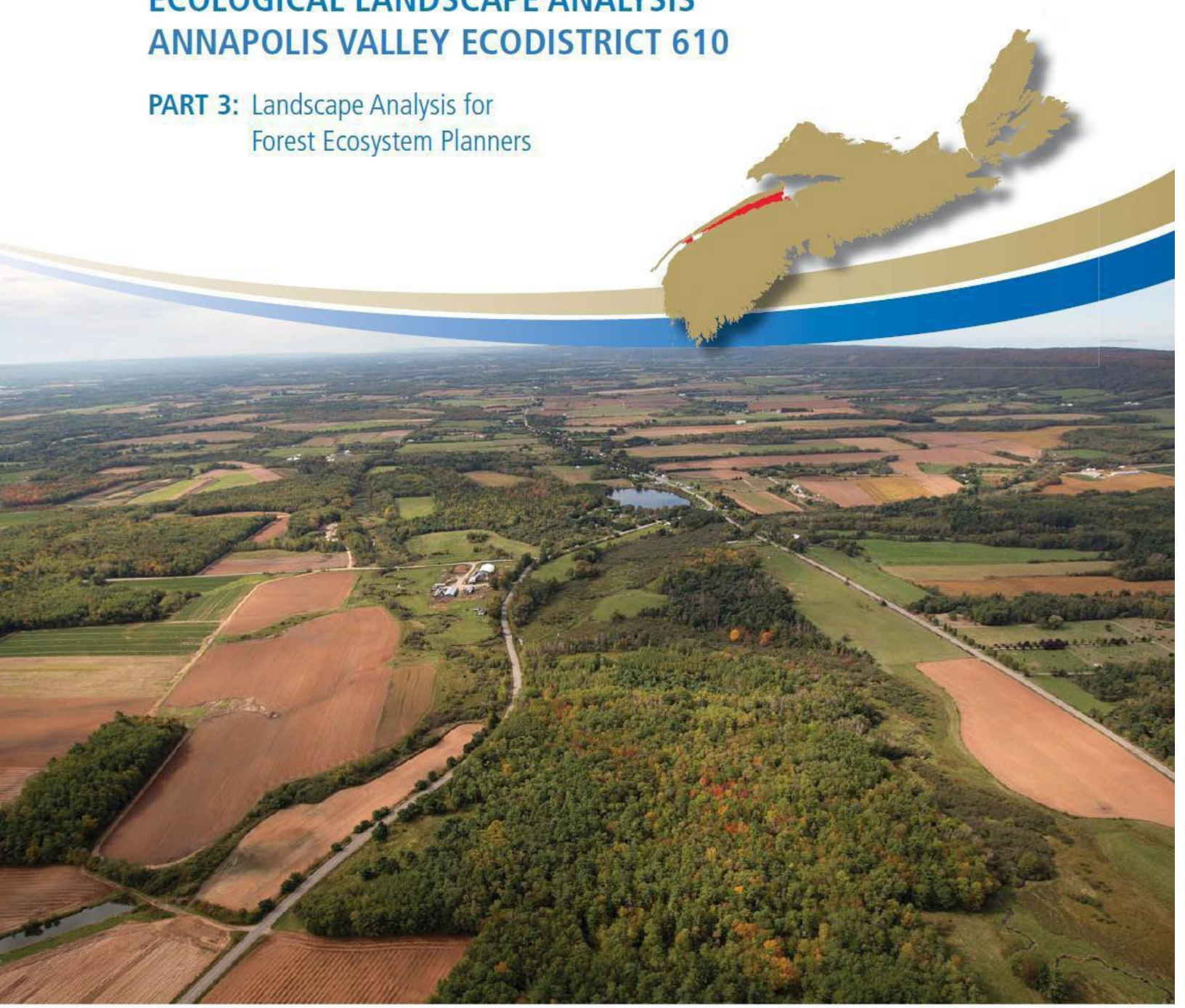
Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS ANNAPOLIS VALLEY ECODISTRICT 610

PART 3: Landscape Analysis for Forest Ecosystem Planners



ELA 2015-610

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 610: Annapolis Valley

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This report, one of 38 for the province, provides descriptions, maps, analysis, photos and resources of the Annapolis Valley 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 separatedocument.

Information sources and statistics (benchmarkdates) include:

- Forest Inventory (2002) – stand volume, speciescomposition
- Crown Lands Forest Model landbase classification (2006) – provides forest inventory update for harvesting & silviculture from satellite photography (2005), silviculture treatment records (2006) and forest age increment (2006)
- Roads 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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Part 3: Landscape Analysis of Annapolis Valley – *For Forest Ecosystem Planners*

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

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

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Understanding the Landscape as an Ecological System

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

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

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

Elements Within Landscapes (Map 2)

The landscape analysis identified and mapped 11 distinctive elements in the Annapolis Valley Ecodistrict – 10 patches and a corridor. A matrix, which is the dominant element, was not identified in this ecodistrict. Patches are smaller yet still distinctive elements. Corridors are natural linear elements, such as river valleys, that extend across ecodistricts (see connectivity section for full discussion of matrix, patch, and corridor concepts).

Spruce Hemlock Pine Hummocks and Hills, representing 32% of area of elements in the ecodistrict, is the largest patch element. The main trees species are shade-tolerant red spruce, hemlock, and white pine, along with black spruce, red maple, and tamarack. Abandoned farmland reverts to old field forests, usually white spruce, aspen, or tamarack.

Pine Oak Flats and **Pine Oak Hills and Hummocks**, the next two largest patch elements with a combined area of 35%, support white pine and red oak, along with black spruce, red pine, jack pine, aspen, and red maple. The other patch elements, in order of size, are **Red and Black Spruce Hummocks**, **Marshes and Grasslands**, **Spruce Pine Flats**, **Floodplain**, **Wetlands**, **Salt Marsh**, and **Tolerant Hardwood Hills**.

Valley Corridors, a linear corridor element, includes the riparian areas along major rivers, such as the Annapolis, Cornwallis, Nictaux, Black, Fales, South, and Gaspereau.

The landscape of the Annapolis Valley Ecodistrict is a reflection of land use practices. Approximately 57% of the area has been converted to other uses – primarily agriculture and urban. The landscape is fragmented and the remaining forest occurs in scattered patches separated by converted land.

The present day forest is generally mature or multi-aged and comprising softwood (29%), mixedwood (36%), and hardwood (34%).

Almost 50% of the forest is early seral species and 17% is late seral. Early seral species include white birch, aspen, red maple, and white spruce.

Late serals include white pine, black and red spruce, oak, and the tolerant hardwoods. Mixedwoods are sometimes mid seral and are often the intolerant hardwoods with later seral softwoods such as pine and red/black spruce.

Flow – Element Interactions (Appendix 1; Map 2)

Flow phenomena are the features that move across and through landscapes. They can be energy or material, living or non-living. Diaz and Apostol (1992) suggest that the most relevant flows for landscape analysis may include water, wind, fire, animals, plants, and humans. The following

flows were considered in the analysis of this ecodistrict and are described in Appendix 1: people, deer, red-tailed hawk, bear, water, anadromous fish, and beaver.

Flow occurs in the landscape and some schematic examples of this flow are shown in Map 2. The landscape of Annapolis Valley is very fragmented compared to what would exist under natural conditions. It is likely that movement or percolation of some species has been adversely affected.

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

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

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.

River corridors promote connectivity.

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

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

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

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

The ecological structure of the Annapolis Valley Ecodistrict is much changed from that which would have existed during pre-settlement times. Land use practices, primarily agricultural and urbanization, has resulted in the large scale conversion to non-forested status of the ecosections on the landscape (conversions for ecosections vary from 26% to 90 %). The forested patches remaining have large areas of intolerant species – a situation likely not present before settlement.

The connective function of the landscape is much reduced by the high-level of fragmentation across the landscape. Habitat needs for some of the species present during pre-settlement times have been lost. Species persisting are those more adapted to the patchwork of converted land with patches of existing forest. Gap-crossing abilities would be a needed attribute for many of the species.

Appendix 2a identifies management strategies and practices for various features in the ecodistrict. Strategies that might be considered include: strategic land purchases by government and conservation groups, restoration of riparian zones, reforestation of abandoned farmland, and public education on connectivity and forest harvesting.

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

Map 2 identifies some of the linkages to neighbouring areas or ecodistricts.

The major rivers provide linkages – the Annapolis drains into the Annapolis Basin and the Bay of Fundy. The Cornwallis flows into the Minas Basin and the Bay of Fundy. A number of smaller rivers flow into the Minas Basin. There is an abundance of small first and second order streams feeding the major rivers which originate in the adjacent North Mountain and Valley Slope ecodistricts.

People, through activities such as recreation, transportation, shopping, and farming, provide linkages to North Mountain and Valley Slope ecodistricts.

Occasional linkages occur when continuously forested areas cross over adjoining ecodistricts into the Annapolis Valley Ecodistrict.

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 Annapolis Valley

Element	Seral Stage					
	Early	% *	Middle	%	Late	%
Pine Oak Flats --- Floodplain ecosite	IH1, IH2, IH4, IH6, OW2, OW4, OW5, MW5, SP2, SP10 --- OF1, OF2, OF3, OF4, OF5, FP5, FP6, CE2	44.0	MW4, SP3, SP4, SP6, SP8 --- FP2, FP3	30.0	SP5, SP7, **SP9** --- **FP1**	23.0
Pine Oak Hills and Hummocks	IH1, IH2, IH4, IH6, OW2, OW4, OW5, MW5, SP2, SP10	40.0	MW4, SP3, SP4, SP6, SP8	33.0	SP5, SP7, **SP9**	22.0
Spruce Pine Flats	IH1, IH4, IH6, MW5, OW2, OW4, SP2, SP10	60.0	MW4, SP3, SP4, SP6, SP8	18.0	**SP5**, SP7, SP9	14.0
Red and Black Spruce Hummocks	IH3, IH4, IH5, IH6, MW5, OF1, OF2, OF3, OF4, OF5	53.0	MW2, MW4, SH5, SH6	22.0	SH1, SH2, **SH3, SH4**	13.0
Spruce Hemlock Pine Hummocks and Hills	IH3, IH4, IH5, IH6, MW5, OF1, OF2, OF3, OF4, OF5	57.0	MW2, MW4, SH5, SH6	20.0	SH1, SH2, **SH3, SH4,** MW1, MW3	11.0
Tolerant Hardwood Hills	IH3, IH4, IH5, IH6	56.0	TH8	24.0	**TH2, TH3,** TH4,	14.0
Floodplain --- Spruce Pine ecosite	OF1, OF2, OF3, OF4, OF5, FP5, FP6, CE2 --- IH1, IH4, IH6, MW5, SP2, SP10	38.0	FP2, FP3 --- MW4, SP3, SP4, SP6, SP8	34.0	**FP1** --- **SP5**, SP7	18.0
Salt Marsh	Grasslands of *Spartina spp.*					
Marshes and Grasslands	Cultivated Fields and Freshwater Wetlands (cattails, willows, alders, WC, WD)					
Wetlands	WC1, WC2, WC4, WC5, WC6, WC7, WD1, WD2, WD3, WD4, WD5, WD6, WD7, WD8, CE1					

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 the Annapolis Valley Ecodistrict is 27 to 28 (Appendix 12a and 12b), indicating a significant level of disturbance. The EEI is highest, or more natural, in the Floodplain element with an EEI of 44 to 48, and lowest in the Marshes and Grasslands element at 7.

The main reason for the low EEI ranges is that 53,100 hectares, or more than half of the area, has been converted to non-forest uses. As well, the ecodistrict only has 173 hectares in the reserve class. The areas for the other categories are: extensive, 29,095 hectares; intensive, 5,165 hectares; and unclassified, 3,534 hectares.

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

Road Index (Appendices 6, 7; Map 5)

The GIS-based “Road Index” provides a standard assessment and mapping of road distributions across ecodistricts to assist planners to objectively explore options for managing road networks

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

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

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

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

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

Map 5 illustrates the distribution of road density classes in the ecodistrict.

The majority of the ecodistrict – 58% – is in the Agriculture & Suburban class (Appendix 7, Table 2) which, as the name implies, are areas dominated by suburban settlement and agriculture.

Remote areas with few roads are important for biodiversity conservation. Less than 1% of the ecodistrict is considered to be remote (Appendix 7, Table 2). Each of these areas is generally small and would not provide much interior habitat.

One of the highest RI values is in the Valley Corridors element, which at 55 is more than double the overall RI of 24 (Appendix 7, Table 3). Since corridor areas are important for biodiversity conservation, an abundance of roads in them is likely detrimental to ecological functioning.

Since so many roads have been established in the ecodistrict, a focus of conservation efforts should be on minimizing their impact. Best management practices should be adhered to in all facets of

construction and maintenance. Possible land purchases could attempt to increase the area of the ecodistrict with a remote character.

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 was obtained from the Atlantic Canada Conservation Data Centre (ACCDC) databases, current to 2013*.

Species at Risk

The term "species at risk" is generally used to describe those species that are, to some extent, protected under provincial or federal endangered species legislation. Usually these species are protected where they occur on provincial, federal, and private lands. In Nova Scotia, the two main pieces of endangered species legislation are the Nova Scotia Endangered Species Act (NSESA) and the federal Species at Risk Act (SARA). Species can be classified as "endangered,"

"threatened," "vulnerable/special concern," or as "extinct" or "extirpated." In most cases for species at risk, recovery planning and special management are in place, as well as legal protection (see http://novascotia.ca/natr/wildlife/biodiversity/at-risk-overview.asp).

Species of Conservation Concern

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

Species Ranking and Coding Systems

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

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

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

As of 2014 in the Annapolis Valley Ecodistrict, there are documented occurrences (under the NSESA) of the following number of formally listed species at risk: five endangered, three threatened, and four vulnerable. In addition to the listed species, the national General Status process also identifies 34 orange-status species, 60 yellow-status species, and 57 green-status species for a total of 151 other species of conservation concern in this district.

Federally, designated species at risk found within the Annapolis Valley Ecodistrict include Atlantic salmon, little brown bat, wood turtle, and several bird species (red knot, chimney swift, red-headed woodpecker, and olive-sided flycatcher).

Other species of conservation concern known for the Annapolis Valley Slope Ecodistrict include striped bass (fish); monarch butterfly (insect); eastern wood-peewee, bobolink, barn swallow, and bank swallow (birds); snapping turtle (reptile); and black ash, Canada frostweed and eastern white cedar (plants).

