



## Composition of Community Forest

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Trees have been a component of human settlement for many centuries, either in forests, in the countryside, or in cities and towns. Trees were planted around homes and churches, in cemeteries, school yards, parks, boulevards and many other places, thereby placing an accent on their aesthetic function. Because of this traditional context, tree planting and maintenance were subordinated to a single-tree level, and the connections among them and their collective importance was not thought to be a consideration. More recently, the importance of trees in settled landscapes has increased because of climate change, increasing pollution levels, and an expansion of build up areas, all resulting in degradation or continuous loss of forests and trees within and around urban areas. These dramatic changes in the environment have significantly emphasized the ecological value of trees in urban areas. It has been only in the last few decades that trees in towns have been thought of as a forest that improves our environment and provides us with many benefits.

Urban forests, as a product of nature and human activity, can have a very complex structure. With a more detailed look at urban forests, you can see many differences in forest cover alone. The structure and the quality of urban forests differ among parks, ravines, industrial areas, downtowns, streets, and residential areas. Trees from each of these areas have an impact on the urban forest as an entity, and all of them collectively are the urban forest. The structure of the urban forest has been analyzed from different angles. The ownership of trees in a community is summarized, as well as species and genera distribution, diameter class distribution, distribution of native trees, and distribution of conifers versus deciduous trees. This approach is needed to make informed management decisions and to apply proper maintenance techniques. For instance, species distribution does not necessarily reflect real canopy cover in a community. Some species could be numerous, but small in size and thereby not maximizing their contribution to the urban forest. Meanwhile, another species could be less common, but because of its large size, dominate the canopy. By knowing the species distribution it is possible to increase the number of native species versus non-native in future plantings, and to put more emphasis on species diversity. These aspects of composition and structure of the community forest are presented in the following chapter and discussed in the summary of this report.

Residential trees have a meaningful role in towns as a substantial part of the entire urban forest. One third (30%), is composed of trees growing in residential areas. Similarly, the highest percentage of canopy cover is generally found on residential land, vacant and parkland (Nowak 1994). By understanding urban forest composition throughout an entire community, it is possible to identify opportunities to enhance the urban forest as well as address its limitations. Good planning and management practice begins with a comprehensive understanding of the urban forest composition.. Good planning and management can help maximize environmental, economic and social benefits by improving the quality of the community forest.



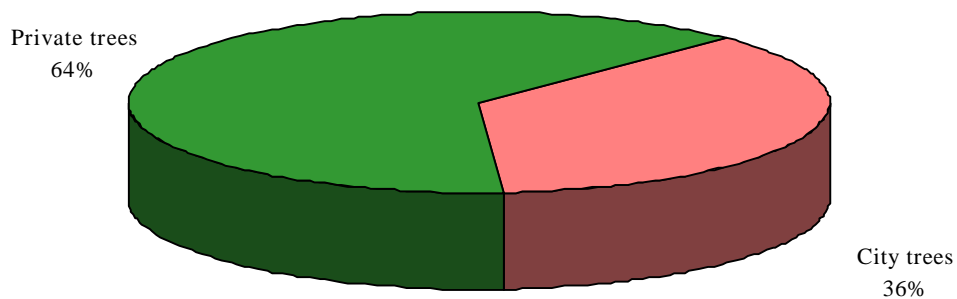
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## Distribution of Trees on Public and Private Land

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The ownership of trees is an important aspect to consider in good urban forest management. Typically, about one third of the trees in the urban forest may be found in parks and on streets. These are publicly owned, and their care is the responsibility of the City. The remaining two-thirds of the trees in a city are found on private property, where species choice, tree establishment, and tree maintenance are the responsibility of the owner. The proportion of privately and publicly owned trees in the community is shown in Figure 1.

