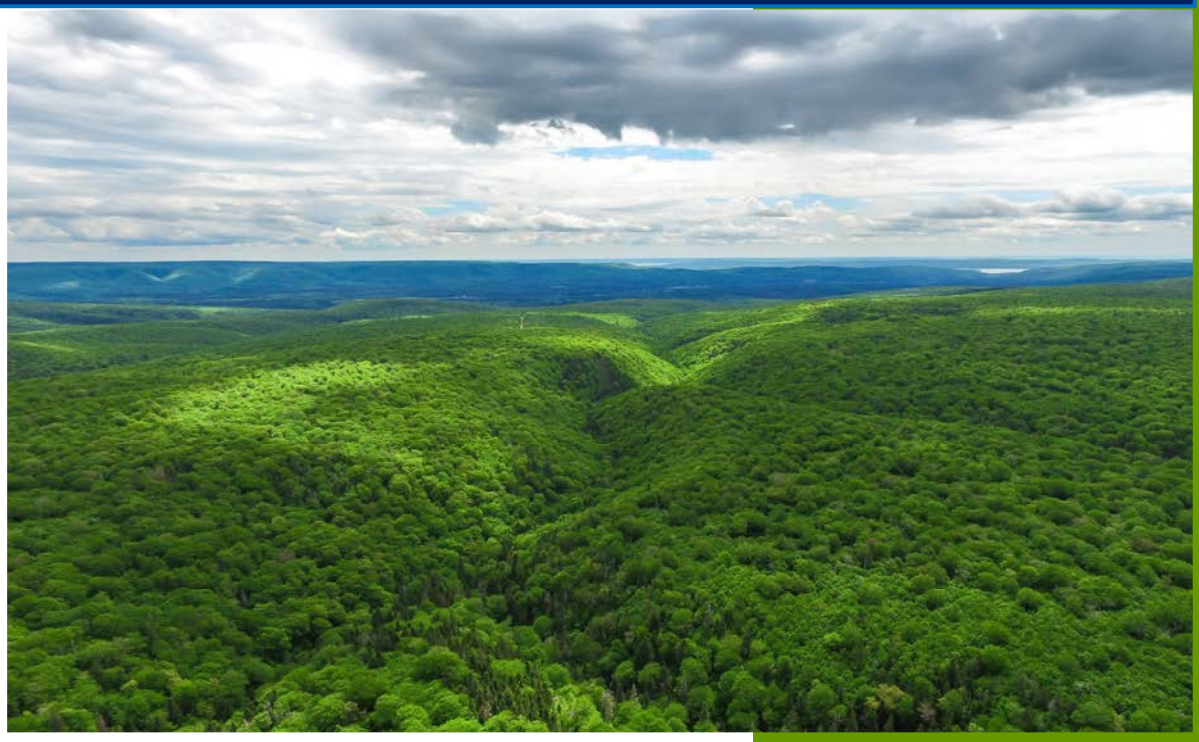
2017

ANNUAL MONITORING REPORT

SFM Indicators and High Conservation Values



Indian Brook, Cape Breton
Port Hawkesbury Paper's Forest Management Area
©Tree Top Images

WOODLANDS
PORT HAWKESBURY PAPER

Executive Summary

The 2017 Annual Monitoring Report provides a summary of Port Hawkesbury Paper's safety, environmental, and forest management progress in the Woodlands Unit. Since 2002, Port Hawkesbury Paper (PHP) has been monitoring and reporting on a suite of sustainable forest management indicators to measure its progress towards achieving targets regarding social, economic, environmental, and cultural forest values. Long-term monitoring of these values allows the public to better understand PHP's forest management activities, and the goals and objectives we set to ensure our forest management is having a positive impact and to implement action items in areas that we are not. This is an important element of continual improvement, which PHP strives for every day.

This report also summarizes the effectiveness monitoring program for High Conservation Value Forests (HCVF). These values were first identified in 2008 for Forest Stewardship Council® (FSC®) certification and updated in January 2018 to include new knowledge and information related to species at risk and protected areas. Annual monitoring is conducted to assess the effectiveness of the measures used to maintain or enhance the identified values.

Contents

About the Woodlands Unit

2001: First forest company in Canada to achieve certification to both the Canadian Standards Association (CSA®) and Sustainable Forestry Initiative (SFI®) standards for sustainable forest management.

2008: First forest company in Maritime provinces to achieve certification to the Forest Stewardship Council® (FSC®) Maritime Standard for responsible forest management. PHP is still certified to the FSC Maritime Standard today.

2008: First forest company in Maritime provinces to achieve Chain-of-Custody certification to the FSC® standard for wood traceability.

2014: Woodlands becomes re-certified to the SFI® Forest Management and Chain-of-Custody Standards, and the PEFC™ Chain-of-Custody standard.

With a dedicated staff of 25 people, the company's Woodlands Unit currently manages 30% of the Crown land in Nova Scotia, which represents 58% (roughly 523,000 hectares) of the Crown land in the seven eastern counties. As a result of 45 years of silviculture activities on these lands, the forest will increase in economic activity over the next 20 years.

Our wood supply primarily comes from the seven eastern counties of Nova Scotia with additional wood purchased in central Nova Scotia. The Woodlands Unit provides silviculture services and information on sustainable forest management practices to private woodland owners. Additionally, we provide training on best management practices for Crown and private contractors and operators. In addition to acquiring softwood pulpwood from the managed forest, Port Hawkesbury Paper also manages its forest lands to produce softwood and hardwood logs, and other products, for sale to local sawmills and buyers.

As the largest Crown license holder in eastern Nova Scotia, we believe that good business includes strong community support and involvement, environmental awareness, continued growth in forest management and contribution to the Nova Scotia economy. The public use of Crown lands for recreation, accessibility, hunting and fishing illustrates the wide variety of

values held by the general public. To achieve sustainable forest management, the needs of all stakeholders must be assessed and managed appropriately.

Forest management certification is one of many tools to support the sustainability of Port Hawkesbury Paper. 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. Port Hawkesbury Paper supports the mutual recognition of credible forest certification systems that take into account national and regional characteristics such as natural conditions, forest ownership structures and legislation.

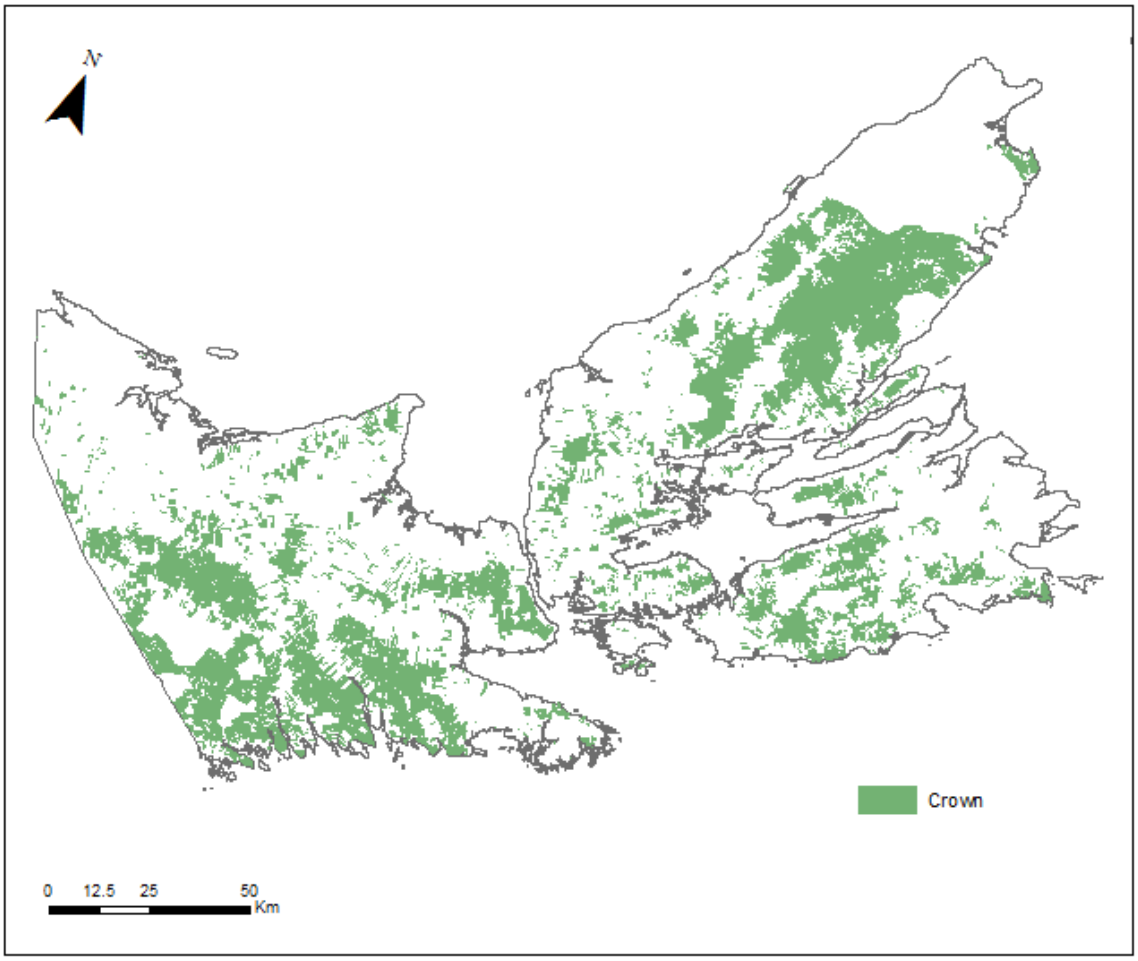
Forest operations at Port Hawkesbury Paper are carefully planned to deliver a valuable, sustainable resource that satisfies economic, social, and environmental benefits. More specifically, Port Hawkesbury Paper works diligently to ensure sustainable harvests, increased forest productivity, and protection for wildlife, water, and recreational resources. With the use of high-end computer mapping and software systems, we supervise our operations to strict standards to ensure we continually meet or exceed our expectations for a healthy productive forest for the future.

Port Hawkesbury Paper's Crown Land Forest Management Area

PHP's Defined Forest Area (DFA) is located in the seven eastern counties of Nova Scotia. The geographic extent of the DFA is shown in Figure 1. The company manages approximately 523,000 hectares of Crown lands through a license agreement with the provincial government within the DFA. The land inventory managed by PHP is broken down into four main components (Table 1).

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. Private wood is purchased at roadside and the company provides competitive pricing. In addition, the company provides silviculture services and training in sustainable forest management practices to encourage good stewardship practices.

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



PHP's Crown Land-base as per the Forest Utilization License Agreement

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

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

Land-base breakdown for Eastern Crown Land

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

Key Commitments to Safety

Safety is a vital aspect of our operating philosophy. From production to quality assurance, cost control and environmental compliance, we focus on safety in everything we do.

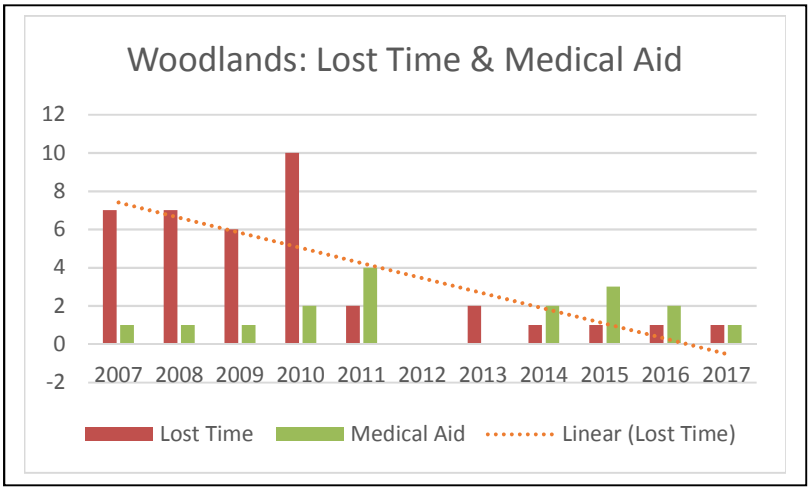
The Health & Safety of employees takes precedence over all other responsibilities and activities within our Company. This is the cornerstone of our safety policy.

We believe that all accidents are preventable. Our success is measured by our safety performance relative to our goal of zero recordable injuires.

It is our objective to work toward continual improvement in health, safety and wellness aspects of our operations.

Woodlands Safety Results

The Woodlands Safety Results show a strong trend towards zero lost time accidents and medical aids. However, we continue to promote employee and worker safety through effective training programs, monitoring, and communication to strive towards our objective of zero safety incidents year after year.



A Lost Time Accident occurs when an employee or worker is injured on the job which results in lost work time. There was one lost-time accident in 2017.

A Medical Aid occurs when an employee or worker is injured on the job and requires medical aid, but does not result in lost work time. There was one medical aid in 2017.

Key Commitments to the Environment

It is the policy of Port Hawkesbury Paper to carry out operations in ways that do not endanger the environment. Sustaining a healthy environment is an integral part of all company operations.

PHP commits to continual improvement of all aspects of our sustainable forest management system for company-managed lands through experience and forest research.

Utilize long-term landscape ecosystem planning, appropriate silviculture systems, and operating practices that conserve biodiversity in managing our forest areas.

Meet or be better than all applicable regulations, legal obligations and other requirements to which Port Hawkesbury Paper subscribes.

Monitoring and reporting on Woodlands environmental performance is an integral part of achieving responsible forest management across the working landscape. Harvest contractors working on Crown land on behalf of the company are audited by PHP three times a year - Winter, Summer and Fall. Compliance and performance is checked against a range of items related to layout compliance, operational safety and environmental compliance, and job quality. Contractors must obtain a certain percentage or higher in each category to be eligible for a bonus payment.

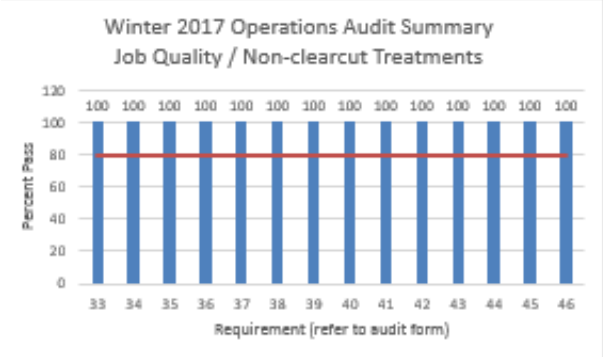
With a total of 41 audits completed, harvest contractors continue to achieve a very high level of overall compliance and performance as shown in the 2017 results. This is due in large part to the long-standing working relationship between the company and its Crown land harvest contractors. Working together to monitor performance, share information, and strive to continually improve has resulted in strong on-the-ground results.

PHP also audits its private suppliers. A total of 21 suppliers were audited in 2017. Using the previous quarter's deliveries, wood suppliers are randomly chosen to be audited by a PHP Area

Supervisor. Private supplier audits are performed on active jobs when possible. However, auditing a completed job may be necessary with smaller suppliers.

Below are summaries of PHP's Crown and private supplier audit program for 2017. Areas of deficiencies are highlighted in orange. If the deficiencies are consistently on-going or deemed to be of significant concern, communications and/or training is made to suppliers to improve performance.

Crown Contractor Audit Results – Winter 2017



1 **WEEKLY INSPECTIONS COMPLETED ACCURATELY**

LAYOUT COMPLIANCE

2 Followed Cutting Boundaries
3 Wildlife clumps (as per instructions)
4 Wildlife corridors (50M min)
5 Properly buffered watercourses and wetlands
6 Residual Trees retained (10/Ha)

OPERATION COMPLIANCE

7 First Aid Supplies
8 First Aid trained personnel (Copies to be made available)
9 Personal Protective Equipment
Fire Protection Equipment
10 · Crew
11 · Machines
12 Remote Location Emergency Plan
13 Proper Warning Signs Posted on 2-way Public Traffic Road
14 System to check on Employees who Work Alone
15 Current Documentation
(a.MSDS & Labels, b.Policies & Work Instructions, c. Safety Certificate)
16 Lock Out - Tag Out Policy in place
Fuel & Oil Storage:
17 · Spill Kit
18 · Pumps (able to be locked for transport or off duty.)
19 · Trailer Permits if not floated.
20 · Central collection spot for Hazardous Material. (2.04)
21 . WHMIS and TDG trained personnel (Copies to be made available)
22 . Waste oil disposal system in place
23 · Tanks Properly Labeled / Placarded to TDG and WHIMS Regulations
24 . Storage tanks located not closer than 100m from any watercourse

Water Quality:

25 . Bridges used and Erosion controlled on approaches to stream crossing
26 . Temporary bridges removed, water courses cleared of debris
27 . No evidence of siltation
28 Machine Rutting: Within Guidelines (or as permitted by Supervisor)
29 Ground Disturbance: Within Guidelines
30 Safety Meeting Minutes
31 EMS Training - New Employees
32 Biodegradable Chain Oil used
Total

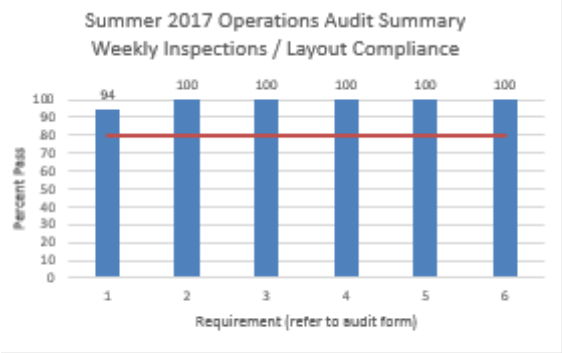
JOB QUALITY

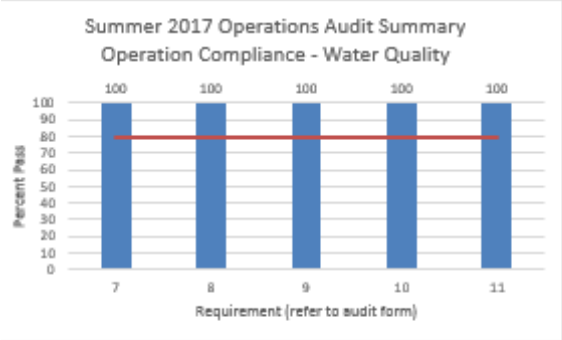
ALL JOBS
Housekeeping:
33 · Garbage & Litter collected to be discarded
34 · No Discarded Parts/Tires
35 · Disposed of Hazardous Materials
36 Road drains and culverts cleared of debris
37 Unmerchantable hardwood trees protected
38 Damage To Leave Trees Acceptable
39 · Plantations
40 · Spacing
41 · Regeneration

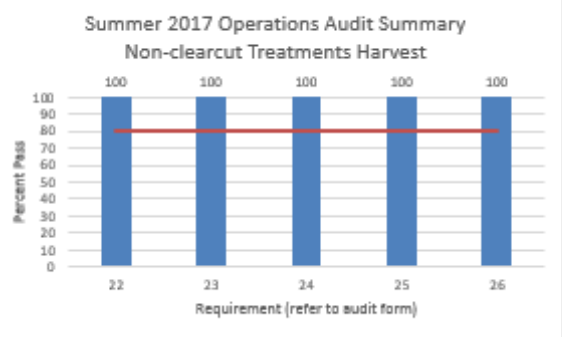
NON - CLEARCUT TREATMENTS HARVEST

42 Tree Spacing
43 Basal Area
44 Trail spacing
45 Trail width
46 No Damage To Leave Trees

Crown Contractor Audit Results – Summer 2017







1 **WEEKLY INSPECTIONS COMPLETED ACCURATELY**

LAYOUT COMPLIANCE

2 Followed Cutting Boundaries
3 Wildlife clumps (as per instructions)
4 Wildlife corridors (50M min)
5 Properly buffered watercourses and wetlands
6 Residual Trees retained (10/Ha)

OPERATION COMPLIANCE

OPERATION COMPLIANCE

Water Quality:

7 . Bridges used and Erosion controlled on approaches to stream crossing
8 . Temporary bridges removed, water courses cleared of debris
9 . No evidence of siltation
10 Machine Rutting: Within Guidelines (or as permitted by Supervisor)
11 Ground Disturbance: Within Guidelines

Total

JOB QUALITY

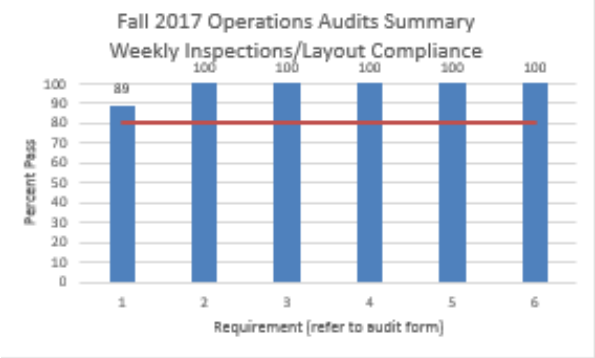
Housekeeping:

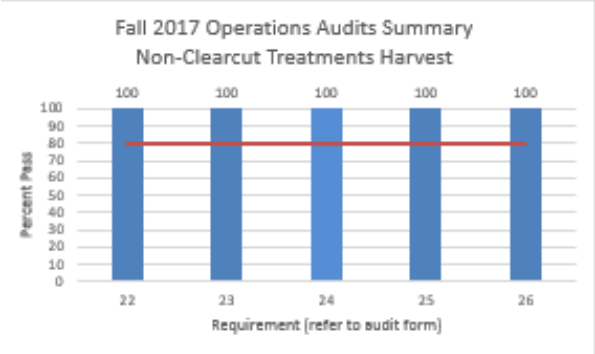
12 · Garbage & Litter collected to be discarded
13 · No Discarded Parts/Tires
14 · Disposed of Hazardous Materials
15 Road drains and culverts cleared of debris
16 Unmerchantable hardwood trees protected
17 Damage To Leave Trees Acceptable
18 · **Plantations N/A**
19 · Spacing
20 · Regeneration
21 UTILIZATION < = 2 M3/HA

NON - CLEARCUT TREATMENTS HARVEST

22 Tree Spacing
23 Basal Area
24 Trail spacing
25 Trail width
26 No Damage To Leave Trees

Crown Contractor Audit Results – Fall 2017





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Total

JOB QUALITY

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13 · No Discarded Parts/Tires
14 · Disposed of Hazardous Materials
15 Road drains and culverts cleared of debris
16 Unmerchantable hardwood trees protected
17 Damage To Leave Trees Acceptable
18 · Plantations
19 · Spacing
20 · Regeneration
21 UTILIZATION < = 2 M3/HA

NON - CLEARCUT TREATMENTS HARVEST

22 Tree Spacing
23 Basal Area
24 Trail spacing
25 Trail width
26 No Damage To Leave Trees

Private Supplier Audit Results – 2017

Legal Requirements
1. Properly buffered watercourses and wetlands.
2. Wildlife clumps left on site.
3. Coarse woody debris left on site.
4. No construction debris/slash in stream.
5. No silt source from road entering stream.
6. There is no evidence of un-cleaned oil spills over 100 litres.
7. Personal protective equipment
8. First Aid Kit
9. Training records shown for First Aid, WHMIS, and TDG (as required)- within 1 month
10. Fire protection equipment as required for crew and machines
11. Fuel tanks properly labeled/placarded/stored/secured to TDG and WHMIS reqs.
12. Lock Out - Tag Out in place

Operations Management Plan
14. Operations Management Plan
15. Property and cut boundaries flagged.

