Dufferin County Forest
Our Forest, Our Future

Our Forest, Our Future:
Dufferin County Forest Management Plan
2016-2036

DUFFERIN
COUNTY

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The Dufferin County Forest is a 1,054 hectare (2,606 acre) multi-tract forested area owned and managed by the County of Dufferin. The Forest serves important functions in terms of erosion and water control, natural heritage protection, biodiversity, wildlife habitat, recreational opportunities, and support of the rural economy through timber production and employment opportunities.

This twenty-year management plan (2016-2036) outlines how environmental, economic, and social sustainability will be achieved for the Dufferin County Forest, building on the County's strategies as outlined in the previous management plan (1995-2015). This plan includes an integrated five year operating plan for the period 2016-2021. As part of the development of the three subsequent five year operating plans, an assessment of the twenty year management plan will occur. As with any planning document, regular analysis will take place to ensure that current circumstances are being sufficiently addressed in the plan.

The goal of the management plan has not changed: *To protect the quality and integrity of ecosystems in the Dufferin County Forest, including air, water, land and biota; and, where quality and integrity have been diminished, to encourage restoration or remediation to healthy conditions; while providing a variety of social and economic benefits to the public.*

In order to achieve this goal, the following key actions will be taken in each of the three areas of sustainability:

Environmental Sustainability
- ❖ provide proper environmental conditions for wild life;
- ❖ protect against floods and erosion;
- ❖ maintain natural forest characteristics as much as possible and;
- ❖ protect the Forest from the threats of invasive species and climate change by maintaining, and, where possible, increasing, biodiversity.

Economic Sustainability
- ❖ maintain sustainable levels of timber harvesting throughout the planning period;
- ❖ seek forest certification to increase the demand for timber products from the County Forest and;
- ❖ continue to develop alternative revenue streams that will not compromise environmental sustainability.

Social Sustainability
- ❖ maintain an active relationship with users and other stakeholders;
- ❖ promote the benefits of forest protection/conservation;
- ❖ continue to inform residents of Dufferin County, in particular, youth, about the County Forest and;
- ❖ develop a separate detailed recreation policy, that is consistent with the overall forest management plan, to manage recreational use, in particular in the Main Tract.

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1.0 INTRODUCTION

This plan applies to the Dufferin County Forest, a 1,054 ha (2,606 acre) multi-tract forested area owned and managed by the County of Dufferin. The Forest serves important functions in terms of erosion and water control, natural heritage protection, biodiversity, wildlife habitat, recreational opportunities, and support of the rural economy through timber production and employment opportunities.

This forest management plan, *Our Forest, Our Future,* emphasizes user and community participation and a sustainability-based approach to forest management.

In order to maintain this emphasis throughout the planning process, the County of Dufferin:
1. made the protection of the quality and integrity of the natural environment the primary goal of the plan;
2. surveyed the public, both groups and individuals, through surveys and open houses;
3. established a Forest Plan Advisory Team (FPAT), representing the main user groups and the general public, to advise the County during the initial planning process and;
4. established a Forest Operation Review Committee (FORC) to conduct a high level review of the County Forest operation prior to continuing the development of the forest management plan and recreation policy.

The *Dufferin County Forest Management Plan* outlines the goal and actions that will guide the sustainability of the 1,054 ha (2,606 acre) Dufferin County Forest over the next twenty years.

This forest management plan was developed around the same time as the first Official Plan for Dufferin County. The Official Plan proposes the preparation of a Natural Heritage System Strategy and includes a Natural Heritage System map. The County Forest is included as part of the Natural Heritage System. The goal, objectives, and actions outlined in this document align with the objectives for natural heritage and water resources in the Official Plan.

2.0 PHYSICAL FEATURES OF DUFFERIN COUNTY

2.1 Topography, Geology, and Soils
Dufferin County, along with its neighbours, Grey, Wellington and Simcoe Counties, is located on a high, undulating plain which forms the "Roof of Ontario". The elevation of the "roof" ranges from 467 to 583 metres above sea level (1,541-1,924 feet). The location of the roof's peak is under much debate, but the *Physiography of Southern Ontario* puts it near the village of Singhampton, just north of Dufferin County. There, the elevation reaches 583 m (1,924 feet). Although the peak of the roof is not within Dufferin County, Dufferin does have the highest seat of government in southern Ontario. Orangeville is located at an elevation of 450 m (1,485 feet).

The elevation in the northeast corner of the county is 260 m (858 feet) above sea level, rising to 380 m (1,254 feet) above sea level in the southeast corner. West of the Niagara Escarpment, the land slopes to the north, from 470 m (1,551 feet) above sea level in the southwest to 530 m (1,749 feet) above sea level in the northwest.

Dufferin County rests on Precambrian rock, estimated to be between 800 and 1100 million years old. In the period between 500 and 300 million years ago, this area was covered by a vast sea. On the floor of this sea settled sand, ooze, mud, shells, tiny sea animals, and all manner of marine debris. Time and pressure eventually turned this layer into rocks of various types and hardness. About 250 million years ago, the sea retreated, leaving a flat, unbroken plain. Rivers flowed over the old seabed, eroding the rocks. The softer rocks, such as the shales, eroded quickly, whereas the harder dolomites and limestones resisted the eroding power of the rivers.

Over several hundred million years, this continued erosion produced the Niagara Escarpment. In Dufferin County, the Escarpment runs through the local municipalities of Mono and Mulmur in a roughly north-south direction.

Dufferin County has been subjected to repeated glaciations and the bedrock is covered by glacial drift varying in thickness from several centimetres to 170 m (561 feet). The soils of Dufferin County have developed directly from this drift. Dufferin County is underlain by sedimentary strata of the Ordovician and Silurian ages. The Ordovician lie to the east and the Silurian to the west of the Niagara Escarpment. The uppermost strata of the Silurian rocks consist of dolomite, shale and sandstone. These rocks are underlain by grey and buff dolomites.

The upper formations of the Ordovician age are the only ones which occur in Dufferin County. Uppermost and adjacent to the Niagara Escarpment are the reddish shales of the Queenston formation. These are underlain by greyish shales.

Dufferin County is characterized by gently undulating ground moraine. Steep slopes, associated with the kame moraines, occur in Mulmur, Mono, and the south part of East Garafraxa. The glaciers also left behind spillways, which today are important sources of gravel. Gravel can be found in many pockets around the County, but the most important deposits are north of Orangeville and in the Grand River Valley.

The glaciers also created the Dundalk till plain which covers the municipalities of Melancthon, Amaranth, East Garafraxa and Grand Valley. The plain is high and flat, supporting the County's agriculture, but is also poorly drained and contains many areas of wetland.

The surface deposits in Dufferin County are of glacial origin. They form the parent material from which the soils have developed. The surface deposits are classified as till, outwash, kame, esker, deltaic, and lacustrine. These classifications indicate the mode of deposition and the texture of the deposit. Glacial till, which covers a large portion of Dufferin County, is a non-sorted mixture of rock fragments and soil particles ranging in size from sand to clay.

Gently undulating till plains cover most of the municipalities of Amaranth, East Garafraxa, Grand Valley, and Melancthon. Most of this area has a superficial deposit of silt. The silt is thinnest near the west side of the county and is thickest in the area between Shelburne and Honeywood.

A part of the Port Huron morainic system forms the core of the region in most of Mulmur and Mono. The kame moraines are very hilly and stony and consist of a mixture of sand and gravel materials, but with clay till, coarse, stony, sandy loam till, and loam till, covered with up to one metre of silt or fine sandy loam.

Dufferin County's glacial heritage did not leave behind many rich mineral deposits. There were deposits of oil discovered in the early settlement days, but none were large enough to support a petroleum industry. In the early years of settlement, there were also rumours of gold and silver deposits, but none were ever found.

Organic deposits exist throughout Dufferin County, the largest of them is Luther Marsh.

Generally speaking, the Dufferin County Forest tracts located in the eastern half of Dufferin County are on drier, upland sites whereas those in the western half are on wetter, lowland sites.

2.2 Hydrology
Dufferin County has no large lakes, but it has many rivers. The Grand, Nottawasaga, Credit, Humber, and Saugeen rivers all have their headwaters in or near Dufferin County.

The Grand River drains the western half of Dufferin County, an area of 6,734 km^2 (2,626 square miles) and occupies the largest cachment basin in southwestern Ontario. Its main tributaries are the Conestogo, Nith, and Speed. In the upper reaches of the Grand River, valley cutting has been restricted by bedrock. North of the village of Grand Valley the drainage is poor, making wetlands prevalent in Melancthon Township. The depth of the river valley increases between Grand Valley and Elora, going from 18 m to 30 m (59 to 99 feet). The Grand River flows south for a distance of about 265 km (164 miles), ending up in Lake Erie just south of Dunnville.

The Nottawasaga River drains the eastern half of Dufferin County. Two of its tributaries, the Pine River and the Boyne River, rise west of the Niagara Escarpment and flow in an easterly direction. The main branch of the Nottawasaga system rises south of Shelburne and flows through the Hockley Valley. The valleys of this system are deeper than those of the Grand River system, often having gradients of more than 20 metres per kilometre (four feet per mile). The Nottawasaga flows into Georgian Bay where its mouth forms the delta of Wasaga Beach, the longest freshwater beach in the world. The Pine River runs through the south end of the Main Tract of the Dufferin County Forest.

The Credit River collects some of its tributaries from the area around Orangeville before flowing south and east to finally empty itself into Lake Ontario just west of Highway 10.

The Humber River begins its journey in the southeast corner of Mono before continuing southward through Metropolitan Toronto and into Lake Ontario at the boundary between the former cities of Etobicoke and York.

The Saugeen has its headwaters just outside the northwest border of Dufferin County, but it does collect some tributaries from within the County before continuing its flow into Lake Huron.

2.3 Climate
Canadian Climate Normals Station Data from Environment Canada (1981-2010) reports the following for Orangeville:

Mean Winter Temperature: -6°C (21°F)
Mean Summer Temperature: 18°C (64°F)

Mean Frost-Free period: 132 days
Mean Annual Precipitation: 90 cm (3')
Mean Annual Snowfall: 152 cm (5')

Both precipitation and snowfall are greatest on the western side of Dufferin County, where there is also poor drainage resulting in prolonged wet soil conditions.

The following projections, from *Climate change projections for Ontario: An updated synthesis for policymakers and planners*, were developed using a composite global climate model, averaging four models (CanESM2, MIROC-ESM-CHEM, CESM1-CAMS, and hadGEM2-ES). The ranges given below represent the ranges over three Representation Concentration Pathways (RCP 2.6, RCP 4.5, RCP 8.5)[1] as described in the Intergovernmental Panel on Climate Change Fifth Assessment Report.

Climate change scenarios for the Lake Huron Sub-Basin indicate that by 2040, we can expect changes within the following ranges compared to the 1971-2000 baseline data:

Mean Winter Temperature: +2.6°C to +2.9°C (36.7°F to 37.2°F)
Mean Winter Precipitation: +35.2 mm to +31.4 mm (+1.4" to +1.2")

Mean Summer Temperature: +1.9°C to +2.1°C (+35.4°F to +35.8°F)
Mean Summer Precipitation: +5.6 mm to -2.8 mm (+0.2" to -0.1")

Mean Annual Temperature: +2.3°C to +2.5°C (+36.1°F to +36.5°F)
Mean Annual Precipitation: +80.2 mm to +67.5 mm (+3.2" to +2.7")

Applying the ranges above to the Canadian Climate Normals Station Data from Environment Canada (1981-2010) noted at the start of this section would produce the following ranges for the new means (where data overlaps):

Mean Winter Temperature: -3.4°C to -3.1°C (25.9°F to 26.4°F)
Mean Summer Temperature: 19.9°C to 20.1°C (67.8°F to 68.2°F)
Mean Annual Precipitation: 98.0 cm to 96.8 cm (3.2' to 3.2')

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[1] The Representation Concentration Pathways (RCPs) represent different levels of increased radiative forcing measured in watts/m^{2}. Radiative forcing, or climate forcing, is the difference of insolation (sunlight) absorbed by the Earth and energy radiated back to space. A positive forcing (more incoming energy) warms the system, while negative forcing (more outgoing energy) cools it. Causes of radiative forcing include changes in insolation and the concentrations of radiatively active gases, commonly known as greenhouse gases and aerosols. The higher the RCP value, the more warming is predicted for the year 2100 relative to pre-industrial values. All of the considered pathways are possible outcomes, depending the level at which greenhouse gas emissions continue.

3.0 DEMOGRAPHICS AND ECONOMY OF DUFFERIN COUNTY

Dufferin County was one of the last areas of southern Ontario to be settled. Its rough terrain and lack of large water bodies were the two main factors that resulted in the delay in settlement. When settlement did begin in earnest in the mid-1800s, it was mostly Protestant Irish families that emigrated to Dufferin County to escape the potato famine. By 1871, the population of Dufferin County had reached 16,689. As the number of settlers increased, so did the amount of land clearing. Trees were seen not only as a valuable product for overseas markets, but also as an obstacle to the planting of wheat, corn, and other crops. Figure 1 shows the population of Dufferin County from 1881-2041.

Figure 1: Population of Dufferin County
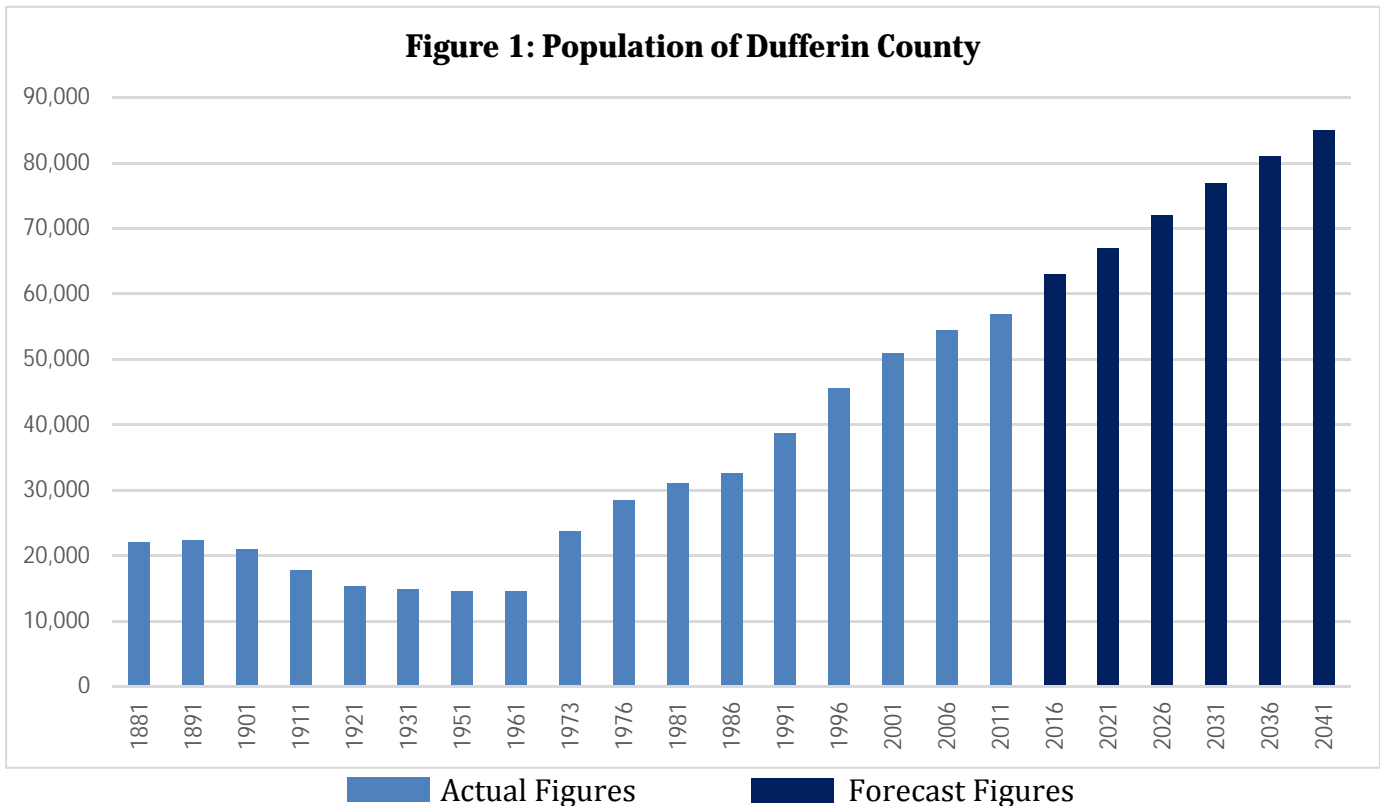
The majority of the settlers of Dufferin County came from the British Isles, particularly Northern Ireland. This heritage is reflected in the current population of Dufferin County; in the 2011 census 91% of the people in the County said that their first language was English. Other ethnic backgrounds represented in significant numbers include Dutch, German, Italian, Polish, Portuguese, and Spanish.

