

*Lanark County Community Forest
Forest Management Plan
2011-2030*



Approved By:

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(Forest Owner)

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LANARK COUNTY COMMUNITY FOREST FOREST MANAGEMENT PLAN

Preparation

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LANARK COUNTY COMMUNITY FOREST FOREST MANAGEMENT PLAN

Commonly Used Terms and Acronyms

County of Lanark	Lanark or County
Eastern Ontario Model Forest	EOMF
Environmental Management System	EMS
Forest Resource Inventory	FRI
Forest Stewardship Council	FSC
Geographic Information System	GIS
Lanark County Community Forest	County Forest or Forest
Mississippi Valley Conservation Authority	MVC
Ontario Ministry of Natural Resources	OMNR
Ontario Professional Forester's Association	OPFA
Registered Professional Forester	RPF
Species at Risk	SAR
Lanark County Community Forests Working Group	LCCFWG

LANARK COUNTY COMMUNITY FOREST
FOREST MANAGEMENT PLAN
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1. Lanark County Forest Compartment List
2. Lanark County Forest Compartment Maps and Aerial Photographs and Forest Stand Data (Maps and Photographs on DVD – Hardcopy in separate Binder: Plan Copies 1 and 2 only)
3. Forest Type Definitions
4. Stand Density Index Diagrams and Tables
5. Species at Risk Occurrences in Lanark County (2009)
6. Glossary of Technical Terms (Source: OMNR, 2000)
7. Bibliography

LANARK COUNTY COMMUNITY FOREST **FOREST MANAGEMENT PLAN**

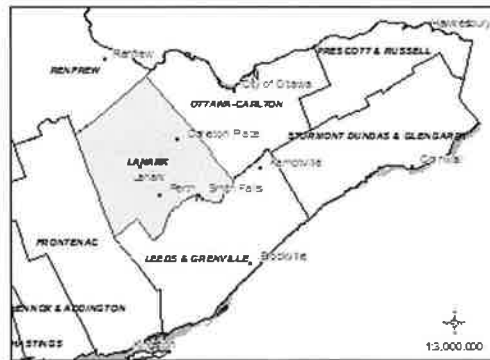
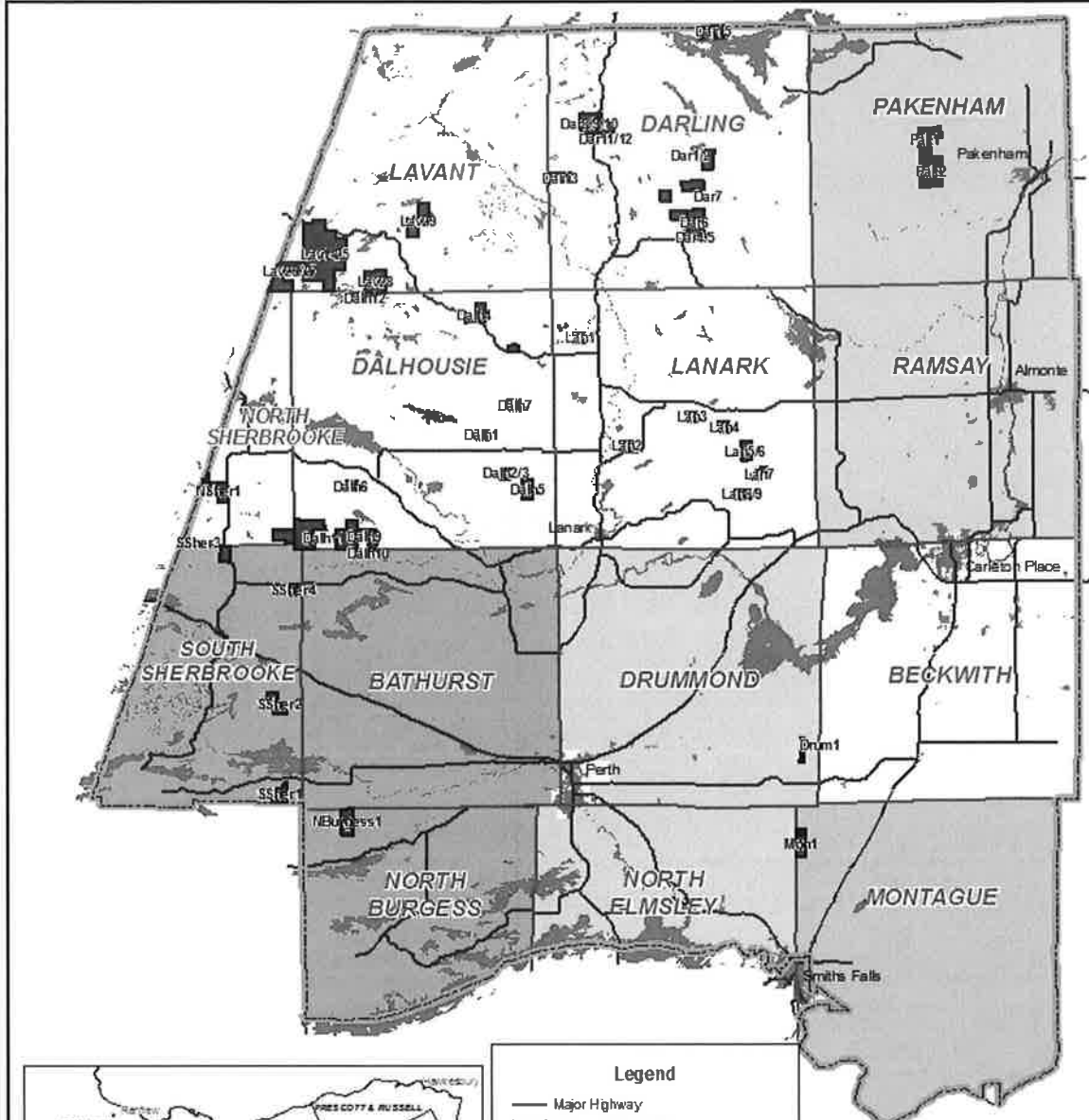
1.0 INTRODUCTION

Lanark County owns title to 4,583 hectares (11,319 acres) of land in Lanark County (Map 1 and Appendix 1). This Twenty Year Forest Management Plan has been prepared to ensure a consistent approach to forest management over the long-term and to meet the requirements of Forest Stewardship Council (FSC) certification (Section 1.3). The Management Plan is a document which describes the attributes of the Community Forest, the forest types and their management, and the natural heritage and cultural heritage values and their conservation.

The previous Management Plan was written in 1994. Although this Plan was not due to expire until 2014, a new Management Plan has been prepared to reflect changes in strategic direction, forest management and environmental policies which have occurred in the last 16 years. This new plan covers the period from January 1, 2011 to December 31, 2030.

The management of the Forest is the responsibility of the Public Works Department. Input on management is provided by the Community Forest Working Group, which includes representation from Lanark County, forestry professionals, and key stakeholders. The composition of the Working Group, led by the Public Works Department, Facilities and Fleet Manager includes:

- Two County Councilors,
- the Community Stewardship Council of Lanark County Coordinator,
- the District Forester, Ontario Ministry of Natural Resources,
- a representative from Mississippi Valley Conservation,
- a representative from the Mississippi Valley Field Naturalists,
- a Public Member, from the Community Stewardship Council of Lanark County, and
- a representative from the local Forest Industry.



Legend

- Major Highway
- Lakes and Major Rivers
- Urban Area
- Compartment Boundary
- Old Township Boundary
- Lanark County Boundary
- Township of Beckwith
- Township of Drummond/North Elmsley
- Township of Lanark Highlands
- Town of Mississippi Mills
- Township of Montague
- Township of Tay Valley

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1.1 Environmental Management System

The environmental management system (EMS) for the Community Forest is described in a series of documents which address strategic direction, Community Forest level planning and site-specific planning and implementation (Table 1). The goal of the EMS is to provide a framework for the sustainable management of the Community Forest and the ongoing assessment of the health and ecological integrity of forest ecosystems and natural heritage values.

Strategic direction for the Forest is described in the Community Forests Vision Statement and Guiding Principles (2010 - see section 1.2). The Forest is managed in accordance with this long-term direction to accommodate a wide variety of values and uses. Other uses of the Forest are guided by other plans or policies prepared by the County of Lanark. For example, the County adopted a Recreational Use Policy on August 25, 2009.

Community Forest level planning documents follow the strategic direction set out in the Vision Statement and Guiding Principles. The Forest Management Plan is the descriptive Community Forest planning document, and there are four prescriptive Community Forest level planning documents. The assessment of sustainable harvesting levels and five year schedules of planned forestry operations are provided in Five-Year Operating Plans. The current Five Year Operating Plan for the Forest covers the period from January 1, 2008 to December 31, 2012. An Annual Work Plan and budget is prepared each year by the Forest Manager and approved by the County, as is an annual State of the Forest Report outlining the previous year's activities. Standard operating procedures for forest operations such as tree marking, road construction, water crossings, and harvesting are described within the Eastern Ontario Model Forest (EOMF) Forest Certification Program Policy and Procedures Manual (2007 – see section 1.3).

Public input to the Vision Statement and Guiding Principles, Forest Policies and Community Forest level planning documents are provided by the Community Forest Working Group, key stakeholders and the general public.

Forest management activities on the Forest are implemented according to a site specific harvest plan/ prescription prepared by a member of the Ontario Professional Foresters Association (OPFA) (Section 6.3) and a Stumpage Sale Agreement (Section 6.5). Harvest activities and other uses of the forest are monitored by the Forest Manager and documented on Forest Operations Inspection Reports and Community Forest Inspection Forms.

Table 1 Environmental Management System: Lanark County Community Forest

<u>DOCUMENT</u>	<u>CONTENTS SUMMARY</u>	<u>KEY REFERENCES</u>
Strategic Documents		
Community Forests. Vision Statement and Guiding Principles. (July 20, 2010)	Vision statement, guiding principles, and objectives for the Community Forest. Community Forest Working Group management structure	Lanark County. 2006. Business Plan for the Lanark County Community Forests 2006 to 2010.
Recreational Use Policy (Aug 25 2009)	Objectives, recommendations and permitted uses for recreation on the Community Forest	
Community Forest Planning Documents		
Forest Management Plan (FMP) (January 1, 2011 to December 31, 2030)	Community Forest History and Description Forest Type Description and Silviculture Natural Heritage and Cultural Values Description Guidelines for Areas of Concern for Protection of Natural Heritage and Cultural Values Monitoring and Assessment Forest Resource Inventory Maps	OMNR 1998a: A Silvicultural Guide For the Tolerant Hardwood Forest in Ontario, OMNR 1998b: A Silvicultural Guide For the Great-Lakes-St. Lawrence Conifer Forest in Ontario OMNR 2000: A Silvicultural Guide To Managing Southern Ontario Forests OMNR 2010: Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales.
Five Year Operating Plan (FYOP) (January 1, 2008 to December 31, 2012)	Report on Past Operations Assessment of levels of sustainable harvest, thinning and revenue Five year harvest and thinning allocations Operating Standards Property Inspections	Eastern Ontario Model Forest. 2007. Forest Certification Policies and Procedures Manual (Information Report 51 Version 2).

EOMF Forest Certification Program Policy and Procedures Manual (Information Report 51 Version 2 2007)	<p>Policies for certified forest owners</p> <p>Specific qualification requirements for activities (e.g. certified tree markers)</p> <p>Standard operating procedures for forest operations including tree marking, road construction, water crossings, and harvesting.</p>	
Annual Work Plan and Budget	<p>Proposed operations and budget to be carried out by the Forest Manager on the Community Forest</p> <p>Planning function under the Five Year Operating Plan</p>	
Annual State of the Forest Reports	<p>Annual summary of operations completed by the Forest Manager on the Community Forest</p> <p>Reporting function under the Five Year Operating Plan</p>	
Site Specific Planning and Implementation Documents		
Harvest plans/prescriptions	<p>Forest and site specific silviculture prescription and map</p> <p>Directions for tree marking, logging and establishment of areas of concern.</p>	<p>OPFA 2010: Practice Bulletin 10: Minimum Content For Prescriptions For Partial Harvesting on Private Land in Ontario</p> <p>OMNR 2004: Ontario Tree Marking Guide. Version 1.1</p>
Stumpage Sale Agreements	Requirements for wood measurement and payment, contractor qualifications and forest operating standards.	
Forest Operations Inspection Reports	Documentation of assessments of harvest operations carried out by Forest Manager to ensure compliance with standards.	
Community Forest Inspection Form	Documentation of findings and recommendations of property inspections carried out by Forest Manager.	

1.2 Strategic Direction

Vision Statement

Lanark County Community Forests are a rich, healthy, mosaic of woodlands, wetlands, streams and lakes, plants and animals, geological and heritage features, situated within a landscape of contiguous Crown and privately owned properties and will be managed sustainably to provide social, recreational, economic, scientific, cultural and spiritual benefits to the people of Lanark County (In reference to document Vision Statement and Guiding Principles; July 20, 2010).

Guiding Principles for Effectively Managing the Community Forests

1. Management and use of the Community Forests will reflect and be responsive to the diverse nature and natural values of the individual Community Forest properties.
2. The people of Lanark County own the Community Forests and the Community Forests should be accessible to all, provided use is not detrimental to the health and sustainability of the Forests and is compatible with other uses and users.
3. The Corporation of the County of Lanark will demonstrate leadership in the management of the Community Forests for forest health, and, as a demonstration of best practices of sustainable forest management for other public and private landowners while recognizing existing and evolving research.
4. The Community Forests will be managed on a landscape basis taking into consideration the ecology of the surrounding areas.
5. The principles of the Vision Statement for the Community Forests will take into consideration the objectives and strategies of the current Mazinaw-Lanark Management Unit Forest Management Plan for the adjoining Crown lands.

6. The Corporation of the County of Lanark will demonstrate sustainable forest management by maintaining certification with the Forest Stewardship Council (FSC) through the Eastern Ontario Model Forest.

7. The Corporation of the County of Lanark will pursue a variety of sources of revenue for and from its Community Forests. All revenues will be re-invested into the Community Forests.

8. The Corporation of the County of Lanark will work in partnership with municipalities, resource agencies, businesses, community groups, landowners and other user groups to manage the Community Forests.

9. The Community Forests Working Group will work closely with the Lanark County Municipal Trails Corporation to develop trails, as appropriate, in Community Forest properties.

10. Healthy Community Forests will support a variety of uses that benefit the people of Lanark County and surrounding areas. They can play a positive role in contributing to the overall health of Lanark's environment and economy, as well as providing environmental benefits outside of Lanark.

11. Forests are considered healthy when their inherent ecological processes are functioning within a natural range of variability. Healthy forests are able to adapt to changes, stresses and disturbances.

Objectives

Nine Objectives are described for achieving the stated Vision and Guiding Principles:

1. To progressively identify, sustain and enhance the health and ecological integrity of the forest ecosystems of the Community Forests.

2. To progressively identify and facilitate opportunities for a variety of responsible uses of the Community Forests where use does not compromise the overall health and ecological integrity of the Forests, including: but are not limited to:

- economic uses
- tourism and recreation
- education
- cultural
- natural heritage
- research

3. To promote a better understanding and appreciation of the values and uses of the Forests.

4. To continue to provide opportunities for community work placement programs.

5. To manage disturbances (fire, insects and diseases) for the overall health and ecological integrity of the Community Forests while ensuring that human life and private property are protected from such disturbances in a responsible and effective manner.

6. To engage in active partnerships with County Municipalities, resource agencies, businesses, community groups, landowners and other user groups to manage and provide stewardship of the Community Forests.

7. To pursue a variety of sources of revenue and funding so that averaged over time, the management of the Forests is financially self-sustaining.

8. To manage the Community Forests as a model of sustainable forest management consistent with FSC Certification.

9. To develop 20 Year Forest Management Plans, 5 Year Operating Plans as well as Yearly Work Schedules.

1.3 Forest Certification

Forest certification involves the independent evaluation of forestry practices to a common standard, which can be used to label forest products such as lumber or paper as harvested from a well managed forest. The Eastern Ontario Model Forest (EOMF) has been evaluating forest certification, or “green labelling” of forest products and the potential costs and benefits for private woodlot owners.

The EOMF was certified in 2003 under the Forest Stewardship Council (FSC). The certificate permits the EOMF to incorporate private lands and community forests under their umbrella certificate. Forest owners must sign a Memorandum of Understanding with the EOMF and commit to following standard policies and standard operating procedures (EOMF Forest Certification Policies and Procedures Manual – 2007). Certified forests are included in the annual independent audit.

In December 2007 the Lanark County Community Forest was incorporated under the EOMF FSC certificate. FSC certification provides Lanark County residents with the assurance that their forests are managed to a world-recognized standard. FSC certification also positions the County to benefit from the sale of certified wood should markets develop for FSC certified lumber, poles, paper or firewood. The other eastern Ontario Community Forests which are included within the EOMF Certificate include Stormont, Dundas and Glengarry, South Nation Conservation, Prescott and Russell, Leeds and Grenville, and Renfrew.

1.4 Plan Administration

There are four controlled copies of the Forest Management Plan:

Copy #	Location
1.	Lanark County Office
2.	Forest Manager
3.	Lanark County Office (spare)
4.	Forest Manager (spare)

Controlled copies will be current, including any plan amendments. Additional uncontrolled copies will be made available as required: uncontrolled copies may not contain all current plan amendments.

The Plan shall be reviewed at the 10 year mid-point to ensure currency and relevancy, and revised where appropriate.

2.0 FOREST HISTORY (Sources: EOMF, 1993, EOMF, 1999. Lanark County, 2006. Ontario Department of Energy and Resources Management, 1970. Ontario Government, 1948, O.M.N.R. 1982)

Immediately prior to European settlement, the forests of Lanark County were occupied by the Algonquin First Nation. Algonquin settlements were typically small and were moved regularly. Although the Algonquins did imitate Iroquoian agricultural methods, the fact that they moved regularly meant that the evidence of forest disturbance from their settlements quickly disappeared after they left.

Settlement of Upper Canada heralded the onset of major changes to the forests. The townships of Montague, North Elmsley and North Burgess were surveyed in the 1790s, but initial European settlement of this area was limited: settlers favoured the townships along the St Lawrence River and Lake Ontario. In the aftermath of the War of 1812, the British government initiated the Rideau Military Settlements program to advance settlement north of the Rideau system.

The first group of settlers under this program, many of whom were veterans of the Napoleonic Wars or the War of 1812, left Scotland in 1815 and reached Perth in 1816. Later groups of settlers were driven by economic reasons, including depression of wages in the weaving district of Lanarkshire, Scotland and the Irish potato crop failure of 1821. The first settlers were destined for the previously surveyed townships or for Bathurst, Beckwith, Drummond or North and South Sherbrooke which were surveyed from 1816 to 1819. By the end of 1823, the surveys of all townships in what would become Lanark County had been completed under the direction of Reuben Sherwood.

The surveys revealed the wide variety of soils that existed in these townships, varying from deep clay or sand to shallow rock. Many of the southern townships had large areas of swamp, and the rocky, shallow soils of the northern townships were quickly identified as having limited agricultural potential. The surveyors noted the vast expanses of timber including white and red pine, maple, ash, elm, beech, bass (wood), black (red) oak, ironwood, hemlock, cedar

and birch. In the northern townships, treed swamps and grassy meadows provided a break in the upland forest cover which offered opportunities for the starting farmer to pasture livestock and cut cedar and ash for fence-rails. In Darling and Pakenham townships some of the best white and red pine had already been cut and shipped to Quebec via White Lake and the Ottawa River before the surveys took place.

Because of the challenges with clearing and farming the relatively poor land, many men left their wives and children to go lumbering in the winter. “Settlement and lumbering were carried on simultaneously in the watershed, the one helping to develop the other as long as the timber lasted. Lumbering provided winter employment for the settlers and a convenient market for hay and other products. (Ontario Government. 1948).”

Export markets to England and later to the United States fuelled the demand for wood products. Early settlers harvested a great deal of valuable timber, from huge pine trees for ship’s masts to white oak, ash and elm for lumber. “Beech and maple, then considered worthless, were piled up in log heaps and burned, the ashes being carefully gathered and sold to merchants, to be made into potash,” one of Canada’s major export products (Ontario Government. 1948).

In addition to its bountiful timber resources, Lanark was blessed with running water to power mills. As settlement progressed, numerous sawmills were developed to serve the growing population and the export markets.

Wildfire was a major source of forest disturbance. Fires were deliberately set by settlers as a means of clearing land or by squatters, who often cut and burned sizable stands of timber in the northern townships for potash. The debris left after logging operations became a major source of fuel for wildfires. Commencing in the mid-1850’s the construction of railway lines created a new source of fire danger as sparks and coals were emitted from coal-burning engines.

