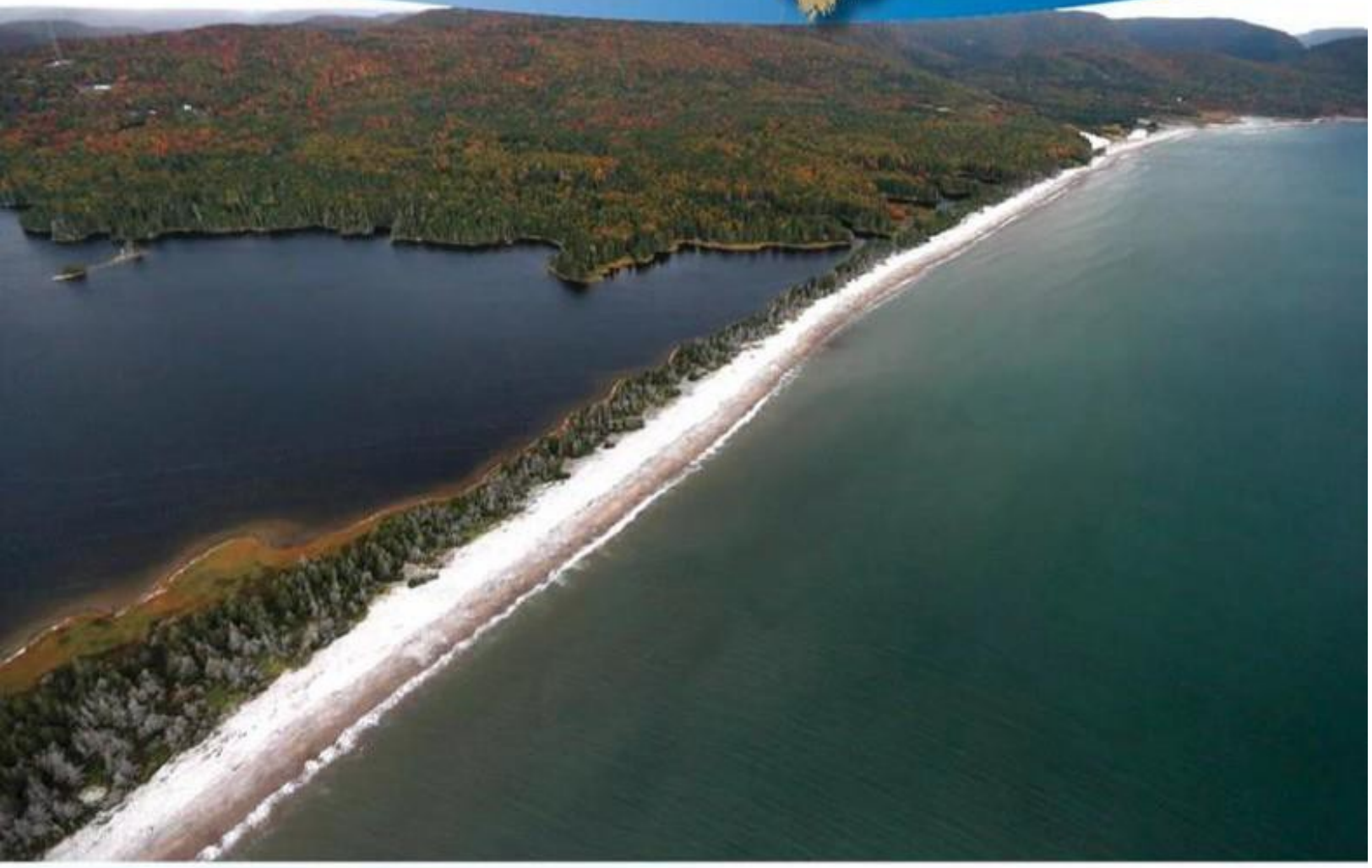
Department of Natural Resources

ECOLOGICAL LANDSCAPE ANALYSIS VICTORIA LOWLANDS ECODISTRICT 220

PART 3: Landscape Analysis for Forest Ecosystem Planners



ELA 2015-220

NOVA SCOTIA

Ecological Landscape Analysis, Ecodistrict 220: Victoria Lowlands

Prepared by the Nova Scotia Department of Natural Resources
Authors: Eastern Region DNR staff

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

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

Information sources and statistics (benchmark dates) include:

- Forest Inventory (1997 to 1999) – stand volume, species composition
- Crown Lands Forest Model landbase classification (2006) – provides forest inventory update for harvesting and silviculture from satellite photography (2005), silviculture treatment records (2006), and forest age increment (2006)
- Roads and Utility network – Service Nova Scotia and Municipal Relations (2006)
- Significant Habitat and Species Database (2007)
- Atlantic Canada Data Conservation Centre (2013)

Conventions

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

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

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

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

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Understanding the Landscape as an Ecological System

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

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

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

Elements Within Landscapes (Map 2)

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

Tolerant Hardwood Hills, representing about half of the ecodistrict, is the matrix element. This element naturally supports long-lived and shade-tolerant hardwood forests of sugar maple, yellow birch, and beech. Red maple is also common. Secondary forests of balsam fir and white spruce are abundant in this element and reflect a modification of the original vegetation following European settlement.

In **Spruce Fir Hills and Hummocks**, the largest patch element, the forests tend to be dominated by black spruce on the moister sites. Balsam fir and white spruce, with a component of white birch and red maple, are found on the better-drained soils that are usually associated with the lower and middle slopes and ravines.

The other patch elements, which are all quite small, are **Coastal Beach**, **Wetlands**, **Salt Marsh** (located within the Valley Corridors element), and **Floodplain**.

Valley Corridors is a linear element associated with the main watercourses in the ecodistrict.

Flow – Element Interactions (Appendix 1; Map 2)

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

The following flows were considered in the analysis of this ecodistrict and are described in Appendix 1: humans, moose, anadromous fish, and aquatic furbearers.

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

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

River corridors promote connectivity.

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

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

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

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

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

The Tolerant Hardwood Hills matrix in Victoria Lowlands, because of its size and distribution, plays an important connective function.

Historically, with the start of European settlement in the early 1800s, much of the deciduous forest in the matrix was cut, burned, and placed under cultivation and pasture. The typical forest of this element is shade-tolerant hardwoods of sugar maple, yellow birch, and beech with red maple often a frequent and prominent component. In the 1920s when many rural families left their farms, fields were abandoned and reforested to white spruce.

Riparian corridors, besides being important habitat, can also be critical connectors of ecosystem elements.

Connective management strategies in Victoria Lowlands could include:

- Enhancing connectivity among conservation areas by applying appropriate medium and high biodiversity emphasis standards when managing areas with natural linkage potential.
- Improving ecoregional connectivity by sustaining and restoring natural conditionsat important linkage points among ecodistricts.

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

Some of the landscape flows – such as humans and moose – have linkages to adjacent ecodistricts. People provide linkages through an assortment of activities (recreation, transportation, settlement, and commercial activities) and link with Cape Breton Highlands and Cape Breton Hills ecodistricts.

Forests and waterways provide linkages to adjoining ecodistricts, including Northern Plateau.

Future management activities should recognize significant linkages to adjoining ecodistricts and manage these areas to enhance and sustain connectivity functions.

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

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

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

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

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

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

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

- forest establishment (0 to 6 m height)
- young competing forest (7 to 11 m height)
- mature forest (> 11 m height; including multi-aged and old forest)

- multi-aged / old forest (multiple layered / Old Forest Policy)

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

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

A look-up table (see Appendix 8) assigns each species in the forest inventory a value from 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 (see 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 Victoria Lowlands

Element	**Seral Stage**					
	Early	**%***	**Middle**	**%**	**Late**	**%**
Spruce Fir Hills and Hummocks	IH6, MW5	10.0	MW4, SP4a, SP6, SP7	14.0	**SP5**, **SH8, SH10,** KA2	69.0
Tolerant Hardwood Hills	OF1, OF2, OF4, IH6, MW5	1.0	IH7, MW4, TH6, TH7, TH8, SH8, SH10	9.0	**TH1, TH2**, TH3, TH4, **TH5,** SH1, SH2	87.0
Floodplain	FP4, FP6			0.0	**FP1**	85.0
Wetlands	WC1, WC2, WC6, WD6					
Salt Marsh	Grasslands of *Spartina spp.*					
Coastal Beach	CO7, Beach grass, Bayberry, Rose spp., White spruce					

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 for Victoria Lowlands is 72 to 74, a relatively high index likely reflective of the large area (40%) owned by the provincial Crown or federal government.

About 50% of the land falls in the extensive ecological emphasis class. This implies land managed for multiple values using ecosystem-based techniques that conserve biodiversity and natural ecosystem conditions and practices.

A little over 12% of the ecodistrict has been converted. This is land that has been changed to an unnatural state for human use, mostly settlements, farms, urban development, and transportation and utility corridors.

The reserve class accounts for about 33% of the area and is divided into two categories: legal reserves and policy reserves. The legal reserves are those areas that have legal status under the IUCN (The International Union for the Conservation of Nature and Natural Resources) codes of

I, II, or III such as wilderness areas, protected beaches, and designated provincial parks. The second type of reserves is those set aside under various provincial policies, such as the Old Forest Policy.

Less than 1% of the ecodistrict falls in the intensive class, representing lands managed intensively to optimize resource production from sites maintained in a native forested state. Management may eliminate or reduce the duration of some development processes, particularly old forest stages, and may include exotic species, old field spruce, and monoculture plantations. Despite intensive practices, these lands are an important component of landscape structure and composition.

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

Road Index (Appendices 6, 7; Map 5)

The GIS-based "Road Index (RI)" 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.

Victoria Lowlands has an overall RI value of approximately 11 (Appendix 7, Table 3), which falls within the Forest Resource Index range of 7 to 15 for lands of rural settlement mixed with forest resource and some agriculture. Forty percent of the ecodistrict has a Mixed Rural RI and 27% has a Remote RI (Appendix 7, Table 2).

The highest road densities occur around settlements and the major transportation systems and are primarily along the ecodistrict's northern boundaries, with the largest area being in the eastern end (Map 5). The Valley Corridors element has an RI of 14.

