Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS PARRSBORO SHORE ECODISTRICT 910

PART 3: Landscape Analysis for Forest Ecosystem Planners

ELA 2014-910

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 910: Parrsboro Shore

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

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

Information sources and statistics (benchmark dates) include:

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

Conventions

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

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

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

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Understanding the Landscape as an Ecological System

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

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

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

The current landscape patterns in the Parrsboro Shore Ecodistrict are influenced by past land use (settlement, farming, shipbuilding), insects and disease (spruce budworm 1985 - 1987, hemlock looper 1985, yellow birch dieback 1940s, and beech canker 1900 and later), and storms (Saxby Gale 1869 and ice storm 2003).

Elements Within Landscapes (Map 2)

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

Tolerant Mixedwood Hills is the matrix element, representing 38.5% of the ecodistrict. This element naturally supports a climax forest of shade-tolerant hardwoods, such as sugar maple, yellow birch, and beech on the upper slopes. Red spruce dominates on the middle and lower slopes. The current forest reflects the impacts of harvesting. Much of the area is early successional forests.

Red and Black Spruce Hummocks, the largest patch element, is mainly located in four large areas in Birch Hill, West Bay, Greenhill, and Five Islands. The softwood covertype of red and black spruce and balsam fir dominates, covering more than half of the element. The other patch elements, in order of size, are **Tolerant Mixedwood Slopes**, **Red and Black Spruce Flats**, **Spruce Pine Hummocks**, **Red Spruce Hummocks**, **Wetlands**, and **Salt Marsh**. *The ecodistrict also contains a tiny Coastal Beach element.*

In **Valley Corridors**, a linear element associated with major watercourses, conversion to other uses exceeds 50% due to activities such as farming, road systems, and harvesting.

Flow – Element Interactions (Appendix 1; Map 2)

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

An example of the flow – element interaction is moose using the Tolerant Mixedwood Hills matrix element in the summer for food, habitat, and travel. In the winter, deer move off the hardwood hills into the spruce hummocks for more thermal protection. The objective would be to maintain the diversity of seral stages and development classes in these important areas.

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

River corridors promote connectivity.

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

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

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

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

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

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

Parrsboro Shore is now dominated by a much changed structure that does not represent the inherent natural conditions that once characterized this landscape. Human land use, transportation systems, and utility corridors have fragmented most of the element types, reducing the connective function of the corridors for some species and also increasing the barrier effect of the corridors for species that must move across the ecodistrict (Map 5).

Connectivity issues can be addressed by:

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

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

All of the landscape flows have been identified with major linkages to adjacent areas or ecodistricts (Map 2). The hydrological system provides the most obvious physical connection between the Parrsboro Shore and its surroundings.

Major river and stream corridors include Seal Cove Brook, Mill Brook, McGahey Brook, Maloney Brook, Ward Brook, Fox River, Diligent River, River Hébert, Moose River, Harrington River, Shad Brook, Bass River of Five Islands, and East River. All these water systems flow from the Cobequid Hills, Cumberland Hills, or Chignecto Ridges and empty into the Bay of Fundy and Chignecto Bay.

The dynamics of these water linkages have downstream effects which starts at the wetlands that capture, filter, and store water to their connection to the overall hydrological system. Most of these river corridors are important nesting areas for bald eagles and anadromous fish, such as Atlantic salmon. Steep ravines provide habitat for rare plants, such as the rattlesnake plantain.

Deer and moose flow in and out of this lowland area, migrating in harsh winter conditions from the Cumberland Hills to the Parrsboro Shore where there are reduced snow levels.

People provide linkages among the neighbouring ecodistricts of Cumberland Hills, Cobequid Hills, and Chignecto Ridges to the Parrsboro Shore through their many activities (recreation, transportation, fishing, forest management, utilities, and development). The major linkages are Highway 2 and Highway 209 that run along the shore from Masstown to Apple River and from Parrsboro to River Hebert and Southampton, bringing national and international tourists to coastal communities.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Target Ranges for Composition Indicators

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

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

Table 7 - Landscape Composition Target Ranges (by Development Class / Disturbance Regime)

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

Forest Vegetation Types for Seral Stages in Each Element

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

Table 8 – Forest Vegetation Types[1] Within Elements in Parrsboro Shore

Element	Seral Stage					
	Early	% *	Middle	%	Late	%
Red and Black Spruce Flats	IH4, IH6, MW4, MW5	28.0	MW2, SH8, SH9	28.0	**SH6, SP7**	38.0
Spruce Pine Hummocks	IH6, MW4, MW5	21.0	SH5, SH6, SH9	42.0	**SP7** (CO3)	34.0
Red and Black Spruce Hummocks	IH4, IH6, MW4, MW5	27.0	MW2, SH8, SH9	30.0	**SH5,** SH6, SP7	30.0
Red Spruce Hummocks	IH4, IH6, MW4, MW5	20.0	MW2, SH7, SH8	32.0	**SH5**, SH6	36.0
Tolerant Mixedwood Hills	IH4, IH6, OF1	24.0	IH7, TH7, TH8	34.0	**TH1, TH2,** TH3, TH4, (**CO3)**	31.0
Tolerant Mixedwood Slopes	IH4, IH6	22.0	MW2, MW4, MW5, SH5, SH8	40.0	**MW1,** MW3, SH3	33.0
Salt Marsh	Grasslands of *Spartina spp.*					
Coastal Beach	*CO7, Beach grass, Bayberry, Rose spp., White spruce*					
Wetlands	WC1, WC2, WC5, WC6, WC7, WD2, WD3, WD6, 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)
*Percentage of element in each successional stage. Percentages may not total 100 due to unclassified lands (such as clearcuts and regenerating stands) not being included.

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

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

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

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

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

- Reserve, such as parks or wilderness areas
- Extensive, which are lands managed or restored for multiple values using ecosystem-based techniques
- Intensive, optimizing resource production by management techniques that may reduce biological diversity, such as plantations; but also meet the Wildlife Habitat and

Watercourses Protection Regulations (NSDNR, 2002)
(See http://www.gov.ns.ca/natr/wildlife/habitats/protection)

- Converted, lands altered for agriculture, roads, or other human activities

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

The overall EEI range for Parrsboro Shore is 61 to 66, which indicates a fairly healthy ecology. The largest category is extensive forest management (61.1%), followed by converted (12.6%), reserve (11.7%), and intensive (3.6%). The remaining lands (10.6%) are unclassified.

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

Road Index (Appendices 6, 7; Map 5)

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

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

Parrsboro Shore has an overall RI value of 10.7 (Appendix 7, Table 3). This average falls within the Forest Resource RI range of 7 to 15 and may be described as moderately low. Only 7.7%, or 3,165 hectares, of the ecodistrict has a Remote RI of 0 to 6. Seventy percent of the ecodistrict area has road indices occurring in the Forest Resource and the Mixed Rural categories.

As expected, the highest road densities occur around the settlements, town and main transportation systems. An RI of 31 in these areas falls in the Agriculture Suburban category and is the highest for this category in the ecoregion (Appendix 7, Table 2 and Map 5).

These high road indices bisect the ecodistrict in numerous areas because of the number of river corridors and human settlement, contributing to habitat fragmentation.

Roads can contribute to habitat fragmentation and environmental degradation. Since 81.5% of land ownership in the ecodistrict is in private hands, efforts could be made to:

- Conserve the relatively low road densities within the matrix (RI of 11) through strategic scheduling of new access and decommissioning where possible. Private woodlot owners may be able to decommission select roads and share access.
- Schedule access systems for regular maintenance or decommissioning, particularly where connectivity or additional reserves are to be established.
- Utilize old abandoned trails or logging roads for recreational trails before additional trails are established.
- Improve the distribution and connectivity among the low road density areas and natural areas and linkages to neighbouring ecodistricts.

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

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

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

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

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

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

Species of Conservation Concern

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

Species Ranking and Coding Systems

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

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

A second system commonly used is NatureServe Conservation Data Centre system. This system uses numbers from one (extremely) to five (widespread, abundant) to denote the relative rarity and conservation concern for species. At the provincial scale, numbers are prefixed with "S" to indicate that this is a state/provincial level rank. Ranks at the National (N) and Global (G) levels are also available for all species. In Nova Scotia, the Atlantic Canada Conservation Data Centre (http://www.accdc.com/) works with partners to provide ranks and data on species' occurrence.

As of 2013 in the Parrsboro Shore Ecodistrict, there are documented occurrences (under the NSESA) of the following number of formally listed species: two endangered, two threatened, and five vulnerable. In addition to the listed species, the National General Status process also identifies 20 orange species, 36 yellow species, 22 green species, and three undetermined species for a total of 81 other species of conservation concern in this ecodistrict.

Designated species at risk found within the Parrsboro Shore Ecodistrict include Atlantic salmon, eastern white cedar, monarch butterfly, three species of lichens (blue felt lichen, boreal felt lichen, and eastern waterfan), and several bird species (piping plover, olive-sided flycatcher, eastern wood-pewee, bobolink, peregrine falcon, and bank swallow).

Other species of conservation concern known for the Parrsboro Shore Ecodistrict include semipalmated sandpiper and eastern bluebird (birds); toothed-leaved nitrogen moss, and metropolitan timmia moss (bryophytes); marsh bellflower, fringed blue aster, and northern blueberry (dicots); lance-leaf grape-fern and fragrant wood fern (ferns and their allies); arctic fritillary and mustard white (insects); ghost antler and peppered moon lichens (lichens); short-awned foxtail and hairlike sedge (monocots).

Birds

As of 2013, six species of birds found to be present in the ecodistrict are designated at risk. Five of these are listed under the NSESA: the piping plover (*melodus*) as endangered; the olive-sided flycatcher as threatened; the bobolink, eastern wood-pewee, and peregrine falcon (*anatum*) as vulnerable. Nationally, three species are listed under SARA: the piping plover as endangered, the olive-sided flycatcher as threatened and the peregrine falcon as special concern. COSEWIC has designated six species: the piping plover as endangered, olive-sided flycatcher, bobolink, and barn swallow as threatened; and the peregrine falcon and eastern wood-pewee as special concern.

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

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

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

The bobolink is associated with large open grasslands and hayfields. Declines are due to mortality from agricultural practices, habitat loss and fragmentation, and bird control methods.