Roads and Landings
16. Take off ditches or cross culverts present and functional
18. No blockage of natural drainage.
19. Haul roads ditched and crowned.
21. No ditches running into stream.
23. Proper size culvert or bridge used.
26. Landing location minimizes risk of stream siltation.

Operating Practices
27. Forwarder trails on driest locations.
28. Forwarder approach to roadside chosen to minimize damage.
30. Supplier has demonstrated efforts to minimize rutting.
31. Portable bridge used.
32. Immature stands are preserved.
33. Harvested merchantable trees have been fully utilized.
34. Wood is piled outside of the special management zone.
36. Boundary lines kept clear of brush.
13. Fuel storage is more than 30 metres from stream.

Equipment
38. Fuel and oil leaks are not present on machinery.
39. Spill kit available on job.

Housekeeping
40. Garbage is properly contained and disposed of.
41. Used oil is properly disposed of.

Best Management Practices - Other
42. Conservation of known critical wildlife habitat elements, biodiversity & species at risk
43. SMPs followed in known Forests with Exceptional Conservation Value
44. SMPs followed for known invasive exotic plants and animals
45. Known characteristics of special sites preserved
46. Harvest residues (slash, limbs, tops) adequately distributed/utilized

Sustainable Forest Management Indicators

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

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

Through the Port Hawkesbury Paper Sustainable Forest Management Policy, the Woodlands Unit implements its Mission and Vision for Sustainable Forest Management (SFM) through 15 Guiding Principles of SFM, 6 Guiding Principles of Wood Procurement, and 16 Standard Practices for SFM.

Indicators of Sustainable Forest Management

For over a decade, PHP has been monitoring and reporting on a variety of sustainable forest management (SFM) indicators. To measure sustainable management over time for a range of forest values, indicators were developed to monitor progress in the maintenance or enhancement of those values.

The Woodlands monitoring program for SFM indicators consists of internal assessments and audit programs. Results from these programs are analysed and summarized on an annual basis to determine if targets are being achieved or have failed to meet set targets. Accordingly, this identifies management actions that must be adjusted to achieve desired outcomes.

Local-level SFM indicators were developed according to the Canadian Council of Forest Ministers' criteria for sustainable forest management. These criteria are:

- Conservation of Biological Diversity
- Forest Ecosystem Condition and Productivity
- Conservation of Soil and Water Resources
- Forest Ecosystem Contributions to Global Ecological Cycles

- Multiple Benefits to Society
- Accepting Society's Responsibility for Sustainable Development

CRITERION 1 - CONSERVATION OF BIOLOGICAL DIVERSITY

Conserve biological diversity by maintaining integrity, function, and diversity of living organisms and the complexes of which they are part.

Indicator 1.1 - Species Diversity - Significant Species

OBJECTIVE	Managing and mitigating effects on known occurrences of endangered and threatened species.	
INDICATOR	Annual review of NSDNR's Significant Species and Habitats Database and other species status lists.	
TARGET Complete annual review of NSDNR's Significant Species and Habitats Database, and other species status lists, and implement appropriate management activities where necessary.		VARIANCE None allowed
2017 Update	The Significant Habitat database is updated each year by the provincial Department of Natural Resources and provided to PHP to be used in forest management planning activities. The 2017 Significant Habitat database maintained by NSDNR contains 33,221 ha of significant species habitats potentially affected by forest management activities on PHP's landbase. The significant species identified in the 2017 data are categorized into the following: Deer Wintering Area 21,662 ha Migratory Bird 259 ha Moose Wintering 5,652 ha Species of Concern 1,603 ha Species at Risk 2,904 ha Other Habitat 1,141 ha The 2017 data are used in operational planning and is reviewed by NSDNR during the harvest approval process. Other species status and appropriate management strategies have been incorporated into PHP's High Conservation Value Forest (HCVF) Assessment Report.	

Moose (Mainland population) - Endangered

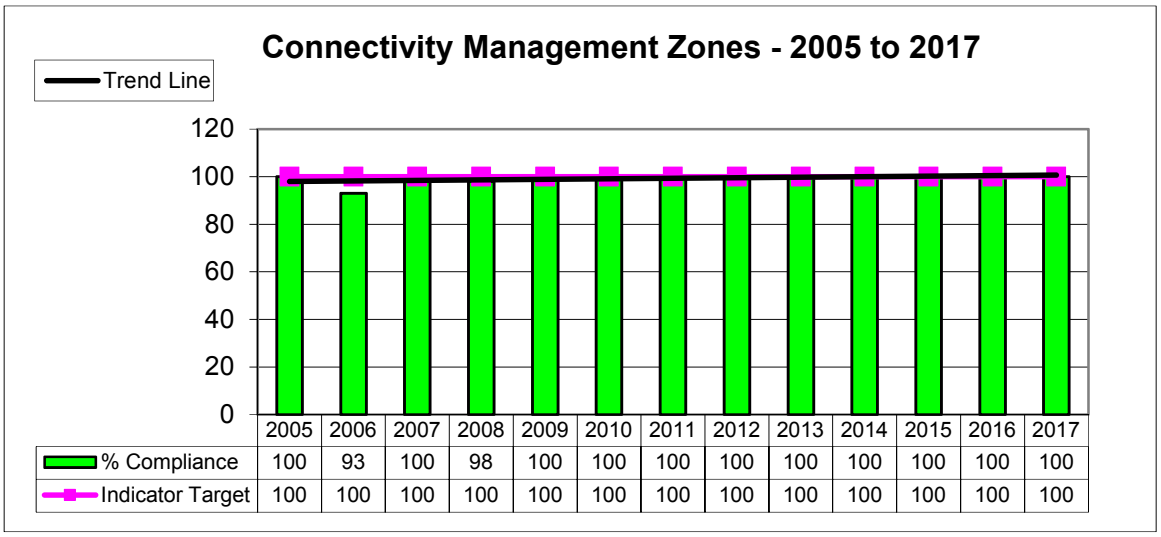
"The native population of moose in Nova Scotia is limited to approximately 1000 individuals in isolated sub-populations across the mainland. The population has declined by at least 20% over the past 30 years with much greater reductions in distribution and population size over more than 200 years, despite extensive hunting closures since the 1930's. The decline is not well understood but involves a complex of threats including: over harvesting, illegal hunting, climate change, parasitic brainworm, increased road access to moose habitat, spread of white-tailed deer, very high levels of cadmium, deficiencies in cobalt and possibly an unknown viral disease.

Moose on Cape Breton Island are not risk as they are abundant and the result of a re-introduction of moose from Alberta in the 1940's."

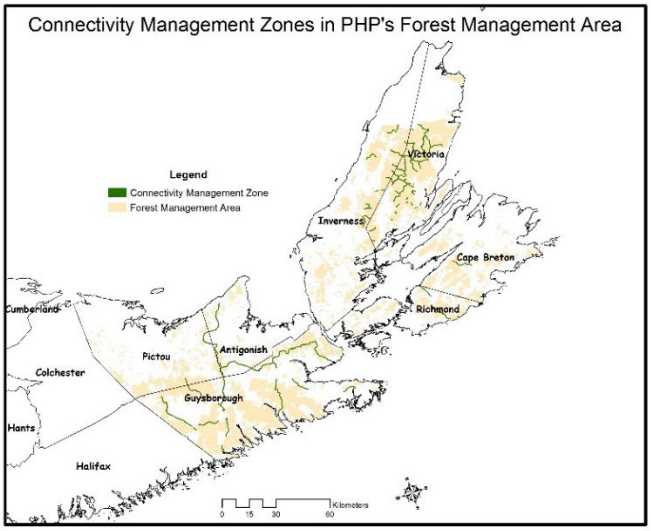
Source: http://novascotia.ca/natr/wildlife/biodiversity/species-list.asp

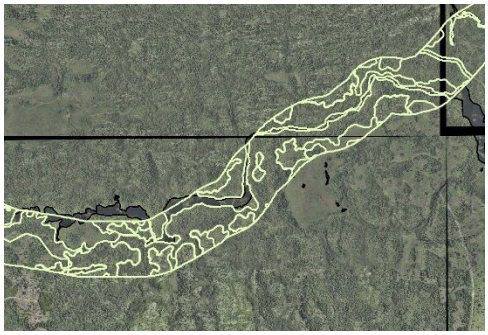
Indicator 1.2 - Genetic Diversity - Connectivity Management Zones

OBJECTIVE	To maintain landscape level Connectivity Management Zones (CMZs) according to company connectivity guidelines.
INDICATOR	Percent of CMZs managed according to connectivity guidelines.
TARGET Maintain a compliance level of 100% of the total number of CMZs meeting the 100 m solid cover with minimum 30% crown closure.	VARIANCE 10%
2017 Update	All 46 CMZs assessed for 100 m solid cover with minimum 30% crown closure met the connectivity guidelines for 100% compliance.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% Compliance	100	93	100	98	100	100	100	100	100	100	100	100	100
Indicator Target	100	100	100	100	100	100	100	100	100	100	100	100	100





Indicator 1.3 - Protected Areas - Protected Area Strategy

OBJECTIVE	To identify and maintain areas reserved from harvest under a protected areas strategy on Crown and freehold lands.
INDICATOR	Proportion of area reserved from harvest under a protected area strategy by EPU.
TARGET Maintain 12% of total area reserved from harvest under a protected area strategy.	VARIANCE +/- 1%
2017 Update	

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%

These percentages are expected to increase in the coming year as the provincial government finalizes new protected areas.

Source: NS Department of Environment,

French River Wilderness Area

Indicator 1.4 - Protected Areas - Old Forest

OBJECTIVE	To maintain old forest conditions throughout the landscape.	
INDICATOR	Percent of forest management area protected for old forest values.	
TARGET Maintain 8% of forest areas in old forest condition.		VARIANCE +/- 1%
2017 Update	In 2017 the total area reserved as old forest across the forest management area was 16%.	

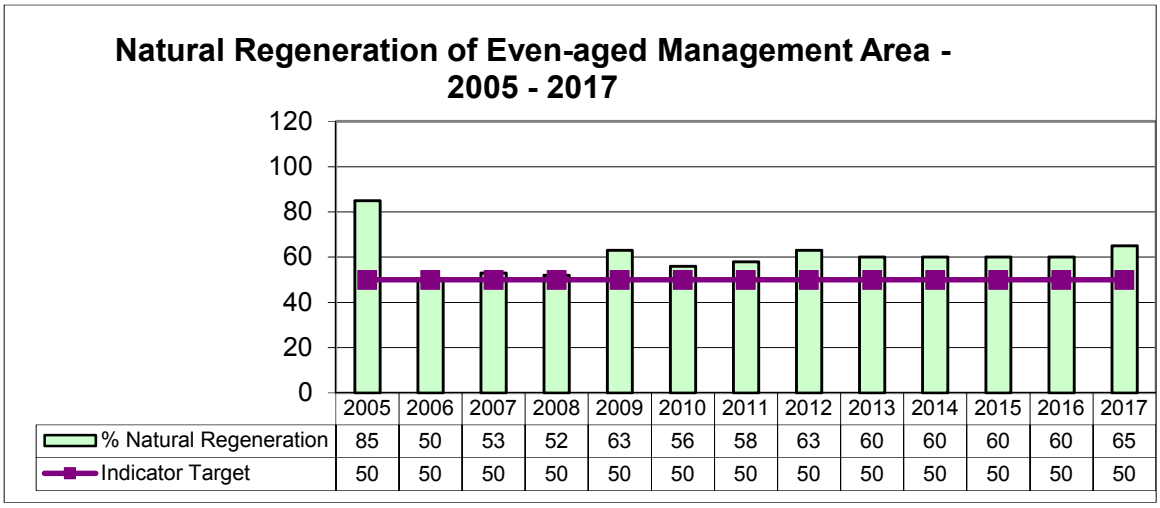
Old Forest Area, Guysborough County, Andrea Doucette, PHP

CRITERION 2 - FOREST ECOSYSTEM CONDITION AND PRODUCTIVITY

Conserve forest ecosystem condition and productivity by maintaining the health, vitality, and rates of biological production.

Indicator 2.1 - Forest Ecosystem Resilience - Natural Regeneration

OBJECTIVE	To promote Acadian forest characteristics through the use of natural regeneration.
INDICATOR	Proportion of even-aged management regenerated naturally.
TARGET Naturally regenerate with appropriate species 50% of total even-aged management area.	VARIANCE +/- 10%
2017 Update	In 2017, 65% of the total even-aged management area was naturally regenerated.



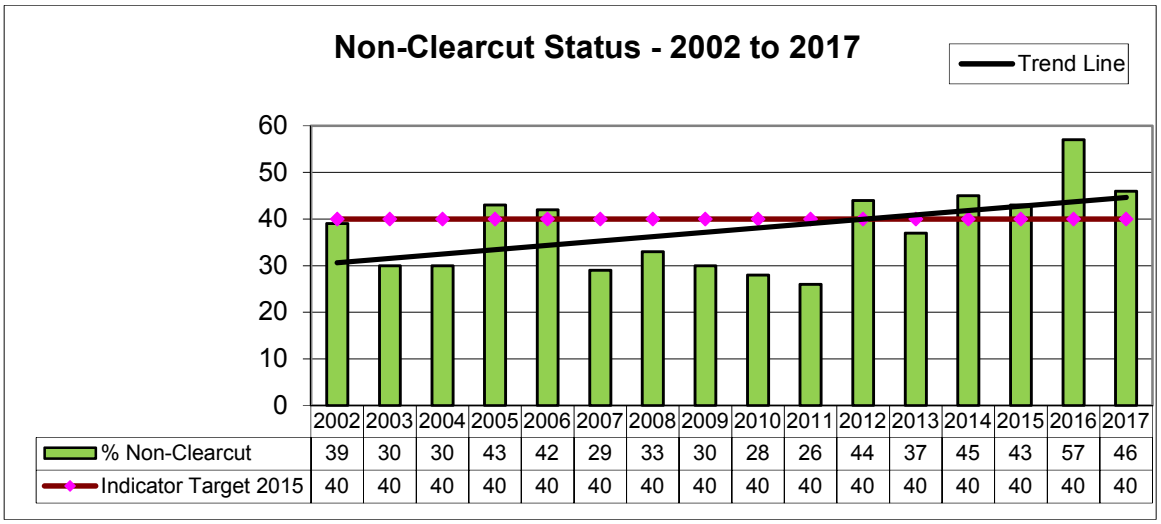
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% Natural Regeneration	85	50	53	52	63	56	58	63	60	60	60	60	65
Indicator Target	50	50	50	50	50	50	50	50	50	50	50	50	50

Red Spruce Natural Regeneration

Red Spruce Shelterwood, Matthew McKenna, PHP

Indicator 2.2 - Forest Ecosystem Resilience - Harvest Treatments

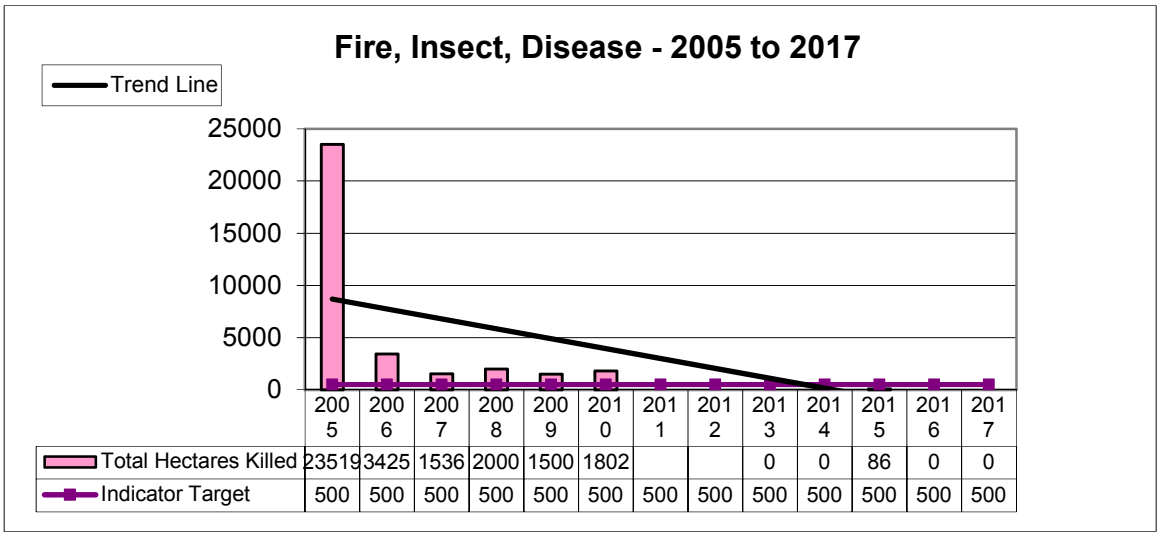
OBJECTIVE	Reduce clearcut area by applying alternative harvest treatments in appropriate ecoregions.
INDICATOR	Proportion of total (softwood and hardwood) area harvested using unevenaged, thinning, shelterwood, selection cut and/or partial cut techniques by EPU.
TARGET Increase non-clearcut treatments in appropriate ecoregions to represent 40% of total harvest by 2015 and 50% of total harvest by 2025.	VARIANCE +/- 5 Year Period
2017 Update	In 2017, the percent of total harvest representing non-clearcut treatments was 46%.



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% Non-Clearcut	39	30	30	43	42	29	33	30	28	26	44	37	45	43	57	46
Indicator Target 2015	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Indicator 2.3 - Forest Ecosystem Productivity - Forest Health

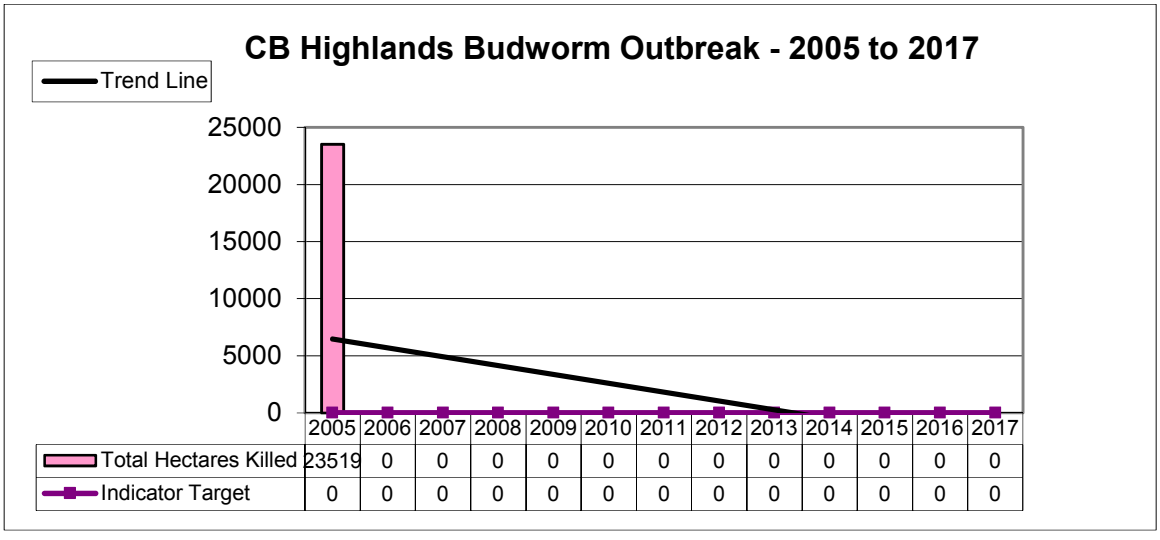
OBJECTIVE	To minimize fire, insect and disease occurrence across the forest landscape.
INDICATOR	Area (by ha) of forest killed by fire, insect and disease.
TARGET Less than 500 ha of forest killed by fire, insect and disease.	VARIANCE + 1000 ha
2017 Update	There was no evidence or recorded data by NS Department of Natural Resources for total forest killed by fire, insect, or disease in 2017.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Hectares Killed	23519	3425	1536	2000	1500	1802			0	0	86	0	0
Indicator Target	500	500	500	500	500	500	500	500	500	500	500	500	500

Indicator 2.4 - Forest Ecosystem Productivity - Budworm Hazard

OBJECTIVE	To minimize budworm hazard on the Cape Breton Highlands.
INDICATOR	Area (by ha) killed by budworm outbreak on the Cape Breton Highlands.
TARGET To have zero hectares of forest killed by a budworm outbreak.	VARIANCE + 800 ha
2017 Update	In 2017, 0 ha of forest in Cape Breton Highlands was killed by a budworm outbreak.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Hectares Killed	23519	0	0	0	0	0	0	0	0	0	0	0	0
Indicator Target	0	0	0	0	0	0	0	0	0	0	0	0	0

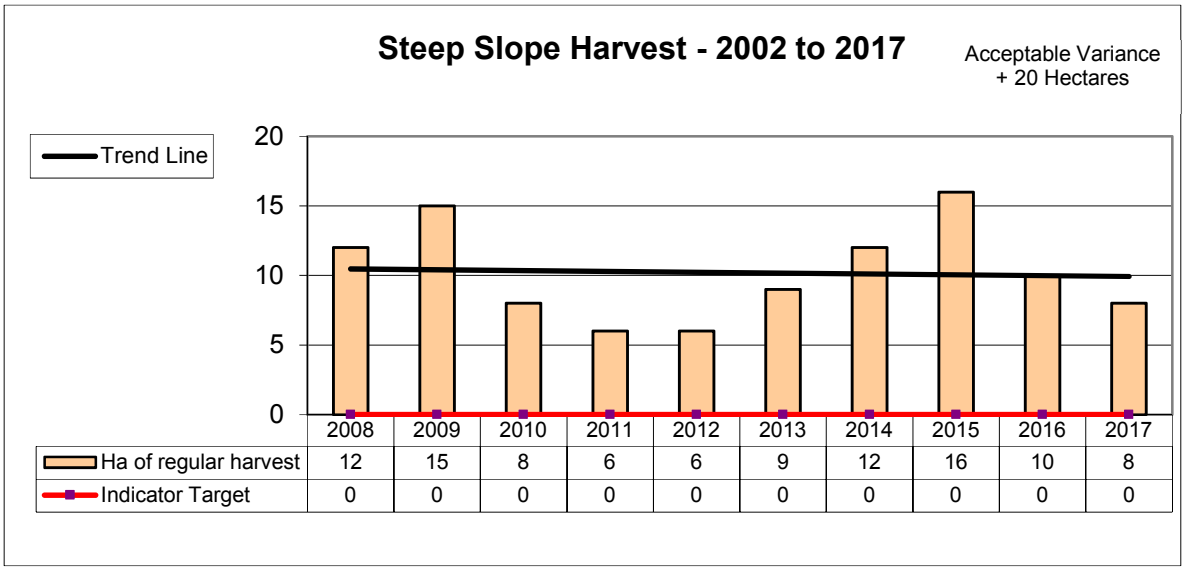
CRITERION 3 - CONSERVATION OF SOIL AND WATER RESOURCES

Conserve soil and water resources by maintaining their quantity and quality in forest ecosystems.

