



HAZARD TREE POLICY AND ACTION STRATEGY

POLICY STATEMENT

IT IS THE POLICY OF THE GRAND RIVER CONSERVATION AUTHORITY TO MAINTAIN THE SAFETY OF ITS LANDS FROM POTENTIALLY HAZARDOUS TREES. The Grand River Conservation Authority will strive to identify and eliminate any tree hazards in the most timely manner possible. When budgetary constraint limits the ability to eliminate all tree hazards, priority shall be placed on trees deemed to be of a high risk nature. The Grand River Conservation Authority will utilize a standardized rating system to determine the hazard potential of a tree. The Forestry Operation department will administer this policy, and shall have final judgement in all matters concerning hazardous trees.

INTRODUCTION

This Hazard Tree Policy has been designed as a pro-active approach to insure that tree hazards are identified and eliminated on any authority land. The policy has three parts:

1. an inspection strategy designed to insure all properties are routinely inspected to identify trees with hazard potential
2. a hazard tree rating system which allows any tree to be rated according to a designated set of standards; the rating will determine the hazard potential of any tree
3. a hazard tree abatement strategy, which, utilizing the hazard tree rating system, insures that hazards are managed in the most cost efficient manner possible

The Hazard Tree Policy seeks to find a balance between managing the risks associated with trees on GRCA lands, preserving arboricultural resources, and maximizing forestry department resources.

HAZARD TREE BACKGROUND

The statement 'hazard tree' is used often in the following document. Thus, a clear definition of this statement is necessary. The word 'hazard' denotes that some threshold of risk has been surpassed. In an arboriculture context, the word 'hazard' conveys the immediacy of structural failure of a tree. It is important to remember that all trees have risk involved, and that any tree can fail under a certain set of conditions.



There are three types of trees in any landscape situation relevant to risk: the first is a **'hazard tree'**, which has a major structural fault that could lead to catastrophic loss, and has an identifiable target; the second is a **'tree at risk'** of a catastrophic loss or with a significant target potential, and that may in time become a hazard tree; the third type is a tree which has no identifiable hazard potential according to the inspection procedure used.

PART 1 - HAZARD TREE INSPECTION STRATEGY

INSPECTION AREAS

The basis of managing hazard trees is routine inspections of the relevant area. This allows hazard trees to be identified, trees at risk to be assessed for increased hazard potential, and non-hazardous trees to be inspected for future risk potential.

Each time an area is inspected, the inspection should be documented on a standard form, with information including the date, time, and any relevant information. Additional documentation including hazard tree rating forms and photographs should be attached to the record and filed.

The Grand River Conservation Authority owns several different types of land. Each area has a different use, a different set of targets, and therefore, a different perspective of tree related liability. Therefore, each area should be inspected with a different frequency and thoroughness.

The areas of inspection within the Grand River Conservation Authority are as follows: Active-use Conservation Areas, Passive-use Conservation Areas, Cottage Lots, Residential Properties, Rented Farm Land, Limited-use Open Land, Maintenance Agreement Land, and Trails.

Active Use Conservation Areas

An Active-use Conservation Area refers to a gated, paid use area designed for public recreation. These areas possess some significant feature to attract patrons, including water features, seasonal campsites, overnight campsites, nature trails, picnic areas, sports fields, and playgrounds. Some of these areas receive significantly high use during parts of the season

The fact that Active-use Conservation Areas are subject to user fees increases the issue of liability. GRCA Conservation Areas are marketed as sources of safe, enjoyable recreation. A catastrophic tree event at one of these areas could generate significant legal ramifications in the event of injury or property damage. Unlike a passive use park setting, these areas may see 24 hour usage. Many campsites are situated in wooded areas, and trees are generally incorporated in all campsites to improve the natural aesthetic of the site. Thus the potential for tree risk is increased in these areas.



For these reasons, Active-use Conservation Areas should be inspected on an annual or semi-annual basis. Ideally, a growing season inspection should be done to determine tree condition, and a dormant season inspection should be undertaken to clearly assess tree structure. If time constraints are an issue, then these areas should be divided into high-use and lower-use areas. For instance, parks which have overnight campsites should be inspected semi-annually, and day-use only parks could be inspected annually. Also, areas of limited use within the park, such as trails or open recreation areas, would only need inspection once during the year. The semi-annual inspection would also allow for identification of sudden hazards, such as hanging branches. Appendix 1 lists all of the Active-use Conservation Areas and the recommended frequency of inspection for each.