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

The piping plover is a small migratory shore bird that feeds on marine worms, fly larvae, beetles, crustaceans, mollusks, and other small marine invertebrates. Habitat preferences include sandy or pebbly beaches with access to intertidal areas and mudflats for feeding. There is limited preferred habitat in the Parrsboro Shore Ecodistrict and therefore occurrences of piping plover are very low, with only one historical record documented. There are approximately 40 breeding pairs along the shores of Nova Scotia. Low numbers are attributed to human disturbances, shoreline development, predation by birds and mammals, and habitat loss from natural beach succession.

The peregrine is a medium-sized raptor that feeds almost exclusively on birds. These falcons nest on steep cliff ledges along the coast of this ecodistrict and have been recorded near Parrsboro, Five Islands, and Green Hill. Populations declined across North America with the falcon almost disappearing because of the use of DDT, which was banned in the 1970s. A reintroduction program initiated in the 1970s, along with the DDT ban, has seen populations increase.

Gymnosperms

Only one species at risk is documented for the Parrsboro Shores Ecodistrict, eastern white cedar. In 2006, Eastern White Cedar was listed under NSESA as vulnerable; only 32 stands are identified provincially. The population is fragmented and comprised of small stands that appear genetically separate from each other. This species is typically found in riparian areas, woodland forests, and old pastures preferring nutrient rich, cool, moist habitats. In the Parrsboro Shores Ecodistrict one site is documented near Eatonville.

Fish

The Five Islands, Fox, and Parrsboro river systems have had occurrences of Atlantic salmon in the Parrsboro Shore Ecodistrict. Historically, Atlantic salmon have utilized these rivers for spawning and continue to make some use of the available habitat they present. The Inner Bay of Fundy salmon population has steadily declined over the last 20 years and has been designated as endangered by COSEWIC and protected under the federal Species at Risk Act. The decline in Atlantic salmon is not well understood but evidence suggests that low marine survival is a primary cause which may be due to ecological changes in the Bay of Fundy. Other threats to this species include environmental contaminants, habitat loss and degradation, lack of riparian buffers along waterways, water passage obstruction, and lack of pools.

Insects

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

Lichens

Three lichen species at risk are found in the ecodistrict. The Atlantic population of boreal felt lichen is designated by COSEWIC as endangered and listed under the federal SARA and NSESA as the same. Blue felt lichen is designated by COSEWIC as special concern and listed federally as special concern and provincially as vulnerable. The eastern waterfan is designated as threatened by COSEWIC. There is no listing with SARA or NSESA.

The eastern waterfan prefers shaded streams where it grows at or below water level in cool clear environments. Environmental changes to these habitats by activities that cause stream siltation, microclimate alterations, changes to water quality, and climate change pose threats to this species. Eastern waterfan is reported near Eatonville.

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. One historical occurrence for boreal felt lichen is documented in the Parrsboro Shores Ecodistrict near Cape Chignecto.

Reptiles

Wood turtle is designated by COSEWIC as threatened and listed under the federal SARA and NSESA as the same. Based on species occurrence information, the Parrsboro Shore Ecodistrict is not likely to support a large number of wood turtle. Wood turtles are uncommon province-wide,

with the majority of observation occurring at a few main concentration areas, presently none of which are located within this ecodistrict.

Old Forest

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

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.

Six of the eighteen ecosections (ICSM, IMHO, IMSM, WMHO, WMSM, and WTLD) found in the ecodistrict comprise less than two percent of the ecodistrict (Map 7).

The ICSM ecosection located within the Red and Black Spruce Flats element has one of the highest land use pressures within both the ecodistrict and ecoregion, with 55.9% converted to human settlement, farming, and other development activities. The Wetlands element, which comprises only 491 hectares, or 1.2%, of the ecodistrict is 51.3 % converted to other uses.

The WCSM ecosection, with a climax community type of red spruce has the highest conversion within the ecodistrict and ecoregion of 64.3% and 63.9% respectively. Old growth stands have been identified on 1354 hectares or 21% of the Crown lands under the Old Forest Policy (Appendix 5).

Six of the eight climax community types have more than adequate old forest representation of more than 8%. The black spruce/white pine and the red spruce community type do not have any representation, a function of the amount of Crown lands that support these communities.

The black spruce/white pine community is found within the WCRD ecosection which accounts for only 4.9% of the ecodistrict and 1.4% of the ecoregion.

Opportunities for future management are to implement existing policies and develop 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.
- Fine filter management opportunities related to conservation of significant habitat.

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

910 Parrsboro Shore Ecodistrict

Landscape Element and Type	Ecosections*	Dominant Natural Disturbance Regime	Dominant Climax Type
Tolerant Mixedwood Hills (Matrix)	WCKK WMKK	Gap	sugar Maple (sM), yellow Birch (yB), Beech (Be), red Spruce (rS)[1],
Red and Black Spruce Hummocks (Patch)	IFHO IFKK WFKK	Frequent	black Spruce (bS), rS, white Pine (wP), balsam Fir (bF)
Tolerant Mixedwood Slopes (Patch)	WCDS WMDS	Gap	sM, yB, Be, rS, eastern Hemlock (eH), wP
Red and Black Spruce Flats (Patch)	ICSM IFSM IMSM WCSM WMSM	Frequent	bS, rS, bF
Spruce Pine Hummocks (Patch)	ICHO WCRD	Frequent	bS, wP, rS
Red Spruce Hummocks (Patch)	IMHO WCHO WMHO	Infrequent	rS, wP
Wetlands (Patch)	WTLD	Open Seral (Frequent)	bS, bF, tamarack (tL), red Maple (rM)
Salt Marsh (Patch)	XXSM	Open Seral (Tidal flooding)	cordgrass
Coastal Beach	*XXCB*	*Not Available*	*white Spruce (wS)*
Valley Corridors (Corridor)	Various	Various	Various

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

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

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

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

[1] On the coastal exposed slopes of Cape Chignecto red spruce occurs on WCKK and WCRD.

- Uncommon community conditions (e.g. old age, large live and dead trees and species' associations). Increase representivity in the uncommon old forest communities.
- Implement restorative measures in community types such as elm, sugar maple, and ash stands along the river corridors or the jack pine, black spruce, and white pine where conversion to other species or uses is high.

Ecological Representivity (Appendices 4, 5)

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

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

When this report was written, there were no wilderness areas in the Parrsboro Shore Ecodistrict. Legal reserves account for 4,765 hectares.

An additional 1,374.5 hectares are defined as policy reserves under old forest sites set aside under the provincial Old Forest Policy. The two reserve classes (legal and policy) account for 1,449.8 hectares, or 3.6%, of the area of Parrsboro Shore (Appendix 4, Appendix 5 and Map 3).

Since provincial Crown lands only represent about 16% of the entire ecodistrict, opportunities to improve representation will have to be directed to private lands by working with programs and groups such as Eastern Habitat Joint Venture programs, Nature Conservancy of Canada, and Nova Scotia Nature Trust.

Priority sites and strategies to improve representation should include:

- Additional old forest area in climax community types of black spruce/white pine and the red spruce.
- Connectivity among wetlands and river corridors.

ELA Summary

Element Interpretation (All appendices and maps)

On the north shore of the Minas Basin, from Economy Mountain in the east to Sand River in the west is a narrow ecodistrict of varied geological history. Nestled up against the Cobequid Hills Ecodistrict 340, the Parrsboro Shore can be best characterized as a series of small rolling hills dissected with the steep sided canyons of rivers and streams flowing from the Cobequid

Mountains. Several smooth outwash plains are interspersed within this topography and examples are clear at Parrsboro and Advocate Harbour.

Overall the elevation seldom exceeds 125 metres above sea level, but the rapid descent to sea level affords the impression of a more significant rise. The local climate is significantly affected by the proximity to the cold waters of the Bay of Fundy. Summer temperatures are cool and fog is a common occurrence even though hot and humid conditions may exist only kilometres away in Truro.

The ecodistrict has three major faults running its length with a series of minor faults throughout which has created a varied landscape with resistant basalts and erodible sandstones side by side. The lowlands are underlain by the soft sandstone but where it is capped by basalt, high steep-sided hills, for example, Economy Mountain, are formed. Large glacial outwash plains can be found at Parrsboro and Advocate Harbour.

The predominant shaly, sandy loams (Kirkhill series) cover the steep slopes from Five Islands to Advocate Harbour. On the lowlands, finer-textured imperfectly drained soils (Diligence series) will be found primarily around Parrsboro. The outwash valleys are underlain with rapidly drained coarser textured soils (Hebert series) often with a high content of gravel. Most of the freshwater in the ecodistrict occurs primarily in fast flowing narrow streams and rivers discharging off the Cobequids. Total freshwater area is 265 hectares, less than 1% of the area of the ecodistrict.

The coastal forest of the Bay of Fundy reflects the transitional climate of the continental and Maritime zones. Species such as red spruce are found in this ecodistrict that are often not found in the Atlantic coastal ecodistricts. Other species also present but not found along the Atlantic coast include hemlock, sugar maple, and scattered beech.

Coastal forests of white spruce skirt the headlands along the Minas Basin but quickly revert to tolerant hardwoods and softwoods a short distance from the shore. Red spruce is the dominant softwood and will be associated with hemlock and white pine on the hummocky ecosections.

Ecosections with coarse-textured, well-drained soils, and usually occurring on the slopes of hills and steeper, hummocky terrain, will be dominated with forests of tolerant hardwoods such as beech, yellow birch, and sugar maple.

Only in the steep-sided ravines will predominantly softwood forests of the tolerant species be found. Windthrow appears to be the dominant stand disturbance although the spruce budworm has created large areas of even-aged spruce forests. The frequency of these budworm attacks is unknown and subsequent disturbances may entirely be from windthrow. Forests on the large ecosections of imperfectly drained fine-textured soils near Parrsboro and elsewhere in the ecodistrict with forests of balsam fir, black spruce, red maple, and birch (red spruce will occur where soils have a higher content of gravel).

Natural disturbance agents in the ecodistrict are primarily associated with hurricanes and are of an infrequent nature such that old growth forests may develop with an uneven-age structure. Stands of fire origin are uncommon. Insect defoliation has not been a significant factor in forest disturbance

although the balsam wooly adelgid is currently damaging and causing mortality in balsam fir forests throughout the ecodistrict; only colder winter temperatures (-30°C) will reduce its impact on the forests. The beech bark canker, introduced in the 1890s, has reduced the beech to an understory species although scattered disease-free individuals are not uncommon. The yellow birch dieback of the 1940s has been a significant agent in the Fundy forest.