In 2011, 67% of the population of Dufferin lived in the three urban centres of Orangeville, Shelburne, and Grand Valley.

In the past, the economy of Dufferin County was based on agriculture. Livestock raising and mixed farming were the main enterprises, with dairy farms prevailing close to large centres of population. The most common crops included hay, mixed grains, oats, wheat, and potatoes. Beef, poultry, dairy, and market gardening operations were also important. In 2011, there were 795 farms in Dufferin County covering an area of 69,745 hectares (172,344 acres). This was down from 1986 when there were 1,079 farms covering an area of 85,360 hectares (210,929 acres). Although a portion of Dufferin's economy still depends on agriculture, it is diversifying.

According to the 2006 census[2], the population of Dufferin County aged 15 years or older was employed in the following industries:

24%	sales and service occupations
19%	trades, transport, and equipment operators and related occupations
16%	business, finance and administration occupations
11%	management occupations
9%	occupations unique to processing, manufacturing and utilities
7%	occupations in social science, education, government service, and religion
4%	natural and applied sciences and related occupations
4%	health occupations
4%	occupations unique to primary industry
2%	occupations in art, culture, recreation, and sport

The commercial retail and service sector is centred in Orangeville and Shelburne and is growing rapidly. With recent influxes of population, industries related to residential and commercial construction (building, supplies, real estate) have also grown. Manufacturing is also an important sector of Dufferin's economy. Tourism is becoming more significant, as local tourism associations take a more proactive role in attracting visitors to the area.

In the Hemson Consulting report, *Greater Golden Horseshoe Growth Forecasts to 2041*, the population of Dufferin County is forecast to rise from the 56,881 reported in the 2011 census to 77,000 in 2031 and 85,000 in 2041 (Figure 1). The same report gives a population forecast for the Greater Golden Horseshoe of 13,476,000 in 2041, an increase of 4,450,000 from 2011. These increases in population are expected to increase the recreational pressure on the Dufferin County Forest.

4.0 HISTORY OF THE DUFFERIN COUNTY FOREST

By 1900, much of Dufferin County had been cleared of trees to facilitate farming. As there had been no reforestation, the trees disappeared, and so did the lumber companies. Many farmers who had supplemented their income with logging fell on hard times. The removal of the tree cover had far-reaching effects: without stabilization, the thin, sandy soils were eroded by wind and water. This made farming impossible. However, Dufferin was not alone in this predicament. Similar settlement patterns in other parts of southern Ontario had created similar problems. As early as 1908, the Ontario Department of Agriculture had published a *Report on the Reforestation of Waste Lands in Southern Ontario*. This report outlined the development of blowsands that had resulted from large-scale land clearing. It also described the economic and environmental benefits of reforestation:

> *"The policy of putting these lands under forest management has many arguments in its favour. It will pay as a financial investment; assist in insuring a wood supply; protect the headwaters of streams; provide breeding ground for wild game, provide object lessons in forestry, and prevent citizens from developing under conditions which can end only in failure."*

In Dufferin County, land reclamation through planting began in 1905. Gradually, tree planting

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[2] Employment data is not available as part of the 2011 census information provided by Statistics Canada.

gained momentum, as people realized that trees were not primarily a nuisance in land-clearing, but were important for stabilization of soils, maintenance of water supplies, and ongoing timber production. This change in opinion could not have come about without the leadership provided by local municipalities. In 1914, Orangeville planted 4,000 trees; further plantings occurred in 1916, 1924, 1925, 1926, and 1932. Mulmur planted 16,000 trees in 1924. This was followed by more plantings in 1925, 1927, and 1928. Mono began planting in 1925, and by 1952 there were 228,300 trees planted on lands in Mono that were formerly barren.

From aerial photography taken of Dufferin County in 1953, it was estimated that there were approximately 19,600 ha (49,000 acres) of grass and meadow (poor pasture) and wooded pasture (grazed woodlands) that were suitable for reforestation and woodland management. Reclaiming the majority of these areas would require planting of about one million trees per year for thirty years. By March 31, 1974 over 17 million trees had been planted in Dufferin County.

In 1953, the Grand River Valley Conservation Authority initiated a forest management agreement with the Department of Lands and Forests (now the Ministry of Natural Resources and Forestry) with the purchase of 190 ha (475 acres) in the municipality of Grand Valley. Many of the lands owned by the Conservation Authority are important water source and water-holding areas. However, they also have value in terms of wildlife, recreation, and timber production.

In 1967, Woodlands Improvement Act (WIA) Agreements began to take hold in Dufferin County. These agreements provided private landowners with assistance from the Department of Lands and Forests in the planting and management of their woodlands. In 1982, the 9000th Woodlands Improvement Act Agreement in Ontario was signed in Dufferin County. The WIA Agreement program was terminated by the provincial government in the mid-1990s.

In 1930, the County of Dufferin, following the lead taken by the County of Simcoe in 1922, signed a forest management agreement with the Department of Lands and Forests under the auspices of the *Counties Reforestation Act*, marking a significant step in the reclamation of barren lands in Dufferin County.

The Dufferin County Forest began its existence on July 3, 1930 when a motion was introduced at the Dufferin County Council meeting requesting the Ontario Forestry Branch to secure options on lands in Mulmur Township for reforestation purposes. This motion was instigated by County Treasurer James Henderson. The first purchase of land for what would become the Dufferin County Forest was made on November 7, 1930. It consisted of 305 ha (753 acres) on Concession VIII in Mulmur Township. Over the next 80-plus years numerous properties were added, bringing the current area of the Dufferin County Forest up to 1,054 ha (2,606 acres).

Although the Dufferin County Forest is, and always was, owned by the County of Dufferin, until 1995 it was managed by the provincial government on the County's behalf. On November 26, 1930, the County of Dufferin signed its first Forest Management Agreement with the Department of Lands and Forests. The agreement was made under the *Counties Reforestation Act*; later coming under the jurisdiction of the *Forestry Act* R.S.O. 1950.

In 1959, the *Forestry Amendment Act* was passed which allowed the Minister of Lands and Forests to make interest-free loans to any Conservation Authority or municipality to assist in the buying of land for forestry purposes, provided that the land was reforested and managed under an agreement

with the Department. This was significant at a time when interest rates were high, and land prices in southern Ontario were rising rapidly. To date, the County of Dufferin has received $28,297.20 in grants under this provision. The current *Forestry Act* R.S.O. 1990 stipulates that lands bought with a grant cannot be sold or used for purposes inconsistent with forestry purposes without the approval of the Minister of Natural Resources and Forestry.

The second agreement between the County of Dufferin and the Department of Lands and Forests was signed in November, 1960 for a twenty year period commencing April 1, 1960. Amendments to the *Forestry Act* now made it possible for the County to receive a grant from the Minister of Lands and Forests for the purchase of lands to be used for forestry purposes. The grant could be up to the amount of 50% of the cost of the land plus 50% of the reasonable solicitor's fees and costs involved in securing title to the land plus an amount equal to the value of the timber on the land. The term "forestry purposes" was also changed, to include not only timber production and reclamation of waste land, but also improving wildlife environment, recreation, flood control, and water conservation.

The *Forestry Amendment Act*, 1967 re-defined forestry purposes to the extent that the Department of Lands and Forests and the County of Dufferin felt that it would be expedient to terminate the existing agreement and prepare a new one. Under the new definition the term forestry purposes included "the production of wood and wood products, provision of proper environmental conditions for wild life, protection against floods and erosion, recreation, and protection and production of water supplies". This agreement was signed on September 14, 1971 to cover the twenty year period commencing April 1, 1971.

When this agreement expired (April 1, 1991), the County of Dufferin decided that increased demands on the forest properties, as well as changes to the Ministry of Natural Resources and Forestry's agreement forest program, meant it could not simply sign a new agreement. The County decided that a comprehensive management plan would have to be prepared for the Dufferin County Forest before a new agreement was signed. Dufferin was the first County in Ontario to take the lead in developing a management plan for its forest properties.

In the spring of 1992, the County of Dufferin approached the Faculty of Forestry at the University of Toronto to have the fourth year forestry class prepare plans for the Dufferin County Forest as part of their thesis work. These plans were presented to the County of Dufferin and the Ministry of Natural Resources and Forestry in April, 1993.

In December, 1993 the County of Dufferin and the Ministry of Natural Resources and Forestry (MNRF) approved the Terms of Reference for a new management plan. Subsequently, the County of Dufferin, in partnership with the MNRF, hired a management plan author to develop a forest management plan for the period 1995-2015.

On June 8, 1995, Dufferin County Council approved *Our Forest, Our Future*: Dufferin County Forest Management Plan 1995-2015. Throughout the process, there was participation from the MNRF, a Forest Advisory Team, and the general public, all of whom provided valuable input and comments.

In 1995, the County took over the control and co-ordination of all activities having to do with the Dufferin County Forest. In order to fulfil this new role, Dufferin hired a County Forest Manager, the first County in Ontario to do so.

On March 13, 1997, the County signed a Memorandum of Understanding with the Ministry of Natural Resources and Forestry (MNRF). This Memorandum, which expired in 2002, outlined the County's and the Ministry's responsibilities in the management of the Dufferin County Forest. Since the expiration of that agreement, the County has been wholly responsible for all aspects of the management of the Dufferin County Forest.

The Ministry of Natural Resources and Forestry (MNRF) provided specific data with regard to natural heritage features, Species at Risk, and ecosystem services to support the development of this forest management plan. However, the MNRF did not designate a representative for the Forest Plan Advisory Team or provide an overall review of the draft forest management plan.

5.0 CURRENT RESOURCES OF THE DUFFERIN COUNTY FOREST

The Dufferin County Forest is a former agreement forest of 1,054 hectares (2,606 acres). The forest is divided into thirteen tracts located in all of Dufferin's rural municipalities: Amaranth, East Garafraxa, Grand Valley, Melancthon, Mono, and Mulmur. The largest single area is the Main Tract (607 hectares, 1,501 acres) in Mulmur Township. Figure 2 shows the location of the individual tracts within Dufferin County.

Figure 2: Tracts of the Dufferin County Forest
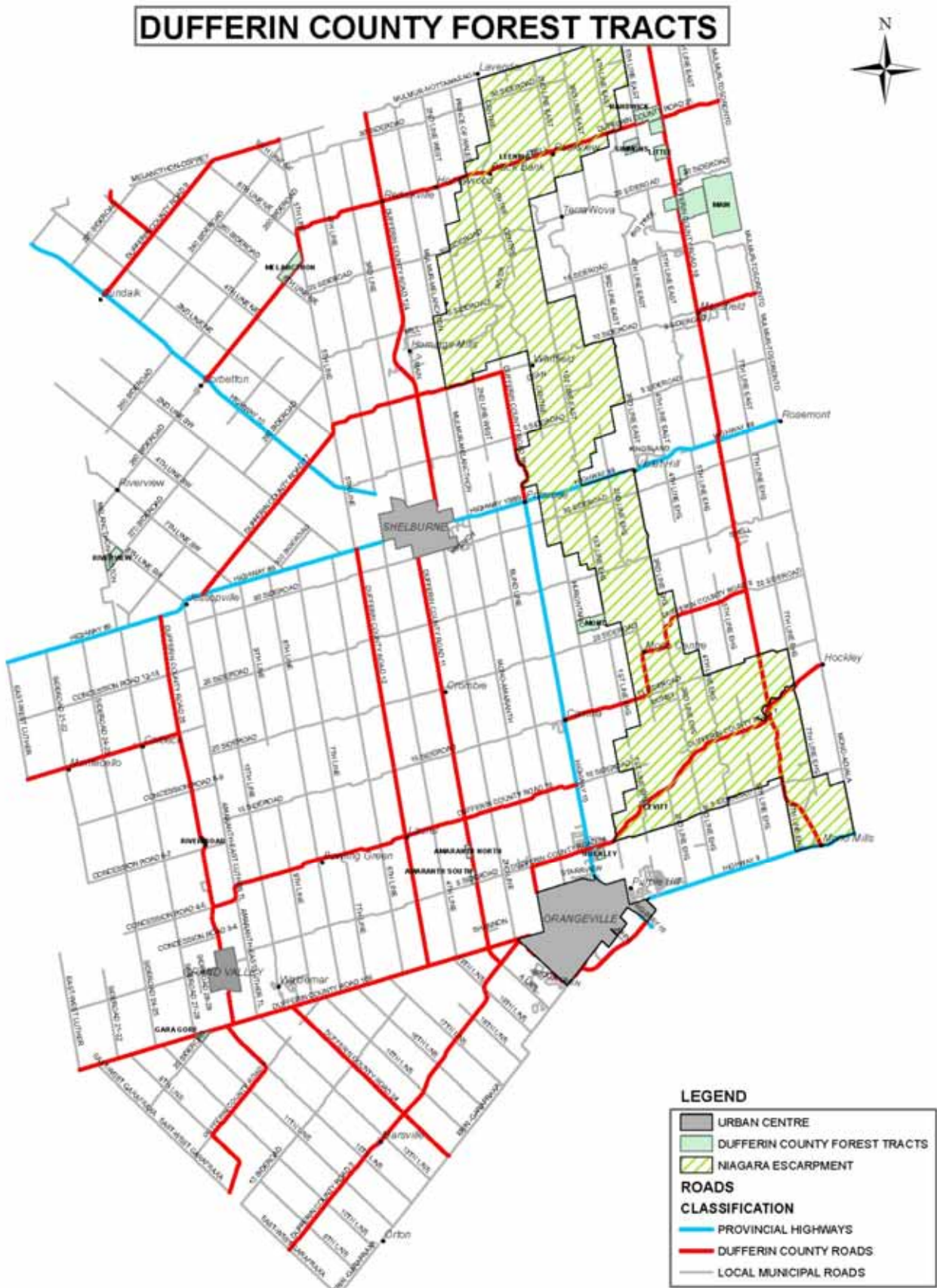
Table 1 describes the significant characteristics of the Dufferin County Forest on a tract-by-tract basis.

