HIGH CONSERVATION VALUE FOREST

ASSESSMENT REPORT

2015 – 2020 FSC® Certification Period

Port Hawkesbury Paper LP

Liscomb River Large Landscape HCV
Guysborough, Nova Scotia
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EXECUTIVE SUMMARY

A High Conservation Value Forest (HCV) assessment initially undertaken for the Port Hawkesbury Paper mill in 2010 (at that time called NewPage Port Hawkesbury) in accordance with Principle 9 of the Forest Stewardship Council® (FSC) Maritimes Standard was updated for the 2015-2020 FSC certification period to ensure original HCV's are still relevant and new HCV's are captured for the next 5-year period. This re-assessment resulted in the following HCV designations:

HCV Category	HCV Value
CATEGORY 1 – BIODIVERSITY	
Question 1: Species at Risk	Boreal Felt Lichen Occurrences Roseate Tern Habitat Bicknell's Thrush Habitat Wood Turtle Habitat American Marten Habitat Mainland Moose Habitat Canada Lynx Habitat Rusty Blackbird Habitat New Jersey Rush Habitat Eastern White Cedar Frosted Glass-Whiskers Occurrences Vole Ears Lichen Occurrences Blue Felt Lichen Occurrences Black Ash Olive-sided Flycatcher Habitat Eastern Whip-poor-will Habitat Eastern Wood Peewee Habitat Canada Warbler Habitat Black-foam Lichen Habitat Little Brown Myotis Habitat Northern Myotis Habitat Tri-colored Bat Habitat Wood Thrush Habitat Evening Grosbeak Habitat Wrinkled Shingle Lichen Occurrences
Question 2: Endemic Species	None identified
Question 3: Seasonal Concentration of Species	PHP Watersheds Cold-water streams for salmon and trout
Question 4: Regionally Significant Species	Natural Red Spruce Stands White Elm

	Red Oak Hemlock Black Ash Jack Pine Wood Turtle
Question 5: Species Concentration at Edge of Natural Range	None identified
Question 6: Legal or Proposed Conservation Area	New provincial protected area (pending legal status) Provincial parks and reserves Provincial nature reserves Provincial wilderness areas National Migratory Bird Sanctuaries National Parks Old forest areas PHP protected areas IBP sites & sites of ecological significance Special Management Zones Adjacent to Park Boundaries
CATEGORY 2 – LARGE LANDSCAPE LEVEL FORESTS **Question 7: Forest Landscapes for Native Species**	Barren Hill Boisdale Hills Bornish Hill Country Harbour East Bay Hills French River Hill Lake Ingonish River Isaacs Harbour River Jim Campbells Barren Masons Mountain North River Oban Petit Lake Ruiss Noir Salmon Gaspereaux Upper Liscomb River

CATEGORY 3 – RARE, THREATENED, OR ENDANGERED ECOSYSTEMS	
Question 8: Naturally Rare Ecosystems	Significant Ecosites Database Nature Conservancy's Critical Occurrences
Question 9: Ecosystems under Present and/or Future Decline	Significant, Old, or Unique Forest Database Old Forest Areas
Question 10: Ecosystems Poorly Represented in Protected Areas	Country Harbour Boisdale Hills Hill Lake Jim Campbells Barren North River Oban Mason's Mountain Salmon Gaspereaux
Question 11: Rare or Absent Large Landscape Level Forests	See Category 2 – Large Landscape Level Forests Connectivity Management Zones
Question 12: Unique Aquatic Ecosystems	St. Mary's River Watershed Margaree River Watershed

CATEGORY 4 – BASIC SERVICES OF NATURE	
Question 13: Water Flows for Social & Economic Activities	Legally Protected Municipal Water Supply Areas Water Supply Intake Points PHP Watersheds
Question 14: Significant Forests Providing Aquatic Ecological Services	Legally Protected Municipal Water Supply Areas Water Supply Intake Points PHP Watersheds Wetlands
Question 15: Forests Critical to Erosion Control	Steep Slope Areas
Question 16: Interface Forests for Fire Protection	None identified

CATEGORY 5 – BASIC NEEDS OF LOCAL COMMUNITIES **Question 17: Basic Needs / Livelihoods of Local Communities**	Cape Breton Moose Population Cold-water streams for salmon and trout Cattle Grazing in Cape Breton Highlands Viewscapes Margaree Watershed and St. Mary's Watershed for salmon fishing Third Party Requests
CATEGORY 6 – TRADITIONAL CULTURAL IDENTITY **Question 18: Forest Areas for Traditional Cultural Identity**	Culturally significant plant areas
Collective Overlap of High Conservation Values **Question 19: Significant Overlap of Values**	None identified

1.0 INTRODUCTION TO PORT HAWKESBURY PAPER LP

The Mill site owned by Port Hawkesbury Paper LP (PHP) 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 employees over 300 people and provides an additional 400-500 jobs for woodlands contractors and suppliers.

Forest Utilization 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 FULA, PHP is responsible for all forest management decisions on Crown lands managed by PHP. A Sustainable Forest Management Long-term Plan (SFMLTP) and annual operating plans must be prepared and approved by the Nova Scotia Department of Natural Resources before implementation. Specific requirements regarding the SFMLTP are articulated in the FULA. PHP prepared an updated SFMLTP for the 2015-2020 period and is available to the public by contacting PHP directly or on its website at http://www.wlinpco.com/mills/port-hawkesbury-paper.aspx.

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 FULA. 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. The Nova Scotia Department of Natural Resources is responsible for land-use and resource-use decisions pertaining to the defined forest area (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.

Landbase Description

PHP's DFA is located in the seven eastern counties of Nova Scotia. The geographic extent of the DFA is shown in Figure 1-1. The company manages approximately 535,000 hectares of Crown lands through a license agreement with the provincial government within the DFA. 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.

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 Nova Scotia Department of Natural Resources has implemented an integrated resource management (IRM) land use approach for the management of Crown lands.

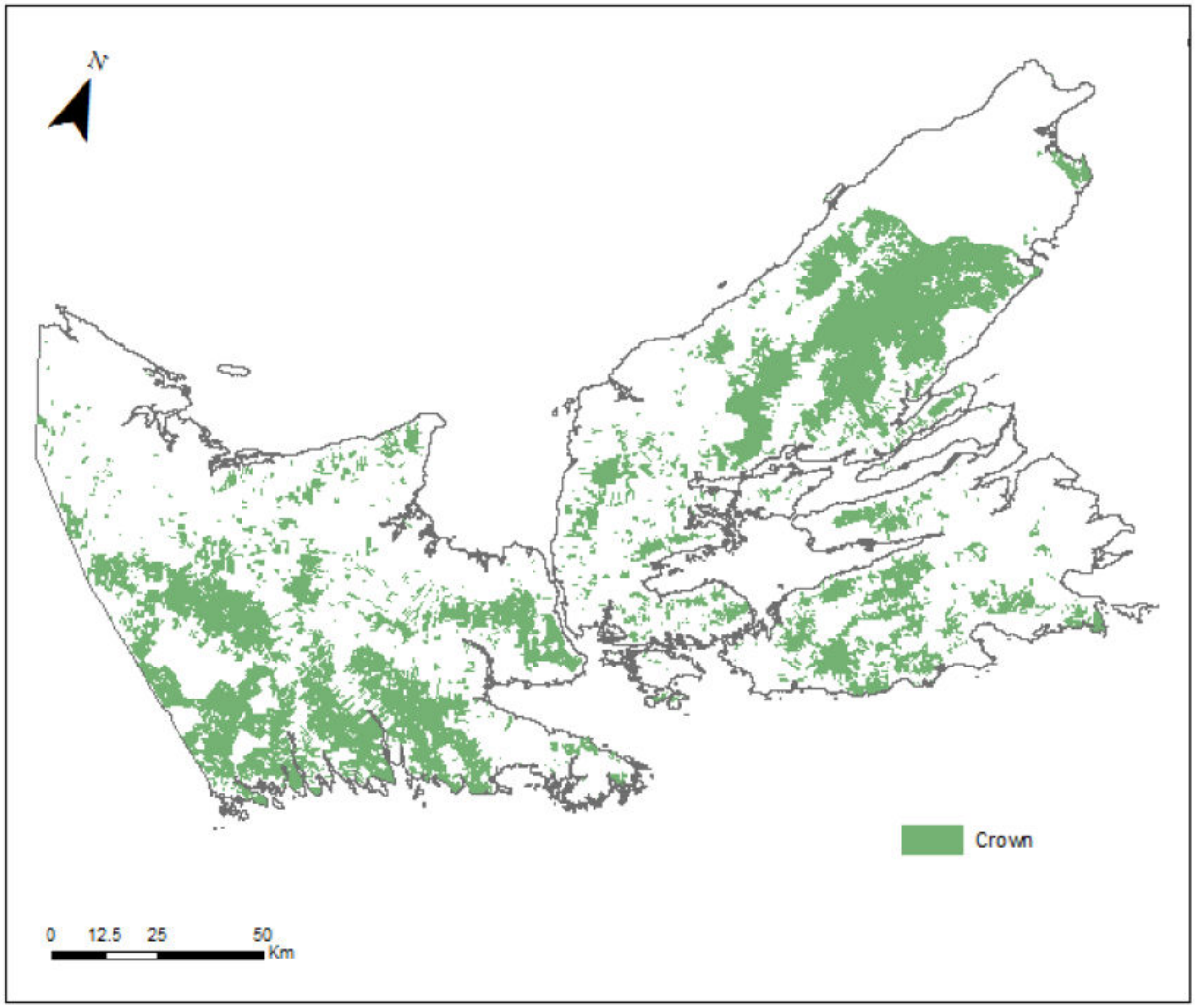


Figure 1-1 PHP's Crown License Area under the Forest Utilization License Agreement

FOREST CERTIFICATION AND HIGH CONSERVATION VALUE FORESTS

Forest management certification is one of many tools used for ensuring the sustainability of PHP's operations. Certification is a voluntary process by which planning, procedures, systems and performance of on-the-ground forestry operations are audited by a qualified and independent third party against a predetermined standard. Forest operations found to be in conformance with the given standard are issued a certificate and follow-up surveillance audits are conducted annually to ensure continued compliance and improvement. Chain of Custody certification provides a rigorous process for tracking certified forest and manufactured material through the paper-making process so appropriate claims can be made by PHP and its customers.

The Woodlands Department of PHP is certified to various management standards including Forest Stewardship Council® (FSC) Maritimes Forest Management Standard, Sustainable Forestry Initiative® (SFI) Forest Management Standard, FSC Chain of Custody Standard, SFI Chain of Custody Standard, and the Programme for Endorsement of Forest Certifications™

(PEFC) Chain of Custody Standard. Third-party audits are conducted annually to verify that PHP continues to manage the forest resource that meets all certification requirements.

An important element in the FSC certification process is the analysis of a company's forest lands for potential high conservation value forests (HCV). All forests contain some ecological or social value(s) that are important for biological processes or human needs. Examples of forest values are rare species habitat, recreational sites, or old growth forests. A forest can be defined as a HCV if the values within are considered to be of outstanding significance or critical importance (ProForest Toolkit 1, 2003).

The HCV framework was first developed for certification by FSC in 1999 and has been applied on an international scale. Since it is international in scope, the HCV framework is generic in its definition, which requires a regional or national interpretation for the forest being assessed. Currently, Principle 9 of the FSC Maritime Standard states that:

> *Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.*

The FSC Maritimes Standard identifies six categories for the assessment of potential high conservation value forests. The six categories are:

Category 1: Forest areas containing globally, regionally or nationally significant **concentrations of biodiversity values** (e.g., endemism, endangered species, refugia).

Category 2: Forest areas containing globally, regionally or nationally significant **large level landscape forests**, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance.

Category 3: Forest areas that are in or contain **rare, threatened or endangered ecosystems**.

Category 4: Forest areas that provide basic **services of nature in critical situations** (e.g. watershed protection, erosion control).

Category 5: Forest areas **fundamental to meeting basic needs of local communities** (e.g. subsistence, health).

Category 6: Forest areas **critical to local communities' traditional cultural identity** (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Using the best scientific information available and local knowledge and expertise, HCV's are spatially identified for the forest area. Afterwards, appropriate management decisions and monitoring is required to ensure that key values are maintained or enhanced over time. Typically, the HCV assessment is completed by a working group or consultant, which is

followed up by an external peer review process. Guidance material for completing the HCV assessment is available through a variety of sources including the FSC Maritime Standard, the ProForest HCV Toolkit, and World Wildlife Canada's HCV Support Document.

HCV METHODOLOGY

Data Collection & Analysis

A variety of data were collected from several sources including PHP's policies and procedures, the original source or through past and existing conservation planning projects (e.g. Colin Stewart Forest Forum) to complete the HCV assessment. Data used or available for use in the assessment include:

- Provincial data available from Nova Scotia Department of Natural Resources (NSDNR) and Nova Scotia Environment (NSE):
  - Forest inventory
  - Road and utility corridors
  - Hydrology
  - Property Ownership
  - Wetlands
  - Significant Old/Unique Forests
  - Significant Ecosites
  - Habitats of Rare/Vulnerable Species
  - Significant Habitats
  - Old Forests
  - Climax-dominated Forests
  - Natural disturbance and patch
  - Wilderness Areas
  - Nature Reserves
  - Sites of Ecological Significance
  - Natural Landscapes of Nova Scotia
  - Preliminary Ecounits
  - Integrated Resource Management Land-use (C1, C2, C3)
  - Restricted Land-Use Layers
    - All Parks (provincial, national)
    - National Wildlife Management Areas
    - Provincial Game Sanctuaries
    - Provincial Wildlife Management Areas
    - National Historic Sites
    - National Wildlife Sanctuaries
    - International Biological Programme (IBP) Sites
    - Designated & Non-Designated Water Supply Areas
    - Ramsar Wetland Sites
    - Canadian Heritage Rivers

- Northern Appalachian/Acadian Ecoregion Assessment (Nature Conservancy Canada)
    - Matrix Forest Blocks
    - Portfolio Occurrences (floodplains, ravines, summits, steep slopes, wetbasins)

- Other Data
    - PHP's Environmental Management System and Forest Certification Documentation
    - PHP's Historical Treatment Data
    - Landsat 5 and 7 satellite imagery from late summer 2005, and other years going back to the late 1980s
    - Digital Elevation Model for Nova Scotia
    - Atlantic Canada Conservation Data Centre Element Occurrence
    - Colin Stewart Forest Forum Large Natural Patches
    - Cold water refugia areas for Salmon and Brook Trout (Federal Department of Fisheries and Oceans)
    - Important Bird Areas

- Other Potential Data Sources through Internet
    - Global/International Data
        - CITES (Appendix I, II and III)
        - IUCN Red Data List
        - Conservation International Hotspot Areas
        - Global Forest Watch Canada
    - National Data
        - International Bird Areas of Canada
        - WWF Ecoregion Conservation Assessment
        - Atlas of Canada Endemic Plant Diversity
        - NatureServe
        - USGS Trees of North America
        - WWF Canada Nature Audit
        - Canadian Conservation Areas Database
        - WWF Enduring Features
        - Ducks Unlimited Canada
        - Canadian Soil Information System
    - Provincial Data
        - Maritimes Breeding Bird Atlas

For HCV categories 1, 2, and 3 in particular, the ArcGIS® platform was used and a series of questions were posed to begin the HCV analysis to better understand general characteristics of the data. These questions were:

- Is the feature on PHP lands?

- Is the feature impacted by forest management activities?
- Is the feature rare?
- What proportion is on PHP lands compared to province?
- What amount is currently protected or specially managed by PHP?

For several years, ecological and habitat values have been identified on PHP lands either through the provincial government or the company itself. As the company's long-term planning system is landscape-based, the ecological planning unit (EPU[1]) is the primary attribute in PHP's forest modelling to balance between the attributes necessary to accurately predict growth and yield, and those necessary for managing other values. Many decisions, actions and responses are dependent on the EPU, thus allowing the company to model the forest in a manner that reflects ecological and societal rather than purely logistical or economic realities. During the HCV assessment process, several of these ecological and societal values have been identified as high conservation values. Values that PHP currently manages for include:

- Steep Slopes
- Marten Habitat Management Zones
- Canada Lynx Management Zones
- Boreal Felt Lichen Predicted Habitat
- Connectivity Management Zones
- Viewsheds
- Recreation Areas
- Significant Watersheds (where PHP is predominant land manager and/or municipal watershed areas in PHP's DFA)
- Old Forest Areas

4.0 HCV CONSULTATION PROCESS

In January 2007, a HCV Design Committee was formed to assist the company (at that time called Stora Enso Port Hawkesbury) with the completion of a High Conservation Value Forest (HCV) Assessment for Forest Stewardship Council (FSC) certification. This Committee completed the assessment for categories 1, 2 and 3. The HCV Design Committee members included:

- Karen Beazley, Dalhousie University
- David McCorquodale, University of Cape Breton
- Chris Miller, Canadian Parks & Wilderness Society
- Craig Smith, Canadian Parks & Wilderness Society
- Kermit deGooyer, Ecology Action Centre
- Raymond Plourde, Ecology Action Centre
- Rob Cameron, Nova Scotia Environment

[1] An EPU (or Ecoregion) is mapped at a scale of 1:500,000 and are subdivisions of the larger Acadian ecozone and express macroclimate as a distinctive ecological response to climate through soils and vegetation (Neily et al. 2003).

- Dave MacKinnon, Nova Scotia Environment
- Bruce Stewart, NS Department of Natural Resources
- Mark Pulsifer, NS Department of Natural Resources
- Philip Greyson, Nature Conservancy of Canada
- Tony Iacobelli, World Wildlife Fund
- Russ Waycott, Stora Enso Port Hawkesbury
- Kari Easthouse, Stora Enso Port Hawkesbury
- Andrea Doucette, Stora Enso Port Hawkesbury
- Steven Delorey, Stora Enso Port Hawkesbury
- James Duggan, Stora Enso Port Hawkesbury

The HCV Design Committee worked collaboratively on Categories 1, 2, and 3 of the HCV assessment, as the expertise of the committee was conservation planning, ecology, and biology. HCV categories 4, 5 and 6 are associated with societal and community values, which were researched and written by Andrea Doucette (PHP) with consultation by various organizations and individuals, including the following:

- Charlie McInnis, Fisheries and Oceans Canada
- Cheryl Benjamin, NS Department of Environment
- John MacMillan, NS Department of Fisheries and Aquaculture
- Dan Gillis, Ashley Williams, Karen McNulty, Carmel Avery-MacDonald, Guysborough Regional Development Authority
- Blaine Gillis, Strait-Highlands Regional Development Authority
- Ashley Bouchie, Alisha Grant, Antigonish Regional Development Authority
- Gerald Gabriel, Pictou Regional Development Commission
- Cindy Tobin, Cape Breton County Economic Development Authority
- Lisa Paul, Unama'ki Institute of Natural Resources
- Jason Googoo, Membertou First Nation
- James Bridgeland, Cape Breton Highlands National Park
- PHP Forest Advisory Committee members

The HCV assessment was finalized in 2010 and identified values for categories 1 through 6 with corresponding management and monitoring activities.

A peer review of the 2010 HCV report was completed by:

- Ronnie Drever, Forest Ecologist – The Nature Conservancy in Canada (HCV 1 – 6)
- Rike Burkhardt, Forest Ecologist – Consultant (HCV 1 – 6)
- Tony Iacobelli, Director Forests and Freshwater Conservation – World Wildlife Fund (HCV 1 – 3)
- Tom Clark, Ecologist – Consultant (HCV 1 – 3)

In 2014, PHP began an internal review of the 2010 HCV Assessment Report to ensure that identified HCV's were still relevant and to capture any new HCV's (e.g. newly listed species at risk). Significant updates were also made to the HCV category of large landscape level forests to capture work that was completed by the provincial government for a new protected areas plan for

the province. A HCV Review Committee was formed to assist the company with updating HCV Category 2 and included the following members:

- Chris Miller, Canadian Parks & Wilderness Society
- Matt Miller, Ecology Action Centre
- Bruce Stewart, NS Department of Natural Resources - Forestry
- Allan Smith, NS Department of Natural Resources - Forestry
- Randy Milton, NS Department of Natural Resources – Wildlife
- Graham Forbes, University of New Brunswick, Faculty of Forestry & Environmental Management
- Derek Geldart, Port Hawkesbury Paper
- Andrea Doucette, Port Hawkesbury Paper
- Joel Taylor, Port Hawkesbury Paper
- Andrew Fedora, Port Hawkesbury Paper

Updates that were made by PHP in other sections of the report were consulted on by experts specific to those fields (see Appendix A).

A peer review of the new 2015-2020 HCV Assessment Report was completed by:

- Ronnie Drever, Forest Ecologist – The Nature Conservancy in Canada
- Tom Clark, Ecologist – Consultant

PURPOSE AND SCOPE OF 2015-2020 HCV ASSESSMENT

This update to the 2010 HCV assessment was completed to verify and/or update the original identified HCV's for the 2015-2020 certification period to ensure current values and/or new values are relevant, captured, and managed for using new information, data, or reports. This update included an internal review of the 19 questions that form Appendix F of the FSC Canada standard *Certification Standards for Best Forestry Practices in the Maritimes Region*. Each HCV identified in the 2010 assessment was verified for continued accuracy or modified based on new information.

The original consultation completed for the 2010 assessment is still applicable to this 2015-2020 HCV assessment report, since much of the original contributions and decisions are retained. Sections where changes and consultations were made to the 2010 assessment report for the 2015-2020 certification period are summarized in Appendix A.

SUMMARY OF 2015-2020 HIGH CONSERVATION VALUE FORESTS

The assessment of high conservation values on PHP lands was conducted using the HCV Assessment Framework provided in Appendix F of the FSC Maritime Standard (FSC Canada 2007b). Additional guidance was drawn upon from the FSC Boreal Standard (FSC Canada 2007a), ProForest HCV Toolkits (Jennings et al. 2003a, 2003b; Jennings 2004), and World Wildlife Fund Canada's HCV Support Document (WWF Canada, 2005). Each HCV category has a question or series of questions that aid in determining whether the assessed lands contain high conservation values. The following sections are structured by HCV category and associated questions. A total of 67 HCV's were identified on PHP lands which is summarized below.

Table 6.1 Summary of 2015-2020 HCV's

HCV Category	HCV Value
CATEGORY 1 – BIODIVERSITY	Boreal Felt Lichen
	Roseate Tern
	Bicknell's Thrush
Question 1: Species at Risk	Wood Turtle
	Rusty Blackbird
	New Jersey Rush
	Chimney Swift
	Common Nighthawk
	Frosted Glass-whiskers
	Olive-sided Flycatcher
	Eastern Whip-poor-will
	Eastern Wood Peewee
	Canada Warbler
	Vole Ears
	Blue Felt Lichen
	Mainland Moose
	Canada Lynx
	American Marten
	Eastern White Cedar
	Black Ash
	Black-foam Lichen
	Little Brown Myotis
	Northern Myotis
	Tri-colored Bat
	Wood Thrush
	Evening Grosbeak
	Wrinkled Shingle Lichen
Question 2: Endemic Species	None identified

Question 3: Seasonal Concentration of Species	PHP Watersheds Cold-water streams for salmon and trout
Question 4: Regionally Significant Species	Natural Red Spruce Stands White Elm Red Oak Hemlock Black Ash Jack Pine Wood Turtle
Question 5: Species Concentration at Edge of Natural Range	None identified
Question 6: Legal or Proposed Conservation Area	New provincial protected area (pending legal status) Provincial parks and reserves Provincial nature reserves Provincial wilderness areas National Migratory Bird Sanctuaries National Parks Old forest areas PHP protected areas IBP sites & sites of ecological significance
CATEGORY 2 – LARGE LANDSCAPE LEVEL FORESTS **Question 7: Forest Landscapes for Native Species**	Barren Hill Boisdale Hills Bornish Hill Country Harbour East Bay Hills French River Hill Lake Ingonish River Isaacs Harbour River Jim Campbells Barren Masons Mountain North River Oban Petit Lake Ruiss Noir Salmon Gaspereaux Upper Liscomb River

CATEGORY 3 – RARE, THREATENED, OR ENDANGERED ECOSYSTEMS **Question 8: Naturally Rare Ecosystems**	Significant Ecosites Database Nature Conservancy's Critical Occurrences
Question 9: Ecosystems under Present and/or Future Decline	Significant, Old, or Unique Forest Database Old Forest Areas
Question 10: Ecosystems Poorly Represented in Protected Areas	Country Harbour Boisdale Hills Hill Lake Jim Campbells Barren North River Oban Mason's Mountain Salmon Gaspereaux
Question 11: Rare or Absent Large Landscape Level Forests	See Category 2 – Large Landscape Level Forests Connectivity Management Zones
Question 12: Unique Aquatic Ecosystems	St. Mary's River Watershed Margaree River Watershed
CATEGORY 4 – BASIC SERVICES OF NATURE **Question 13: Water Flows for Social & Economic Activities**	Legally Protected Municipal Water Supply Areas Water Supply Intake Points PHP Watersheds
Question 14: Significant Forests Providing Aquatic Ecological Services	Legally Protected Municipal Water Supply Areas Water Supply Intake Points PHP Watersheds Wetlands
Question 15: Forests Critical to Erosion Control	Steep Slope Areas
Question 16: Interface Forests for Fire Protection	None identified

CATEGORY 5 – BASIC NEEDS OF LOCAL COMMUNITIES **Question 17: Basic Needs / Livelihoods of Local Communities**	Cape Breton Moose Population Cold-water streams for salmon and trout Cattle Grazing in Cape Breton Highlands Viewscapes Margaree Watershed and St. Mary's Watershed for salmon fishing
CATEGORY 6 – TRADITIONAL CULTURAL IDENTITY **Question 18: Forest Areas for Traditional Cultural Identity**	Culturally significant plant areas
Collective Overlap of High Conservation Values **Question 19: Significant Overlap of Values**	None identified

CATEGORY 1: BIODIVERSITY

Category 1: Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia)

Question 1:
Does the forest contain species at risk or potential habitat of species at risk as listed by international, national or territorial/provincial authorities?

All national- and provincial-listed species-at-risk were originally analyzed by the HCV Design Committee to determine if these species are likely to occur within the area of operation. Species lists were obtained from COSEWIC for nationally-listed species and from NSDNR for provincially-listed species. For the 2015-2020 re-assessment period, nationally and provincially listed species were reviewed to identify changes to existing species status or newly listed species at risk.

If a national- or provincial-listed species-at-risk was determined to likely occur within the area of operation, based on existing data and knowledge, further analysis was undertaken to assess known spatial distributions and habitat requirements. Spatial data comes from NSDNR and NSE as well as from existing records from the Atlantic Canada Conservation Data Centre (ACCDC). Where required, individual status reports and recovery plans were also reviewed for select species.

Results

Tables 7-1 and 7-2 show a complete list of nationally- and provincially-listed species-at-risk in Nova Scotia as of January 2018. Many of these species were identified during the original assessment and any new additions or changes are noted accordingly. Based on these tables, Table 7-3 lists all species at risk known or presumed to occur on the company's forest management area. HCV designation is noted in this table.

Table 7.1 Nationally-listed species-at-risk in Nova Scotia (COSEWIC Website)

Species	Taxonomy	2016 National SAR Status Update
American eel	Fish	Special concern
Atlantic salmon (Inner BoF pop.)	Marine Fish	Endangered
Atlantic sturgeon	Marine Fish	Threatened
Atlantic walrus	Marine Mammal	Special concern
Atlantic whitefish	Freshwater Fish	Endangered
Bank swallow	Bird	Threatened
Barn swallow	Bird	Threatened
Barrow's goldeneye (East. pop.)	Bird	Special concern
Bicknell's thrush	Bird	Threatened
Black-foam lichen	Lichen	Threatened
Blanding's turtle	Reptile	Endangered
Blue felt lichen	Lichen	Special concern
Bobolink	Bird	Threatened
Boreal felt lichen	Lichen	Endangered
Brook floater	Mollusc	Special concern
Canada warbler	Bird	Threatened
Chimney swift	Bird	Threatened
Common nighthawk	Bird	Threatened
Eastern baccharis	Vascular Plant	Threatened
Eastern lilaeopsis	Vascular Plant	Special concern
Eastern meadowlark	Bird	Threatened
Eastern mountain avens	Vascular Plant	Endangered
Eastern ribbonsnake (Atl. pop.)	Reptile	Threatened
Eastern waterfan	Lichen	Threatened
Eastern whip-poor-will	Bird	Threatened
Eastern wood-pewee	Bird	Special concern
Eskimo curlew	Bird	Endangered
Evening Grosbeak	Bird	Special Concern
Frosted glass-whiskers (NS pop.)	Lichen	Special concern
Golden crest	Vascular Plant	Special concern
Gypsy cuckoo bumble bee	Arthropod	Endangered
Harlequin duck	Bird	Special concern
Least bittern	Bird	Threatened
Little brown myotis	Mammal	Endangered

Long's bulrush	Vascular Plant	Special concern
Macropis cuckoo bee	Arthropod	Endangered
Monarch butterfly	Lepidoptera	Special concern
New jersey rush	Vascular Plant	Special concern
Northern myotis	Mammal	Endangered
Olive-sided flycatcher	Bird	Threatened
Peregrine falcon	Bird	Special concern
Pink coreopsis	Vascular Plant	Endangered
Piping plover	Bird	Endangered
Plymouth gentian	Vascular Plant	Endangered
Prototype quillwort	Vascular Plant	Special concern
Red knot	Bird	Endangered
Red-necked phalarope	Bird	Special concern
Redroot	Vascular Plant	Special concern
Roseate tern	Bird	Endangered
Rusty blackbird	Bird	Special concern
Sable Island Sweat Bee	Arthropod	Threatened
Savannah sparrow	Bird	Special concern
Short-eared owl	Bird	Special concern
Shortnose sturgeon	Fish	Special concern
Smooth skate	Fish	Special concern
Snapping turtle	Reptile	Special concern
Striped bass (BoF pop.)	Fish	Endangered
Sweet pepperbush	Vascular Plant	Threatened
Tall beakrush	Vascular Plant	Endangered
Thorny skate	Fish	Special concern
Thread-leaved sundew	Vascular Plant	Endangered
Transverse Lady Beetle	Insect	Special Concern
Tri-colored bat	Mammal	Endangered
Tubercled spike-rush	Vascular Plant	Special concern
Vole ears	Lichen	Endangered
Water-pennywort	Vascular Plant	Special concern
Wood thrush	Bird	Threatened
Wood turtle	Reptile	Threatened
Wrinkled Shingle Lichen	Lichen	Threatened
Yellow lampmussel	Mollusc	Special concern
Yellow-banded bumble bee	Arthropod	Special concern

Table 7-2. Provincially-listed species-at-risk in Nova Scotia (NSDNR Website)

Species	Taxonomy	2016 NS SAR Status
Moose (mainland pop.)	Mammal	Endangered
Red knot	Bird	Endangered
Chimney swift	Bird	Endangered
Piping plover	Bird	Endangered
Atlantic whitefish	Freshwater Fish	Endangered
Pink coreopsis	Vascular Plant	Endangered
Ram's head lady slipper	Vascular Plant	Endangered
Thread-leaved sundew	Vascular Plant	Endangered
Blanding's turtle	Reptile	Endangered
Boreal felt lichen	Lichen	Endangered
Eastern mountain avens	Vascular Plant	Endangered
Rockrose (Canada frostweed)	Vascular Plant	Endangered
Harlequin duck	Bird	Endangered
Water-pennywort	Vascular Plant	Endangered
Canada lynx	Mammal	Endangered
American marten	Mammal	Endangered
Plymouth gentian	Vascular Plant	Endangered
Roseate tern	Bird	Endangered
Common nighthawk	Bird	Threatened
Yellow lampmussel	Mollusc	Threatened
Eastern ribbonsnake	Reptile	Threatened
Bicknell's thrush	Bird	Endangered
Wood turtle	Reptile	Threatened
Sweet pepperbush	Vascular Plant	Vulnerable
Peregrine falcon	Bird	Vulnerable
Prototype quillwort	Vascular Plant	Vulnerable
New jersey rush	Vascular Plant	Vulnerable
Eastern lilaeopsis	Vascular Plant	Vulnerable
Long's bulrush	Vascular Plant	Vulnerable
Eastern white cedar	Plant	Vulnerable
Golden-crest	Vascular Plant	Vulnerable
Tuberclad spikerush	Vascular Plant	Vulnerable
Redroot	Vascular Plant	Vulnerable
Little brown myotis	Mammal	Endangered
Northern myotis	Mammal	Endangered
Tri-colored bat	Mammal	Endangered
Hoary willow	Plant	Endangered
Macropis cuckoo bee	Insect	Endangered
Vole ears	Lichen	Endangered
Barn swallow	Bird	Endangered
Canada warbler	Bird	Endangered
Rusty blackbird	Bird	Endangered
Black ash	Plant	Threatened
Brook floater	Aquatic	Threatened
Eastern baccharis	Vascular Plant	Threatened
Olive-sided flycatcher	Bird	Threatened
Eastern whip-poor-will	Bird	Threatened
Spotted pondweed	Aquatic	Vulnerable
Snapping turtle	Reptile	Vulnerable
Blue felt lichen	Lichen	Vulnerable
Eastern wood peewee	Bird	Vulnerable
Bobolink	Bird	Vulnerable
Bank Swallow	Bird	Endangered

Gypsy Cuckoo Bumble Bee	Insect	Endangered
Monarch Butterfly	Insect	Endangered
Tall Beakrush	Plant	Endangered
Transverse Lady Beetle	Insect	Endangered
Evening Grosbeak	Bird	Special Concern
Yellow-banded Bumble Bee	Insect	Special Concern
Black Foam Lichen	Lichen	Threatened
Eastern Waterfan	Lichen	Threatened
Sable Island Sweat Bee	Insect	Threatened
Wringled Shingle Lichen	Lichen	Threatened

Currently in Nova Scotia there are 64 listed Species at Risk. The number of forest-dwelling species that may be impacted by PHP's forest management is 27 (Table 3-3).

Table 7-3. Known or presumed to occur within forest management area

Species	Habitat	Nature Serve Status	Potentially Affected by PHP Management
Boreal felt lichen	Forest	G1G2	YES
Roseate tern	Coastal forest/islands	G4	YES
Bicknell's thrush	Forest	G4	YES
Wood turtle	Forest/aquatic	G3	YES
Rusty blackbird	Scrub riparian habitats	G4	YES
New Jersey Rush	Edges of bogs/fens	G2G3	YES
Chimney Swift	Forest/Rural/Urban	G5	YES
Common Nighthawk	Waterways/Forest/Open Areas	G5	YES
Frosted glass-whiskers	Forest	GNR	YES
Olive-sided Flycatcher	Open Forest	S4S5	YES
Eastern Whip-poor-will	Open Forest	N/A	YES
Eastern Wood Peewee	Forest	N/A	YES
Canada Warbler	Forest	S5	YES
Vole Ears	Forest	G4G5	YES
Blue Felt Lichen	Forest	GNR	YES
Mainland Moose	Forest	G5TNR	YES
Canada lynx	Forest	N/A	YES
American marten	Forest	N/A	YES

Eastern white cedar	Forest	N/A	YES
Black Ash	Forest	N/A	YES
Black-foam Lichen	Forest	G3G5	YES
Little Brown Myotis	Caves/Forest	G3	YES
Northern Myotis	Caves/Forest	G1G2	YES
Tri-colored Bat	Caves/Forest	G2G3	YES
Wood Thrush	Forest	G4	YES
Evening Grosbeak	Forest	G5	YES
Wrinkled Shingle Lichen	Forest	G3/G5	YES

Nature Serve Status Descriptions for Global (G), National (N) and State/Provincial (S) Levels:
1 = critically imperiled
2 = imperiled
3 = vulnerable
4 = apparently secure
5 = secure

TNR – unranked/not yet assigned
GNR – Global rank not yet assessed

High Conservation Values & Management Strategies for Species at Risk

Boreal Felt Lichen Habitat (*Erioderma pedicellatum*) (Atlantic population)

Photo © Tom Neily

Status: National – endangered; Provincial – endangered

The boreal felt lichen is a globally imperilled cyanolichen that grows predominately on the branches and trunks of balsam fir trees in the cool and humid coastal forests of Nova Scotia and Newfoundland (COSEWIC 2002). This suboceanic species is found mostly on north- and east-facing slopes that are exposed to a constant supply of moisture from the coast. The known population in Atlantic Canada is less than 7000 thalli, with only 14 thalli known from Nova Scotia. The population is believed to have declined by approximately 90% over the past two decades (COSEWIC 2002). Threats to the boreal felt lichen include atmospheric pollution, acid precipitation, habitat loss (*particularly from logging*), and habitat degradation. Other threats include forest pesticides,

wildfires, climate change, and moose herbivory on balsam fir seedlings. Threats from the forestry industry specifically, include large-scale industrial forestry practices (*including pesticide use, clearcutting, and conversions to plantations*) (COSEWIC 2002). Clearcuts larger than 100m by 100m have been shown to have a negative impact on boreal felt lichen populations, and are believed to have led to the extirpation of some populations in Scandinavia (Holien et al. 1995). Clearcuts can increase genetic isolation and induce micro-climatic changes, such as decreased humidity due to an open canopy (Holien et al. 1995).

Distribution:

The historic range of the boreal felt lichen includes the coastal forests of Atlantic Canada and Scandinavia, but the population is now believed to be restricted to Newfoundland and Nova Scotia. Local populations in Scandinavia, Prince Edward Island, and New Brunswick appear to have been extirpated. The vast majority of the global population of boreal felt lichen occurs in southeastern Newfoundland.

Potential boreal felt lichen habitat in Nova Scotia has been modelled and mapped by Nova Scotia Environment using a GIS predictive analysis that combines a number of habitat factors, including physiography, topography, forest cover, hydrology, and slope orientation (Cameron and Neily, 2008). The specific GIS algorithm that was used to develop this model queried the provincial forest cover layer for stands with balsam fir as a primary or secondary species and which occur within 80 meters of a mapped peatland (bog or fen), which was then further constrained to select only those stands within 30 kilometers of the Atlantic.

In 2002, COSEWIC documented that the species was known from only three locations in the province (totalling 14 thalli). To date, there are now 383 known locations across Nova Scotia with 131 of those existing on PHP's leased lands. Many of these new locations have been surveyed by the Mersey Tobeatic Research Institute (since 2005) and Port Hawkesbury Paper (since 2009).

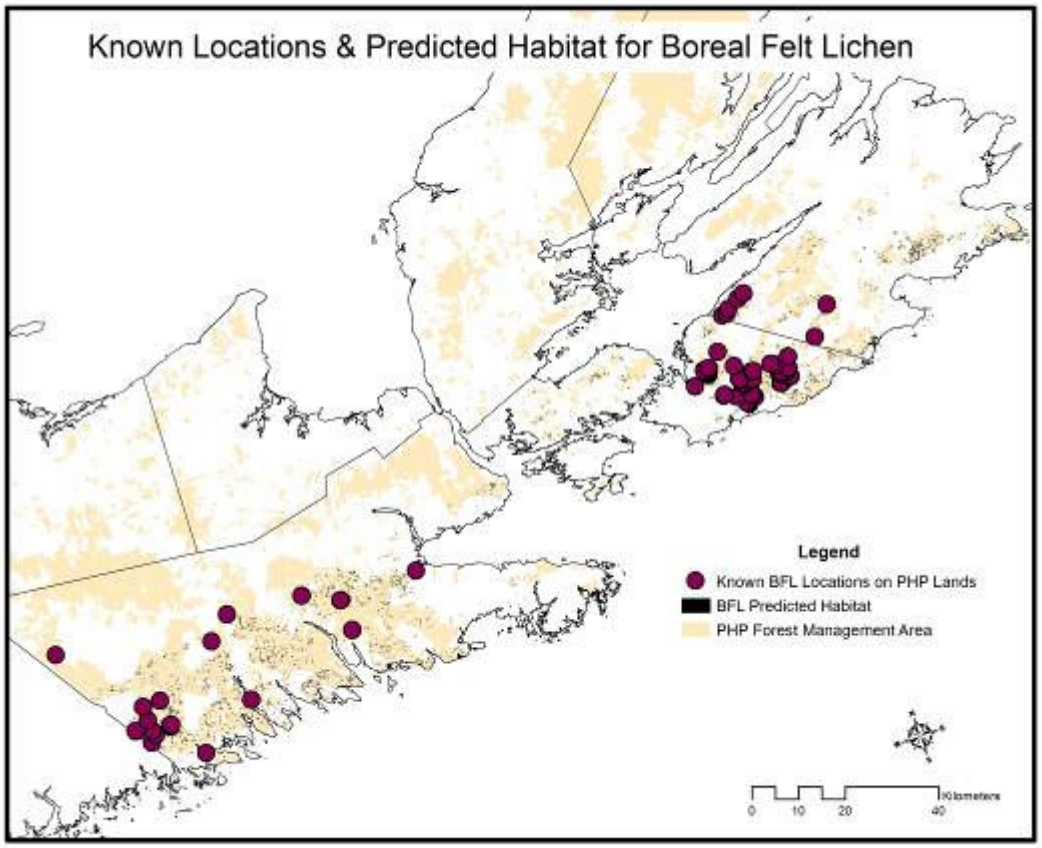


Figure 7-1. BFL Known Locations & Predicted Habitat HCV

HCV Decision:

All potential boreal felt lichen habitat within PHP's area of operation that is predicted by the model from Nova Scotia Environment is considered to be HCVs, as well as all existing known locations of BFL.

Management Approach (as per provincial Boreal Felt Lichen Special Management Practices Policy, NSDNR 2012)

1. Boreal Felt Lichen Habitat Model: The most recent iteration of the Boreal Felt Lichen habitat model (Cameron and Neily, 2008), will be used to predict areas with high potential for Boreal Felt Lichen occurrence. NSDNR is responsible for providing PHP with the most current GIS-modeled habitat layer.

2. Boreal Felt Lichen field surveys: All areas of proposed forest harvesting and silviculture operations on provincial Crown lands which overlap with polygons identified in the habitat model will be surveyed for the presence of Boreal Felt Lichen. Surveyors must be recognized experts in field identification of lichens. Each year following approval of the annual operating plan, the Regional Planners will submit to GIS analyst any planned harvest

areas overlapping with the BFL habitat layer not previously surveyed. The goal is to have surveys completed minimum three years prior to any harvesting activity including road building. The GIS analyst is responsible for hiring recognized lichen expert for surveys. Survey results provided by surveyor will be recorded in TFM by GIS Analyst, which will include area surveyed (regardless of BFL presence), BFL site location if found, and surveyors name and date of survey. The GIS Analyst will also add the 100 meter buffer around the BFL site location, so it can be included in job layout and harvesting plans.

3. Forested buffers at BFL sites: Forested buffers measuring a minimum of 100 meters in radius will be maintained around each BFL occurrence. In addition to the requirements under the *Wildlife Habitat and Watercourse Protection Regulations*, where a BFL occurrence is located within a peatland or in a forest stand immediately adjoining a peatland, a forester buffer equal to or greater than 20 meters in width will be maintained around the perimeter of the peatland. For larger peatlands which may be only partly surrounded by good BFL habitat, only that portion of the peatland deemed to be good BFL habitat as a result of onsite surveys will require the BFL mandated 20 meter minimum forested buffer. No trees within the BFL buffer zone will be harvested during forest harvest and silviculture operations. The location of each BFL buffer area will be clearly identified to enable the contractor to exclude the area from the harvest or silviculture operation. All such forest stands will be appropriately tracked using GIS mapping to ensure long-term maintenance of the buffer stands during ongoing harvesting and silviculture operations.

4. Reporting locations of forested buffers: All locations of forested buffers around Boreal Felt Lichen occurrences on Crown lands will be reported as GIS mapping to the NS Department of Natural Resources by the GIS analyst responsible for that area of Crown lands on an annual basis.

(NOTE: Maintenance inspections: NS Department of Natural Resources will annually conduct on-site inspections of each harvest or silviculture operation completed on Crown lands which overlaps with a BFL occurrence to ensure that satisfactory maintenance of forested stands at each site has been met.)

Roseate Tern Habitat (*Sterna dougallii*)

Photo © N.S. Department of Natural Resources

Status: National – endangered; Provincial – endangered

The roseate tern reaches its northern range in eastern Canada. It nests in association with other seabirds, particularly common terns, on coastal islands and exposed coastal areas.

Population numbers are very low for this species, having declined significantly over the past 50 years (NSDNR 2007a). An estimated 150 breeding pairs of roseate terns are believed to occur in Canada, the majority of which occur in Nova Scotia.

Threats to the roseate tern include predation on eggs and young (*particularly by gulls, crows, and minks*), human disturbance to colonies, and encroachment by coastal development (Whittam and Leonard 1999, NSDNR 2007a). Inter-specific competition for breeding space and the effects of certain toxic chemicals may also be having an effect on this species. Direct human exploitation of roseate terns for egg- and feather-collecting has caused substantial declines for this species in the past.

Distribution:

The roseate tern is distributed on both sides of the Atlantic Ocean and winters on the north-eastern coast of South America from Brazil to Guyana. It reaches its northern range in Canada, where it breeds primarily along the Atlantic coast of Nova Scotia. Over 90% of the Canadian population is concentrated in three colonies in Nova Scotia: (1) Brothers Islands, (2) Grassy Island, and (3) Country Island complex.

The Country Island complex occurs in Guysborough County, just off the coast from Goldboro at the head of Country Harbour. PHP's area of operation includes lands on the adjacent mainland coast, in close proximity to the Country Island complex. Mainland areas in this vicinity are used extensively by roseate terns for feeding and, in the past, as temporary refuge sites when predators have invaded the colony on the island complex.

Figure 7-2. Roseate tern IBA site at Country Harbour (IBA Canada 2007)

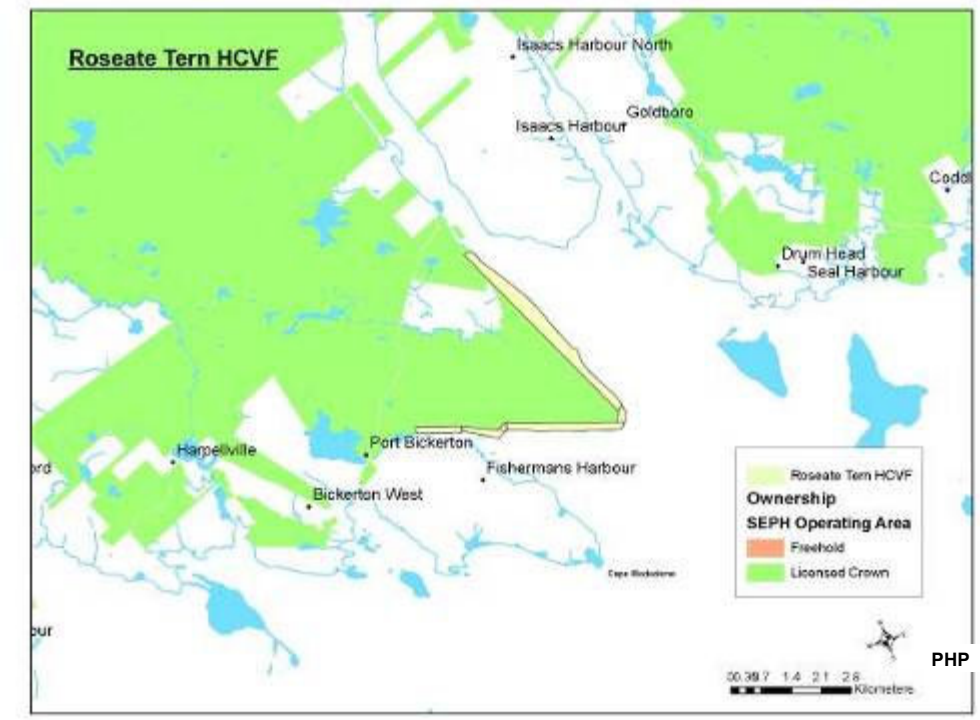


Figure 7-3. Roseate tern HCV at Fishermans Harbour

HCV Decision:

Roseate term habitat at Fishermans Harbour is considered an HCV.

Management Approach

- Establish a 150 m no harvest buffer zone along the coast at Fishermen's Harbour.

Bicknell's Thrush Habitat (*Catharus bicknelli)*

Photo © Dan Busby

Status: National – threatened; Provincial – Endangered

The Bicknell's thrush is an elusive song bird that inhabits dense coniferous forest and stands of regenerating balsam fir at high elevations and along the coast. It breeds in eastern Canada and the northeastern United States. Bicknell's thrush is considered globally-vulnerable by the International Union for the Conservation of Nature (IUCN).

Threats to the Bicknell's thrush come mostly from loss of habitat, particularly encroachment from development and disturbance associated with large-scale forestry practices, especially pre-commercial thinning.

Distribution

In Nova Scotia, the Bicknell's thrush is found mostly on Cape Breton Island, with the greatest concentrations occurring in the Highlands (*e.g. Cape Breton Highlands National Park, Cape North, highlands south of Cheticamp Lake*) and Scaterie Island (IBA Canada 2007). These areas contain globally-significant concentrations of Bicknell's thrush. The Kelly's Mountain area in Cape Breton was also previously identified by the Important Bird Areas (IBA) program (of Bird Studies Canada and Nature Canada) as Bicknell's thrush habitat. However, Bird Studies Canada has recently acknowledged that this IBA site was mapped incorrectly and should instead represent known Bicknell's thrush habitat south of the Cape Breton Highlands National Park where PHP has considerable lands under management. Bird Studies Canada has identified this area and is shown on Figure 7-5.

Spatial distributions for the HCV assessment are delineated using the boundaries of Important Bird Areas (IBA) for Bicknell's thrush, which were identified and mapped by IBA Canada (the Kelly's Mountain site is not considered Bicknell's thrush HCV for the above reason) (IBA Canada 2007). Additional data regarding high-elevation forest habitat in the Cape Breton Highlands for Bicknell's thrush is available through the High Elevation Landbird Program (2002 to present) administered by Bird Studies Canada – Atlantic Region and the Canadian Wildlife Service.

HCV Decision:

All existing Bicknell's thrush IBA sites are considered HCVs. Within PHP's area of operation, these currently include Cape North and Scaterie Island.

Additional sites within the Cape Breton Highlands, particularly sites found south of the National Park, are also known to contain Bicknell's thrush, in part, through research efforts carried out by Bird Studies Canada and the Canadian Wildlife Service.

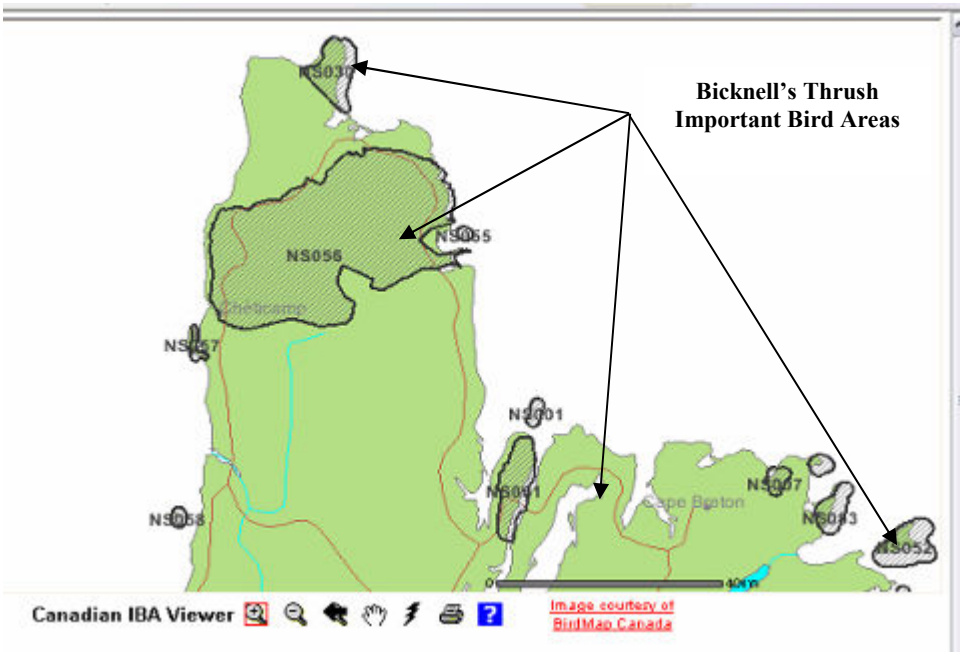


Figure 7-4. Bicknell's thrush HCVs.

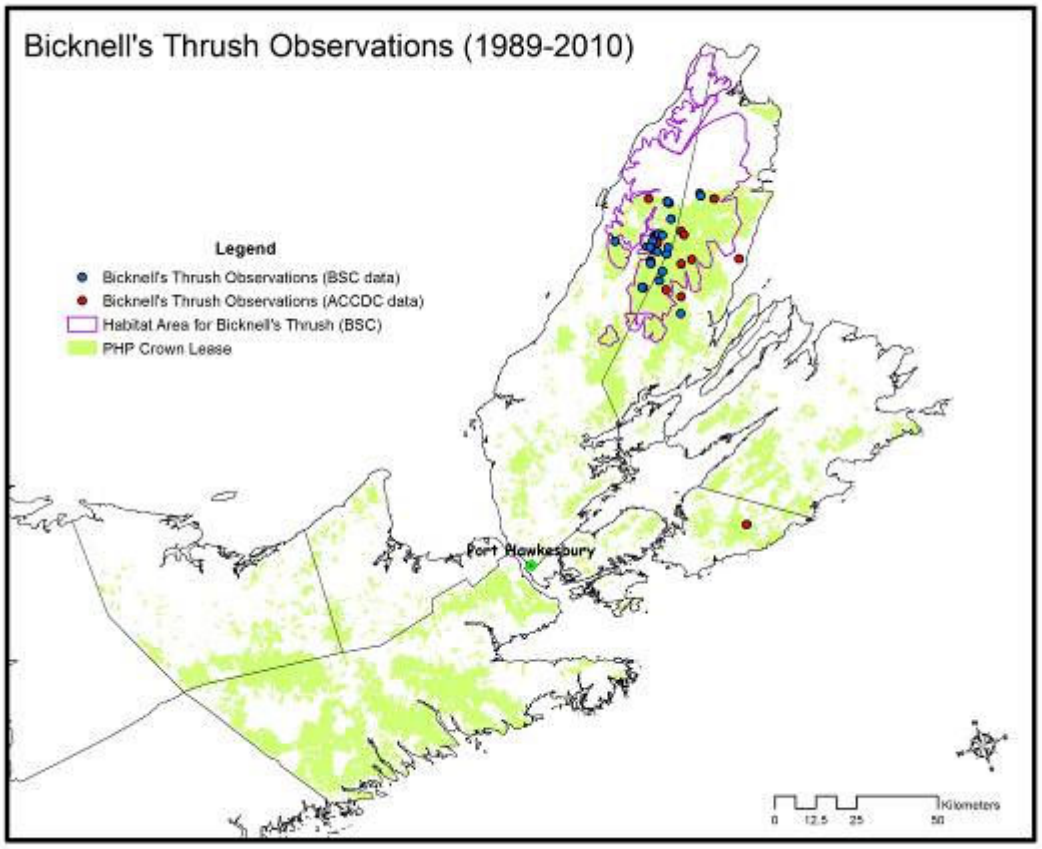


Figure 7-5. Bicknell's Thrush Location Data

Management Approach

The below special management practices were developed by PHP in collaboration with Bird Studies Canada.

Unspaced patches For Bicknell Thrush (Species at Risk) Habitat:

(i) Spacing areas (stands) within the Bicknell thrush layer (refer to TFM) that meet all of the following criteria shall have un-spaced patches left:
   a) At least 380 meters in elevation
   b) Minimum 30% conifer species
   c) Minimum 20,000 stems per hectare

(ii) Qualifying areas cannot be spaced during the breeding and nesting period between May 1 and July 31.
   a) if the area cannot be treated outside the breeding and nesting period (needs to be spaced between May 1 and July 31), the area must first be surveyed by Bird Studies Canada. Areas to be surveyed must be sent to the Environmental Consultant. Prior to any spacing work, surveys must be completed and Bird Studies Canada will report results to the Environmental Consultant. Results and written approvals will then be provided to operations prior to any spacing work.

(iii) Spacing crews need to be informed on any conditions related to patches and timing.

Patch sizes will be 15mX15m and are intended to represent 30 average sized trees post-spacing.
Frequency of the patches will be equivalent to ½ the existing Provincial wildlife clump regulations = 5 trees/ha.

Wood Turtle Habitat (*Glyptemys insculpta*)

Photo © N.S. Department of Natural Resources

Status: National – threatened; Provincial – threatened

The current wood turtle population in Nova Scotia is estimated to be around ~2500 individuals. This species is particularly susceptible to anthropogenic influences, where even slight increases in the mortality rate can have significant impacts on the population due to its low reproduction rate, geographic isolation of meta-populations, and its late age of maturation (NSDNR 2007a).

Threats to the wood turtle come mostly from road mortality (e.g. *direct collisions as well as indirect impacts from increasing road densities and increasing frequency of use*), collecting and pet trading, increases in predation by species adapted to human environments (*e.g. racoons*), and the alteration and destruction of habitat, particularly conversions of floodplains. Threats generally posed by the forestry industry include road mortality (*both on-site and off-site*),

mortality from harvesting equipment, improper road construction, increasing road densities, damage to riparian areas, and disturbance to forest nesting sites from short-term changes in hydrology following clearcutting (MacGregor and Elderkin 2003, NSDNR 2007a).

Distribution

Wood turtles occur in eastern North America from Nova Scotia and New Brunswick, south to Virginia, and west through Southern Quebec and Southern Ontario to Minnesota and Iowa. The species is widespread within its range, but occurs at low densities. The wood turtle commonly inhabits forested areas near riparian zones, and can be found at significant distances inland from a watercourse.

In Nova Scotia, wood turtles are reported from 31 different watersheds, though several of these sightings may represent translocated individuals not part of a breeding population. A significant proportion of the provincial wood turtle population occurs on lands managed by PHP, in eastern mainland Nova Scotia and on Cape Breton Island. The St. Mary's River watershed, in particular, contains the highest population of wood turtles in Nova Scotia and represents some of the best remaining wood turtle habitat globally. At least 80% of this watershed is considered significant wood turtle areas by NSDNR, particularly along the main river course and between the east and west branches of the St. Mary's River (MacGregor and Elderkin 2003).

Other significant watersheds in Nova Scotia containing wood turtles include River Denys and River Inhabitants on Cape Breton Island (MacGregor and Elderkin 2003).

HCV Decision:

Specific areas managed by PHP within the St. Mary's River watershed on Mainland Nova Scotia and River Denys watershed in Cape Breton are considered HCV's. The provincial government has not yet provided PHP with spatial data showing critical wood turtle habitat areas. However, the following management practices are appropriately applied on a stand-by-stand basis during the planning and operational approval process between PHP and the Nova Scotia Department of Natural Resources.

Management Approach (as per provincial Wood Turtle Special Management Practices Policy, NSDNR 2012)

<u>General Management Recommendations</u>

1. Adjust the timing and location of motorized vehicle use for forest management activities to when Wood Turtles are inactive or less likely to be occupying terrestrial habitat (Nov – March).

    - No motorized vehicle use may occur within 100 m of either side of a perennial watercourse in known wood turtle areas (as identified by DNR) in April, May and October.

- No motorized vehicle use may occur within 150 m of either side of a perennial watercourse in known wood turtle areas (as identified by DNR) from June to September.

- Regular motor vehicle use may occur within 20 m of either side of a perennial watercourse in known wood turtle habitat (as identified by DNR) from November through March. Follow existing Wildlife Habitat and Watercourse Protection Regulations

2. Use temporary bridge crossings for perennial streams to avoid altering stream bank, creating erosion and sedimentation, damaging stream bed, and impacting overwintering turtles.

3. Forest management roads and landings should not be constructed parallel to watercourses within 200 m of watercourses where wood turtles occur.

Special Management Practices

Overwintering

Wood turtles will spend approximately 6 months of each year (Oct – Apr) in pools, where there is submerged structure and clear running water.

- Follow existing Wildlife Habitat and Watercourse Protection Regulations to prevent siltation into watercourses where wood turtles are known to overwinter.

- Plan winter temporary stream crossings in advance to avoid pools, submerged logs and limbs where wood turtles are known to overwinter.

- Temporary stream crossing approaches should be brushed well to avoid breaking down the stream bank, causing erosion and sedimentation.

- No harvesting should occur within a special management zone for 20 m up and downstream from an identified overwintering site.

Basking

After emerging from their overwintering sites in early April, wood turtles will spend April and May basking along the banks of rivers, streams and ephemeral ponds close to perennial streams.

- Follow the above general management recommendations for machine exclusion for this time of year.

Nesting

Wood turtles nest in sand and gravel beaches or bars found along watercourses, shoulders of highways and woods roads, and landings from late May to early July.

- Between April and October, temporary or permanent bridges should not be placed within 100 m upstream or downstream of identified nesting sites, or potential nesting sites with the following characteristics:
    - sand and/or gravel beaches or bars > 25 m2 in area
    - little or no vegetation on the sand and gravel beaches or bars
    - south exposure
    - 0.5 m above mid summer water levels

- No forest management activities (mechanical or manual) to take place within 100 m of an identified nesting beach between 15 May and 15 July.