Indicator 3.1 - Soil Protection - Steep Slopes

OBJECTIVE	To avoid regular harvesting in identified steep slope areas.	
INDICATOR	Area (by ha) of regular harvest in steep slope areas.	
TARGET Maintain no regular harvest in areas with greater than 30% average slope.		VARIANCE + 20 ha
2017 Update	A total of 8 hectares was harvested in areas with greater than 30% average slope. NOTE: This indicator is based on spatial data that identifies slopes > than 30% average using contour data. It is not based on the actual % slope for any given area as could be determined on-the-ground. Therefore, to calculate the results for the indicator, a GIS exercise is done which overlaps the steep slope data with completed harvest jobs to determine non-conformances. Most often, the areas showing as harvested are slivers due to inaccuracies in the data.	

MacKenzie Mountain - CB, Matthew McKenna, PHP



Indicator 3.2 - Water Protection - Watersheds

OBJECTIVE	To protect hydrological functions in all watersheds.
INDICATOR	Proportion of identified watershed area (that is managed by PHP) in a closed forest condition.
TARGET Each watershed shall have 80% of its area (that is managed by PHP) in a closed forest condition.	VARIANCE - 5%
2017 Update	PHP has identified 17 watersheds throughout its management area that are monitored specifically for closed forest condition (> 10 years of age and/or > 2 meters in height). Watershed size ranges from the smallest at 9 hectares to the largest at 51,293 hectares. In 2017, all 17 watersheds had 80% or more of its area in a closed forest condition.

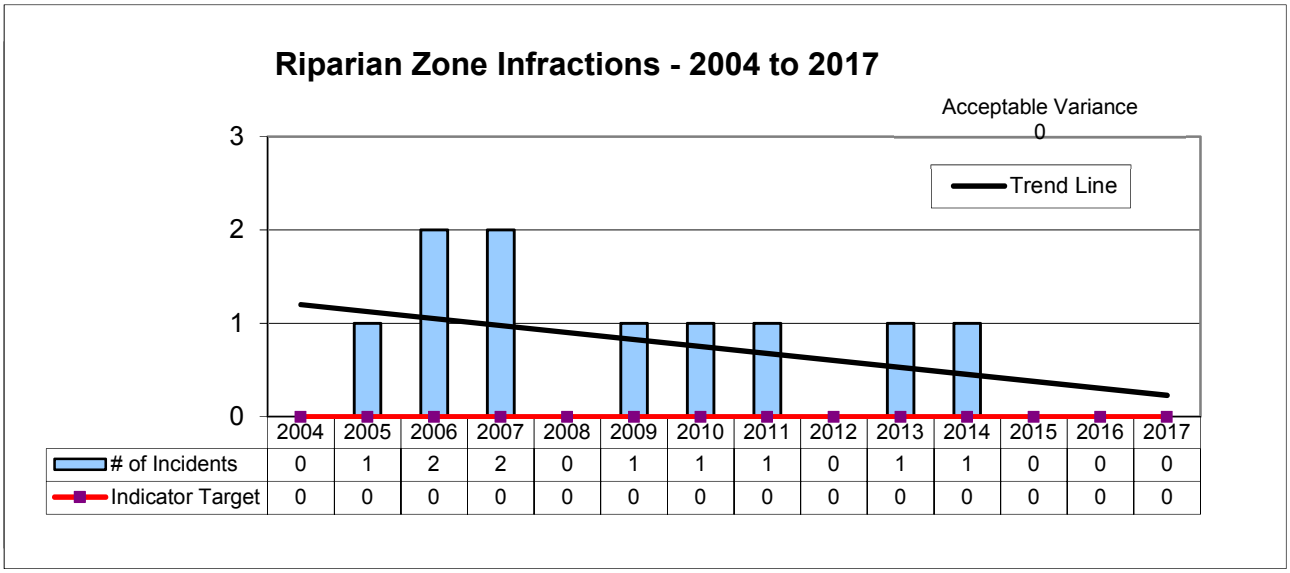
Watershed Name (and total hectares managed by PHP)	**% Closed Forest 2017**	**% Closed Forest 2016**	**% Closed Forest 2015**	**% Closed Forest 2014**	**% Closed Forest 2013**	**% Closed Forest 2012**	**% Closed Forest 2011**
Antigonish Municipal Watershed (647 ha)	100%	100%	100%	100%	100%	100%	100%
Guysborough 1 Municipal Watershed	86%	92%	91%	96%	100%	100%	92%
Guysborough 2 Municipal Watershed (9	100%	100%	100%	100%	100%	100%	100%

Inverness Municipal Watershed (125 ha)	85%	93%	92%	92%	95%	95%	97%
Pictou Municipal Watershed (40 ha)	100%	100%	100%	100%	90%	88%	100%
Victoria Municipal Watershed (962 ha)	97%	99%	98%	98%	96%	98%	98%
Baddeck River Watershed (15545 ha)	95%	95%	96%	94%	95%	99%	93%
East River Watershed (9468 ha)	95%	94%	93%	93%	95%	94%	89%
Grand River Watershed (5662 ha)	90%	89%	89%	85%	82%	85%	82%
Liscomb River Watershed (12760 ha)	94%	92%	91%	90%	91%	96%	90%
Margaree River Watershed (29118 ha)	92%	89%	88%	89%	98%	100%	91%
Middle River Watershed (15757 ha)	94%	89%	90%	87%	94%	99%	92%
Mira River Watershed (13337 ha)	92%	90%	91%	92%	100%	100%	92%
New Harbour River Watershed (452 ha)	93%	95%	94%	99%	98%	98%	99%
North River Watershed (16108 ha)	90%	85%	86%	83%	92%	96%	79%
River Inhabitant Watershed (4922 ha)	96%	93%	90%	93%	96%	96%	94%
St. Mary's River Watershed (51293 ha)	93%	92%	92%	93%	93%	96%	90%

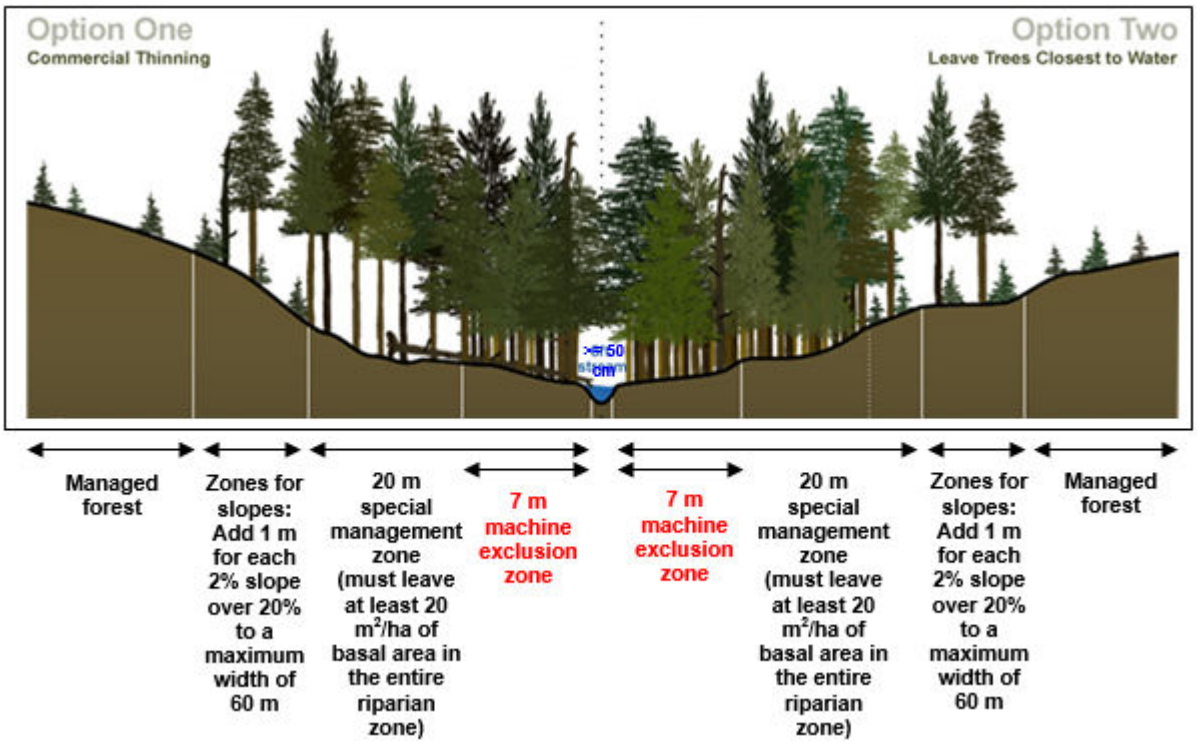
St. Mary's River Watershed, Andrea Doucette, PHP

Indicator 3.3 - Water Protection - Riparian Zone Management

OBJECTIVE	To protect and maintain all riparian functions.	
INDICATOR	Number of riparian zone non-conformance incidents.	
TARGET To have zero non-conformance incidents.		VARIANCE None allowed
2017 Update	All harvest jobs in 2017 met the requirements for maintaining a minimum 20-meter wide riparian buffer.	

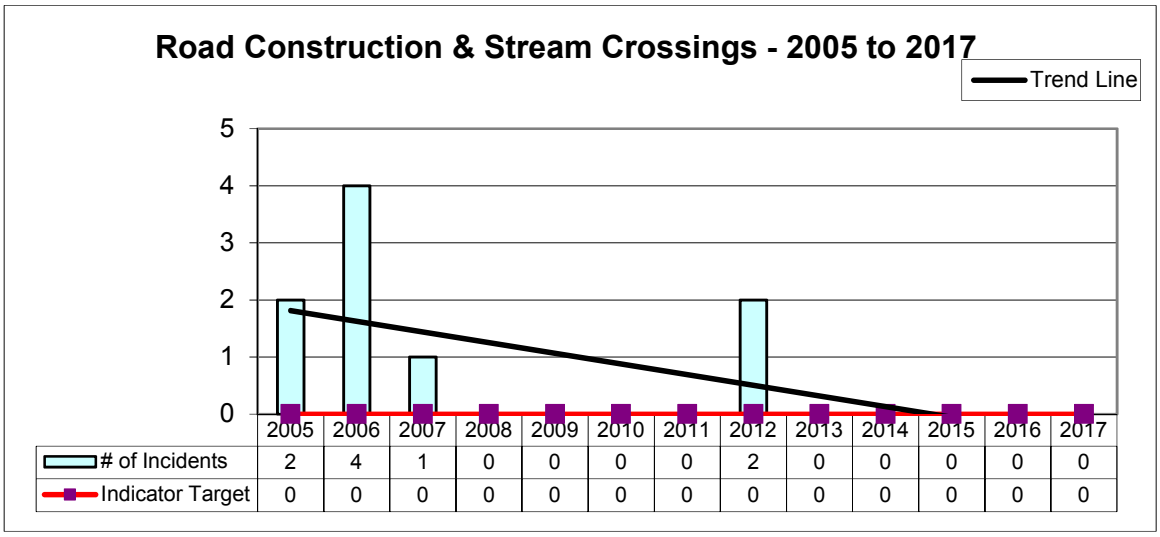


The Wildlife Habitat and Watercourse Protection Regulations can be found under Section 40 of the Forests Act. They were developed for application by people working in forestry and are applicable to watercourses and marshes, which include wetlands, lakes, ponds, rivers, streams, creek, estuary, or salt-water body that contains water for at least part of the year. The below image illustrates how special management zones must be established around watercourses and marshes when conducting forestry operations.



Indicator 3.4 - Water Protection - Roads and Stream Crossings

OBJECTIVE	To reduce negative impacts on water quality resulting from road construction.	
INDICATOR	Number of road construction and stream crossing incidents (new and upgrades) according to company guidelines.	
TARGET To have zero non-conformance incidents.		VARIANCE None allowed
2017 Update	In 2017, there was one incident related to road construction and stream crossings.	



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
# of Incidents	2	4	1	0	0	0	0	2	0	0	0	0	0
Indicator Target	0	0	0	0	0	0	0	0	0	0	0	0	0

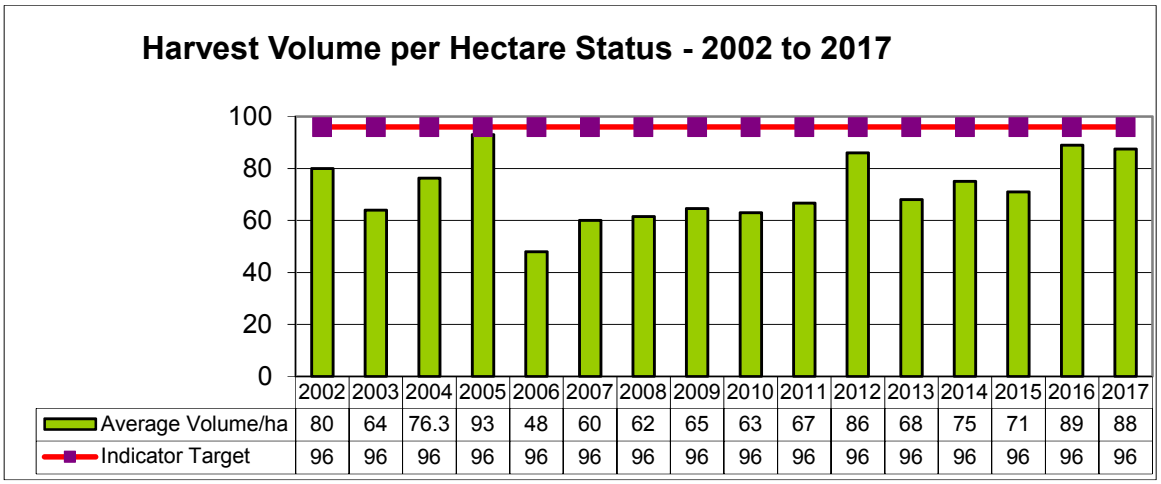
New bridge installation, Paul MacDonald, PHP

CRITERION 4 - FOREST ECOSYSTEM CONTRIBUTIONS TO GLOBAL ECOLOGICAL CYCLES

Maintain forest conditions and management activities that contribute to the health of global ecological cycles.

Indicator 4.1 - Forest Carbon - Harvest Volume

OBJECTIVE	To reduce carbon emissions.
INDICATOR	Period average volume per hectare harvested.
TARGET Increase the average harvest volume by 20% within the next 25 years.	VARIANCE +/- 5 Year Period
2017 Update	The average volume per hectare harvested was 87.5 m^3/ha. This is based on all treatments excluding commercial thinnings.



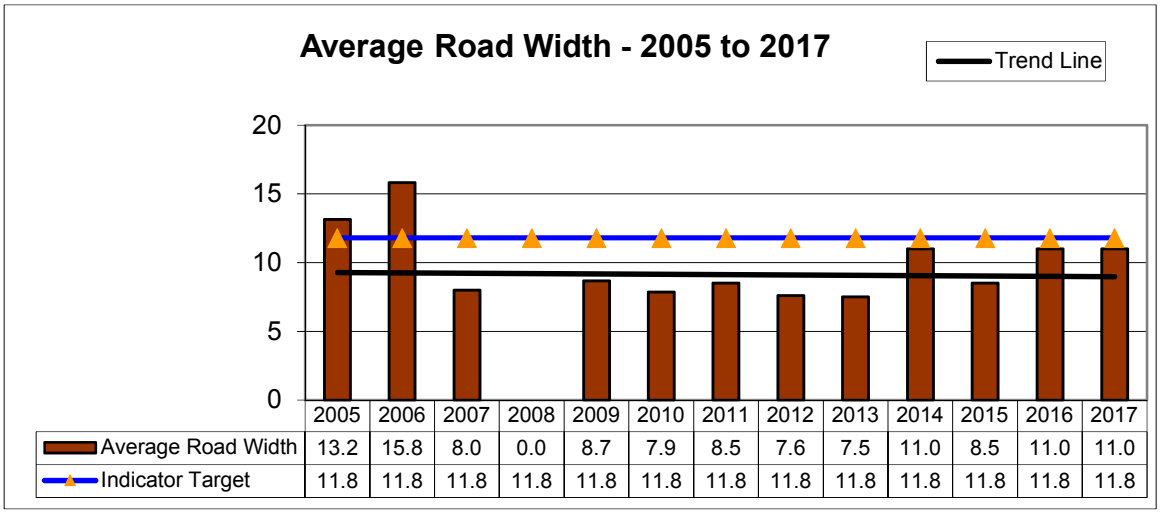
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average Volume/ha	80	64	76.3	93	48	60	62	65	63	67	86	68	75	71	89	88
Indicator Target	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96

Indicator 4.2 - Forest Carbon - Total Growing Stock

OBJECTIVE	To contribute to total carbon storage through maintenance of above-ground carbon pool.	
INDICATOR	Total growing stock of both merchantable and non-merchantable species on forest lands.	
TARGET Total growing stock of 21,221,500 m^3		VARIANCE +/- 1,000,000 m^3
2017 Update	The total growing stock for softwood is estimated to be 17,895,038 m^3 and the total growing stock for hardwood is estimated to be 15,019,044 m^3.	

Indicator 4.3 - Forest Land - Road Construction

OBJECTIVE	To minimize amount of deforested land.	
INDICATOR	Width of permanently disturbed area due to road construction.	
TARGET Reduce average road width of newly constructed roads by 10%.		VARIANCE 5% +/-
2017 Update	The average road width of newly constructed roads in 2017 was 11 meters.	



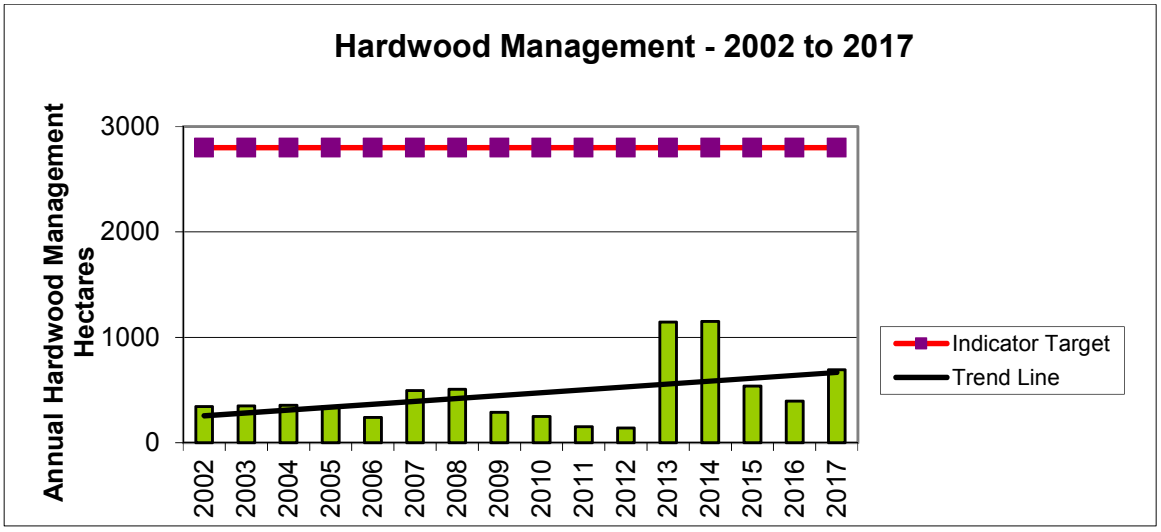
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average Road Width	13.2	15.8	8.0	0.0	8.7	7.9	8.5	7.6	7.5	11.0	8.5	11.0	11.0
Indicator Target	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8

CRITERION 5 - MULTIPLE BENEFITS TO SOCIETY

Sustain flows of forest benefits for current and future generations by providing multiple goods and services.

