MANAGED FOREST PLAN

AURORA WOODLANDS

January 1, 2010 - December 31, 2019

Synopsis

MANAGED FOREST PLAN
AURORA WOODLANDS

The following forestry program provides an update to the Town of Aurora's Managed Forest Plan for the Case and Vandorf Woodlots which was written in 1999. Located in south Aurora, these public forests are the most extensive in Town; covering a combined area of over 50 hectares. They have an impressive floral diversity; supporting the growth of over 33 different tree species and over 60 different shrubs and herbs, and they currently provide recreational opportunities for nearby residence while sustaining the growth of some of the largest trees in York Region.

Over the next ten years, the population in the Town of Aurora is expected to increase by approximately 20%. The resulting higher demand imposed on the local forests for recreation will require management to reduce negative impacts on forest health. This plan update was therefore written to provide a close examination of the forest resources and natural heritage features, and to outline management strategies that will help satisfy the needs of the public while protecting the natural ecosystems. The objectives and strategies of this plan can be suitably applied to manage other smaller woodlots in Town, as found growing along its extensive trail system.

After thorough evaluation of the forest conditions and following planning meetings with Town administrators the goal developed for the management program is as follows:

> *To provide the citizens of Aurora with a safe and healthy place to recreate and experience nature while conserving the natural heritage resources.*

The focus of forest management in the Aurora Woodlands will be recreation, education, forest protection and conservation of species diversity and wildlife habitat. Each of these objectives are realistic and have minimal conflict. The objectives are expected to be effective over the next 10 years; January 1, 2010 to December 31, 2019. An operational schedule is given to guide management during this period. The key issues and recommended priority of activities are as follows;

Figure 1. Dead limbs hanging over trails such as the one shown in the crown of this healthy sugar maple should be pruned.

<u>Activities to be implemented in both Woodlots</u>

1. Assess pruning or removal requirements as shown on Map 6 & 7 (Figure 1). Inspect and mark trees adjacent to trails and property boundaries on a two-year cycle. Schedule implementation of treatments.
2. Organize a Forest Advisory Team consisting of individuals that represent local forest user groups (e.g., hikers, schools, nature clubs, adjacent neighbourhoods, Adopt-a-Park program). This team will provide input on trails and forestry issues and serve as a sounding board for management projects.

3. Rehabilitate bike stunt areas by dismantling structures, filling and levelling dug pits, and repairing or closing un-official trails (Map 5 & 6). Prevent construction of bike stunts by erecting signage and fencing where appropriate (Figure 2).
4. Meet with the Forest Advisory Team to identify potential unofficial trails to close. Install signs and wooden fence / logs at the entrance to selected un-offical trails.
5. Remove fire pit structures and rehabilitate areas by establishing shrub and tree vegetation.
6. Convert communities of Manitoba maple and European buckthorn where they exist to more native plant assemblages. See Map 4 & 5.
7. Design updated trail brochures to be distributed at the Town Hall and as pdf files on the Town's Web Site.
8. Engage nearby schools in seed collection, tree planting, insect population monitoring, and invasive species control and restoration.
9. Monitor identified trees shown on Map 2 & 3 for seed production and conduct seed collection when available. Seeds should be sown in the Town's tree nursery to grow specimens for reforestation programs.

Figure 2. Examples of mountain bike stunts found in the woodlands.

10. Forest insect and disease monitoring programs should be conducted annually and control programs conducted when necessary and feasible.
11. Install and maintain bird boxes. Involve local community & school groups in this activity.
12. Work with Silv-Econ Ltd. to designate the Aurora Woodlands as FSC certified.

<u>Activities to be implement in the Vandorf Woodlot</u>

1. Improve trail base using limestone screenings (260 m) and construct 650 m of new official trail (Map 5). Use cedar rail fencing along paths to deter development of unofficial trails where appropriate.
2. Install one notice board in the Vandorf Woodlot near the location of the old Lloyd sawmill (Map 5).
3. Plant approximately 6,000 trees among M-1, M-2 and M-3 and 500 tree seedlings in P-2 to increase forest cover as shown on Map 7.
4. Selection thin stands W-2 and W-5 as shown on Map 7 to encourage growth of established forest regeneration, promote a sustainable presence of large, healthy trees and conserve uncommon and 'At Risk' species.
5. Design, produce, install signs for self guided nature trails.

6. Work with the Ministry of Natural Resources to evaluate potential improvements required for fish passage at the old dam on the Holland River.

Activities to be implement in the Case Woodlot

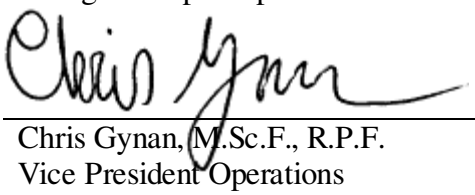
1. Mitigate erosion and sediment transport issues through development of a sediment and erosion control plan (see Figure 3).
2. Remove yard waste and encourage no dumping of yard waste through signage, and a letter mailing to neighbouring landowners (Figure 5).
3. Improve trail base using limestone screenings. 1 km (Map 4).
4. Enter into discussions with the owner of the 10 hectare property located adjacent to the Town owned portion of the Case Woodlot to present forest-use issues and to potentially acquire the property for inclusion in the Town's park system (see Map 8).
5. Upgrade the 30 meter long boardwalk (Map 4).

Figure 3. Discharge outlets from the storm water pond (left) and roadside ditch along Bathurst Street (right).

Figure 4. Photo of stand W-6 in the Case Woodlot showing sediment deposits resulting from upstream erosion of stream banks.

Figure 5. Yard wasted strewn Behind residential backyards.

I hereby certify that the following plan is based on an analysis of a thorough forest inventory, gives considerable thought for conservation of the forest ecosystem and follows sound forest management principles.



December 11, 2009

Date

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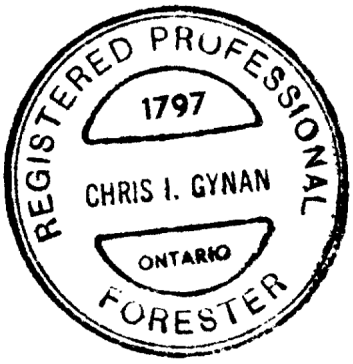

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MANAGED FOREST PLAN
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Section 1 : Introduction

Careful stewardship of public woodlands is critical to the conservation of forest ecosystems, wildlife habitat and groundwater resources. Forest ownership is also a privilege that few people in the world will ever experience. Woodlot owners, therefore, have special responsibilities as land stewards to manage their properties with a great deal of thought for all creatures whose quality of life depends on the existence of large areas of healthy forest.

The Aurora Woodlands is the collective name for two properties which make up the managed forests in the Town of Aurora. The Vandorf Woodlot is the largest of the two. Purchased by the Town as parcels in the late 1970's and early 80's, this 33 hectare forest provides a rare opportunity to experience some of the largest cedar and hemlock trees in York Region. The smaller property, the Case Woodlot (17 hectares), was more recently acquired and provides multiple recreational opportunities while sustaining wetland and forest habitat for an abundance of wildlife.

The following managed forest plan introduces the Aurora Woodlands by first presenting an historical and present day overview to ensure that future management programs are guided by an understanding past events and changes in the forest. Their importance to the surrounding landscape is then emphasized by discussing the local soils, topography, hydrology, wildlife habitat and species at risk. The present day composition of the forests, as well as issues and areas of concern are then illustrated and interpreted for the development of objectives and strategies that promote recreation, conservation, education, forest protection and wildlife habitat. Forest operating procedures and a schedule of activities are included to facilitate the implementation of management projects. By following this management plan, the citizens of Aurora will likely greater appreciate and understand their forests which will in turn contribute to their conservation and sustainability.

1.1 Duration of Plan

This plan contains objectives and strategies expected to last for the period from January 2010 to December 31, 2029. The management objectives and strategies proposed in this plan can be applied to other forested municipal properties such as found along the extensive trail systems throughout Town.

1.2 Registered Property Owners

Name: Corporation of the Town of Aurora
1 Municipal Drive, Box 1000
Aurora, Ontario
L4G 6J1

Phone: (905) 727-3123

1.3 Property Location and Area Coverage

The Aurora Woodlands, which include the Case Woodlot and Vandorf Woodlots are located within the Town of Aurora in the Region of York (Table 1). Both forests are situated at the south end of Aurora, just north of Bloomington Side Road (Map 1).

Table 1. Location of woodlots.

Case Woodlot	**Vandorf Woodlot**
17 hectares Bathurst Street / Henderson Drive Part of Lot 75 Concession I west	33 hectares Vandorf Sd. Rd. / Bayview Avenue Part of Lot 76 & 77 Concession I east

The woodlands cover approximately 50 hectares, of which 45 hectares (90%) is forested (Map 2 and Map 3). The forests are composed of six major vegetation communities: sugar maple (49%), white cedar - hemlock (21%), mixed plantation (8%), Manitoba maple – hawthorn – buckthorn - ash (5%), mixed hemlock and sugar maple (4%), and aspen (1%) (Table 2). Each of these communities contains unique combinations of tree species and wildlife.

Table 2. Summary of property area by vegetation type based on 2009 forest inventory.

Cover Type	**Hectares**	**Percent of Total Area**
Sugar maple	24.75	49%
White cedar, hemlock	10.44	21%
Mixed plantation	3.99	8%
Manitoba maple, hawthorn, buckthorn, ash	2.92	6%
Mixed hemlock and sugar maple	2.24	4%
Aspen	0.69	1%
Meadows & forest clearings	2.68	5%
Wetland	1.7	3%
Pond	0.72	1%
Grand Total	***50.13***	***100%***

Section 2 : Historical Background

This section of the plan sets the context of the forests role in the Aurora community and provides management direction from a historical and present day perspective.

2.1 Distant Past

Even before human settlement there was a rich history of change occurring in the Aurora Woodlands. The change which occurred in these forests can be traced back to the end of the last major glacial event approximately 10,000 years ago. The evolution of the flora starting from this date can be tracked by examining the pollen records contained in the sediments of glacial lakes. Palynological studies conducted at Maplehurst Lake near Woodstock, Ontario showed that 12,000 years ago, southern Ontario had a tundra-like environment (Mott and Farley-Gill 1978). As the climate warmed and the soils developed, spruce woodlands became the dominant flora until about 9,500 years ago when they were replaced by mixed conifer-hardwood forests. In these mixed forests, white pine was dominant but hemlock succeeded the pine as the most abundant conifer around 7,200 years ago. By 6,400 years ago, continued warming had produced a predominantly hardwood forest environment. European settlers found much of the land surrounding Aurora was originally forested with white pine, hemlock and cedar on the poor agricultural sites. On the better sites grew maple, oak, elm, ash, walnut and hickory (Historica Research Ltd. *et al*. 1994). Today, these species can still be found in the Aurora Woodlands and are the result of many years of environmental change and forest dynamics.

The forest ecosystems within the Case and Vandorf woodlots have been influenced by human activity over the last several hundred years. Activities and disturbances have included logging, trail blazing and forest clearing and burning. The resultant forest structure and species composition is the manifestation of this human disturbance and of the "work" of nature.

Figure 6. Former location of the old Lloyd sawmill in the Vandorf Woodlot (circa 1800).

Both woodlots have been influenced by timber cutting. The Vandorf woodlot has a more active history of logging in the distant past than does the Case woodlot as evidenced by the greater abundance of cut stumps and logs throughout the entire forest. The Vandorf Woodlot's extensive logging history is likely a result of its close proximity to the old Lloyd sawmill which was located approximately 600 meters north of the woodlot in the Holland River Valley (Lloyd 1995; Figure 6; Map 3). Remnants of the sawmill dam still stand at the site and can be viewed from the access trail where it crosses the river. This lumber mill was one of the earliest built in York County. The exact date of its

development is unknown but is believed to be early in the 1800's. It is very likely that harvesting in the Vandorf woodlot started at this time, approximately 200 years ago. The sawmill dam was repaired with concrete in 1944 as determined by the date inscribed in the foundation. This date likely supports that notion that sawmilling operations continued until at least 1944.

Similar to the Vandorf Woodlot, the Case Woodlot was also harvested during the early settlement period. The Case Woodlot was likely heavily cut around 1900, specifically in the area of stand W-5; counts of tree rings range from 90 to 127 years. Other compartments which indicate that a major disturbance occurred at this time include stand W-3 and W-4 which have many large aspen and oak trees. Both oak and aspen require an abundance of sunlight to grow as seedlings to maturity, indicating that a shady overstory was likely lacking back in time when these trees were growing as seedlings.

The abundance of oak may also indicate that the Case woodlot was subject to forest fire in conjunction with heavy logging. Prior to the 1930's, forests along the Oak Ridges Moraine were under the influence of frequent wildfires and disturbances caused both naturally and anthropogenically. North American Indians and European settlers used fire and clearcutting to improve hunting and agriculture (Dey and Parker 1996). Following these disturbances, red oak trees predominated because of their resistance to fire and their intolerance to shade. As a result, oaks prevailed on the landscape of the Oak Ridges moraine. Following the 1930's fire suppression and conservation efforts were practiced to protect the remaining forests in southern Ontario. This has prevented many of the oak forests from regenerating and has led to the development of shade tolerant woodlots such as sugar maple and American beech. Forest researchers are now finding oaks to be successionaly displaced by more shade tolerant species such as sugar maple. The Case Woodlot is one of the remaining oak-maple forests in York Region that has a rich history of natural and anthropogenic disturbances which likely led to the development of the great oak trees now growing there.

2.2 Recent Past & Summary of Activities

Both the Vandorf and Case woodlots were acquired by the Town of Aurora to protect the natural heritage resources from encroaching development. The Vandorf woodlot was purchased in two phases. First, the north half of the forest was sold to the Town by Jack Wood in the late 1970's. Jack Wood had farmed the fields which extended west of the forest to Yonge Street. These agricultural lands were subdivided into industrial lots which were later sold. The southern portion of the woodlot was purchased by the Town in 1980. Combined, these pieces of land cover an area of approximately 50 hectares (123 acres).

The Case Woodlot was acquired by the Town of Aurora in 1986 as part of a parkland contribution by the Tamarack subdivision development which surrounds the forest to the south and east. At that time the Town's woodlot was 8 hectares (20 acres) in size. In 1996 the Town purchased an additional 8 hectares of adjoining land to the west, which included wetlands, a large pond, known locally as Salamander Pond, and productive hardwood forests (Stands W-1, W-2 and part of W-3) (Map 2).

Since the Town acquired ownership of these forests, steps have been taken by the Parks Department to keep them healthy, enjoyable and safe for park visitors. Efforts initially were focused within the Case woodlot because of its high recreational use. Projects here included trail construction, tree cutting to improve stand health and safety, and installation of garbage cans.

By 1999, the Town developed its first official managed forest plan for the two woodlots and began implementing an operating plan which included the following items,

- Purchased and installed a notice board for the Case Woodlot
- Constructed 2.9 km of trails in the Vandorf Woodlot and upgraded 1.3 km of trails in the Case Woodlot
- Developed and installed forest trail signs for key access points to inform users of the rules of the forest
- Installed two benches in the Vandorf Woodlot
- Installed two trash bins in each of the woodlots in high traffic areas
- Marked and removed 134 dangerous and declining trees in the Case Woodlot in 2000
- Maintained trails by repairing eroded areas
- Transplanted saplings to the Town's tree nursery for production of native caliper sized trees for planting on boulevards and in parks
- Implemented tree planting in the Holland River Valley with the Lake Simcoe Region Conservation Authority to restore forest cover and wildlife habitat
- Worked with community groups to install bird boxes throughout the Vandorf Woodlot

2.3 Current Use

The Aurora Woodlands provide a multitude of recreational opportunities. Some of these include outdoor education, mountain biking, hiking, wildlife viewing, cross-country skiing, nature appreciation and many more. In the past, the Case Woodlot had a higher degree of recreational use than the Vandorf Woodlot likely because it is has been surrounded by a residential area for a longer period of time. However in recent years, agricultural lands surrounding the Vandorf Woodlot have been transformed to residential communities which have significantly increased the level of forest use.

Figure 7. Official trail in the Vandorf Woodlot.

An attractive feature of most public woodlands is their numerous trails. Trails in the Town's woodlots can be classed as two types: official and un-official. Official trails are paths which are sanctioned by the Town of Aurora and typically have either a woodchip or limestone screening base to protect the soil from erosion and provide users with a relatively dry route which is free of vegetation. Un-official trails have been developed without permission by forest users. In recent years, unauthorized mountain bike stunts and associated winding trails on steep

slopes have been constructed. Currently the woodlots have a combined official trail distance of 4.3 km: 1.3 km in the Case Woodlot and 2.9 km in the Vandorf Woodlot (see Map 2 and 3). These trails are part of the Oak Ridges Trail network. Unofficial trails are extensive in both forests: 2.4 km in the Case Woodlot and 1.85 km in the Vandorf Woodlot.

Aside from providing opportunities to recreate and experience nature, the proximity of both woodlots to several schools makes them attractive places for children to play. Additionally, the properties are suitably located for environmental education programs functioning through the nearby schools. The Vandorf Woodlot is also connected through its trails to Shepherds Bush to the north, which is a regional attraction because of its annual maple syrup festival and outdoor recreational facilities.

The pressures on these forests from humans have increased substantially over the last 10 years and are forecasted to increase more in the coming ten years as housing development throughout Town increases and new residents look to explore the natural features of Aurora. During this period the residential population is expected to grow by 20% from a populous of 50,000 to 63,000 (Figure 8). The following plan addresses the necessary strategies to ensure the forests are prepared to handle the foreseen demand.

