

FOREST MANAGEMENT PLAN
for the
PETERBOROUGH COUNTY FOREST

for the Ten-year Period
from January 1, 2010 to December 31, 2019

Renewal Date December 31, 2019



TITLE, CERTIFICATION AND APPROVAL PAGE

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I hereby certify that this plan has been prepared under my personal supervision and that all fieldwork and calculations have been carried out with professional skill and judgement in accordance with the good forestry practices.

Prepared By:

R. J. Spence, R.P.F.
Silv-Econ Ltd.

Signature

Date

I have read this Forest Management Plan and found it satisfactory and consistent with other resource management plans, land-use guidelines and/or policies for the County of Peterborough.

I recommend that the operating plan be approved for implementation.

Sheridan Graham
General Manager, Strategic
Services

Signature

Date

Approved by County of Peterborough By-law No. 2011-57 passed on September 21, 2011.

PREFACE

Forest management activities in the Peterborough County Forest are the responsibility of the County. The County Forest is situated in 3 distinct parcels referred to as the Belmont-Dummer Block, Havelock Depot Block and the Cavan Block.

This Forest Management Plan has been prepared to outline resource management and forestry activities that are scheduled to take place within the County Forest over the next ten-year period. It is proposed that this plan be reviewed every five years and renewed every 10-years.

This plan provides both long and short-term management direction for the forested lands owned by Peterborough County. The preparation of the Forest Management Plan has been done in accordance with standard forest management planning practices.

An overall goal of this plan is to contribute to the environment, social and economic well-being of the residents of Peterborough County and the people of Ontario through the sustainable development of the natural resources contained within County Forest.

As custodians of this landbase, resource managers must ensure the long-term health of ecosystems of the County Forest by managing the natural resources wisely. The adoption of an ecosystem approach to resource management is the cornerstone in working toward sustainable development.

This Forest Management Plan establishes longer-term (10+ years) resource management objectives while identifying specific areas where active management will take place within a 10-year operating period. It is suggested that this plan be reviewed during the fifth year as a means of reporting progress in management as well as for reviewing and improving the forecast of treatments if necessary.

During the implementation of this plan there may be circumstances that arise where a change to the plan may be necessary. Any alteration will be consistent with the principles of sustainable forestry, should be minor and reflect good forestry and resource management practices.

It is suggested that Annual Work Plans and Annual Work Reports be produced during the course of the planning term outlining the scheduling and implementation of management activities. These work plans and reports will provide the necessary linkage between the work proposed in the Forest Management Plan, management accomplishments, the financial resources allocated through annual budgeting process and revenues secured. It is further recommended that 5-year summary reports be prepared to show the progress of management. This is in keeping with past reporting sequences for the County Forest.

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1.0 INTRODUCTION

Peterborough County is responsible for the management of natural resources in the County Forest. This Forest Management Plan has been prepared to ensure that the forest resources are managed in a sustainable and responsible manner.

This forest management plan is a detailed technical document having a primary objective of organizing sustainable resource management activities. This document states how the forest resources will be managed and shows where the activities will occur during the operating period. This plan also identifies where forest management operations have occurred in the County Forest in the recent past. The management of the County Forests will be planned and implemented with an emphasis on sound resource management recognizing that this area provides for other uses.

All forest management activities for the 2010 to 2019 operating period will be guided by the principles of sustainable forestry. The management plan should be reviewed every five years and renewed every ten years to ensure that management objectives and strategies are both appropriate and obtainable. Annual Work Plans should be prepared annually in accordance with the operating plan and five-year summary reports should be prepared. This plan was prepared using the most up to date resource information available. However, the plan must be flexible enough to accommodate information or details that become available after the approval of the plan as it may be necessary to alter management activities. In these instances, the appropriate change will take place and be recorded in the Annual Work Reports.

To assist readers in reviewing this technical document a Glossary of Terms has been included and may be found in Appendix 1.

All common maps referred to in this plan are located in Appendix 2.

2.0 DESCRIPTION OF PETERBOROUGH COUNTY FOREST

2.1 Geographic Location and Area

The County Forest occupies a total of approximately 2,130 hectares of County owned lands within the County of Peterborough. The Forest is comprised of three separate and distinct blocks. On their own they are relatively contiguous, self-contained parcels. Map 1-Key Map shows the location of these land parcels in a regional context while Map 2-Forest Boundary identifies for the County Forest boundary on a more localized level. Table 1 provides a listing and the approximate size of the parcels within the County Forest.

Table 1 Peterborough County Forest Blocks

Block	Area (ha)
Belmont-Dummer	1967.7
Havelock Depot	72.9
Cavan	90.2
Total	2130.8

Hectares based on GIS database.

All the data, figures, tables and information presented in this management plan has been prepared for all three parcels and the Forest is treated as a single unit. Individual distinction of the parcels will be noted when necessary. For the purposes of this plan, all management records have been kept at the Forest level recognizing the separation of the individual parcels as required.

Belmont-Dummer Block

This is the main parcel and it is located on part Lot(s) 12 – 26, Concession(s) XI - XII in Dummer township and part Lot(s) 21 – 28, 30, 32 Concession(s) XII of Belmont township (Map 3 – Base Map – Belmont/Dummer Parcel). The parcel is accessed from the 12th Line Road of Dummer township which runs through the center of the parcel. There is a gate at the south end (entrance) of the County Forest. The road is not normally maintained on a regular basis beyond this point. The forest is surrounded by private lands and it shares common boundaries with the Otonabee Region Conservation Authority in a few locations (part Lots 22,23 Con XI, 25-26 Con XI). This block is contiguous with the exception of two small parcels at the north-east corner. The block is completely forested (mixed wood) and has been used for forestry and recreational purposes.

Havelock Depot Block

This is a smaller parcel and is situated in Belmont township on part Lots 12 Concession 9. It is located north of Havelock on County Road 44 behind the Works Department site. This is a small contiguous parcel approximately 73 hectares in size and is completely forested (mixed hardwoods) and has been used for forestry and limited recreational purposes. It is fronted by County Road 44 and is surrounded by private lands.

Cavan Block

This parcel is located on Lot 1 Concession 1 in Cavan township and is adjacent to properties owned and managed by the Ganaraska Region Conservation Authority. The property is accessed from the Cold Springs Road from the south, Glamorgan Road from the north and the Carmel Line from the east (Map 4 – Base Map – Cavan Parcel). This parcel is completely forested and almost exclusively pine plantations that have been thinned several times. The forest is used for forestry and limited recreational activities. It contributes towards the extensive the trail network of the Ganaraska Forest.

2.2 Administration and Planning

Peterborough County is responsible for the management and administration of the County Forest and this currently rests with the General Manager, Strategic Services and Corporate Projects division. The County does not have staff dedicated to the County Forest and seeks assistance from consultants and external resource managers to plan, implement, monitor and report on management activities in the County Forest to ensure that the forest resources are managed in a sustainable and responsible manner.

2.2.1 Official Plans

The Planning Act requires that each municipality develop an Official Plan to guide municipal development. All municipalities must have regard for the Provincial Policy Statement.

An Official Plan for the County of Peterborough was consolidated in 2006. The other municipalities where the County Forest resides are in the Township of Cavan-Millbrook-North Monaghan and its Official Plan was prepared in April 2005, and the Official Plan of the Township of Havelock-Belmont-Methuen was approved in January 2004.

Implementation of the Official Plan and other development policies are directed by zoning by-laws within the municipalities. Management activities in the County Forest will have regard for these policies and by-laws where they exist.

2.2.2 Forest Management Planning History

The Cavan Block was managed by the Ministry of Natural Resources (MNR) under the Agreement Forest program which terminated in 2001. The County has been fully responsible for management on this parcel since that time. The Belmont-Dummer and Havelock Depot Blocks were not part of the MNR's Agreement Forest program and have been managed by the County.

Management on the County Forest has been guided by a number of planning documents over the years and they are listed below.

- Management Plan for Peterborough County Forest, 1986-2006. G.M. Wilson. Sir Sanford Fleming College.
- Management Plan for Peterborough County Forest, 1981-2001. (Cavan Block) 1981. OMNR. R.E. Penwell.
- County of Peterborough Forest Management Study. 2000. B. Weir, S. Welsh. County of Peterborough. Includes Forest Operating Plan 2000-2009.

With the expiry of the recent operating plan the County initiated steps to prepare a new plan. This management plan will provide direction and guide management activities on the County Forest for the next ten-years covering the period of 2010 to 2019.

As mentioned above, Peterborough County has utilized the services of consultants and external resource managers to plan, implement, monitor and report on management activities in the County Forest to ensure that the forest resources are managed in a sustainable and responsible manner. Since the mid-1990's the County has utilized the services of a local forest products company that offered professional forestry services to local landowners. Domtar Forest Resources-Trenton and recently Norampac Inc-Trenton and Silv-Econ Ltd have assisted the County in forest planning and operational activities. Since 2001 these forest management services have been certified under the Forest Stewardship Council (FSC) standards demonstrating the commitment the County and its consulting partners have in sustainable forestry.

It is recommended that the County continue to show their dedication to high forest management standards by maintaining the linkage to the FSC certification via a third party or in securing its own certificate.

2.2.3 Peterborough County Forest and the Oak Ridges Moraine Conservation Plan

The Cavan Block is located within the Oak Ridges Moraine. Recent initiatives to conserve and protect the important hydrological and ecological features and functions of the Oak Ridges Moraine led to the introduction of the *Oak Ridges Moraine Conservation Act, 2001* and the development of the Oak Ridges Moraine Conservation Plan 2002. The purpose of the Oak Ridges Moraine Conservation Plan is to provide land-use and resource management planning direction on how to protect the Moraine's hydrological and ecological features and functions. The Peterborough County Forest Management Plan must be consistent with the requirements under the *Oak Ridges Moraine Conservation Act, 2001* and the terms and conditions of the Oak Ridges Moraine Conservation Plan.

The Oak Ridges Moraine Conservation Plan divides the Moraine into four land-use designations: (i) Natural Core Areas, (ii) Natural Linkage Areas, (iii) Countryside Areas, and (iv) Settlement Areas. The Cavan Block is situated within an area designated as a Natural Core Area. Natural Core Areas protect those lands with the greatest concentrations of key natural heritage features that are important to maintaining the integrity of the Moraine as a whole. Only existing uses and very restricted resource management, agricultural, low intensity recreational, home businesses, transportation, and utility uses are allowed in these areas (MMAH 2002).

The Cavan Block has been and will continue to be managed in a manner that is consistent with the Oak Ridges Moraine Conservation Plan.

3.0 BIOPHYSICAL DESCRIPTION

3.1 Physiography

There are many different landforms in the province of Ontario. Chapman and Putnam, 1984, identified five natural divisions in southern Ontario that were based on the bedrock. These divisions were further sub-divided into 55 minor physiographic regions. The Belmont-Dummer and Havelock Depot Block lies within the Dummer Moraine described below. Reference should be made to the 1984 publication entitled "The Physiography of Southern Ontario" for additional details.

Dummer Moraine

This physiographic region is a narrow band of rough stony lands bordering the Canadian Shield on the north. The moraine runs eastward from the Kawartha Lakes and extends down to Hwy 41. This region is characterized primarily by till plains and has small sand and limestone plain pockets. Additional information on the Dummer Moraine can be found in the Ontario Ministry of Natural Resources District Land Use Guidelines for the Lindsay District - 1983.

Oak Ridges Moraine

The Cavan Block lies along the edge of the Oak Ridges Moraine. This moraine runs west-east extending from the Niagara Escarpment to the Trent River and is considered to be one of Ontario's most significant landforms. The Moraine divides the watersheds draining south into Lake Ontario from those draining north into Georgian Bay, Lake Simcoe and the Trent River system. This region is characterized by deep sand, sand-loams and supports a variety of landscape and ecological features.

3.2 Site Region / District

Ontario is divided into seven broad ecological zones based on the work of G.A. Hills, 1959. These zones are called Site Regions and are described as areas where "the response of the vegetation to the features of landform follows a consistent pattern".

These Site Regions are sub-divided into Site Districts "based on a characteristic pattern of physiographic features which set apart fairly large areas from one another".

The Belmont-Dummer, Havelock and the Cavan Blocks lie within Site Region 6E and more specifically Site District 6E-9. This area is briefly described below. Additional information can be obtained by referencing Hills 1959 report titled "A Ready Reference to the Description of the Land of Ontario and its Productivity".

Lake Simcoe-Rideau Site Region (6E)

This is a ecological zone extends from the eastern end of Ontario to Lake Huron and the Bruce Peninsula on the west. It has a mid-humid climate and a gently undulating to rolling terrain of ice-laid materials deeply covering palaeozoic bedrock over 80% of the site district (Hills, 1959). Also present are smoother lacustrine deposits and limestone plains. Soils consist of grey-brown podzolic soils except in areas of stony till (Hills, 1959). Within this Site region the typical vegetation includes a diverse array of tree species.

Madoc Site District (6E-9)

Site District 6E-9 is a long narrow zone reaching across southern and eastern Ontario. Hills (1959) described Site District 6E-9 as "an area of high lime, stony loamy till with outcrops of shallowly covered limestone and trains of siliceous and low-base sand." Refer to the 1986 OMNR publication "Life Science Areas of Natural and Scientific Interest in Site District 6-9" for additional information.

3.3 Topography

The topography of the Belmont-Dummer and Havelock Depot Blocks varies from flat to gently rolling. There are some areas of broken topography however there are no significant variations in elevation on these parcels.

The Cavan Block is generally flat with no severe hill or rock formations. Elevations range from 290 metres to 300 metres above sea level and generally no surface water present on the block.

3.4 Climate

The climate for the Peterborough County Forest is characterized by cold winters with moderate snowfall and warm summers. Climatic statistics for the County Forest are summarized in the following table.

Table 2 Climatic Statistics (Environment Canada Climate Normals 1971-2000)

Statistics	Measurement
Mean Annual Temperature	6.9 C
Mean January Temperature	-7.7 C
Mean July Temperature	20.8 C
Mean Annual Precipitation	855.5 mm
Mean Annual Rainfall	701.2 mm
Mean Annual Snowfall	154.3 mm

3.5 Soils

The predominant soil type found in the Cavan Block is the Pontypool and Bridgeman sand. They are characterized by excessive drainage, low fertility and are subject to wind and water erosion. The underlying soils are generally deep and stratified sands of medium-fine texture. These areas experienced severe erosion problems in the early 1900's and the plantations were established to help soil conservation efforts.

Most of the Belmont-Dummer and Havelock Depot Blocks are covered by Dummer loam which is primarily a stony loam till. It is well drained, calcareous and is shallow to moderate in depth. In the south-west portion of his block the soils are organic in origin. These are poorly drained and support conifer species such as cedar. Large areas of cedar swamp and muskeg with little or no timber producing capabilities are found in these organic soil types.

3.6 Hydrology

The Belmont-Dummer and the Havelock Depot Blocks are within the Otonabee Region Conservation Authority watershed. The headwater areas of the Ouse Creek are located in the northern section of the Belmont-Dummer Block. There are many swamps, small creeks and woodland pools that drain into the Ouse Creek through this block and flow southward into Rice Lake. The Havelock Depot parcel does not have any significant drainage or water features.

The Cavan Block is located in the watershed of the Ganaraska Region Conservation Authority and this particular parcel does not have any significant water or drainage features located on it.

The County Forest, its vegetation, systems of wetlands and soil characteristics provide important ecological functions by maintaining groundwater levels, controlling surface runoff and maintaining water quality.

3.7 Forest Description

This section provides a description of the forest types in the County Forest. Through this the reader should develop an understanding of the forest resources that are found in this forest and acquire an appreciation of the resource management challenges that lie ahead.

3.7.1 General Description

The forest resources of the County Forest were inventoried on a large scale by the Ontario Ministry of Natural Resources in 1960 and again in 1979. In 1999 with the assistance of Domtar, new aerial photographs of the Belmont / Dummer block were taken and interpreted to produce a new Forest Resources Inventory (FRI) for the block. However, the Havelock Depot and the Cavan Blocks were not covered under this project. Therefore, the 1979 FRI data for these areas were used and the age, height and stocking attributes were adjusted to reflect the new inventory date. The results of the photo interpretation and inventory updates have been entered into a GIS database. The use of GIS will provide the means to continually update the changes in the FRI as a result of management activities.

The original GIS and forest inventory for the County Forest was constructed on an Ontario Base Map (OBM) basis in 1999. In 2009 the inventory was converted to a seamless inventory and was rectified using digital imagery for the County. The original forest stand boundaries from previous inventory exercises continue to be used and have all been re-numbered. Individual stand attributes were updated as management activities were implemented. The original stand boundaries have been retained.

Each forest stand has been assigned an ecosite type using the stand attributes derived from the FRI process. The ecosites used were those presented in the OMNR Field Guide to Forest Ecosystems of Central Ontario, 1997 (SCSS Field Guide FG-01). Stands were also assigned to a specific Forest Unit based on certain stand characteristics and silvicultural direction. These are discussed later in the plan.

The results of the updated FRI are presented in the following Tables and are briefly discussed. Standard MNR FRI terminology continues to be applied and is used in the forest inventory for the County Forest. The Peterborough County Forest has a total area of approximately 2,130.8 hectares including water and land. There is a total of 1,887.8 hectares of productive forest land, only 2.3 hectares of water and the remaining 240.7 hectares being comprised of non-productive, non-forested lands (Table 3).

Table 3 Area Summary For The Peterborough County Forest

Summary of the Total Area							
Water							TOTAL 2.3
Non-Forested Land							22.5
Forested Land							2106.0
		Non-Productive Forest		218.2			
		Productive Forest		1887.8			
Total Area							2130.8
Summary of the Productive Forest							
Working Group		Protection Forest Site Class 4 & Islands	Production Forest				Total
			B&S / NSR	PFR	Regular	Sub-Total	
Ash	A	9.2	0.0	0.0	18.5	18.5	27.7
Balsam Fir	B	0.0	0.0	0.0	43.5	43.5	43.5
White Birch	BW	0.0	0.0	0.0	11.1	11.1	11.1
Cedar	CE	11.4	0.0	0.0	518.3	518.3	529.7
Other Hardwoods	H	0.0	0.0	0.0	34.3	34.3	34.3
Hemlock	HE	0.0	0.0	0.0	13.5	13.5	13.5
Larch	L	0.0	0.0	0.0	10.9	10.9	10.9
Maple-Hard	MH	0.0	0.0	0.0	273.4	273.4	273.4
Maple-Soft	MS	0.0	0.0	0.0	27.3	27.3	27.3
Oak	O	0.0	0.0	0.0	17.6	17.6	17.6
Poplar	PO	0.0	0.0	0.0	436.1	436.1	436.1
Red Pine	PR	0.0	0.0	0.0	188.4	188.4	188.4
White Pine	PW	0.0	0.0	0.0	272.9	272.9	272.9
White Spruce	SW	0.0	0.0	0.0	1.4	1.4	1.4
TOTAL		20.6	0.0	0.0	1867.2	1867.2	1887.8

Source: 1999 FRI survey of Peterborough County Forest, updated 2008.

The following is a discussion of the forest cover types / working groups found in the Belmont / Dummer Block.

3.7.2 Working Groups / Cover Types

Ash Working Group (A)

Black Ash (*Fraxinus nigra* Marsh.)

White Ash (*Fraxinus americana* L.)

This working group contains both white and black ash. It is one of the smallest working groups making up only 1.5 % of the productive forest and often occurs in pure pockets.

Black ash typically grows in poorly drained areas where standing water occurs frequently. It is commonly found with red maple, cedar and black spruce.

White ash is commonly found as a minor component of tolerant hardwoods. It grows best on moderately well-drained soils. As a seedling it can survive extended periods of shade, however, white ash becomes increasingly more intolerant with age. In most cases it is ranked as having an intermediate level of tolerance to shade. It can regenerate readily from cut stumps and does not normally have a high frequency of sprouts. White ash will respond well to release.

Balsam Fir Working Group (B)

Balsam Fir (*Abies balsamea* (L.) Mill.)

This working group inhabits approximately 2.3 % of the productive forest. Balsam grows on a variety of soil types ranging from silts to stony loams however, growth is normally impeded on very dry or wet sites. Balsam is commonly found in association with red maple, poplar and spruce.

Balsam fir is a short lived species and is able to respond to release after many years of suppression. It is very tolerant to shade and is a regular and persistent understorey species of tolerant hardwood, hemlock and pine forests. It is important that when managing for pine and hemlock that efforts are made to control the presence of balsam.

Seed crops every 2 to 4 years with light crops during intervening years. Almost any seedbed is suitable for germination provided it is moist. Thick duff layers subject to drying are detrimental to seed germination and seedling development. Initial establishment of balsam is best under 15-20% light intensities. Balsam fir does not grow to large diameters and is not a commercially valuable tree species.

White Birch Working Group (BW)

White Birch (*Betula papyrifera* Marsh.)

Stands dominated by white birch occupy less than 0.6 % of the productive forest. It develops best on fresh well-drained sandy loams but is commonly found on the less productive shallow stony soils where its growth and form are poor. This species is abundant on the drier sites however, is seldom found on wet or poorly drained soils.

White birch is commonly found in association with poplar, white pine, white spruce and balsam fir. It is a short lived species maturing at approximately 60 to 80 years.

The seeds are small and light weight and can be carried significant distances from the parent tree. Seeds which germinate on the forest floor are normally unable to penetrate through the matted leaf litter to reach the soil therefore a certain level of disturbance is required for white birch to regenerate by seed. However, reproduction can occur from sprouts after a disturbance (harvest or fire) and are more likely to occur on small vigorous stems than on mature stumps. White birch is intolerant to shade and does not respond well to release.

Yellow Birch Working Group (BY)

Yellow Birch (*Betula alleghaniensis* Britton)

Yellow birch is not a dominant species anywhere in the County Forest and therefore is not represented as a working group. It is a minor associate of hard maple, hemlock, beech and basswood forests.

Yellow birch grows best on moderately well drained sandy loams on flats and lower slopes. On poorly drained soils, subject to ponding in the spring and fall, trees are often found on growing on old stumps and wind thrown logs.

Good seed crops are every 1 to 3 years and are the best after 70 years of age. Seed fall begins with cold weather. Yellow birch does not regenerate well on undisturbed or thick leaf litters as the new roots are too weak to penetrate through to the moist soil. Those young germinates are usually killed as the litter dries during the growing season.

This species requires partial shade and some exposed mineral soils to regenerate successfully and is able to regenerate from stump sprouts. Its tolerance to shade is at the intermediate level and it responds well to release.

Cedar and Larch Working Groups (CE / L)

Northern White Cedar (*Thuja occidentalis* L.)
Eastern Larch (*Larix laricina* (DuRoi) K. Koch)

These two working groups occupy approximately 28.1 % of the productive forest. Stands in this working group are normally situated on poorly drained organic sites.

The majority of the working group is made up of cedar with minor occurrences of larch or tamarack which are usually found acidic organic soils. These species are commonly associated with black and red spruce, balsam fir and black ash.

Cedar has good seed crops every 3 to 5 years with light to moderate crops in intervening years. Layering is a common means of reproduction especially in wet areas. Cedar is tolerant to shade and can persist several years of suppression and responds well to release.

Larch trees have good seed crops every 3 to 6 years and produce very little seed in intervening years. Larch is intolerant to shade and although it can withstand some shade in its juvenile stage, it must become dominant and remain in the overstory to survive. Black spruce, which is more tolerant and found in association with larch normally replaces it.

Hardwood Working Group (OH)

American Beech (*Fagus grandifolia* Ehrh.)
American Basswood (*Tilia americana* L.)
Black Cherry (*Prunus serotina* Ehrh.)

There are very few pure beech, basswood or black cherry stands in the block. These stand types (species) have been grouped with oak under the Other Hardwoods working group (OH) and represent 1.8 % of the productive forest.

Beech and basswood forests are in the climax stages of development. Beech is very tolerant and has no difficulty in establishing itself under extremely low light intensities. However, beech will grow better under a partial overhead canopy than in the open after a heavy disturbance. Beech

can survive extended periods of suppression and will respond favourably to release but has a tendency to develop epicormic branches if released to heavily. Beech is an important tree species for wild life and at times can experience severe crown damage by bears feeding on the nuts. Deer also rely on beech nuts as a source of food.

Basswood grows well on sandy loams and is capable of growing on poor dry sites but will not be of good form or vigour. Good seed crops are produced almost every year and seeds germinate best on mineral soil. Basswood has a great capacity to regenerate by stump sprouts and mature clumps of basswood are quite common. Basswood has an intermediate level of tolerance to shade.

Hemlock Working Group (HE)

Eastern Hemlock (*Tsuga canadensis* (L.) Carr.)

Stands dominated by hemlock occupy only 0.7 % of the productive forest. It is an important species in the management of deer in providing suitable winter habitat. It is extremely tolerant to shade and normally establishes itself better under partial sunlight than in the open. It is commonly found in association with tolerant hardwoods and in mixed white pine forests. It common to find hemlock in small almost pure patches, especially on cool north facing slopes and on ridges.

Hemlock produces good seed crops every 2 to 3 years in mature stands. Germination of seeds is best on shaded, cool moist sites however, they are slow growing and are subject to being smothered by hardwood leaf litter in the first few years. Mineral soil is a good seedbed and early survival of hemlock seedlings depend on sufficient moisture levels in the upper soil layers.

