



# Port Hawkesbury Paper LP 2015

## Sustainable Long-Term Forest Management Plan for FULA Lands


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*January 2015*

*Version 1*

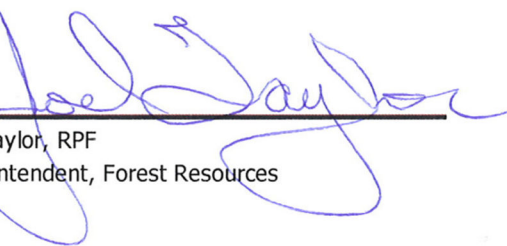


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## *Executive Summary*

This document outlines Port Hawkesbury Paper’s Sustainable Forest Management Long-term Plan (SFMLTP) for its forest management area (FMA) in Eastern Nova Scotia, Canada. The forest modelling component was implemented as a joint project between Port Hawkesbury Paper (PHP) and the Nova Scotia Department of Natural Resources (NSDNR). This plan covers a 100 year time horizon (2015 – 2115) and incorporates Annual Operating Plans and an up to date forest inventory.

This Plan adheres to the principles of adaptive forest management and continual improvement. The Plan was completed on the foundation of ecological landscape planning, natural disturbance regimes, and sustainable forest management principles. Furthermore, it conforms to the company’s commitment and statements to environmental and social responsibility.





## *Port Hawkesbury Paper LP*

### **History**

The Mill site owned by Port Hawkesbury Paper LP has been a fundamental component of the provincial and local economy for over 50 years. The original site was developed by Nova Scotia Pulp Limited which opened the sulphite market pulp mill in 1962. In 1971, the PM-1 newsprint machine was finished, capable of producing 190,000 mt/yr. Over the course of 20 years (1960 to 1980) Port Hawkesbury's population more than doubled; significantly influenced by job-growth provided by the mill.

In 1998, PM 2 super-calendar paper machine (SC-A++) was completed and brought into use, capable of producing 360,000 mt/yr. In 2004, StoraEnso completed the expansion of the super-calendar line with the addition of TMP (Thermo Mechanical Pulp) on Line 3. In 2007 the mill was purchased by NewPage Corporation. In 2008 the Woodlands Unit achieved FSC (Forest Management and Chain of Custody) certifications. In 2011, the hog boiler and 60MW steam turbine project was sold to NSPI. In 2012 the mill was purchased by Port Hawkesbury Paper LP at which point all resources were devoted to producing paper on the super-calendar machine. The mill directly employs over 300 people and provides an additional 400-500 jobs for woodlands contractors and suppliers.

Port Hawkesbury Paper LP is looking towards the future with exciting new projects and efficiency improvements to reduce the energy requirements of the Mill. Port Hawkesbury Paper LP with the backing of the provincial government, and sound new investments is poised to continue being a significant contributor to the provincial economy for many years to come.

### ***Introduction***

This document addresses a range of social, environmental, and economic issues critical for the long-term health and vitality of Nova Scotia's forests. This is the sixth long term plan document produced since 1962; the first plan was written in 1967, the second in 1986, the third in 2002, the fourth in 2006, and the fifth in 2012. This SFMLTP was prepared by PHP's Woodlands Unit to outline the forest management strategy for FULA lands on a 100-year planning horizon. It was also developed to ensure that PHP's forest management practices show continuous improvement, based on a level of public accountability associated with the SFI and FSC Maritime forest certification standards. Port Hawkesbury Paper LP fully endorses the Principles and Criteria in the FSC Maritimes Standard, which are "essential elements or rules of environmentally appropriate, socially beneficial and economically viable forest management". The company's SFMLTP is revised every 5 years to ensure new information and improvements in forest management are incorporated.



## *Port Hawkesbury Paper LP*

### **Forest Utilisation License Agreement (FULA)**

The FULA terminates and replaces the original 1969 crown licence agreement. Under the provisions of the license agreement, the Province of Nova Scotia granted the company management responsibility for the agreement lands. "Management", when used in relation to the agreement lands, means the right to enter upon the agreement lands, to build roads thereon, to cut and remove trees growing thereon in accordance with the Forest Management Plan or otherwise in accordance with the agreement. The company also has the responsibility to apply silvicultural treatments to the agreement lands in accordance with approved forest plans; and to do all other things necessary to provide for the establishment, maintenance and harvesting of the forest crop on the licensed lands in the most efficient, safe and economical manner.

### **Forest Management Planning**

Under the Forest Utilization Licence Agreement, PHP is responsible for all forest management decisions on Crown lands managed by PHP. The SFMLTP and annual operating plans must be inspected and approved by the NSDNR before implementation. Specific requirements regarding the SFMLTP are articulated below as excerpts from the FULA (this current SFMLTP falls under section 18.1 as the Initial Long Term Forest Plan).

#### *18.1 Initial Long Term Forest Plan*

*(a) The Initial Long Term Forest Plan is the Long Term Forest Plan as prepared by NewPage and as approved by DNR on February 5th, 2003, as updated by NewPage in 2006 and 2012, excepting for the harvest volume level addressed below, and it shall be deemed sufficient to permit the PHP to commence operations, provided that it shall be replaced by the PHP not later than December 31, 2014 unless otherwise authorized by the Province in writing.*

#### *18.2 New or Revised Long Term Forest Plans*

*(a) New or Revised Long Term Forest Plans (the "Long Term Forest Plans") shall be submitted for approval on or before June 30, 2014 and every five (5) years thereafter,*

subject however to any requirements set out in any renewal agreement under subsection 1.3 of this Agreement.

*(b) The Long Term Forest Plans shall be composed of two parts as follows:*

*(i) The planning horizon for a non-declining supply of Primary Forest Products by major category (such as Softwood Pulpwood; Softwood Sawlog and studwood; Hardwood Sawlog; Biomass Fuel and firewood) will be for a minimum of one hundred years, and shall incorporate PHP objectives and the Province's forest resource and land use objectives. The Province and the PHP shall develop the Long Term Forest Plans jointly, sharing information and data in a cooperative and collaborative manner and, in particular, shall jointly undertake wood supply analyses using state of the art methodology, applicable/available growth and yield data and science, extensive ground level information to inform realistic estimates of forest harvesting, and restriction deductions resulting from various forest resource and land use policies. The Province will specify long term goals, objectives and*

*Policies for sustaining a range of forest values and where possible, resource restrictions affecting wood supply will be "stacked" on the same land base to lessen impacts on potential wood supply. Protected areas will be examined to ascertain what they contribute to policy directives; and (ii) A twenty (20) year spatial and temporal plan by NSDNR Ecological Planning Units ("EPU"), or other such approach as may be mutually developed over time, which shall directly support the long term planning horizon of 100 years. For each NSDNR EPU a plan will be developed showing, but not limited to, the following in accordance with policy: unique areas, protected areas, old forest, sensitive habitats, wetlands and watercourses, wildlife connectivity corridors, major harvest blocks and main access roads. A twenty (20) year schedule of forest activity by harvest and silviculture treatment will be developed for each ecosystem district. The treatments selected shall be those that best promote biodiversity as well.*



Although the Agreement constitutes a legally binding commitment, the provincial government, as owner and manager of all resources within the Crown license area, continues to play a significant role in resource management. Provincial legislation, regulations and policies still govern:

- Protection of forests from natural disturbances such as fire and insect infestation.
- Mineral and petroleum rights.
- Management and control of land on inland and coastal shorelines lying below ordinary mean high water mark.
- Control and management of wildlife related activities (hunting, fishing, and endangered species)
- Protected areas (wilderness areas), nature reserves, etc.

## Silviculture

An innovative and intensive silviculture program began in the 1960's and was formally incorporated into the 1969 agreement. In both the former agreement and the new FULA agreement, a portion of the agreed stumpage payments (government fees collected from commercial timber harvesting) are allocated to the silviculture program. The stumpage may be supplemented with additional funding for the agreement Crown lands which is designed to increase the yield and quality of wood produced within the principles of sustainable development. PHP's forest operations in Nova Scotia have implemented a modern silviculture program including full reforestation of all harvested areas and stand tending treatments of young forests.

Supplementary agreements to the original license have been cooperatively entered into by PHP and the Nova Scotia Department of Natural Resources (NSDNR). These agreements have provided funding for increased silviculture effort on Crown lands to restore forest health and productivity following fires, insect infestations, windstorms and other natural disturbances. Both PHP and the NSDNR have contributed funding to these programs.

## Rights and Regulations

The Woodlands Unit at PHP is responsible for all forest planning on company managed lands. Forest planning on company managed Crown lands are subject to the terms of the Forest Utilization Licence Agreement. It allows the company to harvest wood, perform silviculture activities, and build roads for access to the licensed area. The agreement includes the preparation of annual and long-term forest management plans, work schedules and reports. NSDNR is responsible for land-use and resource-use decisions pertaining to the DFA.



## Legislation and Regulatory Requirements

A list of all relevant legislation and regulatory requirements that relate to the DFA is included in the Woodlands' Unit Environmental Management System (EMS). The list provides details of legal requirements associated with the forest, where this information can be obtained, and how this information is systematically updated. The EMS includes a description of the forestry activities associated with specific legal requirements.

## Defined Forest Area Related Workers

A DFA-related worker is any individual employed by the company to work for wages or a salary who does not have a significant or substantial share of the ownership in the employer's organization and does not function as a manager of the organization. PHP promotes the legal constitutional rights, and health and safety of DFA-related workers. Company silviculture crews are unionized members of the Canadian Papermaker and Energy workers union. The collective agreement contains many articles relating to worker safety. Contractor employees work in a non-union environment.

PHP maintains a joint Occupational Health and Safety Committee that convenes twice per year. Each company crew has a safety representative that is a member of the joint Committee. Contractors also have their own safety committees required under the Nova Scotia Occupational Health and Safety Act. In addition, PHP maintains a Safety and Environmental Review Committee that meets regularly to discuss contractor operation issues.

## *Landbase Description*

PHP's Defined Forest Area (DFA) is located in the seven eastern counties of Nova Scotia. The geographic extent of the DFA is shown in Figure 1. The company manages approximately 535,000 hectares of Crown lands through a license agreement with the provincial government within the DFA. The land inventory managed by PHP is broken down into four main components (Table 1).

The PHP FULA lands total 535,000ha in the Eastern region. Crown Wilderness Areas (108,000ha) are protected lands which contribute to non-timber values in the forest model. Contributing to the wood basket along with the PHP FULA lands are available unlicensed crown in the Eastern region (as well as Pictou county) as approved by the Nova Scotia Department of Natural Resources. Crown wood in central (excluding Pictou) and western Nova Scotia are not included in this plan.

In addition to acquiring wood from PHP company managed lands, the company harvests wood from private woodland owners through short-term stumpage leases. Private wood is also procured from private suppliers that operate on private woodlands located in central and eastern Nova Scotia. Wood is purchased at roadside and the company provides competitive pricing. In addition, the company provides silviculture services and training in sustainable forest management practices to encourage good stewardship practices.

The public use of Crown lands for recreation, accessibility, hunting and fishing, to name a few, illustrates the wide variety of values held by the general public. Tourism plays an important role in the regional economy; as a result, unique challenges in meeting the needs of all stakeholders must be assessed and managed appropriately. The NSDNR has implemented an integrated resource management (IRM) land use approach for the management of Crown lands.

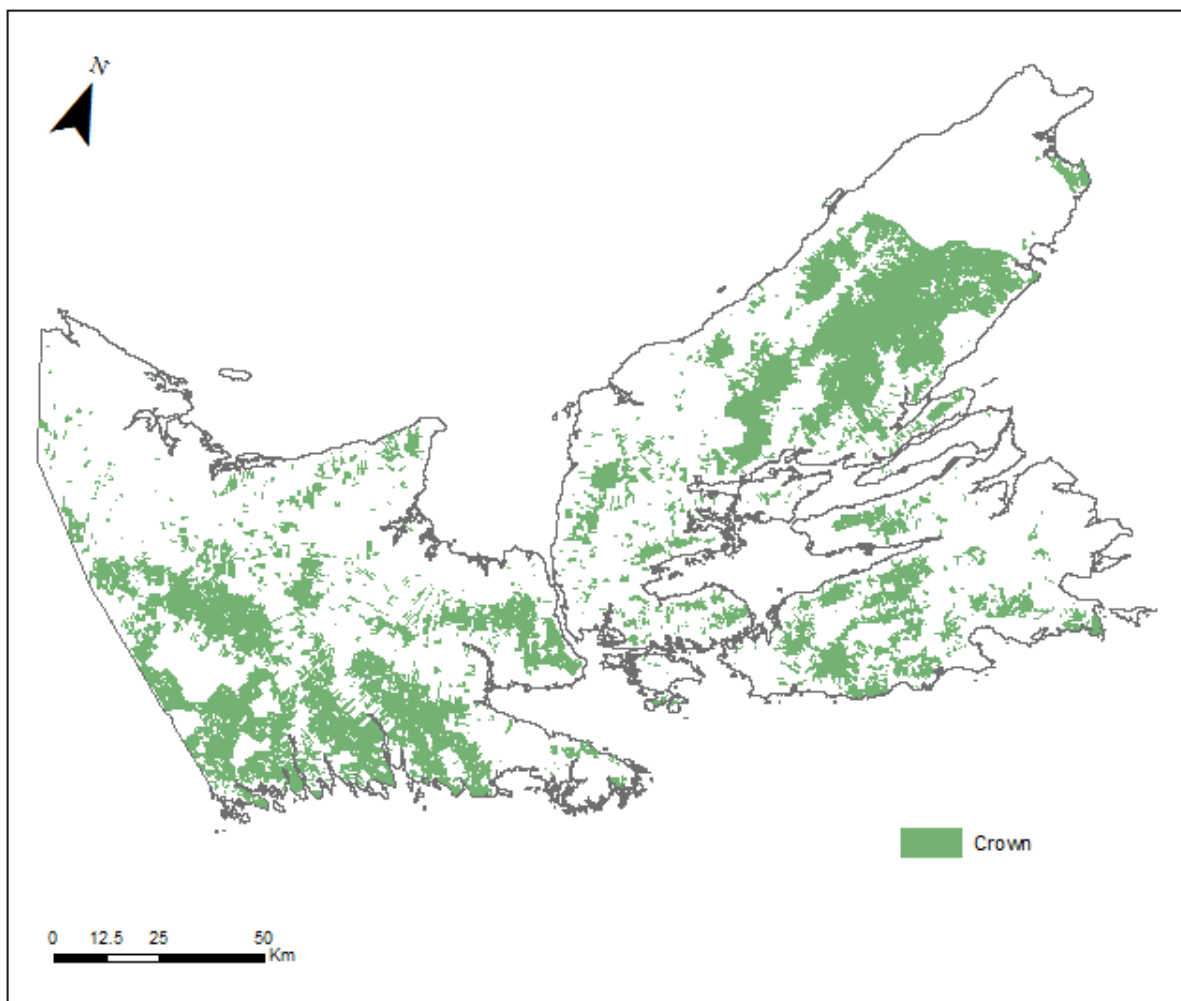


Figure 1 – Map of PHP's FULA Landbase

## Landbase Netdown Process

The landbase was assembled using the photo interpreted forest inventory flown in 2008 and 2009 as a base. Historic treatment shapefiles were incorporated from PHP and NSDNR databases to update the spatial boundaries and attributes of the forest inventory. Wildlife habitat, ecosystem data, special management layers, and hydrology and roads layers were compared, agreed upon and amalgamated where appropriate to create the most recent and accurate dataset possible.

As landbase layers are overlaid, attributes are coded to allow for partitioning of results based on forest and non-forest values. The total land area includes all area, crown wilderness area and non-forested land are removed to create the forested landbase. After removing permanent exclusions (off limits to forest management prescriptions), the remainder is the working landbase which contributes to wood supply. The working landbase is largely occupied by special management lands, which dictate treatment prescription details. The below table summarises the landbase netdown.