**Figure - 1. Proportion of municipally owned trees vs. privately owned trees**



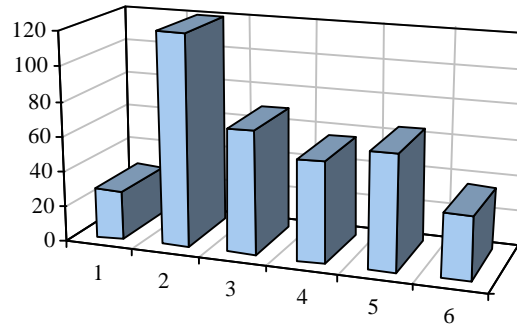


## Distribution of Diameter Classes in the Community

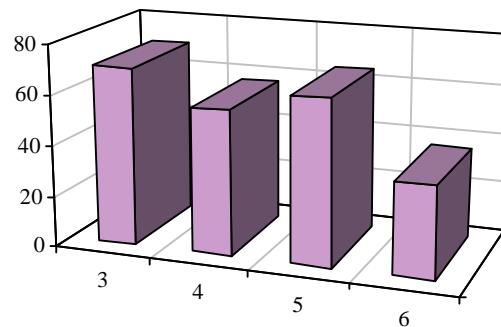
The size of a tree will determine the extent of many of the benefits that the tree provides to the community. Larger trees have a greater effect on micro-climate and hydrology, sequester more carbon dioxide, trap more dust and pollutants, and provide more wildlife habitat. The appraised value of a tree, increases with the square of the radius of the tree's cross-section. For many species, size will also provide an estimate of the relative age of an individual.

The distribution of all trees in the community by diameter is presented in Figure -2. For clarity, Figure -3 shows the distribution of the largest diameter classes.

**Figure - 2. Number of trees in each of six diameter classes**



**Figure -3. Number of trees in diameter classes greater than 30 cm**



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Diameter classes:  
1- 0-15.5cm  
2- 15.6-30.5cm  
3- 30.6-45.5cm  
4- 45.6-60.5cm  
5- 60.6-76.5cm  
6- >76.6cm



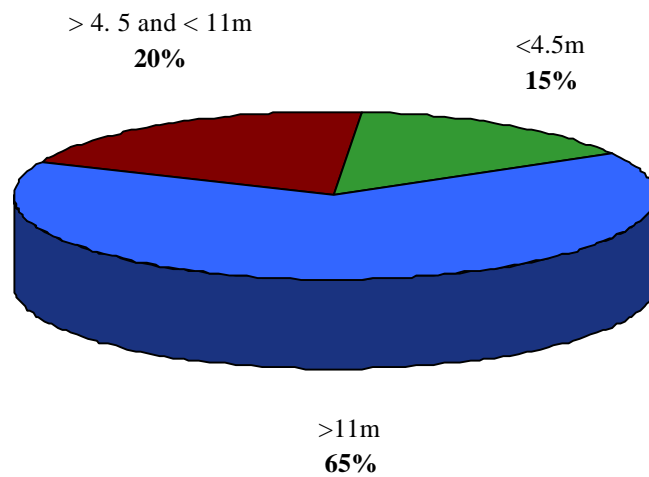
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## Distribution of Trees by Height Classes in the Community

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There is a trend towards planting smaller trees in urban environments, as they are better able to cope with aboveground restrictions, such as power lines, signs, and buildings. However, these trees don't provide the same positive effects on the environment, as do larger trees. Cities need larger trees that can form a closed canopy. Larger trees abundant enough to cover about half the city's surface can: reduce the speed of winter winds, cool pavement and shade buildings in the summer, attenuate storm water, improve air quality by intercepting airborne pollutants, and generally improve the urban landscape, etc.(Moll 1989).The proportion of all trees in each height class, as measure of urban forest structure, is shown in Figure 4.

**Figure - 4. Proportion of trees by height classes**



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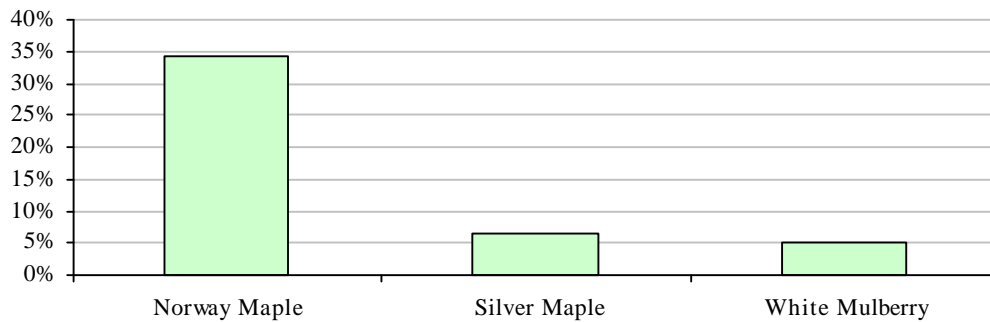
*Height Classes:*  
*Height class 1 - 1- 4.5m*  
*Height class 2- 4.5-11m*  
*Height class 3- >11m*