Hemlock can survive extended periods of severe suppression and still retain good form and are capable of responding favourably to release under these circumstances. Hemlock trees develop a rather shallow root systems and are susceptible windthrow. Hemlock is also sensitive to sunscalding when suddenly exposed under a partial harvest system.

Hard Maple Working Group (MH)

Sugar Maple (*Acer saccharum* Marsh.)

This is working group occupies approximately 14.5% of the productive forest.

Maple forests are a late successional forest type. These forests develop best on well drained loam, sandy loam soils. Maple is an integral member of a number of forest types and is commonly associated with beech, basswood, yellow birch, hemlock and in some cases white pine. It is a prolific producer of seed and good crops occur every 2 to 5 years. Seeds will germinate at low temperatures and is capable of penetrating the leaf litter to establish itself in large numbers. Hard maple is very tolerant to shade and can survive extended periods of suppression. It is a very long lived species.

Due to their tolerance to shade, most maple stands have trees of all ages present, from young seedlings to mature trees. Other forests that have experienced some form of major disturbance have developed uniformly and the trees are of even age and size. In the Belmont / Dummer block the majority of the maple forest is in the uneven-aged state. High grading of some maple stands has occurred in the past resulting in this forest type having a higher component of poor quality stems. It is an objective of this operating plan to improve the condition of this forest type.

Soft Maple Working Group (MS)

Red Maple (*Acer rubrum* L.)

Stands in which red maple is the dominant species occupies 1.4 % of the productive forest. It will develop best on moderately well drained moist sites and can be found on slow draining flats and in depressions. Red maple is usually found in mixed stands and is commonly associated with sugar maple, beech, balsam, poplar and white birch. It is considered to be a subclimax species.

Red maple has a very light seed and is carried by the wind. Seeds will germinate where there is a layer of hardwood litter provided the underlying soil is moist. Reproduction can be in the form of coppice as red maple is a vigorous sprouter.

This is a good browse species for deer and rabbits.

Oak Working Group (O)

Red Oak (*Quercus rubra* L.)

This working group is almost exclusively red oak. White oak has been found to occur but only as a individual trees rather than a stand. Red oak dominated stands in the block represent only 0.9 % of the productive forest.

Red oak is characteristically an upland species. Growth and development are best on sandy to sandy-loam soils. Oak forests are susceptible to defoliation by the gypsy moth and forest tent caterpillar.

Red oak has an intermediate tolerance level to shade. Oak will begin to produce acorns at approximately 50 years and good crops occur every 2 to 5 years. Acorns are an important food source for a variety of wild life species and as a result it is not uncommon for the majority of the seed crop to be loss to predation. Red oak has a great capacity to reproduce through stump sprouts. It sprouts more vigorously in younger stems than on older, mature stumps. In many cases the regeneration success of oak stands relies on the presence of sufficient levels of advance oak regeneration prior to the removal of the overstory.

Poplar Working Group (PO)

Balsam Poplar (*Populus balsamifera* L.)

Trembling Aspen (*Populus tremuloides* Michx.)

Large-toothed Aspen (*Populus grandidentata* Michx.)

The poplar working group presents approximately 23.1 % of the productive forest. Generally these species are found on a variety of sites but appear to develop best on well drained sandy and light sandy loam soils. These species are some of the most shade intolerant species requiring in most cases full sunlight for survival. In most circumstances these pioneer species will not develop as an understorey species as partial shade does not favour its development. Poplar forests are relatively short lived and are found in association with pine, white birch, white spruce, balsam fir and maple. The poplar forests are an important source of raw material for the pulp and paper industry in the area.

Poplar will produce good seed crop every 2 to 3 years. The seedlings do not grow fast and are subject to competition. However, most of the poplar reproduction is from root suckers which originate from adventitious buds along the lateral roots are in close proximity to the soil surface.

Many poplar areas in the block are naturally converting to hard maple. Where suitable this successional trend will be encouraged through partial cutting.

Red Pine Working Group (PR)

Red Pine (*Pinus resinosa* Ait.)

The red pine working group is a relatively small area representing only 10.0 % of the productive forest. All of this area is comprised of plantations ranging in age from 35 to 45 years. The majority of these sites are deep, well-drained sandy soils. Red pine occurs normally on lighter textured soils and is also found on dry, coarse soils in association with scrub oak and poorly formed poplar. Red pine occurs sporadically on heavier textured soils primarily because of its inability to compete with other tree species. Red pine is sensitive to soil pH levels.

This pine species produces good seed crops every 3 to 7 years with very light crops in intervening years. Germination is satisfactory at 35% full sunlight, however, red pine requires light levels of approximately 60% or more to thrive once established on the site. Red pine is less tolerant to shade and best growth is in full sunlight.

Some areas have sustained serious damage from porcupines and will need to be monitored over time.

White Pine Working Group (PW)

White Pine (*Pinus strobus* L.)

This working group has been and will continue to be very important for producing valuable forest products. It currently represents 14.5 % of the productive forest.

White pine forests have been known to grow on virtually all soil types in the surrounding area. However, this species is best suited to the well drained lighter sandy soils which are abundant in this area. These forests are considered to be in the late pioneer stages of development. White pine is found with red pine, poplar and white birch and in association with hemlock on shallow soils and ridges. Maple can also be found in white pine forests as an understorey species. It is a relatively long lived species.

White pine normally produces good seed crops every 3 to 5 years with very little seed in intervening years. Germination can occur at approximately 20% full sunlight. Once established tree growth increases proportionately as light intensities increase and is optimal at 50 to 55% full sunlight. In open conditions white pine is susceptible to weevil damage and many plantations have been attacked resulting in forked stems. Growing white pine under partially shaded conditions will reduce the occurrence of weevil and the shelterwood system is ideal in producing these conditions.

Spruce Working Group (S)

White Spruce (*Picea glauca* (Moench) Voss)

Black Spruce (*Picea mariana* (Mill.) B.S.P.)

Red Spruce (*Picea rubens* Sarg.)

This working group is limited to two small plantations of white spruce representing 0.1%.

Table 4 summarized the age class distribution for each of the forest cover types found in the County Forest.

Table 4 Summary of the Production Forest by Working Group and Age Class for the Period 2010-2019

WORKING GROUP		AGE CLASS									
Name	Abbr.	B-S / NSR	1-20	21-40	41-60	61-80	81-100	101-120	121+	TOTAL	
ASH	A	0.0	2.9	0.0	23.0	1.8	0.0	0.0	0.0	27.7	1.5%
BALSAM FIR	B	0.0	1.2	0.0	42.3	0.0	0.0	0.0	0.0	43.5	2.3%
WHITE BIRCH	BW	0.0	0.0	0.0	11.1	0.0	0.0	0.0	0.0	11.1	0.6%
CEDAR	CE	0.0	7.7	1.1	145.8	317.2	53.0	4.9	0.0	529.7	28.1%
OTHER HARDWOODS	H	0.0	0.0	3.9	0.0	0.0	30.4	0.0	0.0	34.3	1.8%
HEMLOCK	HE	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0	13.5	0.7%
LARCH	L	0.0	3.8	0.0	0.0	7.1	0.0	0.0	0.0	10.9	0.6%
MAPLE-HARD	MH	0.0	7.2	8.9	54.3	94.9	93.5	0.0	14.6	273.4	14.5%
MAPLE-SOFT	MS	0.0	0.4	0.0	26.9	0.0	0.0	0.0	0.0	27.3	1.4%
OAK	O	0.0	0.0	0.0	0.0	1.8	15.8	0.0	0.0	17.6	0.9%
POPLAR	PO	0.0	1.2	5.1	237.0	165.2	27.6	0.0	0.0	436.1	23.1%
RED PINE	PR	0.0	2.7	34.6	46.9	96.3	7.9	0.0	0.0	188.4	10.0%
WHITE PINE	PW	0.0	10.4	2.2	1.5	67.4	97.2	83.9	10.3	272.9	14.5%
WHITE SPRUCE	SW	0.0	1.1	0.3	0.0	0.0	0.0	0.0	0.0	1.4	0.1%
Total		0.0	38.6	56.1	588.8	751.7	338.9	88.8	24.9	1887.8	100.0%
UNCLASSIFIED LAND										22.5	
WETLAND										220.5	
										<u>2130.8</u>	

Source: 1999 FRI survey of the Peterborough County Forest. Updated 2008.

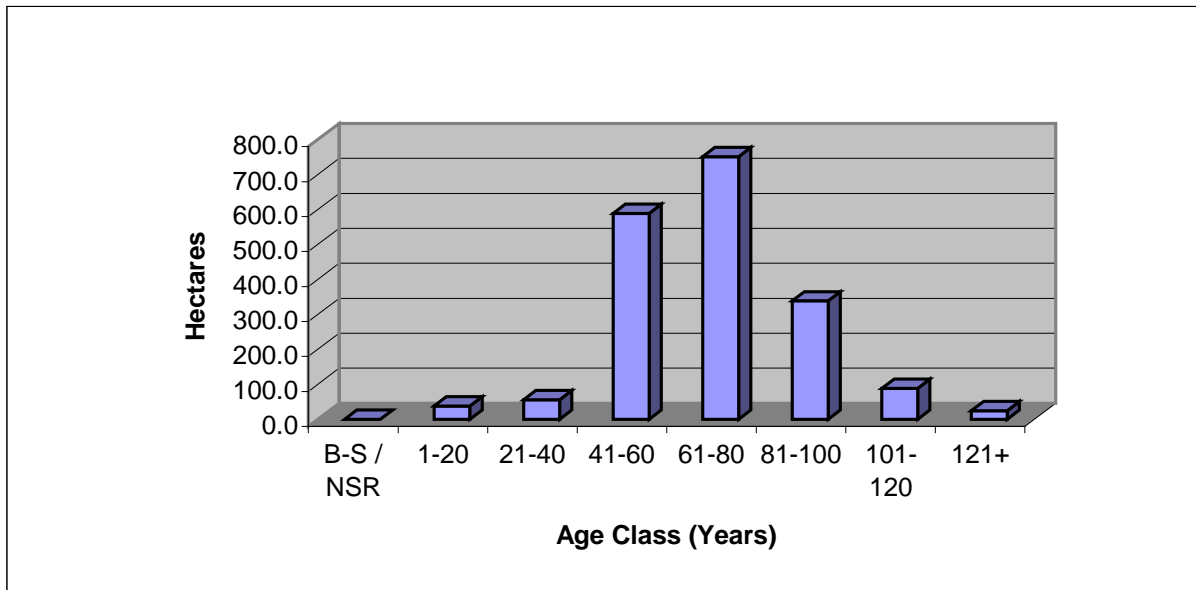
The age class distribution of the County Forest bell-shaped with the majority of area in the 41-100 year age classes (see Figure 1). This is typical of the forest in the Great Lakes-St. Lawrence Forest Region in Ontario. This is a function of historical land settlement and logging practices that took place in the late 1800's and early 1900's. There has been a minor shift in the age class distribution in the past ten years as the County Forest ages and is managed. Ten years ago the majority of the forest was in the 21-80 age class. Over time and through the sustainable management strategies the age class distribution should be more regulated and evenly spread out.

The following maps have been produced to show the distribution of the forest resources of the County Forest as they relate to the working groups and age classes presented;

Map 5: Forest Working Group

Map 6: Forest Age Classes

Figure 1 Age Class Distribution of Productive Forest for the Peterborough County Forest



3.7.3 Ecological Land Classification

Each of the forest stands assigned to an ecological class based on the forest stand attributes such as species composition of the forest and other site characteristics. The ecosites used were those presented in the OMNR Field Guide to Forest Ecosystems of Central Ontario, 1997 (SCSS Field Guide FG-01).

The results of ecosite assignment are presented on the Table 5 below. The dominant ecosites present on the County Forest are those associated with pine and pine complexes (approximately 44%), followed by white cedar and associated species complexes (approximately 33%). This is not surprising due to the amount of pine and cedar found in the forest as shown in the working group tables above. Poplar complexes are the third most dominant ecosite grouping at approximately 10%. These three groupings represent 87% of the ecosites found in the County Forest. The range of ecosites does contribute to the overall biodiversity of the forest.

Map 7: Forest Ecosites, shows the distribution of the forest resources of the County Forest as they relate to the ecosites. See Appendix 2.

Table 5 Eco-Site Summary for the Peterborough County Forest

ECO-SITE DESCRIPTION	ECOSITE	AREA (HA)	
WHITE PINE - RED PINE (dry - fresh)	ES11.1	62.7	3.3%
WHITE PINE - RED PINE (fresh - moist)	ES11.2	21.5	1.1%
RED PINE (dry - fresh)	ES12.1	157.0	8.3%
RED PINE (fresh - moist)	ES12.2	2.0	0.1%
POPLAR - WHITE BIRCH (dry - fresh)	ES17.1	67.9	3.6%
POPLAR - WHITE BIRCH - WHITE SPRUCE - BALSAM FIR(dry - fresh)	ES18.1	61.6	3.2%
POPLAR - WHITE BIRCH - WHITE SPRUCE - BALSAM FIR(fresh - moist)	ES18.2	69.3	3.7%
WHITE PINE - RED PINE - WHITE SPRUCE - WHITE BIRCH (dry - fresh)	ES20.1	390.4	20.6%
WHITE PINE - RED PINE - WHITE SPRUCE - WHITE BIRCH (fresh - moist)	ES20.2	19.4	1.0%
CEDAR - WHITE PINE - WHITE BIRCH - WHITE SPRUCE (dry - fresh)	ES21.1	245.8	13.0%
CEDAR - WHITE PINE - WHITE BIRCH - WHITE SPRUCE (fresh - moist)	ES21.2	69.1	3.6%
CEDAR - OTHER CONIFER (dry - moist)	ES22	20.6	1.1%
RED OAK - HARDWOOD (dry - fresh)	ES23.1	15.4	0.8%
RED OAK - HARDWOOD (fresh-moist)	ES23.2	8.9	0.5%
SUGAR MAPLE RED OAK - BASSWOOD (dry - fresh)	ES24.1	105.4	5.6%
SUGAR MAPLE - RED OAK - BASSWOOD (fresh - moist)	ES24.2	5.3	0.3%
SUGAR MAPLE - BEECH - RED OAK (dry - fresh)	ES25.1	33.6	1.8%
SUGAR MAPLE - BASSWOOD (dry - fresh)	ES26.1	68.6	3.6%
SUGAR MAPLE - BASSWOOD (fresh - moist)	ES26.2	7.3	0.4%
SUGAR MAPLE - WHITE BIRCH - POPLAR - WHITE PINE (dry - fresh)	ES27.1	122.8	6.5%
SUGAR MAPLE - WHITE BIRCH - POPLAR - WHITE PINE (fresh - moist)	ES27.2	12.2	0.6%
SUGAR MAPLE - HEMLOCK - YELLOW BIRCH (dry - fresh)	ES29.1	15.7	0.8%
HEMLOCK - YELLOW BIRCH (dry - fresh)	ES30.1	13.5	0.7%
BLACKSPRUCE - TAMARACK	ES31	5.0	0.3%
WHITE CEDAR - BLACK SPRUCE - TAMARACK (moist - wet)	ES32	67.7	3.6%
WHITE CEDAR - OTHER CONIFER (moist - wet)	ES33	65.5	3.5%
WHITE CEDAR - LOWLAND HARDWOOD (moist - wet)	ES34	159.6	8.4%
LOWLAND HARDWOOD ((moist - wet)	ES35	2.9	0.2%
		1896.6	100.0%

Does not include wetlands or unclassified lands.

Eco-site classification and description as per OMNR Field Guide to Forest Ecosystems of Central Ontario, 1997.

3.8 Biodiversity - Stand Level / Species Diversity

Stand level diversity can refer to the variety of living and non-living features that occur within a stand and the processes by which they interact. The following general statements are provided here regarding biodiversity and how it is being both maintained and enhanced in the County Forest.

The greatest influence to achieve silvicultural, biodiversity and wildlife objectives at the stand level is through proper tree marking and harvesting. Trained and certified tree markers implementing a prescription, approved by a registered professional forester, can quickly adapt to changing stand and site conditions to ensure an array of management objectives are met by marking trees for removal and / or specifically identifying them for retention. This may include retaining small

patches or single conifer stems (hemlock or white pine trees) in tolerant hardwood stands. Additionally, stocking levels have been refined in specific locations to enhance feeding opportunities for deer. Additionally, stocking has been manipulated to provide suitable canopy closure for certain raptors and /or tree species. These decisions are being made by knowledgeable individuals and serve to provide habitat components for wild life in addition to maintaining tree species diversity at the stand level. These efforts contribute toward landscape diversity.

Trained and certified tree markers have further assisted in the maintenance of biodiversity by recognizing a variety of forest values and implementing the appropriate management strategies to enhance or protect these resource features (e.g. hawk nests, cavity or den trees, super canopy trees, seepage ways, hardwoods trees in conifer stands, conifer trees in hardwood stands, trails etc.). These are discussed in later sections of this management plan.

3.9 Other Resource Values

3.9.1 Wildlife Resources

To date, an intensive wildlife and/or habitat inventory has not been completed for the County Forest. Undoubtedly the forest offers good terrestrial and wetland habitats for a variety of mammals, reptiles, amphibians and song birds due to its mosaic of habitats and its diversity of forest cover types and species complexes. The imbalanced age class structure towards the mid-rotation age classes (41-100 year) would imply that habitat requirements for species dependant on younger (1-40 age class) and older forests (> 100 years) are not present or adequate. It must be kept in mind that the County Forests (all blocks) are connected to much larger contiguous forested landscapes and is a contributor to the various habitat requirements of the wildlife that are found in the broader area. As management continues on the County Forest a more balanced distribution age classes will result.

The OMNR Natural Resource Values Information System (NRVIS) for the Peterborough District contains limited information with respect to the County Forest's wildlife values. The currency of the information within the NRVIS system is questionable and the resource value maps have not been updated on a regular basis.

Within Ontario, more than 175 species of plants and animals are currently designated as 'At Risk' by the Ministry of Natural Resources. A search of the Natural Heritage Information Centre (NHIC) database was made to determine if any species at risk have been observed in the geographic area surrounding the properties. The search results returned one sighting on the Cavan property of a Prairie Buttercup. This species is considered by the MNR to be 'apparently secure' but warrants some concern.

Observations of other significant plants, animals and habitats within 10 km of the county forest properties are noted in the Table 6. These sightings exemplify that the forest in the County of Peterborough and the County Forest itself provide important conservation areas for rare species.

Table 6 List of Significant Species and Habitats Documented by the Ministry of Natural Resources Within 10 Km of the Peterborough County Forests

Common Name	Habitat	Current Status	Data Source
Pepper and Salt Skipper	Along streams in forest glades and edges, logging roads, power line clearings and dirt roads along moist forests.	Vulnerable	NHIC
Prairie Warbler	Overgrown fields with scattered shrubs, utility right-of-ways, thickets, second-growth clearings and young pine plantations	Vulnerable	NHIC
Red-shouldered Hawk	Forest	Special concern	NHIC
River Bank Quillwort	Shorelines	Vulnerable	NHIC
Prairie Buttercup		Special concern	NHIC
	Dry Tallgrass Prairie Type Habitat	Critically imperilled	NHIC

NHIC: Natural Heritage Information Centre. Ministry of Natural Resources

Upon reviewing the MNR's species at risk list and the range maps, the following species were identified that may occur in the vicinity of the County Forest properties.

Table 7 Species at Risk that May Occur in the Vicinity of the County Forest

Status		
Species of Concern	Threatened	Endangered
<ul style="list-style-type: none"> • Red-headed Woodpecker • Cerulean Warbler • Bald Eagle • S. Flying Squirrel • Northern Map Turtle • Snapping Turtle • Five-lined Skink • Milksnake • E. Ribbonsnake 	<ul style="list-style-type: none"> • Least Bittern • E. Prairie Fringed Orchid • E. Spiny Soft-shelled Turtle • E. Musk Turtle • Blandings Turtle • E. Hog-nosed Snake 	<ul style="list-style-type: none"> • American Ginseng • Butternut • Wood Turtle • Spotted Turtle

Through the normal planning and operational procedures practiced in the County Forest the habitats of these species will be conserved. A set of area of concern guidelines have been used in the County Forest in the past and have been adopted from various MNR guidelines. These areas of concern strategies for the County Forest are summarized in Appendix 3. These can be reviewed and updated accordingly as new or revised information is made available. Pre-treatment assessments and the development of site specific prescriptions that incorporate sustainable forestry principles and guidelines will help ensure that the habitat needs of a wide variety of species are met including the species that are at risk.

White-tailed Deer

The Belmont / Dummer block is recognized as an important winter concentration area for deer.

The white-tailed deer (*Odocoileus virginianus*) occurs throughout the area and is considered to be a Provincially featured species for MNR habitat management and forest management planning

exercises. Although this species thrives best in young forests with abundant "edge" and openings normally associated with significant disturbances to the landscape (e.g. fire, forest cutting, wind blowdown, etc.), white-tailed deer also have a specific need for closed canopy conifer forests to help shelter them from deep snow and harsh temperature and wind conditions during the winter. The tendency for deer to congregate in traditional "yards" during the winter demands special attention by forest and wildlife managers to recognize this special habitat type and ensure that optimal conditions are available both currently and in the future.

Cedar and hemlock are considered to be optimal cover species for deer, special planning is required wherever harvests of these species are contemplated within or in proximity to deer yards.

The obvious challenge for resource managers will be to ensure adequate supplies of high quality thermal cover for deer in proximity to abundant food supplies that can be easily accessed by deer in winter when deep snow restricts movement.

3.9.2 Aquatic Resources

Ouse Creek runs through the Belmont / Dummer Block and has been classified as a coldwater system by the Ontario Ministry of Natural Resources. Forest management operations will recognize this important resource and conduct activities to ensure no negative impacts to water quality and related fish habitat result.

4.0 CURRENT USES OF THE COUNTY FOREST

4.1 Overview

The County Forest is used to support a variety of activities. These are at low-level intensities that is a direct function of limited size of the Blocks.

Map 8 – Resource Use highlights the current resource use status of each of the three blocks. It also shows the current access roads, trails and of hunt camp locations.

The following is a brief discussion on the current uses of the County Forest. Existing uses of the County Forest can be divided into two broad categories: resource-based and non-resource-based uses. Resource-based uses include activities such as sustainable forestry, habitat and wildlife management including trapping. Non-resource-based uses include recreational activities such as hunting and snowmobiling, cycling, hiking, cross-country skiing and fishing.

4.2 Resource-based Uses

The County Forest has been managed employing the principles of sustainable forestry and has sought the assistance and expertise of forest professionals. As a result the County Forest remains healthy, provides habitats for a variety of wildlife, supports non-resource-based activities and generates revenues through the sale of forest products derived from the County's well-managed forests. Forestry activities have taken place in all of the County Forest parcels.

Another example of a resource-based activity includes the beaver pond management projects undertaken by Duck Unlimited in the past. These projects attempted to rejuvenate stagnated ponds by creating new browse-food opportunities in the proximity of wetlands as well as installing nesting structures-boxes to provide safe habitat. These activities took place in the 1995-1997 and were confined to the Belmont-Dummer Block as the other two parcels are small and were less suitable.

The Belmont-Dummer Block has been part of a registered trap line for many years confirming that responsible forest management that incorporates a broad range of objectives is successful in meeting wildlife habitat needs to support healthy wildlife populations and should continue to be integrated into forest management activities. Trapping does not occur on the Havelock Depot or Cavan Blocks.

4.3 Non-Resource-based Uses

Hunting and snowmobiling are by far the two most popular non-resource-based activities taking place in the Peterborough County Forest at this time. The Belmont-Dummer Block is the largest of the three parcels and offers the most opportunity for broader uses.

There are two old established hunt camps located in the Belmont-Dummer Block and a hunting group periodically rents a vacant run-down building which is situated in the centre of the property during the deer-hunting season. Numerous other hunt groups set up portable camps within the forest for the deer hunt. Day hunting for deer as well as for upland game is also popular. Hunting is not permitted in the other two Blocks.

The headwaters of the Ouse River are located at the northern extremity of the Belmont-Dummer Block, with the river continuing south-westerly through the center portion of this parcel. This is an important coldwater stream with an abundance of Speckled Trout to support fishing activities. The other two blocks do not have water features to support any fishing opportunities.

The main north-south road in the Belmont-Dummer parcel is part of the Havelock and District Snowmobile Club route. This trail connects with other trail systems allowing access to a wide variety of destinations. The road-trail network within the County Forest is limited.

The Cavan Block has access-compartment roads around its perimeter and supports a small trail network inside. This Block is adjacent to the Ganaraska Forest and connects into the extensive trail network that is managed by the Ganaraska Region Conservation Authority. The trails in the Cavan block are used for hiking and cross-country skiing. Motorized vehicles are prohibited.

4.4 Current Restrictions

Listed below is a summary of the current use restrictions that are in place for each of the County Forest parcels. These limitations have been in place for quite some time and are a function of resource management direction. The restrictions are also necessary to ensure the health and safety of forest users in addition to ensuring forest management objectives are met.

<u>Block</u>	<u>Current Status</u>	<u>Limitations</u>
Belmont-Dummer	General Resource Use	No camping (except as authorized by the County)
Havelock Depot	Restricted Use	No hunting, trapping, motorized vehicles, camping
Cavan	Restricted Use	No hunting, trapping, motorized vehicles, camping

5.0 MANAGEMENT OBJECTIVES AND RECOMMENDED STRATEGIES

5.1 Overall Management Objectives

The Forest Management Study in 2000 established a set of resource management principles and several objectives to guide resource management activities on the County Forest. These were reviewed and are summarized below.