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).*

The Crown has met its objective on one (rS, eH, wP) of the six species associations. Suitable sites could not be found for the other species associations. Since only 1% of the area of the district is Crown, identification of other old forest sites will likely require the involvement of conservancy agencies and private woodland owners.

Birds

Nationally, chimney swifts and nighthawks are designated threatened by COSEWIC and SARA, while peregrine falcons are listed as species of special concern. There has been a nationwide decline in both chimney swifts and common nighthawks, as well as other aerial insectivores due to declines in insect food species and nesting habitat.

Mammals

The mainland moose has been designated an endangered species under the Nova Scotia Endangered Species Act. Mainland moose are genetically distinct from those on Cape Breton Island, where moose populations are healthy.

One of the remnant populations of moose on the mainland is in southwestern Nova Scotia, in a large area containing most of the Tobeatic Wilderness Area and extending southwest to Pubnico, southeast to Liverpool, and northwest to Digby. This area is considered to be "occupied moose habitat" (an area with recurrent observations of moose over time). However, some moose wander long distances, and they are occasionally observed in ecodistricts outside of this zone. DNR records show that moose have been observed within the Annapolis Valley ecodistrict in Digby area and near to the ecodistrict in other locations.

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

Prior to the introduction of forest harvesting as a disturbance regime, the availability of moose habitat would have historically been tied to natural disturbances. The natural disturbance regimes for this ecodistrict have been determined to be mainly gap and infrequent disturbance. Essentially, this would have meant a lesser availability of early successional hardwoods than in ecodistricts with frequent disturbance where fire would have played a major role in altering forest composition. It would be expected that the best moose habitat would have been patchy and not extensive in size.

The availability of suitable habitat for mainland moose is crucial in maintaining its future presence, and timber harvesting practices currently play a role in creating changes in the forest landscape. This change is important in providing food for moose, such as the succulent twigs, stems, and foliage of young deciduous trees and shrubs. Secluded wetland areas with an abundance of emergent vegetation are used for both feeding and cooling during the summer.

The occurrence of moose in the Annapolis Valley will likely continue to be in the form of occasional sightings of transient animals as opposed to moose occupying breeding habitat. Considering existing land use practices, the landscape here tends to be more attractive to white-tailed deer than to moose. Furthermore, moose mortality from brainworm is believed to be a limiting factor for moose in areas where they overlap strongly with deer.

The American marten is a species in the weasel family that is believed to be undergoing population recovery in southwestern Nova Scotia. They were once more widespread throughout the province but had declined to a few scattered populations by 1900. Reintroduction efforts have taken place in recent decades. DNR records show a single marten was trapped near Bridgetown in 1996.

Although historically described as a species of mature softwood, there is evidence that marten are also using mixedwood forests and younger aged softwood stands, possibly related to the relatively moderate winter weather in this part of the province. Food in the way of mice, voles, and red squirrels would be available in these stands, but denning requirements may have to be met within mature softwood stands. Some of the existing forest stands in the Annapolis Valley have the capability to provide at least some of their habitat needs, but with so much forest fragmentation, American marten are unlikely to become established here.

The southern flying squirrel is a disjunctive species in Nova Scotia, geographically separated from other squirrel populations to the south. This species requires mature hardwoods for the production of mast for food and for denning opportunities. This species has been found in the northeastern end of the ecodistrict, in stands containing tolerant hardwoods along the Gaspereau River.

Fish

Human influences have caused a decline in brook trout populations in Nova Scotia and, as a result, this species has been given a yellow status. Numerous watercourses and branching tributaries on the valley floor provide considerable habitat for brook trout.

Anadromous fish species considered to be at risk or of conservation concern have been reported to occur in watercourses within the Annapolis Valley.

The Atlantic salmon has historically utilized rivers in this ecosection for spawning but is presently in decline, and are considered to be extirpated from most rivers in the southwest. Salmon, which have traditionally utilized Nova Scotia rivers for spawning, are divided into several populations.

Survey data over roughly the last decade shows salmon found in tributaries of the Gaspereau River and the Annapolis River, as well as in Moose River, Bear River, and Acacia Brook, which flow directly into the Annapolis Basin. Those salmon occurring on the Gaspereau River would be

considered part of the inner Bay of Fundy population; the remainder would be part of the outer Bay of Fundy population.

The other anadromous species of note are striped bass, Atlantic sturgeon, and gaspereau.

Reptiles

Wood turtles have been found in the Annapolis River and some of its tributaries likely occur in the Cornwallis system as well. These turtles are uncommon province-wide, particularly so in southwestern Nova Scotia.

Insects

Included in the list of species considered to be of conservation concern in the ecodistrict is the monarch butterfly.

Plants

Plant species of conservation concern include black ash, Canada frostweed, and eastern white cedar.

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

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

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

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

Table 9 – Elements, Ecosections, Disturbance Regimes andClimax Types			
610 Annapolis Valley Ecodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Spruce Hemlock Pine Hummocks and Hills (Patch)	WFHO WMHO WMKK WMSM	Infrequent	red Spruce (rS), eastern Hemlock (eH), white Pine (wP)
Pine Oak Flats (Patch)	ICSM WCSM	Frequent	red Oak (rO), wP, black Spruce (bS)
Pine Oak Hills and Hummocks (Patch)	ICHO WCHO	Frequent	rO, wP, bS
Red and Black Spruce Hummocks (Patch)	IFHO IMHO	Infrequent	rS, bS
Marshes and Grasslands (Patch)	DKLD	Open Seral (Frequent)	N/A
Spruce Pine Flats (Patch)	IFSM	Frequent	bS, wP
Floodplain (Patch)	IMSM	Gap	American Elm (aE), sugar Maple (sM), white Ash (wA)
Wetlands (Patch)	WTLD	Open Seral (Frequent)	bS, red Maple (rM)
Salt Marsh (Patch)	XXMS	Open Seral (Frequent)	*Spartina spp.* (cordgrass)
Tolerant Hardwood Hills (Patch)	WFSM	Gap	sM, yellow Birch (yB), Beech (Be)
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 TopographicPattern

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

The Annapolis Valley Ecodistrict contains four ecosections that are rare at the ecodistrict level: ICHO, WFSM, WMKK, and WTLD. ICHO and WFSM are also rare at the ecoregional level. WMSM is rare at the ecoregional level. WMSM is 76% and 75% converted at the ecodistrict and ecoregional level, respectively. Twelve of the 15 ecosections are more than 50% converted.

The American elm-sugar maple-white ash species association is a climax species on only 3% of the ecodistrict and 4% of the ecoregion. Examples of this community type are currently difficult to find. Tolerant hardwoods (sugar maple-yellow birch-beech) are climax on 4% of the ecodistrict and 5% of the ecoregion.

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

- Conservation of species that are threatened as indicated by DNR's General Status of Species-those yellow and red listed; conservation of significant habitats.
- Attempts to restore where feasible the climax communities in locations where they have dramatically decreased (e.g. elm-sugar maple-white ash tolerant hardwoods on abandoned agricultural land).
- Identification and mapping of sites of cultural importance.
- Development of extension programs to inform and educate those who have an impact on rare, uncommon, threatened species, sites, and habitats.

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.

Appendix 5 provides a breakdown of the type and area within the ecodistrict that are held either in legal or policy reserves.

The legal reserves are mostly national historic sites and parks (Port Royal, Fort Anne, Grand Pré, Abraham Gesner, Bloody Creek, and New England Planters).

Policy reserves comprise largely national wildlife sanctuaries (Boot Island) and designated provincial parks (Upper Clements, Clairmont, and a small portion of Blomidon).

Representation is lacking in the ecodistrict. Nearly all ecosections have 0.2% or less of their area in the reserve category (Appendix 4) with the highest being salt marsh (XXMS) where 0.7% of its area is under reserve.

Since only 1% of the ecodistrict is Crown owned, opportunities to increase representation will have to come from involvement of private owners or land purchases.

Each ecosection requires more representation as do the climax community types of elm-sugar maple-ash and sugar maple-yellow birch-beech.

ELA Summary

Element Interpretation (All appendices and maps)

The Annapolis Valley Ecodistrict is bounded by the south-facing slopes of the North Mountain and the north facing slopes of the South Mountain. It is about 130 kilometres long and varies in width from 3 to 11 kilometres. The small adjacent Gaspereau Valley has been included in this ecodistrict.

The shelter provided by the North and South mountains allows the Annapolis Valley to have early springs and hot summers, making it one of Nova Scotia's most productive agricultural areas.

The valley is underlain by Triassic era sedimentary deposits which have provided the parent material for the sandy soils found in the ecodistrict. The valley is drained by two rivers: the Annapolis River flows southwest to the Annapolis Basin and the Cornwallis River flows northeast to the Minas Basin. The headwaters of both rivers are the large peat land, Caribou Bog, near Berwick.

The high tides of the Bay of Fundy affect both basins and have formed extensive areas of tidal salt marsh. Most of this marshland, which is now protected from the salt water by a system of dykes, is used for agriculture. The dykes were originally built by the early French settlers in the 1600s. These dyke lands have fine-textured soils derived from marine silt. Aside from a few small ponds, fresh water on the valley floor is limited to streams and rivers and occupies only 2% of the ecodistrict.

The rapid to well-drained sandy soils on the valley floor are prone to drought and support pure stands of white pine, red pine, and red oak, or mixtures of all three of these species. Earlier successional stages include red maple, white and grey birch, red oak, and poplar. The alluvial soils along the major rivers once supported a riparian hardwood forest of elm, black cherry, and black ash.

There are still a few locations where cedar is found and it was probably more common at one time. Red spruce and hemlock grow on the lower and toe slopes of the two mountains and extend into the valley on the fresh-moist sites.

In many locales, the valley floor is not flat but comprises small hills and hummocks where the soil is not excessively sandy. These sites will support tolerant hardwoods on the upper slopes and red spruce, hemlock, and pine on the lower or shaded slopes.

Black spruce and larch grow on the wetter sites with scattered red pine. Throughout the valley on the better-drained soils, sugar maple, yellow birch, beech, and ironwood will be found but they rarely form pure hardwood associations, occurring instead with white pine, hemlock, and red spruce.

Natural disturbance agents in the ecodistrict are primarily associated with hurricanes and windstorms on the medium to fine-textured soils. Where soils are sandy, coarse and dry, fires have been associated with the pine and oak forests that have resulted.

Insect defoliation has not been a significant factor in forest disturbance although forest tent caterpillars have defoliated aspen stands in the past. The loss of American elm on the floodplain forests due to Dutch elm disease has impacted these ecosystems.

Spruce Hemlock Pine Hummocks and Hills

(Patch) (WFHO, WMHO, WMKK and WMSM ecosections) (29,258 ha)

This element, the largest of the patch elements, is distributed throughout the ecodistrict but is most often located along the ecodistrict's northern and southern boundaries, where it borders the North Mountain and Valley Slope ecodistricts.

Many small streams originating on higher land flow from the north and south into this element. Wetlands, most often in the form of meadows, are sometimes associated with these streams.

A report in the early 1900s depicted a landscape dominated by agriculture use. At that time, some of the larger scattered forested areas were located around Northville and Atlanta.

The pre-European forest had a tolerant softwood climax of red spruce-white pine-eastern hemlock.

This patch element is still largely agricultural (element is 65% converted) land dominated by orchards, hay, and grain fields with some pasture land. The small areas of forest interspersed through this element comprise softwood (35%), mixedwood (36%), and hardwood (28%) covertypes and has its largest area in early seral species.

The softwood is predominately white spruce with some red or black spruce, balsam fir, and sporadic occurrences of white pine and eastern hemlock; mixedwoods featuring a high component of intolerant hardwoods (poplar, birch, and red maple) with white spruce, balsam fir, and red spruce; and hardwoods that are primarily the intolerant white birch, red maple, and poplar, although ironwood or white ash occur to a minor extent.

Because of the high rate of conversion, there are only a few larger areas of forest and so the area is fragmented and lacking in interior forest habitat. Of the ecosections comprising this element WMKK (1101.2 ha) is considered uncommon as it makes up only 1.2% of the ecodistrict and 2.5%

of the ecoregion and ecosection respectively. WMSM is also uncommon as it is 76% converted and not common in the ecoregion (1.6% of the ecoregion).

Representation is lacking. Ecosections WFHO, WMKK, and WMSM have no representation while WMHO has only marginal representation (37 ha).

Connectivity among patches of this element is of concern, particularly where connectivity is required between patches located on opposite sides (north and south) of the ecodistrict; areas of intervening habitat have been extensively converted. Between forested areas, connectivity is also of concern. Approximately 12% of the seral stage of the element is not classified.

Flows

People (agriculture, urban, recreation, forest harvesting); deer (habitat); red-tailed hawk (perch trees, hunting grounds); bear (agricultural food source); water (small streams); anadromous fish; beaver (damming of feeder streams, food source, use of drainage ditches).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)

Composition of Spruce Hemlock Pine Hummocks and Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	16%	9%	75% (44 Mat + 31 OF)	31%
Seral Stage	Early	Mid	Late	Unclassified
	57%	20%	11%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	35%	28%	36%	1%

Desired Condition

Currently a much-converted (approximately 65%) element. A desired increase in the area of forested element encouraging forested connective links among areas, particularly those with primarily mature, mid, and late seral species. Late seral species being tolerant softwoods. Some representation of younger development classes. Multi-aged and old growth areas occurring on the landscape.

Issues

- low amount of climax species
- fragmentation and connectivity
- amount of interior forest habitat
- uncommon ecosections
- representivity
- lack of old forest

Pine Oak Flats

(Patch) (ICSM and WCSM ecosections) (20,155 ha)

The climax forest of this element, one of the larger in the ecodistrict, featured several species associations delineated from one another on the basis of soil moisture.

The driest areas supported white pine and red oak developed from the gradual process of barren and heathlands reverting to forest. Well-drained areas were characterized by tolerant mixedwoods.

Wet areas by wetlands (often swamps adjacent to streams) often comprise black spruce, alders, red maple and cedar. Floodplains of the Annapolis and Cornwallis Rivers featured a tolerant sugar maple-ash-elm species association.

The present day forest, fractured by agricultural land, is mostly mature or multi-aged with similar amounts of mixedwoods (39%) and hardwoods (35%) and lesser amounts of softwoods (25%).