Table 1: Tracts of the Dufferin County Forest

Tract	Amaranth North/South	Gara Gore	Hockley	Leening
Municipality	Amaranth	East Garafraxa	Mono	Mulmur
Area (ha/acres)	24/59	15/37	20/51	8/20
Year Acquired	1940	1934	1976[3]	1976[4]
Zoning	environmental protection	environmental protection	environmental protection	Niagara Escarpment Rural Area
Parent Material	---/ loess or alluvium over loam till	loam and silt loam till	loess or alluvium over loam till	glacial till
Topography	smooth basin/ smooth very gently sloping	smooth gently sloping	smooth moderately sloping	irregular steeply sloping
Soil Type	---/fine sandy loam	loam	silt loam	loamy
Drainage	---/imperfect	good	good	good
Primary Overstorey Covertype	Laurel Wetland Complex/ tolerant hardwoods	white spruce	Orangeville Wetland Complex	white spruce
Secondary Overstorey Covertype	---/white spruce	---	---	white pine
Invasive Plant Species	---	---	European buckthorn	---
Known Wildlife Species	snapping turtle, muskrat, raccoon, beaver, mink, fox, coyote, white-tailed deer, colonial waterbirds, pied-billed grebe, northern harrier, mink frog/---	---	muskrat, beaver, mink, fox, coyote, raccoon, waterfowl, various amphibians and reptiles	---
Cistern(s)/ Fire Pond(s)	0/0	0/0	0/0	0/0
Aggregate	other	other	secondary significance	other
Recreation	few trails/few trails	few trails	one interpretive trail	few trails
Special Features	wetland/---	---	significant woodland, wetland	activities restricted as stipulated by donor

--- indicates insufficient data

[3] Did not become part of the County Forest until 1995.
[4] Did not become part of the County Forest until 1995.

Table 1: Tracts of the Dufferin County Forest (continued)

Tract	Levitt	Little	Main	Melancthon
Municipality	Mono	Mulmur	Mulmur	Melancthon
Area (ha/acres)	4/10	44/109	607/1,501	59/146
Year Acquired	2010	1972-1973	1930-1963	1945
Zoning	Niagara Escarpment Natural Area	open space	open space	open space conservation/general agricultural
Parent Material	esker and kame gravel	outwash sand	outwash sand-sandy loam till	esker and kame gravel
Topography	irregular moderately sloping	smooth very gently sloping	irregular very steeply sloping	smooth basin/ irregular steeply sloping
Soil Type	sandy loam	loam sand	loam sand-sandy loam	sandy loam
Drainage	good	good	good	good
Primary Overstorey Covertype	white cedar	mixedwood	red pine	Melancthon 1 Wetland Complex
Secondary Overstorey Covertype	hard maple	---	red oak	white spruce
Invasive Plant Species	---	---	garlic mustard, European buckthorn	---
Known Wildlife Species	---	white-tailed deer, wild turkey, small mammals	white-tailed deer, ruffed grouse, wild turkey, fox, porcupine, racoon, small mammals	bullfrogs, muskrat, racoon, beaver, white-tailed deer, colonial waterbirds
Cistern(s)/ Fire Pond(s)	0/0	0/0	0/0	0/1
Aggregate	tertiary significance	tertiary significance	tertiary significance	primary significance
Recreation	few trails	one interpretive trail	extensive trail system	two trails
Special Features	activities restricted as stipulated by donor, SAR, deer winter concentration area	significant woodland, creek	significant woodland, ANSI, Pine River floodplain, deer winter concentration area, SAR, linkage	significant woodland, wetland, deer winter concentration area

--- indicates insufficient data

Table 1: Tracts of the Dufferin County Forest (continued)

Tract	Mono	Randwick	River Road	Riverview	Simmons
Municipality	Mono	Mulmur	Grand Valley	Melancthon	Mulmur
Area (ha/acres)	71/175	117/289	5/12	40/99	40/99
Year Acquired	1942, 1963	1940-1944	1963	1949	1967-1968
Zoning	open space	open space	environmental protection	open space conservation/general agricultural	open space
Parent Material	outwash fine sand	outwash sand	fine sandy loam material over outwash gravel	loam till	outwash sand
Topography	irregular moderately sloping	smooth very gently sloping	smooth very gently sloping	smooth level/smooth gently sloping	smooth very gently sloping
Soil Type	sandy loam	loam sand	fine sandy loam	loam	loam sand
Drainage	good	good	good	poor/good	good
Primary Overstorey Covertype	red pine	red pine	red pine	Melancthon 2 Wetland Complex	red pine
Secondary Overstorey Covertype	tolerant hardwoods	tolerant hardwoods	---	white pine	white pine
Invasive Plant Species	garlic mustard, dog-strangling vine	garlic mustard	---	---	---
Known Wildlife Species	white-tailed deer, wild turkey, small mammals	white-tailed deer, wild turkey, small mammals	---	bullfrogs, muskrat, racoon, ruffed grouse, waterfowl, small game	white-tailed deer, wild turkey, small mammals
Cistern(s)/ Fire Pond(s)	0/0	0/2	0/0	0/1	0/0
Aggregate	tertiary significance	tertiary significance	other	tertiary significance	tertiary significance
Recreation	extensive trail system	extensive trail system	no trails	two trails	extensive trail system
Special Features	significant woodland, linkage	SAR, significant woodland, wetland, shoreline	---	significant woodland, wetland	significant woodland

--- indicates insufficient data

5.1 Forest Inventory

The most recent inventory of the Dufferin County Forest was conducted in 2013. A summary of the estimated production forest[5] area and volume is shown in Table 2.

Table 2: Summary of Estimated Production Forest Area and Volume, Dufferin County Forest

Working Group	Area (ha)	% of Total Area	Volume (m³)	% of Total Volume
Red Pine	328	37	73,202	48
Red Oak	218	25	24,951	16
Mixedwood	110	13	19,242	13
White Pine	88	10	15,708	10
Hard Maple	77	9	7,843	5
White Spruce	47	5	9,872	6
Bottomland	7	0.8	1,196	0.9
Total	875	99.8[1]	152,014	98.9[1]

[1]Totals are not equal to 100 due to rounding.

Overstorey Tree Vegetation

The **red pine** (*Pinus resinosa*) working group makes up about 328 ha (37%) of the production forest. All of the red pine stands were planted in order to stabilize the light, sandy soils. Only 21 ha are less than 60 years old. Past selection system regimes have resulted in the red pine plantations developing an understorey of white pine and tolerant hardwoods.

Red oak (*Quercus rubra*) makes up the next largest working group in the production forest - about 218 ha (25%). There are 14 hectares (5%) in the 31-40 age class, the other stands are all 70 years or older. The red oak stands are all of natural origin.

The **mixedwood group** makes up 110 ha (13%) of the area of the Dufferin County Forest. The stands are either mixed hardwood with a significant component of red pine and/or white pine (*Pinus strobus*), or balsam fir (*Abies balsamea*) or eastern white cedar (*Thuja occidentalis*) associated with various hardwoods.

The **white pine** working group makes up about 88 ha (10%) of the production forest. White pine grows in association with red pine, white spruce (*Picea glauca*), red oak, poplar (*Populus spp.*) and ash (*Fraxinus spp.*). The stands of white pine are a mix of planted and natural. Thirty-nine hectares (44%) of the white pine is less than 30 years old, the remainder is 50 years or older.

The **hard maple** (*Acer saccharum*) working group makes up about 77 ha (9%) of the production forest. The stands are of natural origin and are located in the Mono and Main tracts. The dominant trees in the hard maple stands are all 65 years or over.

The **white spruce** working group makes up about 47 ha (5%) of the production forest. All of it is planted on lowland sites in Mono, Amaranth, Melancthon, Riverview, and Gara-Gore tracts. The white spruce is all between the ages of 56 and 66 years.

The **bottomland** stands are associated with lowland areas, but are not quite wetlands. There are

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[5] Production forest: all productive forest land managed primarily for human benefit, unless otherwise reassigned.

only two of these in the production forest area, one dominated by ash, the other by cedar.

Due to the overall relatively low volume of wood that is removed from the Dufferin County Forest annually, there are no mills that depend on it for a significant portion of their supply. The thinning of red pine plantations produces pulpwood, sawlogs, and poles. Hardwood sawlogs and fuelwood are supplied through improvement harvests in the hardwood stands. The standing trees are sold on a tender basis. Buyers of standing timber from the Dufferin County Forest have come from all over Ontario. Table 3 shows the annual harvest area and volume 1995-2015.

Table 3: Annual Harvest Area and Volume 1995-2015

Year	Area Harvested (ha)	Volume Harvested (m³)
1995	26.8	2,427
1996	26.7	2,210
1997	29.7	2,153
1998	35.6	2,049
1999	29.0	2,012
2000	28.8	1,094
2001	43.3	2,010
2002	30.0	1,540
2003	34.0	1,469
2004	31.0	1,744
2005	28.0	1,409
2006	35.0	972
2007	47.0	1,911
2008	60.0	2,235
2009	58.0	2,436
2010	36.0	1,308
2011	20.0	1,237
2012	33.0	1,322
2013	32.0	3,170
2014	18.0	421
2015	38.0	1,344
Average	34.3	1,737

Regeneration

Regeneration is the term used to describe young trees with a DBH (diameter at breast height) of 6-8 cm. Trees taller than breast height (1.3 m) are classed as advanced regeneration, trees less than breast height are classed as early regeneration. The quantity and species of regeneration depends mainly on the shade tolerance of the species forming the overstorey. Species which are shade intolerant (e.g. red pine, poplar) regenerate with great difficulty under their own canopy. The understorey in these stands will be limited or will be formed by more shade tolerant species such as maple or ash. Shade tolerant species will usually regenerate under their own canopy.

In the Dufferin County Forest, most regeneration is hard (sugar) maple, white ash (*Fraxinus americana*), white pine, ironwood (*Ostrya virginiana*), red maple (*Acer rubrum*), and beech (*Fagus grandifolia*). Early red oak regeneration occurs in some areas where there is red oak in the

overstorey.

Ninety-two percent of the forest area has advanced regeneration. The lack of regeneration on 8% of the forest may be caused by high overstorey density, lack of a seed source for species that would normally grow in the understorey, or otherwise inhospitable site conditions for regeneration.

Understorey Vegetation
Besides regeneration, most forest stands have some shrubs, plants, mosses, and grasses and sedges in the undestorey. The species and amount of these varies with the site type, stand history, and current stand structure.

In the Dufferin County Forest, the most common plants in the undestorey are: maple-leaved viburnum, red osier dogwood, raspberry, bracken fern, Canada mayflower, sarsaparilla, mosses, and grasses.

5.2 Wildlife
Animals which are present in the Dufferin County Forest include: white-tailed deer, ruffed grouse, wild turkey, woodcock, Canada geese, mallards, wood ducks, pheasants, snapping turtle, muskrat, raccoon, beaver, mink, coyote, fox, porcupine, cottontail rabbits and other small mammals. Not all of these species exist on all of the tracts, as some are associated with wetland habitat types (e.g. snapping turtle), while others are associated with upland types. The main wildlife species known to be associated with each tract can be found in Table 1.

The Ministry of Agriculture and Food lists a number of shrubs in its *Farm Forestry and Habitat Management* guide that are important for many different wildlife species. These species are highbush cranberry, red osier dogwood, alternate-leaved dogwood, nannyberry, elderberry, staghorn sumac, serviceberry, ninebark, bittersweet, virginia creeper, wild apple, wild grape, and American hazelnut. Of these, red osier dogwood, alternate-leaved dogwood, elderberry, sumac, and wild apple are known to exist in the Dufferin County Forest.

The Ministry of Natural Resources and Forestry, which is responsible for wildlife management in Ontario, does not collect census data for the wildlife species in the Dufferin County Forest. Wildlife management is based on a habitat management approach, i.e. the forest is managed for different habitat types rather than being directly managed for different wildlife species. The Dufferin County Forest currently includes the following habitat types: non-treed wetlands, treed wetlands/bottomland conifers, bottomland hardwoods, creeks, ponds, mixedwoods, upland tolerant hardwoods, upland oak, and conifer plantations.

Deer winter concentration areas are important for the survival of white-tailed deer over the winter. Generally speaking, these areas provide conifer cover which intercepts snow, allowing deer to move around with lower energy losses. The "core" of a deer yard is that portion of the yard where use by deer is highest during winters that are severe. The Levitt, Main, and Melancthon Tracts are part of identified deer winter concentration areas. The Hockley, Leening, and Mono Tracts are adjacent to identified deer winter concentration areas.

Habitat types other than those listed above which are adjacent to the Dufferin County Forest include cultivated fields, meadows, river valleys, stream corridors, and small woodlands.

5.3 High Conservation Value Forests

In the Dufferin County Forest, there are a number of high conservation value forests that require special attention in the planning process. These can be grouped as follows: evaluated wetlands; old growth forest; Areas of Natural and Scientific Interest (ANSIs); species at risk habitat; and critical fish habitat. The County has determined that the Little Tract is an area of developing old growth forest. The wetland and ANSI designations have been determined by the Ministry of Natural Resources and Forestry. The Leening and Levitt Tracts, which have restrictions on their use through the terms of donation, are also within the Niagara Escarpment Plan Area. A summary of the high conservation value forests is shown in Table 4; the values are described in more detail in the sections following.

Table 4: High Conservation Value Forests in the Dufferin County Forest

Tract (Compartments)	Working Group	Area (ha)	Conservation Value
Amaranth (42a), Laurel Wetland Complex	Mr	12	provincially significant wetland
Amaranth (43b, 43c), Farmington Swamp	hardwoods	10	locally significant wetland
Hockley, Orangeville Wetland Complex	Ce, Po	20	provincially significant wetland
Leening	Po, Pw, Sw	8	Niagara Escarpment Rural Area; donor restrictions
Levitt	Ce	4	Niagara Escarpment Natural Area; donor restrictions
Little	mixedwood	44	developing old growth
Main (11, 20a, 21b, 23c, 24a, 25a, 26-30, 31a, 31d), Oak Ridges South Slope Forest	Or	266	life science ANSI
Main (31b, 31c)	Po	24	locally significant wetland
Melancthon (33a, 33c, 33d, 34a, 35a), Melancthon 1	Ce	48	provincially significant wetland
Randwick (4d), Walker's Creek Wetland	Ce	2	locally significant wetland
Riverview (37a, 38c, 38d), Melancthon 2	Po	13	locally significant wetland
Total		451	

Laurel Wetland Complex (provincially significant)
The Laurel Wetland Complex is located on Cons. I-IV in Amaranth Township. The Amaranth Tract (Con. III, Lot 8) is part of this complex, which is 95% swamp and 5% marsh. The area provides habitat for a number of wildlife species including snapping turtles, muskrat, raccoon, beaver, mink, fox, coyote, white-tailed deer, and colonial waterbirds.

Orangeville Wetland Complex (provincially significant)
The Hockley Tract is part of the Orangeville Wetland Complex, which includes much of the area in the vicinity of the Island Lake Conservation Area at the headwaters of the Credit (flowing south into Lake Ontario) and Nottawasaga (flowing north into Georgian Bay) Rivers. The wetland complex is

58.6% marsh, 41.2% swamp, and 0.2% bog. This area provides habitat for muskrat, beaver, mink, fox, coyote, raccoon, waterfowl, and various amphibian and reptile species. The Island Lake Conservation Area also has numerous recreational opportunities, including nature appreciation, hiking, summer and winter fishing, canoeing, kayaking, and outdoor education.

