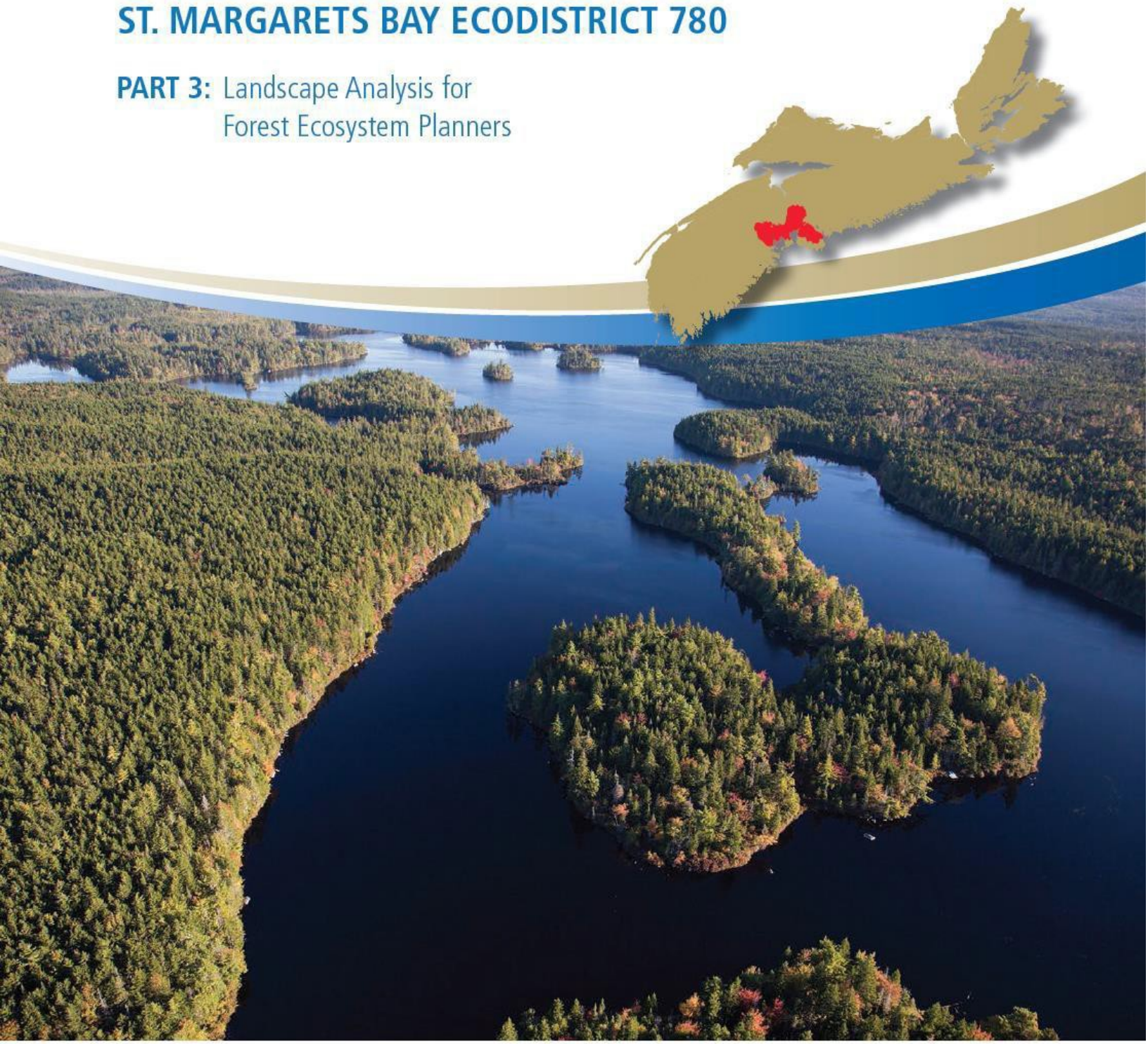
Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS ST. MARGARETS BAY ECODISTRICT 780

PART 3: Landscape Analysis for Forest Ecosystem Planners



ELA 2014-780

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 780: St. Margarets Bay

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

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

Information sources and statistics (benchmark dates) include:

- Forest Inventory (2002) – stand volume, species composition
- Crown Lands Forest Model landbase classification (2006) – provides forest inventory update for harvesting & silviculture from satellite photography (2005), silviculture treatment records (2006) and forest age increment (2006)
- Roads & Utility network – Service Nova Scotia and Municipal Relations (2006)
- Significant Habitat and Species Database (2007)
- Atlantic Canada Data Conservation Centre (2013)

Conventions

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

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

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

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Understanding the Landscape as an Ecological System

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

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

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

Elements Within Landscapes (Map 2)

The landscape analysis identified and mapped eight distinctive elements in the St. Margarets Bay 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 Hemlock Pine Hummocks and Hills is the matrix element, representing about two-thirds of the ecodistrict. A little over half of the element is softwoods, such as red spruce, eastern hemlock and white pine. The remainder is mixedwood and hardwoods.

Spruce Pine Hummocks is the largest patch element, which is most prominent around Martins River, Sponds Lake, Seffernsville and Beech Hill. The area is still dominated by a mature and multi-aged red and black spruce. The other patch elements, in order of size, are **Tolerant Mixedwood Drumlins**, **Spruce Pine Flats**, **Wetlands**, **Tolerant Hardwood Hills** and the tiny **Coastal Beach**.

Valley Corridors is the corridor element, providing routes for wildlife and other travel throughout the ecodistrict.

Flow – Element Interactions (Appendix 1; Map 2)

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

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.

An example of the flow – element interaction is the small moose population that uses the peninsula area around Sheldrake Lake, the Bluff, Five Bridges Lake and Hatchet Lake. This area contains a number of elements, including Spruce Hemlock Pine Hummocks and Hills, Spruce Pine Hummocks and Tolerant Mixedwood Drumlins. This area has a good mixture of development classes, community types and seral stages that provide excellent habitat for the moose population.

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 St. Margarets Bay Ecodistrict has a changed structure that does not represent the inherent natural conditions that once dominated this landscape. Transportation systems and utility corridors have fragmented most of the larger element types, reducing the connective function of the corridors and also increasing the barrier effect of corridors for species that cross them (Map 5).

An additional concern of ecological planning is the maintenance of connectivity between conservation areas, such as 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.

Issues that need to be addressed in landscape design include:

- 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 between 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)

Landscape flows are identified with major linkages to adjacent areas or ecodistricts in Map 2.

The major rivers / lakes provide the most obvious physical connection between the St. Margarets Bay Ecodistrict and its surroundings. Gold River is the main river in the western section of this ecodistrict and runs through the Beach Hill / Chester Basin area, draining into Mahone Bay. A number of second and third order streams feed into the East River, which also drains into Mahone Bay. The Ingram River begins at the Snake Lake area and empties into St. Margarets Bay. Some of the other rivers, such as Nine Mile and Prospect, provide a connection to the Eastern Shore Ecodistrict 820.

Moose and deer move in and out of the St. Margarets Bay Ecodistrict and the Eastern Shore Ecodistrict around the communities of Peggy's Cove, Terrance Bay and Glen Margaret.

People provide linkages between neighbouring ecodistricts of the Eastern Shore, Eastern Interior, South Mountain and LaHave Drumlins through their many activities (recreation, transportation, fishing, utilities development and settlements). The major linkages are located at Halifax Stillwater Lake, Hammonds Plains, Martins River, New Ross and Card Lake.

Future management activities should recognize the significant links to all neighbouring ecodistricts and manage these areas to enhance and sustain the connectivity functions.

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 1 to 5 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 St. Margarets Bay						
Element	**Successional Stage**					
	Early	**% ***	**Middle**	**%**	**Late**	**%**
Spruce Pine Flats		4.0		31.0	**SP7**	57.0
Spruce Pine Hummocks	IH1, SP2, SP8	2.0	IH2, IH6, SP3, SP4, SP6, SH9	15.0	**SP5, SP7,** SP9	68.0
Spruce Hemlock Pine Hummocks and Hills[2]	IH3, IH4, IH5, IH6, MW4, MW5	4.0	SH5, SH6, MW2	24.0	**SH1, SH2, SH3, SH4,** MW1	57.0
Tolerant Hardwood Hills	IH3, IH5, IH6, OF1, OF3	54.0	IH7, TH8	8.0	**TH1, TH2,** TH3	31.0
Tolerant Mixedwood Drumlins[2]	OF1, OF2, OF3, OF4, IH4, IH5	12.0	IH6, IH7, MW2, MW4, SH5, SH6	28.0	**MW1, TH8,** SH1, SH2, SH3, SH4	52.0
Wetlands	FP3, WC1, WC2, WC5, WC6, WC7, WC8, WD1, WD2, WD3, WD6, WD7, WD8, SP7					

View forest groups and vegetation types at
http://novascotia.ca/natr/forestry/veg-types/veg-navigation.asp
To help with identification of vegetation types, the 14 forest groups in Nova Scotia designated by DNR are: Cedar (CE), Coastal (CO), Flood Plain (FP), Highland (HL), Intolerant Hardwood (IH), Karst (KA), Mixedwood (MW), Old Field (OF), Open Woodland (OW), Spruce Hemlock (SH), Spruce Pine (SP), Tolerant Hardwood (TH), Wet Coniferous (WC), Wet Deciduous (WD)
Bolded vegetation types indicate typical late successional community
[1] Forest Ecosystem Classification for Nova Scotia (2010)
[2] Hemlock is a minor component of this element in 780.
*Percentage of element in each successional stage. Percentages may not total 100 due to unclassified lands (such as clearcuts and regenerating stands) not being included.

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

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

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

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

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

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

All lands within the ecodistrict are assessed at the stand level and assigned one of these four ecological emphasis classes (EEC) based on past practices. These classes are mapped over all areas of the landscape using a 1 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 these land use intensities provides an overall Ecological Emphasis Index of 64 to 70 for the ecodistrict (Appendices 12a and 12b). This would suggest that the overall intensity of land use for the St. Margarets Bay Ecodistrict is at a changed state affecting both the structure and function to support habitat (for all species) and for biodiversity conservation.

The 184,677 hectares contained within the St. Margarets Bay Ecodistrict are inherently capable of supporting 159,298 hectares of forests, with remaining lands being non-forest ecosystems such as lakes, wetlands and barrens.

A GIS based classification of current land use, employing the four ecosystem emphasis classes, indicates that 81% of the land inherently capable of supporting forests falls within the extensive ecological emphasis class (Appendix 12a, Appendix 12b and Map 3). Lands in this category are managed for multiple values using ecosystem based techniques that conserve biodiversity and encourage natural ecosystem conditions and processes.

An additional 7% of these lands fall in the intensive ecological emphasis class 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, at times, from competing vegetation. Management adheres to environmental regulations and policies, such as the Wildlife Habitat and Watercourse Protection Regulations, Forest Code of Practice and Department of Environment and Labour's Wetlands Directive.

The remaining lands are split between the reserve class (3%) and the converted class (7%). The reserve class is divided into two categories: legal reserves and policy reserves. The legal reserves are those areas that have legal status under the IUCN (International Union for the Conservation o Nature) codes of I, II, or III, such as wilderness areas, protected beaches and designated provincia parks. (See also the Ecological Representation section for more information.)

The second type of reserve is for areas under various provincial policies. Representation within the lowlands is relatively low because of the percentage of Crown land holdings. There is 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.

The 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.

NSDNR 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.

The St. Margarets Bay Ecodistrict has an overall Road Index (RI) value of 11 (Appendix 7, Table 3). The average falls within the Forest Resource Index range of 7 to 15 and may be described as moderately low. Sixty-three percent of the ecodistrict has a remote road index of 15 or less (Appendix 7, Table 2).

