



City of Cambridge, Massachusetts  
Urban Forest Management Plan

# Current State of the Urban Forest

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## Introduction

The City of Cambridge covers an area of 7.13 square miles (6.39 square miles of land), with a population size of 109,694 as of 2014<sup>1</sup>. Approximately 30% of the land area in Cambridge is covered by tree canopy<sup>2</sup>. The Department of Public Works and the City Arborist of the City of Cambridge manage a sizeable urban forest program, which includes maintaining public trees, cleaning up after storms, protecting trees in construction zones, and guiding replanting efforts.

As part of the urban forest program, the City of Cambridge (the “City”) maintains a tree inventory to track the over 19,000 publicly owned trees in the city. This comprehensive inventory contains information on the species identity, size and location of all public trees, as well as site characteristics and planting information. The tree inventory was initiated in 2005, and the first inventory was completed in 2011. At the time of completion (December 2011), a report<sup>3</sup> was created to describe the street and park trees in the city. Both the tree inventory<sup>4</sup> and the 2011 report are freely available to the public on the City of Cambridge website.

The City continuously updates the tree inventory, whenever a new tree is planted or an old tree is removed or re-measured. Additionally, between 2012 and 2015 Earthwatch Institute ran an urban forest program in Cambridge, in which citizen scientists who were trained by a professional scientist measured thousands of public trees in the City. Since the 2011 report, approximately half of the records in the tree inventory have been updated, due to the combined efforts of City personnel and the citizen-scientists of Earthwatch.

The data upon which this report is based includes 22,566 tree inventory records, 18,735 of which are from the City of Cambridge (city tree inventory last updated January 16, 2016), and 3,831 of which were updated by Earthwatch researchers using data collected by citizen-scientists between 2012 and 2015.

The following section of the Urban Forest Management Plan for the City of Cambridge provides an analysis of the current state of the urban forest, based on the most up-to-date tree inventory. This section includes an update and expansion of the 2011 report, including details about the public trees in Cambridge, including their location, ownership, and distribution throughout the City. We compare the range of sizes and the species composition of street trees and park trees. We further examine the distribution and species composition of trees planted between 2007 and 2015, as well as the extent and distribution of empty tree wells throughout the City. Finally, we demonstrate how tree health condition varies across the City, separately for recently planted trees and for older trees.

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<sup>1</sup> United States Census Bureau. <http://www.census.gov/quickfacts/table/PST045215/2511000.00>. Accessed Feb 29, 2016.

<sup>2</sup> O’Neil-Dunne, J. 2012. A report on the City of Cambridge’s existing and possible tree canopy. University of Vermont Spatial Analysis Lab.

<sup>3</sup> Ciesielki, Linda and the City of Cambridge Department of Public Works Parks + Urban Forestry Division. 2011. The trees of the City of Cambridge: An analysis of the City’s street and park trees.

<sup>4</sup> [www.cambridgema.gov/theworks/ourservices/urbanforestry/treeinventory](http://www.cambridgema.gov/theworks/ourservices/urbanforestry/treeinventory).

## Urban Forest Overview

The tree inventory contains records for 20,773 trees in the public domain in the City of Cambridge, and an additional 1,117 tree well locations where a tree can be planted in the future (currently listed as ‘planting site’ or ‘stump’ in the tree inventory; **Table 1, Map 1**). The inventory does not include trees on private property (such as gardens, commercial property, University property, *etc.*).