Roads can contribute to habitat fragmentation and environmental degradation. Since 56% of land ownership in the ecodistrict is in private hands, efforts could be made to:

- Encourage sharing of access roads and decommissioning of excess roads.
- Educating public about proper road construction.
- Encourage road maintenance.
- Encourage maintenance of unroaded areas and, promote linkages among them and other areas without roads either within or outside the ecodistrict.

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 interms of forest management and other activities that alter habitat and the landscape. If more information is required or if management specific to a priority species needs to be developed, a regional biologist, Wildlife Division staff, or other species experts should becontacted.

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 2013, in the Victoria Lowlands Ecodistrict 220, there are documented occurrences (under the NSESA) of the following number of formally listed species at risk: six endangered, one threatened, and two vulnerable.

Endangered species found in the ecodistrict include three mammal species: American marten (*Martes americana*), Canada lynx (*Lynx canadensis*), and little brown bat (*Myotis lucifugus*); and three bird species: barn swallow (*Hirundo rustica*), piping plover (*Charadrius melodus melodus*), and Bicknell's thrush (*Catharus bicknelli*). Bobolink (*Dolichonyx oryzivorus*) and eastern wood-pewee (*Contopus virens*) are two bird species listed as vulnerable. Wood turtle (*Glyptemys insculpta*) is listed as threatened. As well, Atlantic salmon – eastern Cape Breton population (*Salmo salar*) is ranked as endangered under COSEWIC. Monarch (*Danaus plexippus*) is listed as special concern federally.

In addition to the listed species, the national General Status process also identifies species of conservation concern. These include 19 orange-status species, 62 yellow-status species, and 29 green-status species for a total of 110 other species of conservation concern in this district (some green species are included because of their Atlantic Canada Conservation Data Centre rank of </= S3). As well there are six species that are ranked as undetermined, generally for a lack of information.

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).*

About 69%, or 2,000 hectares, of the Crown land has been identified under the policy.

Victoria Lowlands Ecodistrict 220 supports a diverse and healthy wildlife population. Although small in size, the area has more than its share of interesting wildlife species.

White-tailed deer were once very common throughout the area but numbers have been reduced. A period of long cold winters, reduction of winter cover and the arrival of coyotes have all contributed to the decline in deer numbers and are responsible in part in keep the recoveryslower than in other parts of the province.

There are four deer wintering area that are partly within the ecodistrict and the surrounding hills which form the boundary of the ecodistrict. These deer wintering areas are found at Little River, French River, Wreck Cove, and Ingonish. The special management practice (SMP) for deer wintering areas are in place to help maintain these areas of important deer cover.

Black bear numbers have increased greatly over the last decade. Black bears are found throughout the ecodistrict. A sow with four cubs has been reported in the Dingwall area on several occasions in the past several years.

Canada lynx, a Nova Scotia endangered species, is normally found in the highland region of the island. However, when hare numbers are low in that region, lynx have been known to spread down to adjoining lowland areas in search of its favourite prey. Bobcat, coyote, and fox are also found throughout the ecodistrict. These mammals feed mainly on small rodents, squirrels, grouse, and snowshoe hare, which are common in the area.

American marten, a Nova Scotia endangered animal, is a small member of the mustelid family that was once common in the ecodistrict. Today its numbers are quite low. Marten require mature softwood or softwood-dominated mixedwood for their habitat. *In the period of 2007 to 2010, a number of marten from New Brunswick were released in this ecodistrict in an attempt to augment the population.*

Moose were an abundant and dominant animal in the region prior to the arrival of the first European settlers. By 1825, as a result of over-harvesting for commercial and subsistence purposes, the population was in serious decline. Moose appears to have disappeared from Cape Breton by the early 20th century. In 1928 and 1929, seven mainland moose were introduced into the highlands but this introduction was unsuccessful. In 1947 and 1948, eight moose from Alberta were released in the Cape Breton National Park. This introduction was successful and has resulted in the present population, which numbers in the thousands.

Currently, moose are now common in the ecodistrict around Cape North, Ingonish, and along the shore from Wreck Cove to Jersey Cove. Moose winter in many of these lower elevation areas and as a result concentration of moose are greater in the winter months. There has been a licensed lottery hunt for the moose in Inverness and Victoria Counties since 1986. At present, 345 licenses are issued and the overall success rate has been around 90%. There is also a First Nations harvest that has been going on for a number of years.

Eagles and osprey are found nesting along the hillsides in the Cape North area as well as the area around Jersey Cove. They prey on the abundant fish found in these areas. Special management practices and guidelines are in place to help protect their nesting habitat. Both species of birds are protected by the province's wildlife act and there are special management practices in place to protect eagle nesting sites from forest harvesting and development.

Colonies of gulls, cormorants and kittiwakes are found nesting on the ocean side cliffs and on Ingonish Island. Piping plover, which is listed as endangered by federal and provincial governments, nests on the beaches at Aspy Bay. Three beaches, North Harbour, Middle Harbour, and South Harbour, have been home to as many as six nesting pairs of these small shorebirds. Human activity, weather, and predators are to main threats to their survival.

There are four orange-listed and 11 yellow-listed bird species found within the ecodistrict, including common loon, arctic tern, and willet. These species are seen in the Aspy Bay area.

Salmon and trout – both speckled and rainbow – can be found in the rivers of the ecodistrict. Salmon is endangered federally and red-listed in Nova Scotia.

Dragonflies and damselflies have been surveyed in the area. Spot-winged glider, muskeg emerald, and black meadowhawk are several of the yellow-ranked species that have been recorded. The Maritime Butterfly Atlas has added many records for species within the Victoria Lowlands Ecodistrict. Arctic fritillary, short-tailed swallowtail, and mustard white are all orange-listed and can be found at South Harbour.

There are 15 orange-listed and 44 yellow-listed plant species within the ecodistrict. Some of these plant species include downy willowherb, pink crowberry, spiked woodrush, Canada anemone, and marsh lousewort from the Bay St. Lawrence area as well as long-bracted frog orchid and red bulrush for the Big Intervale Cape North area.

Three sites in the ecodistrict are listed as sites of ecological significance in the Atlas of Nova Scotia's Nature Reserves and Sites of Ecological Significance.

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.

Appendix 3, Table 2 identifies those rare (2% or less of ecodistrict and ecoregion area) and under-represented ecosystems. Within the Victoria Lowlands Ecodistrict, there are seven ecosections – ICHO, ICSM, IMSM, WCDS, WCSM, WMHO, and WTLD – that each comprise less than 2% of the ecodistrict area. These ecosections combined form 1,297 hectares, or 7% of the ecodistrict.

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

- Conservation of uncommon forest species for which genetic viability may bethreatened as indicated by DNR's General Status of Wildlife ratingsystem.
- Fine filter management opportunities related to conservation of significant habitats.
- Uncommon community conditions (e.g. old age, large live and dead trees and species associations).

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

220 Victoria LowlandsEcodistrict			
Landscape Element and Type	**Ecosections***	**Dominant Natural Disturbance Regime**	**Dominant Climax Type**
Tolerant Hardwood Hills (Matrix)	WCHO WCSM WFKK WMHO	Gap	sugar Maple (sM), yellow Birch (yB), Beech (Be)
Spruce Fir Hills and Hummocks (Patch)	ICHO WCDS WCKK WMKK	Frequent	white Spruce (wS), balsam Fir (bF), black Spruce (bS)
Coastal Beach (Patch)	XXCB	N/A	wS
Wetlands (Patch)	WTLD	Open Seral (Frequent)	bS, tamarack (tL), red Maple (rM)
Salt Marsh (Patch)	XXMS	Open Seral (Frequent)	N/A
Floodplain (Patch)	ICSM IMSM	Gap	white Ash (wA), American Elm (aE)
Valley Corridors (Corridor)	Various	Various	Various

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

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

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

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

Ecological Representivity (Appendices 4, 5)

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

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

The Victoria Lowlands Ecodistrict includes part of the Cape Breton Highlands National Park, provincial parks, Polletts Cove – Aspy Fault Wilderness Area, French River Wilderness Area, sites of ecological significance under moratorium, several protected beaches and Nova Scotia Nature Trust lands, in total accounting for 6,763 hectares, or 37% of this ecodistrict, as legal or policy reserves.

Included in these figures is 2,000 hectares of old forests under the provincial Old Growth Policy, representing 69% of Crown land.

ELA Summary

Element Interpretation (All appendices andmaps)

Victoria Lowlands is the second smallest ecodistrict in Nova Scotia and includes the gently rolling topography along the Atlantic coastline of eastern Cape Breton Island. This diverse terrain includes hills, coastal lowlands, outwash plains, alluvial terraces, and fans situated between the highland escarpment and the Atlantic Ocean.

The underlying rocks are shale, limestone, and sandstone characteristic of the Carboniferous Bras d'Or Lake lowlands. Where gypsum occurs there is karst topography with sinkholes. The soils are primarily well-drained, moderately coarse-textured glacial tills. In areas where coarse sandy loams of the Hebert soil series occur, drainage can be rapid. The total area is 185 square kilometres.

Much of the ecodistrict reflects a history of land clearing and harvesting. Much of this occurred on the gentle terrain adjacent to the coast and second growth forests tend to be dominated by balsam fir, white spruce, white birch, and red maple.

On the hillier terrain with longer slopes, sugar maple, beech, and yellow birch prevail, along with scattered red oak, white ash, white birch, red maple, hemlock, and white pine.

White pine and hemlock will be found in the ravines along the rivers and streams flowing off the plateau. Near Neils Harbour, there are rare stands of jack pine.

This ecodistrict contains most of the land suitable for farming in the northern part of Cape Breton Island. Where old fields and clearings have been abandoned, white spruce has reforested the sites.

Coastal erosion is a concern for landowners.

Tolerant Hardwood Hills
(Matrix) (WCHO, WCSM, WFKK and WMHO ecosections) (8,635 ha)

Secondary forests of balsam fir and white spruce are abundant in this element and reflect a modification of the original vegetation. With the start of European settlement in the early 1800s much of the deciduous forest was cut, burned, and placed under cultivation and pasture.

The typical forest of this element is a tolerant hardwood forest of sugar maple, yellow birch, and beech with red maple often a frequent and prominent component. Balsam fir and white spruce are conspicuous but not necessarily abundant. Hemlock is uncommon and usually associated with lower steep slopes along streams. White pine can occur where soils are rockier and shallow. Red oak is widely distributed and locally common as at Pleasant Bay and Cape North.