The principles represented an ideology that focused on the philosophy that the forest itself is of the utmost importance and that all other uses evolve out of proper forest stewardship.

Principles:

1. *"The sustainability of the forest is paramount."*
2. *"The forestry/resource use is the primary use of the County Forest."*
3. *"Recreational/cultural uses are secondary uses for the forest."*
4. *"Forestry activities and uses enhance the forest for recreational and cultural opportunities."*

Resource management objectives were divided into two broad categories; Resource and Non-Resource. The Resource Objectives related to the different resources that the forest offers as they relate to stewardship, sustainability, economic/social values and living environments. The Non-Resource Objectives focused on public awareness of the forest, public involvement in planning for the forest, investing educational opportunities, and public safety.

Resource Management Objectives:

1. *"To be responsible stewards of the land through the protection and conservation of the soil, aquatic resources, forest and wildlife resources of the Peterborough County Forest and to respect the natural environment by adopting and implementing an ecosystems-based approach to the management of these lands."*
2. *"To maintain the lands in the County Forest as forested lands and actively manage them in a sound environmental manner and in keeping with the principles of sustainability to ensure long-term health of eco-systems and their functions."*
3. *"To recognize the social and economic values which are derived from the County Forest."*
4. *"To promote healthy wildlife populations through the implementation of natural habitat enhancement programs."*

Non-Resource Objectives:

1. *“To increase public awareness of the Peterborough County Forest and the opportunities it provides for people and wildlife including recreation, tourism, hunting, outdoor education, cultural heritage and critical habitat.”*
2. *“Consider the responsible use of the Peterborough County Forest through increased public involvement in planning and management of the forest.”*
3. *“To cooperate with agencies that wish to conduct research in the Peterborough County Forest.”*
4. *“To take reasonable measures to make the Peterborough County Forest safe and accessible for a range of users.”*

The general management philosophy and approach to land stewardship for the County Forest continues in the same manner. The principles and objectives previously set remain applicable today. For further explanation and detail on each of the principles and objectives outlined above can be obtained from the 2000 forest management study.

It is worth noting that the relatively small size of the County Forest has placed limitations on the ability of the County to expand its levels of management and contributions to other land use activities.

It is also important to note that the County Forest has been financially self-sustaining in the past as a result of revenues derived from the forest being directed into a Forest Reserve Account. The financial resources have been used to support management planning and operational activities on the County Forest. It is recommended that this practice continue, that the account be protected and be used to sustain ongoing management activities on the County Forest.

5.2 Forest Management Objectives

5.2.1 Forest Operations Objectives and Recommended Strategies

The following are a set of objectives and strategies to direct and guide forest management activities and operations occurring within the boundaries of the County Forest. They are developed to compliment those established in 2000.

Objective(s):

1. **TO** ensure that both sustainable forestry practices and healthy ecosystems result from forest management operations and that all forest management activities are conducted in accordance with this plan.
2. **TO** maintain, enhance and where necessary restore the sustainability of ecological features of the County Forest.

Recommended Strategies:

1. Manage the forest in an ecologically responsible and sustainable manner.
2. Implement silvicultural practices to maintain a healthy and sustainable forest.
3. Employ all silvicultural tools to manage the forest resources and work toward providing a sustainable and predictable supply of forest products from the Peterborough County Forest.
4. Continue to encourage the utilization of poor quality and smaller sized forest products of all species for pulpwood or fuelwood by promoting efficient wood processing and making the best end use of all forest products.
5. Ensure operational audits are conducted in a timely and regular fashion.

5.2.2 Forest Renewal and Maintenance Objectives and Recommended Strategies

Objectives:

1. **TO** ensure that there are sufficient funds available to conduct and implement a sound resource management program and;
2. **TO** apply the most appropriate and cost effective silvicultural treatment to each forest site to ensure that the forest is regenerated adequately and quickly and;
3. **TO** ensure that all harvested lands are regenerated to the most silviculturally appropriate species by relying primarily on silvicultural systems that promote natural regeneration wherever possible and where necessary through artificial means.
4. **TO** maintain the productivity of this forested area.

Recommended Strategies:

1. Continue directing stumpage revenues into the Forest Reserve Account to ensure adequate funding is available to support silvicultural work.
2. Ensure that the areas allocated for harvest are completed in a timely fashion and in a manner to facilitate forest renewal efforts.
3. Employ appropriate silvicultural treatments to successfully regenerating the forest while ensuring that sound forest management and environmental practices continue on this tract of land.
4. Use a blend of appropriate silvicultural treatments (harvest, renewal, maintenance) over time to develop a more balanced age class distribution and the desirable mix of species.

5. Continue the practice of matching site conditions to desirable tree species and where necessary and appropriate restore the site to tree species that are better suited.

5.2.3 Biodiversity / Environmental Objective and Recommended Strategies

Objectives:

1. **TO** conserve and protect the long term health of the forest ecosystem ensuring that the genetic diversity of all species is maintained, that there is no loss of ecological units, that current biological diversity is not adversely affected and is restored where necessary and practical.

Recommended Strategies:

1. Implement an ecosystem based management approach.
2. Use certified tree markers to ensure other forest values are identified and that the appropriate measures are implemented to conserve, protect and/or enhance the value.
3. Improve wildlife habitats in conjunction with forest management operations such as maintaining conifer clumps in hardwood forests, and maintaining some hardwoods in conifer stands.
4. Place appropriate buffers on streams, wetlands, seepage areas and woodland pools.
5. Alter harvesting block size, patterns and distribution to enhance, maintain and create habitat diversity for a variety of wildlife species.
6. Promote species diversity through development and implementation of marking prescriptions that favour the retention and establishment of species that are under represented.
7. Implement a snag management program to maintain and create habitat for cavity nesting birds and animals by maintaining 6-8 den trees per hectare.
8. Maintain 7-8 mast trees per hectare (oak, beech, cherry) as sources of food for wildlife and for purposes of genetic diversity.
9. Make provisions for the retention of supercanopy trees. It is recommended that 1 supercanopy tree be retained for every 4 hectares.
10. Make provisions for downed woody debris when conducting forest management operations, particularly site preparation.
11. Recognize the importance of and providing protection for species at risk (endangered, species of concern, threatened and rare) where they are known to exist (flora and fauna).

12. Ensure that habitat requirements for species at risk and area sensitive species are made available through the provision of suitable forest types and considered during the pre-planning (prescription development) and operational phases.
13. Protect stick nests and provide suitable buffers to conserve and/or enhance habitat in the immediate and surrounding area.
14. Impose operational and/or seasonal controls, when necessary, in key forested areas to minimize conflicting uses of land, to minimize adverse impacts on the forest environment and life cycle needs of wildlife.
15. Ensure forest contractors operate in a responsible manner.

5.3.4 Integrated Resource Management Objective and Recommended Strategies

Objectives:

1. **TO** ensure that forest management provides for other uses of the forest and assists Peterborough County in achieving a range of resource management goals.

Recommended Strategies:

1. Implement an effective integrated resource management program.
2. Offer opportunities for other resource users to provide input and review forest management plans and proposals.
3. Implement approved provincial forest management guidelines for the protection and enhancement of other forest values and /or ecosystem features (deer, fisheries, pileated woodpeckers, cultural heritage, access roads and water crossings, biodiversity).
4. Keep roads and trails free of harvesting debris and post signs advising forest users of ongoing forest management operations.
5. Ensure that appropriate buffers or modifications to forest management activities are considered to maintain aesthetic values, health and safety of other forest users including seasonal limitations where necessary.

5.3.5 Forest Product Quality Objective and Recommended Strategies

Objectives:

1. **TO** ensure that sustainable forest management practices continually upgrade the quality of the forests and derived products while striving to increase the percentage of sawlog quality material.

Recommended Strategies:

1. Continue using certified tree markers to implement silvicultural prescriptions prepared by a registered professional forester.
2. Minimize logging damage to residual trees in forest stands that are to be harvested under a partial cutting system (selection, shelterwood) by employing directional felling techniques, restricting season of harvest, limiting the number of skid trails, placing restrictions on size and type of equipment and placing limits on the length of trees to be skidded as deemed necessary.

5.3.6 Other Objectives and Recommended Strategies

Objectives:

1. **TO** consolidate and expand the land holdings of Peterborough County Forest wherever possible.

Recommended Strategies:

1. Consider options to add to and/or consolidate the County Forest through property exchange(s) and/or acquisition(s) to consolidate PCF to enhance resource management goals (i.e. future recreational trail development, environmental protection of the Ouse Lake/Creek water system) where it can benefit the County

5.4 Resource Management Issues and Recommended Strategies

The following is a brief outline of the issues and concerns that the County needs to consider in furthering resource management activities on the Peterborough County Forest.

5.4.1 Markets-Forest Economy

The Canadian economy is suffering in one of the worst economic downturns experienced in many decades. The forest sector and related markets continue to be in a state of decline. Commercial harvesting and other operational delays are to be expected while the forest industry adjusts to the current economic climate. Revenues from the sale of standing timber will be lower than experienced in the recent past. Operations in the PCF may not be on a regular basis and will be dependant upon prevailing market conditions and the condition of the forest.

Objectives:

1. **TO** ensure the County receives fair value for the products generated from management activities.

Recommended Strategies:

1. Limit the number timber sales to accommodate the prevailing market conditions.

2. Continue using a competitive process in an attempt to optimize revenues while ensuring fair value for forest products
3. Continue working with traditional contractors, service providers to ensure consistency in the delivery of management and operational activities.
4. Implement the activities-operations outlined in the forest management plan to ensure forest sustainability objectives achieved.

5.4.2 Hunting

Hunting is not allowed in the Cavan Block and is monitored by the Ganaraska Region Conservation Authority who owns the lands surrounding the PCF property and does not allow hunting on their lands in the immediate vicinity. There are signs posted around the perimeter of this block identifying land use restrictions.

Hunting is not permitted in the Havelock Depot Block. Signage should be placed at strategic locations around this property to identify ownership, use restrictions and other key messages.

Hunting has been permitted in the Belmont-Dummer Block but is not regulated or controlled. Signs notifying visitors to this block of potential hunting activities are posted at several locations within the Belmont-Dummer Block.

There are two old hunt camps located in the Belmont-Dummer Block that are used by hunters. There are two to three portable camps that move into the Block and set up temporary hunting camps while another hunting group regularly rents the old County house. Temporary hunting camps normally set up across from the Wolf property and two camps in the north-west section of the Belmont-Dummer Block below the northern hydro line. The County receives no compensation from any of the hunting camps for use of the property.

There is growing concern surrounding safety issues, the number of hunters using the property, liability, illegal hunting and garbage.

Objectives:

1. **TO** ensure recreational activities are conducted in a safe and responsible manner to protect the County from unnecessary liabilities.
2. **TO** explore options to limit the County's liability if hunting is to continue in the Belmont-Dummer Block.

Recommended Strategies:

1. Request the existing hunters to organize themselves as a formal legally recognized hunt club And enter into an agreement with the County for Right of Use and Maintenance of the County Forest House.
2. Monitor hunting through a hunting registry system administered by the County

3. Consider limiting/ restricting access to the County Forest during certain hunting periods (e.g deer hunting season).
4. Encourage users of and visitors to the County Forest to report unlawful activities to the County and MNR Conservation Officers.
5. Encourage MNR Conservation Officers to patrol the property to ensure hunting activities are in compliance with the law and to ensure poaching is not occurring.
6. Monitor, maintain, update and replace signage on the County Forest properties to enhance awareness and to provide contact information.

5.4.3 Access Roads

The road network in the vicinity of the Cavan Block is extensive and managed by the Gananaska Region Conservation Authority. The Cavan Block is well accessed for management purposes and no immediate road maintenance or additional development is required. The Havelock Depot Block is used on a limited basis and access is not a priority. There are no immediate plans to develop additional access in this small block other than to conduct intermittent forest management activities.

The road network within the Belmont-Dummer Block is limited however, it services the property for its current use. This block has a single entry road at the south-end and it branches just past the County house and both roads run to the northern part of the block.

Road maintenance has been limited in the past to spot treatments by the County and/or by harvesting contractors. Some gravelling occurred in 2008 from the gate to the County house. The main road is in need of additional maintenance to remove encroaching vegetation and hazard trees, replacing old culverts and/or installing rock fords as well as gravelling.

The roads are being used by the public throughout the year and are susceptible to additional damage during the spring (break-up) and fall (freeze-up) periods.

Objectives:

1. **TO** improve and maintain the overall quality of the road network throughout the Belmont-Dummer Block for the benefit of all users within the scope of resource management objectives and whenever financially feasible.

Recommended Strategies:

1. Use funds generated from property management activities to support regular road maintenance and upgrading activities while seeking additional funding support where necessary.
2. Restrict forest management operations during critical periods to protect road infrastructure (i.e. freeze-up in fall, spring thaw) and where possible consider broader public restrictions and seasonal road closures to the PCF.

3. Replace old culverts with rock fords as required when water flow is minimal and ground conditions are suitable. Secure necessary permits as required.
4. Consider enhancing the road network in conjunction with harvesting operations to include strategic loops to provide additional recreational opportunities but preventing additional points of entry to the PCF.
5. Consider road improvements (gravelling, brushing) on sections of the road network north of the County house.
6. Consider expanding County Forest road maintenance activities to include a portion of the 12th Line (Dummer) during periods when forest management activities are taking place in the Belmont-Dummer Block to ensure the road is kept in good condition for the contractor and the residents.

5.4.4. Signage

Due to the limited access and points of entry to the Belmont-Dummer Block signage has not been an issue. The four signs (hunting notification) that are currently in place need to be refreshed and additional signs need to be strategically located on the property.

Ducks Unlimited has a sign at the entrance of the Belmont-Dummer Block and they may choose to refresh or remove the sign. DU projects have contributed to the overall diversity of the County Forest. The County should discuss with DU their interest in continuing their involvement in the Belmont-Dummer Block.

The Havelock Depot parcel is not well used, however signs delimiting the property and identifying uses restrictions (No Hunting, No Motorized Vehicles) are not in place.

The Cavan Block is signed at the perimeter with No Hunting, No Motorized Vehicles placards.

Objectives

1. **TO** increase public awareness of the County Forest and the permitted and restricted uses which currently exist.

Recommended Strategies

1. Replace old or damaged signs (hunting notification) and place additional signs in strategic locations (e.g. west-east ends of the two hydro lines) to ensure adequate coverage for all possible points of entrance to the Belmont-Dummer Block.
2. Consideration to be given to developing a sign board at the entrance of the Belmont-Dummer Block that includes information such as roads-trails, resource management messages, rules of the forest, use restrictions, emergency contacts etc.
3. Place appropriate signage at the Havelock Depot Block to identify property and use restrictions.

4. Monitor signs on all properties on a regular basis and replace and/or update as required.

5.4.5. Boundary-Property Lines

It is important to establish and maintain property boundaries to ensure resource management activities are contained within the PCF and that activities on adjacent lands do not encroach onto PCF property. Aerial imagery for the Belmont-Dummer Block shows evidence of old cut-out lines along some sections of this parcel. These are becoming less evident on the ground and it would be reasonable to refresh and/or mark these lines before they become completely overgrown. The Havelock Depot parcel was harvested approximately 15-20 years ago and boundary lines have faded and should be refreshed.

The boundaries of the Cavan Block are generally well defined and do not require refreshing at this time.

Objectives

1. **TO** refresh the boundary lines of the Belmont-Dummer and Havelock Depot Blocks to limit the potential occurrences of trespassing.

Recommended Strategies

1. Use GPS mapping technology, air photos, survey information and individuals knowledgeable of the property to assist in locating and refreshing the boundary lines with paint and/or placards.
2. Engage and co-operate with adjacent landowners.
3. Monitor boundary lines and signage (where it exists) on a periodic basis and refresh/replace as required.

5.4.6. County House

The County house is located in the central portion of the Belmont-Dummer Block. It has not been maintained for many years. It has been vandalised many times and is rented periodically by local hunters during the deer hunting season. It is in poor condition and may pose health and safety issue and expose the County to unnecessary risks. The County house may be used to meet broader resource management and awareness goals of the County but would take considerable capital investment to bring it up to the building code, to maintain it and protect it from vandalism.

Objectives:

1. **TO** limit the exposure to the County from unnecessary risks associated with the vacant structure in the Belmont-Dummer Block.

Recommended Strategies:

1. Review the status of the County house and take appropriate actions to repair or decommission the structure.

5.4.7. Unauthorized Activity

Some unauthorized activities are taking place in the Belmont-Dummer Block. This includes but not limited to the dumping of garbage, cutting of fuelwood, campfires and youth gatherings at the county house and gate, poaching, and other illegal activities.

Objectives

1. **TO** eliminate the occurrence of unauthorized activities in the County Forest.

Recommended Strategies

1. Limit the development of new roads on the property to control access especially along the edge of the property to prevent the creation of unauthorized points of entry into the County Forest.
2. Consideration should be given to other access control measures (i.e. gate closures).
3. Establish a monitoring-reporting program and inform the necessary officials to secure their support to patrol-monitor the property on a regular basis including weekends.
4. Investigate other ways in which the County can foster partnerships to enhance and facilitate the monitoring of the County Forest that may include but not limited to stakeholders, municipalities, MNR, OPP.
5. Post signs with contact numbers where the public and users of the County Forest can report unauthorized activities.

6.0 REPORT OF PAST FOREST MANAGEMENT OPERATIONS

A series of tables have been prepared outlining the past forest management activities that have taken place in the County Forest. These tables are in the same format that has been used to report management activities over the past ten-year period from 2000 to 2009. Information was obtained from Annual Work Reports and the five-year summary Report of Past Operations (2000-2004, 2005-2009).

Maps showing the specific areas treated in the past can be seen in Appendix 4. Similar tables and maps for the following five-year operating periods can also be found in this appendix.

- 2005-2009; 2000-2004; 1995-1999; 1990-1994

The following is a brief discussion of the results.

6.1 Report of Past Forest Management / Silvicultural Activities

Trends in total forest management activity over a twenty-year period are presented in Table 8 show a positive trend demonstrating the County's commitment to actively managing the forest. The increase in management can be attributed to the following;

- preparing, implementing sustainable resource management plans, conducting activities in accordance with good forestry practices,
- the successional development of the forest and its response to sustainable silviculture,
- implementing a broader range of management activities (harvest, renewal activities such as site preparation and tree planting, as well as forest maintenance activities including tending, spacing, pruning and thinning).

Revenues from the sale of forest products have shown a steady increase over time. This is a result of;

- using forest consultants to plan, implement and monitor management operations,
- finding better markets for all products (firewood, pulpwood, sawlogs, veneer and poles) and utilizing a competitive timber sale process,
- better utilization of products and adhering to best end use principles,
- better yields and applying management to a broader range of for cover types

Cost figures for management were not available for the 1990-94 and 1995-99 operating periods. Given the forest management partnership that the County had with Domtar during that time frame it is quite likely that the cost were covered by Domtar as part of their Woodlot Management Program. In 2000-04 cost were low due to the continuing relationship with Domtar. However, in the 2005-09 operating period cost increased and is explained by;

- the County upgrading and maintaining the access roads on a more regular basis,
- implementing a broader range of management activities including site preparation, tree planting, tending and thinning,
- the delivery mechanisms between the County and Domtar-Trenton for forestry services changed (now provided by Norampac-Trenton) in 2005 and the County is having to cover more of the actual costs of management than in previous years. Services are still provided at a reduced rate but are no longer free as they were before. Additional changes may occur in the near future.

Table 8 Past Forest Management Trend by 5-Year Operating Period

Management Item	Operating Period			
	1990-1994	1995-1999	2000-2004	2005-2009
Total Management (ha)	215.2	359.2	370.0	501.6

Actual Management Cost	N/A	N/A	\$ 2,996	\$ 84,959
Total Revenue	\$ 55,959	\$ 104,359	\$ 119,586	\$ 317,864

Table 9 provides a summary of the specific forest management work that took place during 2000-2009. The work is broken by each of the general activity types implemented within the various forest cover types / forest units present in the County Forest. A total of 871.6 hectares received a management treatment over the past ten-year period. The harvest and treatment levels during this period are consistent with those levels prescribed in previous management plans. The County met and/or exceeded silvicultural treatment targets established in the 2000-2009 period. The County conducted slightly less harvesting than forecasted and more forest renewal (planting) activities. However, overall silvicultural targets-objectives were achieved.

As previously mentioned, figures are further broken done into five-year operating periods and can be found in Appendix 4.

6.2 Report of Expenditures for Forest Management / Silvicultural Activities

Table 10 shows the direct and indirect expenditures to implement the forest management program during the 2000-2009 operating period.

Indirect costs are those incurred by the forest management delivery agent (Domtar, Norampac-Trenton). These are costs associated with delivering the components of Norampac's Woodlot Management Program and Norampac's ongoing contribution to the management of the Peterborough County Forest. Indirect costs for this operating period were approximately \$56,089 and considered to be in-kind contributions to the overall management of the County Forest by the forest management delivery agents.

Direct costs are those actually spent by Peterborough County on specific silvicultural-management activities conducted on the property under the guidance of the operating plan and supervision of the delivery agents. The direct cost of forest management (planning, operations, roads etc) over the ten-year period was \$87,955.

Peterborough County has developed a silvicultural component in their budgeting process that has been used, as required, to fund silvicultural projects on the County Forest. It is recommended that this practice continue to enable the County to meet the management needs of the forest.

This report does not include road maintenance costs conducted by harvesting contractors as part of their operations (i.e. grading, gravelling, minor construction).

Figures are further broken done into five-year operating period and can be found in Appendix 4.

6.3 Summary of Harvest Volume and Stumpage Values

Table 11 shows the volume and revenues secured by Peterborough County over the past ten-year period from the forest products derived and sold from the harvesting-thinning activities. The figures are broken down by species and product type for operating period.

A total of \$ 437,450 was received during the 2000 - 2009 operating period for all forest products produced from sustainable management operations. Almost 50% of the revenue (\$217,989) came from a single plantation thinning operation in the Cavan Block during 2008 that produced a range of forest products including utility poles and sawlogs. The remaining revenue was generated from regular operations that produced pulpwood (\$64,685) and sawlogs (\$143,989).

There were 1.523 million board feet of sawlogs produced, a total of 11,325.1 GMT (green metric tonnes) of hardwood pulpwood produced, and 4,141.8 GMT of other products (pine poles, softwood pulpwood, cedar posts) harvested from the County Forest during the 2000 - 2009 period.

Figures are further broken down into five-year operating period and can be found in Appendix 4.

The County Forest continues to generate a modest profit given the relative size of the property and the scale-intensity of management activities. It is expected that this trend will continue over the next planning period. It is clear that sustainable forest management operations offer long-term financial and environmental benefits.

Table 9 Ten-Year Summary Report of Forest Management / Silvicultural Activities for the Period January 1, 2000 to December 31, 2009

Activity	FOREST UNIT (Hectares)							TOTAL	
	PNU	PNS	MXC	THS	THU	IHC	OTHER	2000-2009	10 Yr Forecast 2000-09
Harvest									
Selection	0.0	4.0	0.0	31.2	0.0	14.1	0.0	49.3	24.2
Shelterwood - Preparatory	92.5	13.8	0.0	5.0	0.0	0.0	0.0	111.3	166.4
- Seed	26.1	0.0	0.0	0.0	0.0	3.2	0.0	29.3	11.6
- Removal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Clear Cut - Patch	0.0	0.0	0.0	0.0	0.0	11.0	0.0	11.0	12.8
- Strip	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Seed Tree	10.0	25.4	0.0	0.0	0.0	5.0	0.0	40.4	66.0
Sub-Total	128.6	43.2	0	36.2	0	33.3	0.0	241.3	281.0
Renewal									
Mechanical SIP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scarification	10.0	4.0	1.2	0.0	0.0	0.0	0.0	15.2	21.0
Prescribed Burn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Planting	38.9	8.0	0.0	0.0	0.0	0.0	0.0	46.9	0.0
Sub-Total	48.9	12	1.2	0	0	0	0.0	62.1	21.0
Maintenance									
Cleaning - Manual	5.0	5.0	0.0	0.0	0.0	0.0	0.0	10.0	36.2
Cleaning - Chemical	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thinning / Spacing	71.2	44.6	1.8	0.0	7.1	10.0	0.0	134.7	127.0
Pruning	0.0	0.0	0.0	0.0	0.0	10.0	0.0	10.0	0.0
Sub-Total	76.2	49.6	1.8	0	7.1	20	0.0	154.7	163.2
Protection									
Pest Control - Ground	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- Aerial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL SILVICULTURE									
	253.7	104.8	3.0	36.2	7.1	53.3	0.0	458.1	465.2
Marking									
Harvest	136.8	70.2	0.0	36.2	0.0	33.3	0.0	276.5	281.0
Maintenance	71.2	46.9	1.8	0.0	7.1	10.0	0.0	137	127.0
Total Marking	208	117.1	1.8	36.2	7.1	43.3	0.0	413.5	408.0
TOTAL MANAGEMENT	461.7	221.9	4.8	72.4	14.2	96.6	0.0	871.6	873.2

Forest Units are described in Section 7.