### IN A NUTSHELL...

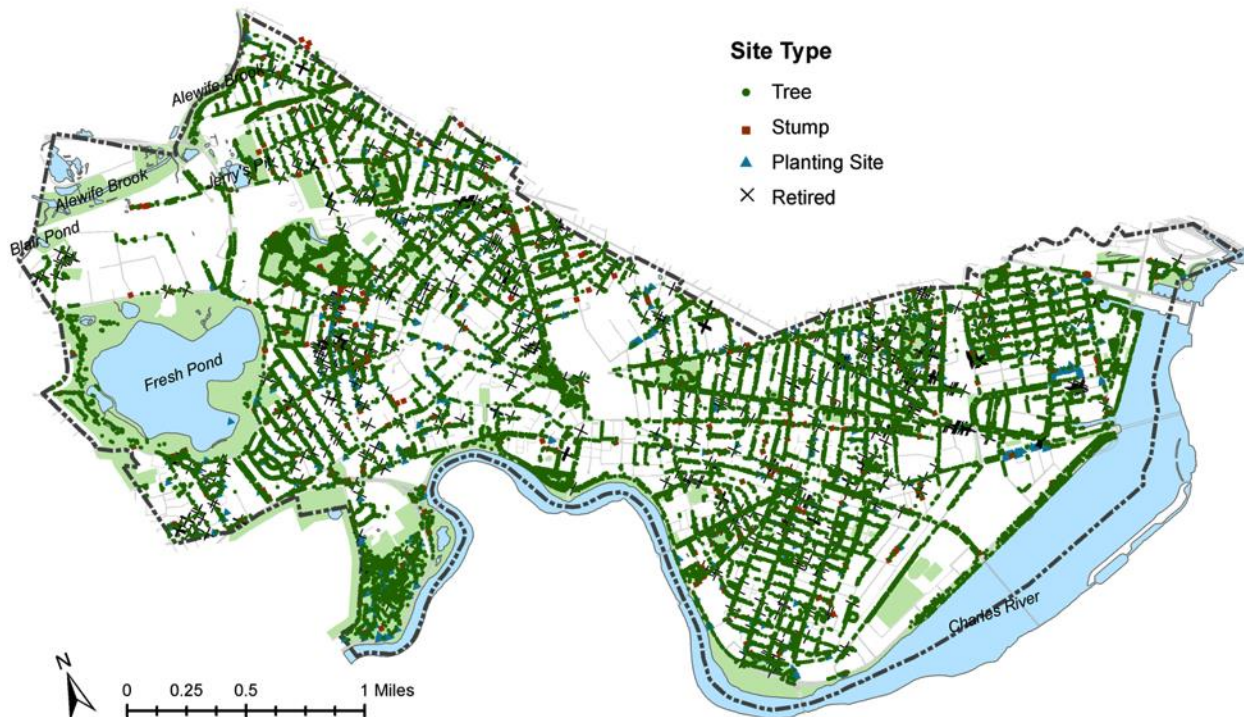
Of the 21,890 public tree wells in the City of Cambridge, 20,773 currently contain a tree.

The inventory contains an additional 676 records in the inventory for retired tree wells, which have been removed from all further analyses. These locations contained public trees at some point in the past, but they have been retired because they are either no longer suitable for sustaining a tree, or else planting a new tree would conflict with the requirements of the Americans with Disabilities Act (ADA).

**Table 1. Number of publicly owned trees and tree wells in the City, by site type.**

Site type	Tree	Stump	Planting Site	TOTAL
Trees and tree wells (count)	20,773	546	571	<b>21,890</b>