Tolerant Mixedwood Hills

(Matrix) (WCKK and WMKK ecosections) (15,639 ha)

This is the matrix element that occurs uniformly throughout the ecodistrict. The area is infrequently disturbed and once dominated by an inherent climax community of red spruce, sugar maple, yellow birch, and scattered beech.

The present forest is less mixedwood dominated and has become more of a community of red and black spruce, scattered white spruce, and balsam fir. This covertype comprises some 36% of the forest.

The intolerant hardwood species of red maple, aspen, and white birch has replaced most of the long-lived tolerant species of sugar maple and yellow birch. The early and mid seral species account for
58% of the total forest with red maple, balsam fir, birch, and aspen dominating. Only 31% of the present forest is in the late seral stage. Forty-four percent of the forested area is in the mature development class.

Tolerant Mixedwood Hills has an ecological emphasis index of 66 to 74, a fairly high rating because most of the forest is still intact with only 5% converted to other uses. Also, almost 20% of the forest has been set aside in reserves and 56% has been identified within the extensive forest management area.

Flows

People (firewood, recreation, camps, sugar maple, blueberries, forestry, tourism); water (filter, catchment), deer (general habitat summer, Cape Chignecto, all year); peregrine falcon (general habitat, nesting on cliffs).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)
Composition of Tolerant Mixedwood Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	33%	17%	50% (44 Mat + 6 OF)	6%
Seral Stage	Early	Mid	Late	Unclassified
	24%	34%	31%	11%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	36%	21%	38%	5%

Desired Condition

The desired condition of this matrix element is a mixedwood covertype of late seral species of red spruce, sugar maple, and yellow birch on the flats and lower slopes along with sugar maple and yellow birch on the well-drained upper slopes.

Issues

- Fifteen percent of the element is unclassified.
- Fifty-seven percent of the forest is in the early and mid seral stages (Appendix 10).
- Only 44% of the forest is in the mature development class.
- Bark beetle damage continues to cause moderate to severe damage in some locations within the element (Cape Chignecto and Five Island provincial park areas).
- This element is fairly well represented with approximately 20% of the element located within the legal reserves. Most of these reserves are located within Cape Chignecto and the Five Islands provincial parks.

Red and Black Spruce Hummocks

(Patch) (IFHO, IFKK and WFKK ecosections) (7,309 ha)

This is the largest patch element comprising some 7,309 hectares or approximately 18% of the entire ecodistrict. Red and Black Spruce Hummocks is located mainly in four areas: Birch Hill, West Bay, Greenhill, and Five Islands.

Sixty-three percent of the area has an inherent climax community of red spruce, sugar maple, yellow birch, and beech with the remaining area being red spruce.

The present forest is almost evenly split between the three seral stages but the softwood covertype of red and black spruce and balsam fir dominates with 52% of the area. The mixedwood covertype accounts for 37% and is dominated by the intolerant hardwoods of white and grey birch, red maple, and aspen.

The early and mid seral stage forest dominates with 56% and the late seral accounting for an additional 30%. Almost 13% of the forest is unclassified. The development classes are fairly well-balanced for the frequent disturbance regime.

The EEI is 62 to 68 as a result of 76% of the forest in the extensive management area and only 8% converted to other uses.

Less the 1% of the area is located in reserves.

Flows

People (hunting, trapping, harvesting, development – hydro, urban, rock hounding); deer (wintering area); moose (summer habitat); peregrine falcon (nesting, feeding, hunting).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006) **Composition of Red and Black Spruce Hummocks**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	18%	24%	58% (46 Mat + 12 OF)	12%
Seral Stage	Early	Mid	Late	Unclassified
	27%	30%	30%	13%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	71%	8%	18%	3%

Desired Condition

A mixedwood-dominated patch type of red spruce, sugar maple, and yellow birch with inclusions of pure stands of red spruce and scattered hardwoods, a variety of development classes for the natural disturbance regime (NDR), and at least 40% of the forest in the mature development class.

Issues

- About 56% of the forest is in the early and mid seral stages.
- Only 38% of the forest is in the late seral stage.
- Less than 1% of the area is identified as legal or policy reserves.
- Less than 4% is under Crown ownership.
- Less than 1% of the area is located within the legal or policy reserve class. Crown land only accounts for 3.9% of the area of this element.

Tolerant Mixedwood Slopes

(Patch) (WCDS and WMDS ecosections) (5,510 ha)

This element type is located in small to medium fragmented patches located primarily in the steep ravines in the Eatonville to Wards Brook area. Small isolated areas occur near Lower Five Islands and Sand River.

The inherent climax community of red spruce, hemlock, and white pine is still dominant but mortality continues to increase from the native bark beetle. The intolerant hardwood component is increasing both in the mixedwood and hardwood community types throughout this patch element.

As a result, the late seral and mature development classes are somewhat reduced to more early and mid seral and the young development classes. Only 46% of the forest is in the mature development class.

The EEI is high at 72 to 76 because 22% of this patch type is located within the Cape Chignecto Provincial Park where there is no resource extraction and most of the forest is in the extensive management class.

Flows

People (hunting, trapping, harvesting, camps); water (filtering); deer (movement, cover shelter); peregrine falcon (nesting, hunting).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)

Composition of Tolerant Mixedwood Slopes

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	18%	16%	66% (60 Mat + 6 OF)	6%
Seral Stage	Early	Mid	Late	Unclassified
	22%	40%	33%	5%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	27%	31%	40%	4%

Desired Condition

A softwood to mixedwood climax community of red spruce, hemlock, and white pine with inclusions of tolerant hardwoods. The area has a gap disturbance and should have at least 70% of these forest communities in the mature development class.

Issues

- Increasing damage caused by the native bark beetle affects forests in ecodistrict.
- The decreasing late seral mature softwood and increasing early to mid seral intolerant hardwoods is a cause for concern.
- There is good representation of the community types and their ecosections within the Cape Chignecto Provincial Park.

Red and Black Spruce Flats

(Patch) (ICSM, IFSM, IMSM, WCSM and WMSM) (3,817 ha)

Red and Black Spruce Flats comprises of small to fairly large isolated areas that occur at West Advocate, Advocate Harbour, Fraserville, Port Greville, and the largest at Diligent River to the west of Parrsboro.

The inherent climax community is red spruce, a completely dominant softwood covertype. This element has undergone substantial change over the years and although it is still 71% softwood covertype it is 40% converted to other land uses. The present forest is still red and black spruce dominated but there is an increasing presence of balsam fir and intolerant hardwoods. Fifty-six percent of the forest is in the early and mid seral stages with only 37% in the late seral state. The development classes are slightly skewed to the younger classes. The EEI is a low of 40 to 43, resulting from the high conversion of forest lands to other uses.

Flows

People (logging, hunting, some agriculture, trapping, fishing); water (filter, catchment); deer (general habitat, wintering area – Fraserville, Diligent River); moose (travel area).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)
Composition of Red and Black Spruce Flats

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	18%	24%	58% (46 Mat + 12 OF)	12%
Seral Stage	Early	Mid	Late	Unclassified
	28%	28%	38%	6%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	71%	8%	18%	3%

Desired Condition

A late seral softwood community of red spruce with a variety of patch sizes, seral stages, and development classes applicable to the disturbance regime.

Issues

- Low EEI (40 to 43) in element.
- Fifty-six percent of the area is in the early and mid seral stages.
- Low percentage (46%) of the forest in the mature development class.
- Increased harvesting a concern.
- Less than 1% of this patch is represented in policy or legal reserves.

Spruce Pine Hummocks
(Patch) (ICHO and WCRD ecosections) (3,814 ha)

This is a black spruce-dominated patch element that occurs on ridged or hummocky terrain underlain with well to imperfectly drained coarse-textured soils derived from sandstone till. It is also found embedded on imperfectly drained soils found within other elements. Forests of black spruce are typical but where there are better-drained soils of higher fertility, red and hybrid spruce and balsam fir are common. White pine is scattered in the mature stands.

When this element occurs immediately along the shore of Chignecto Bay, the abundant precipitation and fog creates the conditions for a red spruce-dominated forest similar to that which drapes the slopes of Cape Chignecto. As the coastal influence wanes, forests revert to black spruce and pine. This is most notable on the curvilinear ridging caused by the folding of the underlying bedrock between the Apple and Sand rivers.

In areas of poor drainage, which occur between the ridges and hummocks, wet forests of red maple, tamarack, black spruce, false holly, winterberry, and ericaceous shrubs are common. Shrub-dominated wetlands are also an inclusion in this element. The dominant natural disturbances are windthrow, insects, and fire and these are frequent, resulting in primarily even-aged forests. Early successional forests will be of similar species composition but can be dominated by red maple, white birch, and aspen. The potential for old growth forest development is limited.

Flows

People (camps, harvesting, trapping); water (catchment, filter); deer (general habitat); moose (passage); peregrine falcon (potential nesting and habitat); shorebirds (limited feeding and shelter).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)
Composition of Spruce Pine Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	35%	26%	39% (30Mat + 9OF)	9%
Seral Stage	Early	Mid	Late	Unclassified
	21%	42%	34%	3%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	46%	20%	32%	2%

Desired Condition

A softwood-dominated patch element of black spruce with a variety of patch sizes seral stages and development classes associated with the frequent disturbance.

Issues

- Forty-two percent of the forested area is in the mid seral stage.
- No area has been identified under the Interim Old Growth Policy.
- Increased bark beetle damage and increased harvesting are problems.
- Increased presence of intolerant hardwood species of aspen, red maple, and white birch is a concern.

Red Spruce Hummocks
(Patch) (IMHO, WCHO and WMHO ecosections) (2,399 ha)

This is a small fragmented patch element that is comprised of several patches located throughout the ecodistrict. The largest of these patches is located at Five Islands/Gerrish Valley. The inherent climax community of red spruce and white pine has a good current distribution of seral stages and development classes. The patch type is now only 50% softwood and almost 40% mixedwood.

The mixedwood covertype now has a higher content of red maple and white birch, balsam fir, and white spruce. Red Spruce Hummocks has undergone major conversion over the past years where approximately 551 hectares, or 23%, of the element has been converted to other uses such as highways, power lines, farmland, and housing development. The EEI is 50 to 55 because of the high conversion and a low percentage of the forest in the reserve class.