Passive-use Conservation Areas

Passive-use Conservation Areas are non-gated recreation areas designed for year round, passive public-use. There is no charge for using these areas (some may have voluntary registration), and there is rarely a defined service provided for the user. These areas provide the public with quality open space for recreation. They usually include a mix of maintained open space, nature trails, playgrounds, picnic areas, and sports fields.

Because of the casual usage of these areas, the liability related to tree risk is less than in an Active-use Conservation Area. While many of these areas see year round usage, the potential for tree related mishap is reduced because the patrons have no permanence on the site. Also, public presence during periods of inclement weather is reduced, during which time tree failure frequently occurs. However, the fact that these areas openly offer the public recreation space means that vigilance in removing tree hazards must be exercised.

For the reasons mentioned above, Passive-use Conservation Areas should be inspected for hazard trees on an annual basis. Some areas, such as those with few trees, or, those which lack picnic areas or other such attractions, could be inspected on a bi-annual basis.

Cottage Lots

The Grand River Conservation Authority has a lease hold agreement with over 700 cottage owners around Belwood and Conestogo Lakes. In this case, the cottage owner owns the buildings on his/her lot, and leases the land from the GRCA. Hazard tree management is a part of the service agreement between the cottage owners and the GRCA.

Cottage use varies according to each cottage owner, but it is generally accepted that each cottage is used permanently for 6-8 months of the year. Cottages are not used during the winter months.

Because of the high-use nature of these lots, it is recommended that each cottage lot be inspected for hazard trees on an annual basis. As well, cottage roads should also be



inspected on an annual basis for hazard trees. An early growing season inspection is desirable, as it allows the identification of winter caused hazards, as well as permitting tree condition to be adequately assessed for condition.

Residential Properties

The Grand River Conservation Authority owns 64 residential properties that are rented to tenants year round. Most of these properties are found in outlying, rural areas. Some are found in urban centers. Many are old farm properties and have large, stately, old trees surrounding them.

Because of the year round, constant use nature of these residences, they should be inspected on an annual basis. Hazard trees at these sites possess the ability to not only injure our own tenants, but also to damage GRCA property.

Rented Farm Land

The Grand River Conservation Authority owns significant amounts of rural land that is rented for crop production to other farm producers. This is not publicly used land, but is used exclusively by the tenant. The nature of farm land is that it is cleared for field crops, so the only presence of hazard trees is at the edges, where fence rows or adjacent forests may possess hazard trees.

Because of the limited use nature of this land, hazard tree inspection need only be done every 3 years. Mainly, this inspection would seek to insure the safety of surrounding private land and public roads from hazard trees. Also, trees which could be hazardous to the tenant would also be identified.

Limited-use Open Land

This vague term refers to land which is owned by the Grand River Conservation Area, but has no identified recreational use. In many cases, this land is held because of some environmental sensitivity. Managed forest is also included in this category, as is flood plain.

Mostly, hazard trees on these lands are found adjacent to public or private areas. Residences, roads, parking areas, and trails may border these lands, and thus tree hazards must be recognized and cleared. Inspection of the entire area may not be required.

For these reasons, it is recommended that these areas be inspected every 3 years for hazard trees.

Maintenance Agreement Land

The Grand River Conservation Authority owns a significant amount of land which is under maintenance agreement with other parties, usually municipal or regional



government. In this case, the GRCA owns the land, and provides it for the recreational use of the local community. The local government agrees to maintain the land, including trees.

In these cases, the local government is responsible for coordinating and conducting tree maintenance. However, the GRCA does possess a degree of responsibility as the landowner. For this reason, these areas should be inspected for hazard trees. While detailed tree assessment is not required on these sites, a rough assessment should be done to insure that hazard trees are being managed. If tree hazards are noted, the relevant party under the maintenance agreement should be notified, as well as the GRCA Property Manager.

It is recommended that these areas be inspected every 2 years for hazard trees, because of the fact that many are of a high use nature.

Trails

The Grand River Conservation Authority owns several large trails that provide recreational opportunities to hikers, cyclists, runners, and cross-country skiers. These trails are independent to those that are part of Conservation Areas.

Hazard Trees on trails do not present the same liabilities as they do in park settings or Conservation Areas. A trail sees transient use, meaning that the user passes quickly through the area. Because of this situation, the likelihood of a tree related mishap is substantially reduced. It is important when inspecting trails to identify gathering points or stopping points, such as benches, vistas, or parking areas. These areas possess a greater potential for tree related mishap.

It is recommended that trails be inspected bi-annually because of the reasons discussed above.