- Forest roads and landings should not be constructed within 100 m of watercourses where wood turtles reside.

Foraging and general movements

Wood turtles can make large overland movements when foraging, and when traveling to and from nesting areas, thereby making them vulnerable to motor vehicles and some land use practices.

- Avoid traveling through and protect wet areas with springs, seepages, vernal pools and ephemeral streams.

- Leave brush piles for cover in cutovers, and silvicultural areas.

- Promote selection harvests, and practices that leave forest openings.

American Marten Habitat (*Martes americana*)

Photo © N.S. Department of Natural Resources

Status: Provincial – endangered

The American marten was once widespread throughout Nova Scotia, but is now located in only two small areas of the Cape Breton Highlands and only in very small numbers. Current population estimates suggest that the population could be as low as 15 to 30 individuals. Preferred habitat for American marten in Nova Scotia is old-growth forest, particularly mature conifer and mixed coniferous-deciduous stands (Scott 2001).

The cause of the on-going decline of the American marten is primarily the result of loss of optimal habitat. Forestry salvage operations in the Cape Breton Highlands in the late-eighties, following a spruce-budworm infestation, were particularly damaging to the remnant American marten populations in this area. Other threats posed by the forestry sector include habitat

fragmentation, road construction (*particularly logging roads pushed into remote area*s), and increased human access to existing American marten areas (*potentially opening-up new areas to trapping lines*) (NSAMRT 2006). Because the current American marten population is so low, the species is also vulnerable to geographic isolation, inbreeding suppression, trapping by-catch, increased predation, and stochastic factors (NSAMRT 2006). Historically, trapping for marten has also caused significant population declines for the species.

Distribution

The American marten has been extirpated from mainland Nova Scotia and is now located in only two areas in the Cape Breton Highlands; (1) Northwest Cape Breton Highlands National Park, and (2) Southeast highlands of Victoria County (*Ingonish River Valley south to Middle River*) (Scott 2001, NSAMRT 2006). The current area of occurrence is around 300km^2, which represents only a tiny fraction of its former range.

Efforts are currently underway to re-establish an American marten population in mainland Nova Scotia at Kejimkujik National Park and in the Cape Breton Highlands.

HCV Decision:

The American marten recovery strategy for Cape Breton Island has identified a Marten Habitat Management Zone (MHMZ) derived from modelling, local experience, and the inclusion of some previously existing moratoria areas. All lands managed by PHP within the MHMZ are considered to be an HCV. These areas include large portions of known American marten habitat in the southeast highlands area of Victoria County, from Ingonish River Valley to Middle River, and also further south in the vicinity of Humes River.

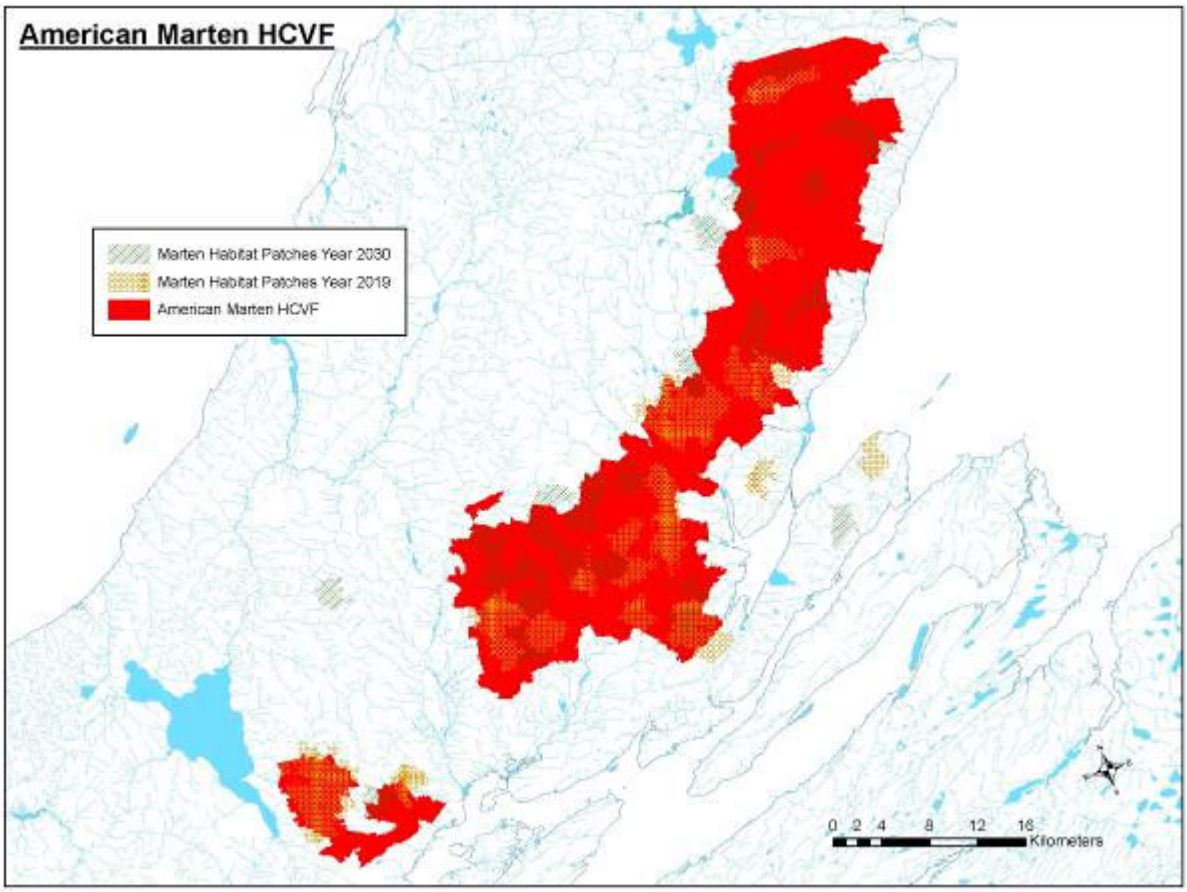


Figure 7-6. American marten HCVs

Management Approach (as per provincial American Marten Special Management Practices Policy, NSDNR 2012)

- Recommendations from the American marten recovery strategy will be implemented and PHP will work to maintain and restore American marten habitat in Nova Scotia (NSAMRT 2006)

- Marten Habitat Management Zone has been defined to restore a self-sustaining population of the Cape Breton Marten.

- 55 Marten habitat patches have been identified within the MHMZ and must be a minimum of 500 ha in size, circular in shape, and contain minimum 60% marten habitat.

To address future habitat supply at the landscape level the following practices are to be applied to forest harvesting throughout the patches on the Cape Breton Highlands:

- 12-14 standing and live mature trees per ha must be left evenly spaced throughout the harvest site (these are in addition to all other requirements of the Wildlife Habitat and Watercourse Protection Regulations)

- Large yellow birch trees should be left standing where possible
- Harvest sites should maintain at least 100 m3 of coarse woody debris/ha and mean maximum diameter of downed logs should exceed 22 cm

Since stand management was not addressed in the Special Management Practices Policy by the Nova Scotia Department of Natural Resources, the following has been developed in consultation with PHP for commercial thinning (CT) of immature stands within the MHMZ and addresses DNR's concerns respecting volume removal, blowdown and patch retention, canopy closure, coarse woody debris (CWD), and monitoring. This new guidance was developed by DNR and dated as February 28, 2014 in their official document to PHP.

If successful, CT has the potential to assist in meeting the clearcut reduction objective, break-up the age class and crown type, increase stem diameter, and provide CWD and future snags.

Commercial thinning of immature stands

At the time of prescribing the marten home range patches, a minimum BA of 18 m2/ha was required in 60% of the patch due to the limited availability of stands with large diameter trees contributing greater BA and that would provide a dense canopy cover. Immature stands proposed for CT have BA between 28 and 32 m2/ha and are experiencing reduced growth due to high stem density. To maintain high canopy cover and ensure the minimum BA, the following CT approach will be applied to immature stands within designated patches in the MHMZ:

- the company will undertake an assessment of the stand's BA prior to CT and will, prior to entering the stand, provide DNR with the harvest instructions and expected level of retention following CT;

- BA to be available following CT will be ≥20 m2/ha to provide a buffer against loss through unforeseen mortality, e.g. blowdown, disease, and insect damage;

- harvested trees will be removed along extraction trails an average of ≤ 4 m wide separated by "leave strips" no less than 25 m and using "ghost trails" between the extraction trails;

- trees in the "leave strip" strip will be selectively removed to retain canopy closure to the highest level possible, i.e. openings resulting from removing clusters of trees will be avoided.

Provisioning of Coarse Woody Debris

It is recognized the salvage harvest following the last budworm harvest in the highlands did not retain existing, nor provide for long term accrual of coarse wood debris. Immature stands thus do not meet the preferred volume or diameter of standing or down coarse woody debris. It is anticipated optimum levels will not be attained in this rotation. However, the following practices will be applied to enhance structural complexity and increase the volume of standing and down CWD immediately following CT and as the stand matures.

- leave standing hardwoods and any existing standing dead or dying trees;

- leave all blowdown

- leave all tops from harvested trees

Moose Habitat (Mainland Nova Scotia population) (*Alces alces americana)*

Photo © N.S. Department of Natural Resources

Status: Provincial endangered

The mainland moose population of Nova Scotia has declined to around 1000 to 1200 individuals, with an effective breeding population potentially much lower than this. Within the past 30 years, total mainland moose numbers have declined in Nova Scotia by 20% (NSDNR 2007b)

The cause of the mainland moose decline is not well understood, but is likely due to a combination of factors, including habitat loss, over-harvesting, poaching, parasitic brainworm, increased road access and road density, spread of white-tailed deer, deficiencies in certain nutrients (*particularly cobalt*), high levels of cadmium, and possibly unknown viral diseases (Parker 2003, Beazley et al. 2004, NSDNR 2007b).

Moose on Cape Breton Island were introduced from Alberta in the 1940's. They are not part of the remnant Nova Scotia population and are not endangered (Parker 2003).

Distribution

Endangered moose occur throughout mainland Nova Scotia, but are concentrated in a few key areas of the province (Parker 2003). Two of these core areas occur within PHP's area of operation; (1) Pictou Hills, and (2) Antigonish Highlands/Guysborough. Spatial delineations of critical moose areas have been identified and mapped by the Nova Scotia Department of Natural Resources.

HCV Decision:

The mainland moose concentration and retention habitat areas identified by the Nova Scotia Department of Natural Resources are considered HCV's.

The Cape Breton moose population is not endangered and is not considered to be a high conservation value.

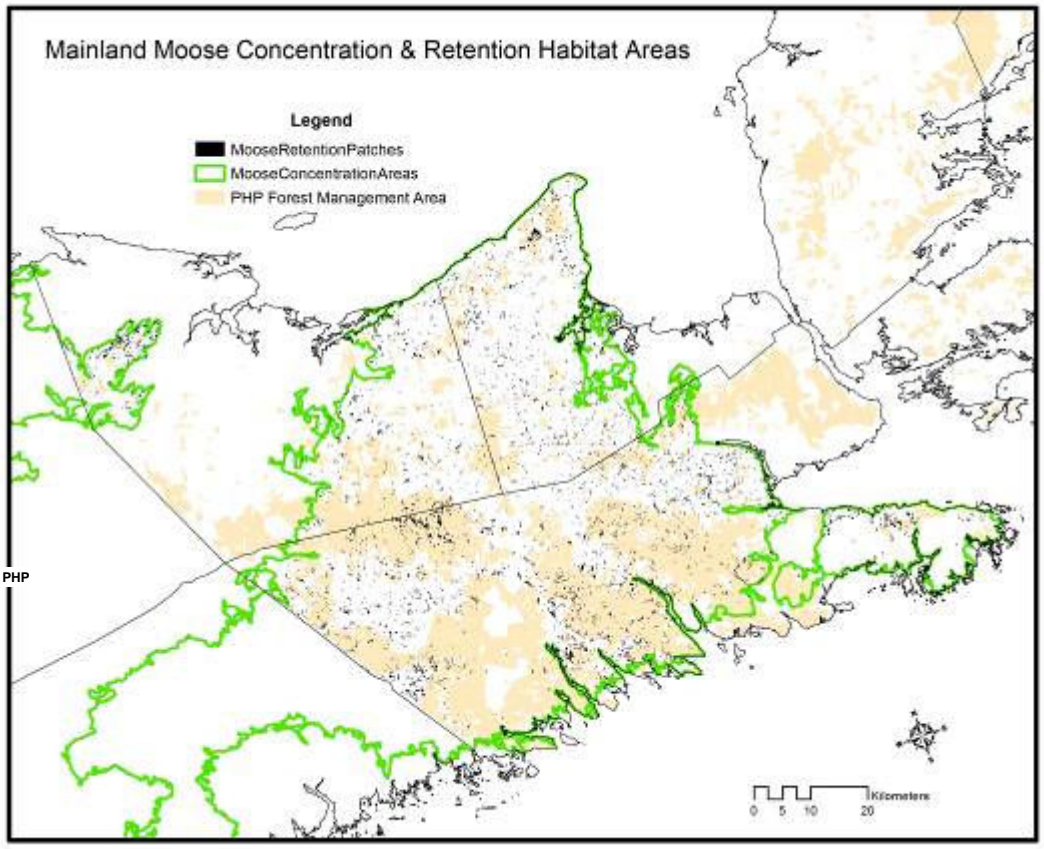


Figure 7-7. Mainland Moose HCV

Management Approach (as per provincial Mainland Moose Special Management Practices Policy, NSDNR 2012)

- Recommendations from the mainland moose recovery strategy (currently under development) will be implemented. In the meantime, special management practices have been established for moose HCV areas (NSDNR 2012).

Moose Shelter Patches

- Within 250 metres of the edge of any forest harvest (partial or clear cut) a minimum of two closed canopy coniferous stands > 3 hectares in area (Forest GIS Inventory specifications: FORNON=0; >80% softwood; > 12 meter height; crown closure >60%) must be retained to supply moose cover and security requirements.
- If the harvest area is large, moose shelter patches may occur within the boundary of the harvest area and augment retention patches. Closed canopy wet coniferous stands provide optimal shelter habitat in summer months; they may also serve as suitable calving sites or facilitate access to moose aquatic feeding areas. One of the two patches should be a coniferous wetland, where such patches are available.

- To maintain winter shelter habitat in the Nova Scotia Uplands Ecoregion, one of the two patches should be mixedwood on well-drained sites in the upper third (greater than 150 m or 500 ft elevation) of a south facing slope, where such patches are available; in this ecoregion, shelter patches located adjacent to mature hardwood stands are ideal. In areas where moose shelter patches meeting the criteria outlined above are not available, the appropriate local NSDNR regional biologist must be contacted to develop alternate plans.

Moose Retention Patches

- Smaller coniferous (Forest GIS Inventory specifications: FORNON=0; >80% softwood; > 12 meter height; crown closure >60%) patches (0.1- 0.5 hectares) must also be retained within each harvest area to provide temporary shelter and concealment for moose moving within and among areas of travel or foraging habitat.
- These patches should be distributed so that moose will be no more than 100 m from cover at any time.
- Moose retention patches can be established by increasing the size of coniferous legacy tree clumps, as outlined under the Wildlife Habitat and Watercourse Protection Regulations, where those clumps meet canopy structural parameters outlined above.

Moose Buffers

- Forested buffers should be retained around and/or near open wetlands, watercourses, and waterbodies (Forest GIS Inventory specifications: ForNon=70, 71, 72, 75, and 77).
- Buffers need to be equal to or greater than 20 meters wide and located in such a way (i.e. on higher ground, or between a road and the water) to conceal moose utilizing open wetland and aquatic habitats.

Roads and Access Points

- Development of roads and improved trails should be avoided where extended extraction trails can be used as an alternative.
- Roads, access points, and improved trails should be decommissioned after they are no longer needed.

Coarse Woody Debris

- Forest harvesters are encouraged to leave tree tops and substantial amounts of woody debris on extraction trails to discourage access.
- Levels of coarse woody debris should correspond with indices outlined in the Nova Scotia Forest Ecosystem Classification.

Canada Lynx Habitat (*Lynx canadensis*)

Photo © N.S. Department of Natural Resources

Status: Provincial – endangered

The Canada lynx was listed as an endangered species in 2001 and it currently occupies only 40-50% of its historic breeding range in Nova Scotia. Its population fluctuates on a ~10-year cycle in association with cyclic changes to the snowshoe hare population, its principle source of prey. Recent estimates place the population between 95 and 140 individuals at the low end of the 10-year population cycle and between 475 and 525 individuals at the high end of the cycle. The effective breeding population in Nova Scotia may represent only 20% of this population (Parker 2001).

Threats to the Canada lynx in Nova Scotia come mostly from inter-specific competition from bobcats and coyotes, loss of habitat from forestry operations, reduced population viability through population isolation and limited genetic diversity, human exploitation (*often as accidental by-catch in traps*), and climate change.

Distribution

Canada lynx has been extirpated from mainland Nova Scotia, where historical breeding ranges include the Cobequid Mountains, Pictou/Antigonish Hills, and Musquodoboit Hills, and possibly the southwest interior and North Mountain.

The extent of the current breeding range is located entirely on Cape Breton Island, particularly in the Highlands region. Smaller populations occur on the eastern shores of the Bras d'Or Lakes at Boisdale Hills and East Bay Hills. The total current breeding range is estimated to be ~4,800 km^2 (Parker 2001). Spatial distributions are shown in the NSDNR status report for Canada lynx.

HCV Decision:

All treed bogs (*with a 100m buffer*) within the Canada lynx areas of the Cape Breton Highlands, Boisdale Hills, and East Bay Hills (NSLRT, 2006) are considered HCVs. This is consistent with the Canada lynx recovery strategy for Nova Scotia, which stipulates that all treed bogs within these Canada lynx areas have a 100 m no harvest buffer zone (*except where some limited harvesting promotes cone-bearing spruce habitat within the buffer zone*).

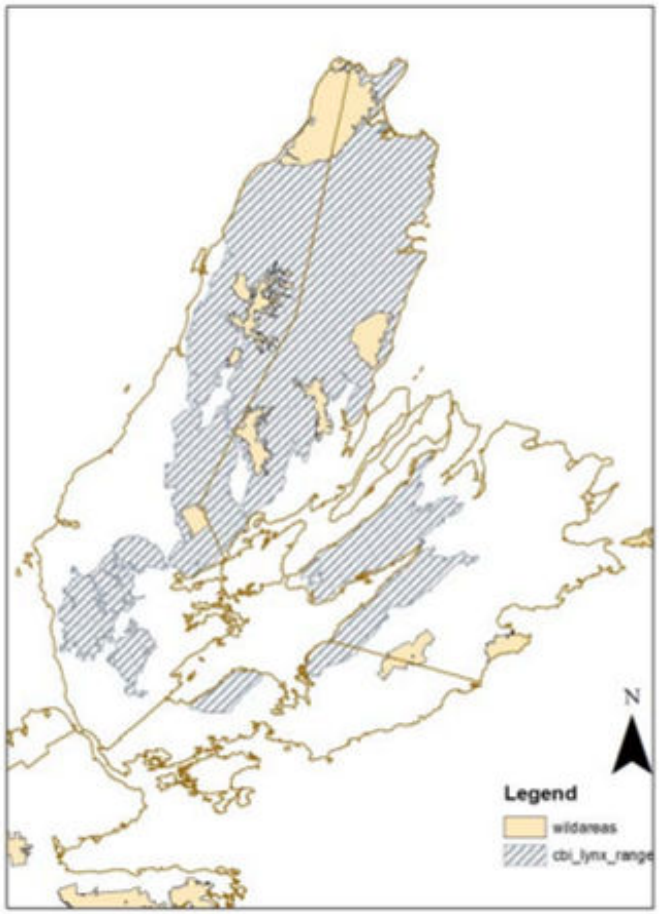


Figure 7-8. Canada lynx HCVs (source: NSDNR Canada Lynx Special Management Practices Policy, 2012)

Management Approach (as per provincial Canada Lynx Special Management Practices Policy, NSDNR 2012)

- Recommendations from the Canada lynx recovery strategy will be implemented and PHP will work to maintain and restore Canada lynx habitat in Cape Breton (NSLRT, 2006).

- A large proportion of available Canada lynx habitat is already contained inside the boundaries of existing protected areas, principally the Cape Breton Highlands National Park, but also the boreal/taiga regions of Pollet's Cove – Aspy Fault Wilderness Area and French River Wilderness Area.

- Other areas containing Canada lynx are currently being examined for potential inclusion as new protected areas, including Crown lands adjacent to French River Wilderness Area, Boisdale Hills, and East Bay Hills. High-priority sites for the creation of new protected areas within PHP's area of operation will receive interim protection from harvesting (refer to

Category 3, question #10). Some proportion of these areas will eventually be designated as protected areas.

- Canada lynx areas located on the working landscape, outside of existing and proposed protected areas, will be managed to maintain and restore Canada lynx populations. A 100m buffer will be established around all treed bogs in the Cape Breton Highlands, Boisdale Hills, and East Bay Hills regions. Within these zones, no harvesting will take place unless it is to replace low cone-bearing balsam fir with high cone-bearing spruce within the same management unit. The intent of managing buffered bogs in this way is to provide high-quality habitat for squirrels, so that a secondary food source is available to Canada lynx at the low-point in their population cycle when the population of snowshoe hare is scarce.

- PHP will reduce the impacts of roads in Canada lynx areas in places such as the Cape Breton Highlands, Boisedale Hills, and East Bay Hills. Refer to Category #2, question #7, dealing with large landscape-level forests, including several important areas for Canada Lynx (*e.g. Polletts Cove-Aspy Fault, Ingonish River Valley, French River, and North River patches*).

- Since 2002, PHP has identified Canada lynx as an indicator species for the Cape Breton Highlands. Future Canada lynx habitat abundance is modelled through PHP's long-term planning process and will be monitored using the NSDNR's on-going assessment data of Canada lynx habitat use in the Cape Breton Highlands.

- PHP has developed, in consultation with a sub-committee of the HCV committee, an HCV Road Impact Mitigation Strategy. Refer to this report for more information on road mitigation developed for this HCV.

Rusty Blackbird Habitat (*Euphagus carolinus*)

Photo © Mersey Tobeatic Research Institute

Status: National – Special concern; Provincial - Endangered

The rusty blackbird is a medium-sized song bird that breeds in swampy wooded areas of the boreal forest zone. Its population has been steadily declining over most of the past century and this trend shows no signs of levelling-off (Greenberg and Droege 1999). Causes of the steep decline are not entirely understood, though habitat loss and wetland conversion are a known threat, particularly in the over-wintering ranges of the species further south. Blackbird control programs in the United States may also be causing problems for the species.

Distribution:

The breeding range of the rusty blackbird occurs throughout the boreal and northern temperate forest zone, from Newfoundland through to Alaska, including all of Nova Scotia. The over-wintering range includes the mixed and deciduous forests of central and eastern North America. In eastern Canada, the Rusty Blackbird uses scrub riparian habitats of islands, lakes, rivers and streams as well as alder and willow thickets (COSEWIC, 2006). Using data from February 2015, the Atlantic Canada Data Conservation Centre (ACCDC) identified 58 observations of rusty blackbird on PHP's area of operation from 1987 to 2010.

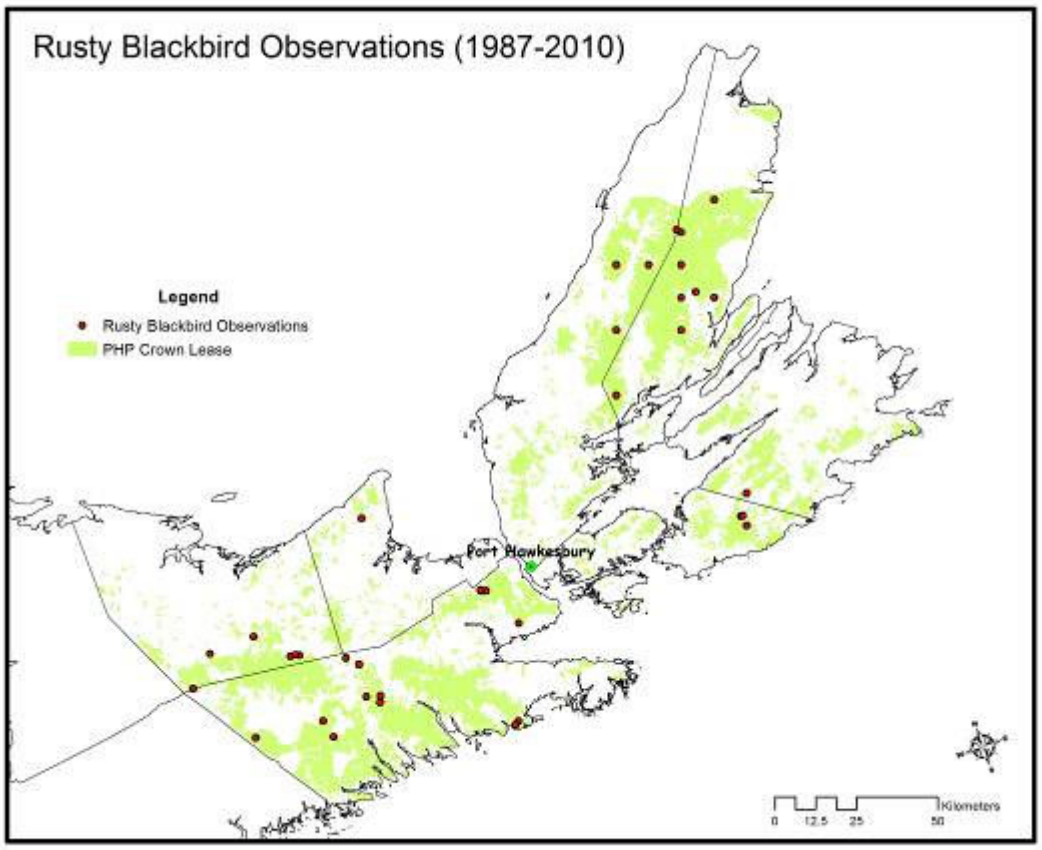


Figure 7-9. Rusty Blackbird Observations (1987-2010) (Source: Atlantic Canada Data Conservation Centre, 2015)

HCV Decision:

Rusty blackbirds tend to occupy forests near the edges of wetlands, bogs, rivers and streams where PHP currently establishes 20 m riparian buffers. Additionally, PHP establishes 100 m buffers around all treed bogs in Cape Breton for Canada lynx habitat management.

Management Approach

PHP will continue to manage riparian areas with 20 m buffers to comply with the provincial regulations for riparian management and 100 m buffers for Canada lynx habitat where some overlap may exist with Rusty blackbird habitat.

New Jersey Rush Habitat (*Juncus caesariensis*)

Photo © N.S. Department of Natural Resources

Status: National – special concern; Provincial - vulnerable

New Jersey rush is a coastal plain flora species that is endemic to eastern North America. It inhabits the edges of infertile bogs and fens and, like most other coastal plain flora species, is dependent upon moderate natural disturbance regimes to reduce inter-specific competition from woody shrubs. The local distribution of this species within a wetland environment appears to be strongly correlated with hydrologic patterns, particularly seasonal flooding (COSEWIC 2004a).

Threats to the New Jersey rush come mostly from wetland alteration caused by drainage, in-filling, and prolonged flooding. The species is also threatened by encroachment from roads and development, logging of adjacent habitat (*particularly clearcutting which can alter local hydrology*), and trampling from heavy all-terrain vehicle use (COSEWIC 2004a).

Distribution

New Jersey rush is found at isolated spots on the coastal plain of eastern North America, in New Jersey, Maryland, Virginia, North Carolina, and Nova Scotia. The Nova Scotia population is known from sixteen bogs and fens in southeastern Cape Breton Island from Port Michaud to Fourchu Bay and inland to Lock Lomond (COSEWIC 2004a, NSDNR 2007). These occurrences are disjunct from other coastal plain flora areas in Nova Scotia, which are mostly located along the lakes and rivers of the southwestern portion of the province.

New Jersey rush occurrences in Nova Scotia are well mapped with a high degree of confidence based on field-verification. Spatial distributions for the HCV assessment come from the significant habitat database from NSDNR, which shows a total of 283.4 hectares of New Jersey rush habitat within PHP's area of operation. This represents roughly 81.9% of all mapped occurrences in Nova Scotia, which also constitutes a significant proportion of the global population of this species as well. Specific locations of New Jersey rush (currently 64 point locations on PHP's Crown lease) are also mapped by the Atlantic Canada Conservation Data Centre (ACCDC).

HCV Decision:

All wetlands containing New Jersey rush are considered HCVs. These areas are spatially-delineated using NSDNR's significant habitat database and the ACCDC spatial location data (Fig. 4-16).

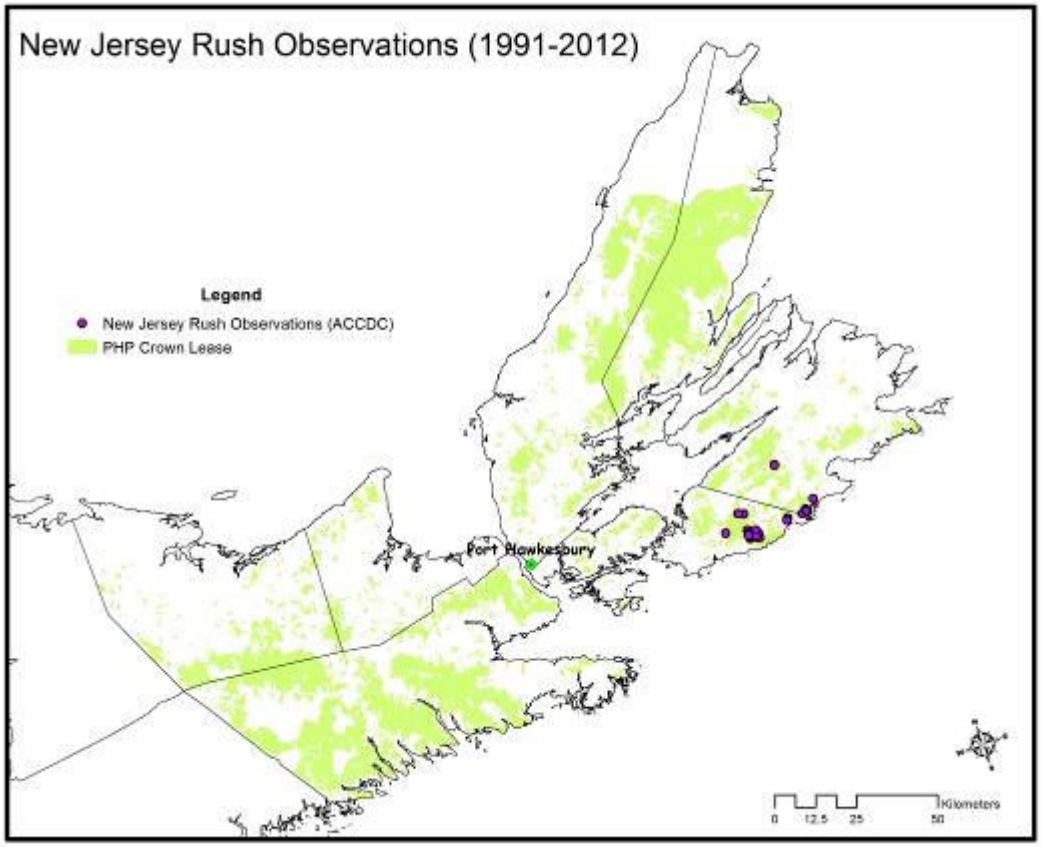


Figure 7-10. New Jersey Rush Observations

Management Approach

- Areas containing New Jersey rush, as delineated by the NSDNR significant habitat layer and data from the ACCDC, will receive full protection from harvesting and road building activities.

- Additionally, a 20 m harvest exclusion buffer zone will be established around all lakes, bogs, and fens containing populations of New Jersey rush unless otherwise directed by NSDNR during the operational approval process.

Eastern White Cedar (*Thuja occidentalis*)

Photo © Mersey Tobeatic Research Institute

Status: Provincial – vulnerable

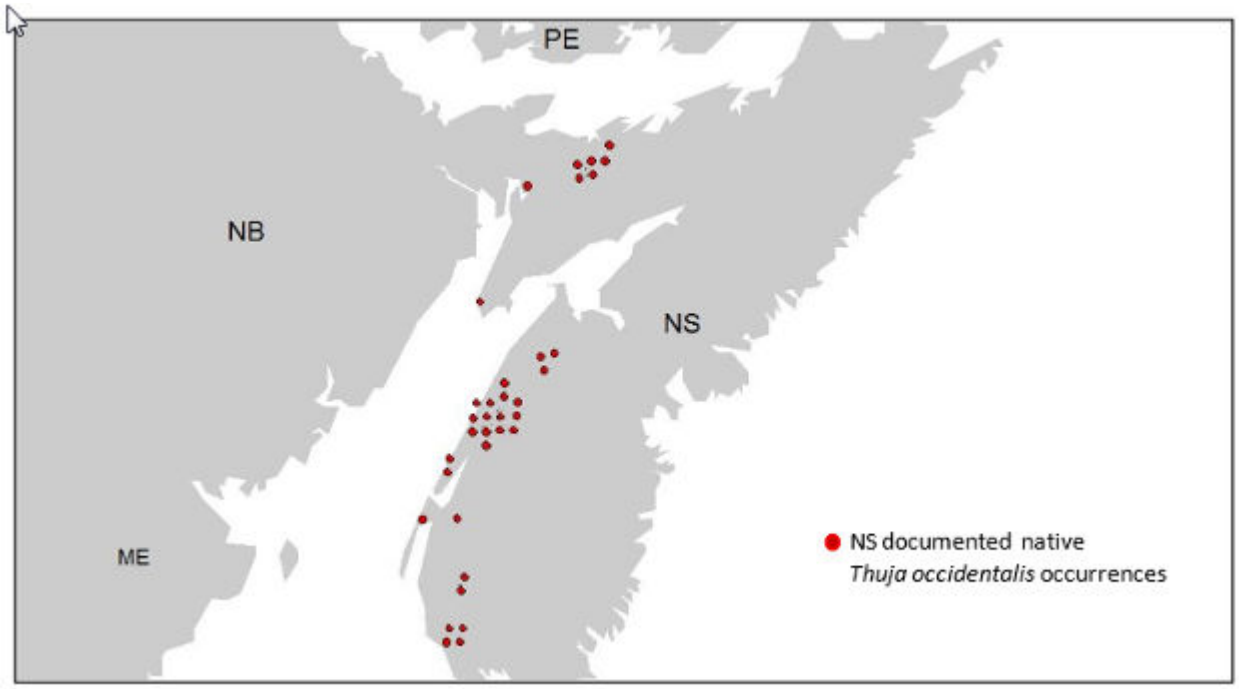
The eastern white cedar is naturally rare in Nova Scotia, with anthropogenic disturbances having caused further declines in the abundance and distribution of this species. Current population estimates range from 13,000 to 15,000 stems located in thirty-two widely scattered stands. In Nova Scotia, eastern white cedar is known to inhabit swamps, lakeside forests, woodlands, old fields, and riparian zones. Soil drainage and pH are likely important factors influencing local distribution patterns (Newell 2005).

Threats to the eastern white cedar come mostly from stand conversions. In recent years, several stands have been lost to forest harvesting and highway construction. Others are threatened by conversions to agricultural fields. Elsewhere, browsing by deer and snowshoe hare can be a limiting factor for seedling regeneration (Newell 2005).

Distribution:

Eastern white cedar occurs in North America from the Canadian Maritime Provinces west to Manitoba, including the Great Lakes region and New England States. Remnant populations occur in isolated pockets further south, at higher elevations in the Appalachian Mountains.

In the Maritimes, eastern white cedar is much more abundant in New Brunswick and Prince Edward Island than in Nova Scotia, where only thirty-two existing stands are documented, all of which occur in the western five counties of the province (Newell 2005). These occurrences have all been field-verified within the past three years. Historical documents suggest that cedar also likely occurs elsewhere within the province, including Pictou and Antigonish Counties where PHP carries out forestry operations, though current distributions are uncertain.



Source: A Management Plan for Native Occurrences of Eastern White Cedar in Nova Scotia, 2010)

Figure 7-11. Native Eastern White Cedar occurrence locations

HCV Decision:

Queries of the NSDNR forest inventory, as well as reviews of the rare species databases from NSDNR, NSE, and ACDCC, did not identify eastern white cedar stands for lands managed by PHP.

No known stands of eastern white cedar occur within PHP's area of operation. No HCVs are designated for this species at this time.

Management approach

- Special management considerations are not required for eastern white cedar at this time.
- Due to the possibility that eastern white cedar stands may occur within PHP's area of operation, particularly in Pictou and Antigonish counties, the company will educate its employees and contractors on how to identify this species in the field. If any occurrences are detected, either through initial surveying or during actual operations, these stands will be immediately protected and no harvesting will be allowed to occur within these sites.

Frosted Glass-Whiskers Occurrences (*Sclerophora peronella*)

Photo © Mersey Tobeatic Research Institute

Status: National – special concern

Frosted glass-whiskers are a globally-rare species of stubble lichen known from only three locations in Canada. Where it is known to occur, the lichen grows on the exposed heartwood of red maple trees in late-seral and old-growth hardwood forest stands. Threats to the frosted glass-whiskers come mostly from habitat loss associated with the decrease in area of old-growth forests.

Distribution

Two out of the three known locations of frosted glass-whiskers in Canada are found in Nova Scotia, inside the boundaries of protected areas on Cape Breton Island. Additional likely occurrences have been noted by the ACDCC.

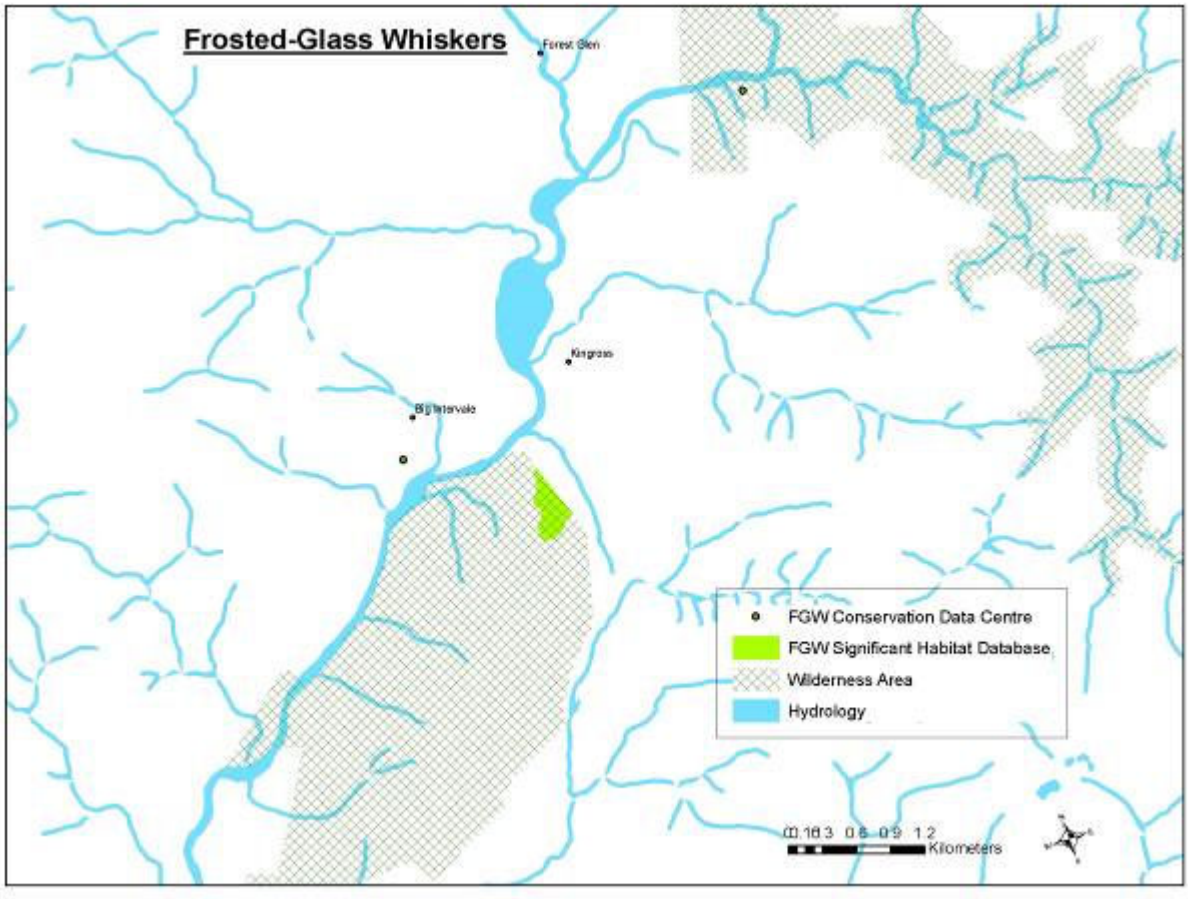


Figure 7-12. Frosted-glass whiskers known occurrences and HCVs

HCV Decision:

Any location known to contain frosted glass-whiskers will be considered an HCV. Spatial delineations are contained in DNR's significant habitat database and records from the ACCDC.

Management Approach

- Current and any future forest stand found by field experts that contains frosted glass-whiskers will be set aside from any harvesting. These areas will be designated as fully protected and a buffer zone will be established around these sites to minimize intrusion.

- In areas of known frosted glass-whiskers occurrences, outside of the strict protection zones, PHP will manage the forest for tolerant hardwood and mixedwood characteristics to maintain late seral and old-growth forest conditions. Additionally, old hardwood stands will not be converted or replaced with other stand types (for additional information on old forest management refer to Category 3, Question 9).

<u>Vole Ears Lichen Occurrences</u> (Reference material - COSEWIC Assessment and Status Report, 2009)

Population Range

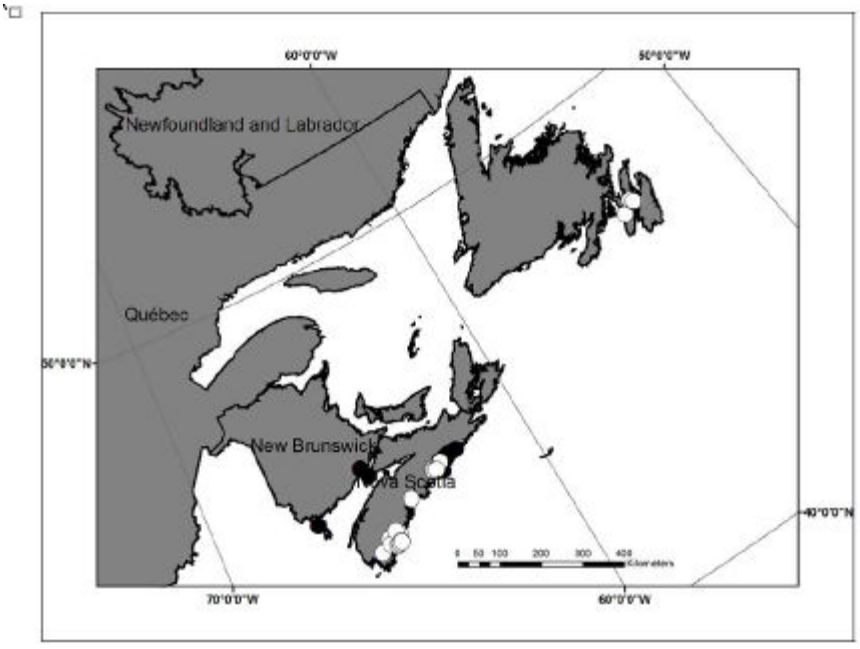


Figure 7-13. Current and Historical Vole Ears Lichen Occurrence Locations

Habitat Characteristics:

The vole ears lichen in Nova Scotia is found on the Eastern Shore and the South Shore, which are both adjacent to the Atlantic Ocean. When growing very near the coast it is found in humid forests of sheltered bays or inlets. The habitat is typically in poorly drained depressions with mature coniferous or mixed forests dominated by Balsam Fir and/or *Acer rubrum* (Red Maple), with a ground flora dominated by *Sphagnum* species.

Spatial Data:

Spatial data of known vole ears lichen has been provided to PHP by the NS Department of Environment. The below map shows that there are no known locations of vole ears lichen in the 7 eastern counties where PHP operates.

Figure 7-14 Vole Ears Lichen Occurrences Locations (NS Dept. of Environment)

In the spring of 2014, a Vole Ears Lichen Project was completed between the NS Department of Environment and the Centre of Geographic Sciences (COGS). Developed as a student project, the purpose was to generate a predictive habitat model for vole ears lichen. The below map shows that the predictive habitat area for vole ears lichen follows that of the above known locations. That is, predictive habitat is modeled to be present in western and central Nova Scotia, but not shown in eastern Nova Scotia.

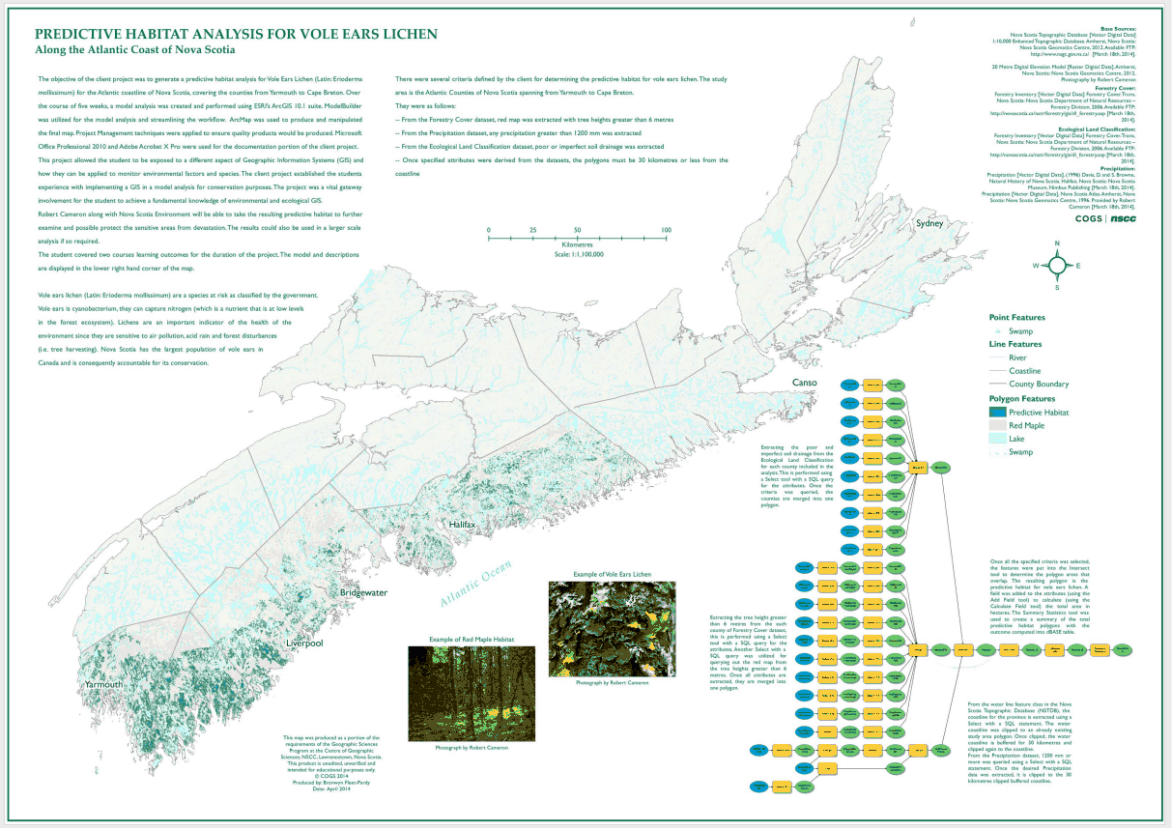


Figure 7-15 Predictive Habitat Map for Vole Ears Lichen (NS Dept. of Environment and COGS)

HCV Decision:

Vole ears lichen is considered an HCV.

Management Approach:

Due to the known locations and predictive habitat to exist outside of PHP's forest management area, there are no special management practices identified at this time for vole ears lichen. PHP is a participating member of the provincial Lichen Recovery Team, so should any change occur where special management practices are required on PHP's Crown lease, they will be implemented.

<u>Blue Felt Lichen Occurrences</u> (Reference material - COSEWIC Assessment and Status Report, 2010)

Distribution Range:

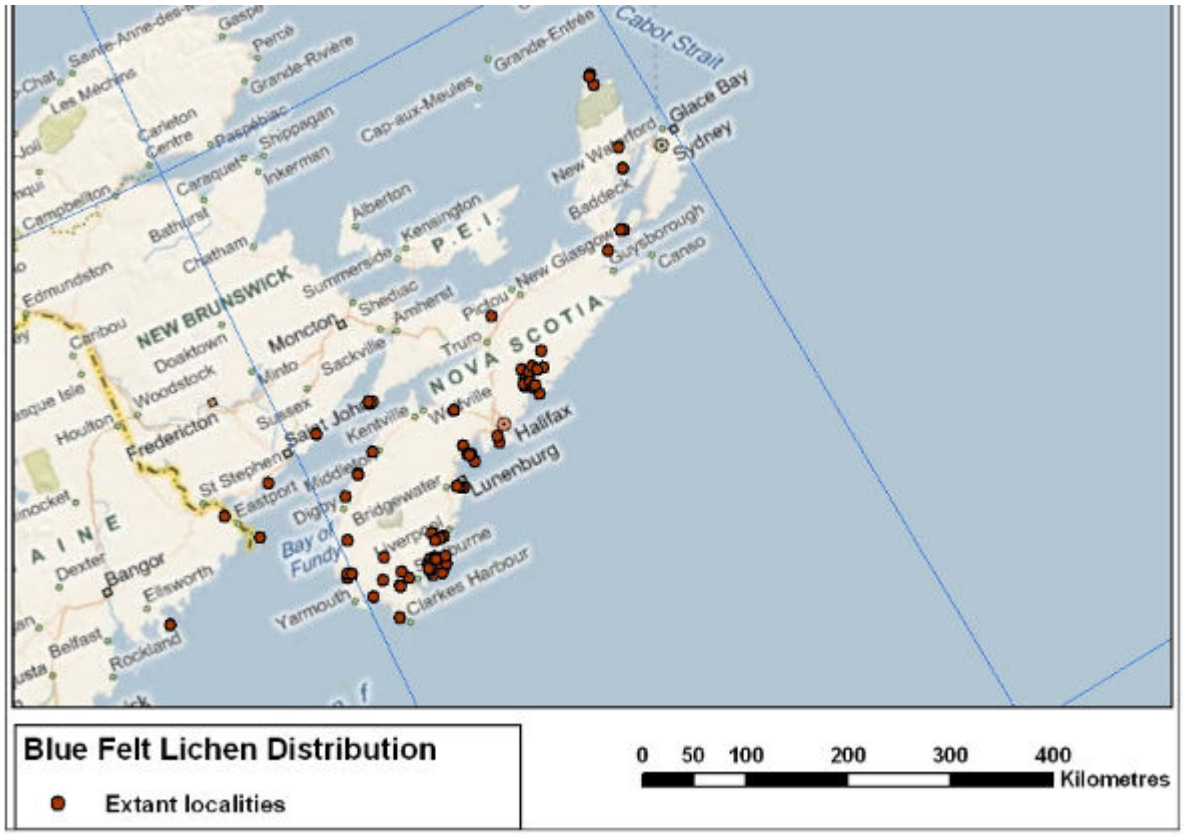


Figure 7-16 Current Distribution of Blue Felt Lichen in Canada

Habitat Characteristics:

The blue felt lichen thrives in the Atlantic coastal forests of Nova Scotia. They are generally located in mixed forests containing red maple that are in wet depressions or adjacent to streams, rivers or lakes. Red maple can make up 50% of the tree species composition while balsam fir is also a common component, up to 30%. Outside of these red maple swales, this lichen can be found on the Atlantic coast near rivers and streams or adjacent to wetlands. It also occurs less frequently in deciduous forests on rich soil on hillside slopes as in the Cape Breton Highlands, on the North Mountain on the Fundy coast, and in the Cobequid Hills. It is most often found in humid micro-climates near seeps, vernal ponds or steep sided gullies.

Spatial Data:

Spatial data of known vole ears lichen has been provided to PHP by the NS Department of Environment. The below map shows that there are known locations of vole ears lichen in the 7

eastern counties where PHP operates. Of the 104 locations, 13 are located in the 7 eastern counties. Of the 13 located in the 7 eastern counties, 3 are located in PHP's forest management area (see second map below) and are in TFM for planning and operations.

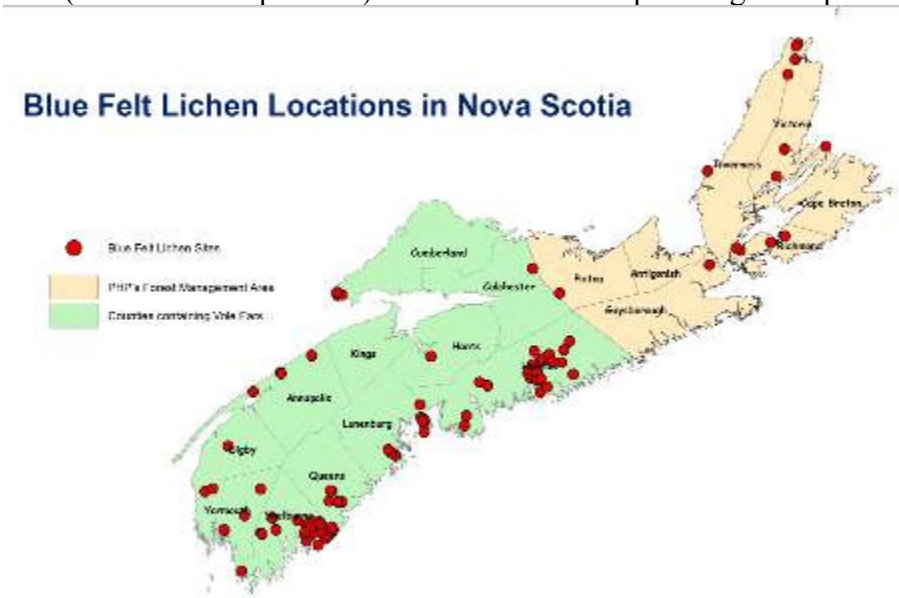


Figure 7-17 Blue Felt Lichen Occurrences Locations (NS Dept. of Environment)

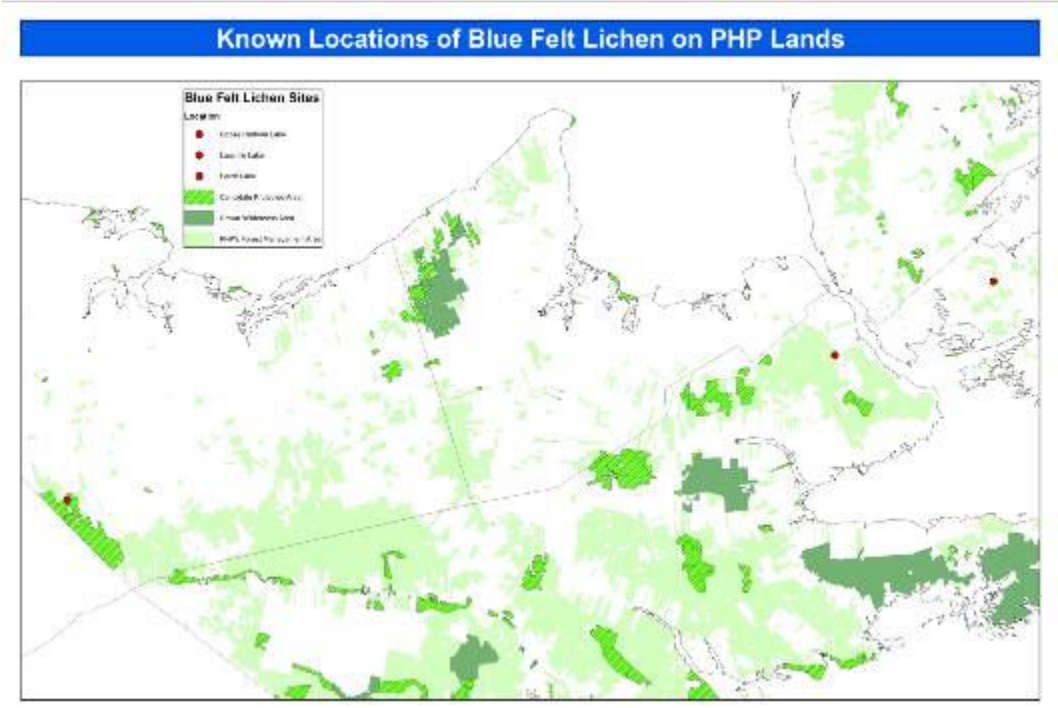


Figure 7-18 Blue Felt Lichen Occurrences on PHP Lands

Of the three locations known to exist on PHP's Crown lease, one is located in a candidate protected area and is currently under a harvest moratorium. The other two locations are located in the working forest. These two locations are nearby to planned harvest operations, so PHP requested a survey of each area by an expert field lichenologist in the fall of 2014 to verify if the

lichen is still present. The lichen was present in both locations, so a 100 meter no harvest buffer will be maintained around each location, which is the same practice used for boreal felt lichen in Nova Scotia.

HCV Decision:

Blue felt lichen is considered an HCV.

Management Approach:

Although there are no special management practices developed by government or other responsible agencies, PHP will implement the same management practice applied to boreal felt lichen for blue felt lichen. Known and confirmed locations of blue felt lichen will have a 100 meter no harvest buffer around the site. Since there is no predictive habitat yet for this species, PHP relies on the NS Department of Environment to notify them of any new locations on PHP's Crown lease. PHP is a participating member of the provincial Lichen Recovery Team, so information can also become available through that partnership.

<u>Black Ash</u> (Reference Material – Black Ash Embryo Rescue Project, date unknown)

Distribution Range:

Perhaps due to the significance of black ash to the Mi'kmaq in Nova Scotia, there is no readily available map showing the population range or locations of black ash.

Habitat Characteristics:

Black ash, also known as wisqoq, is a riparian mid successional hardwood tree species that ranges from western Newfoundland to southern Manitoba in Canada and south to Iowa and East to northern Virginia in the United States. Black ash is a slow growing species with diffuse distribution in Nova Scotia. Studies by the First Nations Forestry Association of Nova Scotia have revealed only 80 trees presently existing locally. Black ash is considered scattered to rare, exhibiting moderate shade tolerance and preferring low ground, damp woods, swamps and river intervals. Black ash is of cultural and economic importance to Mi'kmaq First Nations of Nova Scotia for basketry, snowshoe frames and canoe ribs as well as interior trim, cabinetry and plywood.

Spatial Data:

There is one known location of black ash in the seven eastern counties where PHP operates. This location is in a pending legal protected area, so it is safeguarded from all management activities.

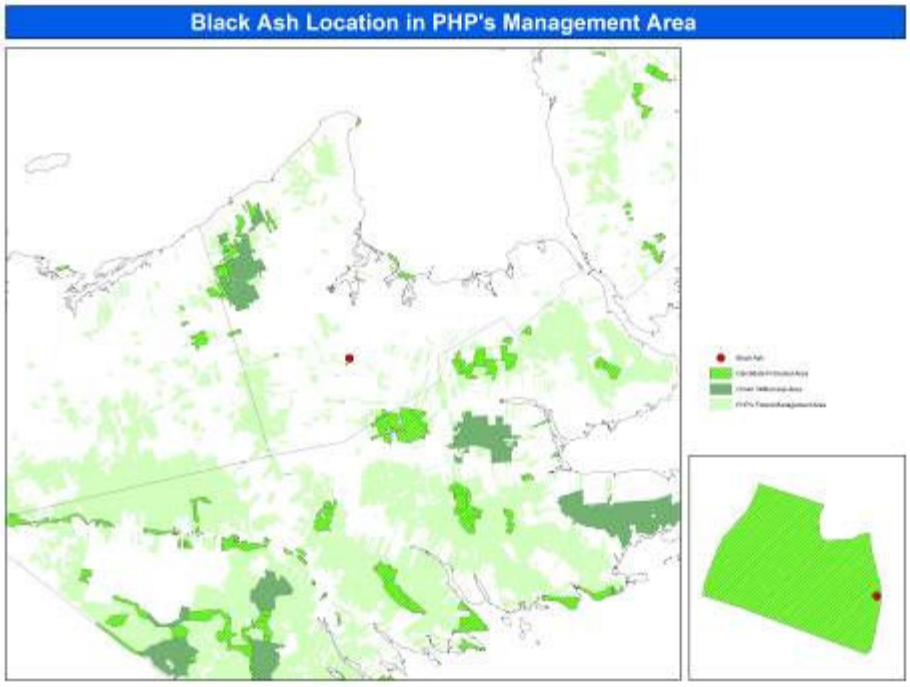


Figure 7-19 Black Ash Occurrences on PHP Land

HCV Decision:

Black ash is considered an HCV.

Management Approach:

PHP staff and contractors are aware that if black ash is found, the tree is to be left and NS Department of Natural Resources is to be immediately notified.

Bird Species-at-Risk Listed in 2013

In the absence of recovery strategies for Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush, PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." Since this project is currently underway, special management practices have not yet been defined for the above bird species.