Flows

People (forestry, hunting, ocean recreation, access for fishing and farming); water (some filtering); deer (general habitat, deer wintering); shorebirds (feeding, nesting, habitat).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)

Composition of Red Spruce Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	35%	18%	47% (37 Mat + 10 OF)	10%
Seral Stage	Early	Mid	Late	Unclassified
	20%	32%	36%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	50%	9%	38%	3%

Desired Condition

A softwood-dominated climax community of red spruce and white pine with inclusions of hardwoods and a distribution of seral stages and development classes appropriate for the frequent disturbance regime.

Issues

- Increase in the early and mid seral stages with white birch, aspen, red maple, and balsam fir dominating.
- High conversion rates for the (WCHO) red spruce community type both at the ecodistrict and ecoregional level.
- Crown ownership is less than 4%.
- Only 3% of the Red Spruce Hummocks has been identified for representation. There is no area on Crown lands where these ecosections or community types have been identified for old growth under the Internal Old Growth Policy.

Wetlands

(Patch) (WTLD ecosection) (491 ha)

A very small patch type of 491 hectares, or about 1%, of the ecodistrict.

These wetlands are relatively large in comparison to other wetlands but only occur in three general locations: Woods Mountain - east of Port Greville, Advocate Harbour, and Carrying Cove. These wetlands are very significant within the ecodistrict because of the small area that they occupy and their importance in water collection, filtering, groundwater recharge, moose habitat cover, thermal protection, and feeding. The wetlands are characterized by poorly drained soils, stunted red and black spruce, bogs, and ericaceous vegetation.

Flows

People (fishing, farming, trapping); water (catchment); deer (feeding, habitat); moose (feeding, cooling); peregrine falcon (hunting).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)

Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	16%	31%	53% (46 Mat + 7 OF)	7%
Seral Stage	Early	Mid	Late	Unclassified
	16%	27%	45%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	86%	4%	9%	1%

Desired Condition

Patches of wetlands or wetland complexes that are all connected in chains and also interconnected to the hydrological systems.

Issues

- No wetlands occur on lands under the administration and control of the Crown.
- Fifty-one percent of the Wetlands within the ecodistrict and 27% within the ecoregion has been converted to other uses.
- There is no area identified for protection in either the legal or policy reserves.

Salt Marsh

(Patch) (XXSM ecosection) (128 ha)

The small salt marshes that occur in the northern shores of the Bay of Fundy are located between Port Greville and Diligent River. The total area comprises some 128 hectares.

Both the Minas Basin and the Cumberland Basin have muddy waters with generally poor fisheries, but the extensive tidal marshes are of great economic and cultural significance.

These salt marshes are very productive systems that support the fisheries of the outer Bay of Fundy. These once extensive marshes have been progressively dyked and drained since the seventeenth century to provide some of the best agricultural land in the province. These dykes that protect the marshland must be constantly maintained.

Valley Corridors

(Corridor) (Various ecosections) (1,550 ha)

This ecodistrict borders on the northern shores of the Minas Basin and all streams and river systems empty into the basin. The rivers dissect the ecodistrict at Port Greville, Parrsboro, Moose River, Lower Five Islands, and Five Islands.

The higher slopes and hills have an infrequent disturbance regime with sugar maple, yellow birch, and beech or red spruce, sugar maple, and yellow birch as the inherent climax community. The lower slopes support red spruce, hemlock, and white pine. These corridors still have a good mixture of seral stages, development classes and covertypes but conversion to other uses exceeds 50% due to human development, farming, road systems, harvesting, and other linear corridors that service human requirements. The EEI is 27 to 29.

Flows

People (settlement, fishing, farming); water (main filter, rich); deer (travel corridors); moose (travel corridors); shore birds (habitat at the mouth of these corridors).

Composition

Parrsboro Shore Ecodistrict 910 (based on statistics up to 2006)

Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	18%	12%	70% (59 Mat + 11 OF)	11%
Seral Stage	Early	Mid	Late	Unclassified
	29%	29%	30%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	58%	6%	31%	5%

Desired Condition

The desired condition of these corridors that follow the major rivers and streams is that the slopes and intervales are well connected and in a natural forest condition.

Issues

- Small percentage of land within the corridors system under the administration and control of the Crown.
- Over 50% of this element type has been converted to other uses.

- The Valley Corridors have been severely fragmented and the natural forest condition is not present.
- Very low EEI of 27 to 29.
- Less than 1% of the element has been identified for representation (Appendix 12a).

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Parrsboro Shore 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:

- High percentage of the forest is in the early and mid seral stages.
- Bark beetle damage continues to increase in the Cape Chignecto area.
- High percentage (15%) of the lands are unclassified.
- Small percentage of the total area (16%) under the administration and control of the Crown.
- Low EEI for the Red and Black Spruce Flats element (40 to 43).
- High conversion for the red spruce community type.
- Small percentage of the forest in the mature development class.
- Valley Corridors has been severely fragmented. Low EEI of 27 to 29.
- Very high conversion in the Wetlands patch element at the ecodistrict and ecoregion levels.
- There is no representation identified for the Wetlands element.

Appendix 1: Flow - Element Interactions

Element	People	Water	Deer	Moose	Peregrine Falcon	Shorebirds
Matrix Tolerant Mixedwood Hills	Firewood, recreation, camps, maple sugar, Blueberries, forestry, tourism	filter, catchment	general habitat, wintering area (Fraserville, Diligent River)	core habitat, summer - Cape Chignecto - all year	nesting - general habitat on cliffs	N/A
Corridor Valley Corridors	Settlement, fishing, farming	Main filter, rich	travel corridors	travel corridors	No	no habitat at mouth of these corridors
Patches Red and Black Spruce Flats	logging, hunting, some agriculture, trapping, fishing	filter, catchment	general habitat, wintering area (Fraserville, Diligent River)	travel area	N/A	N/A
Red and Black Spruce Hummocks	Hunting, trapping, harvesting, development - hydro, urban, rock hounding	N/A	Wintering area	summer habitat	nesting, feeding, hunting	No
Tolerant Mixedwood Slopes	Hunting, trapping, harvesting, camps	filtering	movement, some wintering	movement, cover, shelter	nesting, hunting	No
Red Spruce Hummocks	forestry, hunting, ocean recreation, access, access for fishing, farming	some filtering	general habitat, deer wintering	No	No	feeding, resting, habitat
Spruce Pine Hummocks	recreation, harvesting, camps, hunting, trapping	catchment, filtering	general shelter, travel	general habitat, passage	potential nesting and habitat	No - limited feeding and shelter
Coastal Beach	tourism, swimming, cottages	No	No	No	Nesting /feeding	feeding, resting, cover
Salt Marsh	dykeland, farmland	catchment	feeding, fawn hiding	no	no	general habitat, feeding
Wetlands	fishing, hunting, trapping	catchment	feeding, habitat	feeding, cooling	hunting	No

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecoections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Tolerant Mixedwood Hills	Matrix	High	WMKK and WCKK	Large very prominent matrix over the entire ecodistrict	Infrequent (wind)	rS sM yB Be and sM yB Be	Red and Black Spruce Hummocks and Mixed Dissections rS eH wP	Numerous river corridors that bisect the element	- rM tA and wB has replaced a lot of the tolerant species. - percentage of Crown ownership is low	- encourage more climax late seral species - manage medium to long rotation - maintain low road density values (RI)
Red and Black Spruce Hummocks	Patch	High	Birch Hill, West Bay, Greenhill, Five Islands	Four large prominent isolated patches: Birch Hill, West Bay, Greenhill, Five Islands	Frequent (wind/fire)	rS sM yB Be and rS	sM yB Be	river systems - human development (Parrsboro)	<4% Crown ownership - early and mid seral dominate (56%)	- encourage more climax late seral species - manage short to medium rotation - maintain low RI
Tolerant Mixedwood Slopes	Patch	High	Fraserville / New Yarmouth	Fairly contiguous patch from Wards Brook to Eatonville	Gap (wind/fire)	rS eH wP	rS sM yB Be and sM yB Be	Bark Beatle	decreasing late seral mature softwood and increasing early to mid seral intolerant hardwoods	- silvicultural practices to encourage climax late seral species - manage long rotation - selection cuts multi-layer
Red and Black Spruce Flats	Patch	Medium	West Advocate, Advocate Harbour, Port Greville, Diligent River	Small to fairly large isolated patches	Infrequent (WCSM) (wind)	rS	rS sM yB Be	high conversion to other uses	- Fragmentation - Conversion - Low percentage of the forest in the mature class - increased harvesting - RI of 18.7	Manage on medium to long rotation - reduce conversion rates - restore where possible the increases in fragmentation - maintain patches of low RI

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Red Spruce Hummocks	Patch	Low to Medium	Largest area - Five Islands/ Gerrish Valley	Relatively small isolated patches throughout the ecodistrict.	Frequent (wind /fire)	rS wP	rS sM yB Be and sM yB Be	Conversion (>23%) to farmland, power lines, highways, housing	increase in wB, tA rM bF - high conversion at ecodistrict and ecoregion - <4% Crown ownership - Low Ecological Emphasis index (50 to 55)	- Manage in relation to natural disturbance - reduce conversion within the WCHO ecosection - decommission roads where possible
Spruce Pine Hummocks	Patch	Medium / High	Spicers Cove, Apple River, Sand River to Carrying Cove, Cape Chignecto, New Yarmouth, Woods Mountain	small fragmented patches	Frequent (wind / fire)	bS bSwP	rS sM yB Be and sM yB Be	fragmentation	bark beetle - harvesting	- manage by disturbance regime - increase percentage of forest in the mature development class - manage to restore some of the climax community
Valley Corridors	Corridor	High	Moose River, Fox River	small fragmented patches	Infrequent (wind / fire)	rS wP and rS	all	- high RI (31) - high conversion (>50%)	- Crown ownership is small - conversion - fragmentation - present community is not representative of inherent community	restore forest along these corridors where possible - manage forest for medium to long rotation

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
Wetlands	Patch	High	Woods Mountain, Advocate Harbour, Carrying Cove	Three medium sized isolates patches	None	bS and rS	rS sM yB Be and sM yB Be	Conversion, fragmentation	No wetlands within the Crown land ownership - conversion to other uses	Management - wetland policy - additional communication to private sector
Salt Marsh	Patch	Very High	Port Greville, Woods Mountain, Fox River	small fragmented patches	None		rS sM yB Be and sM yB Be	- maintenance of structure	- small isolated patches - cost to maintain the dykes - no Crown ownership	communication to private sector on importance of these patches