Late seral species, such as red or black spruce and pine, are the most visible components of the softwood covertype. The mixedwoods and hardwoods are more commonly early or mid seral types with red maple, white birch, gray birch, and poplar as the hardwoods, and the spruces and balsam fir making up the softwoods.

Tributaries of the Annapolis and Cornwallis rivers are abundant throughout the element, as are associated streamside wetlands. In 1912, almost the total element with the exception of wetlands was developed for agriculture. Agriculture is still an important use with 59% of the element being converted.

Although there are forested areas within the various areas of this element, they are generally small and the amount of interior forest habitat would be lacking. Some of the larger forested areas within patches are at Centreville, Aylesford, Middleton, and Lawrencetown.

From a connectivity perspective, this patch element is important because in the eastern part of the ecosection it runs in an east-west direction splitting the ecodistrict and influencing the movement of species in a north-south direction. Also, this element houses major river systems and tributaries whose riparian zones may provide important linkages.

Very little land of this element is protected by legal means or through policy. Ecosection WCSM has 0.5 hectares in reserve and ICSM 25.9 hectares in reserve (Appendix 12b) so representivity is of concern. Approximately 12,000 hectares have been converted to other uses (Appendix 12a).

No old forest on Crown land has been identified under the Interim Old Forest Policy.

Flows

People (agriculture, development, trapping, fishing); deer (food source); red-tailed hawk (general habitat); bear (browse, thermal refuge in wetlands); water (storage, filtration, and recharge from small wetlands); beaver (habitat).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007) **Composition of Pine Oak Flats**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	5%	5%	90% (55 Mat + 35 OF)	35%
Seral Stage	Early	Mid	Late	Unclassified
	44%	30%	23%	3%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	25%	35%	39%	1%

Desired Condition

A mix of species associations, interspersed among agricultural lands: forested floodplains along the Annapolis and Cornwallis rivers of sugar maple, ash, and elm; dry sandy barren areas and heathlands in various stages of development from essentially non-forested to areas of climax pine and oak; wetland areas of black spruce, larch, maple, alders, cedar, and wetlands; small areas of mature tolerant mixedwoods.

Issues

- little representivity
- connectivity/fragmentation
- converted land
- lack of forested riparian zones on some sections of waterways
- lack of old forest

Pine Oak Hills and Hummocks

(Patch) (ICHO and WCHO ecosections) (12,176 ha)

These well-drained sandy soils located on hummocky ground support a climax of white pine and red oak. Barrens and heathlands would be a common feature of this forest.

Currently, the forest is mostly mature (56%) or multi-aged (30%). Hardwoods, mixedwoods, and softwoods comprise 40%, 34%, and 25%, respectively, of the covertypes. Hardwoods are largely early seral intolerants such as grey birch, white birch, red maple, and some later seral red oak. Mixedwoods are likely to be the aforementioned hardwoods with pine or black spruce. Softwoods are mostly white pine, black and red spruce, and occasionally red pine.

Most of this element is located in the eastern half of the ecodistrict where it has many waterways flowing through it. Early use of this element by settlers included agriculture, but to a lesser extent than some of the other ecodistrict elements.

Presently, this element is roughly half converted to other uses (Appendix 12a). While the area is somewhat fragmented and lacking in larger patch size for interior forest-dwelling species, the occasional large block is present – a good example being at Nictaux East.

The ecosections comprising this element – WCHO and ICHO – contain no or little representation (Appendix 4). ICHO occupies only 1.4 % of the ecodistrict and 1.6% of the ecoregion; it is considered a rare ecosection (Appendix 3, Table 2). No old forest was identified under the Interim Old Forest Policy. Approximately 5% of the element has not yet been classified.

Flows

People (agriculture, sand pits, ATV, development); deer (browse, cover); red-tailed hawk (hunting, nesting); bear (food - blueberries, blackberries, acorns).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)
Composition of Pine Oak Hills and Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	9%	5%	86% (56 Mat + 30 OF)	30%
Seral Stage	Early	Mid	Late	Unclassified
	40%	33%	22%	5%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	25%	40%	34%	1%

Desired Condition

A mix of successional stages – early stages characterized by heathlands and barrens and later stages characterized with heathlands and barrens reverting to forest (red oak, red pine, jack pine) and the largest component of the landscape: mature/multi-aged white pine-red oak. Some inclusions comprise black spruce on wetter ground. All intermingled with agriculture land.

Issues

- little representivity
- lacking in large patch size
- riparian zone practices
- connectivity/fragmentation
- low amount of late seral species
- high amount of intolerant hardwood
- lack of old forest

Red and Black Spruce Hummocks
(Patch) (IFHO and IMHO ecosections) (11,811 ha)

This element of fine-textured (clay) soils can be found in larger areas on hummocky ground primarily in the western half of the ecodistrict. Larger areas are west of Bridgetown, near Lawrencetown and at Wilmot.

The climax species in the area is a tolerant softwood association of red spruce-eastern hemlock-white pine with inclusions of black spruce.

In the early 1900s, most of the element was used for agriculture. Currently, about 50% of the element is converted to other uses.

The forest in this element is mainly mature (41%) or multi-aged (32%) and comprising softwood (29%), mixedwood (36%), and hardwood (34%). Intolerant hardwoods are prominent in the hardwood covertype as well as being the hardwood component of the mixedwoods.

White birch, poplar, and red maple are common species in these covertypes. The softwood covertype is mostly the early seral white spruce on abandoned farmland. Some red and black spruce can be found – these species also occur in mixedwoods.

IFHO and IMHO – the ecosections making up this element – are 65% and 26% converted (Appendix 12b). IMHO is one of the least converted ecosections in the ecodistrict. There appears to be larger areas of non-converted land around Paradise and Beaconsfield with opportunities of increasing size. Neither IFHO nor IMHO can be considered uncommon ecosections within the ecodistrict. IMHO is present on 8.6% of the ecoregion (Appendix 3, Table 2).

Representivity is an issue as 5.4 hectares of IMHO is in reserve (Appendix 12b) and IFHO has no area in this category. The element is traversed by a number of streams so management or the riparian zone is very important. Approximately 12% of the seral stage of the element is unclassified.

Flows

People (agriculture - pasture and hay, fishing, trapping; deer (in wetter areas cover, in early development stages browse, cover in later development stages); red-tailed hawk (similar to largest patch); bear (wetter areas thermal refuge, food and cover); water (meandering streams, lack of treed riparian zone).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)

Composition of Red and Black Spruce Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	17%	10%	73% (41 Mat + 32 OF)	32%
Seral Stage	Early	Mid	Late	Unclassified
	53%	22%	13%	12%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	29%	34%	36%	1%

Desired Condition

Late seral-dominated softwood stands and softwood-dominated mixedwoods with a variety of development classes and seral stages. Some old growth present. Inclusions of black spruce.

Issues

- amount of early seral species
- low amount of tolerant softwoods
- representivity
- amount of converted area
- lack of old forest

Marshes and Grasslands
(Patch) (DKLD ecosection) (5,099 ha)

The first dykes in Nova Scotia were built by Acadians near Annapolis Royal in the 1630s.

Dykes stop the flow of salt water over areas that were formerly salt marsh. A system of ditches on the inland side of the dyke enhances drainage of the dyked areas. Dyked areas are some of the province's most fertile agriculture areas for growing hay, pasture, corn, and grains.

The two concentrated areas of dykes in the ecodistrict occur at the western end on salt marshes along the Annapolis River and in the eastern end along the Habitant, Canard, Cornwallis, and Gaspereau rivers. Much of the Annapolis River dykeland is reverting to shrubland.

Salt marshes are important areas in the food chain of coastal ecosystems and important wildlife habitat for a variety of species. Conversion to agriculture land has resulted in a loss of biodiversity.

Flows

People (agriculture, recreation - walking, hiking, hunting, waterfowl); deer (seasonal food); red-tailed hawk (hunting territory); fish (impediment to movement)

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)
Composition of Marshes and Grasslands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	4%	9%	87% (51 Mat + 36 OF)	36%
Seral Stage	Early	Mid	Late	Unclassified
	48%	39%	9%	4%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	14%	46%	38%	2%

Desired Condition

That this element is not converted to other uses.

Issues

- amount of converted land
- salt marsh restoration

Spruce Pine Flats
(Patch) (IFSM ecosection) (3,868 ha)

This element contains imperfectly drained clay soils or flat terrain. Historically, a black spruce forest was the climax species.

The softwood covertype now makes up 29% of the area and comprises black spruce with red spruce on some of the better-drained areas, white spruce on abandoned farmland, and some white pine. Mixedwoods (33%) and hardwoods (38%) are dominated by the intolerant white birch, red maple, and aspen. The mixedwoods also contain black and red spruce.

This element is 61% converted.

Numerous streams and associated wetlands traverse this element emphasizing the need for riparian zone management. Only 0.4 hectares of the IFSM ecosection within this patch element has representation within the reserve area (Appendix 4).

Flows

People (agriculture, recreation - fishing, trapping); deer (browse, cover); red-tailed hawk (perches, hunting); bear (agriculture, food source); water (meandering streams, lack of treed riparian zone); beaver (better habitat - slow moving streams).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)

Composition of Spruce Pine Flats

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	13%	7%	80% (39 Mat + 41 OF)	41%
Seral Stage	Early	Mid	Late	Unclassified
	60%	18%	14%	8%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	29%	38%	33%	<1%

Desired Condition

A late seral softwood-dominated covertype of black spruce in a variety of sizes, seral stages, and development classes. Better-drained areas supporting tolerant softwoods.

Issues

- low amount of climax softwoods
- high amount of intolerant hardwood
- representivity
- lack of old forest

Floodplain
(Patch) (IMSM ecosection) (2,716 ha)

This riparian-like floodplain element is found on imperfectly drained, loamy soils along or close to some of the ecodistrict waterways. The element is most prevalent in the eastern end of the ecodistrict with larger areas around Berwick North, Factorydale, Cambridge Station, and Lakeville. Some long, linear type sections of the element occur along the Cornwallis River.

Historically, the area supported a white ash-sugar maple-elm community. Today mixedwoods are dominant (40%), followed by hardwoods (32%), and softwoods (25%). Covertypes are mostly mature or multi-aged. The intolerant hardwoods are very prominent in both the mixedwood and hardwood covertypes. Red and black spruce are the most common softwoods.

The climax species association of white ash, sugar maple, and elm is rare.

Wetlands are a common feature of some of this element, which is 32% converted and has no representivity. Approximately 10% of the area is unclassified.

Flows

People (agriculture, fishing); deer (food); red-tailed hawk (general habitat); bear (browse from herbaceous vegetation); water (wetlands - water storage, filtration, groundwater recharge).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)
Composition of Floodplain

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	12%	10%	78% (46 Mat + 32 OF)	32%
Seral Stage	Early	Mid	Late	Unclassified
	38%	34%	18%	10%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	25%	32%	40%	3%

Desired Condition

Predominately mature hardwood stands with a sustained community of white ash, sugar maple, and elm. Inclusions of wetlands.

Issues

- amount of converted area in riparian zones
- limited occurrence of climax species
- land use practices
- representivity
- lack of old forest

Wetlands
(Patch) (WTLD ecosection) (847 ha)

Wetlands occur in only a few locations and make up only about 1% of the ecodistrict.

The largest wetland complex is located at Caribou Lake, west of Berwick.

Looking at the landscape at a smaller scale, a large number of smaller wetlands are scattered throughout the ecodistrict.

Wetlands play an important role in water collection, flood control, filtering, and groundwater recharge. Wetlands and the land immediately adjacent are biodiversity hotspots. Because of their ecological importance and relative rarity in the ecodistrict, it is important that land use practices do not impact the wetlands and adjoining riparian corridor.

About 53% of the element has been converted (Appendix 12a).

The wetland ecosection is essentially uncommon at the ecodistrict and ecoregion level (1% and 2% respectively).

There is no representivity of the wetland ecosection under either policy or legal reserve.

At the smaller scale, across the landscape, many wetlands are threatened by land use practices (agricultural, development) adjacent to them.

Rare plants have been identified in some wetlands.

Flows

People (peat extraction); deer (wooded swamps habitat, food source); water (filtration, storage, groundwater recharge); fish (habitat in waterways).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007) **Composition of Wetlands**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	7%	16%	77% (49 Mat + 28 OF)	28%
Seral Stage	Early	Mid	Late	Unclassified
	64%	18%	17%	1%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	19%	59%	22%	0%

Desired Condition

A series of wetlands interconnected to hydrological systems. Low impact land use practices adjacent to wetlands.

Issues

- amount of wetland converted
- adjacent land use practices
- uncommon ecosection
- no representivity

Salt Marsh

(Patch) (XXMS ecosection) (610 ha)

Prior to European settlement, large areas of salt marsh occurred at the western end of the ecodistrict on the Annapolis River, the eastern end on the Habitant, Canard, and Gaspereau rivers and at Grand Pré.

As a result of dyking for agricultural purposes, only a few salt marshes remain, primarily along the ecodistrict's eastern boundary, close to the mouths of the aforementioned rivers and at Boot Island National Wildlife Area. Salt marshes along the Annapolis River were almost all converted to dykeland with the only salt marshes remaining near Annapolis Royal.

Of the salt marshes currently remaining, 276 hectares have been converted to other uses. Only 6.8 hectares are listed as Crown reserve lands, with a total of 15 hectares under the reserve category. The element makes up about 1% of the ecodistrict.

Flows

People (hunting, water fowl, trapping); deer (food); water (salt marsh and fresh water mixing, nutrient input to salt marsh); fish (nursing area, feeding in intertidal zone).

Composition

Annapolis Valley Ecodistrict 610 (based on statistics up to 2007) **Composition of Salt Marsh**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	9%	6%	85% (71 Mat + 14 OF)	14%
Seral Stage	Early	Mid	Late	Unclassified
	13%	69%	9%	9%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	0%	42%	58%	0%

Desired Condition

Naturally functioning salt marshes. No development or land use practices.

Issues

- representivity
- converted area
- uncommon ecosection

Tolerant Hardwood Hills

(Patch) (WFSM ecosection) (462 ha)

These well-drained clay soils are found on flat terrain in areas around Moschelle, Tupperville, and Morristown.

As the smallest in size of the elements, Tolerant Hardwood Hills is 72% converted (Appendix 12a).