INSPECTION PROTOCOL

While the areas of assessment may differ, the protocol for the assessment of each individual tree remains the same. Each tree that has a target must receive a thorough inspection for hazard potential. There are 6 'zones of inspection' for assessing each tree for failure potential. They are:

1. Zone 1 – this area is the stem and root zone four feet up the stem, and four feet out from the stem. This crucial area absorbs most of the tree weight under compression, and structural compromise in this area compromises the structure and safety of the entire tree.
2. Zone 2 – is the main stem, from the point 4 feet off of the ground, up to the main branch union. Failure points are often found in this zone, but can often be corrected.



3. Zone 3 – is the primary root system extending to about way out to the drip line.
4. Zone 4 – is the primary branches out to 1/3 their length.
5. Zone 5 – is the is the remainder of the structural roots.
6. Zone 6 – is the remainder of the crown. This area is often crucial in determining the tree condition.

Each of these areas must receive a thorough inspection. When failure potential is identified in any of these areas, the tree should be rated according to the hazard tree rating system (see below) to determine its exact hazard potential.

Careful inspection of the site is also important when inspecting a tree. Construction or other damage to the root system of the tree can result in tree decline, and thus cause the tree to become hazardous over time.

It is important to inspect each tree at a site according to the above criteria.

PART 2 – HAZARD TREE RATING SYSTEM

The primary objectives of the hazard tree rating system are to:

- determine whether trees which show some evidence of failure potential are actually hazardous
- prioritize which hazardous trees should receive attention
- maintain a detailed record to justify tree trimming or removal

The hazard tree rating system has been designed to accommodate the large number of trees present on Grand River Conservation Authority lands. It allows significant flexibility in judging which trees present the greatest hazard.

The hazard tree rating system has 5 sections. Each tree is rated according to the five sections, and the sections are totaled. The total determines whether the tree is hazardous or not. However, if the assessing arborist at any time feels that one factor makes the tree immediately hazardous, that point can override the system and the tree is marked for removal. The five sections are discussed in detail below.

Section 1 – Species Rating

The species rating assesses the known hazard potential of a tree species. Each species of tree has a different set of attributes making it more or less likely to fail. Growth patterns, habit, hardness of wood, rate of growth, and root type all contribute to the failure potential of a tree species.

The hazard tree rating system rates tree species in one of three categories:



1. Low Failure Rate – this species is rarely known to fail under normal, acceptable growing conditions. The structure, hardness of wood, and branch scaffold of this species is traditionally good.
2. Medium Failure Rate – this species has attributes that make it prone to failure under certain conditions, but under normal conditions failure is rare. The structure, hardness of wood, and branch scaffold of this tree is average. The tree may be prone to pathogens that reduce its structural integrity.
3. High Failure Rate – this species is known to fail frequently under normal conditions. The structure, hardness of wood, and branch scaffold of this species is poor, and it is usually prone to one or more pathogens that reduce its structural integrity.

The following trees are regularly found on Grand River Conservation Authority lands; the failure potential of each is indicated.

White Fir – medium failure potential	Balsam Fir – medium failure potential
Manitoba Maple – high failure potential	Norway Maple – medium failure potential
Red Maple – medium failure potential	Silver Maple – medium failure potential
Sugar Maple – low failure potential	Horsechestnut – medium failure potential
Tree-of-Heaven – high failure potential	Paper Birch – medium failure potential
White Birch – medium failure potential	Common Catalpa – medium failure potential
Hawthorne – low failure potential	American Beech – low failure potential
Green Ash – medium failure potential	White Ash – medium failure potential
Honeylocust – medium failure potential	Black Walnut – medium failure potential
Larch – medium failure potential	Tuliptree – medium failure potential
Crabapple/Apple – low failure potential	Norway Spruce – Low failure potential
White Spruce – medium hazard potential	Blue Spruce – medium failure potential
Austrian Pine – medium failure potential	White Pine – medium failure potential
Scots Pine – medium failure potential	Sycamore – low failure potential
White Poplar – high failure potential	Eastern Cottonwood – high failure potential
Lombardy Poplar – high failure potential	Trembling Aspen – high failure potential
Black Cherry – low failure potential	White Oak – low failure potential
Bur Oak – low failure potential	English Oak – low failure potential
Red Oak – low failure potential	Black Locust – high failure potential
White Willow – high failure potential	Black Willow – high failure potential
Weeping Willow – high failure potential	Mountain Ash – medium failure potential
White Cedar – low failure potential	Basswood – medium failure potential
Hemlock – medium failure potential	American Elm – medium failure potential

Section 2 – Size Rating

The size of the hazard plays an important role in prioritizing which hazards must be abated first. Size rating can be assessed in one of two ways: the size of the defective part (ie: dead branch, weak branch union) can be rated, or the entire tree can be rated. The



size of the part plays a significant role in how much potential damage tree failure can cause.