All these activities had an inevitable result on the forests of Lanark County. Forest cover declined precipitously throughout the 1800s: Lavant Township was reported as having less than 10% forest cover by 1861. Major changes in tree species occurred as the most favoured

species such as white and red pine were selectively removed from the forest. Species that were adapted to disturbance such as red oak, poplar and white birch thrived in the harsh conditions.

In the hundred year period from 1815 to 1915, the forested landscape was completely altered; however, the 20th century saw a marked reduction in land clearing and harvest levels and a subsequent recovery in forest cover in Lanark. By early 1900s, the accessible timber limits along the Mississippi River were exhausted, resulting in greatly reduced rates of harvesting. The remaining sawmills shifted their focus to the hardwood forests. Many marginal agricultural lands were abandoned due to poor fertility and changes in farming technology, leading to the establishment of new forests by natural means and through tree planting programs. Destructive fires, both natural and man-made were greatly curtailed. The gradual change to managing rather than exploiting forests resulted in harvest disturbances which emulated natural processes.

By 1991, forest cover in Lanark County had increased to 58.1% (as measured by OMNR using 1991 FRI on-shield and 2000 SOLRIS off-shield). The forest cover in the amalgamated township of Lanark Highlands was 74.1%. The majority of the forests of Lanark County are between 80 and 120 years of age, which reflects this period of forest recovery and reduced disturbance levels. Tree species which are more adapted to lesser levels of disturbance like sugar maple continue to increase in prominence on the landscape, although mature forests of red oak, poplar, and white birch remain.

Insects, disease and abiotic stresses continue to impact the species composition of the forest. White elm, which was a common species in Lanark's hardwood forests, started its precipitous decline in the 1950s due to the introduction of dutch elm disease. Butternut has been declared an endangered species because of the butternut canker. The 1998 ice storm and droughts of 2001 and 2002 resulted in significant decline of many tree species, most notably american beech, poplar and white birch. The future status of white, green and black ash has become a concern since the identification of emerald ash borer in Ottawa.

2.1 Lanark County Community Forest History

As early as 1850, concerns were being raised about lands being impoverished by all the valuable timber being cut off. By the turn of the 20th century, many people were expressing concern for the state of the forests throughout southern Ontario. In 1921, the Province passed the Reforestation Act, which enabled the Minister of Lands and Forests to enter into agreement for reforesting, developing and managing lands held by Counties.

On June 17, 1938 The Council of Lanark County passed Bylaw 1135, authorizing the purchase of property to be managed for Forestry Purposes under an agreement with the Department of Lands and Forests. Under the terms of this Agreement, Lanark County would purchase land to be managed for forestry purposes and the Department of Lands and Forests would manage the lands. Forestry purposes were broadly defined as the production of wood and wood products, provision of proper environmental conditions for wildlife, protection against floods and erosion, recreation and protection and production of water supplies.

The original purchase comprised 648 hectares (1600 acres) in Lavant Township, now part of the Lavant Main block. The property was purchased in 1938 for \$1523.18 or \$.95/ acre. Lanark County continued to add properties to their holdings with the last property purchased in 1987, resulting in a total area on title of 4,583 hectares or 11,319 acres. Most of these land purchases were marginal agricultural lands with shallow-soiled fields which were subsequently planted with trees, woodlots that had typically been grazed and harvested, lakes, wetlands, and rock barrens. The area of forest in each of the townships of Lanark County is shown in Table 2 on the following page. The forest types are described in detail in Section 9.0.

The Agreement was renewed and modified several times since 1938. The term of the last Agreement was for 40 years, from November 27, 1961 to March 31, 2000. The Province of Ontario provided substantial financial support to the Agreement Forest Program. Grants were provided by the Provincial government to assist with land purchase. A total of \$421,863.19 was provided by the Province to Lanark County as grants for land purchase. Records of costs and revenues incurred by the Province for forest management were maintained by the OMNR,

but not charged to the Forest Owner. Primarily because of the significant costs associated with tree planting, Lanark had accumulated a substantial forest management debt on the OMNR's books (\$456,844) by 2001.

Table 2: Lanark County Forest Area by Township (Deeded Area).

Township	Area (Hectares)	Area (acres)	Percentage
Lanark Highlands			
• Lavant	1,398	3,453	
• Dalhousie	937	2,313	
• Darling	739	1,825	
• Lanark	338	834	
• N. Sherbrooke	236	584	
Sub –Total	3,648	9009	79.6%
Tay Valley			
• S. Sherbrooke	312	770	
• N Burgess	121	300	
Sub-Total	433	1,070	9.5%
Mississippi Mills			
• Pakenham	405	1000	8.8%
Montague	77	190	1.7%
Drummond North Elmsley			
• Drummond	20	50	0.4%
Total	4583	11,319	100.0%

In 1999, a change in Provincial government priorities resulted in the end of the Agreement Forest Program. On April 25, 2001, Lanark County and the OMNR executed a Termination Agreement which dissolved the partnership, giving the County full responsibility for management of the Forest. In return for releasing the OMNR from its responsibilities for management of the forest, the OMNR forgave Lanark County the accumulated debt incurred in management of the Forest.

Despite the termination of the agreement Lanark County continues to be legally bound by the conditions of the Forestry Act (Section 2) for lands for which the Minister made a grant for

purchase. These conditions require Minister's approval for any land use change, sale or lease as well as for sharing of proceeds resulting from any land disposition, sale or lease and for the repayment of the grant in the case of a land use change. Properties that have received grants from the province are identified in Schedule "A" of the Termination Agreements. Lanark County will consult with the OMNR for any proposed change in land base and/ or land use.

In the fall of 2001, the County of Lanark issued a Request for Proposals, seeking a consultant to develop a Community Forest Business Plan. In January of 2002, the planning process was launched with a presentation to County Council. Key stakeholders and the public were involved throughout the planning process. In November of 2002, the Business Plan for the Community Forests of Lanark County, 2002 to 2006 was tabled. The Business Plan was reviewed and updated to cover the period from 2006 to 2010. In 2010, Lanark County once again updated their strategic document for the Forest and produced "Community Forests: Vision Statement and Guiding Principles."

In 2006, Lanark County enlisted the services of Mississippi Valley Conservation Authority (MVC) as Forest Manager under the terms of a two- year pilot project. Upon successful completion of this Agreement, Lanark County and MVC signed a five year Memorandum of Understanding to retain MVC's services commencing in April 2008. Under the terms of this Memorandum of Understanding, MVC staff and consultants provide professional forestry planning and management services to the County.

Throughout Lanark County's transition from owner to owner/ forest manager, The Community Stewardship Council of Lanark County has acted as an advisor and facilitator. Through participation in the Community Forest Working Group Lanark Stewardship continues to provide valuable advice and support to Lanark County and the Forest Managers.

3.0 PHYSICAL FEATURES

Information in this section is from the 1994 Resource Management Plan, and was extracted from the Soil Survey of Lanark County (1967).

3.1 Bedrock Geology

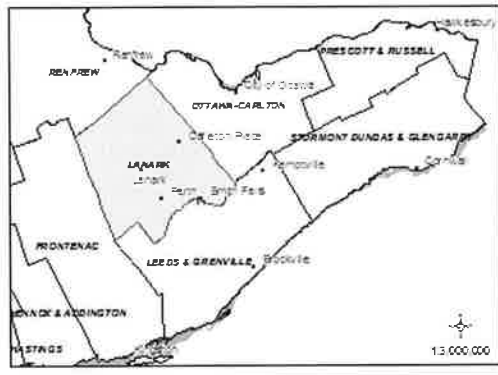
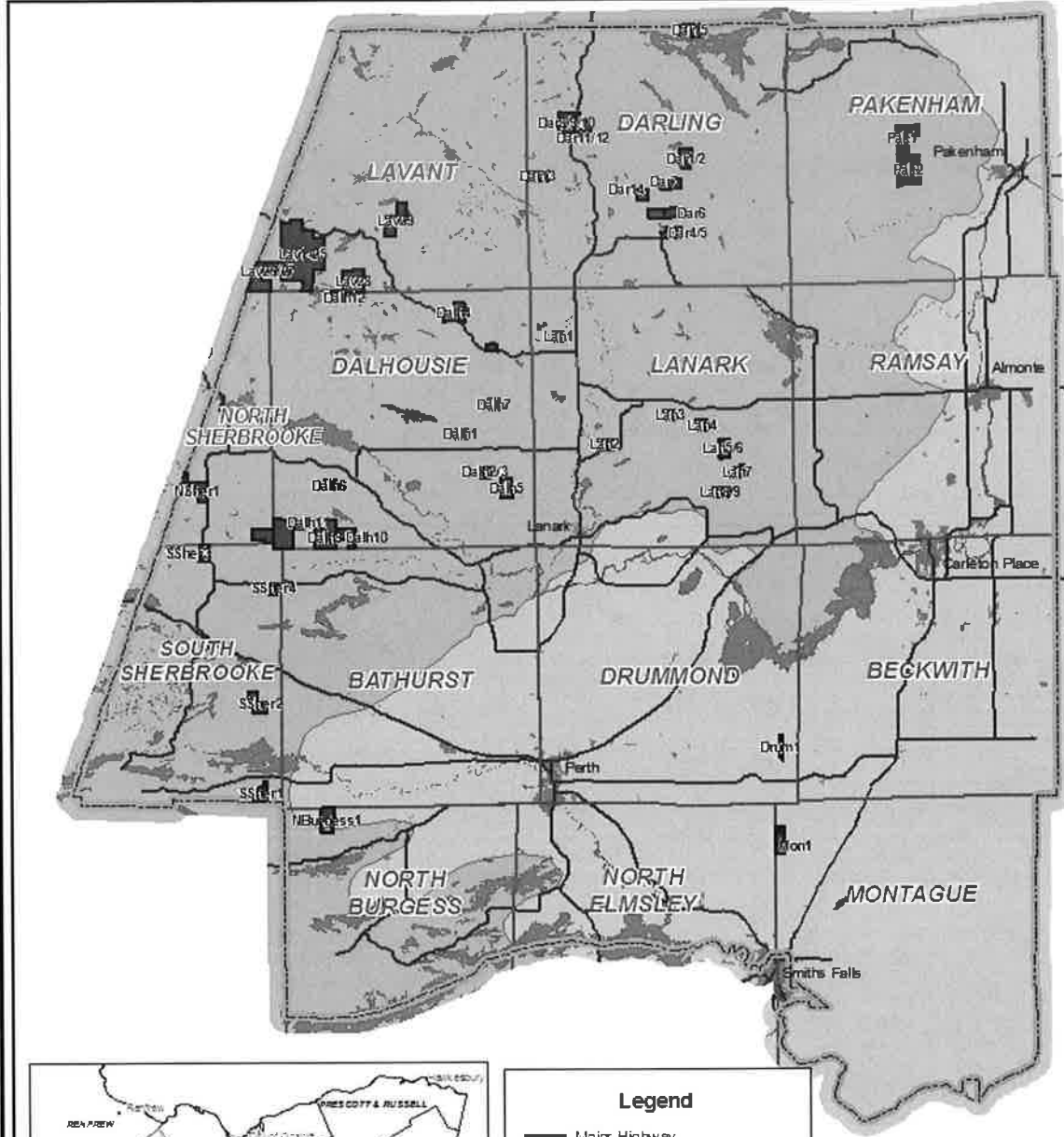
The geology of Lanark County is divided into two main sections, with the boundary line starting in the north-east corner of the County and roughly following a line along the Mississippi Valley to Balderson, Perth, Rideau Ferry and Otter Lake (Map 2). The area of Precambrian-aged bedrock (Canadian Shield) includes about two thirds of Lanark County, encompassing the majority of the geographic townships of Lavant, Darling, Pakenham, Dalhousie, Lanark, North and South Sherbrooke, Bathurst, and North Burgess Townships, and about one half of Ramsay Township. This area consists largely of igneous and acid metamorphic rocks (granite, gneiss) with a large belt of metamorphosed limestone (marble) running northeast-southwest through North Sherbrooke, Dalhousie, Lanark and Ramsey. The area of Palaeozoic-aged bedrock includes the majority of Montague, North Elmsley, Drummond and Beckwith Townships, as well as about one half of Ramsay Township, and consists largely of limestone. This area includes the most productive farmland in Lanark County and the shallow-soiled areas commonly referred to as the Smiths Falls Limestone Plain. All but three of the County Forest properties (Montague 1, North Burgess 1 and Drummond 1) are located on Precambrian-aged bedrock.

3.2 Soils and Topography

Most of the soils of Lanark County have developed from unsorted glacial till. This till cover is thin over most of the County and in many places bedrock is exposed. Small areas of deeper, more varied deposits (sand and gravels, clays) are found throughout the County. The texture classes of the soils of Lanark County are summarized in Table 3.

**Map 2
Bedrock Geology of Lanark County**

Scale 1:375,000



Legend

- Major Highway
- Lakes and Major Rivers
- Urban Area
- Compartment Boundary
- Old Township Boundary
- Lanark County Boundary

Bedrock Geology

- Precambrian (Canadian Shield)
- Paleozoic (Limestone)

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Table 3: Soil Texture Classes of Lanark County (EOMF Website, 2009)

Texture	Percentage
Sandy Loam and Sand	74%
Muck	14%
Loam, Silt loam and Clay loam	11%
Clay	1%

The dominant soil types on the County Forest are complexes of rock and Monteaale or Tweed sandy loams overlying Precambrian-aged bedrock as described below. Pockets of other soil types (eg White Lake sand and gravel) also occur on the Forests.

Monteaale Sandy Loam – Rock: This complex consists of acidic well-drained, stony sandy loam soils derived from granite in varying depths over bedrock. Exposed bedrock is common, as are low lying areas containing muck soils. The topography is rough.

Tweed Sandy Loams – Rock: this complex consists of acidic to basic well-drained, stony sandy-loam soils in close association with marble in varying depths over bedrock. Exposed bedrock is common, as are low lying areas containing muck soils. The topography is variable and ranges from smooth to rough.

Both soil complexes have a low potential for agriculture (Class 7 – the lowest rating of the Ontario Soil Survey). Limitations to agriculture include soil depth, rock exposure, stoniness, low fertility, low moisture holding capacity and steep slopes. These sites are generally better suited to forestry, wildlife and recreational uses.

The three County properties on limestone bedrock contain clay or loam soils or organic muck soils.

3.3 AGGREGATE RESOURCES

There are three sand and gravel pits on the County Forest on compartments Darling 6, Lanark 1 and Lavant Main (1-25). At this time the pits at Darling 6 and Lavant Main are licensed under the Aggregate Resources Act.

4.0 PROPERTY ACCESS

Residents can drive to many of the Lanark County Forest properties via County or Township roads or right-of-ways. However, lack of winter maintenance may affect year-round access to some remote properties. The Recreational Use Policy of Lanark County (Adopted August 25, 2009) prohibits the recreational operation of motorized vehicles in excess of 400 kg gross vehicle weight except on authorized access roads (signed) within the Lanark County Community Forest.

The Lavant Main Block, including Dixon and Bottle Lakes can be accessed by vehicle using the forest access roads. These roads are well-built but are single lane, have uneven surfaces and are not winter maintained. A truck or other vehicle with suitable clearance is suggested for driving on these roads.

Due to changes in rural land use, many municipal roads are no longer maintained. Access to some County properties is also restricted by private land. Lanark County should be contacted prior to attempting to access these properties. The properties shown in Table 4 on the following page have year-round access constraints.

Table 4: Property Access Constraints

COMPARTMENT	ACCESS ISSUE
North Burgess 1	Unmaintained Township Road
Dalhousie 1	Unmaintained Township Road
Dalhousie 6	Access Across Private Land (No road)
Dalhousie 11	Unmaintained Township Road
Dalhousie 12	Access Across Private Land (No road)
Darling 7	Unmaintained Township Road
Darling 13	Road Crosses Private Land
Drummond 1	Right of Way
Lanark 3	Unmaintained Township Road
Lanark 4	Unmaintained Township Road
Lavant 26/27	Road Crosses Private Land
Lavant 28	Road Crosses Private Land
Lavant 29	Unmaintained Old Government Road
North Sherbrooke 2	Unmaintained Township Road
South Sherbrooke 1	Unmaintained Township Road
South Sherbrooke 2	Right of Way
Pakenham 1, 2	Unmaintained Township Road

5.0 FOREST HEALTH

There are many insects, diseases and abiotic stresses that impact the health of forests of Lanark County (Table 5). The dutch elm disease, butternut canker and the ice storm (1998) have resulted in substantial tree mortality in recent years. The greatest threats are invasive pests with few or no natural biological controls. Two invasive exotic pests, the emerald ash borer and beech bark disease pose a substantial future threat to the forests of Lanark County. The infestation of asian long-horned beetle in Toronto, while potentially devastating to Lanark's hardwood forests, appears to be under control at this time.

Maintaining species and genetic diversity is the best defence against forest health issues. Sustainable forest management practices are designed to maintain a diversity of tree species growing on suitable sites, to retain healthy individuals of tree species under threat of disease (e.g. elm, butternut) and to favour natural regeneration of a diversity of species. For example, despite continued extensive mortality in white elm, healthy elm trees continue to develop seed and seedlings. Healthy elm trees are retained during tree marking and logging operations to provide a seed source for the future.

The Canadian Forest Service (CFS) and OMNR monitor local forest health conditions and provide updates to Forest Managers through regular information meetings. Detailed descriptions of forest health issues and current status reports can be found on the CFS website.

5.1 Ice Storm 1998

“January 1998 saw the largest ice storm to hit eastern Canada and northeastern USA in recorded history. The storm started on January 5th and lasted for four days, depositing heavy accumulation of freezing rain. Over 3 million people were left without electricity in the United States and Canada. Downed powerlines prevented restoration of power to many areas of Quebec and Ontario until the later part of January. (Young, 1998)”

Table 5: Lanark County Forest Health

Stress	Favoured hosts	Current Damage	Potential Damage
Insects			
Spruce Budworm	Spruce, Fir	Low	Low
Forest Tent Caterpillar	Poplar, Other Hardwoods	Low	Low to Moderate
Gypsy Moth	Oak, Other Hardwoods	Low	Low to Moderate
Larch Casebearer	Tamarack	Low	Low to Moderate
Cedar Leaf Miner	Cedar	Moderate	Moderate to High
White Pine Weevil	White Pine	Moderate	Moderate
Emerald Ash Borer	Ash	NA	High
Asian Long - Horned Beetle	All Hardwoods	NA	High
Diseases			
White Pine Blister Rust	White Pine	Low	Low to moderate
Beech Bark Disease	Beech	NA	High
Root Rot Fungus (e.g. Armillaria, Fomes)	Spruce, red pine	Low to moderate	Low to moderate
Dutch Elm Disease	Elm	High	High
Butternut Canker	Butternut	High	High
Abiotic			
Wind	All Species	Low	High (Localized)
Drought	Oak, Ash, Red Pine	Low to moderate	Moderate
Ice, Snow	Poplar, Birch, Red Pine, Scots Pine, Cedar, Beech, Red Maple, Basswood	Moderate	High

“Woodlots that contained early successional species such as trembling aspen, hybrid poplar and white birch, suffered severe damage. In some areas, these species were stripped of all major branches, leaving just one stem. The damage to the other hardwoods was variable and patchy, with some stands being completely stripped of their fine and main branches while other areas suffered relatively little damage. The extent of the damage to conifers varied from species to species, hitting red pine plantations and eastern white cedar the hardest. Eastern white pine, white spruce and balsam fir suffered relatively little damage. (EOMF, 1999) ”

Most of Lanark County received moderate ice damage. The response to the ice storm was the first concerted effort to manage the impacts of a local forest health issue in many years. The OMNR provided Lanark County with about \$20,000 under the ice storm assistance program (ISAP) to assist in managing plantations and woodlots that had been severely affected. The Community Stewardship Council of Lanark County took an active role to support the County in these efforts. The Council’s Ontario Works crew cleared access trails throughout the Forest and cleaned up some of the worst damage in red pine plantations at compartments North Sherbrooke 1, Lanark 5, Lanark 7, Dalhousie 1 and Dalhousie 2/3. Pockets of red pine plantations which were heavily damaged at Lanark 5, Lanark 7, Dalhousie 1 and Dalhousie 2/3 were replanted with white pine. Planting assessments indicated success at all properties except Dalhousie 2/3, where raspberry and horsetail competition were limiting white pine survival.

The impacts of the ice storm continue to be observed, as trees with partially damaged crowns exhibit progressive decline and mortality. This was accentuated by severe summer droughts in 2001 and 2002. Mortality has been most noticeable in american beech, poplar and white birch. Decline also continues in species such as red maple, green ash, red pine and cedar.