**Map 1: All City of Cambridge trees by site type.**

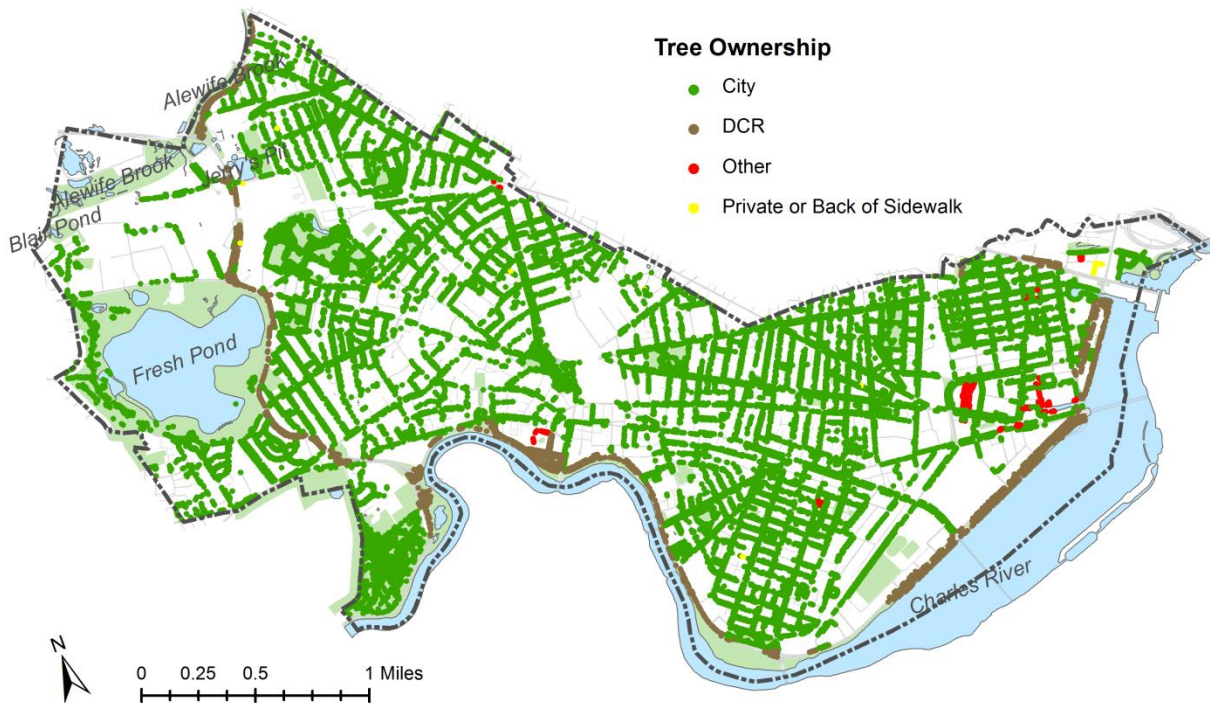




## Tree Ownership

Of the 21,890 public trees and tree wells, the City owns and maintains 19,801, and the Department of Conservation and Recreation (DCR) owns and maintains 1,748. The remaining 341 trees and tree wells are categorized as private or back of sidewalk trees, or are maintained by other entities than the City or the State (*Map 2*).

**Map 2: All City of Cambridge trees by ownership category.**



## Tree Location

The majority of all publicly owned trees and tree wells in Cambridge are classified as street trees (66.7% of City-owned sites, and 33.3% of DCR-owned sites). A large percentage of trees are also classified as park trees (23.0% of City-owned sites and 66.2% of DCR-owned sites). The remaining trees are located on public schools, college campuses, cemeteries, around city buildings, and at Fresh Pond golf course. These trees are shown in the “Not Street or Park” category in *Table 2 and Map 3*.

### IN A NUTSHELL...

- Most of the trees owned by the City of Cambridge are street trees, and most of the trees owned by DCR are park trees.

**Table 2. Number of public trees in the City of Cambridge, by site type and site location.**

Trees are owned by the City, the Department of Recreation (DCR), or other entities (Not City or State).

Tree Location	Site Type <sup>^</sup>	City	DCR	Not City or DCR	Total
Street	Tree	12,421	548	163	13,132
	Stump	352	11	3	366
	Planting Site	427	24	--	451
Park	Tree	4,386	1,130	123	5,639
	Stump	119	25	1	145
	Planting Site	41	2	1	44
Not Street or Park	Tree	1,944	8	50	2,002
	Stump	35	--	--	35
	Planting Site	76	--	--	76
<b>Total</b>		<b>19,801</b>	<b>1,748</b>	<b>341</b>	<b>21,890</b>

<sup>^</sup>Tree wells listed as “Planting Site” in the tree inventory are empty wells that are available for planting a new tree.

The majority of the analyses in this document focus on trees owned by the City or by DCR, and only rarely discusses the 341 trees that are not owned by the City or DCR (i.e., “Not City or DCR” category in **Table 2**). Furthermore, the analyses are focused on Street and Park trees, and thus the 2,063 trees owned by the City or DCR that are not located along streets or within parks (i.e. “Not Street or Park” category in **Table 2**) are rarely discussed.