As expected, the highest road densities occur around the settlements, town and main transportation systems. Road Indexes of 26 in these areas place them in the agriculture and suburban category and the highest within the entire ecoregion (Appendix 7, Table 2 and Map 5).

These high Road Indexes bisect the ecodistrict in numerous areas because of the number of corridors and human settlement contributing to habitat fragmentation.

Because of the low percentage of Crown lands, opportunities for reducing fragmentation will rely mainly on private owners. Issues include:

- Conserve the relatively low road densities within the ecodistrict 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 low road density areas (Owls Head Hill, Sherwood-Whitney Lake area, Houghton Lake, Kehoe Mountain and the Chebucto Peninsula) where this may improve connectivity between 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 or is required or if management specific to a priority species need to be developed, a regional biologist, Wildlife Division staff or other species experts should be contacted.

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

Species at Risk

The term "species at risk" is generally used to describe those species that are, to some extent, protected under provincial or federal endangered species legislation. Usually these species are protected where they occur on provincial, federal and private lands. In Nova Scotia, the two main

pieces of endangered species legislation are the Nova Scotia Endangered Species Act (NSESA) and the federal Species at Risk Act (SARA). Species can be classified as "endangered," "threatened," "vulnerable/special concern," or as "extinct" or "extirpated." In most cases for species at risk, recovery planning and special management are in place, as well as legal protection (NSDNR 2013).

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/or 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 St. Margarets Bay Ecodistrict, there are documented occurrences (under the NSESA) of the following number of formally listed species at risk: six endangered, three threatened and two vulnerable. In addition to the listed species, the national General Status process also identifies three red-status species, 18 orange-status species, 37 yellow-status species and 33 green species for a total of 91 other species of conservation concern in this district.

Designated species at risk found within the ecodistrict include moose, Atlantic salmon, wood turtle, several bird species (e.g. olive-sided flycatcher, Canada warbler, bank swallow and roseate tern) and boreal felt lichen.

Other species of conservation concern known for the St. Margarets Bay Ecodistrict include four-toed salamander (amphibian); fisher (mammals); northern maidenhair fern and buttonbush

dodder (plants); bog and hoary elfins and Kennedy's emerald (insects); gray catbird, common loon and common and arctic terns (birds).

Birds

As of 2013, six at-risk bird species have been found in the ecodistrict. Five of these are listed under the NSESA: the roseate tern, rusty blackbird and Canada warbler as endangered; the olive-sided flycatcher as threatened; and the Eastern wood-pewee as vulnerable. Nationally, all six species are listed under SARA: the roseate tern as endangered, the Canada warbler, olive-sided flycatcher and bank swallow as threatened and the rusty blackbird and Eastern wood-pewee as special concern.

There has been a nationwide decline in aerial insectivores such as olive-sided flycatcher, Eastern wood-pewee and bank swallow due to declines in insect food species. Availability of nesting habitat for bank swallow is also thought to be a threat to the species.

Habitat loss and land use practices, particularly on wintering grounds are thought to have contributed to the widespread decline of rusty blackbird, Canada warbler, olive-sided flycatcher, and Eastern wood-pewee. The greatest threats to roseate tern on the other hand are predation by gulls, and habitat loss due to erosion and development of the small coastal islands that they use for breeding, one of which occurs in the St. Margarets Bay Ecodistrict.

Fish

The St. Margarets Bay Ecodistrict contains all or part of 11 main river watersheds that drain to the Atlantic Ocean; and one, the St. Croix River, which drains to the Bay of Fundy. Atlantic salmon have historically used each of these watersheds for spawning and rearing, and continue to make some use of the habitat available in these river systems. The Committee of the Status of Endangered Wildlife in Canada (COSEWIC) has assigned designatable units (DU) that refer to the populations of Atlantic salmon that should be assessed independently from one another.

The ecodistrict contains a part of two DUs: the Inner Bay of Fundy DU and the Nova Scotia Southern Upland DU. Both are designated by COSEWIC as endangered, but only the Inner Bay of Fundy DU has any listing status under the federal SARA or NSESA (endangered). Barriers to dispersal and acidification of many areas within these watersheds are thought to have drastically reduced the amount of freshwater habitat that may be used by Atlantic salmon for spawning and rearing, although it is low returns from the marine environment that continues to be considered the most important factor in the decline of Atlantic salmon.

Insects

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

Skillet clubtail is a federally endangered dragonfly species that has only three known populations in Canada, the closest of which is in New Brunswick. Historically, skillet clubtail were observed in the St. Margarets Bay Ecodistrict, but the last record of observation of the species in the area was from 1948.

Lichens

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

The distribution of boreal felt lichen in Nova Scotia is largely limited to within tens of kilometres from the Atlantic coast, in high-humidity forested areas adjacent to, or within, wetlands that have a major balsam fir contingency. Areas meeting this description occur within the St. Margarets Bay Ecodistrict. Although there are a few records of boreal felt lichen observed in the 1980s, no recent observations have been documented. Surveys in potential habitat areas, however, may reveal new occurrences.

Blue felt lichen is known from 88 locations in Nova Scotia that represent a considerable portion of the entire range known in North America. In Nova Scotia, blue felt lichen are generally found in mixed forests containing red maple that are in wet depressions or adjacent to streams, rivers or lakes in coastal areas up to 300 m in elevation. Five occurrences of blue felt lichen are found in the southernmost portion of the St. Margarets Bay Ecodistrict, four in the Terence Bay Wilderness Area and the one in the Blandford Game Sanctuary on the Aspotogan Peninsula, where additional occurrences have also been recorded to the south in the South Shore ecodistrict.

Threats to both boreal felt lichen and blue felt lichen include atmospheric pollutants and acid precipitation, which change the chemistry of the bark on the trees on which the lichens grow, which can cause direct mortality or interfere with reproduction. Also, boreal and blue felt lichen habitat often overlaps with areas otherwise suitable for forest harvesting activities, which can serve as threat to the species either by direct mortality or habitat loss.

Forestry activities on Crown land in areas where boreal felt lichen may occur are subject to special management practices for the species, which requires that surveys for the species are conducted, and if found, an area buffering the occurrence will not be harvested. Potential boreal felt lichen habitat in the ecodistrict is subject to a relatively low intensity of forestry activity on Crown land compared to some other areas in the province, such as the Eastern Shore.

Mammals

Moose on the mainland of Nova Scotia have been designated as endangered under the Nova Scotia Endangered Species Act. Mainland moose are genetically distinct from those on Cape Breton Island, where moose populations are healthy. One of the remnant populations of moose on the mainland is on the Chebucto Peninsula, part of which is comprised of the St. Margarets Bay

Ecodistrict. This area is considered to be “occupied moose habitat” (an area with recurrent observations of moose over time).

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

Since 2012, special management practices in support of moose have been made mandatory for forestry activities on Crown land in designated moose concentration areas. These practices aim to conserve thermal refugia, aquatic feeding sites, calving areas, and visible cover. The St. Margarets Bay Ecodistrict falls within a designated moose concentration area, and the majority of moose habitat in the ecodistrict is on Crown land and therefore subject to the special management practices.

Forestry activity on the Crown land of the ecodistrict is not as intense as on the Crown land in some of the other moose concentration areas, such as Pictou or Antigonish counties. The ecodistrict contains a small but important stronghold of habitat conducive to supporting a small but apparently stable population of moose on the mainland of the province.

Harbour porpoises generally occur along the continental shelf of both the Atlantic and Pacific coasts, although, as its name implies, they will frequently venture inshore in the summer, including the harbours of the St. Margarets Bay Ecodistrict. Harbour porpoise is not listed under the NSESA; it is listed as a threatened species under the federal SARA but has since been redesignated by COSEWIC as special concern. One of the main threats to harbour porpoise – incidental capture by gillnets set for groundfish fisheries – has been substantially reduced since efforts in that fishery have been reduced. Another threat to harbour porpoise is loss of habitat resulting from the use of acoustic harassment devices, particularly around salmon aquaculture sites.

Plants

Two plant species at risk are documented for the St. Margarets Bay Ecodistrict. Black ash, a tree species, is very rare in the province with an estimated 1,000 individuals and only 12 known mature trees. The only known occurrences of black ash in the ecodistrict were identified in 2013 – two young trees located at the northernmost edge of the ecodistrict near Cochrane Lake. Black ash is designated as threatened under the NSESA but has no federal designation or listing status.

Rockrose, also known as Canada or long-branched frostweed, is listed under the NSESA as endangered. Currently, the known populations in Nova Scotia are limited to the Annapolis Valley in Kings and Queens counties. The only known observation of the species in the St. Margarets Bay Ecodistrict is from 1940. It is unlikely that the species currently occurs in the ecodistrict. Rockrose has no COSEWIC designation or federal listing status under SARA.

Reptiles

Wood turtle is listed as threatened under both the federal SARA and the NSESA. Based on species occurrence information, the St. Margarets Bay Ecodistrict is not likely to support a large number of wood turtle, although individual wood turtles may be sighted infrequently at the very northernmost and easternmost fringe of the ecodistrict boundary. These turtles are uncommon province-wide, with the majority of observations occurring in a few main concentration areas, none of which are located within the ecodistrict.

The known distribution of the leatherback sea turtle in Atlantic Canadian waters is largely associated with areas where fishing activities occur during the summer months when adults of the species are present in the northern portion of their range (leatherback turtles migrate to tropical breeding areas and rookeries in the winter). Occasionally, individuals are sighted near shore, including the harbours of the St. Margarets Bay Ecodistrict.

Incidental capture of leatherback sea turtles from the pelagic longline fishery along the Scotian shelf is thought to be the most significant threat to the species in Atlantic Canadian waters; threats to the species' nesting beaches, eggs and young is thought to contribute most to the species' decline. Leatherback turtle is designated by COSEWIC and listed under the federal SARA as endangered. The species has no designation under the NSESA.

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

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

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

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

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

780 St. Margarets Bay Ecodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime[1]**	**Dominant Climax Type[2]**
Spruce Hemlock Pine Hummocks and Hills (Matrix)	IMHO WCHO WCKK WCRD WMHO	Infrequent	red Spruce (rS), eastern Hemlock (eH), white Pine (wP)
Spruce Pine Hummocks (Patch)	ICHO ICKK ICRD	Frequent	black Spruce (bS), wP
Tolerant Mixedwood Drumlins (Patch)	WCDM WFDM WFKK WMDM	Gap	sugar Maple (sM), yellow Birch (yB), Beech (Be), rS, eH, wP
Spruce Pine Flats (Patch)	ICSM IMSM	Frequent	bS, wP
Wetlands (Patch)	WTLD	Open Seral (Frequent)	bS, red Maple (rM), tamarack (tL)
Tolerant Hardwood Hills (Patch)	WMKK	Gap	sM, yB, Be
Coastal Beach (Patch)			
Valley Corridors (Corridor)	Various	Various	Various

***Ecosection Explanations**: For example, in **ICHO**, **I** stands for Imperfectly drained under Soil Drainage **C** stands for Coarse textured under Soil Texture and **HO** stands for Hummocky under Topographic Pattern

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

Soil Texture: **C** – Coarse textured soils (e.g., gravel) **M** – Medium textured soils (e.g. loam) **F** – Fine textured soils (e.g. clay)

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

[1] Dominant Natural Disturbance Regime is assigned to dominant ecosite condition of ecosection
[2] Climax species

Eleven of the 16 ecosections (ICKK, ICSM, IMHO, IMSM, WCDM, WCRD, WFDM, WFKK, WMDM, WMKK and WTLD) found in this ecodistrict are considered rare (Map 7).