Table 10 Ten-Year Summary Report of Expenditures for Forest Management / Silvicultural Activities for the Period January 1, 2000 to December 31, 2009 (\$ Dollars)

Activity	FOREST UNIT							TOTAL	
	PNU	PNS	MXC	THS	THU	IHC	OTHER	2000-2009	10 Yr Forecast 2000-09
Indirect Expenditures									
Marking - Harvest	10,630	2,645	0	1,890	0	1,203	848	\$17,216	\$19,687
- Maintenance	35	1,175	0	0	483	750	0	\$2,443	\$4,775
Block Layout	1,784	489	50	445	177	387	380	\$3,712	\$3,039
Monitoring	4,643	2,235	0	1,140	325	420	5,450	\$14,213	\$4,913
Assessment	687	366	0	210	50	0	1,225	\$2,538	\$2,663
Planning / Reporting	540	325	0	185	75	25	14,817	\$15,967	\$5,000
Total Indirect Costs	\$18,319	\$6,910	\$50	\$3,870	\$1,035	\$2,760	\$22,720	\$56,089	\$40,077
Direct Expenditures									
Renewal									
Mechanical SIP	0	0	0	0	0	0	0	\$0	\$0
Scarification	2,730	0	266	0	0	0	0	\$2,996	\$3,979
Prescribed Burn	0	0	0	0	0	0	0	\$0	\$0
Planting	10,373	11,500	0	0	0	0	0	\$21,873	\$0
Sub-Total	13,103	11,500	266	0	0	0	0	\$24,869	\$3,979
Maintenance									
Cleaning - Manual	1,250	900	0	0	0	0	200	\$2,350	\$15,395
Cleaning - Chemical	0	0	0	0	0	0	0	\$0	\$0
Thinning / Spacing	0	0	0	0	0	2,500	0	\$2,500	\$11,028
Pruning	1,350	0	0	0	0	0	0	\$1,350	\$0
Sub-Total	2,600	900	0	0	0	2,500	200	\$6,200	\$26,423
Protection									
Pest Control - Ground	0	0	0	0	0	0	0	\$0	\$0
- Aerial	0	0	0	0	0	0	0	\$0	\$0
Sub-Total	0	0	0	0	0	0	0	\$0	\$0
Total Direct Costs									
	\$15,703	\$12,400	\$266	\$0	\$0	\$2,500	\$200	\$31,069	\$30,402
Other									
Management Fees	0	0	0	0	0	0	20,185	\$20,185	\$4,000
Roads	0	0	0	0	0	0	28,475	\$28,475	\$5,000
Misc	0	0	0	0	0	0	8,226	\$8,226	\$2,000
Total Other Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$56,886	\$56,886	\$11,000
TOTAL MANAGEMENT COST	\$34,022	\$19,310	\$316	\$3,870	\$1,035	\$5,260	\$22,920	\$144,044	\$81,479

Actual cost to Peterborough County for the management of the County Forest for the 10-year period 2000-2009 [Total Mgt Cost less Total Indirect Cost].
 Forest Units are described in Section 7.

\$87,955

Table 11 Ten-Year Summary Report of Harvest Volumes and Stumpage Revenues for the Period January 1, 2000 to December 31, 2009

Year / Period	Area (Ha)	Products	Unit of Measure	Total Stumpage	Total Volume	Softwood						Total Sftwd	Hardwood						Total Hdwd				
						Pw	Pr	He	Sw	Ce	Bf/OC		Mh	Ms	Be	Bd	Or	Aw/OH		Po	Bw		
2000-2004	176.2	TOTAL	Pulp	GMT	\$32,671.57	6760.7	587.0	0.0	0.0	0.0	0.0	30.0	617.0	6.5	16.0	0.0	39.7	26.1	6.6	5850.9	197.9	6143.7	
			Sawlogs	MBM	\$81,657.85	652.4	391.2	82.3	0.0	41.9	33.9	0.0	549.3	10.4	0.5	0.5	7.7	19.2	4.1	52.1	8.5	103.1	
			Other	GMT	\$5,256.57	933.2	0.0	872.9	0.0	6.3	0.0	0.0	879.2	54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.0
					\$119,585.99																		
					10955.8	m3 <= converted volumes																	
2005-2009	188.8	TOTAL	Pulp	GMT	\$32,013.65	4564.5	246.7	877.3	0.0	35.4	0.0	149.4	1308.9	139.0	0.0	0.0	0.0	0.0	0.0	3116.6	0.0	3255.6	
			Sawlogs	MBM	\$62,331.74	870.4	225.2	546.9	0.0	48.1	2.9	1.2	827.4	0.5	0.0	0.0	0.5	1.1	0.3	34.7	5.8	43.1	
			Other	GMT	\$223,519.12	3208.6	0.0	2779.8	0.0	0.0	183.4	0.0	3027.6	181.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	181.0
					\$317,864.51																		
					12125.1	m3 <= converted volumes																	
10 YEAR TOTAL	365.0	TOTAL	Pulp	GMT	\$64,685.22	11325.1	833.6	877.3	0.0	35.4	0.0	179.4	1925.8	145.5	16.0	0.0	39.7	26.1	6.6	8967.5	197.9	9399.3	
			Sawlogs	MBM	\$143,989.59	1522.8	616.4	629.3	0.0	89.9	36.8	1.2	1376.7	10.9	0.6	0.5	8.2	20.4	4.5	86.8	14.4	146.1	
			Other	GMT	\$228,775.69	4141.8	0.0	3652.7	0.0	6.3	183.4	0.0	3906.8	235.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	235.0
					\$437,450.50																		
					23080.8	m3 <= converted volumes																	

Total Revenues **\$437,450.50**
Net Costs **\$87,955.00**
Net Revenues **\$349,495.50**

7.0 FOREST MANAGEMENT AND SILVICULTURE

7.1 Silvicultural Systems

The principle means by which timber management objectives are achieved is through the application of silvicultural systems. Silviculture may be described as the theory, science and art of controlling forest establishment, development, composition and reproduction. The practice of silviculture involves various treatments to maintain and enhance the productivity of forest stands in addition to controlling and manipulating the above. A silvicultural system is the process by which the forest is managed (harvested, renewed, maintained).

A sound working knowledge of the nature of forest tree species and how they grow, reproduce and respond to environmental changes enables managers to critically assess site and forest stand conditions. Management systems can be adopted which will best suit the forest species and surrounding environment. Employing sound silvicultural treatments will result in the creation and development of productive forest stands which will be of the type and nature necessary to satisfy management objectives.

One of the most important functions of silviculture is to promote the compositional development of the forest stand to those species that are best suited to the local sites. Inferior tree species and poorly formed stems occur in most forest stand situations. These individuals grow at the expense of desirable trees therefore efforts to control their numbers will be made. This is achieved primarily through the control of harvesting activities. It is recognized that poorly formed and declining trees have their place in the ecosystem and although efforts to control their numbers are proposed they will not be eliminated from the forested landscape.

Altering the intensity and timing of extraction operations will result in the control of undesirable stems, and the progression towards the development of productive forest stands containing vigorous individuals well suited to grow on that particular site. Harvest control can also produce environments that are more suitable for the establishment and growth of a particular tree species over another. This in turn can be used to develop a high quality forest.

Forest stands containing too many or too few trees are unable to meet timber objectives and either extreme can be detrimental to timber production goals. The application of silvicultural knowledge enables managers to sustain proper stocking levels in forest stands throughout its life. This will optimize the rate of growth, maintain a positive wood production picture and produce desirable forest products. Basal area control is achieved through thinning regimes that are conducted at various intervals throughout the life of the stand. This type of control is addressed in the following sections.

Stand establishment is another major function of silvicultural practices. As previously mentioned, manipulation of the harvest will tend to favour the establishment of some species over others. Employing partial or complete overstory removal will achieve this. Furthermore, preparing the site to receive natural tree seed or artificial planting stock is an accepted and recommended practise in Ontario. Site preparation techniques such as mechanical and chemical in addition to prescribed burning attempt to create conditions favourable for the establishment and early growth requirements of desirable tree species.

Three basic approaches have been developed over the years to successfully establish and maintain different forest types. These systems compliment the natural forces of establishment, growth, competition and decline that are at work in the forest, to achieve the desired outcomes. They are flexible and thus allow for protection and enhancement of other forest values and uses.

The following timber management systems are the basic techniques used to establish, maintain and improve the different forest types found in Ontario and will be utilized in the management of the forests of Peterborough County.

1) Selection System

The selection system is ideally suited to the tolerant hardwood forest type and in areas where a high degree of forest cover is beneficial to other forest values and uses.

Trees are commonly removed either as single individuals or in small groups, at relatively short time intervals (10-20 years). The choice of single vs group selection is dependent upon the objectives of the stand and the species present or desired in the forest. These periodic harvests create a forest containing trees of all sizes and ages.

Trees of all ages are harvested including those that are defective, over mature and those trees competing with others of greater potential value. Some poor quality trees are retained in the stand to provide specific biological and ecological functions (snags, cavity –den trees etc). This improves the quality and the health of the remaining forest.

In maple, beech and hemlock forest mixtures, most species present will grow and reproduce in the shade of other trees. Regeneration develops from natural seed or seedling sprouts in the small openings created.

2) Shelterwood System

The shelterwood management system is used to regenerate tree species that have light requirements between that produced by the selection and clearcut management systems. The amount of light available to the regenerating trees is managed by a series of cuts. The first cut leaves a partial cover of the best trees to provide seed and the necessary shade to obtain and develop regeneration. Once seedlings have established the "overstory" is further reduced and / or removed completely to allow the new forest to grow unimpeded.

By having the new forest in place before the partial cover is removed, the forests under this management system maintain their aesthetic appeal and cover for wildlife. This is a useful system for regenerating species such as white pine, hemlock, red oak and yellow birch. This system can also be utilized in the management of some tolerant hardwood forests. Forests managed under this system normally contain trees that are approximately the same age.

Both the selection and shelterwood timber management systems utilize natural regeneration to renew the forest although artificial measures may be used to supplement natural regeneration.

The uniform shelterwood system will be the preferred technique to be used in the Peterborough County Forest, however, the strip shelterwood system may be employed for some stand types.

3) Clearcut System

When this system is employed all merchantable trees are removed at one time. This type of harvesting system is well suited for species requiring full sunlight to establish and grow. Regeneration may come naturally from seed present on the forest floor or sprouts from the cut stumps or artificially by planting.

The clear cutting system is normally used when we wish to manage for light-demanding species such as poplar, white birch and red pine. The size of the cut patches, their distribution and pattern will be controlled to meet additional resource management objectives.

Specific trees (species, size, quality) can be strategically retained to provide additional regeneration options as well to provide for both the species and structural diversity of the future stand. These trees are called "seed trees" or "standards". This technique will be utilized wherever possible.

The *Silvicultural Guide for the Tolerant Hardwood Forest* (OMNR 1998) and the *Silvicultural Guide for the Great Lakes St-Lawrence Conifer Forest* (OMNR 1998) and the *Silvicultural Guide to Managing Southern Ontario Forests* (OMNR 2000) in Ontario provide excellent discussions of these silvicultural systems.

Silviculture plays a major role in forest management. It is recognized that there may exist situations where the normal silvicultural system does not fit the forest condition. In these situations, deviations from the established system may result and are recommended where necessary to meet forest management objectives and the individual needs of each forest stand.

To ensure that silvicultural prescriptions are implemented properly and that the appropriate treatments are applied in the field under variable site / stand conditions, only trained individuals and certified tree markers should be permitted to conduct tree marking activities within the County Forest. This will also assist in the proper identification of other forest values and the application of the appropriate resource management guidelines. Trained tree markers will ensure that an array of resource management objectives are met and further the practice and principles of sustainable forestry. The appropriateness of each prescription should be evaluated for all sites scheduled for treatment during the implementation of this plan.

7.2 Silvicultural Ground Rules for Normal Operations

As part of the forest inventory process all individual stands were assigned to a forest unit to facilitate the organization and management of the forest cover types in the County Forest. A forest unit is defined as "an aggregation of stands which are to be managed under the same rotation and silvicultural system". Forest units can be comprised of stands from a number of working groups / covert types as long as they are managed in a similar fashion. In the previous management plan a total of six forest units were recognized and the forest inventory was updated to reflect this stand attribute.

Stands were assigned to forest units based on the composition of the overstory. Other stand features / parameters such as structure, quality, regeneration, soil are not considered at this point but are taken into consideration at the time of prescription development and management

implementation to ensure the treatment is appropriate for the stand-site conditions and the objectives of the forest stand.

The forest units and the silvicultural system to be applied are listed below. These treatment options - prescriptions are accepted management practices and are consistent with sustainable forestry. The criteria used and the management system to be used is described in more detail in Section 7.5 (sustainable timber supply).

Table 12 Silvicultural System by Forest Unit

Abbrev.	Forest Unit		Silvicultural - Management System	Cover Type / Working Groups
	Name			
1. PNU	Pine		Uniform Shelterwood	Pw, Pr, Pw/r
2. PNS	Pine/Spruce		Seed Tree / Clear Cut	Pr, Pw
3. THS	Tolerant Hardwood		Selection	Mh, Be, Bd, By, He
4. THU	Tolerant Hardwood		Uniform Shelterwood	Or, Aw, Cbl, Hi, Mh, By
5. IHC	Intolerant Hardwood		Clear Cut-Patch	Po, Bw, Ms
6. MXC	Mixed Conifer		Clear Cut-Strip	Ce, Sp, B, L

7.3 Operational Strategies for Areas of Concern

A number of resource features can be encountered when performing forestry operations. It is important that individuals involved with the planning and implementation of these operations have the knowledge to identify and modify operations accordingly to conserve and enhance the resource features encountered. Listed below are a series of resource management guidelines produced by the Ministry of Natural Resources that are to be considered when planning and implementing this operational plan to conserve areas of concern (see references in the appendices).

Environmental, Water Quality Guidelines

- Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales
- Timber Management Guidelines for the Protection of Fish Habitat
- Forest Management Guidelines for the Protection of the Physical Environment
- Environmental Guidelines for Access Roads and Water Crossings
- Code of Practice for Timber Operations in Riparian Areas

Mammal Guidelines

- Forest Management Guidelines For The Provision White-tailed Deer Habitat
- Forest Management Guidelines for the Provision of Marten Habitat
- Guidelines for Providing Furbearer Habitat in Timber Management
- *Raptor, Bird Guidelines*
- Guidelines for the Protection of Red-Shouldered and Cooper's Hawk Nesting Sites.
- Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat
- Management Guidelines For The Protection Of Heronries in Ontario
- Management Guidelines And Recommendations For Osprey in Ontario
- Guidelines For The Protection of Forest-Nesting and Wetland Nesting

- Habitat Management for Ontario's Forest Nesting Accipiters
- Habitat Management Guidelines for Cavity-Nesting Birds in Ontario
- Habitat Management Guidelines for Waterfowl

Other Resource Value, Socio-Economic Guidelines

- Incorporating Biodiversity in Timber Management Plans
- Timber Management Guidelines for the Protection of Natural Heritage Values
- Timber Management Guidelines for the Protection of Tourism Values

A summary of Area of Concern Strategies and Forest Conservation Measures for the Peterborough County Forest has been prepared and can be found in Appendix 3.

7.5 Sustainable Timber Supply

7.5.1 Background

The determination of the long-term sustainable timber management is an important part of the forest management planning process. Equally important is the allocation process that identifies candidate areas to receive treatment or sites to be selected for treatment over a period of time.

Controlling harvest and treatment levels is an important tool to ensure the balance of growth and harvest is maintained and that the forest remains healthy. Planning and scheduling activities also helps to achieve many forest management objectives such as providing a variety of habitat types, producing a range of stands across the successional spectrum and to provide for a predictable supply of forest products on a sustainable basis.

The Peterborough County Forest is a relatively small forest and forests of this size do not normally lend themselves to strict forest regulation strategies. However, the following analysis was conducted to provide a benchmark to ensure harvest-thinning levels are consistent with sustainable forestry principles and to be used as a guide in allocating forest stands for treatment.

Calculations were also provided under the previous management plan and used in a similar manner. The previous calculations were performed using the model MADCALC Version 5.0.0 (Ontario Ministry of Natural Resources) with some local modifications specific to the Peterborough County Forest. A different model was used for this planning period. The BOREAL model utilized for this plan and is described as a tactical planning system for forest ecosystem management.

Silvicultural Systems and Forest Yield

Forest cover types are grouped according to the silvicultural systems and treatments that will be applied to achieve management objectives. These are referred to as forest units and are defined as “an aggregation of stands which are to be managed under the same rotation and silvicultural system”. Forest units can be comprised of stands from a number of working groups / cover types provided that they are managed in a similar fashion. Six forest units have been recognized in the Peterborough County Forest. Forest stands were assigned to a forest unit based on the species composition of the overstory, and the structure, quality, and regeneration status. Table 13 provides a summary of the forest units and the criteria used to assign stands to forest units. Map 9 (Forest Units) illustrates how the distribution of the forest units within the County Forest.

A variety of silvicultural systems are used in managing the timber resources of the Peterborough County Forest including (i) 2-, and 4-step uniform shelterwood, (ii) uneven-aged single tree and group selection, (iii) even-aged clearcut with standards, and (iv) even-aged clearcut strip/patch. The *Silvicultural Guides for the Tolerant Hardwood Forest* (OMNR 1998a) and the *Great Lakes St-Lawrence Conifer Forest* (OMNR 1998b) in Ontario provide excellent discussions of these silvicultural systems¹.

Following *Plonski* (1974²), yield tables were developed for each forest unit. This procedure involved two components: (1) estimating yield functions and (2) creating yield tables which reflect the average stocking of stands in the forest.

Yield functions were estimated from Plonski's normal yield tables for each forest unit by regressing gross merchantable volume (GMV) on basal area (BA). A linear model of the form:

$$GMV = \beta_1 + \beta_2 (BA) \quad (1)$$

provides a satisfactory fit of the relationship. Where:

β_1 is a constant and β_2 is the estimated coefficient on the explanatory variable basal area (BA).

The yield function from equation 1, is used to estimate yield given the average stocking for stands in the forest unit. Thus:

$$Y_n = \beta_1 + \beta_2 (BA_n) * (\text{Avg. stocking}) \quad (2)$$

where: Y_n = Yield (m^3) at age n , and BA_n = normal basal area at age n .

The yield tables were used to determine harvest volumes based on silviculture specifications and management criteria that have been implemented in the County Forest as outlined in Table 14.

¹ OMNR. 1998a. A silvicultural guide for the tolerant hardwood forest in Ontario. Ont. Min. Nat. Resour. Queen's Printer for Ontario. Toronto. 500p.

OMNR. 1998b. A silvicultural guide for the Great Lakes St-Lawrence conifer forest in Ontario. Ont. Min. Nat. Resour. Queen's Printer for Ontario. Toronto.

² Plonski, W.L. 1974. Normal Yield Tables (Metric). Ont. Min. Nat. Res. Toronto, Ontario. 40 p.

Table 13 Forest Unit Description Summary

FOREST UNIT		MANAGEMENT SYSTEM	CRITERIA
NAME	ABB.		
Pine Shelterwood	PNU	Uniform Shelterwood 4-staged	<ul style="list-style-type: none"> • all Pw stands • Pw, Pr, Sp, He mixes where combined BA equal to or greater than 12m²/ha • Sp and Ce stands if Pw, Pr, He composition is 40% or greater • Po, Bw stands if primary conifer composition (Pw, Pr, He, Sp) greater than 40% • All Pw, Pr, Sp stands where Pw regeneration present • Working Groups/Cover Types: Pw, Pr, Sp, He, including plantations
Pine/Spruce	PNS	Clear Cut - Seed Tree	<ul style="list-style-type: none"> • Pr, Pw and Sp stands if Pw, Pr, Sp, He BA less than 12m²/ha (@ primary conifer <40% of composition) • All Ps, Pj stands • Po, Bw stands if Pw, Pr, Sp, He BA greater than 8 m²/ha (@ primary conifer composition 30% or greater) • Any red pine, Scot's pine, jack pine, spruce stands where white pine regeneration was absent • Working Groups/Cover Types: Pw, Pr, Sp, including plantations
Tolerant Hardwood- Uneven Aged	THU	Selection	<ul style="list-style-type: none"> • all Mh/s stands, • plus Or, He, Ms, Po stands where Mh, Be, Bd, By composition > 40% • site classes X, 1, 2 • Working Groups/Cover Types: Or, Aw, Cbl, Hi, Mh, By
Tolerant Hardwood-Even Aged	THE	Uniform Shelterwood 2-staged	<ul style="list-style-type: none"> • site class 3 Mh/s stands, or those lacking quality potential • all Or stands where Mh, Be, Bd, By composition <40% • Po, Bw stands where Mh, Be, Bd, By composition > 40% • He stands where Mh, Be, Bd, By composition is 40% or less • Working Groups/Cover Types: Mh, Be, Bd, By, He
Intolerant Hardwood	IHC	Clear Cut - Patch / Seed Tree	<ul style="list-style-type: none"> • Po, Bw stands where Mh, Be, Bd, By composition is 40% or less • Ms stands where tolerant hardwood composition 30% or less • Working Groups/Cover Types: Po, Bw, Ms
Mixed Conifer	MXC	Clear Cut - Patch / Strip	<ul style="list-style-type: none"> • Ce, Sp, B, L stands • primary conifers (Pw, Pr, He) must be 30 % or less • Working Groups/Cover Types: Ce, Sp, B, L

Table 14 Silvicultural Systems and Management Criteria - Peterborough County Forest

Forest Units	Silvicultural System	Rotation / Cutting Cycle (yrs)	Regeneration Period (yrs)	Thinning Stages	% Basal Area Cut	Basal Area Growth Factor in Managed Stands
PNS-Pine/Spruce (e.g. Pine, Spruce, Larch, includes plantations)	Seed Tree	100	1	<ul style="list-style-type: none"> 1st thinning at age 40 Subsequent thinning at age 50, 60, 70, 90 Stand may convert to pine shelterwood-PNU, 	1 st - 25% Subsequent 30% Final 75%	0.85 m ² /ha/yr after 1 st thinning 0.35 m ² /ha/yr after subsequent thinnings
PNU-Pine Shelterwood (i.e. Pine, includes plantations)	Uniform Shelterwood 4-cut	140	5-10	<ul style="list-style-type: none"> 1st thinning at age 50 2nd thinning at age 65 Prep cut at age 90 Seed cut at age 110 Release cut at age 130 Final cut at age 140 Stand remains as pine shelterwood - PNU 	1 st and 2 nd - 30% Prep - 40% Subsequent 50% Final 90%	0.18 m ² /ha/yr
MXC-Mixed Conifer (ie. Cedar, Spruce, Larch, Balsam)	Patch/Strip Cut with standards	120	5-10	<ul style="list-style-type: none"> 1st thinning at age 60 2nd thinning at age 80 Final thinning at age 100 Stand may convert to tolerant hardwood even aged-THE 	1 st - 30% 2 nd - 50% Final - 90%. Retain 4m ² /ha.	0.18 m ² /ha/yr
THS-Tolerant Hardwood-Selection (i.e. Red oak, Sugar maple, White ash, other hardwoods)	Selection	20-25	1	<ul style="list-style-type: none"> managed under an all-aged or uneven-aged management system 	1/3 basal area reduction at any one time	0.24 m ² /ha/yr
THU-Tolerant Hardwood-Uniform Shelterwood (i.e. Red oak, Sugar maple, White ash, other hardwoods)	Uniform Shelterwood 4-cut	120	5-10	<ul style="list-style-type: none"> 1st thinning at age 70 2nd thinning at age 90 3rd thinning at age 110 Final thinning at age 120 Stand remains as tolerant hardwood even aged-THE 	1 st - 30% 2 nd - 30% 3 rd - 30 Final - 90%.	0.18 m ² /ha/yr
IHC-Intolerant Hardwood (i.e. Poplar, White birch, Red maple)	Patch Cut with Standards	80	1	<ul style="list-style-type: none"> Final thinning at age 70 Stand remains as intolerant hardwood-IHC 	Final - 80%. Retain 4 m ² /ha	0.45 m ² /ha/yr

A summary of the age class distribution of the forest units in the County Forest is presented in Table 15. These were used as input items for determine sustainable harvest levels.

Table 15 Forest Unit Area by Age Class

Age Class (yrs)	FOREST UNIT (hectares)						TOTAL
	MXC	PNU	THS	THU	PNS	IHC	
1-10	12.6	10.4	7.2	0.0	2.6	4.5	37.4
11-20	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-30	1.1	0.7	0.0	0.0	6.7	1.1	9.6
31-40	1.1	1.5	12.7	0.0	28.0	8.2	51.5
41-50	30.9	1.5	29.3	0.0	105.6	28.4	195.7
51-60	161.0	18.4	25.0	4.0	58.4	126.0	392.7
61-70	196.1	119.3	54.3	0.0	13.1	23.1	405.9
71-80	118.8	60.2	36.0	3.0	44.5	79.8	342.3
81-90	27.6	71.9	120.0	21.0	2.1	16.2	258.9
91-100	25.4	25.3	3.8	8.3	17.1	0.0	79.9
101-110	4.9	66.0	0.0	0.0	0.0	0.0	71.0
111-120	0.0	17.9	0.0	0.0	0.0	0.0	17.9
121-130	0.0	9.1	0.0	14.6	0.0	0.0	23.8
131-140	0.0	1.1	0.0	0.0	0.0	0.0	1.1
Total	579.6	403.4	288.3	50.9	278.0	287.3	1887.6

7.5.3 Sustainable Timber Supply Policies

The long-term sustainable timber supply for the Peterborough County Forest is estimated following the approach described in “BOREAL: A tactical planning system for forest ecosystem management” (Puttock et al. 1998³). The system projects outcomes of management alternatives in terms of sustainable harvest levels, harvest schedules, and future forest conditions. System components include descriptive statistics and other information that describe the state of the forest, silvicultural systems and yield tables, and various policy scenarios.