As a precautionary approach, PHP has reviewed available information and/or spatial data for the above species that do not have defined special management practices or recovery strategies.

This review is to determine if precautionary special management practices are necessary based on habitat requirements, and if so, to identify those practices for PHP to implement.

Olive-sided Flycatcher Habitat (reference material - NS Species at Risk Guide, MTRI 2008)

Population Range (provincial status now Threatened):

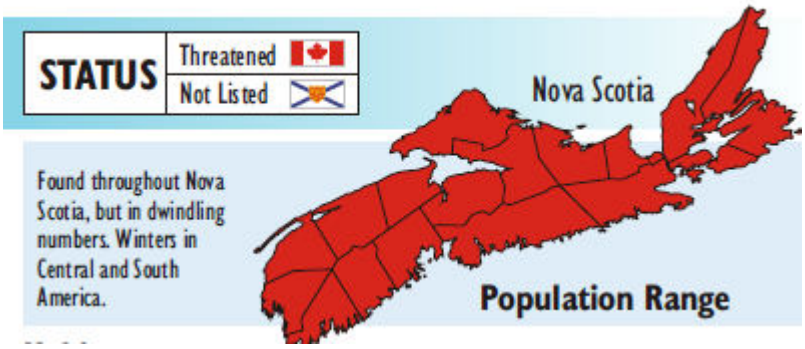


Figure 7-20 Olive-sided Flycatcher Habitat Range (MTRI 2008)

Spatial Data:

The below figure shows the spatial distribution of known locations of Olive-sided flycatcher on PHP's Crown lease using observation data by the ACCDC (2015) and BSC (2015).

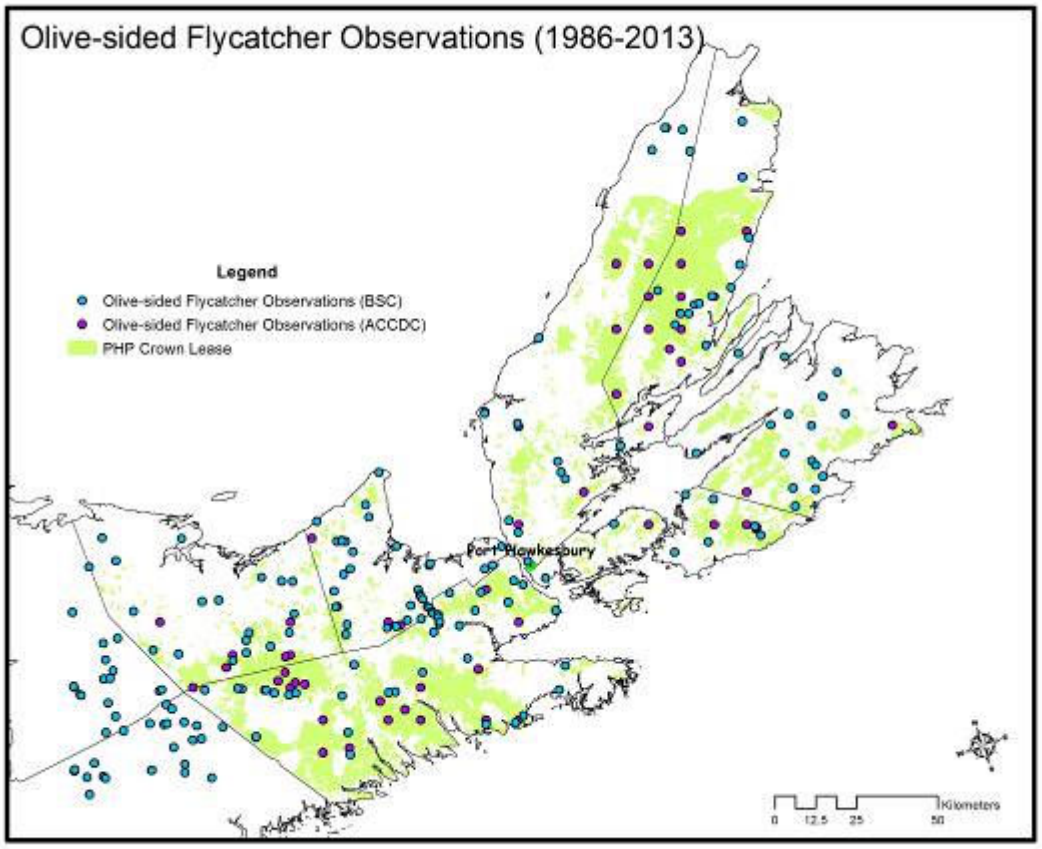


Figure 7-21 Olive-sided Flycatcher Occurrences on PHP Land

Habitat Characteristics:

Olive-sided flycatcher are found in early post-fire landscapes or clearings, and like to perch on the tops of tall trees or snags, from which they take off to catch flying insects. They have a preference for coniferous forest edges, and openings like meadows, rivers, bogs, swamps, and ponds, including young forests following a forest fire or clearcut.

HCV Decision:

Olive-sided flycatcher is considered an HCV.

Management Approach:

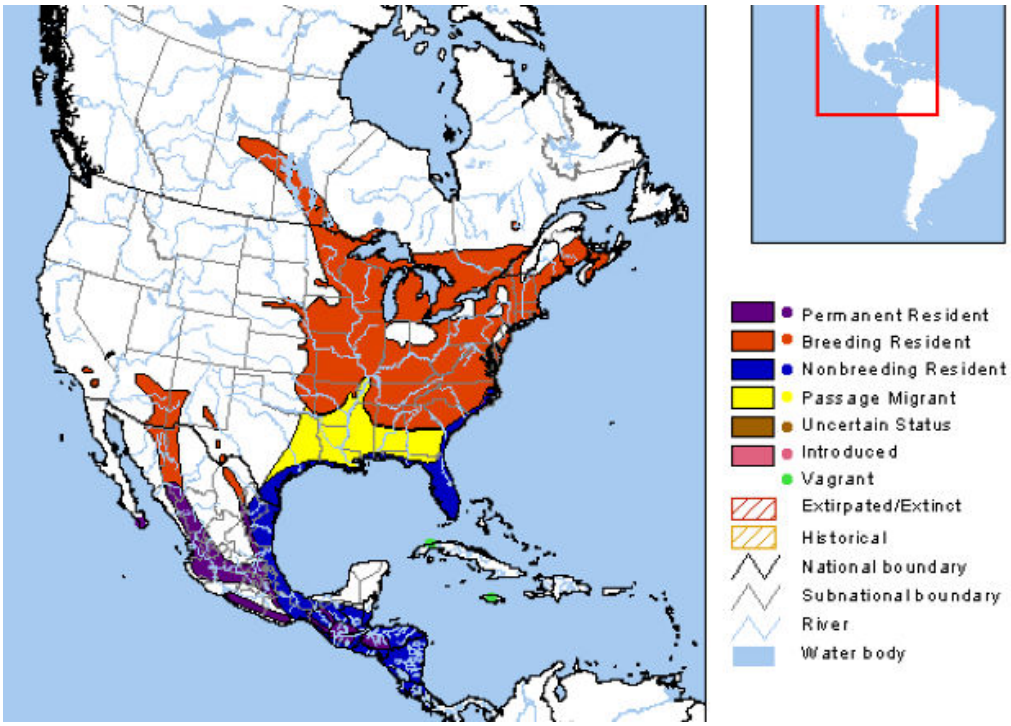
The habitat characteristics of olive-sided flycatcher are minimally impacted by forestry activities due to where they typically inhabit. PHP leaves snags throughout its operations and the presence of tall trees can be found in several PHP silviculture treatments (e.g. single selection, group

selection, partial cuts, shelterwoods, patch cuts, red spruce management). PHP also provides habitat features such as forest edges, openings, and clearcuts. Therefore, specific special management practices are deemed to be not necessary at this time and PHP believes there is adequate habitat across the forest management area. However, if special management practices are developed by government or other agencies, they will be implemented as applicable to forest management. If an active nest is located during regular operational activities, the activity will be stopped and the local DNR Wildlife Biologist will be notified so appropriate measures can be implemented.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

<u>Eastern Whip-poor-will Habitat</u> (Reference material - COSEWIC Assessment and Status Report, 2009)

Distribution Range:



Spatial Data:

There is no known spatial data that shows locations of whip-poor-will sightings on PHP's Crown lease.

Habitat Characteristics:

The Whip-poor-will is a nocturnal species and as a result, it has not been well-studied. The Whip-poor-will breeds in dry open woodland and is typically associated with forest edges and openings. It prefers rock or sand barrens with scattered trees, savannahs, old burns in a state of early forest succession, and open conifer plantations for breeding. The species shows a preference for even-aged stands and it avoids both wide-open spaces and deep forest. Forests where Whip-poor-will is found tend to be open with well-spaced trees and a low canopy, or have small to medium sized openings. Areas with decreased light levels where forest canopies are closed are generally not occupied, perhaps because of reduced foraging success.

HCV Decision:

Whip-poor-will is considered an HCV.

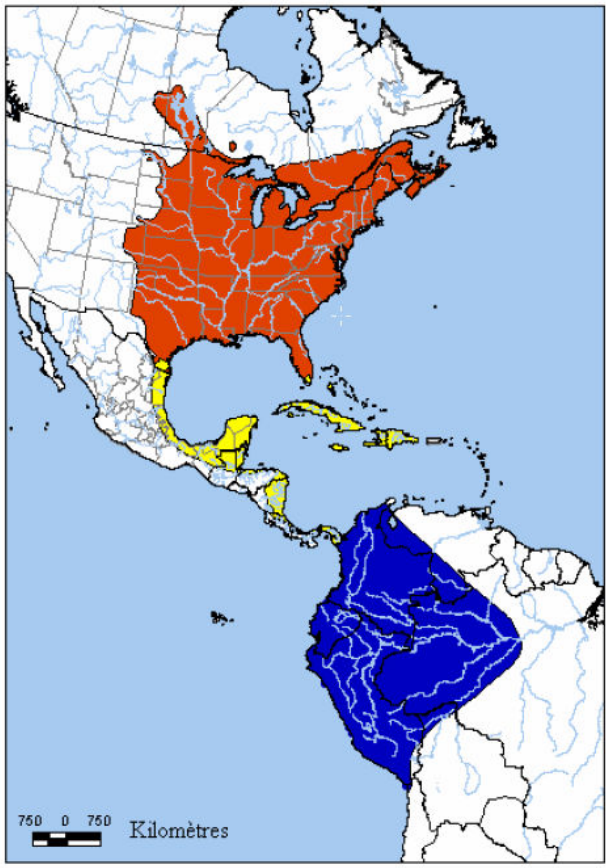
Management Approach:

The habitat characteristics of whip-poor-will are minimally impacted by forestry activities due to where they typically inhabit. PHP creates forest edges and openings through active management, as well as even-aged stands that can contain well-spaced trees. Therefore, precautionary specific special management practices are deemed to be not necessary at this time and PHP believes there is adequate habitat across the forest management area. However, if special management practices are developed by government or other agencies, they will be implemented as applicable to forest management. If an active nest is located during regular operational activities, the activity will be stopped and the local DNR Wildlife Biologist will be notified so appropriate measures can be implemented.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

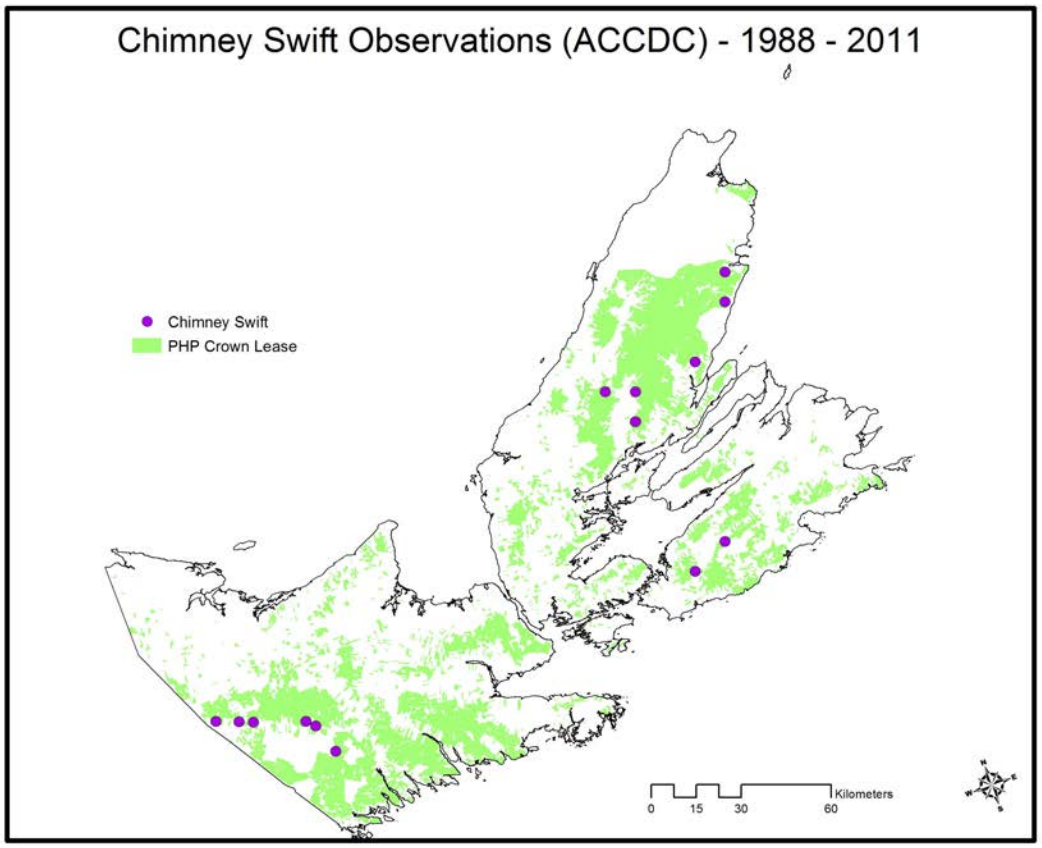
<u>Chimney Swift Habitat</u> (Reference material - COSEWIC Assessment and Status Report, 2007)

Distribution Range:



Spatial Data:

The below figure shows the spatial distribution of known locations of Chimney swift on PHP's Crown lease using observation data by the ACCDC (2016).



Habitat Characteristics:

Since Chimney Swift are often feeding most of the day, their habitat requirements vary greatly. Their habitats can include towns, cities, villages, rural or wooded areas, but they are most commonly found in urban and suburban areas (COSEWIC 2007). They are often seen in aquatic areas because of their reliance on insects as their main food source.

Chimney swift may nest in large diameter trees and will sometimes occupy cavities created by the Pileated woodpecker. Chimneys, barns, and wells are also used, but their most common nest preference is unused chimneys.

HCV Decision:

Chimney swift is considered an HCV.

Management approach:

The Chimney swift can be impacted by forest management activities since this species of bird may nest in wooded areas with large diameter trees. Currently, there are no special management

practices identified for forest managers regarding Chimney swift habitat. However, since the feeding and nesting habitat relies heavily on urban and suburban areas where there is an abundance of chimneys for nesting, PHP believes it currently has a low impact on Chimney swift populations.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

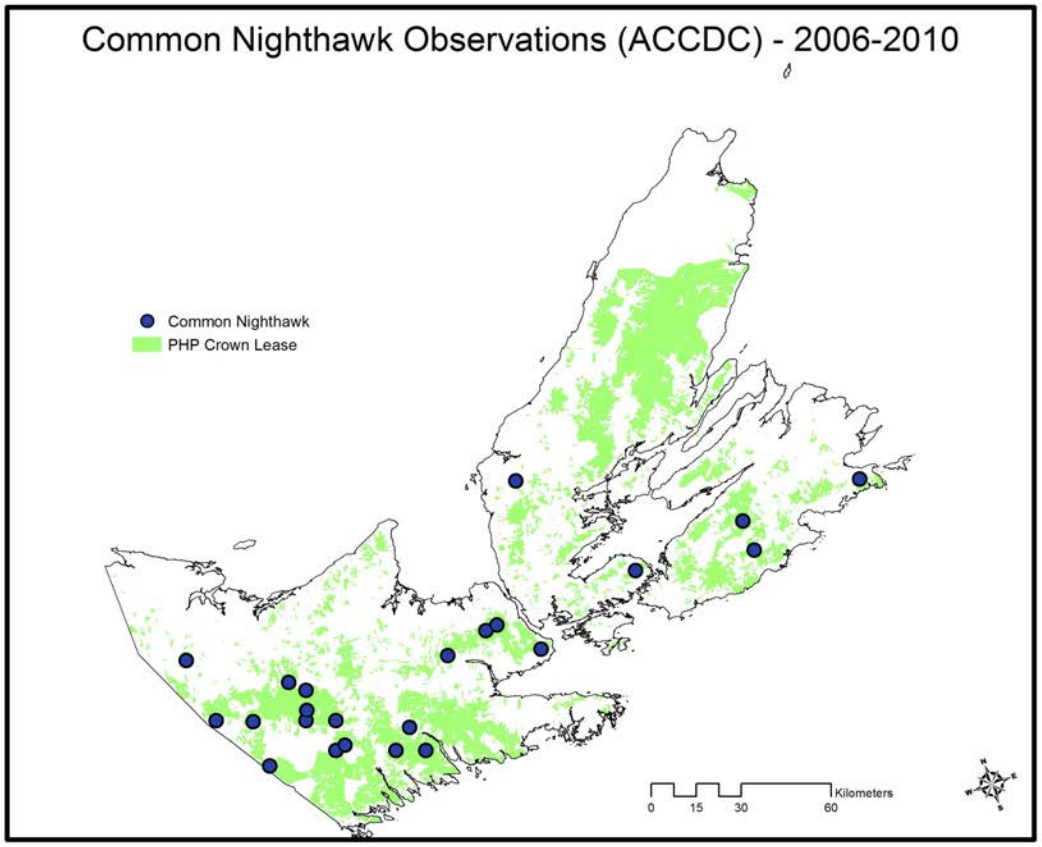
<u>Common Nighthawk Habitat</u> (Reference material - Recovery Strategy for Common Nighthawk, 2016)

Distribution Range:

Source: Recovery Strategy for the Common Nighthawk, 2016

Spatial Data:

The below figure shows the spatial distribution of known locations of Common Nighthawk on PHP's Crown lease using observation data by the ACCDC (2016).



Habitat Characteristics:

The Common Nighthawk uses a variety of habitats for breeding, foraging, roosting, and migration/wintering (Recovery Strategy for Common Nighthawk, 2016). Nests are generally established in open ground or clearings. They can breed in a variety of habitats including sandy areas, open forests, wetlands, or rocky areas. They prefer to forage in open areas where there is an abundance of flying insects. This is mostly done at night. They also roost in a variety of sites including tree limbs, the ground, fenceposts, or rooftops.

HCV Decision:

Common Nighthawk is considered an HCV.

Management approach:

The Common Nighthawk prefers some habitats where PHP does not operate such as rocky areas, sandy areas, and wetlands. However, they do prefer open wooded areas, which PHP does create through its forest management (e.g. clearcuts, partial cuts, shelterwoods, selection cuts). The Common Nighthawk Recovery Strategys lists a variety of threats including changes in natural processes, climate and natural disasters, accidental mortality, pollution, exotic or invasive species, and habitat loss or degradation. Types of habitat loss include change in roof construction and materials, residential and commercial development, agriculture, and logging and wood harvesting. It is currently unknown if logging and wood harvesting causes a significant severity to populations with a low causal certainty that there is a high degree of evidence linked to the threat of logging.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

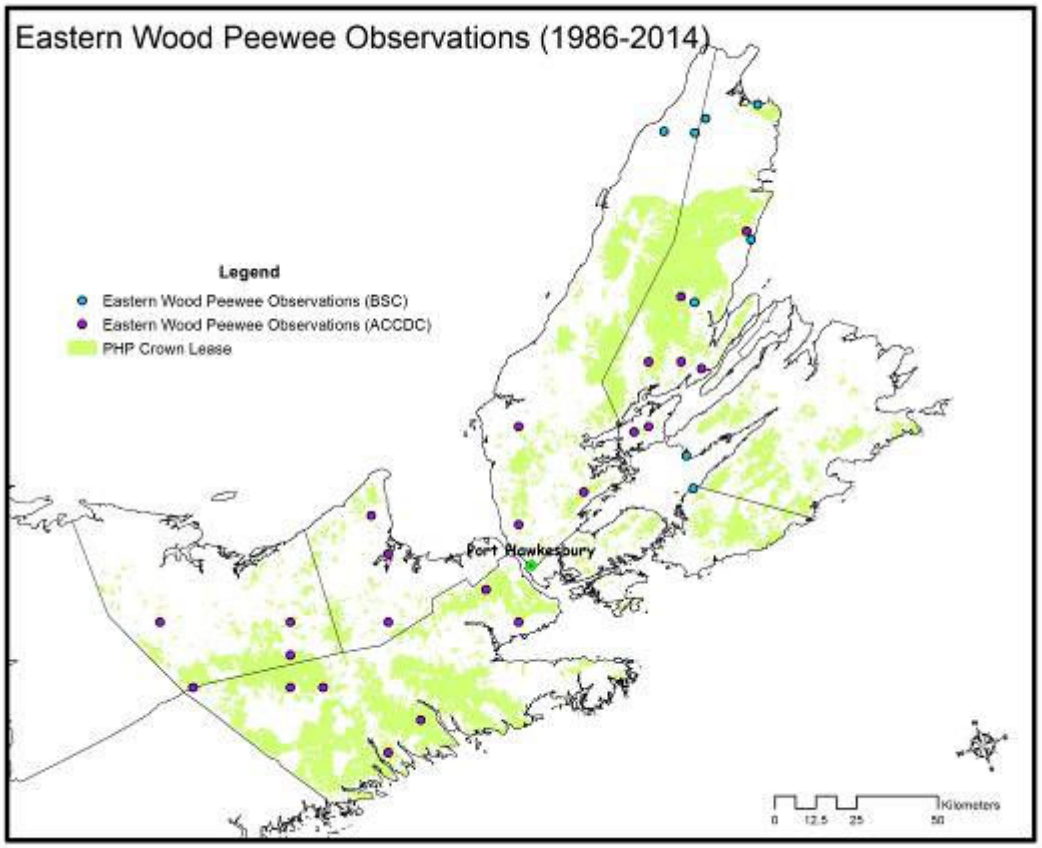
<u>Eastern Wood Peewee Habitat</u> (Reference material - COSEWIC Assessment and Status Report, 2012)

Distribution Range:

Figure 1. Global range of the Eastern Wood-pewee (based on Gauthier and Aubry 1995; Ridgely et al. 2003; Cadman et al. 2007; Bird Studies Canada [BSC] 2011a, b).

Spatial Data:

The below figure shows the spatial distribution of known locations of Eastern wood peewee on PHP's Crown lease using observation data by the ACCDC (2015) and BSC (2015).



Habitat Characteristics:

In Canada, the Eastern Wood-pewee is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in forest stands of intermediate age and in mature stands with little understory vegetation.

Maritimes Breeding Bird Atlas (MBBA)

Preliminary analyses comparing the probability of observation of Eastern Wood-pewees within their Maritime range after 20 hours of observation in the first and second Atlas periods indicate significant declines over the last 20 years (Figure 6). The probability of observation declined from 0.50 to 0.40, which yields a statistically significant average annual decline of 1.02% over the 20-year period (or roughly a 10% decline over 10 years). The decline was driven mainly by New Brunswick (-1.6% per year; M. Campbell unpubl. data; S. Makepeace *fide* Sabine pers. comm. 2012).

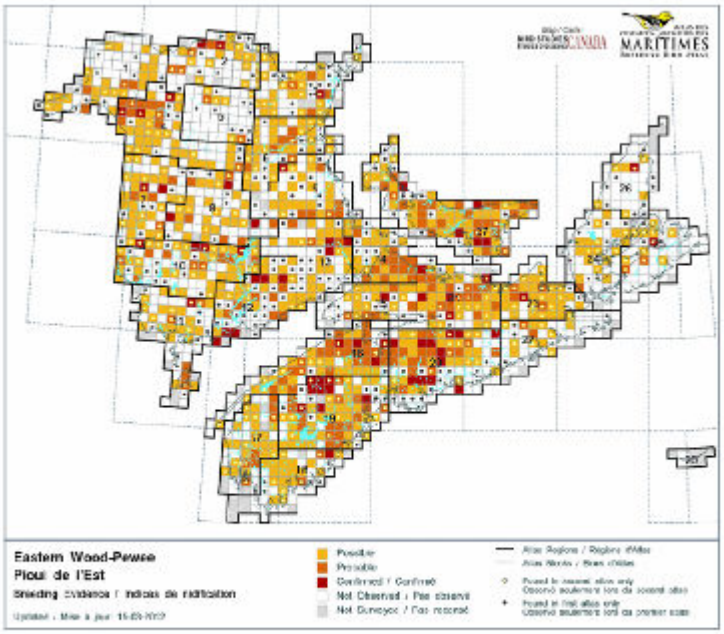


Figure 6. Distribution of the Eastern Wood-pewee in the Maritimes during the period 2006-2010 (reproduced with permission from BSC 2012). Squares with black dots are those in which the species was found in the first atlas period (1986-1990), but not in the second (2006-2010). Squares with yellow dots are those in which the species was found in the second atlas period but not in the first.

HCV Decision:

Eastern wood peewee is considered an HCV.

Management approach:

The Eastern wood peewee can be impacted by forest management activities since this species of bird prefers mature and intermediate age stands of deciduous and mixed forests. However, PHP manages the forest management area by creating a range of age classes through forest modeling, long-term planning, and operational planning. Also, PHP manages deciduous and mixed forest stands with a variety of harvest treatments that can still maintain adequate forest structure (e.g. single selection, group selection, partial cuts, shelterwoods, patch cuts). The above figure shows the Maritime Breeding Bird Atlas data for the species. In eastern Nova Scotia where PHP operates, the breeding evidence shows a variety of results with the most common type being 'possible' evidence.

Forestry practices that maintain large tracts of intermediate aged forest with closed canopy and limited clear cuts (less than 10 ha) along with thinning to remove mature trees and large-diameter woody growth should provide adequate habitat for Eastern Wood-Pewees (Stauffer and Best 1980, Crawford et al. 1981).

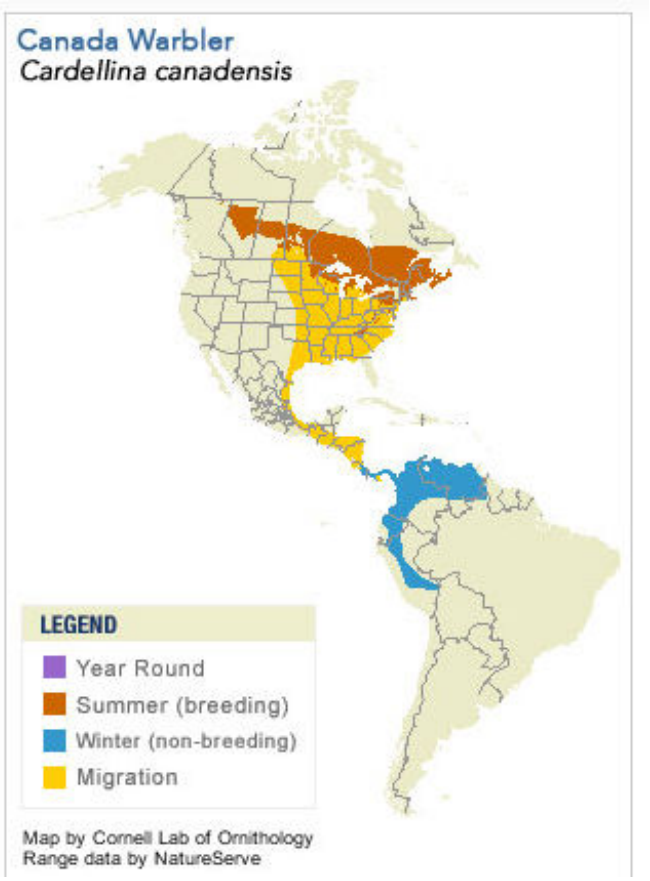
Therefore, precautionary specific special management practices are deemed to be not necessary at this time and PHP believes there is adequate habitat across the forest management area. However, if special management practices are developed by government or other agencies, they will be implemented as applicable to forest management. If an active nest is located during

regular operational activities, the activity will be stopped and the local DNR Wildlife Biologist will be notified so appropriate measures can be implemented.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

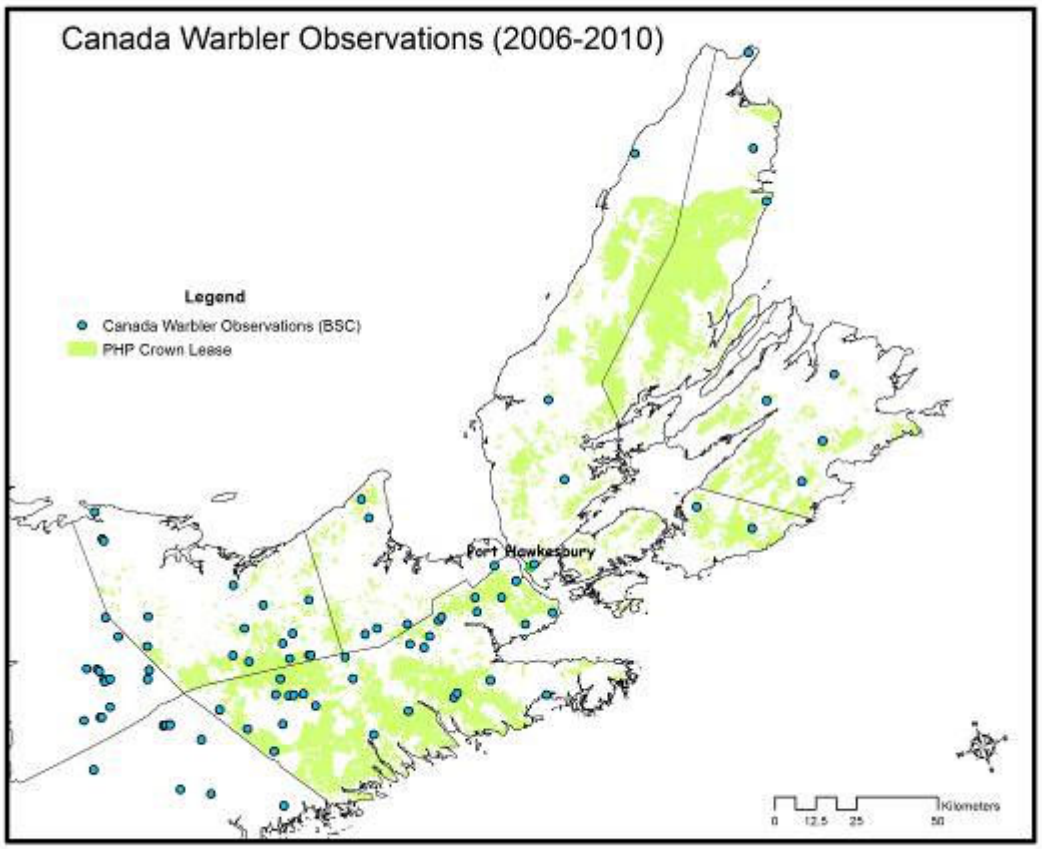
<u>Canada Warbler Habitat</u> (Reference material – Species at Risk Public Registry; http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=1008#habitat)

Distribution Range:



Source: http://www.allaboutbirds.org/guide/canada_warbler/lifehistory
Spatial Data:

The below figure shows the spatial distribution of known locations of Canada warbler on PHP's Crown lease using observation data by BSC (2015).



Habitat Characteristics:

Canada warblers are so little studied partly because they have never been abundant. They are limited to a fairly specific niche, inhabiting dense, log-strewn understoreys in damp, mossy woods, usually near forest edges, swamps and bogs and often in ravines or on steep slopes leading to waterside thickets of alders and willows. Their nests, well hidden in moss hummocks, rotting stumps and ruts created by upended trees, are seldom found, obscured by thick fern beds and tree roots. The Canada Warbler is also found in stands regenerating after natural disturbances, such as forest fires, or anthropogenic disturbances, such as logging.

The factors responsible for the decline of the Canada Warbler have not been identified. However, habitat loss and degradation in the wintering range of this migratory bird are thought to be the most likely factors. In eastern Canada, habitat loss due to the conversion of swamp forests to agricultural activities is believed to have contributed to the decline in Canada Warbler populations.

HCV Decision:

Canada warbler is considered an HCV.

Management Approach:

The habitat characteristics of Canada warbler are minimally impacted by forestry activities due to where they typically inhabit. PHP creates regenerating stand structures and forest edge through active management, which is preferred by this species, but also avoid steep slope areas, ravines, swamps, and bogs. The provision of stumps and coarse woody debris left by PHP is also believed to create understory conditions preferred by the Canada warbler. Furthermore, PHP does not contribute to habitat loss by converting swamp forests to agricultural land. Therefore, precautionary special management practices are deemed to be not necessary at this time and PHP believes there is adequate habitat across the forest management area. However, if special management practices are developed by government or other agencies, they will be implemented as applicable to forest management. If an active nest is located during regular operational activities, the activity will be stopped and the local DNR Wildlife Biologist will be notified so appropriate measures can be implemented.

PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. Currently, there are no specific forest management practices developed for the Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, Whip-poor-will and Wood Thrush. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." PHP will continue to participate in this project and implement practices where feasible as they are developed.

<u>Wood Thrush</u> (Reference material - COSEWIC Assessment and Status Report on the Wood Thrush, 2012)

Status: National – threatened; Provincial – not listed

Source: COSEWIC Assessment and Status Report on the Wood Thrush, 2012

The Wood Thrush is a medium sized bird closely related to the American Robin. The Wood Thrush can be found throughout North America and winters in Central American and southern Mexico. Its decline is thought to have occurred due to cowbird parasitism, acid rain, loss of wintering habitat, and forest fragmentation in North America. The breeding range of the Wood Thrush includes mainland Nova Scotia where late-successional deciduous and mixed forests are preferred.

Canadian Range:

The Wood Thrush breeds in Ontario, Quebec, New Brunswick and mainland Nova Scotia. The Wood Thrush is not known to nest on Cape Breton Island.

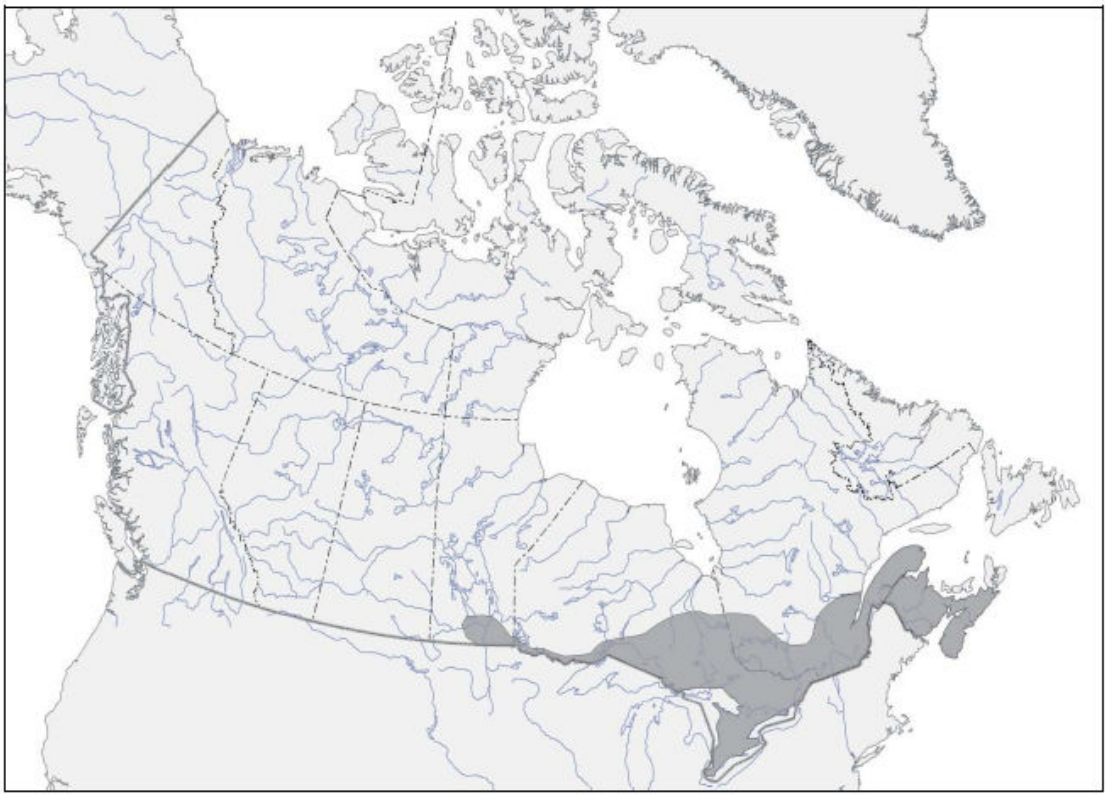


Figure 3. Current Canadian breeding range of the Wood Thrush (based on Gauthier and Aubry 1995; Friesen 2007; BSC 2012a,b, Ebird 2012). The species is considered an occasional visitor to Manitoba (Carey *et al.* 2003).

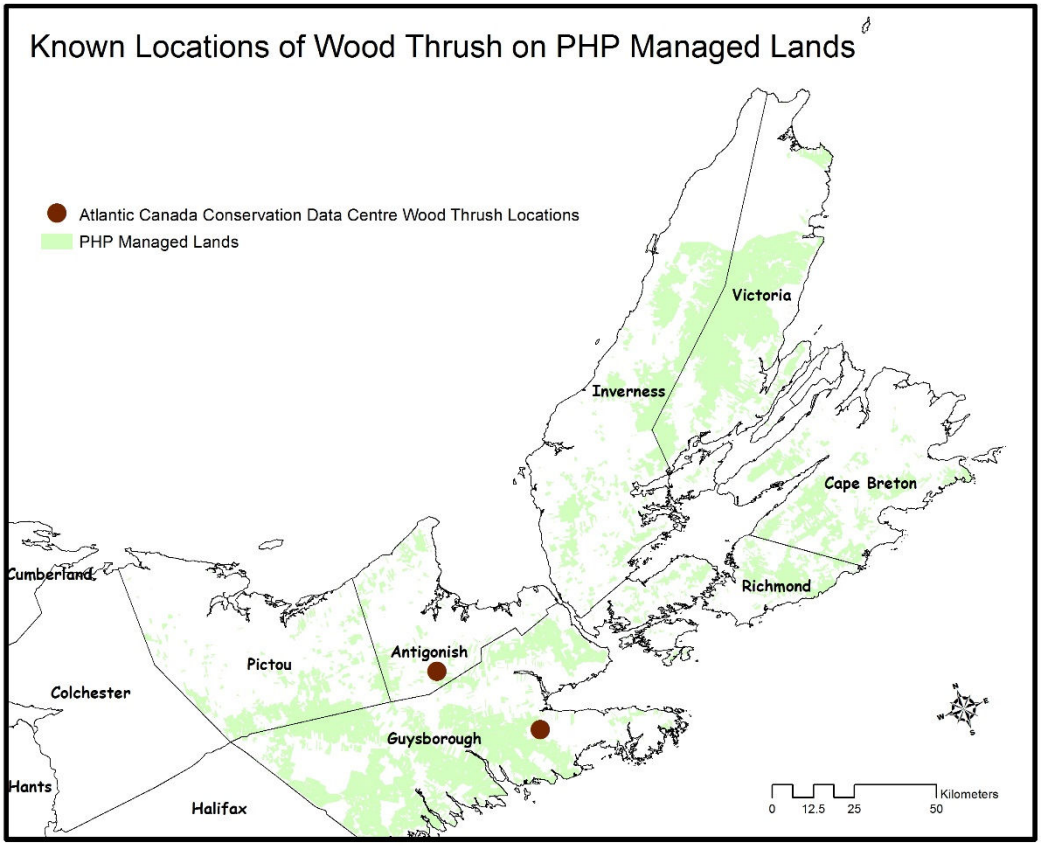
Source: COSEWIC Status and Assessment Report on the Wood Thrush, 2012

Habitat Characteristics:

The main habitat requirement for Wood Thrush during the breeding season of spring and summer in Canada is hardwood and mixed-wood forests. They prefer moist forest stands with a dense tree canopy of deciduous or mixed forests with a well-developed deciduous understory. Early successional woodlands and coniferous forests do not provide suitable breeding habitat. Wood Thrush will nest in large forest areas, but will also use highly fragmented forests (COSEWIC, 2012).

Spatial Data:

There are only two known locations of Wood Thrush on PHP's managed lands, which were provided by the Atlantic Canada Conservation Data Centre. The below map shows these two locations, which were recorded in 2007 and 2008.



HCV Decision:

The Wood Thrush is considered an HCV.

Management Approach:

Currently, there are no required management practices for Wood Thrush in Nova Scotia or Canada. In the absence of best management practices for this species, as well as others including Canada Warbler, Common Nighthawk, Eastern Wood-Pewee, Chimney Swift, Olive-sided Flycatcher, Rusty Blackbird, and Whip-poor-will, PHP is currently participating in a working committee with Bird Studies Canada on a Habitat Stewardship Program project called 'Forest Birds at Risk'. The purpose of the project is to "provide guidance in the collection of habitat information and forest management practices that could potentially enhance conservation efforts for these species, and to evaluate their value in the Maritime context." Since this project is currently underway, special management practices have not yet been defined for the above bird species. However, PHP will continue to monitor for best management practices on an annual basis, so appropriate conservation measures can be taken.

Regardless, given the preferred breeding habitat of Wood Thrush in mature deciduous and mixed-wood forests, PHP believes its uneven-aged and mixed-wood forest management techniques in these forest types do not greatly impact the breeding requirements of the Wood Thrush. The COSEWIC 2012 report supports this notion by stating that "the species is relatively tolerant of forest management activities that are conducted on a small spatial scale (i.e. single-tree, group selection cuts, uneven-age forest management, selective removal of mature trees). The report further states that Sugar Maple and American Beech are preferred species for nesting. PHP manages tolerant Sugar Maple stands using only single or group selection depending on tree quality. American Beech is present throughout the forest management area and pure stands are not managed, but if found dispersed throughout a hardwood stand, it is managed as necessary to meet the forest management prescription. Additionally, PHP does not apply herbicides in its forest management area, which allows for the continued natural growth of deciduous trees and shrubs in forest stands.

Black-foam Lichen (Reference material - COSEWIC Assessment and Status Report, 2015)

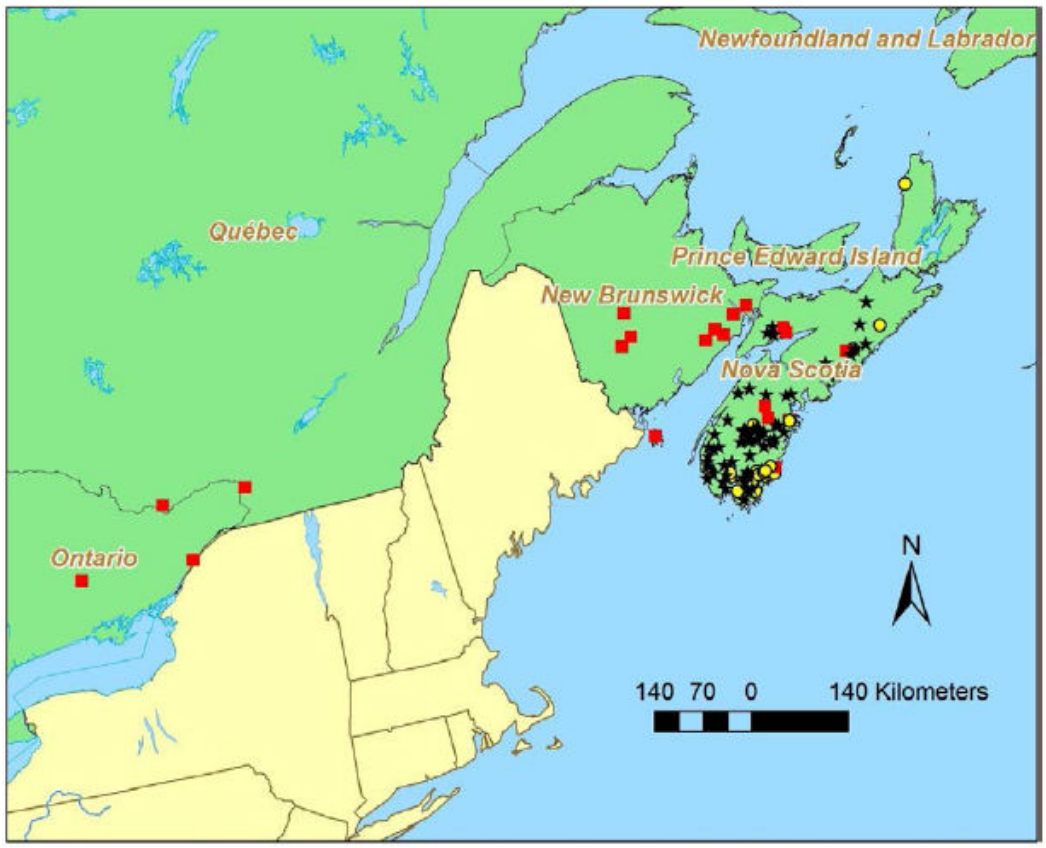
Status: National – threatened

Source: COSEWIC, 2015

The COSEWIC Assessment and Status Report (2015) describes the black-foam lichen as "a leafy lichen that grows as greenish grey rosettes up to 20 cm across on the trunks of deciduous trees. The 1-2 mm wide solid lobes rest on a thick spongy black tissue made of fungal filaments. The reddish brown fruit bodies on the upper surface contain sacks that are unusual in containing a large number of tiny spores that provide its only means of reproduction." (p. iv)

The Black-foam lichen is found throughout North America, however there is only one known location in Russia. The lichen has been found in Ontario and Quebec, but no longer seem to occur in these provinces. The last known recorded location of the black-foam lichen in New Brunswick was approximately 10 years ago, while it appears widespread but not common in Nova Scotia (COSEWIC, 2015). It is thought to occur most commonly throughout southwestern Nova Scotia (Tom Neily, pers. comm).

Distribution Range:



Current Distribution of Black-foam lichen in Canada (yellow dots represent occurrences found post 1995; black stars represent occurrences found before 1995 and not revisited; revisited occurrences where the lichen was absent are red squares)

Habitat Characteristics:

Black-foam lichen requires mature deciduous tree habitats with high humidity and high light levels. Proximity to wetlands, brooks, lakes, and other water sources provide the needed humidity. The lichen is often found in moderately open deciduous forest stands with little undergrowth and tends to grow high on tree trunks. The most common tree species suitable for lichen growth is red maple, red oak, white ash, sugar maple, and shadbush. It has also been found on balsam fir, yellow birch, beech, and hemlock. (COSEWIC, 2015)

Spatial Data:

Based on fieldwork completed in 2013 and 2014, there is one known location of black-foam lichen in the seven eastern counties where PHP operates. This location of two colonies on sugar maple host trees is in the Cape Breton Highlands National Park. This location was also confirmed by Tom Neily (Lichenologist) and he verified that most locations of black-foam lichen are found in southwest Nova Scotia.

Province and County	Occurrence	Date found	Re-survey date	Re-survey presence	Est. # of colonies	Host Tree	Grazing Damage	Ownership/ Protection	Threats
				Nova Scotia					
Colchester	Economy River, Economy Falls	1992	2013	N	-	Sugar Maple	N/A	Wilderness Area	G,C
Colchester	Simpson Lake Economy Falls	1977	2013	N	-	Sugar Maple	N/A	Wilderness Area	G,C
Halifax	West of Scraggy Lake	2008	2013	Y	35	Sugar Maple	N/A	Crown Land	F,G,H,C
Halifax	Ship Harbour, Reid Hill	2008	2013	N	-	Sugar Maple	N/A	Wilderness Area	G,C
Inverness	Corney Brook, Cape Breton Highlands N.P.	2008	2013	Y	2	Sugar Maple	N/A	National Park	G,C
Lunenburg	Hirtle Lake, Upper Branch Road	1982	2014	N	-	Red Maple	N/A	Private Land	F,G,H,C
Lunenburg	Rhodes Lake	2009	2013	N	-	Red Maple	N/A	Private Land	F,G,H,C
Lunenburg	Franey's Corner	2008	2013	Y	15	Red Oak, Red Maple	Y	Private Land	F,G,H,C
Lunenburg	Colpton, Ash Brook	2008	2013	N	-	Red Maple	N/A	Private Land	F,G,H,C
Queens	Thomas Raddall Provincial Park	1992	2013	N	-	Red Maple	N/A	Provincial Park	G,C
Queens	Main Parkway swamp Kejimkujik	2006	2013	Y	12	Red Maple	N	National Park	G,C
Queens	Granite Village	2011	2013	Y	5	Red Maple	Y	Private Land	F,G,H,C

HCV Decision:

Black-foam lichen is considered an HCV.

Management Approach:

Although there are no special management practices developed by government or other responsible agencies, PHP will implement the same management practice applied to boreal felt lichen and blue felt lichen. Known and confirmed locations of black-foam lichen will have a 100 meter no harvest buffer around the site. Since there is no predictive habitat yet for this species, PHP relies on the NS Department of Natural Resources to notify them of any new locations on PHP's Crown license. PHP is a participating member of the provincial Lichen Recovery Team, so information can also become available through that partnership. PHP also acquires data annually from the Atlantic Canada Conservation Data Centre, which is checked for any new locations of all species at risk. Data may also become available through the Mersey Tobeatic Research Institute, which conducts surveys of boreal felt lichen for PHP and have also identified for the company locations of black-foam lichen or blue-felt lichen. PHP also reaches out

periodically with these organizations to verify whether new locations of black-foam lichen or others have been found.

<u>Little Brown Myotis, Tri-colored Bat, and Northern Myotis</u> (Reference material - COSEWIC Assessment and Status Report on the Little Brown Myotis, Northern Myotis, and Tri-colored Bat in Canada, 2013; Proposed Recovery Strategy for the Little Brown Myotis, Northern Myotis, and Tri-colored Bat in Canada, 2016)

Status: National – endangered; Provincial – endangered

Figure 1. Images of the three bat species; clockwise, from top left; *Myotis lucifugus* (dead bat with visual signs of WNS on muzzle ears and wings; Berryton Cave, NB); *M. septentrionalis* (with visual signs of WNS on forearm; Lake Charlotte, NS); *Perimyotis subflavus* (Hayes Cave, NS). Note the elongated ears and pointed tragus typical of *M. septentrionalis*. (Photo credits: *M. lucifugus*: K. Vanderwolf; *M. septentrionalis* and *P. subflavus*: H. Broders.)

Source: COSEWIC Status and Assessment Report, 2013

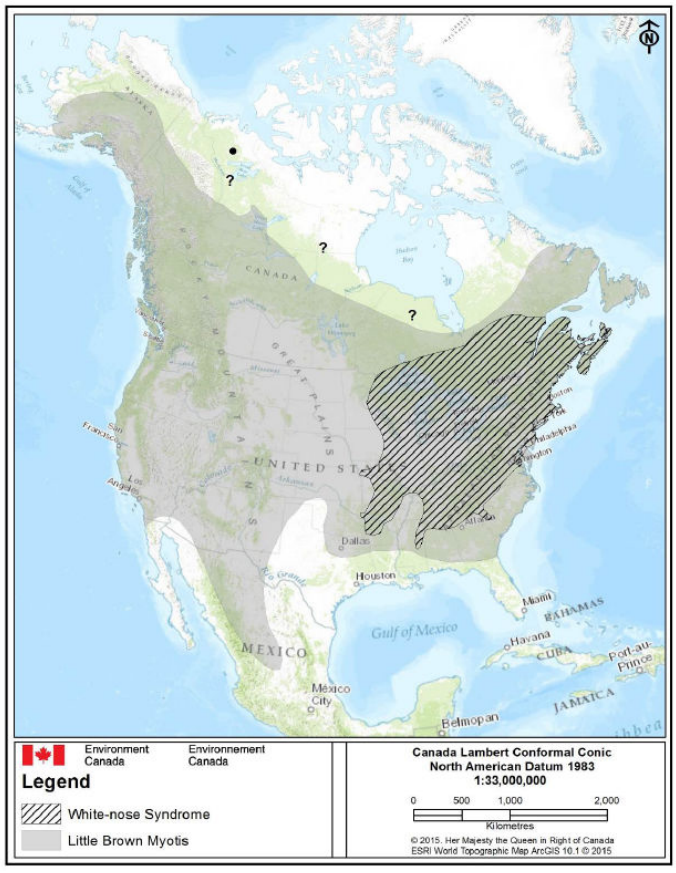
The proposed COSEWIC Recovery Strategy (2016) describes all three bats as "small (average 7.4 g), brown-pelaged, insectivorous species. The Little Brown Myotis is the most common bat species in Canada and often roost in buildings, barns and attics and feed over lakes and other

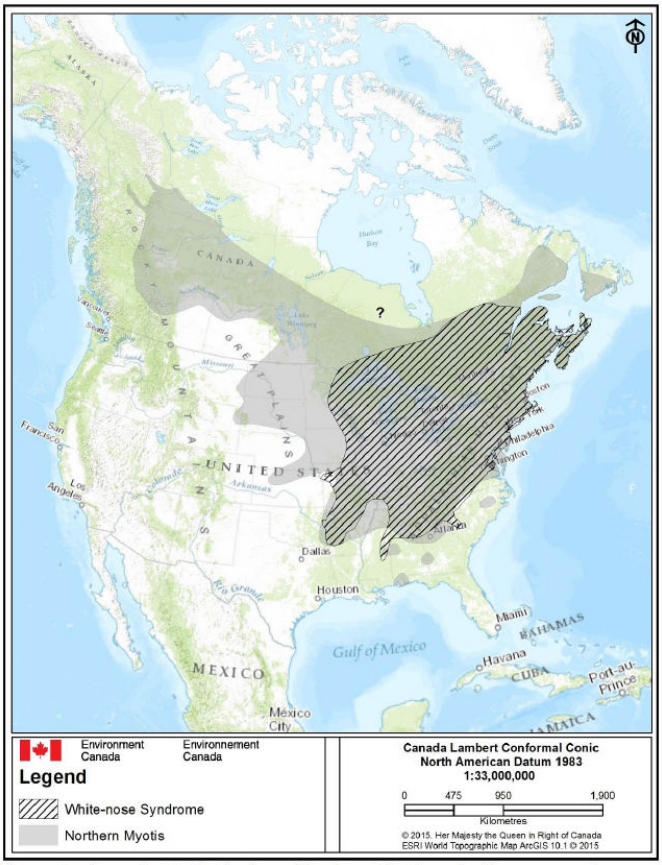
highly visible areas (Hugh Broders, pers. comm). The Northern Myotis is most common in a forested habitat, while the Tri-colored Bat uses a variety of habitat types and is rarer than the Little Brown and Northern bats.

The single biggest threat to the three bat species is white-nose syndrome (WNS). WNS is a fungal disease and was first detected in Canada in 2010. It's estimated that WNS has caused a decline of 94% in bat populations throughout Nova Scotia, New Brunswick, Ontario, and Quebec. WNS continues to expand throughout the area, which is expected to affect the entire bat population into the next decade (COSEWIC, 2013). The rapid decline of populations due to WNS led to an emergency listing of the three bat species as endangered under the federal and provincial Species at Risk Acts.

Distribution Range:

The population range of the three bat species vary from each other as evident in the below maps. The distribution of WNS is approximately the same however. The range of all three species shows that they occupy areas in eastern Nova Scotia. However, approximately 98% of the tri-colored bat population is predominantly found in central and western Nova Scotia (west of Truro) (Hugh Broders, pers. comm).

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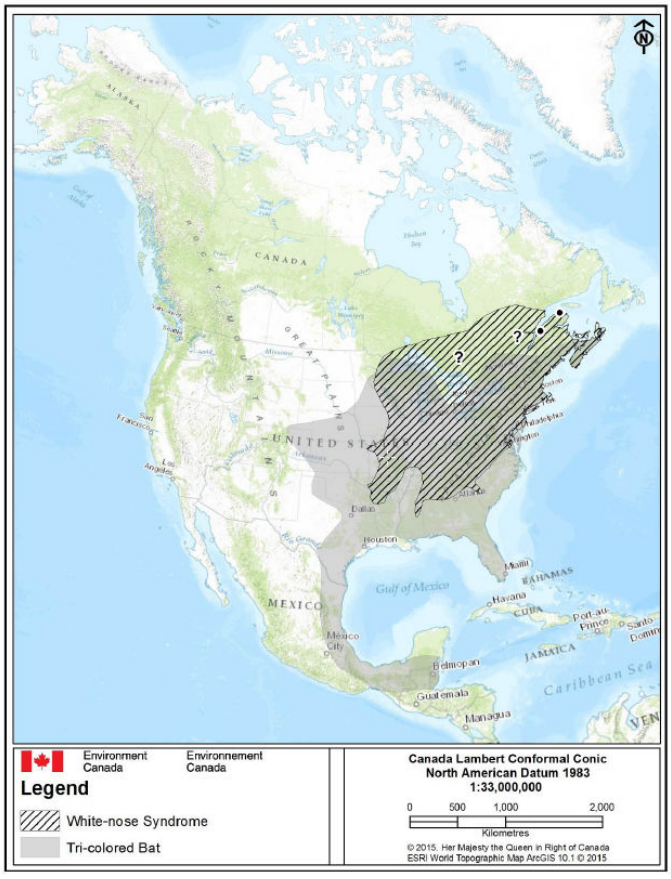
ESRI World Topographic Map ArcGIS 10.1 © 2015


Environment Canada
Environnement Canada
Legend
White-nose Syndrome
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North American Datum 1983
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Kilometres
© 2015. Her Majesty the Queen in Right of Canada
ESRI World Topographic Map ArcGIS 10.1 © 2015

Habitat Characteristics:

All bats have three main types of habitat requirements: overwintering for hibernating, summering for roosting and foraging, and swarming for mating and socializing. All three bat species overwinters in underground openings, including caves, abandoned mines, wells, and tunnels, and typically are used year after year (COSEWIC, 2016). The Little Brown Myotis may also overwinter in buildings, barns, and attics (Hugh Broders, pers. comm) and are known to use bat boxes. Urban and suburban areas with trees and/or forested habitat, bat boxes, bridges, cliffs, and barns are known to be used in the summer for roosting by the Little Brown Myotis. They tend to prefer older forest stands where there is a higher abundance of snags for roosting and foraging habitat in the closed understory.

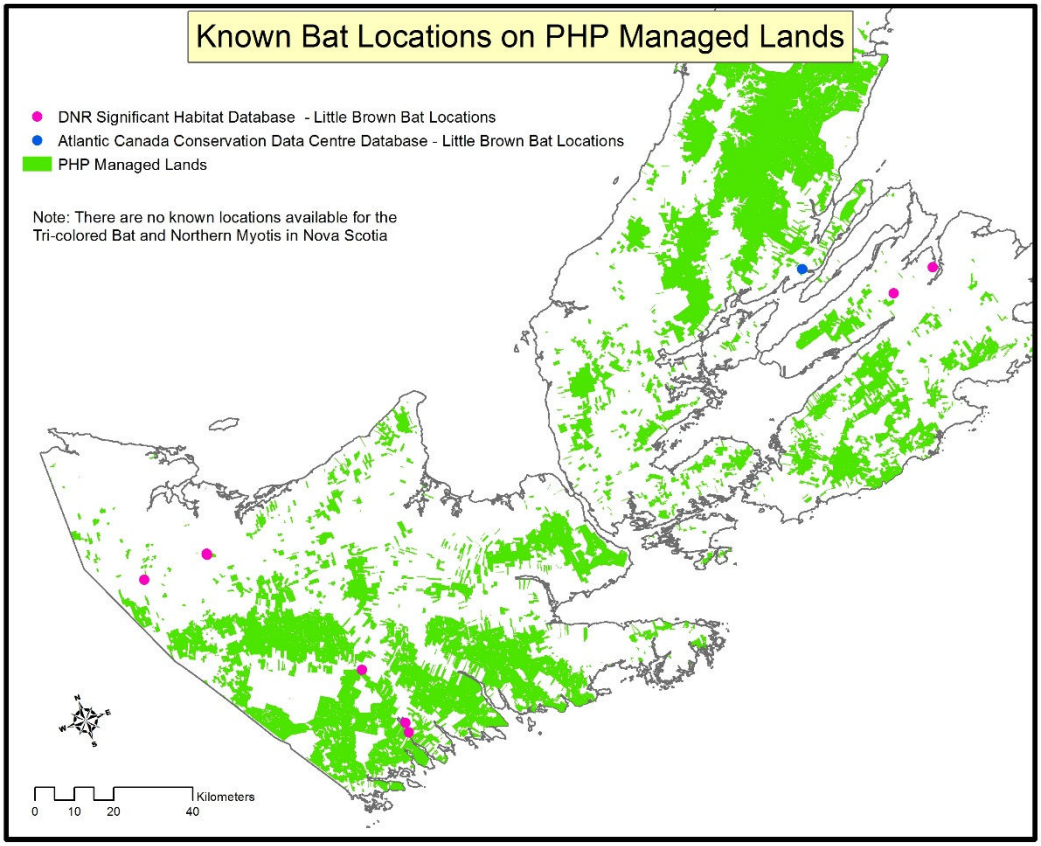
The Northern Myotis rarely uses man-made structures for roosting and are more reliant on tree species than the other two bat species. Height, diameter, age, and decay class are all important variables in preferred trees species for the Northern Myotis (COSEWIC, 2013). Large diameter snag trees found in open areas of mature to overmature forests are important for the Northern Myotis. A coniferous or conifer-dominated mixedwood stand seems to be the preferred forest type for all three bat species. Feeding by the Northern Myotis often occurs in the low-lying areas within a forest (Hugh Broders, pers. comm).