However, it must be noted that smaller sized hazards have the ability to cause extensive damage or injury. Thus, smaller hazards should not be overlooked. Common sense dictates that the larger hazards must be given priority.

The hazard tree rating system rates size hazard in one of three categories:

1. Small Hazard – the tree or hazardous part is of a small size, 6” or less in diameter
2. Medium Hazard – the tree or hazardous part is of a larger size, 6”-16” in diameter
3. Large Hazard – the tree or hazardous part is of a considerably large size, 16” or more in diameter

In some cases, where the tree has a small diameter but a considerable height, the size factor may have to be adjusted. Tall, spindly trees have considerable hazard potential, and therefore the size rating should be adjusted accordingly. Adjustment of the size rating to accommodate tall trees with small diameters should be made at the discretion of the arborist.

Section 3 – Target Rating

In order for a tree to be hazardous, it must have a target. A tree in an out-of-the-way place, far from any public activity, is not hazardous despite that fact that it might have failure potential.

Targets are judged according to usage. Some areas receive high usage, while others see only occasional usage. The hazard tree rating system rates hazard tree targets according to one of the four following categories:

1. Occasional Use – areas which are infrequently used; these areas include open lawn areas, trails, wooded areas
2. Moderate Use – areas which receive active but not constant/regular use; these areas include walkways, picnic areas, passive open recreation areas, infrequently used driveways
3. Frequent Use – areas which receive regular use; these areas include driveways, park roads, cottage lot roads, sheds, outhouses, picnic shelters, parking areas, tent or seasonal campsites, concessions; they also include phone lines, cable lines, or secondary utility lines
4. Constant Use – areas which are extensively used; these areas include residence structures(houses, cottages, garages), municipal roads, community structures, permanent campsites; they also include primary utility conductors and distribution conductors



Identifying the target is important in identifying a hazard tree. The target often dictates the urgency that a hazard tree is dealt with. Careful inspection of a site is necessary to determine the exact target potential of a hazard tree.

Section 4 – Tree Condition Rating

Tree condition is an important consideration when assessing a tree for hazard potential. A tree in decline may not be immediately hazardous, but it will become hazardous in the future if it continues to decline. Rating the condition of the tree is especially important in flagging future hazards. This also assists in predicting future tree work needs.

The hazard tree rating system rates condition in one of three categories:

1. Good Condition – the tree shows good, healthy growth and little or no evidence of stress or decline
2. Average Condition – the tree is in average condition; it may show some evidence of stress or decline, but not in a manner which threatens its survival
3. Poor Condition – the tree is in decline; it shows small leaf size, reduced vigor, crown dieback, and/or other features indicating stress or decline

The condition of the tree should be carefully noted when rating a hazard tree. This permits the inspector to compare the tree condition from year to year, and thus map decline.

Section 5 – Tree Structure Rating

Structure is perhaps the most important aspect of assessing the potential of a tree to fail. Trees are massive, complex organisms, and any compromise in the structural integrity of the tree can result in catastrophic failure. The list of possible structural defects that a tree can possess is large, but some of the more common defects have been listed below.

Weak Branch Unions	These are places where branches are not strongly attached to the tree. Trees with a tendency to produce upright branches, such as Elm and Silver Maple, often have weak branch unions.
Wood Decay	Wood decay, usually the result of some parasitic pathogen, creates cavities which make the tree inherently unstable by weakening its support structure.
Cankers	A canker is a localized area on the stem or branch of the tree, where the bark is sunken or missing. Cankers are caused by some external pathogen, and there is always a likelihood of branch failure at or near the canker.
Growth Pattern	Poor tree growth, such as a lean, branches which are



larger than the trunk, and crown deformity, can result in trees which are unsafe.

In many cases, one structural defect will not make the tree a hazard; however, combinations of these and other defects will give the tree the potential to fail. In some cases, one defect may make the tree hazardous. For example, a perfectly healthy Red Oak with a major basal cavity (cavity near the base of the trunk) is a hazard, despite its many other positive characteristics.

The hazard tree rating system rates tree structure in one of the following 4 categories:

1. Good Structure – the tree is structurally sound according to the accepted standards of its species. There are no evident structural compromises.
2. Average Structure – the tree has acceptable structure. While there may be some minor structural problems, they do not warrant immediate concern.
3. Poor Structure – the tree has one or more structural defects that warrant concern. Failure at one of these defects is possible.
4. Severe Structure – the tree has at least one major structural defect. This defect has immediate failure potential. This one point may override all other factors and result in immediate removal of the hazard.