The BOREAL planning system is driven by a number of user-defined policies and criteria for sustainable forest management. These include one or more policy objectives and management constraints, a planning horizon and planning cycle, and required outcomes from the timber supply analysis.

A 100-year planning horizon was established with 10-year planning cycles. The outcomes of the analysis included volume and area harvested by period. Harvesting was assumed to take place at the beginning of each period.

A single management policy to optimize timber production over the 150 year planning horizon was considered. This policy was assessed for several management scenarios including area and volume regulation (control). Following a review of the results, a policy

³ Puttock, G.D., I. Timossi, and L.S. Davis. 1998. BOREAL: A tactical planning system for forest ecosystem management. For. Chron. 74(3):413-420.

that optimized timber production under sustained yield area control was chosen. Area regulation was selected because it is relatively simple to administer and provides a more even harvest flow over time for the Peterborough County Forest.

Sustained yield area control was imposed by limiting period-to-period variation of the area harvested. The general form of the constraint is:

$$A_{t+1} \geq (1-a)A_t \text{ and } A_{t+1} \leq (1+a)A_t \quad (3)$$

where: A represents area harvested in hectares, t is period t (t = 1...15), and a is the permitted period-to-period variation in area harvested - set at 20%.

Finally, constraints that limit the area of each forest unit and age class are specified as:

$$AREA_{ij} = X \quad (4)$$

where: i and j represent the forest unit and age class respectively and X denotes area available for harvest.

Sustainable Harvest Area Projections

Results of the modeling exercise are summarized in the tables below. Sustainable harvest projections for all planning periods are given in Table 16. Variations between periods are due to the current age structure of the forest, which is dominated by stands that are 51 to 90 years old. However the variation between any two successive periods is within the 10% allowed under the sustainable timber management policies of BOREAL. The area available for harvest-thinning activities increases overtime up to period 8 where it decreases. This is a result of a changing age class distribution and would stabilize in subsequent periods as age classes become more regulated.

Table 16 gives the sustainable harvest area for each forest unit for ten planning periods. Each planning period is 10-year in length. The harvest level for the 2010-2019 planning term is 240.2 hectares or approximately 24.0 hectares per year. These levels are consistent with those projected during the previous management plan.

Table 16 Forest Unit Area Scheduled for Harvest by 10-Year Planning Period

Planning Period (10 Yrs)	Forest Unit						Total for each 10 Yr Period (ha)	Avg. Annual Area (ha)
	MXC	IHC	PNS	PNU	THS	THU		
1	30.4	95.5	0.0	90.2	0.0	23.1	240.2	24.0
2	57.9	76.1	0.0	128.3	3.6	21.0	288.9	28.9
3	115.3	77.7	17.0	80.1	45.7	8.5	347.4	34.7
4	85.0	33.6	0.0	163.1	110.5	21.0	417.2	41.7
5	199.5	0.0	46.5	238.8	3.6	6.9	500.3	50.3
6	344.4	0.0	0.0	205.2	45.7	0.0	601.3	60.1
7	394.2	4.5	46.1	93.9	168.4	6.9	720.9	72.1
8	252.1	0.0	25.5	180.9	112.5	0.0	579.0	57.9
9	51.0	95.5	0.0	199.9	110.5	0.0	465.9	46.6
10	2.0	76.1	105.6	123.8	58.3	0.0	375.8	37.6

The volume expected to be derived from the sustainable harvest areas over the next 100 years if treatments are scheduled up to these levels are presented in Table 17. The volume to be generated during the 2010-2019 planning term is 59,505 cubic metres (gross volume) or approximately 5,501 cubic metres per year if treatments are allocated up to the maximum allowable levels.

Table 17 Gross Merchantable Volume Harvested by Planning Period for All Forest Units

Planning Period (10 years)	Total Gross Volume (m³)	Average Annual Gross Volume (m³)
1	59505	5951
2	61671	6167
3	71444	7144
4	75404	7540
5	83776	8378
6	98710	9871
7	113228	11323
8	107967	10797
9	108242	10824
10	91246	9125
Total	871193	

8.0 ALLOCATION FOR TREATMENT

The determination of the harvest rate is an important part of the forest management planning process. Equally important is the allocation process to identify areas to be selected for treatment or candidates to receive treatment over a period of time.

Controlling harvest and treatment levels is an important tool to ensure the balance of growth and harvest is maintained and that the forest remains healthy. Planning and scheduling activities also help to achieve many forest management objectives such as providing a variety of habitat types, producing a range of stands across the successional spectrum and to provide for a predictable supply of forest products on a sustainable basis.

8.1 Areas Eligible and Allocated for Treatment

To assist in selecting areas on which harvesting may be carried out during the term of the management plan, a survey was conducted to identify stands that were in need of treatment. Stand conditions, age, stocking and forest type were a few of the many of the forest attributes that were evaluated. Through this process a list of stands were selected which are considered to be eligible for treatment over the next 10-year period. This list was reviewed and a tentative treatment schedule was established.

The total area scheduled for harvest over the next 10-year term approximates the calculated allowable harvest, however there are some variations within each of the forest units. This is in part due to size of the land base and in part due to the location of the forest types across the County Forest. Also, attempts were made to distribute the treatment areas and to continue the progression of operations established in the past.

It is important to remember that the size of the land base will continue to place limitations on the treatment allocation process and the flexibility that is normally available with larger land holdings. It remains an objective to approximate the calculated harvest levels over time and it is felt this has been achieved as outlined in the table below.

Table 18 Comparison of Calculated Allowable Harvest vs Allocated Harvest, 2010-2019

Forest Unit	Silvicultural System	Calculated Allowable Harvest (ha)	Allocated Harvest (ha)
PNU	Uniform Shelterwood 4-staged	90.2	52.3
PNS	Clear Cut - Seed Tree	0.0	72.7
MXC	Clear Cut - Patch / Strip	30.4	0.0
THS	Selection	0.0	100.7
THU	Uniform Shelterwood 2-staged	23.1	0.0
IHC	Clear Cut - Patch / Seed Tree	95.5	44.2
Total		239.2	269.9

A summary of the areas to be treated during the 2010-2019 period is presented on Table 19. Over the next 10-year period a total area of 269.9 hectares are allocated for harvest, 81.8 hectares are scheduled for renewal treatments while 241.4 hectares are planned to receive a maintenance treatment. A total of 433.3 hectares are planned to be tree marked to support the forest management program over the next 10 years.

It is important to keep in mind that the areas identified for treatment and the type of treatment that is forecasted during the 2010-2019 period may be adjusted as the sites are more fully assessed through the pre-planning and operational phases. Stands scheduled for a thinning and/or harvest are considered to be eligible for subsequent renewal and maintenance treatments. These options will be identified during the development of the forest operation prescription and/or following the operation. Adjustments will be recorded in the annual work reports.

The list of stands and maps identifying those areas eligible for treatment and those selected for management during the 10-year period are found in Appendix 5.

A forecast of the expenditures required to implement the planned forest management program for the next 10-year term was also prepared and the results are presented in the Table 20 below. It is estimated that approximately \$ 400,143 will be required to support the scheduled forest management planning and operational activities. Expenditures on forest management are forecasted to be higher than in the previous 10-year term since there is more area and additional treatments scheduled in the 2010-2019 period. Expenditures also include an estimated cost to renew the management plan in 2019 as well containing contingency funding to support unforeseen expenditures (planning and operational). Forest management activities on the County Forest remain financially self-sustaining.

Table 19 Forecast of Forest Management / Silvicultural Activities, 2010-2019

Activity	FOREST UNIT (Hectares)							TOTAL
	PNU	PNS	MXC	THS	THU	IHC	OTHER	
Harvest								
Selection				98.6		11.6		110.2
Shelterwood - Preparatory	52.3	31.8						84.1
- Seed				2.1				2.1
- Removal								0.0
Clear Cut - Patch								0.0
- Strip								0.0
- Seed Tree		40.9				32.7		73.5
Sub-Total	52.3	72.7	0.0	100.7	0.0	44.2	0.0	269.9
Renewal								
Mechanical SIP								0.0
Scarification		40.9						40.9
Prescribed Burn								0.0
Planting		40.9						40.9
Sub-Total	0.0	81.8	0.0	0.0	0.0	0.0	0.0	81.8
Maintenance								
Cleaning - Manual	23.0	40.9				14.1		78.0
Cleaning - Chemical								0.0
Thinning / Spacing	77.4	84.8	1.1					163.3
Pruning								0.0
Sub-Total	100.4	125.7	1.1	0.0	0.0	14.1	0.0	241.4
Protection								
Pest Control - Ground								0.0
- Aerial								0.0
Sub-Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL SILVICULTURE	152.7	280.2	1.1	100.7	0.0	58.4	0.0	593.1
Marking								
Harvest	52.3	72.7	0.0	100.7	0.0	44.2	0.0	269.9
Maintenance	77.4	84.8	1.1	0.0	0.0	0.0	0.0	163.3
Total Marking	129.7	157.5	1.1	100.7	0.0	44.2	0.0	433.3
TOTAL MANAGEMENT	282.5	437.7	2.2	201.4	0.0	102.6	0.0	1026.4

Figures may change upon results of pre-treatment assessment and other treatment priorities.

Table 20 Forecast of Expenditures for Forest Management/ Silvicultural Activities, 2010-2019

Activity	FOREST UNIT							TOTAL
	PNU	PNS	MXC	THS	THU	IHC	OTHER	
Operating Expenditures								
Prescription								
Marking & Support								
Timber Sale Support								
Monitoring								
Assessment								
Planning / Reporting								
Total Operating Costs	\$14,919	\$18,115	\$125	\$11,579	\$0	\$5,088	\$49,500	\$99,326
Silvicultural Expenditures								
Renewal								
Mechanical SIP								
Scarification								
Prescribed Burn								
Planting								
Sub-Total	\$0	\$55,215	\$0	\$0	\$0	\$0	\$0	\$55,215
Maintenance								
Cleaning - Manual								
Cleaning - Chemical								
Thinning / Spacing								
Pruning								
Sub-Total	\$4,598	\$8,180	\$0	\$0	\$0	\$2,824	\$0	\$15,602
Protection								
Pest Control - Ground								
- Aerial								
Sub-Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Silvicultural Contingency							55000	\$55,000
Total Silvicultural Cost	\$4,598	\$63,395	\$0	\$0	\$0	\$2,824	\$55,000	\$125,817
Other								
Management Fees								
Roads								
Misc / Other Operating								
Total Other Costs							\$175,000	\$175,000
TOTAL COST	\$19,517	\$81,510	\$125	\$11,579	\$0	\$7,912	\$279,500	\$400,143

Figures may change upon results of pre-treatment assessment and other treatment priorities.

Table 21 Forecast of Harvest Volumes and Stumpage Revenues, 2010-2019

Forest Unit	Area (ha)	Est. Yields (NMV m3/ha)	Products	Est. Total Yield (NVM m3)	Stumpage (\$/m3)	Total Stumpage (\$)
PNU	129.7	40	Pulp	5,188	5	\$25,940
		8	Sawlogs/Veneer	1,038	20	\$20,752
		2	Other	259	25	\$6,485
		50		6,485		\$53,177
PNS	157.5	45	Pulp	7,088	5	\$35,438
		25	Sawlogs/Veneer	3,938	20	\$78,750
		20	Other (poles)	3,150	50	\$157,500
		90		14,175		\$271,688
MXC	1.1	60	Pulp	66	5	\$330
		25	Sawlogs/Veneer	28	20	\$550
		5	Other	6	25	\$138
		90		99		\$1,018
THS	100.7	40	Pulp	4,028	5	\$20,140
		8	Sawlogs/Veneer	806	20	\$16,112
		2	Other	201	25	\$5,035
		50		5,035		\$41,287
THU	0	40	Pulp	0	5	\$0
		8	Sawlogs/Veneer	0	20	\$0
		2	Other	0	25	\$0
		50		0		\$0
IHC	44.2	60	Pulp	2,652	5	\$13,260
		25	Sawlogs/Veneer	1,105	20	\$22,100
		5	Other	221	25	\$5,525
		90		3,978		\$40,885
TOTALS			Pulp	19,022		\$95,108
			Sawlogs/Veneer	6,913		\$138,264
			Other	3,837		\$174,683
433.2 Ha			GRAND TOTAL	29,772		\$408,054
43.32 Ha			Annual	2,977		\$40,805

Yields are Net Merchantable Volume (NMV). Yields and stumpage based on traditional levels and values.

8.2 Harvest Volume and Value

Table 21 provides an estimate of the volumes and values to be realized from the areas allocated for treatment over the 10-year operating period. The estimates are broken down by product types (sawlog and pulpwood) and for each of the forest units. Actual volumes and values will vary depending upon market values and utilization levels during the course of the operating plan. The figures that are forecasted were produced using historical yields and stumpage values from timber sales from the County Forest in the past and are net merchantable volumes.

It is expected that some commercial volumes and revenues will be realized during the treatment of the red pine plantations. These figures have been included in the volume - value estimates.

Total of 29,772 cubic metres (m³) are expected to be generated from sustainable harvesting-thinning activities and yield approximately \$408,054 in stumpage revenues. These are in keeping with traditional levels. The forest management activities are financially self-sustaining and harvesting-thinning operations are expected to generate a small profit that can be used to support additional resource management activities on the County Forest. The County has established a Forest Reserve Account where forest revenues are directed and then used to support management and operational costs associated with the management of the County Forest. It is recommended that this practice continue to ensure that the necessary funding is available to plan, implement and report management activities.

It is recommended that Peterborough County continue using the services of forestry professionals to conduct an active forest management program and to specifically assist in the implementation of the treatments prescribed in this forest plan. This will ensure that the overall objectives of the plan are met and that the forest resources remain healthy and that interests of the County are protected.

It recommended that the County continue using a multi-year harvesting contract to complete the scheduled harvesting treatments. This contract could be established through a competitive process that is limited to logging operators who have proven records of conducting operations that respect the principles of sustainable forestry. This would benefit both the County and the forest operator in the short term and have longer-term advantages for all parties involved. It is important to remember that the best price does not always result in the best results.

9.0 ACCESS-TRAIL MANAGEMENT

The existing access roads in the various County Forest blocks are used primarily for forest management activities. However, the access roads also provide opportunities for recreational pursuits (hunting, hiking, biking, limited motorized vehicles, x-country skiing etc). Most of the roads-trails have been created as a result of past forest management operations. Access roads are maintained on a limited basis and trails are not normally maintained beyond what can be derived from forestry activities.

The following briefly outlines the existing access-trail network in each of the blocks and provides some guidance on the future needs to support the management of the County Forest for forestry and recreational purposes. Maps 10-12 show the existing and proposed access-trails in the County Forest and Table 22 provides a summary.

9.1 Cavan Block

The access network in and around this block is excellent (Map 10). The block is bordered on three of four sides by compartment roads that were developed when the plantations were established in the early 1940's. The roads are in good condition and are adequate to meet the management needs of this block. The Glamorgan Road on the west, and Carmel Line on the north edges of the block are unmaintained municipal roads and have been maintained, as required, by harvesting contractors working in the Cavan Block (2008) and in the surrounding Ganaraska Forest (ongoing).

There is one culvert on Glamorgan Road at the north end of the block. This appears to be adequate to meet the present cross-road drainage flows however, it may need to be replaced at some point in the future.

Additional road maintenance is not required at this time and would be re-assessed prior to the next thinning activities.

There are approximately 3.8 km of trails that are used in this block and are connected to the extensive trail network of the Ganaraska Forest. The trail that runs south-north in the centre of the block is used as part of a double-track cross-country ski trail. This and the other trails are used for hiking. These trails are in good condition and do not require any immediate attention. Additional trails should not be developed in this block.

Motorized vehicles are prohibited in this block, save and except the municipal roads that are used quite heavily by ATV's and motor-bikes. Hunting is also prohibited. The signage around the block appears to be adequate and in reasonable condition to ensure the public is aware of the use restrictions.

The block should be monitored on a regular basis and the County should continue to communicate with the staff at the Ganaraska Forest to ensure mutual resource management objectives are met.

9.2 Havelock Depot Block

This block was harvested approximately 15-20 years ago and the extraction-spur road is growing over. For the purposes of this exercise there are no roads or trails in this block that have been mapped.

This block has some use restrictions proposed (no hunting, no motorized vehicles, no camping) and there are no signs (property and/or use restrictions) posted on or around the property. This should be considered in the future along with other awareness and signature projects that may be undertaken by the County.

There no roads or trails are planned for this block in the next 10 years. The block should be monitored on a regular basis.

9.3 Belmont / Dummer Block

The Belmont / Dummer block has good access which over the past several years have been maintained to allow for an active forest management program (Map 11). There is an access road running northward which provides excellent access to the majority of the forested areas in the block. This road splits at approximately the mid-point of the main property and proceeds in a north-east direction. These two roads continue to provide the main access for the property and are used for forestry and recreational activities. It is estimated that these two roads have a cumulative length approximately 13.7 km. It is recommended that there not be any new main roads developed in the tract due to its limited size.

Maintenance of these main roads has been limited in the past and the costs have been shared between the harvesting contractors and the County wherever possible. The County recently gravelled and graded the main road from the main entrance to the old County house. Consideration should be given to continuing these maintenance activities and possibly extend them to areas beyond the County house to support overall management activities in the block.

The County should consider expanding road maintenance activities to include a portion of the 12th Line (Dummer) when active forest management activities are taking place to ensure it remains in good condition for use by the contractor, residents and the public.

Any road construction that is required to implement this management plan will be minor. The purpose of any new road will be to gain access to harvest-thinning block, to limit the skidding distances and to locate the log landings away from the main access roads. Furthermore, these tertiary roads will be constructed at a standard that respects the aesthetics of the area and may be considered as part of any future trail network for the block.

The location of any new tertiary road should be approved by the County to ensure that road does not adversely affect other resources values and is consistent with the objectives of this management plan. Road edges, landings and some skid trails have in the past been seeded with a wild life seed mixture to provide early foraging opportunities for species such as deer. Since this area is within a known deer yard, consideration should be given to continuing this practice.

To access one of the northern treatment areas, approximately 1.5 km of new road would be constructed above the northern hydro line. This would be an extension of the existing road located west of the Ouse River and would normally be the responsibility of the harvesting contractor to construct (Map 12). The County may consider assisting the harvest contractor in the development of the new road as it may be used for a broader purpose in the management of the County Forest. This may be in the form of financial or in-kind contributions. An estimate has been prided on Table 22.

There are 6 water crossings (2 of the crossings have double culverts). Three of the single water crossings (culvert #1, #6, #7) on the main road may need to be replaced in the near future. It is suggested that a rock ford construction be considered rather than traditional metal pipes. Additional evaluation would be necessary by County staff and the necessary permits obtained.

All road maintenance requirements associated with public safety issues and environmental protection should be acted upon on a priority basis. Additional road maintenance work should be identified in the annual work plans and undertaken as financial and human resources exist.

There currently exists an additional 8.4 km of trails in this block over and above the 13.7 km of road. These trails are primarily a result of previous harvesting activities (spur roads) and generally dead-end a short distance off the main road. One exception is the looping trail on the east side that was developed in conjunction with the harvesting operations a number of years ago.

The County is not considering any expansion of existing recreational uses or increasing the number of trails in the block. However, through the harvesting operation in the northern portion of the block, it proposed that a connecting loop be created to provide options for future recreational opportunities in this block. This development would add approximately 3.0 km to the existing (road-trail) network. To provide/ develop this connecting loop may require some financial input on the part of the County to direct the harvesting contractor to modify operations. See Table 22.

The trails in this block are not maintained.

Table 22 Access Road and Trail Lengths in the County Forest

Block	Existing Road (km)	Proposed Road (km)	Existing Trail (km)	Proposed Trail (km)
Cavan	3.6	0	3.8	0
Havelock Depot	0	0	0	0
Belmont-Dummer	13.7	1.5	8.4	1.5
Estimated Costs *		\$7.5k		\$3.0k

* Costs are provided for informational purposes. These costs have been incorporated into Table 20 under the "Roads" line item.

Should the County consider developing additional trails in this block, opportunities may exist to connect some of the older spur roads and skid trails with one another. An evaluation of options would be required and would be dependent upon the direction the County chooses with respect to trail development and the type of permissible uses in the block (i.e. motorized vs non-motorized). The County may consider dividing the block into zones depending on long-term goals. In considering trail options, it is important to keep in mind the limited size of the property, its configuration (narrow), the rough terrain (bouldery) and the amount of lowland areas as well as the development and maintenance costs.

Any trail maintenance and development projects would be identified in the annual work plans and undertaken as financial and human resources exist.

There are some discussions taking place regarding the use of this block to provide a connecting link to ATV trails in the area. The County should take this into consideration when developing and maintaining the road network for resource management activities as it may alter various management strategies that are recommended in this plan and based on previous direction.

10.0 RESOURCE PROTECTION

10.1 Fire Protection

The objective for fire management in the County Forest is to:

1. Prevent personal injury or loss of life and minimize damage to the resources of the Peterborough County Forest that may be the result of wildfire.

Recommended Strategies:

1. Actively suppress all wildfires.
2. Implementation of management actions such as hazard reduction on an “as need basis”.
3. Limit or restrict management activities in the County Forest during extremely dry conditions.
4. Incorporate prevention and detection programs delivered by local Municipal Fire Services.
5. Adhere to the provisions of the County’s Emergency Plan (March 2007).
6. Provide local emergency services with maps of the County Forest and the necessary contact information.
7. Ensure contractors working in the County Forest have the necessary fire suppression equipment given the size and scope of the operations taking place, contact information for an emergency.

It is important to note that there has not been a wildfire in the County Forest but this does not eliminate the risk of fire (natural, man-made fire).

Species composition, canopy cover, ecological moisture regimes (wet, dry sites) and exposure all influence the moisture characteristics of forest fuel complexes and fire behaviour. Other factors that affect fire behaviour are stand age, height, species composition of the understory, In general terms deciduous forests have a low fire risk, conifer dominated forests have a high fire risk while the risk to mixedwood stands is dependant upon the amount and type of coniferous species present (pine vs cedar).

Deciduous stands, lowland cedar areas and swamps may serve as natural firebreaks in a forested landscape. Fields, hydro corridors and roads also serve in this capacity. A fire

risk assessment was conducted for the County Forest using the working group – cover type from the forest inventory data and each stand was assigned a fire risk rating of high, moderate or low. The assignment of risk rating for the various cover types were as follows:

High Fire Risk: pine, spruce

Moderate Fire Risk: hemlock, balsam, upland cedar

Low Fire Risk: all hardwoods, lowland cedar

Areas that are frequented by the public (hunt camps, county house) were also identified as high risk areas. The results of this assessment are presented on Map 13 – Fire Risk Assessment.

High Fire Risk: 21.6%

Mod Fire Risk: 2.8%

Low Fire Risk: 75.6%

All of the Havelock Depot Block is a low. Additionally this block has limited use and limited access. The Works Department Yard would serve as a good staging area for emergency personnel and equipment.

The Cavan Block is predominately red pine plantations and therefore has a high fire risk. The block is used by hikers, bikers and the municipal roads are used by ATV's and motor-bikes which also increases the risk of fire. The block is well accessed and these roads serve as good firebreaks. There are wider areas along the road that could be used as staging areas in addition to the Ganaraska Forest Centre. There is limited to no opportunity to secure water from the small creek-swamp in the north-west part of the parcel, therefore road access for fire suppression is important.

Most of the Belmont-Dummer Block has a low fire risk while there are isolated pockets of forest that have a moderate or high risk. The two main roads and some of the better trails can serve as firebreaks. However, access to the northern-half of this block by emergency vehicles would be limited due to the relatively poor condition of the road. The road may be improved over time as forest operations progress. The entrance area and the site around the County house could serve as staging areas. There are ample opportunities to secure water from the Ouse River, creeks and swamps in this block.

Fire suppression responsibilities for the Peterborough County Forest resides with various municipal fire services. As the landowner, the County has a responsibility for ensuring reasonable access to the properties and a responsibility for fire prevention. A fire management plan-response strategy with the municipalities should be developed.

Forest management activities to reduce fire threats or risks within the County Forest may include;

1. Thinning (especially plantations) to reduce stand densities and promote height growth to reduce the risk of crown torching and crown fires.
2. Slash management strategies including the lopping of tops and branches and in some instances distributing the slash over the harvest-thinning site (case by case basis).
3. Stand improvement and sustainable harvesting activities to maintain a healthy, vigorously growing forest.

4. Prescribed burning and in combination with thinning and harvesting could be considered but not normally be recommended in the County Forest due to high costs and potential risks.

Other actions the County could consider undertaking reduce fire risks and enhance emergency responses may include but not limited to;

1. Brushing the edge of the main roads.
2. Graveling – grading main road up to the County house.
3. Consider extending road maintenance activities north of the house.
4. Posting signs.