These mid to late successional hardwood forests are typical of the Acadian Forest. Early successional forests following stand-level disturbances are typically of similar species with white birch and red maple usually more abundant. Striped maple and mountain maple are usually conspicuous in the undergrowth. These forests also have an abundant cover of ferns and club mosses.

Tolerant Hardwood Hills occurs on hummocky to hilly topography. Soils are typically coarse to medium-textured loams and sandy loams but better-drained fine-textured soils also support this element on hilly terrain. Embedded within this element are scattered and locally prominent site conditions that support a different forest community. Talus slopes have early successional forests of white spruce and white pine.

Karst (gypsum) outcrops support mid to late successional forests of yellow birch, red maple, sugar maple, white spruce, and hemlock. Along watercourses, steep ravines give rise to mixedwood forests often dominated by red maple, yellow birch, and hemlock. Floodplains occur on the Clyburn Brook, French and Barachois rivers and in Indian Brook.

Natural stand-level disturbances are rare and stands will usually maintain themselves through gap replacement, leading to an uneven-aged climax forests and the opportunity to develop old forest characteristics. Typically the understory has good reproduction of similar species that compose the mature stand.

Natural disturbance agents include hurricanes, ice storms, disease, and insects. The forests of this element currently reflect two province-wide disturbance events: beech bark canker introduction around 1900 and the birch dieback of the 1940s. Beech is now primarily an understory species and yellow birch is gaining prominence.

At the start of the 1920s many rural families left their farms to live and work in urban areas. As these fields were abandoned they reforested to white spruce. Today, very little remains of the settlements except rock walls, foundations, and cemeteries.

Flows

Humans (forestry, woods roads, off-highway vehicles (OHVs), outdoor recreation, hunting, fishing, trapping); moose (travelways, foraging); anadromous fish (water quality maintenance, riparian habitat, stream cooling, siltation, undercut banks); aquatic furbearers (denning, travel, foraging, beavers).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006) **Composition of Tolerant Hardwood Hills**				
Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	14%	27%	60% (41 Mat + 19 OF)	19%
Seral Stage	Early	Mid	Late	Unclassified
	1%	9%	87%	3%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	30%	36%	31%	3%

Desired Condition

A mature late seral hardwood forest.

Issues

- About 20% converted to nonforest
- Only 36% of the element now in a hardwood covertype
- Fragmentation
- Small patch size
- Only 10% of the current forest is in the early and mid seral stage
- Less than 10% of the element is on Crown lands
- Second lowest EEI (62 to 63) of all elements

Spruce Fir Hills and Hummocks

(Patch) (ICHO, WCDS, WCKK and WMKK ecosections) (6,720 ha)

This is a small to large patch level landscape element occurring on well to imperfectly drained hummocky and hilly terrain underlain by coarse to medium-textured glacial tills. Spruce Fir Hills and Hummocks also be found associated with steep slopes of streams and rivers flowing through the ecodistrict.

The forests tend to be dominated by black spruce on the moister sites and balsam fir and white spruce with a component of white birch and red maple on the better-drained soils that are usually associated with the lower and middle slope positions and ravines.

With progressively poorer drainage, black spruce, tamarack, and red maple dominate the forest vegetation and small wetlands are embedded throughout the element. Tolerant hardwood species occupy the crests and upper slopes.

Early successional forests tend to have a higher component of aspen, tamarack, and balsam fir but overall regenerating forests from stand-level harvesting will also include red maple, white birch, grey birch, and pin cherry.

The dominant natural disturbances are frequent and result in primarily even-aged forests except where tolerant hardwood species are established. Natural disturbances agents include windthrow and insects (e.g. spruce budworm if forests have a high component of balsam fir or white spruce).

The impact of settlement on this area was extensive, starting in the early 1800s, and much of this element reflects a history of cutting and burning followed by cultivation and pasturage. Therefore, the extent of the tolerant hardwood sites in this element could have extended to lower slopes positions.

Near the Atlantic coastline, forests may experience coastal influence and have features of coastal vegetation types with examples of this condition at White Point and MacKinnons Cove.

The presence of karst topography is scattered throughout the ecodistrict with extensive deposits at North Shore (Plaster Provincial Park), Dingwall, and South Harbour. Forests on karst topography have late successional species such as sugar maple, yellow birch, beech, and hemlock. Many rare plants are also associated with these karst locales.

Flows

Humans (forestry, woods roads, OHVs, outdoor recreation, hunting, fishing, trapping); moose (travelways, foraging, thermal cover); anadromous fish (water quality maintenance, riparian habitat. stream cooling, siltation, undercut banks); aquatic furbearers (denning, travel, foraging, breeding, nesting).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006)
Composition of Spruce Fir Hills and Hummocks

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	18%	52%	30% (14 Mat + 16 OF)	16%
Seral Stage	Early	Mid	Late	Unclassified
	10%	14%	69%	7%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	60%	9%	24%	7%

Desired Condition

Predominately a black spruce forest patch with lesser amounts of balsam fir and an even distribution of development classes. All seral stages should be represented.

Issues

- Only 30% of the current forest is in the mature and multi-aged development class
- About 30% of the current forest is now in the mixedwood and hardwood covertype

Coastal Beach

(Patch) (XXCB ecosection) (268 ha)

Coastal beaches are wave-dominated deposits composed of a mixture of sand, gravel, cobbles, and other sizes of sediments and occur under a variety of circumstances leading to several types of beach landforms. These can be barrier beaches, spits, tombolos or pocket beaches.

In this ecodistrict, spits are common with examples at South Harbour and Englishtown. Spits are beaches where sediment is moved along the shoreline by waves and when there is an abrupt change of shoreline orientation or the currents diminish, sediment is deposited.

Barrier beaches, for example at Ingonish and Breton Cove, are sand bars above high tide and parallel to the coastline and separated from it by a lagoon or lake, usually with brackish water. Pioneer species such as beach grass and associates occur near the high-water mark. A progressing development of woody shrubs such as bayberry, juniper, wild rose, foxberry, crowberry, and white spruce occur as the soil stabilizes and incorporates organic content and water retaining capabilities.

Many coastal beaches are too small to map and have been left as inclusions in other elements. Sand dunes with forests of white spruce can be seen at South Harbour, North Pond, and Aspy Bay.

Shingle beaches, which are beaches of eroded headlands, are quite prominent in this ecodistrict. They are wide and long and on the older parts of the upper beach scrubby forests of white spruce are found.

Flows

Humans (outdoor recreation, swimming, boating, fishing).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006)

Composition of Coastal Beach

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	42%	34%	24% (8 Mat + 16 OF)	16%
Seral Stage	Early	Mid	Late	Unclassified
	0%	3%	96%	1%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	63%	4%	32%	1%

Desired Condition

The beach areas should remain in as natural condition as possible.

Issues

- About 22% converted
- Coastal property development
- Permanent wharfs
- Overuse by humans

Floodplain
(Patch) (ICSM and IMSM ecosections) (54 ha)

Floodplains in this ecodistrict are associated with smooth, level terrain along the major rivers such as the Aspy and Ingonish rivers. However, they are also embedded in other elements associated with the Clyburn, French and Little rivers and some smaller brooks.

This is a linear patch element that receives annual deposits of sediments due to flooding. Soils are coarse sandy loams, often gravelly, deposited over gravel and cobble. The climax forest is dominated by white ash and at one time also included elm, although this species has been almost eliminated due to the Dutch elm disease.

Small gap disturbances in this climax forest maintain a canopy that provides important functions along these watercourses. Earlier successional forests include balsam poplar and white spruce. Where soils are imperfectly drained red maple and black spruce are more abundant along with willows and alders.

These floodplains are not known to support many rare or uncommon floodplain plants.

Flows

Humans (outdoor recreation, hunting, fishing, trapping); moose (travelways, foraging); anadromous fish (water quality maintenance, riparian habitat, stream cooling, siltation, undercut banks); aquatic furbearers (travelways, denning, foraging).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006)
Composition of Floodplain

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	27%	10%	63% (31 Mat + 32 OF)	32%
Seral Stage	Early	Mid	Late	Unclassified
	0%	0%	85%	15%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	1%	30%	54%	15%

Desired Condition

Community types of sugar maple, elm, and ash on the higher well-drained areas with black spruce on the imperfectly drained fine-textured soils.

Issues

- Less than 1% of the current forest is in the early and mid seral stage
- About 54% of the current forest is in a softwood covertype
- High RI of 23
- Lowest EEI of all the elements (56 to 67)

Wetlands
(Patch) (WTLD ecosection) (36 ha)

The few freshwater wetlands in the Victoria Lowlands are associated with small lakes and streams with a few depressional swamps and bogs aligned with the karst topography.

Vegetation can vary depending on how wetlands are drained but typical hydrophytic vegetation includes sedges, rushes, sphagnum moss, horsetails, sensitive and cinnamon ferns, cranberry, Labrador tea, false holly, alders, and winterberry.

Smaller wetlands are embedded within the other elements of the ecodistrict, especially the Floodplain and Spruce Fir Hummocks and Hills elements.

Wetlands are generally treeless or sparsely forested woodlands of black spruce, tamarack, and red maple. For the most part, sites are underlain by poorly drained mineral soils derived from sandstone tills or organic soils derived from peat (sphagnum mosses) or sedges. This element plays a critical role in water collection, filtering, and groundwater recharge.

Flows

Humans (outdoor recreation, hunting); moose (travelways, foraging, calving areas); anadromous fish (water quality maintenance); aquatic furbearers (denning, travel, foraging).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006)
Composition of Wetlands

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	0%	87%	13% (8Mat + 5OF)	5%
Seral Stage	Early	Mid	Late	Unclassified
	8%	0%	92%	0%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	84%	8%	8%	0%

Desired Condition

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

Issues

- High RI of 21
- Potential conversion and infilling
- Minor representation within the element

Salt Marsh
(Patch) (XXMS ecosection) (*90 ha, located in Valley Corridors element*)

Along the coast there are areas that are periodically flooded by the tide and are mapped as salt marshes. The most prominent of these are the brackish water marshes developed at the mouths of major streams and rivers, with examples at Indian Brook and Ingonish.