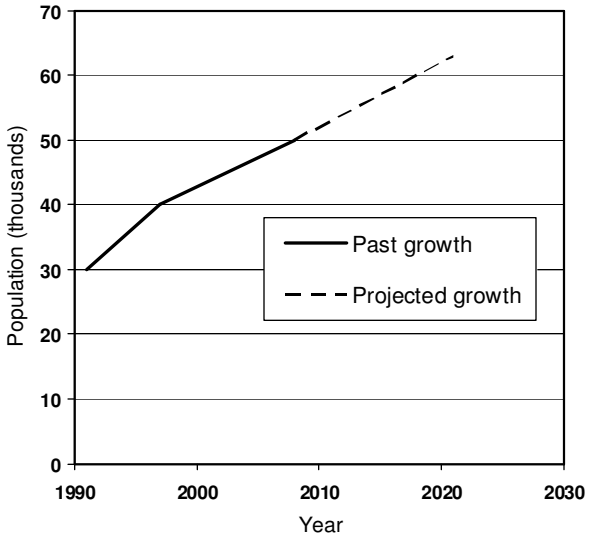


Figure 8. Past and projected population growth from 1998 to 2021 in the Town of Aurora. Data from the Town of Aurora Community Profile 2008.

Rules of the Forest

- Stay on trails
- Pickup after dogs
- No collecting plants
- No camping
- No littering
- No motorized vehicles
- No hunting

Section 3 : Importance to the Surrounding Landscape

This section of the plan highlights the importance of the Aurora Woodlands to the surrounding landscape. The following information facilitates development of management objectives and activities.

3.1 Soils Description

The Aurora Woodlands are growing on some of the most productive soils in Ontario. Three classes of soil dominate on both properties (Hoffman and Richards 1955). Soils are mostly sandy loam, except for portions of the west side of the Vandorf Woodlot and in the Holland River Valley which are silty-clay loam. These soils are neutral to slightly alkaline in pH, and capable of sustaining considerable growth in key species like red oak and sugar maple. In contrast, soils in the wetlands are organic due to restricted decomposition of woody debris imposed by the higher watertable. These soils are classified as Mesisols and consist of well decomposed wood and sedge peat which extend to depths of over 50 cm in some areas. Tree vegetation identified and growing in these areas commonly include cedar and hemlock. All soils are very susceptible to erosion, hence the importance of maintaining forest cover in these areas.

3.2 Topography

The Aurora Woodlands are situated on the northern fringe of the Oak Ridges Moraine (see Map 1). The moraine, famous for its rugged, tumbled topography is a prominent glacial landform in southern Ontario which extends from the Niagara Escarpment to the Trent River. It consists mostly of sand and gravel varying in depth from 15 meters to 100 meters, except for a pocket of clay till in King Township. This extensive glacial deposit is recognized as performing a number of important ecological functions. Most significantly, the well-drained, coarse-textured soils of the moraine make it an important ground water recharge area for all primary water courses flowing north to Lake Simcoe and south to Lake Ontario. In general, the topography of the landscape can be described as gently rolling with some steep hills. Both woodlots are located on the north slope of the Bloomington Ridge.

3.3 Hydrology

The northern position of the two woodlots on the Bloomington Ridge puts them into the Lake Simcoe watershed. In contrast, all watercourses directly south of Aurora flow into the Humber River and eventually to Lake Ontario. These forest areas contribute to a regionally important groundwater system and are considered to be hydrological-environmentally significant by the Lake Simcoe Conservation Authority (Ecologistics 1982). The groundwater system protected by the forest is known as the Oak Ridges aquifer complex. This natural reservoir supplies drinking water for residents of Newmarket, Aurora and surrounding area. Additionally, the forests are considered significant because they protect the headwaters of the east branch of the Holland River, and help to cool and purify rainwater. The Lake Simcoe Region Conservation Authority has found that the water quality in these headwater areas is relatively good and supports a cold water fishery (LSRCA 2000).

Watercourses flowing through the woodlands are shown on Map 1. In the Case Woodlot streams are intermittent and flow only during rain storms and following snow melt. A permanent watercourse flows through the Vandorf Woodlot. Its width often exceeds two meters and its depth averages half a meter. In the area of the forests, the greatest threats to the watercourse systems are believed to be excessive nutrient runoff from residential neighborhoods, and erosion and sedimentation caused by flash flooding of water discharged from upstream sources. Maintenance of the forest cover will sustain the cooling effects of the forest and help to minimize erosion of stream banks.

Figure 9. East Holland River flowing through the Vandorf Woodlot.

3.4 Flora

The flora identified in the Aurora Woodlands include at least 33 tree species (Table 3) and over 60 different herbs and shrubs (Table 4). These diverse woodlands serve as a fine example of our natural heritage.

Table 3. List of tree species observed growing in the Aurora Woodlands. RED indicates species which are locally rare or that are declining in numbers and BOLD indicates invasive, non-native species.

Common name	Scientific name	Species abbreviation
fir, balsam	*Abies balsamea*	Bf
maple, Manitoba	***Acer negundo***	**Mm**
maple, red	*Acer rubrum*	Mr
maple, sugar	*Acer saccharum*	Mh
maple, black	*Acer nigrum*	Mb
birch, white	*Betula papirifera*	Bw
birch, yellow	*Betula alleghaniensis*	By
beech, blue	*Carpinus caroliniana*	Bb
hickory, bitternut	*Carya cordiformis*	Hi
beech, American	*Fagus grandifolia*	Be
buckthorn, European	***Rhamnus catartica***	**Bt**
ash, white	*Fraxinus americana*	Aw
ash, black	*Fraxinus nigra*	Ab
Butternut	*Juglans cinera*	Bn
black walnut	*Juglans nigra*	Wn
Tamarack	*Larix laricina*	La
Ironwood	*Ostrya virginiana*	Iw
pine, white	*Pinus strobus*	Pw
aspen, large tooth	*Populus grandidentata*	Pg
aspen, trembling	*Populus tremuloides*	Pt
poplar, balsam	*Populus balsamifera*	Pb
cherry, black	*Prunus serotina*	Cb
cherry, choke	*Prunus virginiana*	Cc
oak, bur	*Quercus macrocarpa*	Ob
oak, red	*Quercus rubra*	Or
black locust	***Robinia pseudoacacia***	**Bl**
buckthorn, European	***Rhamnus cathartica***	**Eb**
sumac, staghorn	*Rhus typhina*	Su
willow	*Salix sp.*	W
cedar, white	*Thuja occidentalis*	Ce
American basswood	*Tilia americana*	Ba
hemlock, eastern	*Tsuga canadensis*	He
elm, white	*Ulmus americana*	El

Table 4. List of non-tree vegetation identified and growing in the Aurora Woodlands. RED indicates infrequently found native species and BOLD indicates invasive, non-native species. This is not a complete list.

Common name	Scientific name	Common name	Scientific name
red baneberry	*Actaea rubra*	woodland jack-in-the-	*Arisaema atrorubens*
Canada anemone	*Anemone canadensis*	heart-leaved aster	*Aster cordifolius*
spreading dogbane	*Apocynum*	marsh marigod	*Caltha palustris*
wild sarsaparilla	*Aralia nudicaulis*	yellow thistle	*Cirsium horridulum*
wild ginger	*Asarum canadense*	bush honeysuckle	*Diervilla lonicera*
big leaved aster	*Aster macrophyllus*	helleborine	*Epipactus helleborine*
sedges	*Carex spp.*	spotted Joe-Pye weed	*Eupatorium maculatum*
blue cohosh	*Caulophyllum*	common strawberry	*Fragaria virginiana*
tall enchanter's	*Circaea lutetiana*	wintergreen	*Gaultheria procumbens*
blue bead lily	*Clintonia borealis*	ostrich fern	*Matteuccia struthiopteris*
alternate leaved dogwood	*Cornus alternifolia*	indian cucumber root	*Medeola virginiana*
red-osier dogwood	*Cornus stolonifera*	partridgeberry	*Mitchella repens*
mosses	*Dicranum spp.*	sensitive fern	*Onoclea sensibilis*
spinulose wood fern	*Dryopteris carthusiana*	lopseed	*Phryma leptostachya*
woodland horsetail	*Equisetum sylvaticum*	hairy Solomon's seal	*Polygonatum pubescens*
trout lily	*Erythronium americanum*	buttercup	*Ranunculus spp.*
bedstraw	*Galium spp.*	ground hemlock	*Taxus canadensis*
Bicknell's cranesbill	*Geranium bicknellii*	poison ivy	*Toxicodendron radicans*
spotted touch-me-not	*Impatiens capensis*	starflower	*Trientalis borealis*
fly honeysuckle	*Lonicera canadensis*	fox grape	*Vitis labrusca*
false Solomon's seal	*Maianthemum*	**goutweed**	*Aegopodium podagraria*
Canada mayflower	*Maianthmum canadense*	**garlic mustard**	*Alliaria officinales*
common plantain	*Plantago major*	**burrdock**	*Artium minus*
Christmas fern	*Polystichum*	**motherwort**	*Leonurus cardiaca*
tall white lettuce	*Prenanthes altissima*	**wild been**	*Phaseolus polystachios*
current	*Ribes spp.*	**greenbriers**	*Smilax spp.*
flowering raspberry	*Rubus odoratus*	**bittersweet nightshade**	*Solanum dulcamara*
wild red raspberry	*Rubus idaeus ssp.*	**coltsfoot**	*Tussilago spp.*
red-berried elder	*Sambucus racemosa ssp.*		
Canada bloodroot	*Sanguinaria canadensis*		
black snakeroot	*Sanicula marilandica*		
solidago	*Solidago spp.*		
rose-twisted stalk	*Streptopus roseus*		
dandelion	*Taraxacum officinale*		
meadow-rue	*Thalictum spp.*		
white trillium	*Trillium grandiflorum*		
bellwort	*Uvularia spp.*		
violet	*Viola spp.*		

3.5 Species at Risk

Within Ontario, more than 175 species of plants and animals are currently designated as 'At Risk' by the Ministry of Natural Resources. The Aurora Woodlands is home to at least four of these species as noted in Table 5. This exemplifies that woodlots in the Town of Aurora provide an important conservation area for rare species.

Table 5. List of species inhabiting the Aurora Woodlands that are designated as 'Species at Risk' in Ontario.

Common name	Scientific name	Habitat	Current status	Data source
Butternut	*Juglans cinera*	Forest	Endangered	Silv-Econ Ltd.
Milksnake	*Lampropeltis triangulum*	Wide range of habitats, especially old fields and farm buildings where rodents are common	Special concern	NHIC [1]
Red-shouldered Hawk	*Buteo lineatus*	Forest	Special concern	NHIC
Blanding's Turtle	*Emydoidea blandingii*	Wetlands	Threatened	NHIC

[1] Natural Heritage & Information Centre, Ministry of Natural Resources

Section 4 : Forest Communities

The following is a general description of each forest vegetation type and their associated silviculture. Vegetation communities were identified and mapped as stands from aerial photographs. These spatial delineation's divide the forest into smaller, more manageable units. This assists in prescribing activities to be implemented across the properties and also helps with record keeping. Each stand is defined by a vegetation boundary of different species composition. Stands have been named according to the type of vegetation they contain, and have each been assigned a unique name. The following classification has been used: W = natural woodland, P = plantation, and M = meadow. A detailed forest inventory was conducted in each of the forest stands and is described later in this plan.

Sugar Maple

This vegetation community has a major component of sugar maple (more than 50%) and typically grows on upland sites having moderate to good drainage. These forests abound on very productive soils and remain relatively stable in terms of species composition over long periods of time. They are often referred to as climax forests because of this stability in species composition. Other tree species commonly occurring in this forest type include American beech, bitternut hickory, red oak, white ash, ironwood and black cherry. Management of these forests follow the single tree selection system of silviculture. In this case trees are selected for removal based on quality, size, species and wildlife habitat value. A target density and size class distribution for to sustainably maintain an abundance of large trees. Harvesting operations typically occur when the basal area is greater than 23 m^2/hectare. Cutting cycles are usually every 10 years.

	Polewood 10-24 cm	**Small Sawlog 26-36 cm**	**Medium Sawlog 38-48 cm**	**Large Sawlog 50 cm +**	**Total All**
Ideal Residual Basal MNR (2004) (m^2/hectare)	5	5	5	5	20
Number of trees per hectare	273	66	34	21	394

White cedar, hemlock

This vegetation community consists of a mixture of coniferous and deciduous tree species dominated by white cedar and eastern hemlock. Other associated species include balsam fir, red maple, yellow birch and sugar maple. These areas are low lying and wet. Hence the soils are very sensitive to compaction and erosion. Regeneration of cedar, hemlock, and yellow birch require mineral soil exposure to ensure seed germination and establishment. Harvesting often occurs as group selection or as strip cuts within which seedlings will regenerate. Protection from deer browsing and weed competition sometimes is necessary. Natural processes which promote regeneration of these species include windthrow (trees blown to the ground) which disturbs and exposes mineral soil. Also fallen trees serve as nurse logs on which tree seed from yellow birch and cedar commonly germinate.

Mixed hemlock, sugar maple

This vegetation community is typically found at lower slopes of sugar maple stands where moisture is more available. These stands have a dominant component of hemlock (at least 20%) and typically abound on very productive soils. They remain relatively stable in terms of species composition over long periods of time. They are also often referred to as climax forests because of this stability in species composition. Silvicultural management follows combinations of the single tree and group selection systems of silviculture. In this case, trees are selected individually and as groups for removal based on quality, size, species, wildlife habitat value, and seed source availability. Removal of groups of trees is required to provide adequate sunlight for establishment and rapid growth of hemlock seedlings. The size of group openings is typically 15 -30 meters.

Manitoba maple, hawthorn, buckthorn, ash

In the Aurora Woodlands, abandoned pasture lands or disturbed areas near watercourses often regenerate with invasive species such as Manitoba maple and European buckthorn. They also tend to contain a lack of native tree regeneration. This is often exacerbated by the presence of garlic mustard in the ground vegetation. Such plant communities are commonly found in urban areas where seed sources of invasive species are abundant. Silvicultural management should focus on restoring native forest communities through aggressive cutting of unwanted plants followed by supplemental tree planting and weed control. Management of such ecosystems can be expensive because of the tenacity of invasive species.

Mixed plantation

This forest type refers to areas planted with a combination of hardwood and coniferous species. Plantations are typically found on former agricultural lands. In the 1960s, one small mixed plantation of black locust, white cedar and green ash was established in at the south east corner of the Vandorf Woodlot. At that time many areas in southern Ontario were planted with seedlings under the Woodland Improvement Act as part of the Ontario Governments initiative to create future forest products, establish wildlife habitat and to help store rainwater and prevent flooding. More recently in the Vandorf Woodlot, a large meadow in the Holland River Valley was planted with the assistance of the Lake Simcoe Region Conservation Authority in 2001 (see P-2 on Map 3). Plantations are commonly managed as nurse crops to establish more native species beneath their canopies.

Aspen

Trembling aspen and large tooth aspen establish best in full sunlight. Where these species occur, disturbance events which initiated establishment of the stand can be easily dated by aging the trees. Like plantations, aspen stands serve as excellent nurse crops for shade tolerant species such as American beech and sugar maple. Also wildlife habitat in these forests often abounds. Aspen attract wildlife in a variety of ways: with their flowers and buds in spring time; with their “punky” wood which is easily excavated by woodpecker searching for insects; and with their abundant woody debris which provides infrastructure at the bottom of the food chain.

Section 5 : FOREST INVENTORY

5.1 Detailed Inventory by Forest Stand

This section provides a technical description of each of the forest stands in the Aurora Woodlands and serves as a basis from which silvicultural management decisions can be made. Reference should be made to Maps 2 and 3 for stand locations.

Inventory techniques

Tree data was collected from 74 sample plots established throughout the forest. A total of 620 trees larger than 10 cm in diameter at breast height were measured. Tree regeneration was also evaluated within each stand. The sample represented approximately 3% of the trees that makeup the forest. Sample sizes of 2% are considered adequate for management planning purposes (MNR 2004).

Interpretation of forest inventory

The following table describes measurements of forest inventory evaluated in the Aurora Woodlands. The table will assist the reader of this plan in interpreting the following stand descriptions.