5.2 Fire

Fire protection is the responsibility of the municipalities. Lanark County pays the Township of Lanark Highlands a yearly fee for fire services. If required the municipality can call in Emergency Services which includes MNR fire suppression.

Forestry staff and forest contractors carry basic fire protection equipment, primarily oriented for vehicle or equipment fires. Should a major fire occur, staff and contractors have been instructed to contact the municipal fire departments.

5.3 Invasive Exotic Plant Species

An invasive exotic plant species is a non-native plant that threatens to replace native species by occupying the same ecological niche. From an ecological perspective, the concern centers on the displacement of diverse native species, the impacts on interrelated species (those that rely on native plants for food and other values) and reduced genetic diversity.

Scots pine, European buckthorn and purple loosestrife are some of the best known examples of invasive exotic plant species which are known to exist on the Forest, but to-date have not been observed at levels which significantly preclude native species.

There are currently no active management activities carried out on the Lanark County Forest for control of invasive exotic species. However, tree markers favour retention of native over non-native species in marking decisions.

The Forest Manager will continue to monitor the presence of invasive exotics as part of existing forest monitoring programs (e.g. property inventory or reconnaissance, harvest planning, harvest monitoring) and to exclude the use of invasive exotic species in tree planting programs. Should a significant concern with invasive exotics arise, the Forest Manager will work with the County to develop and apply practical control measures.

6.0 FOREST PRODUCTS

6.1 Historical Markets (Sources: EOMF, 2005. Ontario Department of Energy and Resources Management, 1970. Ontario Government. 1948.)

Forest products markets have evolved continuously since the early days of settlement. Market changes occur regularly because of changes in demand, available supply and more recently global competition.

Early settlers cleared forests for agriculture use and typically logged full-time in the winter. Wood for housing, firewood, fencing, tools and farm buildings were critical to the early settlers trying to carve out a living developing farms in Lanark County. Where a need for construction material was identified, wood often provided the solution. For example, early buildings were constructed from cedar and ash logs and roofed with basswood troughs to facilitate water runoff. Lumber, barrel staves (white oak and elm), maple sugar, tanbark, corduroy for road building and potash (formed from burning of beech and maple) were important local forest products and markets for settlers trying to clear their land.

In 1804, the Royal Navy's desperate need for naval timbers and masting, coupled with the demand for general building timber in England and the United States touched off an era of intense logging in Ontario which was to last over 100 years. In 1806 Philomen Wright sent his first raft of squared timber down the Ottawa River to Quebec City. Squared timber was only made from pines, which were more than one metre at the stump and thirty-eight metres long.

Although white pine was the focus of much of the early lumber trade, local construction and furniture trades also stimulated the demand for white oak, ash, and elm lumber. The first sawmill in the Mississippi River watershed was built in Almonte by David Shepherd in 1819. In the next decade, sawmills had been constructed at the current day sites of Almonte, Appleton, Blakeney, Carleton Place, Fallbrook, Innisville, Lanark, Pakenham, and Playfairville. Carleton Place, Lanark and Pakenham also had potash factories. Undoubtedly many more sawmills and potash factories were also in existence.

By the late 1840s, declining demand for square timber from England was being replaced by increasing demand from the United States for sawn lumber. The focus of the lumber industry changed from shipping squared timber to sawing and shipping lumber, which created jobs and wealth locally. The American markets also created a demand for hardwood tree species which had been underutilized. The Crown started leasing timber limits along the Mississippi and Clyde Rivers in the 1840s and lumber families such as the Gillies, McLarens and Caldwells erected large sawmills around Lanark and Carleton Place to use the timber. Growth in the local economy and construction projects also created markets for lumber. For example, Gillies provided the lumber to upgrade the existing corduroy road connecting Lanark and Perth to a plank road. This project was completed in 1853.

The Mississippi River was used as the major transportation route to get timber to the sawmills until the early 1900s. Timber slides, dams and chutes were constructed to facilitate the movement of logs. Railway lines such as the Kingston-Pembroke Railway (K & P - constructed in 1883) were later used to transport lumber for use in Canada and for export to the USA. In the 1920s and 1930s, the K & P was used to haul pulpwood to mills.

Large scale commercial harvesting of woodlots became more productive with the development of mechanized logging equipment in the 1950s. Most commercial activity in Lanark in the last half of the 20th century was focussed on hardwood and softwood sawlogs, hardwood pulpwood, and firewood. The advent of log trucks allowed the industry easier access to markets such as the pulp and paper mills in Cornwall and Hawkesbury. Although the furnish for these mills was originally conifer species, the mill's pulping processes were modified in the late 1940s and early 1950s to utilize the more abundant hardwood resource.

The 21st century has brought new challenges to the forest industry. The rapid rise in the Canadian dollar, increased global competition from low-cost producers and rapidly escalating energy, labour and fibre costs have affected all forest products companies. Additional pressures facing individual mills and sectors include aging equipment (Domtar's Cornwall mill was the oldest continuously operating pulp and paper mill in Canada) a reduction in the rate of growth of North American paper demand and the softwood lumber tariffs imposed by the U.S.A.

In 2002-2003, the Kemptville District of the OMNR identified 12 licensed primary wood-using mills, consisting of 1 pulp and paper mill, 6 medium sized sawmills, 4 small sawmills and 1 miscellaneous mill. When viewed in a global context, all mills would be considered to be small in their sector. These mills reported total wood consumption of 538,992 M3. Over 75% of this wood was harvested outside the boundaries of the Kemptville District. By 2005 the Domtar pulp and paper mill in Cornwall and five of the medium sized sawmills had experienced either permanent or temporary closures. However, in Lanark County there are still several family-owned sawmills which continue to operate intermittently and rely on the availability of local wood. These smaller operations are flexible and are able to quickly respond to changes in market demand and wood availability.

6.2 Current Markets

CONIFER

Today's markets continue to evolve. Small timber harvested during conifer thinnings was traditionally shipped to the Canadian - International Paper (CIP) pulp and paper mill in Hawkesbury. However, this mill closed in 1982. For the next 10 years, there were few markets available for red pine plantation thinnings, which represent 7.7% of the Lanark County Forest. During this period, most first thinnings on the Lanark County Forest were accomplished by special employment projects, with much of the wood left on the ground or sold at minimal value for firewood. In the 1990s, two Ottawa Valley sawmill entrepreneurs (Laverne Heideman and Sons Ltd Eganville, Ben Hokum and Sons Ltd Killaloe) recognized the opportunity to harvest this underutilized wood supply. They found markets for the small dimension lumber in the furniture and pressure treating businesses and modified their sawmill operations to saw these smaller trees. To improve efficiencies in the logging of these smaller trees, small mechanized tree harvesters and forwarders were introduced. Declining conifer supply from crown lands in Quebec has also increased the demand for these products. Today, red pine plantation thinnings are a major revenue source for the Lanark County Forest.

There are other markets for conifer products. Mature white pine trees continue to be valued for the production of sawn lumber. Large, straight, knot-free red pine trees are the preferred supply for manufacturers of poles and log homes. Markets for cedar lumber, posts and pickets remain strong in Lanark County. As the red pine plantations age, the larger trees will also be suitable for use by traditional conifer sawmills.

HARDWOOD

Harvest of hardwood forests has been the bread and butter of the local forest industry for many years: however hardwood markets have fluctuated substantially in recent years. Many of the hardwood forests owned by the County are of previous agricultural origin, and have a history of disturbance including fuelwood and sawlog harvest, grazing and land clearing. Thinning in these hardwood forests which have not been previously managed results in the removal of small diameter and lower quality trees; there are relatively few hardwood sawlogs harvested. Over 2/3 of the volume typically thinned in the first managed cut from hardwood woodlots is low grade or small trees. With proper management, long-term yields of quality hardwood sawlogs will increase, creating better revenue opportunities for the County.

Traditionally the majority of the low quality hardwood products have been delivered in eight foot lengths as firewood or as pulpwood to Domtar's pulp and paper mill in Cornwall, Norampac's pulp and paper mill in Trenton, Smurfit-Stone's pulp mill in Portage du Fort, or Fraser Papers pulp mill in Thurso, Quebec. With the permanent closure of Domtar in 2005 and Smurfit-Stone in 2008, the market and price for hardwood pulpwood has substantially declined. Hardwood pulpwood is currently being shipped from Lanark County to Norampac Trenton and to Thurso, which is now owned by Fortress Paper.

Firewood demand grew during the 1970s as a result of dramatic increases in oil prices, but declined slowly during the 1980s and 1990s as oil prices dropped and natural gas availability increased. With recent drastic spikes in oil, electricity and natural gas prices, the demand for firewood is again on the upswing and is helping to offset the loss of the pulpwood market. Firewood is sold by the full cord in 8 foot lengths and by the face cord as cut and split. Preferred firewood species include maple, beech, yellow birch and hickory for their heat value

and ash because of its low moisture content and ease of splitting. Oak has high heat value but is not always favoured because of the length of time required to dry properly.

Most of the hardwood sawlogs in eastern Ontario are sold locally to family-owned hardwood sawmills in Lanark or Renfrew Counties, Hawkesbury or into Quebec markets. Sawmills have traditionally provided a ready market for the higher value sawlogs, although these operations have not been exempt from the challenging operating environment facing the forest industry. The predominant species of hardwood sawlogs cut in Lanark are sugar maple, red oak, basswood and poplar.

LOGGERS

The changes that have occurred in the local forest industry have had substantial impacts on the local logging community. These changes were clearly in effect even prior to the mill shutdowns which started in 2005.

Over the last 20 years, three major changes have brought about a drastic decline in the numbers and fortunes of logging contractors. First, uncontrolled logging on private land greatly reduced the availability of quality sawlogs, both through a decline in woodlot quality and a greater reluctance of a changing demographic of private landowners to allow logging on their property. Second, continued cost pressures on large pulp and paper mills resulted in minimal real price increases or even price reductions for pulpwood. Finally, the advent of mechanized harvesting equipment designed to harvest large volumes at low cost reduced the competitive advantage of traditional loggers, who relied on traditional cut and skid methods. As a result of these changes, there has been a substantial decline in the number of full-time logging contractors in south-eastern Ontario.

For the remaining small contractors operating successful logging businesses in south-eastern Ontario, Community Forests offer important opportunities for sustainable timber harvesting.

6.3 Forest Management

The detailed standards applied for forest management and conservation of natural heritage and cultural values are discussed in Sections 9.0 and 10.0 of this plan.

Each year an annual plan and budget is prepared by the Forest Manager for approval by Lanark County. For each harvest area, a site specific harvest plan is prepared by a member of the Ontario Professional Foresters Association (OPFA) outlining the forest operations prescription, access requirements, boundary lines and prescriptions for protecting natural and cultural heritage values. Stands are marked for harvest and buffers around natural and cultural heritage values established by tree markers who have successfully completed the OMNR Level 1 Tree Marking Certification course.

6.4 Sale of Wood Products

Commercial wood sales on the Lanark County Forest are issued through a competitive tendering process. Volume estimates are calculated through a sample inventory of marked trees and wood is sold on a unit-price measure. Hardwood sawlogs are paid for based upon a percentage of the delivered price at the sawmill. Although lump sum sales have been used in the past, unit price sales are preferred because the bidder only pays for the wood that is actually harvested. This practice is fairer to both the logging contractor and the County.

The use of unit price sales for conifers has been greatly facilitated by the increased use of weigh scales to measure wood. The measurement of hardwood sawlogs is completed at the mill site, and a copy of the scale provided to Lanark County for verification. Alternatively, arrangements may be made for an on-site measurement of sawlogs by a scaler approved by Lanark County at the contractor's cost. Firewood can be measured by a sample scale of truckloads. Lanark County retains the right to monitor and dictate any conditions on wood scaling that it feels are necessary to protect its interests.

Wood hauled from Lanark County Forest is monitored through a bill of lading system. In addition to protecting the County's interests, this system is a critical requirement for mills producing FSC certified forest products. These mills require Chain of Custody certification before they can sell forest products that are labeled as FSC certified. Tracking the movement of certified wood from an FSC certified forest to the mill is one step in this process. The requirements for Chain of Custody certification and wood tracking are outlined in the EOMF Forest Certification Policies and Procedures Manual.

To make timber sales accessible to all logging contractors, Lanark County:

- makes timber sales available in a variety of sizes,
- defers a portion of deposit payments until cutting commences and
- considers flexible wood scaling arrangements provided that the County's interests are protected.

6.5 Harvest Operations

All harvest operations are carried out according to a signed contract between the Purchaser and Lanark County. The contract describes in detail the terms of the Stumpage Sale Agreement, including volumes and prices, wood measurement, operating conditions and legal and safety requirements. Logging contractors must carry appropriate insurance and Workplace Safety and Insurance Board (WSIB) coverage to protect the County from liability.

All logging operations are monitored regularly by the Forest Manager to ensure compliance with the contract, operating standards (see also Section 11.2) and adherence to values described in this plan.

6.6 Forest Harvesting Access

MUNICIPAL LOAD RESTRICTIONS (Source: Lanark County Website)

Reduced load restrictions (5 tonnes per axle), in force every spring on those roads that are posted with the appropriate signs, include **all** County and Township Roads with the **following exceptions:**

- County Road 29, 43, 49, 511
- Part of County Road 10 from its intersection with County Road 1 in Perth to St. John's High School.
- Part of County Road 6 from its intersection with Wilson Street in Perth to Lanark Lodge
- Part of County Road 12 from its intersection with County Road #511 to 7th Concession of Lanark

These restrictions may change: updates can be found at the Lanark County Office or Website. Provincial Highway 7 does not post load restrictions during the spring break-up period.

The spring load restrictions usually begin in early March and last 6 to 8 weeks. Restrictions are removed when the likelihood of road damage has diminished.

HARVEST ROADS

Access into a property is usually gained from existing forest access roads or old roads and farm laneways. Periodically a new section of road may need to be constructed by harvesting contractors. All new roads and landings must adhere to Table 20 and be approved by the Forest Manager before operations commence. If a harvest area is close to a municipal road, wood may be piled at roadside (with permission of the Road Superintendent).

Sometimes the best access is through adjacent private property, either through an existing laneway or field. In this case, the Forest Manager may assist the logging contractor to develop an access agreement with the adjacent landowner.

The construction of new access onto a property from a township/county road requires the permission of the Township/County Road Superintendent. To avoid creating new permanent access roads, which can lead to misuse of the property (e.g. garbage dumping), these roads are generally designed to be temporary. After use the entrance to the road is usually decommissioned by culvert removal and/ or physical blocking with berms, ditches or trees or other materials.

Existing access roads and water crossings must be maintained to the same standards as encountered at the beginning of harvest operations. Logging contractors must repair to original condition damage to roads, trails, fences, gates, culverts, bridges, utilities or other improvements damaged beyond ordinary wear and tear.

Any new water crossings which are required will be constructed consistent with local best management practices and with appropriate approvals and permits.

SKIDDER/ FORWARDER TRAILS

Logging contractors must construct access trails for logging equipment to extract harvested trees. In plantations, access trails are generally created by removing marked rows of trees, usually ranging from every third to every fifth row. In natural stands, access trails are located in more open areas of the forest, preferably adjacent to trees which are marked for harvest.

The stumpage sale contract between Lanark County and the logging contractor provides specifications on:

- maximum area of access trail coverage,
- acceptable levels of trail rutting and
- acceptable levels of damage to residual trees.

Low, wet sites are prone to excess rutting and compaction in the frost-free season. These sites cannot be harvested in compliance with the contract standards until frost has developed in the ground.

6.7 Forest Harvesting: Normal Harvest Operating Season

By providing opportunities for sustainable harvest of timber, Lanark County is contributing to the overall improvement in forest practices in the County and the provision of local employment opportunities. Although it is important to provide these opportunities for as great a period of time as possible, the County has defined the normal harvest operating season to be approximately nine months in duration. Operations usually do not occur within the period of spring break-up (mid-April to early July) for a number of reasons:

- The bark of trees is particularly susceptible to damage and peeling, resulting in increased wounding and long-term decay,
- Heavier soils are saturated with water and prone to rutting and erosion,
- This is the prime breeding season for many bird species, and
- Municipalities place load restrictions on roads limiting the hauling of wood.

Exceptions to this normal harvest operating season do exist. For example, the above issues are generally not of concern in red pine plantations growing on rapidly drained soils.

7.0 RECREATION

The County of Lanark adopted a Recreational Use Policy on August 25, 2009. It provides detailed guidance for recreational activities on the Forest. The strategic directions provided in the Policy which influence forest management activities are summarized in sections 7.1 to 7.3.

7.1 Recreational Use Policy Assumptions and Criteria

The Recreational Use Policy includes the following Assumptions and Criteria:

1. Assumptions

- The County Forest will be managed to meet or exceed FSC Certified Management Standards.
- The County Forest is owned by the Corporation of the County of Lanark and is not crown land.
- Recreational pursuits in the forest are a privilege, not a right.
- Forest health, management and associated operations take precedence over recreational activities.
- Recreational activities must have minimal impact on the forest.

2. Criteria for Analysis of Recreational Activities

- Activity must have minimal environmental impact.
- Activity must not have significant impact upon other forest users.
- Activity must be compatible with forestry operations.
- Activity must not pose significant liability concerns to the County.
- Activity should not require significant County staff intervention for administration or policing.

7.2 Recreation Areas

The Baird Property – West Half Lot 11, Concession IV, Lanark Ward (36 hectares) – supports formal recreation activities. This property has good access, an interpretive trail, picnic site, a boardwalk, some characteristics of old growth hardwood forest and red pine plantations.

Recommended Uses:

- Education.
- Non-motorized, recreational use of the trails.
- Protected portions with old growth characteristics (for research) with potential to develop uses for disabled.

Recommended Restrictions:

- No motorized vehicles.
- No forest harvesting, except in the red pine plantation to maintain the health of the stand.

Although not formally designated as a recreation area, the 850 hectare Lavant Main Block has long been a popular area for hiking, hunting and fishing. The road provides access to Dixon Lake which is on County property, and to Bottle Lake which is on the adjacent Crown land.

7.3 Other Properties with Prohibited Activities

Appendix “E” of the Recreational Use Policy identifies five other properties comprising 724 deeded hectares (16% of the Community Forest Land Base) which have use restrictions. The focus of management of these properties may be more multiple use or recreational, with less emphasis on commercial forestry however forest management shall be considered in response to future natural occurrences, or on areas previously intensively managed such as plantations, or stand improvement. These properties are:

Desalvo property	Montague	77 Hectares
Peckett property	North Burgess	121 Hectares
Amyot property	Pakenham	405 Hectares
Conboy property	South Sherbrooke	101 Hectares
Young property	Drummond	20 Hectares

8.0 PROPERTY ADMINISTRATION

As the owner of 4,583 hectares, property administration issues arise on a regular but limited basis. Acting on behalf of the County, the Forest Manager carries out property inspections to ensure that the properties are being used consistent with County Policy. Infractions are reported to the County for follow-up remedial action. Regular surveillance and handling of small issues can prevent the development into larger scale problems (see also Section 11.1). The major issues of concern are described below.

8.1 Encroachment/ Occupation

Construction of unauthorized structures including permanent tree stands on County Forest lands is prohibited under the Recreational Use Policy. The owner of the structures will be identified and will be asked to remove all permanent structures from County property. If ownership is unclear or the owner is uncooperative, the County will make arrangements to remove the structure(s).

8.2 Garbage

Periodically garbage is dumped on County property. This usually occurs on properties with passable laneways where the perpetrator can dump garbage without being seen.

Although evidence of the perpetrator can sometimes be found in the garbage, past experience suggests that prosecutions are unlikely. Garbage dumping is an important reason why new harvest access roads are decommissioned after logging is completed.

8.3 Personal Use Firewood

The County does not permit the cutting of firewood for personal use. This is because of the cost which would be associated with the administration and monitoring of the many people

interested in cutting firewood and because of safety and liability concerns. Persons requesting firewood are referred to firewood dealers or loggers who sell firewood.

8.4 Wood Theft

Wood theft is a limited problem which is most commonly associated with the cutting of wood for personal firewood use or to maintain trails or open areas on County land. Unauthorized trespass across property boundary lines is always a potential issue.

Each instance of wood theft must be evaluated for extent, intent, single instance vs repeated occurrences, future risk and cost of prosecution to the County. Options range from a simple warning, to billing for the wood cut, to criminal prosecution.

8.5 Fencing

Property fencing is an issue typically restricted to the few properties adjacent to active farmlands. The process for assigning responsibility for the costs of construction, reconstruction, repair or maintenance of property fences is described in the provincial Line Fences Act. The act emphasizes that fences are normally the equal responsibility of both landowners, although provision for an unequal sharing of responsibility does exist.