## Distribution of Species in the Community

In order to increase biodiversity in the urban forest, it has been suggested that no more than 5% of the trees in a community should be of the same species (Moll 1989). Biodiversity ensures against the rapid and devastating loss of trees due to pest or disease epidemics. Consider, for example, the American Elm that used to be the main tree species component in many eastern North American cities. The spread of Dutch Elm Disease killed most elms in a relatively short time, leaving behind severely depleted urban forests.

**Figure -5. Contribution of species represented with more than 5% of the total trees in the community**



The species which represent 5% and more of the population in the community are shown in Figure - 5. The number of trees in all species is shown in Table - 1. The distribution of species and diameter classes is shown in Figure - 6.

**Table -1. Number of trees by species.**

Common name	Number of Trees	Proportion of Total Number of Community Trees
<i>Norway Maple</i>	129	34.31%
<i>Silver Maple</i>	24	6.38%
<i>White Mulberry</i>	19	5.05%
<i>Siberian Elm</i>	18	4.79%
<i>Manitoba Maple</i>	13	3.46%
<i>Eastern White-Cedar</i>	12	3.19%
<i>Tree of Heaven</i>	12	3.19%

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**Table -1. Number of trees by species.**

Common name	Number of Trees	Proportion of Total Number of Community Trees
<i>Colorado Spruce</i>	11	2.93%
<i>Paper Birch</i>	11	2.93%
<i>Norway Spruce</i>	10	2.66%
<i>White Spruce</i>	10	2.66%
<i>Little-Leaf Linden</i>	9	2.39%
<i>American Elm</i>	7	1.86%
<i>Basswood</i>	7	1.86%
<i>Black Locust</i>	7	1.86%
<i>Apple/Crabapple sp.</i>	6	1.60%
<i>Honey Locust</i>	6	1.60%
<i>Cherry (Fruit)</i>	5	1.33%
<i>Red/Green Ash</i>	5	1.33%
<i>Common Horsechestnut</i>	4	1.06%
<i>English Oak</i>	4	1.06%
<i>Northern Catalpa</i>	4	1.06%
<i>Showy Mountain-ash</i>	4	1.06%
<i>Black Walnut</i>	3	0.80%
<i>Ginkgo</i>	3	0.80%
<i>Gray Birch</i>	3	0.80%
<i>Japanese Maple</i>	3	0.80%
<i>White Oak</i>	3	0.80%
<i>White Pine</i>	3	0.80%
<i>Crack Willow</i>	2	0.53%
<i>European Beech</i>	2	0.53%
<i>London Plane</i>	2	0.53%
<i>Red Oak</i>	2	0.53%
<i>Sugar Maple</i>	2	0.53%
<i>Alder Buckthorn</i>	1	0.27%
<i>American Beech</i>	1	0.27%

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**Table -1. Number of trees by species.**

Common name	Number of Trees	Proportion of Total Number of Community Trees
<i>Austrian Pine</i>	1	0.27%
<i>Blue Beech</i>	1	0.27%
<i>Choke Cherry</i>	1	0.27%
<i>European Hornbeam</i>	1	0.27%
<i>Red Maple</i>	1	0.27%
<i>Red Pine</i>	2	0.53%
<i>Scot's Pine</i>	1	0.27%
<i>Upright Japanese Yew</i>	1	0.27%
<b>Total Number of Trees:</b>	<b>376</b>	