Figure 2 –Table for Landbase breakdown for Eastern Crown Land

Landbase Category			Area(ha)
1. Total Land Area			699,090
1.a Protected Area Land	108,532		
2. Land Outside Protection			590,558
2.a Non-Forested Land	98,782		
3. Forested Landbase (FLB)			491,776
3.a Inoperable/Subjective Removals	38,064	38,064	
3.b Landuse Restrictions (IRM C3)	545	512	
3.c 12 Percent Areas	77,943	65,076	
3.d.1 DNR Lynx Habitat Buffers	24,523	18,836	
3.d.2 DNR Moose Habitat Buffers	10,980	8,314	
3.d.3 Coastal Plains Flora Buffers	106	77	
3.e DNR Oldgrowth Policy	19,585	7,213	
3.f Aboriginal Offered Lands	0	0	
3.g Other Regional Harvest Exclusions	18,581	7,759	
3 FLB Exclusions Sub-Total		145,850	
4. Working Landbase (WLB)			341,097
4.a Watercourse Buffers (20m)	36,980	15,822	15,822
4.b Marten Patches	21,804	9,786	9,255
4.c Deer Wintering Areas	18,082	10,904	10,436
4.d Mainland Moose Areas (Softwood)	90,454	66,869	63,518
4.e IRM - C2 Areas	247,010	149,922	112,265
4 Working Landbase (WLB)			211,296
5. WLB No Restrictions			134,630

## Ecological Landbase Classification

The Nova Scotia Department of Natural Resources have recently refined the Ecological Landbase Classification (ELC) system. Port Hawkesbury Paper has fully aligned with the new ELC and it is used as the planning framework for all habitat, economic, social, and timber supply objectives at all scales of planning.

For instance, the Uplands ecoregion is broken down into seven separate ecodistricts. Figure 2 on page 6 displays the eighteen ecodistricts PHP manages.

### Ecoregions

Ecoregions replace the previous PHP EPU layer. The layers are very similar, however several boundaries were not coincident. Ecoregions classify PHP's FULA lands into six regional categories. Ecoregions are primarily delineated based upon differences in climatic and geological conditions.

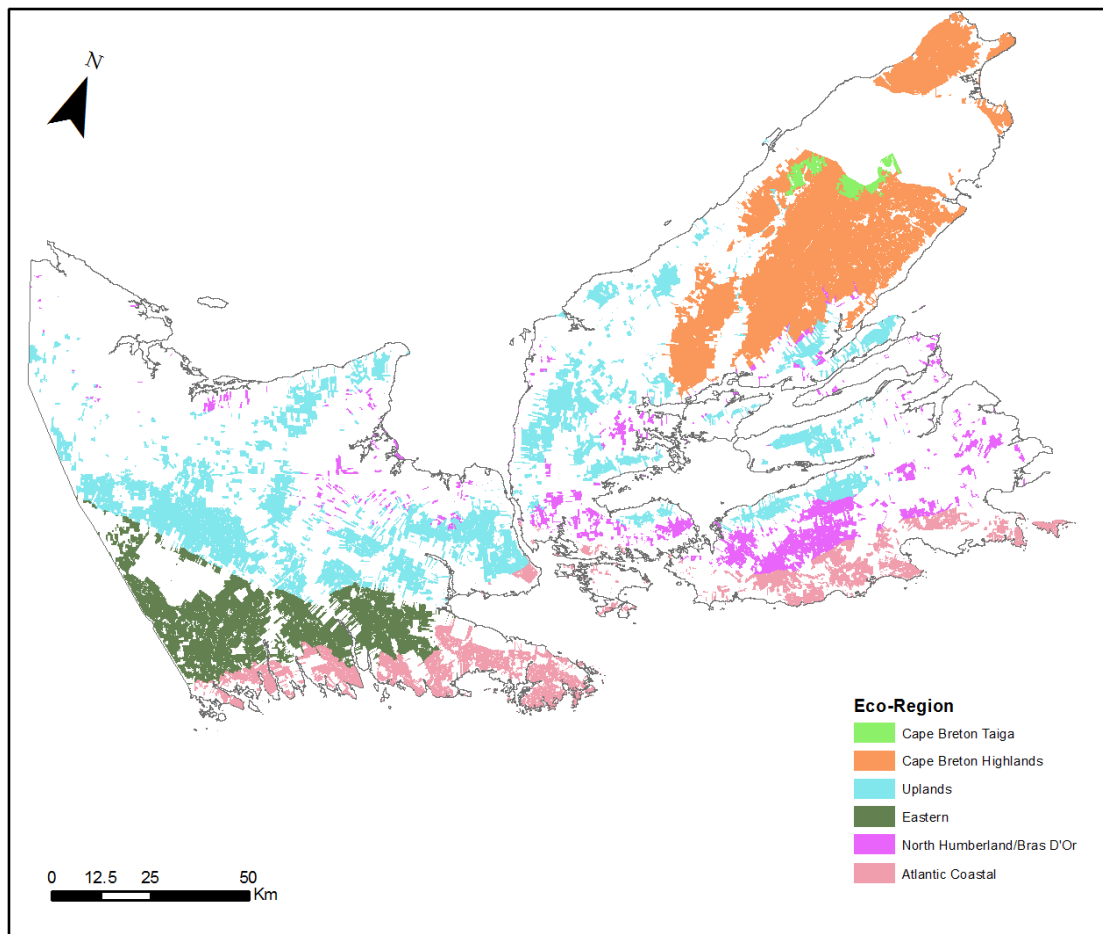


Figure 3 – Map of Ecoregions of PHP's FULA Landbase



## Ecodistricts

We can further breakdown each EPU into smaller management units called ecodistricts, which has been incorporated into our planning process and will be reported on more prominently for the foreseeable future. The 18 ecodistricts have boundaries which coincide with the ecoregion boundaries therefore allowing the ability to roll up or down scales depending on the analysis.

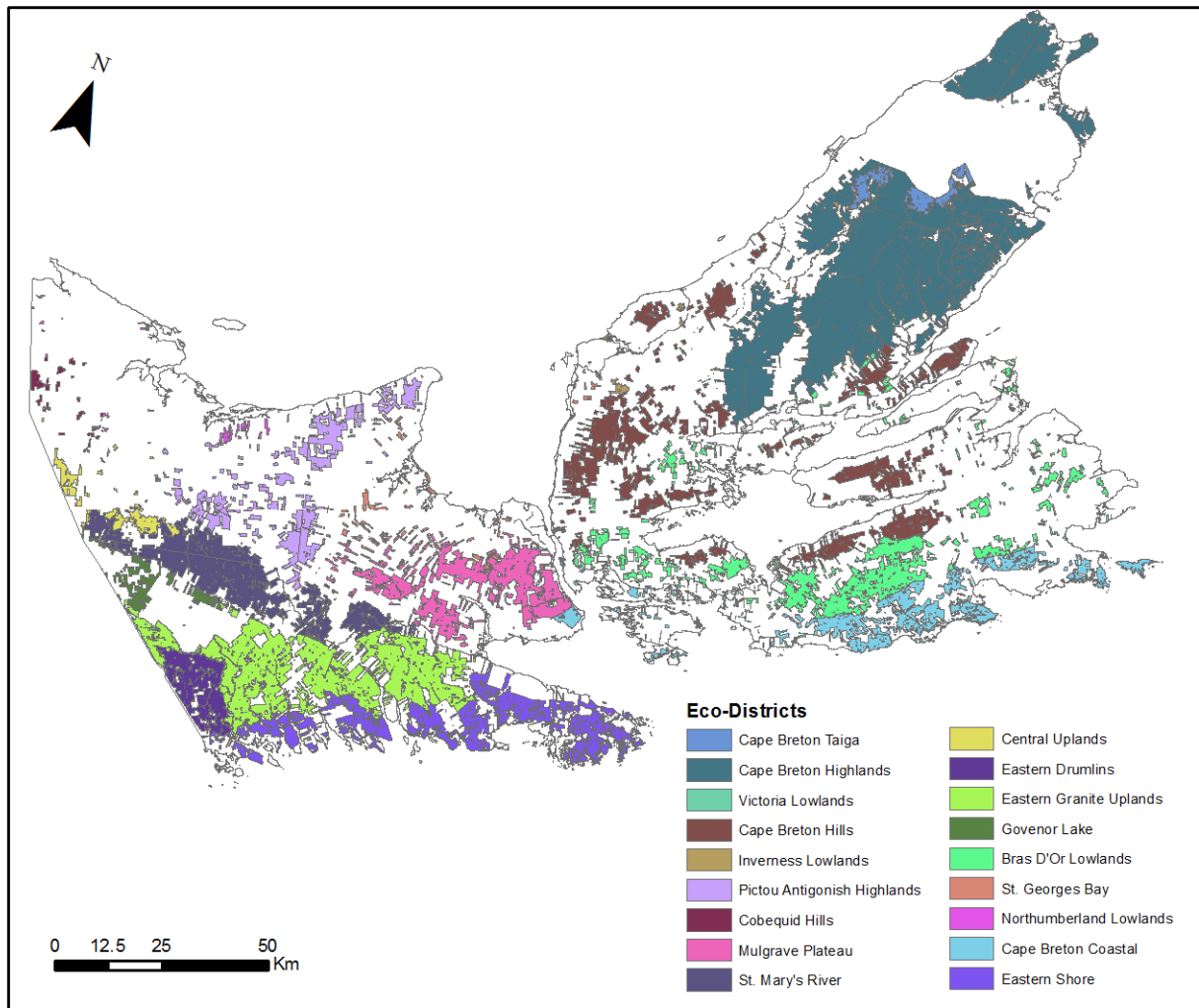


Figure 4 – Map of Ecodistricts of PHP's FULA Landbase

## Forest Elements

At a fine scale and spatially represented, forest elements represent a climax forest community that is influenced by the soil moisture and nutrient regimes as well as topography. Regional climate and natural disturbance regimes influence these ecosystems. Forest Elements promote an understanding of successional vegetation patterns and the effects of forest disturbances. The following figure displays an example of forest elements contained in ecodistrict 330 – Pictou Antigonish Highlands which falls under the Upland ecoregion.

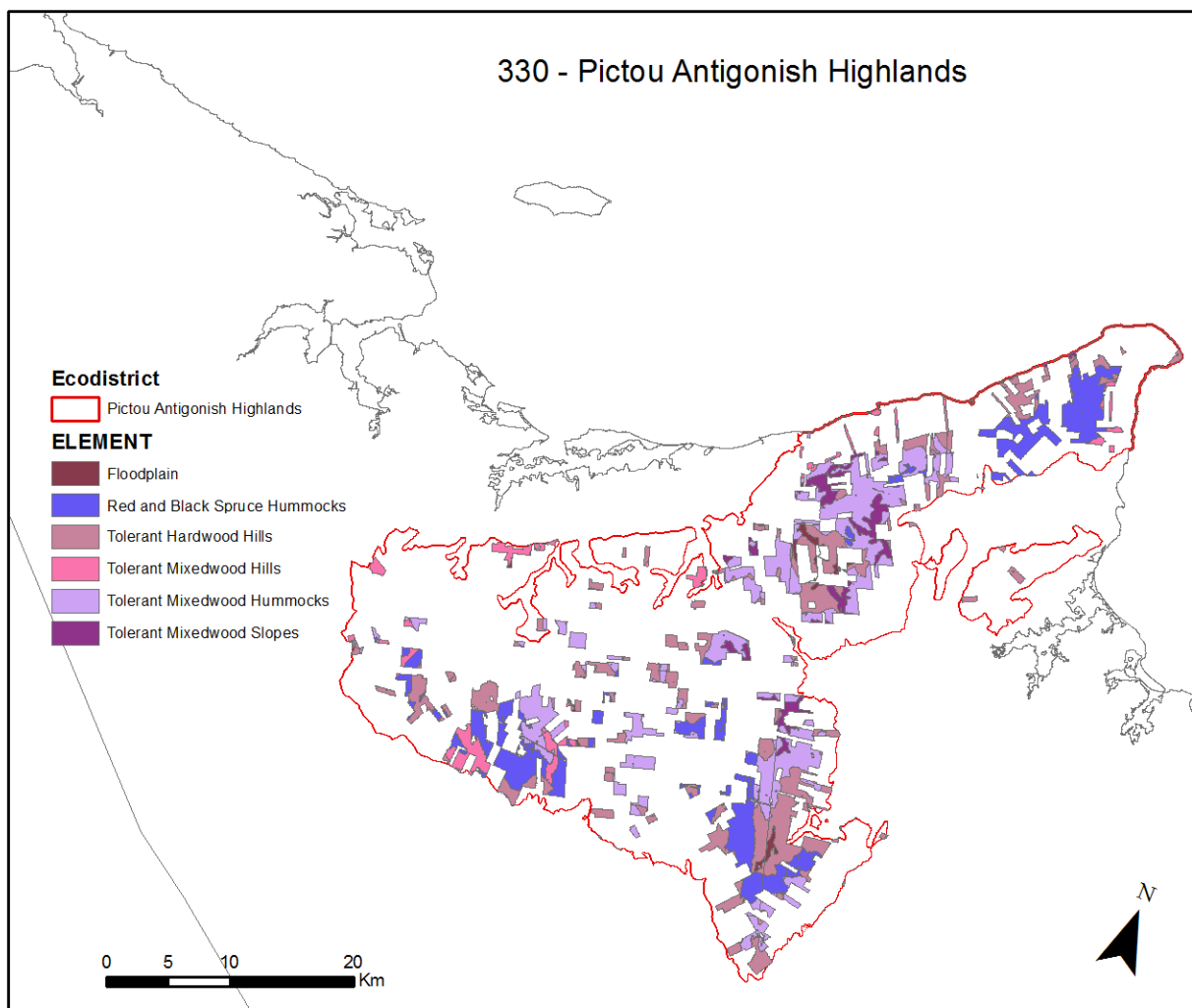


Figure 5 – Map of Forest Elements of Ecodistrict 330



## *FSC Plantations*

Port Hawkesbury Paper does not have FSC plantations. The entirety of PHP's FULA landbase is currently managed using the Forest Ecosystem Classification Guide. PHP is committed to restoring the Acadian forest where appropriate given the historical abundance of farms in Nova Scotia and their subsequent abandonment.

The managed landbase PHP has inherited contains a small fraction of converted forest groups given the intensive Silviculture of the late 1980's. PHP has identified 5,583 ha of land in its license that was converted from Tolerant Hardwood to mostly White Spruce plantations between 1980 and 1987. During that time, herbicides were used to maintain softwood composition.

Forest management practices have greatly evolved since the late 1980's; herbicides have not been used since 1997, as well as work instructions pertaining to pre commercial thinning species retention. Late successional species are given higher priority in all stands with the goal of enhancing natural biodiversity throughout the managed landbase. Harvesting prescriptions are based upon the Forest Ecosystem Classification guide in which, soils play a detrimental role in determining the successional pathway to follow.

A significant portion of the identified converted forest lies within the Cape Breton Keppoch, an infrequently disturbed Ecodistrict. Infrequent stand initiating disturbances generally lead to the establishment of mid to late-successional vegetation types. Acceptable treatments for these stands with the goal of restoration include shelterwoods, patch cuts, partial cuts, and Commercial Thinning. These treatments will encourage Yellow Birch regeneration through openings and scarification and will help convert the stands back to more uneven aged with enhanced natural biodiversity.