Indicator 5.1 - Timber and Non-timber Benefits - Hardwood Management

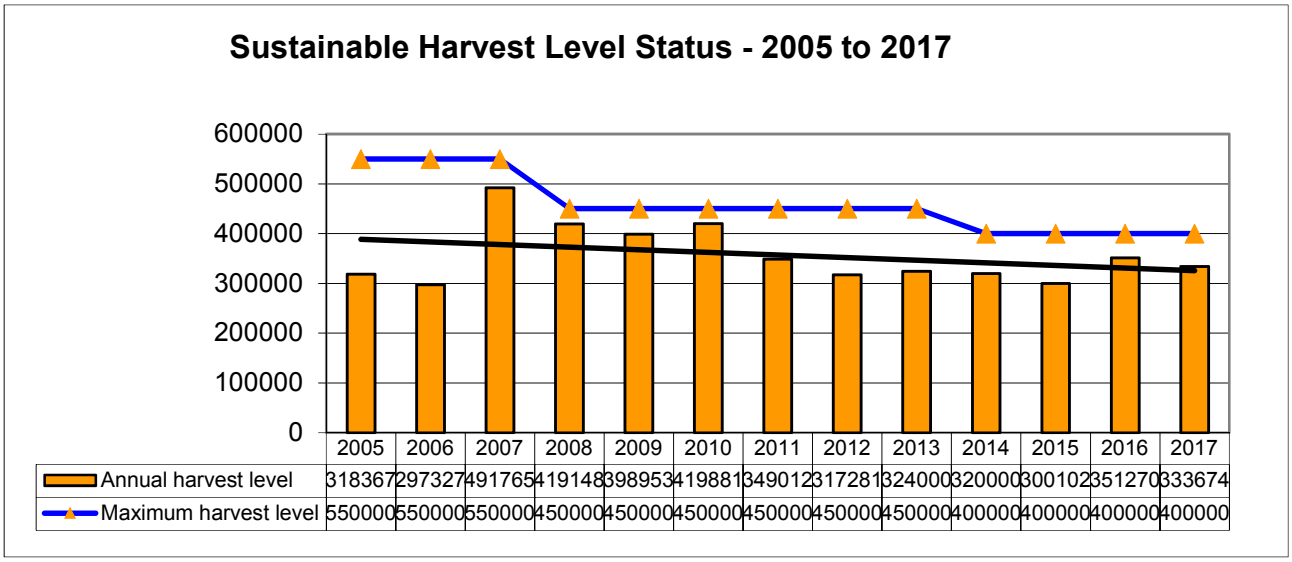
OBJECTIVE	To increase the future value of the hardwood resource.	
INDICATOR	Area (by ha) of hardwood management.	
TARGET Manage 2,800 hectares of hardwood in the first five-year period of the 2015 Long-Term Plan.		VARIANCE +/- 500 ha
2017 Update	In 2017, the area of hardwood management was 693 ha.	



Single Tree Selection, Obidary Road, Antigonish

Indicator 5.2 - Communities and Sustainability - Harvest Level

OBJECTIVE	To continue to harvest at a sustainable rate.	
INDICATOR	Annual harvest level.	
TARGET Harvest 400,000* m3 of softwood per year.		VARIANCE -10%
2017 Update	In 2017, the volume amount harvested was 333,674 m^3 of softwood (83% of annual harvest level).	



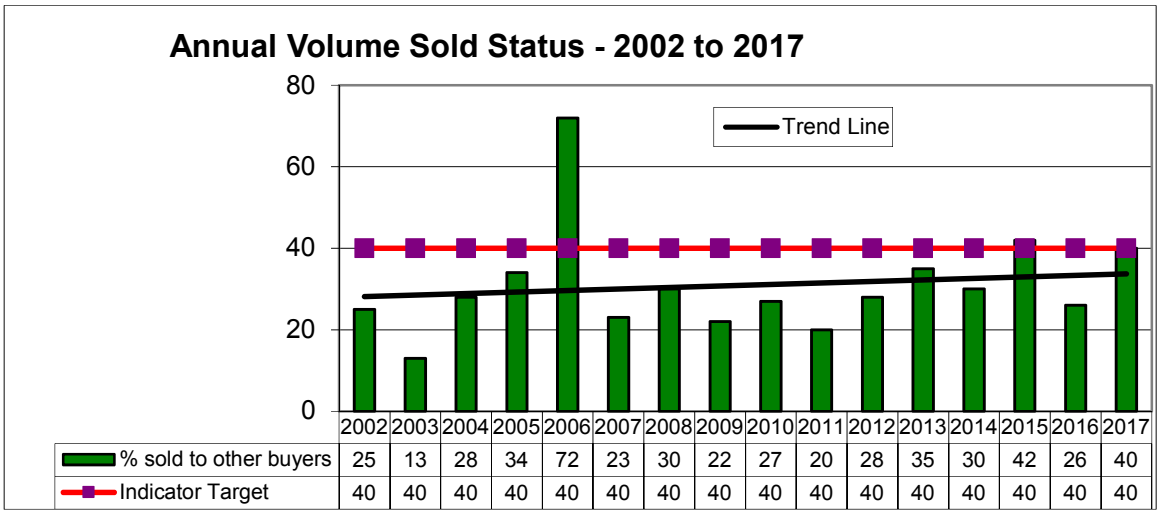
Softwood clearcut harvest, Liscomb, Matthew McKenna, PHP

Indicator 5.3 - Communities and Sustainability - Third Party Requests

OBJECTIVE	Where appropriate, provide economical, recreational and cultural opportunities to the general public.	
INDICATOR	Number of reasonable third party requests approved.	
TARGET Approve all reasonable third-party requests received each year.		VARIANCE 10 requests
2017 Update	A total of 32 third party requests were received in 2017 and all were approved.	

Indicator 5.4 - Fair Distribution of Benefits and Costs - Sales to Other Mills

OBJECTIVE	To ensure fair distribution of forest resources.	
INDICATOR	Proportion harvest volume sold to other buyers.	
TARGET Sell at least 40% of annual harvest volume to other buyers.		VARIANCE +/- 5 Year Period
2017 Update	In 2017, the company sold 40% of the annual harvest volume to other buyers.	



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% sold to other buyers	25	13	28	34	72	23	30	22	27	20	28	35	30	42	26	40
Indicator Target	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

CRITERION 6 - ACCEPTING SOCIETY'S RESPONSIBILITY FOR SUSTAINABLE DEVELOPMENT

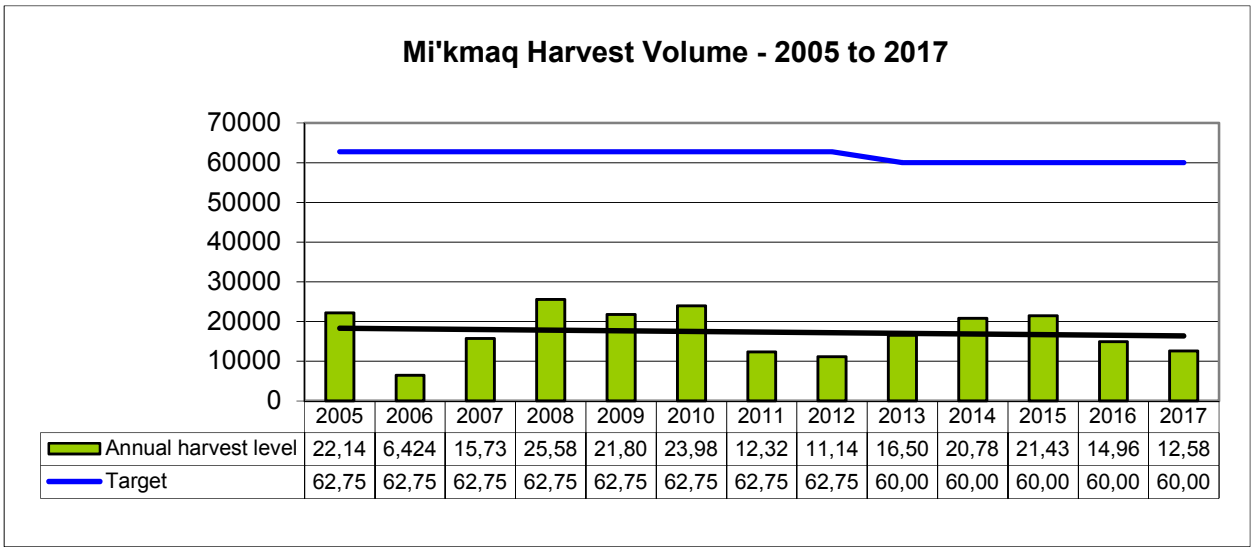
Soceity's responsibility for sustainable forest management requires that fair, equitable and effective forest management decisions are made.

Indicator 6.1 - Aboriginal and Treaty Rights - Respect First Nations

OBJECTIVE	To provide opportunities to better understand, recognize and respect local Mi'kmaw and Treat Rights.	
INDICATOR	Number of opportunities to meet with Mi'kmaw community representatives.	
TARGET Ensure a minimum of six opportunities to meet with Mi'kmaw individuals annually.		VARIANCE - 1 Meeting
2017 Update	In 2017, the company met at least 12 times with Mi'kmaq organizations, communities, or individuals related to forest management agreements and other initiatives. Two training sessions were also held with First Nations in relation to the new PHP and Confederacy of Mainland Mi'kmaq Forest Management Agreement.	

Indicator 6.2 - Aboriginal and Treaty Rights - First Nation Agreements

OBJECTIVE	To build capacity within Mi'kmaq communities to provide increased employment opportunities for Mi'kmaw individuals.
INDICATOR	Volume harvested under agreements with Mi'kmaq communities.
TARGET To increase the softwood and hardwood volume harvested under First Nation agreements to 60,000 tonnes.	VARIANCE - 5,000 tonnes
2017 Update	In 2017, the total volume harvested was 12,587 tonnes.



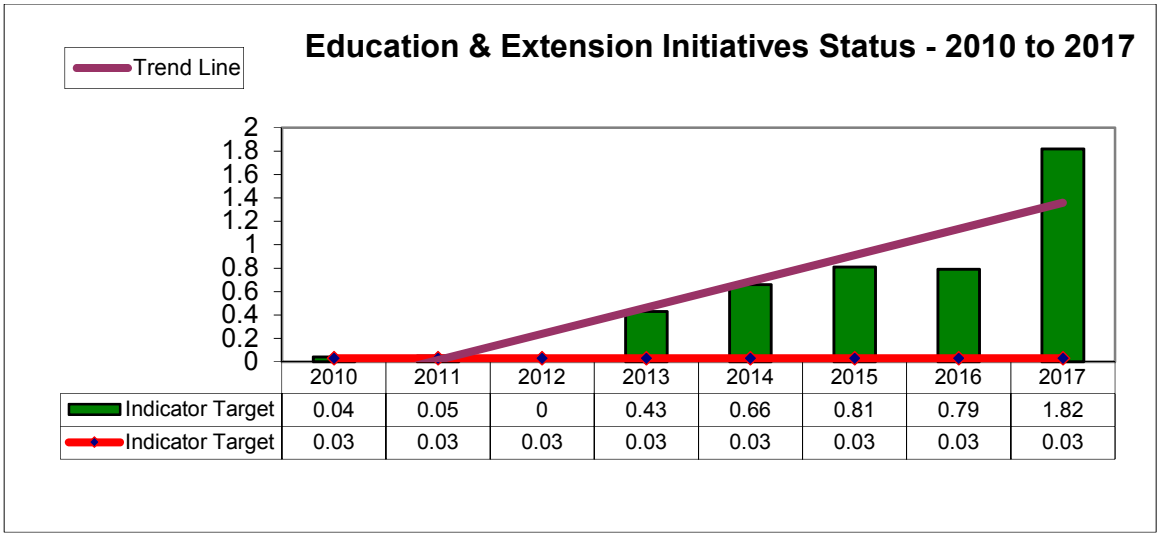
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Annual harvest level	22,14	6,424	15,73	25,58	21,80	23,98	12,32	11,14	16,50	20,78	21,43	14,96	12,58
Target	62,75	62,75	62,75	62,75	62,75	62,75	62,75	62,75	60,00	60,00	60,00	60,00	60,00

Indicator 6.3 - Public Participation - Opportunities for Participation

OBJECTIVE	To engage the public in sustainable forest management planning.
INDICATOR	Number of FAC meetings and general public opportunities/avenues for public participation.
TARGET Ensure a minimum of three FAC meetings annually, public open-house, regional forest tours.	VARIANCE None
2017 Update	In 2017, there were 8 opportunities for public participation. They ranged from FAC meetings, mill tours, and Atlantic Teachers Tour. NSDNR also posts all planned harvest jobs on Crown land to their online Harvest Viewer Map site. This site provides an opportunity for the general public to see where upcoming harvest operations will be occurring and provides a forum for asking questions or raising concerns to PHP prior to the start of harvest operations. Follow-up responses are provided by PHP. In 2017, 460 harvest jobs were posted to the site and 172 comments or questions were received and responded to.

Indicator 6.4 - Decision-Making - Education and Extension

OBJECTIVE	To advance sustainable forest management principles through commitments to research and extension.
INDICATOR	Level of investment and contribution to education and extension initiatives.
TARGET The company will provide $0.03 of direct and/or in-kind contributions to education and extension initiatives for every m^3 harvested within the defined forest area.	VARIANCE +/- $0.01
2017 Update	In 2017, $1.82 for every m^3 harvested was contributed to education and extension initiatives.



Summary of SFM Indicators

Since 2002, the Woodlands Unit has developed, monitored and reported on a suite of SFM indicators. During that time, indicators have been revised or removed to be replaced with improved indicators based on a new understanding of forest dynamics. PHP has made significant progress in achieving several of our targets and others are on their way. To improve their conditions over time, management decisions and activities will be implemented to result in indicators trending towards their desired targets.

- Target Achieved within Acceptable Variance
- Target On-going
- Target Not Achieved within Acceptable Variance

1.1 Annual review of NSDNR's significant species and habitats database, and other species status lists.	
1.2 Percent of CMZs meeting the 60% closed forest condition guideline.	
1.3 Proportion of area reserved from harvest under a protected areas strategy by EPU.	
1.4 Percent of defined forest area by EPU protected for old forest values.	
2.1 Proportion of natural regeneration in reforestation program.	
2.2 Proportion of total (softwood and hardwood) area harvested using unevenaged, thinning, shelterwood, selection cut and/or partial cut techniques by EPU.	
2.3 Area of forest disturbed by fire, insect and disease.	
2.4 Area (by ha) affected by budworm outbreak on the Cape Breton Highlands.	
3.1 Area (by ha) of regular harvest in steep slope areas.	
3.2 Proportion of identified watershed area (that is managed by PHP) in closed forest condition.	
3.3 Number of riparian zone non-conformance incidents.	

3.4 Number of road construction and stream crossing incidents according to company guidelines.	
4.1 Yearly average volume per hectare harvested.	
4.2 Total growing stock of both merchantable and non-merchantable species on forest lands.	
4.3 Width of permanently disturbed area due to road construction.	
5.1 Area (by ha) of hardwood management.	
5.2 Annual harvest level.	
5.3 Number of reasonable 3rd party requests approved.	
5.4 Proportion harvest volume sold to other mills.	
6.1 Number of opportunities to meet with Mi'kmaw community representatives.	
6.2 Volume harvested under agreements with Mi'kmaq communities.	
6.3 Number of FAC meetings and general public opportunities/ avenues for public participation.	
6.4 Level of investment and contribution to education and extension initiatives.	

High Conservation Value Forest Effectiveness Monitoring Program

Introduction

This HCVF Effectiveness Monitoring Program was developed to fulfill the requirements of Principle 9 of the FSC Maritimes Standard. To meet Principle 9 of the standard, forest managers must complete an assessment of their forest lands to identify high conservation values. There are six distinct categories that give an area critical conservation significance. FSC Canada defines an HCVF as:

High Conservation Value Forests are those that that possess one or more of the following attributes:

a) Forest areas containing globally, regionally or nationally significant:

> *i) Concentrations of biodiversity values (e.g., endemism, endangered species, refugia); and/or*
>
> *ii) 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.*

b) Forest areas that are in or contain rare, threatened or endangered ecosystems.

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

d) Forest areas fundamental to meeting basic needs of local communities (e.g., subsistence, health) and/or critical to local communities‟ traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Once HCVF's are identified on the land-base, the forest manager must decide how these areas will be managed to maintain or enhance the values that are present. Where values exist, monitoring is needed to show that the prescribed management is effective. PHP's effectiveness monitoring program identifies two stages of monitoring for several HCVF's.

The first level of monitoring is for the basic operational procedures or special management practices that have been identified for the value (e.g. buffer zones, maintenance of special habitat characteristics, protection). This level of monitoring is typically done on an annual basis. It is also important at this stage of monitoring to ensure that PHP is aware of and implementing the best management approach, prescriptions, and/or special management practices as defined

by an outside organization. Therefore, PHP will also contact known experts and/or organizations to gather any new available information regarding management or to verify that its current management approach is the best at that time. All HCV's have an identified operational monitoring protocol that is implemented on an annual basis.

The second level of monitoring, if applicable, is strategic monitoring to determine if the HCV attribute(s) are being maintained on the landscape. For example, for a species at risk such as Boreal Felt Lichen, it is important to determine that the identified forest habitat is still suitable and that the species is still present in the habitat. Contrary to operational monitoring, not all HCV's require a strategic level of monitoring. For example, the HCV of old forest are legally protected and therefore, not available for active forest management. Therefore, the attribute of maintaining old forests on the landscape is automatically preserved. Alternatively, strategic monitoring is important for species at risk when the objective is to maintain areas of good forest habitat for a threatened species, and to ensure that the species is still present in this habitat.

For strategic monitoring, PHP recognizes that there is a required level of involvement by government agencies and/or other organizations for the monitoring of species populations and health. It is PHP's intention to collaborate with these agencies to collect the necessary information.

HCVF Category 1 – Biodiversity – Species at Risk

HCV – American Marten Habitat

<table>
<tr><td colspan="3">HCV ATTRIBUTE Species at Risk – Habitat and Population</td></tr>
<tr><td colspan="3">OPERATIONAL MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT

OBJECTIVE</td><td colspan="2">Maintain and/or enhance American Marten habitat in home range patches</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Reserve stand structure as required within harvest areas located within the American Marten Habitat Management Zone</td></tr>
<tr><td colspan="2">MONITORING/REPORTING FREQUENCY

Annual</td><td>MONITORING STRATEGY

Habitat management requirements are implemented through the DNR approval process for Crown lands. Monitor implementation of stand structure reserve using TFM. Verify annually that special management practices are still current and/or make operational changes as needed.</td></tr>
<tr><td colspan="2">DATA SOURCES

The Forest Manager (TFM); PHP & DNR field audits</td><td>COST AND DIFFICULTY

Low to Moderate - Dependant on PHP’s required level of involvement</td></tr>
<tr><td colspan="3">LONG-TERM STRATEGIC MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT

OBJECTIVE</td><td colspan="2">American Marten population recovery</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Population estimates / use within the Marten Habitat Management Zone</td></tr>
<tr><td colspan="3">MONITORING STRATEGY

DNR is responsible for population inventory and studying habitat use.</td></tr>
<tr><td colspan="2">DATA SOURCES

American Marten Recovery Team
DNR Manager, Wildlife Resources
Randy Milton</td><td>COST AND DIFFICULTY

Low to High - Dependant on PHP's required level of involvement</td></tr>
</table>

FOREST MANAGEMENT PRESCRIPTION

These prescriptions are applied throughout 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;

- Special management practices for commercial thinning operations in marten patches;

- Harvest sites should maintain at least 100 m3 of coarse woody debris/ha and mean maximum diameter of downed logs should exceed 22 cm.

There are also 30 home range patches established within the Marten Habitat Management Zone. These patches may 'migrate' within the zone, but must be a minimum 500 ha in size, circular in shape, and contain a minimum 60% marten habitat as described in the marten recovery strategy.

2017 MONITORING UPDATE

1. All harvest treatments applied throughout the Cape Breton Highlands included the above management prescriptions as required and approved by DNR regional staff.
2. A total of 130 hectares (0.2%) was treated in 2017 inside the Marten Habitat Management Zone as per DNR's approval process.
3. The American Marten Recovery Strategy (2007) estimates that the Marten population is less than 50 individuals. A re-introduction program began in 2007, which brought 130 individuals into Cape Breton from New Brunswick. A total of 35 individuals were collared, but their movements were lost approximately 6 months after release. DNR does have pictures, have live-trapped, recorded tracks in snow and have received reports/sightings of marten in the Cape Breton Highlands (Peter Austin-Smith, pers. comm., 2013). A goal of the Marten Recovery Team is to have >= 30 marten in Cape Breton by 2010, >= 100 by 2030 and >= 350 by 2040.
4. In 2016 and into 2017, DNR's camera-trap work resulted in 81 pictures being taken with 13 of those including images of American Marten (16%). DNR may continue its intensive camera-trap work in the winter of 2017-18, as well as additional snow tracking in the areas of commercially thinned stands.
5. DNR is also consolidating reports on American Marten to assess distributions within and outside the Marten Habitat Management Zone. These include tracks reported during Canada Lynx surveys, trail cameras, and 5-km predator snow track surveys conducted in Cape Breton from 2005 through 2017.

SUPPORTING DOCUMENTS/REFERENCES

Marten Special Management Practices, NSDNR July 2012; Proposed Marten Recovery Strategy, NSDNR May 2006; Status Report on American Marten, F. Scott June 2001; Weaseling their Way Back into Cape Breton? Assessing the Feasibility of Augmenting the Cape Breton Island Marten Population Through Habitat Suitability and Individual-based Modeling, Rebecca Jepessen, Acadian University Thesis, 2010.

HCV – Mainland Moose Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Maintain and/or enhance Mainland Moose habitat	
INDICATOR	Reserve stand structure as required within harvest areas located within the five Significant Mainland Moose Population Concentration areas mapped by NSDNR	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Habitat management requirements are implemented through the DNR approval process for Crown lands. Monitor implementation of stand structure reserve using TFM. Verify annually that special management practices are still current and/or make operational changes as needed.
DATA SOURCES The Forest Manager (TFM); PHP & DNR field audits		COST AND DIFFICULTY Low to Moderate - Dependent on PHP's required level of involvement
LONG-TERM STRATEGIC MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Mainland Moose population recovery	
INDICATOR	Population estimates / use of population concentration areas	
MONITORING STRATEGY DNR is responsible for population inventory and studying habitat use.		

DATA SOURCES	COST AND DIFFICULTY
Mainland Moose Recovery Team DNR Biologist Lisa Doucette	Low to High - Dependent on PHP's required level of involvement

FOREST MANAGEMENT PRESCRIPTION

- Moose shelter patches (within 250 metres of the edge of any forest harvest (partial or clearcut) a minimum of two closed canopy coniferous stands > 3 hectares in area)

- Moose retention patches (Smaller coniferous must also be retained within each harvest area to provide temporary shelter and concealment)

- Moose buffers (Forested buffers should be retained around and or near open wetlands, watercourses, and waterbodies)

- Roads and access points (Development of roads and improved trails should be avoided where extended extraction trails can be used as an alternative)

- Coarse woody debris (leave tree tops and substantial amounts of woody debris on extraction trails to discourage access)

- Decommission roads to reduce human access

2017 MONITORING UPDATE

1. All harvest treatments within the mainland moose concentration areas included the above management prescriptions. Currently, there are concerns within DNR about the special management practices for mainland moose, so future harvest treatments in the moose concentration areas are assessed and approved individually by DNR for specific habitat requirements.
2. The Mainland Moose Recovery Plan (2007) estimates approximately 1000-1200 individuals on mainland Nova Scotia. This is the most current information available on mainland moose population numbers.
3. No changes have been made to the special management practices for mainland moose as issued by DNR; however, there are current discussions within the department about modifications to the SMPs. A guidance document was provided to PHP on April 13, 2014 which outlined guidance regarding moose retention patches for a specified time period (January 20 to July 18, 2014). The guidance document is now obsolete.
4. The Action Plan for the Recovery of Eastern Moose in Mainland Nova Scotia was released to the public in 2016. A total of 14 actions have been identified which are in different phases of completion. The action items related to the Mainland Moose include increased understanding of genetics, cause of death/illness, long-term monitoring, threats, poaching, translocation feasibility, review and adapt forest management practices as habitat requirements are better understood, public awareness and engagement. Currently, there are no changes to the special management practices issued by DNR as a result of the action plan, however, PHP stays abreast of any changes through its integrated relationship with DNR.