## Distribution of Species by Diameter Classes (only those >3% of the total tree population are shown)

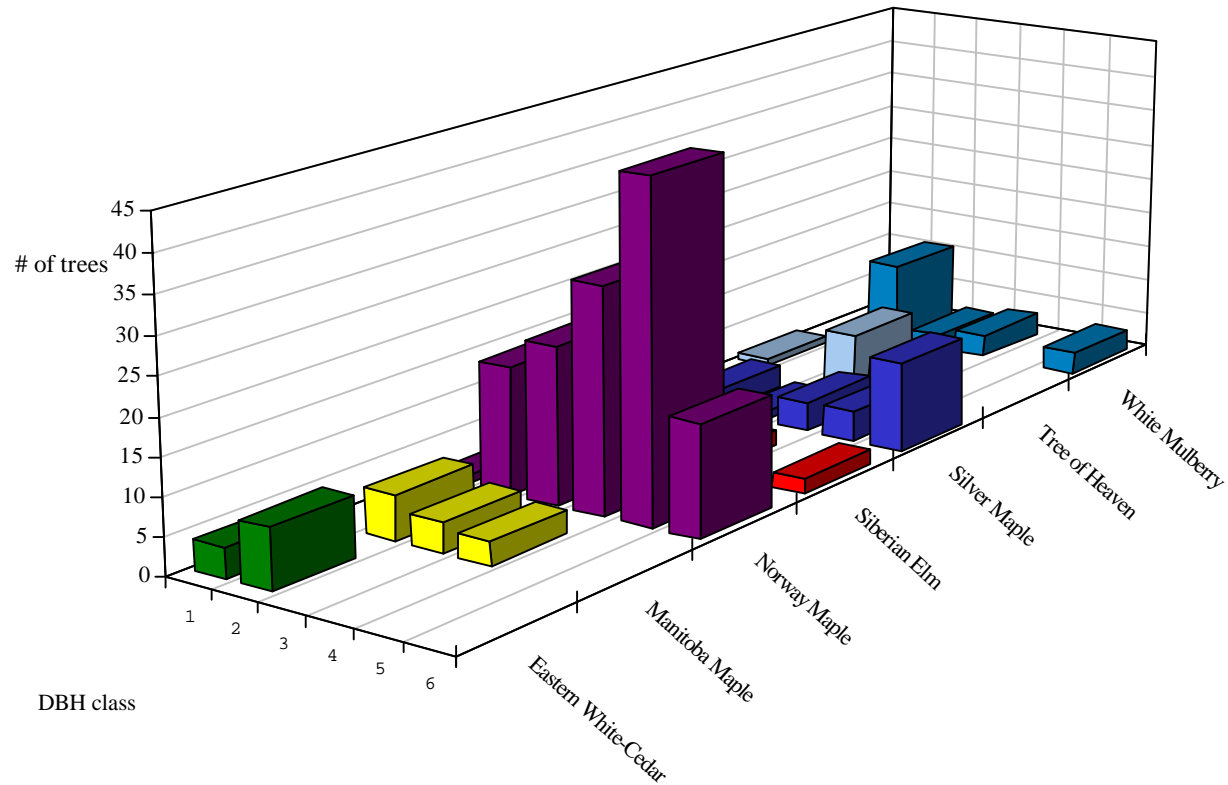


Figure - 6. Number of trees by species and each diameter class

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Diameter classes:

- 1- 0-15.5cm
- 2- 15.6-30.5cm
- 3- 30.6-45.5cm
- 4- 45.6-60.5cm
- 5- 60.6-76.5cm
- 6- >76.6cm



## Distribution of Genera in the Community

Similar to species biodiversity, it has been suggested that no more than 10% of the trees in a community should be of the same genus (Moll, 1989).

Figure -7. illustrates the distribution of the genera which represent more than 10% of the total tree population.

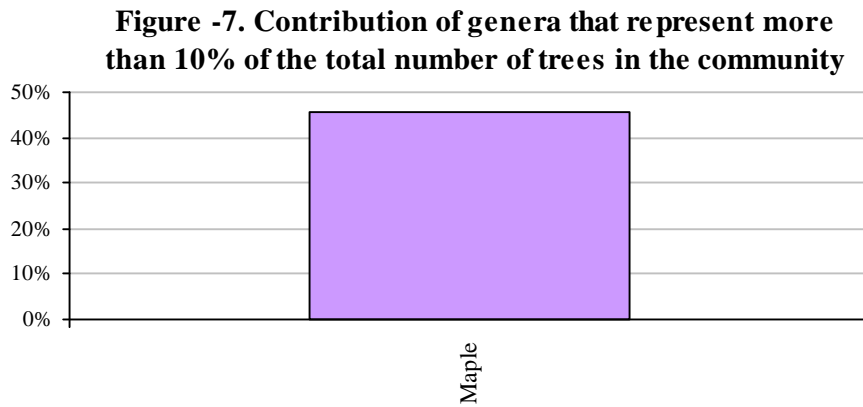


Table - 2. summarizes the number of trees by genus. The distribution of genera by diameter class is shown in Figure -8.