The Tri-colored Bat roosting habits are less understood than the other two bat species. Most sites are found in forested areas where they seem to roost in dead foliage and lichens. Of the three bat species in Nova Scotia, the Tri-colored Bat seems to be the least common in PHP's forest management area, where 98% of known sightings have occurred west of Truro (Hugh Broders, pers. comm).

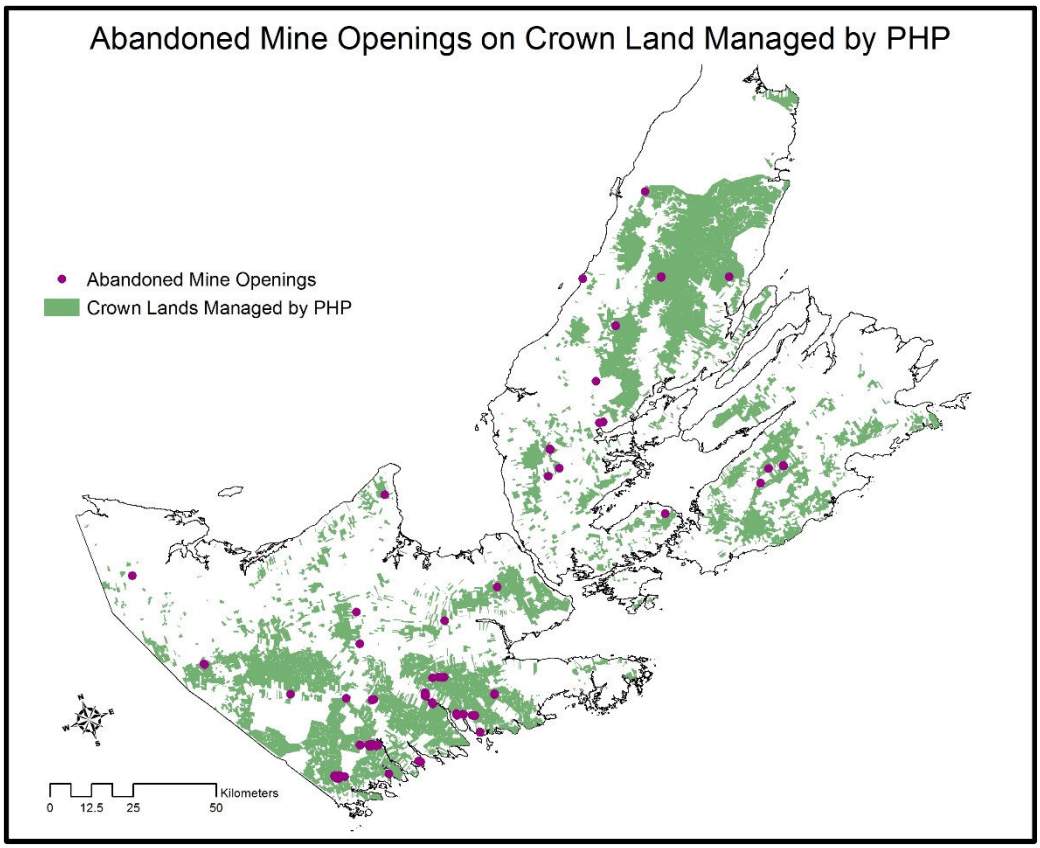
Swarming habitat for all three species is most often used in late summer and early fall. These areas are used mainly for socialization such as mating, migration stops, and assessment of possible overwintering sites near openings of hibernacula. (COSEWIC, 2016).

Spatial Data:

In Nova Scotia, there is little known about the locations of all bat species and their hibernacula sites. Since there is much sensitivity around sharing the known locations of bats due to their rapidly declining numbers caused by WNS, spatial data is currently not provided to outside organizations. Also, there are no research activities currently being conducted in Nova Scotia due to limited funding. However, a useful source of information is abandoned mine openings, which can be used by bats for overwintering (Hugh Broders, pers. comm). There are a few known mines used as hibernacula sites, which include Plaster Cave in Cape Breton.



Note: The Little Brown Bat locations available in the DNR Significant Habitat database were collected in the mid 1980's and mid 1990's. The data location from the Atlantic Canada Conservation Data Centre is from an unknown time period. There are no known locations publicly available for the Northern Myotis and the Tri-colored Bat.



HCV Decision:

All three bat species are considered HCV's.

Management Approach:

Currently in Nova Scotia, there are no best forest management practices required for bats (Hugh Broders, pers. comm). With the recent (2016) release of the proposed federal Recovery Strategy for all three bat species, a comprehensive list of actions has been identified to work towards bat population recovery on an international and national scale. One action item includes the development of beneficial management practices by Environment Canada for the forestry, wind energy, mining and nuisance wildlife control industries. PHP will stay abreast of the development of these practices, so they may be incorporated into everyday management.

It is assumed there are abandoned or unused buildings on PHP's Crown lease from old camp sites that could be used by bats. However, PHP does not have a comprehensive list of their locations since they are granted by the provincial government. Regardless, if an abandoned building is discovered during a forest operation, it is left alone.

Regarding wolf trees which are important for roosting, the NS Forest Wildlife Guidelines of 1988, which is now a Crown land policy, recommends that snags, wolf trees, and cavity trees be left on harvest sites as much as possible. Most often, wolf trees are so large and difficult to harvest because of many branches, and have low economic value, that PHP leaves on site. PHP also audits all Crown contractors quarterly and one item checked for is unmerchantable trees retained on site, which would be snags, wolf trees, and cavity trees. Since 2009, unmerchantable trees were retained on site 100% on all audits except for 97% in 2010.

Until beneficial management practices do become available, PHP is currently managing the forest in a variety of ways that benefit bat habitat needs. A 2006 report called "Forest Management & Bats" by Bat Conservation International lists a variety of forest management activities that can support bat habitat needs. Below is a table summarizing these activities and how PHP's management supports bat conservation.

PHP Management	Treatment Type	Practices Currently Implemented Beneficial to Bats
Even-aged Management Complete or almost complete removal of all trees in a forest stand, which are replaced by a new stand of young trees.	Clearcut Shelterwood Seedtree	- Edge habitat for foraging - Herbaceous growth following harvest can provide food sources for insects - Snag trees left standing can provide roosting sites - Wildlife clumps of standing trees provide some structure - Mature structure left on site following shelterwood and seedtree provide foraging and roosting habitat
Uneven-aged Management Individual and/or small patches of trees are harvested which create small canopy openings. A variety of trees sizes and ages remain abundant in stand.	Group Selection Single-tree Selection	- Abundance of mature trees left on site provides roosting habitat - Small gap openings provide foraging habitat - Edge habitat for foraging - Snag trees left standing can provide mature roosting sites
Thinning Removal of weak or supressed trees to promote healthy growth in remaining stand.	Pre-commercial Thinning Commercial Thinning	- Increased light to the forest floor can increase herbaceous growth for bats' insect prey.

Wildlife Corridors, Leave Strips, Connectivity Management Zones Varying widths of unmanaged stands between managed areas	All areas as required	- Edge habitat for foraging - Travel corridors - Roosting sites
Riparian Habitat Management Buffers of forest stands along all watercourses (bed and shore of a river, stream, lake, creek, pond, marsh, estuary or salt-water body that contains water for at least part of each year)	All watercourses greater than 50 cm wide	- A minimum 20 meters riparian buffer is maintained along all watercourses greater than 50 cm. - As % slope increases from the watercourse edge, the riparian buffer must be increased to a maximum of 60 meters - Although permitted, PHP generally does not harvest inside riparian buffers - Riparian habitat provides important high quality foraging habitat for bats

<u>Evening Grosbeak</u> (Reference material - COSEWIC Assessment and Status Report, 2016)

Status: National – Special Concern

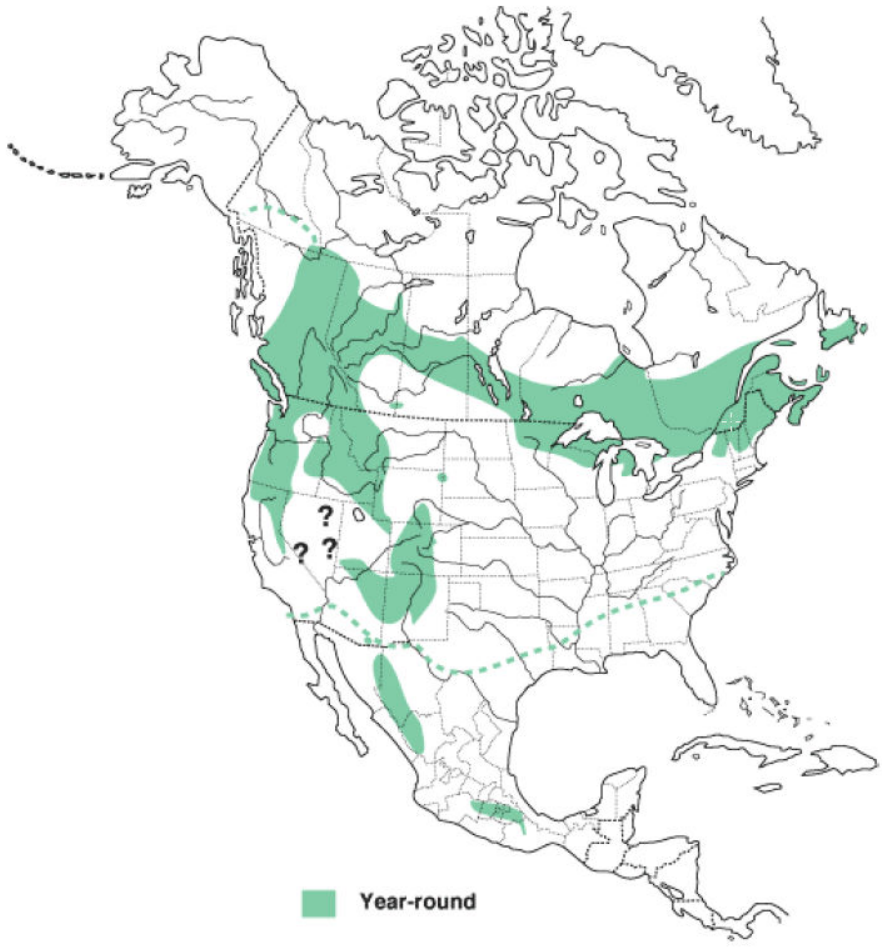
Source: COSEWIC, 2016

The COSEWIC Assessment and Status Report (2016) describes the Evening Grosbeak as "a stocky, boldly coloured songbird, with a massive greenish-yellow bill. Adult males have a dark brown head with a brilliant yellow supercilium; the brown of the head transitions to yellow

upperparts and belly, contrasting with a black tail and black wings, with a distinct patch of all-white secondaries. Adult females and juveniles are generally greyish-brown with some yellow on the nape and flanks and black and white wings and tail. In summer, this species can be a major predator of the Spruce Budworm and helps in the natural control of this insect pest. In winter it is a familiar visitor to bird feeders." (p. iv)

The Evening Grosbeak breeds in Canada, the United States, and Mexico. It can be found in all Canadian provinces and territories except Nunavut. During the winter months, it can be found across broad geographic ranges if the seed source for feeding from boreal forests is abundant (COSEWIC 2016, p. iv).

Distribution Range:



North American range of Evening Grosbeak. COSEWIC 2016, p. 9

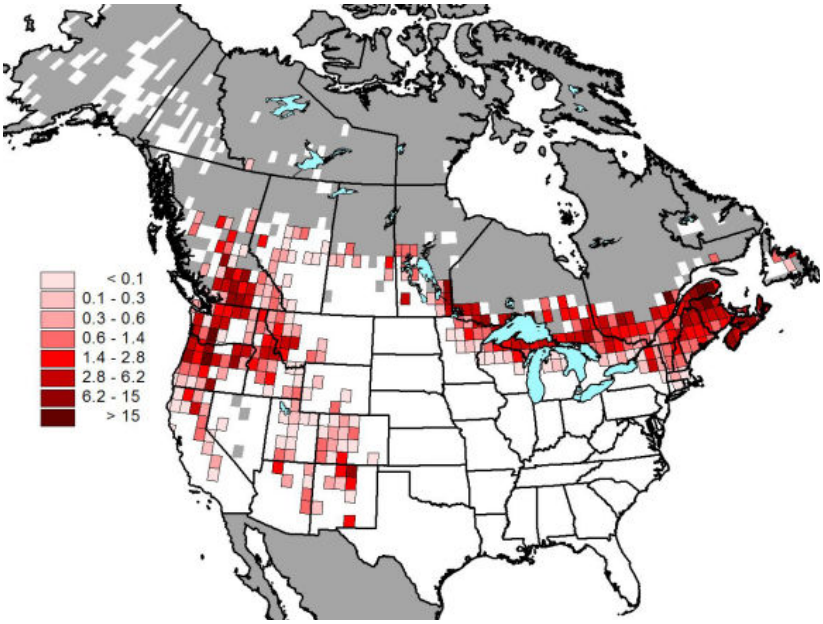
Habitat Characteristics:

Evening Grosbeak is typically found along the boreal shield, boreal plain and mountain cordillera ecozones. These forests provide the needed habitat characteristics for Evening Grosbeak year-round since they are mostly dominated by fir, spruce, larch and aspen.

This bird prefers large mature and old mixedwood forest stands with fir, white spruce, or trembling aspen. A Boreal Avian Modeling Project from 2014 showed that Nova Scotia is an area of high-quality habitat based on abundance data, however, the correlation to budworm outbreaks is not clearly understood. During the winter months, areas with berries and seeds seems to be preferred and they will use bird feeders in urban and suburban areas.

Spatial Data:

Data from the Breeding Bird Survey shows that Evening Grosbeak is most abundant in British Columbia and the Maritime provinces. The below map shows relative abundance data from 1987 to 2006. In Nova Scotia, the relative abundance of birds per route is approximately 4.42 birds. This is the highest density in Canada. During budworm outbreaks, this number is expected to increase significantly since Evening Grosbeak flourish during a budworm outbreak.



Source: COSEWIC 2016, p. 24

Estimated population and relative abundance of Evening Grosbeak in the Canadian provinces according to BBS data (Partners in Flight Science Committee 2013).

Province / State / Territory	Population size (adult birds)	% of global population	Relative abundance from BBS (birds/route)	Standard deviation of relative abundance	Number of BBS routes	Number of routes detecting Evening Grosbeak
YK	0	0	n/a	n/a	n/a	n/a
NWT/NU	0	0	n/a	n/a	n/a	n/a
BC	600,000	14.5	0.69	0.19	111	49
AB	60,000	1.4	0.10	0.04	137	15
SK	40,000	1	0.07	0.05	55	7
MB	200,000	5	0.37	0.18	66	16
ON	500,000	12.8	0.59	0.13	221	55
QC	500,000	13.4	0.47	0.08	99	70
NB	110,000	2.6	1.62	0.32	31	24
NS	200,000	5.4	4.42	0.70	29	29
PEI	1,300	0	0.25	0.20	4	2
NL	30,000	0.8	0.09	0.06	23	8
Total	**2,211,300**	**56.9**				

HCV Decision:

Evening Grosbeak is not considered an HCV at this time. This will be re-visited should the species be listed at a higher COSEWIC ranking than currently.

Management Approach:

Currently, there is no recovery strategy or action plan for this species. No special management practices have been developed by government or other responsible agencies. The COSEWIC Status Report identifies logging and wood harvesting as a low threat since the scope of this threat is considered small for the next 10 years. Also, the population density is considered highest in Nova Scotia and being listed as special concern indicates that no special management practices or a precautionary approach are currently needed.

<u>Wrinkled Shingle Lichen</u> (Reference material - COSEWIC Assessment and Status Report, 2017)

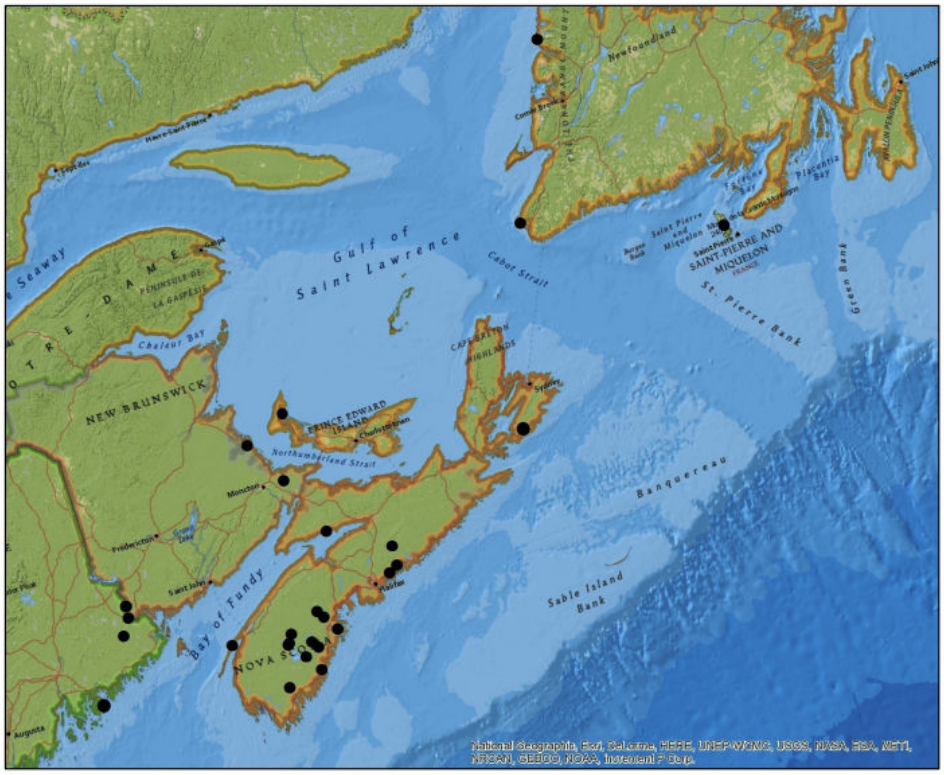
Status: National – Threatened

Source: COSEWIC, 2017

The COSEWIC Assessment and Status Report (2017) describes the Wrinkled Shingle Lichen as a "leafy lichen forming patches or rosettes that can be up to 10 cm across. It almost always grows on the trunks of deciduous trees. The upper surface is brownish grey and wrinkled. The photosynthetic partner is a cyanobacterium." (p. iv)

The lichen is known to occur in 56 locations. In the Maritime provinces, 49 are located in Nova Scotia with four in New Brunswick, two in Newfoundland and one in Prince Edward Island (COSEWIC 2017, p. iv).

Distribution Range:



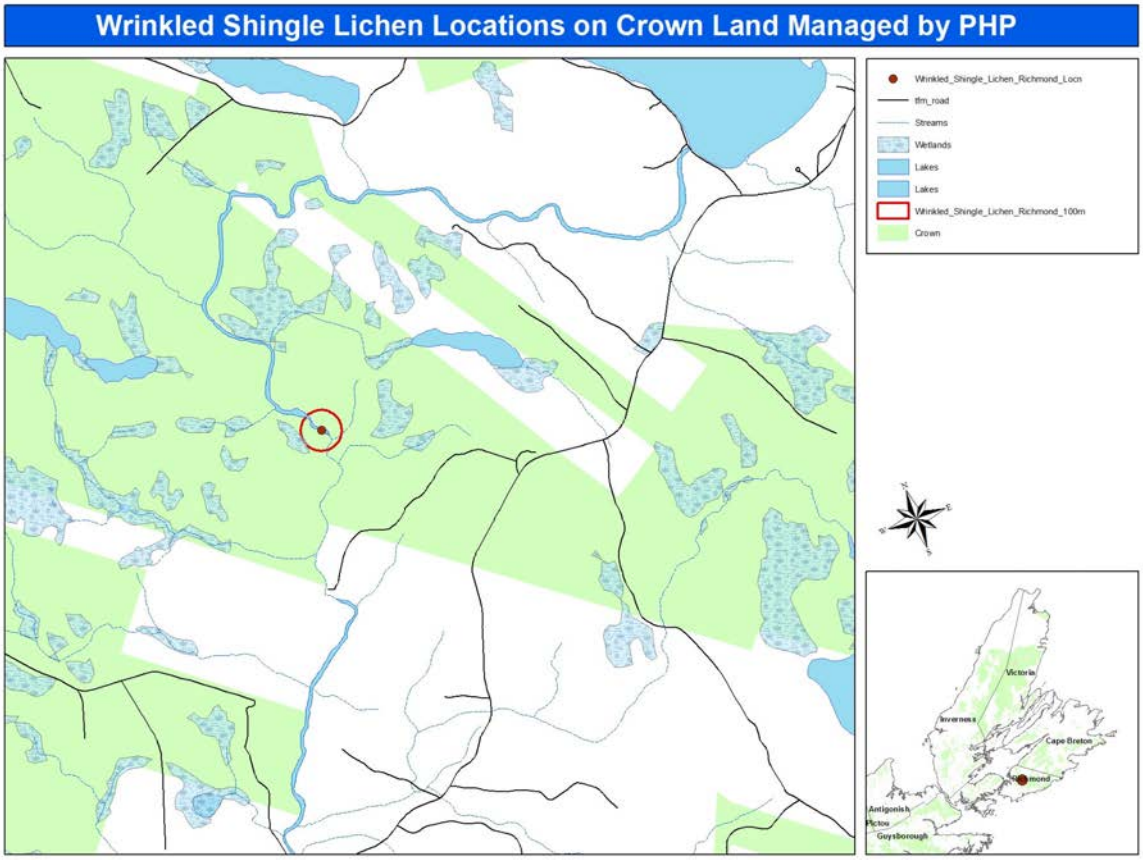
All known locations of Wrinkled Shingle Lichen in the Maritime provinces, COSEWIC 2017.

Habitat Characteristics:

In Nova Scotia, the Wrinkled Shingle Lichen is often found along the edges of treed swamps or riparian floodplains, and usually at the base of moderate to steep slopes. They are often found on deciduous trees in imperfectly drained, humid habitats.

Spatial Data:

As mentioned above, there are 49 known locations of Wrinkled Shingle Lichen in Nova Scotia. One of these locations occurs in PHP's Crown management area (below map). There are no other known locations of this lichen in PHP's forest management area.



HCV Decision:

Wrinkled Shingle Lichen is considered an HCV.

Management Approach:

Currently, there is no recovery strategy or action plan for this species. Additionally, no special management practices have been developed by government or other responsible agencies. Therefore, PHP has committed to applying a 100-meter no harvest buffer, similar to the boreal felt lichen special management practice, around this site should the area be approved for forest management.

Question 2.
Does the forest contain a globally, nationally or regionally significant concentration of endemic species?

Very few endemic species occur in Nova Scotia. The region is not a centre of endemism and does not contain globally, nationally, or regionally significant concentrations of endemic species, so this question is not especially relevant to the current HCV assessment. Spatial delineations and proposed management approaches of individual endemic species within PHP's area of operation, such as the prototype quillwort, are discussed individually in Question #1.

Question 3. Does the forest include critical habitat containing globally, nationally or regionally significant seasonal concentration of species (one or several species, e.g. concentrations of wildlife in breeding sites, wintering sites, migration sites, migration routes or corridors – latitudinal as well as altitudinal, watershed level forests or riparian forests associated with high value fisheries habitat?

Nova Scotia is located along the Atlantic Flyway and is an important stopover location for numerous species and populations of migratory birds. As a result, globally-, nationally-, and regionally-significant concentrations of birds occur at various sites across the province, particularly coastal and estuarine sites. Many of these places have been mapped by IBA Canada. These include:

- Basque Islands and Michaud Point (NS045)
  - Canada Goose
  - Colonial Waterbirds/Seabirds
  - Common Eider
  - Great Cormorant
  - Waterfowl
- Big Glace Bay Lake (NS007)
  - Canada Goose
- Cape North (NS030)
  - Bicknell's Thrush
  - Boreal Owl
- Central Cape Breton Highlands (NS061)
  - Bicknell's Thrush
- Eastern Shore Islands (NS027)
  - Common Eider
  - Harlequin Duck
  - Waterfowl
- Portnova Islands (NS006)
  - Great Cormorant
- Rocks off Fourchu Head (NS047)
  - Great Cormorant
- Scatarie Island (NS052)

    - Bicknell's Thrush
- The Capes (NS057)
    - Black-legged Kittiwake
    - Great Cormorant

Most of these IBA sites are rocky coastal islands or headlands. The only sites containing potentially operable forest include Cape North, Central Cape Breton Highlands, and Scatarie Island. The Scaterie Island IBA site is located within the boundaries of a legally-designated protected wilderness area. No harvesting is permitted to occur within this site. Coastal IBA sites are not impacted by PHP's forest management activities, therefore, no special management practices are required.

IBA sites Cape North and Central Cape Breton Highlands have been addressed in Category 1, Question 1 for Bicknell's thrush. Additionally, the Cape North IBA site contains significant concentrations of Boreal owl. For this area, no harvesting currently occurs and is not expected to occur in the future. Should harvest plans be developed, this will be re-visited.

Aquatic Ecosystems

Spawning Atlantic Salmon

The Atlantic salmon (*Salmo salar*) is an anadromous fish species, spending most of its life cycle in the oceans but spawning in freshwater streams. The species is distributed throughout the North Atlantic from the Eastern Seaboard of the United States north to Ungava Bay, and across the Atlantic Ocean past Greenland and Iceland to Western Europe and Scandinavia (ASF 2007). Some Atlantic salmon populations are landlocked, spending their entire life-cycle in freshwater environments.

Over the past several decades, the population of Atlantic salmon has suffered steep declines, dropping to less than 100,000 individuals overall in the mid- to late-1990's (ASF 2007). Several populations are considered endangered, such as the Inner Bay of Fundy population (COSEWIC 2007), and numerous salmon runs in the southern portion of the species' range have gone extinct in recent years. In Nova Scotia, there are several important rivers that support Atlantic salmon populations (e.g. Margaree River, St. Mary's River, Middle River, East River, West River (Pictou and Antigonish counties).

The brook trout (*Salvelinus fontinalis*) is also an important fish species in Nova Scotia. It is more widely distributed across the province than Atlantic salmon and is an important indicator of water quality and ecosystem integrity. During the past several decades, both the Atlantic salmon and brook trout populations have suffered sharp declines, due to a combination of pressures from

over-fishing, habitat degradation, acid precipitation, pollution, and competition from invasive species, among other factors.

HCV Decision:

Seventeen watersheds were identified within PHP's area of operation where the company maintains cutting rights to a high proportion of the total area of the watershed, including both the St. Mary's River and Margaree River watersheds (these watersheds are HCVs under Question 12), and six watersheds containing municipal watershed areas (*e.g. water supply areas*). These areas contain important aquatic resources. All public lands managed by PHP within these seventeen watersheds are considered to be HCVs. These watersheds are:

- Antigonish Municipal Watersheds
- Guysborough Municipal Watershed - 1
- Inverness Municipal Watersheds
- Pictou Municipal Watersheds
- Victoria Municipal Watersheds
- Guysbourough Municipal Watershed - 2
- Baddeck River
- East River
- Grand River
- Liscomb River
- Margaree River
- Middle River
- Mira River
- New Harbour River
- North River
- River Inhabitants
- St Marys River

Cold-water refugia streams for Atlantic salmon and brook trout were identified through research carried out by the Nova Scotia Department of Aquaculture and Fisheries. For the HCV designations, cold-water streams have been buffered by 100 meters for management purposes.

Management approach:

- To maintain normal long-term hydrologic functions within the seventeen identified watershed areas, PHP will ensure that at least 80% of the productive forest within these special management watersheds will be maintained in a closed forest condition (> 12 years of age) at any given moment in time.

- Streams identified as HCVs for salmon and trout cold-water refugia will be managed to maintain as much thermal cover as possible. This will be done by ensuring all harvest treatments within 100 meters of cold-water refugia streams will maintain a minimum 50% crown closure. The only exception will be for forest stands containing a high proportion of

non-wind firm trees, such as balsam fir or white spruce that are vulnerable to wind blowdown. In these cases, the management objective, where naturally feasible, will be to restore the forest to species that are longer-lived and more resistant to wind disturbances. Furthermore, no management activities will occur within 20 meters of the cold-water refugia streams. No intensive forestry will occur within the cold-water refugia HCV's.

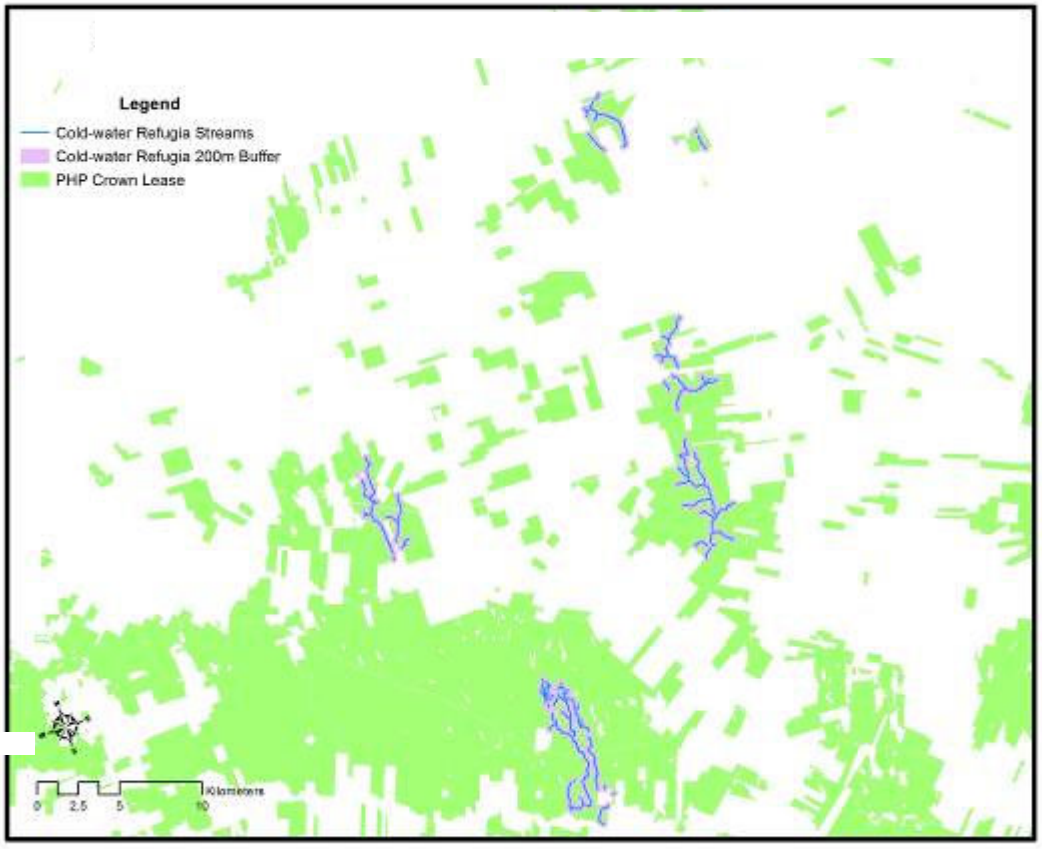


Figure 7-22. Cold-water Refugia Streams with 100 m Management Buffer - Mainland HCV's (NS Department of Aquaculture and Fisheries)

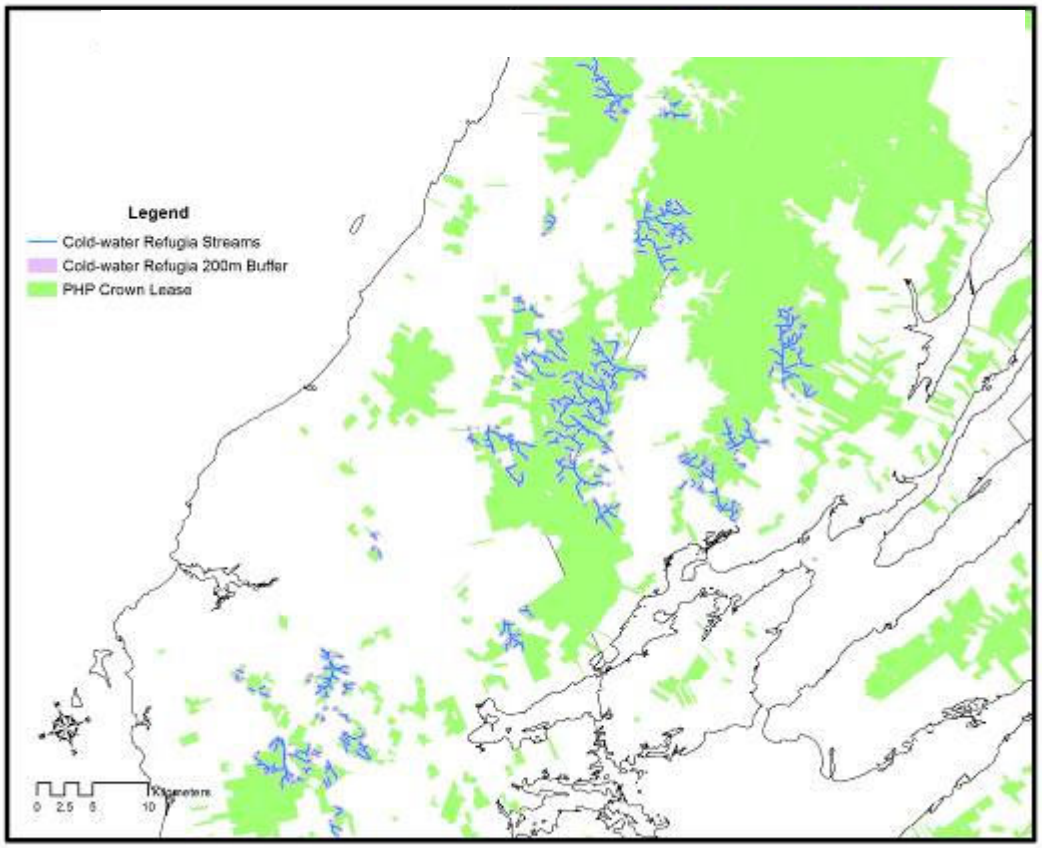


Figure 7-23. Cold-water Refugia Streams with 100 m Management Buffer - Cape Breton HCV's (NS Department of Aquaculture and Fisheries)

Question 4. Does the forest contain critical habitat for regionally significant species (e.g., species representative of habitat types naturally occurring in the management unit, focal species, species declining regionally, including concentrations of aquatic species whose habitat is dependent on riparian forest or watershed condition?

Red spruce (*Picea rubens*)

Red Spruce

The red spruce tree is native to the forests of eastern North America and is a defining species in the Acadian forest. It is a long-lived, shade-tolerant coniferous species that tends to occupy moist, but well-drained soils. In Nova Scotia, the species often forms homogenous stands or is found in close association with white pine and hemlock. It sometimes forms hybrids with black spruce where ranges overlap.

Red spruce is a regionally-significant species in the Acadian forest that is currently under-represented in late-seral and old forest conditions. In Nova Scotia, the species is most common through the southwest and central portions of the province, and begins to transition to black spruce-dominated forests in the eastern mainland counties of Pictou, Antigonish, and Guysborough. Only a few isolated and widely-scattered stands of red spruce are known to occur on Cape Breton Island.

HCV Decision:

A total of 1,882 hectares is identified as red spruce stands in the provincial forest inventory on PHP lands. These stands are typically found in the western portion of PHP's operating area in eastern Mainland Nova Scotia. All natural red spruce stands are considered HCV's.

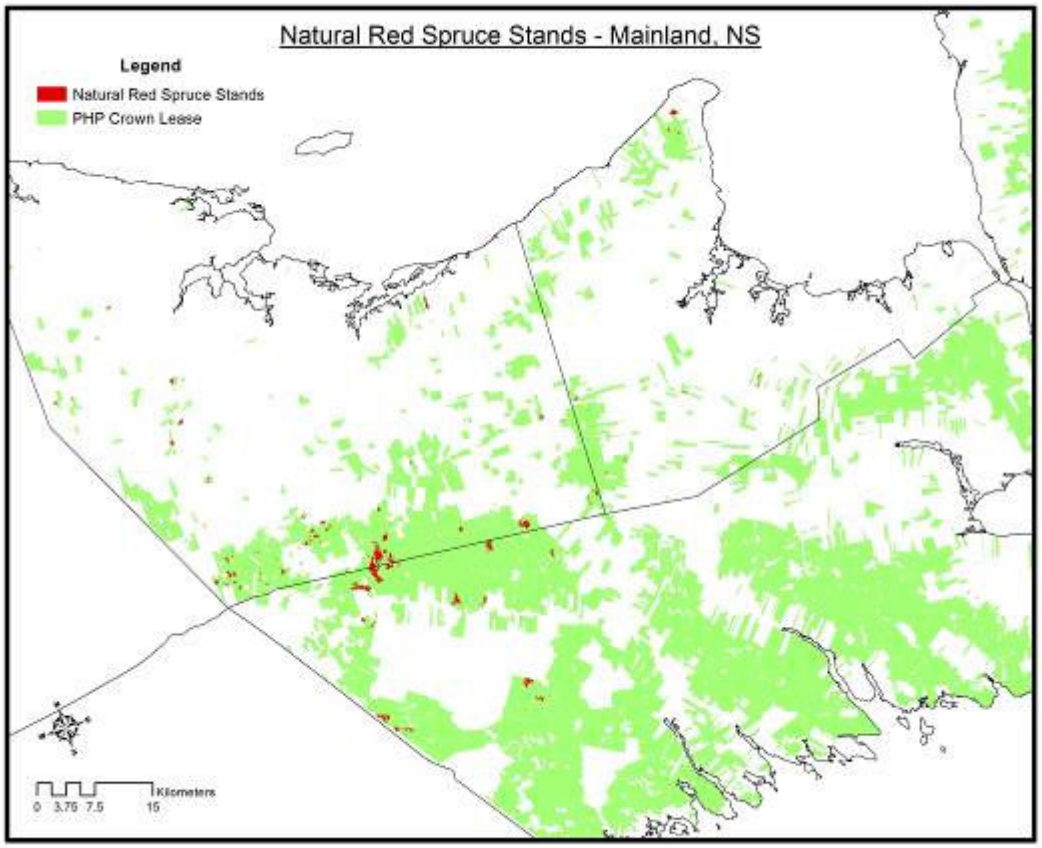


Figure 7-24. Red Spruce Stands – Mainland, Nova Scotia

Management approach:

- Several existing natural mature red spruce stands within PHP's area of operation occurring in an uneven-aged condition are currently off-limits to harvesting and are fully-protected as old forest sites designated by NSDNR. These areas will remain fully-protected by PHP. For additional information, refer to Category 3, Question #9).

- Red Spruce Management Work Instruction Summary: PHP is committed to maintaining red spruce stands within its area of operation and to improving the quality of these stands over time. This will involve re-establishing uneven-aged conditions. To accomplish this, PHP will implement the following management objectives:

  Red Spruce Dominated Stands

  - Strive for two to three cohort stand structures.
  - Over time, we will strive to increase the area of multiple ages in many stands.
  - Promote natural red spruce regeneration
  - At harvest (other than tending), trees should be large and of high value. Management (spacings, thinnings) should be carried out to help meet this objective.

- Retain overstory structure, including snags; future snags; other tolerant species; and residual red spruce component – both individuals when windfirm and in clumps (structure and seed).

Immature stands

The option for immature red spruce stands is to partially remove the overstory in 2-3+ stages separated by a period of 10 to 20 years. The trees retained should be windfirm and quality immature trees. This helps ensure increased value of residual stand and regeneration establishment, and subsequent regeneration release(s).

Maturing stands

As a preferred option, a modified shelterwood treatment providing increased retention will be implemented, with a plan for two ages initially, with the intent of a third as the newly regenerated stand grows into the existing overstory canopy. As possible, considering tree ages and wind firmness:

Step One: Initial shelterwood harvest is modified to include more patch retention, by doubling the present wildlife clump retention – move to 20 trees per hectare, with patches scattered throughout the treatment area (i.e. an irregular shelterwood)

Step Two (once regeneration is 60 cm tall at 5-10 yrs): Overstory harvest to release regeneration is needed (regeneration protection harvest techniques implemented). The retention includes both small patches of residuals, as well as individuals (as available, few isolated pines/hemlock/hardwoods, and snags with designated red spruce retention). Ten living trees per hectare are required. Shelterwood completed with adequate established regeneration.

Step Three (15-35 yrs): The young and immature stand is tended as it grows (space – thin).

Longer term: As trees grow into the upper canopy, some of the patches and individual trees will be harvested, excluding designated wildlife clumps and legacy trees.

At this time (in the future), three cohorts are introduced in to the stand with the intent of patterning an uneven-aged structure.

In some instances, trees in the forest stand planned for treatment are not wind-firm and excessive blowdown and significant wood losses would occur following implementing one of the treatments described above. If the stand is determined to be a high risk for blowdown, an alternative treatment may be implemented (eg. strip cuts), or it should be left to grow until maturity then harvested.

Other Regionally Significant Species

Other regionally significant species identified are listed below. These species are addressed in other sections of the HCV report as identified.

- White elm (Category 3, Question 9)
- Red oak (Category 3, Question 9)
- Hemlock (Category 3, Question 8 & 9)
- Black ash (Category 3, Question 9)
- Jack pine (Category 3, Question 9)
- Wood turtle (Category 1, Question 1)

Question 5. Does the forest support concentrations of species at the edge of their natural ranges or outlier populations?

Nova Scotia is located geographically where a number of species reach the edges of their natural ranges, including outlier populations. In fact, the Acadian forest is defined, in part, by its mixture of southern broadleaf species with northern needleleaf species. This is a characteristic feature of the forests in this region. Being located at the edge of the continent, Nova Scotia is also positioned at the natural eastern range limit for many species distributed in an east-west direction at this latitude in North America.

Other notable range-limit and outlier populations in Nova Scotia include arctic-alpine plants, boreal forest elements, and coastal plain flora populations.

Arctic-Alpine plants

A number of arctic-alpine plants occur in isolated spots around Nova Scotia, particularly exposed coastal areas with poor soils and rocky inland barrens. These plants are relicts of early post-glacial time, around 10,000 years BP, when Nova Scotia was predominately tundra. Small populations of these arctic-alpine plants survived in the harshest locations of the province, where they could not be competitively excluded by faster-growing plants as the climate warmed.

Boreal Forest Elements

Nova Scotia contains some of the most southerly boreal forest remnants on the planet, concentrated mostly on the plateau of the Cape Breton Highlands and exposed coastal areas along the Atlantic and Bay of Fundy coasts. Species compositions in these areas are similar to the boreal forest ecosystems elsewhere in eastern North America, dominated by *Abies balsamea*, *Picea mariana*, and *Larix laricina*, with *Betula papyrifera* and *Populus tremuloides*. These forests are prone to large-scale natural disturbance events associated with insect infestations and wildfires. Similarly with other areas of the circumpolar boreal forest zone, peatland ecosystems are abundant in these forests, particularly plateau-bogs and shoreline-fens. The boreal forest ecosystems in Nova Scotia are remnants of a once much more widespread post-glacial forest,

from a time period approximately 8,000 years ago when the climate of Nova Scotia was significantly cooler than present. Throughout most of Nova Scotia, the boreal forest was replaced by the modern mixed coniferous-deciduous Acadian forest by approximately 5,000 years BP.

Coastal Plain Flora

Nova Scotia contains a small isolated population of coastal plain flora that is disjunct from its principal range along the eastern seaboard of North America (Wisheu and Keddy 1994, and Wisheu et al. 1994). These southern plants, among the rarest in Canada, occur primarily along gently-sloping, coarse-grained lakeshores in areas most exposed to chronic wave-activity and seasonal ice scour (Keddy and Wisheu 1989). They constitute a guild of taxonomically unrelated freshwater wetland plant species defined principally by their similar ecological roles and common ancestry to the coastal plain physiographic region of eastern North America (Rawinski and Price 1994). The majority of the coastal plain flora populations in Nova Scotia occur in the southwestern portion of the province (Keddy 1985, Wisheu et al. 1994), with the exception of *Juncus caesariensis*, which is most prevalent in southeastern Cape Breton.

Figure 7-25. Distribution of coastal plain flora in eastern North America, showing disjunct range limit population in southern Nova Scotia.

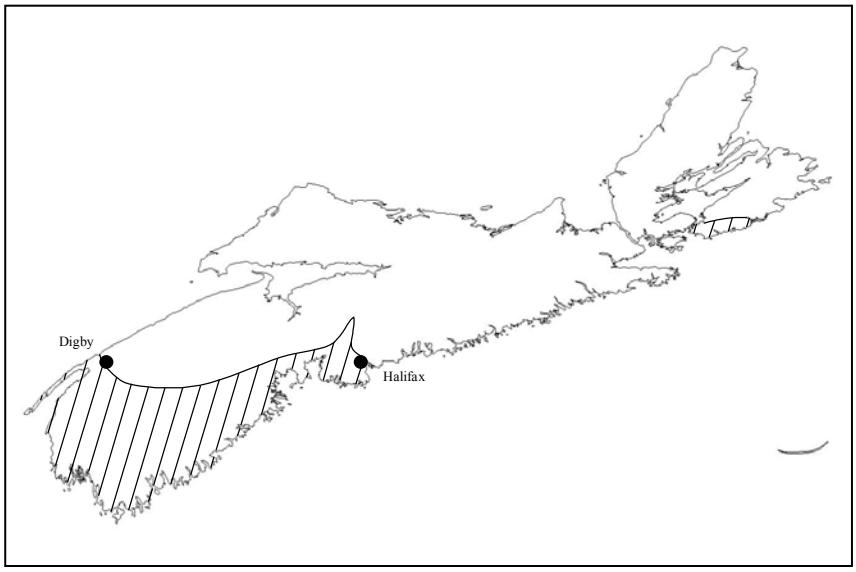


Figure 7-26. Coastal plain flora distribution in Nova Scotia (southwestern Nova Scotia and southeastern Cape Breton populations).

HCV Decision:

No HCVs are designated specifically for this criterion, dealing with range limits and outlier populations.

Range limits associated with the southern and northern species of the Acadian forest are dealt with throughout the various categories of the HCV assessment (*e.g. red spruce management, Category #1, Question #4; old-forest protection, Category #3, Question #9*). Boreal forest outliers are covered in the HCV category for the protection of large-landscape level forests, which are distributed disproportionately in the boreal forest zones of Nova Scotia (*e.g. Category #2*). Coastal plain flora outliers occurring within PHP's area of operation in southeastern Cape Breton are covered in the section dealing with species-at-risk (*e.g. Juncus caesariensis; Category #1, Question #1*).

Management approach:

- No HCV's are designated for this question, therefore, no special management approaches are required at this time (refer to other sections of report as noted above).

Question 6.
Does the forest lie within, adjacent to, or contain a conservation area: (a) designated by an international authority, (b) legally designated or proposed by relevant federal/provincial/territorial legislative body, or (c) identified in regional land use plans or conservation plans?

Rationale

Protected areas are critical for the protection of biodiversity. They provide a foundation upon which other conservation measures can be applied and are the few remaining places on the landscape where nature is allowed to function without undue human intervention or manipulation. It is important to recognize, however, that anthropogenic activities undertaken outside or immediately adjacent to protected areas can still have significant impacts on the ecosystems contained within the protected areas themselves. This makes it imperative for adjacent land-use practices to be considered as part of the protected areas management itself. PHP is committed to ensuring that harvesting and silviculture practices undertaken adjacent to protected areas will not negatively impact the ecosystems contained therein.

Methods

All existing protected areas in Nova Scotia were assembled into a single GIS layer, including both legally-protected sites (*federal and provincial*) and sites that are administratively-protected (*provincial and PHP*).

Legally-protected

- National Parks (*Federal*) T9
- Migratory Bird Sanctuaries (*Federal*) T10
- Wilderness Areas (*Provincial*) T4
- Nature Reserves (*Provincial*) T5a
- Provincial Parks (*Provincial*) T1
- Designated Provincial Park Reserves (*Provincial*) T1

Administratively-protected

- Sites of ecological significance (*Provincial*) T5b
- International Biological Programme sites (*Provincial*) T5b
- Old forest zones (*Provincial*)
- PHP Protected Areas

These protected areas provide the spatial delineations for establishing buffer zones around protected sites, and subsequently developing management approaches to lessen the intensity of forestry operations near protected areas. A number of new protected areas have also been

identified by the Nova Scotia Environment and are pending legal protection. These sites are considered part of this analysis as well.

Results

The below table and figure show federal and provincial protected areas located in PHP's forest management area.

Table 7-4 Protected Areas

Protected Area Category	# of Sites	Total Hectares
New Provincial Protected Area (pending legal status)	89	98,184
Provincial Parks and Reserves	21	1,492
Provincial Nature Reserves	7	1,868
Provincial Wilderness Areas	19	106,526
National Migratory Bird Sanctuaries	1	392
National Parks	1	94,870
TOTAL HECTARES		**303,332**

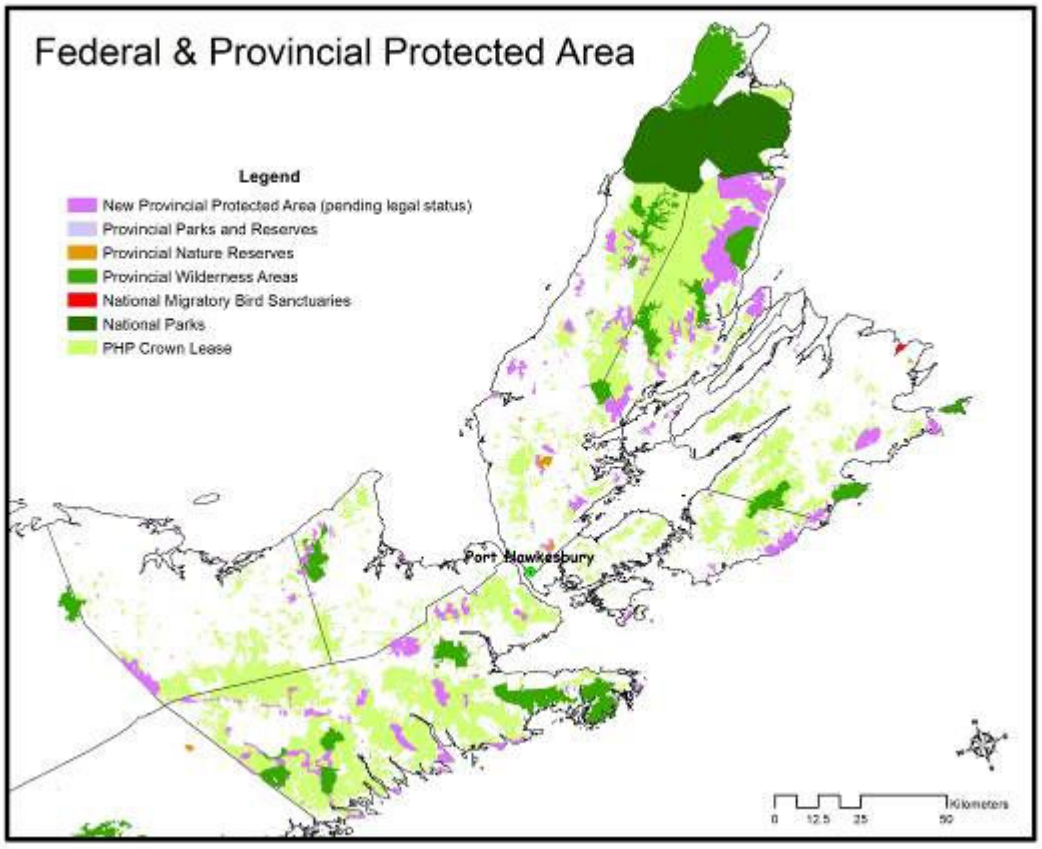


Figure 7-27. Federal and Provincial Protected Area

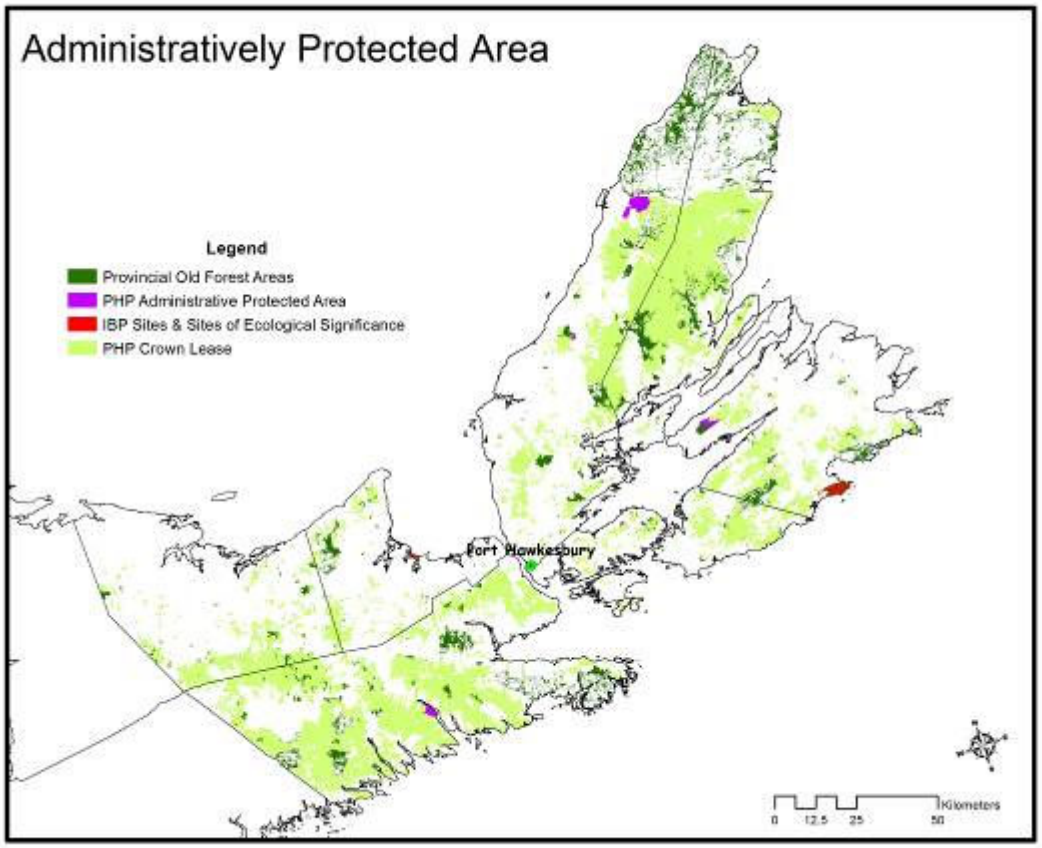
Eigg Mountain – James River
Provincial Wilderness Area
Photo: Matthew McKenna, PHP

French River
Provincial Wilderness Area
Photo © N.S. Department of Natural Resources

The below table and figure show administratively protected areas located in PHP's forest management area.

Table 7-5 Administrative Protected Area

Administratively Protected Area Category	# of Sites	Total Hectares
Old Forest Areas	N/A	84,717
PHP Protected Area	8	6,147
IBP Sites & Sites of Ecological Significance	12	3,107
TOTAL HECTARES		**93,971**



HCV Decision:

All existing protected areas within PHP's area of operation (e.g. *legally-protected and administratively-protected*) are considered HCVs. Also, a 200 m wide Special Management Zone will be placed around all existing protected areas to minimize road impacts to adjacent protected areas.

Management approach

- No harvesting is permitted to occur within any of the legal and administratively protected areas, as per provincial legislation and regulations, and company policies.

- A 200 meter wide Special Management Zone will be placed around all existing protected areas, in which the primary forest management objective will be Acadian forest restoration. No intensive forestry (e.g. plantations, exotics) will occur within these zones and road construction will be minimized to reduce access points into the protected areas. Where roads are required, they will be built parallel to protected area boundaries, and where practical, will not be built within 100 meters of protected area boundaries.

8.0 CATEGORY 2: LARGE LANDSCAPE LEVEL FORESTS

Category 2: Forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance

Question 7.
Does the forest constitute or form part of a globally, nationally or regionally significant forest landscape that includes populations of most native species and sufficient habitat such that there is a high likelihood of long-term species persistence?

Rationale

Large landscape level forests are important for the long-term conservation of biodiversity in the Acadian forest region. These areas are more likely to contain viable populations of naturally occurring species in their normal habitat ranges than smaller fragmented forests. Unfortunately, few large landscape level forests remain in Nova Scotia, or more broadly within the Northern Appalachian / Acadian Ecoregion (NAAE).

Methods

HCV's within PHP's forest management area were previously identified in 2008 for protected areas, large landscape forests, and forest remnant patches and included within the company's 2010 HCV report for FSC certification.

HCV sites were included primarily using polygons from an early stage of the Colin Stewart Forest Forum (CSFF) discussions, recognizing that further work was required at the time to refine this list and a level of uncertainty would remain until formal designations by the Nova Scotia government were finalized.

The approach used at the time for the HCV work was to "cast-the-net" wider than was ultimately required to fulfill requirements for protected areas and the maintenance of large landscape level forests and forest remnant patches. A harvest moratorium was placed on these HCV areas to create space for completing the CSFF discussions and the provincial protected areas process that followed.

The CSFF process was officially completed in December 2009, when the final CSFF report for recommended protected areas was submitted to the Nova Scotia government. Using the CSFF report, the provincial government continued the protected areas process, involving several rounds of public and stakeholder consultations, resulting in a final protected areas proposal released in August 2013.

Now that both the CSFF process and the Nova Scotia government's protected areas planning process are complete, and the uncertainty associated with these two processes no longer exists, an update to the PHP HCV moratorium sites was required.

Port Hawkesbury Paper LP established an HCV review committee in June 2014 to assess HCV sites under moratorium in the 2010 report. This committee included representation from the company, the Nova Scotia government, ENGO's, and academics.

The purpose of the HCV review committee was to refine the HCV sites for protected areas, large landscape forests, and forest remnant patches by systematically reviewing sites under moratorium. More specifically, the committee was striving to (1) decide which moratorium sites were no longer required as HCVs, and (2) for those moratorium sites determined by the committee to still be required for HCVs, to modify boundaries using best available information and expert advice and develop appropriate management prescriptions.

In 2017, a new advice note was issued by FSC Canada regarding Motion 65: High Conservation Value 2 (HCVF2) – Intact Forest Landscapes (IFL) Protection. The definition of an IFL by Global Forest Watch is:

A territory within today's global extent of forest cover which contains forest and non-forest ecosystems minimally influenced by human economic activity, with an area of at least 500 km2 (50,000 ha) and a minimal width of 10 km (measured as the diameter of a circle that is entirely inscribed within the boundaries of the territory) (Source: Glossary definition as provided on Intact Forest website. 2006-2014).

The FSC advice note requires certificate holders to use Global Forest Watch IFL maps, or a more recent IFL inventory using the same methodology, such as Global Forest Watch Canada, as a baseline for identifying IFLs. If an IFL is identified on a certificate holder's management area, forest management operations, including harvesting and road building may occur in IFLs, if they:

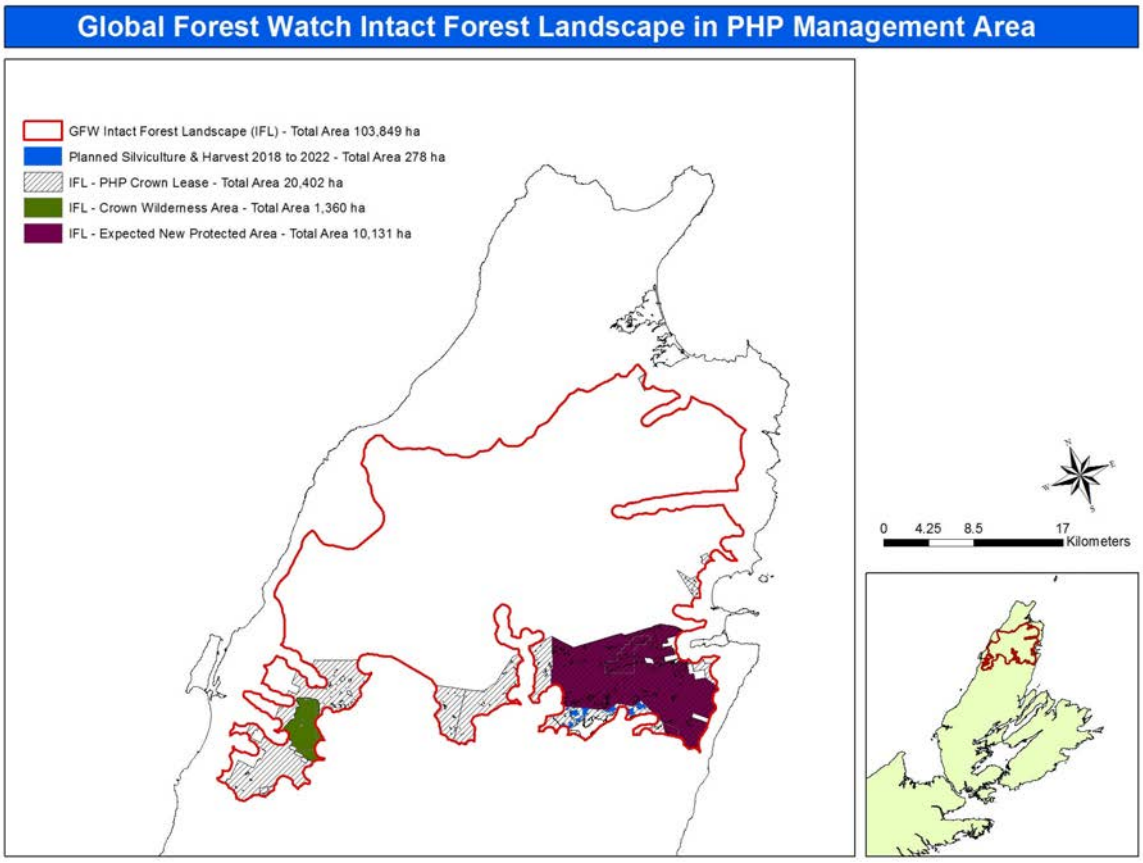
- Do not impact more than 20% of Intact Forest Landscapes within the Management Unit, and
- Do not reduce any IFLs below the 50,000 ha threshold in the landscape.