Measurement	Description
DBH (Diameter at Breast Height)	The diameter of a tree measured in centimeters at breast height (1.4 meters from the ground)
Species and Percent Composition	This identifies the variety of tree species growing in the woodlands. The percent composition indicates the proportion of the stand basal area occupied by each species. For instance, a composition of Mh5 Be5 indicates that 50% of the trees are sugar maple and 50% are beech.
Basal Area (square meters per hectare)	The cross sectional surface area of a tree measured at breast height (1.4 meters from the ground). This is summarized for all trees greater than 9 centimeters in DBH on a unit hectare. Basal area is directly related to wood volume.
Density (stems per hectare)	The number of stems greater than 9 centimeters in DBH occupying one hectare of land.
% UGS & % AGS	Trees which show signs of major structural defects or fungal infection are classed as UGS (Unacceptable Growing Stock). Such trees likely will not survive another 20 years. Healthy, structurally sound trees are termed AGS (Acceptable Growing Stock).
Age (years)	The average age of the most dominant species.
Height (meters)	The average total height of the most dominant species.
Advanced Regeneration	Heavy - > 4000 saplings / ha Moderate – 1000 to 4000 saplings / ha Light – < 1000 saplings / ha
Early Regeneration	Heavy - > 70 % coverage of forest floor Moderate – 30 to 70 % coverage Light – <30 % coverage

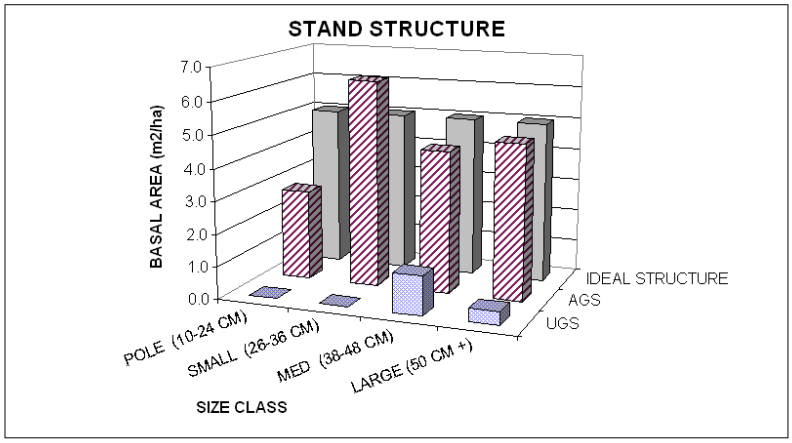
STAND ANALYSIS **CASE WOODLOT**

Stand #: **W-1** Area: **3.5 ha**

Prism plots - factor 2
No. of PLOTS -> 5

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Mh	0	7	0	**7**	14	0	**14**	8	1	**9**	10	1	**11**	**39**	**2**	**41**	245	*16.4*	**82.0%**
He	0	0	0	**0**	1	0	**1**	2	0	**2**	1	0	**1**	**4**	**0**	**4**	13	*1.6*	**8.0%**
Be	0	0	0	**0**	0	0	**0**	0	1	**1**	1	0	**1**	**1**	**1**	**2**	5	*0.8*	**4.0%**
Bn	0	0	0	**0**	0	0	**0**	0	1	**1**	0	0	**0**	**0**	**1**	**1**	3	*0.4*	**2.0%**
Hi	0	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	**1**	**0**	**1**	3	*0.4*	**2.0%**
Pw	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	5	*0.4*	**2.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	7	0	7	16	0	16	11	3	14	12	1	13	46	4	50	273	20	100%
BA m2/ha	0	2.8	0.0		6.4	0.0		4.4	1.2		4.8	0.4		18.4	1.6				
														92%	8%				
Total BA	**0**	**2.8**			**6.4**			**5.6**			**5.2**			**20.0**					
		14%			32%			28%			26%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Mh8 He1 (Be Bn Hi Pw)1

AGE	100
YEAR ESTABLISHED	1909
HEIGHT	26
BASAL AREA	20.0

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Mh5 Aw4 (Be Cb He)1	MOEDERATE	GOOD	Aw5 Mh5	LIGHT	EXCELLENT

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This sugar maple stand is located in the north-west corner of the property on rolling topography. Numerous trails pass through the area. The stand has an uneven-aged structure consisting mostly of sugar maple. Ninety two percent (92%) of the trees are considered acceptable growing stock. These trees are free of significant diseases, lack major structural defects, and they have good form and growth potential. Poor quality trees are mostly medium sized American beech which are succumbing to beech bark disease. The above histogram shows a deficiency of small sized trees. There is however an abundance of maple and ash saplings and seedlings that make up the regeneration layer. The stand contains a single butternut and hickory tree.

Past Management: Established circa 1909. Selection thinned in 1993, removed 370 trees (235 m^3). Removed hazard trees in January 2000: 134 trees (80 m^3). Saplings transplanted periodically to the Town's tree nursery. Un-official trails and bike stunts established between 2000 and 2009.

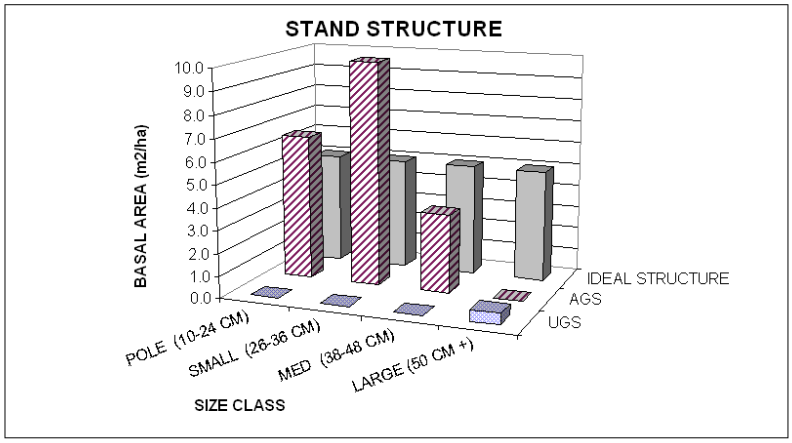
STAND ANALYSIS **CASE WOODLOT**

Stand #: **W-2** Area: **1.7** **ha**

Prism plots - factor 2
No. of PLOTS -> 4

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Mh	0	6	0	**6**	10	0	**10**	2	0	**2**	0	0	**11**	**18**	**0**	**18**	233	*9.0*	**43.9%**
Bw	0	5	0	**5**	3	0	**3**	0	0	**0**	0	0	**1**	**8**	**0**	**8**	133	*4.0*	**19.5%**
He	0	1	0	**1**	4	0	**4**	1	0	**1**	0	0	**1**	**6**	**0**	**6**	55	*3.0*	**14.6%**
Po	0	0	0	**0**	1	0	**1**	1	0	**1**	0	1	**0**	**2**	**1**	**3**	10	*1.5*	**7.3%**
Aw	0	0	0	**0**	0	0	**0**	2	0	**2**	0	0	**0**	**2**	**0**	**2**	7	*1.0*	**4.9%**
Be	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.4%**
Mr	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	7	*0.5*	**2.4%**
Or	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	7	*0.5*	**2.4%**
Pt	0	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	**1**	**0**	**1**	3	*0.5*	**2.4%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	13	0	13	20	0	20	7	0	7	0	1	1	40	1	41	476	21	100%
BA m2/ha	0	6.5	0.0		10.0	0.0		3.5	0.0		0.0	0.5		20.0	0.5				
														98%	2%				
Total BA	**0**	**6.5**			**10.0**			**3.5**			**0.5**			**20.5**					
		32%			49%			17%			2%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Mh4 Bw2 He1 Po1 (Aw Be Mr Or Pt)2

AGE	70
YEAR ESTABLISHED	1939
HEIGHT	22
BASAL AREA	20.5

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Aw4 He2 Mh2 Bw1 Be1	LIGHT	GOOD	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This hardwood consists mostly of pole to small sized sugar maple and white birch which tend to be in good health. Large poplar are also present but in poor health condition as they approach their life expectancy. They are serving as excellent foraging trees for birds such as the pileated woodpecker. The forest regeneration layer is sparsely vegetated and dominated by ash. Other regenerating species include beech, hemlock, sugar maple and white birch.

Past History: Likely heavily cut around the 1940s. In recent years, numerous hiking and cycling trails have been established.

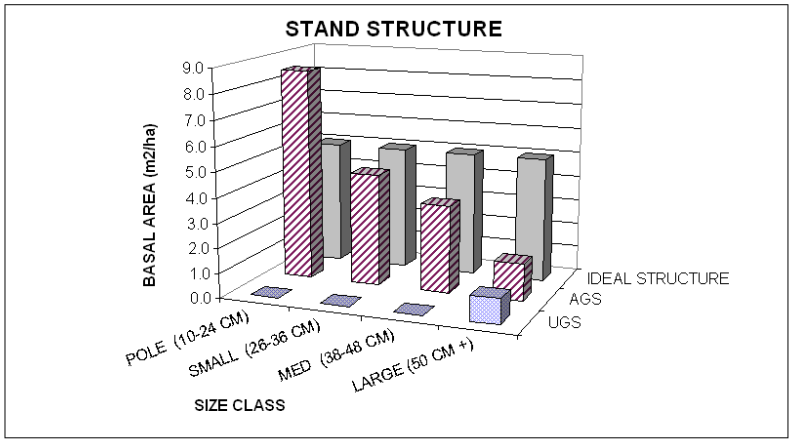
STAND ANALYSIS **CASE WOODLOT**

Stand #: **W-3** Area: **2.2** **ha**

Prism plots - factor 2
No. of PLOTS -> 4

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
He	0	7	0	**7**	2	0	**2**	2	0	**2**	1	0	**1**	**12**	**0**	**12**	177	*6.0*	**31.6%**
Mh	0	4	0	**4**	3	0	**3**	3	0	**3**	0	2	**2**	**10**	**2**	**12**	123	*6.0*	**31.6%**
Or	0	0	0	**0**	3	0	**3**	0	0	**0**	2	0	**2**	**5**	**0**	**5**	25	*2.5*	**13.2%**
Mr	0	1	0	**1**	1	0	**1**	1	0	**1**	0	0	**0**	**3**	**0**	**3**	32	*1.5*	**7.9%**
Bf	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.6%**
Bw	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.6%**
Cb	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.6%**
Ce	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.6%**
El	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.6%**
Pw	0	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	**1**	**0**	**1**	3	*0.5*	**2.6%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	17	0	17	9	0	9	7	0	7	3	2	5	36	2	38	471	19	100%
BA m2/ha	0	8.5	0.0		4.5	0.0		3.5	0.0		1.5	1.0		18.0	1.0				
														95%	5%				
Total BA	**0**	**8.5**			**4.5**			**3.5**			**2.5**			**19.0**					
		45%			24%			18%			13%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
He3 Mh3 Mr1 Or1 (Bf Bw Cb Ce El Pw)2

AGE	100
YEAR ESTABLISHED	1909
HEIGHT	24
BASAL AREA	19.0

COVER TYPE
Mixed hemlock and sugar maple

ECOSITE
Fresh-Moist Hemlock Mixed Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	He6 Be2 Mh1 (Ce Aw)1	LIGHT	GOOD	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This lowland stand hugs the shoreline of the wetland and pond. This stand has the greatest diversity of tree species in the Case Woodlot. Un-healthy, declining trees tended to be uncommon but did include a few large sugar maples. The stand contains an abundance of young hemlock and sugar maple trees. Hemlock should be protected during any harvesting activity since it is a difficult species to regenerate.

Management History: Likely heavily cut in the early 1900s. A major hiking trail passes through this stand.

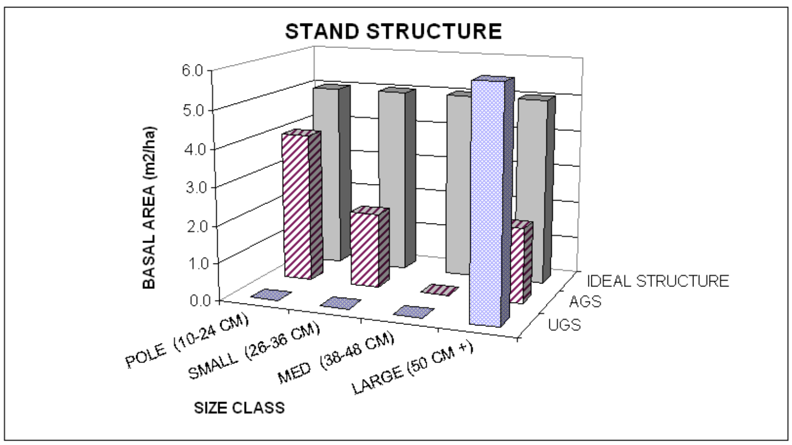
STAND ANALYSIS **CASE WOODLOT**

Prism plots - factor 2

Stand #: **W-4** **Area:** **0.7 ha** No. of PLOTS -> 1

Number of trees sampled

Species	Sapl.	Polewood 10 - 24 cm			Small logs 26-36 cm.			Medium logs 38-48 cm			Large logs 50 cm +			TOTAL # of trees			Density (trees / ha)	BA by spp.	Spec. comp. %
	not calculated	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL			
Pg	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3	3	31	6.0	42.9%
Aw	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	88	2.0	14.3%
Bw	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	26	2.0	14.3%
Or	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	10	2.0	14.3%
Pw	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	88	2.0	14.3%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	2	0	2	1	0	1	0	0	0	1	3	4	4	3	7	243	14	100%
BA m2/ha	0	4.0	0.0		2.0	0.0		0.0	0.0		2.0	6.0		8.0	6.0				
														57%	43%				
Total BA	**0**	**4.0**			**2.0**			**0.0**			**8.0**			**14.0**					
		29%			14%			0%			57%			100%					
Ideal Selection BA		*5*			*5*			*5*			*5*			*20*					
		25%			25%			25%			25%			**100%**					



SPECIES COMPOSITION	
Pg4 Aw1 Bw1 Or1 Pw1	
AGE	100
YEAR ESTABLISHED	1909
HEIGHT	24
BASAL AREA	14.0
COVER TYPE	Aspen
ECOSITE	Dry-Fresh Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Iw5 Mh3 Aw2	MODERATE	EXCELLENT	Aw6 Mh4	MODERATE	GOOD

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This area is dominated by very large, old aspen trees. The trees are senescing rapidly, creating growing space for well established saplings of sugar maple as they deteriorate. Many of the trees have succumbed to windthrow and have littered the forest floor with fallen logs and branches. This woody debris is helping to keep the soils fertile while provided necessary habitat for wildlife such as the wood frog and garter snakes. Several narrow hiking trails pass through this stand.

Management History: Likely heavily cut over 90 years ago.

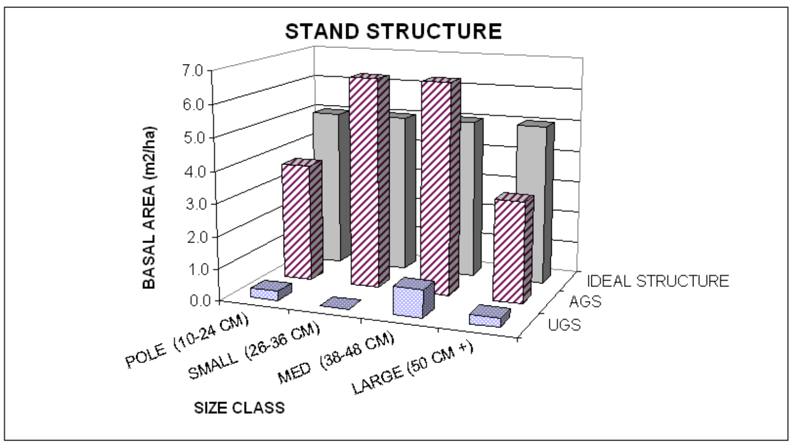
STAND ANALYSIS **CASE WOODLOT**

Stand #: **W-5** **Area:** **6.5** **ha**

Prism plots - factor 2
No. of PLOTS -> 7

Number of trees sampled

Species	Sapl.	Polewood 10 - 24 cm			Small logs 26-36 cm.			Medium logs 38-48 cm			Large logs 50 cm +			TOTAL # of trees			Density (trees / ha)	BA by spp.	Spec. comp. %
	not calculated	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL			
Mh	0	9	0	9	18	0	18	17	1	18	7	0	7	51	1	52	227	14.9	69.3%
Or	0	0	0	0	0	0	0	5	0	5	3	0	3	8	0	8	14	2.3	10.7%
Aw	0	0	0	0	2	0	2	1	1	2	1	0	1	4	1	5	13	1.4	6.7%
Be	0	1	1	2	1	0	1	0	1	1	0	1	1	2	3	5	32	1.4	6.7%
He	0	3	0	3	2	0	2	0	0	0	0	0	0	5	0	5	45	1.4	6.7%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	13	1	14	23	0	23	23	3	26	11	1	12	70	5	75	332	21	100%
BA m2/ha	0	3.7	0.3		6.6	0.0		6.6	0.9		3.1	0.3		20.0	1.4				
														93%	7%				
Total BA	0	**4.0**			**6.6**			**7.4**			**3.4**			**21.4**					
		19%			31%			35%			16%			100%					
Ideal Selection BA		***5***			***5***			***5***			***5***			***20***					
		25%			25%			25%			25%			**100%**					



SPECIES COMPOSITION
Mh7 Or1 (Aw Be He)2

AGE	100
YEAR ESTABLISHED	1909
HEIGHT	24
BASAL AREA	21.4

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:

ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
Mh6 Be2 Aw2 (Bd Cb)	MODERATE	EXCELLENT	Mh6 Aw4	MODERATE	GOOD

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This compartment has the largest trees in the woodlot and also has a very interesting structural composition. The area contains many large, even-aged red oaks as well as a complete array of differently sized (aged) sugar maple trees. It is anticipated that over time the oaks will become displaced by maple. This foreseen loss of oaks results from the fact that this species is intolerant of shade and therefore cannot regenerate successfully under a closed canopy of maple. American beech tended to make up most of the un-healthy, declining trees; a result of beech bark disease. Regeneration of sugar maple, white ash and beech is abundant. Other less common seedlings of basswood, and black cherry can be seen. During the 2009 inventory many woodfrogs were heard calling in the spring and observed in the summer. Walking trails are heavily used by cyclists and pedestrians.

Management History: Originated in the early 1900s following clearcutting. Thinned to remove hazard trees in 1993 and again in 2000.