The inherent climax forest was mostly the tolerant sugar maple-yellow birch and beech with some wetlands and black spruce.

Currently, the forest is two-thirds mature. Early seral species make up 56% of the area.

The softwood covertype component (26%) comprises white pine, red and black spruce, white spruce, and balsam fir. Mixedwoods (35%) have a lot of intolerant hardwoods sometimes mixed with the above mentioned softwoods. The hardwood covertype (39%) is the intolerant white birch, red maple, and aspen.

Ecosection WFSM, which makes up this element, is unique at both the ecodistrict and ecoregional level. In terms of representivity, there is no area in the reserve category.

Flows

People (agriculture, recreation); deer (browse, cover, food); red-tailed hawk (nesting, perch trees); bear (early seral stages food - berries, agriculture forage); water (lack of treed riparian zone); anadromous fish (habitat in feeder streams).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)

Composition of Tolerant Hardwood Hills

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	9%	5%	86% (67 Mat + 19 OF)	19%
Seral Stage	Early	Mid	Late	Unclassified
	56%	24%	14%	6%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	26%	39%	35%	0%

Desired Condition

Primarily mature tolerant hardwood forests of sugar maple-yellow birch-beech scattered among an agricultural landscape. Some inclusions of wetlands and black spruce.

Issues

- amount of converted area
- amount of climax tolerant hardwood
- uncommon ecosection
- representivity
- lack of old forest

Valley Corridors

(Corridor) (Various ecosections) (5,595 ha)

Riparian corridors of varying widths are present along waterways. Approximate locations of corridors along a few of the major rivers (Annapolis, Nictaux, Black, Fales, South, Cornwallis, Canard, Gaspereau, Habitant, and Pereaux) have been delineated (Map 2).

The Annapolis Valley Ecodistrict contains a large number of waterways. The riparian zones around this water are extremely important for biodiversity and ecosystem function. The riparian zone, besides having the impact on ecological functioning of the adjacent waterway, is also a productive habitat itself.

Because of the extensive land use practices along the ecodistrict waterways, forested conditions along many sections of riparian zone do not exist. Considering the corridors from Map 2, about one-third of their area has been converted from forest.

Although winding through a much converted landscape, there appears to generally be a narrow forested strip along the Annapolis River from Paradise to Aylesford and over much of the Cornwallis River.

Forested riparian zones in fragmented landscapes provide important travel corridors for species travelling across the landscape, enhancing connectivity. Land use practices bordering riparian zones are important in maintaining their integrity.

Flows

People (agriculture, fishing); deer (seasonal herbaceous food, travel corridor); red-tailed hawk (hunting territory); bear (seasonal herbaceous food); water (travel corridor for fish, wetlands within important for storage, filtration, groundwater recharge); fish (some salmon-Annapolis, gaspereau, shad, striped bass).

Composition

Annapolis Valley Ecodistrict 610 (based on statisticsup to 2007)

Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	2%	4%	94% (69 Mat + 25 OF)	25%
Seral Stage	Early	Mid	Late	Unclassified
	44%	34%	21%	1%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	18%	47%	35%	0%

Desired Condition

Where possible, continuous forest conditions or undisturbed vegetation emphasizing lower impact land use practices.

Issues

- amount of converted (non-forested corridor)
- land use practices within and adjacent to corridor

Ecosystem Issues and Opportunities (All appendices and maps)

Management of the forest resource in the Annapolis Valley Ecodistrict should focus on forest biodiversity conservation across the range of spatial scales. General principles could include maintenance of connectivity, maintenance of landscape heterogeneity, maintenance of stand structural complexity, and maintenance of the integrity of aquatic systems (Lindenmayer and Franklin 2002). Actions taken toward these principles could consider:

- Managing climax forest communities in relation to the natural disturbance regime (NDR), development class, and seral stage.
- Investigating the possibility of increasing the amount of late seral species in elements where the predicted climax is tolerant species by:
    - implementing partial cuts in intolerant hardwood or mixedwood stands containing a minor tolerant species component. Increased tolerant species regeneration will result
    - consider underplanting of intolerant hardwoods or mixedwoods with tolerant species (red spruce, white pine)
    - plant abandoned agriculture land with tolerant species
    - favouring tolerant species in all thinning treatments (pre-commercial thinning, commercial thinning)
- Benefiting interior wildlife species by increasing patch size, which will have to consider land ownership patterns.
- Recognizing the importance of riparian corridors on all watercourses, both as protectors of aquatic ecosystems and as habitat. Look into maintaining the integrity of corridors through appropriate management practices (type of harvesting, rate of harvesting) both within the corridor and in adjacent areas.
- Protection of existing wetlands and wetland complexes. Ensure wetland integrity is not compromised by resource management activity (harvesting, road construction). Recognize importance of wetland-adjacent land relationships for biodiversity.
- Development of road plans for Crown blocks. Assess impact of road construction on ecological concerns such as fragmentation aquatic ecosystems, sensitive sites, and protected areas. Develop a road maintenance plan to ensure road deterioration does not become a deleterious effect. Encourage sharing of road networks. Consider decommissioning of roads where secondary use (ATV, snowmobiling) of roads is not an issue.
- Seeking opportunities to inform the public about ecosystem management. Since most of the land in the Annapolis Valley is held by largely small private landowners, their participation is necessary for ecosystem management to be implemented.
- Investigating avenues for improving connectivity in the ecodistrict, such as attempting to restore natural communities where connectivity gaps exist. Opportunities may exist to do this along some of the many riparian corridors in the ecodistrict. Isolated spots for improvement could be present along the coast.
- Improving representivity in the ecodistrict by considering additional ecosections WMKK, WMDS, and IMDM for protection.
- Consider maintaining an acceptable balance among the four ecological emphasis classes.

Appendix 1: Flow - Element Interactions

Element	People	Deer	Red-Tailed Hawk	Bear	Water	Anadromous Fish	Beaver
Patches Spruce Hemlock Pine Hummocks and Hills (WMHO, WFHO, WMKK, WMSM)	- agriculture - urban - recreation - hunting, trapping - forest harvesting	- early seral forest establishment phase browse - mid seral summer cover - late seral winter cover - spring/fall food (orchards, hay, corn, early green)	- early development classes habitat for food sources - mature trees for nesting - perch trees-snags in fields and cutover edges - food source year round	- early development classes food (berries etc.) - overwinter in Valley Slope, South Mountain - forage - corn, blueberries, apples - mostly on south side of ecodistrict	- Brook Trout - lack of treed riparian zone (higher water temperature)	- feeder streams	- dam feeder streams - early vegetation type food source (aspen)
Pine Oak Flats (WCSM, ICSM)	- agriculture - development - trapping, fishing	- herbaceous food in summer - possible acorn crop	- general habitat (feeding, perching, nesting)	- browse from herbaceous vegetation - wetter areas thermal refuge	- lower water quality from nutrient dumping - higher water temperature in agricultural areas - storage, filtration, recharge from wetlands	----------	- habitat
Pine Oak Hills and Hummocks (WCHO, ICHO)	- agriculture - recreation (ATV use) - sand pits - development	- browse and cover	- regenerating areas important as hunting areas - mature areas used as nesting sites	- food, regenerating areas provide food source (blueberries, blackberries) - oak-acorns	----------	----------	----------

Appendix 1: Flow - Element Interactions

Element	People	Deer	Red-Tailed Hawk	Bear	Water	Anadromous Fish	Beaver
Red and Black Spruce Hummocks (IFHO, IMHO)	- agriculture (more pasture and hay) - recreation use (fishing and trapping)	- wetter areas in the western end of ecodistrict used as cover - early development stages provide browse - cover in later development stages	- same as matrix	- wetter areas to some extent thermal refuge - other successional stages provide food and cover	- higher water table - meandering streams - lack of treed riparian zone (higher water temperature) - altered water quality	- some, not as productive streams	----------
Marshes and Grasslands (DKLD)	- agriculture - recreation (walking, hiking) - hunting waterfowl	- seasonal food	- hunting territory	----------	----------	- impediment to movement	----------
Spruce Pine Flats (IFSM)	- agriculture - recreation (fishing and trapping)	- browse, cover	- perches, hunting	- food source	- higher water table - meandering streams - lack of treed riparian zone (higher water temperature) - altered water quality	- some, not as productive streams	- more beaver, slower moving streams
Floodplain (IMSM)	- agriculture - fishing	- herbaceous food in summer in riparian areas	- general habitat	- browse from herbaceous vegetation	- boating - wetlands for water storage, filtration, and groundwater recharge	- populations in rivers	----------
Wetlands (WTLD)	- peat extraction	----------	- hunting territory	----------	- filtration, storage, groundwater recharge	- habitat in waterways	----------

Appendix 1: Flow - Element Interactions

Element	People	Deer	Red-Tailed Hawk	Bear	Water	Anadromous Fish	Beaver
Salt Marsh	- hunting waterfowl, trapping	- food	----------	----------	- salt water/fresh water mixing - nutrient inputto salt marsh	- nursing area - feeding in intertidal area	----------
Tolerant Hardwood Hills (WFSM)	- agriculture - recreation	- early seral forest establishment phase - browse - late seral winter cover	- early development classes habitat for food source - mature trees-nesting - perch trees-snags in cutover and field edges	- early development classes food (berries etc.) – overwinter in Valley Slope, South Mountain - forage - corn, blueberries, apples - mostly on south side of ecodistrict	- brook trout - lack of treed riparian zone (higher water temperature)	- feeder streams	----------
Corridor Valley Corridors	- agriculture - hunting, fishing	- seasonal herbaceous food - travel corridors	- hunting territory	- seasonal herbaceous food	- travel corridors for fish - wetlands within important for storage, filtration, groundwater recharge	- salmon (Annapolis) gaspereau, shad, striped bass	----------

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Spruce Hemlock Pine Hummocks and Hills	Patch	High	WMHO WFHO WMKK WMSM	Landscape	Infrequent	- climax community tolerant softwood - current community dominated by mature early seral species	- Red and Black Spruce Hummocks - Pine Oak Hills and Hummocks - Pine Oak Flats - neighbouring ecodistricts (North Mountain, South Mountain)	- little late seral mature forest (Old Growth) - fragmentation > 60% converted - minimal large patch size (interior habitat) - loss of wetland habitat - destruction of riparian habitat - water quality alteration	- harvesting practices - conversion to farmland, urban areas - see above - infilling of wetlands - agriculture, urbanization - agriculture practices	- public education regarding harvesting - reclaim any abandoned farmland - strategic acquisition of lands by government and conservation groups - patch aggregation through harvesting or land acquisition - education and enforcement - education - encourage use of restored riparian zone as connector - legislation education
Pine Oak Flats	Patch	High	WCSM, ICSM	Landscape	Frequent	- climax white pine-red oak, tolerant mixedwoods, white ash-sugar maple-elm, black spruce, willows, alders, wetlands - currently farmland, intolerant hardwood, intolerant mixedwood pine, black spruce	----------	- similar to Spruce Hemlock Pine Hummocks and Hills	- similar to Well-drained, Tolerant Softwood Hills, Hummocks and Flats	- similar to Well-drained, Tolerant Softwood Hills, Hummocks and Flats

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
Pine Oak Hills and Hummocks	Patch	High	WCHO, ICHO	Landscape	Frequent	Climax-red oak, white pine, some black spruce - currently converted (50%) to farmland, intolerant hardwood, intolerant mixedwood pine, black spruce	- most elements	- fragmentation (in some cases entire patch converted) - lack of interior patch condition - lack of connection between patches	- land conversion - land use practices - land conversion in intervening land between some patches	- restoration land purchase where possible - encourage conservation of existing intact patches - patch aggregation - encourage restoration of some riparian corridors as connectors
Red and Black Spruce Hummocks	Patch	Moderate	IFHO, IMHO	Landscape	Infrequent	- climax community tolerant softwoods and black spruce - current community white spruce mixedwood and intolerant hardwoods	- Pine Oak Flats	- late seral stage lacking - fragmentation > 40% converted - in some locations potentially important connector between North and South Mountain ecodistricts - patch size - connectivity among patches	- harvesting practices - conversion to farmland - see above - land conversion	- education - reclamation, strategic land acquisition - increase patch size by patch aggregation (harvesting, land acquisition) - reclamation strategic land acquisition

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Valley Corridors	Corridor	High	- Annapolis system - Cornwallis system - Gaspereau	Landscape	----------	- farmland - variable plant communities dependent on soil drainage - white spruce, red maple, ash, black spruce, red spruce	- most elements	- land conversion - species change in corridor - dams on tributaries - bank stabilization (Cornwallis in Kentville)	- agriculture practices - pollution - fish movement - accumulation of heavy metals	- expand Special Management Zone regulation to agriculture - riparian restoration - stewardship education - possible zoning by municipalities
Grasses and Marshlands	Patch	Low	- St. Marys Bay - Annapolis Basin - Annapolis River Minas Basin - Grand Pre - Cornwallis River - Habitant River - Canard River	Local	----------	- hayfields, pasture	- Salt Marsh - Red and Black Spruce Hummocks	- man made landscape	- conversion of salt marsh	- possible restoration

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Spruce Pine Flats	Patch	Moderate	IFSM	Local	Frequent	Climax-black spruce, tolerant softwood, wetlands	----------	- fragmentation (in some casesan entire patch converted) - lack of interior forest condition - lack of connectivity between patches - lack of natural riparian zone in many waterways	- land conversion - land use practices - land conversion in intervening patches - water quality lack of riparian habitat	- restoration, land purchase where possible - patch aggregation - use of restored riparian zone as connective pathway
Floodplain	Patch	----------	IMSM	Local	Gap	- climax-ash, sugar maple-elm, black spruce, wetlands - currently intolerant hardwoods and mixedwoods, black spruce	----------	----------	----------	----------
Wetlands	Patch	High (often headwaters)	- WTLD - peat bogs at Berwick, Aylesford	Local	----------	- larger wetlands bogs-ericaceous species, sphagnum - other smaller wetlands, meadow, shrub swamp, flooded flats	- Pine Oak Flats - Spruce Pine Flats - Pine Oak Hills and Hummocks	- alteration of surface vegetation - infilling of small wetlands - disturbance of riparian zone around wetlands	- peat harvesting - land conversion	- ensure undisturbed areas left - education enforcement