Assessing the tree for structural defect is often the most difficult part of the inspection protocol. To properly inspect a tree, a careful ground level inspection should be done. In some cases, the arborist may have to ascend to the crown of the tree for an aerial inspection. Also, some limited root excavation may be required to thoroughly assess root condition and defects. For efficiencies sake, the ground level inspection is sufficient in most cases, but further inspection may be required if the ground level inspection raises additional concerns.

Rating Summary

The preceding 5 rating categories are designed provide a standardized system for assessing trees for hazard potential. In review, they are as follows:

Species Rating	1-Low Failure Rate	2-Medium Failure Rate	3-High Failure Rate	
Size Rating	1-Small Hazard	2-Medium Hazard	3-Large Hazard	
Target Rating	1-Occasional Use	2-Moderate Use	3-Frequent Use	4-Constant Use
Condition Rating	1-Good Condition	2-Moderate Condition	3-Poor Condition	
Structure Rating	1-Good Structure	2-Average Structure	3-Poor Structure	4-Severe Structure

After rating each category, the categories are totaled and the total is the Hazard Tree Rating. The rating is as follows:



16-17	Tree is an extreme hazard and requires urgent abatement of hazard
14-15	Tree is hazardous and should be abated in a timely manner
10-13	A tree at risk; it should be monitored regularly for change
9 or less	Tree is not hazardous

As mentioned, if the assessor feels that one factor overrides all others, he/she can give the tree a hazard rating of 'OV' (override), indicating it must be removed at the earliest possible opportunity. Also, a dead tree should be given a rating of 'DEAD', and should be prioritized accordingly.

PART 3 – ABATEMENT STRATEGY

A large part of the preceding document has dealt with inspection and assessment. However, eliminating the actual hazards is perhaps the most crucial part of hazard tree management. The hazard tree rating system is designed to help prioritize work, so that tree hazards are removed in the most efficient manner possible.

Hazards are prioritized according to the rating they receive under the hazard tree rating system.

Abatement Methods

During the inspection procedure, the arborist must make a decision on the best way to abate the hazard. There are three primary methods of abating a tree hazard:

1. Tree Removal – removal of the entire tree is a drastic step, but is often necessary when a tree has serious structural defects. Dead trees also must be removed.
2. Pruning / Selective Branch Removal – Branch removal is often all that is required to abate a hazardous tree part.
3. Correction – there are several techniques which can be used to correct defects in trees. Steel braces and/or cables are commonly installed to strengthen weak branch unions. However, correction does not remove the hazard. Correction activities can be undertaken to extend the safe life of a tree, but should be used only when the tree has significant historic or landscape value. Installation of correction devices should be followed by routine inspection to insure that the devices are functioning correctly.

A crucial part of assessing a hazard tree is a careful estimate on the time and cost of the proposed hazard abatement. This allows for cost forecasting and more efficient budget management.

Preventative Hazard Management



An important part of a successful tree hazard abatement strategy is preventative hazard management. In this case, small trees that show hazardous potential are removed before they become large. This allows for easier, cost-effective hazard management. One of the problems with this strategy is the negative public perception of removing small, healthy trees. It is difficult to justify removing a young, vigorously growing tree for the sake of future cost savings. However, this strategy can be easily incorporated with other hazard abatement strategies to maximize spending and reduce future costs.

Preventative hazard tree management is a more feasible strategy for such areas as Active- and Passive-use Conservation Areas, where public outcry is less likely. The long term cost savings of this strategy are considerable.

Marking Trees

When a tree has been identified as a hazard, it must be marked for future identification. However, because of the high use nature of GRCA lands, permanently marking a tree in a highly distinguishable manner can often cause contention with the public. Thus, it is advisable that the tree not be marked until immediately before it is scheduled for removal. In some cases, using non-permanent methods such as flagging tape is preferable to permanent methods such as paint. This allows the mark to be removed if the tree, for some reason, cannot be removed.

POLICY CONCLUSIONS

The importance of adhering to this policy cannot be underestimated. Often, tree removal becomes an issue of debate between differing opinions. The purpose of a policy is to guarantee a consistent response to situations regardless of current political or public opinions.

The Hazard Tree Policy is designed to ensure the safety of all people using Grand River Conservation Authority properties. It seeks to deal with tree maintenance issues in a responsible and efficient manner, while maintaining safe conditions throughout Grand River Conservation Authority lands.

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