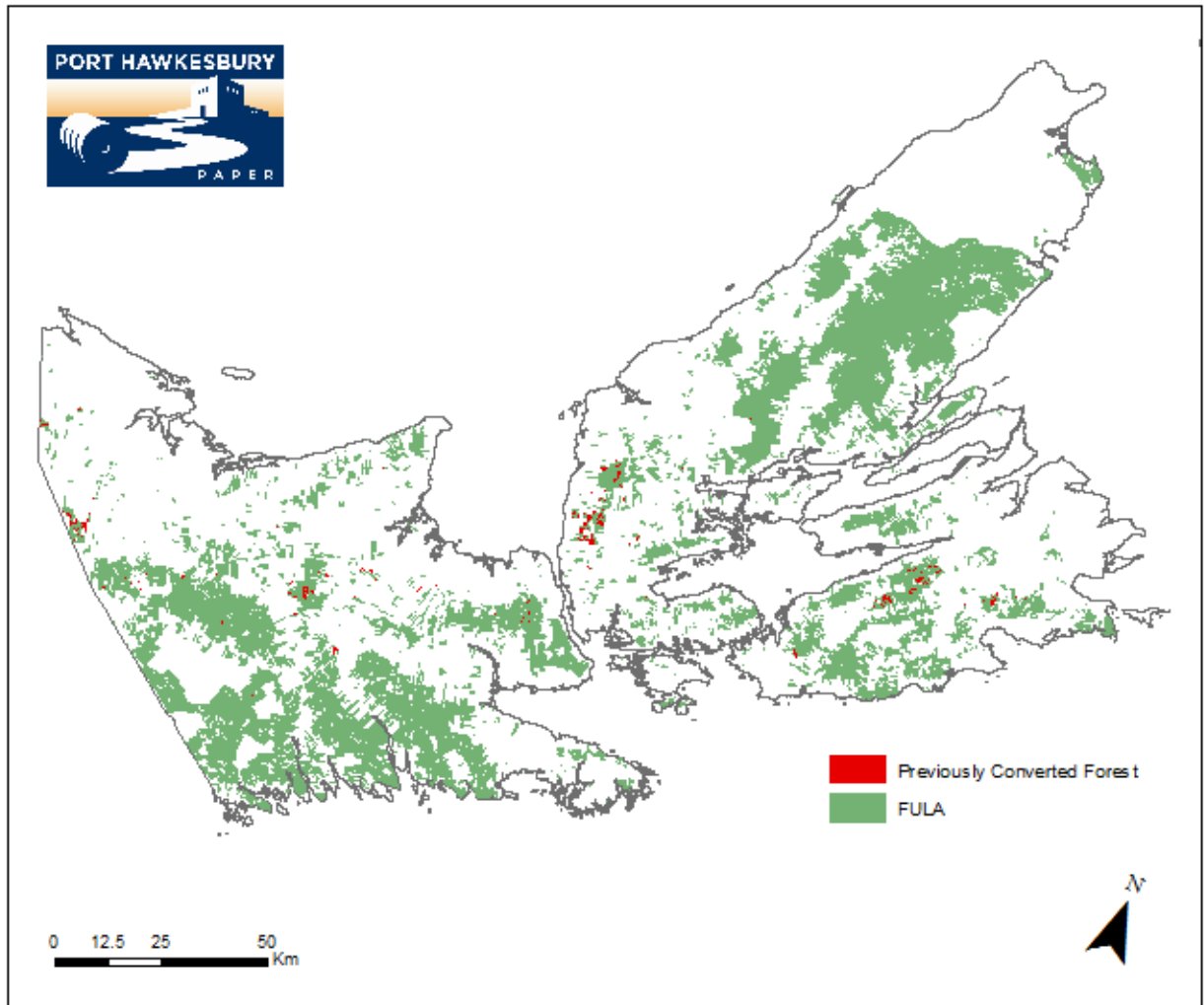


Figure 6 – Map of Area of Previously Converted Forest

## Development Type Codes

Figure 7 – Table of Forest Community Development Type Codes for use in the forest model

ANV	Anthropogenic Non-vegetated
AV	Anthropogenic vegetated
HIHw	Intolerant Hardwood
HITHw	Intolerant/Tolerant Hardwood
HITHSH	Intolerant/Tolerant Hardwood/Mixedwood – Softwood Leading
HITHHS	Intolerant/Tolerant Hardwood/Mixedwood – Hardwood Leading
HTHw	Tolerant Hardwood
ILW	Inland Water
MIHwHS	Intolerant Hardwood/Mixedwood – Hardwood Leading
MIHwSH	Intolerant Hardwood/Mixedwood – Softwood Leading
MTHw	Tolerant Hardwood/Mixedwood
NFCC	Non-forested Harvested
NFOD	Non-forested Natural Disturbance
NFV	Non-forest Vegetated
NNV	Naturally Non-vegetated
OCEAN	Ocean
SMHePiSp	Mixed Spruce Pine Hemlock
SPiDom	Pine Dominated
SSpbFDom	Spruce/Balsam Fir Dominated
SbFDom	Balsam Fir Dominated
SrSbSDom	Red Spruce/Black Spruce Dominated
SwSDom	White Spruce Dominated



## Public Outreach

### Forest Advisory Committee

The Forest Advisory Committee (FAC) was established in 2000 for the Woodlands Unit at Port Hawkesbury Paper LP (PHP). The committee's main function is to provide an ongoing and interactive opportunity for meaningful public participation in forest management decisions and two-way flow of information from the public to the company and back again.

The FAC includes representatives from a variety of public interest groups including youth, woodlot owner, contractor, small industry, tourism, recreation, Aboriginal, community development, small business, academia, government, environmental, community, and forest education. The views of these public interest groups and individuals are brought to PHP's Woodlands Unit through the FAC; they assist the company to identify, understand, and prioritize forest related issues. In addition to meeting at least six times per year, FAC members participate in an annual field tour of PHP's forestry and forestry related operations.

### General Stakeholder Engagement

Apart from our Forest Advisory Committee, PHP LP practices meaningful stakeholder engagement in a variety of ways. In addition to our formal inquiries and third party requests processes, individuals and groups can find information and express their concerns through our *Leader in Sustainability & Outreach* and by contacting our regional woodlands staff.

We annually meet with municipal councils in our forest management region and host public open house events. Our publically available *Green Balance Report* offers a comprehensive look at our environmental and safety performance for each year of operation.

### High Conservation Value Forests

High Conservation Value Forest (HCVF) areas are also monitored annually to evaluate whether desired management activities are being met to ensure maintenance or enhancement of a high conservation value (HCV). Additionally, HCV's are monitored annually for new research and/or data compiled by relevant organizations to track whether HCV characteristics and management activities are current and still relevant.

## Aboriginal and Treaty Rights

PHP respects Aboriginal and treaty rights and will continue to comply with all legal requirements and land use decisions identified by the federal and provincial governments. PHP has no direct treaty obligations to Aboriginal peoples, but will continue to provide for economic opportunities with First Nations communities in areas where its operations impact Aboriginal and treaty rights. In recent years, PHP worked with the Unama'ki Institute of Natural Resources to provide employment opportunities for Aboriginal peoples on Cape Breton Island. The company has signed a Memorandum of Understanding with the Assembly of First Nations and Kwi'mukw Maw-klusuaqn (KMK - also known as Mi'kmaq Rights Initiative) towards the development of an Impact and Benefit Agreement, and an Environmental Agreement. These agreements will provide a framework for working together on matters such as employment opportunities, education and training, research, and environmental compliance and monitoring.

PHP and the Province of Nova Scotia have entered into a long term "Forest Utilization and Licence Agreement" in which PHP has committed to:

### "Mi'kmaq Use

- (a) Section 35 of the *Constitution Act*, 1982, protects the existing Aboriginal and treaty rights of the Mi'kmaq, and PHP agrees that it will
  - i. provide the Mi'kmaq with continued access to the Agreement Lands for traditional activities (fishing, hunting, harvesting of wood for domestic purposes); and
  - ii. respect Mi'kmaq culturally important sites within the Agreement Lands and provide the Mi'kmaq with continued access to those sites.
- (b) The Province, Canada and the Mi'kmaq entered into an Umbrella Agreement on June 7, 2002, in which all three Parties recognized there are outstanding constitutional rights issues amongst them, including Aboriginal rights and treaty rights;
- (c) Pursuant to the Umbrella Agreement, on February 23, 2007 the Parties signed the Mi'kmaq-Nova Scotia-Canada Framework Agreement that established the negotiation process for the resolution of issues respecting Mi'kmaq rights and title;
- (d) PHP acknowledges that this Agreement is subject to any negotiated agreements between the Province, Canada and the Mi'kmaq, or the Province and the Mi'kmaq with respect to such rights on the Agreement Lands;
- (e) The Province may require that PHP modify its forestry plans for the



Agreement Lands to accommodate Mi'kmaq rights; and

- (f) PHP will make reasonable efforts to negotiate, enter into, and implement a Memorandum of Understanding with the Mi'kmaq of Nova Scotia through the Assembly of Nova Scotia Mi'kmaq Chiefs respecting socio-economic benefits including educational and skills training, employment, reasonable economic opportunities for the Mi'kmaq to benefit from management of the Agreement Lands, including biomass fuel supplies, and ongoing community participation processes in forest management planning."

Port Hawkesbury Paper LP has publically committed to create employment opportunities for Mi'kmaq people equal to a minimum of 8% of the full time PHP positions in the aggregate direct labour force for the project. The company believes that having Mi'kmaq people gainfully employed will strengthen our employee team and is good for the social fabric of the communities we live and work in.

Port Hawkesbury Paper LP will also investigate business partnerships with Mi'kmaq communities and business developers including Mi'kmaq controlled businesses.

## ***Monitoring***

### **Environmental Management System**

PHP has developed a series of policies, procedures, forms, and work instructions for its Woodlands Unit staff, contractors, and forest workers. Work instructions provide guidelines and outlines procedures for conducting various forest management activities. Company staff and contractors receive training on these procedures and work instructions and/or the company's Safety & Environmental Field Handbook must be on-site at all workplaces and available to employees for review. New employees are trained in EMS procedures as it pertains to their jobs and on-going training will be provided as required. Emergency response plans have been developed and are distributed to workers on the DFA including haul truck drivers.





## Monitoring Program

Continual improvement and adaptive management are key elements of practicing SFM. Progress must be measured, reported, and analyzed to make certain the SFM system is succeeding. New knowledge and experience gained must be incorporated into the system to build on existing management plans and actions.

PHP's monitoring program for SFM indicators consists of internal assessments and audit programs. Each indicator in the SFMLTP has an associated monitoring and review schedule to ensure forest management decisions and actions meet desired goals and targets. PHP will evaluate those indicators that fail to meet set targets and adjust management actions accordingly to achieve the desired outcome(s). Indicators closely tied to complex computer models will be monitored through a Geographic Information System and wood supply models. Other indicators developed through less complex methods (i.e. developed with FAC or according to Best Management Practices) will be monitored through a GIS, where appropriate, or audit programs.

Each year the company produces a publicly available Green Balance report which is a summary of the previous year's performance on safety, environmental and sustainable forest management progress.

## Internal Audits

*Company Contractor Performance & EMS Legal Compliance:* Conducted by PHP staff to ensure contractor operations comply with applicable laws and regulations, as well as PHP's policies and procedures.

*Private Supplier Compliance:* Conducted by PHP staff to monitor compliance with applicable laws and regulations, and Best Management Practices for forestry operations.

*Trucking Audit:* Conducted by PHP staff to monitor personal protection requirements, safety equipment, and truck safety requirements.

*Road Audit:* Conducted by PHP staff to monitor road construction and watercourse protection guidelines.

## Linkages between SFMLTP & Annual Operating Plans

A number of tools are used to ensure that operational plans are developed and implemented in a way that meets the strategic objectives developed through the SFM planning process (Table 12). This step is critical in ensuring that the SFM plan is implemented properly.

- **SFM Treatment Objectives and Targets**

Area teams are given treatment area objectives annually that are in line with annual budgets and SFM objectives. Teams are responsible for developing a schedule of activities to meet these objectives.

- **EMS Work Instructions**

Our EMS is used to ensure that work procedures are carried out consistently, follow up procedures are carried out, and any deficiencies are addressed. An annual review of the system also ensures that practices are kept in line with current best management practices.

- **Appropriate Silviculture Systems**

“Appropriate silviculture systems” are those silviculture treatments that have been appropriately matched with the biophysical, ecological and climatic conditions unique to a given site or ecodistrict.. Appropriate silviculture systems outlines harvesting treatments determined to be most appropriate for each tree species and corresponding natural disturbance regime.

- **The Forest Manager**

The Forest Manager (TFM) is an enterprise GIS and reporting system used by all planning personnel at PHP. The system contains live information on areas planned, on-going and completed, and is directly linked to SFM outputs. Planning staff use this tool to plan and report on SFM treatment based activities on a daily basis.

Specific SFM values, such as old forest, connectivity zones, identified sites of significant cultural, spiritual, or aesthetic value and wildlife habitat are identified on all maps and displays within TFM to ensure that these values are addressed in any plans developed. Specific information on the values displayed and how they should be addressed is contained in the EMS work instruction.



## *Third Party Forest Certification*

Certification is a voluntary, non-governmental process used to verify independently, good forest management according to a defined standard. In addition to helping improve forest management practices, certification allows forest products to be sold to consumers with an approved label. To achieve certification, a company is audited by an accredited third party to verify whether standard requirements are being met and/or are on their way to being met through management actions and continual improvement. Once certified, the company is audited annually with a re-certification audit and new certificate issued every five years.

In North America, the two most widely used and respected sets of forest certification standards are created and governed by the Forest Stewardship Council (FSC®) and the Sustainable Forestry Initiative (SFI®). Both are autonomous, not-for-profit, multi-stakeholder organizations established to promote responsible forest management. While FSC and SFI are distinct in some respects, the core values and principles they each use in creating their standards are relatively similar.

Some common elements of each standard include:

- Conservation of biological diversity
- Eco-system based management
- Maintenance of wildlife habitat and species diversity
- Protection and/or maintenance of special sites (high conservation values)
- Maintenance of soil and water resources, including riparian areas next to streams and lakes
- Ensuring harvest levels are sustainable, and harvested areas are reforested
- Protection of forestlands from deforestation and conversion to other uses
- No wood from illegal or unauthorized sources
- Aboriginal rights and/or involvement
- Public disclosure

Port Hawkesbury Paper LP's woodland operations are presently certified to both the FSC and SFI standards. Having dual-certifications ensures that we are comprehensive in our approach to responsible forest management; assists us to remain compliant with the Forest Utilization Licence Agreement; and provides us a competitive market advantage.

## Wildlife and Policy

There are many considerations, constraints, and goals placed on the forest model to ensure compliance with the Nova Scotia Code of Forest Practice, The FSC Maritime Standard, and The SFI 2010-2014 Standard. Values pertaining to wildlife and policy are best managed at multiple scales, with varying timelines, allowing the levels of management to mesh and be incorporated into the model as appropriate.

### American Marten

The American Marten (*Martes americana*) is provincially listed as an endangered species under the Nova Scotia Endangered Species Act. There are 55 patches spread throughout the Cape Breton Highlands totalling 21,804ha. These large, circular patches (refer to Figure 8) are composed heavily of Spruce and Fir and have had significant silviculture investment. Given the established habitat criteria of Highlands Marten (18m<sup>2</sup> basal area, 6m height, 60% crown closure), and the very low incidence of blowdown in the Highlands, commercial thinning treatments have been successful. In the forest model, Marten patches are restricted to only allow commercial thinning (CT) harvests throughout the entire 100 year plan.



Figure 8 - Commercial Thinning Operation in a Marten Patch

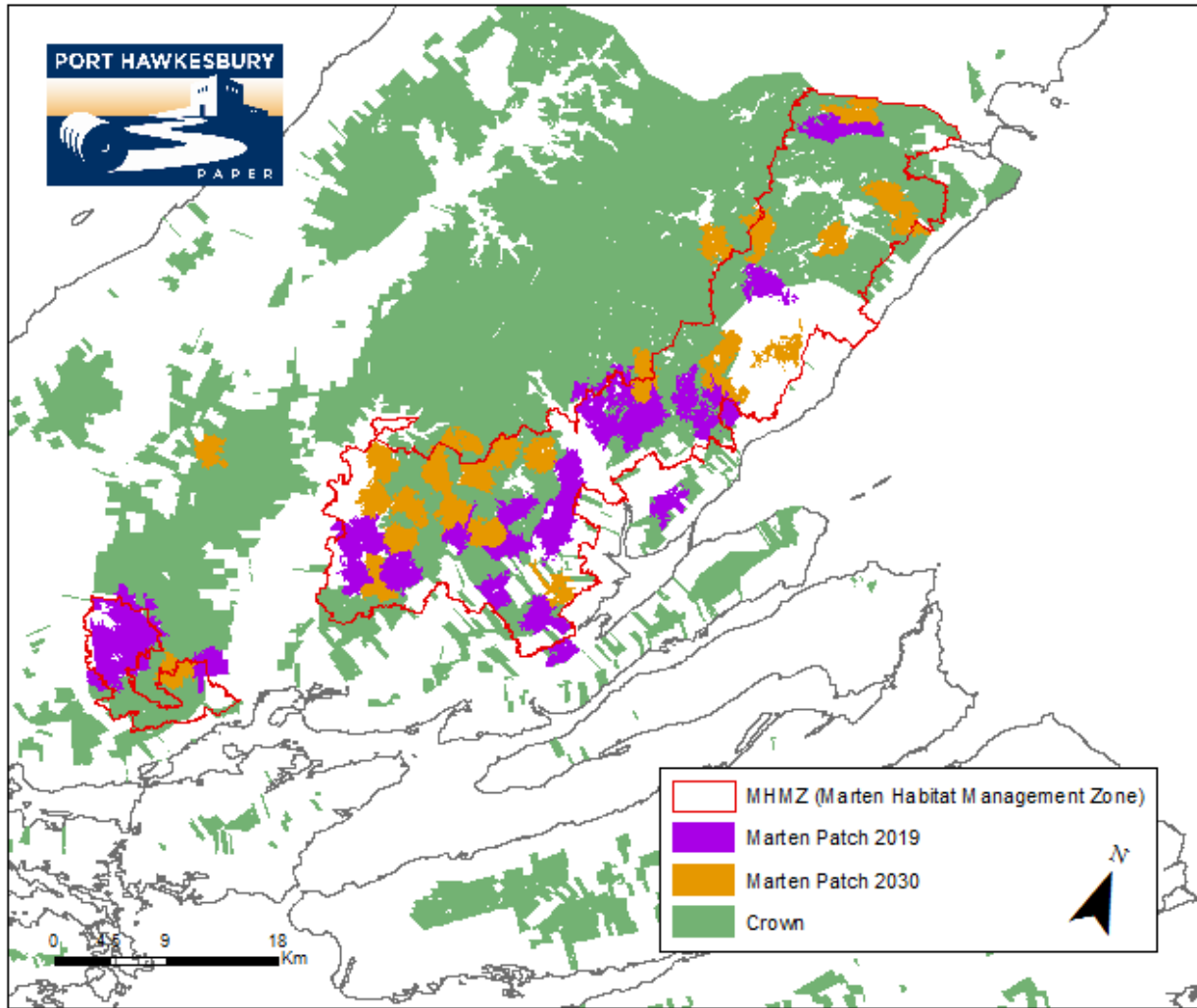


Figure 9 - Map of Marten Habitat Management Zone in the Cape Breton Highlands

## Mainland Moose

Moose inhabiting mainland Nova Scotia are classified as endangered and special management practices are to be carried out in geographically identified concentration zones. Figure 8 displays the concentration area in eastern mainland Nova Scotia which covers roughly 80% of PHP's mainland FULA landbase. For specific information on habitat criteria and patch retention information please refer to the Sustainable Management Practice (SMP) for mainland moose in Nova Scotia. For the purposes of forest modelling predictions, harvests occurring within the concentration area have their extraction volumes reduced by 12% to reflect the wood supply impact of the Mainland Moose SMP. The twenty-year landscape plan will help to facilitate patch identification at a landscape scale going forward.