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 910)
Table 1a: Species at Risk (species protected by endangered species legislation on all lands)

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS	-			
Piping Plover	*Charadrius melodus melodus*	Endangered	Endangered	Endangered
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened	Threatened
Eastern Wood-Pewee	*Contopus virens*	Vulnerable	N/A	Special Concern
Bobolink	*Dolichonyx oryzivorus*	Vulnerable	N/A	Threatened
Peregrine Falcon	*Falco peregrinus anatum*	Vulnerable	Special Concern	Special Concern
Bank Swallow	*Riparia riparia*	N/A	N/A	Threatened
FISH	-			
Atlantic Salmon - Inner Bay of Fundy population	*Salmo salar pop. 1*	N/A	Endangered	Endangered
GYMNOSPERMS				
Eastern White Cedar	*Thuja occidentalis*	Vulnerable	N/A	N/A
INSECTS	-			
Monarch	*Danaus plexippus*	N/A	Special Concern	Special Concern
LICHENS				
Blue Felt Lichen	*Degelia plumbea*	Vulnerable	Special Concern	Special Concern
Boreal Felt Lichen - Atlantic population	*Erioderma pedicellatum (Atlantic pop.)*	Endangered	Endangered	Endangered
Eastern Waterfan	*Peltigera hydrothyria*	N/A	N/A	Threatened
REPTILES	-			
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 910)

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

SPECIES		DESIGNATION	
Common Name	**Scientific Name**	**Provincial General Status Rank**	**ACCDC S-Rank***
BIRDS	-		
Semipalmated Sandpiper	*Calidris pusilla*	Sensitive (Yellow)	S3M
Pine Siskin	*Carduelis pinus*	Sensitive (Yellow)	S3S4B,S5N
Black Guillemot	*Cepphus grylle*	Secure (Green)	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	Secure (Green)	S1S2B,S5M
Bay-breasted Warbler	*Dendroica castanea*	Sensitive (Yellow)	S3S4B S3?B
Cape May Warbler	*Dendroica tigrina*	Sensitive (Yellow)	S3B
Gray Catbird	*Dumetella carolinensis*	May Be At Risk (Orange)	S3S4B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive (Yellow)	S2B
Willow Flycatcher	*Empidonax traillii*	Sensitive (Yellow)	S3S4B
Wilson's Snipe	*Gallinago delicata*	Sensitive (Yellow)	S3B,S4N
Common Loon	*Gavia immer Perisoreus*	May Be At Risk (Orange)	S3S4
Gray Jay	*canadensis Petrochelidon*	Sensitive (Yellow)	S3B
Cliff Swallow Boreal	*pyrrhonota Poecile*	May Be At Risk (Orange)	S3
Chickadee Eastern	*hudsonica*	Sensitive (Yellow)	S3B
Bluebird Tennessee	*Sialia sialis*	Sensitive (Yellow)	S3S4B
Warbler	*Vermivora peregrina*	Sensitive (Yellow)	
BRYOPHYTES			
Toothed-leaved Nitrogen Moss	*Tetraplodon angustatus*	Sensitive (Yellow)	S2S3
Metropolitan Timmia Moss	*Timmia megapolitana*	Sensitive (Yellow)	S2?
DICOTS			
White Snakeroot Hooked	*Ageratina altissima*	May Be At Risk (Orange)	S1
Agrimony Nantucket	*Agrimonia gryposepala*	Secure (Green)	S3
Serviceberry Rosy	*Amelanchier nantucketensis*	May Be At Risk (Orange)	S1
Pussytoes Drummond's	*Antennaria rosea ssp. arida*	May Be At Risk (Orange)	S1
Rockcress Western Hairy	*Arabis drummondii*	Sensitive (Yellow)	S2
Rockcress Robbins'	*Arabis hirsuta var. pycnocarpa*	May Be At Risk (Orange)	S1S2
Milkvetch Marsh	*Astragalus robbinsii var. minor*	May Be At Risk (Orange)	S1
Bellflower	*Campanula aparinoides*	Sensitive (Yellow)	S3
Large Toothwort	*Cardamine maxima*	May Be At Risk (Orange)	S1
Small-flowered Bittercress	*Cardamine parviflora var. arenicola*	Sensitive (Yellow)	S2
Cuckoo Flower	*Cardamine pratensis var. pratensis*	May Be At Risk (Orange)	S1
Chinese Hemlock-parsley	*Conioselinum chinense*	Sensitive (Yellow)	S2
Rock Whitlow-Grass	*Draba arabisans*	Sensitive (Yellow)	S2
Rock Whitlow-Grass	*Draba glabella*	May Be At Risk (Orange)	S1
Northern Comandra	*Geocaulon lividum*	Sensitive (Yellow)	S3

Appendix 3: Special Occurrences (Ecodistrict 910)

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***
Bicknell's Crane's-bill	*Geranium bicknellii*	Secure (Green)	S3
Pale Jewelweed	*Impatiens pallida*	Sensitive (Yellow)	S2
Water Blinks	*Montia fontana*	May Be At Risk (Orange)	S1
Smooth Sweet Cicely	*Osmorhiza longistylis*	May Be At Risk (Orange)	S2
Field Locoweed	*Oxytropis campestris var. johannensis*	May Be At Risk (Orange)	S1
Laurentian Primrose	*Primula laurentiana*	Secure (Green)	S3
Triangular-valve Dock	*Rumex salicifolius var. mexicanus*	Sensitive (Yellow)	S2
Meadow Willow	*Salix petiolaris*	Secure (Green)	S3
Silky Willow	*Salix sericea*	May Be At Risk (Orange)	S2
White Mountain Saxifrage	*Saxifraga paniculata ssp. neogaea*	Sensitive (Yellow)	S2
Saltmarsh Starwort	*Stellaria humifusa Suaeda*	Sensitive (Yellow)	S2
Horned Sea-blite	*calceoliformis*	Secure (Green)	S2S3
Fringed Blue Aster	*Symphyotrichum ciliolatum*	Sensitive (Yellow)	S2S3
Northern Blueberry	*Vaccinium boreale*	May Be At Risk (Orange)	S2
Golden Alexanders	*Zizia aurea*	May Be At Risk (Orange)	S1
FERNS AND THEIR ALLIES			
Cut-leaved Moonwort	*Botrychium dissectum*	Secure (Green)	S3
Lance-Leaf Grape-Fern	*Botrychium lanceolatum var. angustisegmentum*	Sensitive (Yellow)	S2S3
Fragrant Wood Fern	*Dryopteris fragrans var. remotiuscula*	Sensitive (Yellow)	S2
Dwarf Scouring-Rush	*Equisetum scirpoides*	Secure (Green)	S3S4
Appalachian Fir-Clubmoss	*Huperzia appalachiana*	Undetermined	S1S3
Little Curlygrass Fern	*Schizaea pusilla*	Secure (Green)	S3
INSECTS			
Arctic Fritillary	*Boloria chariclea*	Sensitive (Yellow)	S2
Common Branded Skipper	*Hesperia comma*	Secure (Green)	S3
Northern Pearly-Eye	*Lethe anthedon*	Secure (Green)	S3
Mustard White	*Pieris oleracea*	Sensitive (Yellow)	S2
Question Mark	*Polygonia interrogationis*	Secure (Green)	S3B
Grey Comma	*Polygonia progne*	Secure (Green)	S3S4
Aphrodite Fritillary	*Speyeria aphrodite*	Secure (Green)	S3S4
LICHENS			
Ghost Antler Lichen	*Pseudevernia cladonia*	Sensitive (Yellow)	S2S3
Peppered Moon Lichen	*Sticta fuliginosa*	Sensitive (Yellow)	S3?
Powdered Moon Lichen	*Sticta limbata*	May Be At Risk (Orange)	S1S2

Appendix 3: Special Occurrences (Ecodistrict 910)

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***
MAMMALS			
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined	SH
MOLLUSKS			
Triangle Floater	*Alasmidonta undulata*	Secure (Green)	S2S3
MONOCOTS			
Short-awned Foxtail	*Alopecurus aequalis*	Sensitive (Yellow)	S2S3
Scabrous Black Sedge	*Carex atratiformis*	Sensitive (Yellow)	S2
Hairlike Sedge	*Carex capillaris*	Sensitive (Yellow)	S2
Bearded Sedge	*Carex comosa*	Sensitive (Yellow)	S2
Rosy Sedge	*Carex rosea*	Secure (Green)	S3
Woolly Panic Grass	*Dichanthelium acuminatum var. lindheimeri Eleocharis*	Undetermined (Undetermined)	S1?
Quill Spikerush	*nitida Eriophorum*	Secure (Green)	S3
Russet Cotton-Grass	*chamissonis Festuca*	Secure (Green)	S3S4
Nodding Fescue	*subverticillata Goodyera*	May Be At Risk (Orange)	S1
Lesser Rattlesnake-plantain	*repens*	Sensitive (Yellow)	S3
Small-flowered Woodrush	*Luzula parviflora*	Secure (Green)	S3S4
White Adder's-Mouth	*Malaxis brachypoda*	May Be At Risk (Orange)	S1
Small Round-leaved Orchid	*Platanthera orbiculata*	Secure (Green)	S3
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	Sensitive (Yellow)	S2S3
Narrow False Oats	*Trisetum spicatum*	Secure (Green)	S3S4

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

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

Appendix 3: Special Occurrences (Ecodistrict 910)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Clam beds (Five Islands, Advocate Harbour)	Ecosystems	Source	Act
Fish Farm (Advocate)		Source	Act
Raised Beach (Cape Chignecto)	Ecosystems	Source	NS Environment Act
Salt marsh	Ecosystems	Significant Species and Habitats Database	NS Environment Act
Three Sisters (Cape Chignecto)	Feature	Significant Species and Habitats Database	NS Provincial Parks Act
Tidal Project (Black Rock)	Feature	Source	
Eastern Habitat Joint Venture Lands (Edgetts Beach, West Apple River)	Ecosystems	DNR Database	NS Wildlife Act
Protected Beaches (Sand River, West Apple River, Port Greville, Harrington, Fox Point, Sand Point, Riverside, Partridge Island)	Ecosystems	DNR Database	NS Beaches Protection Act
Provincial Parks and Reserves (Cape Chignecto, Five Islands)	Parks	DNR Database	NS Provincial Parks Act
Wilderness Areas (Raven Head)	Ecosystems	DNR Database	Wilderness Areas Protection Act