The WMKK ecosection within the Tolerant Hardwood Hills patch element has the highest land use pressure, with 57% converted to human settlement and other development activities. This ecosection forms less than 1% of both the ecodistrict and ecoregion. Ten percent of this ecosection has been converted at the ecoregional level.

Three other ecosections, WFDM, WMDM and WMHO, have high land use pressures and conversion rates that exceed 20%. Old growth stands have been identified on 2,957 hectares, or 9%, of the Crown lands under the Old Forest Policy. Community types (bS, wP and rS, eH, wP, sM, yB, Be) have more than adequate representation (>8%).

The sugar maple, yellow birch and beech community is very rare within the ecodistrict and ecoregion. The area of the black spruce community is unusual within both the ecodistrict and ecoregion (2 to 3%).

Future management opportunities include developing additional, effective practices to address fine filter conservation issues such as:

- uncommon forest species for which genetic viability may be threatened as indicated by DNR's Endangered Species Rating System (yellow and red listed)
- conservation of significant habitats
- uncommon community conditions (e.g. old age, large live and dead trees, and species associations) and increased representivity
- implementing restorative measures in community types – such as sugar maple, yellow birch and beech, ash stands or the red spruce, hemlock 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 Integrated Resource Management classification to include old forest, Eastern Habitat Joint Venture Sites, non-designated provincial park reserves and non-designated sites of ecological significance.

Wilderness areas, designated provincial parks and park reserves, areas under the Special Places Act, National Historic Sites and Parks, Protected Beaches and Sites of Ecological Significance, are legal reserves under the IUCN I, II, III, accounting for 4,081 ha, or 2.2%, of this ecodistrict (Appendix 5).

An additional 3,668 hectares are defined as policy reserves, including old forest sites, operational non-designated parks and reserves and designated provincial parks and park reserves. These two reserve classes (legal and policy) account for 4.2% of the area of the St. Margarets Bay Ecodistrict (Appendix 5 and Map 3).

Since Provincial Crown lands represents less than 2% in some of the element types, opportunities to improve representation will have to be directed to private lands in the form of Eastern Habitat Joint Venture programs; Nature Conservancy of Canada, Nova Scotia Nature Trust and other land conservation groups. Priorities and strategies to improve representation should include:

- uncommon or rare climax community types, such as sugar maple, yellow maple and beech in the Tolerant Hardwood Hills patch element or black spruce in the Spruce Pine Flatspatch element
- connectivity among wetlands and river corridors

ELA Summary

Element Interpretation (All appendices and maps)

The St. Margarets Bay Ecodistrict encompasses the eastern portion of the South Mountain Batholith, a part of the larger Atlantic uplands, a gently tilting upland ranging from less than 300 m along its northern border to sea level along the Atlantic coast, and sloping in a south to southeasterly direction towards St. Margarets Bay and Mahone Bay. Adjacent ecodistricts include South Mountain 720, LaHave Drumlins 740, Eastern Shore 820, Eastern Interior 440 and Rawdon / Wittenburg Hills 410.

Spruce Hemlock Pine Hummocks and Hills
(Matrix) (IMHO, WCHO, WCKK, WCRD, WMHO ecosections) (113,169 ha)

The matrix element comprises about two-thirds of the area of the entire ecodistrict. The covertype of the Spruce Hemlock Pine Hummocks and Hills is now 53% softwood with 29% mixedwood and 15% hardwood (Appendix 10, Table 1). Mid-seral species of balsam fir, red maple, black spruce and birch dominate the mixedwood and hardwood covertypes. There is approximately 300 hectares of white spruce within this element type (Appendix 10, Table 2).

The topography within the matrix has irregular arrangements of low rounded hills and hummocks with pronounced ridges, especially where the soil is thin and the bedrock is exposed. Small streams and rivers, bogs, swamps and several large lakes are distributed over this geographical area.

Only 1.4% of the Spruce Hemlock Pine Hummocks and Hills is under reserve status, all of which is within the red spruce, eastern hemlock and white pine community type (WCKK and WCHO). There is no representation within the other ecosections (WMHO, IMHO and WCRD).

Two ecosections within this element (IMHO and WCRD) form less than 2% of the ecodistrict (Appendix 3, Table 2). Unclassified lands account for 7% of the 113,169 hectares of the element. Approximately 8,000 hectares of the Spruce Hemlock Pine Hummocks and Hills have been converted to other uses (Appendix 12a). Conversion is highest around the shoreline in the communities of Chester, Chester Basin, St. Margarets Bay and Spryfield (Map 3).

The Ecological Emphasis Index (EEI) remains fairly high (62 to 70) because 76%, or 85,682 hectares, is extensively managed (Appendix 12a). There is only 834 hectares classified as being intensively managed.

Flows

People (transportation, recreation ATV's, harvesting, tourism, ecotourism, aggregate, hunting, fishing, trapping, kayaking, sailing, canoeing, exploration - minerals); moose (cover, movement, currently moose are concentrated in patches); trout/salmon (catchment); waterfowl (nesting, habitat - lakes and ponds, concentrations of winter waterfowl occur within the bays, particularly goldeneye, old squaw, long tailed ducks); otter (habitat, riparian, food).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Spruce Hemlock Pine Hummocks and Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	23%	15%	62% (34 Mat + 28 OF)	28%
Seral Stage	Early	Mid	Late	Unclassified
	4%	24%	57%	15%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	53%	15%	29%	3%

Desired Condition

Late seral dominated softwood stands and softwood dominated mixedwood stands with a variety of development classes and seral stages consistent with the natural disturbance regime.

Issues

Only 1.4% of the element is in the reserve class. A total of 6% of the red spruce, eastern hemlock and white pine on Crown lands has been selected for representation under the Old Growth Policy.

- only 52% of the element is now softwood
- 28% of area comprises early and mid-successional tree species
- 15% of the Spruce Hemlock Pine Hummocks and Hills remains unclassified (Appendix 12a)
- 7% of the element has been converted to other uses.

Spruce Pine Hummocks

(Patch) (ICHO, ICKK, ICRD ecosections) (37,511 ha)

The Spruce Pine Hummocks is a patch element that comprises about 20% of the ecodistrict. This element is predominately located on the east side of the ecodistrict. Late seral softwood of spruce and pine dominate the softwood covertype.

About 8.4% or 3,158 hectares of this element is within reserve areas (2,495 hectares under legal reserves and 663 under policy reserves). All of the area within the legal reserves is located within the ICHO ecosection. Representation within the ICRD and ICKK ecosections is found in the form of old growth under the Provincial Policy Reserves.

Only one of the ecosections, ICKK, forms less than 2% of the ecodistrict. This ecosection also forms less than 2% of the ecoregion (Appendix 3, Table 2).

Unclassified lands account for 14% of the element. A total of 1,598 hectares have been converted to other uses. The EEI range remains among the highest for all the elements at 67 to 74. Seventy-three percent of the element is classified as extensively managed.

Flows

People (timber, hunting, trapping, recreation, hiking, exploration); moose (major habitat); trout/salmon (catchment for trout); goods (aggregate and forestry)

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Spruce Pine Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	23%	19%	58% (30 Mat + 28 OF)	28%
Seral Stage	Early	Mid	Late	Unclassified
	2%	15%	68%	15%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	72%	6%	18%	4%

Desired Condition

This is a spruce and pine dominated softwood covertype that occurs in a variety of patch sizes and development stages. Maintain the development stages, seral stages and connectivity between the wetlands/lakes and river corridors. The inclusions of hardwoods and mixedwoods within this spruce pine dominated forest will increase fertility and diversity and reduce the fire risk.

Issues

There is more than adequate representation of the black spruce and white pine community selected under the Old Growth Policy. There is a gap of approximately 470 hectares in the red spruce, eastern hemlock and white pine community. There is 816 hectares of old forest selected under the legal reserves and 511 hectares under the policy reserves with a shortfall of approximately 2%.

- 14% of the lands remain unclassified
- harvest pressures

- pressure to convert large amounts of land for urban and residential development
- pressure to maintain Crown blocks for recreational opportunities

Tolerant Mixedwood Drumlins

(Patch) (WCDM, WFDM, WFKK, WMDM ecosections) (7,770 ha)

This relatively small fragmented patch element is located in both the eastern and western sections of the ecodistrict but almost nonexistent in the Aspotogan Peninsula northward to the five Mile Lake and Pockwock Lake area. Late seral species still dominate with 52% but early and mid-seral species of white birch, red maple, grey birch, larch and white spruce comprise 40% of the total forested area (Appendix 10, Table 1).

Approximately 10% of this patch element is under reserve status (500 hectares under legal reserves and 278 hectares under Provincial Policy Reserves). All ecosections within this patch element have some representation with the exception of WFKK (Appendix 4, Appendix 12).

All four of the ecosections form 2% or less of the eocdistrict. Three of the ecosections (WCDM, WFDM and WFKK) also form 2% or less of the ecoregion (Appendix 3, Table 2).

Approximately 535 hectares, or 7%, of the Tolerant Mixedwood Drumlins are unclassified (Appendix 12a).

Some of the highest conversions within the ecodistrict occur within this element type because of the deeper richer soils of these communities located on the drumlins. The WFDM and WMDM have conversions of 24% and 37% respectively (Appendix 3, Table 2).

The Ecological Emphasis Index ranges from 60 to 64. Ten percent of the area is in reserve status while only 2% is intensively managed (Appendix 3, Table 2 and Appendix 12b).

This element also contains islands within Mahone Bay. The well drained medium textured soils of these drumlin islands have often been converted to other land uses and examples of late successional forest conditions are rare. The vegetation on many of the Mahone Bay islands was studied recently (SRES 2002). Red spruce and white pine with scattered sugar maple, yellow birch and hemlock were reported which indicates that these islands are afforded some protection from the Atlantic Ocean.

Flows

People (recreation, forestry, roads); moose (food, cover); trout/salmon (catchment); goods (forest products); otter (general habitat, streams).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Tolerant Mixedwood Drumlins

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	13%	21%	66% (32 Mat + 34 OF)	34%
Seral Stage	Early	Mid	Late	Unclassified
	12%	28%	52%	8%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	51%	17%	31%	1%

Desired Condition

The desired condition of this patch type is to maintain a mixedwood community of late seral species of sugar maple, yellow birch, beech, red and black spruce, white pine and eastern hemlock with 60 to 70% of the community in the mature, multi-aged and old growth development class.

Issues

There are no large apparent gaps within this element. Minor gaps occur within ecosections but the community type of red spruce, eastern hemlock, white pine, sugar maple, yellow birch and beech is fairly well represented.

- conversion to other uses is very high with the WMDM and WFDM ecosections
- harvesting pressures
- fragmentation / connectivity
- 51% softwood covertype

Spruce Pine Flats

(Patch) (ICSM, IMSM ecosections) (5,385 ha)

Small isolated patches located around Frederick Lake, Pockwock Lake, East River, Simms Settlement, Glengarry and Seffernsville. The larger patches are located at Beech Hill and Spondo Lake. The area is now dominated by a late seral mature / multi-aged softwood dominated covertype. Red and black spruce, spruce / fir and balsam fir are the major community types.

Less than 1% of this patch type has representation within the reserve area. It is the old forest under the Interim Old Growth Policy that provides the representation for this community type. Both of these ecosections (ICSM and IMSM) are rare in both the ecodistrict and ecoregion.

The Ecological Emphasis Index is 70 to 74, one of the highest of all elements within this ecodistrict.