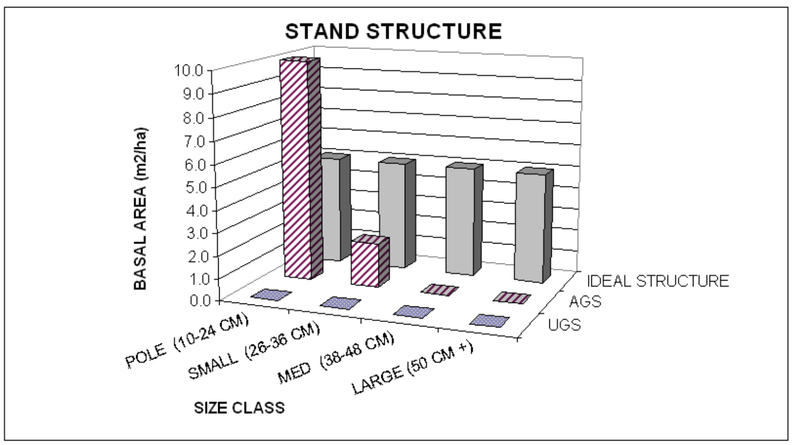
STAND ANALYSIS **CASE WOODLOT**

Prism plots - factor 2

Stand #: **W-6** **Area:** **0.5** **ha** No. of PLOTS -> 1

Number of trees sampled

Species	Sapl.	Polewood 10 - 24 cm			Small logs 26-36 cm.			Medium logs 38-48 cm			Large logs 50 cm +			TOTAL # of trees			Density (trees / ha)	*BA by spp.*	Spec. comp. %
	not calculated	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL			
Mm	0	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	**2**	**0**	**2**	176	*4.0*	**33.3%**
Ag	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**16.7%**
Bt	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**16.7%**
Ce	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	26	*2.0*	**16.7%**
El	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**16.7%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	5	0	5	1	0	1	0	0	0	0	0	0	6	0	6	467	12	100%
BA m2/ha	0	10.0	0.0		2.0	0.0		0.0	0.0		0.0	0.0		12.0	0.0				
														100%	0%				
Total BA	**0**	**10.0**			**2.0**			**0.0**			**0.0**			**12.0**					
		83%			17%			0%			0%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Mm3 Ag2 Bt2 Ce2 El

AGE	14
YEAR ESTABLISHED	1995
HEIGHT	8
BASAL AREA	12.0

COVER TYPE
Manitoba maple, buckthorn, ash

ECOSITE
Fresh-Moist Lowland Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:

ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
Mh6 Be2 Aw2 (Bd Cb)	MODERATE	EXCELLENT	Mh6 Aw4	MODERATE	GOOD

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This young stand is found in the flood plane of the intermittent watercourse which flows to Salamander Pond. It is a highly disturbed ecosystem that is frequently flooded by water discharged from the storm water retention pond to the south as well from ditches along Bathurst Street. The area is subject to sediment deposition and erosion. It is dominated by invasive species, namely Manitoba maple and European buckthorn. A narrow boardwalk crosses the watercourse in this stand. Opportunities for restoration and remediation exist.

Management History: Many of the trees in this stand naturally regenerated in the mid 1990s.

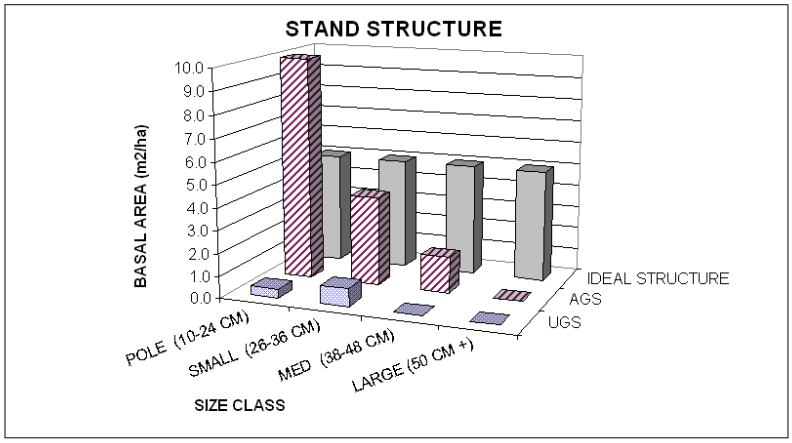
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: W-1 **Area: 1.3 ha**

Prism plots - factor 2
No. of PLOTS -> 5

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Mh	0	4	1	**5**	5	1	**6**	2	0	**2**	0	0	**0**	**11**	**2**	**13**	125	*5.2*	**31.0%**
Cb	0	6	0	**6**	4	1	**5**	0	0	**0**	0	0	**0**	**10**	**1**	**11**	132	*4.4*	**26.2%**
Ce	0	6	0	**6**	0	0	**0**	0	0	**0**	0	0	**0**	**6**	**0**	**6**	106	*2.4*	**14.3%**
Po	0	6	0	**6**	0	0	**0**	0	0	**0**	0	0	**0**	**6**	**0**	**6**	106	*2.4*	**14.3%**
Pt	0	3	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**	**3**	**0**	**3**	53	*1.2*	**7.1%**
Pw	0	0	0	**0**	0	0	**0**	2	0	**2**	0	0	**0**	**2**	**0**	**2**	6	*0.8*	**4.8%**
El	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	5	*0.4*	**2.4%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	25	1	26	10	2	12	4	0	4	0	0	0	39	3	42	533	17	100%
BA m2/ha	0	10.0	0.4		4.0	0.8		1.6	0.0		0.0	0.0		15.6	1.2				
														93%	7%				
Total BA	**0**	**10.4**			**4.8**			**1.6**			**0.0**			**16.8**					
		62%			29%			10%			0%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Cb3 Mh3 Ce1 Po1 Pt1 (El Pw)1

AGE	50
YEAR ESTABLISHED	1959
HEIGHT	18
BASAL AREA	16.8

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Bt6 Mh4 (Ce)	LIGHT	POOR	Bt7 Bf3	MODERATE	POOR

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This stand is one of the youngest natural forests in the Vandorf Woodlot and contains trees of uniform age, namely black cherry and sugar maple. The regeneration layer is dominated by European buckthorn and garlic mustard. Some sugar maple saplings are present and serve as important nursery stock to regenerate the forest.

Management History: The stand originated primarily from natural seed sources around 1960, likely in an abandoned meadow. Some planting of cedar and white pine is evident.

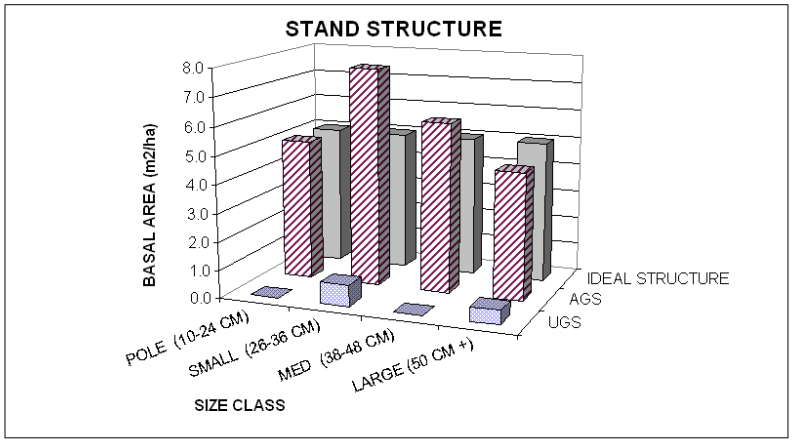
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: **W-2** **Area:** **9.2** **ha**

Prism plots - factor 2
No. of PLOTS -> 8

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	Polewood UGS	Polewood TOTAL	Small logs 26-36 cm. AGS	Small logs UGS	Small logs TOTAL	Medium logs 38-48 cm AGS	Medium logs UGS	Medium logs TOTAL	Large logs 50 cm + AGS	Large logs UGS	Large logs TOTAL	TOTAL # of trees AGS	TOTAL # of trees UGS	TOTAL # of trees TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Mh	0	11	0	**11**	25	2	**27**	21	0	**21**	17	2	**0**	**74**	**4**	**78**	247	*19.5*	**79.6%**
He	0	2	0	**2**	3	0	**3**	1	0	**1**	1	0	**0**	**7**	**0**	**7**	34	*1.8*	**7.1%**
Be	0	3	0	**3**	0	1	**1**	1	0	**1**	0	0	**0**	**4**	**1**	**5**	38	*1.3*	**5.1%**
Cb	0	1	0	**1**	2	0	**2**	0	0	**0**	0	0	**0**	**3**	**0**	**3**	18	*0.8*	**3.1%**
Iw	0	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	**2**	**0**	**2**	22	*0.5*	**2.0%**
Aw	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	11	*0.3*	**1.0%**
Bd	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	3	*0.3*	**1.0%**
Ce	0	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	**1**	**0**	**1**	2	*0.3*	**1.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	20	0	20	31	3	34	24	0	24	18	2	20	93	5	98	374	25	100%
BA m2/ha	0	5.0	0.0		7.8	0.8		6.0	0.0		4.5	0.5		23.3	1.3				
														95%	5%				
Total BA	**0**	**5.0**			**8.5**			**6.0**			**5.0**			**24.5**					
		20%			35%			24%			20%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Mh8 Be1 He1 (Aw Bd Cb Ce Iw)

AGE	90
YEAR ESTABLISHED	1919
HEIGHT	24
BASAL AREA	24.5

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Cb3 Mh3 Be1 He1 (Aw Bb)2	LIGHT	GOOD	Aw5 Mh4 Bt1	MODERATE	GOOD

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This upland stand has a sustainable mix of small, median and large sized trees. The understory is relatively open with a few saplings of black cherry, sugar maple and blue beech among other species and a moderate abundance of ash and maple seedlings. At the north end there are several ephemeral ponds which should be protected from logging and other human activities. These ponds are used as breeding grounds by wood frogs. Any activities that involve heavy equipment should be restricted from the forest during wet periods.

Management History: The stand originated around 1920, was harvested in the distant past and likely supplied wood to the old Lloyed sawmill.

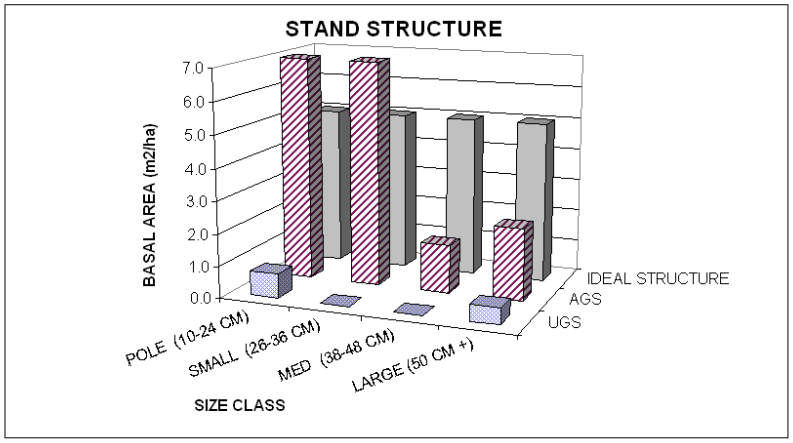
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: W-3 **Area: 10 ha**

Prism plots - factor 2
No. of PLOTS -> 8

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Ce	0	4	0	4	11	0	11	4	0	4	6	0	6	25	0	25	95	6.3	32.9%
He	0	9	0	9	5	0	5	1	0	1	1	0	1	16	0	16	119	4.0	21.1%
Mh	0	5	0	5	5	0	5	0	0	0	0	0	0	10	0	10	72	2.5	13.2%
Aw	0	1	1	2	3	0	3	1	0	1	1	0	1	6	1	7	35	1.8	9.2%
By	0	3	0	3	2	0	2	0	0	0	0	0	0	5	0	5	40	1.3	6.6%
Bd	0	2	0	2	1	0	1	0	0	0	0	0	0	3	0	3	25	0.8	3.9%
Iw	0	3	0	3	0	0	0	0	0	0	0	0	0	3	0	3	33	0.8	3.9%
Pw	0	0	0	0	0	0	0	0	0	0	1	2	3	1	2	3	4	0.8	3.9%
Be	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2	2	22	0.5	2.6%
Ap	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	11	0.3	1.3%
Bn	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	3	0.3	1.3%
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	28	3	31	28	0	28	6	0	6	9	2	11	71	5	76	459	19	100%
BA m2/ha	0	7.0	0.8		7.0	0.0		1.5	0.0		2.3	0.5		17.8	1.3				
														93%	7%				
Total BA	**0**	**7.8**			**7.0**			**1.5**			**2.8**			**19.0**					
		41%			37%			8%			14%			100%					
Ideal Selection BA		*5* 25%			*5* 25%			*5* 25%			*5* 25%			*20* 100%					



SPECIES COMPOSITION
Ce3 He2 Aw1 By1 Mh1 (Ap Bd Be Bn Iw Pw)2

AGE	140
YEAR ESTABLISHED	1869
HEIGHT	24
BASAL AREA	19.0

COVER TYPE
White cedar, hemlock

ECOSITE
White cedar Mineral Coniferous Swamp

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Ce5 He2 Mh1 Be1 Aw1 (Cb)	LIGHT	GOOD	Mh5 Ce3 Aw2 (Bf Be)	LIGHT	GOOD

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This lowland stand contains white cedar and hemlock trees. Some of the cedar and hemlock are among the largest growing in the Region of York. Similar to the hemlock-sugar maple stand in the Case Woodlot (W-3), this stand also has the highest diversity of trees compared to the upland areas. Forest soils are poorly drained and are sensitive to compaction and erosion. Human activity here should be discouraged to ensure protection of this sensitive area. The stand is maintaining itself as a mixed forest through natural processes such as windthrow following storm events. The area has many structural features which attract wildlife: these include super canopy white pine which serve as escape trees for racoons and porcupines, cedar and hemlock thickets which create good wintering cover for deer, hollow logs for denning animals and many standing dead trees which serve as foraging sites for many birds.

Management History: The largest trees originated in the mid to late 1800s and was heavily harvested in the past. Evidence of harvesting exists in the presence of very old, cut stumps.

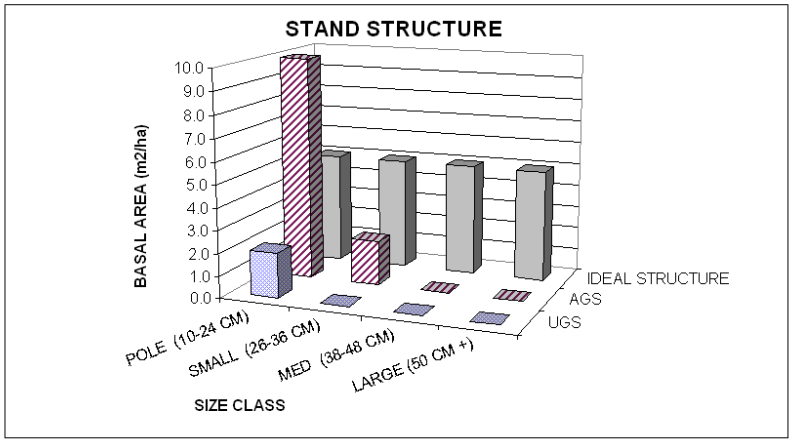
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: **W-4** **Area:** **0.8** **ha**

Prism plots - factor 2
No. of PLOTS -> 1

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Ap	0	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	**2**	**0**	**2**	176	*4.0*	**28.6%**
Bd	0	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	26	*2.0*	**14.3%**
Bt	0	0	1	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**0**	**1**	**1**	88	*2.0*	**14.3%**
El	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**14.3%**
Mh	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**14.3%**
Pt	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	88	*2.0*	**14.3%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	5	1	6	1	0	1	0	0	0	0	0	0	6	1	7	555	14	100%
BA m2/ha	0	10.0	2.0		2.0	0.0		0.0	0.0		0.0	0.0		12.0	2.0				
														86%	14%				
Total BA	**0**	**12.0**			**2.0**			**0.0**			**0.0**			**14.0**					
		86%			14%			0%			0%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Ap3 Bd1 Bt1 El1 Mh1 Pt1

AGE	50
YEAR ESTABLISHED	1959
HEIGHT	10
BASAL AREA	14.0

COVER TYPE
Manitoba maple, hawthorn, buckthorn

ECOSITE
Fresh-Moist Lowland Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Mh5 Bt3 Pt2	MODERATE	GOOD	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This stand contains a scattering of apple trees, indicating it was once quite open and may have served as a small orchard. Today the forest is regenerating to sugar maple and European buckthorn. Garlic mustard is also present and presents a potential threat to forest regeneration of native species.

Management History: A former apple orchard which was abandoned and left to grow naturally around 1960.

