	597			
						Late	227	356	1709	303	2,595			
						Uncl	843	0	0	0	843			
		Mixedwood	N/A			Early	60	120	434	273	887	3,559; 31.0	MID	2,924; 25.0
						Mid	84	250	1,187	426	1,947			
						Late	6	47	300	66	419			
						Uncl	307	0	0	0	307			
		Hardwood	aEsMwA	Gap	1,412; 6.0	Early	125	411	1,453	369	2,358	2,878; 24.0	LATE	3,114; 27.0
						Mid	4	36	244	96	380			
						Late	1	0	98	1	100			
						Uncl	41	0	0	0	41			
		Unclassified				Early	179	14	19	0	212	443; 4.0	UNCL	1,423; 12.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	232	0	0	0	232			
Total					**23,673***	**# ha**	**2,242**	**1,475**	**6,147**	**1,753**	**11,617**			
						%	**19.3%**	**12.7%**	**52.9%**	**15.1%**	**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 Northumberland Lowlands 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 IFHO IFDM IMDM	Frequent Frequent Frequent Frequent	bS wP bS wP bS wP bS wP	S	SrSbSDom	39,347	39.2%	L	**Well-drained**: Early VT - Grey birch, pincherry, aspen - aspen, honeysuckle, wood aster - red maple, aspen, bunchberry Mid VT: Red spruce, balsam fir, step-stair moss Late VT: Red spruce, hemlock, starflower **Well-drained to imperfectly drained:** Black spruce cinnamon fern, sphagnum - Black spruce, false holly, wild raisin - Red maple, balsam fir, sensitive fern - tamarack, black spruce, sedge white pine included **Poorly drained:** scrubby wetlands of shrubs and stunted trees
				M	MIHwSH	19,161	19.1%	E/M	
				H	HIHw	17,414	17.3%	E/M	
				M	MIHwHS	12,160	12.1%	E/M	
				S	SwSDom	4,973	5.0%	E	
				S	SspbFDom	2,500	2.5%	M	
				S	SpiDom	1,774	1.8%	M/L	
				S	SbFDom	1,233	1.2%	E/M	
				S	SMHePiSp	1,021	1.0%	L	
				M	MTHw	278	0.3%	L	
				H	HTHw	301	0.3%	L	
				H	HITHw	223	0.2%	M	
Total						**100,387**	**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 Northumberland Lowlands 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
Red Spruce Hummocks	WMHO WFRD WFHO WMRD	Frequent Frequent Frequent Frequent	rS rS eH wP rS rS	S	SrSbSDom	6,698	25.5%	L	**Well-drained:** Early VT - Grey birch, pincherry, aspen, - aspen, honeysuckle, wood aster - red maple, aspen, bunchberry Mid VT: Red spruce, balsam fir, step-stair moss Late VT: Red spruce, hemlock, starflower **Well-drained to imperfectly drained:** black spruce, cinnamon fern, sphagnum, false holly, wild raisin - red maple, balsam fir, sensitive fern - tamarack, black spruce, sedge
				H	HIHw	6,232	23.8%	E/M	
				M	MIHwSH	4,899	18.7%	E/M	
				M	MIHwHS	3,526	13.4%	E/M	
				S	SwSDom	2,961	11.3%	E	
				S	SspbFDom	607	2.3%	M	
				S	SMHePiSp	447	1.7%	L	
				S	SbFDom	313	1.2%	E/M	
				H	HITHw	244	0.9%	M	
				S	SpiDom	162	0.6%	M	
				M	MTHw	97	0.4%	L	
				H	HTHw	47	0.2%	L	
Total						**26,233**	**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 Northumberland Lowlands 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 Hills	WFKK WMKK WCKK IFKK WCDS	Infrequent Infrequent Infrequent Infrequent Gap	rS sM yB Be rS sM yB Be rS sM yB Be rS sM yB Be rS eH sM yB Be	H	HIHw	6,227	24.9%	E/M	**Well-drained:** Early VT - aspen, honeysuckle, wood aster Mid VT - rS, bF, step-stair moss Late VT - yB, rS, wood fern - sM, yB, new york fern - rS, eH, starflower - eH, rS, wild lilly-of-the valley **Well-drained to imperfectly drained:** - bS, cinnamon fern, sphagnum, false holly, wild raisin - rM, bF, sensitive fern - eL,bS, sedge