Appendix 3: Special Occurrences (Ecodistrict 910)
Table 1d – Heritage Features

Feature	Type	Information Source
Cemetery (Advocate, Port Greville)	Heritage	Source
Historic wharf loading dock (Eatonville)	Heritage	Source
Limestone Kiln	Heritage	Source
Old Sawmill (Fox River)	Heritage	Source
Old Farmstead (Moose Island)	Heritage	Source

Appendix 3: Special Occurrences

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

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

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
ICHO	bS	1,811	4.4	1,959	4.8	69 to 71	8.9	1,811	1.3	2,118	1.5	69 to 71	8.9
ICSM	rS	636	1.6	6,588	16.1	25 to 31	55.9	636	0.5	13,192	9.4	24 to 30	55.9
IFHO	rS	2,740	6.7	6,588	16.1	63 to 69	7.7	2,740	2.0	13,192	9.4	63 to 69	7.7
IFKK	rS sM yB Be	2,873	7.0	14,294	35.0	64 to 66	8.8	2,873	2.1	14,425	10.3	63 to 66	8.8
IFSM	rS	1,000	2.4	6,588	16.1	68 to 71	4.8	1,331	1.0	13,192	9.4	63 to 67	8.0
IMHO	rS	203	0.5	6,588	16.1	56 to 66	8.3	5,310	3.8	13,192	9.4	53 to 62	7.4
IMSM	rS	32	0.1	6,588	16.1	63	15.6	1,372	1.0	13,192	9.4	51 to 55	10.0
WCDS	rS eH wP	1,821	4.5	5,515	13.5	77 to 82	2.8	1,953	1.4	6,453	4.6	74 to 79	3.4
WCHO	rS wP	2,791	6.8	2,791	6.8	42 to 46	35.1	4,288	3.1	2,791	2.0	37 to 41	33.1
WCKK	sM yB Be	6,003	14.7	5,403	13.2	75 to 83	3.4	6,545	4.7	84,863	60.7	72 to 79	4.2
WCRD	bS wP	2,002	4.9	2,002	4.9	70 to 73	0.8	2,002	1.4	2,002	1.4	70 to 73	0.8
WCSM	rS	2,368	5.8	6,588	16.1	24 to 25	64.3	2,430	1.7	13,192	9.4	23 to 24	63.9
WFKK	rS sM yB Be	1,722	4.2	14,294	35.0	57 to 67	7.2	1,722	1.2	14,425	10.3	55 to 66	7.2
WMDS	rS eH wP	3,694	9.0	5,515	13.5	69 to 72	6.4	13,512	9.7	6,453	4.6	58 to 61	10.6
WMHO	rS	247	0.6	6,588	16.1	62 to 70	3.1	55,929	40.0	13,192	9.4	47 to 54	13.3
WMKK	rS sM yB Be	9,698	23.7	14,294	35.0	61 to 68	6.6	25,142	18.0	14,425	10.3	50 to 57	4.9
WMSM	rS	245	0.6	6,588	16.1	71 to 72	0.7	245	0.2	13,192	9.4	69 to 70	0.7
WTLD	wetlands	491	1.2	0	0.0	35 to 36	51.3	1,023	0.7	0	0.0	54 to 55	27.0

*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)
WMKK	rS sM yB Be	9,698	3.4	305	13	0	0	305	3.1	13	0.1	318	3.3
WCKK	sM yB Be	6,003	60.5	2,726	0	2	0	2,727	45.4	0	0.0	2,727	45.4
WMDS	rS eH wP	3,694	14.0	518	0	0	0	518	14.0	0	0.0	518	14.0
IFKK	rS sM yB Be	2,873	0.0	0	5	0	0	0	0.0	5	0.2	5	0.2
WCHO	rS wP	2,791	3.7	69	3	0	0	69	2.5	3	0.1	72	2.6
IFHO	rS	2,740	3.8	0	9	0	0	0	0.0	9	0.3	9	0.3
WCSM	rS	2,368	0.3	1	12	0	0	1	0.0	12	0.5	13	0.5
WCRD	bS wP	2,002	10.9	0	1	0	0	0	0.0	1	0.1	1	0.1
WCDS	rS eH wP	1,821	61.2	722	0	0	0	722	39.7	0	0.0	722	39.7
ICHO	bS	1,811	31.0	348	2	0	0	348	19.2	2	0.1	350	19.3
WFKK	rS sM yB Be	1,722	4.2	0	11	0	0	0	0.0	11	0.6	11	0.6
IFSM	rS	1,000	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
ICSM	rS	636	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WTLD	wetlands	491	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
XXWA	NONE	285	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WMHO	rS	247	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
WMSM	rS	245	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
IMHO	rS	203	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
XXMS	salt marsh	171	3.6	0	9	0	0	0	0.0	9	5.1	9	5.1
XXCB	coastal beach	39	0.0	0	10	0	0	0	0.0	10	26.0	10	26.0
IMSM	rS	32	0.0	0	0	0	0	0	0.0	0	0.0	0	0.0
Total		**40,872**		**4,689**	**75**	**2**	**0**	**4,690**		**75**		**4,765**	

See Appendix 12b for full Ecological Emphasis worksheet.

Appendix 5: Ecodistrict Reserves and Protected Areas Summary

Legal Reserves			Policy Reserves (including unproclaimed legal proposals)		
Act Designation	Area by Ownership		Policy Program	Area by Ownership	
	Crown (ha)	Private (ha)		Crown (ha)	Private (ha)
Designated Provincial Parks and Park Reserves	4,688	0	Old Forest	1,375	
Protected Beaches	2	51			
Nova Scotia Nature Trust	0	11			
Nature Conservancy of Canada	0	9			
Areas under Special Places Act	0	5			

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

Appendix 6: Description of Road Density Index

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

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

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

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

Main Concepts

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

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

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

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

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

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

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

Appendix 7: Road Density Index Worksheets

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

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

Road Type	Road Index Weighting	Length (km)
Trails, tracks, abandoned roads, and railways	1	778
Utility corridors	3	0.5
Gravel Roads and active railways	6	201
Paved streets and roads collectors	10	152
Highways	15	0

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	**Range**	**Hectares**	**Percent**
Remote	0 to 6	3,165	7.7
Forest Resource	7 to 15	17,126	41.9
Mixed Rural	16 to 24	11,416	27.9
Agriculture Suburban	25 to 39	8,571	21
Urban	40 to 100	220	0.5
Total		**40,498**	**99.0**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area (ha)	Road Index
Valley Corridors	1,520	31
Coastal Beach	29	16.2
Tolerant Mixedwood Hills	15,564	8.1
Tolerant Mixedwood Slopes	5,479	8.0
Red Spruce Hummocks	2,375	13.6
Salt Marsh	121	32.4
Spruce Pine Hummocks	3,789	6.5
Red and Black Spruce Flats	3,784	18.7
Red and Black Spruce Hummocks	7,269	9.0
Wetlands	488	18.8
Total	**98,501**	**12**

*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

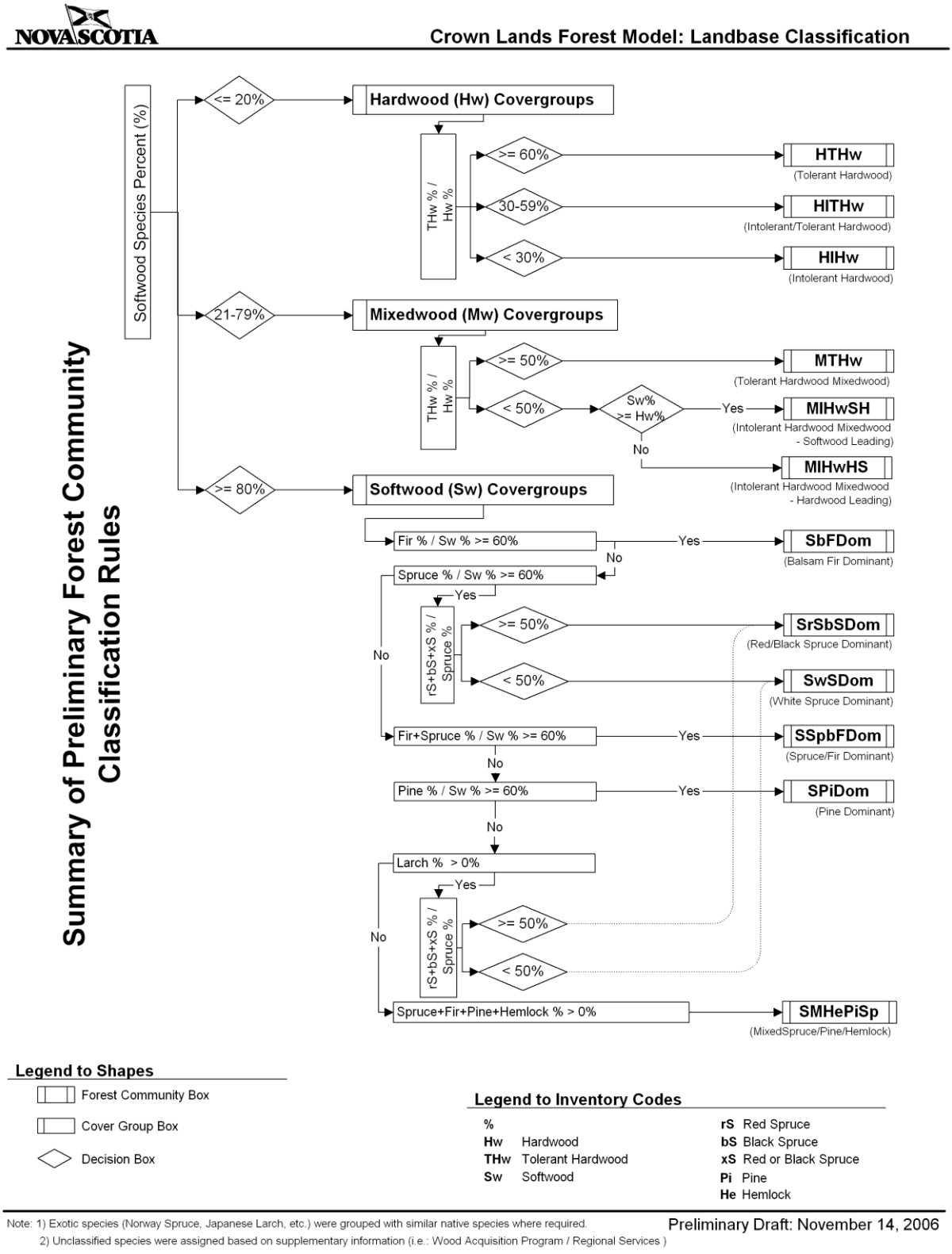
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6 m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-lived shade-intolerant "pioneer" species • peak seed production by forbs and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