Consistent with Lanark County's objective to be a responsible landowner and good neighbour, reasonable efforts will be made to equally share the costs of fence work with adjoining landowners, including materials and labour. Should an arrangement not be successfully negotiated, the Line Fences Act provides for municipally-appointed fence-viewers to resolve the dispute.

9.0 FOREST ECOSYSTEMS OF THE LANARK COUNTY FOREST

9.1 Forest Resource Inventory

GIS-based maps for the Forest were produced for Lanark County by an independent contractor. The inventory for the Lanark County Forest has been digitized from the 1991 enhanced FRI photographs produced by the OMNR and EOMF. Current photo imagery (DRAPE 2009) was obtained from a cooperative project sponsored by many partners including the OMNR, Conservation Authorities, and municipalities. Roads, natural heritage and cultural values information are all based on OMNR data sources supplemented with local knowledge.

The enhanced FRI produced for Lanark County is of exceptionally high quality; it requires limited updating to reflect the activities that have occurred since 1991. The Forest Manager will have GIS capabilities and will update and maintain the inventory on behalf of the County. FRI updates will reflect activities that result in substantial changes to the natural or physical features. Since 1991 these have been limited on the County Forest and include tree planting and ice storm recovery activities. The locations of roads and other physical features will also be verified using GPS. The GIS contractor produced an Excel spreadsheet of the FRI data for use by the Forest Manager. Forestry staff can identify changes or updates to the forest composition on this spreadsheet and return them to the GIS department for updating of the stand description.

FRI data provides a good approximation of forest type but has limitations. For example, species composition and age are estimates based on the largest trees in the overstory as interpreted from an aerial photograph. FRI cannot be used to describe the mid and understory composition of a forest. FRI information is verified as required on the ground by the Forest Manager.

All area information used in Sections 9 and 10 is based on the FRI area, not deeded area. FRI and deeded areas as shown in Appendix 1 differ by 3.3 % due to variances between the mapped lot fabric, deeds and actual property boundaries as delineated on-the-ground through surveys and fencing. Again, actual property boundaries are verified in the field by the Forest Manager. The Forest Manager can adjust the mapped property boundaries using GIS as differences are found.

MAP PRODUCTS

Appendix 2 contains the map products which have been produced for this plan and supporting forest stand data. These include compartment maps showing forest types and natural heritage and cultural values, and aerial photographs. All maps have been produced at a 1:10 000 scale. For two larger compartments (Lavant 1-25 and Pakenham 1-2) a second map which fits on 8.5 by 11 inch paper has also been produced at a 1:20 000 scale.

9.2 Land-base and Forest Summary

Tables 6 and 7 summarize the land-base and forests of the Lanark County Forest based on the areas found in the FRI. The forests have been grouped into 8 forest types, which are stands with similar tree species and site conditions. Forest type definitions are provided in appendix 3. The description of the characteristics and management of the eight forest types follows in section 9.3.

“The forests of eastern Ontario lie within the Great Lakes-St. Lawrence (GLSL) Forest Region, south and east of the Canadian Shield. The GLSL Forest Region occupies a broad geographic range in Ontario and Quebec as well as south-eastern Manitoba and northwestern New Brunswick. The forests are dominated by sugar maple and beech, with red maple, yellow birch, basswood, white ash, largetooth aspen and red and bur oaks. White oak, red ash, grey birch, rock elm, blue beech and bitternut hickory occur intermittently. Black ash is common on poorly drained areas which may also include black spruce and eastern white cedar. Eastern hemlock, eastern white pine and white spruce are common on shallow, acidic or eroding materials. White pine, red pine and red oak are common on coarse textured drier soils. (EOMF, 1999)”

82.9 percent of the area of Lanark County properties are forested and 17.1 percent are non-forest lands, most of which are associated with water and wetlands. 64.1 percent of the forested lands are hardwood-dominated forests and 35.9 percent are dominated by conifers. Only 7.7 percent of the Lanark County Forest is conifer plantations consisting primarily of red pine.

Three forest plantations which were established in or around 1991 are shown as “Grass and Meadow” on the FRI and in table 6. These plantations are at North Burgess 1, Dalhousie 1, and Dalhousie 10. These areas will be surveyed by the Forest Manager and if they are deemed as “free-growing” forests, their descriptions will be updated in the inventory.

The forests of Lanark County have been heavily influenced by the previous 200+ years of European settlement. The Community Forests are typically second growth and have been heavily disturbed by fire, logging and agricultural settlement (Section 2.0). They contain a wide diversity of native hardwoods and conifers, numbering over 30 tree species. As a result of disturbance, many early to mid-successional tree species are present which have regenerated either naturally or through the planting of trees. Many of these species such as red oak, white birch, poplar and red pine are present in greater quantities than were originally found on the landscape. Many other species are greatly reduced in abundance from their pre-settlement distribution, either due to harvesting (white pine, hemlock) or to introduced pests (white elm).

89.2% of the forests on the Lanark County Forest are younger than 100 years of age. Even the older stands have not been excluded from the heavy disturbances of the past, although they may retain a component of older trees that have been identified in the FRI. For example, a previous farm woodlot that was tapped for maple syrup may contain trees that are older than 200 years of age, but likely lacks the structure and diversity of an old growth forest. Few if any undisturbed old-growth forest ecosystems remain in Lanark County although several of the best and largest examples of old forest have been preserved on Crown land (Murphy’s Point Provincial Park, Darling Forest Area of Natural and Scientific Interest (ANSI), Perch Lake Pines and Billa Lake Hardwoods). Many more old forests in adjacent Renfrew, Frontenac and Lennox and Addington Counties have been protected as part of the OMNR’s Madawaska Highlands Land Use Planning Process and Ontario’s Living Legacy.

**Table 6 Lanark County Forest
Forest Summary**

Forest Type	Area (Hectares)	Percentage
Hardwoods		
Upland Tolerant Hardwood	1254.96	26.5%
Red Oak	543.44	11.5%
Hardwood Shelterwood	351.32	7.4%
Lowland Hardwoods	207.71	4.4%
Intolerant Hardwoods	162.03	3.4%
Sub-total Hardwoods	2519.46	53.2%
Conifers		
Other Conifers	576.08	12.1%
White Pine	468.97	9.9%
Red Pine	366.36	7.7%
Sub-total Conifers	1411.41	29.7%
Sub-total All Forests	3930.87	82.9%
Non-Forest		
Muskeg	332.23	7.0%
Open Water	174.37	3.7%
Grass and Meadow	113.02	2.4%
Brush and Alder	88.11	1.9%
Un-classified	35.80	0.8%
Rock	35.11	0.7%
Urban - Rural	26.35	0.6%
Sub-total Non-forest	804.99	17.1%
Total Lanark County Forest	4735.9	100.0%

**Table 7 Lanark County Forest
Forest Type Age Class Summary**

Forest Type	1-20	21-40	41-60	61-80	81-100	101-120	121+	Total
Hardwoods (Hectares)								
Tolerant Hardwood	3.19	6.43	118.65	291.27	730.12	81.73	23.57	1254.96
Red Oak	0	0	20.43	37.30	300.49	175.54	9.68	543.44
Hardwood Shelterwood	3.97	37.43	113.48	153.12	39.18	4.14	0	351.32
Lowland Hardwoods	10.65	0	99.91	74.17	22.98	0	0	207.71
Intolerant Hardwoods	3.82	2.04	13.06	117.27	16.73	9.11	0	162.03
Sub-total Hardwoods	21.63	45.9	365.53	673.13	1109.5	270.52	33.25	2519.46
Conifers (Hectares)								
Other Conifers	17.24	29.54	49.13	192.19	226.11	51.73	10.14	576.08
White Pine	14.90	13.05	23.40	156.40	203.46	45.64	12.12	468.97
Red Pine	9.42	172.79	174.16	9.99	0	0	0	366.36
Sub-total Conifers	41.56	215.38	246.69	358.58	429.57	97.37	22.26	1411.41
Total	63.19	261.28	612.22	1031.71	1539.07	367.89	55.51	3930.87
% Age Class	1.6%	6.6%	15.6%	26.2%	39.2%	9.4%	1.4%	100.0%

The reduction in natural and human-induced wildfire has also had an impact on the forest. The limited number of red oak and white pine forests under the age of 60 can be partially explained by this phenomenon. If these species are to be maintained on the landscape over the long-term, silvicultural strategies including tree planting, tending of natural regeneration and prescribed burning will need to be considered.

The forests of Lanark County continue to change as they age. Many early successional forests and plantations are changing with time, as regeneration of later successional tree species such as sugar maple, hemlock and beech develops in the understory. With time and proper forest management, the forests will continue to grow and develop and will slowly return to a species composition and age class more similar to their pre-settlement condition. The anticipated trends in forest type succession are described in detail in Section 9.3.9.

The forest management standards for each forest type as described in the following section 9.3 are designed to complement the processes of natural succession, while emphasizing improvement in timber quality through removal of poor quality stems and regeneration of a diversity of tree species that are adapted to the site conditions.

9.3 Forest Types

The forests of the Lanark County Community Forest have been grouped under eight categories of forest types with common tree species and site conditions. Forest type definitions are provided in appendix 3.

9.3.1 Upland Tolerant Hardwood

Upland tolerant hardwood forest associations on the Lanark County Forest are the predominant forest type, comprising 1255 hectares and 26.5 percent of the total area. Tolerant hardwood forests are dominated by the shade tolerant tree species sugar maple growing on dry to moderately well-drained soils. The soils are often shallow and rocky, with low agricultural capability. Typical associates on drier sites include beech, red oak, white ash, and ironwood while yellow birch and basswood are more common on fresh sites. Hemlock and white pine are typically found on less disturbed sites. Other associates include red maple, white birch, white and bur oak, black cherry, bitternut hickory, white elm, butternut and trembling and largetooth aspen.

Advanced regeneration in upland tolerant hardwoods is generally dominated by the shade tolerant species sugar maple, beech and ironwood. Suppressed advanced regeneration of most mid-tolerant species (e.g basswood, red oak) will often be present within these stands. Mid-tolerant species may develop into saplings if located within crown openings.

Upland tolerant hardwood types typically occur on level to rolling sites, and on mid to lower slopes of sites with more rugged terrain. Red oak or white pine tend to dominate the upper slopes in these situations.

The majority are between 61 and 100 years of age, with 81 to 100 as the dominant age class. Tolerant hardwood forests less than 60 years of age are typically even-aged and have originated as a result of past heavy cutting or agricultural use, although two-aged stands with an overstory of large decadent trees are also common. Older stands usually exhibit an all-aged distribution.

SILVICS (adapted from OMNR, 1998a. OMNR, 2000. and local knowledge)

Sugar Maple

- sugar maple has regular seed crops; seed production begins at about age 40 to 60 years.
- seedlings have a vigorous root radicle which easily penetrates leaf litter.
- sugar maple is shade tolerant: early growth can occur in as little as 5% of full sunlight.
- older seedlings persist under heavy shade but exhibit slow growth.
- sugar maple responds well to release at nearly all ages.
- excessive release of suppressed stems often results in epicormic branches and top decline.
- sugar maple is deep rooted and relatively resistant to windthrow.
- sugar maple is subject to a variety of stem infections such as eutypella and nectria canker.

The silvics of the other tree species of the upland tolerant hardwood forest type are detailed in Silviculture Guides produced by the OMNR.

LONG-TERM MANAGEMENT OBJECTIVE

Hard maple is a high value hardwood which is sought after for sawlog production. The rate of volume growth on these sites is moderate (typical yields of 800 to 1500 board feet per acre of sawlogs from light selection thinning on a twenty-five year cutting cycle of mature tolerant hardwoods), but high average value per board foot makes sawlog production a sound financial objective. Hard maple and beech are also preferred species for firewood and pulpwood.

The long-term management objectives for upland tolerant hardwood forests are:

- maintain a continuous forest canopy,
- develop or maintain an all-aged forest condition,
- improve the overall timber quality of the stands,
- enhance/ restore the components of large trees, white pine and hemlock,
- maintain/ regenerate a diversity of shade tolerant and mid-tolerant tree species
- maintain/ regenerate a component of minor tree species
- provide protection for significant wildlife habitat and wildlife trees

MANAGEMENT

The vast majority of upland hardwood forest types are managed using the single tree and group selection system. Table 8 summarizes the key parameters for selection management used on the forest. Detailed guidelines for selection management are provided in the Silviculture Guides produced by the OMNR.

Table 8: Silviculture Summary Upland Tolerant Hardwoods

Full stocking basal area	26 to 32 m ² / ha				
Desired residual basal area	18 to 22 m ² / ha				
Full stocking crown closure	85-100%				
Desired residual crown closure	65-75%				
Desired Structure	DBH cm	10-24	26-36	38-48	50-60
	BA m ² / ha	6	6	5	3
Cutting cycle	20 to 30 years				
Group openings	1 to 2 per hectare, ½ to full tree height				

9.3.2 Red Oak

Red oak forests are common on the Lanark County Forest, representing 543 ha and 11.5 percent of the total area. Two red oak ecotypes are distinguished by soil depth. Typically red oak is found growing on shallow, rocky ridges in this area. Growth and stem quality are fair to poor in such cases. Scattered stunted red oak can survive in the harshest rock barrens such as those found at the south end of the Lavant Main Block, although trees seldom grow to more than 6 meters in height in these situations. Typically red oak grows with white pine, sugar maple, poplar, hemlock and ironwood on shallow-soiled ecotypes. Taller, higher quality trees can be found on lower and middle slopes and in soil pockets. On mid to lower slope ecotypes red oak is found growing with all the tree species of the upland tolerant hardwood forest type.

The predominance of red oak in Lanark County is largely due to the past history of settlement. The activities of land clearing, logging, and fires due to potash production, railroad engine sparks

and logging slash which were common in Lanark County throughout the 1800s and early 1900s created high light, low competition conditions in which red oak thrived. The majority of red oak stands originated during this period and are 80 to 120 years old. Most stands are even-aged.

Advanced regeneration in red oak forests is generally dominated by the shade tolerant species sugar maple, beech and ironwood. Regeneration of red oak may be present within these stands, although it is usually less than 15 cm in height and short-lived. Red oak and white pine may develop into saplings on shallow-soiled sites, or if located within crown openings on better sites.

SILVICS (adapted from OMNR, 1998a. OMNR, 2000. and local knowledge)

Red Oak

- red oak has highly irregular seed crops; good seed years may occur every two to ten years, with complete failures in some years.
- acorn production begins at about age 20 to 30 years, and increases with diameter up to 60cm.
- dominant trees with full crowns produce the most seed.
- acorns require 18 months to mature.
- acorns remain viable on the ground for only one winter
- in light seed years, most acorns are lost to predation by birds and mammals or insect damage.
- ideal seedbed is moist mineral soil; germination is best when buried 2 cm in the soil
- red oak reproduces by stump sprouting: sprouts originating at root collar or below ground and seedling sprouts tend to develop less decay because of an independent root system
- red oak is a fire-adapted species; fire creates mineral soil exposure which enhances seed germination, and existing seedlings tend to resprout vigorously after fire.
- germination is followed by vigorous, rapid tap-root development
- red oak is intermediate in shade tolerance; seedlings cannot survive under a closed canopy
- once established seedlings require full light for survival and growth.
- in full sunlight red oak has faster height and diameter growth than most of its associates.
- dominant-codominant saplings and poles respond well to release; larger trees do not respond well to release.
- excessive release of suppressed stems often results in epicormic branches and top decline.

- red oak is deep rooted with a strong taproot and relatively resistant to windthrow.
- although relatively decay resistant, red oak is subject to a number of stem infections and leaf defoliators (forest tent caterpillar, gypsy moth).
- oak seedlings may be repeatedly browsed by deer, causing re-sprouting and poor form.
- dieback and mortality due to drought stress is common on dry sites

The silvics of the other tree species of the red oak forest type are detailed in Silviculture Guides produced by the OMNR.

LONG-TERM MANAGEMENT OBJECTIVE

Red oak is a high value hardwood which is sought after for sawlog production, comparing well with sugar maple for value over the long-term. Red oak provides the County with an important diversity of forest products to market. Periodic changes in consumer preference create a shift in demand between grained (oak, ash) and non-grained (maple, birch) hardwood lumber which typically follows a 10 to 20 year cycle. Red oak fuelwood and pulpwood are less preferred species than most other high-density hardwoods. Some local hardwood pulp mills have declined to use oak because of the effect of the large vessels on paper quality. This is in contrast to hardwood pulp mills in the southern USA which use large volumes of oak species. Although it provides good heat value, red oak takes longer to dry for firewood than most other tree species.

The rate of volume growth on most red oak sites is low to moderate but high yields from shelterwood harvesting and high average value per board foot can be achieved. Shaw Lumber Company tracked the volume production from three shelterwood cuts of a high quality oak stand on crown land in Darling Township near Peter White Lake. Over a 12 year period from 1992 to 2004, the company harvested 5,120 board feet per acre from this stand (J. Shaw, personal communication, 2007). A typical tolerant hardwood selection cut generates 1,000 to 1,500 board feet per acre.

Because of its predominance on the landscape, red oak is a critically important mast species to maintain and regenerate. Acorns provide food for a diversity of wildlife in Lanark County.

Where red oak is a minor component of tolerant hardwood forests, group selection is used to provide regeneration of the species. For oak-dominated stands, the long-term objective is to maintain and regenerate even-aged red oak–white pine–hemlock forests.

MANAGEMENT

High quality red oak–dominated forests are managed using a three cut shelterwood system. Table 9 summarizes the key parameters for oak management used on the Forest. Detailed guidelines for shelterwood management are provided in the Silviculture Guides produced by the OMNR. Group selection may be used where tolerant hardwoods are clearly dominant on the site and the objective is to maintain an oak component.

Table 9: Silviculture Summary of Red Oak Three Cut Shelterwood

	Seed Cut	Release Cut	Final Cut
Timing	Age 80 to 120	5 to 15 years after seed cut	5 to 15 years after release cut
Post-harvest Crown Closure	70%	40-50%	< 10%
Height of Oak Regeneration	NA	.3 – 1.5m	.75 to 2.0m
Harvest Season	NA	Winter	Winter
Post-harvest Tending (as required)*	Manual or Prescribed Burn	Manual or Prescribed Burn	Manual or Prescribed Burn
* Manual tending should be applied immediately after sufficient numbers of seedlings are established. For best response from prescribed burning, seedlings should be 3 years old.			

9.3.3 Hardwood Shelterwood

Hardwood Shelterwood is a small hardwood forest type comprising 351 hectares and 7.4 percent of the Forest. These stands have been heavily disturbed in the past, either by heavy cutting or grazing. They contain a diversity of tree species including sugar and red maple, red oak, poplar, and white pine. Two distinct ecotypes are recognized; on deeper soils these stands were originally upland tolerant hardwoods, while on shallower soils they were red oak–white pine–hemlock forests. While these forests have the long-term potential to develop into good quality

stands, they currently have high percentages of poor quality stems, intolerant hardwood species (poplar, white birch) and/ or ironwood.

The majority of these stands are in the 41 to 60 and 61 to 80 age classes. Most hardwood shelterwood forests are even-aged, but the ice storm of 1998 has created more two-aged forests. Forests with a history of grazing also tend to be two-aged, consisting of scattered defective hardwood stems with an understory of ironwood saplings and poles.

LONG TERM MANAGEMENT OBJECTIVE

The objective of management in this forest type is to enhance existing succession processes towards upland tolerant hardwood or red oak–white pine–hemlock forests by favouring tree species suited to the site. Usually this means upland tolerant hardwoods on deeper soiled ecotypes and red oak–white pine–hemlock on shallow or sandy soiled ecotypes.

MANAGEMENT

In most stands, commercial thinning is the most suitable treatment. Low quality and declining trees are removed to favour the growth and regeneration of tree species suited to the site condition. Depending upon the species, density and condition, basal area is typically reduced to 16 to 20 M²/ Ha, with a crown closure of 65 to 75%. For stands with the objective of conversion to upland tolerant hardwoods, group openings can be created to enhance the establishment and growth of tolerant and mid-tolerant tree species. If red oak–white pine–hemlock are the objective, a uniform canopy closure is desired to avoid encouraging tolerant hardwood regeneration, and large crown openings are generally avoided. Detailed guidelines for commercial thinning are provided in the Silviculture Guides produced by the OMNR

In low quality mature stands, a two cut shelterwood harvest may be used to release the advanced growth of hardwood regeneration and start a new forest. Periodically, planting of white pine or red oak is prescribed to supplement natural hardwood regeneration.