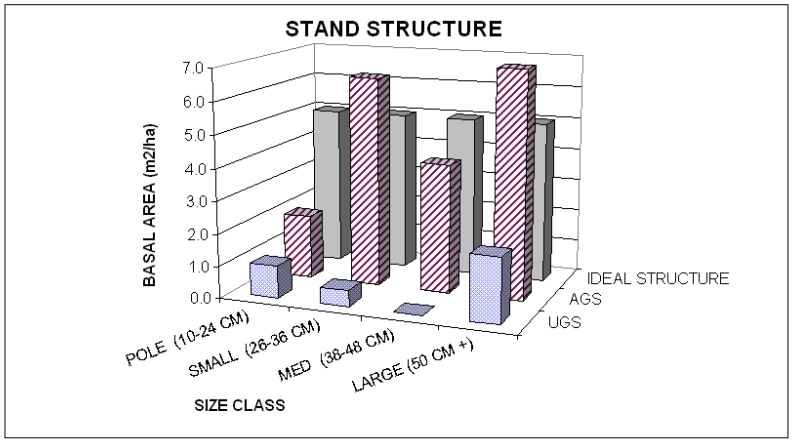
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: **W-5** **Area:** **2.5** **ha**

Prism plots - factor 2
No. of PLOTS -> 4

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	UGS	TOTAL	Small logs 26-36 cm. AGS	UGS	TOTAL	Medium logs 38-48 cm AGS	UGS	TOTAL	Large logs 50 cm + AGS	UGS	TOTAL	TOTAL # of trees AGS	UGS	TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Mh	0	1	2	**3**	11	1	**12**	8	0	**8**	13	3	**16**	**33**	**6**	**39**	214	*19.5*	**84.8%**
Bd	0	0	0	**0**	2	0	**2**	0	0	**0**	0	1	**1**	**2**	**1**	**3**	16	*1.5*	**6.5%**
Be	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.2%**
Cb	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.2%**
Iw	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**2.2%**
Pw	0	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	**1**	**0**	**1**	3	*0.5*	**2.2%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	4	2	6	13	1	14	8	0	8	14	4	18	39	7	46	298	23	100%
BA m2/ha	0	2.0	1.0		6.5	0.5		4.0	0.0		7.0	2.0		19.5	3.5				
														85%	15%				
Total BA	**0**	**3.0**			**7.0**			**4.0**			**9.0**			**23.0**					
		13%			30%			17%			39%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Mh8 Bd1 (Be Cb Iw Pw)1

AGE	100
YEAR ESTABLISHED	1909
HEIGHT	26
BASAL AREA	23.0

COVER TYPE
Sugar maple

ECOSITE
Dry-Fresh Sugar Maple Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Mh6 Be1 Cb1 (Aw He)2	LIGHT	GOOD	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This upland stand is similar in species composition to W-2 but has a greater proportion of large trees and fewer small trees. The understory is heavily vegetated with alternate leaved dogwood and a scattering of tree regeneration. A very large bitternut hickory is present in this stand and can be viewed from a network of well used hiking trails. Approximately 15% of the trees are in poor health condition; many of these are large trees. There are numerous seeps and intermittent streams.

Management History: Small scale harvesting activities took place just prior to the Town's acquisition of this property in 1980. The stand likely once supplied wood to the old Lloyd sawmill.

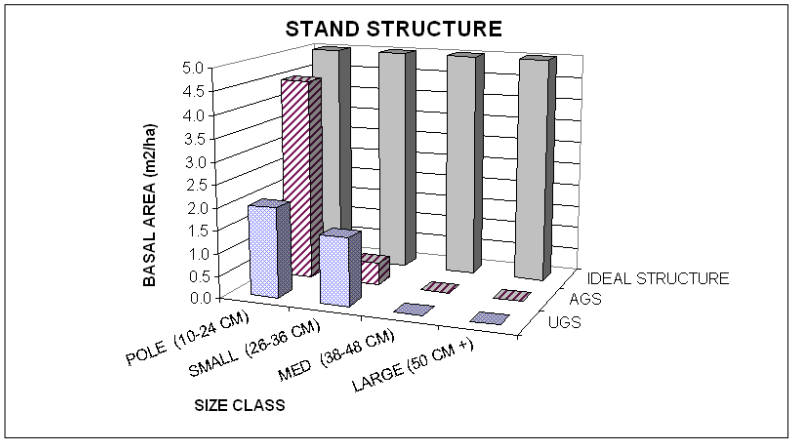
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: **W-6** **Area:** **1.7** **ha**

Prism plots - factor 2
No. of PLOTS -> 4

Number of trees sampled

Species	Sapl. not calculated	Polewood 10 - 24 cm AGS	Polewood 10 - 24 cm UGS	Polewood 10 - 24 cm TOTAL	Small logs 26-36 cm. AGS	Small logs 26-36 cm. UGS	Small logs 26-36 cm. TOTAL	Medium logs 38-48 cm AGS	Medium logs 38-48 cm UGS	Medium logs 38-48 cm TOTAL	Large logs 50 cm + AGS	Large logs 50 cm + UGS	Large logs 50 cm + TOTAL	TOTAL # of trees AGS	TOTAL # of trees UGS	TOTAL # of trees TOTAL	Density (trees / ha)	BA by spp.	Spec. comp. %
Pt	0	3	0	**3**	1	0	**1**	0	0	**0**	0	0	**0**	**4**	**0**	**4**	73	*2.0*	**23.5%**
Ap	0	1	2	**3**	0	1	**0**	0	0	**0**	0	0	**0**	**1**	**3**	**4**	66	*2.0*	**23.5%**
Mm	0	2	0	**2**	0	1	**1**	0	0	**0**	0	0	**0**	**2**	**1**	**3**	51	*1.5*	**17.6%**
Bt	0	0	2	**2**	0	0	**0**	0	0	**0**	0	0	**0**	**0**	**2**	**2**	44	*1.0*	**11.8%**
Cb	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**5.9%**
Mh	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**5.9%**
W	0	0	0	**0**	0	1	**1**	0	0	**0**	0	0	**0**	**0**	**1**	**1**	7	*0.5*	**5.9%**
Haw	0	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	**1**	**0**	**1**	22	*0.5*	**5.9%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
				0			**0**			**0**			**0**	**0**	**0**	**0**	0	*0.0*	**0.0%**
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	9	4	13	1	3	4	0	0	0	0	0	0	10	7	17	306	9	100%
BA m2/ha	0	4.5	2.0		0.5	1.5		0.0	0.0		0.0	0.0		5.0	3.5				
														59%	41%				
Total BA	**0**	**6.5**			**2.0**			**0.0**			**0.0**			**8.5**					
		76%			24%			0%			0%			100%					
Ideal Selection BA		***5*** 25%			***5*** 25%			***5*** 25%			***5*** 25%			***20*** **100%**					



SPECIES COMPOSITION
Pt2 Ap2 Mm2 Bt1 (Cb Mh W Haw)3

AGE	40
YEAR ESTABLISHED	1969
HEIGHT	26
BASAL AREA	8.5

COVER TYPE
Manitoba maple, hawthorn, buckthorn

ECOSITE
Fresh-Moist Lowland Deciduous Forest

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Ce3 W2 Bt2 Aw1 Mh1 (Be)1	LIGHT	POOR	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: Similar to stand W-4, this area contains a scattering of apple trees, indicating it may have been part of an old orchard. Tree health condition however is very poor and there is a greater proportion of invasive species namely Manitoba maple and European buckthorn. The forest floor is also heavily dominated by garlic mustard.

Management History: Apple, willow and hawthorn trees scattered throughout the stand likely provided some shelter for cattle that may have grazed the fields adjacent to the Holland River prior to the 1960s.

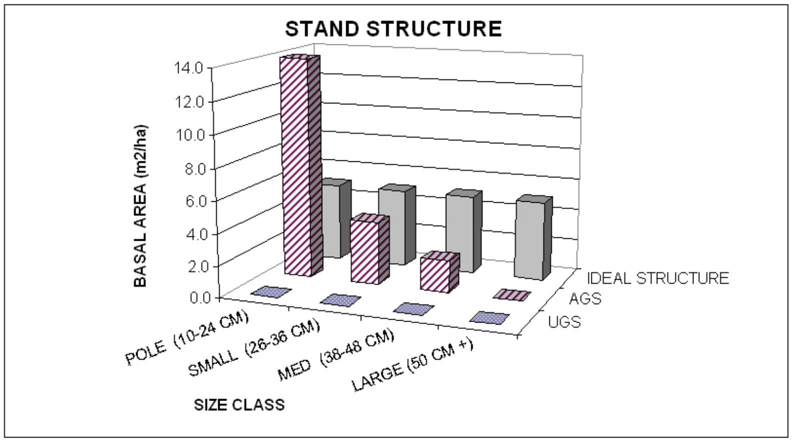
STAND ANALYSIS **VANDORF WOODLOT**

Stand #: **P-1** **Area:** **0.4 ha**

Prism plots - factor 2
No. of PLOTS -> 1

Number of trees sampled

Species	Sapl.	Polewood 10 - 24 cm			Small logs 26-36 cm.			Medium logs 38-48 cm			Large logs 50 cm +			TOTAL # of trees			Density	BA	Spec.
	not calculated	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	(trees / ha)	by spp.	comp. %
Ce	0	5	0	5	0	0	0	0	0	0	0	0	0	5	0	5	441	10.0	50.0%
Aw	0	2	0	2	1	0	1	1	0	1	0	0	0	4	0	4	216	8.0	40.0%
Bl	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	26	2.0	10.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	0	7	0	7	2	0	2	1	0	1	0	0	0	10	0	10	684	20	100%
BA m2/ha	0	14.0	0.0		4.0	0.0		2.0	0.0		0.0	0.0		20.0	0.0				
														100%	0%				
Total BA	**0**	**14.0**			**4.0**			**2.0**			**0.0**			**20.0**					
		70%			20%			10%			0%			100%					
Ideal Selection BA		*5*			*5*			*5*			*5*			*20*					
		25%			25%			25%			25%			**100%**					



SPECIES COMPOSITION	
Ce5 Aw4 Bl1	
AGE	40
YEAR ESTABLISHED	1969
HEIGHT	17
BASAL AREA	20.0
COVER TYPE	Mixed plantation
ECOSITE	Mixed Plantation

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	NONE	-	-	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This small stand contains a mix of cedar, white ash and black locust planted in rows. There are also a few black walnut which are large and in excellent condition. There is a general lack of tree renegeration in the understory; likely a result of the dark light conditions created by the dense overstory.

Management History: This is the oldest plantation in the woodlot, established in the 1960s.

STAND ANALYSIS **VANDORF WOODLOT**

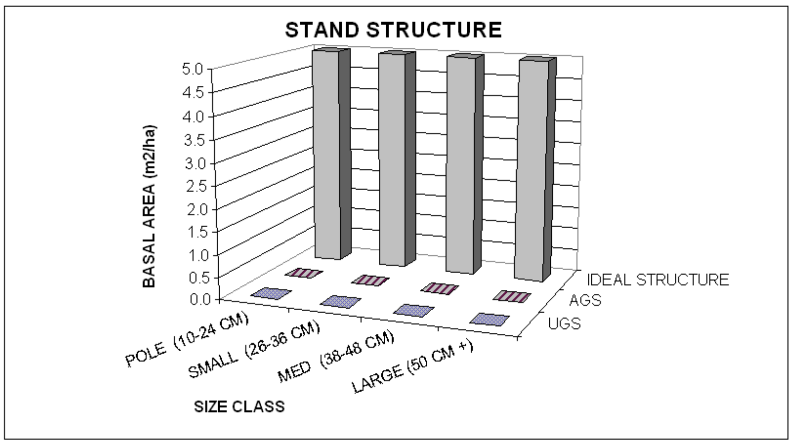
Prism plots - factor 2

Stand #: **P-2** **Area:** **3.6 ha** No. of PLOTS -> 1

Number of trees sampled

Species	Sapl.	Polewood			Small logs			Medium logs			Large logs			TOTAL # of trees			Density	BA	Spec.
		10 - 24 cm			26-36 cm.			38-48 cm			50 cm +						(trees / ha)	by spp.	comp. %
	not calculated	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL	AGS	UGS	TOTAL			
Sw	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	352	0.0	66.7%
Aw	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	88	0.0	16.7%
Pw	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	88	0.0	16.7%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
				0			0			0			0	0	0	0	0	0.0	0.0%
		-	-		-	-		-	-		-	-		-	-		-	-	-
Total trees	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	529	0	100%
BA m2/ha	12	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0				
Total BA	**12**		**0.0**			**0.0**			**0.0**			**0.0**			**0.0**				

	Polewood	Small logs	Medium logs	Large logs	Total
Ideal Selection BA	*5* 25%	*5* 25%	*5* 25%	*5* 25%	*20* 100%



SPECIES COMPOSITION
Sw7 (Aw Pw)3

AGE	10
YEAR ESTABLISHED	2001
HEIGHT	3
BASAL AREA	0.0
COVER TYPE	Mixed plantation
ECOSITE	Mixed Plantation

AGS = ACCEPTABLE GROWING STOCK, UGS = UNACCEPTABLE GROWING STOCK

REGENERATION:	ADVANCED REGENERATION	STOCKING	QUALITY	EARLY REGENERATION (SEEDLINGS)	STOCKING	QUALITY
	Sw7 (Aw Pw)3	MODERATE	EXCELLENT	NONE	-	-

SPECIES CODES: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

Comments: This is the youngest and largest plantation in the woodlot. It serves to restore forest cover in the Holland River flood plane. A scattering of planted silver maple, bur oak, black walnut, tamarack, nannyberry and highbush cranberry are also found in this area.

Management History: Established in 2001.Planted with the assistance of the Lake Simcoe Region Conservation Authority and local volunteers.

5.2 Overstory Composition

The Case and Vandorf woodlots contain approximately 16,000 trees larger than 10 cm DBH; about 1 tree for every 30 square meters of land. More than 60% of the trees are composed of three species, namely sugar maple (42%), hemlock (15%) and white cedar (8%). 93% are in good health and will likely continue to thrive in the coming 20 years. 7% however show signs of decline such as crown dieback and fungal infection and will likely not survive the next 20 years. Silv-Econ Ltd has found that this level of decline is not abnormal for southern Ontario woodlots.

Table 6. Estimated number of trees (≥ 10 cm DBH) by species in the Aurora Woodlands.

Species	Vandorf Woodlot		Case Woodlot		Total # trees	Percent Total	Percent UGS
	AGS[1]	UGS[1]	AGS	UGS			
Sugar maple	3,611	225	2,885	116	6,837	42%	5%
Hemlock	1,549		829		2,379	15%	0%
White cedar	1,320		61		1,382	8%	0%
Ash species	499	52	180	17	748	5%	9%
American beech	336	300	130	134	901	6%	48%
Ironwood	604				604	4%	0%
Black cherry	414	16	49		480	3%	3%
White pine	27	27	87		140	1%	19%
Trembling aspen	403		18	6	427	3%	1%
Yellow birch	414				414	3%	0%
Apple	287	82			369	2%	22%
Basswood	343	13			357	2%	4%
White birch			297		297	2%	0%
Buckthorn		145		40	185	1%	100%
Elm	79		89		168	1%	0%
Red oak			167		167	1%	0%
Manitoba maple	56	28	79		163	1%	17%
Red maple			83		83	1%	0%
Balsam fir			49		49	<1%	0%
Butternut	35			10	44	<1%	22%
Hawthorn	36				36	<1%	0%
Large tooth aspen				21	21	<1%	100%
Willow		11			11	<1%	100%
Black locust	10				10	<1%	0%
Hickory			10		10	<1%	0%
Total	**10,025**	**899**	**5,013**	**344**	**16,281**	**100%**	**8%**

[1] AGS = Acceptable Growing Stock, UGA = Unacceptable Growing Stock

5.3 Understory Composition

Tree regeneration within the Case and Vandorf woodlots can be classed as advanced (saplings) or early (seedlings). Advanced regeneration is generally more abundant in the Case Woodlot; likely a result of the more active history of silvicultural management in the past 20 years. Among both forests, advanced regeneration is dominated by three species: sugar maple (41%), ash (20%), and American beech (10%) (Table 7). A list of species regenerating in each stand is provided in Table 8.

Incidental observations of black maple (*Acer nirgum*) seedlings were observed in W-3 of the Vandorf Woodlot. This lowland species is very similar in appearance to sugar maple with the exception that its leaves are slightly wilting in appearance and have a downy layer of pubecense. It is a species more commonly found in southwestern Ontario (e.g. north shore of Lake Erie). The seed source of these seedlings may be a single, large black maple (80 cm DBH) which is presently growing in the P-2 (see Map 3).

Table 7. Estimated number of saplings by species in the Aurora Woodlands.

Species	# trees	Percent of total
Sugar maple	19,283	41%
Ash species	9,414	20%
American Beech	4,931	10%
White spruce	4,032	9%
White cedar	2,331	5%
Hemlock	1,872	4%
Black cherry	1,206	3%
Buckthorn	1,066	2%
White pine	864	2%
Ironwood	863	2%
Trembling aspen	410	1%
Blue beech	368	1%
Basswood	260	1%
Willow	132	0%
White birch	69	0%
Total	**47,101**	**100%**

Table 8. Summary of regeneration in the stands that make up the Aurora Woodlands.