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

Species		Ecodistrict																																						
Code	**Name**	100	210	220	310	320	330	340	350	360	370	380	410	420	430	440	450	510	520	530	540	550	560	610	620	630	710	720	730	740	750	760	770	780	810	820	830	840	910			
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	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	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	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	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	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	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	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	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	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	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	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	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	4	4
JP	jack pine	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	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	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	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	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	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	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	4	4
RP	red pine	3	3	3	3	3	3	3	3	3	4	3	3	3	4	3	3	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	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	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	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	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	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	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	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	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	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	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	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	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	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	5	5

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

Appendix 9: Vegetation Community Classification – Forest Model



Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

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 WCRD	Softwood	bS bSwP	Frequent	3,814; 100.0	Early	8	61	54	11	133	1,505; 45.9	EARLY	691; 21.0
						Mid	87	82	101	37	306			
						Late	153	273	436	177	1,040			
						Unclass	26	0	0	0	26			
		Mixedwood	N/A			Early	33	35	37	9	114	1,038; 31.7	MID	1,377; 42.0
						Mid	554	100	111	32	798			
						Late	7	10	58	1	75			
						Unclass	51	0	0	0	51			
		Hardwood				Early	81	168	106	30	384	660; 20.3	LATE	1,117; 34.1
						Mid	85	112	74	1	273			
						Late	0	2	0	0	2			
						Unclass	1	0	0	0	1			
		Unclassified				Early	60	0	0	0	60	70; 2.1	UNCL	88; 2.6
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	10	0	0	0	10			
Total					**3,814***	**# ha**	**1,155**	**842**	**978**	**297**	**3,273**			
						%	**35.4%**	**25.7%**	**29.8%**	**9.1%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

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	WCHO (55.0%) WCSM (26.0%) ICSM (5.0%) WMKK (3.0%) IFHO (2.0%) WCKK (<1.0%)	Softwood	rS wP rS rS eH	Frequent	1,242; 80.0	Early	0	18	61	4	83	225; 58.0	EARLY	114; 29.4
						Mid	0	4	30	11	45			
						Late	9	0	59	7	74			
						Unclass	22	0	0	0	22			
		Mixedwood	rS sM yB Be	Infrequent	52; 3.0	Early	9	9	6	0	24	119; 30.7	MID	112; 28.9
						Mid	2	11	36	5	55			
						Late	3	3	17	13	37			
						Unclass	4	0	0	0	4			
		Hardwood	sM yB Be	Infrequent	8; <1.0	Early	1	1	5	0	7	24; 6.1	LATE	116; 29.8
						Mid	0	0	12	0	12			
						Late	0	0	4	1	5			
						Unclass	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	20; 5.2	UNCL	46; 11.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	20	0	0	0	20			
Total					**1,550***	**# ha**	**71**	**46**	**230**	**42**	**388**			
						%	**18.3%**	**11.8%**	**59.2%**	**10.7%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory						
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)			
Tolerant Mixedwood Hills	WMKK (62.0%) WCKK (38.0%)	Softwood	rS eH	Gap	599; 3.8	Early	120	241	366	18	745	5,149; 35.8	EARLY 3,363; 23.4
						Mid	462	246	269	97	1,073		
						Late	554	125	1,905	225	2,808		
						Unclass	523	0	0	0	523		
		Mixedwood	rS sM yB Be	Gap	9,646; 61.7	Early	277	528	220	18	1,042	5,570; 38.7	MID 4,927; 34.2
						Mid	671	726	1,045	288	2,730		
						Late	146	73	789	117	1,125		
						Unclass	673	0	0	0	673		
		Hardwood	sM yB Be	Gap	5,394; 34.5	Early	563	262	432	3	1,261	3,005; 20.9	LATE 4,494; 31.2
						Mid	76	228	778	43	1,125		
						Late	24	31	489	16	561		
						Unclass	58	0	1	0	58		
		Unclassified				Early	315	0	0	0	315	668; 4.6	UNCL 1,608; 11.2
						Mid	0	0	0	0	0		
						Late	0	0	0	0	0		
						Unclass	354	0	0	0	354		
Total					**15,639***	**# ha**	**4,814**	**2,460**	**6,294**	**824**	**14,393**		
						%	**33.4%**	**17.1%**	**43.7%**	**5.7%**	**100.0%**		

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Red Spruce Hummocks	WCHO (81.0%) WMHO (10.0%) IMHO (9.0%)	Softwood	rS wP rS	Infrequent	2,399; 100.0	Early	13	23	107	6	149	828; 49.9	EARLY	323; 19.5
						Mid	34	18	51	45	147			
						Late	63	31	211	79	385			
						Unclass	147	0	0	0	147			
		Mixedwood				Early	10	65	11	0	86	625; 37.7	MID	533; 32.1
						Mid	185	114	54	8	360			
						Late	16	3	97	31	147			
						Unclass	32	0	0	0	32			
		Hardwood				Early	4	26	19	0	50	142; 8.6	LATE	596; 35.8
						Mid	3	5	17	1	26			
						Late	6	9	43	5	64			
						Unclass	3	0	0	0	3			
		Unclassified				Early	38	0	0	0	38	63; 3.8	UNCL	207; 12.5
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	25	0	0	0	25			
Total					**2,399***	**# ha**	**579**	**293**	**611**	**175**	**1,658**			
						%	**34.9%**	**17.6%**	**36.8%**	**10.7%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

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)				
Salt Marsh	XXMS	Softwood				Early	0	0	10	0	10	57; 86.6	EARLY	14; 20.6
						Mid	1	2	13	0	16			
						Late	0	3	21	4	29			
						Unclass	1	0	0	0	1			
		Mixedwood				Early	0	0	0	0	1	6; 9.6	MID	20; 31.0
						Mid	0	3	2	0	4			
						Late	0	0	0	2	2			
						Unclass	0	0	0	0	0			
		Hardwood				Early	0	2	1	0	3	3; 3.8	LATE	31; 46.2
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	0; 0.0	UNCL	1; 2.2
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	0	0	0	0	0			
Total					**128***	**# ha**	**3**	**11**	**47**	**6**	**66**			
						%	**3.8%**	**16.2%**	**70.8%**	**9.1%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Red and Black Spruce Flats	WCSM (52.0%) IFSM (26.0%) ICSM (15.0%) WMSM (6.0%) IMSM (1.0%)	Softwood	rS	Frequent	2,978; 78.0	Early	12	70	131	41	254	1,302; 71.3	EARLY	519; 28.4
						Mid	18	99	158	41	316			
						Late	55	142	358	87	642			
						Unclass	90	0	0	0	90			
		Mixedwood				Early	38	36	32	13	119	335; 18.3	MID	505; 27.6
						Mid	27	34	74	19	154			
						Late	5	5	26	8	43			
						Unclass	19	0	0	0	19			
		Hardwood				Early	12	39	47	0	98	137; 7.5	LATE	687; 37.6
						Mid	0	16	16	2	35			
						Late	0	0	2	0	2			
						Unclass	3	0	0	0	3			
		Unclassified				Early	48	0	0	0	48	52; 2.9	UNCL	116; 6.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	4	0	0	0	4			
Total					**3,817***	**# ha**	**331**	**440**	**845**	**211**	**1,827**			
						%	**18.1%**	**24.1%**	**46.2%**	**11.6%**	**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 (910 Parrsboro Shore)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Red and Black Spruce Hummocks	IFKK (39.0%) IFHO (37.0%) WFKK (24.0%)	Softwood	rS	Frequent	2,718; 37.2	Early	22	111	273	45	451	3,250; 51.5	EARLY	1,675; 26.5
						Mid	58	162	256	72	548			
						Late	100	244	1,065	223	1,632			
						Unclass	619	0	0	0	619			
		Mixedwood	rS sM yB Be	Frequent	4,591; 62.8	Early	180	158	529	32	898	2,365; 37.4	MID	1,945; 30.8
						Mid	135	194	681	158	1,169			
						Late	22	25	140	26	212			
						Unclass	85	0	0	0	85			
		Hardwood				Early	47	36	232	1	317	607; 9.6	LATE	1,896; 30.0
						Mid	5	11	211	2	228			
						Late	0	11	41	0	52			
						Unclass	10	0	0	0	10			
		Unclassified				Early	9	0	0	0	9	93; 1.5	UNCL	797; 12.6
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	84	0	0	0	84			
Total					**7,309***	**# ha**	**1,375**	**951**	**3,428**	**560**	**6,314**			
						%	**21.8%**	**15.1%**	**54.3%**	**8.9%**	**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 (910 Parrsboro Shore)

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 rS	Open Seral	196; 40.0	Early	3	5	2	0	10	95; 86.5	EARLY	17; 15.8
						Mid	0	9	16	0	24			
						Late	0	17	24	7	48			
						Unclass	12	0	0	0	12			
		Mixedwood				Early	1	1	0	0	3	10; 8.8	MID	30; 27.6
						Mid	0	0	6	0	6			
						Late	0	0	1	0	1			
						Unclass	0	0	0	0	0			
		Hardwood				Early	0	2	2	0	4	4; 3.7	LATE	49; 44.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	1; 1.0	UNCL	13; 11.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	1	0	0	0	1			
Total					**491***	**# ha**	**18**	**34**	**51**	**7**	**110**			
						%	**16.3%**	**30.8%**	**46.2%**	**6.7%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (910 Parrsboro Shore)