9.3.4 Lowland Hardwoods

Lowland hardwood forest associations have a scattered distribution throughout the Lanark County Forest, covering 4.4 percent and 208 hectares. Stands occur in seasonally flooded areas along creeks and in poorly drained areas of many properties. Larger expanses are found on limestone-based soil types in properties in the geographic townships of Drummond and Montague. Lowland hardwood forests are dominated by the mid-tolerant tree species red and/ or silver maple (soft maples) and green and black ash growing on imperfect to poorly drained soils. Fresh to moist sites typically support a diverse group of tree species including white elm, yellow birch, bur oak, basswood, white cedar, largetooth aspen and balsam poplar. Hemlock and white pine are typically found on less disturbed sites. The wettest sites are treed swamps with few tree species, often limited to red and silver maple, white elm, green and black ash, balsam poplar, tamarack and black willow.

Many lowland hardwood forests, particularly those on limestone-based soils have their origin in agricultural use, either as pasture or as hay fields. As these sites were abandoned due to drainage problems, pioneering mid-tolerant tree species became established. Cycles in beaver populations and the resulting fluctuations in water levels also contribute to the establishment and demise of lowland hardwood forests.

Higher quality stands have an abundance of single stems which have arisen from seed rather than coppice and higher stocking. Lower quality stands tend to be dominated by coppice growth, or are of lower stocking. Past clearcutting tends to increase the amount of coppice growth. The quality of many stands has declined further as a result of the ice storm of 1998.

Most of the existing mid-tolerant species can successfully regenerate on the variety of microsites found within these forests. Green ash, basswood, white elm and white pine become established on soil hummocks, while yellow birch and hemlock favour rotting wood as a substrate. Silver maple is often found regenerating within seasonally flooded woodland pools. Small mammals and songbirds transport acorns which become established under the canopy of mature mixed lowland hardwoods. Red maple is a prolific seed producer that regenerates on most microsites.

The majority of the forests are in the 41 to 60 and 61 to 80 age classes. Most lowland hardwood forests less than 60 years of age are even-aged. Older stands may develop a two aged or all-aged distribution.

SILVICS

The silvics of the tree species of the lowland hardwood forest type are detailed in Silviculture Guides produced by the OMNR.

LONG-TERM MANAGEMENT OBJECTIVE

Active forest management is generally a low priority for these forests. Most stands have limited merchantable volume and at best a few low – value sawlogs. Wet sites create further operability limitations. The long-term management objective is to allow continued natural succession until the forests reach a point of commercial merchantability. This point is not anticipated to occur for most stands in this forest type during the term of this management plan.

MANAGEMENT

Management knowledge of poorly drained hardwood swamps is limited, although thinning of younger stands has been shown to be effective. Larger scale cutting has typically been approached with caution by forest managers because of the potential for wholesale changes in the water table and subsequent flooding and potential for windthrow of shallow rooted tree species. Partial cutting is also critical in controlling the dense shrub and herb competition present on some rich lowland sites. If stands with moderate drainage and sufficient volume to warrant a harvest cut are encountered, lowland hardwood forests will be managed using the single tree or group selection system. Detailed guidelines for lowland hardwood management are provided in the Southern Ontario Silviculture Guide produced by the OMNR.

9.3.5 Early Successional (Intolerant) Hardwoods

At 162 hectares and 3.4 percent, intolerant hardwoods represent the smallest hardwood forest type on the Lanark County Forest. These forests typically developed after heavy disturbance prior to ownership by the County. Past disturbances may include past high-grading, clearcutting, agricultural land clearing or cattle grazing. Three ecotypes can occur, depending upon potential future forest and soil types; upland tolerant hardwoods on deeper soils, red oak or white pine on shallow or sandy soils, and soft maple-ash or cedar-white spruce on lowland soils.

The pioneer tree species poplar, white birch, and balsam fir make up at least 30% of the composition of these forests. Trembling and largetooth aspen dominate the better drained sites, with balsam poplar occurring on imperfectly to poorly drained soils. Common associates on upland sites include sugar and red maple, white pine and red oak, depending upon soil depth. White cedar, green ash and red maple are found on moister sites. Most tree species can be found within this forest type. Stand stocking and quality of these stands is frequently low and has declined further as a result of the ice storm of 1998.

The forests are transitory by nature and may contain a well-stocked understory of good quality saplings and polewood mid-tolerant and shade tolerant tree species. Regeneration is usually dominated by sugar maple, although most other tree species can be found in the understory if seed source is available. Substantial quantities of aspen suckers developed after the ice storm: they continue to thrive in open stands, but most have died off in the better stocked stands.

The majority of these stands are in the 61 to 80 year age classes. Most intolerant hardwood forests are even-aged, but the ice storm of 1998 has created more two-aged forests.

SILVICS

The silvics of the tree species of the intolerant hardwood forest type are detailed in Silviculture Guides produced by the OMNR.

LONG TERM MANAGEMENT OBJECTIVE

The objective of management in this forest type is to enhance existing succession processes to restore tree species suited to the site and to develop more mature forests. Usually this means upland tolerant hardwoods on deeper soils, red oak or white pine on shallow or sandy soils, and soft maple-ash-elm or cedar-white spruce-tamarack on lowland soils.

MANAGEMENT

In stands with a substantial component of desirable tree species with good quality, commercial thinning is the most suitable treatment. Low quality and declining trees are removed to favour the growth and regeneration of tree species suited to the site condition. Depending upon the species, density and condition, basal area is typically reduced to 16 to 20 M²/ Ha, with a crown closure of 65 to 75%. For stands with the objective of conversion to upland tolerant hardwoods, group openings can be created to enhance the establishment and growth of tolerant and mid-tolerant tree species. If white pine, red oak, white cedar or white spruce are the objectives, a uniform canopy closure is desired to avoid encouraging tolerant hardwood regeneration, and large crown openings are generally avoided. Detailed guidelines for commercial thinning are provided in the Silviculture Guides produced by the OMNR.

In mature stands dominated by poplar and birch and/or desirable species with poor quality, shelterwood management can be used to release the advanced growth of hardwood regeneration. Where poplar or white birch regeneration is desirable, clearcutting with seed trees is the preferred system. Periodically, planting of white pine or red oak is used to supplement hardwood regeneration.

9.3.6 Other Conifers (Cedar, spruce, tamarack)

Other conifers is the largest conifer forest type on the Forest consisting of 576 hectares and 12.1 percent. The forest is dominated by white cedar although white spruce, tamarack, and balsam fir are also important. Common hardwood associates include poplar, white birch, green and black

ash, sugar and red maple, basswood and white elm. Trembling and largetooth aspen occur on the better drained sites, with balsam poplar occurring on imperfectly to poorly drained soils. The forest type is characterized by two distinct ecotypes: upland and lowland cedar.

Upland cedar forests typically developed after the clearing of nutrient poor soils for agriculture purposes, which was followed by land abandonment and reclamation by a mix of pioneer conifer and hardwood tree species. Hard maple, basswood and other upland hardwoods can form a component of upland cedar stands. They are transitory by nature and may contain a well-stocked understory of good quality mid-tolerant and shade tolerant tree species. Regeneration is usually dominated by sugar maple, although most other hardwood species can be found in the understory if seed source is available. Substantial quantities of aspen suckers developed after the ice storm: they continue to thrive in open stands, but most have died off in the better stocked stands.

Lowland cedar forests are typically a late successional tree species association, although some lowland cedar sites developed after farm fields were abandoned. Few tree species besides white cedar, black ash, red and silver maple, white spruce, balsam fir, balsam poplar and tamarack can survive in these wet, nutrient poor sites. Most trees are small, but larger specimens may be found along the boundaries with upland sites. Black ash and balsam fir tend to be the most common tree species regenerating in the understory of lowland cedar stands.

Stand stocking and quality of these stands is typically low and has declined further as a result of flooding from beaver dam construction and the ice storm of 1998. Stands typically range from 61 to 100 years of age. Most other conifer forests are even-aged, but the ice storm of 1998 has created more two-aged forests by causing severe breakage of cedar.

LONG-TERM MANAGEMENT OBJECTIVE

Cedar has the potential for producing a range of forest products. Larger trees can produce sawlogs, while smaller trees are used for posts and pickets. White spruce is used to produce commercial dimension lumber and newsprint. Demand for white spruce has increased as the supply has decreased from traditional sources both in Ontario and Quebec. However, most of

these forests have limited merchantable volume due to age and quality, and wet sites and ice damage create further operability limitations.

Regeneration objectives in upland other conifer stands are to manage succession towards upland hardwoods, while maintaining a component of conifer patches for wildlife cover. On lowland sites, maintenance of conifer cover is a high priority.

MANAGEMENT

When stands are encountered with sufficient volume to warrant a harvest cut and site conditions which permit operations, even-aged thinning of younger stands and patch-clearcutting of older stands will be applied. Detailed guidelines for conifer management are provided in the Southern Ontario Silviculture Guide produced by the OMNR.

9.3.7 White Pine

White pine comprises 469 hectares (9.9 percent) of the Lanark County Forest. White pine forests occur naturally on sandy and shallow rocky soils; they are particularly abundant at the Pakenham and Lavant Main blocks, both of which have large areas of these soil types. White pine natural regeneration is also common under the shallow-soiled red oak stands found near Dixon and Bottle Lakes. White pine has been under-planted in several low quality oak stands on County properties. Under-planting provides shade to minimize the impacts of the white pine weevil. There are few white pine plantations that were established in old fields on County lands.

SILVICS (adapted from OMNR 1998b and local knowledge)

- White pine grows under a wide variety of soil and moisture conditions. While typically associated with well-drained sandy or shallow soils, large white pine can also be found growing on hummocks in swamps.
- Although cone production can begin as early as 15 years of age, optimal seed crops occur after 50 years.

- Moist mineral soil, mineral soil and humus mixtures and moist organic seedbeds are suitable for germination.
- White pine seedlings can establish under 20 to 25% of full sunlight.
- White pine is intermediate in shade tolerance: leader growth increases with light intensity up to approximately 45 to 55 per cent of full sunlight.
- Young white pine seedlings are slow growing for their first five years and are adversely affected by competition from understory brush and hardwood species.
- White pine response to release is best if the tree is not overly suppressed and has at least a 1/3 live crown ratio.
- Individual tree crown dominance is moderately expressed in white pine plantations, resulting in self-thinning and subsequent mortality of suppressed trees.
- White pine is usually a deep rooted species which is relatively windfirm.
- The most common damaging agents of white pine are white pine weevil, white pine blister rust and ice and snow damage.

LONG-TERM MANAGEMENT OBJECTIVE

White pine is used to produce lumber used for furniture, cabinets and mouldings, boltwood and as a minor component of the furnish for fine papers. Demand for open-grown white pine is limited by the quality problems associated with white pine weevil and blister rust.

The long-term management objective is to regenerate even-aged white pine forests and enhance white pine that is developing under oak forests, although regeneration of a variety of associated species (red pine, white spruce, hard and soft maple, ash, elm, beech, cherry) is also expected. White pine growing on shallow rocky soils is generally not harvested, although it may be managed to retain as an all-aged forest with patches of white pine of a variety of ages.

MANAGEMENT

The primary limitation on commercial first thinnings in white pine is short merchantable height because of white pine weevil damage and/ or site limitations. Where average merchantable

height exceeds 8 meters, first thinnings can be carried out when the stand reaches an average diameter of 20 centimeters and a basal area of 35 M2/ Ha. This is usually reached when natural stands are 45 to 50 years of age. Thinnings are selective, although enough trees must be marked to permit machine access. Basal area stocking guides for thinning white pine stands are provided in Tables 10 and 11. For a particular stand, the prescription for residual basal area should typically fall between the Stand Density Index (SDI) target and a 1/3 basal area removal. The associated stand density index diagram is found in Appendix 4.

Two sources have been used for basal area stocking guides for white pine. At average diameters of 25 cm (10 inches) and up, the OMNR targets (Table 11) have been field assessed and are appropriate. For stands with average dbh of less than 25 cm, OMNR guidelines for residual basal area suggest thinning white pine plantations to a level that is lower than recommended by local managers. For these younger stands, thinning guidelines will also consider the more conservative targets as provided by the USDA (Table 10). A residual basal of 26 m2/ ha (115 ft/ acre) is considered a minimum for a first thinning in any commercial white pine stand.

Table 10: White Pine (Less than 22.5 cm average diameter) Source: Wisconsin Extension (1996)

DBH		Fully Stocked		Target Residual BA			Minimum Residual BA (33% Removal)	
Cm	Inches	M2/ Ha	Ft2/ Acre	M2/ Ha	Ft2/ Acre	% Removal	M2/ Ha	Ft2/ acre
15.2	6	33.3	145	20.9	91	37%	22.2	97
17.8	7	35.6	155	24.1	105	32%	23.7	103
20.3	8	39.0	170	27.9	121	29%	26.0	113
22.9	9	41.3	180	29.0	126	30%	27.5	120
25.4	10	43.6	190	32.1	140	26%	29.0	127
30.5	12	48.2	210	36.4	159	24%	32.1	140
35.6	14	50.5	220	38.7	169	23%	33.6	147
40.6	16	52.8	230	39.8	174	25%	35.2	153
45.7	18	55.1	240	42.2	184	23%	36.7	160

Table 11: White Pine Plantations (25 cm and up average diameter) Source: OMNR (1997)

DBH		SDI Fully Stocked		SDI Target Residual BA			Minimum Residual BA (33% Removal)	
Cm	Inches	M2/ Ha	Ft2/ Acre	M2/ Ha	Ft2/ Acre	% Removal	M2/ Ha	Ft2/ acre
15	6	24.7	108	18.5	81	25%	16.5	72
17.5	7	27.6	120	20.4	89	26%	18.4	80
20	8	30.8	134	22.6	98	27%	20.5	89
22.5	9	33.0	144	23.8	104	28%	22.0	96
25	10	35.6	155	25.8	112	28%	23.7	103
27.5	11	37.4	163	27.6	120	26%	24.9	109
30	12	40.6	177	29.0	126	29%	27.0	118
35	14	44.2	193	31.7	138	28%	29.4	128
40	16	47.7	208	35.2	153	26%	31.8	138
45	18	50.9	222	37.4	163	27%	33.9	148

Live crown ratio is usually 30 to 50% at the time of first thinning. While some self pruning will occur, most white pine forests on better sites should be pruned to increase the lumber yield and to reduce the incidence of blister rust infections.

HARVEST CUTS

Harvest cuts differ from thinning operations in that management is primarily focused on the biological needs of the regeneration, rather than the mature trees. Harvest cuts will be scheduled in mature white pine forests with the potential to develop regeneration of pine and/or red oak.

Harvest cuts in white pine will be consistent with OMNR Silviculture Guidelines. Typically, a three-cut uniform shelterwood system (seeding, release and final removal cuts) is planned. Deferral of the final removal cut may be considered to preserve aesthetic values. Natural white pine, red pine and red oak regeneration is preferred, but under-planting may be used to supplement natural regeneration. Manual or chemical tending will be scheduled as required.

9.3.8 Red Pine (Plantations)

There are 366 hectares of red (and jack) pine plantations on the Lanark County Forest. This is only 7.7 percent of the Forest. Most are in the 21 to 40 and 41 to 60 year age classes. Red pine plantations have been planted on two soil types in Lanark County which creates two ecotypes:

- 1) Well drained sand or gravel soils, and
- 2) Sandy loam-rock complexes.

Red pine plantations on the Lanark County Forest are typically pure red pine although small pockets of white spruce were sometimes planted in adjacent low wet areas. Some of the original trees planted at the Lavant Main Block were white spruce, and scattered pockets are still visible. Red pine plantations often contain hardwood trees which were located in farm fencerows or regenerated at the time of establishment including cedar, poplar, sugar maple, elm, and black cherry. This diversity helps to enhance the wildlife habitat values in young single-species plantations. Most plantations have received a first thinning. Although these plantations are generally well stocked and in good condition, their stocking and quality was reduced by the ice storm of 1998.

Regeneration is sparse in young, well-stocked red pine plantations, but mixed hardwood (sugar maple-ash-cherry-elm) and balsam fir regeneration develops quickly after stands have undergone a first thinning. Natural white and red pine natural regeneration occur on dry sand hills. Ice-damaged pockets within red pine plantations were planted with white pine as part of the recovery efforts.

There are a small number (15.3 hectares) of jack pine plantations on the Lanark County Forest which are included within the red pine forest type. These plantations are typically small and are usually planted on shallow soils over bedrock. By providing initial forest cover, they act as a nurse crop for hardwood regeneration. Most jack pine plantations are of very poor form and quality, a situation that has worsened substantially since the ice storm in January 1998.

SILVICS (adapted from OMNR 1998b and local knowledge)

- Red pine typically grows on dry, sandy, acidic sites with low fertility.
- Red pine planted on calcareous soils typically start dying back after 30 years.
- Cone production begins at 15 to 25 years of age for open grown red pine and 50 to 60 years for red pine in closed stands.
- The infrequency and irregularity of red pine seed crops are limiting factors affecting natural red pine regeneration.
- Moist mineral soil or mineral soil with a sparse covering of organic materials and partial shade provide conditions suitable for germination.
- Red pine seedlings require at least 35% of full sunlight for successful establishment.
- Shade tolerance of red pine seedlings decreases with age: maximum seedling height growth will occur at 45 per cent of full sunlight until 5 years of age, but older seedlings prefer 65 to 100% of full sunlight.
- Red pine seedlings are adversely affected by competition from understory brush and hardwood species.
- Red pine response to release is best if the tree is not overly suppressed and has at least a 1/3 live crown ratio.
- Individual tree crown dominance is poorly expressed in red pine plantations, resulting in stagnation of dense stands.
- Red pine is usually a deep rooted species which is relatively windfirm.
- The most common damaging agents of red pine are ice and snow damage and root rots.

LONG-TERM MANAGEMENT OBJECTIVE

Red pine is used to produce poles, sawlogs and boltwood and as a minor component of the furnish for fine papers. Demand for plantation red pine thinnings significantly increased in the mid 1990s with the development of boltwood markets, resulting in high stumpage values.

The long-term management objective for red pine plantations is to regenerate mixed pine forests (primarily white pine with a red pine component) on sand and gravel ecotypes and hardwood forests (sugar maple, ash, elm, cherry) forests on sandy loam ecotypes. Jack pine is considered as a transition species that is growing outside its natural range and there are currently no plans to harvest or regenerate this species. Jack pine stands are naturally succeeding to hardwood forests, a process which has been accelerated by the ice storm.

MANAGEMENT

First thinnings in red pine can be carried out when the stand reaches an average diameter of 18 centimeters and a basal area of 40 M²/ Ha. This is usually reached once plantations reach 25 years of age.

Typically first thinning is a row thinning removing every fourth to fifth row to establish access, with selection thinning within the remaining rows. Many older plantations have had every 3rd row removed during the first thinning. Full row removal is preferred. Jogs in the row to avoid areas of high quality timber are acceptable provided they are limited; repeated short jogs in rows create problems for machine operators and may reduce the ability to market the thinnings.

Subsequent thinnings are selective, using the previously harvested rows for access. Basal area stocking guides for thinning red pine plantations are provided in Table 12. For a particular stand, the prescription for residual basal area should typically fall between the SDI target and a 1/3 basal area removal. The associated stand density index diagram is found in Appendix 4.

Table 12: Red Pine Plantations

DBH		SDI Fully Stocked		SDI Target Residual BA			Minimum Residual BA (33% Removal)	
Cm	Inches	M2/ Ha	Ft2/ Acre	M2/ Ha	Ft2/ Acre	% Removal	M2/ Ha	Ft2/ acre
15	6	37.1	162	28.3	123	24%	24.7	108
17.5	7	38.5	168	30.1	131	22%	25.6	112
20	8	40.8	178	31.4	137	23%	27.2	118
22.5	9	42.1	183	31.8	139	24%	28.0	122
25	10	44.2	193	33.4	145	24%	29.4	128
27.5	11	44.5	194	34.4	150	23%	29.6	129
30	12	45.9	200	34.6	151	25%	30.6	133
35	14	47.1	205	36.5	159	23%	31.4	137
40	16	48.4	211	37.7	164	22%	32.2	140

Source: OMNR 1997.

Live crown ratio is usually 25 to 40% at the time of first thinning. Red pine has excellent self-pruning properties in well-stocked stands.