**Table -2. Number of trees by genera**

Genus	Number of Trees	Proportion of Total Number of Community Trees
<i>Maple</i>	172	45.74%
<i>Spruce</i>	31	8.24%
<i>Elm</i>	25	6.65%
<i>Mulberry</i>	19	5.05%
<i>Linden-Basswood</i>	16	4.26%
<i>Birch</i>	14	3.72%
<i>Cedar (Thuja)</i>	12	3.19%
<i>Tree of Heaven</i>	12	3.19%
<i>Oak</i>	9	2.39%
<i>Black Locust</i>	7	1.86%
<i>Pine</i>	7	1.86%
<i>Apple/Crabapple</i>	6	1.60%

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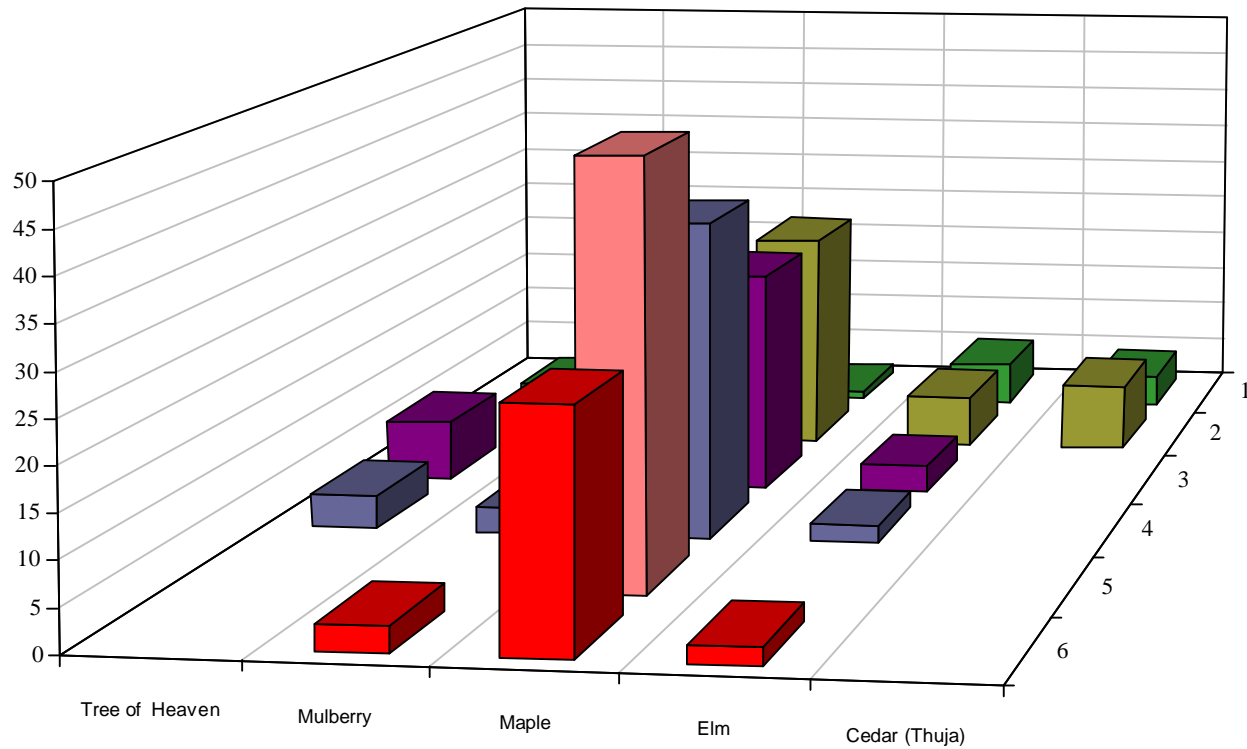
**Table -2. Number of trees by genera**