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 Slopes	WMDS (67.0%) WCDS (33.0%)	Softwood	rS eH wP	Gap	5,510; 100.0	Early	7	28	46	6	87	1,348; 26.7	EARLY	1,131; 22.4
						Mid	37	13	70	14	135			
						Late	88	25	886	33	1,031			
						Unclass	95	0	0	0	95			
		Mixedwood				Early	62	135	75	0	272	1,994; 39.5	MID	1,993; 39.5
						Mid	116	220	700	112	1,149			
						Late	3	9	414	53	479			
						Unclass	95	0	0	0	95			
		Hardwood				Early	186	215	212	16	629	1,540; 30.6	LATE	1,680; 33.3
						Mid	53	142	473	42	710			
						Late	4	13	147	5	169			
						Unclass	19	0	12	0	31			
		Unclassified				Early	143	0	0	0	143	162; 3.2	UNCL	240; 4.7
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Unclass	19	0	0	0	19			
Total					**5,510***	**# ha**	928	800	3,035	281	5,044			
						%	**18.5%**	**15.8%**	**60.2%**	**5.5%**	**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 2: Composition of Forest Communities (in Tusket Islands Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Mixedwood Hills	WMKK WCKK	Gap	rS-eH rS-sM-yB-Be sM-yB-Be	S	SrSbSDom	3,937	28.7%	L	**Well-drained:** Early VT -rM wB Mid VT: rM yB Late VT: yB Be (sM) **Well to Moist** Early VT:rM wB Mid VT: bF rS Late VT:bS rS (wP)
				M	MIHwSH	2,303	16.8%	E/M	
				H	HIHw	1,899	13.8%	E/M	
				M	MIHwHS	1,897	13.8%	E/M	
				S	SwSDom	467	3.4%	E	
				S	SspbFDom	319	2.3%	M	
				S	SpiDom	7	0.1%	M/L	
				S	SbFDom	415	3.0%	E/M	
				S	SMHePiSp	4	0.0%	L	
				M	MTHw	1,370	10.0%	L	
				H	HTHw	616	4.5%	L	
				H	HITHw	489	3.6%	M	
Total						**13,724**	**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 Tusket Islands 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 Slopes	WMDS WCDS	Gap	rS eH wP	S	SrSbSDom	1,183	24.2%	L	**Well-drained** Early VT: rM wB Mid VT: bF rS yB LateVT: rS eH wP yB Be sM
				M	MIHwSH	835	17.1%	E/M	
				H	HIHw	1,063	21.8%	E/M	
				M	MIHwHS	902	18.5%	E/M	
				S	SwSDom	43	0.9%	E	
				S	SspbFDom	48	1.0%	M	
				S	SpiDom	9	0.2%	M/L	
				S	SbFDom	65	1.3%	E/M	
				S	SMHePiSp	< 1	0.0%	L	
				M	MTHw	257	5.3%	L	
				H	HTHw	140	2.9%	L	
				H	HITHw	337	6.9%	M	
Total						**4,882**	**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 Tusket Islands Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Red Spruce Hummocks	WCHO WMHO IMHO	Infrequent	rS wP rS	S	SrSbSDom	565	35.4%	L	**Well-drained** Early VT: rM wB Mid VT: bF rS yB LateVT: rS eH wP yB Be sM
				M	MIHwSH	344	21.6%	E/M	
				H	HIHw	62	3.9%	E/M	
				M	MIHwHS	118	7.4%	E/M	
				S	SwSDom	164	10.3%	E	
				S	SspbFDom	40	2.5%	M	
				S	SpiDom	<1	0.0%	M/L	
				S	SbFDom	58	3.7%	E/M	
				S	SMHePiSp	<1	0.0%	L	
				M	MTHw	163	10.2%	L	
				H	HTHw	63	4.0%	L	
				H	HITHw	16	1.0%	M	
Total						**1,595**	**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 Tusket Islands 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	WCRD ICHO	Frequent	bS rS wP	S	SrSbSDom	1,260	39.3%	L	**Well-drained**: Early VT -rM wB Mid VT: bS bF Late VT: bS wP
				M	MIHwSH	666	20.8%	E/M	
				H	HIHw	651	20.3%	E/M	
				M	MIHwHS	367	11.5%	E/M	
				S	SwSDom	52	1.6%	E	
				S	SspbFDom	101	3.2%	M	
				S	SpiDom	14	0.4%	M/L	
				S	SbFDom	80	2.5%	E/M	
				S	SMHePiSp	0	0.0%	L	
				M	MTHw	80	2.4%	L	
				H	HTHw	2	0.1%	L	
				H	HITHw	5	0.1%	M	
Total						**3,203**	**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 Tusket Islands 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 rS	S	SrSbSDom	72	66.1%	L	**Wet** Wetlands with pockets of bS and Edaphic climax communities of bS bF tl rM
				M	MIHwSH	8	7.3%	E/M	
				H	HIHw	4	3.7%	E/M	
				M	MIHwHS	2	1.8%	E/M	
				S	SwSDom	2	1.8%	E	
				S	SspbFDom	5	4.6%	M	
				S	SpiDom	<1	0.0%	M/L	
				S	SbFDom	16	14.7%	E/M	
				S	SMHePiSp	<1	0.0%	L	
				M	MTHw	<1	0.0%	L	
				H	HTHw	<1	0.0%	L	
				H	HITHw	<1	0.0%	M	
Total						**3,203**	**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 Tusket Islands Grouped by Landscape Element)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Red and Black Spruce Flats	WCSM IFSM ICSM WMSM IMSM	Frequent	rS	S	SrSbSDom	983	55.4%	L	**Well to moist:** Early VT -rM wB, aspen Mid VT: rM bF Late VT: bS rS (wP) **Wet:** Wetlands with pockets of bS tL rM bS
				M	MIHwSH	161	9.0%	E/M	
				H	HIHw	118	6.6%	E/M	
				M	MIHwHS	144	8.1%	E/M	
				S	SwSDom	104	5.9%	E	
				S	SspbFDom	68	3.8%	M	
				S	SpiDom	2	0.1%	M/L	
				S	SbFDom	145	8.2%	E/M	
				S	SMHePiSp	<1	0.0%	L	
				M	MTHw	30	1.7%	L	
				H	HTHw	5	0.3%	L	
				H	HITHw	15	0.8%	M	
Total						**1,775**	**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 Tusket Islands 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	WCHO WCSM ICSM WMKK IFHO WCKK	Frequent Infrequent	rS-sP rS-EH	S	SrSbSDom	122	33.1%	L	All
				M	MIHwSH	42	11.4%	E/M	
				H	HIHw	12	3.3%	E/M	
				M	MIHwHS	36	9.9%	E/M	
				S	SwSDom	81	22.0%	E	
				S	SspbFDom	9	2.5%	M	
				S	SpiDom	<1	0.0%	M/L	
				S	SbFDom	14	3.7%	E/M	
				S	SMHePiSp	<1	0.0%	L	
				M	MTHw	6	1.7%	L	
				H	HTHw-	41	11.1%	L	
				H	HITHw	5	1.4%	M	
Total						**368**	**100.0%**		

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

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

Climax Type	Ecodistrict		Ecoregion	
	Hectares	Percent	Hectares	Percent
rS sM yB Be	14,294	35.0%	14,425	10.3%
rS	6,588	16.1%	13,192	9.4%
rS eH wP	5,515	13.5%	6,453	4.6%
sM yB Be	5,403	13.2%	84,863	60.7%
rS wP	2,791	6.8%	2,791	2.0%
bS wP	2,001	4.9%	2,001	1.4%
bS	1,959	4.8%	2,118	1.5%
rS eH	600	1.5%	600	0.4%
Total	**39,151**	**95.8%***	**126,443**	**90.3%****

*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
Tolerant Mixedwood Hills	15,632	3,046	8,820	646	838	2,282	10,393 to 11,534	66 to 74
Red and Black Spruce Hummocks	7,308	25	5,610	216	586	872	4,504 to 4,940	62 to 68
Tolerant Mixedwood Slopes	5,507	1,238	3,414	119	287	449	3,940 to 4,165	72 to 76
Red and Black Spruce Flats	3,814	11	1,915	122	1,561	204	1,529 to 1,631	40 to 43
Red Spruce Hummocks	2,396	73	1,372	155	551	246	1,202 to 1,325	50 to 55
Spruce Pine Hummocks	3,811	352	2,953	133	177	196	2,649 to 2,747	70 to 72
Valley Corridors	1,438	2	467	77	832	59	387 to 416	27 to 29
Wetlands	492	0	224	2	252	14	172 to 179	35 to 36
Salt Marsh	128	8	88	9	21	2	77 to 78	60 to 61
Coastal Beach	*39*	*10*	*23*	*0*	*6*	*0*	*27*	*69*
Total	**39,920**	**1,277**	**25,156**	**4,615**	**6,878**	**1,994**	**21,796 to 22,793**	**55 to 57**

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	1,811	350	1,163	61	161	76	1,257 to 1,295	69 to 71
ICSM	636	0	177	31	356	73	159 to 195	25 to 31
IFHO	2,740	9	2,159	20	211	340	1,718 to 1,888	63 to 69
IFKK	2,873	5	2,338	121	251	159	1,829 to 1,908	64 to 66
IFSM	1,000	0	881	10	48	61	679 to 709	68 to 71
IMHO	203	0	135	10	17	42	114 to 135	56 to 66
IMSM	32	0	27	0	5	0	20	63
WCDS	1,821	722	838	23	51	187	1,403 to 1,497	77 to 82
WCHO	2,791	73	1,348	181	980	209	1,182 to 1,286	42 to 46
WCKK	6,003	2,727	2,060	158	202	856	4,526 to 4,954	75 to 83
WCRD	2,002	1	1,793	71	16	120	1,394 to 1,454	70 to 73
WCSM	2,368	13	674	87	1,524	71	558 to 594	24 to 25
WFKK	1,722	11	1,135	79	124	374	976 to 1163	57 to 67
WMDS	3,694	518	2,582	96	236	262	2,544 to 2,675	69 to 72
WMHO	247	0	185	12	8	43	153 to 174	61 to 70
WMKK	9,698	318	6,810	495	641	1,436	5,908 to 6,626	61 to 68
WMSM	245	0	225	13	2	4	173 to 175	71 to 72
WTLD	491	0	223	2	252	14	171 to 178	35 to 36
Total	**40,377**	**4,747**	**24,753**	**1,470**	**5,085**	**4,327**	**24,761 to 26,925**	**61 to 67**

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

Appendix 13:

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

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

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

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

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

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

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

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

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

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

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