Port Hawkesbury Paper referred to Global Forest Watch Canada's IFL GIS data and identified an IFL in Cape Breton.

Intact Forest Landscapes

There is one known Intact Forest Landscape as identified by Global Forest Watch Canada in PHP's forest management area. It is 103,849 ha and encompasses the Cape Breton Highlands National Park as well as other area outside the park. The total area of Crown land managed by PHP inside the IFL is 20,402 ha (20%). Of that 20%, approximately 10,000 ha has been identified as a pending new protected area by the provincial government with an existing additional 1,260 ha already established as a Crown Wilderness Area. This leaves approximately 9% as potential operable forest area by PHP. Therefore, it is not expected that PHP could impact

up to or more than 20% of the total IFL, but continued monitoring and reporting will occur to ensure FSC requirements are being met.



Protected areas

The final report of the CSFF recommended 84,502 ha within the PHP tenure be established as protected areas. Most of these CSFF recommended sites were ultimately approved by the Nova Scotia government for protection and were included in the final protected areas plan released in August 2013. These sites are now in the process of being officially designated by the province, and PHP is supportive of this process. This fulfillment of the CSFF recommendations is a major contribution toward protected areas within PHP's lease. See Question 6 in this report for more detailed information on all legal (and pending) and administratively protected areas.

Even when the CSFF-recommended sites are officially designated as protected areas, however, a few gaps in ecosystem representation still remain in the protected areas system.

Upon reviewing all of the moratorium sites, the HCV review committee recommended establishing several "administrative protected areas" that will be voluntarily protected by PHP. A total of eight administrative protected areas were identified, totaling 6,147 hectares. These sites include: Country Harbour, Boisedale Hills, Hill Lake, Jim Campbells Barren, North River, Oban,

Mason's Mountain, and Salmon Gaspereaux. The management prescription for these areas is "no management activities (harvest, road building, silviculture)" (see Question 6).

Large Landscape HCVs

Large landscape forests (identified by HCV review committee as greater than 10,000 hectares in size) occur predominately in the Cape Breton Highlands. For these sites, the predominate approach utilized to protect this value is through the creation of new protected areas, but also through the establishment of "core roadless areas". For remnant forest patches less than 10,000 hectares in size, and are scattered more widely in Cape Breton and eastern mainland Nova Scotia, decisions were made on a site-by-site basis. Management decisions for large landscape and remant patch include protected areas, core roadless areas, and/or special management areas.

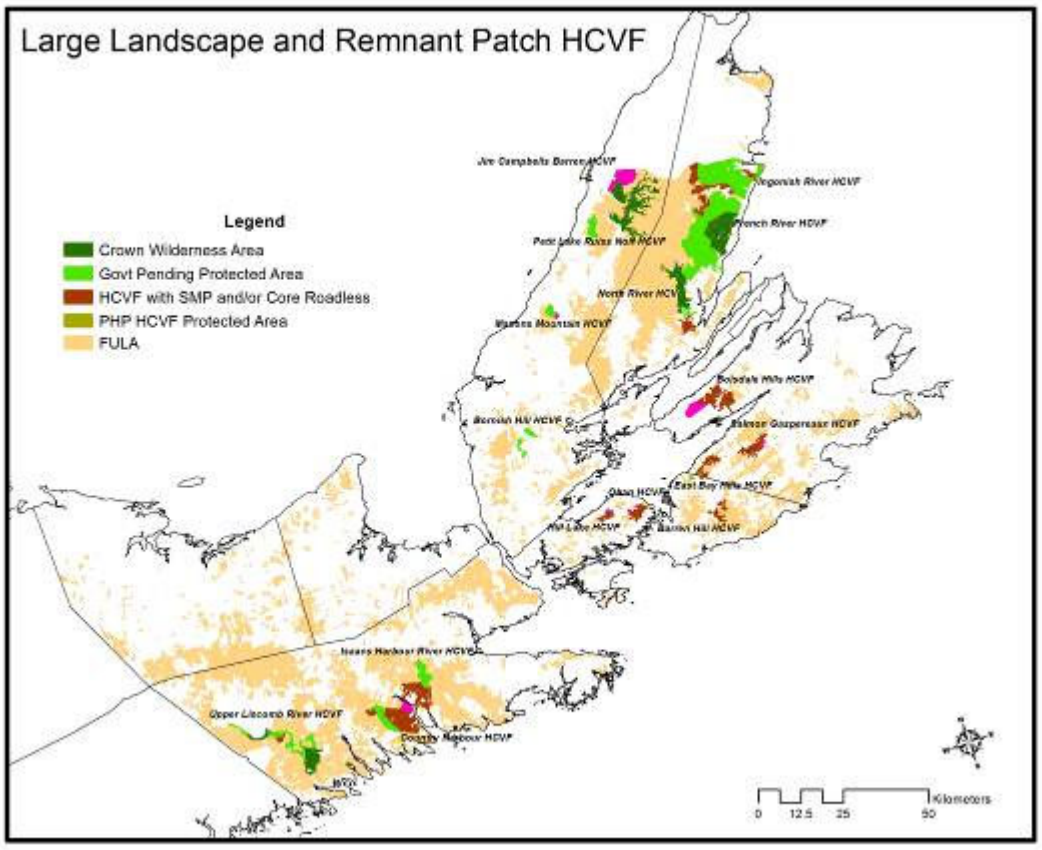


Figure 8-1. Large landscape and remnant patch HCV.

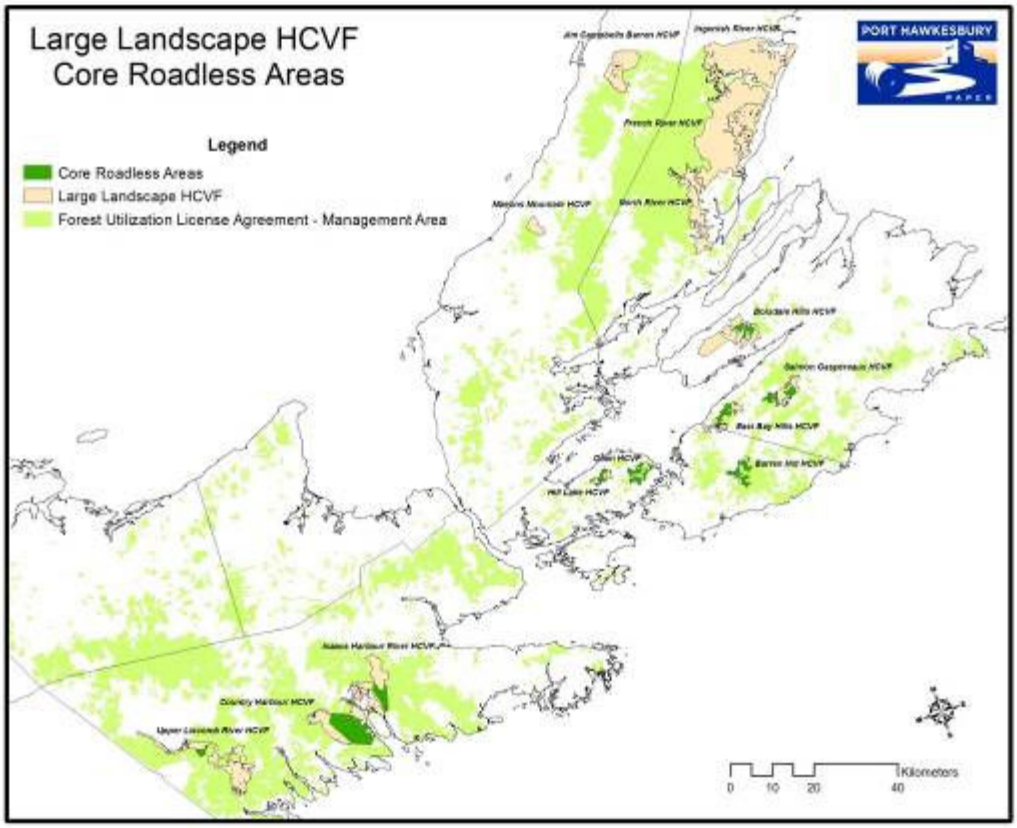


Figure 8-2. Core roadless areas within Large Landscape and Remant Patch HCVs.

Large landscape and remnant patch site-by-site assessments

Below is a summary table listing the review outcome by the 2014/15 HCV committee for the original 34 CSFF moratorium sites identified in the 2010 HCV Assessment Report. A total of 16 sites will remain as HCV's while the remaining 18 are removed since the outcome of the provincial planning process for new protected areas show these sites to now be adequately represented for protection.

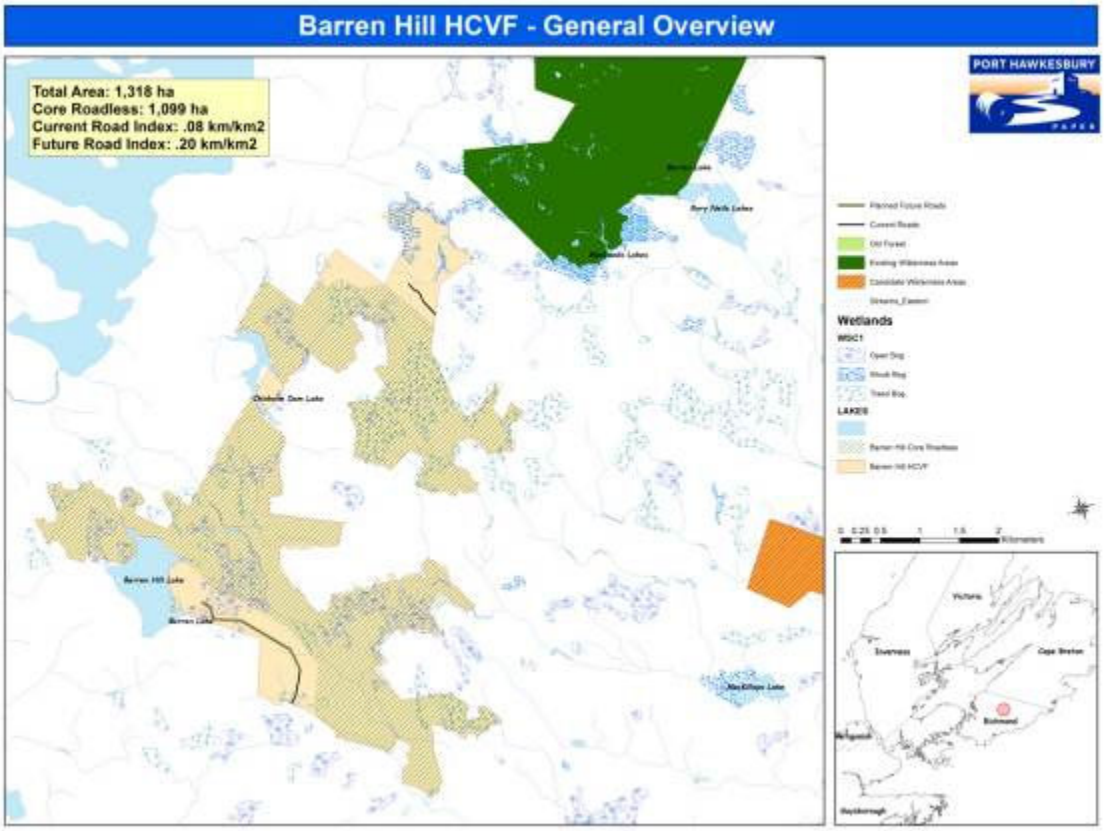
Original CSFF Name	Proposed HCV Status	Total Hectares	HCV Category
Barren Hill	Maintain HCV	1,318	Remnant Patch
Boisdale Hills	Maintain HCV	5,630	Remnant Patch
Bornish Hill	Maintain HCV	2,106	Remnant Patch
Country Harbour	Maintain HCV	8,202	Remnant Patch
East Bay Hills	Maintain HCV	1,865	Remnant Patch
French River	Maintain HCV	25,226	Large Landscape
Hill Lake	Maintain HCV	877	Remnant Patch
Ingonish River	Maintain HCV	15,210	Large Landscape

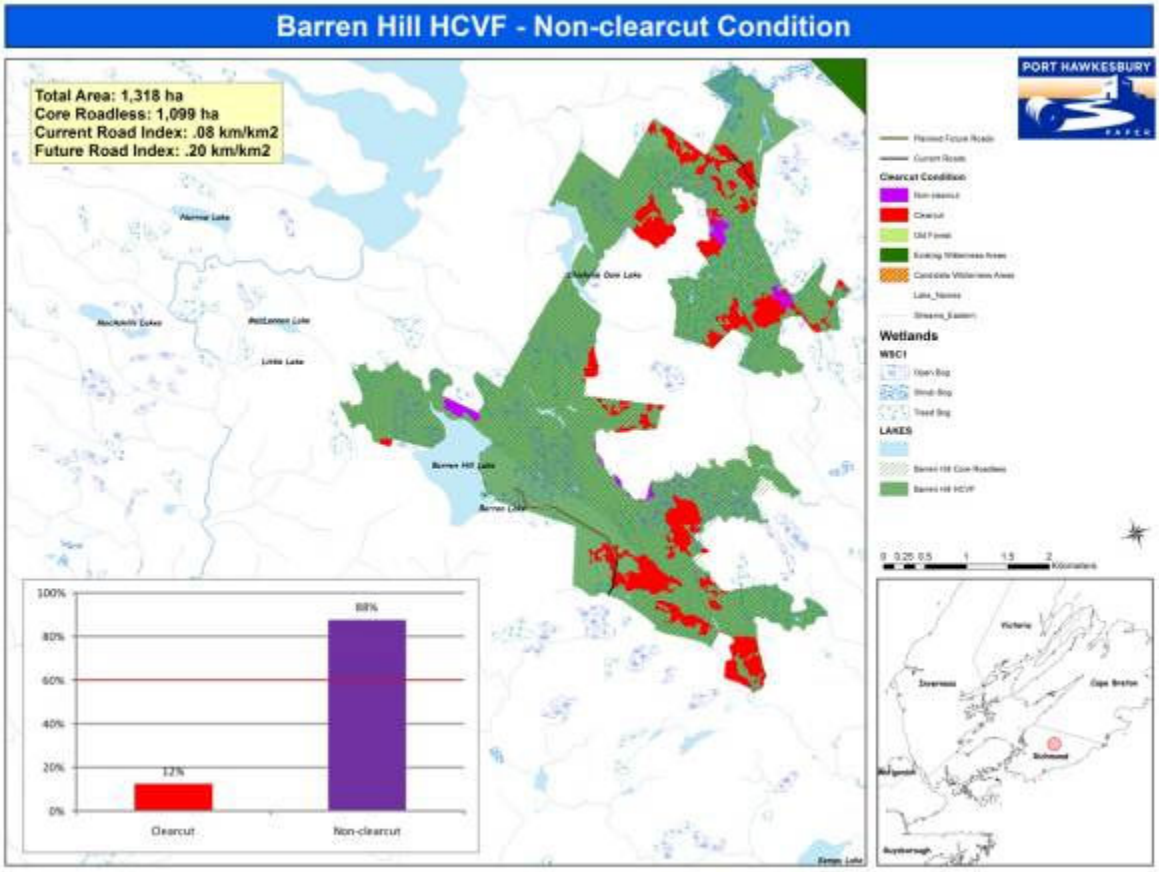
Isaacs Harbour River	Maintain HCV	6,157	Remnant Patch
Jim Campbells Barren	Maintain HCV	4,586	Remnant Patch
Masons Mountain	Maintain HCV	1,022	Remnant Patch
North River	Maintain HCV	6,328	Remnant Patch
Oban	Maintain HCV	1,618	Remnant Patch
Petit Lake Ruiss Noir	Maintain HCV	1,612	Remnant Patch
Salmon Gaspereaux	Maintain HCV	2,357	Remnant Patch
Upper Liscomb River	Maintain HCV	7,398	Remnant Patch
Upper Liscomb River 2	Remove HCV		
Cranberry Lake	Remove HCV		
West Lakes	Remove HCV		
Liscomb River	Remove HCV		
Margaree River	Remove HCV		
Capelin Cove	Remove HCV		
Cross Lake Salmon River	Remove HCV		
Dover Bay	Remove HCV		
Fishermans Harbour	Remove HCV		
Fourchu	Remove HCV		
Humes River	Remove HCV		
Kluscap Mountain	Remove HCV		
Twelve O Clock Mountain	Remove HCV		
Middle River - Framboise	Remove HCV		
Canso Coastal Barrens	Remove HCV		
Middle River	Remove HCV		
Ogden Round Lake	Remove HCV		
Bonnet Lake Barrens	Remove HCV		

The following table and maps show details for each HCV site including total area, area of HCV for special management and/or protection (legal and/or administrative), core roadless area (if applicable), current and future road index values, and non-clearcut condition. Management prescriptions for all HCV's follow the maps.

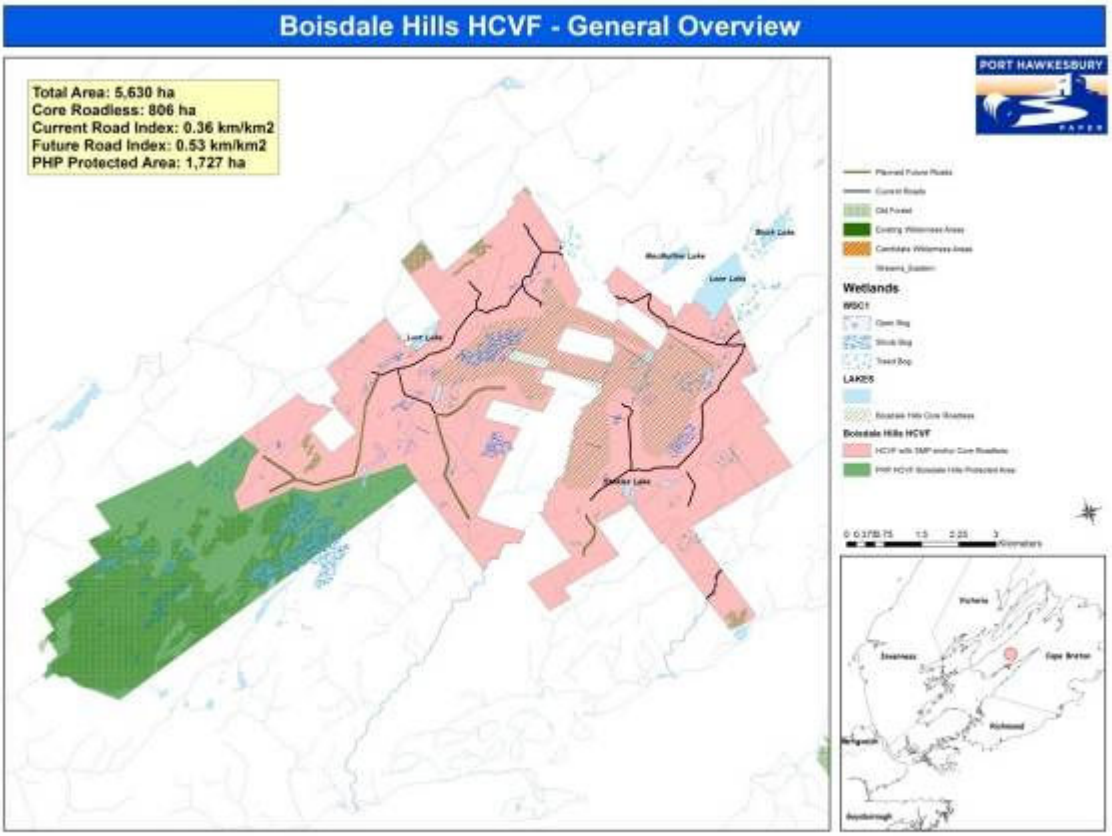
HCV Name	Core Roadless Management (ha)	Special Management (ha)	Government Protected (legal & pending) (ha)	PHP Protected (ha)	Total Hectares
Barren Hill	1,099	219	-	-	1,318
Boisdale Hills	806	3,097	-	1,727	5,630
Bornish Hill	-	-	2,106	-	2,106
Country Harbour	4,903	358	2,112	829	8,202
East Bay Hills	642	1,061	162	-	1,865
French River	-	1,261	23,965	-	25,226
Hill Lake	369	395	-	113	877
Ingonish River	-	3,781	11,429	-	15,210
Isaacs Harbour River	1,269	2,721	2,167	-	6,157
Jim Campbells Barren	-	-	1,742	2,844	4,586
Masons Mountain	-	-	825	197	1,022
North River	-	1,353	4,948	27	6,328
Oban	1,167	277	-	174	1,618
Petit Lake Ruiss Noir	-	-	1,612	-	1,612
Salmon Gaspereaux	1,018	1,051	48	240	2,357
Upper Liscomb River	377	-	7,021	-	7,398
TOTAL HECTARES	**11,650**	**15,574**	**58,137**	**6,151**	**91,512**

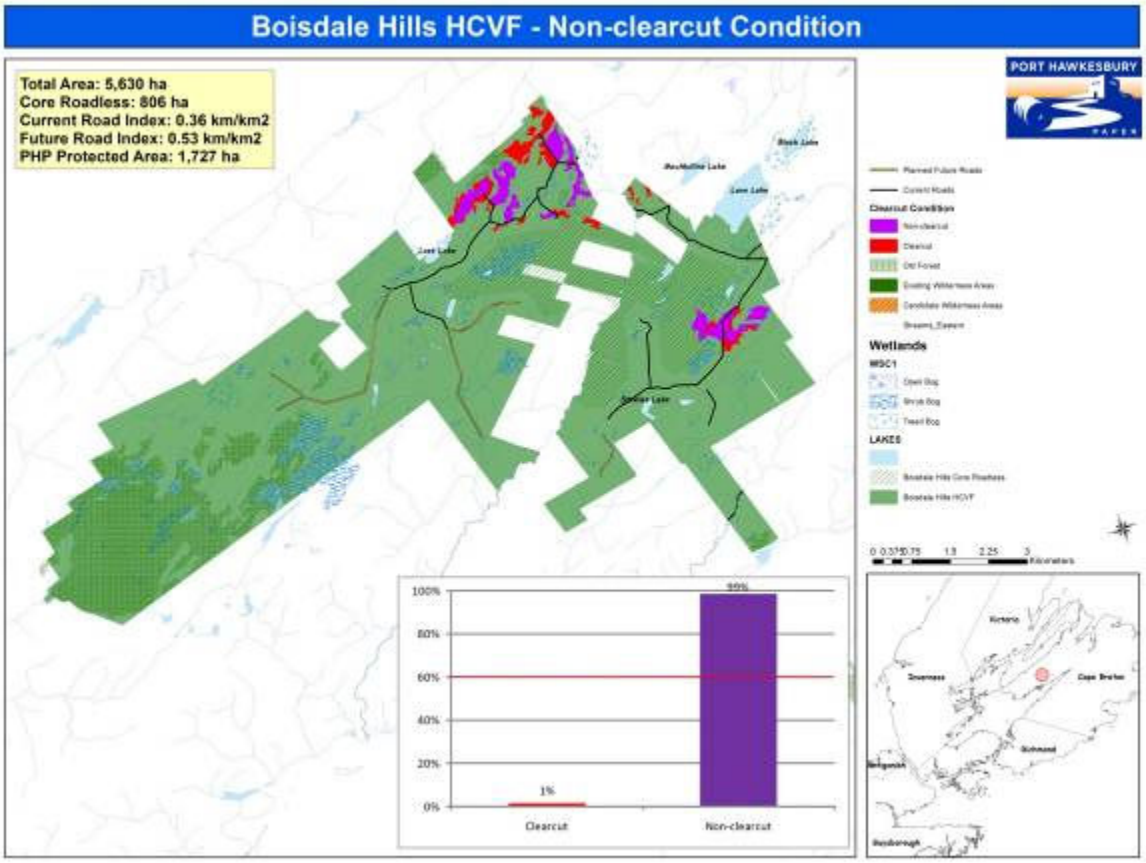
Barren Hill HCV



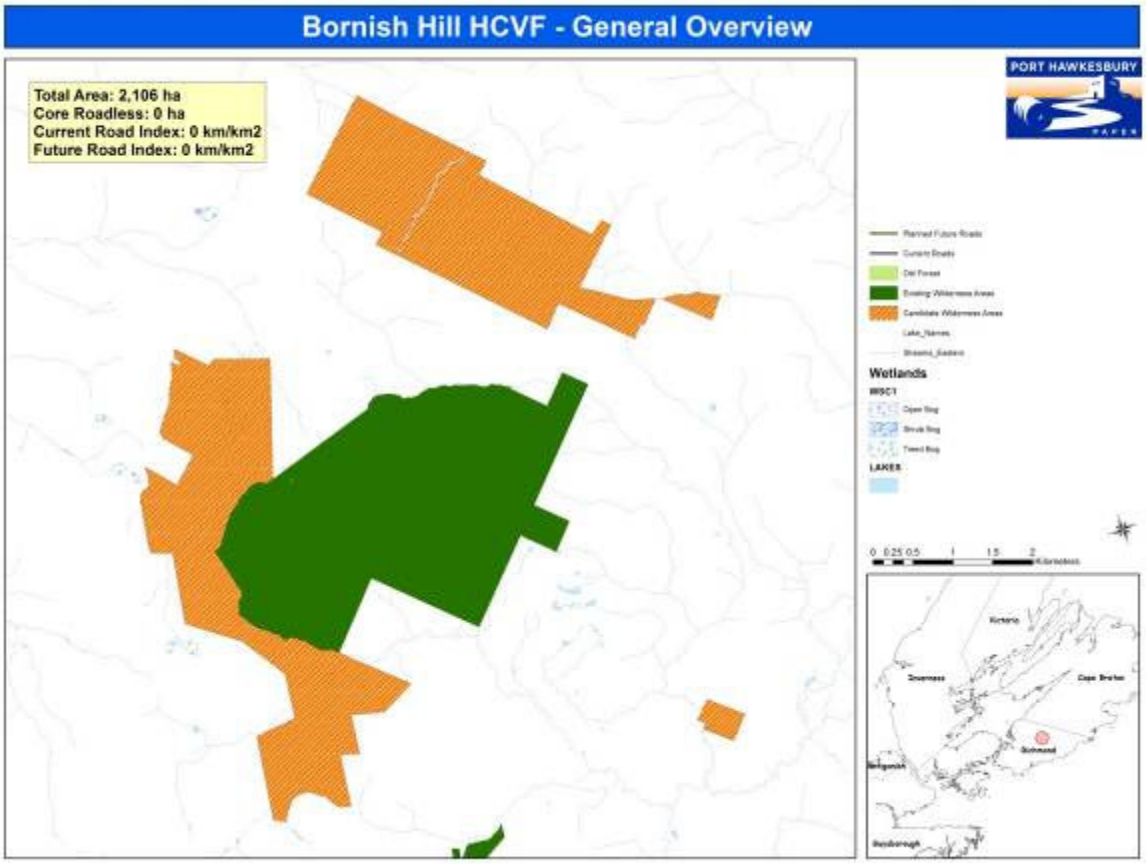

Barren Hill HCVF - Non-clearcut Condition
Total Area: 1,318 ha
Core Roadless: 1,099 ha
Current Road Index: .08 km/km2
Future Road Index: .20 km/km2
PORT HAWKESBURY
Clearcut Condition
Wetlands
WSCI
LAKES
100%
80%
60%
40%
20%
0%
12%
88%
Clearcut
Non-clearcut

Boisdale Hills HCV

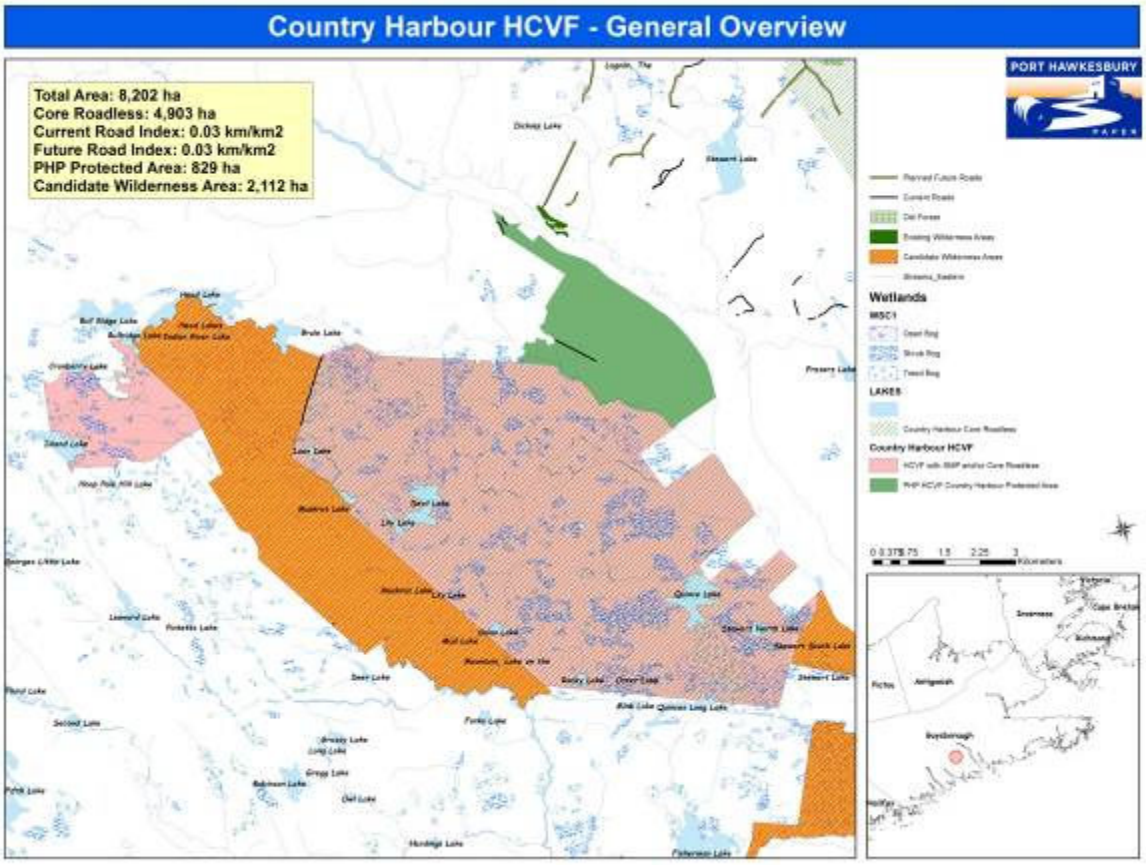


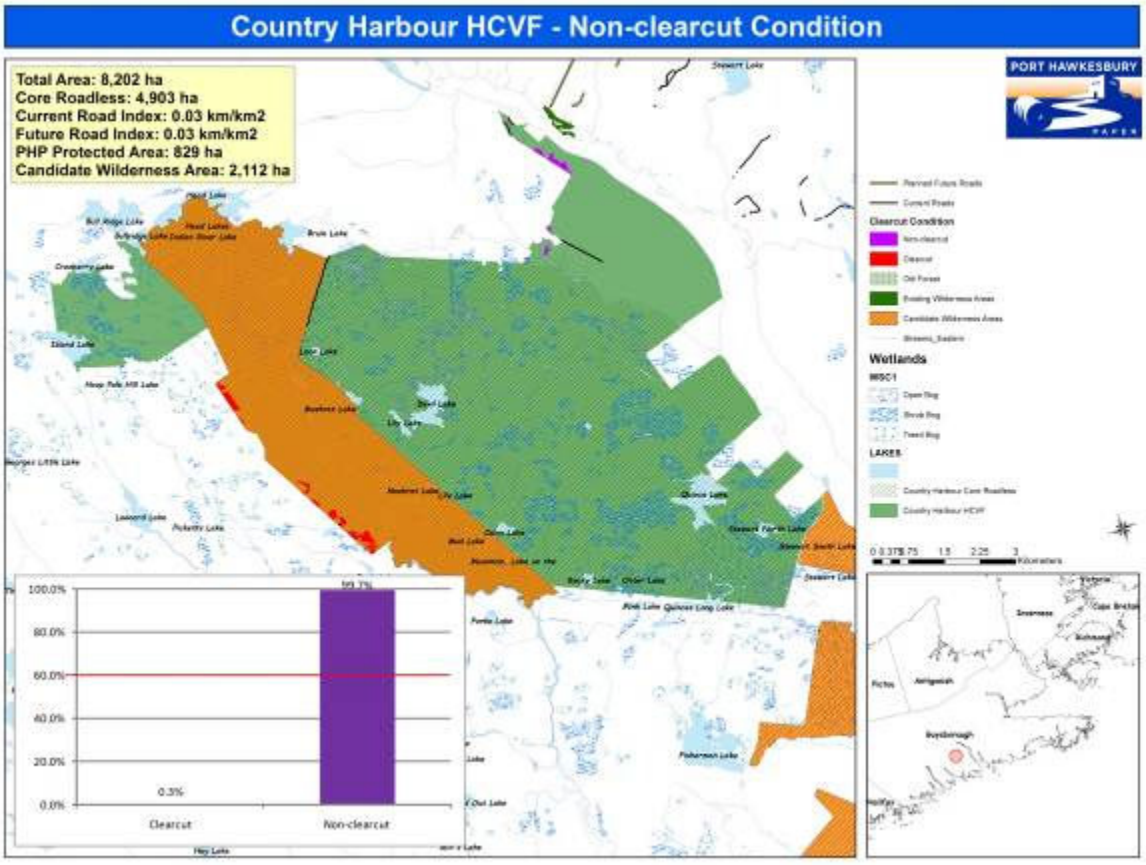

Boisdale Hills HCVF - Non-clearcut Condition
Total Area: 5,630 ha
Core Roadless: 806 ha
Current Road Index: 0.36 km/km2
Future Road Index: 0.53 km/km2
PHP Protected Area: 1,727 ha
PORT HAWKESBURY
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
1%
99%
Clearcut
Non-clearcut

Bornish Hill HCV (fully protected)

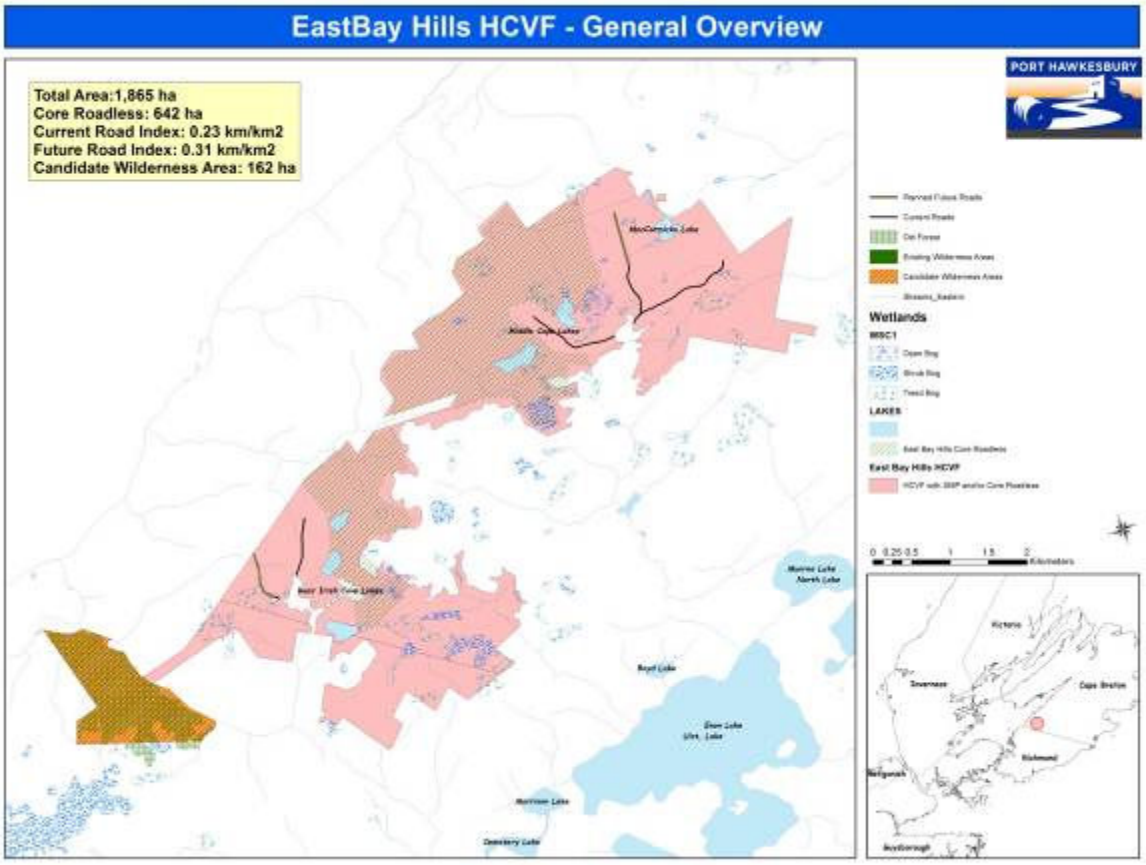


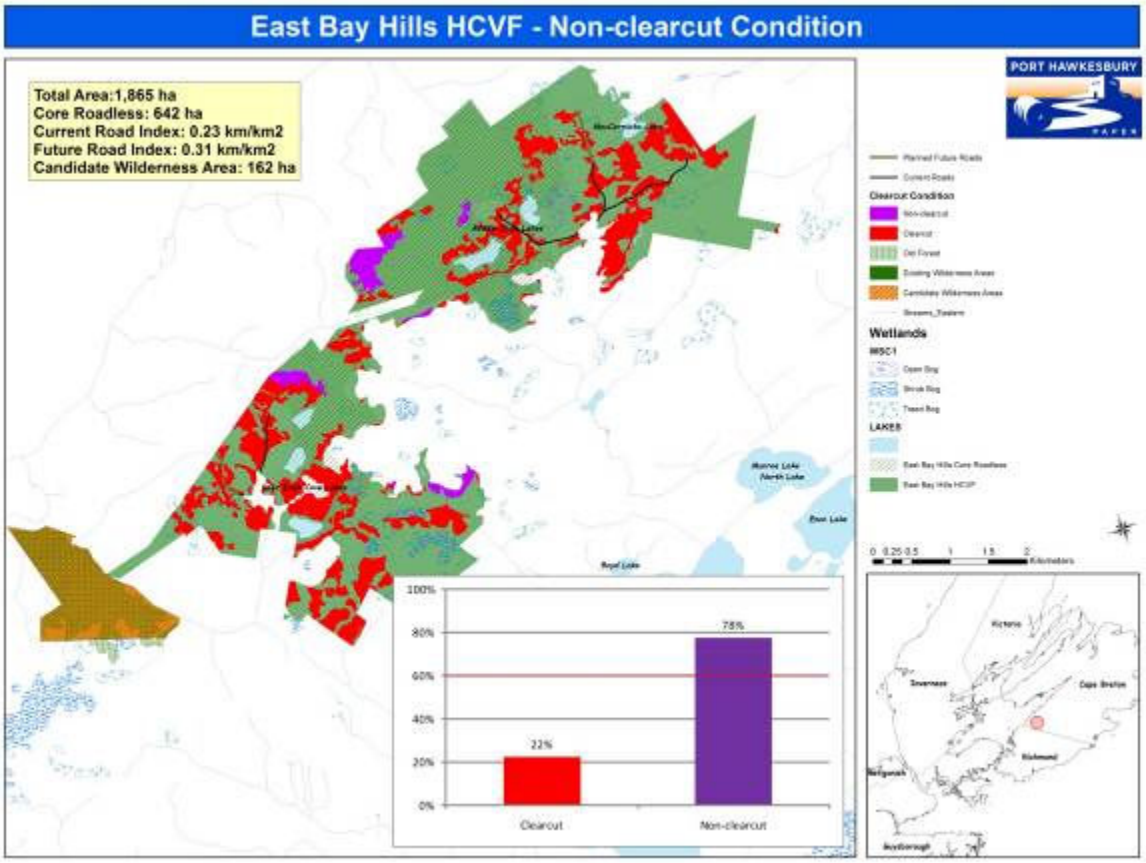
Country Harbour HCV



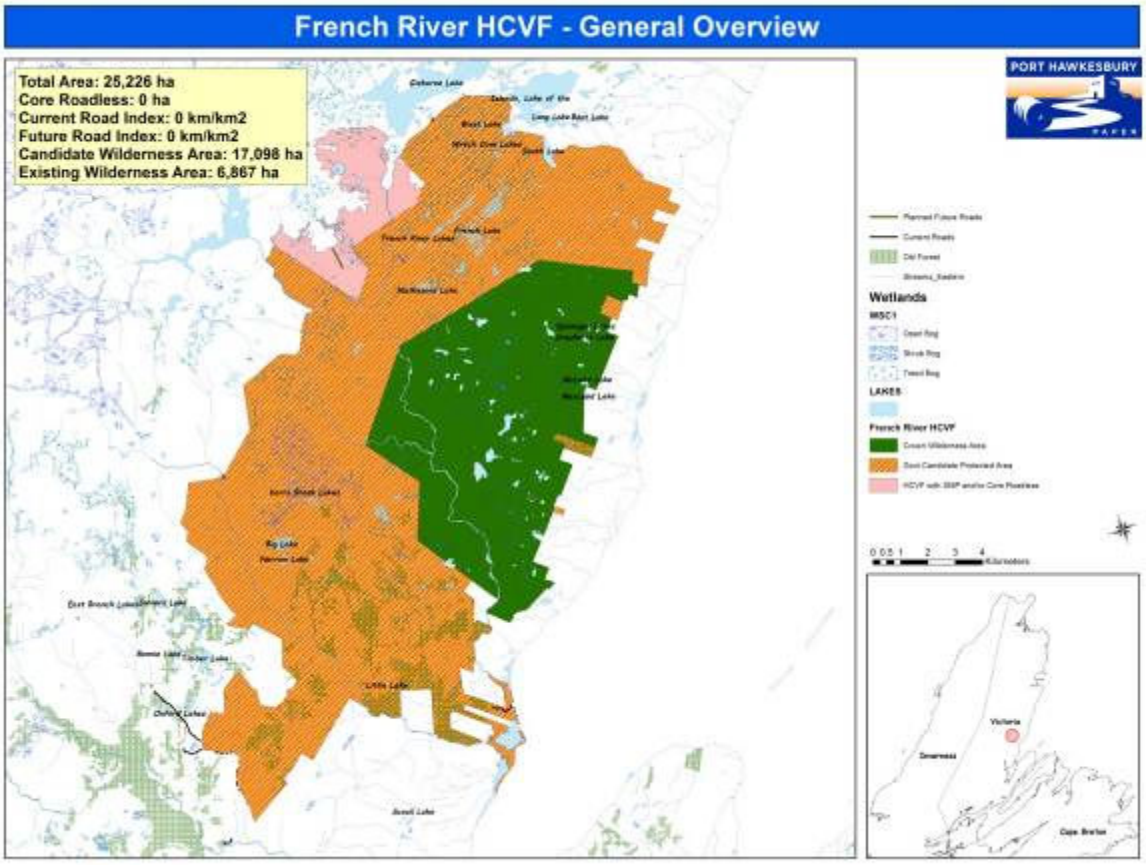

Country Harbour HCVF - Non-clearcut Condition
Total Area: 8,202 ha
Core Roadless: 4,903 ha
Current Road Index: 0.03 km/km2
Future Road Index: 0.03 km/km2
PHP Protected Area: 829 ha
Candidate Wilderness Area: 2,112 ha
PORT HAWKESBURY
Clearcut Condition
Wetlands
LAKES
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
99.7%
0.3%
Clearcut
Non-clearcut

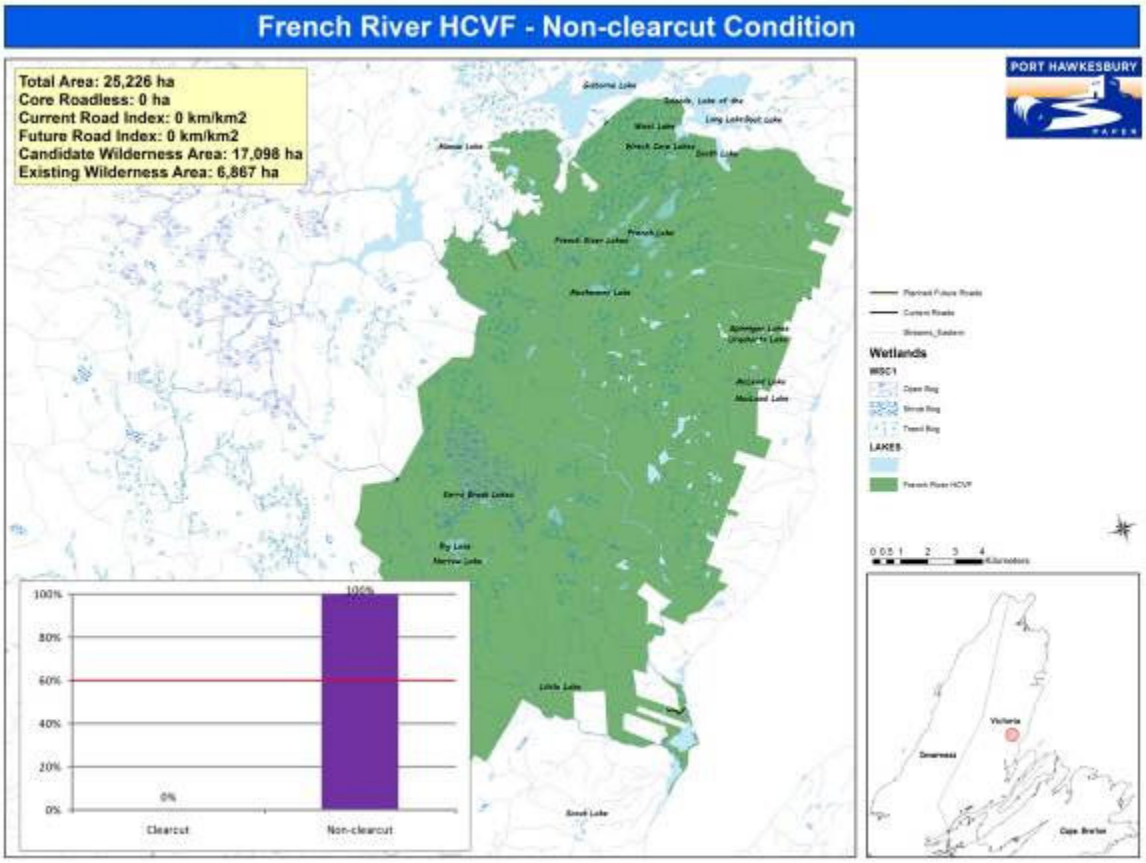
East Bay Hills HCV



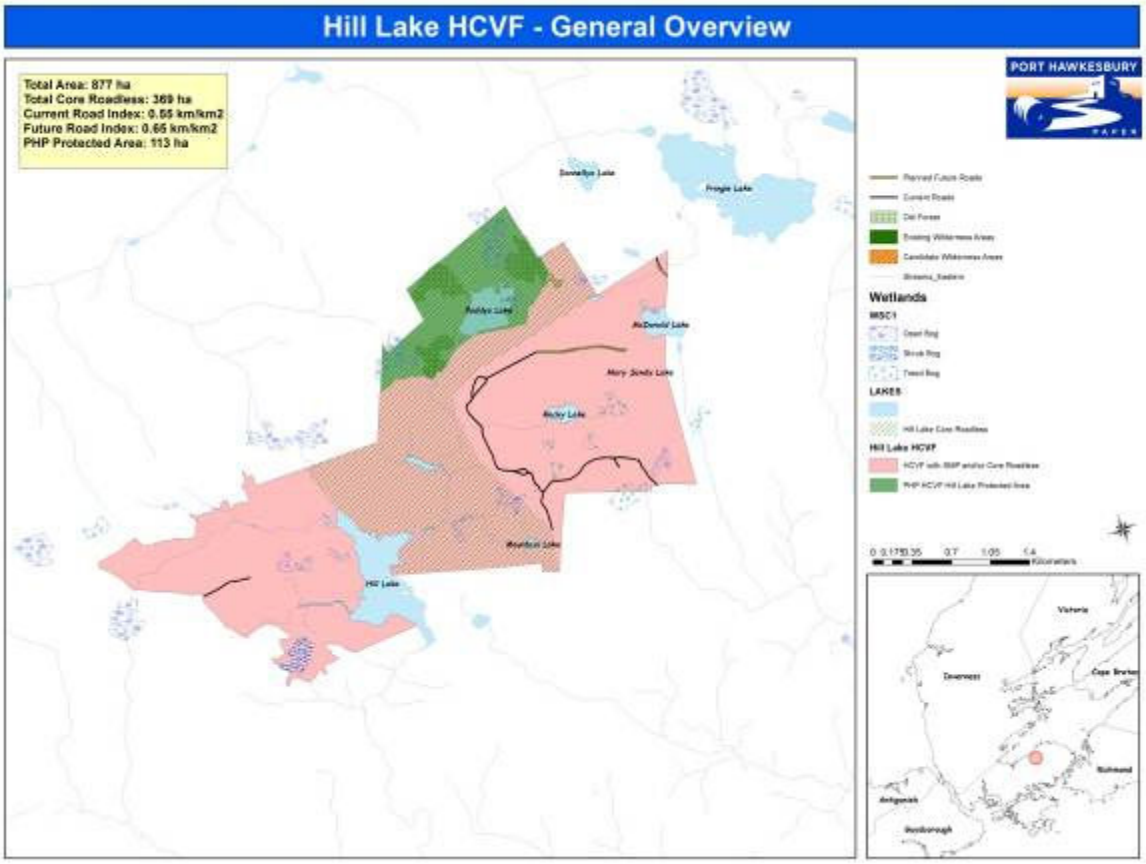

East Bay Hills HCVF - Non-clearcut Condition
Total Area:1,865 ha
Core Roadless: 642 ha
Current Road Index: 0.23 km/km2
Future Road Index: 0.31 km/km2
Candidate Wilderness Area: 162 ha
PORT HAWKESBURY
Clearcut Condition
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
22%
78%
Clearcut
Non-clearcut

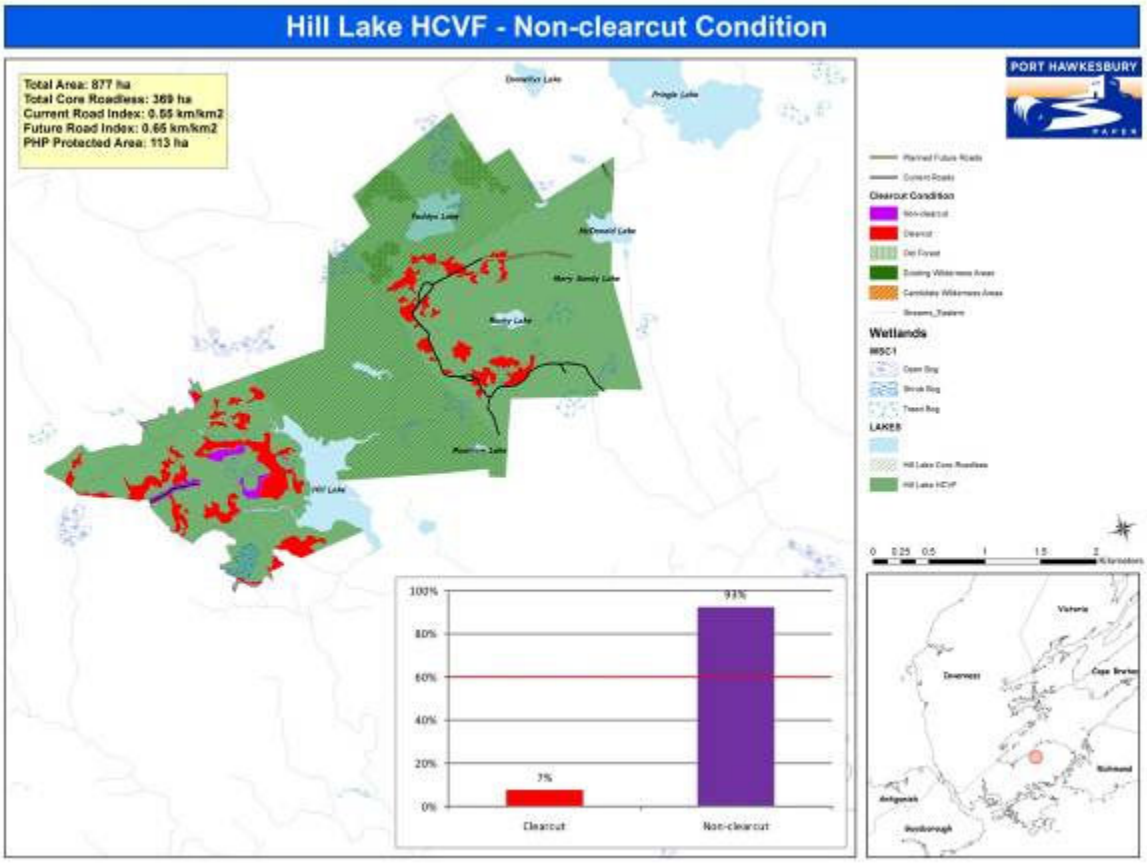
French River HCV



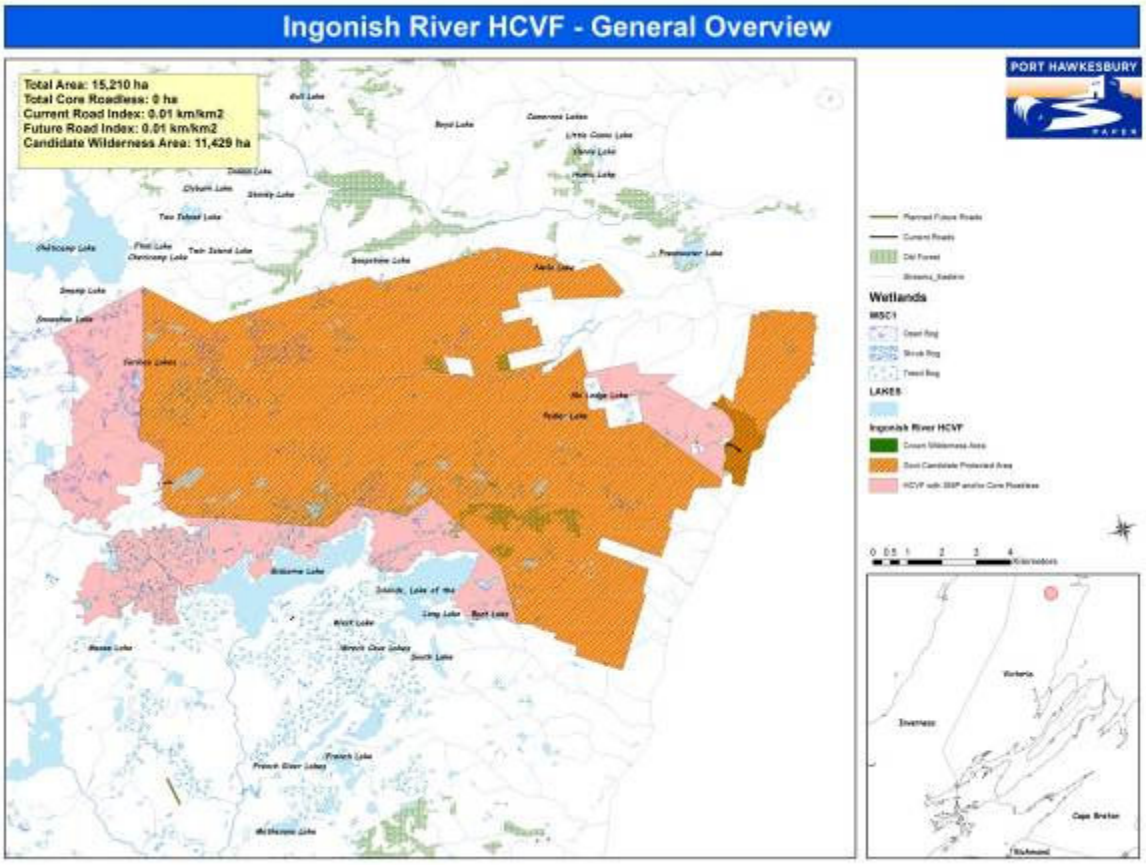

French River HCVF - Non-clearcut Condition
Total Area: 25,226 ha
Core Roadless: 0 ha
Current Road Index: 0 km/km2
Future Road Index: 0 km/km2
Candidate Wilderness Area: 17,098 ha
Existing Wilderness Area: 6,867 ha
PORT HAWKESBURY
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
0%
Clearcut
Non-clearcut

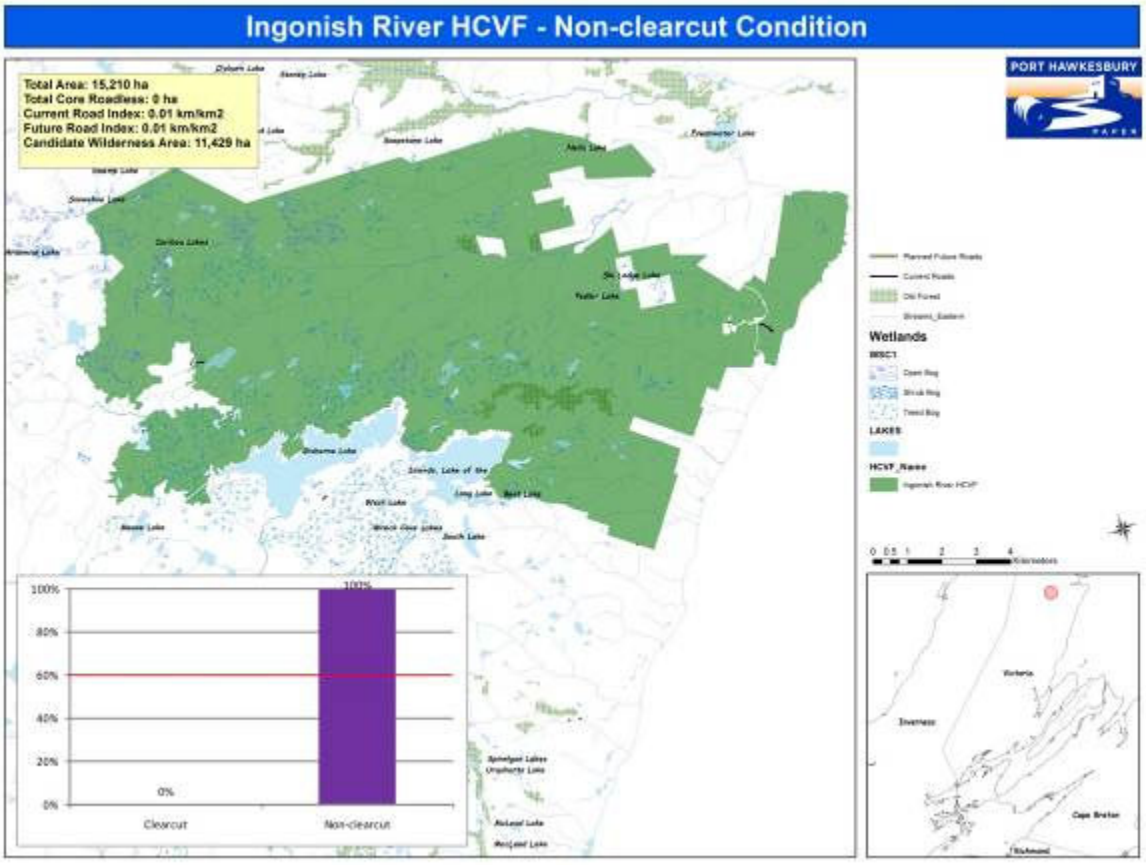
Hill Lake HCV



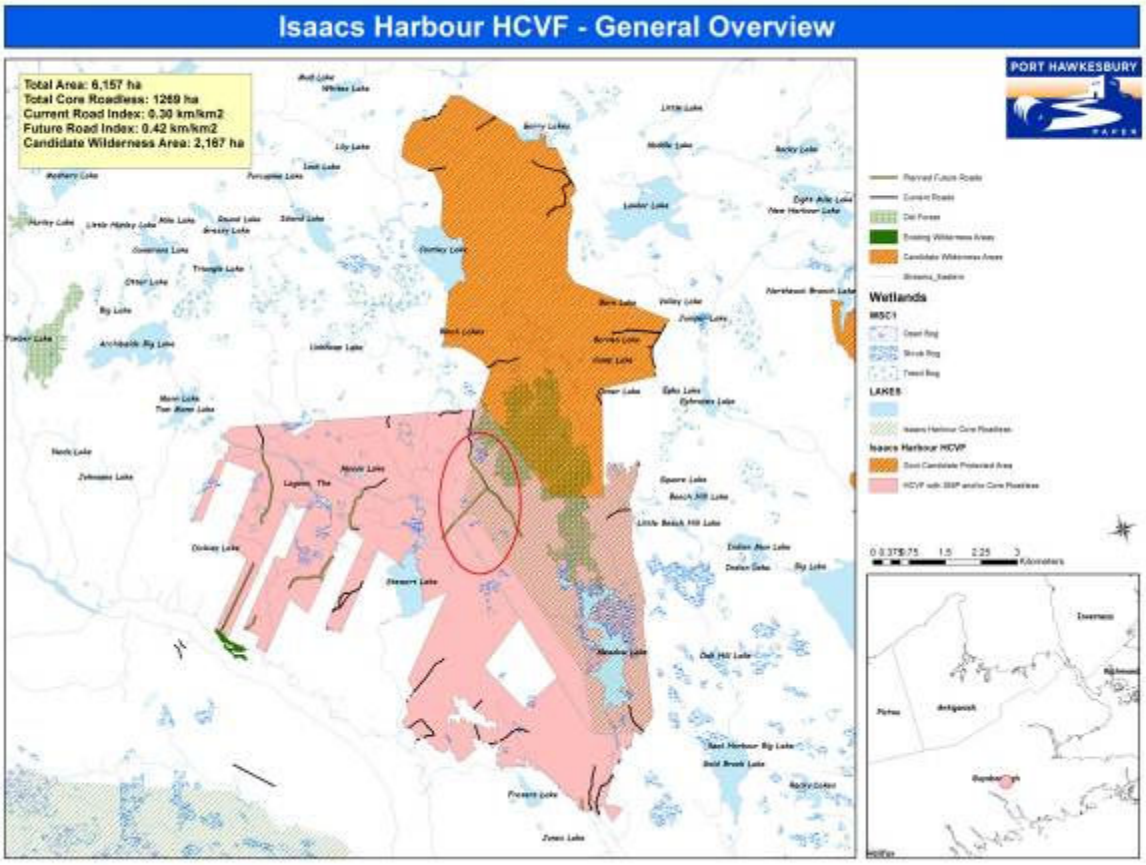

Hill Lake HCVF - Non-clearcut Condition
Total Area: 877 ha
Total Core Roadless: 369 ha
Current Road Index: 0.55 km/km2
Future Road Index: 0.66 km/km2
PHP Protected Area: 113 ha
PORT HAWKESBURY
Clearcut Condition
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
7%
93%
Clearcut
Non-clearcut