Figure 10 - A Mainland Nova Scotia Moose

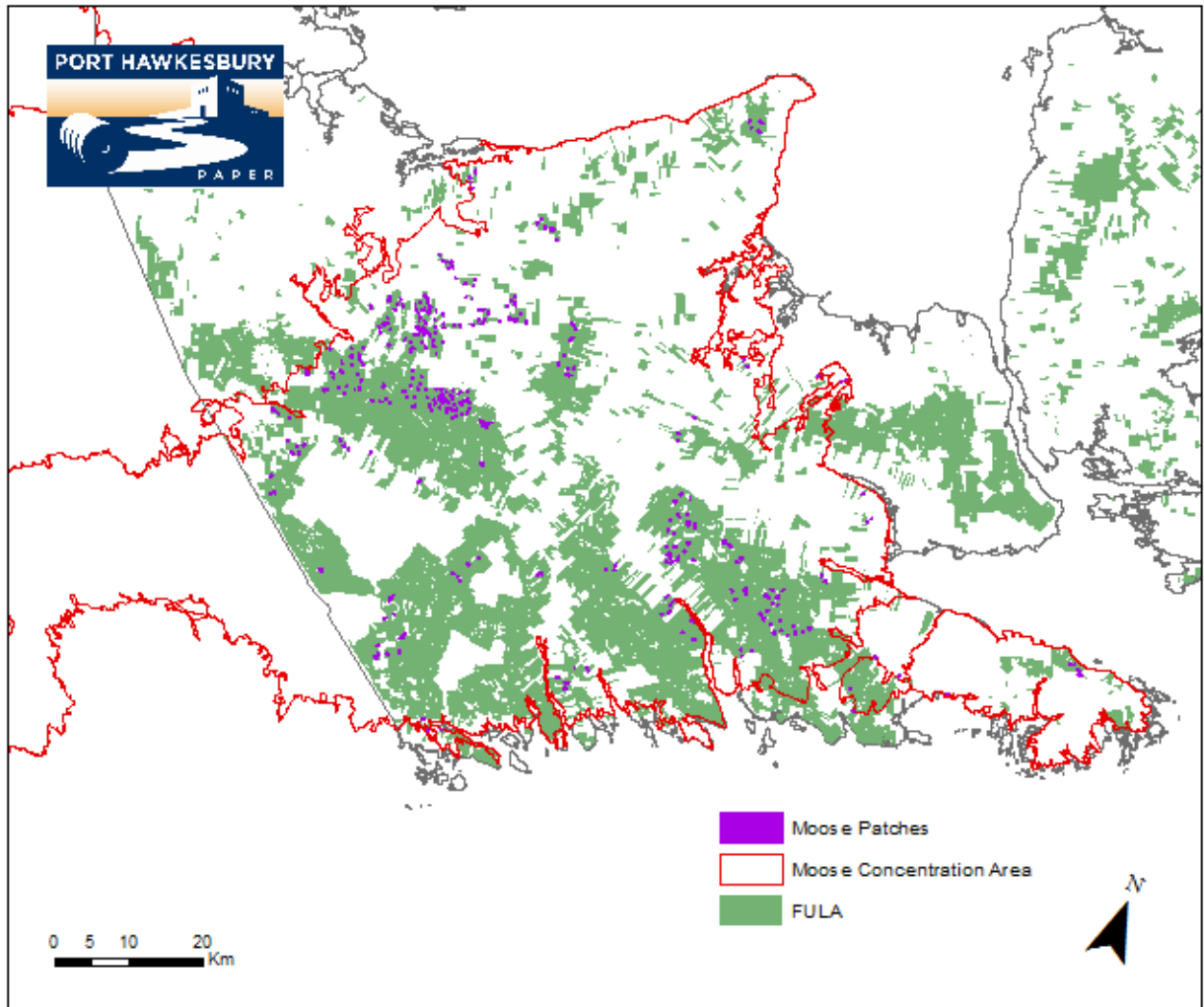


Figure 11 - Map of Mainland Moose Concentration Area and Shelter Patches



## Deer Wintering Areas

White-tailed Deer (*Odocoileus virginianus*) are a widely distributed species in North America. According to the Special Management Practices for White-tailed Deer Wintering Areas for Nova Scotia, in areas which experience harsh winters, 50% of existing conifer cover within the yard should be maintained in uncut shelter patches. These areas are identified spatially and were constrained in the model to ensure 50% or more of these patches are maintained with mature conifer cover.

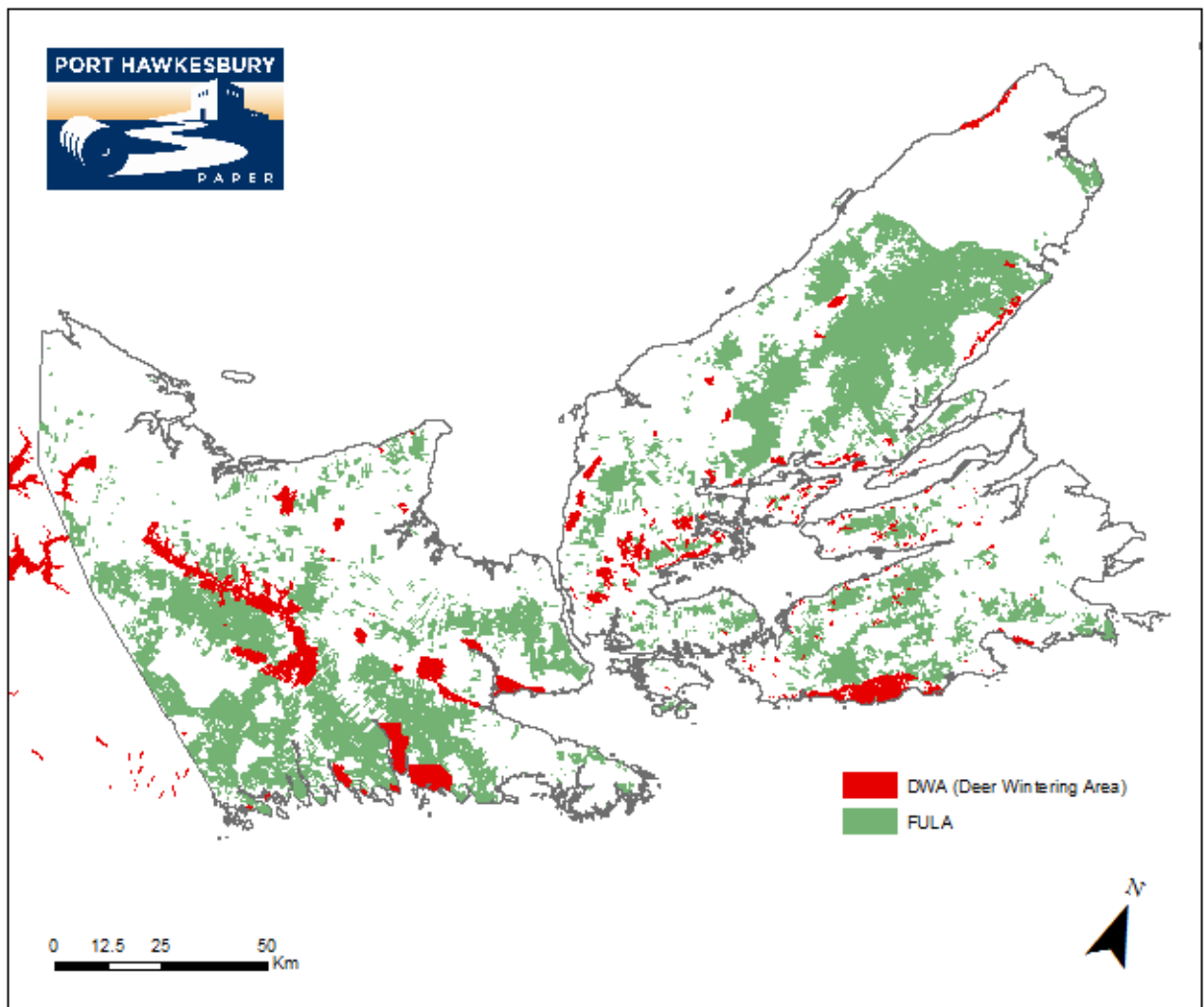


Figure 12 - Map of Deer Wintering Areas in Eastern Nova Scotia



## Boreal Felt Lichen

Known to be found in cool, moist Balsam Fir stands within 25 kilometers of the Southern Nova Scotia Shoreline is the Boreal Felt Lichen (*Erioderma pedicellatum*). This cyanolichen is currently endangered both federally and provincially. Port Hawkesbury Paper LP ensures all planned harvest areas within the habitat zone are assessed by a professional prior to harvest. When Boreal Felt Lichen is found, a 100 metre no-harvest zone is protected around the host tree.

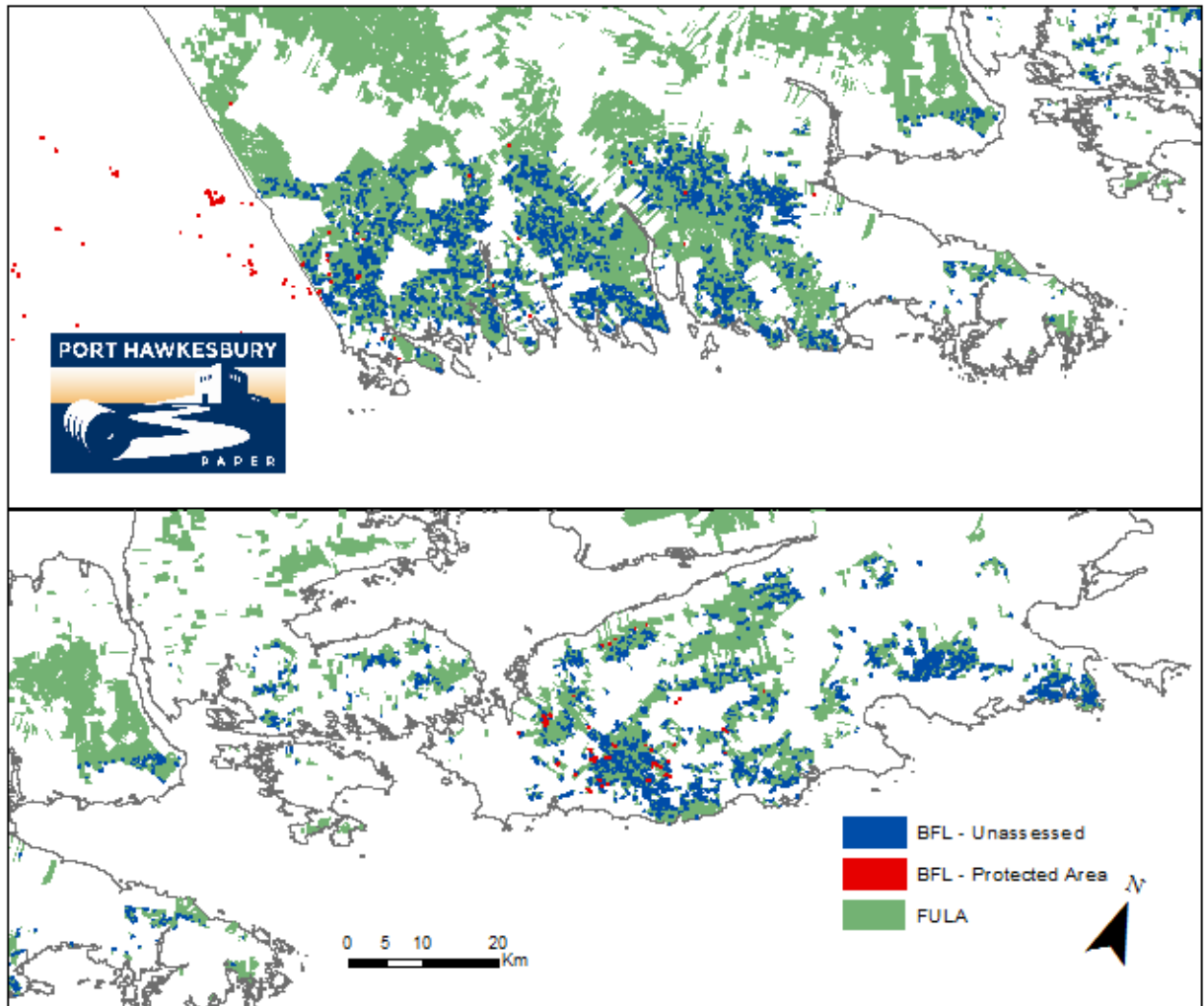


Figure 13 - Map of Boreal Felt Lichen Potential Habitat and Known Locations

## *Landscape Level Management*

### **Natural Disturbance Regimes**

A fundamental Landscape component of this long term plan is the Natural Disturbance Regime (NDR) classification and management. There are 3 categories of NDR as follows according to the provincial Ecological Landscape Classification.

**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:** 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.



## Integrated Pest Management

Since 1997, Port Hawkesbury Paper (and previous mill owners) has maintained a non-herbicide use 'policy' on the managed leased lands. The Nova Scotia Department of Natural Resources initiates and manages the pesticide spray program on PHP's Crown lease as needed.

Port Hawkesbury Paper utilizes Integrated Pest Management approaches across its crown holdings. Monitoring plans, modeling forecasts, and tactical strategies in many cases are implemented in a joint partnership between PHP and the Nova Scotia Department of Natural Resources.

Stand health and susceptibility to pests is managed on several different levels: Proactively, from both a long term planning and operational standpoint, over-mature stands are targeted for harvesting first, and age class structures are managed to ensure proportionate area remains in all age classes. With the potential for an upcoming Spruce Budworm outbreak, the age class structure of the highlands is far less susceptible than the 1970's when the age class structures was heavily mature and over mature.

PHP assists DNR where possible in the surveying and monitoring of pest populations. The province reports on pheromone trap counts and, in the case of a Spruce Budworm epidemic, may request increased branch sampling to monitor L2 populations of the budworm.

PHP aids in the prediction of habitat susceptibility from pests through maintaining an updated inventory of forest cover information. Data pertaining to post treatment forest characteristics allows for accurate modeling predictions of forest susceptibility to pests

## *Tactical Considerations and Adjustments*

A work group was assembled in 2014 to address tactical issues with regard to forest management planning in Nova Scotia. The group consists of NSDNR staff as well as industry representatives throughout the province. The tactical planning group came to the conclusion that operational restrictions on planned harvest areas results in a 27% deduction from planned areas/volumes. The figures outlined in this report are adjusted by 27% to ensure a more realistic expectation of planned volumes.