10.2 Protection from Insects and Disease

The Canadian Forest Service and the OMNR monitor forest health conditions and provide annual report on the forest health. One of the best ways to reduce the risks of insect-disease outbreaks is to implement resource management practices that maintain the forest in a healthy condition. Additionally, the regular monitoring of the forest will assist in identifying insect and disease occurrences before they become major issues.

The control of insect-disease can be accomplished through an integrated pest management approach to ensure biologically effective, environmentally and economically efficient pest management. A combination of biological and chemical strategies should be considered if insect-disease problems arise in the County Forest. Chemical controls measures should be utilized only when other methods cannot achieve satisfactory control, and as part of a comprehensive and integrated pest management program.

The prevention of insect-disease through the encouragement and maintenance of mixed stands of good health and vigour offers a good line of first defence. It also contributes to the overall biodiversity of the forest.

Indirect approaches for forest protection and insects-disease typically include manipulating the forest at the stand level using sustainable silvicultural techniques and practices that lead to improving the overall health of the forest. These approaches may include the species selection (choosing the right for the site conditions), forest density control (to increase growth and improve health) and silvicultural practices that modify species composition to reduce the susceptibility of the forest.

Direct methods to control infestations may include trapping insects, other mechanical treatments and harvesting infested areas as well as using biological control agents and/or the application of insecticides. Possible insect risks in the County Forest may include the following: spruce budworm, white pine weevil, birch skeletonizer. Some invasive insect species to watch for include the: emerald ash borer, Asian long-horned beetle and the European wood wasp.

To date there has not been any significant negative affects to the County Forest associated with insects or diseases. There is normally a level of diseased trees in a healthy forest that provide for wildlife and contribute to the ecological functions of the forest. The maintenance of a diverse and healthy forest is the best preventative measure against widespread

outbreaks of disease. Silvicultural options, such as thinning and sanitation cutting, are preferred but chemical control may be warranted in some circumstances. Experts from the OMNR and the Canadian Forest Service should be consulted in the event of an outbreak occur.

Some common diseases in the area include:

Cankers (nectria, eutypella, hypoxylon), white pine blister rust, root rots (annosus, armillariea), galls, Butternut canker. None of these appear to be having an impact of the County Forest.

It is recommended that staff and contractors monitor the forest for the occurrence of insects and diseases and take the appropriate management measures when necessary.

10.3 Invasive Plant Species

Invasive species (plants, insects) have become major issue over the last decade, and a significant threat to biodiversity and forest health in some locations. Invasive plants can quickly become established in natural habitats, and out compete native species and overwhelm certain habitats. They have the potential to displace native vegetation, and interfere with the natural regeneration of forest tree species. Invasive insects have the potential to cause major damage to large tracts of forested lands.

A major factor contributing to the success of invasive species is the fact that few natural “controls” exist here for invading plants and few natural predators for non-native insects to restrict their advances. Invasive plants can spread by seed, human activity or by birds and animals and is difficult to control. Establishment of invading plants usually begins along roads, trails, fencerows or woodland edges, travel and utility corridors where they quickly establishment themselves. Invasive insects can be spread by the movement of wood products and by flight. Insects usually prefer a specific host (e.g. emerald ash borer: ash trees, asian long-horned beetle: maple trees) and therefore can have significant impacts on local forest conditions.

Invasive plant species have not been a problem in the County Forest. However, invasive species are becoming more widespread. The following species have been identified as potential threats to the natural communities in areas in southern Ontario.

Invasive Plants:

- buckthorn,
- strangling dogvine
- garlic mustard
- giant hogweed

Invasive Insects:

- emerald ash borer
- asian long-horned beetle
- sirex woodwasp
- pine shoot beetle

Early detection and quick reaction will be important measures in the management and control of invasive plants species in the County Forest. Strategies to control invasive species may include a combination of mechanical and chemical treatments. In most situations multiple and sequential treatments will be required for initial control followed by regular surveillance and a repeat of prescribed treatments.

Staff, contractors and the public using the forest could monitor the properties for the presence of invasive species.

As the County Forest is used by a greater number of people and for a variety of uses, the risk of invasive species becoming established also increases. Public awareness of the issue can be incorporated into any signage programs that the County initiates for the properties.

The Cavan Block is most at risk to invasive plants due to the high recreational use in and around this block. The Belmont-Dummer is at moderate risk from invasive plant species largely in part due to the recreational activities pursued in this block. The Havelock Depot Block has a low risk level for invasive species.

Prevention and control strategies for invasive species may include but not limited to the following:

1. Maintain a healthy forest environment by implementing sustainable forest management practices to reduce the susceptibility of the County Forest to invading species.
2. Monitor the County Forest on a regular basis through normal resource management functions/ activities for early detection purposes. Report occurrences and seek advise from the Ministry of Natural Resources, Canadian Food Inspection Agency (insects).
3. Develop specific treatment plans as required to manage and control invasive species if found in the County Forest.
4. Increase the awareness of invasive species to the users of the County Forest through strategic messaging using a variety of communication products.
5. Incorporating prevention strategies as a condition of operational activities or harvesting contracts (equipment to be cleaned before entering the County Forest).

10.4 Protection from Illegal Cutting and the Dumping of Garbage

There is on occasion the illegal cutting of fuelwood in the Belmont-Dummer Block. This has been confined to areas along the main road. The occurrence is normally on weekends and when management activities in the County Forest are not taking place. In the recent past the illegal cutting is on the rise. This does not appear to be an issue in the other blocks.

The illegal dumping of garbage is not a problem on either of the Cavan or Havelock Block but is a growing concern in the Belmont-Dummer Block. This to occurs after hours, on weekends and generally confined to areas along the main road. Items have ranged from fibreglass boats, construction materials, yard waste, furniture (couches, chairs), tires, and other household garbage.

Possible strategies were presented in Section 5 and repeated here:

1. Limit the development of new roads on the property to control access especially along the edge of the property to prevent the creation of unauthorized points of entry into the County Forest.
2. Consideration should be given to other access control measures (i.e. gate closures).
3. Inform the necessary officials and secure their support to patrol-monitor the property.
4. Post signs with contact numbers where the public can report unauthorized activities.
5. Investigate other ways in which the County can foster partnerships to enhance and facilitate the monitoring of the County Forest.

11.0 MONITORING AND ASSESSMENT

11.1 Forest Inventory

The forest resources of the Peterborough County Forest was assessed in 1999. Aerial photographs were taken and interpreted by a specialist to develop a new Forest Resource Inventory (FRI). Standard FRI stand attributes used by the OMNR continues to be utilized for the County Forest inventory. The results of the previous survey were used in the planning of the previous management plan. During the implementation of that plan, the forest inventory was updated to reflect the results of the scheduled operations (post treatment assessments) and any new information that was collected. This provided a continuous inventory and benefited the development this management plan. Inventory data should continue to updated in this manner. The previous FRI was entered into a GIS database that was on an OBM basis. During the production to this plan forest stand data was migrated into a seamless data set for the entire property and rectified with digital imagery. As the imagery is updated the FRI data should be reviewed to capture any changes to the forest stand boundaries that are not acquired through normally operating and reporting processes.

The inventory for the County Forest is presented at the back of this report including a stand list and map.

11.2 Monitoring

The implementation of forest management plans are monitored to ensure compliance with the management plan, to determine the effectiveness of silvicultural treatment, to ensure operations have complied with prescriptions and other operational conditions. Monitoring is also an effective tool to identify problems in other areas of resource management (insect-disease, illegal dumping etc) and to observe the effect of

management and uses of the forest on the state and condition of the forest and other forest features.

Indicators of Forest Sustainability

Monitoring plan implementation is useful to ensure sustainable forestry is continuing on the property. Indicators are the tools for assessing the outcomes of management decisions. Indicators assist in adaptive, knowledge-based management. This plan and its operational components are for a 10-year period. A periodic assessment of progress is recommended in the fifth-year (5 Year Summary Report) in order to determine if the plan is being implemented effectively and if the objectives are being achieved.

As in the previous plan, a comparison of planned vs actual accomplishments would be part of the approach. Other items of consideration would include the status of the forest with respect to the cover types, ages, eco-sites and to evaluate and comment on trends.

Given the limited size, scale and scope of the management activities scheduled to take place on the County Forest this would seem to be a reasonable approach. The County may include other components-indicators as required and/or deemed appropriate.

Forest Operations Inspections

All forest management activities will be inspected on a regular basis for compliance with contract specifications and silvicultural prescriptions. The frequency of the inspections will be dependant upon the complexity of the operations, the features to be protected, the ability of the contractor to perform, the size and the type of equipment to be used and the associated risks. Site meetings with the contractor prior to commencing operations is necessary to discuss terms and conditions, expectations and to identify and mitigate any potential problems.

Inspections should be conducted more frequently at the beginning of the operation thereby making sure objectives will be met. A final inspection should take place close to the end of the operation and final instructions provided to the contractor. A closing inspection is also recommended to ensure any final instructions were followed.

Post treatment stand data should be collected and the forest inventory updated accordingly.

Regeneration

Survival assessments should be conducted on sites that have been planted. Normally these assessments would take place in first, second, seventh year following tree planting. Remedial actions would be prescribed to ensure adequate survival and stocking is achieved and that competing vegetation is controlled.

Assessment of stands regenerating naturally will normally be conducted 5-7 years after the initial treatment.

Other

Monitoring for range of components (insect-disease, invasive plants, species at risk) should be undertaken during regular forest management activities whenever feasible. However when there are no scheduled operations planned in a given year, efforts should be made to continue the monitoring the condition of the forest.

The County should monitor the properties for other uses and activities on a regular basis to ensure land use strategies and restrictions are being met as well as to make certain that unauthorized activities are not taking place. Monitoring schedules beyond those that can be accomplished through forest operations inspections should be made. Monitoring activities could be scheduled on weekends to provide coverage during times when the property may be used and/or visited by the public. This presence on the County Forest will undoubtedly make a significant improvement in how members of the public treat the County Forest and should result in fewer occurrences of unauthorized activities on the property. Monitoring and reporting may include County staff with support from contractors-consultants working on site, local residents, forest users and enforcement agencies (e.g. OPP, MNR). Ensuring signs with contact information are located strategically in the County Forest will assist in this effort.

11.3 Record Keeping

It is important to maintain accurate and concise records of all activities to ensure the continuity of the management plan thus enabling the County the ability to analyse and report on the status of the forest. The County has received annual and 5-year summary reports from its service providers in the past. The continuation of the general format and information contained is recommended. The County may choose to expand the type of information that is reported to meet its needs.

12.0 CONCLUSIONS AND RECOMMENDATIONS

The County Forest has been managed in a sustainable manner over the years. The commitment to responsible resource stewardship is evident and the forest has demonstrated its ability to be self-sustaining for the size, scale and scope of its past and current management direction. The County Forest continues to be used for a variety of uses.

The management plan and the activities that are recommended to take place over the next 10-year period will allow the County to continue managing the forest to achieve an array of management objectives including forestry, wildlife, recreation, biodiversity, as well as financial.

Given the relative size of the County Forest it must be recognized that there are limitations on the level and type of activities that can take place in the County Forest without placing the forest itself at risk or creating financial challenges for the County.

The following recommendations in this plan is for the consideration of the County:

1. Execute the forest management plan.

2. That the goals, objectives and recommended management strategies detailed in this forest management be adhered to.
3. Continue to ensure the County Forest is financially self-sustaining, placing forest revenues in the Forest Reserve account for use in managing the forest.
4. Engage resource management professionals as required to plan, implement and report on forest management activities in the County Forest.
5. That the County seek legal advise and develop a policy with respect to the County's 3rd party liability which may arise from the public use of the County Forest.
6. Conduct any additional studies that the County feels may be necessary to further explore and evaluate resource management and/or land use challenges that have been identified.

APPENDIX SUMMARY 1

1. Glossary of Terms
2. List of Maps
3. Area of Concern Strategies for the Peterborough County Forest
4. Report of Past Forest Operations
5. Allocation / Areas Selected for Treatment 2010 - 2019
6. References
7. Forest Resources Inventory (FRI)

Appendix 1 Glossary Of Terms

If you're planning to harvest trees in your woodlot or to establish a forest on your property, you may need to communicate with foresters and logging contractors along the way. This Extension Note provides a glossary of common forestry terms that will help you understand some forest management concepts and share your ideas with forestry experts. Words that appear in italic type are defined elsewhere in this glossary.

ACRE

- An area of land equal to 43,560 square feet or 0.404686 hectares
- Roughly equal to 210 feet by 210 feet or 64 metres by 64 metres

ADVANCED REGENERATION

- Young trees that have reached eye-level or above

AGE CLASS

- A category that describes trees or stands of trees of a similar age, usually within a range of 20 years
- In hardwood stands age class is often determined by measuring the diameter of a tree's trunk, rather than its actual age
- The following age classes are commonly used in Canada:
seedlings.....tiny sprouts
saplings1 to 9 cm
polewood.....10 to 25 cm
small sawlogs26 to 37 cm
medium sawlogs.....38 to 49 cm
large sawlogs50 cm or larger

ALL-AGED STAND

- A stand that contains trees of all ages and sizes

ALTERNATE-ROW PLANTING

- A planting arrangement in which two different tree species are planted in alternate rows
- Often used to study how one tree *species* competes with another or develop a mixed species plantation

BASAL AREA OF A TREE

- The area, in square metres, of the cross-section of a tree measured 1.3 metres above the ground

BASAL AREA OF A FOREST OR STAND

- The area, in square metres per hectare, of the cross-section of all the trees measured 1.3 metres above the ground

BIOLOGICAL DIVERSITY (BIODIVERSITY)

- The variety and variability among living organisms and *ecosystems*
- Includes differences within and between ecosystems, differences between species and differences between members of the same species
- A high level of diversity within a species, which is known as genetic diversity, helps the species

survive massive climactic and environmental changes, such as those created by pollution or global warming

- Ecosystems with a high level of diversity are more stable and support a greater number of life forms

BLOWDOWN

- A tree or group of trees that has been blown down by the wind

BREAST HEIGHT

- A point on a tree that is 1.3 metres above ground level
- Often the place at which a tree's diameter is measured
- On a slope, breast height is measured on the uphill side of the tree

CANOPY

- An almost continuous layer of foliage formed by the crowns of larger trees
- Shades the layers of vegetation below

CANOPY GAP

- A hole in the forest canopy that lets light penetrate to the forest floor
- Caused by fallen trees, fire, harvesting, logging, disease, insects, wind, cutting or other disturbances
- Provides the open, sunlit conditions that many tree species need to germinate and grow

CAVITY TREE

- A standing tree, dead or live, that has a hole or holes where wildlife can make nests or *dens* or escape predators

CLEARCUT

- A large opening created by cutting all the trees in one *harvest*
- Usually regenerates to an *even-aged forest*

CLEARCUTTING

- A harvesting method in which all the trees are cut in one harvest

COLONIZER

- The first *species* to grow in an open area after *clearcutting* or after a natural disturbance such as fire
- Also known as pioneer species, colonizers thrive in full sunlight

- Colonizers launch the process of *succession* by creating the conditions that other species need to grow

COMPARTMENT

- A group or stand of trees that is sufficiently uniform in species composition, arrangement condition and age class to be a distinguishable unit

CONIFER

- A tree which is “evergreen.” It has cones and needles or scale-like leaves that are usually retained throughout the winter
- Examples include spruce, fir, pine, cedar and larch
- The wood of conifers is referred to as “softwood”

COPPICE GROWTH

- New shoots that grow at the base of a tree in response to stresses, such as the cutting of the tree
- A form of natural *regeneration* that allows some species to reproduce without seeds

CORD

- A unit of measurement for stacked round or split wood
- One bush cord has the outer dimensions of four by four by eight feet
- One face cord has the outer dimensions of 16 inches by four by eight feet and is one-third of a bush cord

CROP TREE

- A tree that is selected to grow until the final *harvest*
- Usually selected for its stem quality, rate of growth, species, and vigour

CROWN

- A tree's live branches and foliage
- When the crowns of neighbouring trees touch, they form a *canopy*

DEAD WOOD

- The decaying logs that lie on the forest floor, also called “coarse woody debris”
- Provides habitat for many life forms and a source of soil nutrients
- Provides the nutrient-rich, moist conditions some tree species need to germinate and grow

DECIDUOUS

- A tree or shrub that sheds its leaves every fall
- Examples include maple, oak, birch, poplar and basswood
- The wood of deciduous trees is referred to as “hardwood”

DEN TREE

- A tree having a hollow or cavity used by animals for refuge or hibernation

DIAMETER AT BREAST HEIGHT (DBH)

- The diameter of a tree trunk measured 1.3 metres above the ground

DOMINANT SPECIES

- The most numerous and vigorous species in an area of mixed vegetation

ECOSYSTEM

- An interacting system of living organisms and their environment

EVEN-AGED FOREST

- A forest in which all the trees are within 20 years of the same age

FOREST INVENTORY

- A survey of a forest area that describes and quantifies the physical characteristics of the trees and plants, including the species present, the abundance of each species, and other measures such as height, diameter and quality
- An inventory may be done prior to the preparation of a management plan, the development of a specific work prescription, or for the purposes of establishing a value for a forest stand

FOREST STRUCTURE

- The ages and sizes of the layers of plant vegetation within a forest
- Layers may include ground vegetation, shrubs, young trees, canopy trees and *supercanopy* trees

FRAGMENTED LANDSCAPE

- An area of land in which the kind of natural vegetation that existed before European settlement has been reduced to small, disconnected parcels
- Fragmentation reduces opportunities for plants and animals to reproduce and exchange genes
- Fragmentation causes a loss of genetic diversity (see *biological diversity*), which reduces a *species'* chance of adapting to and surviving climactic changes, pollution, disease and insect infestations

GIRDLING

- Mechanically cutting the bark and underlying tissues all the way around the tree
- The removal of the bark by rodents, such as mice and voles
- Often kills a tree

MAST

- The fruit and seeds produced by trees and shrubs
- An important source of food for wildlife
- Soft mast are fleshy fruit such as berries

- Hard mast are shelled nuts such as acorns

MERCHANTABLE WOOD

- The part of a tree or a stand that is of commercial value for products such as lumber and veneer
- Determined by tree size and quality
- Usually a tree must be at least 10 centimetres in diameter to be considered merchantable

MICROSITE

- The site occupied by a tree

MICROCLIMATE

- The growing conditions in a small area
- Includes many aspects of the environment, such as temperature, humidity and soil conditions

NURSE CROP

- Trees that provide the shelter, shade and moist conditions that other species need to grow

NURSE LOG

- A decaying log on the ground that provides the moist, fertile conditions some tree species need to germinate and grow

OLD GROWTH

- A forest that has a large number of the features found in the forests that grew before European settlement
- Southern Ontario's old-growth forests contained a great diversity of habitats and species, as well as trees of many ages and sizes

ORGANIC LITTER

- The layer of decomposing leaves, bark, twigs and other organic debris that lies on the forest floor

GROUP SELECTION SYSTEM

- An adaptation of the selection system, a *silviculture system* that removes some mature and/or unhealthy trees and leaves most trees to grow and regenerate the forest
- By removing groups of trees, creates *canopy gaps* where young trees can grow
- Favours mid-tolerant species that need some direct sunlight to thrive (see *tolerance*)

HABITAT

- Food, water, shelter, cover and other elements of the environment that living organisms need to survive

HARDWOODS

- Trees which are deciduous

HARVESTING

- The process of cutting trees to make wood products or fuelwood

HECTARE

- An area of land equal to 10,000 square metres (100 metres by 100 metres)
- An area of land equal to 2.47105 acres

HIGH-GRADING

- A form of logging that removes the most valuable trees and leaves the less valuable *species* to grow and regenerate the forest
- Changes the species composition in a forest
- Can reduce the future commercial value and health of the forest

GROUND COVER

- The layer of life that carpets the forest floor
- Includes plants, mosses and fungi

PREPARATORY CUT

- The first cutting stage in the shelterwood silviculture system
- Reduces stand density and enhances conditions for crop tree crown development

PRUNING

- Removing dead and living branches from trees
- Reduces the size of the knots in the wood and increases a tree's value for wood products such as lumber and veneer

REFORESTATION

- Establishing a new forest after the trees are cut

REGENERATION

- Young trees (noun) or the process of growing young trees (verb)
- The growth of young trees can be promoted through natural or artificial means
- Trees naturally regenerate by producing seeds or by *coppice growth*
- People artificially regenerate forests by dispersing seeds, planting trees or stimulating coppice growth

REGENERATION CUT

- The second cutting state in the shelterwood *silviculture system*
- Removes about half of the mature trees in a stand
- Creates space so that the remaining trees can develop large crowns
- Trees with large crowns produce more seeds and the shade that many species need to germinate and grow

RELEASING

- Removing the vegetation near a tree that might compete with it for sunlight, water and nutrients
- Increases a tree's growth rate and chances of survival

REMOVAL CUT

- A final cut in the shelterwood *silviculture system*

- Mature trees are harvested after young trees are established below them
- Increases the growth and survival rates of young trees by providing full sunlight

SALVAGE CUT

- The process of harvesting dying or dead trees
- Used to salvage valuable timber and fuelwood and to prepare sites for *reforestation*
- Often used in forests that have been damaged by insects, disease, or fire, or to restore native vegetation to sites that were planted in the past with non-native species

SELECTING (MARKING)

- The process of choosing trees to grow as future sources of wood products or fuelwood, wildlife habitat or sources of seed for *regenerating* the forest

SILVICULTURE

- The science of growing trees

SILVICULTURE SYSTEMS

- Methods for growing, *harvesting* and *regenerating* trees
- Three main systems are used in Ontario: clearcutting, selection and shelterwood

1. Clearcutting

- All trees in a stand are removed at the same time
- The *clearcut* area can be planted with seedlings after the harvest or left to regenerate naturally

2. Selection System

- Individual trees or groups of mature and/or unhealthy trees are harvested
- Leaves most of the trees and a variety of *age classes* to grow and regenerate the forest

3. Shelterwood System

- An even-aged *silvicultural system* where in order to provide a source of seed and/or protection for regeneration, the old crop is removed in two or more successive cuts
- Encourages natural regeneration in the shelter and shade of remaining trees
- The four-cut shelterwood system incorporates preparatory, regeneration, first and final removal cuttings
- The removal cuts are initiated when regeneration is well-established and the new stand is provided with adequate sunlight and space to grow

SNAG

- A standing dead tree that is decaying
- Can provide habitat for many species
- Can be a safety hazard during logging operations

- The *clearcut* area can be planted with seedlings after the harvest or left to regenerate naturally

SPECIES

- A group of plants, animals or other life forms that can interbreed

STAND

- A group of trees that can be distinguished from other vegetation by its composition, age, arrangement or condition

STOCKING

- A relative measure of the quantity of trees in a stand
- Can be expressed in terms of crown closure, and number of trees, basal area or volume per hectare

SUCCESSION

- The process of change that occurs naturally in a forest over time as one community of living organisms replaces another
- In southern Ontario, open fields and meadows often succeed to forests of intolerant species (see *tolerance*), which later evolve into mixed forests

SUPERCANOPY

- A cluster of vegetation composed of tall trees that poke through the canopy
- Usually conifers, such as white or red pines
- Provides landmarks and nesting spots for birds

TENDING

- Caring for trees
- Can include *thinning*, *pruning* and other measures to reduce competition
- Increases survival rate, growth rate and commercial value of trees

THINNING

- Removing some trees from a *stand*
- Decreases the density of a forest, reduces competition and gives the remaining trees room to grow larger and faster

TOLERANCE

- The ability of a plant to germinate and grow in shade
- Tolerant *species*, such as maple, hemlock and beech, can grow in shade
- Mid-tolerant species, such as oak, ash and white pine, need some sunlight to survive
- Intolerant species, such as white birch, poplar and black cherry, need full sunlight — also referred to as pioneer species
- The growth rate of all species, including tolerant species, increases when the plants are exposed to more sunlight

TREE MARKING

- Selecting and marking trees to be *harvested* and trees to be left to grow
- Trees are usually marked with paint on the trunk
- In Ontario, yellow paint indicates trees that are to be cut and blue paint indicates trees that are not to be cut

UNEVEN-AGED FOREST

- A forest with trees of all ages and sizes, usually with at least three *age classes*

WOLF TREE

- Large tree, generally of poor form, with a large *crown*
- Provides good shade but crowds out young trees

UNDERPLANTING

- Planting young trees under a *canopy* of mature trees

USEFUL CONVERSIONS

Area — Imperial UnitsMetric Equivalents

1 acre	0.404686 ha
1 square foot.....	0.0929030 m ²
1 square inch	6.4516 cm ²
1 square mile	2.58999 km ²
1 square yard	0.836127 m ²

Length — Imperial Units.....Metric Equivalents

1 chain (66 ft)	20.1168 m
1 foot	0.3048 m
Dbh (4.5 ft)	1.3 m
1 inch.....	2.54 cm
1 mile.....	1.60934 km
1 yard.....	0.9144 m

Ratios — Imperial UnitsMetric Equivalents

1 cord per acre	8.95647 m ³ (stacked)/ha
1 cubic foot per acre	0.0699725 m ³ /ha
1 square foot per acre	0.229568 m ² /ha
1 ton (2000 lb) per acre	2.24170 t/ha

Volume— Imperial Units.....Metric Equivalents

1 cord (128 stacked ft ³)	3.62456 m ³
1 cubic yard	0.764555 m ³
1 board foot	0.0024 m ³
1000 foot board measure (fbm).....	195 ft ³
1000 foot board measure (fbm).....	4.4 m ³
1 gallon.....	4.54609 l

For more information contact:
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Appendix 2 List of Maps

Map 1: Key Map

Map 2-Forest Boundary

Map 3: Base Map – (Belmont/Dummer Block)

Map 4: Base Map – (Cavan Block)

Map 5: Forest Working Group

Map 6: Forest Age Classes

Map 7: Forest Ecosites

Map 8: Resource Use

Map 9: Forest Units

Map 10: Existing Access -Trail Map (Cavan Block)

Map 11: Existing Access-Trail Map (Belmont-Dummer and Havelock Depot Blocks)

Map 12: Proposed Access-Trail Map (all blocks)

Map 13 – Fire Risk Assessment

AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY

Appendix 3 Area of Concern Strategies and Forest Conservation Measures For The Peterborough County Forest

Introduction

Forests are used for a variety purposes and are home to many different species of plants and animals. Land and forest management activities may have both positive and negative impacts on particular features, habitats and recreational uses. Resource managers must be aware of the impacts that planning and operational decisions can have on these values.