Woodlot	Stand name	Hectares	Advanced Regeneration (Saplings)	Stocking	Quality	Early Regeneration (Seedlings)	Stocking	Quality
CASE	W-1	3.5	Mh5 Aw4 (Be Cb He)1	MOEDERATE	GOOD	Aw5 Mh5	LIGHT	EXCELLENT
CASE	W-2	1.7	Aw4 He2 Mh2 Bw1 Be1	LIGHT	GOOD	NONE	-	-
CASE	W-3	2.2	He6 Be2 Mh1 (Ce Aw)1	LIGHT	GOOD	NONE	-	-
CASE	W-4	0.7	Iw5 Mh3 Aw2	MODERATE	EXCELLENT	Aw6 Mh4	MODERATE	GOOD
CASE	W-5	6.5	Mh6 Be2 Aw2 (Bd Cb)	MODERATE	EXCELLENT	Mh6 Aw4	MODERATE	GOOD
CASE	W-6	0.5	Mh6 Be2 Aw2 (Bd Cb)	MODERATE	EXCELLENT	Mh6 Aw4	MODERATE	GOOD
VANDORF	W-1	1.3	Bt6 Mh4 (Ce)	LIGHT	POOR	Bt7 Bf3	MODERATE	POOR
VANDORF	W-2	9.2	Cb3 Mh3 Be1 He1 (Aw Bb)2	LIGHT	GOOD	Aw5 Mh4 Bt1	MODERATE	GOOD
VANDORF	W-3	10.4	Ce5 He2 Mh1 Be1 Aw1 (Cb)	LIGHT	GOOD	Mh5 Ce3 Aw2 (Bf Be)	LIGHT	GOOD
VANDORF	W-4	0.8	Mh5 Bt3 Pt2	MODERATE	GOOD	NONE	-	-
VANDORF	W-5	2.5	Mh6 Be1 Cb1 (Aw He)2	LIGHT	GOOD	NONE	-	-
VANDORF	W-6	1.7	Ce3 W2 Bt2 Aw1 Mh1 (Be)1	LIGHT	POOR	NONE	-	-
VANDORF	P-1	0.4	NONE	-	-	NONE	-	-
VANDORF	P-2	3.6	Sw7 (Aw Pw)3	MODERATE	EXCELLENT	NONE	-	-

Species Abbreviations: Bl-Black locust, Bb - Blue beech, Bn-Butternut, Bt-European buckthorn, Bw-White birch, By-Yellow birch, Cb-Black cherry, Ce-White cedar, El-White elm, He-eastern hemlock, Hi-hickory, Iw-ironwood, Mh-sugar maple, Mm-Manitoba maple, Mr-red maple, Or-red oak, Pg-large tooth aspen, Pt-trembling aspen, Pw-white pine, Sw-white spruce, W-Willow

5.4 Wildlife Habitat

The Aurora woodlands are not only a significant hydrologic resource to the Lake Simcoe watershed, they are also part of a vital landscape feature that attracts an abundance of wildlife. Conservation of such features is essential to sustaining the diversity of life which rely on these large, healthy forests (MNR 1997). Wildlife habitat identified within the woods include:

Wildlife Habitat Inventory	
Habitat Feature	**Notes & Comments**
Standing Dead Snags • *Can provide habitat for many species* • *Can be a safety hazard during logging operations*	Present in all stands.
Cavity Trees • *A standing tree, dead or live, that has a hole or holes where wildlife can make nests or dens or escape predators*	Cavity tree are generally lacking throughout the Aurora Woodlands. Numerous bird boxes have been installed in the Vandorf Woodlot.
Stick Nests • *Nest made of sticks located in a tree*	Crows nest in the Vandorf Woodlot. Many nests of different species are likely present.
Fallen Dead Trees • Logs on the forest floor used by wildlife for foraging and escape	Coarse woody debris in all forest compartments. Most abundant in W-4 in the Case Woodlot and W-3 in the Vandorf Woodlot.
Mast Trees • *The fruit and seeds produced by trees and shrubs* • *An important source of food for wildlife* • *Soft mast are fleshy fruit such as berries* • *Hard mast are shelled nuts such as acorns*	Red oak, bur oak, black cherry, choke cherry, hickory, butternut, black walnut, American beech, apple
Super-canopy Trees • *A cluster of vegetation composed of tall trees that poke through the canopy* • *Usually conifers, such as white or red pines* • *Provides landmarks and nesting spots for birds more cuts*	White pine in W-3 of the Vandorf Woodlot and W-1 of the Case Woodlot.
Conifer Thickets • *A cluster of conifer trees that provide shade, reduced snow depth and thermal shelter for wildlife*	Stands containing an abundance of hemlock and cedar serve as thermal cover for wildlife during the winter. W-3 in both the Case and Vandorf Woodlots provide this type of habitat.
Other Food Sources • *Berries, cones etc that serve as forage for wildlife*	Birch and poplar catkins, wild grape, virginia creeper, highbush cranberry, nannyberry and dogwood fruit.
Surface Water • *Sources of drinking water for wildlife*	Both woodlots have an abundance of water sources including streams, ponds and wetlands.
Dens or Dug Holes • *Ground holes used for denning or escape*	None observed but likely present.

Section 6 : ISSUES & AREAS OF CONCERN

Special attention should be directed to several areas in the woodlands which present potential issues for user safety or which jeopardize the health of the forest ecosystem. Sites which were deemed to receive special care are shown on Map 4 and Map 5. These areas include hazard trees along the trail system, trail disrepair, bike stunts, unofficial clearings and camp fire pits, alien invasive weeds, and soil erosion and sedimentation. Management strategies that address these issues are outlined in the 10-year management program.

Hazard Trees

In a forest environment all trees have the potential to fail under certain conditions. A "hazard tree" is a tree with significant visible structural defects likely to cause failure of all or part of the tree which could damage a "target". A target can be a person or property. (Source: York Regional Forest Hazard Tree Management Strategy 2007). There are many trees observed adjacent to trails in woodlots that are either dead or have defects such as dead limbs, split trunks, decay, cavities, bleeding sap and excessive end weight, among others. Such trees present a safety issue for forest users.

Figure 10. Dead limbs hanging over trails such as the one shown in the crown of this healthy sugar maple should be pruned.

An assessment and mapping of hazard trees in the Vandorf and Case Woodlots was carried out by Silv-Econ Ltd. in October 2009. Each tree within striking distance of trails was inspected for the presence of defects such as dead limbs, split trunks, decay, cavities, bleeding sap and excessive end weight, among others. Trees with noted hazards were mapped using a Trimble GPS. Recommendations for pruning or removal are illustrated on Maps 6 and 7. A summary of the hazard trees is provided below in Table 9.

Table 9. Estimated number of saplings by species in the Aurora Woodlands.

Woodlot	# trees	Average DBH (cm)
Vandorf Woodlot - removals	62	23
Vandorf Woodlot – pruning	7	37
Case Woodlot - removals	53	32
Case Woodlot – pruning	79	41
Total	**201**	**-**

Uncommon and 'At Risk' Species

Locally uncommon and 'At Risk' tree species in the woodlots are butternut, hickory, blue beech, and black maple. To a lesser extent other species include bur oak, red oak and American beech. The locations of these plants where observed are illustrated on Maps 2 and 3. These species are commonly found in the sugar maple forests. The 2009 inventory revealed that American beech is showing significant decline as a result of beech bark disease (*Nectria coccinae*). The mature red oak and hickory are not regenerating as a result of the heavy shade cast by the dense canopy. These species require large-scale disturbance to create the ground level light conditions required for regeneration and growth.

Buttternut, hickory, beech, and the oaks are all important nut bearing trees for wildlife such as wild turkey, blue jays and squirrels. Blue beech and black maple also provide important fruit for wildlife and add diversity to the landscape. Conservation of such native trees should be part of any forest management program.

Invasive Species

Non-native invasive plants can quickly occupy a forest site, excluding native flora and overtopping small trees and shrubs. Within the Greater Toronto Area, of particular concern are dog strangling vine (*Vincetoxicum nigrum*), garlic mustard (*Alliaria petiolata*), European buckthorn (*Rhamnus cathartica*), and Manitoba maple (*Acer negundo*). Although dog strangling vine was not observed in the Aurora Woodlands during the inventory of 2009, it is known to be in the Aurora area and is likely present at some locations in the forest.

The observed locations of invasive species of concern are depicted on Maps 4 and 5. They can be found growing in small to medium sized patches up to 1 hectare in size. At present, there are no insects or diseases that significantly control the populations of these plants.

Yard Waste Dumping

Although not frequently observed, yard waste is present in various locations of the forest; particularly within the Case Woodlot as illustrated on Map 4 (Figure 11). It is typically located behind the back fence of neighbouring residential lots. Yard waste is not only unsightly but also can inhibit forest regeneration and introduce alien invasive species which can spread and negatively impact the biodiversity and resilence of the forest ecosystems.

Figure 11. Yard wasted strewn behind residential back yards.

Un-official Trails and Bike Stunts

Trails in the Town's woodlots can be classed as two types: official and un-official. Official trails are paths which are maintained by the Town of Aurora and typically have either a woodchip or limestone screening base to protect the soil from erosion and provide users with a relatively dry route which is free of vegetation. Un-official are all other trails. Maps 3 & 4 illustrate the location of trails.

In recent years, numerous mountain bike stunts and winding trails on steep slopes have been constructed by forest users without the Town's permission. Mountain biking on un-official forest trails causes excessive rutting, soil disturbance, loss of vegetation, and affects the recreational experiences and enjoyment of the forest by other users. Such recreational activities can have a profound impact on forest ecosystems. For these reasons mountain biking on un-official trails is not considered compatible with the broader objectives for protecting the environment.

Figure 12. Examples of mountain bike stunts found in the woodlands.

Camp Fires

Within the Case and Vandorf woodlots are small forest clearings containing camp fire pits. These present a significant fire hazard within the forest and surrounding development.

Erosion and Sediment Transport

Within the Case Woodlot it appears that a great deal of sediment has been deposited in the intermittent watercourse that flows to the pond. This sedimentation has affected the forest by smothering tree roots causing tree mortality, and formation of an invasive community of plants such as Manitoba maple, European buckthorn and garlic mustard. The area affected is about 1 acre in size (stand W-6; Figure 13).

Figure 13. Photo of stand W-6 showing sediment deposits.

This sediment has come from sources upstream. Investigations by Silv-Econ have found that the stream bank upstream near the outlet of the storm water pond has been significantly eroded (Figure 14). So much so that trees adjacent to the stream bank have had their anchoring roots exposed, and many have fallen over. It has also carved a channel which is larger than its natural condition. It appears that flash flooding by water discharged from the adjacent storm water pond and roadside ditches along Bathurst Street are washing out the natural river channel. A smaller area of erosion is also present in the woods near the north east corner of the Case Woodlot. This area is being impacted by runoff originating from Bathurst Street which flows along the roadside ditch of Henderson Drive into the forest.

Several sections of Official trail located on slopes within the Case woodlot have bare, eroding soils. This is likely a result of the heavy foot and bicycle traffic, combined with rainwater runoff. Trails in this forest are mostly constructed with a woodchip base, which appear to break down quickly.

Figure 14. Discharge outlets from the storm water pond (top) and roadside ditch along Bathurst Street (bottom).

Public use of private land neighbouring the Case Woodlot

The Case Woodlot is one of eight properties that make up the forest located at the south east corner of Henderson Drive and Bathurst Street (Map 8). Other properties include several 1-2 hectare private lots found on the perimeter of the forest, and one large private property (10 hectares) found in the centre of the forest.

Public use of the forest outside of the Town's property is unrestricted and considered high. Activities include mountain biking, construction of bike stunts, and hiking. Much of this is undertaken on the large 10 hectare parcel. These activities are facilitated by a network of over 2 km of un-maintained trails that lead from the Case Woodlot. Soil erosion and loss of vegetation along trails and in areas of bike stunts is evident on the private land bordering the Case Woodlot (Figure 15). Users of the Case Woodlot that venture onto neighbouring private land may present a liability concern to the Town and adjacent forest owners.

Figure 15. Soil erosion on adjacent private land caused by construction of bike stunt.

Section 7 : INSECTS AND DISEASE

The following section describes those insects and diseases which have been identified in the forest. Management strategies are also outlined.

GYPSY MOTH (*Lymantira dispar*)

Gypsy moth is an insect native to Europe, Africa and southern Asia. This moth was introduced to North America in 1869 as part of a silk manufacturing experiment. The experiment failed and some of the insects escaped from laboratories near Boston, Massachusetts, and found their way to Ontario in the early 1970's. The insect can be a serious defoliator of oak, poplar and birch trees during epidemics. Outbreaks of this insect occurred in 1991 in southern Ontario. The insect not only defoliates but also weakens trees, predisposing them to other pathogens such as armilaria root rot (*Armilaria mella*). The overall result can be widespread disease and mortality in hardwood forests. Gypsy moth populations are currently rising in the Region of York. Outbreaks can occur rapidly and last several years, followed by sudden declines. A minimum of 1250 egg masses per hectare will cause 40% loss of leaves.

Management Strategy

There are several approaches to controlling the Gypsy Moth.

1. First is a preventative measure, ensuring that there is a diverse array of tree species, and naturally occurring predators. There are about 40 species of birds that have been found to feed on the gypsy moth. Some of these include Cuckoos, starlings, grackles, blue jays, robins, orioles, tanagers, chickadees and Vireos. Maintaining a diverse array of forest cover will help provide available habitat for many of these birds. At the same time, habitat conditions will also be created for naturally occurring pathogens (fungal and viral diseases) and parasites (insects) which prey on the gypsy moth.

2. A more active approach to control is to hand pick egg masses from the trees followed by burning or crushing the eggs. This works well for Gypsy Moth which often lay their eggs on the stems of trees not too high off the ground. Gypsy moth egg masses look like thumb size tufts of caramel coloured felt.

3. Another method to control this moth is to place burlap around the tree at breast height. After feeding at night, the caterpillars will often climb down the tree to seek shelter on the forest floor in the early morning. They will be intercepted by the burlap which they find attractive as a hiding place. The burlap can be checked daily and any caterpillars can be removed.

4. A more aggressive approach to controlling this forest pest is to use a bacterial insecticide known as B.t. (*Bacillus thuringinses*). This is a naturally occurring soil bacteria which has extremely low toxicity to organisms other than caterpillars. To humans its toxicity is far less than that of table salt. Aerial application is standard in mature forests.

5. Another pathogen which naturally affects the Gypsy moth is a virus known as NPV (nucleopohlyhedrosis virus). The infected larvae appear wilted. This virus is transferable from one larva to another and hence can be spread quickly throughout an entire population. Application can be through trap and release procedures.

EASTERN TENT CATERPILLAR (*Malacosoma americanum*)

In contrast to the Gypsy Moth, tent caterpillar is a native insect of Ontario's forests. It's egg masses look like a clump of tiny black garbage cans. Eggs are often laid high up in the forest canopy on small branches.

Management Strategy

Control of this insect is more difficult than the Gypsy moth hence use of bacterial insecticide is resorted to during epidemic levels. Maintenance of a diverse array of floral species will help to create habitat for natural predators of this insect.

EUPTYPELLA CANKER (*Eutypella parasitica*)

In addition to the caterpillars, there are also fungal diseases present in the Aurora Woodlands. Some hardwoods are infected with eutypella canker. The damage caused by this fungal disease is often seen as large cankers as high as 3 meters up the stem of trees. It infects hardwoods having exposed wounds, such as branch stubs, and can seriously effect wood quality by deforming and weakening the stem. Trees with good vigor can often outgrow the disease.

Management Strategy

1. In forests Eutypella canker is traditionally controlled by harvesting diseased trees greater than 12 cm (dbh) to improve vigor and growth of residual trees.

2. Improve stand vigor by thinning to a basal area of 20 m^2/ha. This will maximize resource use by remaining trees and in turn will improve their defence mechanisms.

SUGAR MAPLE BORER (*Glycobius speciosus*)

On some maples in the Vandorf Woodlot, symptoms of sugar maple borer were observed. Symptoms appear as cankers, often in a horizontal "j" shape. Areas of exposed xylem riddled with larva tunnels are often associated with the canker. The larva of this beetle tunnel beneath the bark and within the wood of sugar maple. This wound area is very susceptible to breakage.

Management Strategy

1. Improve stand vigor by thinning to a basal area of 20 m^2/ha. This will maximize resource use by remaining trees and will in turn improve their defence mechanisms.

2. Remove diseased trees during harvesting operations.

NECTRIA CANKER (*Nectria* spp.)

Aphids were also found on beech trees in both woodlots. Aphids can serve as infection vectors of the beech bark disease which commonly kills american beech. Symptoms on beech trees include peeling bark and red fruiting bodies. Nectria also infects aspen, basswood, brich, maple and willow. On species other than beech, the symptoms appear as cankers. There are several species of Nectria, each having their own unique symptoms.

Management Strategy

1. Improve stand vigor by thinning to a basal area of 20 m^2/ha. This will maximize resource use by remaining trees and in turn will improve their defence mechanisms.

WHITE PINE BLISTER RUST (*Cronartium ribicola*)

White pine blister rust was observed on white pine seedlings in Stand 4 of the Case Woodlot. Symptoms appear in June as yellow blisters and lesions on the bark. Blistering may girdle the tree, ultimately destroying its vascular system and killing the tree. Girdled areas are also susceptible to breakage.

Management Strategy

1. Improvement of air circulation, and removal and burning of diseased trees is the best management strategy to control this disease.

ARMILLARIA ROOT ROT *(Armillaria spp.)*

The key diagnostic symptom of this fungal disease is mycellial growth under the bark at the base of the tree. The fungus may appear as a white mycellial fan under the bark or as rhizomorphs. Rhizomorphs appear as long "shoe-string" like strands of black fungus. Strands may extend several meters up the tree. The base of the tree often has a resinous flow. In the late summer, honey coloured mushrooms may be found at the base of the tree. This naturally occurring disease affects stressed trees. It is more likely to cause mortality in younger trees than older ones.

Management Strategy

1. Improve stand vigor by thinning to a basal area of 20 m^2/ha. This will maximize resource use by remaining trees and improve their defense mechanisms.

EMERALD ASH BORER (*Agrilus planipennis*)

Although this forest pest has not yet been found in the Aurora Woodlands, it is noteworthy to highlight since it has a high likelihood of affecting trees throughout Town in the coming years. The emerald ash borer (EAB) is a highly destructive insect that attacks and kills ash trees (*Fraxinus* sp). Native to eastern Asia, EAB was first discovered in Windsor, Ontario and Detroit, Michigan in 2002. Today it is now found throughout the Greater Toronto Area (GTA), including York Region.