Flows

People (hunting, general recreation, fishing, trapping); moose (major habitat).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Spruce Pine Flats

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	13%	10%	77% (31 Mat + 46 OF)	46%
Seral Stage	Early	Mid	Late	Unclassified
	4%	31%	57%	8%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	51%	15%	31%	3%

Desired Condition

A late seral softwood dominated covertype of black spruce in a variety of patch sizes, seral stages and development classes. An inclusion of hardwoods on the better drained knolls and improved connectivity between Wetlands and the Valley Corridors.

Wetlands

(Patch) (WTLD ecosection) (2,645 ha)

Small to medium sized wetland patches that are extremely important in this ecodistrict. Wetlands comprise some 2,645 hectares, or 1.4%, of the ecodistrict. Although there are numerous lakes within the ecodistrict, these wetlands have a high importance in water collection and filtering, moose habitat - calving, thermal protection and feeding.

The largest wetland areas are located near the Fourties, Bear Marsh, Caribou Lake, Martins River (Lunenburg County) and the West Lake / Little Pine Lake areas of Halifax County.

These wetlands are characterized by imperfect to poorly drained soils, stunted black spruce and ericaceous vegetation.

There is no representation, legal or policy, for these wetland community types. There is very little intensive management and almost no conversion within this element type. *In 2011, a Nova Scotia Wetland Conservation Policy (http://www.novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf) was released that provides direction and a framework for the conservation and management of wetlands in the province.*

The EEI remains fairly high (71 to 75) because all lands are extensively managed and there is very little conversion within this element.

Flows

People (hunting, trapping); moose (major habitat and feeding); trout/salmon (catchment, filter); waterfowl (nesting, rearing, habitat); otter (habitat).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	16%	22%	62% (25 Mat + 37 OF)	37%
Seral Stage	Early	Mid	Late	Unclassified
	1%	23%	66%	10%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	66%	6%	23%	5%

Desired Condition

A series of wetlands and wetland complexes interconnected to hydrological systems.

Tolerant Hardwood Hills

(Patch) (WMKK ecosection) (325 ha)

A small single isolated patch type is located in the Chester-East Chester area. The area is now dominated by a mature, early seral stage softwood forest (Appendix 10, Table 1). White spruce comprises over 20% of the community type. Red and black spruce, mixed spruce and pine, and balsam fir are the other softwood species that dominate the present softwood covertype. All the reserve area, 14%, or 47 ha, are under policy reserve area, on provincial Crown lands.

There is no representation under legal reserves (Appendix 4). This community type of sugar maple, yellow birch and beech forms less than 2% in both the ecodistrict and ecoregion (Appendix 3, Table 2). A total of 186 ha, or 57%, of this patch type has been converted to other uses. The EEI is 30 to 32, the lowest of all the elements in the ecodistrict.

Flows

People (settlement, development and recreation); moose (food, cover); goods (forest products).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Tolerant Hardwood Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	9%	2%	89% (52 Mat + 37 OF)	37%
Seral Stage	Early	Mid	Late	Unclassified
	54%	8%	31%	7%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	80%	0%	16%	4%

Desired Condition

A predominately mature late seral hardwood forest with a sustained community of sugar maple, yellow birch and beech.

Issues

This element type is very rare within both the ecodistrict and ecoregion. There is sufficient representation in the policy reserves but no representation within the legal reserves. Other issues include:

- a tolerant hardwood community that is presently dominated by a softwood covertype
- 62% of the forest is in early and mid-seral stage
- white spruce comprises some 20% of this forest community
- rare ecosection within both the ecodistrict and ecoregion that is experiencing high conversion rates and low EEI

Valley Corridors

(Corridor) (Various ecosections) (4,160 ha)

This corridor element contains a mature and multi-aged late seral softwood forest (Appendix 10, Table 1). Red and black spruce, white pine and hemlock dominate with lesser amounts of tolerant and intolerant hardwoods, white spruce and balsam fir. Seventy percent of Valley Corridors is either infrequent or gap disturbed. The development classes are fairly well balanced for the disturbance regimes, with 77% of the area in the multi-aged and mature class.

Flows

People (recreation, settlement, hiking, fishing, trapping, green space, power generation); moose (limited habitat); trout/salmon (habitat, gaspereau on the Nine Mile, landlocked salmon on the Indian River, PCB contamination, sea trout on the Ingram River).

Composition

St. Margarets Bay Ecodistrict 780 (based on statistics up to 2008)

Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	9%	14%	77% (42 Mat + 35 OF)	35%
Seral Stage	Early	Mid	Late	Unclassified
	2%	20%	73%	5%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	67%	7%	25%	1%

Desired Condition

A series of well-connected slopes and intervals in a natural forest state.

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the St. Margarets Bay 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:

- Only 1.4% of the Spruce Hemlock Pine Hummocks and Hills is in the reserve class.
- Sugar maple, yellow birch and beech are very rare within both the ecodistrict and ecoregion.
- Slight gaps exist in the representation of red spruce, eastern hemlock and white pine community.
- Only 52% of the Spruce Hemlock Pine Hummocks and Hills is now softwood.
- High percentage of the Spruce Hemlock Pine Hummocks and Hills matrix element is in the early and mid-successional stages.
- Fairly high percentage of the land is unclassified.
- Seven percent of the matrix has been converted to other uses.
- Tolerant hardwood community is dominated by softwood covertypes.
- White spruce comprises 20% of the Tolerant Hardwood Hills patch element.
- Very low EEI (30 to 32) for Tolerant Hardwood Hills.
- Increased pressure to convert large amounts of land in the Spruce Pine Hummocks patch element to urban and residential development.
- Pressure to maintain Crown blocks for recreational opportunities.
- Fragmentation and connectivity issues within the Tolerant Mixedwood Drumlins element.

Appendix 1: Flow - Element Interactions

Element	People	Moose	Trout/Salmon	Waterfowl	Otter
Spruce Hemlock Pine Hummocks and Hills (Matrix) (rS eH wP)	Transportation, recreation (ATVs), harvesting, tourism/eco-tourism, aggregate, hunting, fishing, trapping, kayaking, sailing, canoeing, exploration - minerals, forest products	Cover, movement, currently moose are concentrated in patches	Catchment	Nesting habitat - lakes and ponds. Concentrations of winter waterfowl occur within the bays, particularly goldeneye, old squaw, long tailed ducks	Habitat - riparian, food
Valley Corridors					
McIntosh Run	Recreation, settlement, hiking, fishing, trapping, greenspace, aggregate	Habitat - towards Herring Cove	Habitat	Habitat, nesting	Habitat
Prospect River	Fishing, hunting, trapping, hiking	Habitat - limited	Trout habitat	Nesting, rearing	Habitat
Nine Mile River	Recreation - canoeing	Cover, habitat	Trout, salmon, gaspereau habitat	Nesting, rearing	Habitat
Woodens River	Recreation - canoeing forestry	Habitat, cover - living here more	Trout, salmon (PCB contamination)	Nesting, rearing	Habitat
Indian River	Fishing, trapping, recreation, power generation, forestry	Limited habitat use	Trout habitat, landlocked salmon	Nesting, rearing	Habitat
Ingram River	Fishing, trapping, recreation, forestry, aggregate	Limited habitat use	Trout and salmon habitat, sea trout	Nesting, rearing	Habitat
East River	Fishing, trapping, recreation				
Gold River	Fishing, trapping, recreation, forestry, aggregate		Trout and salmon habitat, sea trout	Nesting, rearing	Habitat

Appendix 1: Flow - Element Interactions

Element	People	Moose	Trout/Salmon	Waterfowl	Otter
Spruce Pine Flats (Patch)	Hunting, fishing, trapping, general recreation	Major habitat			
Spruce Pine Hummocks (Patch)	Timber, hunting, trapping, recreation, hiking, exploration, aggregate, forestry	Major habitat	Catchment - trout		
Wetlands (Patch)	Hunting, trapping	Major habitat and feeding	Catchment, filter	Nesting, rearing habitat	Habitat
Coastal Beach (Patch)	Recreation, parks, camping, boat launch, picnic parks				
Tolerant Mixedwood Drumlins (Patch)	Recreation, forestry, roads, forest products	Food, cover	Catchment		General habitat - streams
Tolerant Hardwood Hills (Patch)	Settlement, development, recreation, forest products	Food, cover			

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Spruce Hemlock Pine Hummocks and Hills (rSeHwP)	Matrix	High	Old forest, WA, Cox Lake, Chebucto Peninsula. Barrens, coastal values - recreation, waterfowl, Pockwock watershed	Large prominent softwood matrix extending over entire ecodistrict	Infrequent (wind) - moose browse in isolated patches	Mature late seral rS,wP remnants of eH	Predominately softwood with some intolerant hwds-rM, birch	Bedrock - Highways 103 and #3 - power lines, abandoned rail - development - urban	Maintenance of patch size - roads - locations, percentage of roads/area	Promote late seral - maintain low road density (moose areas) - moose connectivity - to maintain low percentage of roads
Wetlands	Patch	Moderate	Moose area on Chebucto Peninsula - Five Bridges Lake - vacant land Meadows - Bog Lake/Bear Skin Lake complex	Small isolated	Open seral	Open treed bogs - shrub swamps - salt marsh along coast in selected areas	Matrix	Connectivity - infills	- under represented element - urban sprawl - infill of wetlands	Maintain wetland & water quality - maintain under represented wetlands i.e. salt marshes
Spruce Pine Flats Species	Patch	Low	Walden - Hubley Big Lake	Isolated	Frequent	mid-seral mixedwood Chebucto Peninsula -bS	Matrix	Harvesting methods - fire - succession	Ownership - lack of education	Silviculture intervention to favour bS / planting - promote forest education
Spruce Pine Hummocks (bS wP)	Patch	High	Pockwock - water supply - woodlot	West is isolated from east	Frequent	West - intolerant hardwood, mixedwood and scattered wP - East - bS, rS, bF scattered pine and red maple	West - Matrix & Black Spruce Patch - east - Matrix	Isolated and connected in the west - succession	Harvest pressure	Manage under disturbance regime guidelines
Tolerant Mixedwood Drumlins (rS, eH, wP, sM, yB, Be)	Patch	Low	Windsor Road (Lunenburg) Drumlins - Holden Lake (Lun) - Otter Lake (HRM) - red Oak west of Oak Hill Lake	Small - isolated - two fairly large patches in Lunenburg County	Gap	East - rS, wP, yB, rO West - mid-successional mixedwood	- west - matrix - east - matrix & patches	- Isolation and connectivity - succession - possible harvesting impacts	Harvesting pressures	Manage under the Gap disturbance process.