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Salt Marsh	Patch	High functionally	- Minas Basin - Annapolis Basin - St. Marys Bay	Local	----------	Salt tolerant plants (e.g. cord grass, sea lavender)	- Marshes and Grasslands - ocean	- dykes	- alteration of marshland - effect of climate change on sea level - road construction practices (culvert)	- restoration of flow patterns
Tolerant Hardwood Hills	Patch	Low	WFSM (Morristown)	Local	Gap	- climax tolerant hardwoods - currently >70% converted (farmland) - intolerant hardwood, pine, white spruce	- neighbouring ecodistrict - Pine Oak Hills and Hummocks - Spruce Hemlock Pine Hummocks and Hills - Marshes and Grasslands	- fragmentation - lack of interior forest conditions	land use	- if applicable, restoration - patch aggregation

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 usingstrategies 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 keypatch 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 neighbouringecosystems 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 610)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS				
Red Knot rufa ssp	*Calidris canutus rufa*	Endangered	N/A	Endangered
Chimney Swift	*Chaetura pelagica*	Endangered	Threatened	Threatened
Olive-sided Flycatcher	*Contopus cooperi*	Threatened	Threatened	Threatened
Eastern Wood-Pewee	*Contopus virens*	Vulnerable	N/A	Special Concern
Bobolink	*Dolichonyx oryzivorus*	Vulnerable	N/A	Threatened
Barn Swallow	*Hirundo rustica*	Endangered	N/A	Threatened
Red-headed Woodpecker	*Melanerpes erythrocephalus*	N/A	Threatened	Threatened
Bank Swallow	*Riparia riparia*	N/A	N/A	Threatened
DICOTS				
Black Ash	*Fraxinus nigra*	Threatened	N/A	N/A
Long-branched Frostweed	*Helianthemum canadense*	Endangered	N/A	N/A
FISH				
American Eel	*Anguilla rostrata*	N/A	N/A	Threatened
Striped Bass- Bay of Fundy pop.	*Morone saxatilis pop. 2*	N/A	N/A	Endangered
Atlantic Salmon - Inner Bay of Fundy 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
MAMMALS				
American Marten	*Martes americana*	Endangered	N/A	N/A
REPTILES				
Snapping Turtle	*Chelydra serpentina*	Vulnerable	Special Concern	Special Concern
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 610)

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	-		
Spotted Sandpiper	*Actitis macularius*	Sensitive (Yellow)	S3S4B
Northern Shoveler	*Anas clypeata*	May Be At Risk (Orange)	S2B
Blue-winged Teal	*Anas discors*	May Be At Risk (Orange)	S3B
Gadwall	*Anas strepera*	May Be At Risk (Orange)	S2B
Brant	*Branta bernicla*	Sensitive (Yellow)	S3M
Common Goldeneye	*Bucephala clangula*	Secure (Green)	S2B,S5N
Least Sandpiper	*Calidris minutilla*	Secure (Green)	S1B,S5M
Semipalmated Sandpiper	*Calidris pusilla*	Sensitive (Yellow)	S3M
Northern Cardinal	*Cardinalis cardinalis*	Secure (Green)	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	Secure (Green)	S1S2B,S5M
Killdeer	*Charadrius vociferus*	Sensitive (Yellow)	S3S4B S3B
Gray Catbird	*Dumetella carolinensis*	May Be At Risk (Orange)	S2B S1B
Willow Flycatcher	*Empidonax traillii*	Sensitive (Yellow)	S3S4B
American Coot	*Fulica americana*	Undetermined	S3B,S4N
Wilson's Snipe	*Gallinago delicata*	Sensitive (Yellow)	S3M
Common Loon	*Gavia immer*	May Be At Risk	S2S3B
Hudsonian Godwit	*Limosa haemastica*	(Orange) Sensitive	S2B
Brown-headed Cowbird	*Molothrus ater*	(Yellow) Secure (Green)	S3M
Great Crested Flycatcher	*Myiarchus crinitus*	May Be At Risk (Orange)	S3B
Hudsonian Whimbrel	*Numenius phaeopus hudsonicus*	Sensitive (Yellow)	S3S4B
Cliff Swallow	*Petrochelidon pyrrhonota*	May Be At Risk (Orange)	S3M
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Sensitive (Yellow)	S3B
American Golden-Plover	*Pluvialis dominica*	Sensitive (Yellow)	S3S4B
Pied-billed Grebe	*Podilymbus podiceps*	Sensitive (Yellow)	S3B
Eastern Phoebe	*Sayornis phoebe*	Sensitive (Yellow)	S3B,S5M
Eastern Bluebird	*Sialia sialis*	Sensitive (Yellow)	S2S3B
Greater Yellowlegs	*Tringa melanoleuca*	Sensitive (Yellow)	S3S4B
Willet	*Tringa semipalmata*	May Be At Risk (Orange)	S1?B
Eastern Kingbird	*Tyrannus tyrannus*	Sensitive (Yellow)	
Warbling Vireo	*Vireo gilvus*	Undetermined	
BRYOPHYTES			
Rugel's Anomodon Moss	*Anomodon rugelii*	Sensitive (Yellow)	S2S3
a Moss	*Ephemerum serratum*	Sensitive (Yellow)	S2S3

Appendix 3: Special Occurrences (Ecodistrict 610)

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***
DICOTS			
Silver Maple	*Acer saccharinum*	May Be At Risk (Orange)	S1
Nova Scotia Agalinis	*Agalinis neoscotica*	Secure (Green)	S3
Hooked Agrimony	*Agrimonia gryposepala*	Secure (Green)	S3
Running Serviceberry	*Amelanchier stolonifera*	Secure (Green)	S3?
Canada Anemone	*Anemone canadensis*	May Be At Risk (Orange)	S2
Wood Anemone	*Anemone quinquefolia*	Sensitive (Yellow)	S2
a Pussytoes	*Antennaria parlinii*	May Be At Risk (Orange)	S1
Drummond's Rockcress	*Arabis drummondii*	Sensitive (Yellow)	S2
Small-spike False-nettle	*Boehmeria cylindrica*	May Be At Risk (Orange)	S1
Marsh Bellflower	*Campanula aparinoides*	Sensitive (Yellow)	S3
Blue Cohosh Prickly	*Caulophyllum thalictroides*	May Be At Risk (Orange)	S2
Hornwort American	*Ceratophyllum echinatum*	May Be At Risk (Orange)	S2?
Cancer-root Five-	*Conopholis americana*	May Be At Risk (Orange)	S1S2
angled Dodder Wild	*Cuscuta pentagona*	Undetermined	S1
Comfrey	*Cynoglossum virginianum var. boreale*	May Be At Risk (Orange)	S1
Rock Whitlow-Grass	*Draba arabisans Epilobium*	Sensitive (Yellow)	S2
Purple-veined Willowherb	*coloratum Epilobium*	Sensitive (Yellow)	S2?
Downy Willowherb	*strictum Floerkea*	Sensitive (Yellow)	S3
False Mermaidweed	*proserpinacoides Fraxinus*	Sensitive (Yellow)	S2
Red Ash	*pennsylvanica Galium*	May Be At Risk (Orange)	S1
Common Bedstraw	*aparine*	Exotic	S1
Northern Comandra	*Geocaulon lividum*	Sensitive	S3
Bicknell's Crane's-bill	*Geranium bicknellii*	(Yellow) Secure	S3
American False Pennyroyal	*Hedeoma pulegioides*	(Green) Sensitive	S2S3
Round-lobed Hepatica	*Hepatica nobilis var. obtusa*	(Yellow) May Be	S1S2
Panicled Hawkweed	*Hieracium paniculatum*	At Risk (Orange)	S3
Pinebarren Golden Heather	*Hudsonia ericoides*	Secure (Green)	S2
Big-leaved Marsh-elder	*Iva frutescens ssp. oraria*	Sensitive (Yellow)	S2
Hairy Lettuce	*Lactuca hirsuta var. sanguinea*	Sensitive (Yellow)	S2
Canada Wood Nettle	*Laportea canadensis*	Sensitive (Yellow)	S3
Yellow-seeded False Pimperel	*Lindernia dubia*	Sensitive	S3S4
Narrow-leaved Evening Primrose	*Oenothera fruticosa ssp. glauca*	(Yellow) Secure (Green)	S2
Smooth Sweet Cicely	*Osmorhiza longistylis*	Undetermined	S2
Rugel's Plantain	*Plantago rugelii*	May Be At Risk(Orange)	S2
Blood Milkwort	*Polygala sanguinea*	Undetermined	S2S3

Appendix 3: Special Occurrences (Ecodistrict 610)

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***
Halberd-leaved Tearthumb	*Polygonum arifolium*	Sensitive (Yellow)	S2
Small's Knotweed	*Polygonum buxiforme*	Undetermined	S2S3
Pennsylvania Smartweed	*Polygonum pensylvanicum*	Secure (Green)	S3
Stout Smartweed	*Polygonum robustius*	Secure (Green)	S3S4
Climbing False Buckwheat	*Polygonum scandens*	Sensitive (Yellow)	S3
Eastern Cudweed	*Pseudognaphalium obtusifolium*	Secure (Green)	S3S4
Alder-leaved Buckthorn	*Rhamnus alnifolia*	Sensitive (Yellow)	S3
Northern Dewberry	*Rubus flagellaris*	Undetermined	S1?
Cut-Leaved Coneflower	*Rudbeckia laciniata*	Sensitive (Yellow)	S2
Cut-Leaved Coneflower	*Rudbeckia laciniata var. gaspereauensis*	Sensitive (Yellow)	S2
Triangular-valve Dock	*Rumex salicifolius var. mexicanus*	Sensitive (Yellow)	S2
Knotted Pearlwort	*Sagina nodosa*	Secure (Green)	S2S3
Bog Willow	*Salix pedicellaris*	Sensitive (Yellow)	S2
Meadow Willow	*Salix petiolaris*	Secure (Green)	S3
Clustered Sanicle	*Sanicula odorata*	May Be At Risk(Orange)	S1
Sleepy Catchfly	*Silene antirrhina*	May Be At Risk(Orange)	S1
Horned Sea-blite	*Suaeda calceoliformis*	Secure (Green)	S2S3
Wavy-leaved Aster	*Symphyotrichum undulatum*	Sensitive (Yellow)	S2
Canada Germander	*Teucrium canadense*	Sensitive (Yellow)	S3
Dwarf Bilberry	*Vaccinium caespitosum*	Sensitive (Yellow)	S2
Blue Vervain	*Verbena hastata*	Secure (Green)	S3
Arrow-Leaved Violet	*Viola sagittata var. ovata*	Secure (Green)	S3S4
FERNS AND THEIR ALLIES			
Cut-leaved Moonwort	*Botrychium dissectum*	Secure (Green)	S3
Least Moonwort	*Botrychium simplex*	Sensitive (Yellow)	S2S3
Common Scouring-rush	*Equisetum hyemale var. affine*	Secure (Green)	S3S4
Meadow Horsetail	*Equisetum pratense*	Sensitive (Yellow)	S2
Dwarf Scouring-Rush	*Equisetum scirpoides*	Secure (Green)	S3S4
Ground-Fir	*Lycopodium sabinifolium*	Secure (Green)	S3?
Sitka Clubmoss	*Lycopodium sitchense*	Secure (Green)	S3?
INSECTS			
Mottled Darner	*Aeshna clepsydra*	Secure (Green)	S3
Lance-Tipped Darner	*Aeshna constricta*	Secure (Green)	S3
Milbert's Tortoiseshell	*Aglais milberti*	Secure (Green)	S2

Appendix 3: Special Occurrences (Ecodistrict 610)

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***
Common Roadside-Skipper	*Amblyscirtes vialis*	Secure (Green)	S2
Ocellated Darner	*Boyeria grafiana*	Sensitive (Yellow)	S3
Henry's Elfin	*Callophrys henrici*	Secure (Green)	S2
Eastern Pine Elfin	*Callophrys niphon*	Secure (Green)	S2
Hoary Elfin	*Callophrys polios*	Secure (Green)	S3S4
Early Hairstreak	*Erora laeta*	May Be At Risk (Orange)	S1
Juvenal's Duskywing	*Erynnis juvenalis*	Secure (Green)	S2S3
Baltimore Checkerspot	*Euphydryas phaeton*	Secure (Green)	S3
Harvester	*Feniseca tarquinius*	Secure (Green)	S3S4
Northern Pearly-Eye	*Lethe anthedon*	Secure (Green)	S3
Little Wood-satyr	*Megisto cymela*	Secure (Green)	S3S4
Elfin Skimmer	*Nannothemis bella*	Secure (Green)	S3
Compton	*Nymphalis l-album*	Secure (Green)	S1S2
Tortoiseshell Riffle	*Ophiogomphus carolus*	Secure (Green)	S3
Snaketail Mustard	*Pieris oleracea*	Sensitive (Yellow)	S2
White Eastern Comma	*Polygonia comma*	At Risk (Red)	S2
Green Comma	*Polygonia faunus*	Secure (Green)	S3
Question Mark	*Polygonia interrogationis*	Secure (Green)	S3B
Grey Comma	*Polygonia progne*	Secure (Green)	S3S4
Satyr Comma	*Polygonia satyrus*	Sensitive (Yellow)	S1
Banded Hairstreak	*Satyrium calanus*	Undetermined	S2
Striped Hairstreak	*Satyrium liparops*	Undetermined	S3
Aphrodite Fritillary	*Speyeria aphrodite*	Secure (Green)	S3S4
Grey Hairstreak	*Strymon melinus*	Secure (Green)	S2
Zebra Clubtail	*Stylurus scudderi*	May Be At Risk (Orange)	S1S2
<u>MAMMALS</u>			
Maritime Shrew	*Sorex maritimensis*	Secure (Green)	S3
<u>MONOCOTS</u>			
Wild Leek	*Allium tricoccum*	May Be At Risk (Orange)	S1
Short-awned Foxtail	*Alopecurus aequalis*	Sensitive (Yellow)	S2S3
Silvery-flowered Sedge	*Carex argyrantha*	Secure (Green)	S3S4
Atlantic Sedge	*Carex atlantica ssp. capillacea*	Undetermined	S2
Bearded Sedge	*Carex comosa*	Sensitive (Yellow)	S2
Hayden's Sedge	*Carex haydenii*	May Be At Risk (Orange)	S1

Appendix 3: Special Occurrences (Ecodistrict 610)