Genus	Number of Trees	Proportion of Total Number of Community Trees
<i>Cherry/Plum</i>	6	1.60%
<i>Honey Locust</i>	6	1.60%
<i>Ash</i>	5	1.33%
<i>Buckeye/Horsechestnut</i>	4	1.06%
<i>Catalpa</i>	4	1.06%
<i>Mountin Ash/Whitebeam</i>	4	1.06%
<i>Beech</i>	3	0.80%
<i>Ginkgo</i>	3	0.80%
<i>Walnut/Butternut</i>	3	0.80%
<i>Ironwood-Hornbeam</i>	2	0.53%
<i>Plane-Sycamore</i>	2	0.53%
<i>Willow</i>	2	0.53%
<i>Buckthorn</i>	1	0.27%
<i>Yew</i>	1	0.27%
<b>Total Number of Trees</b>	<b>376</b>	



**Distribution of Genera by Diameter Classes (only those >3% of the total tree population are shown)**

**Figure -8. Number of trees by genera and each diameter class**



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Diameter classes:  
1- 0-15.5cm  
2- 15.6-30.5cm  
3- 30.6-45.5cm  
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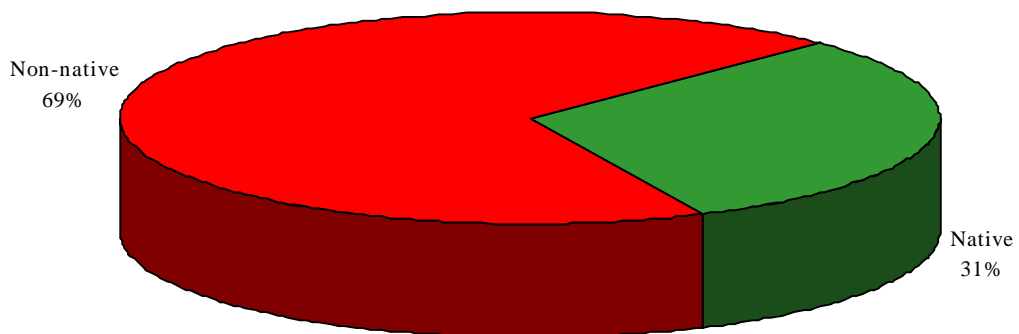
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## Distribution of Native Trees, Deciduous and Conifers in the Community

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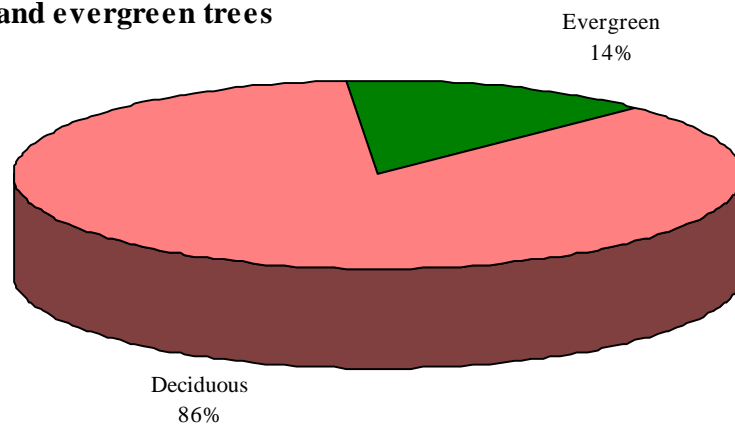
There is growing concern about the spread of “non-native” trees in our communities. Figure -9. illustrates the proportion of non-native trees in the community. We use the term non-native to mean those species which do not grow naturally in the region. (See Table -15).

**Figure - 9. Proportion of native and non-native trees**



Similarly, Figure -10. shows the proportion of coniferous and deciduous trees (softwoods and hardwoods) found in the community. Figure -11. and Figure -12. show the diameter distribution for native vs non-native, and coniferous vs deciduous species.