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Tolerant Hardwood Hills (sM, yB, Be)	Patch	Low	Only one patch west of Graves Island	Small - isolated	Gap	wS, rS, wP, sM	Matrix	Isolation - succession issues	Converted by land use practices	Manage under the Gap process.
Valley Corridors	Corridors	High	Nine Mile River - linkages to Eastern Interior - Moose area - remote wilderness - recreation - hunting - fishing	Continuous - small river - intact narrow corridor	Varies - infrequent	bS/wP/rS more barrens on west side	Matrix - bS/wP Patch	Conversions in upper reaches (connectivity)	Urban development	Restorative measures - riparian zone management - land use planning
			Woodens River - Nine Mile and Woodens system off moose area	Continuous small river, intact - lakes/streams/ pools	Varies - infrequent	bS/wP/rS/bF/rM /yB/wB	Matrix	Development-subdivisions - conversions	Development	Restorative measures - riparian zone management - land use planning
			Prospect - recreation -hunting and fishing - some moose cover	Short river/small - lakes/ streams/pools	Frequent	bS/wP/rS/bF/rM /yB/wB	Matrix	Development-subdivisions - conversions	Development	Restorative measures - riparian zone management - land use planning
			McIntosh Run recreation in urban area walking trails	Orientation NW/SE -narrow	Infrequent	rS, pine, rM, bS, wB, bF	bS/wP patches	Connectivity - conversion	Urban development - pollution - dam- Long Lake	Restoration Land use planning - education

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
			Indian River - recreation - camps, fishing	Linkages at north end - lake/river/ pipeline	Infrequent	rS, wP, eH, yB, rO, rM, sM, wB, bF	bS/wP patch	Connectivity - conversion	Power dams and pipelines (Little/Big Indian & Sandy - Dams - harvesting	Restoration - fish ladder

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 780)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS	-			
Roseate Tern	*Sterna dougallii*	Endangered	Endangered	Endangered
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened	Threatened
Eastern Wood-Pewee	*Contopus virens*	Vulnerable	Special Concern	Special Concern
Bank Swallow	*Riparia riparia*	N/A	Threatened	Threatened
Rusty Blackbird	*Euphagus carolinus*	Endangered	Special Concern	Special Concern
Canada Warbler	*Wilsonia canadensis*	Endangered	Threatened	Threatened
DICOTS				
Black Ash	*Fraxinus nigra*	Threatened	N/A	N/A
Canada Frostweed (Rockrose)	*Helianthemum canadensis*	Endangered	N/A	N/A
FISH				
Atlantic Salmon - Inner Bay of Fundy population	*Salmo salar*	N/A	Endangered	Endangered
INSECTS	-			
Monarch	*Danaus plexippus*	N/A	Special Concern	Special Concern
Skillet Clubtail	*Gomphus ventricosus*	N/A	Endangered	Endangered
LICHENS	-			
Blue Felt Lichen	*Degelia plumbea*	Vulnerable	Special Concern	Special Concern
Boreal Felt Lichen - Atlantic population	*Erioderma pedicellatum*	Endangered	Endangered	Endangered
MAMMALS	-			
Harbour Porpoise - Northwest Atlantic population	*Phocoena phocoena*	N/A	Special Concern	Special Concern
Moose - Mainland Nova Scotia population.	*Alces alces*	Endangered	N/A	N/A
REPTILES	-			
Leatherback Sea Turtle - Atlantic population	*Dermochelys coriacea*	N/A	Endangered	Endangered
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 780)

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)	Unranked
Pine Siskin	*Carduelis pinus*	Sensitive (Yellow)	Unranked
Killdeer	*Charadrius vociferus*	Sensitive (Yellow)	Unranked
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	Unranked
Cape May Warbler	*Dendroica tigrina*	Sensitive (Yellow)	Unranked
Gray Catbird	*Dumetella carolinensis*	May Be At Risk (Orange)	Unranked
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive (Yellow)	Unranked
Common Loon	*Gavia immer*	May Be At Risk (Orange)	Unranked
Gray Jay	*Perisoreus canadensis*	Sensitive (Yellow)	S3S4
Black-backed Woodpecker	*Picoides arcticus*	Sensitive (Yellow)	S3S4
Common Tern	*Sterna hirundo*	Sensitive (Yellow)	Unranked
Arctic Tern	*Sterna paradisaea*	May Be At Risk (Orange)	Unranked
Wilson's Warbler	*Wilsonia pusilla*	Sensitive (Yellow)	Unranked
BRYOPHYTES			
Drab Brook Moss	*Hygrohypnum luridum*	Sensitive (Yellow)	S2S3
a Feather Moss	*Hylocomiastrum pyrenaicum*	Sensitive (Yellow)	S2S3
a Moss	*Platylomella lescurii*	Sensitive (Yellow)	Unranked
DICOTS			
Nova Scotia Agalinis	*Agalinis neoscotica*	Secure (Green)	S3
Buttonbush Dodder	*Cuscuta cephalanthi*	May Be At Risk (Orange)	S1
Pink Crowberry	*Empetrum eamesii*	Sensitive (Yellow)	S3
Purple-veined Willowherb	*Epilobium coloratum*	Sensitive (Yellow)	S2?
Red Ash	*Fraxinus pennsylvanica*	May Be At Risk (Orange)	S1
Kalm's Hawkweed Panicled	*Hieracium kalmii*	Undetermined (Undetermined)	Unranked
Hawkweed Pinebarren	*Hieracium paniculatum*	Secure (Green)	S3
Golden Heather Whorled	*Hudsonia ericoides*	Sensitive (Yellow)	S2
Yellow Loosestrife	*Lysimachia quadrifolia*	Undetermined (Undetermined)	S1
Greenland Stitchwort	*Minuartia groenlandica*	Sensitive (Yellow)	S2
Water Blinks	*Montia fontana*	May Be At Risk (Orange)	S1
Farwell's Water Milfoil	*Myriophyllum farwellii*	Sensitive (Yellow)	S2
Rugel's Plantain	*Plantago rugelii*	Undetermined (Undetermined)	S2

Appendix 3: Special Occurrences (Ecodistrict 780)

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***
Blood Milkwort	*Polygala sanguinea*	Sensitive (Yellow)	S2S3
Sharp-fruited Knotweed	*Polygonum raii*	Undetermined (Undetermined)	S2S3
Climbing False Buckwheat	*Polygonum scandens*	Sensitive (Yellow)	S3
Comb-leaved Mermaidweed	*Proserpinaca pectinata*	Sensitive (Yellow)	S3
Eastern Cudweed	*Pseudognaphalium obtusifolium*	Secure (Green)	S3S4
Horned Sea-blite	*Suaeda calceoliformis*	Secure (Green)	S2S3
Canada Germander	*Teucrium canadense*	Sensitive (Yellow)	S3
Little Floating Bladderwort	*Utricularia radiata*	Secure (Green)	S3
Arrow-Leaved Violet	*Viola sagittata var. ovata*	Secure (Green)	S3S4
FERNS AND THEIR ALLIES			
Northern Maidenhair Fern	*Adiantum pedatum*	May Be At Risk (Orange)	S1
Acadian Quillwort	*Isoetes acadiensis*	Sensitive (Yellow) Secure	S3
Little Curlygrass Fern	*Schizaea pusilla*	(Green)	S3
FISH			
Atlantic Salmon	*Salmo salar*	May Be At Risk (Orange)	S2
INSECTS			
Mottled Darner	*Aeshna clepsydra*	Secure (Green)	S3
Lance-Tipped Darner	*Aeshna constricta*	Secure (Green)	S3
Milbert's Tortoiseshell	*Aglais milberti*	Secure (Green)	S2
Pepper and Salt Skipper	*Amblyscirtes hegon*	Secure (Green)	S2
Common Roadside-Skipper	*Amblyscirtes vialis*	Secure (Green)	S2
Henry's Elfin	*Callophrys henrici*	Secure (Green)	S2
Bog Elfin	*Callophrys lanoraieensis*	May Be At Risk (Orange)	S1S2
Eastern Pine Elfin	*Callophrys niphon*	Secure (Green) Secure	S2
Hoary Elfin	*Callophrys polios*	(Green)	S3S4
Orange Bluet	*Enallagma signatum*	May Be At Risk (Orange)	S1
Juvenal's Duskywing	*Erynnis juvenalis*	Secure (Green) Secure	S2S3
Harvester	*Feniseca tarquinius*	(Green) Sensitive	S3S4
Harlequin Darner	*Gomphaeschna furcillata*	(Yellow) Secure (Green)	S3
Common Branded Skipper	*Hesperia comma*	Secure (Green) Secure	S3
Northern Pearly-Eye	*Lethe anthedon*	(Green) Secure (Green)	S3
Elfin Skimmer	*Nannothemis bella*	May Be At Risk (Orange)	S3
Compton Tortoiseshell	*Nymphalis l-album*		S1S2
Jutta Arctic	*Oeneis jutta*		S1

Appendix 3: Special Occurrences (Ecodistrict 780)

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***
Brook Snaketail	*Ophiogomphus aspersus*	May Be At Risk (Orange)	S1
Riffle Snaketail	*Ophiogomphus carolus*	Secure (Green) Sensitive	S3
Spot-Winged Glider	*Pantala hymenaea*	(Yellow)	Unranked
Greenish Blue	*Plebejus saepiolus*	At Risk (Red) At	S1
Eastern Comma	*Polygonia comma*	Risk (Red) Secure	S2
Green Comma	*Polygonia faunus*	(Green) Secure	S3
a Comma	*Polygonia interrogationis*	(Green) Secure	Unranked
Grey Comma Satyr	*Polygonia progne*	(Green) Sensitive	S3S4
Comma Banded	*Polygonia satyrus*	(Yellow)	S1
Hairstreak Banded	*Satyrium calanus*	Undetermined (Undetermined)	S2
Hairstreak Striped	*Satyrium calanus falacer*	At Risk (Red) Undetermined	S2
Hairstreak Striped	*Satyrium liparops*	Sensitive (Yellow) May	S3
Hairstreak	*Satyrium liparops strigosum*	Be At Risk (Orange)	S3
Forcipate Emerald	*Somatochlora forcipata*	Sensitive (Yellow)	S2
Delicate Emerald	*Somatochlora franklini*	May Be At Risk (Orange)	S1
Kennedy's Emerald	*Somatochlora kennedyi*	Secure (Green) Secure	S1S2
Clamp-Tipped Emerald	*Somatochlora tenebrosa*	(Green) Secure (Green)	S3
Aphrodite Fritillary	*Speyeria aphrodite*		S3S4
Grey Hairstreak	*Strymon melinus*		S2
LICHENS			
Powder-tipped Antler Lichen	*Everniastrum catawbiense*	Yellow (2)	S1S2
Blistered Jellyskin Lichen	*Leptogium corticola*	Yellow (3)	S2S3
Appressed Jellyskin Lichen	*Leptogium subtile*	Yellow (3)	S1S3
Ghost Antler Lichen	*Pseudevernia cladonia*	Yellow (3)	S2S3
Peppered Moon Lichen	*Sticta fuliginosa*	Yellow (3)	Unranked
Powdered Moon Lichen	*Sticta limbata*	Yellow (2)	S1S2
MAMMALS			
Fisher	*Pekania pennanti*	Yellow (3)	S2
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined (5)	Unranked
MONOCOTS			
Lesser Brown Sedge	*Carex adusta Carex*	Yellow (3)	S2S3
Silvery-flowered Sedge	*argyrantha Carex*	Green (4)	S3S4
Fernald's Hay Sedge	*foenea*	Green (4)	Unranked
Early Coralroot	*Corallorhiza trifida*	Green (4)	S3

Appendix 3: Special Occurrences (Ecodistrict 780)

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***
Ovate Spikerush	*Eleocharis ovata*	Yellow (3)	Unranked
Dudley's Rush	*Juncus dudleyi*	Yellow (3)	Unranked
Greene's Rush	*Juncus greenei*	Yellow (2)	S1S2
Woods-Rush	*Juncus subcaudatus var. planisepalus*	Yellow (3)	S3
Loesel's Twayblade	*Liparis loeselii Listera*	Green (4)	S3S4
Southern Twayblade	*australis Spiranthes*	Yellow (2)	S2
Yellow Ladies'-tresses	*ochroleuca*	Yellow (3)	S2S3

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

Appendix 3: Special Occurrences (Ecodistrict 780)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Lakes - Mill, Upper Vinegar, Lower Vinegar, Sandy, Rafter, Panuke, Big St. Margarets Bay Lake, Pockwock, Big Indian, Uniacke, Five Mile, others	Ecosystems	Service Nova Scotia	Nova Scotia Environment Act Nova Scotia Forest Act (Wildlife Habitat and Watercourse Protection Regs)
Loon Nesting Lakes	Bird Habitat	Significant Habitats of Nova Scotia Database (SHNSD)	Nova Scotia Environment Act Nova Scotia Forest Act (Wildlife Habitat and Watercourse Protection Regs)
Eagle Nests	Bird Habitat	SHNSD	Nova Scotia Wildlife Act (NSWA)
Wedge Island – Roseate Tern Colony	Bird Habitat/Species	SHNSD ACCDC	NSESA SARA
Pockwock Lake Watershed	Water Supply	SOURCE	Nova Scotia Environment Act
Wilderness Areas – Terence Bay and Blue Mountain - Birch Cove Lakes	Ecosystems	SOURCE	ACT
Provincial Parks – Long Lake and Jerry Lawrence	Ecosystems/ Recreation	SOURCE	NS Parks Act
Panuke Lake Nature Reserve	Ecosystems	SOURCE	ACT
Pockwock Lake Watershed	Water Supply	SOURCE	Nova Scotia Environment Act

Appendix 3: Special Occurrences

Table 2: Comparison of Ecological Emphasis Classification Index by Ecosection (Within Ecodistrict and Ecoregion)

Ecosections that form 2% or less of the ecodistrict and/or ecoregion area or are more than 75% converted are highlighted. The table provides a sense of how unique or uncommon an ecosection and its associated climax communities are within the ecodistrict and across the ecoregion. The EEC Index value conveys an indication of relative land use pressure on the ecosection.