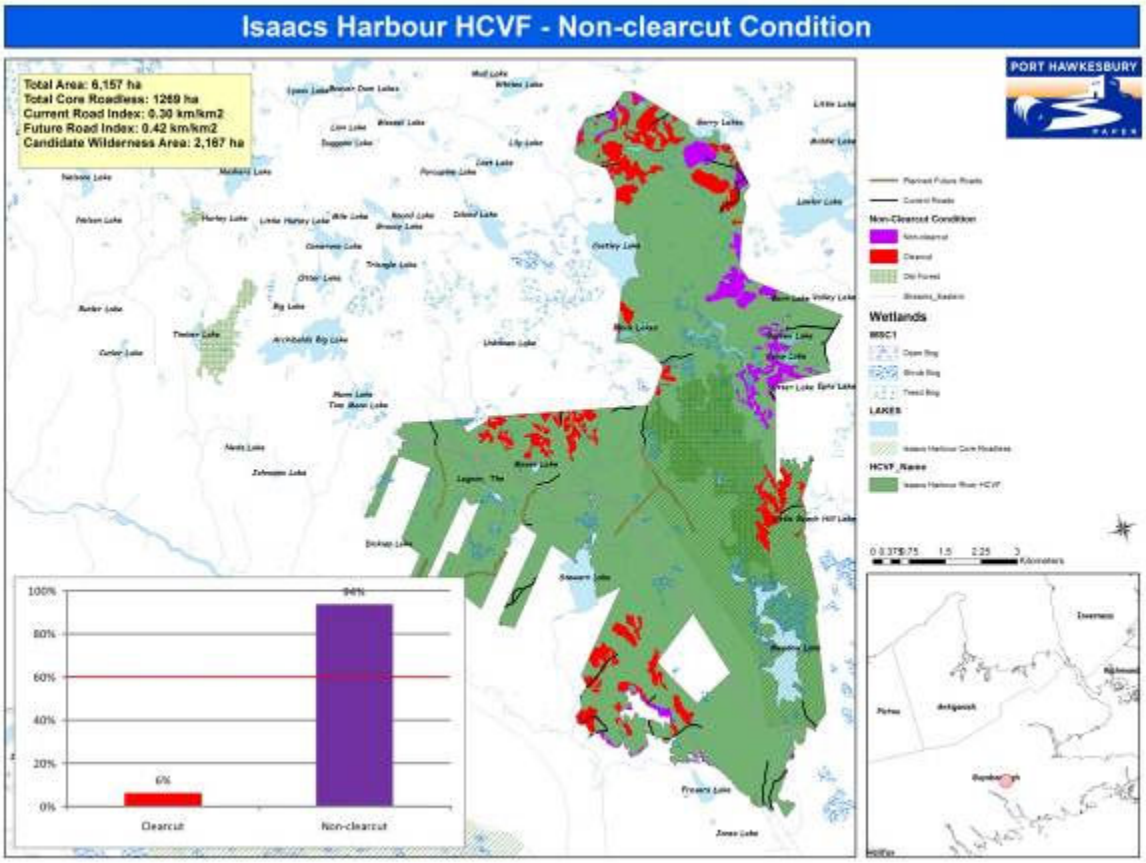
Ingonish River HCV



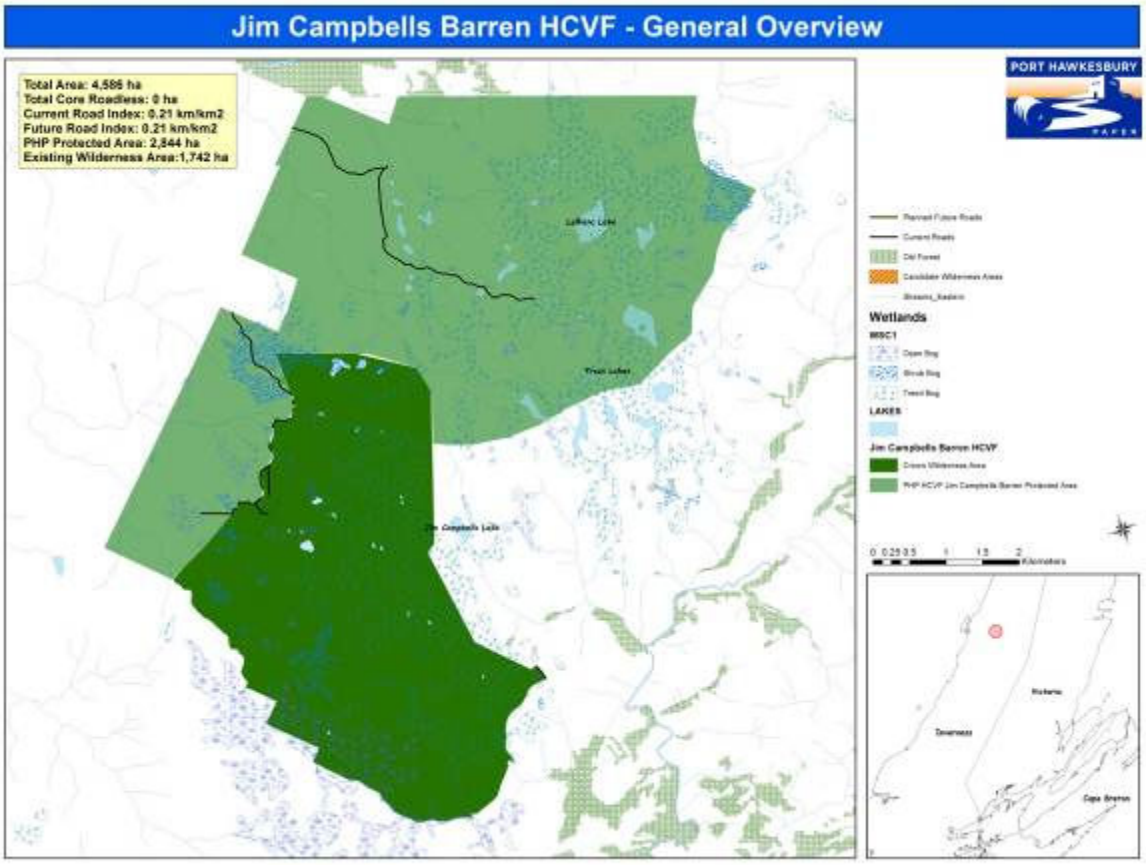

Ingonish River HCVF - Non-clearcut Condition
Total Area: 15,210 ha
Total Core Roadless: 0 ha
Current Road Index: 0.01 km/km2
Future Road Index: 0.01 km/km2
Candidate Wilderness Area: 11,429 ha
PORT HAWKESBURY
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
0%
100%
Clearcut
Non-clearcut
Victoria
Inverness
Cape Breton
Richmond

Isaacs Harbour HCV

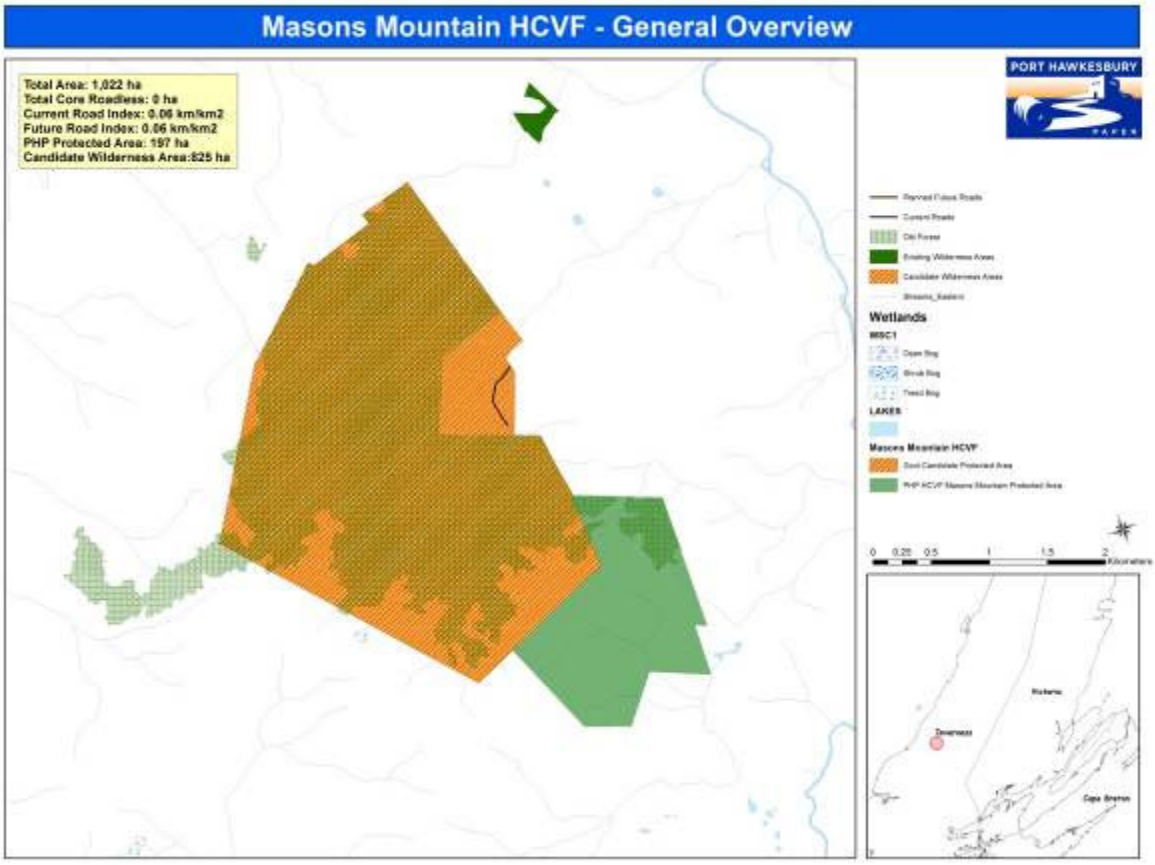



Isaacs Harbour HCVF - Non-clearcut Condition
Total Area: 6,157 ha
Total Core Roadless: 1269 ha
Current Road Index: 0.30 km/km2
Future Road Index: 0.42 km/km2
Candidate Wilderness Area: 2,167 ha
PORT HAWKESBURY
Non-Clearcut Condition
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
6%
94%
Clearcut
Non-clearcut

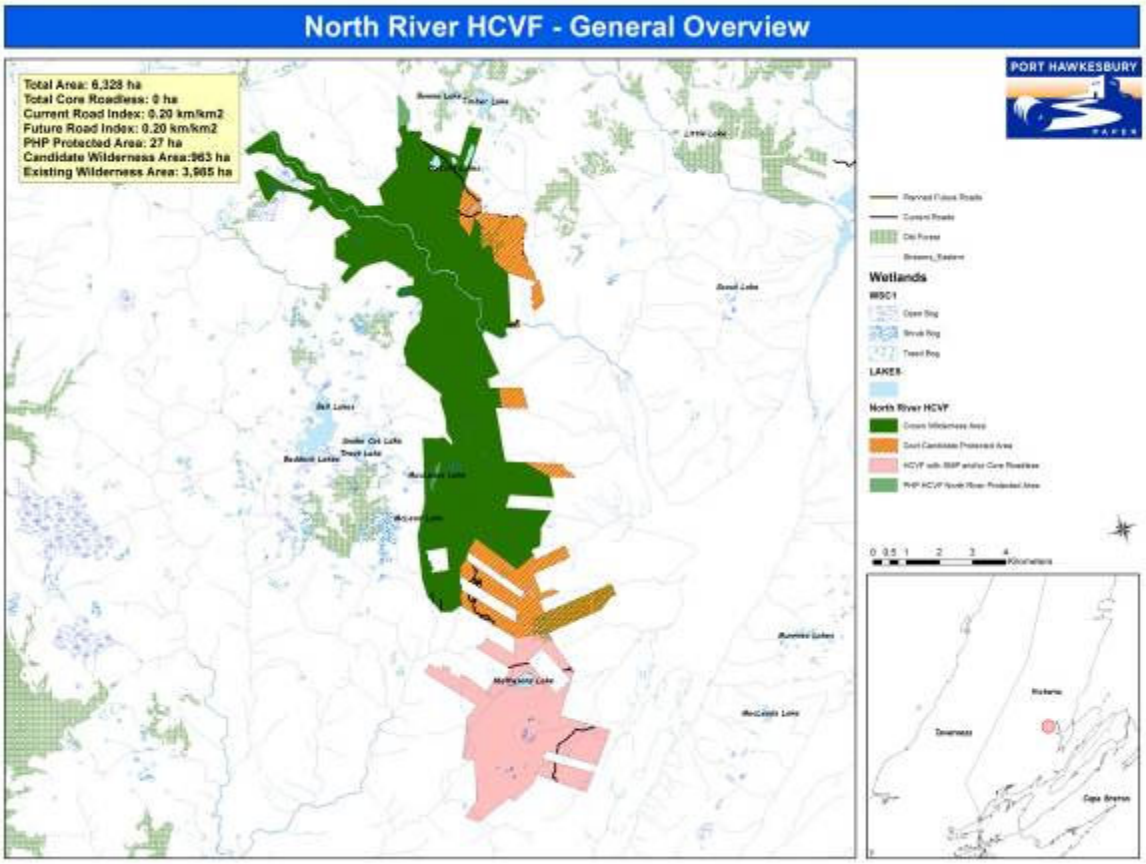
Jim Campbells Barren HCV (fully protected)

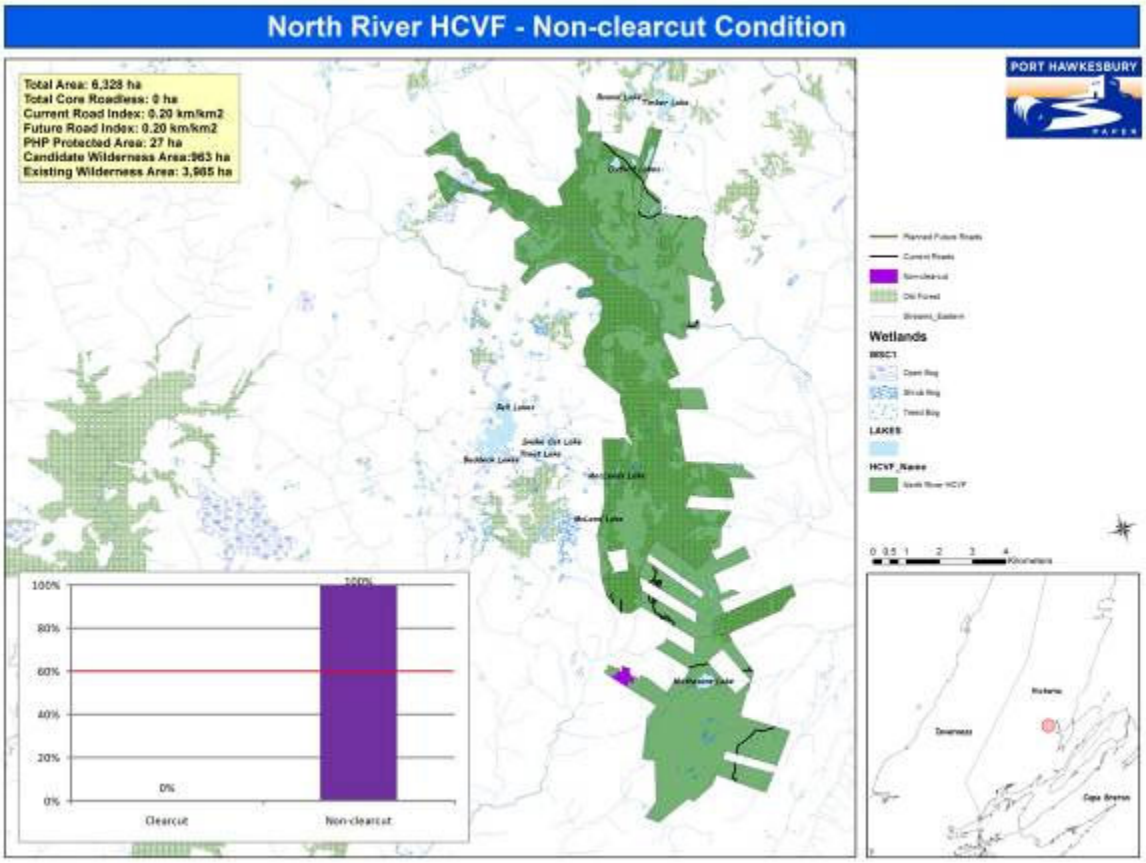


Masons Mountain HCV (fully protected)

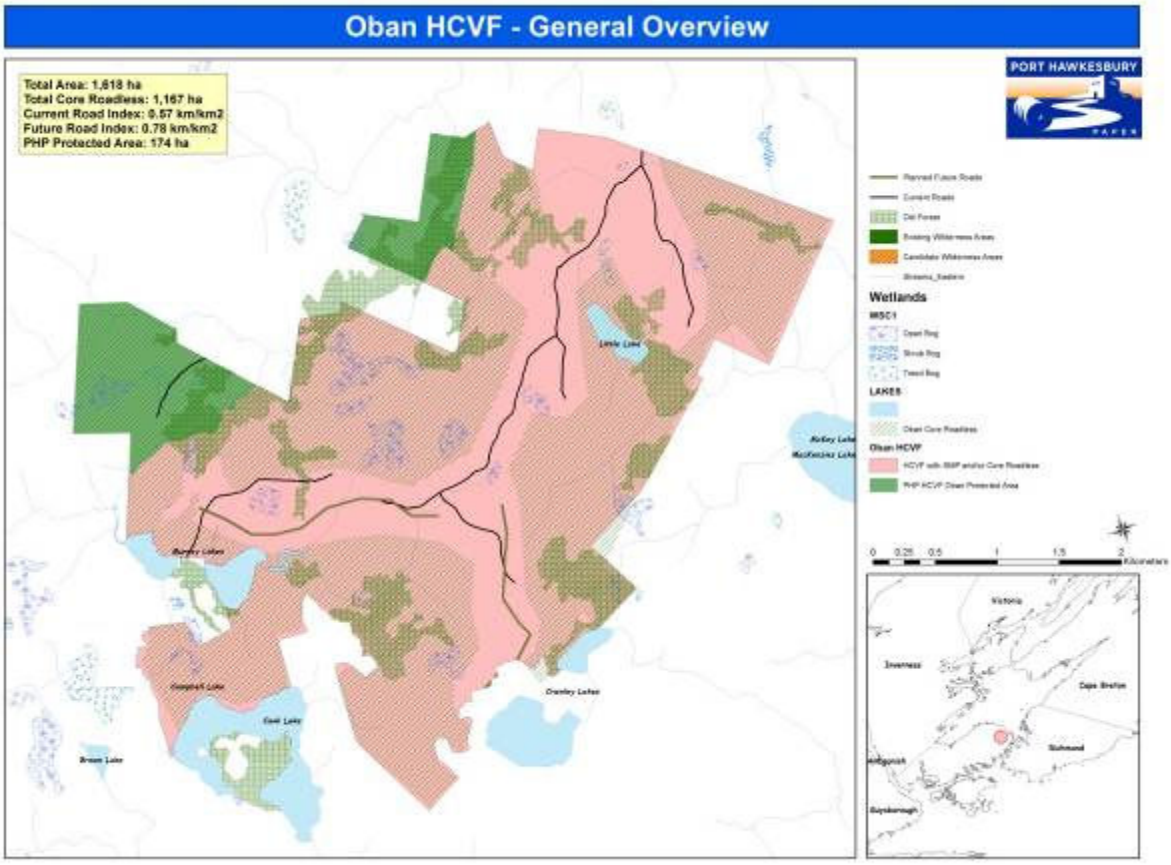


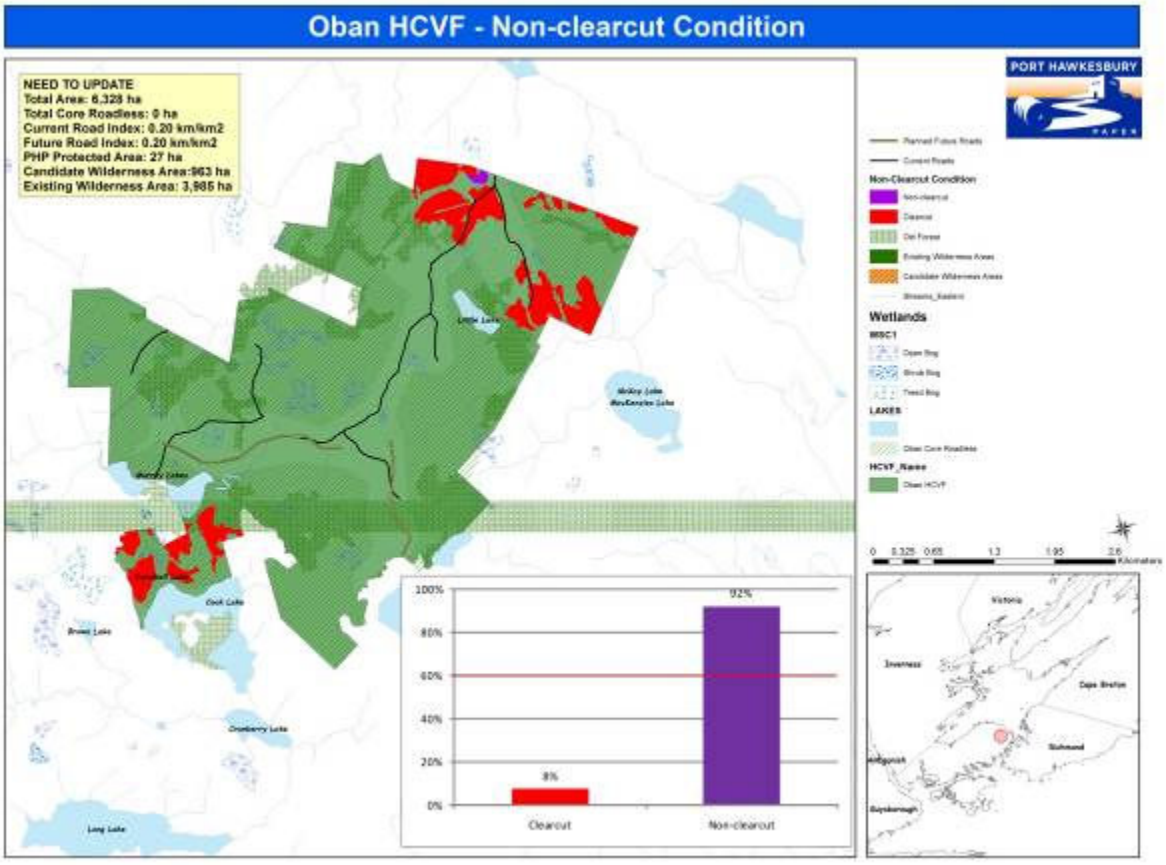
North River HCV



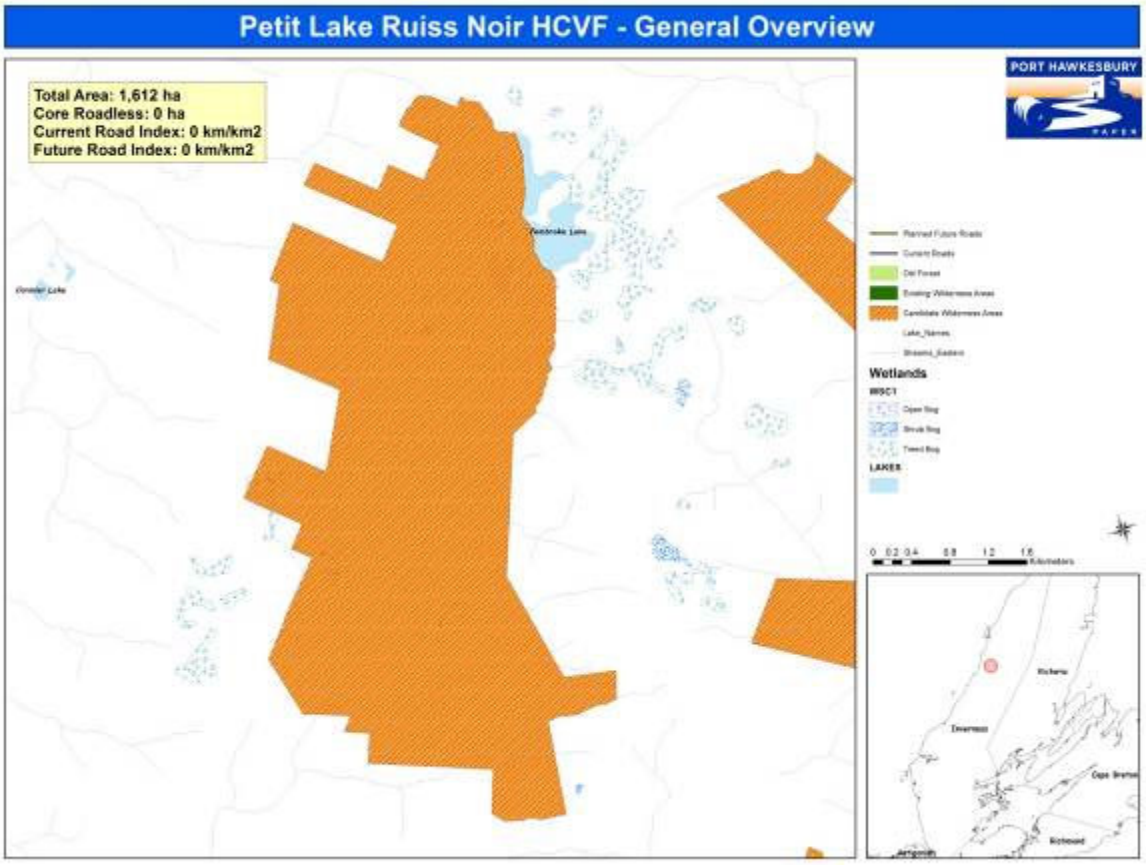

North River HCVF - Non-clearcut Condition
Total Area: 6,328 ha
Total Core Roadless: 0 ha
Current Road Index: 0.20 km/km2
Future Road Index: 0.20 km/km2
PHP Protected Area: 27 ha
Candidate Wilderness Area:963 ha
Existing Wilderness Area: 3,965 ha
PORT HAWKESBURY
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
0%
Clearcut
Non-clearcut

Oban HCV

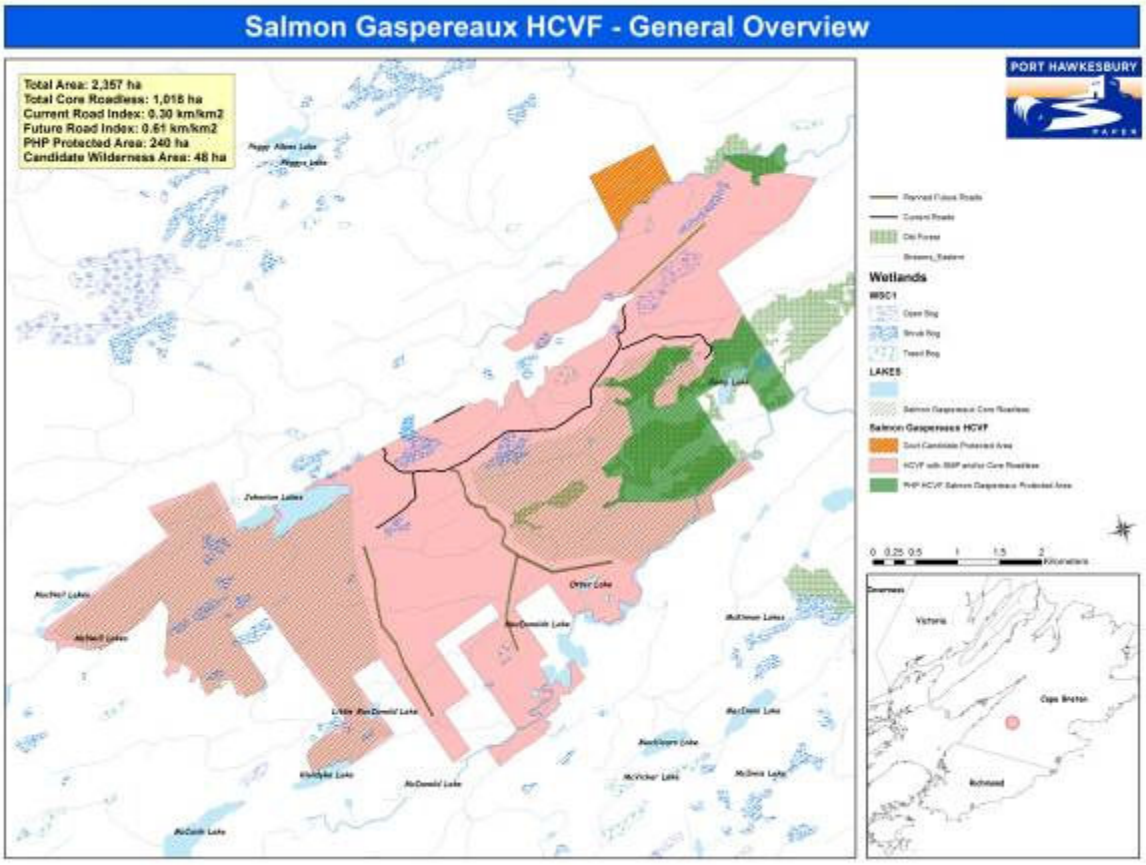

Oban HCVF - General Overview
Total Area: 1,618 ha
Total Core Roadless: 1,167 ha
Current Road Index: 0.57 km/km2
Future Road Index: 0.78 km/km2
PHP Protected Area: 174 ha
PORT HAWKESBURY
Wetlands
LAKES
Oban HCVF
Little Lake
Burley Lake
Crawley Lakes
East Lake
Brown Lake
Victoria
Inverness
Cape Breton
Richmond
Antigonish
Guysborough

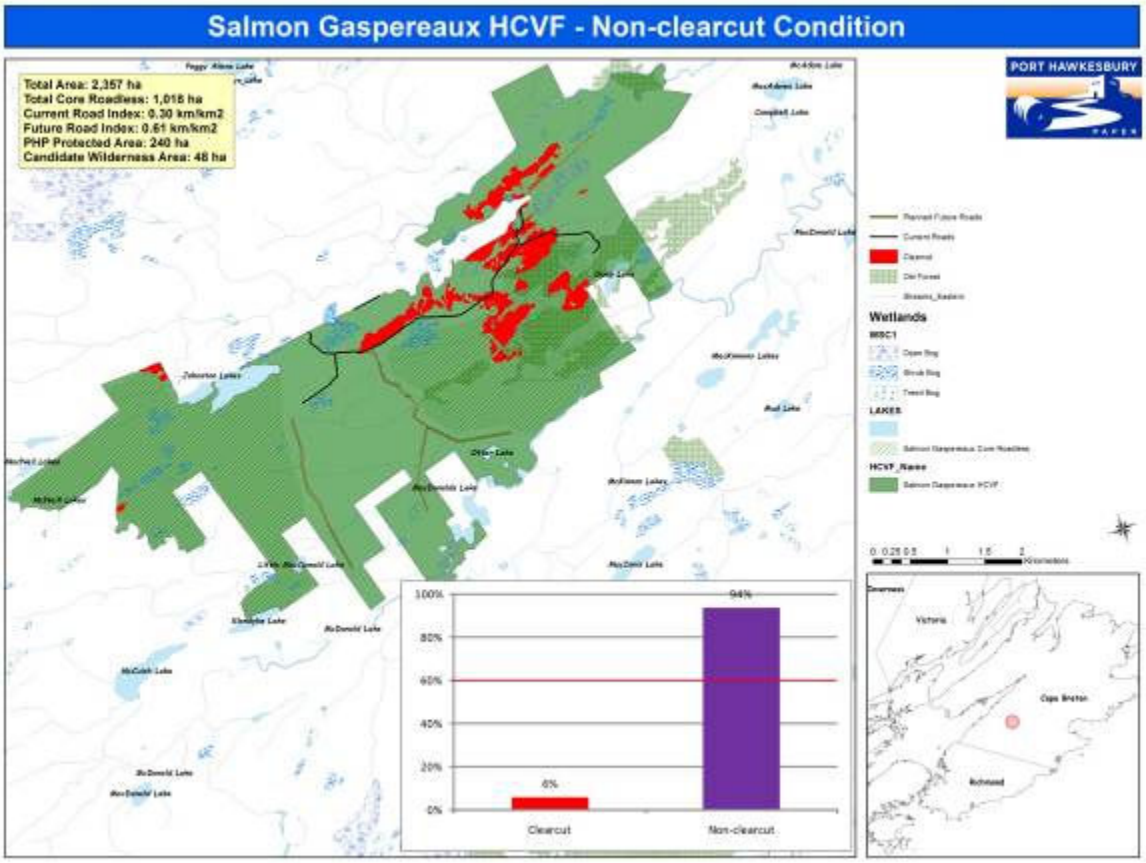

Oban HCVF - Non-clearcut Condition
NEED TO UPDATE
Total Area: 6,328 ha
Total Core Roadless: 0 ha
Current Road Index: 0.20 km/km2
Future Road Index: 0.20 km/km2
PHP Protected Area: 27 ha
Candidate Wilderness Area:963 ha
Existing Wilderness Area: 3,985 ha
PORT HAWKESBURY
Non-Clearcut Condition
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
8%
92%
Clearcut
Non-clearcut

Petit Lake Ruiss Noir HCV (fully protected)

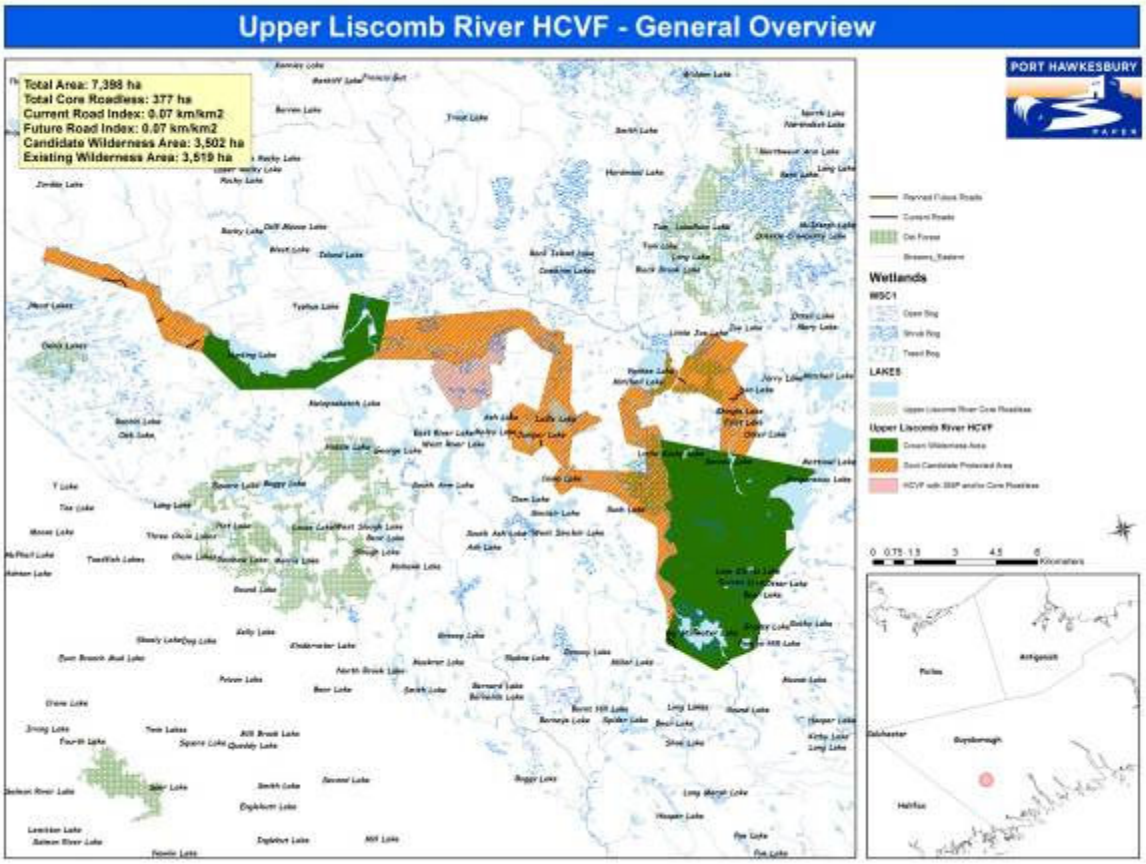


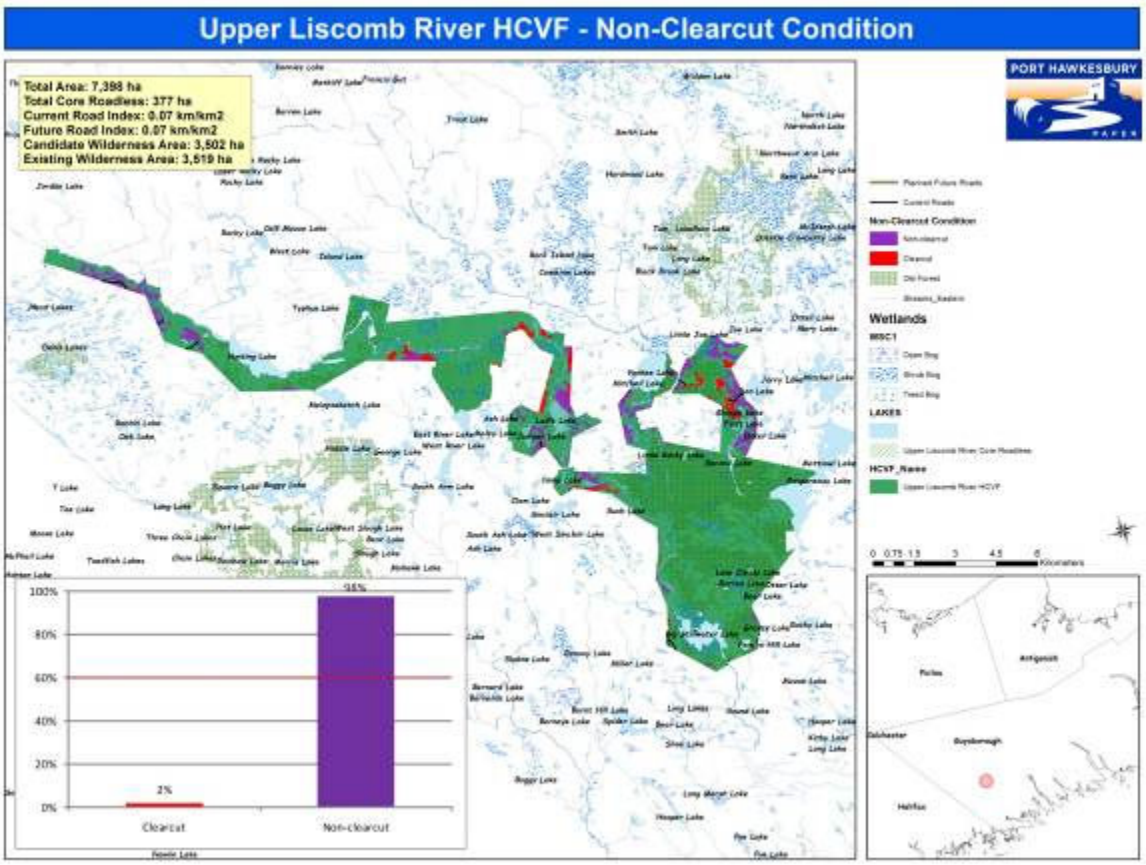
Salmon Gaspereaux HCV




Salmon Gaspereaux HCVF - Non-clearcut Condition
Total Area: 2,357 ha
Total Core Roadless: 1,018 ha
Current Road Index: 0.30 km/km2
Future Road Index: 0.61 km/km2
PHP Protected Area: 240 ha
Candidate Wilderness Area: 48 ha
PORT HAWKESBURY
Wetlands
LAKES
100%
80%
60%
40%
20%
0%
6%
94%
Clearcut
Non-clearcut
Victoria
Cape Breton
Richmond

Upper Liscomb River HCV

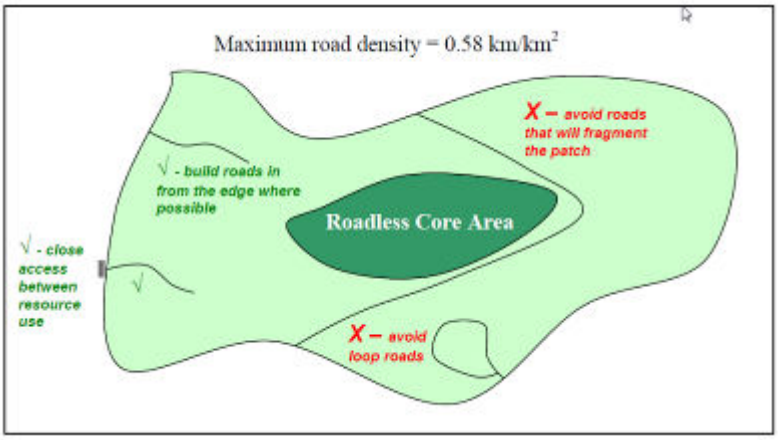




Management Approach for Large Landscape and Remnant Patch HCV's

The HCV review committee finalized a list of several management strategies at the landscape scale as well as the forest stand scale for the large landscape and remnant patch HCV's.

No management activities (harvest, silviculture, roads) permitted in legal (and pending) protected areas and PHP administrative protected areas
CORE ROADLESS AND SPECIAL MANAGEMENT AREAS
No new roads in Core Roadless areas
For HCV area outside core roadless, follow road design objectives as shown below. Road Index value at HCV level not to exceed 0.58 km/km2. If feasible and where necessary, block off access to reduce road travel.



Use the provincial Forest Ecosystem Classification Guide to identify ecosite level prescriptions that: • Promote ecosite patches by combining stands through treatment • Employ 'extensive' management practices that support: - natural regeneration - longer rotations with consideration of natural disturbance processes - tree species diversity consistent with the vegetation type, while promoting those that support long-term resilience (i.e. best options for future)
No full-tree logging
Reduce road length by increasing average forwarding distance targets by 20% (from 250 m to 300 m)
Bridge construction may be temporary and removed as practical
Retain minimum 60% area in non-clearcut condition (at the HCV level). Non-clearcut defined as forest stand greater than 10 years of age.
No FSC plantations / Intensive management
No planting of exotic species
Acadian Forest Restoration (considering N.S. Forest Code; FSC)
Management will align with natural disturbance regimes
Application of Forest Ecosystem Classification to identify appropriate treatments
Appropriate forest covertype management: Use of hardwood management keys
Appropriate forest covertype management: Use of mixedwood management keys
Natural regeneration where appropriate
Appropriate use of PHP's 12 different harvest techniques (CC, PC, SW, ST, Single, Group, Patch, CT, OR, CTR, RS, SC)
Species at Risk Recovery Strategy/SMP Implementation
No herbicides
Steep Slope Exclusion
Leave patches (e.g. active eagle/hawk nest sites, inoperable areas, vernal pools, DNR requests during approval process)

9.0 CATEGORY 3: RARE, THREATENED OR ENDANGERED ECOSYSTEMS

Category 3: Forests that are in or contain rare, threatened or endangered ecosystems

Question 8.
Does the forest contain naturally rare ecosystem types?

Rationale

Ecosystem types that are naturally rare on the landscape often contain important biodiversity, provide critical natural ecosystem services, and/or contain geographically restricted species often with narrow ecological niches. Quite often, these ecosystem-types are disproportionately significant for their size and many are vulnerable, or have been made rarer, by anthropogenic influences.

Methods

Rare ecosystem types were identified and mapped for the HCV assessment using NSE's significant ecosites database and the portfolio of critical occurrences from the assessment of the Northern Appalachian / Acadian Ecoregion by the Nature Conservancy.

Significant ecosites (NSE)

NSE has compiled a list of rare ecosystem-types within the province (Table 4-4). Currently, forty different rare ecosystem-types are included in the significant ecosite database, including examples of rare forest types, significant wetlands, coastal areas, aquatic and riverine systems, and a number of terrestrial non-forest ecosystems. Spatial distributions were generated for the database from a combination of original GIS analyses and aerial photograph interpretation, with some previous ground-truthing where possible.

All significant ecosite types included in this list occupy near, or less than, one percent of the total landmass of Nova Scotia. Some are known from only a few locations in the province or contain only a few total hectares province-wide. The significant ecosite database does not differentiate between ecosystem types that are naturally rare within the province, or those rare due to anthropogenic influences. In many cases, there is overlap between the two, where naturally rare ecosystem-types are made rarer due to ongoing anthropogenic influences.

Forest

Rare forested ecosystems include mature stands of natural jack pine, natural red pine forest, hemlock forest, beech forest, red maple floodplains, hemlock floodplains, forested floodplains, coastal tolerant hardwood forest, mountain cove ecosystems, calcareous- and karst-dominated forests, and forested dunes.

Terrestrial non-forest

Rare terrestrial non-forest ecosystems include talus slopes, karst shrublands, cliff ecosystems, coastal barrens, inland barrens, highland barrens, and certain types of wetland-barren ecosystem complexes.

Wetlands

Rare wetland ecosystems include alkaline bogs, alkaline fens, vernal ponds, salt marshes, coastal bogs, and coastal fens. For Crown lands, the NSE database also includes the best representative examples of certain wetland types within the province, as well as wetland complexes that are rare or uncommon in Nova Scotia.

Coastal

Rare coastal ecosystems within the NSE database include beach and dune systems, various types of coastal wetlands (e.g. coastal bogs, coastal fens, salt marshes), coastal barrens, erosional seabluffs, offshore islands, coastal tolerant hardwood forest, forested dunes, and type sequence examples of estuaries and lagoons.

Portfolio of critical occurrences: NAAE

The Nature Conservancy has completed a region wide analysis of the NAAE, which includes the Canadian Maritime Provinces, the Gaspé region of Quebec, and portions of the New England States. As part of this conservation assessment, a portfolio of critical occurrences was identified which includes a number of rare ecosystem-types of great importance to conservation within the ecoregion. This data was analyzed over a four-year period by a team of experts assembled by the Nature Conservancy.

For the HCV assessment, the spatial distributions of all ‘critical’ and ‘critical protected’ wetland, summit, slope, floodplain, and ravine areas from the portfolio of critical occurrences were included in the analysis of rare ecosystem-types (Table 4-5). These features are regionally-significant within the ecozone.

Results

Table 9-1. NSE significant ecosites

Rare ecosystem-type	Total area in Nova Scotia (ha)	Proportion of Nova Scotia (%)	Total area in PHP lands (ha)	Proportion of provincial occurrence on PHP lands (%)
Alkaline bog	11850.1	0.22	379.9	3.21
Alkaline fen	3513.7	0.06	130.4	3.71
Beach/dune	5806.4	0.11	125.0	2.15
Beech forest	1065.4	0.02	9.7	0.91
Calcareous forest	12423.6	0.23	1443.1	11.62
Cliff*	15.8	0.00	15.8	99.98
Coastal tolerant hardwood	1123.1	0.02	29.0	2.58
Coastal barren	63377.9	1.15	11347.4	17.90
Coastal open bog	16195.9	0.29	2029.4	12.53
Coastal open fen	2620.3	0.05	534.3	20.39
Coastal shrub bog	18264.3	0.33	3313.7	18.14
Coastal shrub fen	4231.2	0.08	533.6	12.61
Coastal treed bog	14101.1	0.26	1968.9	13.96
Coastal treed fen	2448.0	0.04	700.0	28.59
Erosional seabluff	297.8	0.01	2.0	0.66
Estuarine flat	38758.9	0.70	0.1	0.00
Estuary complex*	18.7	0.00	16.0	85.19
Fen/bog complex*	20909.2	0.38	3392.5	16.22
Floodplain forest*	196.0	0.00	59.1	30.17
Hemlock floodplain	238.6	0.00	19.3	8.11
Hemlock forest	6527.0	0.12	87.0	1.33
Highland barren	15724.2	0.29	3979.4	25.31
Inland barren	48500.9	0.88	10815.9	22.30
Inland bog/barren complex*	80.1	0.00	80.1	100.00
Karst conifer forest	11978.8	0.22	633.6	5.29
Karst hardwood forest	11622.2	0.21	995.0	8.56
Karst shrubland	1264.6	0.02	27.6	2.18
Lagoon	8119.9	0.15	209.1	2.57
Lake island	5612.1	0.10	46.7	0.83
Mountain cove	76.9	0.00	38.7	50.28
Offshore Island	24312.9	0.44	124.4	0.51
Oxbow lake	140.2	0.00	0.4	0.30
Red pine forest	2023.5	0.04	128.8	6.37
Red maple floodplain*	56.7	0.00	0.7	1.18
Salt Marsh	15482.4	0.28	15.6	0.10
Shrub fen complex*	80.0	0.00	62.3	77.83
Sugar maple floodplain	4367.1	0.08	528.8	12.11
Talus slope	946.1	0.02	160.8	17.00
Vernal pond	443.9	0.01	2.6	0.58
Forested dunes	3321.8	0.06	31.9	0.96

*representative example

Table 9-2. NAAE-CA 'critical' and 'critical protected' occurrences

NAAE-CA critical occurrence	Total area in Nova Scotia (ha)	Proportion of Nova Scotia (%)	Total area in PHP lands (ha)	Proportion of provincial occurrence on PHP lands (%)
Floodplain (critical)	77720.81	1.41	4753.81	6.12
Floodplain (critical protected)	4132.39	0.08	0.03	0.001
Ravine (critical)	0	0	0	0
Ravine (critical protected)	0	0	0	0
Slope (critical)	835.82	0.02	230.64	27.59
Slope (critical protected)	1148.60	0.02	67.02	5.83
Summit (critical)	2294.11	0.04	350.13	15.26
Summit (critical protected)	1672.28	0.03	4.20	0.25
Wetlands (critical)	16143.81	0.29	1323.80	8.20
Wetlands (critical protected)	15600.96	0.28	773.91	4.96

HCV Decision:

All significant ecosites from the NSE database, and all sites from the portfolio of critical occurrences from the Nature Conservancy's assessment of the NAAE are considered HCVs.

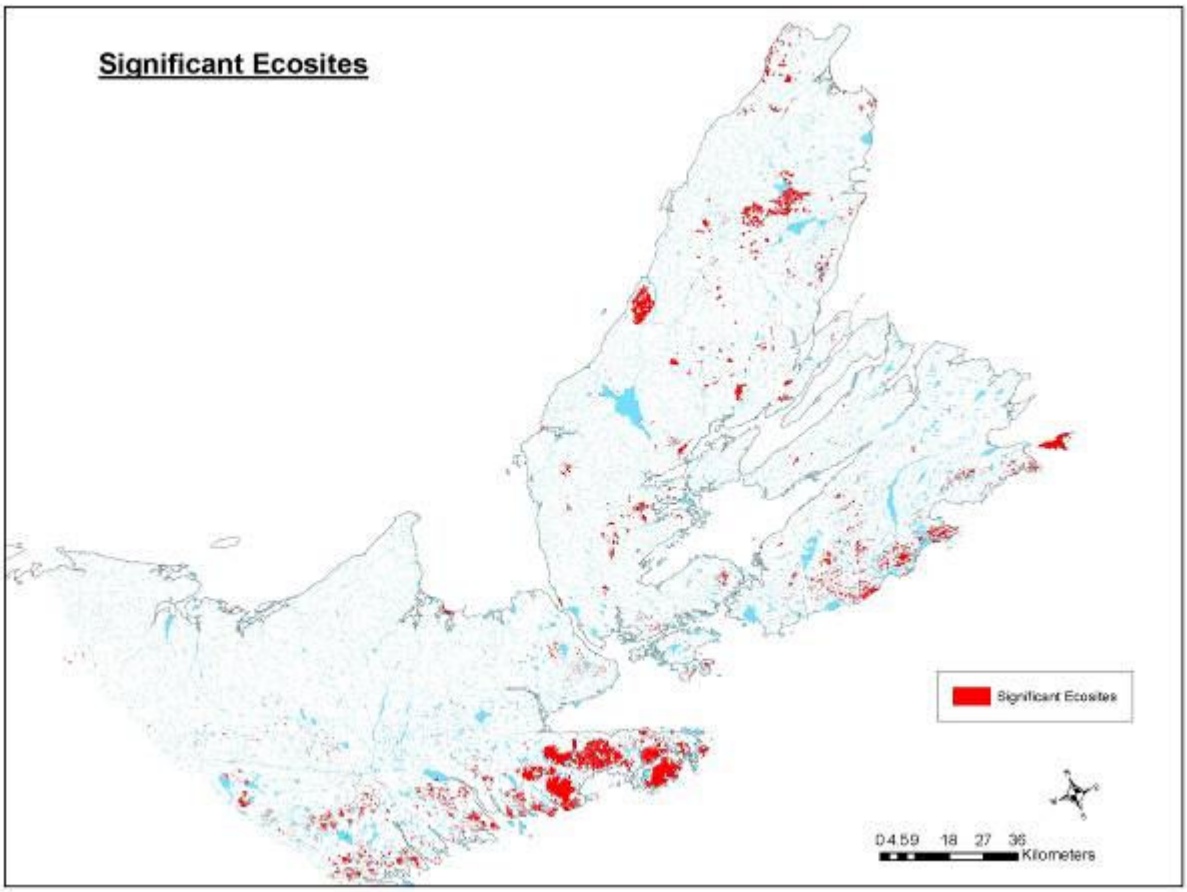


Figure 9-1. Significant Ecosites HCV

Oxbow Lake – River Inhabitants Nature Reserve
NewPage Port Hawkesbury Freehold Protected Area
Photo © David MacKinnon, NSDNR

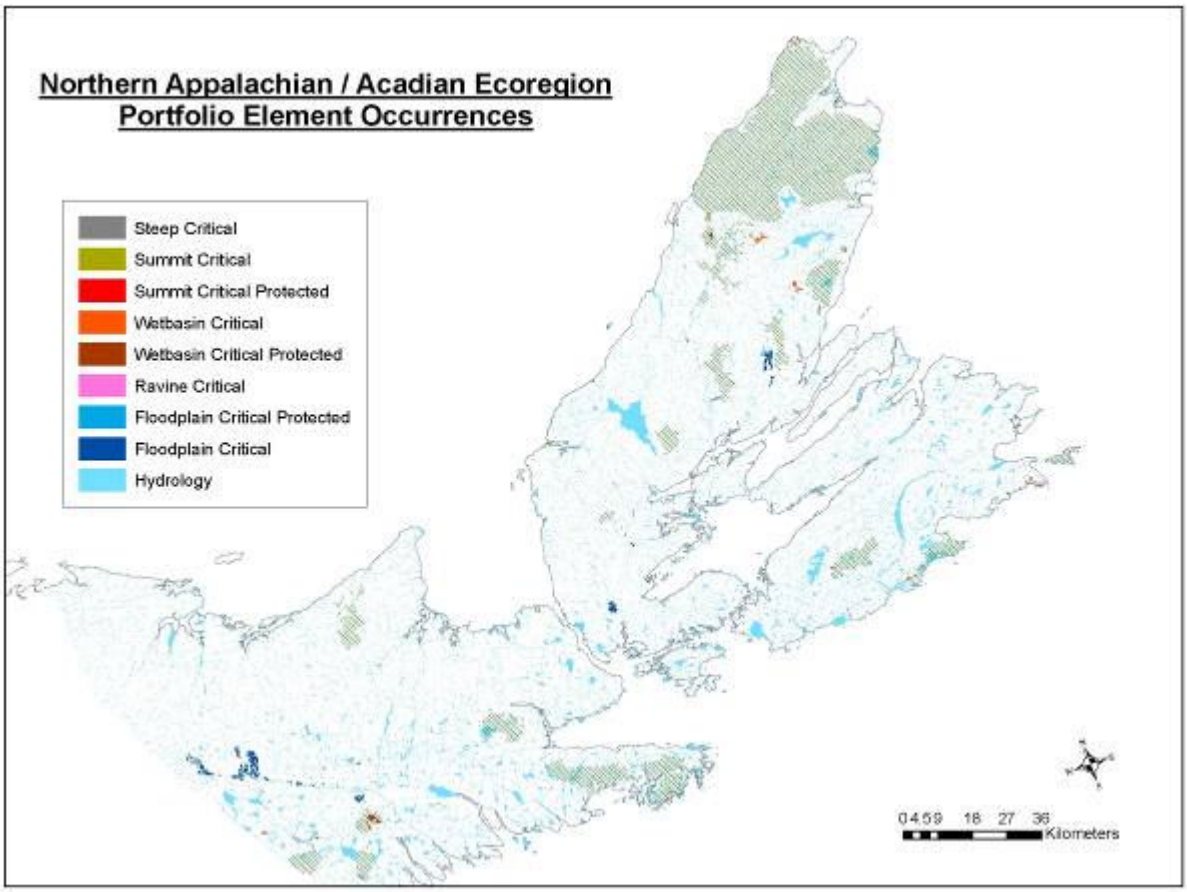


Figure 9-2. Northern Appalachian/Acadian Ecoregion HCV

Management approach

- All significant ecosites identified by the NSE database (Table 4-4), with the exceptions noted below, will receive full protection (no harvesting) and road access and fragmentation will be controlled where possible. For all significant ecosites containing a wetland or aquatic component, a buffer zone will be established around these features as per provincial watercourse regulations.

    - The only exceptions for full protection include karst conifer forest, karst hardwood forest, calcareous forest, and hemlock forest. For these rare ecosite-types, these areas will be managed to maintain and restore mature climax conditions for their respective forest-types over time. Further, hemlock stands will always be managed to maintain and restore hemlock, and where hemlock stands occur on floodplains, no harvesting will occur and these areas will be declared fully protected.

- All NAAE layers that are 'critical' or 'critical protected' will receive full protection (no harvesting) and road access and fragmentation will be controlled where possible. For

occurrences that contain wetland or aquatic elements, a buffer zone will be established around these features as per provincial watercourse regulations.

Question 9.
Are there ecosystem types or ecosystem type conditions with the forest or ecoregion that have significantly declined, or under sufficient present and/or future development pressures that they will likely become rare in the future (e.g. old seral stages)?

Rationale

Old growth forests are significantly rarer in Nova Scotia today than they were in the past, and much of this decline has been caused by anthropogenic influences. The few stands of old forest that remain are hugely important for the normal functioning of the Acadian forest and are critical for the protection of biodiversity in Nova Scotia, particularly for old-forest dependent species.