5. In relation to the Action Plan, PHP is a partner on a new research study to "develop tools to provide decision support in forest management planning at multiple spatial scales for moose habitat requirements".
SUPPORTING DOCUMENTS/REFERENCES
Mainland Moose Special Management Practices, NSDNR July 2012; Recovery Plan for Mainland Moose in Nova Scotia, March 2007; Action Plan for the Recovery of Eastern Moose in Mainland Nova Scotia 2014-2018

HCV – Canada Lynx Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Maintain and/or enhance Canada Lynx habitat	
INDICATOR	Reserve stand structure in lynx bog buffers within harvest areas located throughout the Cape Breton Lynx Range	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Habitat management requirements are implemented through the DNR approval process for Crown lands. Monitor implementation of stand structure reserve using TFM. Verify annually that special management practices are still current and/or make operational changes as needed.
DATA SOURCES The Forest Manager (TFM); PHP & DNR field audits		COST AND DIFFICULTY Low to Moderate - Dependant on PHP's required level of involvement
LONG-TERM STRATEGIC MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Canada Lynx population recovery	
INDICATOR	Population estimates / use of treed bog leave areas	

MONITORING STRATEGY

DNR is responsible for population inventory and studying habitat use. A joint project between DNR and Acadian University is assessing the efficacy of the 100-meter treed bog buffers. The project began in January 2011 and ended in 2015.

DATA SOURCES	COST AND DIFFICULTY
Canada Lynx Recovery Team DNR Biologist Peter Austin-Smith	Low to High - Dependant on PHP's required level of involvement

FOREST MANAGEMENT PRESCRIPTION

- To supplement red squirrel habitat, which is an important food source for lynx, a wider buffer strip of 100 m of unharvested forest should be left around all treed bogs in the Cape Breton lynx range.

- Where possible, decommission secondary, non-main trunk forest access roads following harvest.

- Plan access roads to have dead ends.

- Plan harvesting to allow decommissioning of sectors of road networks.

- Where possible, narrow and orient road right-of-ways to create shade conditions to reduce snow compaction, thereby reducing ease of travel for coyotes.

- Maintain a continuous supply of >50ha patches of mid-regeneration (15-35-year old) conifer dominated habitat that supports high densities of snowshoe hare over each lynx management unit.

- Create a landscape that will maintain a continuous presence of a mosaic of successional stages, especially mid-regeneration patches that will support resident lynx.

- Employ silvicultural techniques that create, maintain, or prolong use of stands by high populations of snowshoe hares.

- Retain coarse woody debris for denning sites.

2017 MONITORING UPDATE

1. All harvest treatments within the Cape Breton lynx range where treed bogs were identified, a 100-meter strip of unharvested forest was left as approved by DNR regional staff.

2. The Canada Lynx Recovery Strategy (2005) estimates approximately 50-500 individuals in the Cape Breton lynx range. This is the most current information available on Canada lynx population numbers.
3. No changes have been made to the special management practices for Canada Lynx as issued by DNR.
4. Some work happening related to habitat issues for both American Marten and Canada Lynx (joint recovery team). Still being developed by DNR Species at Risk group. Looking to get more funding to do habitat modeling and management issues in CB Highlands. Nothing approved yet; still in discussion phase.
5. DNR and Acadia University collaborated on a research study in the Cape Breton Highlands from 2013 to 2015. Some results of that work include:
    - 1 km long track surveys were conducted Jan – March 2013-2015 for a total 243.9 km,
    - 87 transects were established between 350 and 500 masl
    - Transects were paired to examine use of SMP buffers with nearby treated stands
    - Buffers typically had "natural" stands although some buffer lengths did encounter short sections of treated areas
    - The number of lynx tracks were relatively similar between 2013 and 2014 but increased dramatically in 2015 which is believed due to the increase in recorded hare tracks beginning in 2014 and extending into 2015
    - All prey species have very similar overall patterns in terms of natural vs treated habitats and buffer vs non-buffer areas
    - Marten and coyote exhibit similar habitat use patterns to prey species while lynx exhibit higher use in natural habitat and buffer zones
    - Occupancy modelling reveals the highest probability of occupancy for lynx occurs in or near buffers in natural areas. Moving away from buffer areas, the probability of occupancy drops dramatically especially in treated stands
    - Lynx will occupy treated areas in buffers but at much lower rate
    - Conclusion is buffer zones with natural structure exhibit a much higher occupancy rate for lynx than treated areas even during an expanding population in response to an increased prey base

SUPPORTING DOCUMENTS/REFERENCES

Canada Lynx Special Management Practices NSDNR July 2012; Lynx Recovery Strategy Feb 2007; Endangered Canada Lynx Proposed Project: Assessing the interim 100 metre buffers around highland bogs, DNR 2014; DNR Wildlife Manager Randy Milton, pers. comm. 2018

HCV – Wood Turtle Habitat

<table>
<tr><td>HCV ATTRIBUTE</td><td colspan="2">Species at Risk – Habitat and Population</td></tr>
<tr><td colspan="3">OPERATIONAL MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT

OBJECTIVE</td><td colspan="2">Maintain and/or enhance Wood Turtle habitat</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Implementation of temporal and spatial special management practices for wood turtles</td></tr>
<tr><td colspan="2">MONITORING/REPORTING FREQUENCY

Annual</td><td>MONITORING STRATEGY

Habitat management requirements are implemented through the DNR approval process for Crown lands. Monitor implementation of temporal and spatial requirements using TFM. Verify annually that special management practices are still current and/or make operational changes as needed.</td></tr>
<tr><td colspan="2">DATA SOURCES

The Forest Manager (TFM); PHP & DNR field audits</td><td>COST AND DIFFICULTY

Low to Moderate - Dependant on PHP’s required level of involvement</td></tr>
<tr><td colspan="3">LONG-TERM STRATEGIC MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT

OBJECTIVE</td><td colspan="2">Wood Turtle population recovery</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Population estimates</td></tr>
<tr><td colspan="3">MONITORING STRATEGY

DNR is responsible for population inventory and studying habitat use.</td></tr>
<tr><td colspan="2">DATA SOURCES

Wood Turtle Recovery Team

DNR Biologist Lisa Doucette</td><td>COST AND DIFFICULTY

Low to High - Dependant on PHP's required level of involvement</td></tr>
</table>

FOREST MANAGEMENT PRESCRIPTION
- 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) - Use temporary bridge crossings for perennial streams to avoid altering stream bank, creating erosion and sedimentation, damaging stream bed, and impacting overwintering turtles. - Forest management roads and landings should not be constructed parallel to watercourses within 200 m of watercourses where wood turtles occur. - Special management practices for overwintering, nesting, and basking (see DNR Special Management Practices 2012).
2017 MONITORING UPDATE
1. All harvest treatments where wood turtles are presumed to be have the above management prescriptions implemented as approved by DNR regional staff. 2. The population of wood turtles in PHP's operating area is estimated to be approximately 3,500 individuals (M. Pulsifer, pers. comm., 2013) 3. No changes have been made to the special management practices for wood turtle as issued by DNR. 4. Monitoring for new locations has not been a funding priority for DNR, and outside funding has been significantly reduced. A graduate student working on overwintering habitat and communal distribution has just finished his MSc at Acadia. There is nothing significantly different with DNR's understanding of wood turtle distribution within the watershed. 5. DNR is not receiving reports of dead turtles that can be linked directly to the forest industry.
SUPPORTING DOCUMENTS/REFERENCES
Wood Turtle Special Management Practices NSDNR July 2012; Protecting and Conserving Wood Turtles: A Stewardship Plan for NS, 2003

HCV – Bicknell's Thrush Habitat

<table>
<tr><td>HCV ATTRIBUTE</td><td colspan="2">Species at Risk – Habitat and Population</td></tr>
<tr><td colspan="3">OPERATIONAL MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT OBJECTIVE</td><td colspan="2">Maintain and/or enhance Bicknell's Thrush habitat</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Implementation of temporal and spatial special management practices for Bicknell's Thrush</td></tr>
<tr><td colspan="2">MONITORING/REPORTING FREQUENCY

Annual</td><td>MONITORING STRATEGY

Identify planned pre-commercial thinning activities in Bicknell's Thrush habitat in the Highlands, so field surveys by Bird Studies Canada can first be conducted to identify presence/absence of the bird during their breeding/nesting season (May, June, July). Monitor implementation of leave patches in thinned/cleared areas using a GIS overlay. Verify annually that special management practices are still current and/or make operational changes as needed.</td></tr>
<tr><td colspan="2">DATA SOURCES

The Forest Manager (TFM); PHP and Bird Studies Canada field audits</td><td>COST AND DIFFICULTY

Low – Bird Studies Canada has consistently completed Bicknell's Thrush surveys each spring if PHP has pre-commercial thinning activities planned for that summer.</td></tr>
<tr><td colspan="3">LONG-TERM STRATEGIC MONITORING PROGRAM</td></tr>
<tr><td>MANAGEMENT OBJECTIVE</td><td colspan="2">Bicknell's Thrush population recovery</td></tr>
<tr><td>INDICATOR</td><td colspan="2">Population estimates</td></tr>
<tr><td colspan="3">MONITORING STRATEGY

Bird Studies Canada annually monitors high elevation bird species through the High Elevation Landbird Program. Since 2002, the Bicknell's Thrush has been monitored in the Cape Breton</td></tr>
</table>

Highlands to gather critical information about population status and habitat use. Approximately 20 to 30 routes are monitored each June with the continued goal of monitoring long-term trends of the Bicknell's Thrush.

DATA SOURCES	COST AND DIFFICULTY
- Bird Studies Canada - Becky Stewart/Holly Lightfoot - Cape Breton Highlands National Park – Matt Smith - International Bicknell's Thrush Conservation Group (http://www.bicknellsthrush.org/) - High Elevation Landbird Report: 10-year Summary, March 2012	Low – Bird Studies Canada has consistently taken the lead on Bicknell's Thrush habitat and population research.

FOREST MANAGEMENT PRESCRIPTION

- Industrial forest stands that support Bicknell's Thrush should remain un-thinned until the trees are no longer at a successional stage that is suitable for nesting, as determined by further research.

- If clearing, construction and/or thinning in Bicknell's Thrush breeding habitat cannot be avoided, activities should be performed outside of the bird breeding season, before June 1st and after July 31st, to prevent the direct destruction of nests, eggs, nestlings, fledglings or adult birds.

- When forest clearing and thinning in Bicknell's Thrush breeding habitat cannot be avoided, patches of intact forest should be left whenever possible. These patches should:
- cover at least one quarter hectare;
- be located 20 to 50 metres from the uncut or unthinned edge; and
- contain intact undisturbed underbrush.

2017 MONITORING UPDATE

1. Three unthinned BITH habitat areas were scheduled for pre-commerical thinning during 2017. Bicknell's Thrush surveys by Bird Studies Canada were conducted in these areas prior to any start of active management activities. BITH was not observed to be present in these areas.
2. The current population estimate for the Bicknell's Thrush in Canada is between 40,570 and 49,258 birds, and it was previously estimated that approximately 1,200 breed in NB and NS (HELP Report, March 2012).
3. No changes have been made to the special management practices for Bicknell's Thrush as issued by Bird Studies Canada.

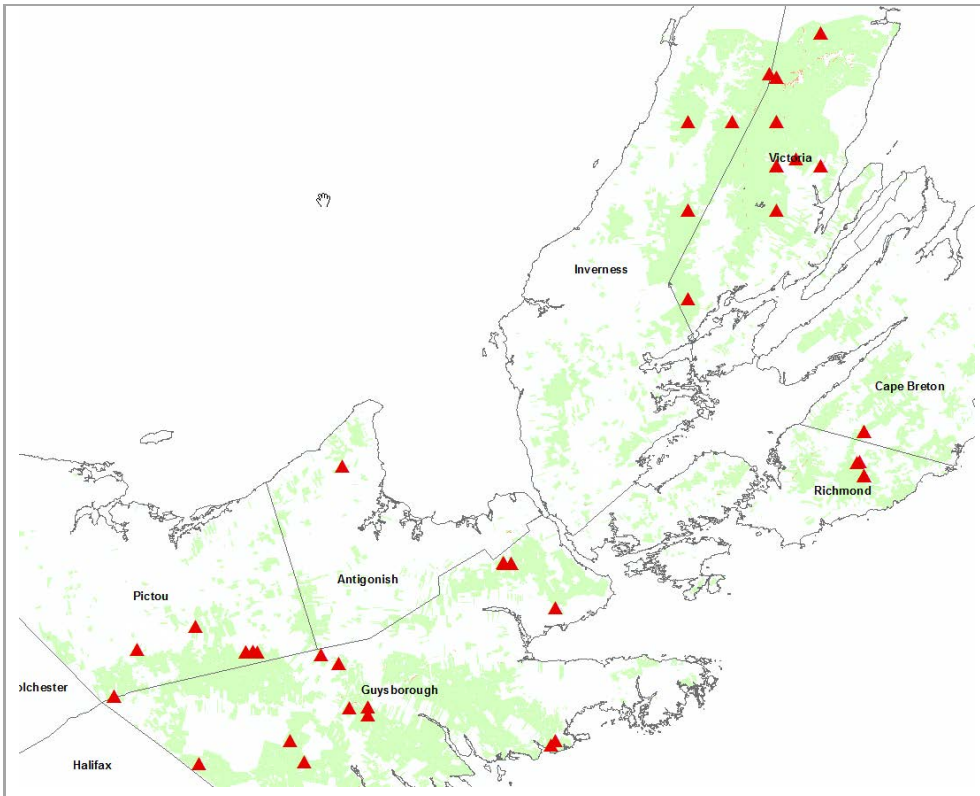
4. In March 2012, Bird Studies Canada released a 10-year summary report of their High Elevation Landbird Program. The results for Bicknell's Thrush monitoring found that the sampling intensity was not enough to detect statistically significant trends in population and habitat use.
5. In 2012-13, Bird Studies Canada refined HELP, using a Generalized Random Tessalation Stratified sampling design to randomly select routes and increase sampling intensity in Cape Breton, thus enabling them to meet international, national and regional information needs (HELP Report, March 2012).
6. In March 2017, Bird Studies Canada released their 'High Elevation Landbird Program' report for 2016. In the years from 2012 to 2015, Bicknell's Thrush presence was higher than in New Brunswick. However, in 2016 the abundance of Bicknell's Thrush in Nova Scotia was the lowest at 0.04 per point surveyed and among the highest on record for New Brunswick (0.22 per point). With numbers continuing to decline in Nova Scotia (25 detected in 2013 versus two in 2016) and Bird Studies Canada not seeing obvious changes to the habitat breeding grounds for Bicknell's Thrush, Bird Studies will be developing a new distribution model with different habitat variables for Nova Scotia. It is hoped that this new model will result in an increase in detections.

SUPPORTING DOCUMENTS/REFERENCES
Conserving the Bicknell's Thrush: Stewardship and Management Practices for High Elevation Forest, 2009; High Elevation Landbird Program: 10-year Report, March 2012 High Elevation Landbird Program: Annual Report for Cape Breton Highlands National 2013-2014

HCV – Rusty Blackbird Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Maintain and/or enhance Rusty Blackbird habitat	
INDICATOR	Reserve stand structure in Rusty Blackbird habitat	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Monitor implementation of reserve stand structure using field audits. Verify annually that special

	management practices are still current and/or make operational changes as needed.
DATA SOURCES The Forest Manager (TFM); PHP field audits	COST AND DIFFICULTY Low – PHP currently monitors for riparian buffer management on its operational field audits
LONG-TERM STRATEGIC MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Rusty Blackbird population recovery
INDICATOR	Population estimates
MONITORING STRATEGY DNR is responsible for population inventory and studying habitat use.	
DATA SOURCES NSDNR	COST AND DIFFICULTY Low to High - Dependent on PHP's required level of involvement
FOREST MANAGEMENT PRESCRIPTION	
- PHP implements the Wildlife Habitat and Watercourse Protection Regulations, which is deemed sufficient for Rusty Blackbirds since they tend to occupy forests near the edges of wetlands, bogs, rivers and streams. - PHP also establishes 100-meter buffers around all treed bogs in Cape Breton for Canada Lynx habitat management, which is also presumed to be beneficial for Rusty Blackbird.	
2017 MONITORING UPDATE	
- There were no infractions regarding implementation of Wildlife Habitat and Watercourse Protection Regulations in 2017. - The population of Rusty Blackbird in Nova Scotia is currently unknown. - On PHP's Crown license area, there are 58 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 1987 to 2010 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.	



SUPPORTING DOCUMENTS/REFERENCES
COSEWIC assessment and status report on the Rusty Blackbird *Euphagus carolinus*in Canada (2006)

HCV – Roseate Tern Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain Roseate Tern Habitat
INDICATOR	Reserve stand structure in Roseate Tern habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Maintain a 200-meter buffer zone along the coast at Fisherman's Harbour. Within this buffer zone, no management will occur.

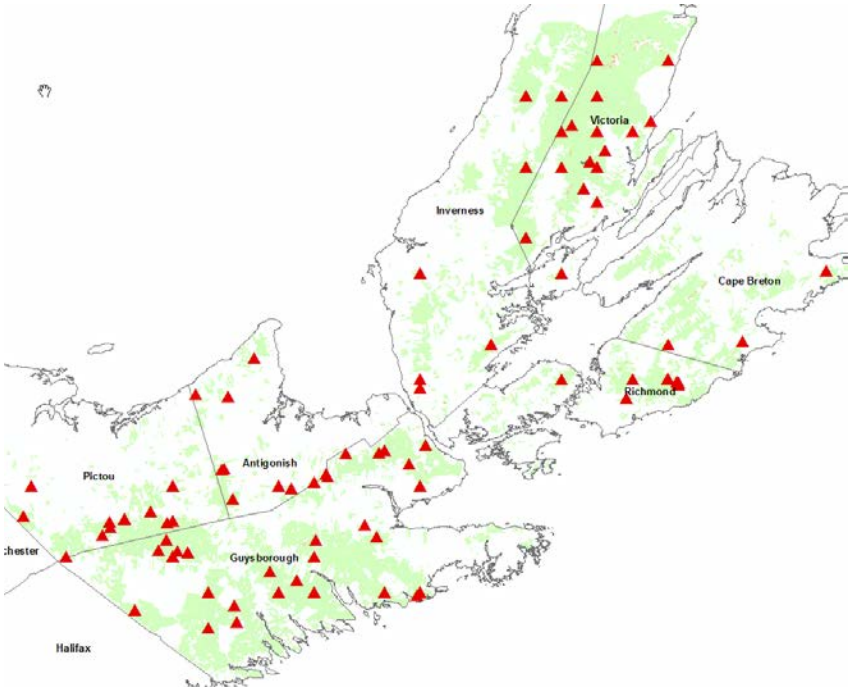
DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM)	Low – PHP does not conduct forest management activities within the 200-meter buffer zone.
FOREST MANAGEMENT PRESCRIPTION	
- PHP does not conduct forest management activities within the 200-meter buffer zone at Fisherman's Harbour. - Other critical habitat for the Roseate Tern is located on offshore islands.	
2017 MONITORING UPDATE	
A GIS overlay using completed harvest treatment data from 2017 shows that there have been no forest management activities within the 200-meter buffer zone at Fisherman's Harbour.	
SUPPORTING DOCUMENTS/REFERENCES	
Roseate Tern Recovery Strategy 2006	

HCV – Olive-Sided Flycatcher Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Olive-sided Flycatcher Habitat
INDICATOR	Reserve stand structure in Olive-sided flycatcher habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's

FOREST MANAGEMENT PRESCRIPTION
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.
2017 MONITORING UPDATE
A recovery strategy for Olive-sided Flycatcher was finalized by COSEWIC in March 2016. Regarding critical habitat for this species, the recovery strategy states: *"The available information is not adequate to enable the identification of critical habitat at the landscape scale for the following reasons:* • *There is a lack of understanding and data to indicate the suitable configuration of important landscape biophysical attributes.* • *Habitat requirements may vary across the range of the species. Management units (i.e., geographic units within which critical habitat would be managed) need to be identified in such a way to best reflect variation in habitat use.* • *There is a lack of data related to Olive-sided Flycatcher presence and abundance in large portions of its range. Without this information any model used to predict critical habitat with current data may have a limited ability to do so in these areas.* • *For Olive-sided Flycatcher, it is unknown whether certain habitats with specific biophysical attributes may be functionally more important than others. For example, specific habitats may have greater densities of individuals or pairs and/or result in higher reproductive success. There are few data regarding the relative importance of suitable habitat types for Olive-sided Flycatcher population numbers and indices of habitat quality.* • *The relationships between anthropogenic disturbance and habitat quality are poorly known. A better understanding of these relationships is needed to ensure sufficient suitable habitat is available for Olive-sided Flycatcher and to identify at what scale and intensity activities would be likely to destroy the critical habitat.* *A Schedule of Studies (Table 4) has been developed to provide the information necessary to identify the critical habitat that will be sufficient to meet the population and distribution objectives. The identification of critical habitat will be included in a revised recovery strategy or an action plan."*

- On PHP's Crown license area, there are 157 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 1987 to 2013 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.



SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Website; ACCDC Data

HCV – Eastern Whip-Poor-Will Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Eastern Whip-poor-will Habitat	
INDICATOR	Reserve stand structure in Eastern Whip-poor-will habitat	
MONITORING/REPORTING FREQUENCY Annual		Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or

	special management practices developed for this species.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
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.	
2017 MONITORING UPDATE	
A COSEWIC recovery strategy for this species has been proposed since 2015, but is not yet finalized. There are no locations of Eastern Whip-poor-will in ACCDC's November 2017 dataset.	
SUPPORTING DOCUMENTS/REFERENCES	
COSEWIC Website; ACCDC Data	

HCV – Eastern Wood Peewee Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Eastern Wood Peewee Habitat
INDICATOR	Reserve stand structure in Eastern wood peewee habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY

	Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's

FOREST MANAGEMENT PRESCRIPTION

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.

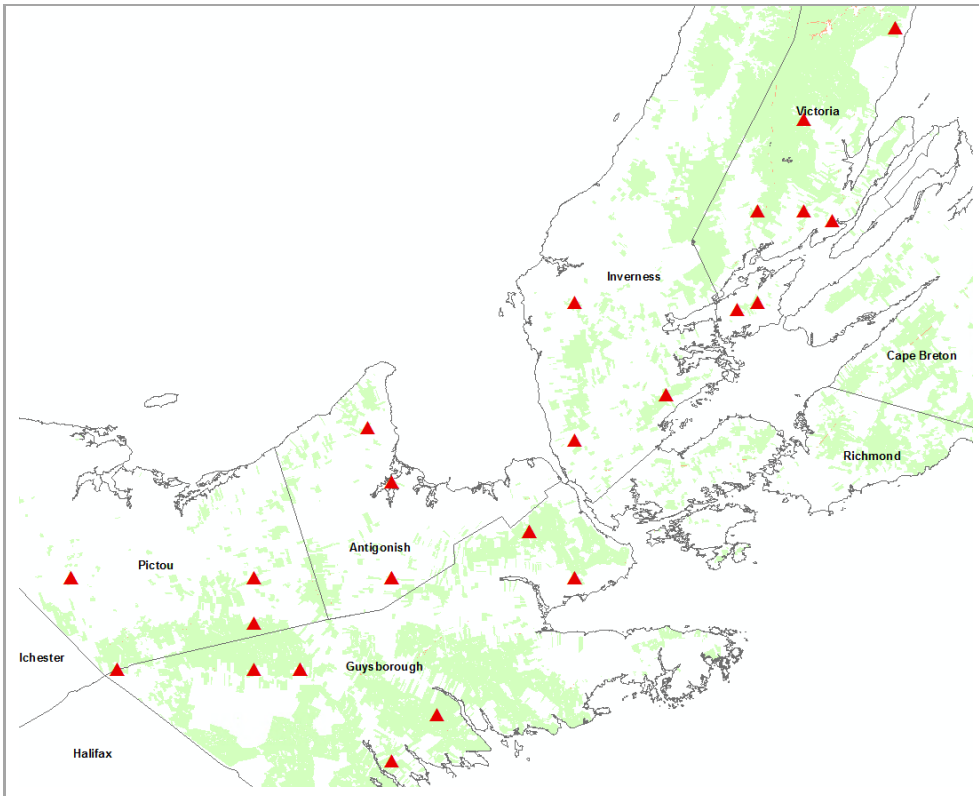
Forestry practices that maintain large tracts of intermediate aged forest with closed canopy and limited clear cuts (less than 10 ha) along with thinning to remove mature trees and large-diameter woody growth should provide adequate habitat for Eastern Wood-Pewees (Stauffer and Best 1980, Crawford et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

2017 MONITORING UPDATE

Currently, there is no recovery strategy, action plan and/or special management practices issued by either COSEWIC or NSDNR.

On PHP's Crown license area, there are 37 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 1986 to 2014 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.



SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Website; ACCDC Data

HCV – Canada Warbler Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Canada Warbler Habitat
INDICATOR	Reserve stand structure in Canada warbler habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.

DATA SOURCES	COST AND DIFFICULTY
ACCDC	Low – PHP does not yet implement SMP's

FOREST MANAGEMENT PRESCRIPTION

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.

2017 MONITORING UPDATE

A COSEWIC recovery strategy was finalized for Canada Warbler in March 2016.

Regarding critical habitat for this species, the recovery strategy states:

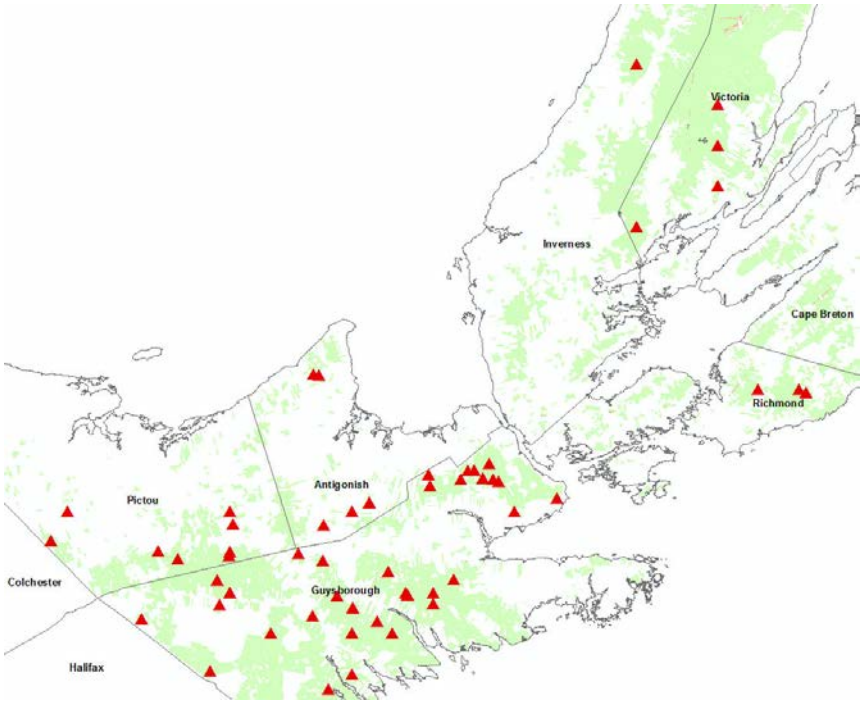
"The available information is not adequate to identify critical habitat at a landscape scale for the following reasons:

• There is a lack of understanding and data to indicate the appropriate configuration of important landscape biophysical attributes.
• Habitat requirements may vary across the range of the species. Management units (i.e., geographic units within which critical habitat would be managed) need to be identified in such a way to best reflect variation in habitat use and management patterns.
• There is a lack of data related to Canada Warbler presence and abundance in large portions of its range. Without this information any model used to predict critical habitat with current data may have a limited ability to do so in these areas.
• For Canada Warbler, it is unclear whether certain habitats with specific biophysical attributes may be functionally more important than others. For example, specific habitats may have greater densities of individuals or pairs and/or result in higher reproductive success.
• The relationships between anthropogenic disturbance and habitat quality are poorly known. A better understanding of these relationships is needed to ensure sufficient suitable habitat is available for Canada Warbler and to identify at what scale and intensity activities would be likely to destroy the critical habitat.

A Schedule of Studies has been developed to provide the information necessary to identify the critical habitat that will be sufficient to meet the population and distribution objectives. The

identification of critical habitat will be included in a revised recovery strategy or an action plan.

On PHP's Crown license area, there are 89 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 1987 to 2014 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.



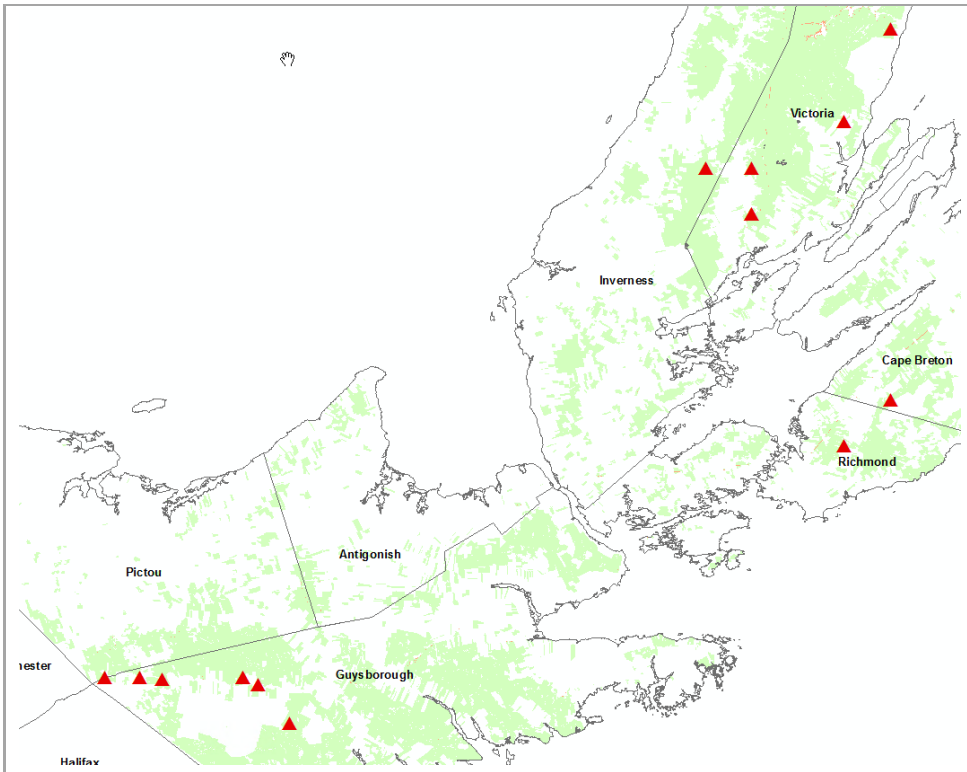
SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Website; ACCDC Data

HCV – CHIMNEY SWIFT Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Chimney Swift Habitat
INDICATOR	Reserve stand structure in Chimney swift habitat

MONITORING/REPORTING FREQUENCY	MONITORING STRATEGY
Annual	Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.
DATA SOURCES	COST AND DIFFICULTY
ACCDC	Low – PHP does not yet implement SMP's

FOREST MANAGEMENT PRESCRIPTION
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. Additionally, feeding and nesting habitat relies heavily on urban and suburban areas where there is an abundance of chimneys for nesting, so PHP believes it currently has a low impact on Chimney swift populations.
2017 MONITORING UPDATE
Currently, there is no recovery strategy, action plan and/or special management practices issued by either COSEWIC or NSDNR. On PHP's Crown license area, there are 16 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 1986 to 2011 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.



SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Website; ACCDC Data

HCV – COMMON NIGHTHAWK Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Common Nighthawk Habitat
INDICATOR	Reserve stand structure in Common nighthawk habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.
DATA SOURCES	COST AND DIFFICULTY

ACCDC	Low – PHP does not yet implement SMP's

FOREST MANAGEMENT PRESCRIPTION

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 Strategy 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.

2017 MONITORING UPDATE

COSEWIC finalized a recovery strategy for the Common Nighthawk in March 2016.

Regarding critical habitat for this species, the recovery strategy states:

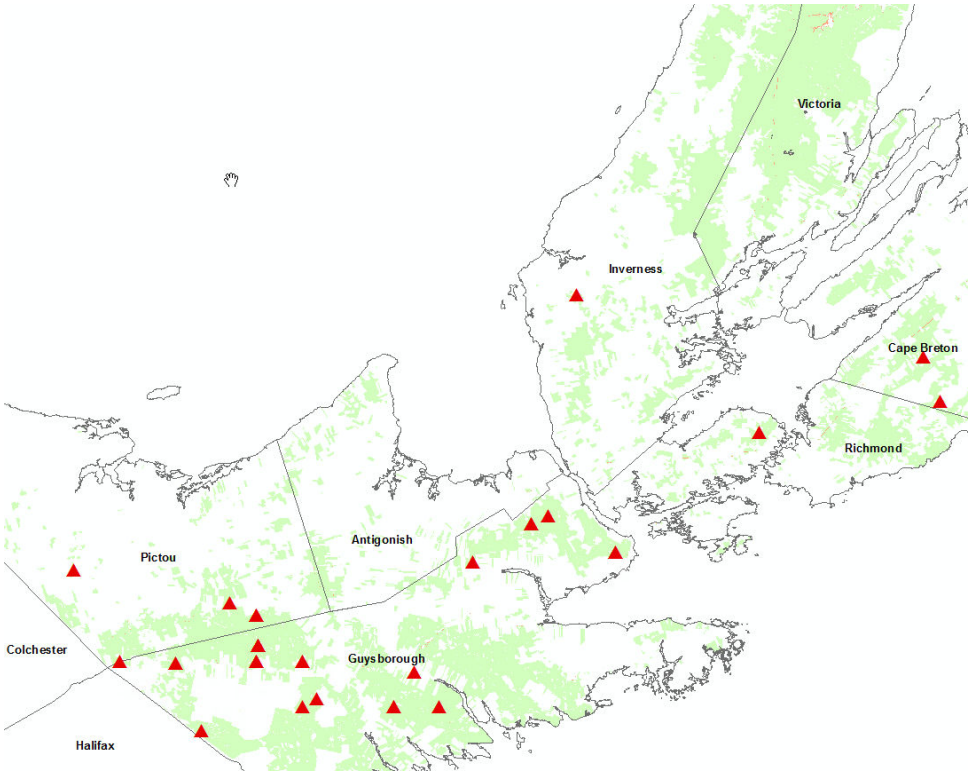
"The available information is not adequate to enable the identification of critical habitat for the following reasons:
• There is a lack of understanding and data to indicate the appropriate biophysical attributes required by the species and their configuration at a landscape scale.
• Habitat requirements may vary across the range of the species. Management units (i.e., geographic units within which critical habitat would be managed) need to be identified in such a way to best reflect variation in habitat use and land planning processes.
• There is a lack of data related to presence, site usage where detected (e.g., foraging, roosting, defending a territory, nesting, transiting), and abundance in large portions of the species' range and the northern limit of the species' range is unknown. Without this information any model used to predict critical habitat with current data may have a limited ability to do so.
• For Common Nighthawk, it is unknown whether certain habitats with specific biophysical attributes may be functionally more important than others. For example, specific habitats may have greater densities of individuals or pairs and/or result in higher reproductive success.
• The relationships between anthropogenic disturbance and habitat quality are poorly known. A better understanding of these relationships is needed to ensure sufficient suitable habitat is currently available for Common Nighthawk and to identify at what scale and intensity activities would be likely to destroy critical habitat.

Locating nests is difficult and determining general nesting locations is problematic using typical point-count survey methodology. Common Nighthawks defend a large area and their foraging habitats can be separated from nest sites by many kilometers, so it is not possible to determine how an individual is using the habitat where it is detected (e.g., foraging, defending

a territory, transiting). Furthermore, traditional point-count survey methodology in the morning is not appropriate for this crepuscular species (Government of Alberta 2013; Saskatchewan Ministry of Environment 2014).

A schedule of studies has been developed to provide the information necessary to identify the critical habitat that will be sufficient to meet the population and distribution objectives. The identification of critical habitat will be included either in a revised recovery strategy or an action plan."

On PHP's Crown license area, there are 35 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 2006 to 2010 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.

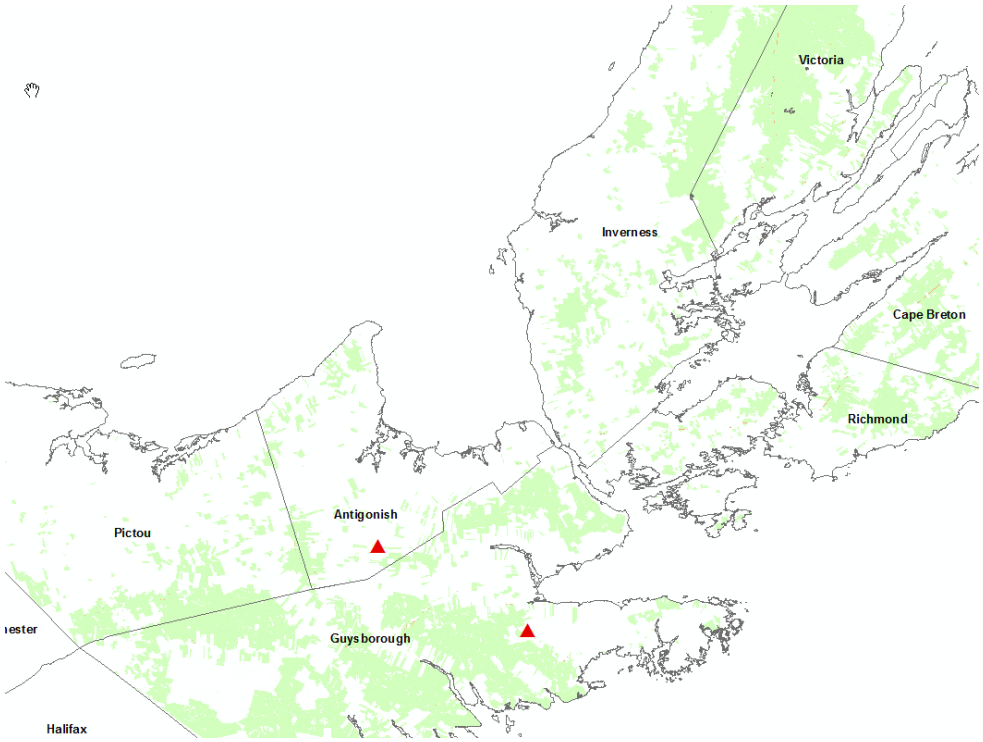


SUPPORTING DOCUMENTS/REFERENCES

COSEWIC Website; ACCDC Data

HCV – WOOD THRUSH Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Wood Thrush Habitat
INDICATOR	Reserve stand structure in Wood thrush habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor COSEWIC and NSDNR's websites for recovery strategies, actions plans, and/or special management practices developed for this species.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
Currently, there are no required management practices for Wood Thrush in Nova Scotia or Canada. 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.	

2017 MONITORING UPDATE
Currently, there is no recovery strategy, action plan and/or special management practices issued by either COSEWIC or NSDNR. On PHP's Crown license area, there are 2 locations in ACCDC's sensitive species dataset from November 2017. These locations range in observation dates from 2008 to 2009 (see below map). Based on this data, deferral of management activities in these locations during the breeding season of May to August may occur depending on data quality, year of original sighting, and input from regional NSDNR biologists.   
SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Website; ACCDC Data

HCV – BLACK-FOAM LICHEN Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Black-foam Lichen Habitat

INDICATOR	Reserve stand structure in Black-foam lichen habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Confirm with NS Department of Natural Resources, NS Environment, Atlantic Canada Conservation Data Centre, and Mersey Tobeatic Research Institute if any new locations of black-foam lichen have been discovered on PHP's Crown lease.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
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.	
2017 MONITORING UPDATE	
No new locations of black-foam lichen have been found on PHP's Crown lease. Currently, there is still only one known location of this lichen in the seven eastern counties where PHP operates and it is in the Cape Breton Highlands National Park. An expert lichenologist also verified that this lichen is still most commonly found in southwest Nova Scotia.	
SUPPORTING DOCUMENTS/REFERENCES	
NS Department of Natural Resources, NS Environment, ACCDC, MTRI	

HCV – LITTLE BROWN MYOTIS Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Little Brown Myotis Habitat
INDICATOR	Reserve stand structure in Little brown myotis habitat

MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor Environment Canada's work on the development of beneficial management practices for the forest industry. Monitor Crown contractor audits to verify that unmerchantable trees, such as snags, wolf trees, and cavity trees, are being retained on site. Monitor ACCDC data for any known locations.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
Currently in Nova Scotia, there are no best forest management practices required for bats. 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 is currently managing the forest in a variety of ways that benefit bat habitat needs, based on a 2006 report called "Forest Management & Bats" by Bat Conservation International which lists a variety of forest management activities that can support bat habitat needs.	
2017 MONITORING UPDATE	
Currently, there are no beneficial management practices developed for the forest industry. A large colony of approximately 300 females was recently found (July 2016) in Nova Scotia. Due to the highly sensitive nature of bat populations, its location was not made publicly available. However, it was confirmed to PHP by a DNR management executive that the colony was not found on PHP's Crown lease. The 2017 Crown operations audits show that unmerchantable trees were left on harvest sites. ACCDC does have one location for this species in its dataset available to PHP, but because of the highly sensitive nature of bat populations, a map of this location is not provided herein. However, it exists inside a pending Nature Reserve, so PHP is not conducting any active management. Furthermore, forest land adjacent to this reserve is private land, so PHP is not doing active management in the general area.	
SUPPORTING DOCUMENTS/REFERENCES	
NS Department of Natural Resources, Environment Canada	

HCV – TRI-COLORED BAT Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Tri-colored Bat Habitat
INDICATOR	Reserve stand structure in Tri-colored bat habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor Environment Canada's work on the development of beneficial management practices for the forest industry. Monitor Crown contractor audits to verify that unmerchantable trees, such as snags, wolf trees, and cavity trees, are being retained on site. Monitor ACCDC data for any known locations.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
Currently in Nova Scotia, there are no best forest management practices required for bats. 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 is currently managing the forest in a variety of ways that benefit bat habitat needs, based on a 2006 report called "Forest Management & Bats" by Bat Conservation International which lists a variety of forest management activities that can support bat habitat needs.	