**Map 3. Location and classification of trees owned by the City of Cambridge.**



## Tree Size

The benefits a tree provides to the city and people living near it, such as shade, carbon sequestration, and stormwater filtration, increases exponentially with size<sup>5, 6</sup>. As a tree grows, it expands outward both from the tips of its branches as well as in the girth of its stems.

Beyond a certain size, the height of a tree is difficult to measure accurately, and so foresters often measure the size of a tree from the diameter of the main stem. Stem diameter varies not only with tree size, but also along the main stem. To allow for comparisons across species and forests, foresters around the world measure tree diameter at a standardized height of 4.5 feet above the ground. This measurement is known as diameter at breast height, or DBH.

The annual diameter increase of trees varies by species, as well as based on environmental conditions and the health of the tree. Thus, although tree DBH increases with age, it is not possible to directly calculate the age of a tree based solely on its DBH. However, it is reasonable to assume that tree size is roughly proportional to tree age, and thus the largest trees in the inventory are among the oldest trees in the city.

Here we look at the size class distribution of street trees and park trees by ownership (City or DCR). In a natural forest environment, trees compete with each other for space, light, and other resources. Due to this competition, there is a natural thinning process as trees get larger. Thus, in many natural forests, there is a higher abundance of trees in smaller size classes than in larger size classes. In the city, trees are generally planted far enough away from each other that they will not have to compete with each other for resources. However, the resources available to trees

### IN A NUTSHELL...

Nearly half (45.7%) of street trees are relatively small- sized (under 6 inches DBH). A combination of factors may contribute to this pattern.

1. *Recent Plantings*: approximately 300 trees between 1 and 4 inches DBH have been planted every year since 2008.
2. *Slow Growth Rates*: on average, young trees grow about ¼ of an inch DBH every year (for details see ***Scientific analysis of current trends in growth and survival of Cambridge's street trees and management recommendations*** section of Management Plan). Thus, it can take a tree 4 to 8 years of growth to pass from the first to second size class bin, and over a decade more to pass to the third size class bin.
3. *Tree deaths*: survival rates of the larger trees in Cambridge are lower than the younger trees. As the large trees die, the overall proportion of small trees increases.

<sup>5</sup> Maco, S. E., and E. G. McPherson. 2003. A practical approach to assessing structure, function, and value of street tree populations in small communities. *Journal of Arboriculture* 29:84–97.

<sup>6</sup> Stephenson, N. L., A. J. Das, R. Condit, S. E. Russo, P. J. Baker, N. G. Beckman, D. a Coomes, E. R. Lines, W. K. Morris, N. Rüger, E. Alvarez, C. Blundo, S. Bunyavejchewin, G. Chuyong, S. J. Davies, A. Duque, C. N. Ewango, O. Flores, J. F. Franklin, H. R. Grau, Z. Hao, M. E. Harmon, S. P. Hubbell, D. Kenfack, Y. Lin, J.-R. Makana, A. Malizia, L. R. Malizia, R. J. Pabst, N. Pongpattananurak, S.-H. Su, I.-F. Sun, S. Tan, D. Thomas, P. J. van Mantgem, X. Wang, S. K. Wiser, and M. A. Zavala. 2014. Rate of tree carbon accumulation increases continuously with tree size. *Nature* 507:90–3.



in a city are limited, particularly for street trees. Scientific studies have reported an average life expectancy rates for street trees ranging from 7 to 28 years<sup>7</sup> (for details on tree survival and growth in the City of Cambridge, see *Scientific analysis of current trends in growth and survival of Cambridge's street trees and management recommendations* section of Urban Forest Management Plan). Although natural tree reproduction processes in a city environment are limited, the City replaces dead trees with small trees, generally with an initial DBH of approximately 2 inches. Thus, we expect the size-class distribution to roughly follow the expected pattern for a natural forest, where there are many more trees in the smaller size classes compared to larger size classes.