Methods

Old forests and late seral stage forests are not common in Nova Scotia. Here, the long history of settlement and resource use has led to a severe decline in the quantity and quality of old forest.

Significant, Old, or Unique Forest database (NSE)

For the HCV assessment, old forests were identified and mapped using NSE's "Significant, Old, or Unique Forest" (SOUF) database. This database uses original queries of NSDNR's forest inventory to identify the location of stands with old forest characteristics for Nova Scotia, as determined by climax species composition and stand height.

Additionally, the CSFF analysis has also generated a rarity-weighted score for each stand-type, as determined by its relative abundance expressed as a proportion of total SOUF in the province. This information is being used as part of a more comprehensive analysis to prioritize and weigh the relative importance of candidate sites for the creation of new protected areas.

A limited amount of field verification has been undertaken using the SOUF patches, so there is a certain amount of ambiguity within the dataset that will need to be worked out over time. Many of these patches are mature climax or late seral stands that have the potential to become old forest or old growth forest reasonably soon.

Old forest database (NSDNR)

NSDNR's old forest strategy seeks to maintain and restore a minimum of 8% of the total provincial landmass in an old forest condition. Currently, a number of areas have been designated as old forest by NSDNR and these areas are currently off-limits to forest harvesting.

These sites have been field verified on the ground, so there is strong confidence in the accuracy of the sites selected. There is provision in the identification of old forest areas to de-list an area if another area is found to contain significantly better old forest characteristics. Refer to NSDNR's old forest strategy for further details on the preparation of the old forest layer.

Primordial stands

Few primordial stands of old-growth forest remain in Nova Scotia (*see the FSC Maritime Standard for a definition of primordial forest*). Currently, no comprehensive list exists for the province which shows the locations of primordial stands that could be readily applied to the HCV assessment. Sites meeting this criterion are known on a case-by-case basis only, and large gaps exist in our current state of knowledge in this regard.

Results

Results of the SOUF analysis are shown in Table 9-4 for each stand type.

HCV Decision:

All areas flagged by the NSE's SOUF database and NSDNR's old forest layer are considered HCVs, as well as any known occurrences of primordial old-growth forest stands.

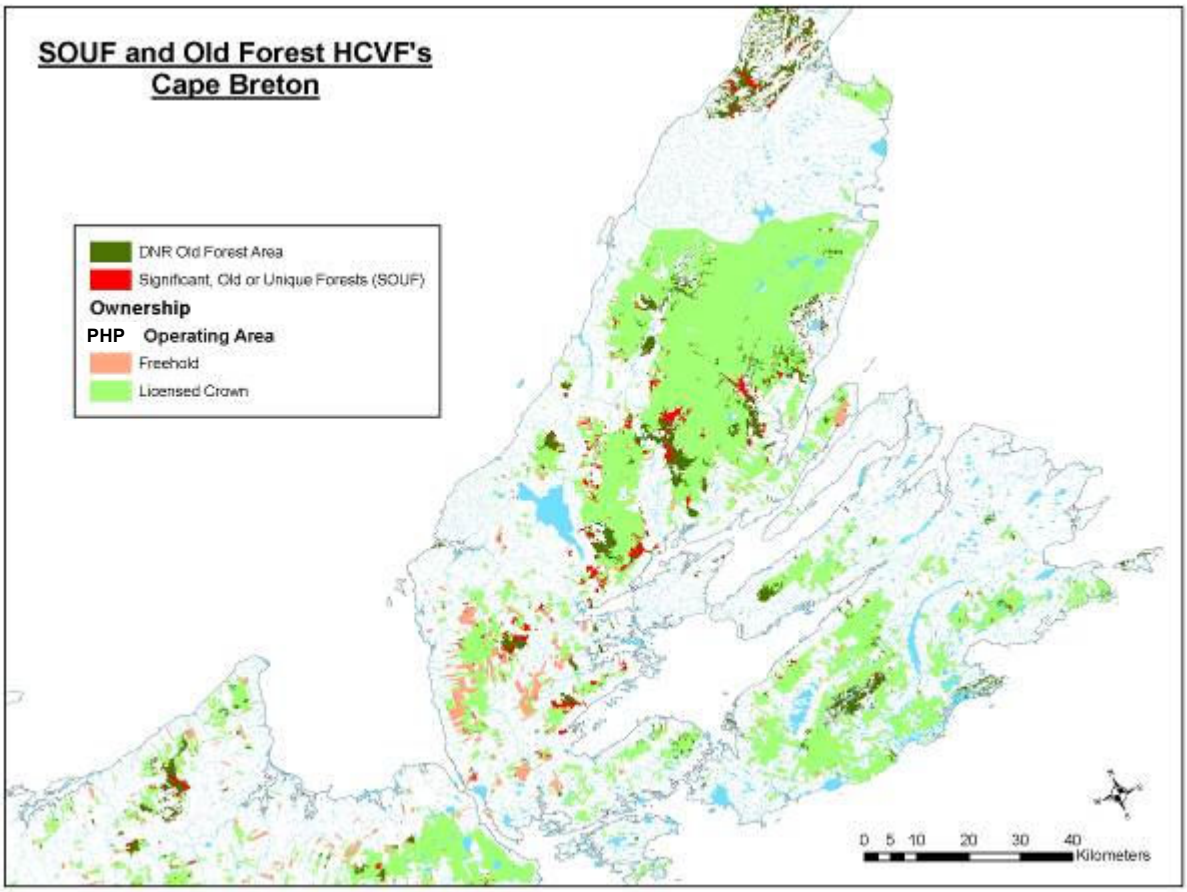


Figure 9-3. SOUF and Old Forest HCV's Cape Breton

Hemlock Forest
Photo: Phil Clark, FSC Certified Private Woodlot Owner

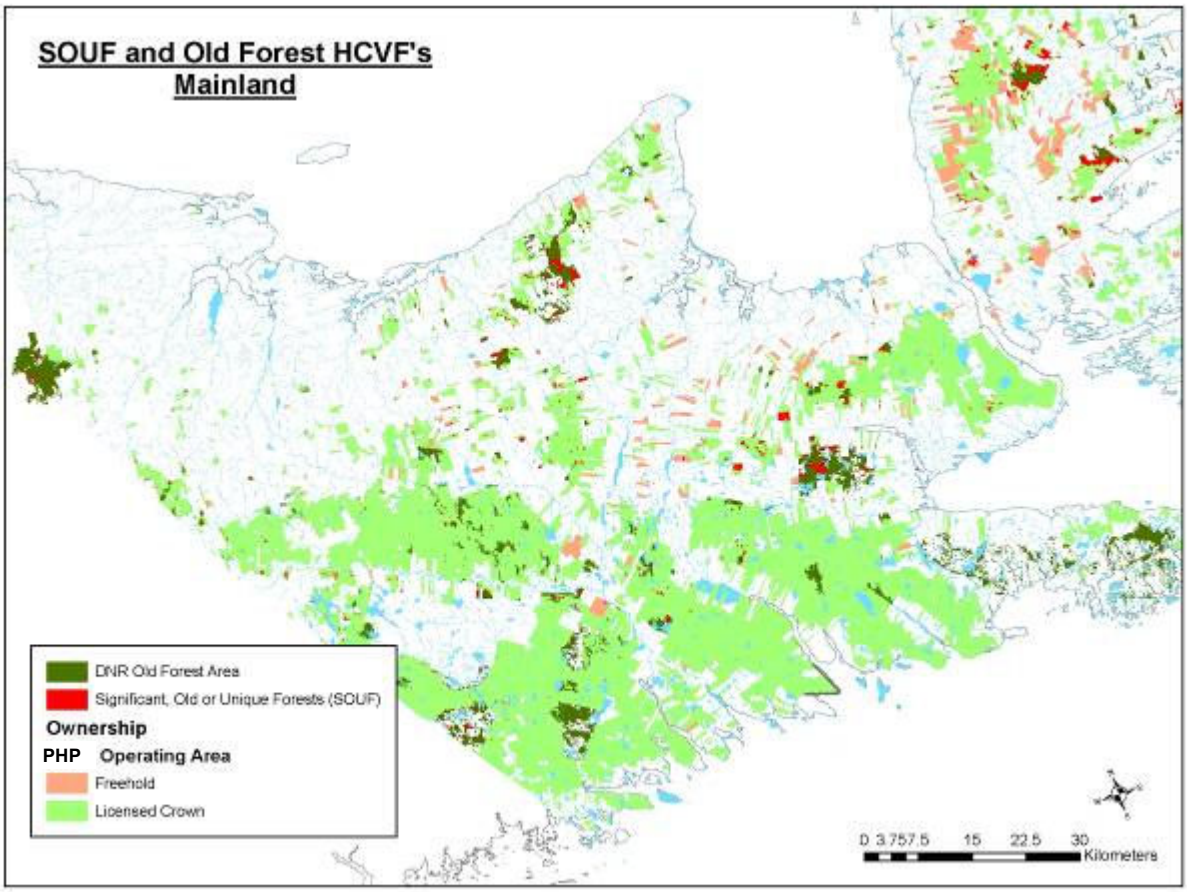


Figure 9-4. SOUF and Old Forest HCV's Mainland

Management approach

- Sites flagged by the SOUF database as being significant, old, or unique will be deferred from harvesting unless shown to be otherwise in the field by experts using the SOUF criteria in Table 9-4. Areas verified as containing significant, old, or unique forest qualities will receive 'full protection' and will be designated by PHP as protected areas. Should the area be equivalent in size, but more ecologically significant, to an existing old forest area defined by the NSDNR, there is the ability to swap areas according to NSDNR's old forest policy. Areas found not to possess such qualities on the ground but containing the climax species as shown in Table 9-4 will remain as HCVs, but instead of receiving full protection these sites will be managed to maintain and restore mature climax and late-seral conditions of the Acadian forest, including continuous retention of old forest conditions. They will not be intensively managed (*e.g. no plantations, no planting of exotic species, etc.*).

- No harvesting will occur within any of the old forest zones flagged by the NSDNR old forest database, as per current provincial requirements.

- No primordial old growth forest will be harvested. These sites will receive full protection and will not be fragmented by road-building or other types of activities associated with the use of adjacent or nearby lands. PHP recognizes that there are significant knowledge gaps for the locations of these stands and will work collaboratively with scientific experts to identify and map locations of primordial old growth forest stands within its area of operation.

Table 9-3. Stand-specific queries of the forest inventory identifying significant, old, or unique forest (SOUF) (NSE)

Species composition	Stand height
70% or more spruce or red spruce	≥17m
50% or more eastern hemlock	≥15m
50% or more white pine	≥18m
70% or more climax coniferous species with the most common species no more than 60%	≥17m
50% or more sugar maple	≥17m
50% or more yellow birch	≥17m
70% or more climax deciduous species (tolerant hardwood)	≥17m
70% or more climax coniferous or deciduous species with neither group exceeding 60%	≥17m
30% or more red pine	≥12m
10% or more red oak	Any height
10% or more eastern white cedar	Any height

Sugar Maple Forest
Photo: Raymond Plourde, Ecology Action Centre

Table 9-4. Significant, old, and unique forest in Nova Scotia

Stand-type	Total area in Nova Scotia (ha)	Proportion of Nova Scotia (%)	Total area in PHP lands (ha)	Proportion of provincial occurrence on PHP lands (%)
American beech	2578.76	0.05	9.73	0.38
Black ash	Unknown	Unknown	Unknown	Unknown
Eastern hemlock	9818.17	0.18	98.02	1.00
Eastern white cedar	Unknown	Unknown	Unknown	Unknown
Elm	61.40	0.001	0.13	0.20
Jack pine	1672.5	0.03	0	0
Mixed climax coniferous	16648.71	0.30	120.72	0.73
Mixed climax coniferous-deciduous	7752.76	0.14	263.69	3.40
Mixed climax deciduous	14950.99	0.27	2606.22	17.43
Red oak	648	0.02	0	0
Red pine	1254	0.04	6.6	0.3
Spruce	11874.91	0.22	144.82	1.22
Sugar maple	363.71	0.01	14.91	4.10
White pine	28590.28	0.52	85.25	0.30

Question 10.
Are there ecosystems that are poorly represented in protected areas, and likely to become rare in an intact state due to ongoing human activities?

Rationale

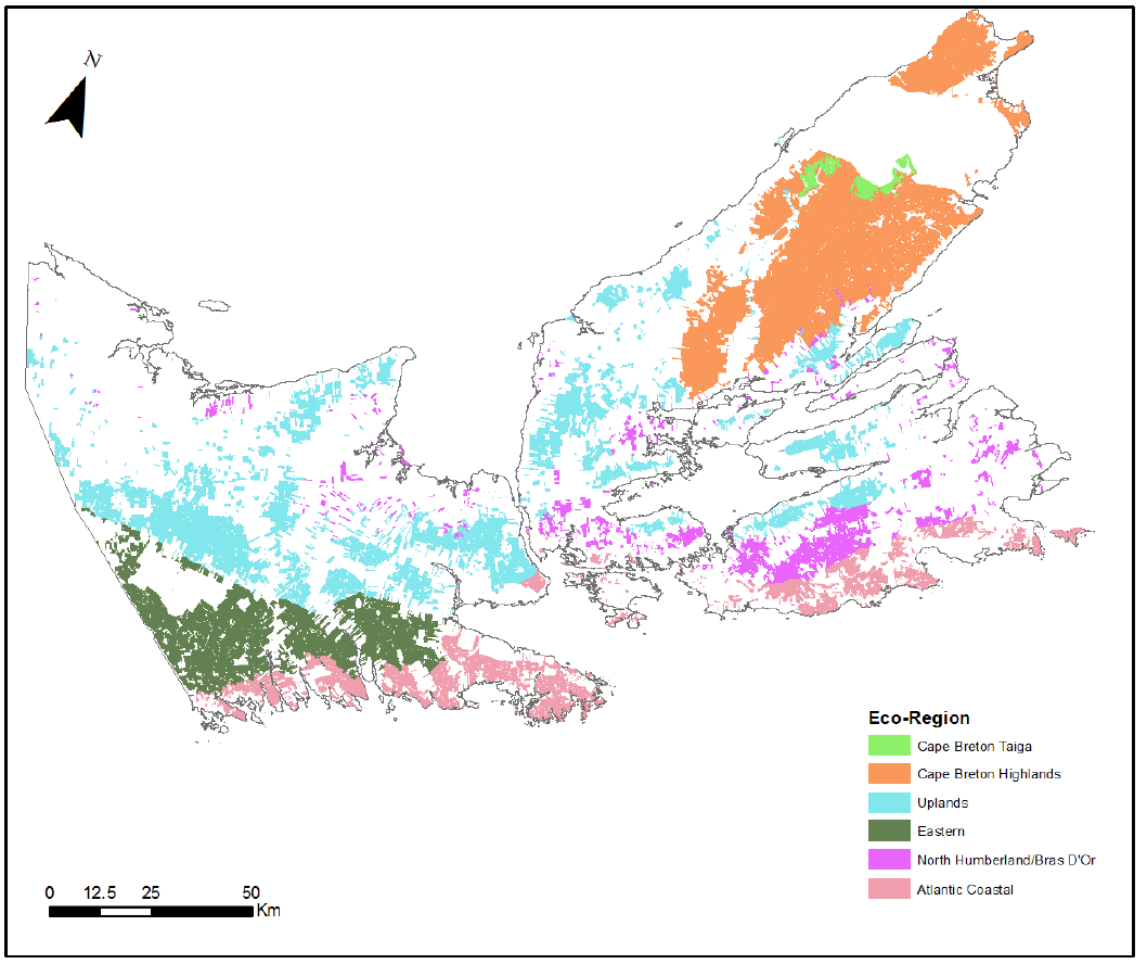
When the first HCV assessment was completed in 2010, sizeable gaps existed in Nova Scotia's system of protected areas, with only 8.2% of the provincial landmass designated as legally-protected. Some landscapes in the province contained no protected areas, leaving many important ecosystems and natural areas under-represented in the protected areas system. In 2013, the provincial government completed a new parks and protected areas plan for Nova Scotia to increase the legally protected landmass to 12% as outlined in the *Environmental Goals and Sustainable Prosperity Act*. This new plan delivers on that commitment by identifying an additional 200,000 hectares province-wide for protection by 2015 (which will increase legal protection to 13%)

PHP recognizes the importance that protected areas play in maintaining the natural biodiversity of Nova Scotia forests. Since the first protected areas were legally set aside in 1998, PHP has made huge contributions to the protected areas network of Nova Scotia through both legal and administrative set asides as managers of the majority of the crown license in Eastern Nova Scotia. In addition to protected areas, PHP implements a vast array of special management practices on the remainder of its holdings to sustain ecosystem function and natural biodiversity.

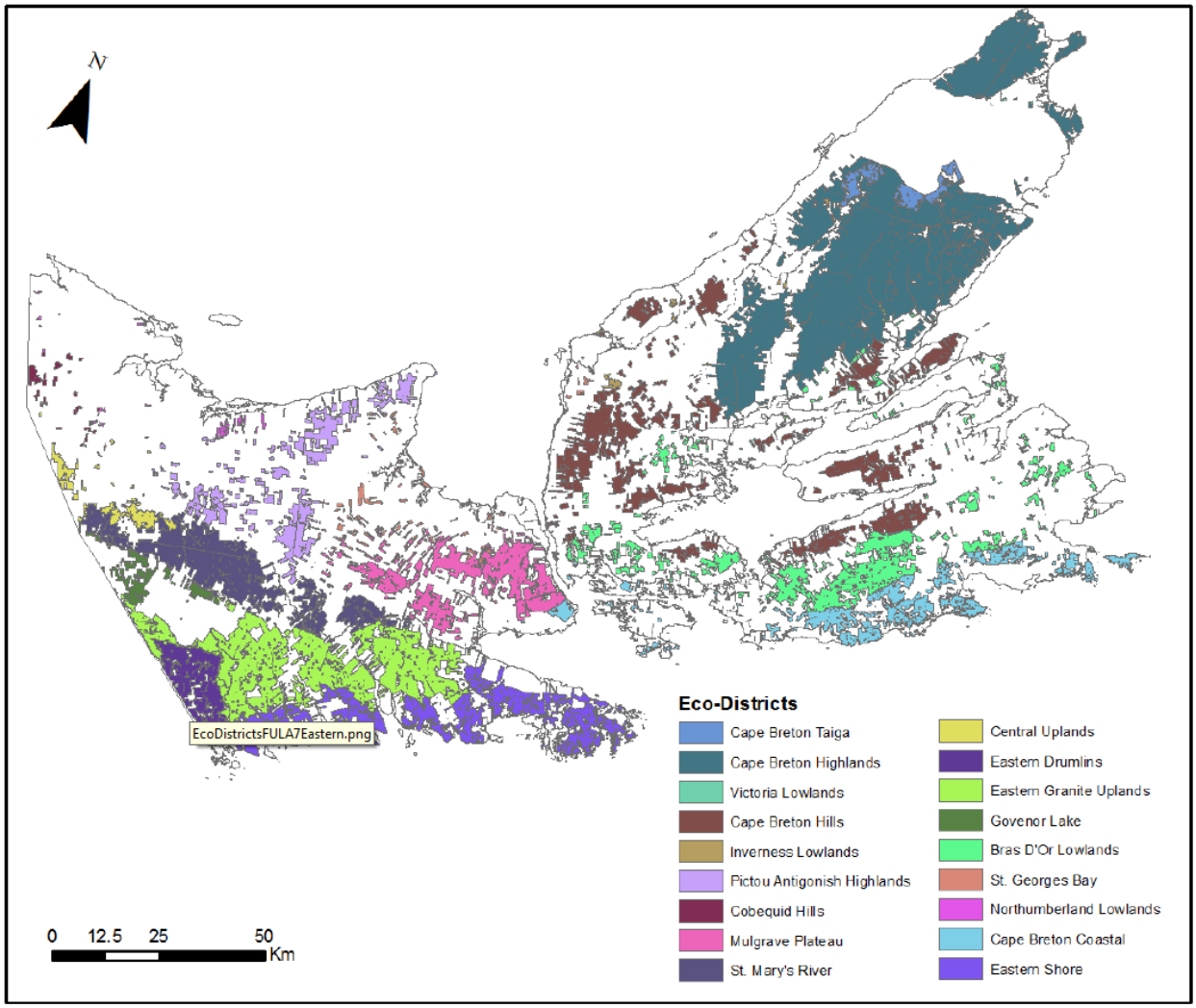
To evaluate our progress in contributing to the protected areas of Nova Scotia and set forth a plan in moving forward, an independent Gap Analysis was conducted on PHP's Crown lease holdings. In accordance with FSC Criterion 6.4, provincial classification systems were used to evaluate the representivity of current legal and administrative protected areas.

Methods

Three separate yet inter-relatable provincial layers were used to assess gaps at the different landscape scales. All layers are used in PHP's Sustainable Forest Management Long-term Plan, and are the framework for reporting on all habitat, economic, social, and timber supply objectives. Ecoregions, being the coarsest scale, was used to classify PHP's lease lands into six regional categories. Ecoregions are primarily delineated based upon differences in climatic conditions. The below figure displays ecoregions present on PHP land.



Ecoregions can be further broken down into ecodistricts. PHP manages eighteen ecodistricts on its license. All ecoregions, with the exception of Cape Breton Taiga, are composed of multiple ecodistricts. For instance, the Uplands Ecoregion is broken down into seven separate ecodistricts. The below figure displays the eighteen ecodistricts PHP manages.



Scale becomes further refined with the next landscape classification component in the Ecological Landscape Assessment. There are twenty six classes of landscape elements included in PHP's gap analysis. Coastal beaches, salt marshes, water, and wetlands were excluded from this analysis since these are considered inoperable.

PHP's gap analysis included forest lands that are either legally or administratively protected. Legal protection is composed of the 13% protected (legal and pending) lands identified by the provincial government. Administrative protection are areas protected through policies to protect habitat and other considerations. The administrative protected areas consist of old forest, moose patches, lynx bog buffers, boreal felt lichen buffers, steep slopes (>30%), and leave patches for other wildlife (e.g. Goshawk Nests). The PHP administrative protected areas discussed under HCV Category 2 in this report were not included since they were not yet identified at the time the gap analysis was completed.

There was no double counting of protected areas. For example, if a one hectare patch is protected by both old forest and steep slopes, it was still considered one hectare of protected.

Using the same example, a map of that hectare would show as either old forest or a steep slope depending on order of GIS overlay.

The breakdown of protected area as a percentage varied depending on the scale observed and the number of classes used. PHP used a tiered approach to evaluating protected area allocation across its land-base. The criteria and associated representation class are as follows:

Criteria	Category
≤ 2%	Lacks Representation
> 2% and ≤ 6%	Representation Present, Fair
> 6% and <14%	Representation Present, Good
≥ 14%	Representation Present, Excellent

Results

Twenty-four landscape elements were used in PHP's gap analysis. Since elements are permanent spatial features which cross ecodistrict boundaries, the result is 80 different ecodistrict/element classes. PHP has committed to maintaining a minimum of 2% of each element within each ecodistrict in a protected state. The gap analysis resulted in achieving the 2% minimum protection for the 80 different ecodistrict/element classes. These results can be found in PHP's *Gap Analysis for Port Hawkesbury Paper LP FULA Lands for Eastern Mainland and Cape Breton, Nova Scotia (August 2014).* The below table shows the percent protected at the ecoregion level, which overall equates to 36% of PHP's lease lands being either legally or administratively protected.

Ecoregion	Percent Protected
1 - Cape Breton Taiga	72%
2 - Cape Breton Highlands	59%
3 - Uplands	25%
4 - Eastern	19%
5 - Northumberland	19%
8 - Atlantic Coastal	42%

HCV Decision:

Although PHP has achieved the minimum 2% protection goal across all landscape ecodistrict/element classes, eight new administrative protected areas were identified by PHP in collaboration with the HCV review committee because of their ecological importance and the committee's interest in seeing some protection in landscapes not captured in the provincial protected areas process.

The eight administrative protected areas identified total 6,147 hectares. These sites include: Country Harbour, Boisedale Hills, Hill Lake, Jim Campbells Barren, North River, Oban, Mason's Mountain, and Salmon Gaspereaux. Maps of these sites are provided under Category 2 of this report.

Management approach

No forest management activities are permitted in the eight PHP administrative protected areas.

Question 11.
Are large landscape level forests (i.e. large unfragmented forests) rare or absent in the forest ecoregion?

Rationale

Large landscape-level forests are relatively rare within the Northern Appalachian / Acadian Ecoregion, including most parts of Nova Scotia. An analysis of the human footprint in this area demonstrates the human footprint in this region. Thus, in order to maintain and restore the natural processes and ecosystems typical of this region, remnant patches of large landscape-level forests will need to be protected and restored, and critical linkages and corridors will need to be established across the landscape.

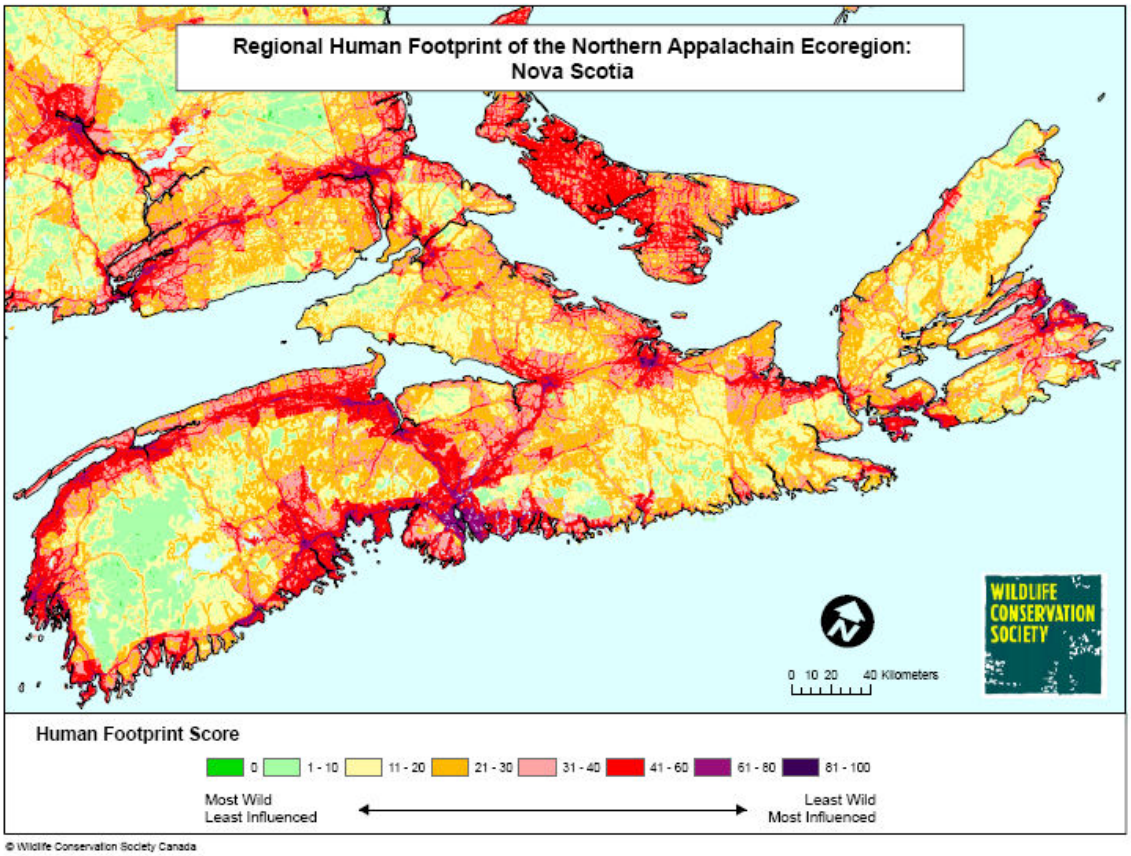


Figure 9-5. Regional Human Footprint – Nova Scotia

Methods

Large landscape-level forests and remnant patches

Large landscape-level forests (> than 10,000 hectares) and remnant forest patches (< 10,000 hectares) have been identified in this HCV assessment under Category 2.

Connectivity zones

Several regional corridors have already been designed and implemented by PHP and are included within the company's existing long-range management plan. These linkages, which are 500m in width, and include a solid 100m core zone, were selected by PHP to provide continuous canopy cover at critical areas on the landscape, particularly between existing protected areas and between designated old forest zones.

Results

For a complete description of the large landscape-level forests and remnant patches identified as HCV's, see Category 2 of this HCV assessment.

Existing connectivity zones within PHP's area of operation are shown below.

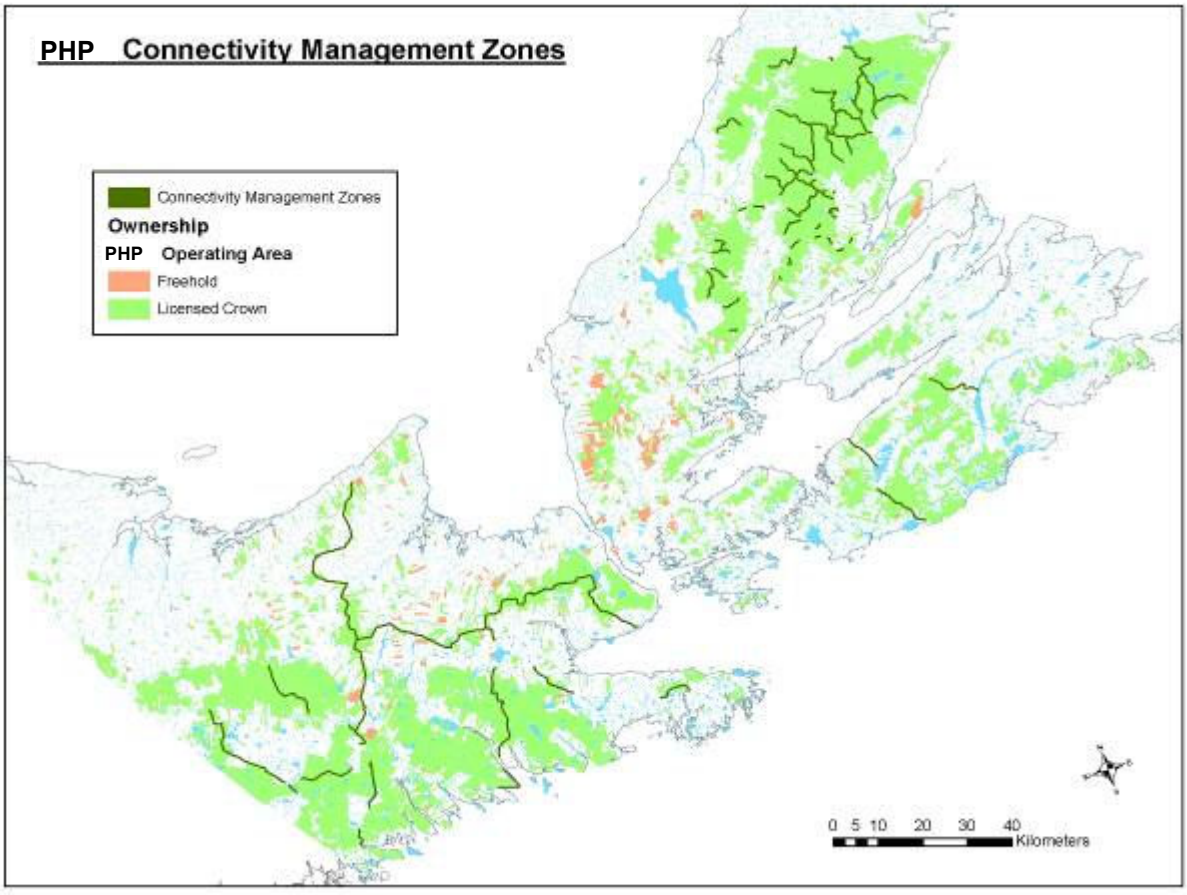


Figure 9-6. PHP Connectivity Management Zones

HCV Decision:

All large landscape-level forests and remnant patches identified under Category 2 are HCV's, as well as existing connectivity zones identified by PHP.

Management approach

The management approach for all large landscape-level forests and remnant patches is described under Category 2.

The PHP connectivity zones will be managed to provide continuous canopy cover within the 500m wide corridors, which will include a solid 100m wide core zone. Although some harvesting will occur within the 500m zones, at no time will these corridors be severed across their width as a result of these treatments. The corridors will not be intensively managed anywhere within the 500m connectivity management zones.

Question 12.
Are there nationally/regionally significant diverse or unique forest ecosystems, forests associated with unique aquatic ecosystems?

Rationale

Intact forests provide a number of important ecological services that benefit adjacent aquatic ecosystems, including controlling water temperature, flooding, erosion, and sedimentation, among others. These forests also provide critical habitat for many important aquatic and wetland species, some of which are rare in Nova Scotia and the NAAE more broadly. These forests must be managed to protect these values and to avoid degrading adjacent aquatic ecosystems.

Methods

Experts on the HCV Assessment Committee were asked to identify key watersheds within PHP's area of operation containing forests associated with important aquatic ecosystems. This analysis was aided by various existing GIS databases for species at risk, significant habitat, significant ecosites, old forest, and large-landscape level forests. Particular attention was paid to the analysis of distributions of aquatic species at risk, namely wood turtle and Atlantic salmon. Watersheds with clusters of these species were flagged by the HCV assessment. Distributions of significant riparian forests were also identified and mapped using the 'forested floodplain' polygons of NSE's significant ecosites database (Refer to Category 3; question #8).

Results

Critical watersheds

St. Mary's River

Clusters of significant ecological values were identified within the St. Mary's River watershed, in mainland Nova Scotia. These values include the presence of species at risk (particularly wood turtle and Atlantic salmon), concentrations of significant ecosites and old forest stands, presence of large intact forests, and presence of rare and irreplaceable ecosystem elements identified in the 'portfolio of occurrences' for the NAAE-CA by the Nature Conservancy.

St. Mary's River
Photo: Raymond Plourde, Ecology Action Centre

Margaree River

Similarly, clusters of significant ecological values were also identified within the Margaree River watershed, on Cape Breton Island. This river system, designated as a Canadian Heritage River, contains some of the most significant Atlantic salmon populations remaining in Nova Scotia. It also contains a number of significant ecosites, continuous stretches of old tolerant hardwood forest, and large intact forests on steep slopes adjacent to the river. The majority of the watershed also still exists in a relatively natural condition and provides important ecosystem services for aquatic ecosystems associated with the Margaree River.

Margaree River

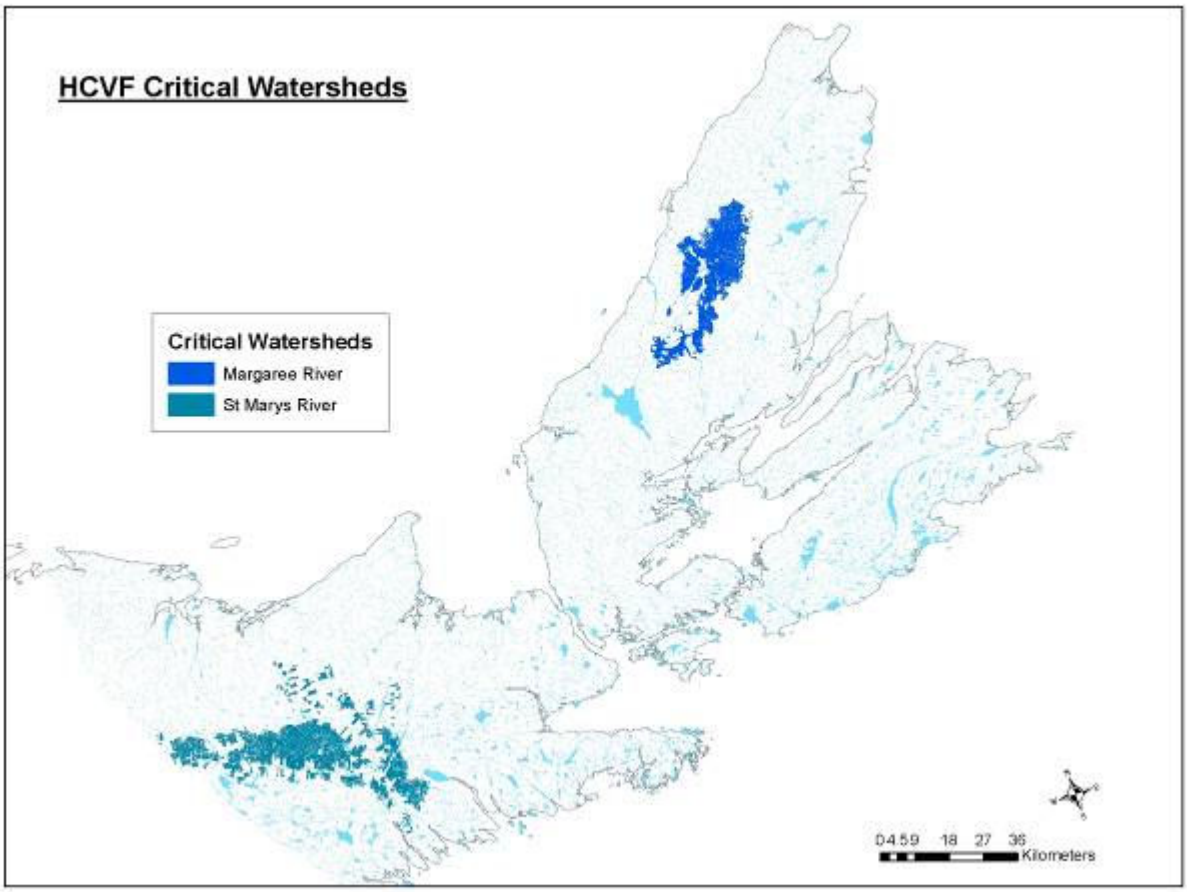


Figure 9-7. Margaree River and St. Mary's River Critical Watersheds HCV

HCV Decision:

All lands within the St. Mary's River and Margaree River watersheds, within PHP's area of operation, are considered HCVs.

All 'forested floodplain' areas identified and mapped within NSE's 'significant ecosite' database are also considered HCVs (refer to Category 3, question #8).

Management approach

- PHP will follow its watershed guidelines and maintain at least 90% of the St. Mary's River and Margaree River watersheds in a natural condition for restoration, and will establish 200m Acadian forest restoration zones (i.e. non-intensive management) along all main watercourses.

- Additionally, the St. Mary's River watershed will be managed to protect important wood turtle populations and habitat, as outlined in Category 1.

- Steep slopes are a critical feature of the Margaree Watershed and will not be harvested using conventional harvesting methods. Currently, no harvest methods are used in steep slope areas and it is not expected to change. However, any methods developed would be subject to approval by the PHP Forest Advisory Committee.

- All forested floodplains contained in NSE's significant ecosite database will receive full protection and road access will be controlled where possible, as per Category 3, question #8.

10.0 CATEGORY 4: BASIC SERVICES OF NATURE

Category 4: Forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control).

Question 13.
Does the forest contribute to maintaining the quality, quantity and seasonal timing for water flows that are a source of drinking water, irrigation water or water for a critical economic activity?

Rationale

Water is the world's most important natural resource since it provides the Earth with the capacity of supporting life. It provides society and communities with vital ecological, economic, and health benefits.

At the watershed level, forest management activities can have significant impacts on the quality and timing of delivery of stream water. Trees tend to buffer large fluctuations in hydrological cycles by intercepting and redistributing precipitation, reducing evaporation, and delaying spring melt. As a result, removal of too large a proportion of forest cover within a watershed can result in increased total stream flow, larger peak stream flows in the spring, increased risk of flooding, increased siltation, nutrient and pollutant loading, and reduced summer stream flows (Kimmins 1987).

These increases in stream flow extremes can have a negative impact on both aquatic life and domestic water consumption. Increased peak flows can result in increased erosion of stream banks, while lower summer flow rates can result in higher water temperatures and reduced water quality. Therefore, proper management of the forest is essential for the maintenance of healthy and abundant water (NewPage Port Hawkesbury, 2006).

Methods

This attribute was assessed through several sources of information including:

- Port Hawkesbury Paper's Policies
- Port Hawkesbury Paper's Sustainable Forest Management Long-term Plan
- Port Hawkesbury Paper's Environmental Management System
- Port Hawkesbury Paper's GIS Database
- Wildlife Habitat and Watercourse Protection Regulations
- Consultation with the Nova Scotia Environment

Results

PHP currently implements several water quality protection measures as part of its everyday forest management operations and complies with all federal and provincial regulations

concerning water use and management. For example, the provincial *Wildlife Habitat and Watercourse Protection Regulations"* requires the company to establish a minimum 20 meter riparian buffer along all streams 50 cm wide or greater and all waterbodies (non-treed wetlands, bogs, lakes). As percent slope increases adjacent to these areas, the riparian buffer is increased. The purpose of these buffers is to provide shade for maintaining cool stream temperatures, stablize stream banks, and filter silt and nutrients from overland flow. Wildlife habitat benefits are also provided.

Through the company's Environmental Management System and forest certification commitments since 2002, the company has invested considerable efforts into developing and applying practices that reduce or eliminate site specific impacts such as rutting, ground disturbance, erosion, and fuel storage, which can have negative impacts on water quality. Work instructions and training on water quality protection practices are provided to all company personnel and contractors through the Environmental Management System. Both internal and third-party auditing to the FSC and SFI forest certification standards, ensures that these practices are carried out properly. Longer-term effects on timing and magnitude of stream flow events must be addressed through long-term planning procedures.

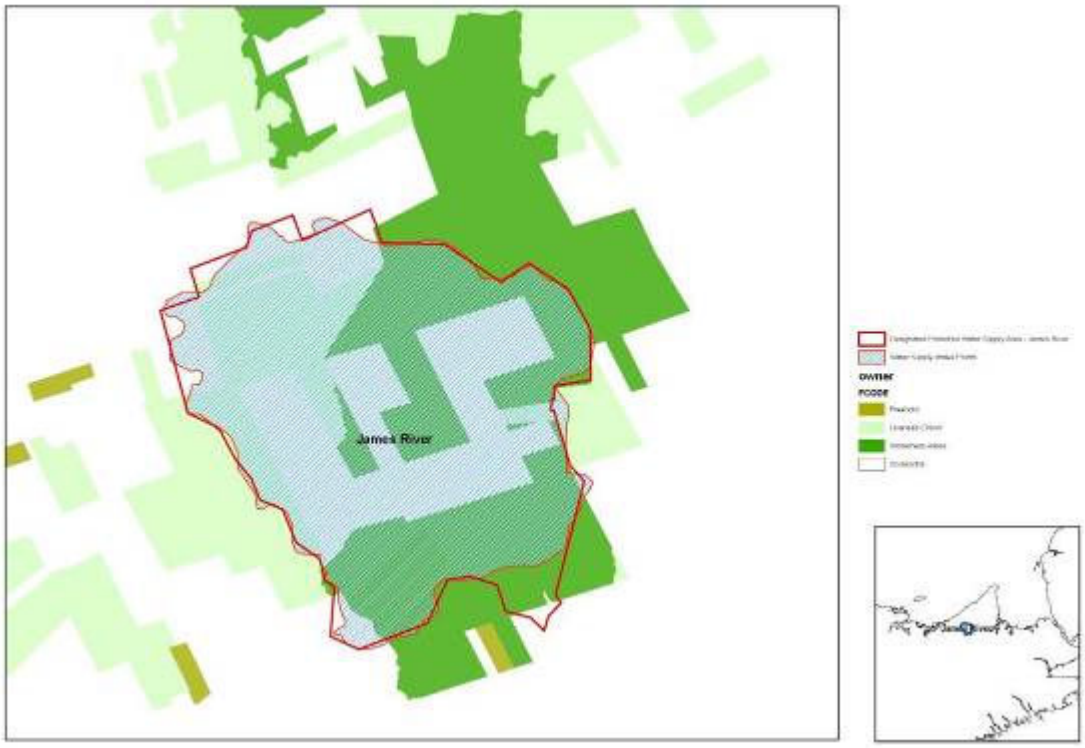
The company's Sustainable Forest Management Long-term Plan has outlined a first step towards watershed-level management through development of Indicator 3.2.1 with the objective of protecting hydrological functions in all watersheds. The indicator statement is "*proportion of identified watershed area (that is managed by PHP) in a closed forest condition with a target of each watershed maintaining 80% of its area (that is managed by PHP) in a closed forest condition (> 10 years of age)*." The PHP definition of a 'closed forest condition' is supported by the Nova Forest Alliance's Criteria and Indicator Report (> 10 years), and the Fundy Model Forest Criteria and Indicator Report (> 10 to 12 years). Although neither report identifies a minimum allowable percentage in a closed forest condition, other watershed studies indicate a minimum of 60% to 80%. To err on the side of caution, the company has identified 80% as the required minimum for a closed forest condition in each identified watershed.

To measure this indicator, a total of 17 watersheds were selected for special management and monitoring. Six of these watersheds are municipal watershed areas that were designated for special management during the provincial Integrated Resource Management process in 1998. These are:

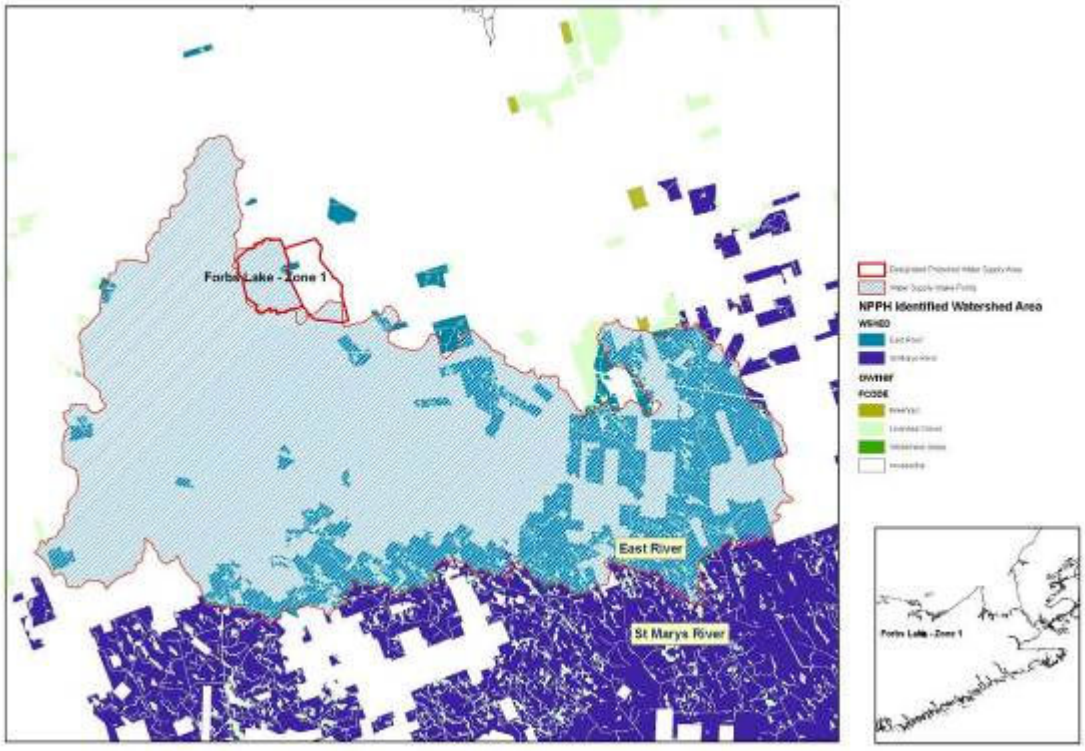
- Antigonish Municipal Water Supply Area
- Guysborough Municipal Water Supply Area – 1
- Guysborough Municipal Water Supply Area – 2
- Inverness Municipal Water Supply Area
- Pictou Municipal Water Supply Area
- Victoria Municipal Water Supply Area

Since then, the Antigonish municipal water supply area has been designated as the James River Water Supply Area under the Environment Act (*1994-95, c. 1, s. 1.*). Other legally protected water supply areas under the Environment Act that are within PHP's operating area are:

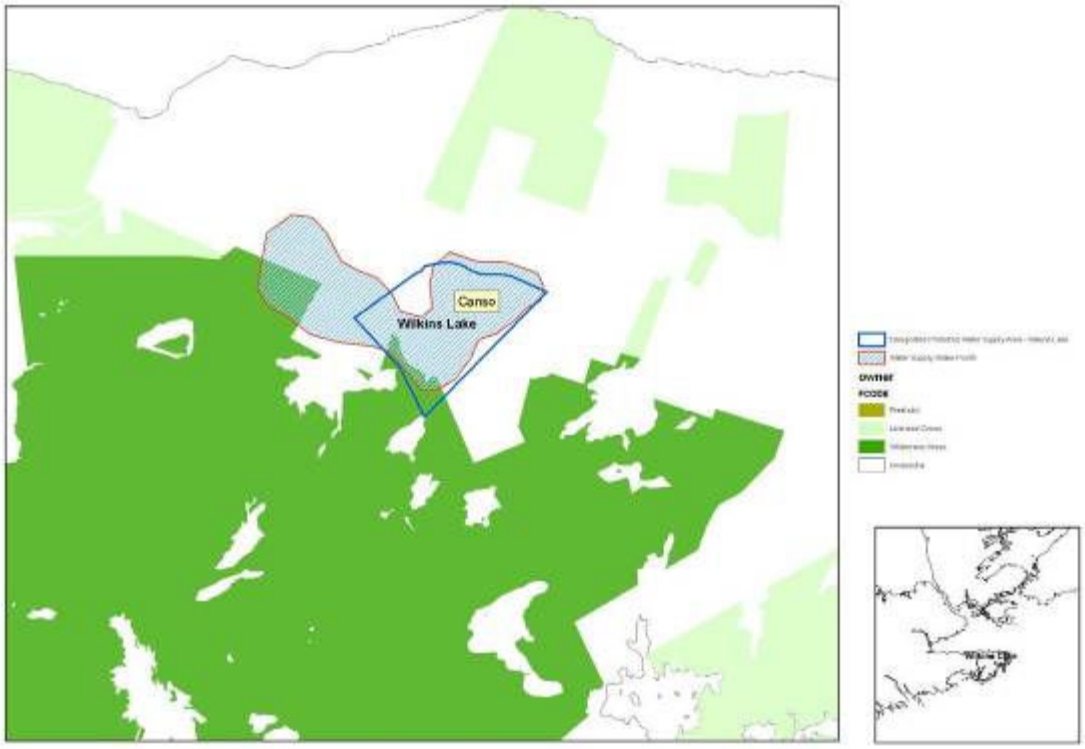
- Forbes Lake
- Wilkins Lake



James River Protected Water Supply Area



Forbes Lake Protected Water Supply Area



Wilkins Lake Protected Water Supply Area

Each protected water supply area mentioned above has its own set of regulations related to management and use activities within the supply area. Regulations related to forestry operations, road construction and watercourse alteration, stream crossings, and watercourse setbacks and buffers are adhered to by the company. As evident in the above maps however, the amount of land managed by PHP is either very small (e.g. Forbes Lake) or the land within the area is established as a legally protected wilderness area where management activities are prohibited.

For the municipal water supply areas not legally protected but identified by PHP as important watersheds for special management (Guysborough Municipal Water Supply Area – 1; Guysborough Municipal Water Supply Area – 2; Inverness Municipal Water Supply Area; Pictou Municipal Water Supply Area; Victoria Municipal Water Supply Area), PHP staff participate in watershed management committees if established (e.g. Sherbrooke Watershed – Guysborough; New Glasgow Watershed – Pictou). Elements such as cutting practices, recommended future treatments, road construction and maintenance, and contaminant spill prevention have been developed for watershed plans with the goal of promoting a healthy forest that will maintain water quality and quantity.

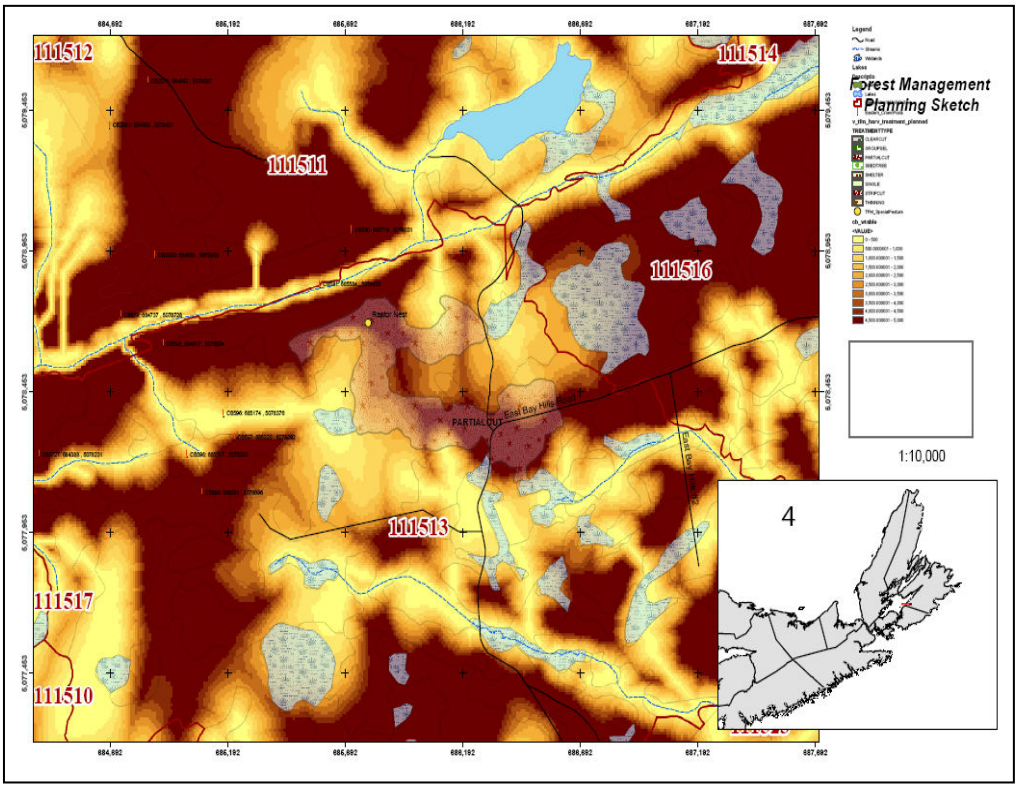
The remaining 11 watersheds of special management identified by PHP are large watersheds which have a high proportion of their total area under the management of PHP. Any of the 17 watersheds that do not maintain a minimum 80% closed-forest condition (as defined above) has scheduled clearcut harvest activities temporarily suspended until the watershed reaches the desired target of 80% or greater.

Table 10-1. Current Closed Forest Condition for Special Watershed Areas on PHP Lands

Watershed Name (and total hectares managed by PHP)	% Closed Forest 2013	% Closed Forest 2012	% Closed Forest 2011	% Closed Forest 2010	% Closed Forest 2009
Antigonish Municipal Watershed (647 ha)	100%	100%	100%	100%	100%
Guysborough 1 Municipal Watershed (2515 ha)	100%	100%	92%	93%	93%
Guysborough 2 Municipal Watershed (9 ha)	100%	100%	100%	100%	100%
Inverness Municipal Watershed (125 ha)	95%	95%	79%	79%	79%
Pictou Municipal Watershed (40 ha)	90%	88%	100%	100%	100%
Victoria Municipal Watershed (962 ha)	96%	98%	98%	98%	100%
Baddeck River Watershed (15545 ha)	95%	99%	93%	93%	97%
East River Watershed (9468 ha)	95%	94%	89%	89%	91%
Grand River Watershed (5662 ha)	82%	85%	82%	82%	81%
Liscomb River Watershed (12760 ha)	91%	96%	90%	90%	93%
Margaree River Watershed (29118 ha)	98%	100%	91%	92%	96%
Middle River Watershed (15757 ha)	94%	99%	92%	92%	95%
Mira River Watershed (13337 ha)	100%	100%	92%	93%	92%
New Harbour River Watershed (452 ha)	98%	98%	99%	99%	99%
North River Watershed (16108 ha)	92%	96%	79%	84%	93%
River Inhabitant Watershed (4922 ha)	96%	96%	94%	94%	94%
St. Mary's River Watershed (51293 ha)	93%	96%	90%	90%	92%

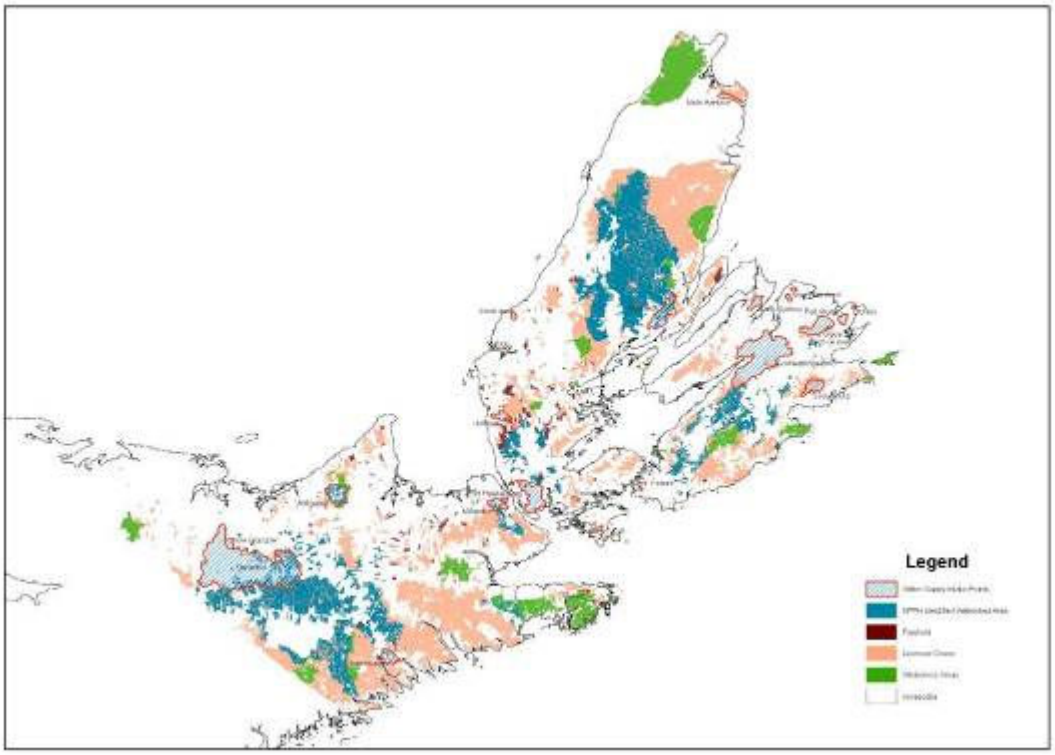
Municipal water utilities are responsible for treating drinking water supplied from groundwater or surface water for approximately 60% of Nova Scotians. They are further responsible for complying with provincial standards that ensure the water supply is properly managed and protected (NSDOE Website: http://www.gov.ns.ca/nse/water/publicwater.asp).

The company also maintains a comprehensive GIS database with several spatial layers representing various features such as lakes, streams, wetlands, watershed areas, and depth-to-water table. Contractors are provided with operating maps that display all hydrological features in the area. These maps are used for the establishment of riparian buffers as well as identifying the best location to establish forwarding trails. The depth-to-water table layer shows the expected depth-to-water at any point in the landscape. The below example shows an area with varying depths-to-water. Areas colored in brown represent the driest areas and yellow represents the wettest. Contractors use these maps to determine the best location for forwarding trails to minimize impacts to soil and water.



The Nova Scotia Environment has also delineated water supply intake areas, which are natural surface watershed areas upstream of municipal surface drinking water supply intake points. The intake areas found in PHP's operating area are shown in the below table and map.

WATER SUPPLY INTAKE AREA	Total PHP Area	Total Intake Area	Proportion
Antigonish	2213	3686	60%
Arichat	13	458	3%
Baddeck	2414	4805	50%
Canso	21	158	14%
Coxheath/Westmo	2383	18361	13%
Glace Bay	53	3685	1%
Judique	592	1367	43%
Louisbourg	1674	2480	68%
Louisdale II	27	267	10%
Mulgrave	821	2093	39%
Neils Harbour	457	997	46%
New Glasgow	11	780	1%
Port Hawkesbury	313	5401	6%
Sherbrooke	1044	2132	49%
St. Peter's	4	116	4%
Stellarton	10749	41235	26%
Grand Total	**22797**	**88029**	**26%**



Water protection measures taken by the company within these areas include the provincial *Wildlife Habitat and Watercourse Protection Regulations*, monitoring of % closed forest condition, steep slope management, HCV aquatic watershed management, ground disturbance and rutting mitigation procedures, and fuel tank and roadside piling requirements.

HCV Decision:

All legally protected municipal water supply areas, the 17 watersheds identified by PHP as important for monitoring % closed forest condition, and the water supply intake points are considered HCV's under this question.

Question 14.
Are there forests that provide a significant ecological service in mediating flooding and/or drought, controlling stream flow regulation, and water quality?

Rationale

In general, all forests provide a significant ecological service in mediating flooding and/or drought, controlling stream flow regulation, and water quality. Circulation of water between land and the atmosphere is a vital global process, and is crucial to all life through the provision of clean water. Large scale disturbances to this cycle can have devastating consequences at the regional, continental and global scales. As a result, it is important to maintain this cycle in its appropriate balance (PHP 2006).