Saltwater marshes are best exemplified at South Harbour where an unusual feature is the presence of white pine stumps. It is suggested that pine had established on a low sandy extension of the spit which was later eroded away as a result of further shifting of the tidal currents.

Both types of marshes are formed from marine sediments deposited from tidal water flooding low-lying coastal areas. The deposits occur in sheltered, intertidal areas or behind spits, bars or islands and protected bays. The deposits are typically silt loams with semi-decomposed grasses and sedges trapped in the accumulating layers.

The dominant natural vegetation of salt marshes is *Spartina* grasses. Saltwater cordgrass, *S. alternifolia,* dominates the lower marsh while salt meadow cordgrass (salt hay grass), *S. patens,* is found on the drier and higher marsh microsite which is flooded less frequently.

Brackish marshes have similar plants but also sedges and rushes which are uncommon in salt marshes. The lands have not been used for agriculture other than for pasture or the harvesting of salt marsh grass for hay or bedding for livestock.

Valley Corridors
(Corridor) (Various ecosections) (2,228 ha)

The most evident linear features within this ecodistrict are faults, folds, and associated watercourses.

Corridors have significant levels of land use which have created settlements, agricultural fields, power lines, roads, and railways. These land use changes reduce the connective function of the corridor for some species and may also increase the barrier effect of the corridors for species that must move across or through them.

Flows

Humans (outdoor recreation, hunting, fishing, trapping); moose (travelways, foraging, thermal cover); anadromous fish (water quality maintenance, riparian habitat, stream cooling, siltation, undercut banks); aquatic furbearers (travelways, denning, foraging).

Composition

Victoria Lowlands Ecodistrict 220 (based on statistics up to 2006)
Composition of Valley Corridors

Development Class	Establishment	Young Competing	Mature (incl. multi-aged and old forest)	Multi-aged and Old Forest
	10%	20%	70% (53 Mat + 17 OF)	17%
Seral Stage	Early	Mid	Late	Unclassified
	4%	14%	80%	2%
Covertype	Softwood	Hardwood	Mixedwood	Unclassified
	28%	46%	25%	1%

Desired Condition

A series of connected slopes and intervales across the ecodistrict that are in a natural forest condition.

Issues

- About 11% converted to nonforest area
- Road index of 11
- Potential hydroelectric structures

Ecosystem Issues and Opportunities (All appendicesand maps)

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

- Recognition that Victoria Lowlands is located in a relatively rural area that is heavily forested with a fairly high ecological emphasis index of 72 to 74
- Ecodistrict is 12% converted with an average road index of 11
- Only 16% of the ecodistrict is under Crown ownership
- High road indices within the Coastal Beach, Wetlands, and Floodplain elements
- Seven of the eleven ecosections are rare and represent less than 2% of the ecodistrict
- About 20% of the Tolerant Hardwood Hills matrix element has been converted

Appendix 1: Flow - Element Interactions

Element	Humans	Moose	Anadromous Fish	Aquatic Furbearers
Matrix Tolerant Hardwood Hills	Forestry, Woods roads, OHVs, Outdoor recreation (Hunting, fishing, trapping, etc.)	Travelways, Foraging	Water quality maintenance, riparian habitat (e.g. stream cooling, siltation, undercut banks)	Denning, travel, foraging (beavers)
Patches Spruce Fir Hills and Hummocks	Forestry, Woods roads, OHVs, Outdoor recreation (Hunting, fishing, trapping, etc.)	Travelways, Foraging, Thermal cover	Water quality maintenance, riparian habitat (e.g. stream cooling, siltation, undercut banks)	Breeding, nesting, foraging
Coastal Beach	Outdoor recreation (Swimming, etc.)	-	-	-
Wetlands	Outdoor recreation (e.g. hunting)	Travelways, Foraging, calving areas	Water quality maintenance	Denning (e.g. muskrat), travel, Foraging
Salt Marsh	Outdoor recreation (e.g. hunting)	-	Foraging (prey species)	Breeding, foraging (e.g. otter), rearing
Floodplain	Outdoor Recreation (Hunting, Fishing, Trapping, etc.)	Travelways, Foraging	Water quality maintenance, riparian habitat (e.g. stream cooling, siltation, undercut banks)	Travelways, denning , foraging
Corridors Valley Corridors Drainages - North Aspy River, Neils Brook, Black Brook, Warren Brook, Clyburn Brook, Power Brook, MacKinnons Brook, MacLeods Brook, French River, Indian Brook	Outdoor Recreation (Hunting, Fishing, Trapping, etc.)	Travelways, Foraging	Water quality maintenance, riparian habitat (e.g. stream cooling, siltation, undercut banks)	Travelways, denning , foraging

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Tolerant Hardwood Hills	Matrix	High	WCHO WCSM WFKK WMHO	Landscape	Gap	- Climax tolerant hardwood - Current forest mixedwood, intolerant hardwood, red spruce, white spruce, some tolerant hardwood	- Matrix - Dissections	- Condition in the matrix - Interior conditions (patch sizes), change in species composition - Ownership (property size)	- Harvesting practices - Fragmentation	- Land purchase by government - Extension and education - Ecological restoration - Patch aggregation - Manage under gap disturbance regime
Spruce Fir Hills and Hummocks	Patch	High	ICHO WCDS WCKK WMKK	Local	Frequent	- Climax tolerant mixedwood - Current forest mixedwood, red spruce, intolerant and tolerant hardwood	WMKK, WFKK, WFHO, WMHO	- Conditions in matrix or associated ecodistrict - Roads - Settlement	- Harvesting in matrix - Uniqueness within region	- Ensure connectivity is addressed in adjacent ecodistricts if dissections converge
Coastal Beach	Patch and/or corridor	Low	XXCB	Local	N/A	- Wave dominated deposits of mixture of sand, gravel, and cobbles. Some with forest of white spruce	WTLD WFKK, WCKK	- Coastal property development, permanent wharfs. Illegal material extraction. Over-use by humans	----------	Ensure connectivity along coast

Appendix 2a: Landscape Connectivity Worksheet

Feature	Structure Type (corridor, matrix, patch, island)	Importance in Ecodistrict (high, moderate, low)	Significant Cases (species, ecosections, specific rivers)	Scale and Pattern of Operation (local, landscape)	Associated Natural Disturbance Regime	Characteristic Community	Characteristic Neighbour(s)	Barriers - Impediments to Functionality	Significant Issues	Management Strategy
Wetlands	Patch	Low	WTLD	Local	Open Seral	- Climax black spruce - Current forest black spruce, mixedwood, intolerant hardwood	WFKK, WCKK	- Susceptible to blowdown from harvesting in adjacent ecosections Aquatic connectivity can be affected by improper road construction	- Conversion - Infilling	- Ensure concerns of potential blowdown addressed in possible adjacent harvest blocks
Salt Marsh	Patch	High	XXMS	Landscape	Open Seral	- Dominated by *Spartina* grasses and cordgrass	WFKK, IFHO, WCKK	- Alteration	- Conversion - Infilling	- Education - Land use practices
Floodplain	Linear - Patch	Low	ICSM IMSM	Local	Gap	- Climax white ash and elm. Successional forest of balsam poplar and white spruce. Imperfect drainage sites have red maple and black spruce	WFHO	- Changes in species composition. Dutch elm disease.	- Amount of early seral species	- Appropriate forest practices to increase late seral species
Valley Corridors	Corridor	High	Various	Landscape	Variable	- Current forest largely mixedwood with some tolerant softwood and black spruce	- Primarily matrix	- Loss of linear continuity in waterways	- Existing or potential hydroelectric structures up stream	- Alternate sources of electrical power - Adoption of forest practices to maintain riparian zone integrity

Appendix 2b: Connective Management Strategies

Structure Type	Attributes	Conditions of Concern	Management Strategies
Matrix	percolation, large patch, interior habitat	fragmentation, excessive edge	1. Promote contiguous forest structure using strategies suchas patch aggregation and overstory-sustaining selection cutting 2. Promote large patch structure and interior conditions 3. Mitigate large-scale, long-term, fragmentation of the matrixthat could impede percolation 4. Manage age and structure appropriate to naturaldisturbance regime (NDR). For gap and infrequently disturbed ecosections maintain 60% maturecover
Patch Ecosystems	patch size, nearest neighbour, edge / interior, intervening habitat condition	undesirable connections, internal composition, excessive separations, threats to key patch	1. Identify and map key patch representatives (high qualityor 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 appropriatethrough strategic management of neighbouring ecosystems 4. Sustain continuity, through management of overstoryand interior structure appropriate to NDR 5. Follow habitat regulations for buffer management. Establish wider buffers with natural boundaries along majorwaterways

Appendix 3: Special Occurrences (Ecodistrict 220)

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

SPECIES		DESIGNATION		
Common Name	**Scientific Name**	**Provincial**	**Federal**	**COSEWIC**
BIRDS				
Bicknell's Thrush	*Catharus bicknelli*	Endangered	Special Concern	Threatened
Piping Plover	*Charadriusmelodusmelodus*	Endangered	Endangered	Endangered
Eastern Wood-Pewee	*Contopusvirens*	Vulnerable	N/A	Special Concern
Bobolink	*Dolichonyx oryzivorus*	Vulnerable	N/A	Threatened
Barn Swallow	*Hirundo rustica*	Endangered	N/A	Threatened
Bank Swallow	*Riparia riparia*	N/A	N/A	Threatened
FISH				
Atlantic Salmon (Eastern Cape Breton population)	*Salmo salar*	N/A	N/A	Endangered
INSECTS				
Monarch	*Danaus plexippus*	N/A	Special Concern	Special Concern
MAMMALS				
Canadian Lynx	*Lynx canadensis*	Endangered	N/A	N/
American Marten	*Martes americana*	Endangered	N/A	A
Little Brown Myotis	*Myotis lucifugus*	Endangered	N/A	N/
Long-tailed Shrew	*Sorex dispar*	N/A	Special Concern	A Endangered N/A
REPTILES				
Wood Turtle	*Glyptemys insculpta*	Threatened	Threatened	Threatened

Appendix 3: Special Occurrences (Ecodistrict 220)