Volumes presented in graphs and tables are in green metric tonnes unless stated otherwise. Conversion factors used are: 1m<sup>3</sup> Softwood = 0.86 tonnes and 1m<sup>3</sup> Hardwood = 1.04 tonnes. The time horizon consists of 20 - 5 year periods. Harvest levels are reported by year (Annual Allowable Cut).

## Age Class Distribution

The working forest is the portion of landbase which contributes to wood supply objectives. A well distributed age class structure is favourable and insinuates a diverse and healthy forest. As can be seen in the below figure, the age class structure maintains its arrangement over time, while the area occupied by older stands increases towards the end of the horizon. This welcoming effect is the result of implementing an arsenal of FEC appropriate non-clearcut harvests over time.

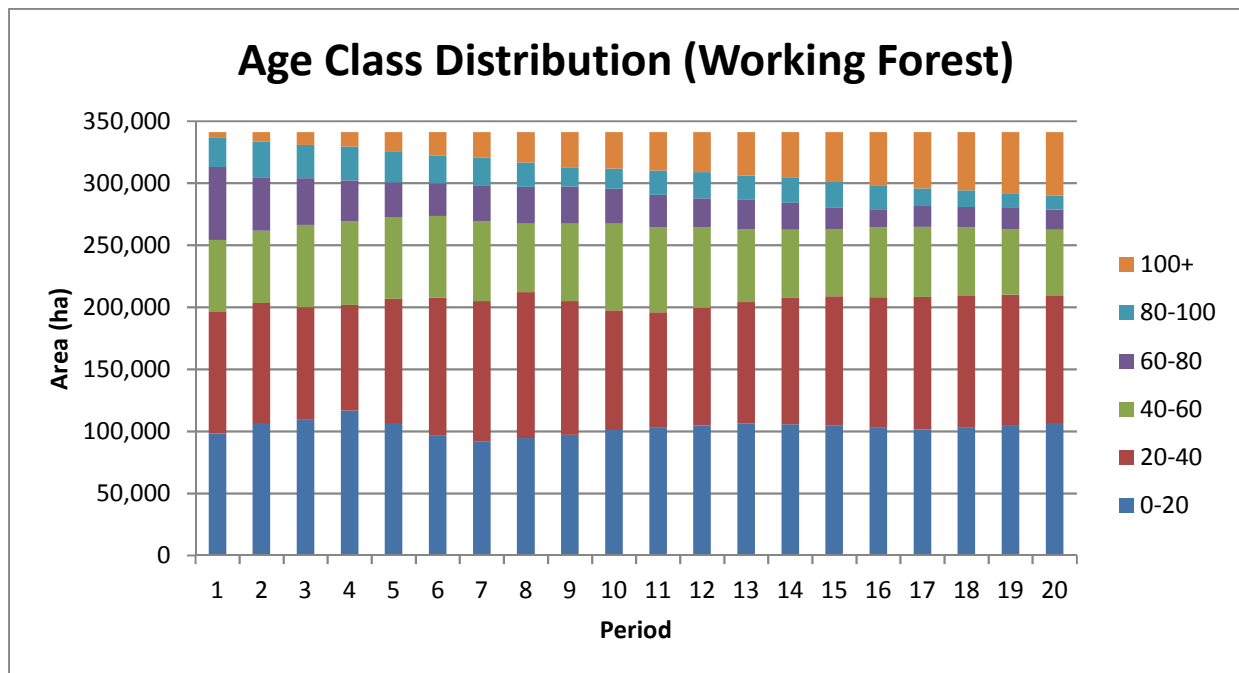


Figure 14 – Graph of Age Class Structure of the Working Forest over a 100 year time horizon

## Management Status

The management status of the working forest area shows what treatment strategies are used on the forest in the model. The distribution in the below figure shows that roughly 40% of the forest is brought to a free to grow state naturally, and the remaining 60% of the area has been managed through silviculture and harvesting techniques that are appropriate based on operability criteria and resulting yields that are realised. Over time, stands managed through commercial thinning, pre commercial thinning of natural stands, and selection harvests increases over time.

The even and regular amount of prescriptions which do not vary widely over time lines up well with our tactical strategies and capacity adjustment capabilities. A detailed summary of harvest and silviculture treatments over time by area which determines this management status distribution is discussed later in this report.

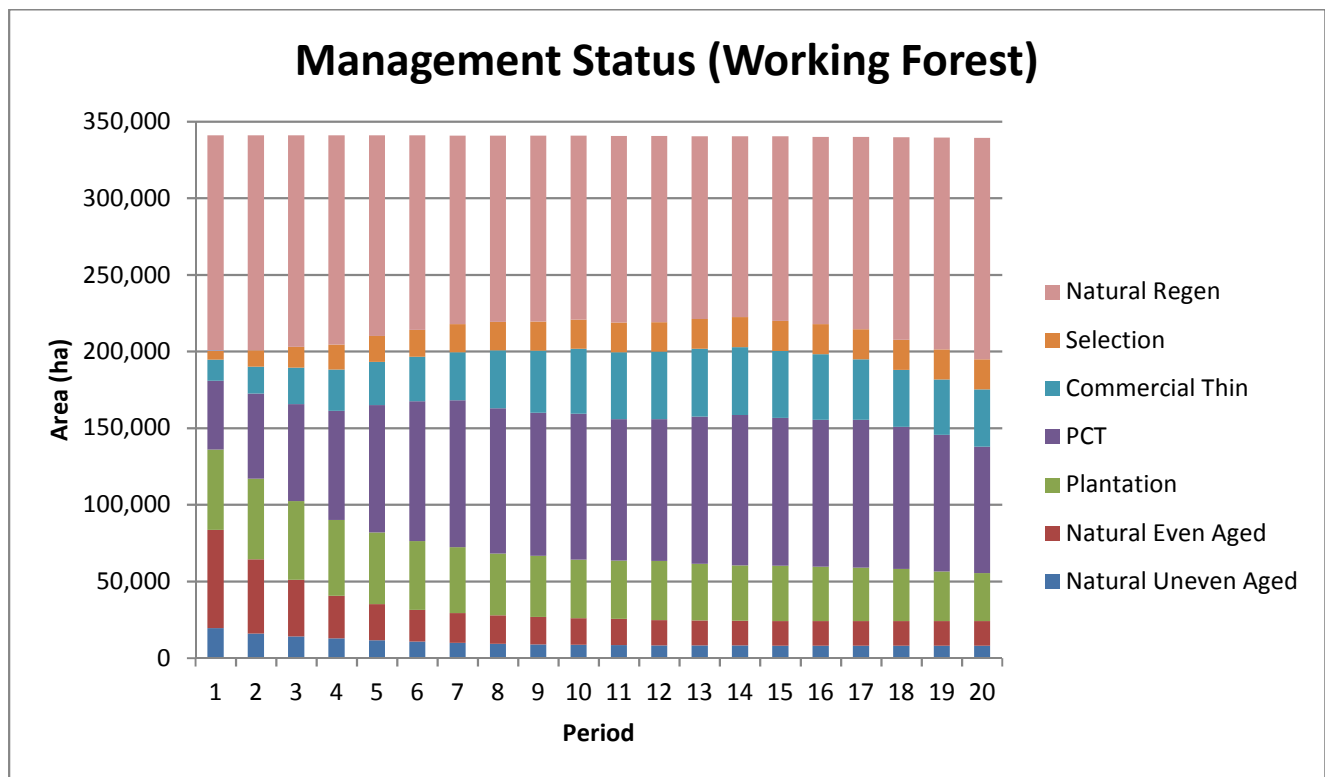


Figure 15 – Graph of Management Status of the Working Forest over a 100 year time horizon

## Ecological Landscape Targets

PHP has aligned with the provincial Ecological Landscape Classification (ELC) system and will phase in seral stage targets by natural disturbance regime. Under the current agreement, PHP will achieve at minimum, 25% of targets in period 1, 50% of targets in period 2, 75% of targets in period 3, and 100% of targets for the remainder of the planning horizon. This plan allows time for the model to enact management prescriptions to satisfy the targets in 20 years, as the current age class distribution does not allow for immediate satisfaction of these goals. The below table states development class and seral targets for Nova Scotia Ecosystem Based Management.

Figure 16 – Table of Maturity Targets by Natural Disturbance Regime

Maturity	Frequent NDR	Infrequent NDR	Gap NDR
Late Seral Stage	20 %	40%	70%
Mature 1(or older)	40%	60%	80%
Mature 2 (or older)	16%	27%	38%
Old	8%	16%	24%

## Development Class and Seral Stage Classification

The provincial ELC was recently modified define maturity classes at a finer scale, breaking the mature class in mature and late mature. Below is the breakdown of development classes by age.

Figure 17 - Development Class Age Breakdown

Seral Stage	Age Group
Young	0-25
Established	25-40
Mature	40-80
Late Mature	80-120
Old	120+

Seral Score is a rating of seral stage progression as defined in Nova Scotia's ecosystem based management and classification systems.

Figure 18 - Seral Score by Seral Stage

Seral Stage	Seral Score
Early	10 – 23.2
Mid	23.3 – 36.5
Late	>36.6

The landbase classification and target approach used in the forest model display favourable results in advancing seral stages of the eastern crown landbase. Even flow harvest levels and non-clearcut treatments allow for a move to more forest area occupied by older forested stands.

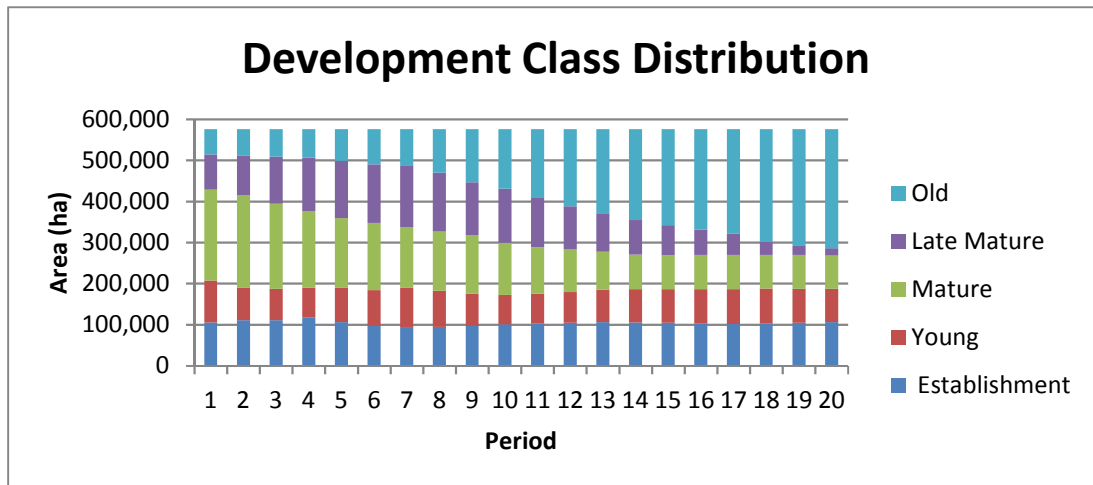


Figure 19 – Graph of Development Class Distribution for the Forested Landbase

## Sustainable Harvest Levels

The sustainable harvest levels are separated into three categories: Spruce and Fir, other softwood, and hardwood. Product volumes as a component of each will be estimated as a percentage based upon piece sized outputs from the model as well as historical knowledge and forest condition assumptions.

The sustainable harvest levels are set with the outcome of non-declining yield; the harvest levels may not decrease over time, and growing stock levels must not be depleted upon the end of the planning horizon.

### Spruce and Fir Sustainable Harvest Level

The Port Hawkesbury papermaking process is limited strictly to Spruce and Fir species which is why the softwood harvest levels are separated. The total softwood harvest level does not decrease over time, however the Spruce and Fir levels increase slightly while the other softwood levels decrease slightly over time.

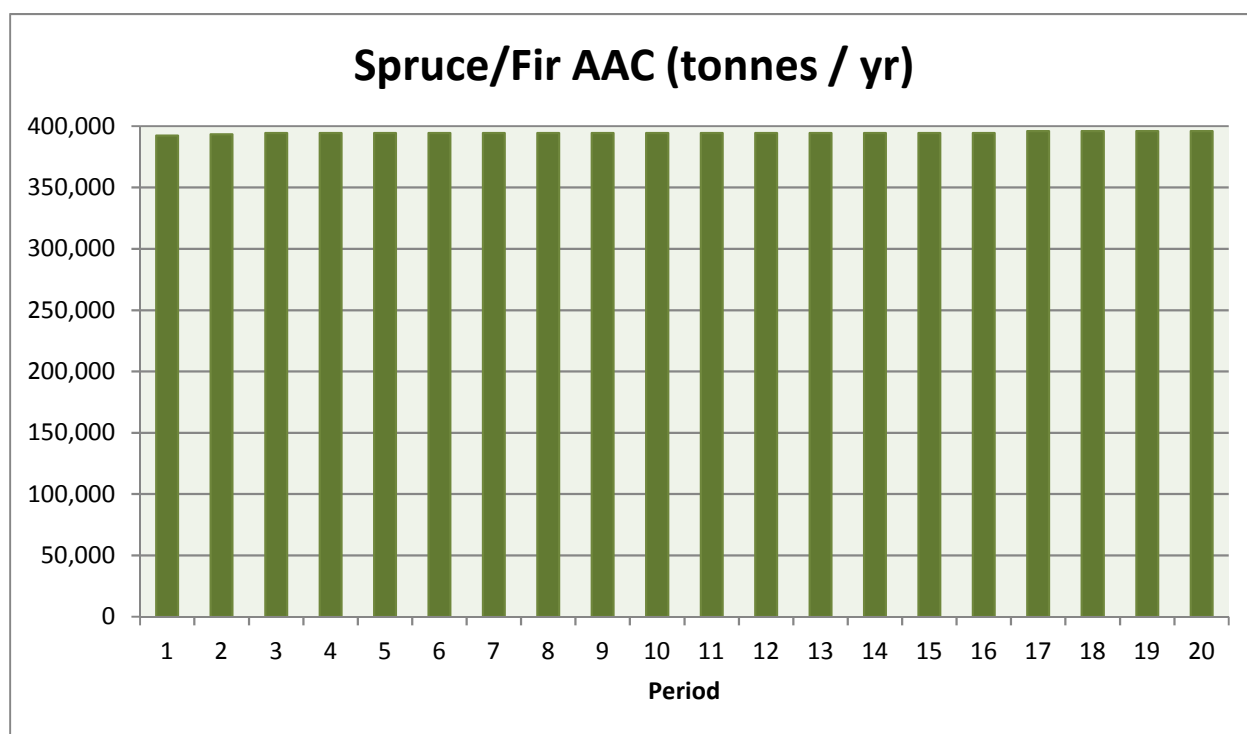


Figure 20 - Graph of Annual Allowable Cut for Spruce and Fir

Figure 21 - Table displaying Spruce and Fir AAC by 5 Year Period

Spruce/Fir (AAC/Period)					
Period	1	2	3	4	5
AAC (tonnes/yr)	392,459	393,478	394,494	394,494	394,494
Period	6	7	8	9	10
AAC (tonnes/yr)	394,494	394,494	394,494	394,494	394,494
Period	11	12	13	14	15
AAC (tonnes/yr)	394,494	394,494	394,494	394,494	394,494
Period	16	17	18	19	20
AAC (tonnes/yr)	394,494	396,099	396,099	396,099	396,099



## Other Softwood Sustainable Harvest Level

Other softwood refers to the species of Pine, Hemlock, and Larch. These species are not used in the PHP paper making process, however they have use as sawables as demand dictates, and low grade portions for biomass.