The identification of areas, sites or features that may be affected by resource management activities is incorporated into the planning process. Treatment plans and silvicultural prescriptions are developed with these areas of concern (AOC) in mind. These values can be general habitat requirements for a single or multitude of species or very site specific features such nesting sites, seepageways and trails.

Areas of concern can be encountered when performing forest management operations. It is important that individuals involved in management activities have the knowledge to recognize these resource values and modify management activities accordingly to conserve, protect and/or enhance the particular resource feature that is encountered.

There are numerous guidelines that resource managers can employ to ensure that healthy forested ecosystems are maintained. Included here is a brief summary of the Area of Concern Guidelines and Forest Conservation Measures that are proposed for implementation in the Peterborough County Forest. These are to serve as general guidelines to assist managers. Attempts have been made to standardize seasonal timing restrictions on forestry operations to cover the general sensitivities to disturbances of most birds and fauna that may be found in the County Forest. There may be situations where restrictions and modifications to planned activities may need to be more or less rigorous than those presented in this summary. These guidelines should be reviewed regularly and updated accordingly as management techniques, philosophies and approaches change.

**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

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**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS															
		Harvest	Renewal	Maintenance																
Name/Concern	Description																			
<p>1. Coldwater, Headwater Lakes and Streams</p> <ul style="list-style-type: none"> • erosion • sedimentation • nutrient enrichment • fluctuating water levels / yields • loss of vegetation cover • increase water temperature • harvesting debris • food production • damage to spawning beds, nursery areas • increased access • shoreline stability • aesthetics 	<p>A variable-width reserve up to 90 metres dependent upon the slope of the shoreline.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Slope</th> <th style="text-align: left;">AOC</th> <th style="text-align: left;">Reserve</th> </tr> </thead> <tbody> <tr> <td>0-15%</td> <td>30m</td> <td>30m</td> </tr> <tr> <td>16-30%</td> <td>50m</td> <td>50m</td> </tr> <tr> <td>31-45%</td> <td>70m</td> <td>70m</td> </tr> <tr> <td>45%+</td> <td>90m</td> <td>90m</td> </tr> </tbody> </table> <p>To be applied to both sides of the stream where timber management activities occur.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>Use natural boundaries or topographic features such as ridge tops as AOC widths where feasible.</p> <p>Minimum reserve width may be expanded where sensitive site conditions exist.</p>	Slope	AOC	Reserve	0-15%	30m	30m	16-30%	50m	50m	31-45%	70m	70m	45%+	90m	90m	<p>Harvesting not permitted in reserve.</p> <p>Limited removal / harvesting of selected trees may be permitted to provide / enhance fish and wild life habitat.</p> <p>Where selected trees are to be removed as described above, the Code of Practice for Timber Management Operations in Riparian Areas shall apply.</p>	<p>No operations in AOC.</p> <p>Underplanting permitted to improve aesthetics and biodiversity.</p> <p>Prescribed burn permitted to travel into AOC.</p>	<p>No maintenance operations permitted in AOC other than protection.</p>	<p>Construction of new roads and landings normally not permitted in AOC.</p> <p>Construction of aggregate pits not permitted within 30 m of waterbody.</p> <p>Exceptions may be permitted if no other alternative exists or if road is required to cross stream provided resource values can be protected.</p> <p>Location and type of road / crossing to be individually assessed and approved by the County.</p> <p>The MNR's Environmental Guidelines for Access Roads and Stream Crossings plus the Code of Practice for Timber Management Operations in Riparian Areas shall apply.</p> <p>Restrict mechanical equipment within 50m of shoreline.</p>
Slope	AOC	Reserve																		
0-15%	30m	30m																		
16-30%	50m	50m																		
31-45%	70m	70m																		
45%+	90m	90m																		

**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS															
		Name/Concern	Description	Harvest		Renewal	Maintenance													
<p>2. Warm, Coolwater Lakes and Streams</p> <p>Water systems in the proximity of the County Forest have been classified as Cold water. Therefore, the following has been included for informational purposes.</p> <ul style="list-style-type: none"> erosion sedimentation nutrient enrichment fluctuating water levels / yields loss of vegetation cover increase water temperature harvesting debris food production damage to spawning beds, nursery areas increased access shoreline stability aesthetics 	<p>A variable-width reserve up to 90 metres dependent upon the slope of the shoreline.</p> <table border="1"> <thead> <tr> <th>Slope</th> <th>AOC</th> <th>Modified</th> </tr> </thead> <tbody> <tr> <td>0-15%</td> <td>30m</td> <td>30m</td> </tr> <tr> <td>16-30%</td> <td>50m</td> <td>50m</td> </tr> <tr> <td>31-45%</td> <td>70m</td> <td>70m</td> </tr> <tr> <td>45%+</td> <td>90m</td> <td>90m</td> </tr> </tbody> </table> <p>Minimum reserve width of 10-30m may be imposed and AOC widths expanded where sensitive site conditions exist.</p> <p>To be applied to both sides of the stream where timber management activities occur.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>Use natural boundaries or topographic features such as ridge tops as AOC widths where feasible.</p>	Slope	AOC	Modified	0-15%	30m	30m	16-30%	50m	50m	31-45%	70m	70m	45%+	90m	90m	<p>No operations in reserve when it is established.</p> <p>Modified operations may be permitted in AOC where it can be demonstrated that fisheries and other resource values can be protected.</p> <p>Selection harvest, and shelterwood permitted on a limited basis.</p> <p>Limited harvesting of trees within AOC may be permitted to provide / enhance fish and wild life habitat.</p> <p>No more than 50% of shoreline to be disturbed at one time.</p> <p>The Code of Practice for Timber Operations in Riparian Areas shall apply.</p>	<p>No operations in reserve when it is established.</p> <p>Prescribed burn permitted to travel into AOC.</p> <p>Mechanical site preparation may be permitted in modified area on a restricted basis where stable soil conditions exist; disturbance patterns to be at right angle to slope, leave coarse woody debris.</p> <p>Normal planting except where deciduous browse for wildlife is desired.</p>	<p>No operations in reserve when it is established.</p> <p>Normal cleaning and thinning activities provided resource values can be protected.</p> <p>Pesticides may be permitted on a restricted basis in modified area; stump or basal application only.</p>	<p>Construction of new roads and landings normally not permitted in AOC.</p> <p>Construction of aggregate pits not permitted within 30 m of waterbody.</p> <p>Exceptions may be permitted if no other alternative exists or if road is required to cross stream provided resource values can be protected.</p> <p>Location and type of road / crossing to be individually assessed and approved by the County.</p> <p>The MNR's Environmental Guidelines for Access Roads and Stream Crossings plus the Code of Practice for Timber Management Operations in Riparian Areas shall apply.</p> <p>Restrict mechanical equipment within 50m of shoreline.</p>
Slope	AOC	Modified																		
0-15%	30m	30m																		
16-30%	50m	50m																		
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**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS															
		Name/Concern	Description	Harvest		Renewal	Maintenance													
<p>3. Wetlands (significant)</p> <p>None currently identified in County Forest. The following is provided for informational purposes.</p> <ul style="list-style-type: none"> erosion sedimentation water quality water temperature water flow and recharge damage to spawning and nursery areas vegetation cover provision and maintenance of forest and habitat diversity including snags, den trees and downed woody debris waterfowl staging and nesting areas disruption of nesting and rearing activities loss of nesting sites degradation of forest and habitat diversity including snags, den trees and downed woody debris 	<p>Significant wetlands to be determined by appropriate agencies.</p> <table border="1"> <thead> <tr> <th>Slope</th> <th>AOC</th> <th>Modified</th> </tr> </thead> <tbody> <tr> <td>0-15%</td> <td>30m</td> <td>30m</td> </tr> <tr> <td>16-30%</td> <td>50m</td> <td>50m</td> </tr> <tr> <td>31-45%</td> <td>70m</td> <td>70m</td> </tr> <tr> <td>45%+</td> <td>90m</td> <td>90m</td> </tr> </tbody> </table> <p>A variable width AOC up to 90m to be placed around all significant wetland areas.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>Use natural boundaries or topographic features such as ridge tops as AOC widths where feasible.</p> <p>AOC width dependent upon slope of wetland area and featured value. AOC width may be expanded as required.</p>	Slope	AOC	Modified	0-15%	30m	30m	16-30%	50m	50m	31-45%	70m	70m	45%+	90m	90m	<p>Selection harvest allowed, shelterwood permitted on a limited basis in modified management area provided values can be protected.</p> <p>Patch cutting of poplar permitted to promote wildlife food supply.</p> <p>No more than 50% of shoreline area to be disturbed at one time.</p> <p>No disturbance in significant waterfowl areas between April 1 – June 30: normal operations from July 1 – March 31 permitted.</p> <p>Leave snags, cavity and nest trees.</p>	<p>Normal silvicultural treatment sequence in modified area.</p> <p>Restrict mechanical site preparation to minimize soil exposure, orient furrow / patterns at right angles to slope, use light equipment.</p> <p>Prescribed burn permitted to travel into AOC.</p> <p>Avoid restocking conifer within 30m of waters edge.</p> <p>Maintain naturally occurring coarse woody debris.</p>	<p>Normal silvicultural treatment sequence in modified area.</p> <p>Pesticides may be permitted on a restricted basis in modified area; stump or basal application only.</p> <p>Normal cleaning and thinning activities provided resource values can be protected.</p>	<p>Construction of new roads and landings normally not permitted in AOC.</p> <p>Construction of aggregate pits not permitted within 30 m of waterbody.</p> <p>Location of road to be approved by the County, use narrow right-of-way.</p> <p>Adhere to the Code of Practice for Timber Management Operations in Riparian Areas.</p> <p>Restrict mechanical equipment within 50m of shoreline.</p>
Slope	AOC	Modified																		
0-15%	30m	30m																		
16-30%	50m	50m																		
31-45%	70m	70m																		
45%+	90m	90m																		

**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>4. Deer Habitat</p> <p>a) Winter Habitat (Deer)</p> <ul style="list-style-type: none"> • maintenance of coniferous shelter (particularly He, Ce) • travel, escape routes • feeding areas • known bedding areas • provision of adequate browse 	<p>The County Forest contributes to larger scale, landscape and/or range-like features.</p> <p>He, Pw, Pr, Ce cover types are important shelter areas.</p> <p>Maintain 10-30% of total deer range in conifer cover types, maintain 60% crown closure in wintering areas.</p> <p>Bedding sites and travel corridors are traditionally found on conifer ridges containing stands of He, Pw and occasionally upland Ce. They are also found along shorelines or water course. Local knowledge will be required to adequately protect these areas.</p> <p>Where conifers other than He and Ce provide cover in bedding or travel corridors, canopy closures levels > 80% are desirable.</p>	<p>Normal silvicultural treatments, shelterwood or patch cut. Winter harvest where feasible.</p> <p>Maintain crown closure requirements, retain clumps of 3-5 conifer trees with touching crown. Conifer shelter to be at least 10m in height. Space clumps 10-30m apart.</p> <p>Retain all conifer in mixed wood stands where conifer content is low in winter yards.</p> <p>Maintain at least 80% crown closure in bedding areas, travel corridors and conifer ridges.</p> <p>Stimulate browse within 30m of shelter areas by reducing basal area in tolerant hardwood stands below normal levels or allow small patch cuts to occur.</p>	<p>Normal silvicultural treatments / operations.</p> <p>Encourage natural regeneration of deciduous species to serve as winter food.</p> <p>Protect conifer patches.</p> <p>Plant suitable conifer species where shelter is limited or a concern and where feasible.</p>	<p>Normal silvicultural treatments / operations.</p> <p>Conduct thinning operations in winter to provide additional feeding opportunities.</p>	<p>Avoid construction of major access in existing or potential wintering areas.</p> <p>Roads and landings to be located to optimize benefits for deer.</p> <p>No landings in small conifer patches.</p> <p>Seed landings with clover / grass mixture.</p> <p>Deer trails, corridors to be kept free of logging debris.</p>

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<p>b) Summer Habitat (Deer)</p> <ul style="list-style-type: none"> • provision of browse, feeding areas • maintenance, creation of openings • maintenance, improvement in mast production potential 	<p>Maintain 10-15% of forest in early successional stages (5-35 years old).</p> <p>5-15% of range to be in permanent openings 0.2 - 4 ha in size.</p> <p>Distribute disturbance and components of habitat throughout deer range.</p>	<p>Normal silvicultural operations.</p> <p>Retain small clumps of conifer in hardwoods stands.</p> <p>Release mast producers from competition, retain non-declining mast producers.</p> <p>Retain at least 7-8 mast producing trees per hectare.</p>	<p>As above (winter habitat).</p> <p>Do not plant trees on roads / landings.</p> <p>Encourage Or, Be regeneration through the release of established natural regeneration or planted patches.</p> <p>Use prescribed burn where appropriate to encourage suitable regeneration.</p>	<p>As above (winter habitat).</p>	<p>No landings in small conifer patches.</p> <p>Seed landings with clover / grass mixture.</p> <p>Deer trails, corridors to be kept free of logging debris.</p>

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<p>5. Marten Habitat</p> <p>The marten population in this part of the province is relatively low. The information provided here is for general guidance and information.</p> <ul style="list-style-type: none"> • degradation of habitat at landscape and stand level • loss of specific habitat features / components • loss of connectivity between core / critical habitat 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>Provisions of some habitat components for marten are made through the application of the deer, moose, pileated woodpecker and biodiversity guidelines</p> <p>Landscape Level: Maintain approximately 10-20% of the forest, which has capability of produce marten, in suitable conditions;</p> <ul style="list-style-type: none"> • stands having a coniferous component greater than 40% • canopy crown closure of coniferous species is greater than 50% • coniferous species are at least 15m in height • uneven canopies preferred • mature stands <p>Stand Level:</p> <ul style="list-style-type: none"> • retain at least 6 dead / declining trees per hectare – 2 should be 30cm in dbh or greater • retain logs, stumps and downed woody debris 	<p>Normal silvicultural treatments.</p> <p>Adhere to snag / cavity tree guidelines within the scope of health & safety parameters.</p> <p>Allow operators to leave hollow logs and downed woody debris in the bush.</p>	<p>Normal silvicultural treatments.</p> <p>Modify site preparation to avoid windrowing, leave larger logs scattered, and create small bush piles.</p> <p>Modify the use of prescribed burning to minimize the impact on downed woody debris where possible.</p>	<p>Normal silvicultural treatments.</p> <p>Adhere to snag / cavity tree guidelines within the scope of health & safety parameters.</p>	<p>No landings in small conifer patches.</p> <p>Seed landings with clover / grass mixture.</p> <p>Wildlife trails, corridors to be kept free of logging debris.</p>

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
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<p>6. Pileated Woodpecker Habitat (PWP)</p> <p>The Pileated Woodpecker is a featured species in the Great Lakes-St. Lawrence Forest Region and provisions for its habitat requirements are addressed on a regular basis.</p> <ul style="list-style-type: none"> • degradation of habitat at landscape and stand level • loss of specific habitat features / components • cavity trees • snags • downed woody debris • safety 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>Provisions of some habitat components for pileated wood-pecker (PWP) are made through the application of the marten and biodiversity guidelines</p> <p>Stand Level:</p> <ul style="list-style-type: none"> • retain 6 cavity trees / hectare > 25 cm dbh • at 1 /ha should be > 40 cm dbh • cavity priorities; <ul style="list-style-type: none"> i. PWP roost trees ii. PWP nest trees iii. other nest cavities iv. escape cavities v. feeding excavations vi. potential cavity trees <p>Making provisions for downed woody debris during the course of timber management operations.</p>	<p>Normal silvicultural treatments.</p> <p>In patch cuts, seed tree cuts, and shelterwood removal cuts; retain'</p> <ul style="list-style-type: none"> i. trees with existing cavities to meet needs of cavity users of early successional forests ii. trees with potential to develop cavities to meet future needs of Pileated wood-pecker <p>Retain dead standing trees where helath & safety concerns can be met.</p> <p>Allow operators to leave hollow logs and downed woody debris in the bush.</p> <p>Consider leaving some unmerchantable trees or portions of trees on the ground and/or in the bush.</p>	<p>Normal silvicultural treatments.</p> <p>Retain dead standing trees where health & safety concerns can be met.</p> <p>Modify site preparation to avoid windrowing, leave larger logs scattered, and create small bush piles.</p> <p>Modify the use of prescribed burning to minimize the impact on downed woody debris where possible.</p>	<p>Normal silvicultural treatments.</p> <p>Retain dead standing trees where health & safety concerns can be met.</p>	<p>No limitations.</p> <p>Conserve valuable roost trees where they are encountered where feasible.</p>

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<p>7. Red-shouldered Hawk, Cooper's Hawk</p> <ul style="list-style-type: none"> • loss of nesting / potential nesting trees • disruption of nesting and rearing activities • abandonment of nest and off-spring • large scale changes to habitat • reduction in mature – closed canopy forest • satellite nests 	<p><u>AOC</u> 400m <u>Reserve</u> 50m <u>Modified</u> 350m</p> <p>Measured (radius) from active nest tree.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>No mechanical disturbance between March 1 – July 31, adjust depending on arrival and departure of birds.</p> <p>Adjust AOC widths to incorporate birds sensitivity to disturbance. AOC may be irregular in shape.</p> <p>Use natural topographic features for AOC where feasible.</p> <p>Protect satellite and confirmed stick nests in suitable habitat.</p> <p><u>AOC</u> 1 tree length <u>Reserve</u> @ 20-25m</p>	<p>Not permitted in reserve.</p> <p>Selection cutting only in modified area.</p> <p>Maintain @ 70% crown closure in modified area and in modified zone around satellite nests.</p> <p>No harvesting in modified areas between March 1 – July 31.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>New roads or landings not permitted in reserve.</p> <p>New roads in modified area may be approved where other alternatives not viable. Inspect site to evaluate specific situation.</p> <p>Design road to minimize impact on nesting values.</p> <p>No construction between March 1 – July 31.</p> <p>Use of existing roads restricted between March 1 – July 31 (including road maintenance, motorized vehicle use).</p> <p>No aggregate extraction in AOC.</p>

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<p>8. Northern Goshawk</p> <ul style="list-style-type: none"> loss of nesting / potential nesting trees disruption of nesting and rearing activities abandonment of nest and off-spring large scale changes to habitat reduction in mature – closed canopy forest satellite nests 	<p><u>AOC</u> 400m <u>Reserve</u> 50m <u>Modified</u> 350m</p> <p>Measured (radius) from active nest tree.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>No mechanical disturbance between March 1 – July 31, adjust depending on arrival and departure of birds.</p> <p>Adjust AOC widths to incorporate birds sensitivity to disturbance. AOC may be irregular in shape.</p> <p>Use natural topographic features for AOC where feasible.</p> <p>Protect satellite and confirmed stick nests in suitable habitat.</p> <p><u>AOC</u> 1 tree length <u>Reserve</u> @ 20-25m</p>	<p>Not permitted in reserve.</p> <p>Selection cutting only in modified area.</p> <p>Maintain @ 70% crown closure in modified area and in modified zone around satellite nests.</p> <p>No harvesting in modified areas between March 1 – July 31.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>New roads or landings not permitted in reserve.</p> <p>New roads in modified area may be approved where other alternatives not viable. Inspect site to evaluate specific situation.</p> <p>Design road to minimize impact on nesting values.</p> <p>No construction between March 1 – July 31.</p> <p>Use of existing roads restricted between March 1 – July 31 (including road maintenance, motorized vehicle use).</p> <p>No aggregate extraction in AOC.</p>

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<p>9. Red-tailed Hawk Broad-winged Hawk</p> <p>Sharp-shinned Hawk</p> <ul style="list-style-type: none"> • loss of nesting / potential nesting trees • disruption of nesting and rearing activities • abandonment of nest and off-spring • large scale changes to habitat 	<p><u>AOC</u> 150m <u>Reserve</u> 25m <u>Modified</u> 125m</p> <p>Measured (radius) from active nest tree.</p> <p>Protect nest tree and surrounding trees.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>No mechanical disturbance between March 1 – July 31, adjust depending on arrival and departure of birds.</p> <p>Adjust AOC widths to incorporate birds sensitivity to disturbance. AOC may be irregular in shape.</p> <p>Use natural topographic features for AOC where feasible.</p>	<p>Not permitted in reserve.</p> <p>Selection, shelterwood and limited patch cutting permitted in modified area.</p> <p>No harvesting in modified areas between March 1 – July 31.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in immediate vicinity of the nest.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in immediate vicinity of the nest.</p>	<p>New roads or landings not permitted in reserve.</p> <p>New roads in modified area may be approved where other alternatives not viable. Inspect site to evaluate specific situation.</p> <p>Design road to minimize impact on nesting values.</p> <p>No construction between March 1 – July 31.</p> <p>Use of existing roads may be restricted between March 1 – July 31 (including road maintenance, motorized vehicle use).</p> <p>Hauling may be permitted through modified management area during breeding season if > 50m from active nest.</p> <p>No aggregate extraction in AOC.</p>

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<p>10. Herons / Osprey</p> <ul style="list-style-type: none"> • loss of nesting / potential nesting trees • disruption of nesting and rearing activities • abandonment of nest and off-spring • large scale changes to habitat 	<p><u>AOC</u> 300m <u>Reserve</u> 75m <u>Modified</u> 225m</p> <p>Measured from the edge of the colony. AOC may be adjusted dependant upon the number of active nests.</p> <p>Maintain 30 m reserve where nest tree or colony is >150m of treed edge.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>No mechanical disturbance between March 1 – July 31, adjust depending upon the arrival and departure of birds.</p>	<p>Not permitted in reserve.</p> <p>Selection and shelterwood permitted in modified area.</p> <p>No harvesting in modified areas between March 1 – July 31.</p> <p>No cutting of potential nest trees around the edge of the wetland / pond. Restrict fuelwood cutting activities.</p> <p>Leave dominant and/or damaged Pw around the edge of the wetland as potential nest trees. Leave 5 snags and/or 5 clumps of 6-10 tall trees in modified area.</p> <p>Protect nests not used in the last 5 years.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>Not permitted in reserve.</p> <p>No operations in modified areas between March 1 – July 31.</p> <p>Normal silvicultural treatments / operations between August 1 – February 28 in modified area.</p>	<p>New roads or landings not permitted in reserve.</p> <p>New roads in modified area may be approved where other alternatives not viable. Inspect site to evaluate specific situation.</p> <p>Design road to minimize impact on nesting values.</p> <p>No construction between March 1 – July 31.</p> <p>Use of existing roads restricted between March 1 – July 31 (including road maintenance, motorized vehicle use).</p> <p>No aggregate extraction in AOC.</p>

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<p>11. Species of Concern, Threatened, and Endangered Flora and Fauna</p> <p>- loss / reduction in habitat - physical disturbance - change in micro-climate - loss of shade or cover</p> <p>Species which may occur in the area of the County Forest that have not yet been listed in these general guidelines.</p> <p>Species of Concern</p> <ul style="list-style-type: none"> • Bald Eagle • Cerulean Warbler • Red-headed Woodpecker • S. Flying Squirrel • Northern Map Turtle • Snapping Turtle • Five-lined Skink • Milksnake • E. Ribbonsnake <p>Threatened</p> <ul style="list-style-type: none"> • Least Bittern • E. Prairie Fringed Orchid • E. Spiny Softshelled Turtle • E. Musk Turtle • Blandings Turtle • E. Hog-nosed Snake <p>Endangered</p> <ul style="list-style-type: none"> • American Ginseng • Butternut • Wood Turtle • Spotted Turtle 	<p>AOC width and details to be established based on an individual site inspection by experienced staff / MNR.</p> <p>AOC widths designed to meet the needs of the value.</p> <p>To be established based on;</p> <ul style="list-style-type: none"> • available literature • provincial guidelines • experience of local experts <p>To be investigated and appropriate measures applied whenever the species is locally confirmed</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p> <p>Updated lists can be seen on the following web-sites;</p> <p>http://www.rom.on.ca/ontario/risk.php</p> <p>www.cosewic.gc.ca</p> <p>www.mnr.gov.on.ca/en/Business/Species</p>	<p>Operational prescription to be established on an individual basis depending the value and surrounding environment.</p> <p>Seasonal restrictions to be applied where appropriate to minimize disturbance.</p> <p>Silvicultural operations modified and/or restricted where required.</p>	<p>Operational prescription to be established on an individual basis depending the value and surrounding environment.</p> <p>Seasonal restrictions to be applied where appropriate to minimize disturbance.</p> <p>Silvicultural operations modified and/or restricted where required</p>	<p>Operational prescription to be established on an individual basis depending the value and surrounding environment.</p> <p>Seasonal restrictions to be applied where appropriate to minimize disturbance.</p> <p>Silvicultural operations modified and/or restricted where required</p>	<p>Access to be controlled based on the value and as required.</p> <p>To be located to minimize disturbance.</p> <p>Restrict mechanical equipment as required.</p> <p>No aggregate extraction in AOC.</p>