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
Purple Sandpiper	*Calidris maritima*	Sensitive (Yellow)	S3N
Least Sandpiper	*Calidris minutilla*	Secure (Green)	S1B,S5M
Semipalmated Sandpiper	*Calidris pusilla*	Sensitive (Yellow)	S3M
Black Guillemot	*Cepphus grylle*	Secure (Green)	S3S4
Semipalmated Plover	*Charadrius semipalmatus*	Secure (Green)	S1S2B,S5M
Killdeer	*Charadrius vociferus*	Sensitive (Yellow)	S3S4B
Cape May Warbler	*Dendroica tigrina*	Sensitive (Yellow)	S3?B
Yellow-bellied	*Empidonax flaviventris*	Sensitive (Yellow)	S3S4B
Flycatcher Atlantic	*Fratercula arctica*	Sensitive (Yellow)	S1B,S4S5
Puffin	*Gavia immer*	May Be At Risk (Orange)	N S3B,S4N
Common Loon	*Morus bassanus*	Secure (Green)	SHB,S5M
Northern Gannet	*Phalacrocorax carbo*	Sensitive (Yellow)	S3
Great Cormorant	*Pinicola enucleator*	May Be At Risk (Orange)	S3?B,S5N
Pine Grosbeak	*Poecile hudsonica*	Sensitive (Yellow)	S3
Boreal Chickadee	*Sterna hirundo*	Sensitive (Yellow)	S3B
Common Tern	*Sterna paradisaea*	May Be At Risk (Orange)	S3B
Arctic Tern	*Tringa melanoleuca*	Sensitive (Yellow)	S3B,S5M
Greater Yellowlegs	*Tringa semipalmata*	May Be At Risk (Orange)	S2S3B
Willet	*Tringa solitaria*	Secure (Green)	S1?B,S4S5M
Solitary Sandpiper			
DICOTS			
Running Serviceberry	*Amelanchierstolonifera*	Secure (Green)	S3?
Canada Anemone	*Anemone canadensis*	May Be AtRisk	S2
Virginia Anemone	*Anemone virginiana var. alba*	(Orange)	S1S
Drummond's Rockcress	*Arabis drummondii*	Sensitive	2 S2
Western Hairy Rockcress	*Arabis hirsuta var. pycnocarpa*	(Yellow)	S1S
Frankton's Saltbush	*Atriplex franktonii*	Sensitive	2
Northern Birch	*Betula borealis*	(Yellow) May Be	S3S
Yellow Marsh Marigold	*Caltha palustris*	At Risk (Orange)	4 S2
Bastard's Toadflax	*Comandra umbellata*	Secure (Green)	S2
Rock Whitlow-Grass	*Draba arabisans*	Sensitive	S2
Pink Crowberry	*Empetrum eamesii*	(Yellow)	S2
Pink Crowberry	*Empetrum eamesii ssp. atropurpureum*	Sensitive	S3
Pink Crowberry	*Empetrum eamesii ssp. eamesii*	(Yellow)	S2S
		May Be At Risk (Orange)	3
		Sensitive (Yellow)	S2S3

Appendix 3: Special Occurrences (Ecodistrict 220)

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***
Hornemann's Willowherb	*Epilobium hornemannii*	Sensitive (Yellow)	S3
Downy Willowherb	*Epilobium strictum*	Sensitive (Yellow)	S3
Hyssop-leaved Fleabane	*Erigeron hyssopifolius*	Sensitive (Yellow)	S3
Black Ash	*Fraxinus nigra*	Sensitive (Yellow)	S2S3
Northern Wild Licorice	*Galium kamtschaticum*	Secure (Green)	S3
Northern Comandra	*Geocaulon lividum*	Sensitive (Yellow)	S3
Spurred Gentian	*Halenia deflexa ssp. brentoniana*	Undetermined	S1?
Kalm's Hawkweed	*Hieracium kalmii*	Undetermined	S2?
Robinson's Hawkweed	*Hieracium robinsonii*	Sensitive (Yellow)	S2
Balsam Groundsel	*Packera paupercula*	Secure (Green)	S3
Marsh Lousewort	*Pedicularis palustris*	May Be At Risk (Orange)	S1
Pennsylvania Smartweed	*Polygonum pensylvanicum*	Secure (Green)	S3
Mistassini Primrose	*Primula mistassinica*	Sensitive (Yellow)	S2
Pink Pyrola	*Pyrola asarifolia*	Secure (Green)	S3
Lesser Pyrola	*Pyrola minor*	Sensitive (Yellow)	S2
Satiny Willow	*Salix pellita*	Undetermined	S2S3
White Mountain Saxifrage	*Saxifraga paniculata ssp. neogaea*	Sensitive (Yellow)	S2
Soapberry	*Shepherdiacanadensis*	Sensitive (Yellow)	S2
White Sea-blite	*Suaeda maritima ssp. richii*	Undetermined	S1
Northern Blueberry	*Vaccinium boreale*	May Be At Risk (Orange)	S2
Dwarf Bilberry	*Vaccinium caespitosum*	Sensitive (Yellow)	S2
Oval-leaved Bilberry	*Vaccinium ovalifolium*	May Be At Risk (Orange)	S1
Alpine Bilberry	*Vaccinium uliginosum*	Sensitive (Yellow)	S2
Thyme-Leaved Speedwell	*Veronica serpyllifolia ssp. humifusa*	Sensitive (Yellow)	S2S3
Squashberry	*Viburnum edule*	Sensitive (Yellow)	S3
FERNS AND THEIR ALLIES			
Maidenhair Spleenwort	*Asplenium trichomanes*	Sensitive (Yellow)	S2
Lance-Leaf Grape-Fern	*Botrychium lanceolatum var. angustisegmentum*	Sensitive (Yellow)	S2S3
Common Moonwort	*Botrychium lunaria*	May Be At Risk (Orange)	S1
Least Moonwort	*Botrychium simplex*	Sensitive (Yellow)	S2S3
Fragrant Wood Fern	*Dryopteris fragrans var. remotiuscula*	Sensitive (Yellow)	S2
Common Scouring-rush	*Equisetum hyemale var. affine*	Secure (Green)	S3S4
Meadow Horsetail	*Equisetum pratense*	Sensitive (Yellow)	S2
Variegated Horsetail	*Equisetumvariegatum*	Secure (Green)	S3
Acadian Quillwort	*Isoetes acadiensis*	Sensitive (Yellow)	S3

Appendix 3: Special Occurrences (Ecodistrict 220)

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***
Northern Clubmoss	*Lycopodium complanatum*	Secure (Green)	S3S4
Sitka Clubmoss	*Lycopodium sitchense*	Secure (Green)	S3?
Northern Holly Fern	*Polystichum lonchitis*	Sensitive (Yellow)	S2
Low Spikemoss	*Selaginella selaginoides*	May Be At Risk (Orange)	S2
Alpine Cliff Fern	*Woodsia alpina*	May Be At Risk (Orange)	S1S2
Smooth Cliff Fern	*Woodsia glabella*	Sensitive (Yellow)	S2
INSECTS			
Eastern Red Damsel	*Amphiagrion saucium*	Secure (Green)	S3
Arctic Fritillary	*Boloria chariclea*	Sensitive (Yellow)	S2
Common Branded Skipper	*Hesperia comma*	Secure (Green)	S3
Spot-Winged Glider	*Pantala hymenaea*	Sensitive (Yellow)	S2B
Short-tailed Swallowtail	*Papilio brevicauda*	Sensitive (Yellow)	S1S2
Mustard White	*Pieris oleracea*	Sensitive (Yellow)	S2
Green Comma	*Polygonia faunus*	Secure (Green)	S3
Question Mark	*Polygonia interrogationis*	Secure (Green)	S3B
Muskeg Emerald	*Somatochlora septentrionalis*	Sensitive (Yellow)	S2
Aphrodite Fritillary	*Speyeria aphrodite*	Secure (Green)	S3S4
Black Meadowhawk	*Sympetrum danae*	Sensitive (Yellow)	S3
LICHENS			
Rosette Pixie-cup Lichen	*Cladonia pocillum*	Sensitive (Yellow)	S2S3
MAMMALS			
American Marten	*Martes americana*	At Risk (Red)	S1
Rock Vole	*Microtuschrotorrhinus*	Secure (Green)	S2
Cougar - Eastern population	*Puma concolor pop. 1*	Undetermined	SH
MONOCOTS			
Short-awned Foxtail	*Alopecurusaequalis*	Sensitive (Yellow)	S2S3
Red Bulrush	*Blysmus rufus*	May Be At Risk (Orange)	S1
Lesser Brown Sedge	*Carex adusta*	Sensitive (Yellow)	S2S3
Atlantic Sedge	*Carex atlantica ssp. capillacea*	Undetermined	S2
Scabrous Black Sedge	*Carex atratiformis*	Sensitive (Yellow)	S2
Hairlike Sedge	*Carex capillaris*	Sensitive (Yellow)	S2
Bristle-leaved Sedge	*Carex eburnea*	Sensitive (Yellow)	S3

Appendix 3: Special Occurrences (Ecodistrict 220)

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***
Rosy Sedge	*Carex rosea*	Secure (Green)	S3
Russet Sedge	*Carex saxatilis*	May Be At Risk (Orange)	S1
Scirpuslike Sedge	*Carex scirpoidea*	Sensitive (Yellow)	S2
Long-bracted Frog Orchid	*Coeloglossum viride var. virescens*	May Be At Risk (Orange)	S2S3
Early Coralroot	*Corallorhiza trifida*	Secure (Green)	S3
Yellow Lady's-slipper	*Cypripedium parviflorum*	Sensitive (Yellow)	S2S3
Showy Lady's-Slipper	*Cypripedium reginae*	May Be At Risk (Orange)	S2
Few-flowered Spikerush	*Eleocharis quinqueflora*	May Be At Risk (Orange)	S2
Menzies' Rattlesnake-plantain	*Goodyera oblongifolia*	Sensitive (Yellow)	S3
Lesser Rattlesnake-plantain	*Goodyera repens*	Sensitive (Yellow)	S3
Moor Rush	*Juncus stygius ssp. americanus*	Sensitive (Yellow)	S1S2
Highland Rush	*Juncus trifidus*	Sensitive (Yellow)	S2
Loesel's Twayblade	*Liparis loeselii*	Secure (Green)	S3S4
Small-flowered Woodrush	*Luzula parviflora*	Secure (Green)	S3S4
Spiked Woodrush	*Luzula spicata*	May Be At Risk (Orange)	S1
Hooker's Orchid	*Platanthera hookeri*	Secure (Green)	S3
Large Round-Leaved Orchid	*Platantheramacrophylla*	Sensitive (Yellow)	S2
Small Round-leaved Orchid	*Platantheraorbiculata*	Secure (Green)	S3
Glaucous Blue Grass	*Poa glauca*	Sensitive (Yellow)	S2S3
White-stemmed Pondweed	*Potamogetonpraelongus*	Sensitive (Yellow)	S3?
Small Burreed	*Sparganium natans*	Secure (Green)	S3
Narrow False Oats	*Trisetum spicatum*	Secure (Green)	S3S4