Our analysis uses 3-inch and 6-inch size class bins. Note that in the inventory, City personnel measured DBH to the nearest inch until August 2015, at which time they began recording DBH measurements to the nearest 1/10<sup>th</sup> of an inch. All tree inventory data from Earthwatch Institute is recorded to the nearest 1/10<sup>th</sup> of an inch. Trees with a DBH bordering two size class bins are placed in the small size class bin (*ex.* a tree with a DBH of 3.0 inches is placed in the 0-3 inch size class bin).

## Street Trees

Of the 12,421 City-owned street trees, 12,360 have a recorded DBH. Of the 548 DCR-owned street trees, 547 have a recorded DBH. All of the 163 trees in the inventory that are not maintained by the City or DCR have a recorded DBH. The following analyses were completed on the 13,070 street trees with a recorded DBH.

Across all publicly owned street trees in the City (City-owned, DCR-owned, and trees not owned by the City or DCR), smaller trees make up the majority of publicly-owned street trees in Cambridge, as expected. Almost one quarter of all street trees have a DBH of 3 inches or less, and 45.7% have a DBH of 6 inches or less (*Table 3a, Figure 1*). Since 2011, the number of street trees with a DBH of 6 inches or less has increased by 236 trees.

The percentage of street trees with a small diameter (DBH of 6 inches or less) is higher in the City of Cambridge than in the neighboring City of Somerville<sup>8</sup>, but similar to the size class distribution of Lawrence, MA<sup>9</sup>.

The City owns and maintains the majority of the public street trees in Cambridge, and the size-distribution pattern for all street trees is driven primarily by the size class distribution of City-

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<sup>7</sup> Roman and Scatena. 2011. Street tree survival rates: meta-analysis of previous studies and application to a field survey in Philadelphia, PA, USA. *Urban Forestry & Urban Greening* 10(4): 269-274.

<sup>8</sup> Davey Resource Group. 2009. Street and Park/Public Space Tree Inventory Management Plan: Somerville, Massachusetts. [www.somervillema.gov/sites/default/files/documents/SomervilleTreeInventoryManagementPlan.pdf](http://www.somervillema.gov/sites/default/files/documents/SomervilleTreeInventoryManagementPlan.pdf) (Accessed May 21, 2016).

<sup>9</sup> Calvin, Jane. The Community Trees of Lawrence, MA. <http://www.mass.gov/eea/docs/dcr/stewardship/forestry/urban/docs/lawremgtplan.pdf> (Accessed May 21, 2016).

owned trees (**Table 3**). Among City-owned street trees, 24% have a DBH of 3 inches or less, and approximately 22% have a DBH between three and six inches. Only 5.2% of City-owned street trees have a diameter of 24 inches or more.

DCR owns and maintains 547 street trees with a recorded DBH. Compared to City-owned trees, the size class distribution of DCR-owned trees is skewed towards larger trees (**Table 3, Figure 2**). Only 13.5% of DCR trees are 3 inches or less in diameter, whereas 18.1% have a DBH of 24 inches or more. The City-owned street trees are skewed towards smaller trees because the city actively plants at least 300 new trees each year, whereas the DCR plants very few trees each year, and focuses instead on maintaining the trees that are already under its jurisdiction.