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*
Porcupine Sedge	*Carex hystericina*	May Be At Risk (Orange)	S2
Loose-Flowered Sedge	*Carex laxiflora*	May Be At Risk (Orange)	S1
Hop Sedge	*Carex lupulina*	Secure (Green)	S3
Prairie Sedge	*Carex prairea*	May Be At Risk (Orange)	S1
Blunt Broom Sedge	*Carex tribuloides*	Secure (Green)	S3?
Sweet Wood Reed Grass	*Cinna arundinacea*	May Be At Risk(Orange)	S1
Early Coralroot	*Corallorhiza trifida*	Secure (Green)	S3
Yellow Lady's-slipper	*Cypripedium parviflorum*	Sensitive (Yellow)	S2S3
Small Yellow Lady's-Slipper	*Cypripedium parviflorum var. makasin*	Sensitive (Yellow)	S2
Yellow Lady's-slipper	*Cypripedium parviflorum var. pubescens*	Sensitive (Yellow)	S2
Deer- tongue Panic Grass	*Dichanthelium clandestinum*	Secure (Green)	S3
Narrow-leaved Panic Grass	*Dichanthelium linearifolium*	Sensitive (Yellow)	S2?
Quill Spikerush	*Eleocharis nitida*	Secure (Green)	S3
Canada Waterweed	*Elodea canadensis*	Secure (Green)	S3?
Slender Cottongrass	*Eriophorum gracile*	Sensitive (Yellow)	S2
Sharp-Fruit Rush	*Juncus acuminatus*	Sensitive (Yellow)	S3S4
Grassleaf Rush	*Juncus marginatus*	Sensitive (Yellow)	S3
Secund Rush	*Juncus secundus*	May Be At Risk (Orange)	S1
Woods-Rush	*Juncus subcaudatus var. planisepalus*	Sensitive (Yellow)	S3
Canada Lily	*Lilium canadense*	Sensitive (Yellow)	S2S3
Loesel's Twayblade	*Liparis loeselii*	Secure (Green)	S3S4
Tuckerman's Panic Grass	*Panicum tuckermanii*	Sensitive (Yellow)	S2S3
Pale Green Orchid	*Platanthera flava var. herbiola*	Secure (Green)	S1S2
Large Purple Fringed Orchid	*Platanthera grandiflora*	Secure (Green)	S3
Hooker's Orchid	*Platanthera hookeri*	Secure (Green)	S3
Fries' Pondweed	*Potamogeton friesii*	May Be At Risk (Orange)	S2
White-stemmed Pondweed	*Potamogeton praelongus*	Sensitive (Yellow)	S3?
Richardson's Pondweed	*Potamogeton richardsonii*	May Be At Risk (Orange)	S2S3
Saltmarsh Alkali Grass	*Puccinellia fasciculata*	Undetermined	S1
Narrow-leaved Blue-eyed-grass	*Sisyrinchium angustifolium*	Secure (Green)	S3S4
Case's Ladies'-Tresses	*Spiranthes casei var. casei*	May Be At Risk (Orange)	S1
Shining Ladies'-Tresses	*Spiranthes lucida*	May Be At Risk (Orange)	S2
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	Sensitive (Yellow)	S2S3
Pale False Manna Grass	*Torreyochloa pallida var. pallida*	Extirpated	S1
White Trillium	*Trillium grandiflorum*	Undetermined	S1

Appendix 3: Special Occurrences (Ecodistrict 610)

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

*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 610)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Rivers - Annapolis; Gaspereau; Cornwallis	Ecosystems	Service Nova Scotia	Nova Scotia Environment Act Nova Scotia Forest Act (Wildlife Habitat and Watercourse Protection Regulations)
Eagle Nests	Bird Habitat	SHNSD	Nova Scotia Wildlife Act (NSWA)
Parks – Blomidon Provincial; Clairmont Provincial; Coldbrook Provincial; Valleyview Provincial; Upper ClementsProvincial	Ecosystems/ Recreation		NS Parks Act
Wildlife Management Areas -- Belleisle Marsh; Minas Basin WMA, Boot Island NWA, Dewey Creek WMA; Kentville Migratory Bird Sanctuary	Ecosystems	NSDNR Restricted Land Use Database	NS Wildlife Act; Canadian Wildlife Act; Migratory Birds Convention Act
Eastern Habitat Joint Venture Lands -Allains Creek; Grand Pré; Lower Canard; Hortonville; New Minas; Wolfville	Ecosystems/ Bird Habitat	NSDNR Restricted Land Use Database	NS Wildlife Act;
Ramsar Wetland Site -- Southern Bight of Minas Basin	Ecosystems	NSDNR Restricted Land Use Database	Ramsar Convention

Appendix 3: Special Occurrences (Ecodistrict 610)
Table 1d – Heritage Features

Feature	Type	Information Source
Historic Native Settlements	Cultural/Community Heritage	Local Knowledge
Native Reserve Lands	Cultural/Community Heritage	NSDNR Database
Historic Acadian Settlements	Cultural/Community Heritage	Local Knowledge
National Historic Site -- Abraham Gesner; Grand Pré; Fort Anne; Bloody Creek	Cultural/Community Heritage	NSDNR Restricted Land Use Database
Abandoned Mines	Geological and Cultural Heritage	NS Abandoned Mines Database

Appendix 3: Special Occurrences

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

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

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	%		
DKLD	dykeland	6,176.1	6.7	0	0	7	89.9	13,132.4	3.2	0	0	12	83.2
ICHO	rO wP rP	1,305.4	1.4	26,194.2	28.2	21	70.7	6,378	1.6	26,194.2	6.4	42 to 46	36.8
ICSM	rO wP rP	12,311.2	13.3	26,194.2	28.2	35 to 36	50.9	13,275.1	3.3	26,194.2	6.4	35 to 36	49.2
IFHO	rS eH wP	5,348.1	5.8	33,336.1	35.9	21 to 22	65	63,358.1	15.6	36,557	9	51 to 60	17.4
IFSM	bS	3,867.4	4.2	12,804.1	13.8	26 to 28	60.6	20,522.9	5.0	66,715.6	16.4	46 to 51	31.1
IMHO	rS eH wP	6,534.4	7.0	33,336.1	35.9	41 to 48	26.3	34,806.5	8.6	36,557	9	46 to 56	20.7
IMSM	aE sM wA	3,200.1	3.4	2,560.1	2.8	47 to 50	31.6	16,842.4	4.1	15,451.6	3.8	42 to 46	36.2
WCHO	rO wP rP	11,086.5	11.9	26,194.2	28.2	35 to 37	48.7	17,090	4.2	26,194.2	6.4	32 to 35	48.2
WCSM	rO wP rP	9,530.5	10.3	26,194.2	28.2	23 to 24	66.6	9,856.5	2.4	26,194.2	6.4	22 to 23	66.7
WFHO	rS eH wP	5,520.4	5.9	33,336.1	35.9	17 to 18	66.4	32,684.9	8.0	36,557	9	34 to 40	40.7
WFSM	sM yB Be	469.6	0.5	3,977.1	4.3	20 to 21	71.1	603.9	0.1	19,830.9	4.9	22 to 23	67.9
WMHO	rS eH wP	16,590.3	17.9	33,336.1	35.9	22 to 25	59.7	38,186.3	9.4	36,557	9	28 to 33	48.6
WMKK	rS eH wP	1,101.2	1.2	33,336.1	35.9	28 to 30	58.8	9,982.8	2.5	36,557	9	49 to 62	15.6
WMSM	rS eH wP	6,262.6	6.7	33,336.1	35.9	16 to 17	75.6	6,488.5	1.6	36,557	9	16 to 17	74.6

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

Appendix 3: Special Occurrences

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

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

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index Ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
WTLD	wetlands	847	0.9	0	0	35	53.1	8,359.3	2.1	0	0	63 to 65	13.7

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

Appendix 4: Ecological Representivity Worksheet

Ecosystem			Crown Responsibility	Legal Reserves		Policy Reserves (including unproclaimed legal reserve proposals)		Ecological Emphasis Classification "Reserve Class"					
Ecosection	Climax Type	Area (ha)	Percent of Area on Crown (%)	Crown Area (ha)	Private Area (ha)	Crown Area (ha)	Private Area (ha)	Crown		Private		Total Reserve	
								ha	% (EcoS)	ha	% (EcoS)	ha	% (EcoS)
WMHO	rS eH wP	16,590.3	0.3	7.5	0	29.6	0	37.1	0.2	0	0	37.1	0.2
ICSM	rO wP rP	12,311.2	0.7	0	0	0	5.9	0	0	5.9	0	5.9	0
WCHO	rO wP rP	11,086.5	1.4	0	0	25.4	0	25.4	0.2	0	0	25.4	0.2
WCSM	rO wP rP	9,530.5	0.9	0	0	0.5	0	0.5	0	0	0	0.5	0
IMHO	rS eH wP	6,534.4	0.1	0	0	0.2	0	0.2	0	0	0	0.2	0
WMSM	rS eH wP	6,262.6	0.4	0	0	0	0	0	0	0	0	0	0
DKLD	dykeland	6,176.1	5.1	0	0	7.4	0	7.4	0.1	0	0	7.4	0.1
WFHO	rS eH wP	5,520.4	0.4	0	0	0	0	0	0	0	0	0	0
IFHO	rS eH wP	5,348.1	1.7	0	0	0	0	0	0	0	0	0	0
IFSM	bS	3,867.4	0.6	0	0	0.4	0	0.4	0	0	0	0.4	0
IMSM	aE sM wA	3,200.1	0	0	0	0	0	0	0	0	0	0	0
XXWA	None	1,698.1	0	0	0	0	0	0	0	0	0	0	0
ICHO	rO wP rP	1,305.4	0	0	0	0	0	0	0	0	0	0	0
WMKK	rS eH wP	1,101.2	1	0	0	0	0	0	0	0	0	0	0
XXMS	saltmarsh	973.8	3.7	0	0	6.8	0	6.8	0.7	0	0	6.8	0.7
WTLD	wetlands	847.0	0.3	0	0	0	0	0	0	0	0	0	0
WFSM	sM yB Be	469.6	1.5	0	0	0	0	0	0	0	0	0	0
Total		**92,822.7**		**7.5**	**0**	**70.3**	**5.9**	**77.8**		**5.9**		**83.7**	

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)
National Historic Sites and Parks	21	0	National Wildlife Sanctuaries	69	0
Designated Provincial Parks and Park Reserves	8	0	Designated Provincial Parks and Park Reserves	36	0
			Operational Non Designated Parks and Reserves	8	0
			Nova Scotia Nature Trust	0	6
			Ramsar Wetland Sites	3	0
			Old Forest	1	0

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

Appendix 6: Description of Road Density Index

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

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

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

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

Main Concepts

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

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

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

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

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

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

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

Appendix 7: Road Density Index Worksheets

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

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

Road Type	Road Index Weighting	Length (km)
Trails, tracks, abandoned roads, and railways	1	1,056
Utility corridors	3	94
Gravel Roads and active railways	6	853
Paved streets and roads collectors	10	1,043
Highways	15	85

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	**Range**	**Hectares**	**Percent**
Remote	0 to 6	531	0.6
Forest Resource	7 to 15	6,023	6.5
Mixed Rural	16 to 24	20,697	22.3
Agriculture Suburban	25 to 39	53,835	58.0
Urban	40 to 100	11,735	12.6
Total		**92,821**	**100.0**

Table 3: Road Index Values for Each Landscape Element Type		
Landscape Element	**Area (ha)**	**Road Index**
Spruce Hemlock Pine Hummocks and Hills	29,258	20
Pine Oak Flats	20,155	23
Pine Oak Hills and Hummocks	12,176	25
Red and Black Spruce Hummocks	11,811	20
Valley Corridors	5,595	55
Marshes and Grasslands	5,099	24
Spruce Pine Flats	3,868	24
Floodplain	2,716	24
Wetlands	847	21
Salt Marsh	610	32
Tolerant Hardwood Hills	462	27
Total	**92,597**	**24**
*Water is excluded from this table. Rounding, overlapping, and averaging of figures may lead to small differences in tables.		

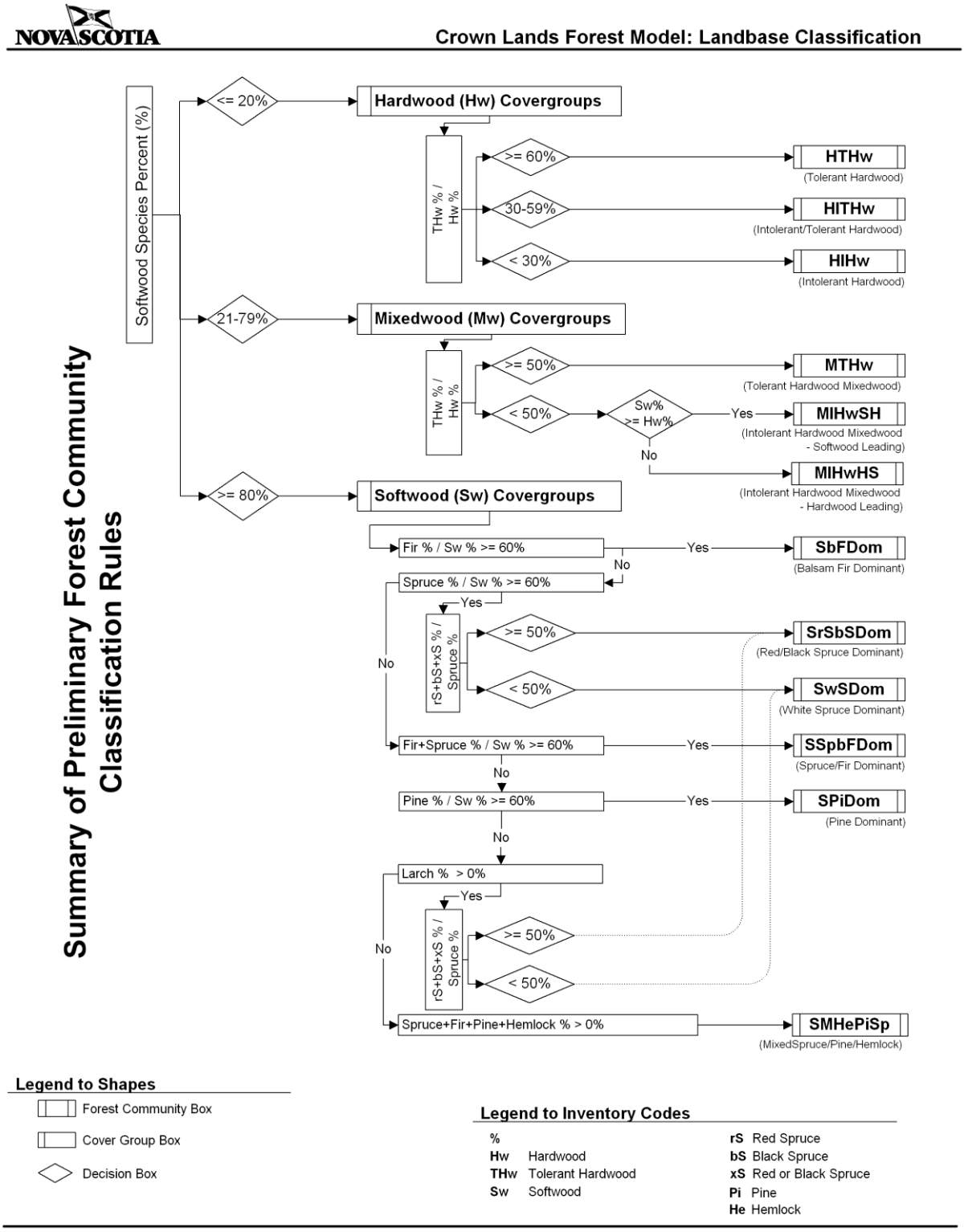
Appendix 8: Development Classes and Seral Stages

Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-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 > 11m) • stands dominated by upper canopy with full differentiation into dominance classes • self-thinning process reduced • tree seed production prominent and regular • individual tree mortality creates canopy gaps that are soon closed by neighbouring tree growth • increased light initiates regeneration and early understory development • approximate age 40 to 125 years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer species • over maturity initiates canopy breakup and understory development Mid Seral Species (Score 24 to 37) • climax species in mixture with pioneers in the overstory • often reflecting a transition to climax domination following a period of sub canopy development Late Seral Species (Score 38 to 50) • canopy dominated by climax species • over maturity initiates gap dynamic processes leading to multi-aged and old growth conditions
4. Multi-aged and old growth forest (Varying height and age and Old Growth ID) • dominant overstory exhibiting a variety of crown sizes and canopy densities • canopy gaps promote development of multi-layered understory and recruitment to overstory	Early Seral Species (Score 10 to 23) • canopy likely to break up and be replaced by developing understory Mid Seral Species (Score 24 to 37) • pioneer-dominated overstory with canopy recruitment from a climax species-dominated understory Late Seral Species (Score 38 to 50) • climax species-dominated overstory maintained through gap dynamic processes

Summary of species-level seral score values by ecodistrict (Source: NSDNR - January 2014 revision)																																								
Species		**Ecodistrict**																																						
Code	**Name**	**100**	**210**	**220**	**310**	**320**	**330**	**340**	**350**	**360**	**370**	**380**	**410**	**420**	**430**	**440**	**450**	**510**	**520**	**530**	**540**	**550**	**560**	**610**	**620**	**630**	**710**	**720**	**730**	**740**	**750**	**760**	**770**	**780**	**810**	**820**	**830**	**840**	**910**	**920**
AS	ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
BA	black ash	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BC	black cherry	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
BE	beech	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
BF	balsam fir	5	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	1	1
BP	balsam poplar	1	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	3	1
BS	black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EC	eastern cedar	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
EH	eastern hemlock	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	exotic species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GB	grey birch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IH	intolerant hardwood	3	2	4	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2	2	4	3	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2
IW	ironwood	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
JP	jack pine	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LA	largetooth aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OH	other hardwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
OS	other softwood	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
PC	pin cherry	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RM	red maple	3	2	4	2	2	2	2	2	4	2	5	2	2	2	2	2	2	2	2	2	5	3	2	2	2	2	2	2	2	2	2	3	2	3	3	2	2	2	2
RO	oak	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
RP	red pine	3	3	3	3	3	3	3	3	3	4	3	3	3	4	3	3	3	3	4	4	4	4	4	4	4	3	4	3	3	3	4	4	3	4	4	3	3	3	3
RS	red spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
SM	sugar maple	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ST	striped maple	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TA	aspen	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TH	tolerant hardwood	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
TL	eastern larch	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
UC	unclassified	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
WA	white ash	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
WB	white birch	3	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WE	white elm	2	2	4	2	4	2	2	2	2	2	2	2	2	2	2	2	4	4	4	2	2	2	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
WP	white pine	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
WS	white spruce	4	4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5	5	4	1	1
XS	red&black spruce	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
YB	yellow birch	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5

A look-up table assigns each species in the forest inventory a value from 1 to 5 for its position on the successional scale. The look-up table may change by ecodistrict since climax on the coast or the Cape Breton Highlands differs from inland and lowland districts. This successional value is multiplied by the species' percent in the stand to give a stand successional score. Each stand may have up to four species, and the four percentages add to 10, so the stand successional scores range from 10 to 50. These scores are subdivided into three successional categories: 10 - 23 early, 24 - 37 mid and 38 - 50 late.

Appendix 9: Vegetation Community Classification – Forest Model



Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Spruce Hemlock Pine Hummocks and Hills (Patch)	WMHO (56.2%) WMSM (21.3%) WFHO (18.7%) WMKK (3.8%)	Softwood	rS eh wP bS	Infrequent	25,014; 85.5	Early	37	293	565	804	1,699	3,161; 35.0	EARLY	5,128; 56.7
						Mid	6	21	58	62	147			
						Late	12	7	346	131	496			
						Uncl	819	0	0	0	819			
		Mixedwood				Early	68	348	610	766	1,791	3,264; 36.1	MID	1,830; 20.2
						Mid	7	46	656	326	1,034			
						Late	0	1	180	74	255			
						Uncl	184	0	0	0	184			
		Hardwood	sM yB Be	Infrequent	3,621; 12.4	Early	160	128	883	435	1,607	2,540; 28.1	LATE	1,003; 11.1
						Mid	2	9	468	171	649			
						Late	0	3	218	31	252			
						Uncl	33	0	0	0	33			
		Unclassified				Early	31	0	0	0	31	74; 0.8	UNCL	1,078; 11.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	43	0	0	0	43			
Total					**29,258***	**# ha**	**1,400**	**856**	**3,984**	**2,799**	**9,039**			
						%	**15.5%**	**9.5%**	**44.1%**	**31.0%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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)				
Pine Oak Flats (Patch)	ICSM (53.3%) WCSM (46.7%)	Softwood	bS	Frequent	4,299; 21.3	Early	8	14	152	43	216	1,625; 24.9	EARLY	2,858; 43.8
						Mid	13	9	88	93	203			
						Late	15	104	657	404	1,180			
						Uncl	25	0	0	0	25			
		Mixedwood	rO wP rP	Frequent	13,705; 68.0	Early	19	40	497	349	905	2,537; 38.9	MID	1,939; 29.7
						Mid	0	24	656	621	1,301			
						Late	0	9	116	134	260			
						Uncl	72	0	0	0	72			
		Hardwood				Early	84	120	1,027	487	1,718	2,291; 35.1	LATE	1,530; 23.5
						Mid	3	1	326	106	435			
						Late	0	0	74	17	91			
						Uncl	48	0	0	0	48			
		Unclassified				Early	20	0	0	0	20	68; 1.0	UNCL	193; 3.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	48	0	0	0	48			
Total					**20,155***	**# ha**	**353**	**320**	**3,594**	**2,253**	**6,520**			
						%	**5.4%**	**4.9%**	**55.1%**	**34.6%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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)				
Pine Oak Hills and Hummocks (Patch)	WCHO (89.4%) ICHO (10.6%)	Softwood	bS	Frequent	645; 5.3	Early	36	20	110	59	225	1,277; 24.6	EARLY	2,081; 40.2
						Mid	5	14	85	72	175			
						Late	11	26	582	172	791			
						Uncl	86	0	0	0	86			
		Mixedwood	rO wP rP	Frequent	11,532; 94.7	Early	57	30	240	209	536	1,753; 33.8	MID	1,722; 33.2
						Mid	9	40	471	411	931			
						Late	0	2	108	88	198			
						Uncl	89	0	0	0	89			
		Hardwood				Early	80	86	823	319	1,308	,087; 40.3	LATE	1,108; 21.4
						Mid	5	23	389	199	617			
						Late	1	3	81	34	119			
						Uncl	44	0	0	0	44			
		Unclassified				Early	11	1	0	0	12	64; 1.2	UNCL	270; 5.2
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	52	0	0	0	52			
Total					**12,176***	**# ha**	**485**	**245**	**2,890**	**1,562**	**5,181**			
						%	**9.4%**	**4.7%**	**55.8%**	**30.2%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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 (Patch)	IMHO (55.2%) IFHO (44.8%)	Softwood	rS eH wP bS	Infrequent	11,811; 100.0	Early	13	190	292	326	822	1,590; 28.9	EARLY	2,885; 52.5
						Mid	0	12	25	52	89			
						Late	0	9	141	51	201			
						Uncl	478	0	0	0	478			
		Mixedwood				Early	43	227	322	563	1,155	1,957; 35.6	MID	1,205; 21.9
						Mid	13	23	225	334	596			
						Late	0	2	33	51	85			
						Uncl	121	0	0	0	121			
		Hardwood				Early	136	76	426	218	857	1,864; 33.9	LATE	716; 13.0
						Mid	2	26	369	123	520			
						Late	0	1	382	47	430			
						Uncl	57	0	0	0	57			
		Unclassified				Early	51	0	0	0	51	84; 1.5	UNCL	690; 12.5
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	34	0	0	0	34			
Total					**11,811***	**# ha**	**948**	**565**	**2,216**	**1,766**	**5,495**			
						%	**17.2%**	**10.3%**	**40.3%**	**32.1%**	**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 (Annapolis Valley 610)

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)				
Marshes and Grasslands (Patch)	DKLD	Softwood	----------	Open Seral	----------	Early	0	2	4	2	8	17; 14.1	EARLY	59; 48.1
						Mid	0	1	2	0	3			
						Late	0	1	4	0	5			
						Uncl	1	0	0	0	1			
		Mixedwood	----------	None	----------	Early	0	4	1	9	14	46; 37.5	MID	48; 39.2
						Mid	0	0	15	11	26			
						Late	0	0	5	0	5			
						Uncl	0	0	0	0	0			
		Hardwood	----------	None	----------	Early	1	4	13	19	36	56; 45.8	LATE	11; 9.3
						Mid	0	0	16	3	19			
						Late	0	0	1	0	1			
						Uncl	0	0	0	0	0			
		Unclassified				Early	1	0	0	0	1	3; 2.6	UNCL	4; 3.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	3	0	0	0	3			
Total					**5,099***	**# ha**	**5**	**11**	**62**	**43**	**122**			
						%	**4.4%**	**9.3%**	**50.7%**	**35.5%**	**100.0%**			

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Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Spruce Pine Flats (Patch)	IFSM (100.0%)	Softwood	bS rS eH wP	Frequent	3481; 90.0	Early	3	11	23	70	108	332; 28.6	EARLY	693; 59.8
						Mid	2	5	1	20	28			
						Late	2	18	71	44	134			
						Uncl	63	0	0	0	63			
		Mixedwood				Early	3	22	62	120	207	380; 32.8	MID	207; 17.9
						Mid	2	5	44	74	125			
						Late	0	0	21	1	22			
						Uncl	27	0	0	0	27			
		Hardwood				Early	39	22	187	127	375	438; 37.8	LATE	162; 14.0
						Mid	0	0	34	20	54			
						Late	0	0	7	0	7			
						Uncl	2	0	0	0	2			
		Unclassified				Early	4	0	0	0	4	10; 0.8	UNCL	97; 8.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	5	0	0	0	5			
Total					**3,868***	**# ha**	**152**	**83**	**449**	**475**	**1,159**			
						%	**13.1%**	**7.2%**	**38.7%**	**41.0%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Floodplain (Patch)	IMSM (100.0%)	Softwood		Open Seral		Early	0	10	15	19	44	351; 25.1	EARLY	525; 37.6
						Mid	0	8	40	43	91			
						Late	1	23	95	66	186			
						Uncl	30	0	0	0	30			
		Mixedwood				Early	1	23	74	74	172	551; 39.5	MID	473; 33.9
						Mid	2	28	107	130	268			
						Late	0	0	10	22	32			
						Uncl	79	0	0	0	79			
		Hardwood	aE sM wA	Gap	2173; 80.0	Early	6	40	178	69	294	448; 32.2	LATE	259; 18.5
						Mid	0	2	95	17	114			
						Late	0	0	28	12	40			
						Uncl	0	0	0	0	0			
		Unclassified				Early	15	0	0	0	15	45; 3.2	UNCL	138; 9.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	29	0	0	0	29			
Total					**2,716***	**# ha**	**164**	**135**	**643**	**453**	**1,394**			
						%	**11.7%**	**9.7%**	**46.1%**	**32.5%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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 (Patch)	WTLD (100.0%)	Softwood	----------	Open Seral	----------	Early	0	0	0	0	0	21; 19.0	EARLY	70; 64.4
						Mid	0	0	3	1	4			
						Late	0	3	8	6	17			
						Uncl	0	0	0	0	0			
		Mixedwood	----------		----------	Early	2	3	5	0	11	24; 22.1	MID	20; 18.4
						Mid	0	1	5	6	12			
						Late	0	0	2	0	2			
						Uncl	0	0	0	0	0			
		Hardwood	----------		----------	Early	5	11	26	18	59	64; 58.6	LATE	19; 17.2
						Mid	0	0	5	0	5			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	0.3; 0.3	UNCL	0; 0.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**847***	**# ha**	**8**	**17**	**53**	**31**	**109**			
						%	**6.9%**	**16.0%**	**49.1%**	**28.0%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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 (Patch)	XXMS	Softwood	----------	None	----------	Early	0	0	0	0	0	0; 0.0	EARLY	4; 13.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Mixedwood	----------	None	----------	Early	0	2	0	0	2	16; 58.4	MID	18; 68.5
						Mid	0	0	12	2	14			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Hardwood	----------	None	----------	Early	0	0	1	1	2	11; 41.6	LATE	2; 8.7
						Mid	0	0	4	0	4			
						Late	0	0	2	0	2			
						Uncl	2	0	0	0	2			
		Unclassified				Early	0	0	0	0	0	0; 0.0	UNCL	3; 9.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**610***	**# ha**	**3**	**2**	**19**	**4**	**27**			
						%	**9.4%**	**5.6%**	**71.4%**	**13.5%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Tolerant Hardwood Hills (Patch)	WFSM	Softwood	bS wP		46; 10.0	Early	2	1	3	0	6	24; 25.7	EARLY	51; 55.7
						Mid	0	0	0	0	0			
						Late	0	0	11	2	13			
						Uncl	5	0	0	0	5			
		Mixedwood				Early	0	3	9	4	16	32; 35.4	MID	22; 24.2
						Mid	0	0	10	7	17			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Hardwood	sM yB Be	Gap	323; 70.0	Early	1	1	22	5	30	36; 38.9	LATE	13; 14.3
						Mid	0	0	6	0	6			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	0; 0.0	UNCL	5; 5.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**462***	**# ha**	**8**	**5**	**61**	**18**	**91**			
						%	**9.1%**	**5.0%**	**66.6%**	**19.3%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Annapolis Valley 610)