Alteration of forested areas can impact water cycling through changes in the holding capacity. Increasing the amount of non-forested area increases the amount of runoff and may increase or decrease the overall evaporation rate. Proper forest management does not involve long-term changes in the amount of area that remains unforested. However, through forest harvesting, areas are changed from a forested to a non-forested condition (i.e. PHP considers this to be less than 10 years of age.) Since these changes are transitory, the total non-forested area at any given time is variable depending on the rate of harvest. It is this total area of non-forest than can have an effect on global hydrological cycles, flooding, drought, stream flow regulation, and overall water quality.

Methods

This attribute was assessed through several sources of information including:

- Port Hawkesbury Paper's Policies
- Port Hawkesbury Paper's Sustainable Forest Management Long-term Plan
- Port Hawkesbury Paper's Environmental Management System
- Wildlife Habitat and Watercourse Protection Regulations
- Special Watershed Areas including municipal watershed areas
- Wetlands Inventory and Management Recommendations
- Provincial Hydrological Data
- Consultation with the Nova Scotia Environment

Results

Many of the results written for question 13 can also apply to question 14, particularly the mentions related to the *Wildlife Habitat and Watercourse Protection Regulations*, special watershed areas, protected municipal water supply areas, and water supply intake points. In addition, PHP has established an indicator and monitors every five years the percent of total productive forest area in a closed forest condition (> 10 years of age) for the entire forest management area. The stated target is to maintain more than 80% of the total productive forest area in a closed forest condition. In 2013, the status of this indicator was 85% (i.e. in a closed forest condition) for the entire PHP forested landbase. PHP is confident that a closed forest condition of 80% or greater for the total productive forest area is a good measure of maintaining healthy hydrological functions across the forest landscape.

There are a number of wetlands on PHP lands that perform critical physical and biological functions including flood control, ground water replenishment, trapping of sediments, trapping and oxidation of pollutants, and climate regulation. In addition, they provide important wildlife habitat, recreational areas, and educational and scientific opportunities (NSEHJV 1994).

PHP became a participant in the Eastern Habitat Joint Venture Stewardship Project in August 1992, through the signing of a wetland stewardship agreement with the Province of Nova Scotia. This agreement aimed to: 1) maintain the existing wetlands base on company-owned and public lands managed by the company in a healthy and productive state; and 2) enhance the production potential for waterfowl and other wildlife on selected wetlands. The Stewardship Project

resulted in the completion of an inventory to determine number, classification and location of wetlands on company managed lands. A total of 5,126 wetland types were identified on public lands under lease to the company (Table 4-12).

Table 10-2. Nova Scotia Wetland Classes on Provincial Crown Land under License to PHP

Wetland Class	Number of Wetlands		Area in Hectares	
	Mainland	Cape Breton	Mainland	Cape Breton
Open Water	75	425	527	3,753
Deep Marsh	8	3	89	36
Shallow Marsh	2	5	39	30
Seasonally Flooded Flats	0	0	0	0
Meadow	29	14	150	64
Shrub Swamp	285	99	1,053	904
Wooded Swamp	3	1	3	1
Bog	1,970	2,207	11,692	14,473
TOTALS	**2,372**	**2,754**	**13,553**	**19,261**

The project further provided the company with 1) general guidelines for wetland conservation for all wetlands; 2) specific management recommendations for selected sites; and 3) special management recommendations for the provision of cavity nest boxes, beaver management, and for wetlands known to harbour rare wildlife species. General guidelines focused on maintaining wetland function by dealing with issues such as buffer zone maintenance, heavy machinery and harvesting within special management zones, road construction, and forest harvesting practices. These guidelines, as well as other special management recommendations for selected sites, were implemented by the company. Many of the recommended guidelines have since been replaced by the *Wildlife Habitat and Watercourse Protection Regulations*. These regulations stipulate the following management activities as adhered to by the company:

Special management zones

(1) Where the average width of a watercourse situated on or adjacent to forest land on which a forestry operation is carried on is equal to or greater than 50 cm, a forestry operator shall establish or ensure the establishment of a special management zone of at least 20 m in width along all boundaries of the watercourse.

(2) Where the land on which a special management zone is established pursuant to subsection (1) has an average slope within 20 m of a watercourse boundary of greater than 20%, the forestry operator shall increase the width of the special management zone by 1 m for each additional 2% of slope to a maximum of 60 m in width.

(3) No forestry operator shall within a special management zone

(a) permit the use of, use or operate a vehicle for forestry operations within 7 m of the watercourse;

(b) reduce the basal area of living trees to less than 20 m^2 per hectare; or

(c) create an opening in the dominant tree canopy larger than 15 m at its greatest dimension.

(4) Despite clause (3)(a), the operation of a vehicle for the purpose of watercourse crossings approved by the Department of Environment and Labour is permitted within a special management zone.

Protection of watercourse less than 50 cm wide

(1) Where the average width of a watercourse situated on or adjacent to forest land on which a forestry operation is carried on is less than 50 cm, no forestry operator shall permit the use of, use or operate a vehicle for forestry operations within 5 m of the watercourse, except for the purpose of watercourse crossings approved by the Department of Environment and Labour.

Provisions applying to all watercourses

(1) A forestry operator shall ensure that understory vegetation and non-commercial trees within 20 m of the edge of any watercourse are retained to the fullest extent possible.

(2) No forestry operator shall conduct any activity within 20 m of the edge of any watercourse that would result in sediment being deposited in the watercourse.

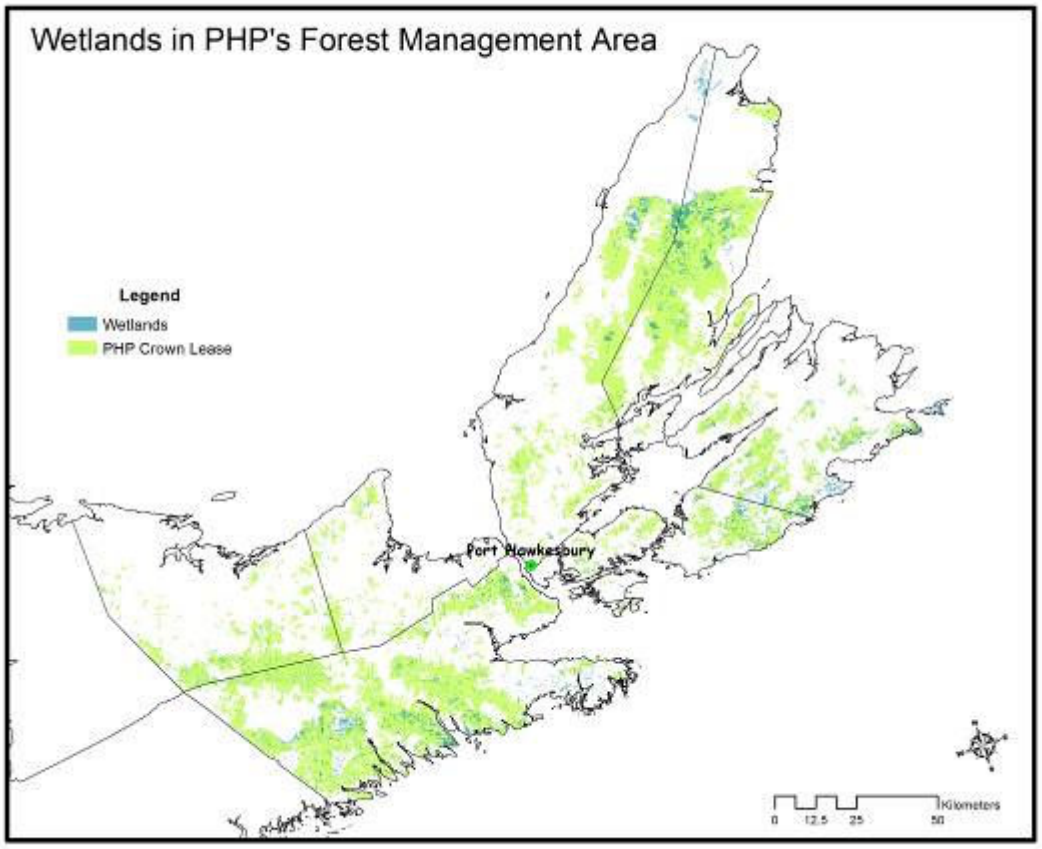


Figure 10-1. Wetlands on PHP Lands

HCV Decision:

All legally protected municipal water supply areas, the 17 watersheds identified by PHP as important for monitoring % closed forest condition, water supply intake points, and wetlands are considered HCV's under this question.

Question 15.
Are there forests critical to erosion control?

Rationale

Soil erosion has ramifications not only for water quality through increased sedimentation, but also for site productivity. Loss of soil reduces the ability of an area to produce healthy forets and if severe enough, can result in loss and maintenance of vegetative cover. Steep sloped areas are particularly sensitive to erosion due to the increased potential velocity of runoff. The ability of water to remove and transport soil is a function of both volume and velocity of the runoff. As a result, mineral soil exposure in steep sloped areas can result in erosion (PHP 2006).

Regular harvesting activities can result in some soil damage during felling and transportation of trees to roadside. However, on steeper sloped areas these techniques may not be sufficient to prevent long-term damage of the site.

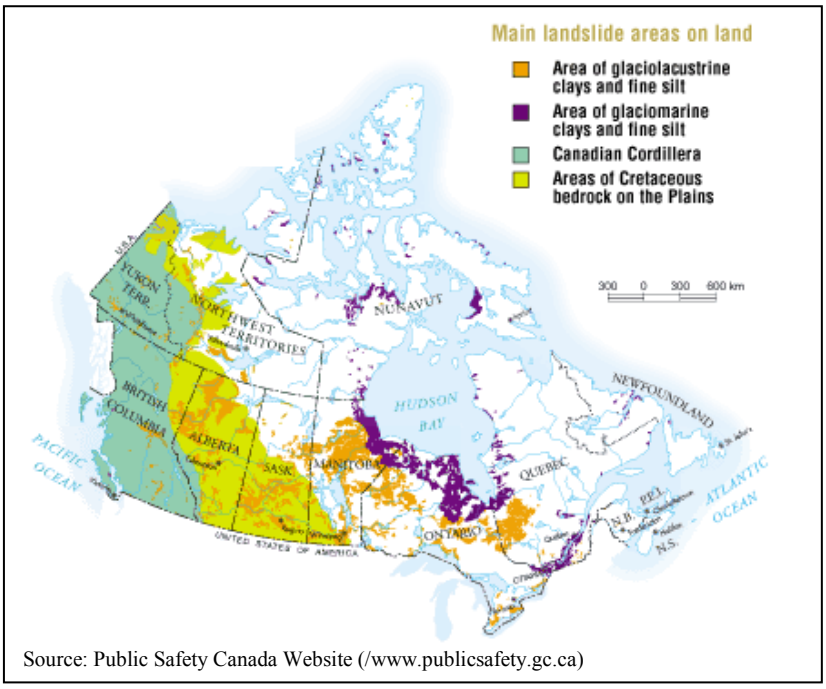
Methods

This attribute was assessed through several sources of information including:

- Port Hawkesbury Paper's Policies
- Port Hawkesbury Paper's Sustainable Forest Management Long-term Plan
- Port Hawkesbury Paper's Environmental Management System
- Digital Elevation Model
- Contours

Results

Nova Scotia is not a province conducive to landslides or avalanches due to its relatively flat terrain compared to central and western provinces. The highest elevation in Nova Scotia is 532 meters in the Cape Breton Highlands National Park (based on 10 meter provincial contour data). The average elevation for Cape Breton is 155 meters while it is 108 meters on the eastern mainland of Nova Scotia.



Source: Public Safety Canada Website (/www.publicsafety.gc.ca)

Figure 10-2. Main Landslide Areas in Canada

Forest harvesting on steep terrain or in areas with fine-textured soils would pose the greatest risk for erosion. The company's Environmental Management System has implemented several

operational guidelines for the protection of forest soils, minimizing soil damage, and soil productivity health, which are both internally and externally audited for compliance.

PHP identified steep sloped areas, for the purpose of operations, in its Sustainable Forest Management Long-term Plan. Through discussions with operations and planning staff, PHP considers areas with greater than 30% average slope to be steep sloped areas (total of 39,573 ha identified. All harvest activities are not permitted in areas with 30% average slope or greater.

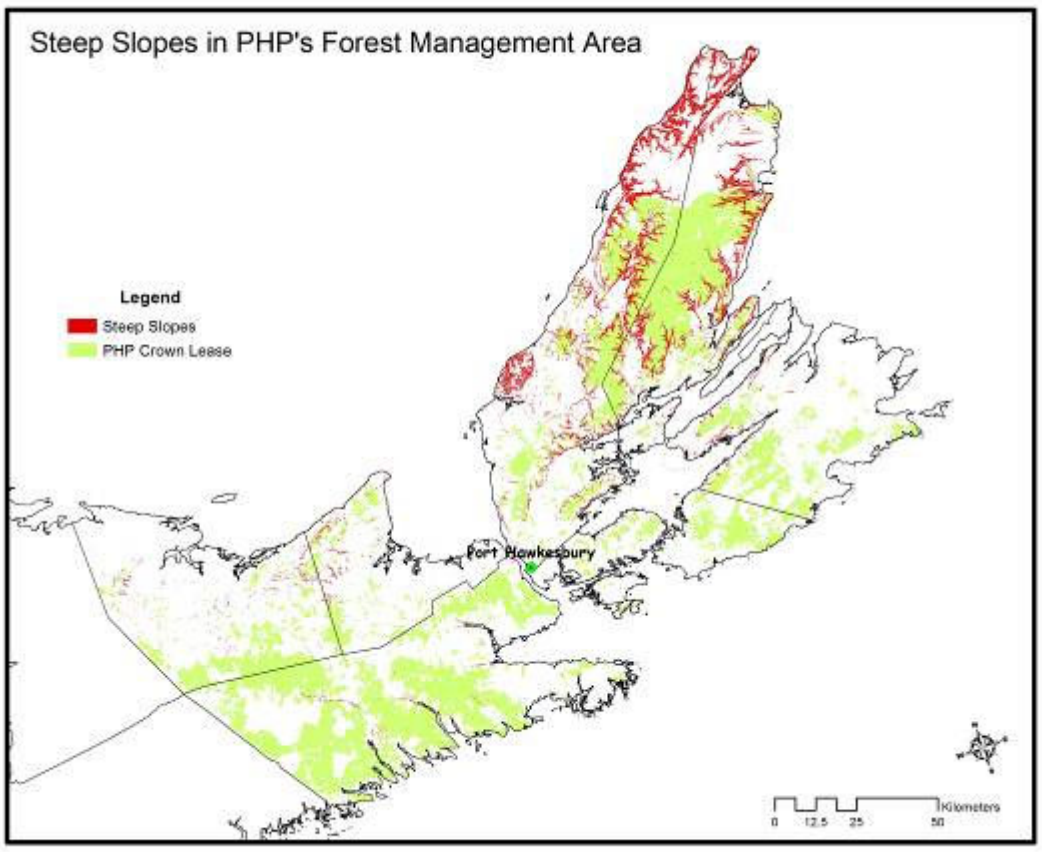


Figure 10-3. Steep Slope Areas on PHP Lands

HCV Decision:

Steep slope areas as identified by PHP are considered HCV's under this question.

Management Approach

All harvest activities are not permitted in areas with 30% average slope or greater.

Question 16.
Are there "interface" forests that play a significant role determining the potential spread of wildfires into developed areas, or other areas where fire would be harmful?

This question has been identified as not relevant in Canadian forest ecosystems (see Appendix 4 in FSC Canada National Boreal Standard). Regardless, the abundance of hydrological features across the Acadian forest landscape, as well as roads and natural hardwood stands, all act as natural barriers to wildfire spread. Additionally, PHP's requirements for fire equipment on all harvest jobs during fire season, and the provincial government's Wildfire Centre which provides a province-wide coordinated suppression effort and fire preparedness monitoring system, greatly reduces the risk of uncontrolled and destructive fires. Therefore, no HCV is identified for this question.

11.0 CATEGORY 5: BASIC NEEDS OF LOCAL COMMUNITIES

Category 5: Forest areas fundamental to meeting basic needs of communities (e.g. subsistence, health).

Question 17.
Are there local communities that use the forest? (This should include both people living inside the forest area and those living adjacent to it as well as any group that regularly visits the forest.) Is anyone within the community making use of the forest for basic needs/livelihoods? (Consider food, medicine, fodder, fuel, building and craft materials, water, income.)

Rationale

The public use of forest lands for recreation, timber, medicinal plants, accessibility, hunting and fishing, to name a few, illustrates the wide variety of values held by the general public on the forest environment. In Nova Scotia, 80% of the land-base is considered forest (NSDNR 2008), which has likely increased from decades earlier when agricultural activity was more prevalent. Today, much of the abandoned farmland has returned to a forested condition. In the distant past, Nova Scotia forests provided building materials for houses, buildings, ships, wharves, barrel staves and for heating purposes (NSDNR 2008). Today, the forests provide materials for pulp, paper, value-added wood products, and non-timber forest products (NTFPs). There are multiple non-timber forest products and uses in Nova Scotia (NSDNR 2008) including:

- Tourism and viewscapes
- Protected areas
- Recreation and leisure
- Education and learning
- Biochemicals
- Food/forage
- Crafting
- Aesthetics and spiritual experiences
- Hunting, fishing and trapping
- Culture and heritage

In Nova Scotia, approximately 50% of the forested land area is owned by small private woodland owners. Another 25% is owned by large industrial companies, while the remaining 25% is publicly owned land of which the majority is allocated to forest companies for timber management. Approximately 24% of all Nova Scotians live throughout the seven eastern counties where PHP manages forest land and there are 59 towns and villages scattered throughout the company's operating area including seven Mi'kmaq First Nation communities.

Methods

This attribute was assessed through several sources of information including:

- Port Hawkesbury Paper Sustainable Forest Management Long-term Plan
- Port Hawkesbury Paper Environmental Management System
- Port Hawkesbury Paper Third Party Request Database
- Nova Scotia Code of Forest Practice
- NSDNR Integrated Resource Management Process
- Netukulimk GIS Management Project (Union of Nova Scotia Indians project)
- Awakening: living with today's forestry (First Nations Forestry Program of NS manual)
- PHP Forest Advisory Committee
- Public input during Open House sessions
- Consultation with all Regional Development Authorities (RDA) in PHP's operating area including:
    - Antigonish Regional Development Authority
    - Guysborough Regional Development Authority
    - Pictou Regional Development Commission
    - Cape Breton County Economic Development Authority
    - Strait-Highlands Regional Development Authority

Results

Provincial Government Integrated Resource Management Process

Community use of the forest in eastern Nova Scotia is extensive and varied. This was evident during the provincial government's Integrated Resource Management (IRM) process which initially began in 1998 and still continues today through the Nova Scotia Department of Natural Resources. IRM is a planning and decision-making process that coordinates resource use so that the long-term sustainable benefits are optimized and conflicts among users are minimized. IRM brings together all resource groups rather than each working in isolation to balance the economic, environmental, and social requirements of society. The process is designed to ensure that multiple benefits are realized while maintaining the values of a public land base for current and future generations (NSDNR 1998).

PHP was actively involved in the initial round of IRM sessions which included workshops, open houses, presentations and handouts. These sessions provided the public with an opportunity to identify issues and activities surrounding the use of Crown lands in eastern Nova Scotia. Furthermore, it enabled the government to categorize Crown lands into three classes which were spatially delineated:

- Category 1 – Crown lands will be available for a full range of uses with few anticipated conflicts among users;
- Category 2 – Crown lands will have competing values and land-uses and therefore will require some form of management to optimize multiple use while minimizing conflicts;

- Category 3 – Crown lands will be specifically allocated to special uses and other resource uses may be limited or denied.

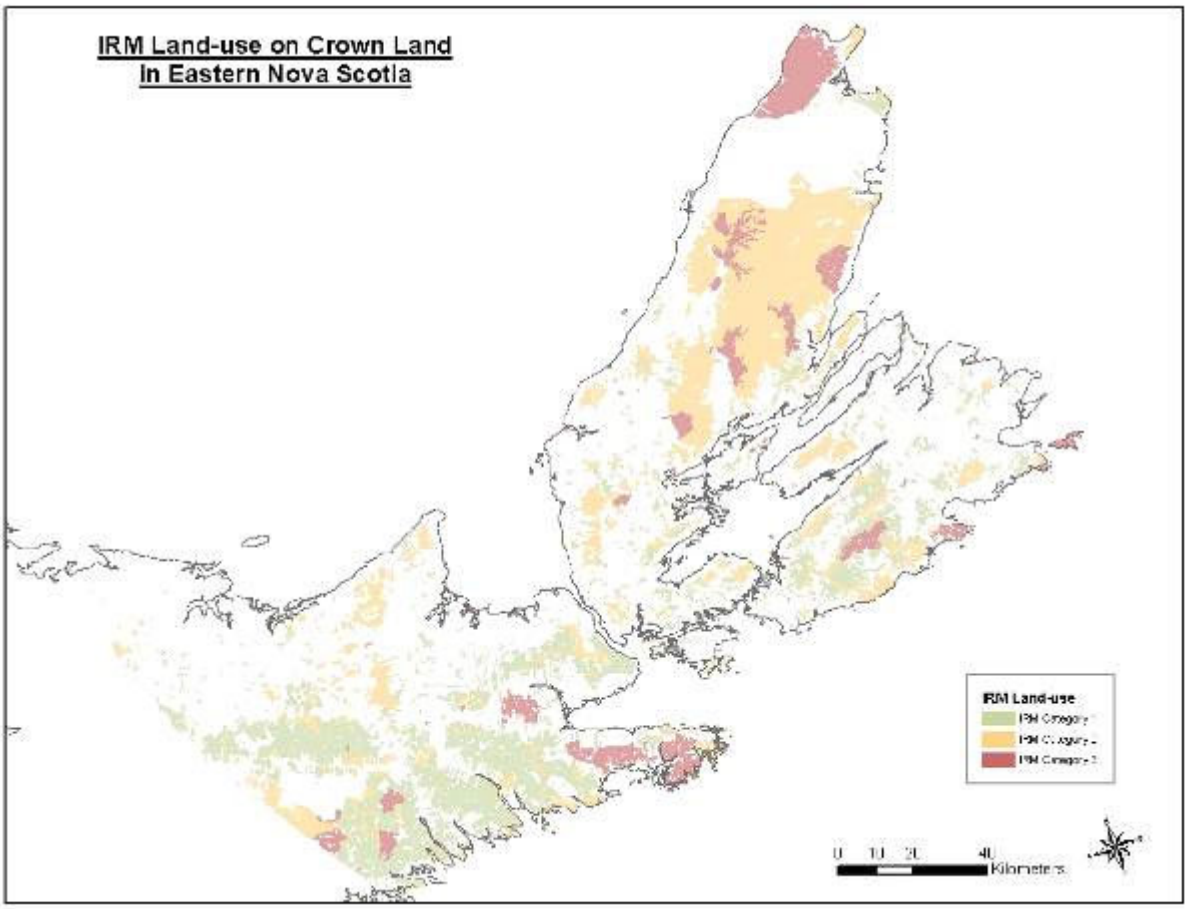


Figure 10-4. Integrated Resource Management Land-use Categories on Crown Land in Eastern NS

Potential conflicts between land-use within the three categories are identified and handled through the Crown management approval process with the Department of Natural Resources.

In 1998 throughout communities in eastern Nova Scotia, a total of nine public information sessions were held which were hosted by the provincial government and the PHP. During those sessions, people were asked to identify any issue or activity related to Crown lands in eastern Nova Scotia. A summary of activities is provided in Table 10-3.

Table 10-3. Identified Activities on eastern Crown land during the 1998 IRM Process

ACTIVITY	NUMBER OF RESPONSES
Archery	1
ATV's	41
ATV's/Snowmobiles	3
Berry Picking	15
Bird Watching	2
Boating	11
Camping	6
Canoeing / Kayaking	15
Cycling	6
Development	24
Drinking Water	24
Exploration	19
Fishing	35
Fossil Collections	12
Fuelwood	15
Hiking	1
Hiking/Ski Trails	98
Horseback Riding	1
Hunting	31
Hunting/trapping/fishing	5
Multiple Use	77
Nature viewing	27
Other	13
Prospecting	13
Research	6
Snowmobiling	51
Swimming	1
Trapping	2
TOTAL RESPONSES	**557**

First Nation Forest Values and Uses

In Nova Scotia, there are 13 First Nation communities of which seven are located in eastern Nova Scotia where PHP manages land. First Nation history and culture is inextricably linked to the land and the resources it provides. Historically, basic needs such as food, clothing and shelter were provided from the land. In addition, the land was home to important places such as burial and sacred areas. It can be said that all of these needs, basic or otherwise, relate to the First Nation cultural identity. Rather than separate the assessment of basic needs from cultural needs between HCV category 5 and category 6, a comprehensive review of First Nation forest values and uses will be covered entirely under category 6.

PHP Initiatives Related to Public Forest Use

The forests of Nova Scotia serve a variety of purposes at the community level ranging from timber harvest, non-timber harvest such as fir tipping, maple syrup production, and berry picking, and recreation and tourism. PHP recognized long ago that residents of rural communities depend on the forest for a variety of social and economic benefits. Historically, the roads built and owned by the company for forest management access have been left open to the public year-round for general access. However, some restrictions will be implemented on some roads to meet HCV commitments to maintain critical habitat features.

The company has established an on-going systematic approach to process public requests for "third party" use of licensed Crown lands and/or freehold lands. To date, there have been approximately 1,700 third party requests put forward to the company for approval since the first request was submitted in 1964. Unless there are conflicting uses between the public and the company, all requests are approved and the regional Department of Natural Resources office is notified of third-party use on Crown lands. All requests are stored in a tracking database and are spatially identified by PHP's management unit. As required, district staff and the Department of Natural Resources are responsible for monitoring third-party use.

Table 10-4. Third Party Request Types Submitted to PHP

Request Type
Access to Listed Highway
Bear Sites
Brush
Camp
Construct a Road
Crown Land Withdrawal
Dump
Easement
Easement/Road Construction

Forward Wood/Use Road
Freehold Sale
Fuelwood
Gravel
Gravel & Easement
Harvest
Harvest Fuelwood
Harvest Hardwood Logs
Harvest Lathe Wood
Land
Landscape
Land Trade
Lease
Mineral Exploration
Misc
Parking Area
Pipe
Right-of-Way
Rail Line Agreement
Road Use
Recreation
Stockpile Hardwood
Survey
Trail (Build/maintain)
Turn
Use of Spring
Well Site
Wind (easement)

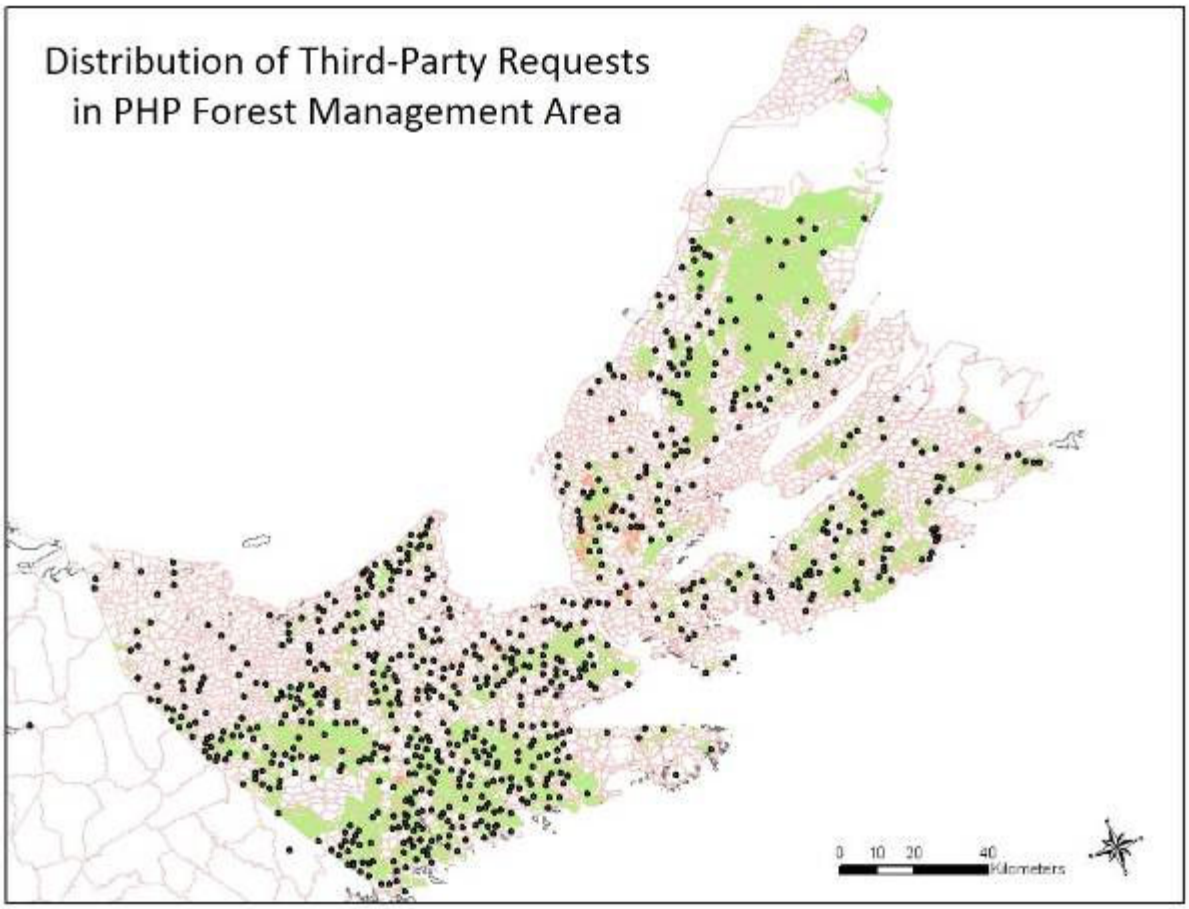


Figure 10-5. Third Party Requests Submitted to PHP by General Public. Note that there can be several requests in one management unit, so not all points are visible because of scale.

There are several trail users and groups in the province that use Nova Scotia forests for recreational activities. Represented by the Nova Scotia Trails Federation, the more than 6,000 trail users and over 70 trail groups access the forest for snowmobiling, hiking, all-terrain vehicular travel, horseback riding, cross-country skiing, back-country camping, and fishing (source: http://www.novascotiatrails.com/). Trail maps are maintained by the individual trail groups, however, most groups do not have their trails spatially delineated through a GIS. Regardless, PHP does not restrict access to any trail user or group on licensed Crown lands or freehold lands. Occasionally, a request is submitted to the company for the development of a new trail and if there are no conflicting uses or environmental limitations, the request is approved.

To further identify forest uses by local communities, PHP compiled a list of possible high conservation values based on the general categories put forward in HCV question 17: food, medicine, fodder, fuel, building and craft materials, water, and income. Tourism and recreation, and forests that sustain subsistence agriculture are also relevant issues in PHP's forest management area. The table below summarizes uses based on input from staff who live and work in the forest management area, PHP's Forest Advisory Committee (where there is representation by government, recreation and tourism groups, and wildlife and fishing

associations), any input received at open houses held by PHP, consultation with the five Regional Development Authorities in PHP's management area, and online searches for relevant information.

General	*Value*	*Description*	*Known rare locations?*	*Threatened by current activities?*	*HCV?*
Food	Moose	Moose hunting is a regulated activity in Nova Scotia. Moose hunting is an important year-round cultural activity and food source for many Cape Breton native communities. Important food source for some communities north of Cape Breton Highlands National Park. Overly abundant populations on Cape Breton Island. On mainland Nova Scotia the moose is an endangered species.	Mainland moose is a provincially listed endangered species. Hunting of Mainland Moose is strictly prohibited by all people. The Cape Breton population is considered healthy.	Only Mainland Moose are known to be threatened by current forestry activities. Where moose are hunted and may be an important food source they are considered overly abundant, and not considered threatened by forestry activities to a level where significant declines would be seen in moose populations. It is well known that forestry activities can create preferred habitat conditions for moose on the landscape so long as there is a fair distribution of age class structure and species composition to provide important habitat components.	Cape Breton moose are considered an important food source for Aboriginal communities. Since the Cape Breton population is considered abundant and healthy, PHP does not restrict access to its lands for hunting, and moose habitat is modelled in the long-term plan and monitored as an indicator, the Cape Breton moose population is not considered a HCV. However, the Mainland Moose is a HCV due to its endangered status in the province (see Category 1).
Food	Deer	Deer hunting is regulated activity in Nova Scotia. It is an important recreational activity in Nova Scotia, but is not a critical source of food for any communities. It is not known to be critically important for First Nation communities.	No.	Deer wintering areas are identified and mapped by the Department of Natural Resources. Any possible threats to deer habitat through forest management activities are addressed through the DNR approval process.	No. Hunting activities and road access to hunting areas are not restricted by the company.
Food	Bear	There is a regulated bear hunting season in Nova Scotia. Bear is not considered a critical food source for local communities and the population is	No	Changes in habitat structure occur as a result of forest management activities.	No. Hunting activities and road access to hunting areas are not restricted by the company.

General	*Value*	*Description*	*Known rare locations?*	*Threatened by current activities?*	*HCV?*
		considered healthy.			
Food	Furbearers, Small/Upland Game	There is a regulated furbearer and upland game season in Nova Scotia. Furbearers listed as species at risk in PHP's operating area are the Canada Lynx and the Pine Marten.	Canada Lynx and Pine Marten are rare in the province and legally listed as endangered. Trapping is strictly prohibited.	Changes in habitat structure occur as a result of forest management activities.	No. Hunting activities and road access to hunting areas are not restricted by the company.
Food	Fish	There are several regulated angling seasons in Nova Scotia for fish such as salmon, trout, smallmouth bass, smelt, perch, and pickerel. Special Management Areas have been identified by the NS Department of Fisheries and Aquaculture, which may affect bag limit, season length, length limit of fish retained, and gear type. There are 11 Special Management Areas in PHP's operating area.	No, however important cold water refugia areas for salmon and trout have been identified. These are described under category 1 of this report as HCV's.	Changes in habitat structure occur as a result of forest management activities.	Cold water refugia areas for salmon and trout are considered HCV. See pages 59 to 63 for HCV designation and management.
Medicine	Medicinal Plants	Medicinal use of plants is found within the native community and it is unknown if they are commonly found and used beyond First Nation lands.	Unknown	This will be addressed through HCV 6.	Currently unknown.
Fodder	Cattle Grazing	Cattle grazing occurs on the Cape Breton Highlands plateau through the summer, as well as, to a lesser degree, the mainland Keppoch.	Yes	No. Grazing activities are not threatened by, and are in fact encouraged, by existing forest management practices through the creation of regenerating areas and the maintenance of road systems.	Yes
Fuel	Wind power generation	Areas of the PHP landbase have high potential for wind	Yes	Wind power generation and existing forestry	No.

General	*Value*	*Description*	*Known rare locations?*	*Threatened by current activities?*	*HCV?*
		power generation.		practices can easily co-exist. Wind power policy already in place which tries to encourage its development.	
Fuel	Fuelwood	Some designated fuelwood areas exist, but are not on the PHP license, and are managed through the Department of Natural Resources. Other areas do receive requests for fuelwood cutting.	No.	No. Requests for fuelwood cutting are handled through the company's Environmental Management System as a third-party request.	No.
Building and Craft Materials	Christmas wreaths	Tipping of Balsam Fir for making Christmas wreaths is an important economic activity in some areas, particularly the Cape Breton Highlands.	No. Balsam fir is very plentiful.	No – Young vigorous balsam fir is preferred by collectors.	No.
Building and Craft Materials	Lobster traps	Small black spruce is used in the traditional construction of lobster traps. Wet, inoperable areas are preferred.	No. Black spruce is very common.	No - preferred areas are not impacted by forestry operations.	No.
Building and Craft Materials	Wood turning	Hardwood burls are sometimes collected for turning into bowls and other crafts.	No – Burls are common throughout the landbase.	Yes – Hardwood management will tend to remove poorer quality trees.	No.
Water	Private wells/ground-water for personal water use (include any easements across freehold land); public drinking water	A constant supply of clean drinking water is essential to every community. There is a solid regulatory framework in the province for water quality health and protection.		Forestry activities can have an impact on water quality. Management actions taken by PHP through regulatory requirements and operational practices strive to minimize threats to water quality health.	Middle River NewPage Freehold Protected Property (easement for water access for private use on adjacent residential property). This easement is a legally binding agreement. The freehold property has been in a protected state since 1998 by PHP.
Income	Forest harvesting and silviculture	The forest industry is an important source of income for many communities in	No – Common throughout.	No – Strong sustainability strategies in place through CSA, SFI	No.

General	*Value*	*Description*	*Known rare locations?*	*Threatened by current activities?*	*HCV?*
		Eastern Nova Scotia.		and FSC certifications.	
Income	Maple Syrup	Some maple syrup licenses are located on Crown Land. Any existing operations on Crown Land are removed from the PHP Licensed area.	Yes.	No – Do not exist in operating area.	No.
Income	Trapping	Trapping does occur in Eastern Nova Scotia, however it is almost always as a hobby or second income.	No – Dispersed.	No – Habitat changes can occur through forestry practices. However, this is addressed through wildlife regulations and CSA Indicators.	No.
Tourism and Recreation	Guiding	A relatively small guiding industry exists, although it is typically providing a second income.	No – Dispersed.	No – Habitat changes can occur through forestry practices. However, this is addressed through wildlife regulations and CSA Indicators	No.
Tourism and Recreation	Heritage	Old community and farm sites are common throughout Eastern Nova Scotia.	No – Typically dispersed and not rare.	No – Most archeologically significant sites are located in areas not typically accessed for forestry. Special Aboriginal sites will be addressed through HCV 6.	No.
Tourism and Recreation	Trails	Hiking, snowmobile and ATV trails are common throughout Eastern Nova Scotia.	No – Dispersed across the landbase.	No - Hiking trails can be impacted by adjacent cutting, however this problem is addressed through the IRM process and EMS work instructions.	No.
Tourism and Recreation	Viewscapes	Many scenic areas are present in Eastern Nova Scotia, which are important to the tourism industry.	Yes.	No – Issues are addressed through the PHP viewscape policy, the IRM process, and work instructions related to minimizing impacts to highly visible areas.	Highly visible areas as identified by PHP are considered HCV. Management activities to mitigate impacts to aesthetics will continue as currently defined.

General	*Value*	*Description*	*Known rare locations?*	*Threatened by current activities?*	*HCV?*
Tourism and Recreation	Fishing	Salmon fishing on the Margaree and St. Mary's River are locally important to the tourism industry.	Yes.	Water quality may be impacted through forest operations. Mitigating impacts are currently addressed through stream crossing work instructions, riparian regulations, watershed level clear cutting restrictions, and as identified under Category 1, Question 3 and Category 3, Question 12 of this assessment.	Yes, as identified in Category 1 and Category 3.
Forests that Sustain Subsistence Agriculture	Not present.				

HCV Decision:

HCV's identified under this category are outlined in the above table.

12.0 CATEGORY 6: TRADITIONAL CULTURAL IDENTITY

Category 6: Forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Question 18.
Is the traditional cultural identity of the local community particularly tied to a specific forest area?

Rationale

NOTE: The word Mi'kmaq, (ending with a "Q") is a noun that means "the people." The word Mi'kmaw (ending with a "W") is a singular noun and refers to one person. It can also be used as an adjective (e.g. Mi'kmaw nation)

The Mi'kmaw Nation are the founding people of Nova Scotia and remain the predominant Aboriginal group within the province. Archaeological findings in central Nova Scotia have given evidence that the Mi'kmaw lived on traditional homeland at least 10,500 years ago (Union of Nova Scotia Indians et al. 1997). The pre-contact population is estimated at 35,000 to 70,000 people, and today it is estimated at approximately 13,500 (both on and off reserve) (www.gov.ns.ca/abor).

When the Mi'kmaq first encountered Europeans in the 16th and 17th centuries, their territory stretched from the southern portions of the Gaspé Peninsula eastward to most of modern-day New Brunswick, and all of Nova Scotia and Prince Edward Island. This area is known to Mi'kmaw people as Mi'kma'ki. Today, Nova Scotia has 13 Mi'kmaq First Nation communities. Seven are located within PHP's operating area. They are:

- Membertou First Nation (pop. 1,131)
- Eskasoni First Nation (pop. 3,807)
- Chapel Island First Nation (pop. 596)
- Wagmatcook First Nation (pop. 662)
- We'koqma'q First Nation (pop. 847)
- Paq'tnkek First Nation (pop. 500)
- Pictou Landing First Nation (fringe of operating area) (pop. 565)

Figure 12-1. Nova Scotia Mi'kmaq First Nations
Source: Nova Scotia Office of Aboriginal Affairs Website (http://www.gov.ns.ca/abor).

Prior to colonization, Mi'kmaw people were nomadic in nature and lived and travelled throughout Mi'kma'ki which supported their culture, traditions, and language. Today, this land still provides that link to their traditions (Union of Nova Scotia Indians 1997).

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 Nova Scotia Mi'kmaq Chiefs and Kwilmu'kw 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 identification and management of heritage resources such as archaeology and traditional use.

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.

Methods

This attribute was assessed through several sources of information including:

- The Assembly of Nova Scotia Mi'kmaq Chiefs and PHP Memorandum of Understanding
- Draft Impact & Benefit Agreement and Environmental Agreement between The Assembly of Nova Scotia Mi'kmaq Chiefs and PHP
- Port Hawkesbury Paper Sustainable Forest Management Long-term Plan
- Port Hawkesbury Paper Environmental Management System
- Port Hawkesbury Paper Dispute Resolution Policy
- Netukulimk GIS Management Project
- Awakening: Living With Today's Forestry
- Mi'kmaw Resource Guide
- Kekina'muek: Learning About the Mi'kmaq of Nova Scotia
- Mi'kmaq First Net – online site for Mi'kmaq resources in Nova Scotia
- Mi'kmaq and Maliseet Treaty Forum

Results

The First Nations people of Nova Scotia are known as the Mi'kmaq. The history of the Mi'kmaq is very extensive and their original homeland was very large, stretching from Nova Scotia and Prince Edward Island to New Brunswick, Newfoundland and the Gaspe Peninsula (CMM 2007). The Mi'kmaw way of life was very much tied to the land and its surrounding resources. The people were seasonal in their movements and often lived in coastal areas during the warmer months and inland during the winter (CMM 2007). Travel routes were well-established and used year after year. The wide-bottomed canoe allowed the Mi'kmaq to canoe far out to sea as well as in shallow streams and even in rapids. Canoes were made of birch bark. The Mi'kmaq also made snowshoes and sleds for travel during the winter months (CMM 2007).

Reliance on wild flora and fauna for subsistence, values and experiences is an integral part of the First Nations traditional culture. Historically, the Mi'kmaq relied on the natural world for basic necessities such as housing, clothing, hunting and fishing gear, transportation, food, and medicine (Aboriginal Information Sheets - http://www.gov.ns.ca/abor/office).

Historical Values of Importance

Prior to European settlement in Nova Scotia, the Mi'kmaq moved with the seasons to fulfil their basic needs and cultural identity. To the Mi'kmaq, Mother Earth provided all the necessities for their survival and they held the utmost respect for the natural world. There are several examples of how the Mi'kmaq used the Earth's natural resources to meet their needs (Table 4-16) (CMM 2007). It is unclear how and if these uses are still relevant today for Mi'kmaw people.

Table 12-1. Examples of Historical Natural Resource Use by Mi'kmaq

FOOD ▪ Fish, fowl, moose, deer, bear, beaver, etc. ▪ Berries of all kinds, apples, cherries, wild turnip ▪ Eggs from a variety of fowl	**MEDICINE** ▪ Turpentine from balsam fir – used to treat wounds ▪ Cold remedy – syrup of black cherry ▪ Porpoise oil – ear aches, a laxative
CLOTHING ▪ Skins of moose, deer, beaver, otter, bear, lynx ▪ Moose hide and deer hide moccasins ▪ Thread for sewing came from moose sinew ▪ Babies were wrapped in fox, swan and wild geese fur	**SPIRITUALITY & CEREMONY** ▪ Sage and sweet grass for cleansing and purification ▪ Tobacco offering
SHELTER ▪ Fir boughs used on floor of wigwam ▪ Spruce ▪ Birch bark and moose/deer/caribou skin	**CEREMONY** ▪ Pipes of willow wood and lobster claw were used in many ceremonies ▪ Willow bushes and birch bark were used to build traditional sweat lodges ▪ Red willow bark was smoked as a tobacco
TRANSPORTATION ▪ Birch bark canoes ▪ Cedar slats as ribs for canoes, fir and spruce roots for lacing and binding ▪ Snow shoes were first made of white ash, later of beech	**SPORTS** ▪ Hockey sticks from hornbeam roots ▪ Skates were made from long thin bones strapped by leather straps to the foot ▪ Sledding, snowshoes from beech and sinew
TOOLS AND UTENSILS ▪ Wooden tubs and kettles from tree trunks ▪ Birch bark vessels sewn together with cedar roots or black spruce roots and sealed with spruce gum ▪ Moose antlers and bones to make needles for sewing and fasteners ▪ Baskets from rushes, splints of cedar, juniper, spruce and other woods ▪ Smokehouses were built from poles and birch bark ▪ Fishing weirs from stone and boughs	**COMMUNICATION** ▪ Shells were used to record the stories and history of the Mi'kmaq on Wampum belts – the "official" recording device of the Mi'kmaw Grand Council
GAMES ▪ Waltes boards from burls of trees ▪ Dice and Waltes sticks made from bone of animals	**ART & DESIGN** ▪ Shells of varying sizes and colors were used for adornment ▪ Porcupine quills were used to decorate many items – dyed and sewn into skins, bark, etc.

	▪ Bone, teeth, claws, feathers as decoration on a variety of items ▪ Moose hair weaving on clothing
MUSIC ▪ The drum was made from animal skin stretched taught over a wood rim and sewn with leather laces or sinew	**DYES** ▪ The inner bark of the birch tree was used to produce an orange dye ▪ Purple came from red cedar roots, red maple (inner bark) ▪ Brown – acorns, larch, white oak

Archaeological sites are another form of a Mi'kmaq value. Archaeology tells us about how and where people lived in the past, what was important to them economically or socially, and how certain people lived their lives based on their beliefs or the language spoken. There are more than 800 Mi'kmaw archaeological sites in Nova Scotia (CMM 2007). The most significant site in Nova Scotia is the Debert archaeological site, near Truro (not within PHP's operating area). Numerous living areas and a diverse set of stone artifacts were found on this site. Other archaeological digs occurred along the Mersey River in southwestern Nova Scotia. Here, more than 100 sites were found along the river that represented ancient camp and fishing areas. Also in southwestern Nova Scotia, Kejimkujik National Park is home to over 500 individual pictures, or petroglyphs, that are carved into stone along lake shorelines and other areas (CMM 2007).

Petroglyphs from Kejimkujik

Source: Mi'kmaw Resource Guide, Union of Nova Scotia Indians 1997.

Mapping Current Values of Importance

Initiated in 1997, the Union of Nova Scotia Indians (UNSI) in cooperation with the Eskasoni Fish & Wildlife Commission (EFWC) developed a geo-referenced data base mapping project on Cape Breton Island, utilizing GIS technology, to integrate community planning activities with the community's Traditional Environmental Knowledge (TEK). The Netukulimk GIS Management Project developed an inventory which identified important medicinal plants, trees, berries, fish, shellfish, birds and mammals within each First Nation community on Cape Breton Island. PHP was a funding partner in the project and was provided with a report that illustrated the inventory within each community. The GIS data was not provided to the company as decided by the project participants. A similar project for public lands beyond First Nation community boundaries would be very beneficial to both the Mi'kmaq people and PHP.

Both terrestrial and aquatic life provided several plants that were used for medicinal purposes by Mi'kmaq people (Table 4-17). It is unclear if these medicinal plants are still being used today in any significant way by Mi'kmaq people. Clarification of this will require willing participation by local First Nations communities with the company to identify critically important medicinal plants and areas of on-the-ground significance.

Table 12-2. Mi'kmaq Medicinal Plants

Medicinal Plant Species with Mi'kmaq Name	
Labrador Tea – Pituistiki'ju'jit	White Birch – Maskwi
Pitcher Plant – Mqo'oqewi'k	Yellow Birch – Nimnoqn
Sphagnum Moss – Pesaqnatkw	High Bush Cranberry – Nipmann
Sweet Grass – Switte'	Blackberries – Ajioqimink
Golden Thread – Wisawtaqji'jkl	Bayberry Bush – Kljikmanaqsi
Spearmint – Plamuipkl	Blueberries – Pkwimann
Cow Parsnip – Pako'si	Gooseberries – Apaqtejkl
T Berry – Kakaaqwejowumann	Plantain – Ansalewipk
Flagroot – Ki'kwesu'skl	Strawberries – Atuomkmink
Balsam Fir – Stoqn	Raspberries – Klitaq
Black or Bog Spruce – Kawatk (Maqtewe'k)	Bunchberries – Plaweju'manaqsi
Ground Juniper – Apatamkiejit (Kinikwejitewaqsi)	Sarsaparilla – Wapapaqji'jkl
White Spruce – Kawatk (Wape'k)	Cudweed – Wekaytaskji'jl
Poplar – Miti	Alder – Tupsi
Sugar or Rock Maple – Snawey Pearly – Everlasting	Pin-Cherry Tree – Maskwe'smanaqsi

Source: Netukulimk GIS Management Project

Flagroot - used to make traditional medicines.

Also identified in this project were fish, shellfish, birds and mammals of importance to Mi'kmaq people:

- Fish – cod, herring, trout, gaspereau, mackerel, smelt, eels, flounder, salmon, perch
- Shellfish – rock crabs, oysters, mussels, clams, sea urchin
- Birds – eagles, Canadian geese, crow, black ducks, loons, partridge, cormorant, heron, owl, blue jay
- Mammals – deer, fox, moose, muskrat, coyote, bear, beaver, racoon, rabbit, otter, mink

Distribution of Culturally Significant Plants – Joint Project between PHP, Unama'ki Institute of Natural Resources, and Cape Breton Highlands National Park

For millennia First Nations people have used wild plants as foods, as medicines, as materials for constructing tools and shelter and for ceremonial uses. Knowledge of these plants – which ones are useful for what and where they have traditionally been gathered – is held by elders in the five Unama'ki communities. The Unama'ki Institute of Natural Resources (UINR) has an interest in documenting this knowledge so that traditionally important plant species can be preserved in Unama'ki for future generations.

The intent of this project was to identify and catalogue plant species of cultural significance to the Mi'kmaq people of Unama'ki and document their known occurrences by locality and habitat such that other areas of Unama'ki can be efficiently assessed for potential occurrence. UINR, on behalf of the participating elders, will retain all control over the content that is to be released to PHP by supplying only the consensual knowledge as determined by the participants at the time of its gathering. For confidentiality reasons, a map showing the culturally significant plant areas is not provided in this report.

Summary of Negotiations between PHP and The Assembly of Nova Scotia Mi'kmaq Chiefs

In early 2012, PHP and the provincial government initiated discussions with The Assembly of Nova Scotia Mi'kmaq Chiefs to create a Memorandum of Understanding that would support the development of an Impact & Benefit Agreement and an Environmental Agreement. These agreements would benefit all 13 First Nations in Nova Scotia (seven are within PHP's forest management area). The Memorandum of Understanding was signed in October 2012, which led to the on-going development of an Impact & Benefit Agreement and an Environmental Agreement. These agreements are currently being finalized and PHP expects completion by mid-2015. Once the agreements are in place, specific work activities under the Environmental Agreement will begin such as environmental management and mitigation plan, environmental monitoring and compliance programs, and identification and management of heritage resources such as archaeology and traditional use.

HCV Decision:

Plant areas identified by UINR as culturally significant for traditional use are considered HCV's. Also, the Impact & Benefit Agreement and Environmental Agreement will further PHP's knowledge and locations of other traditional use areas for the Nova Scotia Mi'kmaq.

Management Approach:

The plant areas identified by UINR are fully protected from all management activities. Additional management prescriptions will be developed for areas identified resulting from the completion of the Impact & Benefit Agreement and Environmental Agreement.

Collective Overlap of High Conservation Values

Question 19.
Is there a significant overlap of values (ecological and/or cultural) that individually did not meet HCV thresholds, but collectively constitute HCVs?

Given the extensive and comprehensive review of all possible HCV's on the landscape under questions 1 through 18 with a small number of values being excluded as high conservation, there is no apparent significant overlap of values that would lead to new HCV's. Once a Mi'kmaq values assessment is completed, this question will be reviewed again.

APPENDIX A

SUMMARY OF CHANGES MADE TO 2010 HCV ASSESSMENT FOR THE 2015-2020 FSC CERTIFICATION PERIOD

A thorough review of the 2010 HCV assessment was completed and the below table is a summary of changes and consultations made for the new 2015-2020 HCV assessment report.

Summary of Changes to 2010 HCV Assessment HCV's

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
Category 1 – Biodiversity **Question 1 – Species at Risk**		
Piping Plover	Removed as HCV since the Piping Plover is a shorebird that is found along rocky or sandy beaches and shorelines, and therefore not impacted by PHP's forest management activities.	Not applicable
Gaspe Shrew	Gaspe Shrew was identified as a HCV in 2010 as it was a listed species at risk. Since then, the Gaspe Shrew has been de-listed and is no longer a species at risk nationally or provincially. Furthermore, the habitat requirements of the Gaspe Shrew is rock outcrops and talus slopes, where PHP does not operate.	National and Nova Scotia Species at Risk websites
Wood Turtle Habitat	The management approach for Wood Turtle was modified to meet the new requirements in the provincial Special Management Practices Policy released in 2012.	Nova Scotia Department of Natural Resources, Wildlife Division
Boreal Felt Lichen Occurrences	The management approach for Boreal Felt Lichen was modified to meet the new requirements in the provincial Special Management Practices Policy released in 2012.	Nova Scotia Department of Natural Resources, Wildlife Division

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
American Marten Habitat	The management approach for American Marten was modified to meet the new requirements in the provincial Special Management Practices Policy released in 2012.	Nova Scotia Department of Natural Resources, Wildlife Division
Mainland Moose Habitat	The management approach for Mainland Moose was modified to meet the new requirements in the provincial Special Management Practices Policy released in 2012.	Nova Scotia Department of Natural Resources, Wildlife Division
Canada Lynx Habitat	The management approach for Canada Lynx was modified to meet the new requirements in the provincial Special Management Practices Policy released in 2012.	Nova Scotia Department of Natural Resources, Wildlife Division
Bicknell's Thrush Habitat	The management approach for Bicknell's Thrush was modified to meet new requirements developed between Bird Studies Canada and PHP in 2012.	Bird Studies Canada - Becky Stewart, Atlantic Program Manager
Olive-sided Flycatcher Habitat	Added as new HCV as it was listed as a new species at risk in 2013.	Bird Studies Canada – Greg Campbell, Senior Project Biologist
Eastern Whip-poor-will Habitat	Added as new HCV as it was listed as a new species at risk in 2013.	Bird Studies Canada – Greg Campbell, Senior Project Biologist
Eastern Wood Peewee Habitat	Added as new HCV as it was listed as a new species at risk in 2013.	Bird Studies Canada – Greg Campbell, Senior Project Biologist
Canada Warbler Habitat	Added as new HCV as it was listed as a new species at risk in 2013.	Bird Studies Canada – Greg Campbell, Senior Project Biologist
Vole Ears Lichen Occurrences	Added as new HCV as it was listed as a new species at risk in 2013.	Nova Scotia Environment – Rob Cameron, Ecologist
Blue Felt Lichen	Added as new HCV as it was listed as	Nova Scotia Environment

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
Occurrences	a new species at risk in 2013.	– Rob Cameron, Ecologist
Black Ash	Added as new HCV as it was listed as a new species at risk in 2013.	Nova Scotia Department of Natural Resources – Frances MacKinnon, Wildlife GIS Analyst
Category 1 – Biodiversity **Question 2 – Endemic Species**		
No changes made under Question 2		
Category 1 – Biodiversity **Question 3 – Seasonal Concentration of Species**		
Cold Water Refugia Sub-watersheds	Modified the original GIS 'freehand' boundaries from the 2010 HCV assessment to a GIS-based buffer width of 200 meters for all cold water refugia sub-watersheds. The management prescription remains the same (minimum 50% crown closure at the forest stand level unless the stand is non-windfirm (e.g. balsam fir)). Also added that the 20 meter legislated riparian buffers (which allow for some extraction) would be left as un-managed forest areas to provide for additional protection for cold water streams.	Nova Scotia Fisheries & Aquaculture – Jason LeBlanc, Fisheries Biologist
Category 1 – Biodiversity **Question 4 – Regionally Significant Species**		
Red Spruce	In the 2010 HCV assessment report, there was one red spruce stand in Cape Breton showing in the GIS inventory. At that time, the company established this stand as a protected area. In early 2014 during regular forest planning, it was confirmed that the area is actually	Port Hawkesbury Paper – Dennis Boulet, Cape Breton Regional Planner Nova Scotia Department of Natural Resources –

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
	a balsam fir/white spruce plantation that was planted in 1984 and was later spaced. The area was ground-checked by the forest planner, area supervisor, and a Crown land forester with the NS Department of Natural Resources to verify that this stand was a plantation of balsam fir and white spruce, and not a natural red spruce stand. Therefore, this particular forest stand is removed as a HCV.	Brian MacSween, Crown Land Forester
Category 1 – Biodiversity **Question 5 – Species Concentration at Edge of Natural Range**		
No changes made under Question 5		
Category 1 – Biodiversity **Question 6 – Legal or Proposed Conservation Area**		
Legal and Administrative Protected Area	This section was updated to include 98,184 hectares of new provincial protected areas (pending legal protection) and 6,147 hectares of new administrative protected areas identified by PHP.	2014/15 HCV Review Committee <u>Members</u> - Canadian Parks & Wilderness Society, Chris Miller - Ecology Action Centre, Matt Miller - NS Department of Natural Resources - Forestry, Bruce Stewart - NS Department of Natural Resources - Forestry, Allan Smith - NS Department of Natural Resources – Wildlife, Randy Milton - University of New Brunswick, Graham Forbes

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
Category 2 – Large Landscape Level Forests **Question 7 – Forest Landscapes for Native Species**		
Large Landscape Level Forests	This section was updated to reflect new information resulting from the completion of the provincial protected areas planning process.	2014/15 HCV Review Committee
Category 3 – Rare, Threatened or Endangered Ecosystems **Question 8 – Naturally Rare Ecosystem Types**		
No changes made under Question 8		
Category 3 – Rare, Threatened or Endangered Ecosystems **Question 9 – Ecosystems under Present and/or Future Decline**		
No changes made under Question 9		
Category 3 – Rare, Threatened or Endangered Ecosystems **Question 10 – Ecosystems Poorly Represented in Protected Areas**		
PHP Administrative Protected Areas	This section was updated to reflect new information resulting from PHP's ecological gap analysis and the identification of new administrative protected areas.	2014/15 HCV Review Committee PHP Gap Analysis
Category 3 – Rare, Threatened or Endangered Ecosystems **Question 11 – Rare or Absent Large Landscape Level Forests**		
Large Landscape Level	This section was updated to reflect the	2014/15 HCV Review

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
Forests	HCV assessment completed for large landscape level forests under Category 2.	Committee
Category 3 – Rare, Threatened or Endangered Ecosystems **Question 12 – Unique Aquatic Ecosystems**		
No changes made under Question 12		
Category 4 – Basic Services of Nature **Question 13 – Water Flows for Social & Economic Activities**		
No changes made under Question 13		
Category 4 – Basic Services of Nature **Question 14 – Significant Forests Providing Aquatic Ecological Services**		
No changes made under Question 14		
Category 4 – Basic Services of Nature **Question 15 – Forests Critical to Erosion Control**		
No changes made under Question 15		
Category 4 – Basic Services of Nature **Question 16 – Interface Forests for Fire Protection**		
No changes made under Question 16		
Category 5 – Basic Needs of Local Communities **Question 17 – Basic Needs / Livelihoods of Local Communities**		

HIGH CONSERVATION VALUE	SUMMARY OF CHANGE	CONSULTATION
PHP Middle River Freehold Protected Area	In the 2010 HCV Assessment Report, PHP (then New Page Port Hawkesbury) identified a property owned by the company as a protected area and maintained a life-time easement with the adjacent property owner for domestic water supply access. When PHP purchased the mill from New Page in 2012, all company owned properties were sold to the provincial government. The life-time easement for the Middle River property was transferred to the government at that time, so PHP no longer has responsibility for this property, and is therefore removed as a HCV.	Not applicable
Category 6 – Traditional Cultural Identity **Question 18 – Forest Areas for Traditional Cultural Identity**		
Areas for Traditional Cultural Identity	Category 6 was updated to include progress that has been made since 2012 between PHP and The Assembly of Nova Scotia Mi'kmaq Chiefs. In fall 2012, a Memorandum of Understanding was signed between the two parties for the development of an Impact & Benefit Agreement, and an Environmental Agreement. These agreements are still under development and once signed, activities will begin for the identification and management of heritage resources such as archaeology and traditional use	Negotiations between PHP and The Assembly of Nova Scotia Mi'kmaq Chiefs (meeting minutes, MOU, draft agreements)

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