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

Appendix 3: Special Occurrences (Ecodistrict 220)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Deer wintering areas (DWA)	Forest habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	
Caves	Caves and mine adits	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database; Atlantic Canada Conservation Data Centre database	
Loon nesting lakes	Freshwater lakes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Eagle nesting areas	Forest habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Wildlife Act
Hawk and owl nesting areas	Forest habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Wildlife Act
Waterfowl breeding, staging, and wintering areas	Freshwater wetlands, saltmarshes, and coastal waters	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Canada Lynx Habitat	Ecosystem	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Marten Habitat	Ecosystem	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Seabird nesting Colonies	Coastal headlands, cliffs and islands	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Shorebird breeding and staging areas	Beaches, saltmarshes and mudflats	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Migratory Birds Convention Act
Piping plover nesting areas	Beaches and dunes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Wildlife Act; Nova Scotia Endangered Species Act
Wood turtle habitat	Rivers, streams and riparian habitat	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Wildlife Act; Nova Scotia Endangered Species Act

Appendix 3: Special Occurrences (Ecodistrict 220)
Table 1c – Other Conservation Features

Feature	Type	Information Source	Legislation or Status Ranking System
Fish habitat areas	Rivers, streams, and lakes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Canada Fisheries Act
Dragonfly, damselfly, and butterfly habitats	Upland and wetland habitats	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Freshwater mussel habitat	Rivers, streams, and lakes	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
Rare plant habitat	Upland and wetland habitats	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	Nova Scotia Endangered Species Act
DNR Old Forest Reserves	Old forest habitat	Old Forest Database	Policy reserve
Operational/Non-Designated Parks and Reserves	Ecosystem / recreation	DNR Restricted Land Use Database	Nova Scotia Parks Act
Karst areas	Upland and wetland sites	Significant Habitats of Nova Scotia Database; Atlantic Canada Conservation Data Centre database	N/A
Cape Breton Highlands National Park	National Park	DNR Restricted Land Use Database	Federal Parks Act
Protected Beaches	Ecosystem	DNR Restricted Land Use Database	Nova Scotia Beaches
Wilderness Areas	Ecosystem /	DNR Restricted Land Use Database	Nova Scotia Wilderness Areas Protection Act
Provincial Parks	Ecosystem / recreation	DNR Restricted Land Use Database	Nova Scotia Parks Act
French River IBP Site	International Biological Program Site	DNR Restricted Land Use Database	N/A

Appendix 3: Special Occurrences (Ecodistrict 220)
Table 1d – Heritage Features

Feature	Type	Information Source
Native Artifacts	Cultural/Community Heritage	Aboriginal Traditional Knowledge Local Knowledge DNR Database
Abandoned Mines	Geological and Cultural Heritage	NS Abandoned Mines Database
Significant Geological Features	Geological and Cultural Heritage	Local Knowledge
John Cabot Landing Site	Cultural/Community Heritage	Local Knowledge

Appendix 3: Special Occurrences

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

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

Ecosection	Climax Type	Ecodistrict Occurrence						Ecoregion Occurrence					
		Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted	Area of Ecosection		Area of Climax Type (1, 2, 3) *		EEC Index ecosection	% Converted
		Ha	%	Ha	%			Ha	%	Ha	%		
ICHO	wS bS bF	173	0.9	9,260	50.2	54 to 61	14.9	173	0.1	9,876	4.9	34 to 38	14.9
ICSM	aE sM wA	180	1.0	268	1.5	58 to 61	11.2	180	0.1	268	0.1	35 to 37	11.2
IMSM	aE sM wA	284	1.5	268	1.5	47	23.3	850	0.4	268	0.1	64 to 66	8.2
WCDS	wS bS bF	182	1.0	9,260	50.2	61	2.6	1,659	0.8	9,876	4.9	96	0.3
WCHO	sM yB Be rO	7,565	41.0	7,750	42.0	64 to 66	14.8	8,745	4.3	7,750	3.8	51 to 53	13.6
WCKK	wS bS bF	5,971	32.4	9,260	50.2	84 to 86	3.4	34,836	17.1	9,876	4.9	88 to 91	0.8
WCSM	sM yB Be rO	102	0.6	7,750	42.0	74 to 76	0.6	102	0.1	7,750	3.8	69 to 71	0.6
WFKK	sM yB Be rO	2,145	11.6	7,750	42.0	76 to 77	5.1	2,145	1.1	7,750	3.8	67 to 68	5.1
WMHO	sM yB Be rO	340	1.8	7,750	42.0	21 to 24	49.6	24,545	12.1	7,750	3.8	77 to 82	0.9
WMKK	wS bS bF	604	3.3	9,260	50.2	48 to 60	13.5	94,239	46.3	9,876	4.9	68 to 74	0.6
WTLD		36	0.2	36	0.2	93	0.7	3,471	1.7	36	0.0	83 to 84	0.1

*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 unproclaimedlegal 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)
WCHO	sM yB Be rO	7,565	6.5	126	14.9	78	4.7	204	2.7	20	0.3	223	2.9
WCKK	wS bS bF	5,971	31.3	0	0.0	17	0.0	17	0.3	0	0.0	17	0.3
WFKK	sM yB Be rO	2,145	5.0	0	0.0	108	0.0	108	5.0	0	0.0	108	5.0
WMKK	wS bS bF	604	1.7	0	0.0	8	0.0	8	1.3	0	0.0	8	1.3
XXWA		517	7.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WMHO	sM yB Be rO	340	1.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
IMSM	aE sM wA	284	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
XXCB	coastal beach	268	50.4	88	40.7	6	0.0	94	35.0	41	15.2	134	50.2
WCDS	wS bS bF	182	78.0	0	0.0	9	0.0	9	4.8	0	0.0	9	4.8
ICSM	aE sM wA	180	13.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ICHO	wS bS bF	173	12.0	17	0.0	2	0.0	18	10.5	0	0.0	18	10.5
WCSM	sM yB Be rO	102	41.6	0	0.0	4	0.0	4	3.8	0	0.0	4	3.8
XXMS	salt marsh	91	15.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total		**18,421.6**		**230.3**	**55.5**	**230.2**	**4.7**	**460.5**		**60.2**		**520.7**	

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 Parks and Adjuncts	4,431	0.0	Old Forest	2,000	0.0
Protected Beaches	88	56	Designated Provincial Parks and Park Reserves	21	0.0
Wilderness Areas	139	0.0	Operational Non Designated Parks and Reserves	7	0.0
Sites of Ecological Significance Under Moratorium	15	0.0	Nova Scotia Nature Trust	0.0	5
Designated Provincial Parks and Park Reserves	1.0	0.0		0.0	0.0
Nova Scotia Nature Trust	0.0	<1		0.0	0.0

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 NovaScotia.

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	221
Utility corridors	3	34
Gravel Roads and active railways	6	158
Paved streets and roads collectors	10	142
Highways	15	0

Table 2: Distribution of Road Index Classes

Road Index Value		Area of Ecodistrict Affected	
Indication	Range	Hectar	Percent
Remote	0 to 6	5,002	27.1
Forest Resource	7 to 15	4,993	27.1
Mixed Rural	16 to 24	7,418	40.2
Agriculture Suburban	25 to 39	1,044	5.7
Urban	40 to 100	0	0.0
Total		**18,457**	**100**

Table 3: Road Index Values for Each Landscape Element Type

Landscape Element	Area	Road
Tolerant Hardwood Hills	8,635	11
Valley Corridors	2,228	14
Coastal Beach	268	20
Wetlands	36	21
Floodplain	54	23
Spruce Fir Hills and Hummocks	6,720	11
Salt Marsh	0	0
Total	**18,458**	**11**