HARVEST CUTS

Harvest cuts differ from thinning operations in that management is primarily focused on the biological needs of the regeneration, rather than the mature trees. On sand and gravel ecotypes regeneration of white pine, red pine and red oak is the desired objective. Shelterwood harvest cuts will be scheduled on these sites in mature red pine plantations, or in younger stands with dense advanced regeneration of white pine, red pine and/ or red oak. Natural regeneration is preferred, but under-planting may be used to supplement natural regeneration. Manual or chemical tending will be scheduled as required. Shelterwood harvest cuts in red pine plantations will be consistent with OMNR Silviculture Guidelines. Typically, a three-cut uniform shelterwood system (seeding, release and final removal cuts) is planned. Deferral of the final removal cut may be considered to preserve aesthetic values.

On sandy loam ecotypes a dense understory of hardwood regeneration develops after the first thinning and is enhanced with each subsequent operation. Continuous thinnings in these plantations will eventually result in an all-aged tolerant hardwood forest, with a minor component of white pine, red pine and red oak. These stands will eventually be managed as tolerant hardwoods under the selection system; shelterwood harvest cuts will not be scheduled under these conditions.

9.3.9 Trends In Forest Type Succession

The County's properties were private lands that were typically farmed or logged before being sold to the County. As a result of significant past natural and man-made disturbances, many have been set back to earlier stages of forest succession. The forest management practiced by the County, including fire suppression tends to result in relatively low levels of disturbance. As the forests develop, many will change composition drastically regardless of whether they are managed or not.

Upland tolerant hardwoods, shallow-soiled red oak sites, lowland hardwoods, lowland cedar and white pine are relatively stable ecosystems that are permanent forest types in Lanark County. Red oak on deeper soils, hardwood shelterwood, intolerant hardwoods, upland cedar and red pine are forest types in transition: in the absence of further major disturbances, over time they will succeed towards the permanent forest types.

Table 13 on the attached page summarizes the trends in forest succession over time for the County Forest. Forest type, ecotype and stability have been described previously, and trend is self-explanatory. "Source for" refers to forest types from which the current forest type may succeed to. For example, red oak on deep soils may succeed to tolerant hardwoods: red oak is a "source for" tolerant hardwoods. "Sink from" refers to forest types which may succeed into the current forest type. For example, hardwood shelterwood and intolerant hardwoods may be managed towards red oak forest types. They are a "sink from" which red oak forest types develop. Red oak on shallow soils and white pine, and lowland hardwoods and lowland conifers tend to cycle back and forth and so can be both a "source for" and a "sink from" each other.

Table 13 Lanark County Community Forest: Trends in Forest Type Succession*

FOREST TYPE	ECOTYPE	STABILITY	TREND	SOURCE FOR	SINK FROM
Tolerant Hardwood (TH)	All	Permanent	Increase	NA	Or, HDus, Int, OC, Pw, Pr
Red Oak (Or)	Shallow Soil	Permanent	Stable	Pw	Pw
	Deep Soil	Transition	Decrease	TH	HDus, Int
Hardwood Shelterwood (HDus)	Shallow Soil	Transition	Decrease	Or, Pw	NA
	Deep Soil	Transition	Decrease	TH	NA
Intolerant Hardwood (Int)	Shallow Soil	Transition	Decrease	Or, Pw	NA
	Deep Soil	Transition	Decrease	TH	NA
	Wet Soil	Transition	Decrease	LH, OC	NA
	All	Permanent	Stable	OC	OC
Lowland Hardwood (LH)	Upland	Transition	Decrease	TH, Pw	NA
	Lowland	Permanent	Stable	LH	LH
Other Conifer (OC)	All	Permanent	Stable	Or, TH	Or, HDus, Int, OC, Pr
	Sandy Loam	Transition	Decrease	TH	NA

* Assumes continuation of current forestry practices and levels of natural disturbance

10.0 NATURAL HERITAGE AND CULTURAL VALUES OF THE LANARK COUNTY COMMUNITY FOREST

10.1 Introduction

The County Forest boasts a diversity of natural heritage and cultural values. Some of these values are landscape level features such as lakes, rivers, deer wintering areas and wetlands which have been classified and mapped by the Ministry of Natural Resources. Other values such as stick nests or remnants of old homesteads may be discovered by or reported to staff. Such values, if new, shall be assessed for accuracy and appropriateness prior to any addition to the inventory on compartment maps (Appendix 2). Natural heritage and cultural values are an important part of the Forest's legacy and are given special consideration for protection when planning forestry operations.

10.2 Values Inventory and Mapping

Values information for the Lanark County Forest is documented on the Compartment Maps (Appendix 2). The initial information source is OMNR's Natural Resources and Values Information System (NRVIS). The maps are maintained by the GIS department of the Forest Manager. The maps provide the initial inventory for assessing the natural heritage and cultural values on a particular property. The information currently shown on the maps includes provincially significant and other wetlands, lakes, rivers, waterfowl staging areas, deer wintering areas, old forests, remnants of old homesteads, recreation trails, water access points, and research plots. The compartment maps also provide descriptions of the forests, which are among the most significant natural heritage value found on the properties.

Prior to forest harvesting, Lanark County carries out natural heritage inventories for natural forest stands. The inventory protocol was developed by a multidisciplinary group, including representatives of Lanark County, the Forest Manager, and several noted local biologists and ecologists. New values information may be also discovered by staff or contractors during the course of forestry operations. Forestry workers are informed of the values and appropriate

buffers are put in to place to provide protection (Section 10.5 Areas of Concern). Generally, as new values are discovered, maps will be updated or new maps created to reflect this information. However, new values which are highly sensitive or subject to exploitation are not mapped but are protected on-site.

10.3 Summary of Natural Heritage Values

Table 14 lists the mapped natural heritage and cultural values for each of the Lanark County Forest compartments. The description of each of the values is provided below. Many of these features are designated as “High Conservation Value Forests” under the Policies of the EOMF FSC certificate (EOMF 2007). The Forest Manager is responsible to ensure that all requirements of this policy are fulfilled as part of the management of the Forest.

Table 14 Natural Heritage and Cultural Values Summary

Compartment No.	Provincially Significant Wetlands (Ha)	Other Wetlands (Ha)	Lakes (Ha)	Streams and Rivers (Km)	Constructed Drains (Km)	Waterfowl Staging Areas (Ha)	Deer Wintering Areas (Ha)	Forest FRI Age > 110 (Ha)	Cultural Values
DALH1		0.2		0.5					
DALH2/3		8.3		0.9					
DALH4		10.0		2.3				16.7	Old Homestead
DALH5		1.9		1.0			9.0		
DALH6									
DALH7		7.9		1.8					
DALH8		2.2		0.4					
DALH9		37.7		3.4				7.4	Old Homestead
DALH10		6.5		1.2					Old Homestead
DALH11		33.6		3.4					Old Homestead
DALH12		0.3		0.03					Old Homestead
DAR1/2		3.6		1.8					Old Homestead
DAR3		1.3		1.1					
DAR4/5		6.4		1.1			47.2		Growth and Yield
DAR6		1.6		0.6					Pioneer Cemetery
DAR7		15.8		3.0					
DAR8/9/10		4.2		1.8				14.2	
DAR11/12		1.7		0.6				3.0	
DAR13		12.3		1.0			80.1	5.5	
DAR14		4.1		1.1					
DAR15		11.2		1.7		91.7			

Table 14 (Continued) Natural Heritage and Cultural Values Summary

Compartment No.	Provincially Significant Wetlands (Ha)	Other Wetlands (Ha)	Lakes (Ha)	Streams and Rivers (Km)	Constructed Drains (Km)	Waterfowl Staging Areas (Ha)	Deer Wintering Areas (Ha)	Forest FRI Age > 110 (Ha)	Cultural Values
DRUM1	22.7	3.4		0.2	0.24				
LAN1		0.1							
LAN2		11.4		1.4				0.2	Recreational Trail
LAN3		5.6		1.0			6.5		
LAN4		0.4		0.2					
LAN5/6		6.1		1.1				1.2	
LAN7		4.2		0.3					
LAN8/9		12.5		0.8					
LAV1-25		92.6	12.5	9.2				42.2	Water Access Point
LAV26/27		43.3	12.5	2.7			16.0	5.8	
LAV28		4.6		0.4					
LAV29		12.5	4.4	3.2				8.1	Growth and Yield
MON1		3.9		0.2	0.18				
NBURGESS1		30.7		3.0					Old Homestead
NSHER1		8.5		1.7				17.5	
NSHER2		18.8		2.4					
PAK1/2		85.6		7.1					
SSHHER1		19.6		0.8					
SSHHER2		17.8		1.8			65.1		
SSHHER3	8.0	9.4		0.3				3.0	Old Homestead
SSHHER4		3.5		0.5				13.6	

10.3.1 Riparian Areas: Wetlands, Lakes and Rivers

“Wetlands and riparian areas are among the most critical parts of any forest ecosystem... and are utilized by over 90% of the region’s wildlife species and provide the preferred habitat for over 40% of these species (New Hampshire, 1997).”

WETLANDS

Wetlands are important ecological resources which provide numerous values to society. These values include wildlife habitat for numerous species, water filtration and purification, erosion and flood control and recreation opportunities. Wetlands are typically composed of varying percentages of swamp, bog and marsh.

In Ontario, the significance of wetlands is determined by evaluating biological, social, hydrological and special features attributes. Although all wetlands are important ecosystems, provincially significant wetlands are those which rank the highest in the provincial wetland classification system. Many of the wetlands in Lanark County have not been evaluated. This is not because they are less important, but rather because wetland evaluation in Ontario has typically been focused off of the Canadian Shield as these wetlands are under greater pressure of drainage and development.

PROVINCIALY SIGNIFICANT WETLANDS

There are portions of two provincially significant wetlands on the Lanark County Forest. These are the Black Creek Wetland on Drummond Compartment 1 and Bolton Creek Wetland on South Sherbrooke Compartment 3. The total area is 30.7 hectares. A complete description of the provincially significant wetlands including vegetation communities is available on the OMNR’s website, under Natural Heritage Information Centre, Natural Areas.

OTHER WETLANDS

Almost all of the County Forest compartments contain wetlands. In Table 6, these areas include the non-forest categories of “muskeg”, “brush and alder” and ‘open water” (less the area of the 5 lakes listed in Table 15). There is a total area of 565.3 hectares of other wetlands on the Lanark County Forest. This represents 11.9 % of the total area of the Forest.

Openings created by beaver in forested landscapes provide critical habitat diversity on the Forest. The continuing cycle from forest, to flooded areas with standing dead trees, through stagnant ponds, to open meadows and back to forest again provides for a variety of wildlife. These include ” frogs, turtles, waterfowl, great blue herons, swallows, otter, mink, and moose in the open water stage; to geese, grouse, woodcock, woodpeckers, yellow-throats, yellow warblers, bog lemmings, bear, deer and moose in the open meadow stage. (New Hampshire, 1997).” For early settlers, beaver meadows were critical pasture areas; periodically evidence of old cedar rail fences can still be found surrounding these natural grasslands.

“Vernal pools are small depressions that fill when spring melt-water or autumn rains accumulate, or when groundwater level rises above the level of the depression (New Hampshire, 1997).” These ponds cannot support fish but provide a unique breeding and feeding habitat for frogs, salamanders, insects and other invertebrates. These features are usually too small and numerous to be mapped, but are given protection during tree marking and harvesting operations as described in Table 20.

LAKES AND STREAMS

In addition to the values provided by wetlands, lakes and streams also provide important fish habitat. The Fisheries Management Plan from the previous Carleton Place District of the OMNR provided a detailed inventory and classification of lakes and rivers in Lanark County. Table 15 summarizes this information for permanent waterbodies on or adjacent to County lands. Table 16 on the following page lists the associated fish species indicated on the OMNR FRI database.

Table 15 Permanent Water Body Classification

CLASS I LAKES		CLASS 2 LAKES		CLASS 1 RIVERS AND STREAMS		CLASS 2 RIVERS AND STREAMS	
CW	WW	CW	WW	CW	WW	CW	WW
Bottle	Caldwell Dixon		Pigeon Nelson	Indian River	Indian River	- Bolton Creek - Long Sault Creek	- Little Clyde (Gunns) Creek - Glen Creek - Forsythe Creek - Middleville Creek - Little Antoine Creek

Class 1) Trophy fisheries are waters that should be managed for high quality angling by virtue of a catch rate above two fish per day, or a specific trophy species and a remote atmosphere

Class 2) Principal fisheries are waters that are managed for a good angling experience with other recreational values secondary. A catch target of 1.5 fish per day for all sport fish combined is desirable.

CW = cold water, WW = warm water

There are five lakes on or adjacent to the County Forest properties: Bottle, Dixon, Caldwell, Pigeon and Nelson. All are located in the geographic township of Lavant. Rivers and streams are more uniformly distributed through the County occurring in Dalhousie, Darling, Lanark, Lavant, Pakenham, and South Sherbrooke. Constructed drains on compartments Drummond 1 and Montague 1 may also have warm water fish species.

In addition to these permanent classified water bodies, there are numerous seasonal (intermittent) creeks on the County Forest. These sites often green-up early in the spring, and as a result are frequently visited by many wildlife species. They are areas of high diversity for plant species, and are given special protection to minimize disturbance from logging operations.

Table 16 Fisheries Information: Permanent Waterbodies

Compartment	Lake/ Stream	Fish Species
LAV 1-25	Dixon Lake	pumpkinseed, pearl dace, smallmouth bass, largemouth bass, yellow perch, brook trout
LAV 1-25	Bottle Lake	brown bullhead, white sucker, pearl dace, sand shiner, northern redbelly dace, brook trout
LAV 26, 27	Caldwell Lake	brown bullhead, rock bass, northern pike, largemouth bass, spotfin shiner, bluntnose minnow, brook trout
LAV 29	Pigeon Lake	northern redbelly dace
LAV 29	Nelson Lake	white sucker, northern redbelly dace, fathead minnow, creek chub
DALH 1, DALH 9	Long Sault Creek	
DALH 8	Little Clyde River	pumpkinseed, common shiner, blacknose shiner, tadpole madtom, northern redbelly dace, finescale dace, bluntnose minnow, creek chub, fallfish
DAR4/5, DAR 6, DAR 7, DAR 8/9/10	Indian River	white sucker, brook stickleback, banded killifish, pumpkinseed, pearl dace, smallmouth bass, golden shiner, common shiner, blackchin shiner, blacknose shiner, northern redbelly dace, finescale dace, bluntnose minnow, brook trout, fallfish, walleye
LAN3	Middleville Creek	brown bullhead, white sucker, brook stickleback, Iowa darter, brassy minnow, pearl dace, largemouth bass, golden shiner, common shiner, blacknose shiner, yellow perch, northern redbelly dace, finescale dace, creek chub, yellow bullhead, rock bass
LAV1-25	Little Antoine Creek	brown bullhead, common shiner, northern redbelly dace, finescale dace, fathead minnow, creek chub
LAV26/27	Little Antoine Creek	brown bullhead, common shiner, northern redbelly dace, finescale dace, fathead minnow, creek chub
PAK1&2	Forsythe Creek	
PAK1&2	Glen Creek	white sucker, fathead minnow, longnose dace, creek chub
SSHER3	Bolton Creek	rock bass, white sucker, northern pike, pumpkinseed, burbot, smallmouth bass, common shiner, blacknose shiner, logperch, bluntnose minnow, brown trout, creek chub, fallfish, central mudminnow, brown bullhead, margined madtom, tessellated darter

10.3.2 Waterfowl Staging Areas (Source: Ducks Unlimited, 2010)

In the fall, many ducks vacate smaller wetlands used during the breeding season and congregate with other waterfowl on larger marshes and lakes. Wetlands provide critical roosting sites. Priority staging areas are also adjacent to preferred feeding areas as waterfowl have to consume large quantities of food in preparation for the fall migration. Compartment Darling 15 is identified as a waterfowl staging area. It contains several large wetlands in close proximity to White Lake. Forest management guidelines will follow the area of concern prescriptions for wetlands, although a specific season of operation limitation will also be put in effect to avoid disturbance to the waterfowl.

10.3.3 Stick Nests

Stick nests are an important feature for wildlife because they may be used repeatedly by the birds that built them or by other birds that do not build their own nests. They are relatively rare habitat features. Stick nests are assessed for evidence of activity and species. Trees with inactive stick nests are protected by tree markers as per table 21 in section 10.6. Where the Forest Manager confirms that stick nests are active, an area of concern prescription specific to the occupying species is applied as described in section 10.5.

Areas of concern prescriptions are focused on larger birds which have highly specific habitat requirements, form colonies and/ or tend to reuse the same nest on an annual or at least regular basis. Historically the species most likely to be identified in Lanark County have been red-shouldered hawks which nest in mature hardwood forest, northern goshawks which nest in mature pine forests, conifer plantations or hardwood stands with a white pine component and great blue herons which nest in marshes and swamps.

10.3.4 Deer Wintering Areas

Deer wintering areas are conifer-dominated forests intermixed with hardwood forest or open areas where deer find shelter and food in the winter. They are often associated with water courses and riparian habitat. Preferred conifer species for shelter and food are white cedar and hemlock. Deer wintering areas “provide shelter from harsh winter weather by reducing snow accumulation and wind speeds, while allowing access to food supplies and escape from predators (New Hampshire, 1997) “

The boundaries of deer wintering areas may change over time, and aerial surveys and mapping by the OMNR may not always reflect current deer use patterns. According to OMNR FRI data, the Lanark County Forest contains 223 hectares of mapped deer yards on 6 Forest compartments as shown in table 17. Other cedar-dominated forests on the Forest (eg Lanark Compartment 1) may also show evidence of high deer use in the winter. Management of these unmapped areas will also take into consideration the area of concern guidelines for deer wintering habitat.

Table 17 Mapped Deer Wintering Areas

FOREST COMPARTMENT	AREA (HECTARES)
Dalhousie 6	9
Darling 4-5	47.2
Darling 15	80.1
Lanark 3	6.5
Lavant 26-27	16
South Sherbrooke 2	65.1

10.3.5 Species-at-Risk (Source: OMNR Website, 2010, Norlock, 2010)

A "species at risk" (SAR) is any naturally-occurring plant or animal in danger of extinction or of disappearing from the province. Once classified as "at risk", they are added to the Species at Risk in Ontario (SARO) List. Appendix 5 contains the 2009 list of known occurrences of SAR in Lanark County. SAR species and designations are subject to change. The OMNR website is the current source for all SAR information, including a full list of all Species-at-Risk in Ontario.

The loss of these species is of concern because they may provide economic values like food (eg American eel), medicine (eg American ginseng), and timber (eg butternut) as well as ecosystem services such as pollination and nutrient cycling. The loss of any species can make ecosystems less resilient and often less productive.

An independent committee of scientific experts (the Committee on the Status of Species at Risk in Ontario) determines how imperilled a species is and then assigns it to one of the following categories:

Extirpated: No longer existing in the wild in Ontario, but still exists elsewhere (e.g. Greater-prairie Chicken)

Endangered: Facing extinction or extirpation (e.g. American Badger).

Threatened: At risk of becoming endangered (e.g. Eastern Hog-nosed Snake).

Special Concern: Sensitive to human activities or natural events which may cause it to become endangered or threatened (e.g. Monarch Butterfly).

As soon as a species is listed as extirpated, endangered or threatened, it is automatically protected from harm under Ontario's Endangered Species Act, 2007. Also immediately upon listing, the general habitats of endangered and threatened species are automatically protected from damage or destruction. The definition of general habitat applies to areas that a species currently depends on. These areas may include dens and nests, wetlands, forests and other areas essential for breeding, rearing, feeding, hibernation and migration. This protection remains in place until a species-specific habitat regulation is created.

When a species is added to the SARO list, the process of identifying species-specific (or regulated) habitat begins. A habitat regulation provides greater certainty of what is meant by a species habitat. It may describe features of the area (e.g., a creek, a cliff, or beach, or a human-made feature such as a barn) or geographic boundaries. The description may include areas where the species is found, has been found in the past, as well as areas that may be important to a species' recovery. A species-specific habitat regulation is the legal description of a species habitat. Once a species-specific habitat regulation is created it replaces the general habitat described previously. Currently, as of writing this plan, the species receiving habitat protection in Lanark County are:

Table 18 Species at Risk with Habitat Protection under the Endangered Species Act

	<u>SPECIES</u>	<u>GEOGRAPHIC TOWNSHIPS</u>	<u>COMMENTS</u>
<u>REGULATED HABITAT</u>	Wood Turtle	Lanark Highlands	Occurrence in Lanark County is not confirmed
	Eastern Prairie Fringed-Orchid	Montague	Grows in fens
<u>GENERAL HABITAT</u>	Ogden's Pondweed	Tay Valley	Aquatic plant
	Loggerhead Shrike	Beckwith, Drummond/ North Elmsley, Mississippi Mills, Montague, Tay Valley	Open land, alvars
	Gray Ratsnake	Drummond/ North Elmsley, Tay Valley	Mixed forest/ open

Area of concern prescriptions for the species-at-risk most likely to occur on the Forest (Blandings turtle, American ginseng and Butternut) are included in Section 10.5. Surveys for species-at-risk are included as part of the pre-harvest natural heritage inventory of a property. If another species-at-risk is identified in a forest compartment an area of concern prescription will be implemented to protect the value in consultation with SAR biologists from the OMNR. The location of SAR are not mapped or made available to the public to avoid creating further pressure on the species.