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
ICHO	bS wP	32,362	18.0	25,534	14.0	68 to 74	4.0	270,098	16.0	419,644	25.0	75 to 79	1.0
ICKK	bS wP	1,848	1.0	25,534	14.0	63 to 72	10.0	2313	0.0	419,644	25.0	67 to 74	8.0
ICRD	bS wP	5,008	3.0	25,534	14.0	59 to 72	3.0	7,277	0.0	419,644	25.0	63 to 72	3.0
ICSM	bS	3,370	2.0	4,783	3.0	69 to 73	3.0	37,858	2.0	75,102	4.0	76 to 79	2.0
IMHO	rS eH wP	1,509	1.0	128,796	70.0	72 to 74	1.0	222,050	13.0	616,727	37.0	70 to 73	3.0
IMSM	bS	2,174	1.0	4,783	3.0	70 to 74	2.0	92,050	5.0	75,102	4.0	71 to 74	4.0
WCDM	rS eH wP sM yB Be	3,434	2.0	8,024	4.0	76 to 78	1.0	10,837	1.0	187,322	11.0	71 to 76	1.0
WCHO	rS eH wP	37,131	20.0	128,796	70.0	64 to 70	7.0	187,670	11.0	616,727	37.0	73 to 77	4.0
WCKK	rS eH wP	69,955	38.0	128,796	70.0	62 to 71	5.0	152,022	9.0	616,727	37.0	66 to 73	4.0
WCRD	rS eH wP	758	0.0	128,796	70.0	56 to 68	9.0	2,880	0.0	616,727	37.0	70 to 75	5.0
WFDM	rS eH wP sM yB Be	2,037	1.0	8,024	4.0	60 to 61	24.0	37,395	2.0	187,322	11.0	52 to 59	18.0
WFKK	rS eH wP sM yB Be	350	0.0	8,024	4.0	62 to 73	2.0	28,197	2.0	187,322	11.0	44 to 49	25.0
WMDM	rS eH wP sM yB Be	2,203	1.0	8,024	4.0	37 to 44	37.0	132,982	8.0	187,322	11.0	58 to 63	14.0
WMHO	rS eH wP	5,759	3.0	128,796	70.0	46 to 52	29.0	154,580	9.0	616,727	37.0	64 to 69	8.0
WMKK	sM yB Be	325	0.0	325	0.0	30 to 32	57.0	17,018	1.0	59,619	4.0	60 to 65	10.0
WTLD	wetlands	2,798	2.0	0	0.0	71 to 75	0.0	87,241	5.0	0	0.0	77 to 78	3.0

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

Appendix 4: Ecological Representivity Worksheet

Ecosystem			Crown Responsibility	Legal Reserves		Policy Reserves (including unproclaimed legal reserve proposals)		Ecological Emphasis Classification "Reserve Class"					
Ecosection	Climax Type	Area (ha)	Percent of Area on Crown (%)	Crown Area (ha)	Private Area (ha)	Crown Area (ha)	Private Area (ha)	Crown		Private		Total Reserve	
								ha	% (EcoS)	ha	% (EcoS)	ha	% (EcoS)
WCKK	rS eH wP	69,955	17.0	508	83	414	0	921	1.0	83	0.0	1,005	1.0
WCHO	rS eH wP	37,131	27.0	473	20	173	0	646	2.0	20	0.0	666	2.0
ICHO	bS wP	32,362	27.0	2,495	1	364	0	2,860	9.0	1	0.0	2,861	9.0
XXWA	NONE	13,650	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WMHO	rS eH wP	5,759	10.0	0	0	0	0	0	0.0	0	0.0	0	0.0
ICRD	bS wP	5,008	15.0	0	0	20	0	20	0.0	0	0.0	20	0.0
WCDM	rS eH wP sM yB Be	3,434	44.0	189	19	282	0	471	14.0	19	1.0	489	14.0
ICSM	bS	3,370	38.0	0	0	35	0	35	1.0	0	0.0	35	1.0
WTLD	wetlands	2,798	11.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WMDM	rS eH wP sM yB Be	2,203	4.0	0	0	1	0	1	0.0	0	0.0	1	0.0
IMSM	bS	2,174	12.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WFDM	rS eH wP sM yB Be	2,037	17.0	293	0	1	0	294	14.0	0	0.0	294	14.0
ICKK	bS wP	1,848	47.0	0	0	320	0	320	17.0	0	0.0	320	17.0
IMHO	rS eH wP	1,509	41.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WCRD	rS eH wP	758	10.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WFKK	rS eH wP sM yB Be	350	1.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WMKK	sM yB Be	325	16.0	0	47	0	0	47	14.0	0	0.0	47	14.0
XXCB	coastal beach	6	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
Total		**184,677**		**3,958**	**123**	**1,657**		**5,615**		**123**		**5,738**	

See Appendix 12b for full Ecological Emphasis worksheet.

Appendix 5: Ecodistrict Reserves and Protected Areas Summary

Legal Reserves			Policy Reserves (including unproclaimed legal proposals)		
Act Designation	Area by Ownership		Policy Program	Area by Ownership	
	Crown (ha)	Private (ha)		Crown (ha)	Private (ha)
Wilderness Areas	2,146	0	Operational Non Designated Parks and Reserves	513	0
Designated Provincial Parks and Park Reserves	1,722	0	Old Forest	2,957	0
National Parks and Adjuncts	90	0	Designated Provincial Parks and Park Reserves	198	0
Sites of Ecological Significance Under Moratorium	1	0			
Protected Beaches Areas under the Special Places Act		1			

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. Transportation systems, however, are expensive and have a wide range of negative environmental impacts, including water course siltation, habitat fragmentation, dispersal obstruction, plant and animal mortality, exotic species invasion, loss of productive land and an overall increase in human presence (Forman & Deblinger 2000, Reed et. al. 1996, Lindenmayer & Franklin 2002).

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

Efficient access systems can be strategically designed to minimize environmental impacts by incorporating factors such as harvest scheduling, life expectancy, location, road class requirements, decommissioning and mitigation measures (Lindenmayer & Franklin 2002, Forman, 2004). Selection of transportation routes should incorporate knowledge of landscape functions to improve compatibility with natural ecosystem flows and connectivity (Forman & Hersperger, 1996). Furthermore, unroaded and lightly roaded areas are important for biodiversity conservation and should be considered during planning (USDA Forest Service 1999).

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

Main Concepts

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

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

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

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

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

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

Full report contained in the Ecological Landscape Analysis Guidebook
http://www.novascotia.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	1,464
Utility corridors	3	273
Gravel Roads and active railways	6	1,036
Paved streets and roads collectors	10	491
Highways	15	115

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	Range	Hectares	Percent
Remote	0 to 6	50,148	27
Forest Resource	7 to 15	66,964	36
Mixed Rural	16 to 24	35,314	19
Agriculture Suburban	25 to 39	22,009	12
Urban	40 to 100	9,778	5
Total		**184,213**	**100**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Valley Corridors	4,160	26
Spruce-Hemlock-Pine Hummocks and Hills	113,169	9
Spruce-Pine Flats	5,385	7
Spruce-Pine Hummocks	37,511	11
Coastal Beach	6	73
Tolerant Hardwood Hills	325	24
Tolerant Mixedwood Drumlins	7,770	12
Wetlands	2,645	10
Total	**170,971***	**11**

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

Appendix 8: Development Classes and Seral Stages

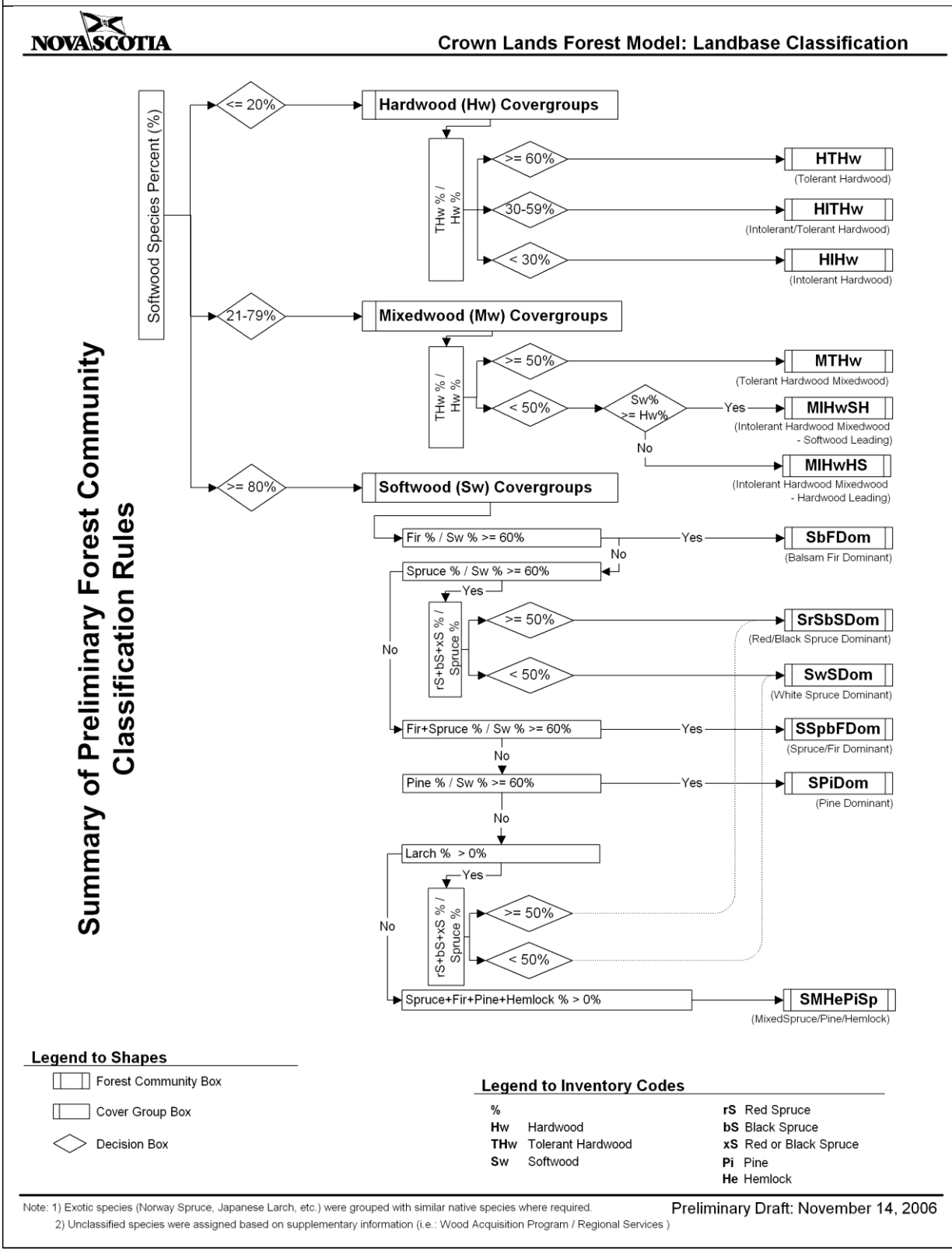
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6 m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade-intolerant "pioneer" species • peak seed production by forbs and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