Melancthon 1 (provincially significant)
Most of the Melancthon Tract is part of this wetland complex, which is 90.4% swamp and 9.6% bog. This area provides habitat for bullfrogs, muskrat, racoon, beaver, white-tailed deer, and colonial waterbirds.

Terra Nova Complex (provincially significant)
The Terra Nova Complex is adjacent to the Main Tract of the Dufferin County Forest, in Mulmur Township. The complex is 94% swamp and 6% marsh. The area provides habitat for bullfrogs, snapping turtles, muskrat, raccoon, beaver, mink, fox, coyote, white-tailed deer, and colonial waterbirds. The Terra Nova Complex is regionally significant as a white-tailed deer winter concentration area and as a spawning and rearing area for brook trout and rainbow trout. It is locally significant as an area of waterfowl production.

Walker's Creek Wetland (locally significant)
The Walker's Creek Swamp is located on Cons. VI-VIII in Mulmur Township and in Tosorontio Township (Simcoe County). The creek runs through the northwest corner of the Randwick Tract (Con. VI, Lot 26). The wetland is 82% swamp and 18% marsh. It provides habitat for snapping turtles, muskrat, raccoon, beaver, mink, fox, coyote, white-tailed deer, and colonial waterbirds.

Melancthon 2 (locally significant)
The wetland known as Melancthon 2 is located on Cons. IX and X in Melancthon Township. Part of it is within the Riverview Tract of the Dufferin County Forest. The wetland is 86% carr, 9% swamp, and 5% marsh. This area provides habitat for bullfrogs, muskrat, and raccoon. The Melancthon 2 wetland provides good winter cover for ruffed grouse and small game. It also has local significance as an area of waterfowl production.

Leening and Levitt Tracts
The Leening and Levitt Tracts are both within the Niagara Escarpment Plan Area. The Leening Tract is designated as Rural Area, the Levitt Tract as Natural Area. These designations, in and of themselves, do not restrict forestry operations on the properties. However, the donor of the Leening Tract placed a condition that does have an impact: *"...so long as the said lands shall be used for Conservation purposes which purpose shall be deemed to be complied with so long as the natural topography of the lands is not altered, buildings are not erected, no part of the said lands is excavated, the existing flora is not disturbed, and the existing fauna is not interfered with, provided that additional trees may be planted from time to time."*. The interpretation of this has been that the Tract is to be preserved, with no forestry operations taking place. The Levitt Tract can be managed, provided that the management is, *"...in accordance with good and proper forestry management practices."* The County has decided that since they are part of the Niagara Escarpment Plan Area, these Tracts qualify for designation as High Conservation Value Forests, meaning that any management that occurs will be carefully considered in the context of both the donor restrictions and its potential impacts on existing values.

Little Tract
When the County took over management of the Dufferin County Forest from the Ministry of Natural Resources and Forestry, the Little Tract was one of few areas of upland forest left relatively unmanaged (there was one small improvement harvest, in 1991-92, since the County purchased the property in 1971). In addition to this, the Tract had a significant component of large white pine trees that appeared to date from around the time of European settlement. These factors prompted the County to restrict recreational activities and forest management in the Tract, allowing the area to develop into old growth forest.

Areas of Natural and Scientific Interest (ANSIs)
In the Dufferin County Forest, there is one ANSI, the Life Science Oak Ridges South Slope Forest. It is located at the southern end of the Main Tract. This ANSI is associated with the Oak Ridges Moraine and represents warmer-than-normal forest associations on sand in Site Region 6. The cover is currently a sugar maple-red oak forest with some red and white pine. In the Pine River floodplain area the species include white ash, yellow and white birch, basswood, cedar, hemlock, balsam fir, and some elm.

Species at Risk
Butternut trees have been located at three of the tracts. No other species at risk have been recorded on the Dufferin County Forest properties (S. Robinson, pers. comm., April, 2014).

Critical Fish Habitat
There are no areas of critical fish habitat in the Dufferin County Forest.

5.4 Forest Health
The health of the forest is impacted by numerous factors, many of which are a natural part of the forest ecosystem. Overall, the Dufferin County Forest is in good health. Increasing forest diversity and promoting vigorous growth should maintain the healthy condition in the face of some notable threats, both biotic and abiotic.

Insects and diseases are monitored by MNRF's Forest Health Technicians, the Canadian Food Inspection Agency, and County Forest staff. Specifically, emerald ash borer, Asian long-horned beetle, Sirex woodwasp, gypsy moth, beech bark disease, butternut canker, and red pine decline are of primary concern. Red pine decline is a complex of issues (further detailed in section 6.3), the remaining are alien invasive species and therefore have the potential to cause a great deal of harm due to lack of native parasites and predators and the ability to take over ecological niches occupied by native species. Other than Asian long-horned beetle, emerald ash borer, and Sirex woodwasp these are all known to be in the Dufferin County Forest. Emerald ash borer has been detected in Dufferin County, but is not confirmed to be present in the County Forest.

Alien invasive plants have great potential to alter the ecology of the terrestrial habitats of the Dufferin County Forest. Since the Dufferin County Forest does not contain a significant number of watercourses, aquatic invasive species are of lesser concern. The invasive species recorded in the 2013 forest inventory were Manitoba maple, European buckthorn, and garlic mustard; none in extensive amounts. During the summer of 2015, the trails in the most-visited tracts – Hockley, Little, Main, Mono, and Randwick - were surveyed for dog-strangling vine (*Vincetoxicum rossicum* and *V. nigrum*). One small patch was found, in the Mono Tract. From general observation, there is

Scots pine growing on the boundaries of a number of the properties. There are mature ornamental Norway maple at the former site of Camp Dufferin at the Main Tract.

Abiotic factors (fire, extreme weather) can also have a significant impact on forest health, and these can be expected to increase with the predicted effects of climate change (further detailed in section 6.3).

In order to reduce the potential for wildfires, the County has maintained the fire ponds in Melancthon, Riverview, and Randwick (two) tracts that were established by MNRF; equipped all tracts with signs indicating the rural address (emergency number) and "In case of emergency, call 9-1-1."; and made it illegal through the County Forest by-law (2003-50) to have campfires in the Forest.

The main entrances at all of the tracts have been gated to reduce unauthorized vehicular access and the related activities of dumping, illegal removal of wood, partying and introduction of invasive plant species.

5.5 Aggregates

Aggregate extraction will not occur in the current management period (2016-2036). It conflicts with the other environmental and resource management objectives of this plan, as it would necessitate removal of the forest cover and alteration of the landscape. However, the County will assess the aggregate resources on all newly acquired forest properties in order to maintain a current database of all resources associated with the Dufferin County Forest. Table 5 summarizes the aggregate resources present in the Dufferin County Forest, compiled from the *Aggregate Resources Inventory of Dufferin County Southern Ontario.*

Table 5: Aggregate Resources in the Dufferin County Forest

Tract	Municipality	Description of Aggregate Resource
Amaranth	Amaranth	other surficial deposits or exposed bedrock
Gara-Gore	East Garafraxa	other surficial deposits or exposed bedrock
Hockley	Mulmur	selected sand and gravel resource area, secondary significance
Leening	Mulmur	other surficial deposits or exposed bedrock
Levitt	Mono	sand and gravel deposit, tertiary significance
Little	Mulmur	sand and gravel deposit, tertiary significance
Main	Mulmur	sand and gravel deposit, tertiary significance
Melancthon	Melancthon	selected sand and gravel resource area, primary significance; unlicensed pit
Mono	Mono	sand and gravel deposit, tertiary significance
Randwick	Mulmur	sand and gravel deposit, tertiary significance
River Road	Grand Valley	other surficial deposits or exposed bedrock
Riverview	Melancthon	sand and gravel deposit, tertiary significance
Simmons	Mulmur	sand and gravel deposit, tertiary significance

5.6 Recreation

Most of the tracts have a trail system that is used for a variety of recreational activities including hiking, wildlife viewing, nature appreciation, cross-country skiing, snowmobiling, mountain biking,

and horseback riding.

Little Tract has a parking area, a sign showing the trail system, a supply of interpretive trail brochures, and individual signposts at the stops on the interpretive trail.

The Hockley Tract has a parking area, fully accessible trail, and interpretive signs.

The Main Tract has a parking area and an unforested area used for large, organized recreational events.

All of the entrances to the County Forest tracts have rural address numbers posted for wayfinding and emergencies.

The Mansfield Outdoor Centre, a private recreational complex, leases the southern part of the Main Tract for the winter months for cross-country skiing, generating revenue anywhere between $500 and $1,000 annually for the County, based on the number of skiers in the prior season.

The Ontario Federation of Snowmobile Clubs (OFSC) trails run through the Main Tract, Randwick Tract, Riverview Tract, Mono Tract, and beside the Simmons Tract.

The process for organized recreational events has been modified several times since the passing of the last management plan. Currently, it appears to be working well for both the County and the user groups. Events have increased from two groups having four or five events annually to eight groups with 14 events annually in the last couple of years. Groups having events for more than twenty participants pay a fee for use of the Forest.

Hunting in the Dufferin County Forest focuses on white-tailed deer and wild turkey. The shotgun portion of the controlled white-tailed deer hunt takes place annually for five days in November and five days in December. The controlled wild turkey hunt takes place in May of each year for a period of approximately five weeks, and in October for a period of just under two weeks. The seasons for small game vary, but usually take place over the fall and winter. The hunting seasons and numbers of tags are determined each year by the Ministry of Natural Resources and Forestry (MNRF) on a Wildlife Management Unit basis. This ensures that wildlife populations in any given area are not exposed to undue hunting pressure. In the case of game animals, such as white-tailed deer, the number of tags in a given Wildlife Management Unit is determined on the basis of hunter success during the previous season and weather conditions over the past year. For example, a particularly hard winter will probably mean that fewer animals survived and a lower number of tags will be issued. Every year, the MNRF publishes a guide for hunters explaining the current year's regulations and seasons. These guides are available from MNRF offices across the province, at locations where hunting licences are sold, and at www.ontario.ca/hunting.

Hunting is currently not allowed in the following tracts: north portion of Amaranth, Hockley, Leening, Levitt, Little, and Mono.

Starting in 1997, the County adopted a permit system for hunters in order to pay for advertisements and signs informing non-hunters about the main hunting seasons (wild turkey and white-tailed deer). This was done to increase safety for all users of the Dufferin County Forest. Figure 3 shows the number of permits sold annually since 1997.

Figure 3: Forest Use Permits (Hunting) Issued for the Dufferin County Forest 1997-2015
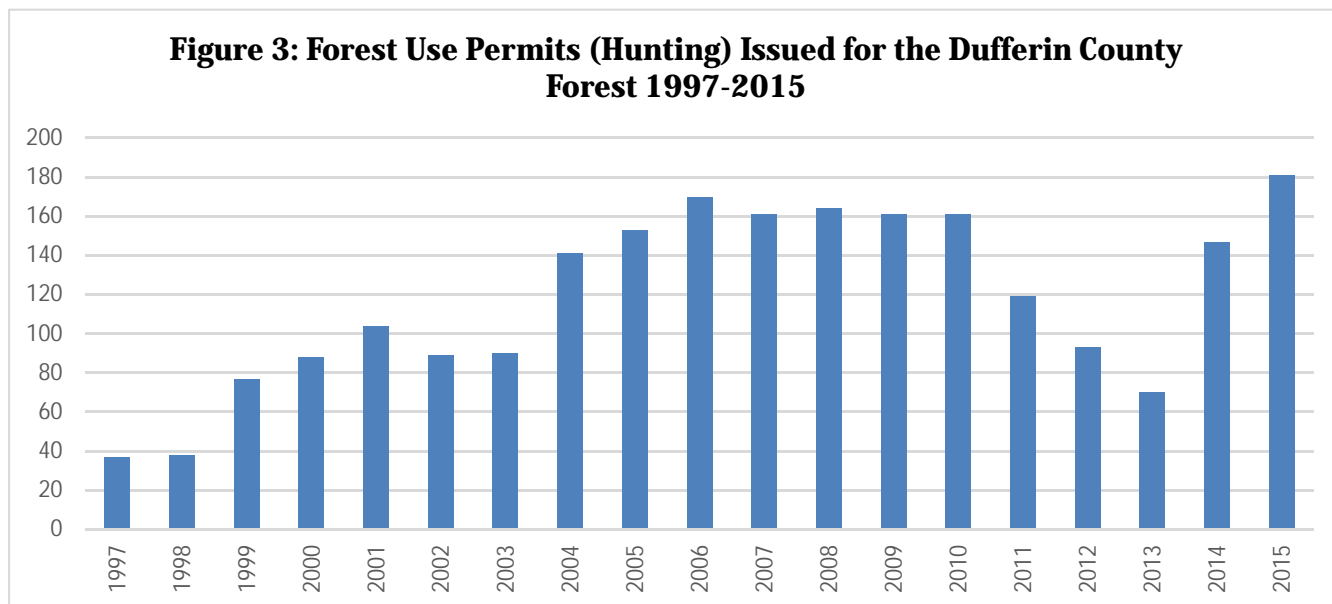
A user survey was conducted online from April, 2013 to March, 2014. This was supplemented by onsite surveys at some of the tracts during the summer of 2013. In total, there were 786 responses to the survey.

The results of this survey showed that the majority (66%) of respondents visit the County Forest on weekends. The most frequented tracts are: Main (54%), Hockley (21%), and Mono (6%). Surprisingly, 16% of respondents were not sure which tract of the County Forest they had visited. Highly ranked activities included mountain biking (54%), horseback riding (27%), and hiking/walking (13%). Most people make between one and five visits to the County Forest each season, with visits in spring, summer, and fall being almost equal. The users are split almost equally between men (58%) and women (42%). The distribution of users' age follows a bell curve, with the maximum in the 50-54 year age class.

When asked how they learned about the County Forest, 41% of respondents said that they have used it for many years and 36% found out by word of mouth.

When asked what one change they would make to the Dufferin County Forest, most of the responses fell into the following categories:
1. further physical separation of recreational uses, in particular mountain bikers and horseback riders;
2. improved maps and signs;
3. improved facilities such as washrooms, garbage cans, parking and;
4. allowing/disallowing various uses such as motorized vehicles, hunting, and logging

5.7 Public Relations and Education

During the last planning period (1995-2015), the County made a significant effort to increase the public knowledge about the County Forest.

The primary activities conducted on an ongoing basis were:
1. placement and replacement of signs identifying all of the tracts and outlining the main stipulations of the County Forest by-law (2003-50);
2. tree and plant identification walks;
3. establishment and maintenance of a County Forest website;
4. attendance at various local events, including the spring and fall home shows;
5. production and periodic updating of a County Forest brochure and;
6. production and periodic updating of a brochure describing the Little Tract interpretive trail.

In order to capture attitudes about the County Forest from non-users, a notice asking people to complete an online survey (or phone in for a paper copy) was distributed to 2,800 randomly chosen property owners distributed over all eight municipalities in numbers relative to total population. There were 105 responses to the survey.

Those respondents who use the County Forest were directed to complete the same information as in the user survey. Those who do not use the County Forest were asked why not and whether or not they thought it important that the County continue to manage the Forest. (It was assumed that those who use the Forest think it is important for the County to continue managing it.)