10.3.6 Old Forests

Old growth forest ecosystems develop over long periods of time in a low disturbance environment. They are complex forests dominated by late-successional tree species (sugar maple, beech, hemlock and white pine) and containing high levels of structural diversity, including snags, downed woody debris, and pit and mound topography. Few if any undisturbed old-growth forest ecosystems remain in Lanark County. However several of the best and largest examples of old forest have been preserved on Crown land (Murphy's Point Provincial Park, Darling Forest ANSI, Perch Lake Pines and Billa Lake Hardwoods). Many more old forests in adjacent Renfrew, Frontenac and Lennox and Addington Counties have been preserved as part of the OMNR's Madawaska Highlands Land Use Planning Process and Ontario's Living Legacy.

The Community Forests are typically second growth and have been heavily disturbed by fire, logging and agricultural settlement. Since the early 1900s, the overall reduction in disturbance levels has allowed the forests to grow and recover. On the Compartment Maps (Appendix 2) all stands shown on the FRI as greater than 110 years of age have been indicated. A listing of these stands is provided in table 19 on the following page.

These stands are found on 15 compartments and include examples of four of the five stable forest types as described in Section 9.3.9: upland tolerant hardwood, white pine, red oak (shallow soil), and other conifer (cedar). The absence of old lowland hardwood forest types is a reflection of the disturbances caused by past agricultural use on limestone-based soils and beaver activity. The old forests range in size from small stands (.17 hectares - Lanark 2, 1.2 hectares – Lanark 5/6) to substantial forests (47.2 hectares – Pakenham 1 and 2, 42.1 hectares, Lavant 1-25)

Lanark County will evaluate all stands that meet the criteria and are identified in each 5 Year Operating Plan to verify the presence/ absence of old growth characteristics and develop suitable management strategies for each stand as described in Section 10.5. Priority areas for preservation will include larger forests with limited evidence of past disturbance, access limitations and stands which are compatible with other uses of the forest, including economic

(forest harvesting) objectives. Old stands which do not meet the criteria for preservation can still be managed to maintain/ enhance old growth characteristics.

Several of these stands have already been assessed. For example, the hardwood stands at Compartments North Sherbrooke 1 and South Sherbrooke 4 contain old trees, but have been heavily disturbed in the past and are lacking key structural attributes of old growth. Conversely the old white pine stands at the Amyot property (Pakenham 1 and 2) are recognized in the Recreation Use Policy as low priority for forestry operations because of access limitations.

The FRI does not describe all attributes of a forest. All forests regardless of FRI age are evaluated for the presence of old growth characteristics prior to implementing harvest operations.

Table 19: Old Forests

COMPARTMENT	YEAR OF ORIGIN	SPECIES COMPOSITION	AREA (HECTARES)
Dalh4	1882	MH 7BD 1BE 1PW 1	5.60
Dalh4	1882	MH 9BE 1	3.92
Dalh4	1892	HE 3PW 2SW 2BF 1CE 1MH 1	7.2
Dalh9	1895	CE 8IW 1MH 1	7.44
Dar8/9/10	1882	OR 7MH 2PO 1	3.75
Dar8/9/10	1892	OR 6MH 2BD 1BE 1	10.48
Dar11/12	1882	PW 4BE 3MH 2BD 1	3.02
Dar13	1842	PW 4BW 2CE 2OR 2	5.45
Lan2	1872	CE 5LA 3AB 1SB 1	0.17
Lan5/6	1884	BE 4MH 4HE 2	1.20
Lav1-25	1882	PW 7BF 1MR 1OR 1	6.66
Lav1-25	1892	PW 5MR 2BF 1BY 1SW 1	2.18
Lav1-25	1892	OR 5PW 3MR 2	16.9
Lav1-25	1897	OR 5MR 3BE 1PW 1	16.41
Lav26/27	1892	PW 4BF 2MR 2MH 1OR 1	1.68
Lav26/27	1892	MR 2OR 2PW 2BF 1BW 1PO 1SW 1	4.14
Lav29	1882	OR 5MH 3BD 2	5.93
Lav29	1892	CE 9EX 1	2.13
NSher1	1875	MH 7BN 1OR 1OW 1	9.83
NSher1	1892	OR 4MH 3BE 2IW 1	2.34
NSher1	1900	MH 7OR 2BD 1	5.35
Pak1	1842	CE 7BF 2AB 1	6.94
Pak2	1892	PW 6PO 2MR 1SW 1	20.49
Pak2	1892	PW 5MR 2OR 1PO 1SW 1	19.77
SSher3	1807	CE 7AB 1BF 1EX 1	3.03
SSher4	1897	MH 9BD 1	13.17
SSher4	1897	MH 9BD 1	0.43
		Total Area	185.61

10.4 Cultural Values

Cultural values include both heritage values, which are human-made or natural features associated with historical use of the forest by either First Nations or European settlers, and features associated with current uses of the forest.

The Forest Manager has participated in cultural heritage awareness training as part of the conditions of FSC certification. This training is designed to raise awareness and assist with the future identification of cultural heritage values. Old homesteads occur in several locations on the Lanark County Forest and are identified and given protection by the Forest Manager as described in Section 10.5. Perhaps the best known cultural heritage value on the Forest is the pioneer cemetery at Darling Compartment 6.

The current uses of the forest which are considered as cultural values include recreation trails, water access points and research plots. Although not designated as cultural values, the roads and trails which provide access to the properties are also important for the current users of the forest.

10.5 Areas of Concern (AOC)

The term area of concern is used to describe values which require special consideration when planning forestry operations, including road building. Typical prescriptions for AOCs may include a reserve, where no activities are carried out or a modified area, where forestry activities are modified to protect the value. Each prescription is specific to the value to be protected. Areas of concern are marked prior to timber harvesting in the field with flagging tape or paint.

Table 20 summarizes the areas of concern and management prescriptions for the Lanark County Forest. Table 20 has been compiled and adapted to fit local conditions from OMNR's Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (2010). This document will continue to serve as the primary reference if a new species or value is identified on the Lanark County Forest which requires an area of concern prescription. FSC recognizes the OMNR's area of concern guidelines within their Certification Standards.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
Lakes Bottle Caldwell Dixon Nelson Pigeon	<ul style="list-style-type: none"> - No harvest reserve within 15 meters of the lake. - The reserve width may be increased to avoid harvest on steep or shallow soiled areas. 	<ul style="list-style-type: none"> - 30 to 90 meter total AOC width (including the reserve) based on slope: Slope (degrees) AOC Width 0 – 8.5 30 m 8.6 – 16.7 50 m 16.8 – 24.2 70 m >24.2 90 m - The AOC is measured from the high water mark. 	<ul style="list-style-type: none"> - Harvest, renewal, and tending operations will, to the extent practical and feasible, encourage perpetuation of the distinctive character of the shoreline forest while emulating natural disturbances and/or succession. - Management to focus on the maintenance and enhancement of wildlife and biodiversity values (den trees, nest sites, downed woody debris, provision of beaver food, etc). - Depending on the silvicultural prescription, retain a minimum of 50% to 70% canopy closure of trees greater than 10 m in height. - Maintain a 3 meter no disturbance zone adjacent to recognizable ephemeral streams, springs, seeps, and other areas of groundwater discharge when not solidly frozen. If these features are crossed, temporary crossing structures such as brush mats should be used. - Harvest, renewal, and tending operations will follow appropriate operating practices to minimize rutting, compaction, and mineral soil exposure - Avoid contamination of lakes or ponds by foreign materials. - No equipment maintenance within AOC. 	<ul style="list-style-type: none"> - No new roads, reconstructed roads, landings or aggregate pits within the reserve. - New or reconstructed roads, landings and aggregate pits should avoid the AOC wherever possible. Roads and landings may be allowed within the AOC when there are no other feasible options. - New roads that traverse the AOC will be planned wherever possible to avoid areas with a high potential to contain ephemeral streams, springs, seeps, and other areas of groundwater discharge. - When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
<p>Ponds (> 0.5 Ha) and Open Wetlands (> 2 Ha)</p> <p>Provincially Significant Wetlands (PSW):</p> <p>Bolton Creek Wetland</p> <p>Black Creek Wetland</p>	<p>- No harvest reserve within 3 meters of the pond or wetland.</p>	<p>PSW:</p> <p>- The AOC width (including the reserve) is 120 meters measured from the high water mark.</p> <p>Ponds and Other Wetlands:</p> <p>- The AOC width (including the reserve) is 15 meters measured from the high water mark.</p>	<p>- Management to focus on the maintenance and enhancement of wildlife and biodiversity values (den trees, nest sites, downed woody debris, provision of beaver food, etc).</p> <p>- For PSW AOC, depending on the silvicultural prescription, retain a minimum of 50% to 70% canopy closure of trees greater than 10 m in height.</p> <p>- Maintain a 3 meter no disturbance zone adjacent to recognizable ephemeral streams, springs, seeps, and other areas of groundwater discharge when not solidly frozen. If these features are crossed, temporary crossing structures such as brush mats should be used.</p> <p>- Harvest, renewal, and tending operations will follow appropriate operating practices to minimize rutting, compaction, and mineral soil exposure</p> <p>- Avoid contamination of ponds or wetlands by foreign materials.</p> <p>- No equipment maintenance within AOC.</p> <p>- Avoid felling of trees into ponds or wetlands. Trees accidentally felled into these features will be left where they fall.</p>	<p>- No new roads, reconstructed roads, landings or aggregate pits within the reserve.</p> <p>- New or reconstructed roads, landings and aggregate pits should avoid the AOC wherever possible. Roads and landings may be allowed within the AOC when there are no other feasible options.</p> <p>- New roads that traverse the AOC will be planned wherever possible to avoid areas with a high potential to contain ephemeral streams, springs, seeps, and other areas of groundwater discharge.</p> <p>- When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.</p>
Treed Swamps	No reserve	Boundary of Swamp	<p>- Silvicultural prescriptions will favour maintenance of partial canopy closure to favour shade tolerant plant communities and maintain water-table levels.</p> <p>- Harvest and skidding restricted to frozen ground conditions.</p>	- As above

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE	DIMENSION	MODIFIED	ROADS
Rivers and Streams	- No harvest reserve within 15 meters of the river or stream. - The reserve width may be increased to avoid harvest on steep or shallow soiled areas.	Brook Trout - 30 to 90 meter total AOC width (including the reserve) based on slope: Slope (degrees) AOC Width 0 – 8.5 30 m 8.6 – 16.7 50 m 16.8 – 24.2 70 m >24.2 90 m - The AOC is measured from the high water mark.	CONDITIONS - Harvest, renewal, and tending operations will, to the extent practical and feasible, encourage perpetuation of the distinctive character of the shoreline forest while emulating natural disturbances and/or succession. - Management to focus on the maintenance and enhancement of wildlife and biodiversity values (den trees, nest sites, downed woody debris, provision of beaver food, etc). - Depending on the silvicultural prescription, retain a minimum of 50% to 70% canopy closure of trees greater than 10 m in height. - Maintain a 3 meter no disturbance zone adjacent to recognizable ephemeral streams, springs, seeps, and other areas of groundwater discharge when not solidly frozen. If these features are crossed, temporary crossing structures such as brush mats should be used. - Harvest, renewal, and tending operations will follow appropriate operating practices to minimize rutting, compaction, and mineral soil exposure - Avoid contamination of rivers or streams by foreign materials. - No equipment maintenance within AOC.	ROADS - No new or reconstructed roads that are not associated with an approved crossing, landings or aggregate pits within the reserve. - New or reconstructed roads that are not associated with an approved crossing, landings and aggregate pits should avoid the AOC wherever possible. Roads and landings may be allowed within the AOC when there are no other feasible options. - Stream crossings allowed only with appropriate permits. - For approved crossings, the cleared Right of Way (ROW) width should not exceed 10 m. - New roads that traverse the AOC will be planned wherever possible to avoid areas with a high potential to contain ephemeral streams, springs, seeps, and other areas of groundwater discharge. - When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.
Brook Trout Long Sault Cr Indian River				
Other Spp Bolton Cr Gunn's Cr Glen Cr Forsythe Cr Middleville Cr Little Antoine Cr				

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
<p>Intermittent Watercourses and Woodland Pools > 25 meters in diameter *</p> <p>*For intermittent streams within 500 m of Bottle Lake, Indian River and Long Sault Creek use the AOC for Other Spp Rivers and Stream</p>	<p>- No harvest reserve within 3 meters of the feature.</p>	<p>- The AOC width (including the reserve) is 15 meters measured from the high water mark</p>	<ul style="list-style-type: none"> - Management to focus on the maintenance and enhancement of wildlife and biodiversity values (den trees, nest sites, downed woody debris, provision of beaver food, etc). - Depending on the silvicultural prescription, retain a minimum of 50% to 70% canopy closure of trees greater than 10 m in height. - Limited temporary corduroy or brush mat crossings of intermittent watercourses permitted. - Temporary crossings to be rehabilitated after use to ensure free flow of water. - Harvest, renewal, and tending operations will follow appropriate operating practices to minimize rutting, compaction, and mineral soil exposure - Avoid contamination by foreign materials. - No equipment maintenance within AOC. - Avoid felling of trees into intermittent watercourses and woodland pools. Trees accidentally felled into these features will be left where they fall. 	<ul style="list-style-type: none"> - No new or reconstructed roads that are not associated with an approved crossing, landings or aggregate pits within the reserve. - New or reconstructed roads that are not associated with an approved crossing, landings and aggregate pits should avoid the AOC wherever possible. Roads and landings may be allowed within the AOC when there are no other feasible options. - Stream crossings allowed only with appropriate permits. - For approved crossings, the cleared Right of Way (ROW) width should not exceed 10 m. - New roads that traverse the AOC will be planned wherever possible to avoid areas with a high potential to contain springs, seeps, and other areas of groundwater discharge. - When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.
Waterfowl Staging Areas		Compartment Boundary (Darling 15)	<ul style="list-style-type: none"> - No forestry operations from August 15 to December 15 	<ul style="list-style-type: none"> - No road operations from August 15 to December 15

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
Red-Shouldered Hawk	<p>Circular: 50 m radius</p> <p>Alternate nests: 50m reserve on nests which are known to have been occupied within the last 5 years and are in good condition.</p> <p>Inactive nests: 20m reserve on nests which are not known to have been occupied within the last 5 years or are in poor condition.</p>	<p>Total AOC is up to 400 meter: modified is up to 350 meters radius from the reserve edge.</p>	<p>- Harvest, renewal, and tending operations are not permitted within 50 to 200 meters of occupied nests during the critical breeding period (March 15 to July 15) based on potential impact of the operation except in extraordinary circumstances.</p> <p>Potential impact <u>No operations within</u></p> <p>High (eg harvest, road constr.) 200 m</p> <p>Moderate (eg small tree plant) 100 m</p> <p>Low (eg hauling, tree marking) 50 m</p> <p>- At least 28 hectares of the AOC must be <u>suitable nesting habitat (mature forest with a crown closure of 70%)</u></p> <p>- Suitable nesting habitat will be retained as a circular patch centred on the occupied nest (300 m radius circle) if the occupied nest occurs in a large uniform block of habitat. Suitable nesting habitat will be retained as an irregularly-shaped patch (contained within the 400 m AOC) if this configuration better encompasses primary and alternate nests as well as preferred habitat.</p> <p>- At least 7 hectares of the AOC must be mature forest with a residual crown closure of 70% within 200 meters of the occupied nest. For this zone, the Target BA is 20 M2/ ha, Structure is 5-5-5 M2/ ha</p> <p>- Harvest that changes development stage, reduces canopy closure below 60%, or creates canopy gaps > 0.03 ha is not permitted within 200 m of the occupied nest.</p>	<p>- New roads, reconstructed roads, landings, and aggregate pits are not permitted within 50 m of occupied nests or within the 7 ha patch of mature forest with 70% canopy closure retained within 200 m of occupied nests.</p> <p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 51-200 m of occupied nests or within forest retained as suitable nesting habitat.</p> <p>- If roads are constructed, temporary roads and/or water crossings will be used whenever practical and feasible to limit future access and disturbance.</p> <p>- When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.</p> <p>- Road construction and aggregate extraction are not permitted within 200 m of an occupied nest during the critical breeding period except in extraordinary circumstances.</p> <p>- Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 50 m of an occupied nest during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
Northern Goshawk	<p>Circular: 50 m radius</p> <p>Alternate nests: 50m reserve on nests which are known to have been occupied within the last 5 years <u>and</u> are in good condition.</p> <p>Inactive nests: 20m reserve on nests which are not known to have been occupied within the last 5 years or are in poor condition.</p>	<p>Total AOC is up to 400 meter: modified is up to 350 meters radius from the reserve edge</p>	<p>- Harvest, renewal, and tending operations are not permitted within 50 to 200 meters of occupied nests during the critical breeding period (March 15 to July 15) based on potential impact of the operation except in extraordinary circumstances.</p> <p>Potential impact <u>No operations within</u> High (eg harvest. road constr.) 200 m Moderate (eg small tree plant) 100 m Low (eg hauling, tree marking) 50 m</p> <p>- At least 28 hectares of the AOC must be <u>suitable nesting habitat (mature forest with a crown closure of 50%)</u>.</p> <p>- Suitable nesting habitat will be retained as a circular patch centred on the occupied nest (300 m radius circle) if the occupied nest occurs in a large uniform block of habitat. Suitable nesting habitat will be retained as an irregularly-shaped patch (contained within the 400 m AOC) if this configuration better encompasses primary and alternate nests as well as preferred habitat.</p> <p>- At least 7 hectares of the AOC must be mature forest with a residual crown closure of <u>70%</u> within 200 meters of the occupied nest.</p> <p>- Harvest that changes development stage, reduces canopy closure below 50%, or creates canopy gaps > 0.1 ha is not permitted within 200 m of the occupied nest</p>	<p>- New roads, reconstructed roads, landings, and aggregate pits are not permitted within 50 m of occupied nests or within the 7 ha patch of mature forest with 70% canopy closure retained within 200 m of occupied nests.</p> <p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 51-200 m of occupied nests or within forest retained as suitable nesting habitat.</p> <p>- If roads are constructed, temporary roads and/or water crossings will be used whenever practical and feasible to limit future access and disturbance.</p> <p>- When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.</p> <p>- Road construction and aggregate extraction are not permitted within 200 m of an occupied nest during the critical breeding period except in extraordinary circumstances.</p> <p>- Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 50 m of an occupied nest during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	MODIFIED		ROADS
		DIMENSION	CONDITIONS	
Common Raptors - Broad-Winged, Coopers, Red-tailed Hawk Stick Nests, Barred Owl Cavity Nest	Circular: 20 meters from the active nest tree	Circular: 100 m radius from the nest.	<p>- Harvest, renewal, and tending operations are not permitted within 25 to 100 meters of occupied nests during the critical breeding period (Broad-winged Hawk and Coopers Hawk - April 1 to July 31. Barred Owl and Red-tailed Hawk - March 15 to July 15) based on potential impact of the operation except in extraordinary circumstances.</p> <p><u>Potential impact</u> <u>No operations within</u> High (eg harvest, road constr.) 100 m Moderate (eg small tree plant) 50 m Low (eg hauling, tree marking) 25 m</p> <p>- Retain inactive or satellite nest trees.</p>	<p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 20 m of nests.</p> <p>- Road construction and aggregate extraction are not permitted within 100 m of occupied nests during the critical breeding period except in extraordinary circumstances.</p> <p>• Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 25 m of occupied nests during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>
Common Raptors - Barred Owl Stick Nest	Circular: 20 meters from the active nest tree	Circular: 200 m radius from the nest.	<p>- Harvest, renewal, and tending operations are not permitted within 50 to 200 meters of occupied nests during the critical breeding period (March 15 to July 15) based on potential impact of the operation except in extraordinary circumstances.</p> <p><u>Potential impact</u> <u>No operations within</u> High (eg harvest, road constr.) 200 m Moderate (eg small tree plant) 100 m Low (eg hauling, tree marking) 50 m</p> <p>- Retain inactive or satellite nest trees.</p>	<p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 20 m of nests.</p> <p>- Road construction and aggregate extraction are not permitted within 200 m of occupied nests during the critical breeding period except in extraordinary circumstances.</p> <p>• Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 50 m of occupied nests during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
Great Blue Heron Colony	Circular: 75 m radius from the edge of any nest.	Total AOC is 300 meter circular: modified is 225 meters radius from the reserve edge.	<p>- Harvest, renewal, and tending operations are not permitted within 75 to 300 meters of occupied nests during the critical breeding period (March 15 to August 1) based on potential impact of the operation (see below) except in extraordinary circumstances.</p> <p>Potential impact No operations within</p> <p>High (eg harvest, road constr.) 300 m</p> <p>Moderate (eg small tree plant) 150 m</p> <p>Low (eg hauling, tree marking) 75 m</p> <p>- retain a minimum of 60% canopy closure of mature forest from 76 to 150 meters from nest.</p> <p>- for large heron colonies (>= four occupied nests) retain a minimum of 50% canopy closure of trees greater than 10 m in height from 151 to 300 meters from nest.</p>	<p>- New roads, reconstructed roads, landings, and aggregate pits are not permitted within 150 m of occupied nests.</p> <p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 151-300 m of occupied nests.</p> <p>- When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.</p> <p>- When roads are constructed within the AOC, temporary roads and/or water crossings will be used whenever practical and feasible to limit future access and disturbance.</p> <p>- Road construction and aggregate extraction are not permitted within 300 m of occupied nests during the critical breeding period except in extraordinary circumstances.</p> <p>- Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 75 m of occupied primary nests during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE	DIMENSION	MODIFIED	ROADS
Osprey Nest	<p>Circular: 75 m radius from the edge of the nest.</p> <p>Alternate nests: 75m reserve on nests which are known to have been occupied within the last 5 years and are in good condition.</p> <p>Inactive nests: 20m reserve on nests which are not known to have been occupied within the last 5 years or are in poor condition.</p>	<p>Total AOC is 300 meter circular: modified is 225 meters radius from the reserve edge.</p> <p>Alternate nests: modified is 75 meters radius from the reserve edge.</p> <p>Inactive nests: modified is 55 meters radius from the reserve edge.</p>	<p>- Harvest, renewal, and tending operations are not permitted within 75 to 300 meters of occupied nests during the critical breeding period (April 1 to August 15) based on potential impact of the operation (see below) except in extraordinary circumstances.</p> <p>Potential impact No operations within</p> <p>High (eg harvest, road constr.) 300 m</p> <p>Moderate (eg small tree plant) 150 m</p> <p>Low (eg hauling, tree marking) 75 m</p> <p>- for active and alternate nests, retain a minimum of 60% canopy closure of mature forest from 76 to 150 meters from nest.</p> <p>- for inactive nests, retain a minimum of 60% canopy closure of mature forest from 21 to 75 meters from nest.</p> <p>- Wildlife trees that may function as potential nest, perch, and roost sites will be preferentially retained based on the following order of priority: 1) supercanopy trees, 2) veteran trees, 3) cavity trees and 4) other live dominant or codominant trees that are windfirm. White pines, red pines, and poplars will be favoured when available.</p>	<p>- New roads, reconstructed roads, landings, and aggregate pits are not permitted within 150 m of occupied nests.</p> <p>- Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 151-300 m of occupied nests.</p> <p>- When new or reconstructed roads traverse residual forest within the AOC, the width of the cleared corridor will be minimized.</p> <p>- When roads are constructed within the AOC, temporary roads and/or water crossings will be used whenever practical and feasible to limit future access and disturbance.</p> <p>- Road construction and aggregate extraction are not permitted within 300 m of occupied nests during the critical breeding period except in extraordinary circumstances.</p> <p>- Hauling and routine road maintenance (except that required for safety reasons or environmental protection) are not permitted within 75 m of occupied primary nests during the critical breeding period unless the road predates the nest or except in extraordinary circumstances. No hauling restrictions on existing public roads.</p>