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

Species		Ecodistrict																																						
Code	Name																																							
AS	ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
BA	black ash	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BC	black cherry	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BE	beech	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
BF	balsam fir	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	1	1
BP	balsam poplar	1	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	1
BS	black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EC	eastern cedar	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EH	eastern hemlock	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	exotic species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GB	grey birch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IH	intolerant hardwood	3	2	4	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2	2	4	3	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2
IW	ironwood	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
JP	jack pine	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LA	largetooth aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OH	other hardwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
OS	other softwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
PC	pin cherry	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RM	red maple	3	2	4	2	2	2	2	2	4	2	5	2	2	2	2	2	2	2	2	2	5	3	2	2	2	2	2	2	2	2	2	3	2	3	3	2	2	2	2
RO	oak	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
RP	red pine	3	3	3	3	3	3	3	3	3	4	3	3	3	4	3	3	3	3	4	4	4	4	4	4	4	3	4	3	3	3	4	4	3	4	4	3	3	3	3
RS	red spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
SM	sugar maple	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ST	striped maple	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TA	aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TH	tolerant hardwood	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TL	eastern larch	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
UC	unclassified	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WA	white ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
WB	white birch	3	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WE	white elm	2	2	4	2	4	2	2	2	2	2	2	2	2	2	2	2	4	4	4	2	2	2	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WP	white pine	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
WS	white spruce	4	4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	4	1	1
XS	red and black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
YB	yellow birch	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

A look-up table assigns each species in the forest inventory a value from one to five for its position on the successional scale. The look-up table may change by ecodistrict since climax on the coast or the Cape Breton Highlands differs from inland and lowland districts. This successional value is multiplied by the species' percent in the stand t 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 (St. Margarets Bay 780)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Spruce Hemlock Pine Hummocks and Hills	WCKK (61.0%) WCHO (32.0%) WMHO (5.0%) IMHO (1.0%) WCRD (<1.0%)	Softwood	rS eH wP	Infrequent	113,080; 99.0	Early	77	49	86	73	285	51,933; 53.0	EARLY	4,175; 3.0
						Mid	49	233	171	589	1,042			
						Late	4,899	7,854	16,486	14,396	43,635			
						Uncl	6,971	0	0	0	6,971			
		Mixedwood				Early	19	19	39	114	191	28,235; 29.0	MID	23,711; 24.0
						Mid	1,333	2,607	4,897	5,586	14,423			
						Late	836	1,439	3,291	4,438	10,004			
						Uncl	3,617	0	0	0	3,617			
		Hardwood				Early	299	897	1,562	676	3,434	14,436; 15.0	LATE	56,103; 57.0
						Mid	326	1,102	5,111	1,705	8,244			
						Late	75	166	1,799	423.0	2,463			
						Uncl	294	0	0	0	294			
		Unclassified				Early	148	17	101	0	266	4,190; 4.0	UNCL	14,804; 15.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	3,923	0	0	0	3,923			
Total					**113,169***	**# ha**	**22,866**	**14,383**	**33,543**	**28,000**	**98,792**			
						%	**23.1%**	**14.6%**	**34.0%**	**28.3%**	**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 (St. Margarets Bay 780)

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	ICHO (82.0%) ICRD (13.0%) ICKK (5.0%)	Softwood	bS wP rS eH wP	Frequent Frequent	37,465; 100.0	Early	15	19	11	17	62	23,297; 72.0	EARLY	667; 2.0
						Mid	28	220	135	276	659			
						Late	1,786	4,531	6,653	6,736	19,706			
						Uncl	2,870	0	0	0	2,870			
		Mixedwood				Early	17	1	3	6	27	5,872; 18.0	MID	4,908; 15.0
						Mid	396	725	1,119	1,061	3,301			
						Late	199	370	560	684	1,813			
						Uncl	733	0	0	0	733			
		Hardwood				Early	70	104	262	92	528	1,732; 6.0	LATE	21,736; 68.0
						Mid	105	101	558	185	949			
						Late	15	4	163	36.0	218			
						Uncl	38	0	0	0	38			
		Unclassified				Early	23	8	20	0	51	1,303; 4.0	UNCL	1,893; 15.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	1,252	0	0	0	1,252			
Total					**37,511***	**# ha**	**7,547**	**6,083**	**9,484**	**9,093**	**32,207**			
						%	**23.4%**	**18.9%**	**29.4%**	**28.2%**	**100.0%**			

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

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Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Tolerant Mixedwood Drumlins	WCDM (42.0%) WMDM (28.0%) WFDM (26.0%) WFKK (4.0%)	Softwood				Early	5	5	64	35	109	3,116; 51.0	EARLY	764; 12.0
						Mid	14	16	31	82	143			
						Late	78	575	809	1,156	2,618			
						Uncl	246	0	0	0	246			
		Mixedwood	rS eH wP sM yB Be	Gap	7,761; 99.0	Early	5	7	13	16	41	1,929; 31.0	MID	1,743; 28.0
						Mid	86	308	366	437	1,197			
						Late	27	172	114	194	507			
						Uncl	185	0	0	0	185			
		Hardwood				Early	39	146	298	103	586	1,042; 17.0	LATE	3,172; 52.0
						Mid	58	46	241	57	402			
						Late	0	0	46	1.0	47			
						Uncl	6	0	0	0	6			
		Unclassified				Early	25	3	0	0	28	57; 1.0	UNCL	466; 8.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	29	0	0	0	29			
Total					**7,770***	**# ha**	**803**	**1,278**	**1,982**	**2,081**	**6,144**			
						%	**13.1%**	**20.8%**	**32.3%**	**33.9%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (St. Margarets Bay 780)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Tolerant Hardwood Hills	WMKK	Softwood				Early	0	0	32	16	48	89; 80.0	EARLY	59; 54.0
						Mid	0	0	0	9	9			
						Late	2	0	18	9	29			
						Uncl	4	0	0	0	4			
		Mixedwood				Early	0	0	4	8	12	17; 16.0	MID	9; 8.0
						Mid	0	0	0	0	0			
						Late	0	2	4	0	6			
						Uncl	0	0	0	0	0			
		Hardwood	sM yB Be	Gap	325; 100.0	Early	0	0	0	0	0	0; 0.0	LATE	35; 31.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0.0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	4; 4.0	UNCL	8; 7.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	4	0	0	0	4			
Total					**325***	**# ha**	**10**	**2**	**58**	**42**	**112**			
						%	**8.9%**	**1.8%**	**51.8%**	**37.5%**	**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 (St. Margarets Bay 780)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Spruce Pine Flats	ICSM (60.0%) IMSM (40.0%)	Softwood	bS	Frequent	3,552; 66.0	Early	2	1	0	2	5	2,395; 51.0	EARLY	190; 4.0
						Mid	20	31	9	96	156			
						Late	111	236	586	1,166	2,099			
						Uncl	135	0	0	0	135			
		Mixedwood				Early	0	0	4	2	6	1,468; 31.0	MID	1,455; 31.0
						Mid	47	88	203	516	854			
						Late	9	15	186	309	519			
						Uncl	89	0	0	0	89			
		Hardwood				Early	11	10	136	21	178	718; 15.0	LATE	2,685; 57.0
						Mid	22	66	275	83	446			
						Late	0	0	49	17.0	66			
						Uncl	27	0	0	0	27			
		Unclassified				Early	0	0	0	0	0	122; 3.0	UNCL	373; 8.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	122	0	0	0	122			
Total					**5,385***	**# ha**	**595**	**447**	**1,448**	**2,212**	**4,702**			
						%	**12.7%**	**9.5%**	**30.8%**	**47.0%**	**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 (St. Margarets Bay 780)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Wetlands	WTLD (100.0%)	Softwood	bS	Open seral	1058; 40.0	Early	0	3	2	0	5	1166; 66.0	EARLY	18; 1%
						Mid	3	52	2	38	95			
						Late	75	261	236	427	999			
						Uncl	67	0	0	0	67			
		Mixedwood				Early	0	0	0	0	0	394; 23.0	MID	398; 23.0
						Mid	12	34	93	84	223			
						Late	16	12	59	58	145			
						Uncl	27	0	0	0	27			
		Hardwood				Early	0	0	11	0	11	104; 6.0	LATE	1155; 66.0
						Mid	2	13	33	33	81			
						Late	2	3	7	1.0	13			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	1	0	1	83; 5.0	UNCL	176; 10.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	82	0	0	0	82			
Total					2,645*	**# ha**	**286**	**378**	**444**	**641**	**1,749**			
						%	**16.4%**	**21.6%**	**25.4%**	**36.6%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (St. Margarets Bay 780)

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)				
Coastal Beach		Softwood				Early							EARLY	2; 100.0
						Mid								
						Late								
						Uncl								
		Mixedwood				Early				2	2	2 100%	MID	
						Mid								
						Late								
						Uncl								
		Hardwood				Early							LATE	
						Mid								
						Late								
						Uncl								
		Unclassified				Early							UNCL	
						Mid								
						Late								
						Uncl								
Total					**6***	**# ha**				**2**	**2**			
						%				**100.0%**	**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 (St. Margarets Bay 780)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Valley Corridors	ICHO (40.0%) WCKK (29.0%) WCHO (17.0%) WCDM (5.0%) ICSM (4.0%) WTLD (4.0%) ICRD (2.0%) WMHO (1.0%) WMDM (1.0%)	Softwood	rS eH wP bS wP bS	Frequent/ Infrequent	3,924; 93.0	Early	0	0	0	3	3	2,187; 67.0	EARLY	71; 2.0
						Mid	2	6	9	22	39			
						Late	80	321	944	706	2,051			
						Uncl	95	0	0	0	95			
		Mixedwood	rS eH wP sm yB Be	Gap	236; 7.0	Early	2	0	2	5	9	811; 25.0	MID	648; 20.0
						Mid	20	73	170	228	491			
						Late	15	21	134	111	281			
						Uncl	31	0	0	0	31			
		Hardwood				Early	4	13	28	14	59	223; 7.0	LATE	2,375; 73.0
						Mid	5	17	63	34	119			
						Late	0	0	36	7.0	43			
						Uncl	2	0	0	0	2			
		Unclassified				Early	0	0	0	0	0	39; 1.0	UNCL	167; 5.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	39	0	0	0	39			
Total					**4,160***	**# ha**	**295**	**451**	**1,386**	**1,130**	**3,262**			
						%	**9.0%**	**13.8%**	**42.5%**	**34.6%**	**100.0%**			