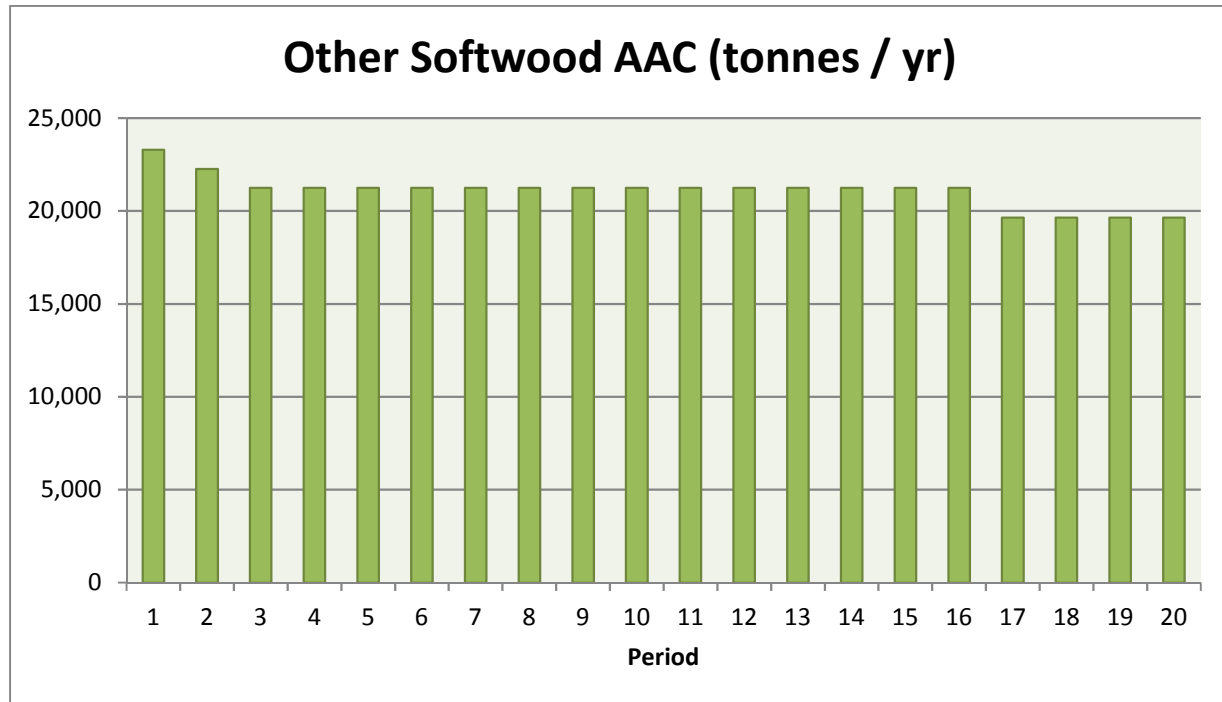


Figure 22 - Graph of Annual Allowable Cut for Pine, Hemlock, and Larch

Other Softwood (AAC/Period)					
Period	1	2	3	4	5
AAC (tonnes/yr)	23,289	22,270	21,253	21,253	21,253
Period	6	7	8	9	10
AAC (tonnes/yr)	21,253	21,253	21,253	21,253	21,253
Period	11	12	13	14	15
AAC (tonnes/yr)	21,253	21,253	21,253	21,253	21,253
Period	16	17	18	19	20
AAC (tonnes/yr)	21,253	19,648	19,648	19,648	19,648

Figure 23 - Table displaying Pine, Hemlock, and Larch AAC by 5 Year Period

## Hardwood Sustainable Harvest Level

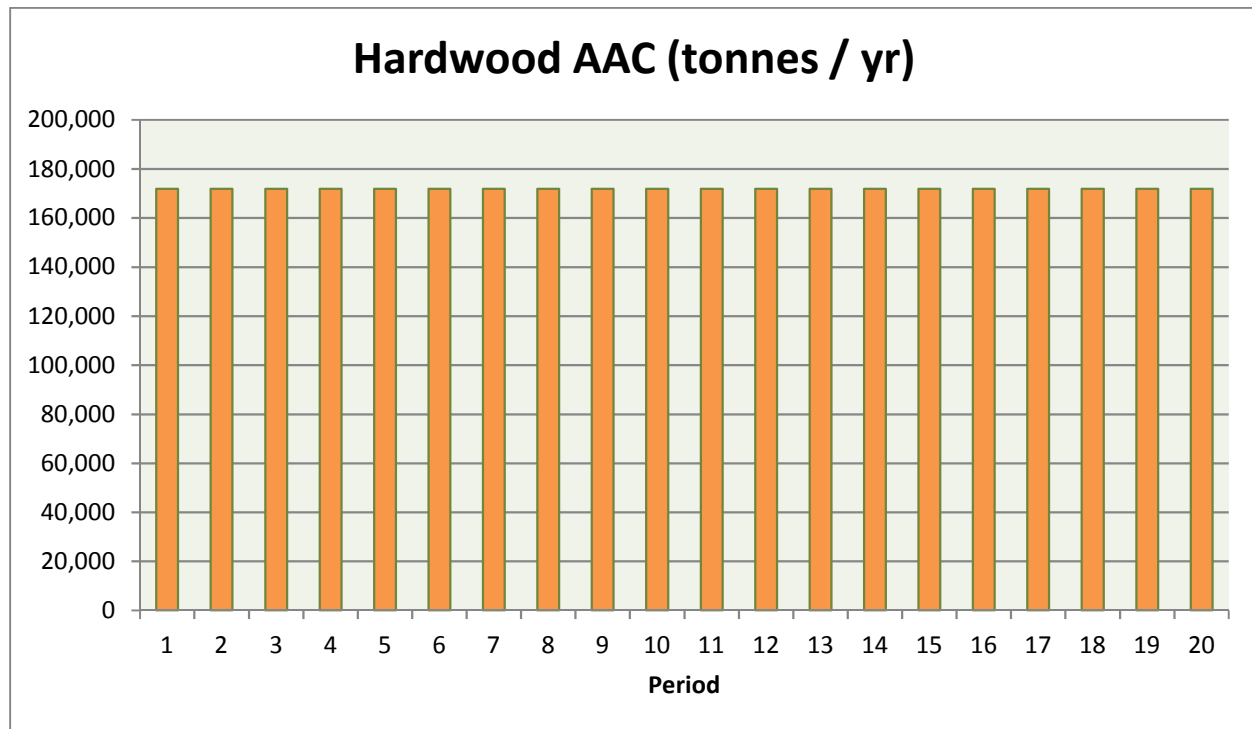


Figure 24 - Graph of Annual Allowable Cut for Hardwood

Figure 25 - Table of Annual Allowable Cut for Hardwood by 5 Year Period

Hardwood (AAC/Period)					
Period	1	2	3	4	5
AAC (tonnes/yr)	171,892	171,892	171,892	171,892	171,892
Period	6	7	8	9	10
AAC (tonnes/yr)	171,892	171,892	171,892	171,892	171,892
Period	11	12	13	14	15
AAC (tonnes/yr)	171,892	171,892	171,892	171,892	171,892
Period	16	17	18	19	20
AAC (tonnes/yr)	171,892	171,892	171,892	171,892	171,892

## Sawlog Component of Harvest Levels

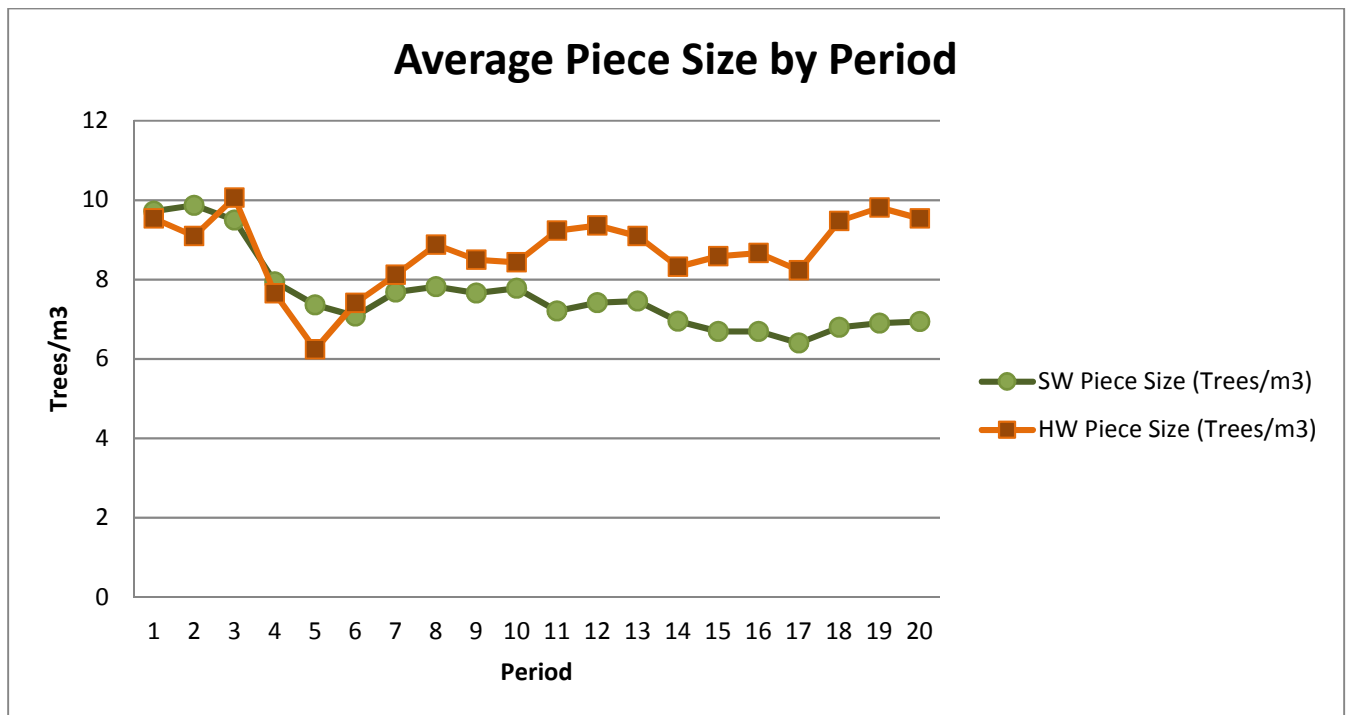


Figure 26 - Graph of Average Piece Size for Hardwood and Softwood by Period

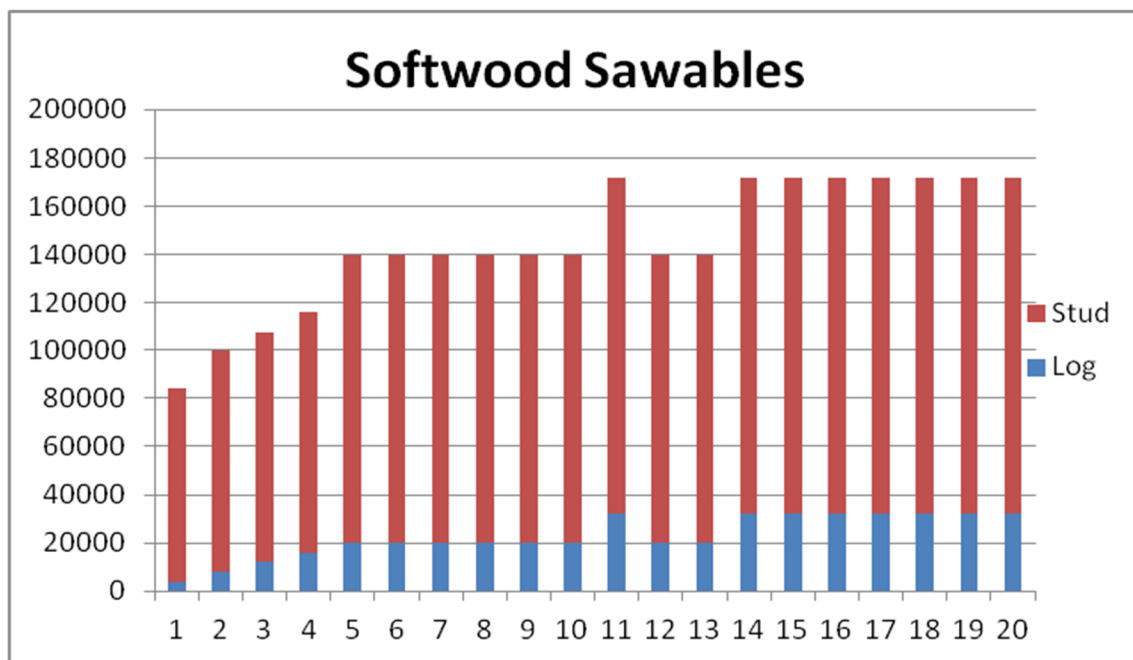


Figure 27 - Graph Predicted Potential Studwood and Sawlog Availability

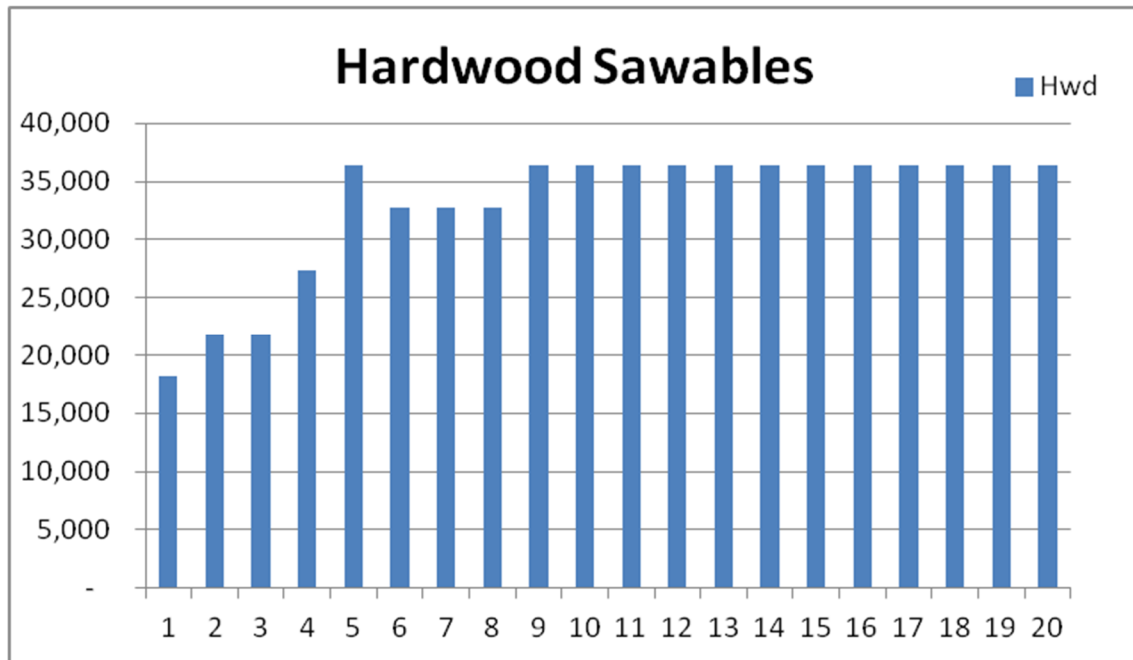


Figure 28 - Graph of Predicted Potential Hardwood Sawlog Availability

## Harvest Treatments

Figure 29 – Table of codes for Harvest Actions in the Model

Harvest Codes	
Clearcut	CC
Overstory Removal	OR
Mixedwood Partial 2nd Entry	HC
Mixedwood Partial 1st Entry	SC
Shelterwood	SL
Commercial Thinning	CT
Selection Harvest	SH