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

Appendix 8: Development Classes and Seral Stages

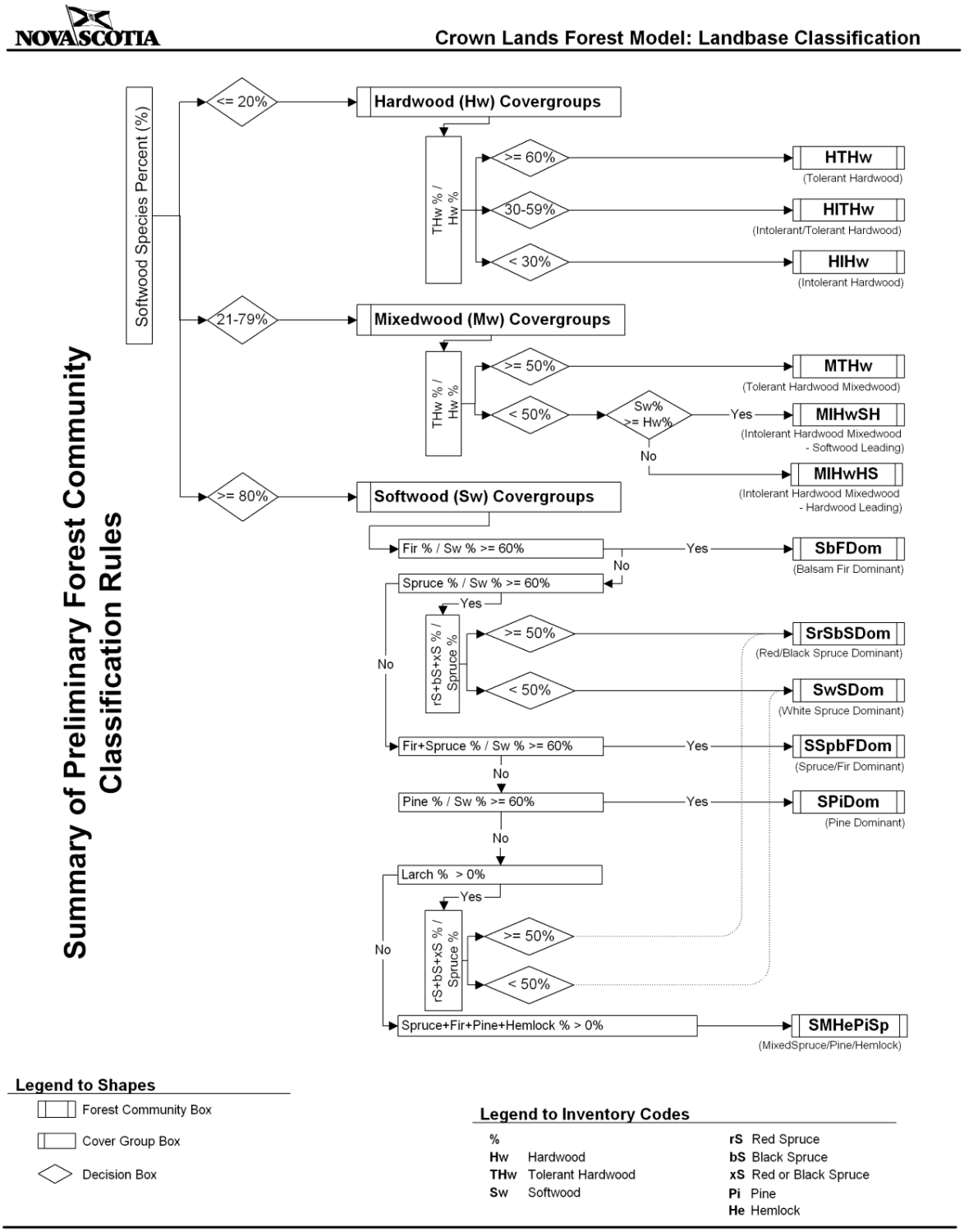
Development Class	Seral Stage
1. Forest Establishment (Height 0 to 6m) • establishment of new growth following a stand-initiating disturbance • high diversity of forbs, shrubs, and tree regeneration, many of which are short-live shade-intolerant "pioneer" species • peak seed production by forbsand shrubs • approximate age 0 to 25years	Early Seral Species (Score 10 to 23) • new growth dominated by pioneertree species or unclassifiedregeneration Mid Seral Species (Score 24 to 37) • regeneration composed of a mixture of pioneer, mid-climax, and climaxspecies Late Seral Species (Score 38 to 50) • regenerationdominated by climax species
2. Young Forest (Height 7 to 11m) • 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 40years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneer treespecies Mid Seral Species (Score 24 to 37) • canopy composed of a mixture ofpioneer, mid-climax, and climaxspecies Late Seral Species (Score 38 to 50) • canopy dominated by climaxspecies
3. Mature Forest (Height > 11m) • stands dominated by upper canopy with full differentiation into dominance classes • self-thinning processreduced • tree seed production prominent and regular • individual tree mortality creates canopy gaps that are soon closed by neighbouring treegrowth • increased light initiates regenerationand early understory development • approximate age 40 to 125years	Early Seral Species (Score 10 to 23) • canopy dominated by pioneerspecies • over maturity initiates canopybreakup and understorydevelopment 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 climaxspecies • over maturity initiates gap dynamic processes leading to multi-aged andold 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 developingunderstory 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 dynamicprocesses

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



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

Preliminary Draft: November 14, 2006

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Victoria Lowlands 220)

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	WCHO (71.4%) WFKK (24.4%) WMHO (4.0%) WCSM (0.2%)	Softwood	wS bS bF	Gap	1,953; 22.6	Early	0	1	1	0	2	2,056; 30.0	EARLY	62; 0.9
						Mid	0	25	0	0	25			
						Late	411	715	431	440	1,997			
						Uncl	32	0	0	0	32			
		Mixedwood				Early	0	5	0	4	10	2,120; 30.9	MID	646; 9.4
						Mid	4	94	29	32	159			
						Late	175	624	536	608	1,943			
						Uncl	9	0	0	0	9			
		Hardwood	sM yB Be rO	Gap	6,678; 77.4	Early	3	15	12	0	29	2,489; 36.3	LATE	5,930; 86.6
						Mid	31	178	195	58	462			
						Late	79	189	1,598	124	1,990			
						Uncl	7	0	0	0	7			
		Unclassified				Early	20	0	0	0	20	186; 2.7	UNCL	214; 3.1
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	166	0	0	0	166			
Total					**8,635***	**# ha**	**936**	**1,844**	**2,803**	**1,267**	**6,851**			
						%	**13.7%**	**26.9%**	**40.9%**	**18.5%**	**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.

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Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Valley Corridors	WCHO (62.4%) IMSM (14.7%) ICSM (7.1%) WCSM (5.3%) ICHO (4.4%) WFKK (1.4%)	Softwood	wS bS bF	Infrequent	617; 27.6	Early	0	0	0	0	1	488; 27.5	EARLY	76; 4.3
						Mid	0	5	0	0	5			
						Late	70	215	121	68	474			
						Uncl	9	0	0	0	9			
		Mixedwood				Early	0	0	0	0	0	446; 25.1	MID	252; 14.2
						Mid	3	5	25	5	38			
						Late	36	63	173	136	408			
						Uncl	1	0	0	0	1			
		Hardwood	sM yB BerO aE sM wA sM yB Be	Gap	1,324; 59.4	Early	1	11	42	22	75	819; 46.1	LATE	1,412; 79.5
						Mid	5	9	161	35	209			
						Late	23	34	438	35	531			
						Uncl	3	0	0	0	3			
		Unclassified				Early	0	0	0	0	0	23; 1.3	UNCL	36; 2.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	23	0	0	0	23			
Total					**2,228.4***	**# ha**	**173**	**342**	**959**	**302**	**1,776**			
						%	**9.8%**	**19.2%**	**54.0%**	**17.0%**	**100.0%**			

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Appendix 10: Table 1: Forest Landscape Composition Worksheet (Victoria Lowlands 220)

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 Fir Hills and Hummocks	ICHO (1.5%) WCDS (2.7%) WCKK (86.8%) WMKK (9.0%)	Softwood	wS bS bF	Infrequent	6,690; 99.5	Early	64	41	0	23	127	3,371; 60.5	EARLY	543; 9.7
						Mid	0	47	0	0	47			
						Late	333	2,115	78	556	3,082			
						Uncl	115	0	0	0	115			
		Mixedwood				Early	2	29	158	2	192	1,362; 24.4	MID	762; 13.7
						Mid	0	313	79	79	470			
						Late	107	262	126	202	697			
						Uncl	3	0	0	0	3			
		Hardwood	sM yB Be	Gap	30; 0.4	Early	0	47	137	2	186	482; 8.6	LATE	3,830; 68.7
						Mid	0	63	182	0	246			
						Late	3	9	38	0	50			
						Uncl	0	0	0	0	0			
		Unclassified				Early	36	2	0	0	38	361; 6.5	UNCL	440; 7.9
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	323	0	0	0	323			
Total					**6,720***	**# ha**	**986**	**2,927**	**799**	**864**	**5,574**			
						%	**17.7%**	**52.5%**	**14.3%**	**15.5%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Victoria Lowlands 220)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Floodplain	ICSM (99.9%) IMSM (0.1%)	Softwood				Early	0	0	0	0	0	0.4; 0.8	EARLY	0; 0.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Mixedwood				Early	0	0	0	0	0	26; 53.8	MID	0.1; 0.1
						Mid	0	0	0	0	0			
						Late	6	5	0	16	26			
						Uncl	0	0	0	0	0			
		Hardwood	aE sM wA	Gap	38; 70.0	Early	0	0	0	0	0	15; 29.9	LATE	41; 84.5
						Mid	0	0	0	0	0			
						Late	0	0	15	0	15			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	8; 15.4	UNCL	8; 15.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	8	0	0	0	8			
Total					**54***	**# ha**	**13**	**5**	**15**	**16**	**49**			
						%	**26.6%**	**10.0%**	**30.9%**	**32.4%**	**100.0%**			

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

Appendix 10: Table 1: Forest Landscape Composition Worksheet (Victoria Lowlands 220)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Coastal Beach	XXCB (100.0%)	Softwood				Early	0	0	0	0	0	33; 62.8	EARLY	0.1; 0.2
						Mid	0	0	0	0	0			
						Late	19	3	3	8	33			
						Uncl	0	0	0	0	0			
		Mixedwood				Early	0	0	0	0	0	17; 31.9	MID	2; 3.1
						Mid	0	0	0	0	0			
						Late	1	15	0	0	16			
						Uncl	0	0	0	0	0			
		Hardwood				Early	0	0	0	0	0	2; 4.5	LATE	50; 95.5
						Mid	1	0	0	0	2			
						Late	0	0	1	0	1			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	0.4; 0.9	UNCL	0.6; 1.1
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**268***	**# ha**	**22**	**18**	**4**	**8**	**52**			
						%	**41.8%**	**34.7%**	**7.9%**	**15.5%**	**100.0%**			

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Appendix 10: Table 1: Forest Landscape Composition Worksheet (Victoria Lowlands 220)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Wetlands	WTLD	Softwood				Early	0	0	0	0	0	18; 84.0	EARLY	2 7.7
						Mid	0	0	0	0	0			
						Late	0	17	0	1	18			
						Uncl	0	0	0	0	0			
		Mixedwood		None		Early	0	0	0	0	0	2; 8.3	MID	0; 0
						Mid	0	0	0	0	0			
						Late	0	0	2	0	2			
						Uncl	0	0	0	0	0			
		Hardwood				Early	0	2	0	0	2	2; 7.7	LATE	19; 92.3
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	0; 0	UNCL	0; 0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
Total					**36***	**# ha**	**0**	**18**	**2**	**1**	**21**			
						%	**0.0%**	**87.6%**	**7.7%**	**4.8%**	**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 (Victoria Lowlands 220)