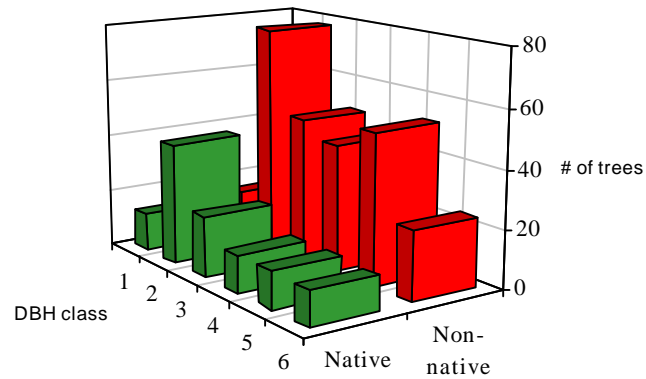
**Figure - 10. Proportion of deciduous and evergreen trees**



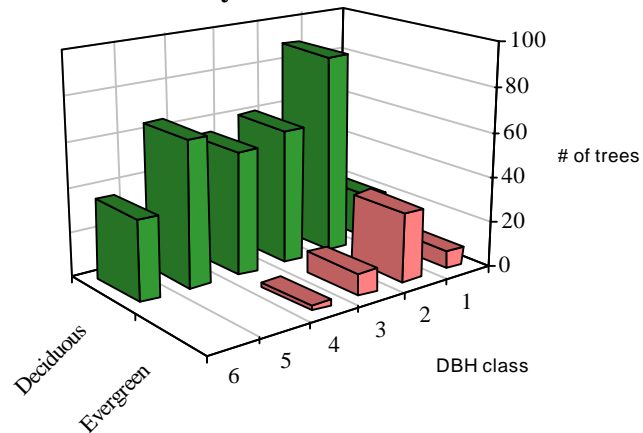


## Distribution of Native vs Non-native and Conifers vs Deciduous Trees by Diameter Classes

**Figure -11. Number of native and non-native trees by each diameter class**



**Figure - 12. Number of evergreen and deciduous trees by each diameter class**



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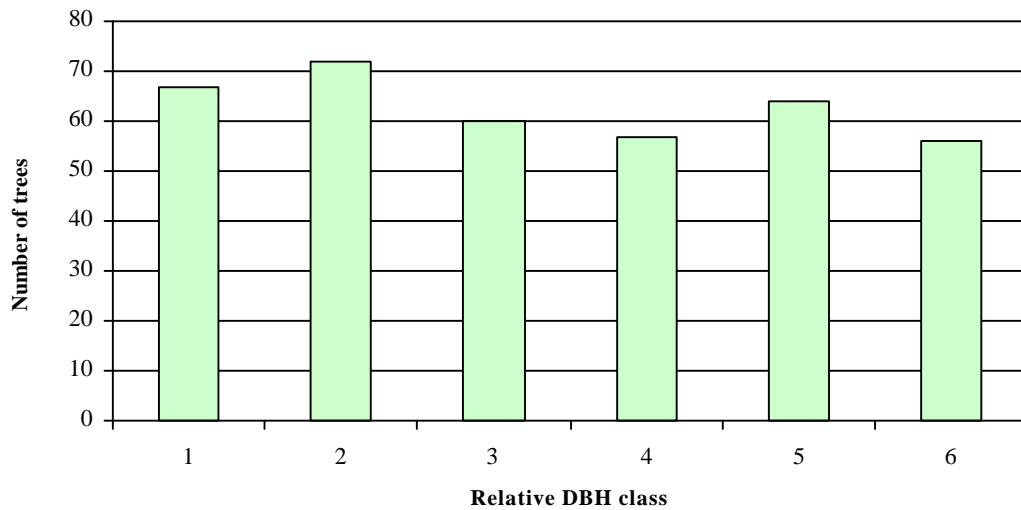
Diameter classes:  
1- 0-15.5cm  
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4- 45.6-60.5cm  
5- 60.6-76.5cm  
6- >76.6cm



## Relative DBH Distribution in the Community

The relative DBH is one way of representing age class distribution in the urban forest. Relative tree diameter is the ratio (percent) between a tree diameter and the maximum diameter for that species. The relative DBH can be used to compare the distribution of different species or to compare species that have different growth characteristics. A relative DBH near 100% indicates a mature tree.

**Figure 12a - Relative DBH distribution**



25 % of maximum BDH = class1  
26-40 % of maximum BDH = class 2  
41-55% % of maximum BDH = class 3  
56-70% % of maximum BDH = class 4  
71-85 % of maximum BDH = class 5  
>86% of maximum BDH = class 6