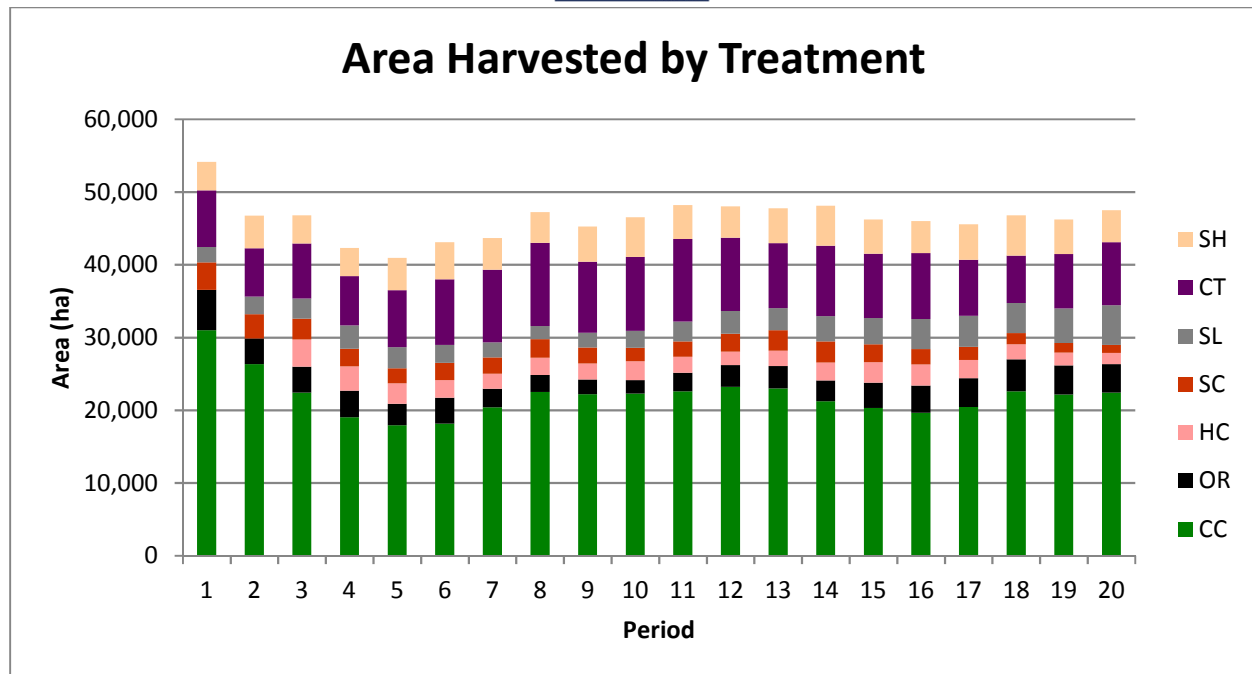


Figure 30 - Graph of Area Harvested by Treatment Type

Figure 31 - Table of Area Harvested by Treatment Type

Area Harvested by Treatment (ha/yr)										
Period	1	2	3	4	5	6	7	8	9	10
Clearcut	6,200	5,270	4,480	3,808	3,588	3,631	4,075	4,501	4,435	4,453
Overstory Removal	1,108	699	714	724	583	710	513	464	405	376
Mixedwood Partial 2nd Entry	0	0	752	672	571	486	413	475	446	513
Mixedwood Partial 1st Entry	752	672	571	486	413	475	446	513	436	371
Shelterwood	423	481	554	637	581	494	420	357	410	472
Commercial Thinning	1,559	1,325	1,515	1,362	1,566	1,801	1,995	2,294	1,950	2,025
Selection Harvest	784	902	767	772	888	1,022	868	838	964	1,091
Period	11	12	13	14	15	16	17	18	19	20
Clearcut	4,519	4,640	4,597	4,243	4,057	3,929	4,083	4,515	4,434	4,481
Overstory Removal	510	600	613	578	698	749	800	879	793	789
Mixedwood Partial 2nd Entry	436	371	426	490	564	584	496	422	358	305
Mixedwood Partial 1st Entry	426	490	564	584	496	422	358	305	259	220
Shelterwood	543	624	603	693	718	825	854	824	948	1,090
Commercial Thinning	2,275	2,014	1,785	1,936	1,768	1,810	1,539	1,308	1,504	1,730
Selection Harvest	928	865	963	1,100	944	883	977	1,101	945	884

## Silviculture Treatments

Figure 32 - Table of Silviculture Codes

Silviculture Codes	
Natural Weeding	EC
Planting	PL
Natural Pre Commercial Thinning	PT

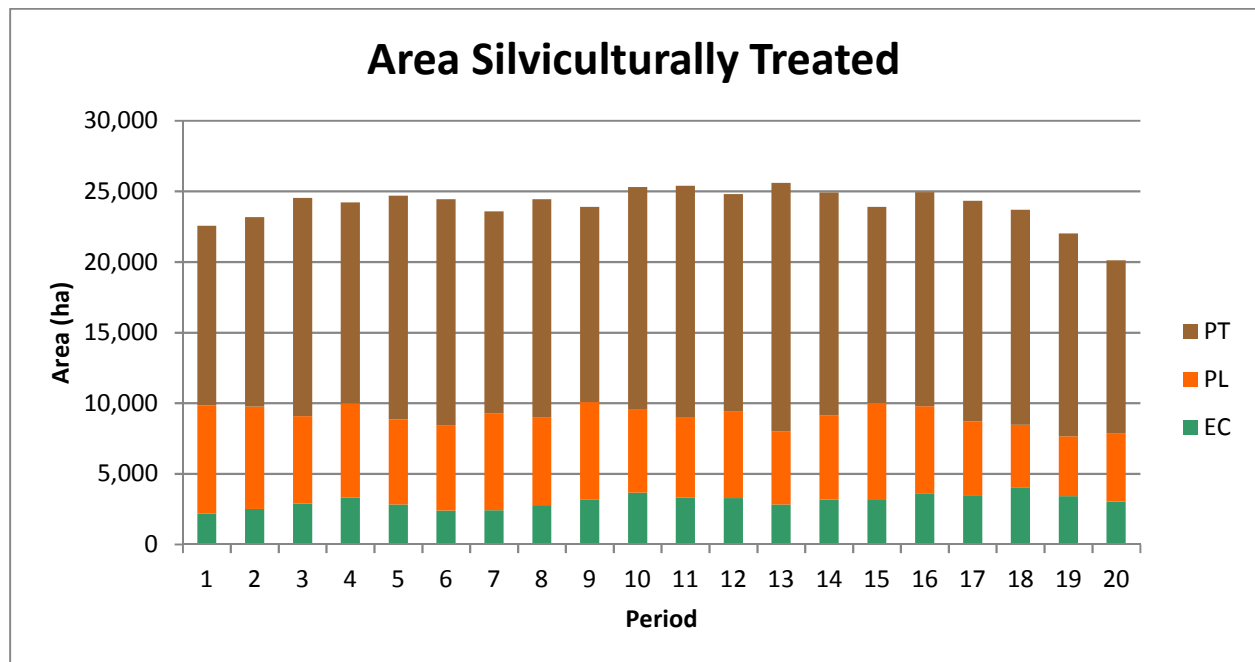


Figure 33 - Graph of Areas treated by Silviculture Type

Figure 34- Table of Areas treated by Silviculture Type

Area Silviculture by Treatment (ha/yr)										
Period	1	2	3	4	5	6	7	8	9	10
Natural Weeding	437	502	578	664	565	480	482	555	638	734
Planting	1,531	1,449	1,240	1,334	1,206	1,211	1,368	1,246	1,379	1,172
Natural Pre Commercial Thinning	2,544	2,685	3,088	2,846	3,166	3,198	2,866	3,086	2,764	3,153
Period	11	12	13	14	15	16	17	18	19	20
Natural Weeding	665	654	564	631	628	722	697	802	682	604
Planting	1,125	1,223	1,040	1,196	1,375	1,233	1,048	891	846	973
Natural Pre Commercial Thinning	3,286	3,085	3,517	3,154	2,778	3,031	3,119	3,048	2,878	2,446

## Plantation Assumptions

Through work with the tactical planning group and model group, it was determined raising a plantation to a free to grow state includes a site prep and plant, with all plantations receiving a weeding treatment, and 20% receiving a second weeding treatment. Through historical treatment level analysis, we concluded that on average, 26% of plantations would be pre commercially thinned at a low density, and 36% would be pre commercially thinned at a high density.

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## ***Appendix I***

### ***SUSTAINABLE FOREST MANAGEMENT (SFM)***

#### **Mission**

The mission of the Woodlands Unit is to “provide a reliable, cost effective and high quality supply of wood through the implementation of Sustainable Forest Management.

#### **Vision**

The vision of Port Hawkesbury Paper LP Woodlands Unit is “that the forest resources, for which we have responsibility, will sustain healthy ecosystems and natural biodiversity, provide a continuous and expanding supply of valuable wood and conserve the forest characteristics of value to society, wildlife and the environment.”

#### **Guiding Principles of SFM**

In order to “promote environmentally responsible, socially beneficial and economically viable management” of company forest resources, Port Hawkesbury Paper LP Woodlands Unit commits to:

1. Plan and conduct its forest operations to meet or be better than the requirements of all applicable regulations and legal obligations.
2. Clearly establish and document long-term tenure and land use rights.
3. Show respect for indigenous peoples’ legal and customary rights and cooperate with local Aboriginal communities regarding conservation of forestlands.
4. Maintain or enhance long-term community relations and forest worker well being. Provide opportunities for the public to receive education, exchange information and provide input to the identification of values, setting of objectives and selection of indicators, which form the basis of our forest management planning.
5. Manage for the conservation of a wide range of social, cultural, economic, and environmental benefits of forests that are consistent with our forest management objectives through the company’s High Conservation Value Forest (HCVF) Assessment and identified Forests of Exceptional Conservation Value.
6. Sustain long-term production of valuable wood by effectively using natural resources and ensuring forest renewal.



7. Implement planning processes and operating practices that conserve the biological diversity and ecological functions and integrity of the forest.
8. Prepare, implement and regularly update a documented forest management plan.
9. Monitor forest conditions, forest product yields, and the results of management activities, and strive for continual improvement through the implementation of science and technology developments, experience and research results.
10. Provide protected status for genuinely unique and representative natural landscapes and rare or endangered biotypes.
11. Develop and implement silviculture methods that complement or imitate natural forest processes to improve overall forest health and quality.
12. Protect the safety of employees and the public by implementation of the company Safety Policy.
13. Control and mitigate environmental impacts of the company's forest activities through implementation of the Woodlands Environmental Policy.
14. Maintain a certified Sustainable Forest Management System.
15. Consider other guidelines for SFM (i.e. the Criteria and Indicators of SFM of the Canadian Council of Forest Ministers (CCFM)) in determining forest management strategies and programs.

## **Guiding Principles of Wood Procurement**

In order to “promote environmentally responsible, socially beneficial and economically viable management” of all lands from which it receives wood, Port Hawkesbury Paper LP Woodlands Unit commits to:

1. Implementing and maintaining a certified Chain of Custody and Controlled Wood system to the Forest Stewardship Council (FSC®) Standard, and a certified Chain of Custody system to the Sustainable Forestry Initiative (SFI®) Standard and Programme for the Endorsement of Forest Certification (PEFC™) Standard.



2. Maintain internationally recognized Environmental Management System to ensure all wood originates from legal sources that are in compliance with the principles of sustainable forestry.
3. Support sustainable forest management and promote forest certification on all land used to supply the mill with fibre to protect, verify and communicate a wide range of economic, environmental and social values. Make publicly available non-proprietary results of third party certification audits and related Environmental Management System documentation (i.e. information pertaining to our FSC, SFI, and PEFC certification programs)
4. Efficiently harvest, transport and process wood to minimize waste of wood and resources.
5. Promote the sustainability of our wood sources by ethical purchasing practices and providing training and long-term partnerships to our suppliers.
6. Commit not to be directly or indirectly involved in the following unacceptable activities:
  - a) Illegal logging or trade in illegal wood or forest products;
  - b) Violation of traditional and human rights in forestry operations;
  - c) Destruction of high conservation values in forestry operations;
  - d) Significant conversion of forests to plantations or non-forest use;
  - e) Introduction of genetically modified organisms in forestry operations;
  - f) Violation of any of the ILO Core Conventions as defined in the ILO Declaration on Fundamental Principles and Rights at Work.)

## Standard Practices for Sustainable Forest Management

### **The Woodlands Unit of Port Hawkesbury Paper LP will:**

1. Develop long-term plans based on ecological landscape planning methods designed to provide a sustainable wood supply while ensuring conservation and restoration of components of the Acadian Forest ecosystem. Such plans promote ecological landscape level diversity, and forest product quality and quantity, while conserving biological and wildlife habitat diversity, mature forest habitat, old forests, natural softwood/hardwood/mixedwood forest community types.



2. On a five-year basis, use permanent sample plot information and accepted modeling procedures to develop or review the long-term forest management plan. The results of past management actions, the latest forest information and ecosystem-based management will be used to develop each subsequent plan, with the objective of continual improvement in our planning procedures. Through this adaptive management approach, we can ensure that we are managing our forests using the most accurate information, and the most current scientific theory.
3. Continue to cooperate with the provincial Department of Natural Resources through the Integrated Resource Management process to provide protected or conservation status for genuinely unique and representative natural landscapes, and rare or endangered biotypes.
4. Continue to provide participation opportunities for Aboriginal peoples with respect to their rights and interests in sustainable forest management issues.
5. Identify, map and manage special sites based on collaborative work with the Province of Nova Scotia and provincial environmental non-governmental organizations.
6. On Crown land areas licensed to the company, submit all silviculture and harvesting plans to government authorities for approval by forest and wildlife scientists prior to operations beginning. All operations will be inspected by government authorities during and at completion of activities.
7. Implement the requirements of the Forest Utilization License Agreement.
8. Plan and conduct all forest operations in accordance with the Wildlife Habitat and Watercourse Protection Regulations and Forest/Wildlife Guidelines for Nova Scotia, which include criteria for stand level wildlife habitat elements to be retained (e.g., snags, mast trees, down woody debris, den trees, nest trees, etc.).
9. Utilize the silviculture system most appropriate to the ecodistrict and site. These can include full removal or partial cutting techniques for harvests, promotion of natural regeneration, planting, release spacing of young stands, maintenance or natural species diversity and encouragement or re-establishment of valuable shade tolerant species, such as red spruce, yellow birch and sugar maple. All forest practices will ensure efficient utilization of trees. Harvesting and other silviculture practices will be augmented to address aesthetics where necessary and appropriate.
10. Address management and protection of water bodies and riparian zones and implement Provincial BMP's during all phases of management activities including exclusion zones, shutdown procedures, and careful road construction. Mill inventories and procurement practices during adverse weather conditions will be guided by PHP's Adverse Weather Policy.



11. Protect and maintain forest and soil productivity and stability by wood harvesting machine tire/track standards, trail rutting restrictions, and logging slash distribution policies.
12. Protect forests from damaging agents from occurrences such as fire, invasive exotic and domestic pest plants, animals, insects and disease. The company does not use chemical pesticides.
13. Promote awareness and provide information on Port Hawkesbury Paper LP forest activities to employees and the public through tours and information programs. Community concerns about forest practices will be responded to in a sensitive and progressive manner as outlined in the Woodlands Environmental Management System (EMS) "concerns from interested persons" procedure. Forest worker well-being is ensured through implementation of the Port Hawkesbury Paper Safety policy.
14. Periodic broad-based public input into our forest management planning process will be implemented through the IRM public consultation process with the Department of Natural Resources. Ongoing public input will be through our Forest Advisory Committee established for the company's Woodlands Unit. We will manage and allow for public recreation where safe and appropriate.
15. Facilitate professional training of wood producers and train those staff employees and operators responsible for implementing BMP's to protect water quality. Promote sustainable forest management practices and provide assistance to private woodlot owners and other private wood producers through the implementation of section 6 of the Woodlands Environmental Policy and implementation of the Nova Scotia Forest Sustainability Regulations.
16. Support, through participation in the Nova Scotia Tree Improvement Working Group, appropriate research, testing, evaluation, and development of genetically improved trees. The company does not use genetically modified organisms (GMO's) in its reforestation programs. Support other sustainable forest management research, science and technology initiatives as appropriate.

Approved By:

A handwritten signature in blue ink that reads "Derek Geldart".

**Derek Geldart**  
Operations Manager, Woodlands  
Port Hawkesbury Paper LP  
August 11, 2014



## ***Environmental Policy - Woodlands***

It is the policy of Port Hawkesbury Paper LP to carry out operations in ways that do not endanger the environment. Sustaining a healthy environment will be an integral part of all company operations. Port Hawkesbury Paper LP fully endorses the Forest Products Association of Nova Scotia Principles of Forest Stewardship, and the Forest Products Association of Canada (FPAC) Sustainability Statement.

Our company forest resources will be managed for long-term sustainability and natural biodiversity while providing a sustainable harvest volume and conserving social and cultural values of the community. The company is committed to implementing its sustainable forest management mission, vision, and guiding principles.

### **In maintaining an Environmental Management System the company, through its employees, shall:**

1. Commit to continual improvement of all aspects of our sustainable forest management system for company-managed lands through experience and forest research.
2. Set appropriate environmental objectives and targets, develop applicable action plans, review progress, and conduct periodical reviews and annual updates.
3. Commit to prevention of pollution, soil conservation, waste reduction, and promotion of applicable recycling in managing our environmental impacts.
4. Utilize long-term landscape ecosystem planning, appropriate silviculture systems, and operating practices that conserve biodiversity in managing our forest areas.
5. Provide appropriate training to company employees and contractors in the relevant environmental aspects of their work on company controlled lands.
6. Expect our private wood suppliers to comply with forest stewardship and environmental standards acceptable to Port Hawkesbury Paper LP.
7. Develop, maintain, and use Emergency Response Plans for environmental emergencies within the Woodlands Unit.
8. Meet or be better than all applicable regulations, legal obligations and other requirements to which Port Hawkesbury Paper LP subscribes.
9. Regularly report on our environmental performance and status to the public.