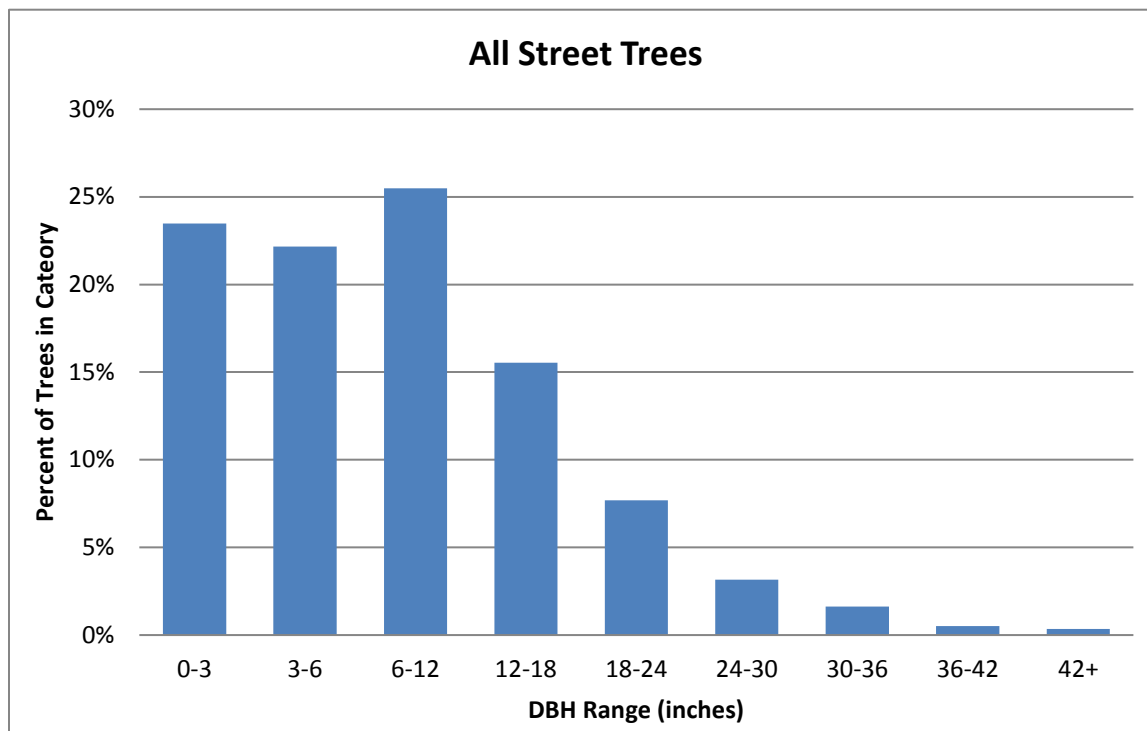
**Table 3. Size class distribution of street trees in the City<sup>§</sup>.**

a) All Street Trees <sup>%</sup>			b) City-owned Street Trees			c) DCR-owned Street Trees		
DBH range (inches)	Count	Percent of trees	DBH range (inches)	Count	Percent of trees	DBH range (inches)	Count	Percent of trees
0-3	3,069	23.5%	0-3	2,967	24.0%	0-3	74	13.5%
3-6	2,898	22.2%	3-6	2,727	22.1%	3-6	130	23.8%
6-12	3,331	25.5%	6-12	3,132	25.3%	6-12	146	26.7%
12-18	2,031	15.5%	12-18	1,927	15.6%	12-18	67	12.2%
18-24	1,004	7.7%	18-24	969	7.8%	18-24	31	5.7%
24-30	413	3.2%	24-30	395	3.2%	24-30	18	3.3%
30-36	212	1.6%	30-36	187	1.5%	30-36	25	4.6%
36-42	66	0.5%	36-42	48	0.4%	36-42	18	3.3%
42+	46	0.4%	42+	8	0.1%	42+	38	6.9%
<b>TOTAL</b>	<b>13,070</b>	<b>100%</b>	<b>TOTAL</b>	<b>12,360</b>	<b>100%</b>	<b>TOTAL</b>	<b>547</b>	<b>100%</b>