				M	MIHwSH	5,974	23.9%	E/M	
				S	SrSbSDom	4,696	18.8%	L	
				M	MIHwHS	4,145	16.6%	E/M	
				S	SwSDom	1,933	7.7%	E	
				S	SspbFDom	683	2.7%	M	
				S	SMHePiSp	485	1.9%	L	
				S	SbFDom	355	1.4%	E/M	
				S	SpiDom	169	0.7%	M	
				M	MTHw	225	0.9%	L	
				H	HTHw	95	0.4%	L	
				H	HIHw	39	0.2%	E/M	
Total						**25,026**	**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 Northumberland Lowlands 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
Red and Black Spruce Hummocks	IFRD IMRD	Frequent Frequent	bS wP	S	SrSbSDom	6,392	37.5%	L	**Well-drained:** Early VT - Grey birch, pincherry, aspen,- aspen, honeysuckle, wood aster - red maple, aspen, bunchberry Mid VT: Red spruce, balsam fir, step-stair moss Late VT: - red spruce, hemlock, starflower **Well-drained to imperfectly drained:** - bS, cinnamon fern, sphagnum, false holly, wild raisin - rM, bF, sensitive fern - eL,bS, sedge **Poorly drained** - wetlands, shrubs, stunted trees
				M	MIHwSH	4,050	23.7%	E/M	
				H	HIHw	2,614	15.3%	E/M	
				M	MIHwHS	2,055	12.0%	E/M	
				S	SwSDom	707	4.1%	E/M	
				S	SspbFDom	532	3.1%	M	
				S	SMHePiSp	425	2.5%	L	
				S	SbFDom	242	1.4%	M	
				S	SpiDom	30	0.2%	M	
				M	MTHw	16	0.1%	L	
				H	HTHw	3	<0.1%	L	
				H	HIHw	1	<0.1%	E/H	
Total						**17,067**	**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 Northumberland Lowlands 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
Jack Pine Hummocks and Ridges	ICHO WCHO WCRD	Frequent Frequent Frequent	jP bS wP jP bS wP jP bS wP	S	SrSbSDom	2,346	28.3%	L	**Well-drained** - jack pine, black spruce, bracken fern - red pine, black spruce, bracken fern **Well-drained to imperfectly drained** - bS, cinnamon fern, sphagnum, false holly, wild raisin - rM, bF, sensitive fern - eL,bS, sedge (jack pine and white pine included)
				H	HIHw	966	11.6%	E/M	
				M	MIHwHS	1,004	12.1%	E/M	
				M	MIHwSH	1,669	20.1%	E/M	
				S	SwSDom	738	8.9%	E	
				S	SspbFDom	459	5.5%	M	
				S	SMHePiSp	345	4.2%	L	
				M	MTHw	235	2.8%	L	
				S	SpiDom	228	2.7%	M	
				S	SbFDom	187	2.3%	M	
				H	HTHw	62	0.7%	L	
				H	HITHw	53	0.6%	M	
Total						**8,292**	**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 Northumberland Lowlands 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	MTLD XXMS	Frequent Open Seral	bS Salt Marsh	S	SrSbSDom	345	57.4%	L	**Well-drained:** - jack pine, black spruce, bracken fern - red pine, black spruce, bracken fern **Poorly drained:** - wetlands, shrubs, stunted trees
				H	HIHw	69	11.5%	E/M	
				M	MIHwHS	101	16.8%	E/M	
				M	MIHwSH	59	9.8%	E/M	
				S	SwSDom	16	2.7%	E	
				S	SspbFDom	7	1.2%	M	
				H	HTHw	2	0.3%	M	
				S	SMHePiSp	2	0.3%	L	
Total						**601**	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 Northumberland Lowlands Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	IMHO WMHO ICSM IFHO WCHO IMSM ICHO IMRD WCSM	Frequent Frequent Open Seral Frequent Frequent Gap Frequent Frequent Frequent	bS wP rS bS wP jP bS wP aE sM wA jP bS wP bS wP jP bS wP	S	SrSbSDom	3,194	38.3%	L	Parts of ecosections within the corridors are parts of the element types (matrix and patches). See other element types for the succession and disturbances.
				H	HIHw	2,598	31.1%	E/M	
				M	MIHwHS	1,341	16.1%	E/M	
				S	SwSDom	635	7.6%	E	
				S	SspbFDom	216	2.6%	M	
				S	SbFDom	123	1.5%	M	
				M	MTHw	84	1.0%	L	
				H	HTHw	156	1.9%	L	
Total						**8,347**	**100.0%**		