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<p>12. Eastern Hog-nosed Snake</p> <p>The Eastern Hog-nosed snake is Provincially - Threatened. It is protected under the Species at Risk Act. It is at the northern limit of its natural range and was likely never common in Ontario. This species has been sighted in areas around the Cavan Block. (i.e. Northumberland County Forest).</p> <ul style="list-style-type: none"> • loss of suitable habitat (e.g. riparian areas, forest edges, grasslands, woody debris, thickets, dry and open pine-oak forests, areas of sandy soils) • disturbance of hibernacula, nesting sites, basking sites • loss of forest cover and reduced habitat diversity • disturbance during critical periods (e.g. emerging from hibernation, nesting) • reduced population of its main prey, the American toad 	<p><u>AOC</u> 50m <u>Reserve</u> 50m <u>Modified</u> 0m</p> <p>For known / identified hibernacula and nesting sites. Reserves and additional modifications may be incorporated if required.</p> <p>Provision of habitat for the Eastern Hog-nosed Snake can be achieved through the application of the guidelines for;</p> <ul style="list-style-type: none"> • Wetlands • Marten • Pileated Woodpecker • Forest Diversity <p>This will provide hollow logs and other downed woody debris, protect woodland pools and riparian areas, provide forest edges, and maintain forest diversity.</p> <p>Applying appropriate silvicultural systems will maintain canopy closure, thereby protecting travel corridors to feeding areas such as swamps, riparian zones and woodland pools.</p> <p>The need to establish AOC boundary lines will be determined on a case by case basis.</p>	<p>Not permitted in reserve.</p> <p>Apply seasonal limitations to restrict operations between May 1-Aug 31 in the vicinity of site specific habitat features and/or in particular sections of the County Forest.</p> <p>Normal silvicultural treatments / operations outside of critical periods.</p> <p>Allow operators to leave hollow logs and coarse woody debris in the bush.</p> <p>Maintain high residual basal area (no more than 50% removal) within 15 m of significant vernal pools that could be used by breeding frogs (> 200 m² in surface area).</p>	<p>Not permitted in reserve.</p> <p>Apply seasonal limitations to restrict operations between May 1-Aug 31 in the vicinity of site specific habitat features and/or in particular sections of the County Forest.</p> <p>Modify site preparation in vicinity of significant habitat features; avoid wind rowing, leave larger logs scattered and create small brush piles with tops, especially in areas having a south facing aspects.</p> <p>Modify the use of prescribed burning to minimize the impact on coarse woody debris where possible.</p> <p>Normal silvicultural treatments / operations outside of critical periods.</p>	<p>Not permitted in reserve.</p> <p>Apply seasonal limitations to restrict operations between May 1-Aug 31 in the vicinity of site specific habitat features and/or in particular sections of the County Forest.</p> <p>Normal silvicultural treatments / operations outside of critical periods.</p>	<p>New access roads and landings not permitted in reserve or other critical habitat areas.</p> <p>Limit use of existing roads from May 1-Aug 31 during critical periods (emerging from hibernation, nesting).</p> <p>Skid trails not permitted in reserve. Restrict trails as required in vicinity of site specific habitat features and during critical periods.</p> <p>No aggregate extraction in AOC or in vicinity of other critical habitat features.</p>

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<p>13. Forest Diversity</p> <p>To be applied throughout the County Forest.</p> <ul style="list-style-type: none"> • maintenance of a healthy forest ecosystem • structural, functional diversity • loss or reduction of wildlife habitat • security cover, shelter • hiding, roosting places • soil enrichment • food 	1. Wildlife Trees (Cavity and Den Trees)	Retain suitable wildlife trees where encountered to maintain 6 cavity trees/ha (5 trees > 25cm, 1 large tree > 40 cm). Increase to 9 trees/ha in riparian areas. Recruit such trees by leaving poor quality or high risk stems. Trees should be well distributed and of different species.			Road and landings to avoid value where possible.
	2. Snags	Encourage operators to leave snags that are not a safety risk. Leave snags in various states of decay. Recruit such trees by leaving poor quality or high risk stems, girdling or stem injections.			Road and landings to avoid value where possible.
	3. Mast Producing Trees	Retain 8 mast trees/ha (Or, Be, Bd, Cb, Bn, Wn, Iw) in tolerant hardwood and coniferous forests where feasible. Mast trees should have large healthy crowns with abundant fine healthy branches, be in a dominant : co-dominant position and be >25 cm dbh (40+cm for optimal results). Retain sufficient mast producing trees to ensure sufficient cross-pollination and the maintenance of a viable gene pool.			Road and landings to avoid value where possible.
	4. Super Canopy Trees	Retain 1 super canopy tree for every 4 hectares.			No limitations.
	5. Maternal-Veteran Tress	Retain 10 trees/ha. Veteran-maternal trees should be large, healthy trees having a dominant : co-dominant crown position and should be a "long lived" species. Other wildlife trees may contribute to veteran-maternal tree targets.			No Limitations
	6. Hollow Logs	Allow or encourage operators to leave hollow logs in the bush. Modify site preparation to avoid windrowing, leave larger logs scattered, create small bush piles.			No limitations.
	7. Downed Woody Debris	Approximately 40% of 190 invertebrate species in Ontario depend on DWD for some component of their habitat needs. Leave coarse woody material on site. Modify as per hollow logs listed above.			No limitations.
	8. Solitary or Clumps of Conifer in Hardwood Stands	Retain and manage He, Ce, Pw, Pr , Sp trees or clumps to provide shelter and feeding areas for animals and birds, enhance tree species diversity. Approximately 10/ha. Trees should be long-lived species, >25 cm dbh (preferably > 40 cm), low risk and high vigour. Trees in clumps (3+) are good.			Road and landings to avoid value where possible.
	9. Intermittent Streams, Seasonal Seepageways	Maintain adequate crown cover within 15m of value to protect water quality. Restrict mechanical disturbances, ensure adequate water crossing structures are used to maintain normal drainage flow patterns. Retain snags and den trees in these areas.			No limitations.
	10. Woodland Pools	Where woodland pool has surface area > 200 m ² , protect pool by providing a 15m modified management area. Provide adequate crown closure by removing no more than 50% of basal area at one time in AOC. Crown closure may be higher if needed to provide for other sensitive species such as American ginseng. No trees to be felled around pool edge or into pool.			Road and landings to avoid these areas. Reduce right-of-way width. Road, landings and skid trails to avoid these areas.

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
Forest Diversity - continued	11. Riparian Areas	Conduct operations only where stable soil conditions exist, use light equipment. Conduct activities in conjunction with other applicable guidelines. Adhere to the Code of Practice for Timber Management Operations in Riparian Areas.			Road, landings and skid trails to avoid these areas.
	12. Log Landings, Tertiary Roads, Other Forest Openings	To provide early spring forage for deer, bear, grouse, etc., seed areas with native grass and/or flower mixtures, do not plant open areas with trees in locations where openings are limited.			Create larger landings in key locations where warranted.
	13. Forest Edges	Create suitable habitat for birds and animals by creating irregular harvest boundaries and distributing forest disturbances throughout forested area where feasible. Do not create unnecessary forest edges, be aware of fragmentation and interior habitat objectives.			No limitations.
	14. Forest Interior Habitats and Fragmentation	Maintain closed canopy conditions (@ 70%) where suitable by employing appropriate silvicultural practices, especially in areas of the forest that are >100m from the edge and where the forest block is >30-50 hectares in size. Avoid creating large or extended breaks in the canopy that may fragment critical interior forest habitats. Encourage regeneration of tree species in interior forest openings not required for other management objectives. Plant trees to provide connecting corridors to other forested areas, leave small areas unplanted for future canopy gaps and structural diversity.			Limit development of roads, abandon roads/trails not required for management purposes.
	15. Forest Cover Types (Successional Stages)	Maintain an array or mosaic of naturally occurring forest cover types in various successional stages. Distribute and manipulate the disturbance type, pattern and size throughout the County Forest. Allow a portion of the forest to grow beyond established timber rotation ages.			No limitations.
	16. Furbearer – Wetland (Beaver, Otter, Mink)	Allow limited patch cutting to occur to waters edge to encourage the growth of deciduous tree species. Avoid planting coniferous species within 30 m of shoreline. Avoid using pesticides to control deciduous species. Maintain forest debris and structural diversity along shoreline to provide habitat for furbearers and associated prey species.			Road, landings and skid trails to avoid these areas.
	17. Furbearer – Forest	Leave small forest patches undisturbed in gullies or on ridges. Alter size of operating blocks. Leave logging slash on site or in small piles where possible. Maintain snags, cavity trees, and coarse woody debris.			No limitations.

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>14. Areas of Natural and Scientific Interest (ANSI)</p> <ul style="list-style-type: none"> recognition of natural heritage sites negative or adverse impacts on identified value or feature increased use through improved access 	<p><u>AOC</u> n/a <u>Reserve</u> n/a <u>Modified</u> n/a</p> <p>Details of AOC to be established in site specific resource management plans prepared by provincial government and/or leading authority.</p> <p>County to work closely with government agency and/or leading authority to ensure integrity of ANSI is not adversely affected by forest management activities.</p>	<p>Forest Management activities to be consistent with ANSI plan and implementation strategy.</p>	<p>Forest Management activities to be consistent with ANSI plan and implementation strategy.</p>	<p>Forest Management activities to be consistent with ANSI plan and implementation strategy.</p>	<p>Forest Management activities to be consistent with ANSI plan and implementation strategy.</p> <p>No aggregate extraction in AOC.</p>
<p>15. Other Natural Areas</p> <ul style="list-style-type: none"> natural functions biodiversity 	<p><u>AOC</u> n/a <u>Reserve</u> n/a <u>Modified</u> n/a</p> <p>Applying sustainable resource management practices will enhance and maintain the integrity of the values and features identified in these landscape areas.</p>	<p>Develop and apply best management practices as required.</p>	<p>Develop and apply best management practices as required.</p>	<p>Develop and apply best management practices as required.</p>	<p>Develop and apply best management practices as required.</p>

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>16. County Forest – Restricted Use Areas</p> <p>No areas have been identified where forest management activities would be restricted.</p> <p>If identified, appropriate management guidelines would be prepared.</p>	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> tbd tbd tbd</p> <p>Develop and apply best management practices as required.</p>	Develop and apply best management practices as required.	Develop and apply best management practices as required.	Develop and apply best management practices as required.	Develop and apply best management practices as required.
<p>17. Significant Woodlands</p> <p>If part of the County Forest is identified as a significant woodland through municipal or provincial natural heritage planning processes, the County will work with the stakeholders to ensure features are maintained.</p>	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> tbd tbd tbd</p> <p>Develop and apply best management practices as required.</p>	Develop and apply best management practices as required.	Develop and apply best management practices as required.	Develop and apply best management practices as required.	Develop and apply best management practices as required.

**AREA OF CONCERN STRATEGIES AND FOREST CONSERVATION MEASURES
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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
Name/Concern	Description	Harvest	Renewal	Maintenance	
<p>18. Cultural Heritage Values</p> <p>Structural remains Archeological remains Traditional use sites Cultural landscapes</p> <ul style="list-style-type: none"> • physical damage to historical values, artefacts and remains • access • aesthetics 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>AOC to be determined on a site specific basis to protect the identified value.</p> <p>Consult with appropriate agencies (Ministry of Culture, Citizenship and Recreation)</p>	<p>No operations until specific management guidelines for known sites have been established.</p> <p>Operations to be consistent with recommendations.</p>	<p>No operations until specific management guidelines for known sites have been established.</p> <p>Operations to be consistent with recommendations.</p>	<p>No operations until specific management guidelines for known sites have been established.</p> <p>Operations to be consistent with recommendations.</p>	<p>New roads or landings may not be permitted within the AOC.</p> <p>No aggregate extraction in AOC.</p> <p>Construction of aggregate pits not permitted within the immediate vicinity of value.</p> <p>Existing roads may be used but shall not be upgrade beyond existing widths.</p> <p>Access may be controlled depending on value / feature identified.</p> <p>Skid trails may be restricted depending on value / feature identified.</p>

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FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>19. Recreational Trails - Permanent / Recognized</p> <p>X-Country Skiing, Snowmobile, Motorcycle, Hiking</p> <ul style="list-style-type: none"> • obstruction by logging debris • degradation of trail • aesthetics • noise • public safety 	<p><u>AOC</u> n/a <u>Reserve</u> n/a <u>Modified</u> n/a</p> <p>Minimize direct user conflict and safety hazards by;</p> <ul style="list-style-type: none"> • scheduling operations in the off-season when feasible; • temporarily close, restrict use, or re-route section of trail affected during operations; • joint use when ever feasible; • discuss options with affected parties; • place proper warning signs at all entry points on affected trails; • trails to be kept free of debris <p>The need to establish AOC boundary lines prior to operational treatment will be determined on a case by case basis.</p> <p>Place warning signs at entrance points and other locations to advise public that forest management operations are in progress.</p>	<p>Normal silvicultural operations along the trail.</p> <p>Selection, shelterwood and limited patch cutting.</p> <p>Cutting along trail may be modified and shall be laid out considering natural features / landscape patterns and planned type.</p> <p>Protect visual values according to situations, maintain aesthetics.</p>	<p>Normal silvicultural operations along the trail.</p>	<p>Normal silvicultural operations along the trail.</p> <p>Girdling presents a safety concern, therefore not allowed within 25 m of the trail.</p> <p>Remove hazard trees within 25m of trail.</p> <p>All logging debris to be removed from trail immediately following the operation.</p>	<p>Co-ordinate the road location and construction to benefit trail and allow joint use.</p> <p>Cost sharing, construction assistance shall be encouraged by affected parties where modifications to road recommended for multiple benefits.</p> <p>Access should cross trails at right angles where possible.</p> <p>Trails to be kept free of logging debris.</p> <p>Use heavy equipment on trail-bed may be restricted.</p> <p>No skidding on trail.</p> <p>Damaged trail surface to be repaired by logger following operations.</p> <p>Post signs to advise public of operations.</p>

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FOR THE PETERBOROUGH COUNTY FOREST - SUMMARY**

RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>20. Boundary Lines</p> <p>(Property, Operating) (Private, Crown Lands)</p> <ul style="list-style-type: none"> trespassing survey monuments public safety aesthetics property damage 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> 25m 0 25m</p> <p>The need to establish AOC boundary lines prior to operational treatment will be determined on a case by case basis.</p> <p>Prior to cut layout, offer landowner the opportunity to assist in the establishment of the property line.</p> <p>Provide landowner opportunity to inspect boundary location prior to commencing operations.</p> <p>Secure boundary line approval.</p> <p>Clearly mark survey monuments.</p> <p>Place proper warning signs to advise public and landowner of operations.</p> <p>Conserve aesthetic values accordingly.</p>	<p>Within the immediate vicinity of the boundary line, the cut shall be planned with the type of harvest / disturbance in mind.</p> <p>Schedule operations in the off-season where feasible.</p> <p>Normal selection, shelterwood harvest permitted up to the agreed upon boundary.</p> <p>Clearing cutting permitted on a limited basis within AOC provided values and be conserved and silvicultural objectives met.</p> <p>Tops to be lopped at 1m in height within AOC.</p>	<p>Normal silvicultural treatment / operations.</p> <p>Prescribed burning not permitted within 25m of boundary line.</p>	<p>Normal silvicultural treatment / operations.</p> <p>Girdling presents a safety concern, therefore not allowed within 25 m of the boundary.</p>	<p>New roads and landings should not be constructed in the immediate vicinity of the boundary line.</p> <p>Construction of aggregate pits not permitted within 15 m of the boundary line.</p> <p>Use existing and/or old roads / trails / landings wherever possible.</p> <p>Restrict mechanical equipment in the immediate vicinity of the boundary line.</p> <p>Consider access control measures.</p>

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
<p>21. Roads - Highway, Municipal, Private</p> <ul style="list-style-type: none"> • degradation of road • obstruction from debris • aesthetics • public safety 	<p><u>AOC</u> 25m <u>Reserve</u> 0 <u>Modified</u> 25m</p> <p>The need to establish AOC boundary lines prior to operational treatment will be determined on a case by case basis.</p> <p>Layout of forest management operations shall consider the type of disturbance and the natural features of the landscape.</p> <p>Advise Ministry of Transportation of pending operations when Entrance permit required.</p> <p>Advise those responsible for the road of the pending operation and/or need to use the road. Agreement on road use, maintenance and repair shall be reached prior to commencing operations. Joint inspection to determine existing road condition.</p> <p>The need for additional measures to be determined on a site specific basis.</p> <p>Place warning signs at entrance points and other locations to advise public that forest management operations are in progress.</p>	<p>Harvesting permitted within immediate vicinity of the road.</p> <p>Selection and shelterwood harvest permitted, patch cutting permitted on a restricted basis.</p> <p>Provide vegetation screen where necessary to protect values.</p> <p>Operational layout shall take into consideration the type of disturbance.</p> <p>Lop tops to 1 metre in height within the immediate vicinity of the road. Harvesting debris not allowed in the right-of-way.</p> <p>Post warning signs at strategic locations to advise public of operations.</p>	<p>Normal silvicultural treatments / operations.</p>	<p>Normal silvicultural treatments / operations.</p> <p>Girdling presents a safety concern, therefore not allowed within 50 m of road.</p>	<p>No landings within the immediate vicinity of the road and no roadside piling permitted unless approved by the County and those responsible for the road.</p> <p>Construction of aggregate pits not permitted within AOC unless approved by the County and those responsible for the road.</p> <p>Approved landings to be free of debris and seeded with a grass / clover mixture.</p> <p>Skidding not permitted on road right-of-way.</p> <p>Repair of damaged road surfaces is the responsibility of the forest operator.</p> <p>Road must not be obstructed during operations.</p> <p>Secure entrance permits from Ministry of Transportation before construction begins.</p> <p>Adhere to seasonal load restrictions.</p> <p>Adhere to speed limits and other safety matters.</p>

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
		Name/Concern	Description	Harvest	
22. Hydro Transmission and Distribution Lines	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>The need to establish AOC boundary lines prior to operational treatment will be determined on a case by case basis.</p> <p>Advise local Hydro office when pending operations are adjacent to lines.</p>	<p>Normal silvicultural operations in the vicinity of hydro line.</p> <p>No tops to be left on hydro right-of-way.</p> <p>Fell trees only if feature / structure can be protected.</p>	<p>Normal silvicultural operations in the vicinity of hydro line.</p> <p>Prescribed burn not allowed in hydro right-of-way.</p>	<p>Normal silvicultural operations in the vicinity of hydro line.</p> <p>As per Harvest.</p>	<p>New roads across Hydro right-of-way must be approved by Hydro and the County.</p> <p>Use of existing roads is encouraged, damage to roads to be repaired by contractor immediately.</p> <p>No skidding allowed in hydro right-of-way.</p> <p>No aggregate extraction in AOC.</p>
<p>23. Research Plots / Environmental Monitoring Stations</p> <p>None identified.</p> <ul style="list-style-type: none"> • degradation of research • physical damage 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>Details of AOC to be established on a site specific basis and to be consistent with the intent and type of research project.</p> <p>Advise principle researcher of pending forest activities.</p> <p>AOC boundary lines may or may not be installed prior to operational treatment. The need to establish AOC boundary lines will be determined on a case by case basis.</p>	<p>Forest management activities to be consistent with individual research project.</p>	<p>Forest management activities to be consistent with individual research project.</p>	<p>Forest management activities to be consistent with individual research project.</p> <p>Restrict mechanical equipment within tree length of research plot unless specifically requested by principle researcher.</p> <p>No aggregate extraction in AOC.</p>	

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RESOURCE VALUE	AREA OF CONCERN	PRESCRIPTION			ACCESS
Name/Concern	Description	Harvest	Renewal	Maintenance	
<p>24. Forest Dwelling Songbirds</p> <p>The information provided here is for general guidance and should be considered when planning and implementing forest management activities.</p> <ul style="list-style-type: none"> • loss of nesting / potential nesting habitat • disruption of nesting and rearing activities • reduction in foraging opportunities • reduction of biodiversity • large scale changes to habitat 	<p><u>AOC</u> <u>Reserve</u> <u>Modified</u> n/a n/a n/a</p> <p>Individual nests of songbirds are difficult to locate when performing forest management and related activities. General provisions for the habitat for a variety of songbirds can be achieved through the application of good forestry practices and sound silvicultural techniques. General habitat requirements can be further enhanced and supported through the implementation of other AOC guidelines outlined in this document such as;</p> <ul style="list-style-type: none"> ▪ Forest Diversity ▪ Marten Habitat ▪ Pileated Woodpecker Habitat ▪ Deer Habitat ▪ Lakes and Streams ▪ Wetlands <p>Following tree-marking prescriptions will maintain important habitat features where they occur in all stands, including snags, living cavity trees, mast-producing trees, coarse woody debris, and conifers for nest trees.</p>	<p>Applying appropriate silvicultural systems will maintain suitable crown closures, diversity of tree species, a range of forest cover types, interior and edge habitats, a suitable distribution and range of age classes in addition to providing vertical and horizontal diversity within the forested area.</p> <p>Adhere to sustainable harvest and treatment levels and distribute management activities throughout the County Forest</p> <p>Avoid mechanical disturbances during critical nesting periods for songbirds (May 1 – July 31).</p> <p>Normal silvicultural treatments / operations between August 1 – April 30</p> <p>Maximize the level of merchandizing / delimiting activities at the stump where possible to minimize the ground area affected by mechanical equipment.</p>	<p>Avoid mechanical disturbances during critical nesting periods for songbirds (May 1 – July 31).</p> <p>Normal forest renewal treatments / operations between August 1 – April 30.</p> <p>Normal tree planting activities.</p> <p>Modified use of prescribed burning where it is recommended for regeneration, site restoration during the critical nesting period.</p>	<p>Avoid mechanical disturbances during critical nesting periods for songbirds (May 1 – July 31).</p> <p>Normal forest maintenance treatments / operations between August 1 – April 30.</p>	<p>No constructions during critical nesting periods for songbirds (May 1 – July 31).</p> <p>Minimize number of skid trails.</p>

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Appendix 4 Report of Past Operations

Map 14: Report of Past Operations, 1990-2009

2000-2009 – 10 Year Summary Report

Table 1. Report of Forest Management / Silvicultural Activities, 2000-2009

Table 2. Report of Expenditures for Forest Management / Silvicultural Activities, 2000-2009

Table 3. Report of Harvest Volumes and Stumpage Revenues, 2000-2009

Map 15. Report of Past Operations, 2000-2009

2005-2009 – 5 Year Summary Report

Table 1. Report of Forest Management / Silvicultural Activities, 2005-2009

Table 2. Report of Expenditures for Forest Management / Silvicultural Activities, 2005-2009

Table 3. Report of Harvest Volumes and Stumpage Revenues, 2005-2009

Map 16. Report of Past Operations, 2005-2009

2000-2004 – 5 Year Summary Report

Table 1. Report of Forest Management / Silvicultural Activities, 2000-2004

Table 2. Report of Expenditures for Forest Management / Silvicultural Activities, 2000-2004

Table 3. Report of Harvest Volumes and Stumpage Revenues, 2000-2004

Map 17. Report of Past Operations, 2000-2004

1995-1995 – 5 Year Summary Report

Table 1. Report of Forest Management / Silvicultural Activities, 1995-1999

Table 2. Report of Expenditures for Forest Management / Silvicultural Activities, 1995-1999

Table 3. Report of Harvest Volumes and Stumpage Revenues, 1995-1999

Map 18. Report of Past Operations, 1995-1999

1990-1994 – 5 Year Summary Report

Table 1. Report of Forest Management / Silvicultural Activities, 1990-1994

Table 2. Report of Expenditures for Forest Management / Silvicultural Activities, 1990-1994

Table 3. Report of Harvest Volumes and Stumpage Revenues, 1990-1994

Map 19. Report of Past Operations, 1990-1994

Appendix 5 Allocation / Areas Selected For Treatment, 2010-2019

List of Stands Selected for Treatment: 2010 – 2019

Map 20. Allocation Areas by Period, 2010 – 2019

Map 21. Allocation by Treatment Type, 2010 – 2019

Appendix 6 References / Background Documents

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Appendix 7 Forest Resources Inventory (FRI), 2010 – 2019

Forest Stand Listing for the Peterborough County Forest: 2010 – 2019

Map 22. Forest Boundary and Compartments (small scale)

Map 23. Forest Resources Inventory (with stand listing)

Map 24. Forest Boundary and Compartments (large scale). << same as Map 22