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED CONDITIONS	ROADS
Deer Wintering Area	No reserve	AOC encompasses entire identified deer wintering area.	<p>Conifer plantations</p> <ul style="list-style-type: none"> - Shelterwood removal cuts to maintain clumps of 3-5 conifer trees spaced 10-30m and no further than 60m apart, unless conifer regeneration is >10m in height with 60% canopy closure. <p>Cedar Stands</p> <p>Regenerate with patch-cut (<1.0ha blocks) or strip-cut (20-40m wide). Final harvest not to occur until regeneration has 60% canopy closure and is at least 5m in height.</p> <p>Hardwood Stands</p> <ul style="list-style-type: none"> - Maintain conifer patches >=.04 ha (20m x 20m) in trees 10 m in height with 60% canopy closure. - Conifer patches <0.04ha are to be maintained as clumps with 3-5 conifer trees spaced 10-30m and no more than 60m apart. - Maintain single solitary conifers at least 10 m in height to link conifer patches. <p>General Provisions</p> <ul style="list-style-type: none"> - Where choices exist, conifer cover patches should be retained on south facing slopes, next to forest openings, over deer beds, and along trails. - Deer trails and travel corridors are to be kept free of logging debris. 	Planning for roads and landings should avoid critical thermal cover, bedding areas and major travel corridors.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE	MODIFIED		ROADS
	DIMENSION	DIMENSION	CONDITIONS	
Blandings Turtle	Boundary of winter hibernation sites and 30 meters from the nesting site.	- The AOC width is up to 300 meters from suitable summer habitat.	<p>Operations involving heavy equipment (e.g., mechanical harvesters, skidders, bulldozers) or otherwise representing a potential injury risk to turtles (e.g., motor-manual tending) are not permitted within:</p> <ul style="list-style-type: none"> - 150 m of suitable summer habitat during the <u>active season</u> (May 1 to September 30). - 300 m of suitable summer habitat during the <u>nesting season</u> (June 1 to June 30). 	<ul style="list-style-type: none"> - No new or reconstructed roads that are not associated with an approved crossing, landings or aggregate pits within the reserve. - New or reconstructed roads, landings and aggregate pits should avoid the AOC wherever possible. Roads and landings may be allowed within the AOC when there are no other feasible options. - Construction or reconstruction of roads is not permitted within 300 meters of suitable summer habitat during the nesting period or within 150 meters of suitable summer habitat during the active season. - Aggregate extraction in existing pits and road maintenance are not permitted within 300 meters of suitable summer habitat during the nesting and incubation periods (June 1 to September 30) - Use of roads within the AOC will be accompanied by a strategy to mitigate potential for traffic-related mortality of Blanding's turtles if the road is: <ul style="list-style-type: none"> - used during the nesting period and within 300 meters of suitable summer habitat or - used during the active season and within 150 meters of suitable summer habitat.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	MODIFIED		ROADS	
	RESERVE DIMENSION	DIMENSION		CONDITIONS
American Ginseng	Reserve extends 20 meters from the outermost edge of the population.	<ul style="list-style-type: none"> - For large ginseng patches with > 20 plants, total AOC is 120 meter circular: modified is 100 meters radius from the reserve edge. - Patches of ginseng with fewer than 20 plants do not require modified areas. 	<ul style="list-style-type: none"> - Maintain residual crown closure of 70%. - Trees will be felled away from the reserve. - Minimize harvesting equipment traffic in AOC. - Winter operations will be conducted to the extent practical and feasible. 	<ul style="list-style-type: none"> - New roads and reconstructed roads are not permitted within 20 meters of the patch. - Whenever practical and feasible, new roads, reconstructed roads, landings, and aggregate pits will not be constructed within 120 meters of large ginseng patches. - New roads and reconstructed roads permitted within the modified AOC will be constructed to minimize potential impact on ginseng habitat (e.g., corridor width < 10 m, no grubbing, no disruption of hydrological flow) and minimize potential for illegal collection (e.g., locate road as far from ginseng patch as possible and where patch is not visible from road); winter roads will be used to the extent practical and feasible.
Butternut	No Reserve	No Modified	<ul style="list-style-type: none"> - No healthy butternut trees will be marked for removal, harvested, or intentionally damaged during operations. Healthy trees include those with: <ul style="list-style-type: none"> - more than 70% live crown and less than 20% of the combined circumference (measured at dbh) of the bole (main stem) and root flare affected by cankers, or - at least 50% live crown and no cankers (visible) on the bole (main stem) or root flares. - unhealthy butternut trees can only be marked for removal by designated Butternut Health Assessors and must be accompanied by appropriate Butternut Health Assessment documentation. - Damage to the crown, stem, and roots of residual butternut trees will be minimized through careful logging practices. - to encourage butternut regeneration, group selection or uniform shelterwood management may be applied adjacent to patches of healthy butternut trees. 	<ul style="list-style-type: none"> - Whenever practical and feasible new roads, reconstructed roads, landings, and aggregate pits are not permitted within 10 m of butternut trees.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	MODIFIED		ROADS
		DIMENSION	CONDITIONS	
Existing Old Growth Forest Ecosystem	Forest Stand			
High Potential Old Growth Forest Ecosystem	No Reserve	Boundary of Forest	Prescription to be developed to maintain and/ or enhance old growth forest ecosystem attributes.	<ul style="list-style-type: none"> - New or reconstructed roads should avoid the AOC wherever possible. - When new or reconstructed roads traverse the AOC, the width of the cleared corridor will be minimized.
Uncommon Tree Species	If Required	Boundary of Forest	Prescription to be developed to conserve forest ecosystem of concern. Depending upon age and condition of forest, conservation may focus on maintaining existing trees or developing regeneration.	<ul style="list-style-type: none"> - New or reconstructed roads should avoid the AOC wherever possible. - When new or reconstructed roads traverse the AOC, the width of the cleared corridor will be minimized.

Table 20 Areas of Concern For Natural Heritage and Cultural Values

VALUE	RESERVE DIMENSION	DIMENSION	MODIFIED	
			CONDITIONS	ROADS
Known Cultural Value (First Nation)	Dimension of reserve to be determined by Forest Manager in consultation with First Nations representative. Objective is to maintain site integrity.			- Not allowed.
Known Cultural Value (Other)	Dimension of reserve to be determined by Forest Manager in consultation with local historical representative. Objective is to maintain site integrity.			- Not Allowed
Authorized Recreation Trails	None required	No specific AOC.	Forest operations will be conducted with public safety in mind by installing warning signs, removing hazard trees (e.g. leaning), and keeping trails free of logging debris.	<p>- Place Warning or Caution signs at strategic points along the trail and within a reasonable distance of planned operations to advise the public of forest operations.</p> <p>- The use of trails for hauling and occasional skidding is allowed as long as the trail is kept free of logging debris and left in a condition consistent with its intended use.</p>

10.6 Tree Marking Considerations For Natural Heritage Values

Many important natural heritage values are identified and protected by the Forest Manager as part of tree marking and harvesting operations. Many areas of concern which are included in table 20 are primarily identified by tree markers: these include vernal pools, intermittent streams, active stick nests, unmapped deer wintering areas, species at risk (butternut, ginseng), unmapped old forests, and old homesteads.

The Ontario Ministry of Natural Resources boasts a unique program which has been developed to train and certify tree markers who work on crown land. The EOMF has adopted the requirement for use of OMNR certified tree markers as a mandatory policy for participants in their FSC Certification program. OMNR certified tree markers are trained to identify and protect numerous natural heritage values as part of their tree marking activities. Certified tree markers must also attend a refresher course every five years where they are updated on changes or additions to Provincial guidelines.

Table 21 provides a summary of additional natural heritage values which are regularly identified and protected during tree marking and harvesting operations. These guidelines have been developed by the OMNR and accepted by FSC as best management practices. These guidelines have been compiled from OMNR's Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (2010) and the 2006-2011 Forest Management Plan for the Mazinaw-Lanark Sustainable Forest License (SFL). The application of these guidelines contributes to the maintenance of a healthy forest ecosystem, the protection and enhancement of wildlife habitat and the conservation of forest biodiversity.

The following excerpts from the Ontario Tree Marking Guide, Section 4.0, Tree Marking for Wildlife Habitat and Biodiversity (2004) briefly summarize three more of the most common values identified by tree markers in the field. The reader is encouraged to read the Guide for further information on these and other values identified and protected by tree markers.

CAVITY TREES

About a quarter of all birds and mammals use holes or cavities in trees for nesting, denning, roosting, resting, or hibernating. Priority for retention of cavity trees is based on the type of cavity (eg nest vs escape), worker safety, size, species and health of the tree, and dispersion.

MAST PRODUCING TREES

The term mast refers to the edible fruits of plants. Mast is consumed by about 25% of birds and mammals in the Forest. The most common mast tree species on the County Forest are red oak, beech, and ironwood. Black cherry, hickory, basswood, but oak and butternut are less common but also important. A diversity of mast species will minimize the risk of a total mast-crop failure. Priority for retention of mast trees is based on the tree species, size of tree, crown position and overall health of the tree and crown.

SCATTERED CONIFERS IN HARDWOOD STANDS

Scattered conifers are used by about 10% of the wildlife that inhabit upland tolerant hardwood forests. For example, they provide refuge and bedding sites for black bears, roosting sites for barred owls, and nesting sites for black-throated green warblers. Priority for retention of solitary conifers is based on the tree species, size of tree, and overall health of the tree and crown.

Table 21: Tree Marking Considerations For Natural Heritage Values

Value	Operational Guidelines
Biodiversity	<p>Maintain a natural mix of tree species, retain species that are less common and less abundant at the stand and landscape level. Examples include:</p> <ol style="list-style-type: none"> 1) Retention of mid-tolerant species (red oak, basswood, black cherry) 2) Retention of tree species at risk or uncommon tree species (butternut, white oak, hickory) 3) Retention of individual “veteran” trees. 4) Creating group openings 5) Planting mixed species
Cavity Trees	<p>Maintain an average of 10 living cavity or den trees per hectare (trees with dbh at least > 25cm and preferably ≥ 40 cm dbh). Where cavity trees are not available, recruit such trees by leaving poor quality stems, especially living trees. Trees should be well distributed and of different species.</p>
Snags	<p>Encourage operators to leave snags (dead standing trees) that are not a safety risk. Leave snags that are in various stages of decay.</p>
Downed Woody Debris	<p>Downed Woody Debris (DWD) includes unmerchantable logs, limbs, branches and stumps on the forest floor. Leave coarse woody material on site. Encourage operators to leave hollow logs in the bush.</p>
Supercanopy Trees	<p>Maintain 1 supercanopy tree for every 4 hectares. Trees will be taller than the height of the main canopy of the forest and should be relatively healthy and windfirm.</p>
Mast Producing Trees	<p>Retain at least an average of 10 mast trees per hectare (order of priority butternut, hickories, oaks, beech, black cherry, basswood, ironwood) in tolerant hardwood and coniferous stands where available. Trees should have large, healthy crowns and be at least >25cm dbh (Ironwood >10cm dbh) and preferably ≥ 40 cm dbh.</p>
Scattered Conifers in Hardwood Stands	<p>Retain and manage individual and small groups of cedar, spruce, hemlock and pine trees in hardwood stands to provide shelter and feeding areas for wildlife and to maintain tree species and structural diversity.</p> <p>Retain at a minimum an average of 10 cedar, spruce, hemlock and pine stems per hectare where available. Trees should be >25cm dbh where ever possible and preferably ≥ 40 cm dbh</p>
Stick Nests of Unidentified Status and Owl Nests	<p>Attempt to identify the species most likely to use the nest. If identification fails – retain and protect the nest tree and all trees with crowns touching it or leaning in a way that would unavoidably damage the nest tree if felled.</p>

11.0 MONITORING AND ASSESSMENT

11.1 Property

Ongoing property inspections are required to ensure that the properties, roads and sites of cultural and recreational significance are maintained in good condition, to address uses of the properties that are inconsistent with the policies of the County, and to cooperate with neighbouring landowners on issues of joint interest. For formal inspections, the Forest Manager will complete a Community Forest Inspection form which is submitted to the County. Whenever possible, the inspections will be carried out in conjunction with ongoing forestry activities to increase efficiencies.

Inspections will be carried out according to the level of intensity of use and/ or misuse of a particular property. The County will strive to respond promptly to complaints regarding improper uses of the County Forest. Inspection frequency will be increased for properties where a violation of County Policy has occurred and where a risk of reoccurrence is considered as possible. Each Five Year Operating Plan will include a listing of properties which require more frequent monitoring. Table 22 includes a listing of six properties where annual inspections are currently desired due to the occurrence of sites of recreational or cultural significance, roads and gravel pits, or past noise and garbage complaints.

Table 22: Annual Property Inspections

PROPERTY	REASON
Darling 4/5	Road and creek access point
Darling 6	Pioneer cemetery, gravel pit
Lanark 1	Abandoned gravel pit
Lanark 2	Baird Property recreation trail
Lavant Main	Dixon Lake road and access point, gravel pit
Montague 1	Frequent noise and garbage complaints

11.2 Forests

EFFECTIVENESS MONITORING

The prescriptions for harvesting and renewing the County Forest are derived from the OMNR's Silviculture Guides (see bibliography). For each harvest area, a site specific harvest plan is prepared by a member of the OPFA consistent with the silviculture guides. The effectiveness of the guides is assessed through long-term monitoring by Forest Managers and through forest science programs. For example, the OMNR maintains an extensive network of growth and yield plots throughout Ontario, including many plots in eastern Ontario. Results of silvicultural effectiveness monitoring are incorporated in revisions to the Provincial Silviculture guides.

HARVEST MONITORING

Harvest and thinning activities including access are regularly monitored by the Forest Manager to ensure compliance with the standards of this Management Plan, the EOMF Forest Certification Policy and Procedures Manual (2007), the forest operations prescription and the stumpage sale contracts. The detailed procedures for monitoring and implementing corrective actions are provided in the EOMF Forest Certification Policy and Procedures Manual (2007).

Monitoring results are documented on the Forest Operations Inspection Report and kept on file. This form provides a comprehensive check-off system itemizing over 30 activities which are assessed in harvest inspections. The main categories are:

- Access
- Areas of concern
- Harvest standards
- Utilization
- Safety
- Emergency preparedness

POST-HARVEST ASSESSMENTS

After a harvest operation is finished, a post-harvest assessment is completed by the Forest Manager to:

- 1) Confirm that the objectives of the forest operations prescription have been achieved.
- 2) Assess the final species composition and stocking of the forest. Updates to the Forest Resource Inventory will be made to document substantial changes to the forest.
- 3) Assess the need for renewal activities (eg site preparation, tree planting, tending) after uniform shelterwood and clearcut operations.
- 4) Estimate the time of next harvest. This information is used to update the 20 year schedule of harvest operations contained in the Five Year Operating Plan. This ensures that a balanced level of timber volume and revenue can be maintained.

REGENERATION ASSESSMENTS

Two levels of regeneration assessment are carried out. Extensive assessments are carried out for commercial thinning operations where regeneration is not a primary objective, and for stands where high levels of desirable advanced regeneration exist. Extensive surveys are a visual assessment based on a walk-through of the area. Intensive regeneration surveys are carried out to verify the success of old field afforestation projects and regeneration of challenging species after shelterwood harvesting, primarily white pine and red oak. The Forest Manager monitors the activities of site preparation, tree planting and tending to ensure that the desired standards are achieved. Commencing in 2012, a schedule of regeneration assessments will be included in the Five Year Operating Plan based on the stands harvested in the previous Operating Plan.

FOREST HEALTH

OMNR's Forest Health Technician monitors local forest health conditions and provide updates to forest managers through information meetings. Forest managers can report observations of

forest health conditions to the technician for further investigation. The Canadian Forest Service maintains a laboratory where the identification of collected specimens can be confirmed.

11.3 Natural Heritage Values

EFFECTIVENESS MONITORING

The management prescriptions for conserving natural heritage values are derived from OMNR's Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales (2010). Direction in this guide is based on the best scientific information and expert advice available at the time of writing. OMNR maintains a program of scientific studies to assess the effectiveness of Guides. These studies are used to assist in the review and revision of Guides.

Through the involvement of members of the Community Forest Working Group and community partnerships, supplementary programs for monitoring natural heritage values on the Forest may be developed.

FISH AND WILDLIFE HABITAT AND POPULATIONS

OMNR periodically assesses the status of wildlife habitat and populations. Examples of these assessments include lake and stream surveys, wetland evaluations, and aerial mapping of deer wintering areas. Updates to this information are available to the County through Land Information Ontario (LIO). OMNR biologists also provide municipalities with updates on the status of Species at Risk and habitat regulations.

11.4 FSC Audit

As a participant in the EOMF Forest Certification Program, the County participates in the annual certification audit and five-year recertification audit to ensure that all activities are in compliance with FSC principles and criteria. The EOMF Program Coordinator also carries out annual audits of program participants to ensure compliance with EOMF policies, procedures and agreements.