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

Appendix 10: Table 2: Composition of Forest Communities (in St. Margarets Bay Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Hemlock Pine Hummocks and Hills	WCKK WCHO WMHO IMHO WCRD	Infrequent	rS eH wP	S	rS bS	38,232	40.5%	L	**Dry: Edaphic climax of** - bS,wP, rP - bS, bracken fern -bS, huckleberry, Lichen woodland **Well drained:** Early: rM, ltA, bF wB - rS, yB, Goldenthread - poor largetooth aspen forest - wB, rM forest Mid: rS,wP,bF - rS, Schreber's moss forest - rS,bF, Stair-step moss forest - rS, wP, bracken forest Late: rS, eH, wP - rS, eH, wP forest **Moist**: - bS, hyS, bF,wP - bS, false holly wet forest - bS, bracken fern forest
				S	Sp bF	7,707	8.2%	L	
				S	bF	2,298	2.4%	E	
				S	Sp wP eH	2,196	2.3%	L	
				S	wP	1,160	1.2%	L	
				S	wS	292	0.3%	E	
				M	IH (SL)	15,424	16.3%	M	
				M	IH (HL)	9,613	10.2%	M	
				M	TH	3,164	3.3%	L	
				H	IH	8,559	9.1%	M	
				H	IHTH	3,384	3.6%	M\L	
				H	TH	2,465	2.6%	L	
Total						**94,494**	**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 St. Margarets Bay 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	ICHO ICKK ICRD	Frequent	bS wP rS eH wP	S	rS bS	17,839	57.8%	L	**Dry: Edaphic climax of** - bS,wP, rP - bS, bracken fern - bS, huckleberry, Lichen woodland **Well drained:** Early:rM, ltA, bF wB - rS, yB, Goldenthread - poor largetooth aspen forest - wB, rM forest Mid: rS,wP,bF - rS, Schreber's moss forest - rS,bF, Stair-step moss forest - rS, wP, bracken forest Late: rS, eH, wP - rS, eH, wP forest **Moist:** - bS, hyS, bF,wP - bS, false holly wet forest - bS, bracken fern forest
				S	Sp bF	3,037	9.8%	L	
				S	bF	729	2.4%	E	
				S	Sp wP eH	1,303	4.2%	L	
				S	wP	343	1.1%	L	
				S	wS	7	0.0%	E	
				M	IH (SL)	4,194	13.6%	M	
				M	IH (HL)	1,354	4.4%	M	
				M	TH	315	1.0%	L	
				H	IH	1,067	3.5%	M	
				H	IHTH	451	1.5%	M\L	
				H	TH	214	0.7%	L	
Total						**30,853**	**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 St. Margarets Bay Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Flats	ICSM IMSM	Frequent	bS	S	rS bS	1,621	35.4%	L	**Moist: Edaphic climax of** - bS, hyS,bF,wP - bS, false holly wet forest - bS, bracken fern forest **Wet: Edaphic climax of** - bS, tL bF rM - bS, Cinnamon fern, sphagnum forest - bS, false holly wet forest - rS, cinnamon fern, sphagnum wet forest - eL, tussock sedge wet forest.
				S	Sp bF	407	8.9%	L	
				S	bF	43	0.9%	E	
				S	Sp wP eH	165	3.6%	E I	
				S	wP	145	3.2%	L	
				S	wS	10	0.2%	E	
				M	IH (SL)	728	15.9%	M	
				M	IH (HL)	608	13.3%	M	
				M	TH	131	2.9%	L	
				H	IH	452	9.9%	M	
				H	IHTH	209	4.6%	M\L	
				H	TH	57	1.2%	L	
Total						**4,576**	**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 St. Margarets Bay Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Mixedwood Drumlins	WCDM WMDM WFDM WFKK	Gap	rS eH wP sM yB Be	S	rS bS	1,805	29.7%	L	**Well drained:** Early: rM, ltA, bF wB -rS, yB, Goldenthread -poor largetooth aspen forest -rich largetooth aspen forest -wB, rM forest Mid: rS,wP,bF -rS, Schreber's moss forest -rS,bF, Stair-step moss forest -rS, wP, bracken forest Late: rS, eH, wP -rS, eH, wP forest yB sM -rS, yB wood fern -sM, yB hay-scented fern forest
				S	Sp bF	659	10.8%	L	
				S	bF	221	3.6%	E	
				S	Sp wP eH	199	3.3%	L	
				S	wP	82	1.3%	L	
				S	wS	149	2.4%	E	
				M	IH (SL)	1,087	17.9%	M	
				M	IH (HL)	695	11.4%	M	
				M	TH	147	2.4%	L	
				H	IH	853	14.0%	M	
				H	IHTH	143	2.4%	M\L	
				H	TH	45	0.7%	L	
Total						**6,085**	**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 St. Margarets Bay 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 Hardwood Hills	WMKK	Gap	sM yB Be	S	rS bS	26	24.1%	L	**Well drained:** Early: rM, ltA, bF wB -rS, yB, Goldenthread -poor largetooth aspen forest - rich largetooth aspen forest - wB, rM forest Mid: rS,wP,bF - rS, Schreber's moss forest - rS,bF, Stair-step moss forest - rS, wP, bracken forest Late: rS, eH, wP - rS, eH, wP forest yB sM - rS, yB wood fern - sM, yB hay-scented fern forest
				S	bF	3	2.8%	E	
				S	Sp wP eH	6	5.6%	L	
				S	wP	5	4.6%	L	
				S	wS	50	46.3%	E	
				M	IH (HL)	12	11.1%	M	
				M	TH	4	3.7%	L	
				M	IH(SL)	2	1.9%	M	
Total						**108**	**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 St. Margarets Bay 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	ICHO WCKK WCHO WCDM ICSM WTLD ICRD WMHO WMDM	Frequent/ Infrequent	rS eH wP bS wP rS eH wP sM yB Be	S	rS bS	1,561	48.5%	L	Combination of all above.
				S	Sp bF	322	10.0%	L	
				S	bF	65	2.0%	E	
				S	Sp wP eH	180	5.6%	L	
				S	wP	55	1.7%	L	
				S	wS	4	0.1%	E	
				M	IH (SL)	494	15.3%	M	
				M	IH (HL)	227	7.1%	M	
				M	TH	89	2.8%	L	
				H	IH	145	4.5%	M	
				H	IHTH	28	0.9%	M\L	
				H	TH	49	1.5%	L	
Total						**3,219**	**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 St. Margarets Bay Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Wetlands	WTLD	Open Seral	bS						**Moist: Edaphic climax of** - - bS, hyS,bF, wP - bS, false holly wet forest - bS, bracken fern forest **Wet: Edaphic climax of** bS, tL bF rM - bS, Cinnamon fern, sphagnum forest - bS, false holly wet forest - rS, cinnamon fern, sphagnum wet forest - eL, tussock sedge wet forest
Total									

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

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

Climax Type	Ecodistrict		Ecoregion	
	Hectares	Percent	Hectares	Percent
rS eH wP	128,796	70.0%	616,727	37.0%
bS wP	25,534	14.0%	419,644	25.0%
rS eH wP sM yB Be	8,024	4.0%	187,322	11.0%
bS	4,783	3.0%	75,102	4.0%
sM yB Be	325	<1.0%	59,619	4.0
Total	**167,462**	**91.0%***	**1,358,414**	**81.0%****

*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 (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Spruce Hemlock Pine Hummocks and Hills	113,169	1,630	85,682	834	8,062	16,961	70,340 to 78,820	62 to 70
Spruce Pine Hummocks	37,511	3,158	27,437	48	1,598	5,270	25,065 to 27,700	67 to 74
Tolerant Mixedwood Drumlins	7,770	778	4,990	158	1,311	535	4,693 to 4,961	60 to 64
Spruce Pine Flats	5,385	34	4,801	13	107	430	3,746 to 3,961	70 to 74
Valley Corridors	4,160	87	3,478	7	398	189	2,744 to 2,839	66 to 68
Wetlands	2,645	0	2,439	0	11	194	1,878 to 1,975	71 to 75
Tolerant Hardwood Hills	325	47	59	21	186	12	99 to 105	30 to 32
Coastal Beach	6	0	4	2	0	0	3	
Total	**170,965**	**5,734**	**128,886**	**1,081**	**11,673**	**23,591**	**108,566 to 120,362**	**64 to 70**

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

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

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

EEI values are benchmarks that will be monitored over time.

Appendix 12b: Ecological Emphasis Index Worksheet – Ecosections

Ecosection	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
ICHO	32,358	2,861	24,443	26	1,380	3,648	22,112 to 23,935	68 to 74
ICKK	1,848	320	1,021	0	176	331	1,169 to 1,334	63 to 72
ICRD	5,008	20	3,435	17	164	1,372	2,943 to 3,629	59 to 72
ICSM	3,369	35	2,969	16	86	263	2,332 to 2,463	69 to 73
IMHO	1,509	0	1,420	2	19	68	1,082 to 1,116	72 to 74
IMSM	2,174	0	1,962	0	43	169	1,514 to 1,599	70 to 74
WCDM	3,434	489	2,776	0	40	129	2,603 to 2,668	76 to 78
WCHO	37,131	666	29,378	162	2,741	4,183	23,786 to 25,877	64 to 70
WCKK	69,953	1,004	52,714	543	3,767	11,925	43,657 to 49,620	62 to 71
WCRD	758	0	497	0	66	195	422 to 519	56 to 68
WFDM	2,038	294	1,210	2	480	52	1,215 to 1,240	60 to 61
WFKK	350	0	264	0	7	79	218 to 257	62 to 74
WMDM	2,203	1	944	153	820	285	818 to 961	37 to 44
WMHO	5,760	0	3,261	127	1,687	685	2,648 to 2,991	46 to 52
WMKK	325	47	59	21	186	12	99 to 105	31 to 32
WTLD	2,796	0	2,585	0	13	198	1,989 to 2,088	71 to 75
Total	**171,013**	**5,736**	**128,942**	**1,072**	**11,676**	**23,594**	**108,609 to 120,406**	**64 to 70**

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

Appendix 13:

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

Aspect	The direction of a downhill slope expressed in degrees or as a compass point.
Atlantic Coastal Plain Flora (ACPF)	A group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes.
Biodiversity	The diversityof plants, animals and other living organisms, in all their forms and level of organization, including genes, species, ecosystems and the evolutionary and functional process that link them.
Canopy	The uppermost continuous layer of branches and foliage in a stand of trees.
Climax forest community	A relatively stable and self-perpetuating forest community condition that maintains itself (more or less) until stand-level disturbance causes a return to an earlier successional stage. The final stage of natural succession for its environment.
Climax vegetation	A forest or non-forest community that represents the final stage of natural succession for its environment.
Coarse filter approach	A habitat-based approach to conserving biodiversity by maintaining a natural diversity of structures within stands, and representation of ecosystems across landscapes. The intent is to meet the habitat requirements of most native species over time. Usually combined with a fine filter approach to conserve specific rare species and ecosystems.
Coarse Woody Debris (CWD)	Dead tree stems greater than 7.5 centimetres in diametre 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 RU 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 P, 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 recruitmen from a developed understory. Typical characteristics include a multi-layered canopy of climax species containing large old trees, decadent wolf trees and abundant snags and coarse woody debris. In Nova Scotia, stands older than 125 years are classed as old growth.
Patch	A discrete community or element nested within a surrounding landscape, which is often a matrix forest. (Patch is a fundamental feature of the “matrix, patch, corridor” concept of landscape structure.)
Precommercial thinning	A silviculture treatment to reduce the number of trees in young stands before the stems are large enough to be removed as a forest product. Provides increased growing space and species selection opportunities to improve future crop tree growth.

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

Vulnerable species	A species of special concern due to characteristics that make it particularly sensitive to human activities or natural activities or natural events. May also be referred to as “species of special concern.” A species declared vulnerable under the federal or Nova Scotia endangered species legislation (NS Endangered Species Act or federal SARA).
Wilderness area	A part of the provincial land base designated under the Wilderness Areas Protection Act (e.g. Canso Barrens).

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