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

Appendix 10: Table 3: Summary of "Potential Climax" Forest Abundance (Based on ELC Interpretations)

Climax Type	Ecodistrict		Ecoregion	
	Hectares	Percent	Hectares	Percent
bS wP	98,311	34.0%	233,738	28.0%
rS	97,462	34.0%	132,798	16.0%
rS sM yB Be	30,452	11.0%	31,500	4.0%
bS	26,319	9.0%	96,810	12.0%
jP bS wP	18,436	6.0%	30,087	4.0%
rS eH wP	2,408	1.0%	9,092	1.0%
aE sM wA	1,867	1.0%	18,171	2.0%
rS eH sM yB Be	46	0.0%	3,789	0.0%
Total	275,301	**96.0%***	555,985	**67.0%****

*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	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Spruce Pine Hummocks	139,878	1,643	86,038	6,209	21,956	23,987	73,755 to 85,748	53 to 61
Red Spruce Hummocks	48,350	329	21,843	3,500	17,140	5,538	18,971 to 21,740	39 to 45
Tolerant Mixedwood Hills	36,517	38	20,178	2,542	8,449	5,954	17,134 to 19,798	46 to 54
Red and Black Spruce Hummocks	21,020	64	14,180	1,036	1,881	3,859	11,923 to 13,853	57 to 66
Jack Pine Hummocks and Ridges	12,602	18	6,471	973	2,734	2,412	5,717 to 6,923	49 to 55
Wetlands	1,825	2	1,506	19	243	7	555 to 559	64 to 67
Valley Corridors	20,595	424	11,472	1,005	5,956	1,670	9,697 to 10,532	41 to 45
Total	280,787	2,518	161,688	15,284	58,359	43,427	**138,405 to 159,870**	**49 to 56**

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
IMHO	104,299	1,292	64,984	4,555	13,426	19,042	56,679 to 66,200	54 to 63
WMHO	46,313	362	21,043	3,201	16,757	4,950	18,182 to 20,657	39 to 45
IFHO	38,696	441	22,789	1,741	8,313	5,413	19,321 to 22,027	50 to 57
WFKK	17,082	7	9,386	1,251	4,414	2,024	7,865 to 8,877	46 to 52
WMKK	12,729	34	7,314	782	2,491	2,108	6,242 to 7,296	49 to 57
IFRD	11,203	64	7,785	360	560	2,434	6,601 to 7,819	59 to 70
IMRD	10,926	0	7,047	772	1,597	1,510	5,856 to 6,610	54 to 61
ICHO	8,178	23	4,405	351	1,721	1,678	3,834 to 4,673	47 to 57
WCHO	7,118	18	3,166	785	2,183	966	2,831 to 3,314	40 to 47
WCKK	4,834	5	2,602	303	1,168	756	2,221 to 2,599	46 to 54
WFRD	2,667	38	1,148	298	808	375	1,067 to 1,255	40 to 47
IFKK	2,381	0	1,179	229	552	422	1,047 to 1,258	44 to 53
ICSM	2,295	98	1,176	92	818	110	1,031 to 1,086	45 to 47
IFDM	2,102	7	718	132	1,106	139	613 to 683	29 to 33
WTLD	2,220	60	1,791	24	180	165	1,451 to 1,533	65 to 69
WFHO	1,640	9	868	110	550	103	713 to 765	43 to 47
IMDM	1,465	0	810	94	337	224	687 to 799	47 to 55

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

Appendix 12b: Ecological Emphasis Index Worksheet – Ecosections

Ecosection	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
IMSM	1,323	10	734	89	436	58	598 to 627	45 to 47
WMRD	1,060	0	367	94	329	269	366 to 501	35 to 47
WCSM	963	0	597	22	248	97	477 to 526	50 to 55
IFSM	484	0	378	8	31	67	302 to 335	62 to 69
WCRD	213	0	59	2	149	3	46 to 48	22
WCDS	46	0	25	2	3	16	23 to 31	50 to 67
Total	**280,237**	**2,468**	**160,371**	**15,297**	**58,177**	**42,929**	**138,053 to 159,517**	**49 to 57**

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

Appendix 13:

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

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

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

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

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

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

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

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

Reserve	An area of forest land that, by law or policy, is usually not available for resource extraction. Areas of land and water set aside for ecosystem protection, outdoor and tourism values, preservation of rare species, gene pool and wildlife protection (e.g. wilderness areas, parks).
Riparian	Refers to area adjacent to or associated with a stream, floodplain, or standing water body.
Road deactivation	Measures taken to stabilize roads and logging trails during periods of inactivity, including the control of drainage, the removal of sidecast where necessary, and the re-establishment of vegetation for permanent deactivation.
Seral stage	Any stage of succession of an ecosystem from a disturbed, unvegetated state to a climax plant community. Seral stage describes the tree species composition of a forest within the context of successional development.
Species	A group of closely related organisms which are capable of interbreeding, and which are reproductively isolated from other groups of organisms; the basic unit of biological classification.
Species at risk	Legally recognized designation for species at federal and/or provincial levels that reflects varying levels of threats to wildlife populations. The four categories of risk are extirpated, endangered, threatened, and species of special concern.
Succession	An orderly process of vegetation community development that over time involves changes in species structure and processes.
Threatened species	A species that is likely to become endangered if the factors affecting its vulnerability are not reversed. A species declared as threatened under the federal or Nova Scotia species at risk legislation (NS Endangered Species Act or federal SARA).
Tolerance	The ability of an organism or biological process to subsist under a given set of environmental conditions. The range of these conditions, representing its limits of tolerance, is termed its ecological amplitude. For trees, the tolerance of most practical importance is their ability to grow satisfactorily in the shade of, and in competition with, other trees.
Vernal pool	A seasonal body of standing water that typically forms in the spring from melting snow and other runoff, dries out in the hotter months of summer, and often refills in the autumn.

Vulnerable species	A species of special concern due to characteristics that make it particularly sensitive to human 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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