Element	Ecosection (% land area)	Covertype	Climax Species (M=Mid; L=Late Seral)	Natural Disturbance Regime	Total Land Area of Potential Forest* (ha; %)	Seral Stage	Current Forest - GIS Inventory							
							Development Class (ha)				Total Forested Area (ha)	Covertype (ha; %)	Seral Stage Summary (ha; %)	
							Establish-ment (1)	Young Forest (2)	Mature Forest (3)	Multi-aged (4)				
Floodplain	ICSM (99.9%) IMSM (0.1%)	Softwood				Early	0	0	0	0	0	0.4; 0.8	EARLY	0; 0.0
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	0	0	0	0	0			
		Mixedwood				Early	0	0	0	0	0	26; 53.8	MID	0.1; 0.1
						Mid	0	0	0	0	0			
						Late	6	5	0	16	26			
						Uncl	0	0	0	0	0			
		Hardwood	aE sM wA	Gap	38; 70.0	Early	0	0	0	0	0	15; 29.9	LATE	41; 84.5
						Mid	0	0	0	0	0			
						Late	0	0	15	0	15			
						Uncl	0	0	0	0	0			
		Unclassified				Early	0	0	0	0	0	8; 15.4	UNCL	8; 15.4
						Mid	0	0	0	0	0			
						Late	0	0	0	0	0			
						Uncl	8	0	0	0	8			
Total					**54***	**# ha**	**13**	**5**	**15**	**16**	**49**			
						%	**26.6%**	**10.0%**	**30.9%**	**32.4%**	**100.0%**			

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Tolerant Hardwood Hills Matrix	WCHO WCSM WFKK WMHO	Gap	sM yB Be rO	S	SwSDom	1,476	22.1%	M	**Well-drained** Early VTs: rM, wB, tA, bF Mid VTs: rM, wA, yB Late VTs: sM, yB, Be **Moist** Early-Mid VTs: bF, rM, wB, tA Late VTs: bF, wS, yB, rM, rS, eH **Old Fields** Early VTs: wS, tL, bF
				S	SbFDom	317	4.8%	L	
				S	SrSbSDom	126	1.9%	L	
				S	SSpbFDom	105	1.6%	L	
				S	SMHePiSp	31	0.5%	L	
				M	MIHwSH	1,288	19.3%	E/M	
				M	MIHwHS	795	11.9%	E/M	
				M	MTHw	37	0.6%	L	
				H	HIHw	1,429	21.4%	E/M	
				H	HTHw	777	11.7%	L	
				H	HITHw	283	4.2%	M	
Total						**6,665**	**100.0**%		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Valley Corridors	ICHO ICSM IMSM WCHO WCSM WFKK XXMS XXWA	Infrequent Gap None	wS bS bF aE sM wA sM yB Be rO Salt Marsh None	S	SwSDom	315	18.0%	M	**Well-drained** Early VTs: rM, wB, tA, bF Mid VTs: rM, wA, yB Late VTs: sM, yB, Be **Moist** Early-Mid VTs: bF, rM, wB, tA Late VTs: bF, wS, yB, rM, rS, eH **Poorly Drained** Early-Late VTs: bS, tL, rM
				S	SrSbSDom	74	4.2%	L	
				S	SbFDom	48	2.7%	L	
				S	SSpbFDom	38	2.2%	L	
				S	SMHePiSp	13	0.7%	L	
				M	MIHwSH	245	14.0%	E/M	
				M	MIHwHS	172	9.8%	E/M	
				M	MTHw	30	1.7%	L	
				H	HIHw	493	28.1%	E/M	
				H	HTHw	178	10.2%	L	
				H	HITHw	148	8.4%	M	
Total						**1,753**	**100.0%**		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Spruce Fir Hills and Hummocks	ICHO WCKK WMKK	Infrequent Gap	wS bS bF	S	SrSbSDom	2,454	47.1%	L	**Well-drained** Early - Mid VTs: rM, wB, tA, bF, gB, pCh Late VTs: bF, wS **Moist** Early-Mid VTs: rM, wB, tA, gB, pCh, tL, bF Late VTs: bS, bF **Poorly Drained** Early-Late VTs: bS, tL, rM **Old Fields** Early VTs: wS, tL, bF
				S	SwSDom	488	9.4%	M	
				S	SbFDom	238	4.6%	L	
				S	SSpbFDom	180	3.4%	L	
				S	SMHePiSp	11	0.2%	L	
				M	MIHwSH	924	17.7%	E/M	
				M	MIHwHS	411	7.9%	E/M	
				M	MTHw	27	0.5%	L	
				H	HIHw	426	8.2%	E/M	
				H	HITHw	53	1.0%	M	
				H	HTHw	3	0.1%	L	
Total						**5,214**	**100.0**%		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Floodplain	ICSM IMSM	Gap	aE sM wA	M	MIHwSH	19	47.1%	E/M	**Well-drained:** Early – Mid VTs: bP, wS, rM, wA Late VTs: sM, wA, aE **Old Fields** Early VTs: wS
				M	MIHwHS	7	17.2%	E/M	
				H	HITHw	12	28.6%	M	
				H	HIHw	3	7.1%	E/M	
Total						**41**	**100.0%**		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Coastal Beach	XXCB	None	coastal beach None	S	SwSDom	33	63.6%	M	**Rapid to Well-drained:** Early VTs: wS
				M	MIHwSH	10	19.3%	E/M	
				M	MIHwHS	6	12.5%	E/M	
				H	HIHw	2	4.5%	E/M	
Total						**51**	**100.0**%		

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

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

Element	Ecosections	Dominant NDR	Dominant Climax Type	Covertype	Forest* Community (Crown Model)	Area (ha)	Percent of Forest Community	Successional Stage	Successional Types
Wetlands	WTLD	None		S	SrSbSDom	15	69.5%	L	**Moist** Early-Mid VTs: bF, rM, wB, tA Late VTs: bS, bF, rM **Poorly Drained** Early-Late VTs: bS, tL, rM
				S	SSpbFDom	2	9.0%	L	
				S	SbFDom	1	5.5%	L	
				M	MIHwSH	2	8.3%	E/M	
				H	HIHw	2	7.7%	E/M	
Total						**22**	**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
wS bS bF	9,260	50.2%	9,876	4.9%
sM yB Be rO	7,750	42.0%	7,750	3.8%
aE sM wA	268	1.5%	268	0.1%
sM yB Be	52	0.3%	1,840	0.9%
Total	**17,330**	**94***	**19,735**	**9.7****

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

Appendix 11: Ecological Emphasis Classes and Index Values

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

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

Appendix 12a: Ecological Emphasis Index Worksheet – Elements

Landscape Element	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
Tolerant Hardwood Hills	6,514	917	4,046	0	1,312	240	4,011 to 4,131	62 to 63
Valley Corridors	1,887	966	686	0	203	32	1,488 to 1,504	79 to 80
Spruce Fir Hills and Hummocks	6,093	2,894	2,597	8	301	294	4,917 to 5,064	81 to 83
Wetlands	36	26	10	0	0	0	33	93
Coastal Beach	238	149	66	0	22	1	199	84
Floodplain	34	0	23	0	4	8	19 to 23	56 to 67
Salt Marsh	0	0	0	0	0	0	0	75
Total	**14,802**	**4951**	**7427**	**8**	**1842**	**574**	**10,667 to 10,954**	**72 to 74**

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

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

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

EEI values are benchmarks that will be monitored over time.

Appendix 12b: Ecological Emphasis Index Worksheet – Ecosections

Ecosection	Total Land Area (ha)	Ecological Emphasis Classes					Ecological Emphasis Index	
		Reserve Area (ha)	Extensive Forest Management Area (ha)	Intensive Forest Management Area (ha)	Conversion to Non-Forest Area (ha)	Unclassified Land Use Area (ha)	Effective Area Range (ha)	EEC Index Range
ICHO	108	18	48	0	26	16	58 to 66	54 to 61
ICSM	110	0	82	0	20	8	63 to 67	58 to 61
IMSM	176	0	109	0	66	1	82 to 83	47
WCDS	149	9	135	0	5	0	110	74
WCHO	5,661	1,243	3,092	0	1,120	205	3,614 to 3,716	64 to 66
WCKK	5,608	3,001	2,224	0	205	178	4,713 to 4,802	84 to 86
WCSM	95	4	88	0	1	3	70 to 72	74 to 76
WFKK	1,880	494	1,241	0	109	36	1,434 to 1,452	76 to 77
WMHO	250	0	65	0	169	16	53 to 61	21 to 24
WMKK	422	8	222	8	82	104	202 to 254	48 to 60
WTLD	36	26	10	0	0	0	33	93
XXCB	238	149	66	0	22	1	199	84
XXMS	71	0	45	0	18	7	36 to 40	51 to 56
Total	**14,802**	**4,951**	**7,427**	**8**	**1,842**	**574**	**10,667 to 10,954**	**72 to 74**

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

Appendix 13:

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

Aspect	The direction of a downhill slope expressed in degrees or as a compass point.
Atlantic Coastal Plain Flora (ACPF)	A group of 90 species of taxonomically unrelated wetland plants that inhabit lake and river shores, bogs, fens, and estuaries and which are found primarily in southwestern Nova Scotia. The distribution of this group of plants extends down the eastern coast of the USA with isolated populations in Nova Scotia and along the Great Lakes.
Biodiversity	The diversityof plants, animals, and other living organisms, in all their forms and level of organization, including genes, species, ecosystems, and the evolutionary and functional process that link them.
Canopy	The uppermost continuous layer of branches and foliage in a stand of trees.
Climax forest community	A relatively stable and self-perpetuating forest community condition that maintains itself (more or less) until stand-level disturbance causes a return to an earlier successional stage. The final stage of natural succession for its environment.
Climax vegetation	A forest or non-forest community that represents the final stage of natural succession for its environment.
Coarse filter approach	A habitat-based approach to conserving biodiversity by maintaining a natural diversity of structures within stands, and representation of ecosystems across landscapes. The intent is to meet the habitat requirements of most native species over time. Usually combined with a fine filter approach to conserve specific rare species and ecosystems.
Coarse Woody Debris (CWD)	Dead tree stems greater than 7.5 centimetres in 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 speciesin 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 ofthat 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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