2017 MONITORING UPDATE
Currently, there are no beneficial management practices developed for the forest industry. The 2017 Crown operations audits show that unmerchantable trees were left on harvest sites. There are no locations of this bat species in the ACCDC dataset available to PHP.
SUPPORTING DOCUMENTS/REFERENCES
NS Department of Natural Resources, Environment Canada

HCV – NORTHERN MYOTIS Habitat

HCV ATTRIBUTE **Species at Risk – Habitat**	
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Northern Myotis Habitat
INDICATOR	Reserve stand structure in Northern myotis habitat
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor Environment Canada's work on the development of beneficial management practices for the forest industry. Monitor Crown contractor audits to verify that unmerchantable trees, such as snags, wolf trees, and cavity trees, are being retained on site. Monitor ACCDC data for any known locations.
DATA SOURCES ACCDC	COST AND DIFFICULTY Low – PHP does not yet implement SMP's
FOREST MANAGEMENT PRESCRIPTION	
Currently in Nova Scotia, there are no best forest management practices required for bats. 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 is currently managing the forest in a variety of ways that benefit bat habitat needs, based on a 2006 report called "Forest Management & Bats" by Bat Conservation International which lists a variety of forest management activities that can support bat habitat needs.
2016 MONITORING UPDATE
Currently, there are no beneficial management practices developed for the forest industry. The 2017 Crown operations audits show that unmerchantable trees were left on harvest sites. There are no locations of this bat species in the ACCDC dataset available to PHP.
SUPPORTING DOCUMENTS/REFERENCES
NS Department of Natural Resources, Environment Canada

HCV – New Jersey Rush Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain New Jersey Rush Habitat
INDICATOR	Administratively protect New Jersey Rush habitat identified in NSDNR's Significant Habitat database and Atlantic Canada Conservation Data Centre database
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor annual harvest operations to ensure New Jersey Rush habitat is administratively protected from all forest management activities.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP does not conduct forest management activities within New Jersey Rush habitat

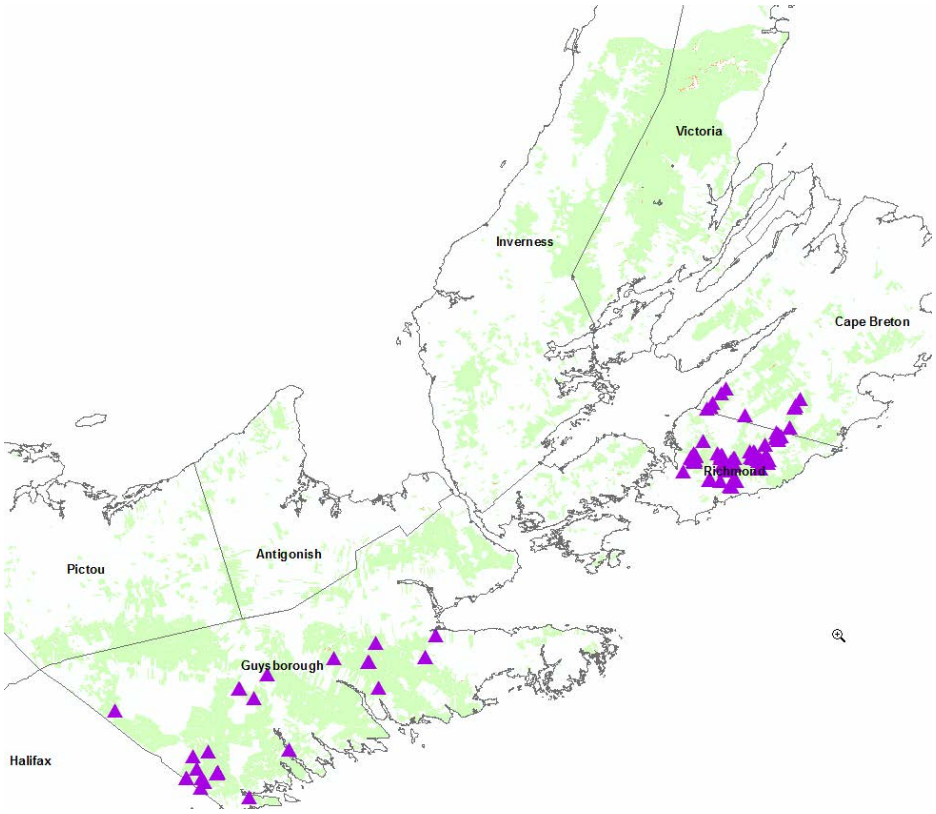
FOREST MANAGEMENT PRESCRIPTION
- PHP does not conduct forest management activities within New Jersey Rush habitat identified in NSDNR's Significant Habitat database and Atlantic Canada Conservation Data Centre database
2017 MONITORING UPDATE
A GIS overlay using completed harvest treatment data from 2017 shows that there have been no forest management activities in identified New Jersey Rush habitat. There are 64 locations of New Jersey Rush in the ACCDC dataset from November 2017. Additionally, most of the locations are found in a protected data layer for Atlantic Coastal Plain Flora.
SUPPORTING DOCUMENTS/REFERENCES
Recovery Strategy and Management Plan for Multiple Species of Atlantic Coastal Plain Flora 2010; ACCDC Dataset

HCV – Boreal Felt Lichen Occurrences

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Protect identified locations of Boreal Felt Lichen
INDICATOR	Administratively protect identified locations of Boreal Felt Lichen by establishing 100-meter buffer around site
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor annual harvest operations to identify areas needing Boreal Felt Lichen presence/absence surveys prior to active operations. Locations of Boreal Felt Lichen are buffered by 100 meters and excluded from forest management activities.
DATA SOURCES The Forest Manager (TFM); Boreal Felt Lichen Potential Habitat Layer	COST AND DIFFICULTY Moderate – PHP financially contributes annually to Boreal Felt Lichen surveys. Surveys are conducted by an expert lichenologist.

LONG-TERM STRATEGIC MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Boreal Felt Lichen population recovery
INDICATOR	Population estimates
MONITORING STRATEGY DNR is responsible for population inventory and studying habitat use.	
DATA SOURCES NSDNR; NSDOE	COST AND DIFFICULTY Low to High - Dependent on PHP's required level of involvement
FOREST MANAGEMENT PRESCRIPTION	
- In planned harvest operations containing potential Boreal Felt Lichen habitat, a field survey is conducted to determine if Boreal Felt Lichen is present on site. If found, a 100 meter no harvest buffer is left around the site.	
2017 MONITORING UPDATE	
- In 2017, there were 56 planned harvest sites surveyed where Boreal Felt Lichen potential habitat was identified. Five sites surveyed had BFL present. A 100-meter no harvest buffer was left around each lichen location. - Since 2008, PHP has worked with the Mersey Tobeatic Research Institute to conduct Boreal Felt Lichen surveys. Prior to these surveys, there were three known locations of Boreal Felt Lichen in Nova Scotia. Since PHP and MTRI's surveys began, the number of known locations has increased to 177 in PHP's forest management area (see below map). - NSDNR recently published a paper entitled "Forest Harvesting Impacts on Mortality of an Endangered Lichen at the Landscape and Stand Scales". This paper supports the 100-meter protection buffer around known Boreal Felt Lichen sites to maintain the micro-climate around the site. NSDNR is also currently working on a habitat supply research paper. NSDNR will also be working on improving the predicted habitat model for Boreal Felt Lichen. NSDNR will also be monitoring how different buffer widths affect microclimate using iButtons (micro-climate data loggers). Currently, there are about 24 iButtons in the field which are being used to assess the variation between and within stands. This information will help determine the sample size needed for a future buffer width study. - PHP is a supporting partner on a recently approved Dalhousie University PhD research project by Mitacs. The project titled "Disturbance thresholds and factors influencing community dynamics of epiphytic cyanolichens in Nova Scotia, with an emphasis on rare and	

at-risk species". The project began in January 2018 and is expected to last two years. The researcher is expected to spend at least 35% of his time on PHP Crown licensed lands each year for site selection and planning, field work, and advisory meetings.



SUPPORTING DOCUMENTS/REFERENCES
Boreal Felt Lichen Recovery Strategy; Boreal Felt Lichen Recovery Team

HCV – Vole Ears Lichen Occurrences

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Protect identified locations of Vole Ears Lichen
INDICATOR	Administratively protect identified locations of Vole Ears Lichen according to SMP

MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Spatial data of known vole ears lichen has been provided to PHP by the NS Department of Environment. There are no known locations of vole ears lichen in the 7 eastern counties where PHP operates.
DATA SOURCES The Forest Manager (TFM); Boreal Felt Lichen Potential Habitat Layer	COST AND DIFFICULTY Low – There are no known locations of Vole Ears Lichen in PHP's management area
FOREST MANAGEMENT PRESCRIPTION	
- 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 lands, they will be implemented.	
2017 MONITORING UPDATE	
There are no existing or new locations of Vole Ears Lichen in PHP's forest management area.	
SUPPORTING DOCUMENTS/REFERENCES	
COSEWIC Assessment and Status Report, 2009; NSDNR; ACCDC 2017 Database	

HCV – Blue Felt Lichen Occurrences

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Protect identified locations of Blue Felt Lichen
INDICATOR	Administratively protect identified locations of Blue felt lichen according to SMP
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Spatial data is collected annually by ACCDC for all rare species. Also, new locations are being

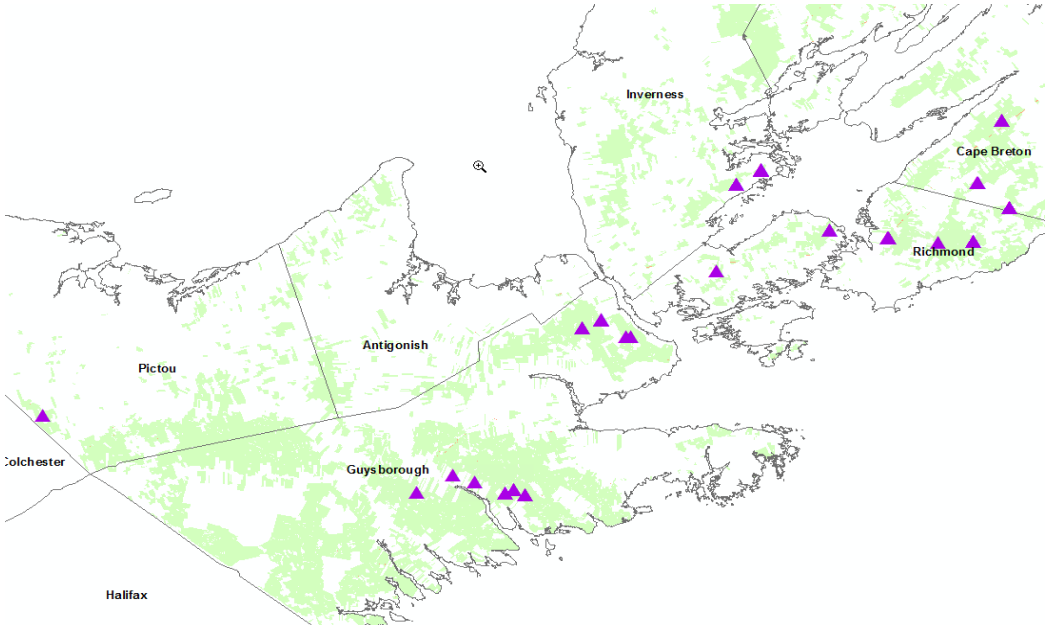
	found on PHP's Crown license during boreal felt lichen surveys.
DATA SOURCES The Forest Manager (TFM); Boreal Felt Lichen Potential Habitat Layer	COST AND DIFFICULTY Low – A survey was conducted for the two known locations of blue felt lichen in PHP's management area.

FOREST MANAGEMENT PRESCRIPTION

- Currently, there are no special management practices available for blue felt lichen.
- There are currently 87 known locations of blue felt lichen on PHP's Crown license area.
- PHP is currently applying 100-meter no harvest buffers around each blue felt lichen location.

2017 MONITORING UPDATE

There were eight new locations of blue felt lichen found in PHP's forest management area. A 100-meter no harvest buffer was applied to each location. In total, there are 87 locations of blue felt lichen on PHP's Crown license area (below map).



SUPPORTING DOCUMENTS/REFERENCES

COSEWIC Assessment and Status Report, 2009; NSDNR; ACCDC 2017 Database

HCV – Eastern White Cedar

HCV ATTRIBUTE	**Species at Risk – Habitat and Population**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Protect identified locations of Eastern White Cedar
INDICATOR	Protection of all known locations of Eastern White Cedar
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Ensure all known locations of Eastern White Cedar in PHP's management area are protected from harvest activities.
DATA SOURCES The Forest Manager (TFM); NSDNR, NSE, ACCDC databases	COST AND DIFFICULTY Low – PHP does not conduct include the harvest of Eastern White Cedar in its management
FOREST MANAGEMENT PRESCRIPTION	
- PHP does not include the harvest of Eastern White Cedar in its forest management. 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.	
2017 MONITORING UPDATE	
No known stands of eastern white cedar occur within PHP's area of operation.	
SUPPORTING DOCUMENTS/REFERENCES	
A Management Plan for Native Occurrences of Eastern White Cedar in Nova Scotia, 2010	

HCV – Black Ash

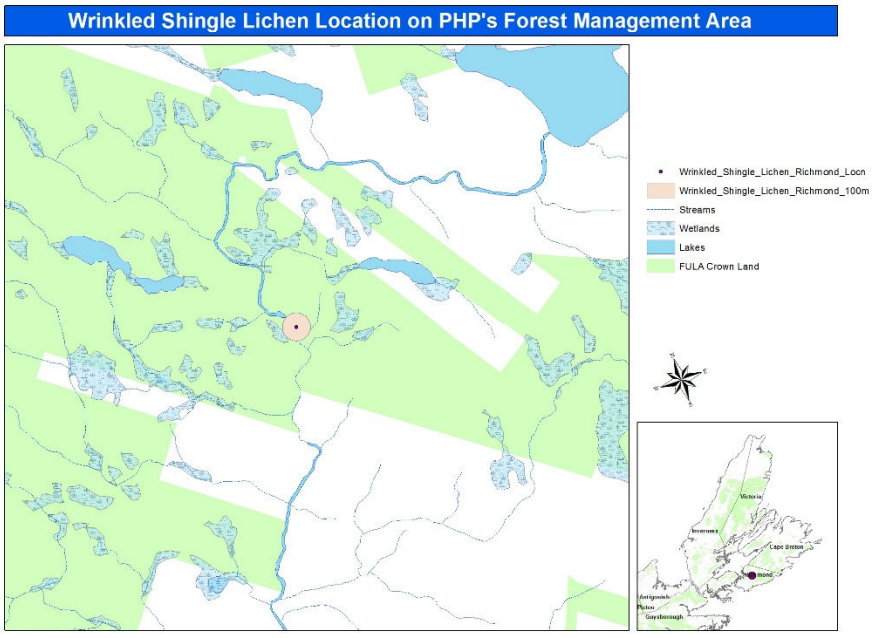
HCV ATTRIBUTE	**Species at Risk – Habitat and Population**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Protect identified locations of Black Ash
INDICATOR	Protection of all known locations of Black Ash
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Ensure all known locations of Black Ash in PHP's management area are protected from harvest activities.
DATA SOURCES The Forest Manager (TFM); NSDNR, NSE, ACCDC databases	COST AND DIFFICULTY Low – PHP does not conduct include the harvest of Black Ash in its management
FOREST MANAGEMENT PRESCRIPTION	
- PHP does not include the harvest of Black Ash in its forest management. Queries of the NSDNR forest inventory, as well as reviews of the rare species databases from NSDNR, NSE, and ACDCC, did not identify black ash stands for lands managed by PHP.	
2017 MONITORING UPDATE	
No known stands of black ash occur within PHP's area of operation.	
SUPPORTING DOCUMENTS/REFERENCES	
NSDNR, NSE, ACCDC databases	

HCV – Frosted Glass Whiskers Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain Frosted Glass Whiskers Habitat
INDICATOR	Administratively protect Frosted Glass Whiskers habitat identified in NSDNR's Significant Habitat database and Atlantic Canada Conservation Data Centre database
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY All known locations of frosted glass whiskers are protected.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP does not conduct forest management activities within Frosted Glass Whiskers habitat
FOREST MANAGEMENT PRESCRIPTION	
There are six known locations of frosted glass whiskers in eastern Nova Scotia. Five of these locations occur on privately owned land. One location on PHP's Crown license area was discovered in 2017 during a boreal felt lichen survey. A 20-meter no harvest buffer was applied to the site.	
2017 MONITORING UPDATE	
- A location of frosted glass whiskers was found in 2017 during a boreal felt lichen survey. A 20-meter no harvest buffer was applied to the site.	
SUPPORTING DOCUMENTS/REFERENCES	
Management Plan for the Frosted Glass Whiskers, Nova Scotia Population, 2011; ACCDC 2017 Database; Boreal Felt Lichen Surveys, 2017-18	

HCV – Wrinkled Shingle Lichen Habitat

HCV ATTRIBUTE	**Species at Risk – Habitat**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain Wrinkled Shingle Lichen Habitat
INDICATOR	Administratively protect Wrinkled Shingle Lichen habitat in identified locations by NSDNR, ACCDC, or PHP lichen survey results.
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY All known locations of wrinkled shingle lichen are protected.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP does not conduct forest management activities within wrinkled shingle lichen habitat
FOREST MANAGEMENT PRESCRIPTION	
There is one known location of wrinkled shingle lichen in eastern Nova Scotia, which was discovered in 2014. This location has a 100-meter no harvest buffer applied to it.	



2017 MONITORING UPDATE
No new locations of wrinkled shingle lichen were found on PHP's Crown license area in 2017.
SUPPORTING DOCUMENTS/REFERENCES
COSEWIC Assessment and Status Report, 2017; ACCDC 2017 Database; Boreal Felt Lichen Surveys, 2017-18

HCV – Cold Water Refugia Sub-watersheds

HCV ATTRIBUTE	**Long-term hydrologic functions**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintenance of thermal cover for Atlantic Salmon and Brook Trout habitat
INDICATOR	Maintain minimum 50% crown closure at the stand level in cold water refugia areas (total 12,218 hectares) with the exception of stands containing non-wind firm trees.

MONITORING/REPORTING FREQUENCY	MONITORING STRATEGY
Annual	Monitor implementation of stand structure reserve using GIS overlay of completed harvest treatments with cold water refugia sub-watershed areas.
DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM)	Low – PHP monitors this internally with resources currently available.

FOREST MANAGEMENT PRESCRIPTION
- Cold water refugia areas are managed to maintain as much thermal cover as possible by leaving a minimum 50% crown closure wherever possible at the stand level following harvest treatments. - The only exception is in stands containing a high proportion of non-wind firm trees, such as balsam fir, black spruce, or white spruce that are vulnerable to blowdown. - No intensive forest management will occur in these HCVF's (i.e. establishing FSC defined plantations).

2017 MONITORING UPDATE
A total of 42 hectares (0.3% of total cold water refugia area) was clearcut or overstory removal in cold water refugia areas in 2017. Since the stand condition was not conducive to maintaining minimum 50% crown closure because they were predominantly black spruce, white spruce, and/or balsam fir, the clearcut or overstory method was applied. That is, these stands were dominated by non-wind firm trees such as fir or spruce. Other treatments (thinning, partial cut, and single tree selection) total 64 ha.
SUPPORTING DOCUMENTS/REFERENCES
N/A

HCV – International Bird Areas

HCV ATTRIBUTE	**Migratory birds habitat**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Maintain and/or enhance migratory bird habitat	
INDICATOR	Reserve stand structure in Important Bird Areas (IBA's)	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Currently, all identified IBA's in PHP's operating area are not impacted by forest management activities due to their location (i.e. off shore islands or inaccessible forest areas). Specific protocols for monitoring birds at IBAs are in development and will leverage and adapt existing monitoring programs that are directly relevant to the IBA Program (IBA Canada website). Verify annually that spatial list of IBA's is up-to-date for PHP's operating area.
DATA SOURCES The Forest Manager (TFM); IBA Canada		COST AND DIFFICULTY Low – PHP does not conduct forest management activities in IBA's, therefore, monitoring is not considered necessary.

FOREST MANAGEMENT PRESCRIPTION
- 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 HCVF, no harvesting currently occurs and is not expected to occur in the future. Should harvest plans be developed, a management strategy for this HCVF will be developed.
2017 MONITORING UPDATE
PHP has not conducted any forest management activities in IBA's identified within the forest management area.
SUPPORTING DOCUMENTS/REFERENCES
IBA Canada website http://www.ibacanada.ca/

HCV – Red Spruce

HIGH CONSERVATION VALUE – RED SPRUCE		
HCV ATTRIBUTE	Natural Red Spruce Stands	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Manage red spruce stands according to PHP Work Instruction for red spruce	
INDICATOR	Management and maintenance of red spruce stands to improve the quality of uneven-aged conditions over time.	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Verify that annual harvest completions in natural red spruce stands were implemented using PHP's work instruction for red spruce management.

DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM)	Low – PHP has forest cover and historical data that shows natural red spruce stand locations. The PHP planner identifies these areas for management.

FOREST MANAGEMENT PRESCRIPTION

Objectives for 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 some 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

Commercial thinning when windfirm.

An option for non-windfirm 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

Shelterwood to promote regeneration.

As an 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 in to 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. ie an irregular shelterwood

- Step Two once regeneration is 60 cm tall (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 in to 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 (over story removal and planting), or it should be left to grow until maturity then harvested.
2017 MONITORING UPDATE
A GIS overlay using completed harvest treatment data from 2017 shows that approximately 34 hectares of natural red spruce stands were managed using PHP's work instruction for red spruce management.
SUPPORTING DOCUMENTS/REFERENCES
N/A

HCV – Protected Areas

HCV ATTRIBUTE	**Protected Area**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Establish protected areas (legal, pending, and/or administrative) in PHP's management area	
INDICATOR	Establishment of legal, pending, and/or administrative protected areas	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Continue to monitor provincial government's protected lands process for the establishment and

	legal protection of new wilderness areas and/or other decisions made regarding areas.
DATA SOURCES The Forest Manager (TFM); NSDNR; NSDOE	COST AND DIFFICULTY Low

FOREST MANAGEMENT PRESCRIPTION

- All identified forest lands for legal or pending protection by the provincial government have been delineated in TFM and are clearly marked as legal or pending protected areas.
- All identified forest lands for administrative protection by PHP have been delineated in TFM and are clearly marked as administrative protected areas.
- PHP staff is aware that no forest management activities are allowed to occur in these 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**

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**

2017 MONITORING UPDATE

A GIS overlay using completed harvest treatment data from 2017 shows that there has been no forest management activities conducted in legal, pending, or administrative protected areas.

In December 2015, the provincial government completed its designation of a new suite of protected areas throughout the province. In total, over 14,000 hectares have been designated as new protected areas, which has led to 12.26% of total land protection in Nova Scotia.