The respondents in this survey were almost evenly split between those who use the Forest (51%) and those that don't (49%). The results of those who use the Forest correlated with the user survey results with the following exceptions:
1. a greater number of respondents use the Mono Tract (37%), 33% use Main Tract, and 14% use Hockley Tract;
2. hiking/walking (49%) was the primary activity and;
3. they learned about the Forest mostly be living close by (47%) or they've used it for many years (39%).

Of those that didn't use the Forest, most didn't know that the public could use it (57%) and a large number didn't know that it existed (38%). An overwhelming majority (98%) agreed that it was important for the County to continue managing the Forest. Reasons given centred mostly around conservation/protection of natural areas, whether for the benefit of humans, the benefit of wildlife, their intrinsic value, or a combination of these reasons.

To assist in public education about forest management, a conifer plantation thinning demonstration area was established adjacent to the Main Tract parking lot in 1997. The area (2.5 hectares) was planted with red pine and some spruce in 1967. It was divided into four sections that were thinned in 1998 as follows: 50% removal, 25% removal, 33% removal, and 0% removal. The second thinning in half of each of the original four sections took place in 2009. This will enable the public to observe the impact of various thinning regimes on the growth of the trees and on the development of regeneration and understorey plants. Disks were collected from the trees at the time of both thinnings so that comparisons in annual ring growth can be made. The demonstration area is a valuable tool in the education of landowners and the general public on the effects of conifer

plantation thinning.

In advance of the well at the Little Tract being decommissioned to Ministry of the Environment and Climate Change standards, the hand pump was removed and accessioned into the Dufferin County Museum & Archives collection in November, 2015. Currently, there are no identified cultural heritage resources in the Dufferin County Forest.

5.8 Research

A procedure for researchers to have access to the Dufferin County Forest has been developed. In the last planning period, all requests for access for research purposes were granted. The three primary research projects were:

1. a study to examine natural and assisted regeneration and understorey development in red pine (*Pinus resinosa*) plantations (Paul Richardson, Ontario Aggregate Resources Corporation/University of Waterloo);
2. a study to determine the cause(s) of widespread red pine decline in southern Ontario (John McLaughlin, Ontario Forest Research Institute) and;
3. a study to determine the impact of prescribed burning and overstorey removal on regeneration of red oak (*Quercus rubra*) (Dan Dey, Ontario Forest Research Institute).

5.9 Ecosystem Services

Ecosystem services are benefits that flow to society from nature. These benefits include such things as: decomposition of and detoxification of human wastes, carbon sequestration, erosion prevention, water holding capacity, pollution absorption, and the improvement of physical and mental health.

Ecosystem services are now being given monetary value so that more of the benefits and values of natural areas are explicitly taken into account when making decisions that impact those natural areas. To date, these mostly include decisions about future development and compensating landowners who voluntarily conserve and/or enhance ecosystem services on their properties. Measuring more of the ecosystem services explicitly allows us to better assess the potential impact of our decisions on ecosystem health.

In 2009, the MNRF commissioned a report titled *Estimation of Ecosystem Service Values for Southern Ontario*. The study took into consideration a number of ecosystem values, including recreation, aesthetic/amenity, other cultural services, pollination and seed dispersal, habitat refuge and biodiversity, atmospheric regulation, soil retention and erosion control, water quality maintenance and nutrient/waste regulation, water supply and regulation, and disturbance avoidance[6].

As the MNRF was willing to provide the County with the dataset used to produce the report, ecosystem service values for the tracts of the Dufferin County Forest were determined. The tracts with wetlands were rated the highest, namely Amaranth and Hockley. Ecosystem service values for all of the tracts are shown in Table 6. Ecosystem services values were taken into consideration when designating the High Conservation Value Forests.

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[6] Disturbance avoidance is the ability of natural environments to shield humans and their infrastructure from extreme weather events such as high winds and floods.

Table 6: Ecosystem Service Values for Tracts of the Dufferin County Forest

Tract	Natural Heritage	Estimated Ecosystem Service Value $/year
Amaranth	provincially significant wetland	$2.1 million – $5.7 million
Gara-Gore	n/a	$132,000 - $330,000
Hockley	significant woodland, provincially significant wetland	$1.8 million - $4.8 million
Leening	Niagara Escarpment Rural Area	$44,000 - $105,600
Levitt	SAR, Niagara Escarpment Natural Area, deer winter concentration area	$35,200 - $88,000
Little	significant woodland, creek	$96,800 - $193,600
Main	significant woodland, ANSI, Pine River floodplain, deer winter concentration area, SAR, linkage	$1.3 million - $2.7 million
Melancthon	significant woodland, provincially significant wetland, deer winter concentration area	$519,200 - $1.3 million
Mono	significant woodland, linkage	$156, 200 - $312, 400
Randwick	SAR, significant woodland, wetland, creek	$257,400 - $514,800
River Road	n/a	$11,000 - $22,000
Riverview	significant woodland, locally significant wetland	$220,000 - $528,000
Simmons	significant woodland	$88,000 - $176,000

6.0 *OUR FOREST, OUR FUTURE*: DUFFERIN COUNTY FOREST MANAGEMENT PLAN 2016-2036

In preparing this forest management plan, a strategic planning approach was used. First, an overall goal was developed for the management of the forest properties. Within the scope of the goal, there are three objectives: social sustainability, environmental sustainability, and economic sustainability. Each of these objectives will be achieved through a number of actions. Where specified, the actions will occur during the period of the embedded operating plan (2016-2021), otherwise they will continue over the entire period of the management plan (2016-2036).

In the following sections, the three objectives of social sustainability, environmental sustainability, and economic sustainability, are presented as having equal importance. However, in situations where they may come into conflict, environmental sustainability will take precedence over the others.

6.1 Goal

To protect the quality and integrity of ecosystems in the Dufferin County Forest, including air, water, land and biota; and, where quality and integrity have been diminished, to encourage restoration or remediation to healthy conditions; while providing a variety of social and economic benefits to the public.

6.2 Land Use

There will be no development or site alteration, as defined in the *Provincial Policy Statement (2014)*, in the Dufferin County Forest. Further, there will be no development in the Leening and Levitt

Tracts, as defined in the *Niagara Escarpment Planning and Development Act.*

In order to facilitate future land use decisions, tracts (and sometimes parts of tracts) have been assigned to one of three classes that correspond to the three areas of sustainability described in this plan:
1. areas where the main focus is environmental sustainability are designated as natural forest;
2. areas where the main focus is economic sustainability are designated as managed forest; and
3. areas where the main focus is social sustainability (recreation) are designated as recreation forest.

Permitted recreational uses associated with each of the three classes will be determined as part of the development of the Recreational Use of the County Forest Policy.

Properties (or parts of properties) added to the County Forest portfolio will be assigned to land use classes based on which of the three areas of sustainability are the main focus for the property (or part of the property). This will be done as soon as possible following acquisition.

Natural Forest
These areas correspond to those identified as High Conservation Value Forests in Table 4. The only forest management activities that will be conducted in these areas will be maintenance or enhancement of notable features. In particular, this applies to the Oak Ridges South Slope Forest ANSI in the Main Tract, which, if left unmanaged, will succeed to a maple-beech forest and lose many of the characteristics that are the reason for the ANSI designation.

Managed Forest
These areas are all of those that are not designated as Natural Forest. Forest management activities that conform to the goal and actions of this forest management plan will be conducted.

Recreation Forest
There are currently no areas that are designated as Recreation Forest.

Table 7: Land Use Classes for Dufferin County Forest Tracts

Tract (Compartments)	Land Use Class	Area (ha)	Conservation Value	Standard Forest Management[1]
Amaranth (42a), Laurel Wetland Complex	natural	12	provincially significant wetland	no
Amaranth (43b, 43c), Farmington Swamp	natural	10	locally significant wetland	no
Amaranth (43a)	managed	2		yes
Gara-Gore (44a)	managed	15		yes
Hockley (49), Orangeville Wetland Complex	natural	20	provincially significant wetland	no
Leening (50)	natural	8	Niagara Escarpment Rural Area; donor restrictions	no

Tract (Compartments)	Land Use Class	Area (ha)	Conservation Value	Standard Forest Management[1]
Levitt (51)	natural	4	Niagara Escarpment Natural Area; donor restrictions	no
Little (48)	natural	47	developing old growth	no
Main (7-10, 12-19, 21a, 22, 23a, 23b, 24b, 24c, 25b, 25c)	managed	316		yes
Main (11, 20a, 21b, 23c, 24a, 25a, 26-30, 31a, 31d), Oak Ridges South Slope Forest	natural	266	life science ANSI	no
Main (31b, 31c)	natural	24	locally significant wetland	no
Melancthon (32a, 32b, 32c, 33a, 33b, 33d)	managed	12		yes
Melancthon (33a, 33c, 33d, 34a, 35a), Melancthon 1	natural	48	provincially significant wetland	no
Mono (39-40, 46)	managed	68		yes
Randwick (1-4c, 5-6)	managed	115		yes
Randwick (4d), Walker's Creek Wetland	natural	2	locally significant wetland	no
River Road (45)	managed	3		yes
Riverview (36, 37b, 37c, 37d, 37e, 38a, 38b)	managed	27		yes
Riverview (37a, 38c, 38d), Melancthon 2	natural	13	locally significant wetland	no
Simmons (47)	managed	42		yes
Total		1054		

[1]In areas designated as "no" removal of hazard trees and invasive species may occur, as well as forest management activities that maintain or enhance notable features.

Maps of all of the tracts of the County Forest showing the land use classes are in Appendix I.

6.3 Environmental Sustainability

Action 1: Do not develop the County Forest properties.

Action 2: Harvest timber on a sustainable basis.

Action 3: Strive to improve stand quality.

Action 4: Emulate natural disturbances during all forest management operations to the extent possible.

Action 5: Promote the characteristics of a natural forest such as snags, cavity trees, downed trees, and mast trees.

Action 6: Promote natural regeneration.

Action 7: Maintain an up-to-date list of relevant species at risk and ensure that forest management operations are in accordance with their habitat requirements in areas where they are identified.

Action 8: Manage disturbances (invasive plants, wildfire, insects and disease, extreme weather events) for the overall health of the forest, while ensuring that human life and private property are protected from such disturbances.
Action 9: Minimize the impacts of climate change.
Action 10: Minimize the impacts of recreational activities.

Sustainable Timber Harvesting
The report *Sustainable Timber Management of the Dufferin County Forest*, produced in conjunction with the 2013 forest inventory, shows that selection harvesting of an average of 30 ha per year is sustainable over the long-term (Table 8).

Table 8: Sustainable Timber Management Area Projections by Planning Period for all Forest Types 2014-2053

Period	Total Area (ha)	Average Annual Area (ha)
2014-2023	424	42.4
2024-2033	440	43.9
2034-2043	374	37.1
2044-2053	318	31.7
Average	389	38.78

This figure is only slightly more than the average annual harvest from 1995-2015 which was 34.3 ha (Table 3). The County will target an average of 30 ha/year for selection harvesting. It is expected that areas harvested on an annual basis will fluctuate, and may change from those proposed in Table 9, depending on size of individual stands, silvicultural priorities, market conditions, and unpredictable natural events such as severe storms or insect or disease infestation.

Table 9: Proposed Selection Harvesting 2016-2036

Tract (Compartments)	Working Group	Area (ha)
2016-2021		
Randwick (3a, 3d, 4b, 6b)	red pine	27
Main (12b, 13d)	mixedwood	15
Main (13c, 22b)	mixedwood	21
Main (14c, 14d)	red pine	6
Main (18b, 19c)	red pine	7
Main (25a)	hardwoods	28
Melancthon (32a, 32b, 33a, 33b, 33d)	conifers	15
Riverview (36a, 36c, 36d, 37c, 37f, 38e)	conifers	10
Gara-Gore (44a)	spruce	15
Total		**144**
2021-2026		
Randwick (3c, 4e)	white pine	7
Randwick (5a, 6a)	white pine	12
Main (8a, 9a, 10a, 11d)	red pine	23
Main (9c, 10c, 11c)	white pine	11
Main (11a, 11b)	mixedwood	16
Main (14a, 15a, 16b)	red pine	14
Main (15c)	mixedwood	15

Tract (Compartments)	Working Group	Area (ha)
Main (19a)	mixedwood	22
Main (21a)	red pine	4
Main (23c, 24c)	red pine	7
Main (24a)	hardwoods	6
Main (26a)	red pine	8
Simmons (47c)	mixedwood	6
Total		**151**
2026-2031		
Randwick (2b, 3b)	hardwoods	10
Randwick (2c, 4a, 4c, 6c)	red pine and white pine	16
Randwick (5b)	red pine	14
Main (7a, 7b, 8d)	red pine	19
Main (8b, 8c, 9b, 10b)	white pine	18
Main (13a, 13b)	red pine	10
Main (16c)	hardwoods	14
Main (17b)	hardwoods	14
Main (19b)	red pine	17
Main (28b)	mixedwood	6
Mono (40b)	red pine	12
Simmons (47b)	white pine	12
Total		**150**
2031-2036		
Randwick (2a)	red pine	11
Main (14b)	mixedwood	10
Main (18c)	hardwoods	10
Main (20a)	hardwoods	25
Main (21c)	hardwoods	20
Main (22a, 28c)	red pine	17
Main (29a)	hardwoods	26
Mono (39a)	red pine	14
Mono (40a, 46a)	hardwoods	15
Mono (41a)	spruce	10
Total		**148**

Pre-Harvest Silvicultural Prescriptions

A number of the environmental sustainability actions will be fulfilled partially through pre-harvest silvicultural prescriptions. The purpose of the pre-harvest silvicultural prescription is to provide a framework for collecting information and making decisions regarding how to best use the natural productivity and potential of a site to serve specified management goals. The prescriptions must take into account not only the physical characteristics of the stand (including soils, hydrology, existing vegetation, and wildlife), but also the landowner's objectives for that stand. All silvicultural prescriptions for the stands in the Dufferin County Forest must conform to the objectives for the forest as stated in this management plan.

Generally speaking, the prescriptions will:
1. follow *A Silvicultural Guide to Managing Southern Ontario Forests* (MNR, 2000);
2. outline how advance regeneration will be protected during harvesting;
3. provide the appropriate conditions for further regeneration;
4. protect specialized wildlife habitats (e.g. stick nests, cavity trees, mast trees) as outlined in *A Silvicultural Guide to Managing Southern Ontario Forests* (MNR, 2000) or, in cases where it contains more up-to-date relevant information, the *Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales* (MNR, 2010);
5. be in accordance with *The Niagara Escarpment Plan* and the *Niagara Escarpment Planning and Development* Act and associated regulations, where applicable and;
6. maintain the critical characteristics of known white-tailed deer winter concentration areas.