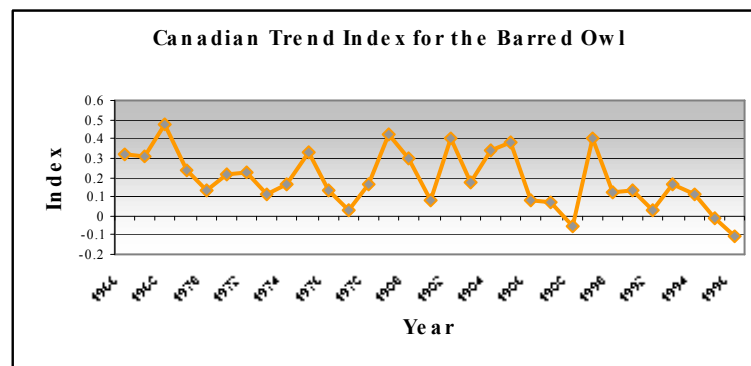
This Environmental Policy and our Environmental Management System shall be accessible, documented, implemented, maintained, reviewed and communicated to all persons working for or on the Woodlands Unit behalf.

## Appendix III - Bio-Indicator Species Habitat Description

### Barred Owl (*Strix varia*)

The Barred Owl, is a large stocky owl (approx. 43-60cm in height), readily identified by its grey-brown body with cross-barring on the neck and breast, and streaks on the belly (Bull and Farrand 1998). It is one of the two common large owls that are permanent residents of temperate North America. It is a nocturnal species, and is a year round resident in Eastern Canada (Peterson 1980). The Maritimes provinces are close to this bird's northeast limit, and it is suspected that the scarcity of birds found in New Brunswick and eastern Nova Scotia may be due to avoidance of the more coniferous forests found here.

Although the Breeding Bird Survey distribution map shows very low numbers found in eastern Nova Scotia, the Atlas of Breeding Birds of the Maritimes shows higher numbers, with a number of confirmed breeding sites found in addition to probable and possible sightings. The population estimates derived from these sources is not completely accurate as they are primarily carried out through the daylight hours, when owls are typically least active. Current projects, such as the nocturnal owl survey, will help to establish a better estimate of the population base, and help with continued monitoring of the population. Presently however, the breeding bird atlas estimates the total number of birds within Nova Scotia to be near 2 100 (+/- 300) in total.



Most of the nests reported in the breeding bird atlas of the Maritimes were found to be in nest boxes (Erskine 1992). Considered one of the more common owls of the Maritimes it is suspected that its numbers were at their lowest levels early in the 20<sup>th</sup> century, with a slight increase since then. Currently, the Barred Owl is rated as a green species in Nova Scotia, which is a rank assigned to species that are not known to be, or not believed to be, at risk. The BBS trend data presented here are for Canada, rather than for the Atlantic Maritime Ecozone as it was the only information. The paucity of information is likely the result of the BBS taking place primarily during daylight hours, and not picking up many of the owls due to their largely nocturnal activity patterns.



The Barred Owl has been selected as a management indicator species in some national forests in the United States as well as selected forest management areas in Canada (McGarigal and Fraser 1984, Higgelke et al. 2000, Williams pers. comm.). This previously well-demonstrated use as an indicator species gave us further confidence that the Barred Owl would be a good indicator species which had the added benefit of providing consistency/comparison with other jurisdictions in North America. Its requirements for closed canopy mature and over-mature forest, and affinity for large diameter trees for nesting make it a good candidate as a bio-indicator for the Uplands EPU, characterized by older, largely deciduous forest types.

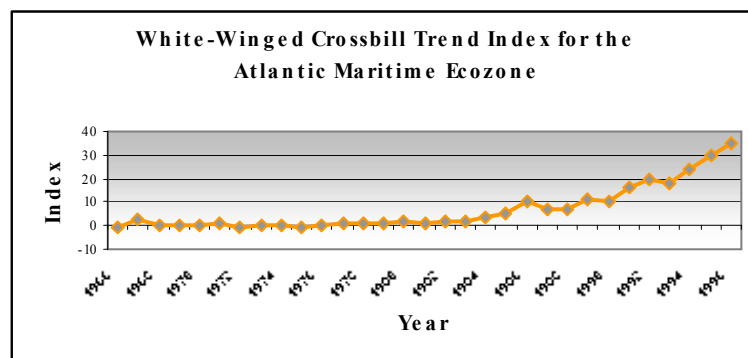
## White-winged Crossbill (*Loxia leucoptera*)

The White-Winged Crossbill is a medium sized (15 – 17 cm) sparrow, which primarily inhabits conifer forests. It is quite easily recognized in the field by its characteristic crossed-tipped mandibles. Distinguishing it from the only other bird with this bill type, the Red Crossbill (*Loxia curvirostra*) are the two prominent white wing bars present on both the male and female birds. The white-winged crossbill breeds in the boreal forests from Alaska and northern Quebec south to Newfoundland and British Columbia and is a permanent resident here in Nova Scotia. Breeding in all areas is erratic, and is dependent on the seed crops of fir, spruce and larch, with the main breeding efforts in the Maritimes occurring January to April, and July to October (Erskine 1992).

According to the 1992 breeding birds census, there were approximately 31 000 (+/- 13 000) breeding pairs found in Nova Scotia. Due to the crossbills dependence on cone seed crop abundance, and the biannual fluctuations in cone crops, monitoring of this species will be restricted to a biannual basis. This will prevent the influence of naturally occurring, small-scale variations on the assessment of forecasted habitat availability. It is interesting to note at this point that the dramatic increase in the crossbill numbers in the Maritimes is a sharp contrast to what is occurring on a national level. The Canadian trend index shows the populations declining quite significantly.

We have identified the White Winged Crossbill as a good

indicator since it occurs throughout Eastern Nova Scotia and is considered a habitat specialist, preferring older softwood forest stands with a healthy cone crop. This, in addition to the active monitoring the populations receive through the Breeding Bird Surveys and Christmas bird counts give PHP a good



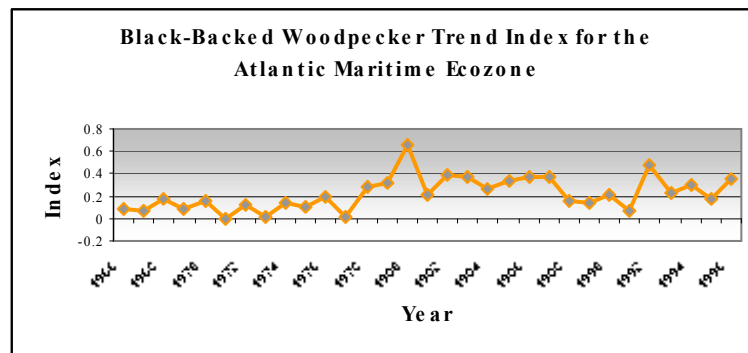
opportunity to model our forest management techniques to maintain suitable habitat. Currently, the White Winged Crossbill is ranked as a Green species in Nova Scotia.

## Black-backed Woodpecker (*Picoides articus*)

The Black-backed woodpecker is a robin-sized woodpecker (approx. 23cm), which is identified by its solid black back, white barred flanks and white below. The male displays a yellow crown, while the female has a solid black crown. This woodpecker, along with the three-toed woodpecker, is the most northerly of the woodpecker family, and has a distribution throughout the boreal range from Alaska through to Labrador and Nova Scotia. It can also be found in the northern most United States, typically in the mountain regions of California and New England. Presence of either of these birds can be detected by the 'scaling' of bark from trees as they forage for burrowing insects and larvae.

Both birds are considered numerous throughout their range, however neither is commonly found (Bull and Farrand 1998). As it is not a commonly encountered species, it is worthy to note that neither the North American Breeding Bird Survey, nor the annual Christmas bird counts detect this species regularly (NatureServ 2001), and that the distribution map presented above should only be considered for the broadest-scale trend estimates.

In the Maritime Provinces, the Black-back is widely but thinly distributed throughout the conifer forests, and becomes more abundant further to the north (Erskine 1992). Due to their feeding preference, Black-backs are typically found in near



proximity to older forests which are more susceptible to insect infestations. Nests in the Maritimes are often found in quite open areas, such as cutovers, open jack pine stands, and the edges of woodland gardens. The population is thought to have increased in this area since the period of European settlement, which removed much of the primeval hardwood and mixed wood, replacing it with spruce and fir (Erskine 1992). According to the Breeding Bird Census of 1992 there are approximately 1600 (+/- 200) nesting pairs found in Nova Scotia. The Department of Natural Resources has ranked this species as green for the province. The long term BBS trend index shows that the population has been relatively stable over the past 30 years, showing only a slight increase overall.

The Black-backed woodpecker has been reported locally throughout eastern mainland Nova Scotia, and its feeding and habitat requirements make it a good indicator species for mature, over-mature, and intermediate aged coniferous and wetland forest areas. Population levels appear to be linked to large-scale disturbance such as budworm infestations and fire. Salvage logging of post-disturbance regions can be detrimental to population abundance. However, proper management of these areas is likely to prevent any substantial impact to abundance. Erskine (1992) recognizes that management of forests for softwood forest products is likely to ensure a continuing place for Black-backs to breed. However, shorter rotation forest practices may reduce the time available for insect damage to weaken trees to the stages especially favoured by this woodpecker. Conversely, silviculture systems aimed at increasing the quality will increase the amount of suitable habitat in the future. As an indicator species, the Black-back will ensure appropriate silviculture systems are followed in the Eastern Mainland lowlands ecological planning unit.

### Bicknell's Thrush (*Catharus bicknelli*)

Until recently, the Bicknell's thrush was considered a subspecies of the Grey Cheeked Thrush. It is very similar in appearance and habitat, with subtle differences that are difficult to identify in the field. It is characterized as being approximately the size of a large sparrow, with olive-brown back, buffy throat, grey-to-white underparts with black spotted chin and flanks (Environment Canada 2000). Although very closely related, the Bicknell's thrush can be distinguished from the Grey-cheeked thrush by its size, as the Bicknell's is much smaller. Physically it can be distinguished by its longer yellow colour at the base of the bill, and chestnut colouring on the upper tail.

The breeding range of the Bicknell's thrush stretches from New York's Catskill Mountains north to the lower shore of the gulf of St. Lawrence, and east to Cape Breton Island. It is a migratory bird, having a winter range restricted primarily to the Greater Antilles. Although this species is a neo-tropical migrant, and it spends a large proportion of its time in areas not under our forest management practices, we have included it as an indicator due to its listing as a Red species by the provincial Department of Natural Resources, and ongoing interest by the Canadian Wildlife Service and local groups. The breeding distribution map given below shows the distribution of the Grey-cheeked thrush, as one for the Bicknell's is not available from Gough at this time. It is modified to show the distribution of the Bicknell's thrush along the eastern portion of Canada and the United States (as discussed previously). Although trend information for this species is not currently available, continued interest in the species and future monitoring will help to establish a base from which we can work.

The sparse distribution of the Grey-cheeked thrush on this map is evidence of its more northerly range, above the limit of the Breeding Bird Survey area. The 1992 breeding bird atlas for the Maritimes notes

that all species of Grey-cheeked thrush found in the Maritimes were of the *Bicknelli* subspecies (Erskine 1992), whereas this subspecies gained rank as a distinct species in 1995. From this account we can make the assumption that the grey-cheeked thrush counted and commented on is indeed the Bicknell's thrush.

The Bicknell's thrush is a bird that finds suitable habitat in montane forests dominated by stunted balsam fir and spruce at elevations ranging from 450 metres (Cape Breton Island) to more than 915 metres further to the south (Vermont). The Bicknell's also appear to use dense regenerating growth, and in Canada, it will make use of second growth industrial forest where elevations and dense growth characteristics are appropriate. Much of the breeding biology and status is unknown for this thrush throughout its breeding range, but the populations are thought to be patchy, having a small breeding population widely dispersed. Although this could create genetic bottlenecks, it may also likely protect the species from widespread extinction. Currently the species is ranked as Red by the Nova Scotia Department of Natural Resources, and has been listed as Vulnerable by Committee on the Status of Endangered Wildlife in Canada (COSEWIC)

This species is a good candidate as an indicator species as it is a resident of the unique Taiga ecosystem found in the Cape Breton Highlands. This ecological planning unit is characterized by short, dense coniferous and Krummholtz habitat, and is primarily seedling, sapling and intermediate age classes. Although forest practices are not the only factor threatening the long-term viability of the populations, we think it is important to include this thrush in our long term planning and modelling procedures to ensure this dense forest structure is maintained.

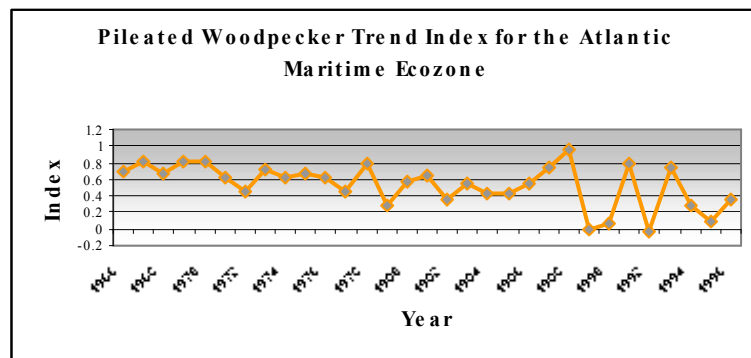
### **Pileated Woodpecker (*Dryocopus pileatus*)**

The Pileated woodpecker is probably one of the most obvious and showy members of the woodpecker family in Canada. The largest of the woodpeckers in North America, (averaging 42 cm in height) it is often heard rather than seen. Its upper surface is black or dark grey in colour, with a white patch on the underside of its wings. Its red crest and white line around its neck are obvious to those who see one. Evidence of this woodpecker is noted by the large oval cavities it hollows out in trees and snags as it feeds or nests. These cavities created by the Pileated woodpecker serve an important ecological role as they are often used by numerous other bird and mammal species once the woodpecker has moved on. Other cavity nesting or roosting species that are dependent on these holes include the Boreal Owl, Screech Owl, Saw-Whet Owl, Wood Duck, American Kestrel, Common Flicker, Northern Flying Squirrel, and American Marten. There are approximately 32 other species that depend on these cavities for their own success (Higgelke *et al.* 2000). Additionally, the woodpecker is thought to have a significant role in the control of insect outbreaks (Kirk and Naylor 1996).

This large bird is found widely throughout forested regions of North America and is a permanent resident of Nova Scotia, where it is currently ranked by the provincial Department of Natural Resources as a 'Green' species. Due to its size, feeding and nesting characteristics, this bird is restricted to extensive forest areas with old, large diameter trees. In the Maritimes pileated woodpecker distribution seems focused on forest stands dominated by deciduous trees (Erskine 1992). This trend is likely explained by the fact that the trees of largest diameter are typically remnant hardwood. The breeding bird atlas for the Maritime provinces estimates the breeding population of pileated woodpeckers in Nova Scotia to be approximately 2 800 (+/- 1 200) pairs. This is thought to be a decline in the numbers found in the area since European settlement, and the subsequent clearing of forested land. The BBS trend index shows a relatively stable population over the past 30 years, with some dramatic changes in the past number of years. These may be a result of varied sampling effort, or seasonal differences in the breeding effort. It is important to keep in mind the long-term population trend, which does indicate an overall decline.

From a management perspective, selection cuts and shelterwood preparatory or seedling cuts do not appear to significantly affect habitat suitability (OMNR 1998). However, clearcuts and shelterwood removal cuts produce habitat that will not be suitable for nesting for 40 – 80 years. Cavity trees, snags and

downed woody debris are an important component of pileated woodpecker habitat, providing for nest, roost, and/or feeding sites (Kirk and Naylor 1996). These essential features should be provided when stand level guidelines are applied. Long-term planning strategies and the constant implementation of adaptive management techniques at both the stand and landscape level are required to ensure that the habitat requirements of this bird are met into the future.



The Pileated Woodpecker makes an ideal indicator species as it has very specific habitat requirements, which cannot be met through artificial means (i.e. it is not readily attracted to nest boxes). It is also a key species where the long-term presence directly impacts the reproductive success and survival of many other species dependent on the cavities it creates. The most notable area for confirmed breeding of the Pileated in Eastern Nova Scotia is throughout the Northumberland Shore EPU, where intolerant hardwood and mixed wood forest types predominate. Using the Pileated as an indicator for this region maintains a level of consistency since it has been chosen as an indicator, or management species by almost all provincial natural resource planning agencies in Canada (Kirk and Naylor 1996)