SUPPORTING DOCUMENTS/REFERENCES

Our Parks and Protected Areas: A Plan for Nova Scotia, 2013; TFM Data; NSE Protected Areas

HCV – Special Management Zone Adjacent to Protected Area Boundaries

HCV ATTRIBUTE	**Limit Protected Area Access**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Minimize road construction
INDICATOR	Minimize road construction to reduce access points into protected areas by implementing a 200-meter wide special management zone.
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Assess whether new roads have been built in the special management zone using GIS overlay.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP currently monitors the special management zone and road construction using TFM.
FOREST MANAGEMENT PRESCRIPTION	
- Minimize road construction to reduce access points into the protected area. If roads are needed, they are to build parallel to the protected area boundary to minimize access points.	
2017 MONITORING UPDATE	
A GIS overlay using completed road construction data from 2017 shows that there have been no new roads built in the special management zone adjacent to protected area boundaries.	
SUPPORTING DOCUMENTS/REFERENCES	
N/A	

HCVF Category 2 – Large Landscape Level Forests

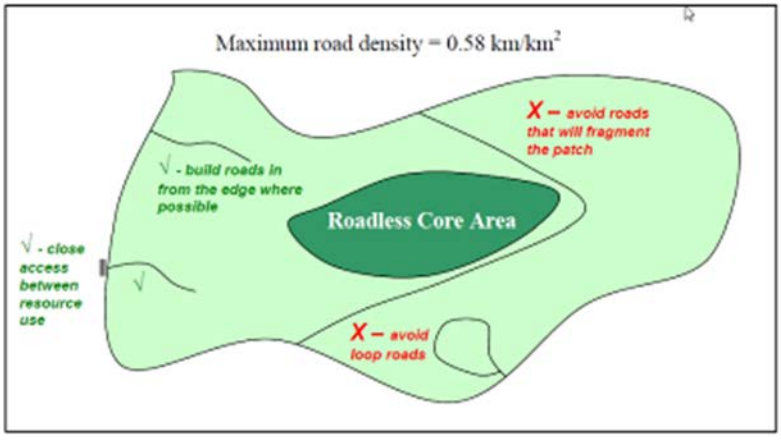
HCV – Intact Forest Landscapes

HCV ATTRIBUTE	**Intact Forest Landscapes**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Adhere to FSC requirements for management of Intact Forest Landscapes
INDICATOR	Maintain the integrity and intactness of intact forest landscapes.
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Assess whether more than 20% of the IFL has been impacted, and if the IFL has been reduced in size below 50,000 ha.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP currently monitors the IFL using TFM.
FOREST MANAGEMENT PRESCRIPTION	
- 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.	
2017 MONITORING UPDATE	
- There have been no harvest, silviculture, or road building activities inside the IFL in 2017. Note: 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 or reduce it in size below 50,000 ha, but continued monitoring and reporting will occur to ensure FSC requirements are being met.	
SUPPORTING DOCUMENTS/REFERENCES	
Global Forest Watch; FSC Advice Note on Intact Forest Landscapes	

HCV – Large Landscape Level Forests

HCV ATTRIBUTE	**Biodiversity and Intactness**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	To maintain biodiversity values and intactness in large landscape level forests
INDICATOR	Manage large landscape level forests with special practices in protected areas, core roadless areas, and special management areas
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Assess management activities within large landscape level forests to ensure practices comply with requirements outlined for protected areas, core roadless areas, and special management areas.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low – PHP currently monitors large landscape level forests using TFM.
FOREST MANAGEMENT PRESCRIPTION	

- 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)

2017 MONITORING UPDATE

PHP uses the provincial Forest Ecosystem Classification manual for all forest management decisions. PHP does not conduct full-tree logging, plant exotic species, use herbicides, and has not implemented intensive management in these areas. All other management prescriptions mentioned above are implemented across the entire forest management area.

The below table summarizes the current status of each large landscape level forest with respect to road index and minimum non-clearcut condition. Non-clearcut condition is defined as anything greater than 10 years of age. No new roads were built in large landscape level forests in 2017, so the road index remains the same as in 2016.

		Road Index Maximum Allowed = 0.58 km/km2		Minimum Non-clearcut Condition = 60%
HCVF LLLF Name	**Total HA**	**2017 Road Index**	**Future Road Index**	**Non-clearcut Condition in 2017**
Barren Hill	1,318	0.08 km/km2	0.20 km/km2	90%
Boisdale Hills	5,630	0.40 km/km2	0.52 km/km2	97%
Bornish Hill (fully protected)	2,106	0 km/km2	0 km/km2	100%
Country Harbour	8,202	0.03 km/km2	0.03 km/km2	99.9%
East Bay Hills	1,865	0.23 km/km2	0.31 km/km2	82%
French River	25,226	0 km/km2	0 km/km2	97%
Hill Lake	877	0.55 km/km2	0.65 km/km2	92%
Ingonish River	15,210	0.01 km/km2	0.01 km/km2	100%
Isaacs Harbour River	6,157	0.25 km/km2	0.42 km/km2	96%
Jim Campbells Barren (fully protected)	4,586	0.21 km/km2	0.21 km/km2	100%
Masons Mountain (fully protected)	1,022	0.06 km/km2	0.06 km/km2	100%
North River	6,328	0.20 km/km2	0.20 km/km2	100%
Oban	1,618	0.57 km/km2	0.78 km/km2	92%

Petit Lake Ruiss Noir (fully protected)	1,612	0 km/km2	0 km/km2	100%
Salmon Gaspereaux	2,357	0.30 km/km2	0.61 km/km2	93%
Upper Liscomb River	7,398	0.07 km/km2	0.07 km/km2	98%
TOTAL HECTARES	**91,512**		Future index may exceed maximum 0.58 km/km2. Will need to manage road index to meet target.	

HCVF LLLF Name	Total HA	2017 Total Area Treated	Treatment Used
Barren Hill	1,318	No area treated	
Boisdale Hills	5,630	22 hectares	Clearcut
Bornish Hill (fully protected)	2,106	No area treated	
Country Harbour	8,202	7 hectares	Clearcut
East Bay Hills	1,865	No area treated	
French River	25,226	No area treated	
Hill Lake	877	No area treated	
Ingonish River	15,210	No area treated	
Isaacs Harbour River	6,157	No area treated	

Jim Campbells Barren (fully protected)	4,586	No area treated	
Masons Mountain (fully protected)	1,022	No area treated	
North River	6,328	No area treated	
Oban	1,618	No area treated	
Petit Lake Ruiss Noir (fully protected)	1,612	No area treated	
Salmon Gaspereaux	2,357	No area treated	
Upper Liscomb River	7,398	No area treated	
TOTAL HECTARES	**91,512**	**29**	

HCVF Category 3 – Rare, Threatened or Endangered Ecosystems

HCV – Significant Ecosites

HCV ATTRIBUTE	**Rare, threatened or endangered ecosystems**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain rare, threatened or endangered ecosystems
INDICATOR	Rare, threatened or endangered ecosystems administratively protected from forest management activities
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor rare, threatened or endangered ecosystems to ensure they are administratively protected from forest management activities. Exception applies if the mapped ecosystem type does not match on-the-ground characteristics.
DATA SOURCES The Forest Manager (TFM); NSDOE	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- All significant ecosites are administratively protected from forest management activities with the following exceptions: - Karst conifer forest, karst hardwood forest, calcareous forest, and hemlock forest that have been previously managed will continue to be managed to maintain and restore mature climax conditions. - Significant ecosites are identified using the provincial forest inventory data and there has been limited field verification, so there is a certain amount of ambiguity within the dataset. Since there may be data inaccuracies between the digital information versus on-the-ground characteristics, stands that do not match the inventory data are exempt from special management activities as outlined here.	
2017 MONITORING UPDATE	
A GIS overlay using completed harvest treatment data from 2017 and significant ecosite data shows that there was 30 hectares managed in a significant ecosite. The significant ecosite database shows these stands to be Inland barrens or coastal shrub bogs, however, they were	

predominately black spruce stands. Therefore, no special management practices or protection was implemented.
SUPPORTING DOCUMENTS/REFERENCES
Significant Ecosite data layer, NSDOE

HCV – Significant, OId or Unique Forests

HCV ATTRIBUTE	**Rare, threatened or endangered ecosystems**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain rare, threatened or endangered ecosystems
INDICATOR	Rare, threatened or endangered ecosystems administratively protected from forest management activities
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor rare, threatened or endangered ecosystems to ensure they are administratively protected from forest management activities. Exception applies if the mapped ecosystem type does not match on-the-ground characteristics.
DATA SOURCES The Forest Manager (TFM); NSDOE	COST AND DIFFICULTY Low

FOREST MANAGEMENT PRESCRIPTION

- All significant, old or unique forests (SOUF) are administratively protected from forest management activities that meet the following species composition. Exception applies if the mapped ecosystem type does not match on-the-ground characteristics.

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	≥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	≥17m
30% or more red pine	≥12m
10% or more red oak	Any height
10% or more eastern white cedar	Any height

2017 MONITORING UPDATE

A GIS overlay using completed harvest treatment data from 2017 shows that there were no SOUF stands managed.

SUPPORTING DOCUMENTS/REFERENCES

Significant, old or unique data layer, NSDOE

HCV – Old Forest

HCV ATTRIBUTE	**Old Forest Protected Area**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Establish old forest protected areas on land-base
INDICATOR	Establishment and legal protection of old forest protected areas

MONITORING/REPORTING FREQUENCY	MONITORING STRATEGY
Annual	Monitor old forest protected areas TFM to ensure no forest management activities are conducted.
DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM); NSDNR; NSDOE	Low

FOREST MANAGEMENT PRESCRIPTION

- All identified old forest areas are legally protected by the provincial government.
- PHP staff is aware that no forest management activities are allowed to occur in these areas.

2017 MONITORING UPDATE
A GIS overlay using completed harvest treatment data from 2017 shows that there have been no forest management activities conducted in the old forest areas identified by the provincial government.
SUPPORTING DOCUMENTS/REFERENCES
Old forest GIS layer, NSDNR

HCV – Poorly Represented Ecosystems

HCV ATTRIBUTE	**Protection of Poorly Represented Ecosystems**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Establish protection of poorly represented ecosystems on land-base	
INDICATOR	Establishment and administrative protection of poorly represented ecosystems	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Monitor poorly represented ecosystems in TFM to ensure no forest management activities are conducted.
DATA SOURCES The Forest Manager (TFM)		COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION		
- All identified poorly represented ecosystems are administratively protected by PHP. - PHP staff is aware that no forest management activities are allowed to occur in these areas.		

Poorly Represented Ecosystem	Total Hectares
Masons Mountain	197
Jim Cambells Barren	2,844
Boisdale Hills	1,727
Country Harbour	829
North River	27
Oban	170
Hill Lake	113
Salmon Gaspereaux	240
TOTAL HECTARES	**6,147**

2017 MONITORING UPDATE

There have been no management activities in the above PHP administratively protected areas.

SUPPORTING DOCUMENTS/REFERENCES

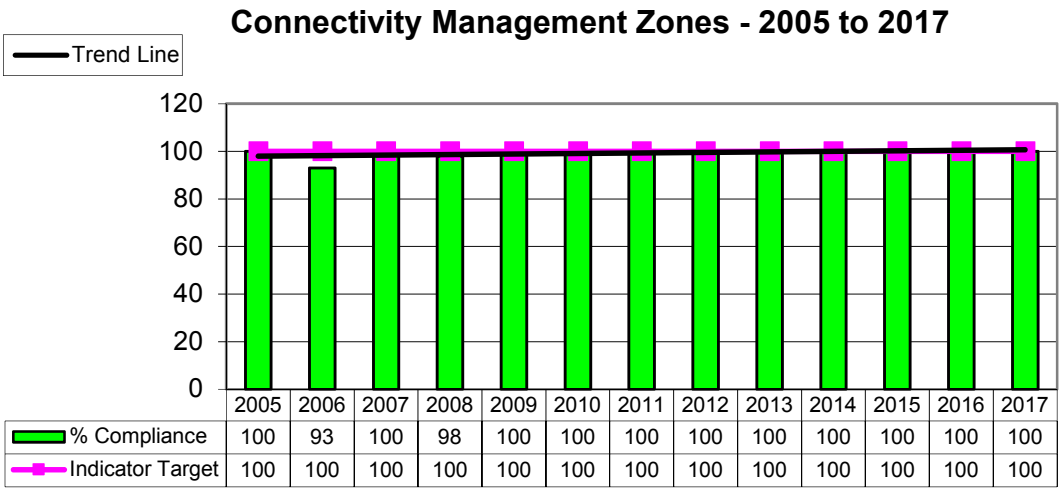
PHP Gap Analysis Report

HCV – Connectivity Management Zones

HCV ATTRIBUTE	**Continuous Canopy cover**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain continuous canopy cover between protected areas and old forest areas
INDICATOR	Maintain a 100-meter wide continuous canopy cover (minimum 30%) corridor within the 500-meter wide Connectivity Management Zone (CMZ)

MONITORING/REPORTING FREQUENCY	MONITORING STRATEGY
Annual	Monitor 100 meters within the CMZ to ensure a continuous canopy cover and CMZ's are not severed across their width.
DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM)	Low

FOREST MANAGEMENT PRESCRIPTION
- The Connectivity Management Zones will be managed to provide continuous canopy cover (minimum 30%) within the 500-meter wide corridors, which will include a solid 100-meter wide core zone. Although harvesting can occur within the CMZ's, these corridors will not be severed across their width. - The 500-meter wide CMZ's are static on the landscape, but the 100-meter wide core zone can 'move' within the CMZ.
2017 MONITORING UPDATE
The Connectivity Management Zones continue to maintain a continuous canopy cover within the 100-meter wide core zone.



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
% Compliance	100	93	100	98	100	100	100	100	100	100	100	100	100
Indicator Target	100	100	100	100	100	100	100	100	100	100	100	100	100

SUPPORTING DOCUMENTS/REFERENCES
The Forest Manager

HCV – Margaree & St. Mary's River Watershed

HIGH CONSERVATION VALUE – MARGAREE & ST. MARY'S RIVER WATERSHED	
HCV ATTRIBUTE	Non-clearcut Condition
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	To maintain a high level of non-clearcut condition in St. Mary's and Margaree Watersheds, and restoration management

INDICATOR	Each watershed shall have minimum 80% of its area (that is managed by PHP) in a non-clearcut condition, and 90% of each watershed shall be managed for restoration (i.e. no more than 10% of each watershed will be established as a FSC plantation).

MONITORING/REPORTING FREQUENCY	MONITORING STRATEGY
Annual	Monitor non-clearcut condition in each watershed to ensure target of minimum 80% is met.
DATA SOURCES	COST AND DIFFICULTY
The Forest Manager (TFM)	Low

FOREST MANAGEMENT PRESCRIPTION

- The St. Mary's and Margaree watersheds will be managed to maintain 80% or more of all lands managed by PHP in the watershed in a closed forest condition (> 12 years of age).

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

2017 MONITORING UPDATE

PHP has been monitoring the non-clearcut condition in these watersheds for several years. See Indicator 3.2 for current condition of St. Mary's and Margaree watersheds. Since 2008, these two watersheds have maintained minimum 80% non-clearcut condition. Additionally, PHP has not yet identified areas on the land base that will be established as an FSC defined plantation (up to 10% of the total forest lands), therefore, all forest areas are currently being managed for restoration and/or maintenance of existing Acadian forest characteristics.

SUPPORTING DOCUMENTS/REFERENCES

The Forest Manager

HCVF Category 4 – Basic Services of Nature

HCV – Legally Protected Municipal Water Supply Areas

HCV ATTRIBUTE	**Water Health**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Maintain water health for communities	
INDICATOR	Implement water protection measures in legally protected municipal water supply areas	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Monitor implementation of water protection measures.
DATA SOURCES The Forest Manager (TFM); NSDOE		COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION		
There is no land managed by PHP within the water supply areas unless requested or approved by the municipality through a watershed committee.		
2017 MONITORING UPDATE		
A GIS overlay using completed harvest treatment data from 2017 shows that there was one harvest of 25 ha in the James River Watershed Area. The stand was over-mature white spruce and balsam fir. Approvals and review went through NSDNR and the James River Watershed Committee. A larger 50-meter buffer was left on a brook and moose patches were also left on the site.		
SUPPORTING DOCUMENTS/REFERENCES		
Nova Scotia Department of Environment		

HCV – Water Supply Intake Areas

HCV ATTRIBUTE **Water Health**	
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain water health for communities
INDICATOR	Implement water protection measures around water supply intake areas.
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor implementation of water protection measures.
DATA SOURCES The Forest Manager (TFM); NSDOE	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- Water protection measures include the Wildlife and Habitat Watercourse Protection Regulations, monitoring of % closed forest condition, steep slope management, HCVF aquatic watershed management, and rutting and ground disturbance guidelines.	
2017 MONITORING UPDATE	
A GIS overlay of completed harvest treatments and water supply intake areas shows 302 hectares were managed within the intake areas. Water protection measures were carried out according to all regulations and requirements issued by NSDNR.	
SUPPORTING DOCUMENTS/REFERENCES	
Nova Scotia Department of Environment	

HCV – Steep Slopes

HCV ATTRIBUTE **Soil Health; Community Health**	
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Maintain soil health and community health
INDICATOR	No conventional harvesting in steep slope areas (30% average slope or greater)
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor steep slope areas and conventional harvesting activities.
DATA SOURCES The Forest Manager (TFM)	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- Conventional harvesting is not permitted in areas with 30% average slope or greater. Non-conventional harvesting such as cable logging is permitted, however, PHP is currently not using this practice.	
2017 MONITORING UPDATE	
A GIS overlay using completed harvest treatment data from 2017 shows that there was 8 hectares of forest management activities within steep slope areas. NOTE: This indicator is based on spatial data that identifies slopes > than 30% average using contour data. It is not based on the actual % slope for any given area as could be determined on-the-ground. Therefore, to calculate the results for the indicator, a GIS exercise is done which overlaps the steep slope data with completed harvest jobs to determine non-conformances. Most often, the areas showing as harvested are slivers due to inaccuracies in the data.	
SUPPORTING DOCUMENTS/REFERENCES	
The Forest Manager	

HCVF Category 5 – Basic Needs of Local Communities

HCV – Cattle Grazing on Cape Breton Highlands

HCV ATTRIBUTE	**Local communities**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Support needs of local communities
INDICATOR	Cattle grazing on the Cape Breton Highlands is allowed
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor any issues arising from cattle grazing on Cape Breton Highlands
DATA SOURCES N/A	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- Local farmers have let their cattle graze on the Cape Breton Highlands for several years during the summer/fall months. - PHP does not restrict this use.	
2017 MONITORING UPDATE	
No issues have arisen in 2017 regarding cattle grazing in the Cape Breton Highlands.	
SUPPORTING DOCUMENTS/REFERENCES	
N/A	

HCV – Viewshed Areas

HCV ATTRIBUTE	**Local Communities**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Minimize visual impacts to local communities from harvest activities
INDICATOR	Implement work instruction 'Harvest View from Roadside'
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor any issues in identified viewshed areas arising from harvest activities.
DATA SOURCES The Forest Manager (TFM); Harvest View from Roadside Work Instruction	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- District staff is responsible for determining the visibility rating using the TFM layer 'Viewsheds'. A harvest area determined to be within the **low category** will not require any specific landscape planning beyond regular housekeeping measures and removal of unsightly damaged residual trees. - Cut blocks falling in **the medium category** on the visibility grid should be designed using the "Landscape Level" instructions in the Harvest View from Roadside Work Instruction. Blocks falling into the high visibility category will follow the "Landscape level", "Stand level" and "Road design" practices as applicable.	
2017 MONITORING UPDATE	
Below is a list of hectares treated within the Viewshed area. Forest stands with a visability rating of 'low' do not require any specific landscape planning beyond regular housekeeping measures. Forest stands rated as moderate or high were managed by implementing the 'Harvest View from Roadside' Work Instruction. These areas are automatically flagged in TFM during planning and are included in forest management plans that are provided operations staff.	

Row Labels	Sum of Hectares
High	
CLEARCUT	31.41560534
High Total	**31.41560534**
Low	
CLEARCUT	37.92691139
OVERSTORY	1.90383655
PARTIALCUT	21.36204945
SINGLE	51.86971301
THINNING	70.7049151
Low Total	**183.7674255**
Moderate	
CLEARCUT	61.54146122
GROUPSEL	48.36084667
PARTIALCUT	11.89055927
Moderate Total	**121.7928672**
Grand Total	**336.975898**

SUPPORTING DOCUMENTS/REFERENCES
Viewshed layer in TFM; Harvest View from Roadside Work Instruction

HCVF Category 6 – Traditional Cultural Identity

HCV – Forest Values and Uses

HCV ATTRIBUTE	**First Nations Forest Values and Uses**
OPERATIONAL MONITORING PROGRAM	
MANAGEMENT OBJECTIVE	Minimize impacts to First Nations Forest Values and Uses
INDICATOR	Implement work instruction 'Aboriginal Value – Suspending Operations'
MONITORING/REPORTING FREQUENCY Annual	MONITORING STRATEGY Monitor any issues identified during annual review of operations plans with First Nations communities. PHP also maintains a public inquiry database, which captures

	concerns or questions the general public may have regarding planned operations.
DATA SOURCES The Forest Manager (TFM); Public Inquiry Database	COST AND DIFFICULTY Low
FOREST MANAGEMENT PRESCRIPTION	
- If operations plans are known to affect First Nations forest values or uses through a review of annual operating plans or public inquiries, PHP will suspend all activities until a resolution is found.	
2017 MONITORING UPDATE	
- There were no public inquiries IN 2017 related to PHP's operating plans that may affect First Nations.	
SUPPORTING DOCUMENTS/REFERENCES	
PHP Work Instruction 'Aboriginal Values – Suspending Operations'	

HCV – Traditional Cultural Identity

HCV ATTRIBUTE	**First Nations Traditional Cultural Identity**	
OPERATIONAL MONITORING PROGRAM		
MANAGEMENT OBJECTIVE	Minimize impacts to First Nations Traditional Cultural Identity	
INDICATOR	Successful implementation of Impact Benefit Agreement and Environmental Agreement with The Assembly of Nova Scotia Mi'kmaq Chiefs	
MONITORING/REPORTING FREQUENCY Annual		MONITORING STRATEGY Monitor successful completion and implementation of Impact Benefit Agreement and Environmental Agreement with The Assembly of Nova Scotia Mi'kmaq Chiefs
DATA SOURCES		COST AND DIFFICULTY

The Forest Manager (TFM); Public Inquiry Database	Moderate
FOREST MANAGEMENT PRESCRIPTION	
Once the Impact Benefit Agreement and Environmental Agreement are finalized, forest management prescriptions will be developed in collaboration with Nova Scotia Mi'kmaq.	
2017 MONITORING UPDATE	
PHP is currently working with the The Assembly of Nova Scotia Mi'kmaq Chiefs to finalize an Impact Benefits Agreement and Environmental Agreement, which will include provisions for the protection of Mi'kmaq Aboriginal and Treaty Rights and Archaeological and Cultural Resources. This work was on-hold in 2016 as other issues outside of PHP's control were being addressed by the Assembly.	