Silvicultural Practices for Working Groups
Forest management activities in the Dufferin County Forest will be conducted with the following silvicultural practices in mind for individual working groups:

1. **Red pine:** The red pine plantations in the Dufferin County Forest will be harvested using the selection system. The harvests will remove approximately 30% of the basal area on a ten year cutting cycle, on a worst-first basis. Where there is significant tolerant hardwood (primarily sugar maple and white ash) regeneration, the stands will be managed so that they succeed to the naturally-occurring tolerant hardwoods. Where there is significant white pine regeneration, the stands will be managed so that this species is retained. Where natural regeneration is not sufficient, native tree species will be planted in order to maintain tree cover. Tree species will be chosen based on the individual site characteristics and the actions described under **Climate Change.**

In recent years, the red pine plantations have started to suffer from red pine decline. This phenomenon is manifesting itself as the relatively rapid (sometimes in a matter of months) decline and death of red pine trees older than about sixty years. In the 2013 forest inventory, 50 ha (15%) of the red pine stands were identified as suffering from red pine decline. The County of Dufferin has participated in a southern Ontario-wide research project to attempt to determine the cause of this decline. The results of the research suggest that a combination of factors is involved, including two types of root rot (*Armillaria ostoyae* and *Heterobasidium annosum*), several years of drought, and alkaline soil. When the trees are growing in soil that has an alkaline base their rooting depth can be significantly reduced. In long periods of dry weather, this reduced rooting depth puts the trees under moisture stress and makes them more susceptible to root rots and other insect and disease attacks. As a result of the research project, some management strategies have been formulated, as described in *Modified Management Recommendations for the Establishment and Management of Red Pine Plantations.* These management recommendations will be used to guide red pine plantation management in the Dufferin County Forest. In general, older red pine stands that are declining will be managed in such a way as to speed succession toward tolerant hardwoods while maximizing timber values.

The extent of red pine plantations in the County Forest is currently around its peak, as a few of them have already had their final removal of red pine overstorey, leaving some supercanopy trees for structure and biodiversity. It is clear that the red pine plantations have served their ecological function in terms of landscape restoration, but are not a natural condition, hence their transition over time to tolerant hardwood or mixedwood stands. Since there are no red pine plantations younger than 40 years in the County Forest, and the nature of red pine is such that it will not

regenerate under selection system conditions, the supply of red pine from the County Forest will decline over time. Red pine's nature, in combination with the issue of decline described above, means that there are no plans to plant red pine even in areas where planting might be required in order to augment natural regeneration. Fortunately, the volume of wood from the Dufferin County Forest is relatively low so that local industry is not dependent on it for survival. In addition, there are numerous plantations locally on private land that are in the 40 years and younger age class.

2. ***Red oak:*** It is desirable that red oak be retained as a component of the Dufferin County Forest for reasons of wildlife habitat, biodiversity, and timber production. However, red oak is difficult to maintain using the selection system due to its mid-successional nature. Red oak will regenerate through stump sprouts and seedlings. However, in the absence of a disturbance such as fire or harvesting that will remove a significant portion of the overstorey, as well as competing understorey species, the regeneration will not grow significantly and will eventually die.

In stands where it is desirable to maintain the red oak component management activities must ensure that there is sufficient red oak regeneration. Red oak regeneration can be maintained by releasing existing regeneration and promoting new generation through prescribed burns and/or partial removal of the tolerant hardwoods in the overstorey. Partial removal of the tolerant hardwood overstorey will provide light for the shade intolerant red oaks, remove the competing tolerant regeneration, and remove the seed source for the tolerant hardwoods.

3. ***Mixedwood:*** The mixedwood stands are characterized by a mix of hardwood and conifer species. In general, these stands will be managed on a selection basis to maintain high-quality timber and wildlife habitat. Wherever possible, conifers will be retained as a component of the stand to promote diversity and as a seed source (in the case of mid-tolerant and tolerant species) for regeneration.

4***. White pine:*** The white pine plantations in the Dufferin County Forest will be harvested using the selection system. The harvests will remove approximately 30% of the basal area on a ten year cutting cycle. Since white pine exhibits intermediate shade tolerance, the conditions after partial overstorey removal will promote white pine regeneration. In some stands, there will also be a component of tolerant hardwoods in the understorey. Therefore, the white pine plantations should develop into natural mixedwood stands.

5. ***Hard Maple:*** The tolerant hardwood stands (dominated by hard (sugar) maple) will be managed on a selection basis to maintain high-quality timber and wildlife habitat. Prior to coming under the ownership of the County of Dufferin and management by the Ministry of Natural Resources and Forestry, many of these stands were high-graded, that is all of the largest (most merchantable) trees were removed with little or no control measures. Under MNR management, this practice was discontinued, thereby increasing the value and vigour of the natural stands. The primary harvesting technique will be improvement cuts, with the condition that some snags, cavity trees, downed trees, and mast trees must be retained to further wildlife objectives as described in *A Silvicultural Guide to Managing Southern Ontario Forests* (MNR, 2000).

6. ***White Spruce***: The white spruce plantations will be managed by removal of approximately 30% of the basal area on a ten year cutting cycle. These plantations have a significant component of spruce and hardwood natural regeneration so will likely develop into mixedwood stands as the overstorey spruce is removed.

7. **Bottomland:** The bottomland plantations will be managed using the selection system of removing approximately 30% of the basal area on a ten year cutting cycle. In addition, in order to protect these sites that have a high water table, harvesting will only be done during frozen ground conditions.

White-Tailed Deer Winter Concentration Areas
Areas of the Dufferin County Forest that are identified white-tailed deer winter concentration areas will be managed so that critical characteristics of the core areas and yarding areas are maintained. Briefly, this means maintaining as much conifer cover as possible in core areas and yarding areas. Due to the location of the core areas within the Dufferin County Forest (Levitt Tract, south end of Main Tract, and Melancthon Tract) it is not expected that there will be commercial harvesting within most of the core areas.

Maintaining openings to provide food sources in the white-tailed deer summer range is considered to be unnecessary given that the tracts of the Dufferin County Forest exist within a mosaic of meadows, regenerating fields and cultivated fields, and are largely not fenced, allowing deer easy access to adjacent properties.

High Conservation Value Forests
High conservation value forests (HCVFs) have particular values that require special attention during planning and management. In general, the HCVFs that are part of the Dufferin County Forest (Table 4) will undergo carefully considered, limited management aimed at maintaining or enhancing the feature(s) for which they are valued. In addition, recreational use in these areas will, in most cases, be restricted in order to support the maintenance/enhancement of values.

The County of Dufferin will ensure that the only management activities conducted in evaluated wetlands are those necessary to maintain or rehabilitate the wetland.

Areas of the Dufferin County Forest that are identified as habitat of species at risk will be managed so that the habitat requirements of these species are maintained.

Management activities in the Oak Ridges South Slope Forest ANSI will seek to maintain or enhance characteristics that the ANSI is being protected for.

Evaluation of Insect and Disease Populations
The County of Dufferin will assess insect and disease populations based on information provided by the MNRF's Forest Health Technicians, County Forest staff, and the Canadian Food Inspection Agency. Emerald ash borer, Asian long-horned beetle, Sirex woodwasp, gypsy moth, beech bark disease, butternut canker, and red pine decline are of primary concern. Other than Asian long-horned beetle, emerald ash borer, and Sirex woodwasp these are all known to be in the Dufferin County Forest. Emerald ash borer has been found in the south end of Dufferin County but has not yet been confirmed in the County Forest. Monitoring of these key insects and diseases will continue and management plans will be developed as necessary.

A management plan for emerald ash borer was developed in early 2012 in anticipation of its arrival in Dufferin County. Since the number of ash in the County Forest is relatively low, the impact of emerald ash borer is expected to be small. Dead or dying ash that are considered to be hazard trees

due to their proximity to trails will be removed as soon as possible after they are identified. Stands with an ash component will be managed in accordance with the strategies outlined in *Managing Ash in Farm Woodlots; Some Suggested Prescriptions* (Williams & Schwan, 2011).

Generally, forest management activities will tend to increase the diversity of the Forest and promote more vigorous growth, thereby reducing the potential impacts of insects and diseases. To further reduce the Forest's susceptibility, the following will apply to all forest management activities:
  1. careful matching of species to site for reforestation;
  2. promotion of a diversity of native species;
  3. management of insects and diseases using an Integrated Pest Management approach and;
  4. protection of the site, residual stems, and regeneration during all activities, including recreation.

Wildfires and Prescribed Burns
The fighting of wildfires on the County Forest properties will be conducted as described in individual municipal Emergency Plans. Roads in the Forest will be maintained and will act as firebreaks. In order to minimize the occurrence of wildfires, campfires will not be allowed. Signs may be posted at key locations in the County Forest reminding users that there are no campfires permitted, to carefully extinguish their cigarettes etc. Potential fire hazards, such as brush piles remaining after forest management activities, will be assessed in cooperation with local fire departments and remedied as needed.

While wildfires have the potential to do great damage to the forest, prescribed burning (the knowledgeable application of fire to a specific land area to accomplish predetermined forest management or other land-use objectives) is an important forest management tool. This is especially true for the maintenance of mid-successional communities such as the red oak stands in the Dufferin County Forest. Therefore, although every effort will be made to control and suppress wildfires, prescribed burning will remain a part of the management strategy for the Dufferin County Forest.

Alien Invasive Plants
Alien invasive plants have great potential to alter the ecology of the terrestrial habitats of the Dufferin County Forest. Since the Forest does not contain a significant number of watercourses, aquatic invasive species are of lesser concern. Of those invasive species noted as present in the forest, garlic mustard (*Allaria petiolata*), European buckthorn (*Rhamnus cathartica*), dog-strangling vine (*Vincetoxicum rossicum* and *V. nigrum)* and Norway maple (*Acer platanoides*) are rated as high risk in the *A Guide to the Identification and Control of Exotic Invasive Species in Ontario's Hardwood Forests* (Derickx and Antunes, 2013) based on their potential environmental, economic, and social impacts.

While garlic mustard, dog-strangling vine, and European buckthorn are still not widespread in the Dufferin County Forest, it is anticipated that their presence will increase over time, due to their invasive nature and their spread being magnified by increased recreational use. (Seeds of these species can be transported from one area to another on bicycle tires, horses' hooves, and peoples' footwear.) The presence of invasive species will be monitored, particularly: in High Conservation Value Forests, before and after forest management operations, and along recreational trails. Where deemed necessary, appropriate control measures will be implemented in order to minimize the spread and invasion of these species in the County Forest.

The mature ornamental Norway maple at the former site of Camp Dufferin at the Main Tract will be removed. There are no other known areas in the County Forest where Norway maple have been planted.

Although Scots pine (*Pinus sylvestris*) is not rated as a high risk species, it is a persistent invader of old field sites. Other than at the Little Tract, there are no significant areas of Scots pine in the County Forest. These are being removed on an ongoing basis. Scots pine invading the roadsides at the County Forest tracts are also being removed as time permits. The County has supported the Town of Mono's Scots pine eradication program by actively removing Scots pine from its own properties in the Town of Mono.

Other species that are rated as high risk that the County will be monitoring include Japanese knotweed (*Fallopia japonica*), and periwinkle (*Vinca minor*).

Where feasible, signs and the website will be used to inform forest users about invasive species and give tips on how to reduce and prevent their spread.

The County will keep abreast of developments with regard to the spread and control of invasive species through the Ontario Invasive Plant Council.

Climate Change

Since trees are unable to move other than through natural seed dispersal, and have long life spans, their ability to adapt to a rapidly changing climate on an individual basis is limited. However, there are some actions that will be taken to make the Forest as a whole more resilient to the impacts of climate change.

The key strategy will be to maintain, and where possible, increase, the diversity of species in the County Forest. In this way, if some species are affected by climate change more than others, the forest as a whole will be more able to absorb the effects. Therefore, the County will continue its management strategy of maintaining diverse tolerant hardwood stands and converting single species conifer plantations to tolerant hardwood or mixedwood stands. Increasing the diversity of the Forest has the added benefit of maintaining its carbon storage capacity over a longer period of time and enhancing biodiversity.

Through the ongoing active management of the majority of the County Forest properties, stands will be maintained in a vigorously growing, healthy state, thereby better to resist the impacts of climate change.

A potential issue related to climate change is that virtually all of the regeneration in the Dufferin County Forest currently happens naturally and, as such, is adapted to the current environmental conditions. This means that the young trees are adapted to the current growing conditions in the area, but not necessarily to future growing conditions. At the same time, it is illogical to destroy naturally-established trees to replace them, at significant expense, with trees that may not be adapted to future growing conditions either.

Where natural regeneration is not sufficient and planting is necessary in order to maintain tree cover, there is a possibility of establishing trees that are genetically better adapted to warmer

regions of Ontario. However, it is unclear how effective this would be as current climate change predictions include not just warming, but also changes in precipitation patterns and increasing frequency and severity of storm events. Therefore, there are no current plans to establish trees (or tree species) that are adapted to warmer regions in the Dufferin County Forest. If it becomes apparent that this strategy needs to change, consideration will be given first to planting trees of existing tree species that are grown from seed from warmer seed zones and second to tree species from warmer regions (e.g. the deciduous forest region) that are not currently native to Dufferin County.

Soil Erosion
In areas where there are currently erosion problems, the County will take reasonable measures to establish ground cover and stabilize the area.

The County of Dufferin will conduct periodic inspections of areas that have had erosion problems in the past and areas that are prone to erosion. If it is deemed necessary, these areas will have restricted recreational use until such time as the area is stabilized. If the County determines that the erosion problem will continue, recreational use may be restricted permanently.

6.4 Economic Sustainability
Action 1: Pursue third party forest certification.
Action 2: Generate revenue from the Dufferin County Forest without compromising its environmental sustainability.
Action 3: Assess the natural heritage and socio-economic significance of the Dufferin County Forest in order to facilitate the acquisition and disposition of properties.

Forest Certification
During the 2016-2021 planning period, the County will begin the process of gaining certification of its forest management operations. Forest certification is defined as: *a procedure whereby an independent third party inspects forest management and utilization practices to assess compliance with a set of ecological, economic and social standards for sustainable forestry.* There are two primary reasons for pursuing forest certification. First, since it is an independent assessment of forest management it serves to increase the confidence of the public in the management of the County Forest. Second, the demand for wood products from certified forests is increasing, giving such products increased market access and, in some cases, premium prices.

Financial Stability
One of the County's objectives for the Dufferin County Forest is that it generate revenue to support operations. At the same time, it is important to remember the non-monetary contributions of the Dufferin County Forest:
1. the Main Tract is one of few, large, publicly-accessible natural areas in Dufferin County;
2. the Forest contributes significant ecosystem services (for details see section 5.7);
3. the Forest, and in particular the Main Tract, is important for outdoor recreation and;
4. the Dufferin County Forest properties add to the value of the areas in which they are located both in aesthetic and monetary terms.

In order to make revenues more predictable, attempts will be made to level out the value of the wood products removed from the forest, while ensuring that the environmental sustainability of the

forest is not compromised.

The County will investigate possible sources of revenue and implement those that it deems feasible as long as they do not conflict with the other objectives of this plan.

Property Assessment, Acquisition and Disposition
In the past, the properties that make up the Dufferin County Forest were acquired by the County in a somewhat haphazard way. Since then, natural heritage and socio-economic assessments were done (Table 10) so that future acquisitions and dispositions of property would be subject to a more objective assessment. The underlying rationale is to increase the overall natural heritage and socio-economic value of the Dufferin County Forest within existing budget constraints.

The following will be considered as the priorities for acquisition:
1. properties adjacent to the Main Tract (large area of contiguous forest);
2. evaluated wetlands, especially those designated as provincially significant and;
3. significant natural areas as defined in the *Provincial Policy Statement (2014)*, in particular those that are adjacent to existing tracts of the Dufferin County Forest.