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 (Corridor)	ICSM (28.0%) DKLD (19.4%) IMSM (8.7%) WCHO (3.5%) WMHO (2.3%) WCSM (2.2%) IFHO (1.1%) WFHO (0.8%) WMSM (0.6%)	Softwood	bS rS eH wP	Frequent	861; 15.4	Early	1	1	54	5	62	122; 17.7	EARLY	301.9; 43.7
						Mid	0	0	3	5	8			
						Late	1	0	33	19	52			
						Uncl	0	0	0	0	0			
		Mixedwood	rO wP rP	Infrequent	947; 16.9	Early	2	4	56	25	87	244; 35.3	MID	235.1; 34.0
						Mid	0	2	75	44	120			
						Late	0	0	22	14	36			
						Uncl	1	0	0	0	1			
		Hardwood	aE sM wA sM yB Be	Infrequent	414.3; 7.4	Early	8	19	91	36	154	323; 46.8	LATE	148.8; 21.5
						Mid	0	0	89	18	107			
						Late	0	0	55	5	60			
						Uncl	2	0	0	0	2			
		Unclassified				Early	0	0	0	0	0	2; 0.3	UNCL	5.2; 0.8
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	2	0	0	0	2			
Total					**5,595***	**# ha**	**16**	**26**	**477**	**172**	**691**			
						%	**2.3%**	**3.7%**	**69.1%**	**24.9%**	**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 2: Composition of Forest Communities (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Hemlock Pine Hummocks and Hills	WFHO WMHO WMKK WMSM	INFREQ INFREQ INFREQ INFREQ	rSeHwP rSeHwP rSeHwP rSeHwP	S	SwSDom	2,286	25.5%	E	**Well** early - rM, wB, HA, tA mid - yB, rM, wA late - sM, yB, Be, Ir **Well-Moist** early - wB, tA, HA, tA mid - bF, rS, yB late - rS, eH, wP **Moist** bS, rM, tL **Agriculture** early - white spruce
				S	SrSbSDom	462	5.1%	L	
				S	SPiDom	154	1.7%	L	
				S	SSpbFDom	133	1.5%	M	
				S	SMHePiSp	97	1.1%	L	
				S	SbFDom	29	0.3%	E	
				M	MIHwSH	1,727	19.3%	E/M	
				M	MIHwHS	1,249	13.9%	E/M	
				M	MTHw	288	3.2%	L	
				H	HIHw	1,979	22.1%	E/M	
				H	HTHw	300	3.3%	L	
				H	HITHw	262	2.9%	M/L	
Total						**8,966**	**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

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Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Pine Oak Flats	ICSM WCSM	FREQ FREQ	rO wP rP rO wP rP	S	SrSbSDom	709	11.05	M /L	**Dry** early - sandy barrens and heathlands mid - rO, gB, rM, wB, rP, jP, bS late - wP, rO **Well** early - wB, tA, ltA, rM mid - bF, rS, yB late - tolerant hardwood **Riparian** early - bCh, wS, rM, cedar mid - rO, rM, wA late - wA, sM, aE **Moist-Wet** - bS, tL, rM, willows, alders, cedar, wetlands
				S	SPiDom	516	8.0%	L	
				S	SwSDom	218	3.4%	E	
				S	SMHePiSp	127	2.0%	L	
				S	SSpbFDom	52	0.8%	M	
				S	SbFDom	2	0.0%	E	
				M	MIHwHS	1,217	18.9%	E/M	
				M	MIHwSH	1,206	18.7%	E/M	
				M	MTHw	115	1.8%	L	
				H	HIHw	2,027	31.4%	E/M	
				H	HITHw	148	2.3%	M/L	
				H	HTHw	116	1.8%	L	
Total						**6,453**	**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

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Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Pine Oak Hills and Hummocks	WCHO ICHO	Frequent Frequent	rO, wP, rP rO wP rP	S	SPiDom	456	8.9%	L	**Dry-Well** early - sandy barrens heathlands mid - rO, yB, rM, wB, rP, jP, bS late - wP, rO **Moist** -bS, rM, tL, wetlands
				S	SrSbSDom	436	8.5%	L	
				S	SwSDom	186	3.6%	E	
				S	SMHePiSp	125	2.4%	L	
				S	SSpbFDom	56	1.1%	M	
				S	SbFDom	19	0.4%	E	
				M	MIHwHS	863	16.9%	E/L	
				M	MIHwSH	812	15.9%	E/L	
				M	MTHw	79	1.5%	L	
				H	HIHw	1,772	34.6%	E/M	
				H	HITHW	183	3.6%	M/L	
				H	HTHw	132	2.6%	L	
						5,117	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Red and Black Spruce Hummocks	IMHO IFHO	Infrequent Infrequent	rS eH wP rS eH wP	S	SwSDom	1,176	21.7%	E	**Well Moist** early - wB, tA, ltA, rM mid - bF, rS, yB late - rS, eh, wP **Moist-Wet** bS, rM, tL, wetlands
				S	SrSbSDom	359	6.6%	L	
				S	SSpbF Dom	37	0.7%	M	
				S	SMHePiSp	8	0.2%	L	
				S	SbFDom	5	0.1%	E	
				S	SPiDom	5	0.1%	L	
				M	MIHwSH	952	17.6%	E/M	
				M	MIHwHS	880	16.3%	E/M	
				M	MTHW	126	2.3%	L	
				H	HIHw	1,103	20.4%	E/M	
				H	HTHw	478	8.8%	L	
				H	HITHw	283	5.2%	M/L	
Total						**5,411**	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Marshes and Grasslands	DKLD	----------	----------	S	SrSbSDom	8	6.9%	L	Primarily Agriculture Land
				S	SwSDom	7	5.5%	E	
				S	SPiDom	2	1.8%	L	
				M	MIHwHS	24	19.9%	E/M	
				M	MIHwSH	19	15.9%	E/M	
				M	MTHw	3	2.8%	L	
				H	HIHw	39	33.0%	E/M	
				H	HITHw	16	13.2%	M/L	
				H	HTHw	1	0.9%	L	
Total						**119**	**100.0%**		

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

Appendix 10: Table 2: Composition of Forest Communities (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Pine Flats	IFSM	Frequent	bS	S	SrSbSDom	160	13.9%	L	**Well – Moist** early - wB, tA, ltA, rM; mid - bF, rS, yB; late -rS, eH, wP
				S	SwSDom	131	11.4%	E	
				S	SPiDom	24	2.1%	L	
				S	SSpbFDom	13	1.1%	M	
				S	SMHePiSp	4	0.3%	L	
				M	MIHwHS	184	16.0%	E/M	**Moist - Wet** bS, rM, tL, wetlands
				M	MIHwSH	181	15.7%	E/M	
				M	MTHw	15	1.3%	L	
				H	HIHw	423	36.8%	E/M	
				H	HITHw	8	0.7%	M/L	
				H	HTHw	7	0.6%	L	
Total						**1,149**	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Floodplain	IMSM	Gap	aE, sM, wA	S	SrSbSDom	223	16.5%	L	**Well-Moist** early - bCh, wS, rM mid - rO, rM, wA late - wA, sM, aE **Moist-Wet** bS, rM, tL, wetlands (Riparian Type Ecosection)
				S	SwSDom	44	3.3%	E	
				S	SSpbFDom	33	2.5%	M	
				S	SMHePiSp	24	1.8%	L	
				S	SPiDom	20	1.5%	L	
				S	SbFDom	6	0.4%	E	
				M	MIHwHS	305	22.6%	E/M	
				M	MIHwSH	239	17.7%	E/M	
				M	MTHw	8	0.6%	L	
				H	HIHw	374	27.7%	EM	
				H	HITHw	38	2.8%	M/L	
				H	HTHw	37	2.7%	L	
						1,350	**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 (Annapolis Valley 610)

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	Wetland species	S	SPiDom	11	9.9%	L	- bS, tL, rM
				S	SrSbSDom	7	6.8%	L	
				S	SSpbFDom	2	2.0%	M	
				M	MIHwSH	13	12.1%	E/M	
				M	MIHwHS	11	10.1%	E/M	
				H	HIHw	59	54.8%	E/M	
				H	HITHw	5	4.2%	M/L	
Total						**108**	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Salt Marsh	XXMS		Marsh species	M	MIHwHS	9	34.0%	E/M	
				M	MIHwSH	6	20.5%	E/M	
				M	MTHw	1	4.0%	L	
				H	HIHw	9	31.9%	E/M	
				H	HTHw	3	9.7%	L	
Total						**27**	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Hardwood Hills	WFSM	Gap	sM yB Be	S	SPiDom	11	12.0%	L	early-rM, wB, ltA, tA mid - yB, rM, wA late - sM, yB, Be
				S	SrSbSDom	6	6.8%	L	
				S	SwSDom	5	5.5%	E	
				S	SbFDom	2	1.8%	E	
				M	MIHwHS	21	22.8%	E/M	
				M	MIHwSH	11	12.2%	E/M	
				H	HIHw	31	34.6%	E/M	
				H	HITHw	4	4.3%	M/L	
Total						**90**	**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 (Annapolis Valley 610)

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	ICSM	Varied depending on climax community of ecosection	Infrequent/ Frequent/Gap	S	SwSDom	61	8.8%	E	Variable depending on element through which the corridor passes, see descriptions for successional types under each element in this table
	DKLD			S	SrSbSDom	28	4.0%	L	
	IMSM			S	SPiDom	27	4.0%	L	
	WCHO			S	SMHePiSp	5	0.7%	L	
	WMHO			S	SSpbFDom	2	0.3%	M	
	WCSM			M	MIHwHS	125	18.1%	E/M	
	IFHO			M	MIHwSH	103	14.9%	E/M	
	WFHO			M	MTHw	16	2.4%	L	
	WMSM			H	HIHw	224	32.5%	E/M	
				H	HTHw	73	10.6%	L	
				H	HITHw	26	3.7%	M/L	
Total						**689**	**100.0%**		

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

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

Climax Type	Ecodistrict		Ecoregion	
	Hectares	Percent	Hectares	Percent
rS eH wP	33,336	35.9%	36,557	9.0%
rO wP rP	26,194	28.2%	26,194	6.4%
bS	12,804	13.8%	66,716	16.4%
sM yB Be	3,977	4.3%	19,831	4.9%
aE sM wA	2,560	2.8%	15,452	3.8%
bS wP	47	0.1%	24,911	6.1%
Total	**78,919**	**85.1%***	**189,660**	**46.6%****

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

Appendix 11: Ecological Emphasis Classes and Index Values

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

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

Appendix 12a: Ecological Emphasis Index Worksheet – Elements

Landscape Element	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Spruce Hemlock Pine Hummocks and Hills	29,232	39	6,393	2,611	18,870	1,318	5,816 to 6,475	20 to 22
Pine Oak Flats	20,150	26	7,285	497	11,987	355	5,703 to 5,880	28 to 29
Pine Oak Hills and Hummocks	12,165	57	5,056	349	6,245	458	4,051 to 4,279	33 to 35
Red and Black Spruce Hummocks	11,807	5	4,280	1,347	5,135	1,040	3,812 to 4,332	32 to 37
Valley Corridors	4,120	9	2,106	106	1,892	7	1,617 to 1,621	39
Marshes and Grasslands	5,095	11	429	19	4,631	5	339 to 341	7
Spruce Pine Flats	3,868	0	1,254	148	2,345	120	1,008 to 1,068	26 to 28
Floodplain	2,715	10	1,466	79	938	222	1,185 to 1,296	44 to 48
Wetland	847	0	397	0	450	0	298	35
Salt Marsh	609	15	314	2	276	2	251 to 252	41
Tolerant Hardwood Hills	461	0	116	8	331	6	90 to 93	20
Total	**91,067**	**173**	**29,095**	**5,165**	**53,100**	**3,534**	**24,169 to 25,936**	**27 to 28**

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
DKLD	6,176	11	586	23	5,551	5	457 to 460	7
ICHO	1,305	0	359	17	922	7	275 to 279	21
ICSM	12,311	26	5,532	317	6,271	165	4,295 to 4,378	35 to 36
IFHO	5,348	0	1,329	406	3,474	140	1,133 to 1,203	21 to 22
IFSM	3,867	0	1,255	147	2,345	120	1,009 to 1,069	26 to 28
IMHO	6,534	5	2,968	941	1,719	901	2,692 to 3,142	41 to 48
IMSM	3,200	15	1,867	83	1,011	224	1,492 to 1,604	47 to 50
WCHO	11,087	59	4,834	337	5,404	452	3,882 to 4,108	35 to 37
WCSM	9,531	1	2,765	228	6,346	191	2,179 to 2,275	23 to 24
WFHO	5,520	2	922	771	3,667	159	926 to 1005	17 to 18
WFSM	470	0	119	10	334	6	94 to 97	20 to 21
WMHO	16,590	38	3,944	1,717	9,909	983	3,671 to 4,162	22 to 25
WMKK	1,101	0	380	20	648	54	303 to 331	28 to 30
WMSM	6,263	0	1, 44.1	156	4,735	127	1,004 to 1,067	16 to 17
WTLD	847	0	397	0	449	0	298	35
XXMS	974	16	625	2	326	4	487 to 489	50
Total	**91,125**	**174**	**27,883**	**5,174**	**53,112**	**3,538**	**24,197 to 25,966**	**27 to 28**

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 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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