The EAB has killed millions of ash trees in southwestern Ontario, Michigan and surrounding states, and poses a major economic and environmental threat to urban and forested

areas in both countries. The EAB attacks and kills all species and sizes of ash, except Mountain ash which is not a true ash. Adult beetles can fly several kilometers. With artificial spread, where people move infested ash materials and firewood to new areas, EAB can quickly spread to other areas of Canada.

Signs and symptoms include,

- Adult beetles are metallic green, ½" long, and may be seen feeding on foliage from June to August
- Tree canopy begins to die back in the upper third portion of the canopy
- Dieback progresses until the tree is bare
- Epicormic shoots (sprouts growing from roots and trunk)
- Bark splitting (vertical cracks and galleries exposed under the bark)
- Larval feeding galleries are typically serpentine and packed with frass (sawdust and excrement)
- D-shaped exit holes formed by adults
- Increased woodpecker activity creating large holes

Impacts of the EAB on the Aurora Woodlands could include a loss of 5% of the tree canopy and 20% of the forest regeneration. The greatest impacts would be observed in stand W-2 and W-3 of the Vandorf Woodlot and W-4 and W-5 of the Case Woodlot.

Management Strategy

Control of this insect at the landscape level has proven futile by Municipalities in south western Ontario. Should EAB be found in the Aurora Woodlands, the Canadian Food Inspection will be contacted and a strategy for control (if any) will be devised at the time using the most current knowledge on control of this insect.

At present, there is only one registered chemical product to control this pest in Canada - TreeAzin™ Systemic Insecticide (PCP No. 28929); derived from the Neim tree (*Azadiracta indica*). Individual trees may be injected between May and Early August. It is hoped that maintenance of a diverse array of floral species will help to create habitat for natural predators of this insect.

Section 8 : FOREST OPERATIONS PROCEDURES

8.1 Silvicultural Prescriptions & Tree Marking

Before trees are to be harvested in the Aurora Woodlands, a silvicultural prescription must be written to ensure the objectives of this plan are realized. Prescriptions are to be based upon recent inventory collected from a pre-harvest visit to the area scheduled to be cut. Each prescription will contain two sections: i) a description of the forest based on the recent inventory; and ii) a tree marking prescription detailing residual stocking, species priority for retention and wildlife habitat considerations. All prescriptions are to be written by a Registered Professional Forester.

Trees to be harvested are to be identified and marked by a Professional Forester to ensure the silvicultural prescription is followed. Trees are to be marked with a band of yellow paint circled around the circumference of the tree at eye level. This enables the cutter to see the marked tree from all sides. A dot of paint in the crevice of the stump is also to be applied if harvesting operations are scheduled as commercial. This will allow for an auditor to check that harvested trees were truly marked.

8.2 Timber Cutting

If tree harvesting operations are to be commercial, a legal contract will be signed between the Town of Aurora and the buyer of the wood. The contract should describe the sale area, the payment schedule, how the trees are marked, access routes, where landings are to be located, when work is to be completed, how trees are to be cut, how trees are to be skidded and how much of the tree should be utilized. Also fines may be outlined for cutting unmarked trees, damaged residual trees, "hung-up" trees and damage to trails, fences, culverts etc. Tree cutting permits and insurance certificates in the amount of 5 million dollars must also be presented. Additional items such as type and size of equipment used may also be added to logging contracts.

8.3 Logging Inspections

Field auditing of timber cutting programs is necessary to ensure contract obligations are met. Auditing will be conducted by Parks Department Staff or by a contract forester. The frequency of audits will be determined based on the size and value of the operation. Each operation will receive at least two field audits. Each visit will likely take between two and four hours.

8.4 Federal, Provincial and Local Policies and Regulations

The management programs contained in this plan will adhere to all Federal, Provincial and local policies and regulations. Forest management activities will conform to the principles of Region of York's Forest Conservation Bylaw and to the guidelines noted in professional documents such as "A Silvicultural Guide to Managing Southern Ontario Forests" (MNR 2000) and the "Ontario Tree Marking Guide, Version 1.1" (MNR 2004).

Activities will also be carried out according to "good forestry practices" as defined by the Federal Forestry Act. Good forestry practices means: "the proper implementation of harvest, renewal and maintenance activities known to be appropriate for the forest and environmental conditions under which they are being applied and that minimize detriments to forest values including significant ecosystems, important fish and wildlife habitat, soil and water quality and quantity, forest productivity and health and the aesthetics and recreational opportunities of the landscape."

Other relevant policies that will help guide stewardship of the Town's forests include,

- Federal Fisheries Act
- Federal Pest Control Products Act
- Federal Species at Risk Act
- Provincial Endangered Species Act
- Provincial Fish and Wildlife Conservation Act
- Provincial Lakes and Rivers Improvement Act
- Provincial Professional Foresters Act
- Provincial Oak Ridges Moraine Conservation Act
- Provincial Weed Control Act
- Municipal Firearms bylaw
- Municipal Tree Cutting Bylaw

Section 9 : MANAGEMENT OBJECTIVES

This section outlines the ten-year objectives making up the management program for the Aurora Woodlands. Strategies required to meet these objectives are outlined in the ten-year management program.

9.1 Recreation Objective

1. To provide a safe, enjoyable and accessible natural environment for park visitors.

9.2 Forest Conservation Objective

1. To promote restoration of uncommon tree species to the forest
2. To maintain a natural abundance of large, healthy trees throughout the woodlands.
3. To enhance forest cover through tree planting and silviculture
4. To control invasive species where possible and restore the native vegetation.
5. Implement silvicultural activities in all forest types when appropriate to ensure a sustainable forest structure that is diverse and able to respond resiliently to environmental stresses.

9.3 Education Objective

1. To increase public awareness and knowledge of forest ecosystems and ongoing forest management programs.

9.4 Environmental Protection Objective

1. To protect forest flora regeneration from human disturbance.
2. To protect forest soil from compaction and erosion.
3. To protect the hydrology of the forest.
4. To protect the forest from vandalism.
5. To reduce the potential for insect and disease problems.
6. To keep the forest free of garbage.

9.5 Wildlife Objective

1. To protect and enhance wildlife habitat features.

Section 10 : 10 - YEAR MANAGEMENT PROGRAM

10.1 Recreation Strategy

Organize a Woodlands Advisory Team

The Town of Aurora's Woodlands Management Program should rely on public input from a Woodlands Advisory Team which consists of local user groups (e.g., hikers, schools, nature clubs and adjacent neighbourhoods) and members of the Town's Adopt-a-Park Program.

1. The advisory team will collectively provide public input on management requirements, and will serve as a system of information dissemination to the broader community.

2. The advisory team will serve as a sounding board for potential management activities.

Remove bike stunts

Mountain biking stunts and trails are present in both the Vandorf and Case woodlots. Mountain biking on un-official forest trails causes excessive rutting, soil disturbance, widening of the trails, loss of vegetation along the trails, and affects the recreational experiences and enjoyment of the forest by other users. Bike stunts can also be dangerous to forest users.

1. Rehabilitate bike stunt areas by dismantling structures, filling and levelling dug pits, and repairing or closing un-official trails (Maps 4 & 5).

2. Discourage further development of stunts and un-official trails by erecting and maintaining fencing and signage where appropriate and by increasing public awareness of the potential impacts of this activity on the environment. Where fencing is required, consider using cedar rail fencing since it will blend in with the natural environment.

3. It is believed that many of the un-official trails and bike stunts are a result of local school students seeking recreational enjoyment. Through morning announcements, school administration should regularly encourage students to not construct bike stunts in the woods and to stay off dirt trails with their bicycles. Cycling should only occur on official trails as posted.

Manage Trails

1. Official trails will typically have a width of 3 meters and a base of limestone screenings to protect underlying soils and facilitate traffic in the form of hikers, cyclists and maintenance vehicles. Culverts are installed where necessary.

2. Trails will be maintained by trimming encroaching vegetation and improving trail surfaces with limestone screening or woodchips. Trails with a woodchip base require frequent amendment as this material breaks down quickly.

3. Un-official trails as shown on Maps 2 and 3 should be reviewed with the Forest Advisory Team to determine the need to upgrade certain trails to Official status. In the Case Woodlot this work would involve amending 1 km with limestone screening. In the Vandorf Woodlot 260 m would be amended with limestone screening and 650 m of new official trail would be constructed. The new official trail will serve to access the meadows which are proposed for planting as part of the Conservation Strategy. Such improvements would be necessary for conducting maintenance and silvicultural operations. Use cedar rail fencing along paths to deter development of unofficial trails where appropriate.
4. Consider upgrading the 30 meter boardwalk in the Case woodlot should adjacent trails be improved (Figure 16). This boardwalk is in disrepair (Map 4).

Figure 16. Boardwalk located in the Case Woodlot.

Take care of hazard trees

The Case and Vandorf Woodlots are both highly used forests. Guidelines for frequency of inspections of hazard trees in such forests is provided in the York Regional Forest Hazard Tree Management Strategy (2007). The following schedule is recommended based on this strategy,

1. Inspect trees adjacent to trails and property boundaries on a two-year cycle.

2. Information received from forest users and adjacent landowners regarding potential hazard trees will be assessed as high or low priority. Those assessed as high priority will be inspected within 3 business days. Low priority items will be dealt with on a prioritized basis within one year.

3. When catastrophic natural disturbances have occurred, these locations will be inspected for hazard trees starting no later than 2 days following the event.

4. Fell trees along the official trail system, or near private property if they pose a safety risk. Removal may be combined with a larger scale thinning operation to release advanced regeneration or as part of sustainable silvicultural work. Pruning should be considered as a treatment to remove hazards if trees are assessed to be in good condition.

Manage forest land surrounding the Case Woodlot

1. Enter into discussions with the owner of the 10 hectare property adjacent to the Case Woodlot to present forest use issues and to potentially acquire the property for inclusion in the Town's park system.

10.2 Conservation Strategy

Implement afforestation

1. Opportunities to increase forest cover by 5% in the Aurora Woodlands exist in the Vandorf Woodlot (Figure 17). The following Table 10 shows the areas and number of seedlings proposed for planting. Suggested tree spacing is 7x7ft (2.13m x 2.13m). All areas are suitable for machine planting. Species should include white pine, white spruce, butternut, black walnut, bur oak, black cherry, and nannyberry shrubs. Funding sources are available through Trees Ontario.

Figure 17. This meadow (M-3) in the Vandorf Woodlot is one of three proposed for planting.

Table 10. Estimated number of seedlings proposed for planting in the meadows (Map 7).

Meadow	Hectares	# Trees
M-1	0.47	1,032
M-2	0.77	1,691
M-2	1.43	3,140
Total	**2.67**	**5,863**

2. Plant locally native tree seedlings in areas where tree regeneration is lacking. Seedlings are to be grown from seed collected from the woodlot within which planting is to occur. Seedlings may also be transplanted within the woodlands.

3. Utilize seedlings from the woodlands as reforestation stock throughout the Town of Aurora. This will ensure the natural gene pool adapted to this area is conserved. These planted forests will likely be healthier in the long run compared to plantations of species from unknown sources.

4. Conduct infill planting in P-2 of the Vandorf Woodlot to improve development of forest cover. See Map 7 for location. Approximately 500 trees can be planted.

Encourage growth of established forest regeneration

1. Release advanced regeneration where appropriate to ensure there is a good supply of young healthy trees to replace dying old ones. This will promote resiliency of the forest to disturbances such as storm damage, and mortality caused by insects and diseases. Apply the individual tree or group selection systems appropriately. This work should coincide with other tree removal programs mentioned in this plan such as hazard tree maintenance, promoting sustainability of large healthy trees, conserving uncommon and 'At Risk' species, and controlling invasive species. Stands identified for silvicultural treatment include W-2, W-4, W-5 & W-6 in the Vandorf Woodlot (Map 7). Other sections of stands may be treated as required.

2. Restrict public access with wooden fencing where tree regeneration is lacking or requires protection.

Implement reforestation

1. Plant tree seedlings within the forest where tree regeneration is lacking. Such activities may be required in areas that become damaged by storms, insects or disease.

Promote a sustainable presence of large, healthy trees

1. Promote the growth of trees in the upland maple forests so there will be approximately 20 very large trees / hectare (greater than 50 centimeters) indefinitely. This may be accomplished by cutting a few trees on a yearly basis following the single tree selection system recommended by the Ontario Ministry of Natural Resources. Small scale operations will likely be non-commercial. Extracted timber could be utilized by local residents or user groups of the forests to help with trail improvement programs. Portable sawmill operators could be brought to the forest to cut the trees into lumber. Silvicultural prescriptions and tree marking is to be carried out by a Registered Professional Forester to ensure the above objective is realized. Stands recommended for thinning in the next 10 years include W-2 and W-5 in the Vandorf Woodlot (Map 7).

Control invasive plant species

1. Dog strangling vine, garlic mustard, European buckthorn and Manitoba maple aggressively spread following disturbances to the forest canopy or soil. Activities such as tree cutting therefore should be minimized in their presence unless the objective of the cutting is directed at their control. Removal can be expensive, requiring chemical treatment and/ or extensive labour over successive years. To minimize costs and maximize benefit to the forest it is best to first target small isolated patches for removal near pristine forest areas. To help minimize costs, volunteers could be engaged in the control strategy. Simple activities such as digging, pulling an monitoring could be designated to volunteers. The latest research on control of these pests should be adopted when available.

Figure 18. The green haze of forest regeneration in this photo is European buckthorn.

2. In concert with removal of invasive species should be a program of native plant restoration. There are several areas in the Case and Vandorf Woodlots that are dominated by invasive species and should be restored with native trees and shrubs (see Maps 5 & 6). These areas present opportunities to increase the abundance of uncommon and 'At Risk' species such as bitternut hickory, black cherry, butternut, black walnut, bur oak and red oak. Planted trees should be at least 1 meter in height and should be installed with a weed control brush blanket and rodent guard.

Conserve uncommon and 'At Risk' species

1. Monitor identified trees shown on Maps 2 & 3 for seed production and conduct seed collection when available. Seeds should be sown in the Town's tree nursery to grow specimens for reforestation programs.

2. Encourage growth of natural regeneration by implementing appropriate silvicultural activities around selected seed trees. Large canopy openings (15- 30 meter diameter) would be required to regenerate many of the uncommon and 'At Risk' species such as butternut, hickory, red oak, bur oak, black cherry. Their growth requires an abundance of sunlight and warmth at the forest floor. Planting of seedlings of these species in meadow areas of the Vandorf Woodlot will also help to ensure viable populations remain in Aurora.

3. Plant species considered as uncommon or 'At Risk' in stands where invasive species are removed.

10.3 Education Strategy

Utilize signs and notice boards

1. Utilize a notice board at each woodlot to post maps, public notices, current information on forest pests, 'rules of the forest', benefits of the forest, and important management information behind protective glass (plastic) doors which will be pad-locked. Park visitors will learn to utilize the board to obtain new information about local forestry activities, workshops and trail hikes to list a few items. One notice board is currently found in the Case Woodlot.

2. Install one notice board in the Vandorf Woodlot near the location of the old Lloyd sawmill. This is an area of confluence of several trails, and is highly used. Historical information about the sawmill could be suitably presented in this notice board to give perspective to users on the rich historical heritage of the area.

Figure 19. Notice board in the Case Woodlot.

3. Consider establishing a self guided nature interpretation trail. Signs along the trail will help to educate visitors about forests (e.g., plants, wildlife habitat) and ongoing management programs.

4. Maintain 'rules of the forest' signs at the entrances to each woodlot as well as in areas where significant issues are observed. These maps will help to keep people on designated trails and away from unofficial trails.

Advertise in local newspapers

1. Forest management information and updates may be published in the local paper (Aurora Banner, Aurora Weekly, Town Crier).

Provide brochures

1. Provide forest trail maps (brochures) at the Town Hall and through the Town's web site to assist woodlot users in accessing official forest trails. Brochures can also present an overview of the forests, 'rules of the forest', and their history and environmental significance.

Encourage school program involvement

1. Engage nearby schools in seed collection, tree planting, insect population monitoring, and invasive species control and restoration. These activities could suitably apply to students' community service hours requirement for graduation.

2. Involve local schools in a tree-rearing program, where seed collected from the woodlots would be grown in containers in the classroom and transplanted to selected areas within the forest. This task could be implemented under Trees Ontario's Heritage Tree Program which provides schools with a structured program. Funding may be available.

3. Develop a badge (jacket patch) which advertises the Aurora Woodlands. Involve nearby schools in creating the patch in a design contest. Patches could be sold to help generate additional money that the school can use to help with other management projects. Through this activity, students will learn about the importance of the forests, as well as the strategies to keep them healthy. This activity could be implemented annually.

Consider FSC Certification

The Forest Stewardship Council (FSC) is an independent, not for profit, non-government organisation, that provides standard setting, trademark assurance and accreditation services for companies, organisations and landowners, interested in responsible forestry. FSC's mission is to promote environmentally appropriate, socially beneficial and economically viable management of the world's forests, based on FSC's 10 Principles and Criteria of responsible forest management. The FSC accredits third-party certification bodies, who award certificates based on the results of its audits of clients.

Silv-Econ Ltd. is Canada's first forest management/forestry consultant to be achieve FSC certification (SW-FM/COC-1769). The company's FSC certification means that it uses the most responsible forestry management practices. Certification provides forest owners affordable access to independent third party evaluation and certification of their forests and forest management practices. Forest products generated from certified woodlots can be sold with the FSC label.