All forest properties that are being considered for acquisition will be assessed in terms of the criteria described in Table 10. Consideration will also be given to the following:
1. the cost of the property (e.g. if the property is donated there are minimal costs);
2. future maintenance costs over and above those that exist for all County Forest tracts (e.g. if the property has buildings) and;
3. any restrictions that the owner wishes to place on present and future uses of the property, including (but not limited to) those related to: use of the land, property, onsite buildings and/or facilities; special agreements and covenants; and financial and legal liabilities.

Any property disposition will be conducted in accordance with current County policy, as well as requiring the purchaser to comply with key aspects of this management plan as a condition of sale.

Despite the foregoing, active property acquisition or disposition is not contemplated within the period of this management plan.

Table 10: Natural Heritage and Socio-Economic Assessment of Dufferin County Forest Properties

Tract	Natural Heritage	Ecosystem Service Value	Size	Species Variety	Site	Distance From Population Centre	Recreation Potential	Land Value (2012)	Total	Rank
Amaranth	provincially significant wetland	4	2	2	3	5	1	2	19	**4**
Gara-Gore	n/a	3	2	1	5	5	0	1	17	**5**
Hockley	significant woodland, provincially significant wetland	4	2	1	3	5	2	2	19	**4**
Leening	Niagara Escarpment Rural Area	2.5	1	2	5	3	0	1	14.5	**8**
Levitt	SAR, Niagara Escarpment Natural Area, deer winter concentration area	3	1	1	3	5	1	1	15	**7**
Little	significant woodland, creek	2	3	1	5	2	2	1	16	**6**
Main	significant woodland, ANSI, Pine River floodplain, deer winter concentration area, SAR, linkage	2	5	5	5	3	2	5	27	**1**
Melancthon	significant woodland, provincially significant wetland, deer winter concentration area	3	4	2	3	1	1	1	15	**7**
Mono	significant woodland, linkage	2	4	3	5	5	2	4	25	**2**
Randwick	SAR, significant woodland, wetland, creek	2	5	3	5	2	2	5	24	**3**
River Road	n/a	2	1	1	5	4	0	1	14	**9**
Riverview	significant woodland, locally significant wetland	2.5	3	2	3	1	1	1	13.5	**10**
Simmons	significant woodland	2	3	3	5	2	1	3	19	**4**

Criteria Used in Assessing Properties
1. **Natural Heritage**
as defined in the *Provincial Policy Statement (2014)*
2. **Ecosystem Service Value Flow ($/year/hectare) (refer to section 5.7 for details)**
$44-$440: 1; $2,200-$4,400: 2; $8,800-$22,000: 3; $88,000-$237,600: 4
3. **Size**
under 10 hectares: 1; 10-30 hectares: 2; 31-50 hectares: 3; 51-75 hectares: 4; over 75 hectares: 5
4. **Species Variety (number of overstorey working groups)**
one working group: 1; two working groups: 2; three working groups: 3; four working groups: 4; more than four
working groups: 5
5. **Site (average site class from Plonski's yield tables)**
site class three: 3; site class two: 4; site class one or better: 5
6. **Distance From Population Centre (Orangeville)**
over 50 kilometres: 1; 41-50 kilometres: 2; 31-40 kilometres: 3; 20-30 kilometres: 4; under 20 kilometres: 5
7. **Recreation Potential**
one point for each of: i. good trail system; ii. important or unique natural heritage feature(s)
8. **Land Value (2012)**
under $300,000: 1; $300,001-$600,000: 2; $600,001-$900,000: 3; $900,001-$1,200,000: 4; over $1,200,000: 5

6.5 Social Sustainability

Action 1: Develop a recreation policy for the Dufferin County Forest.
Action 2: Increase public awareness within Dufferin County and the surrounding area of the
Dufferin County Forest and the opportunities and values it provides.
Action 3: Work in conjunction with the Dufferin County Museum & Archives to identify, protect and,
where appropriate, promote cultural heritage resources.
Action 4: Cooperate with researchers and research agencies.

Recreational Use of the County Forest Policy
In order to address increasing recreational pressures on the Dufferin County Forest, during the
2016-2021 planning period the County will complete a recreation policy for the Dufferin County
Forest. This policy will generally include:
1. access procedures for events;
2. responsibilities of user groups that have access to the County Forest;
3. responsibilities of the County;
4. designated uses for trails in the Main Tract (and other tracts as deemed necessary)
and;
5. permitted and not permitted recreational uses.

The Recreational Use of the County Forest Policy will be supported by an updated County Forest by-
law to enable enforcement of various provisions.

Access Restriction
The County will continue to maintain gates and other methods of access restriction to the forest tracts in
order that unauthorized motorized vehicle use, dumping, illegal removal of wood, partying and
introduction of invasive plant species can be curtailed.

Human Health
The County Forest plays an important role in the health and well-being of the community. It is a low
cost outdoor venue for physical activity for those living in or visiting the region. Many people find

the forest environment enjoyable simply because of its peace and tranquility compared with the rest of their daily lives. As well, trees absorb carbon dioxide and pollutants from the air and release oxygen, providing very real air quality (and consequently, health) benefits.

However, the Forest also has the potential to have a negative impact on human health. The County will post information on the County Forest website regarding forest-related human health issues such as west nile virus, lyme disease, and poison ivy. Printed information regarding these issues will be available through the Dufferin County Museum & Archives and at public events where there is a County Forest presence. The primary information source regarding these topics will be the local health unit. Other human health issues will be added as appropriate.

Signs
During the 2016-2021 planning period, the County will post yellow dots on the perimeter of all forest properties as described in the *Trespass to Property Act*. Consideration will be given to placing signs marking the corners of all of the County Forest tracts. Signs that are currently posted in the Forest will be replaced as needed. Consideration will be given to adding GPS coordinates to new signs.

Information Products
The County of Dufferin will continue to produce and update information products such as brochures, maps, and hunting information packages. These will be distributed through County offices, by postal mail, and on the website. The County of Dufferin will handle requests for information, comments, and complaints about the Dufferin County Forest in a timely and appropriate fashion. In order to help maintain the balance between recreational use and environmental sustainability, the County Forest will not be actively promoted outside of Dufferin and its surrounding area.

Presentations, Schools, Walks, and Tours
The County of Dufferin will ensure that knowledgeable guides are available to give tours of the Dufferin County Forest at the public's request, as well as organizing at least one event in the forest annually for the general public. These may be held in conjunction with National Wildlife Week, National Forest Week, Arbor Day, or Earth Day. Presentations for schools and other groups will be dealt with on an as-requested basis. School group activities may include a practical project in the forest such as invasive species removal or species inventory. The County Forest will be promoted at appropriate local events.

Conifer Plantation Thinning Demonstration Area
The next thinning of the demonstration area at the Main Tract is planned to take place in 2019. This will entail a further thinning of all of the established blocks, which will result in four blocks that have been thinned three times, three that have been thinned twice and one that has not been thinned at all.

Interpretive Trails
During the 2016-2021 planning period, an interpretive trail at the Main Tract, describing different forest management regimes, will be developed. The interpretive trails at the Little Tract and Hockley Tract will be maintained.

Cultural Heritage Resources

In cooperation with the Dufferin County Museum & Archives, the County will, as appropriate, identify, protect, and promote any identified cultural heritage resources within the Dufferin County Forest.

Researchers

Researchers wishing to use the Dufferin County Forest will be encouraged to do so, as long as their project does not unduly interfere with other objectives for the Forest. The County will work to promote the County Forest as a research location in order to increase the detail of its flora and fauna inventory.

7.0 MONITORING

In order to ensure that all activities related to the Dufferin County Forest are achieving the objectives described in this management plan, a number of monitoring activities will be undertaken. In cases where monitoring shows that objectives are not being achieved, management actions will be adapted in an effort to achieve the stated objectives.

Input from Forest users, especially in regard to enhancing inventory information, will be welcomed. Where necessary, information will be verified prior to being added to the inventory database.

7.1 Environmental Sustainability

There are two methods for assessing if forest management operations and silvicultural activities are meeting stated environmental objectives: cut inspections and forest inventory.

Cut Inspections

Cut inspections in the Dufferin County Forest will be conducted according to the following guidelines:

     1. Inspections will be conducted at least weekly in areas where forest management operations are ongoing.

     2. An inspection will be conducted within one week of the end of forest management operations.

     3. Every inspection will ensure compliance with the applicable tender Specifications and Scope of Work, including:

        i. the Contractor shall carry out operations in a professional manner, to minimize damage to unmarked trees, roads, trails, fences, culverts, bridges, etc.;

        ii. the Contractor shall conduct logging so as to minimize damage to the residual stand and developing regeneration, and to agree with the County of Dufferin upon the method of felling forwarding and skidding prior to commencement of operations;

        iii. the Contractor shall ensure that all roads, trails and watercourses remain free of logging debris, and roads are passable at all times;

        iv. where fire hazard conditions make harvesting under this Tender dangerous, the County of Dufferin may, from time to time, notify the Contractor to suspend such operations for such a period as the County of Dufferin deems advisable, and the Contractor agrees to immediately suspend such operations for that period;

        v. the Contractor shall cut all trees or rows that are marked in orange or yellow

paint, utilize and remove all merchantable wood 2.54 metres in length and: in plantations down to 10 cm diameter outside bark top end; in natural stands where sawlogs are being cut, down to 20 cm diameter outside bark top end; in natural stands where fuelwood is being cut, down to 10 cm diameter outside bark top end; and

vi. the Contractor shall cut trees so that the stump heights are not over 30 cm. The stump height may not be greater than its diameter and not over 60 cm. The butt mark is to remain.

Forest Inventory

Forest inventory in the production forest area of the Dufferin County Forest will be conducted according to the following guidelines:

1. A forest inventory will be conducted for newly acquired properties within five years of their acquisition.

2. A forest inventory will be conducted in individual stands prior to the development of a prescription for forest management and within 18 months of the conclusion of a forest management operation. If a stand has not been subject to a forest management operation for a period of 15 years, a forest inventory will be conducted.

3. The forest inventory will include (at minimum):

i. a quantitative inventory of overstorey tree vegetation (variable-radius plot sampling);

ii. a quantitative inventory of regeneration (fixed-radius plot sampling);

iii. a quantitative inventory of understorey non-tree vegetation (fixed-radius plot sampling)

iv. a quantitative inventory of invasive plant species (fixed-radius plot sampling) and;

v. a quantitative or qualitative, as appropriate, inventory of wildlife, water resources, topography, aesthetics, and special habitat features.

In addition to cut inspections and forest inventory, the County of Dufferin will do the following to ensure that environmental sustainability is being achieved:

1. Annual inspections will be conducted in areas that are prone to erosion. Areas where erosion is reported by users will be inspected within three months of being reported.

2. The potential for insect and disease outbreak will be assessed as information is collected or reported.

3. Key invasive plant species will be monitored along recreational trails on an ongoing basis to allow for early detection and rapid response to reduce invasion potential.

4. Annually, the area of timber sold from the Dufferin County Forest will be monitored.

5. An identification and assessment of aggregate deposits will be conducted for newly acquired properties within five years of their acquisition.

6. Forest management operations that are conducted by contractors, such as non-commercial thinning, cleaning, or marking, will be audited by the County, the specific procedures will depend on the operation.

7.2 Economic Sustainability

In order to ensure that the forest is economically sustainable, the County of Dufferin will do the following:

1. A budget for the Dufferin County Forest, including projected revenues and expenses and a capital budget, will be presented annually to Dufferin County Council.

2. The natural heritage and socio-economic value of the forest properties will be re-evaluated every ten years, in conjunction with operating plan development.

3. The criteria used for assessing the significance of the properties will be revisited every ten years, in conjunction with operating plan development, to ensure that they are still facilitating the achievement of the County of Dufferin's objectives for the Forest.

7.3 Social Sustainability

The Recreational Use of the County Forest policy will be reviewed periodically to ensure that its purposes are being met.

In addition, to ensure that the social sustainability objectives are being met, the County of Dufferin will do the following:

1. Maintain involvement with user groups and other stakeholders, primarily through the establishment of an advisory group, details of which will be outlined in the Recreational Use of the County Forest policy;

2. Conduct informal oral (as opportunities arise) and formal written (every ten years or, if needed, more frequently) surveys of users and non-using ratepayers to determine if:

    1. they have gained knowledge about the Dufferin County Forest;

    2. there still exist knowledge gaps that the County of Dufferin can fill and;

    3. they have any safety or access concerns.

4. Assimilate and act on comments/concerns from users on an ongoing basis.

5. Maintain a dialogue with researchers and research agencies working in the Dufferin County Forest.

8.0 REPORTING

All activities pertaining to the Dufferin County Forest will be reported as follows:

1. reports on specific subjects, as required, to Dufferin County Council.

2. an annual report to Dufferin County Council and the ratepayers of Dufferin County.

3. a budget for the upcoming year and a financial report for the past year, presented to Dufferin County Council as part of the established budgetary process.

9.0 THE FUTURE OF THE PLANNING PROCESS

A Recreational Use of the County Forest policy will be developed, as described in 6.2, as soon as possible following the approval of this forest management plan.

Future land use decisions will be dealt with in the context of the three land use classes outlined in 6.1. Amendments to this forest management plan, as well as the Recreational Use of the County Forest policy, will follow any such decisions, as needed.

Some of the activities described in the management plan are specific to the period of the embedded operating plan (2016-2021), most will continue over the entire period of the management plan (2016-2036). Three additional five year operating plans will be written to fulfill the management plan; for the periods 2021-2026, 2026-2031, and 2031-2036. The operating plans will be supported by Annual Reports and Annual Work Schedules.

Toward the end of the twenty year management plan, a new twenty year plan will be written for the period 2036-2056. This plan will include a five year operating plan for the period 2036-2041.

APPENDICES

A: Glossary

alien: plants, animals and micro-organisms that have been accidentally or deliberately introduced into areas beyond their native range. Synonyms may include introduced, non-native, and exotic.

ANSI: Area of Natural and Scientific Interest. ANSIs are areas of land and water that represent significant geological (earth science) and biological (life science) features. Earth science ANSIs include areas that contain examples of rock, fossil and landform features in Ontario. These features are the result of billions of years of geological processes and landscape evolution. Life science ANSIs are areas that contain examples of the many natural landscapes, communities, plants and animals found in the 14 natural regions of the province. The *Ministry of Natural Resources and Forestry* identifies ANSIs that are "provincially significant" by surveying regions and evaluating sites to decide which have the highest value for conservation, scientific study and education.

barren and scattered: productive forest land which, because of natural or artificial disturbance, contains only scattered trees (*stocking* below 0.25) or no trees at all with either shrub cover or bare soil, but no significant regeneration.

basal area: the cross sectional area of a stem at breast height (1.3m), most commonly accumulated as square metres per hectare. Also see *normal basal area*.

biodiversity: the variety and variability (in time and space) among living organisms and the ecological complexes in which they occur. Biodiversity can be measured at the genetic, species and landscape levels.

bog: see *wetland*

breast height: 1.3m above the ground

carr: see *wetland*

conifer (softwood): needle-bearing tree that produces seeds in cones.

deciduous forest region: The deciduous forest is the southernmost region in Ontario, dominated by agriculture and urban areas. This forest generally has the greatest diversity of tree species, while at the same time having the lowest proportion of forest. It has most of the tree and shrubs species found in the Great Lakes–St. Lawrence forest region, and also contains black walnut, butternut, tulip, magnolia, black gum, many types of oaks, hickories, sassafras and red bud — species commonly found in Ohio, Pennsylvania and the Carolinas in the USA. The deciduous forest region has the most diverse forest life in Ontario, including many rare mammals, birds, plants, insects, reptiles and amphibians. This region is also referred to as the Carolinian.

deer winter concentration area (deer yard): a forested area deer traditionally migrate to and where they spend the winter months. The "core" of a deer yard is that portion of the yard where use by deer is highest during winters that are severe. Boundaries of a deer yard tend to change over time.

Department of Lands and Forests: see *Ministry of Natural Resources and Forestry (MNRF)*

development means the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*, but does not include:
a) activities that create or maintain *infrastructure* authorized under an environmental assessment process;
b) works subject to the *Drainage Act*; or
c) for the purposes of policy 2.1.4(a), underground or surface mining of *minerals* or advanced exploration on mining lands in *significant areas of mineral potential* in Ecoregion 5E, where advanced exploration has the same meaning as under the *Mining Act*. Instead, those matters shall be subject to policy 2.1.5(a). *(Provincial Policy Statement, 2014)*

development: includes a change in the use of any land, building or structure. (*Niagara Escarpment Planning and Development Act*)

diameter at breast height (DBH): the diameter of a tree taken at a height of 1.3m above the ground

ecosystem services: the benefits that people obtain, either directly or indirectly, from ecological systems. These services can be understood in ecological terms and they can also be translated into economic terms through valuation studies. These services are the foundation of human well-being and they also represent a significant part of the total economic value of our landscape and economy. And yet their value is most often uncounted, assumed to be 'zero'. It is therefore important to be able to estimate the economic value of ecosystem services. Increasingly valuation is recognized as another useful tool in environmental decision making to weigh tradeoffs between conservation and land development.

endangered: a species that lives in the wild in Ontario but is facing imminent *extinction* or *extirpation*

even-aged: condition of a *stand* in which relatively small age differences exist between individual trees. The maximum difference in age is usually twenty years. Also see *uneven-aged*.

extinct: a species that no longer lives anywhere in the world

extirpated: a species that lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario

fen: see *wetland*

forest inventory: sample survey of a forest area to provide an estimate of timber by volume, species, products, size, and other characteristics. Also assesses understorey and ground

vegetation, wildlife, water resources, aesthetics and special characteristics of the forest. Also see *timber inventory.*

forestry purposes: includes the production of wood and wood products, provision of proper environmental conditions for wild life, protection against floods and erosion, recreation, and protection and production of water supplies; (*Forestry Act*, R.S.O. 1990)

Great Lakes–St. Lawrence forest region: The Great Lakes–St. Lawrence forest is the second largest forest region in Ontario. This forest extends along the St. Lawrence River across central Ontario to Lake Huron and west of Lake Superior along the border with Minnesota. The southern portion of the Great Lakes–St. Lawrence forest extends into the populated areas of Ontario. The Great Lakes–St. Lawrence forest is dominated by hardwood forests, featuring species such as maple, oak, yellow birch, white and red pine. Coniferous trees such as white pine, red pine, hemlock and white cedar, commonly mix with deciduous broad-leaved species, such as yellow birch, sugar and red maples, basswood and red oak. Much of the forest in the Great Lakes–St. Lawrence forest is uneven aged, meaning that young and old trees can be found within the same group of trees.

hardwood: leaf-bearing trees whose seeds are not produced in cones.

high conservation value forest: forest land managed primarily to exert beneficial influence on soil, water, landscape, or for any other purpose when production of merchantable timber, if any, is incidental

high-grading (selective cutting): the cutting of the largest and most merchantable trees in a stand. There are relatively few or no control measures.

Integrated Pest Management (IPM): refers to the practice of preventing or reducing damage caused by pests by using the best available information, along with a variety of ecologically and economically sustainable approaches and control methods.

intolerant: used to describe trees which do not tolerate shade (e.g. red pine, poplar). Also see *tolerant.*

invasive: *alien* species whose introduction or spread negatively impact native biodiversity, the economy and/or society, including human health.

managed forest: land use designation for areas of the Dufferin County Forest where the main focus is economic sustainability.

marsh: see *wetland*

Ministry of Natural Resources and Forestry (MNRF): the provincial ministry responsible for natural resources, including forests, wetlands, waters, and fish and wildlife. The MNRF was formerly known as the Department of Lands and Forests and the Ministry of Natural Resources (MNR).

mixedwood: a *stand* in which both the *conifer* and *hardwood* components are greater than 30%

native: usually, a species known to have existed on a site prior to the influence of humans.

natural forest: land use designation for areas of the Dufferin County Forest where the main focus is environmental sustainability.

normal basal area: the basal area for a given *working group* on a particular *site class* at a particular age, as given by Plonski's Normal Yield tables.

prescribed burning: the knowledgeable application of fire to a specific land area to accomplish predetermined forest management or other land-use objectives

private land: land not vested in Her Majesty in right of Ontario, but includes unpatented land that is located or sold under the *Public Lands Act*. Also see *public lands*.

productive forest land: all forest areas capable of growing commercial trees and not withdrawn from such use

production forest: all productive forest land managed primarily for human benefit, unless otherwise reassigned

public lands: the lands vested in Her Majesty in right of Ontario and under the management of the Minister [of Natural Resources], and includes the lands in respect of which a lease, licence of occupation or permit has been granted or issued under the *Mining Act*, the *Provincial Parks Act* or the *Public Lands Act.* Also see *private land*.

recreation forest: land use designation for areas of the Dufferin County Forest where the main focus is social sustainability (recreation).

regeneration: the renewal of a tree crop whether by natural (self-sown seed or by vegetative means) or artificial means (sowing and planting). This term may also be used to describe the young crop itself.

selective cutting: see *high-grading*

selection system: a periodic partial cutting, controlled by basal area, using vigour and risk characteristics to determine individual tree selection

shelterwood system: an *even-aged silvicultural system* where in order to provide a source of seed and/or protection for regeneration, the old crop is removed in two or more successive cuttings

significant means:
a) in regard to *wetlands, coastal wetlands* and *areas of natural and scientific interest*, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time;
b) in regard to *woodlands,* an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its

contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources;

c) in regard to other features and areas in policy 2.1, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or *natural heritage system*;

d) in regard to *mineral* potential, an area identified as provincially significant through evaluation procedures developed by the Province, as amended from time to time, such as the Provincially Significant Mineral Potential Index; and

e) in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest for the important contribution they make to our understanding of the history of a place, an event, or a people.

Criteria for determining significance for the resources identified in sections (c)-(e) are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation. *(Provincial Policy Statement, 2014)*

silviculture: the science and art of cultivating forest crops. More particularly, the theory and practice of controlling the establishment, composition, constitution and growth of forests. Silviculture is a combination of three forestry activities: 1) timber harvest; 2) forest renewal; 3) subsequent maintenance of the new forest.

silvicultural system: a process, following accepted silvicultural principles, in which crops constituting forests are tended, harvested, and regenerated, resulting in the production of crops of distinctive form. Systems are conveniently classified according to the method of harvesting the mature stands with a view to regeneration and according to the type of crop produced.

site alteration means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site. For the purposes of policy 2.1.4(a), *site alteration* does not include underground or surface mining of *minerals* or advanced exploration on mining lands in *significant areas of mineral potential* in Ecoregion 5E, where advanced exploration has the same meaning as in the *Mining Act*. Instead, those matters shall be subject to policy 2.1.5(a). *(Provincial Policy Statement, 2014)*

site class: a measure of the relative productivity of a site. Site classes 1a and X are the most productive; site class 3 is the least productive. Site class is determined using Plonski's Normal Yield Tables.

special concern: a species that lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats

species at risk (SAR): species that are determined to need special care by an independent committee of experts, the Committee on the Status of Species at Risk in Ontario (COSSARO),

which consists of people with expertise in scientific disciplines or Aboriginal Traditional Knowledge. Species at risk fall into one of five categories, depending on the degree of risk: *extinct, extirpated, endangered, threatened,* or *special concern.*

stand: a community of trees possessing sufficient uniformity in composition, constitution, age, arrangement or condition to be distinguishable from adjacent communities.

stocking: the actual *basal area* as a fraction of the *normal basal area*. Stocking can be more than 1.

supercanopy tree: a living tree that sticks up well above the main canopy of a forest stand.

swamp: see *wetland*

threatened: a species that lives in the wild in Ontario, is not *endangered*, but is likely to become *endangered* if steps are not taken to address factors threatening it

timber inventory: sample survey of a forest area to provide an estimate of timber by volume, species, products, size and other characteristics. Also see *forest inventory.*

tolerant: used to describe trees that can regenerate under a canopy (e.g. maple, hemlock). Also see *intolerant.*

uneven-aged: the condition of a stand in which trees markedly differ in age. Also see *even-aged*.

wetland: land that is seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils (characterized by an abundance of moisture) and has favoured the dominance of water-tolerant plants. The four major types of wetlands are **swamps**, **marshes**, **bogs** and **fens**. A **carr** is a waterlogged, wooded community, characterized by alders and willows. Wetlands in Ontario are evaluated based on their biological, hydrological, socio-economic and special features and designated as either provincially or locally significant.

	Vegetation	**Water**	**Soil**	**General Location**
bog	sphagnum moss	water from runoff and precipitation only	thick layer of peat (decomposed sphagnum moss), which is highly acidic, extends beneath bog	common to northern Ontario, but some in the south
fen	grasses, sedges	some flow-through	neutral and alkaline	rare in Ontario

	Vegetation	Water	Soil	General Location
marsh	cattails, sedges, rushes	very efficient at supplying water and nutrients to vegetation; occasional flooding; maintain some open water (less than 2 m in depth); will dry out during extended droughts	mineral; high organic matter content near surface	southern Ontario
swamp	shrubs and trees (e.g. soft maple and cedar)	occasional flooding	organically rich mineral soils	most common wetland in southern Ontario

working group: an inventory aggregation for management purposes. An aggregate of *stands*, including potential forest areas assigned to this category, having the same predominant species, and management under the same rotation and broad silvicultural system.

B: Acronyms

ANSI	Area of Natural and Scientific Interest
CFIA	Canadian Food Inspection Agency
CO	Conservation Officer
DCMA	Dufferin County Museum & Archives
DCF	Dufferin County Forest
GIS	Geographic Information System
GPS	Global Positioning System
MNR	Ministry of Natural Resources
MNRF	Ministry of Natural Resources and Forestry
MOC	Mansfield Outdoor Centre
NEC	Niagara Escarpment Commission
OFRI	Ontario Forest Research Institute
OFSC	Ontario Federation of Snowmobile Clubs
SAR	Species at Risk
USDA	United States Department of Agriculture
WIA	Woodlands Improvement Act

C: Species Abbreviations

Ab	black ash
Aw	white ash
Bd	basswood
Be	American beech
Bn	butternut
Bw	white birch
Ch	cherry

C   other conifers
Ce   eastern white cedar
Elm American elm
H   other hardwoods
He   eastern hemlock
I   ironwood
La   tamarack/larch
Mh   hard/sugar maple
Mr   red maple
Or   red oak
Pj   jack pine
Po   poplar/aspen
Pw   white pine
Sb   black spruce
Sw   white spruce
Wn   black walnut

D: Conversion Factors
1 hectare (ha) = 10,000 m^2 = 2.47 acres
1 metre (m) = 3.26 feet = 1.09 yards
1 cubic metre (m^3) = 35.7 cubic feet = 0.42 cords = 227 f.b.m.

E: Recreational Use of the County Forest Policy Summary
[to be completed]

F: Related Municipal Policies and By-Laws
County Forest By-Law 2003-50
Dufferin County Official Plan
Dufferin Local Municipal Official Plans and Zoning By-Laws
Fees By-Law (including County Forest) 2012-08
Recreational Use of the County Forest Policy
Reserve Funds By-Law (including County Forest) 2002-45

G: Related Provincial Policies and Legislation
Endangered Species Act
Fish and Wildlife Conservation Act
Forestry Act
The Niagara Escarpment Plan
Niagara Escarpment Planning and Development Act
*Planning Act*
Professional Foresters Act
A Silvicultural Guide to Managing Southern Ontario Forests

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I: Tract Maps Showing Land Use Classes

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

AMARANTH TRACT (N)

Laurel Complex (AM5)

DUFFERIN COUNTY ROAD 11

AMARANTH TRACT (S)

DUFFERIN COUNTY ROAD 11

Farmington Swamp (AM9)

43c

43b

43a

43e

43a

Farmington Swamp (AM9)

Farmington Swamp (AM9)

5 SIDEROAD

N

LEGEND

- COUNTY FOREST STANDS BOUNDARY
- NIAGARA ESCARPMENT
- MANAGED LAND USE CLASS
- NATURAL LAND USE CLASS
- EVALUATED WETLANDS
- AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
- AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
- AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

GARA GORE TRACT (N)

DUFFERIN COUNTY ROAD 109

11TH LINE

20 SIDEROAD

44.6

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

LEENING TRACT

LEGEND

COUNTY FOREST STANDS BOUNDARY
NIAGARA ESCARPMENT
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

DUFFERIN COUNTY ROAD 21

LEVITT TRACT

CALEDON MELTWATER DEPOSITS

DUFFERIN COUNTY ROAD 7 (HOCKLEY ROAD)

1ST LINE EHS

51b

51a

51b

LEGEND

COUNTY FOREST STANDS BOUNDARY
NIAGARA ESCARPMENT
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

LITTLE TRACT

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

DUFFERIN COUNTY ROAD 18 (AIRPORT ROAD)

LEGEND

- COUNTY FOREST STANDS BOUNDARY
- NIAGARA ESCARPMENT
- MANAGED LAND USE CLASS
- NATURAL LAND USE CLASS
- EVALUATED WETLANDS
- AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
- AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

MAIN TRACT

MELANCTHON TRACT

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

MONO TRACT

LEGEND

- COUNTY FOREST STANDS BOUNDARY
- MANAGED LAND USE CLASS
- NATURAL LAND USE CLASS
- NIAGARA ESCARPMENT
- EVALUATED WETLANDS
- AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
- AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

Elba-Camilla Wetland Complex (AM6)

HURONTARIO

41b
41c
41a
40b
40a
40c
39a
39b
39c
45a
38b
39d

20 SIDEROAD

1ST LINE EHS

MONO CLIFFS PROVINCIAL PARK

LEGEND

COUNTY FOREST STANDS BOUNDARY

NIAGARA ESCARPMENT

MANAGED LAND USE CLASS

NATURAL LAND USE CLASS

EVALUATED WETLANDS

AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE

AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

RANDWICK TRACT

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

RIVER ROAD TRACT

DUFFERIN COUNTY ROAD 25

45a

45a

N

RIVERVIEW TRACT

LEGEND

- COUNTY FOREST STANDS BOUNDARY
- MANAGED LAND USE CLASS
- NATURAL LAND USE CLASS
- NIAGARA ESCARPMENT
- EVALUATED WETLANDS
- AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
- AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

SIMMONS TRACT

PINE RIVER VALLEY

5TH LINE EAST

47c

47b
47b
47b

47a

LEGEND

COUNTY FOREST STANDS BOUNDARY
MANAGED LAND USE CLASS
NATURAL LAND USE CLASS
NIAGARA ESCARPMENT
EVALUATED WETLANDS
AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE
AREA OF NATURAL AND SCIENTIFIC INTEREST - EARTH SCIENCE

N