10.4 Environmental Protection Strategy

Protect sensitive forest areas

1. Reduce the extensiveness of unofficial trails to limit soil compaction, erosion and loss of growing space for trees. This may be accomplished by posting signs and cedar rail fencing at the start of un-official trails (Figure 20). Additionally, logs and other woody debris can be placed along un-official trails to deter their use.

2. Forest protection signs may include,
   - *No bicycling – sensitive soils and natural regeneration area*
   - *Conserve your forest, stay on maintained trails*
   - *Natural regeneration area, please protect*
   - *Forest restoration project*
   - *No camp fires*
   - *No littering*
   - *No picking of plants*

Figure 20. Unofficial trail with warning sign.

3. Wood chips are to be used to repair areas of soil erosion where appropriate.

Monitor and control forest insects and diseases

1. Forest insect and disease monitoring programs should be conducted annually and control programs conducted when necessary and feasible.

2. Consider using insect pheromone traps to keep track of insect species and population changes. Assistance with this may be obtained from local user groups, schools, and / or the Ministry of Natural Resources.

3. Work in concert with the Ministry of Natural Resources, the Region of York and other resource management organizations in establishing control programs when necessary.

4. Implement silvicultural thinning to maintain a diversity of tree species in both the overstory and understory to ensure the forest is resilient to insect and disease impacts.

Mitigate erosion and sediment transport issues

1. To prevent further damage to the watercourse and forest vegetation in the Case Woodlot (stand W-6; Map 4), the flows and the discharge from the stormwater management pond and roadside should be assessed and addressed through development of a sediment and erosion control plan. In the mean time, the community of invasive species which has become established in the sediment deposit should be managed to restore native vegetation to the area. This restoration will require tree cutting, planting of native tree seedlings and shrubs and follow-up weed control (manual methods only).

   Species to consider for planting in W-6 are listed in the following table,

Species	# Trees
bur oak (1 m potted)	30
elm and/or hackberry (1 m potted)	30
white cedar (3 ft field grown)	50
river willow (cuttings)	100
red osier dogwood (potted shrub)	100
silky dogwood (potted shrub)	100
Total	**410**

Encourage no dumping of yard waste

1. On an annual basis in spring (late April) consider including a letter mailing to residents that live immediately adjacent to the forest to inform them of the importance not depositing yard waste in the woods. An alternative to this could include briefly visiting each of the landowners to inform them of the Town's concern over dumped waste. Providing them with a brochure on invasive plant species would also be informative.

Remove camp fire pits & rehabilitate

1. Remove fire pit structures and rehabilitate areas by establishing shrub and tree vegetation. Monitor areas for further inappropriate use and respond to issues as necessary.

10.5 Wildlife Strategy

Protection of habitat

1. Management of wildlife habitat will utilize the featured species approach (Naylor *et al.* 1996). In this case, habitat required by the Pileated woodpecker is to be conserved. This approach involves retaining cavity trees during harvesting projects where appropriate. There are several types of cavity trees utilized by the Pileated woodpecker. These include hollow trees having several entrance and exit holes (used to escape from predators), trees with dark cavities (used for nesting), trees riddled with feeding cavities and trees that have good potential to become cavity trees. Retention or creation of such features where they are not dangerous to users will ensure that habitat is available for other species of birds and mammals such as wood ducks, owls, squirrels, raccoons and porcupines. Approximately 25% of forest wildlife rely on standing dead trees (snags) for habitat (MNR 1996).

2. Encourage the production of wildlife habitat through timber cutting programs. Woody debris is to be left on site to serve as valuable wildlife habitat. Fallen logs and rotting wood on the forest floor provides habitat for over 30% of all vertebrate wildlife. It creates infrastructure at the bottom of the food chain and represents both the end and the beginning of life in the forest. Guidelines for habitat conservation include,
    a. Retain tree tops and logs in the forest to serve as denning, feeding and escape routes for wildlife. Keep logs away from trails so they are not used to for bike stunts.
    b. Retain standing dead trees where they are not dangerous such as near trails.
    c. Limit activity around active nests during the nesting period (Szuba & Naylor 1998).

3. Other forest features which should be conserved during any tree cutting program include mast species (e.g., oak, beech, cherry, hickory, butternut, walnut), and trees with stick nests since many nests are reused by birds. Additionally, all yellow birch are to be retained since this species is preferred for nesting by the red shouldered hawk which is an 'At Risk' species in York Region.

4. No cut zones are to be placed around watercourses, seeps and ephemeral ponds. Zones are to be 30 meters in width.

Restoration of Habitat

1. Work with the Ministry of Natural Resources to evaluate potential improvements required for fish passage at the old dam on the Holland River; located at the north end of the Vandorf Woodlot. Federal and Provincial funding sources are generally available for such work.

2. Convert communities of Manitoba maple and European buckthorn where they exist to more native plant assemblages; Case Woodlot W-6; Vandorf Woodlot P-2, W-4 & W-6 (Map 4,5).

3. Install and maintain bird boxes. Involve local community groups in this activity.

Section 11 : Schedule of Activities

The following sections present a prioritized schedule of recommended activities to be implemented over the next 10 years (2010 – 2019). Activities have been divided into Administrative Tasks, Vandorf Woodlot Operations, and Case Woodlot Operations. A potential 10 year budget is provided as a guide. The budget is an estimate of materials and services. Town of Aurora staff time was not considered in the budget.

11.1 Administrative Tasks

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
1	Environmental Protection	Mitigate erosion and sediment transport issues	Consider approaching Region's Transportation Services Department to highlight the issues caused by storm water discharged from the Region's culvert, and request support for corrective action (see Map 4). To prevent further damage to the watercourse and forest vegetation in the Case Woodlot (stand W-6), the flows and the discharge from the storm water management pond and roadside should be assessed and addressed through development of a sediment and erosion control plan.	2010	$5,000
2	Environmental Protection Recreation	Organize a Woodlands Advisory Team	Meet with the team to review trails as shown on Maps 2 & 3 to determine the need to upgrade certain trails to Official status and to possibly decommission	Spring 2010	-

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
			some. Potential upgrades are shown on Maps 4 & 5. Consider posting signs and cedar rail fencing at the start of un-official trails which are identified to be closed.		
3	Recreation Environmental Protection	Prevent construction of bike stunts	Discourage further development of stunts and un-official trails by erecting and maintaining fencing and signage where appropriate and by increasing public awareness of the potential impacts of this activity on the environment. Where fencing is required, consider using cedar rail fencing since it will blend in with the natural environment.	Annually	$500
4	Wildlife	Restoration of Habitat	Work with the Ministry of Natural Resources to evaluate potential improvements required for fish passage at the old dam on the Holland River; located at the north end of the Vandorf Woodlot. Federal and Provincial funding sources are generally available for such work.	2010	-
5	Environmental Protection	Encourage no dumping of yard waste	On an annual basis in spring (late April) consider including a letter mailing to residents that live immediately adjacent to the forest to inform them of the	Annually	$300

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
			importance not depositing yard waste in the woods. An alternative to this could include briefly visiting each of the landowners to inform them of the Town's concern over dumped waste. Providing them with a brochure on invasive plant species would also be informative.		
6	Education	Consider FSC forest certification	Work with Silv-Econ Ltd. to designate the Aurora Woodlands as FSC certified. This activity will demonstrate to citizens of the Town of Aurora that the forests are managed to the highest environmental standards.	2010	To be determined
7	Education	Create trail map brochures	Design updated trail brochures to be distributed at the Town Hall and as pdf files on the Town's Web Site. Maps from this management plan can be suitably modified to brochure format.	Winter 2011	$500
8	Education	Encourage school program involvement	Engage nearby schools in seed collection, tree planting, insect population monitoring, and invasive species control and restoration. Involve local schools in a tree-rearing program, where seed collected from the woodlots would be grown in containers in	Annually in September	$500 annually Purchased items may include insect pheromone traps, growing

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
			the classroom and transplanted to selected areas within the forest. This task could be implemented under Trees Ontario's Heritage Tree Program which provides schools with a structured program. Funding may be available. Develop a badge (jacket patch) which advertises the Aurora Woodlands. Involve nearby schools in creating the patch in a design contest. Patches could be sold to help generate additional money that the school can use to help with other management projects. Through this activity, students will learn about the importance of the forests, as well as the strategies to keep them healthy. This activity could be implemented annually.		containers, and potting soil among others.
	Education	Encourage school program involvement		Annually in September	
9	Education	Develop forest trail signs	Design, produce, install signs for self guided nature trails. Eight stops could be established along the trail system. Install forest protection signs in key protection areas as needed.	Winter 2012 As required	$4,000 $1000
10	All Objectives	Apply plan to other forested areas in town	Apply the objectives and strategies of this plan to other Town owned woodlot properties. Inventory, map, and develop	As required	$200 per hectare (assume 30 hectaes)

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
			10 year operating plans for each property.		
			Total		**$22,300**

11.2 Vandorf Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
1	Recreation Wildlife habitat	Take care of hazard trees	Inspect and mark trees adjacent to trails and property boundaries. Assess pruning or removal requirements as shown on Map 7. Consider selling the timber standing in the forest or at roadside to offset costs. Retain some logs in the forest for wildlife habitat.	2010	$8,000
2	Recreation Environmental Protection	Remove bike stunts	Rehabilitate bike stunt areas by dismantling structures, filling and leveling dug pits, and repairing or closing un-official trails (Map 5).	Annually April – July September	-
3	Recreation	Trail maintenance	Improve trail base using limestone screenings. 260 m (Map 5).	2010	$3,000
4	Recreation	Trail construction	Construct 650 m of new Official Trail. Culverts will be required (Map 5).	2010	$15,000
5	Environmental Protection	Trail closing	Install signs and wooden fence / logs at the entrance to selected un-official trails. These trails have not yet been determined.	As required	$5,000

11.2 Vandorf Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
6	Education	Purchase and install notice board	Install one notice board in the Vandorf Woodlot near the location of the old Lloyd sawmill (Map 5). This is an area of confluence of several trails, and is highly used. Historical information about the sawmill could be suitably presented in this notice board to give perspective to users on the rich historical heritage of the area.	2011	$2,500
7	Environmental Protection	Remove camp fire pits & rehabilitate	Remove fire pit structures and rehabilitate areas by establishing shrub and tree vegetation. Monitor areas for further inappropriate use and respond to issues as necessary.	April 2010	$300
8	Recreation	Take care of hazard trees	Inspect and mark trees adjacent to trails and property boundaries on a two-year cycle. Schedule implementation of treatments.	Every 2 years	$2,000 annually
9	Conservation	Implement afforestation	Plant approximately 6,000 trees among M-1, M-2 and M-3 as shown on Map 7. Funding available through Trees Ontario.	2011	Up to $4,000
10	Conservation Wildlife	Control invasive plant species, Restoration of Habitat	Convert communities of Manitoba maple and European buckthorn where they exist to more native plant assemblages; P-2, W-4 & W-6 (Map 7).	Annually	$2,000 annually
11	Conservation	Implement	Planting approximately 500 tree seedlings in	2012	Potential funding

11.2 Vandorf Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
		afforestation	P-2 to improve development of forest cover. See Map 7 for location. Consider community involvement in this project.		available through TD Friends of the Environment
12	Conservation	Encourage growth of established forest regeneration Promote a sustainable presence of large, healthy trees Conserve uncommon and 'At Risk' species	Promote the growth of trees in the upland maple forests so there will be approximately 20 very large trees / hectare (greater than 50 centimeters) indefinitely. This may be accomplished by cutting a few trees on a yearly basis following the single tree selection system recommended by the Ontario Ministry of Natural Resources. Small scale operations will likely be non-commercial. Extracted timber could be utilized by local residents or user groups of the forests to help with trail improvement programs. Portable sawmill operators could be brought to the forest to cut the trees into lumber. Silvicultural prescriptions and tree marking is to be carried out by a Registered Professional Forester to ensure the above objective is realized. Stands recommended for thinning in the next 10 years include W-2 and W-5 (Map 7). Implement reforestation where necessary to supplement existing natural regeneration.	Within the first 5 years of operating period.	$4,000 for tree marking and silvicultural prescription and harvest supervision.
13	Conservation	Conserve	Monitor identified trees shown on Map 3 for	Annually	-

11.2 Vandorf Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
		uncommon and 'At Risk' species	seed production and conduct seed collection when available. Seeds should be sown in the Town's tree nursery to grow specimens for reforestation programs.		
14	Environmental Protection	Monitor and control forest insects and diseases	Forest insect and disease monitoring programs should be conducted annually and control programs conducted when necessary and feasible.	Annually	-
			Total		**$71,800**

11.3 Case Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
1	Recreation Wildlife habitat	Take care of hazard trees	Inspect and mark trees adjacent to trails and property boundaries. Assess pruning or removal requirements as shown on Map 6. Consider selling the timber standing in the forest or at roadside to offset costs. Retain some logs in the forest for wildlife habitat.	2010	$10,000
2	Recreation	Trail Maintenance	Improve trail base using limestone screenings. 1 km (Map 4).	Summer 2010 or 2011 following tree maintenance activities.	$10,000
3	Recreation	Manage forest land surrounding the	Enter into discussions with the owner of the 10 hectare property adjacent to the Case	2010	-

11.3 Case Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
		Case Woodlot	Woodlot to present forest use issues and to potentially acquire the property for inclusion in the Town's park system.		
4	Recreation Environmental Protection	Remove bike stunts	Rehabilitate bike stunt areas by dismantling structures, filling and leveling dug pits, and repairing or closing un-official trails (Map 4).	Annually April – July September	-
5	Wildlife	Control invasive plant species Restoration of Habitat	Convert communities of Manitoba maple and European buckthorn where they exist to more native plant assemblages; stand W-6 (Map 4).	2013	$10,000
5	Environmental Protection	Remove camp fire pits & rehabilitate	Remove fire pit structures and rehabilitate areas by establishing shrub and tree vegetation. Monitor areas for further inappropriate use and respond to issues as necessary.	April 2010	$300
6	Recreation	Take care of hazard trees	Inspect and mark trees adjacent to trails and property boundaries on a two-year cycle. Schedule implementation of treatments.	Every 2 years	$2000 annually
6	Environmental Protection	Trail closing	Install signs and wooden fence / logs at the entrance to selected un-official trails. These trails have not yet been determined.	As required	$5,000

11.3 Case Woodlot Operations

PRIORITY	OBJECTIVE	TASK	DESCRIPTION	YEAR	POSSIBLE COST
7	Recreation	Trail Closing	Consider upgrading the 30 meter boardwalk (Map 4).	2012	$6,000
8	Conservation	Conserve uncommon and 'At Risk' species	Monitor identified trees shown on Map 2 for seed production and conduct seed collection when available. Seeds should be sown in the Town's tree nursery to grow specimens for reforestation programs.	Annually	-
9	Environmental Protection	Monitor and control forest insects and diseases	Forest insect and disease monitoring programs should be conducted annually and control programs conducted when necessary and feasible.	Annually	-
10	Wildlife	Restoration of Habitat	Install and maintain bird boxes. Involve local community & school groups in this activity.	Annually	Potential funding available through TD Friends of the Environment
			Total		**$51,300**

Section 12 : Contacts

Suppliers of trees, shrubs, seed mixes and ground vegetation
Somerville Seedlings (conifer trees and seedlings)
(705) 435-6258 P.O. Box 70, Alliston, ON. L9R 1T9.

Chris Gynan (hardwood seedlings, saplings, shrubs, fast growing hybrid poplar)
(905) 989-0601 39 Ladyburn Dr., Keswick, ON, L4P 3R1

Sheridan nurseries (all tree species) (416) 798-7970
RR# 4, 12266 Tenth Line, Georgetown, Ontario, L7G 4S7. (wholesale division)

Humber nurseries (forest ground vegetation)
(905) 794-0555 8386 Hwy. 50, Brampton, ON L6T 0A5.

OSC Seeds (Seed mixes)
(519) 886-0557 P.O. Box 7, Waterloo, Ontario. N2J 3Z6.

Rodent Guards
Quest plastics
2475 Tedlo Street
Mississauga, ON L5A 4A8
905-270-4438

Page wire fencing
Terrafix
178 Bethridge Road
Toronto, ON M9W 1N3
(416) 674-0363

Heavy duty metal gates
RWG Repairs Inc.
Contact: Roger Goode
P.O. Box 94
Queensville ON L0G 1R0
Ph 905-478-2443

Insect Pheromone Traps
Pherotech International 1-800-665-0076
7572 Progress Way. Delta, British Columbia. V4G 1E9.
http://www.pherotech.com/

Forestry Related Web Sites
Natural Heritage Information Centre
http://nhic.mnr.gov.on.ca/nhic_.cfm

Plant identification
http://oregonstate.edu/dept/ldplants/

Tree diseases
http://www.forestpathology.org/

Information on birds and their calls
http://www.mbr-pwrc.usgs.gov/

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Section 14 : Maps

Map 1 – Key Map

Map 2 – Forest Cover Types and Infrastructure – Case Woodlot

Map 3 – Forest Cover Types and Infrastructure – Vandorf Woodlot

Map 4 – Maintenance Activities – Case Woodlot

Map 5 – Maintenance Activities – Vandorf Woodlot

Map 6 – Silviculture Management – Case Woodlot

Map 7 – Silviculture Management – Vandorf Woodlot

Map 8 – Property Ownership of Surrounding Forest - Case Woodlot