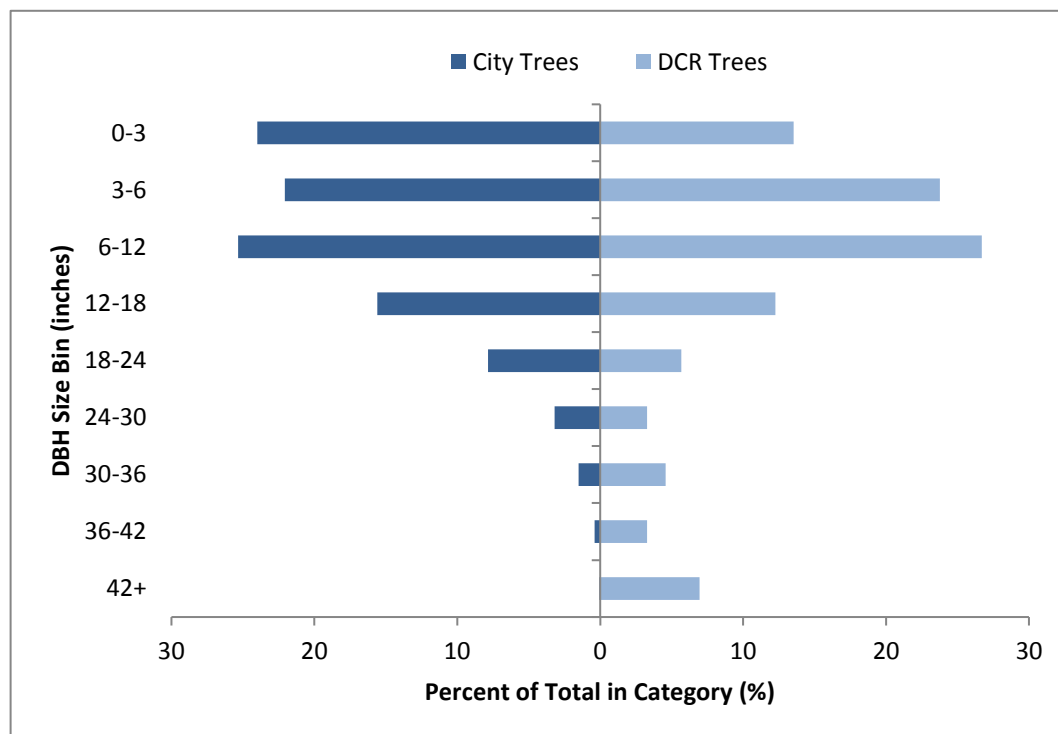
<sup>§</sup>Sixty-one City-owned street trees and one DCR-owned street trees were excluded from this analysis because they did not have a recorded DBH value.

<sup>%</sup>This category includes 12,361 City-owned street trees with a recorded DBH, 547 DCR-owned street trees with a recorded DBH, and 163 trees with a recorded DBH that are not maintained by the City or DCR.

**Figure 1. Size class distribution of all street trees in the City.**



**Figure 2. Size class distribution of City-owned and DCR-owned street trees in the City.**



## Park Trees

Of the 4,386 City-owned park trees, 12,4326 have a recorded DBH. Of the 1,130 DCR-owned park trees, 864 have a recorded DBH. Of the 123 trees in the inventory that are not maintained by the City or the State, 119 have a recorded DBH. The following analyses were completed on the 5,309 park trees with a recorded DBH.

Across all publicly trees in Cambridge, the percentage of park trees in the smaller size classes is lower than the percentage of street trees. Among all park trees in the inventory, only 10.4% have a DBH of 3 inches or less. The majority of park trees are in the 6 to 12 inch size-class bin (34.2% overall, and 35.6% of City-owned trees, **Table 4, Figure 3**). Although, compared to street trees, the size-class distribution of park trees is skewed toward larger trees, the percentage of trees in the largest size classes is lower among park trees. Only 3.5% of City-owned park trees are 24 inches or larger, compared to 5.2% of City-owned street trees. Among DCR-owned trees, only 9.5% of park trees are 24 inches or larger, compared to 18.1% of DCR-owned street trees.

The shifted size-class distribution in park trees suggests that fewer trees have been planted recently in parks compared to along streets. Similar to the pattern for street trees, the DCR-owned park trees are also further skewed towards larger trees than the City-owned trees (**Table 4, Figure 4**). This suggests that the City has planted more trees recently in parks than DCR has. The size-class distribution of park trees in Cambridge is similar to that of Somerville park trees<sup>8</sup>.

**Table 4. Size class distribution of park trees in the City<sup>§§</sup>.**

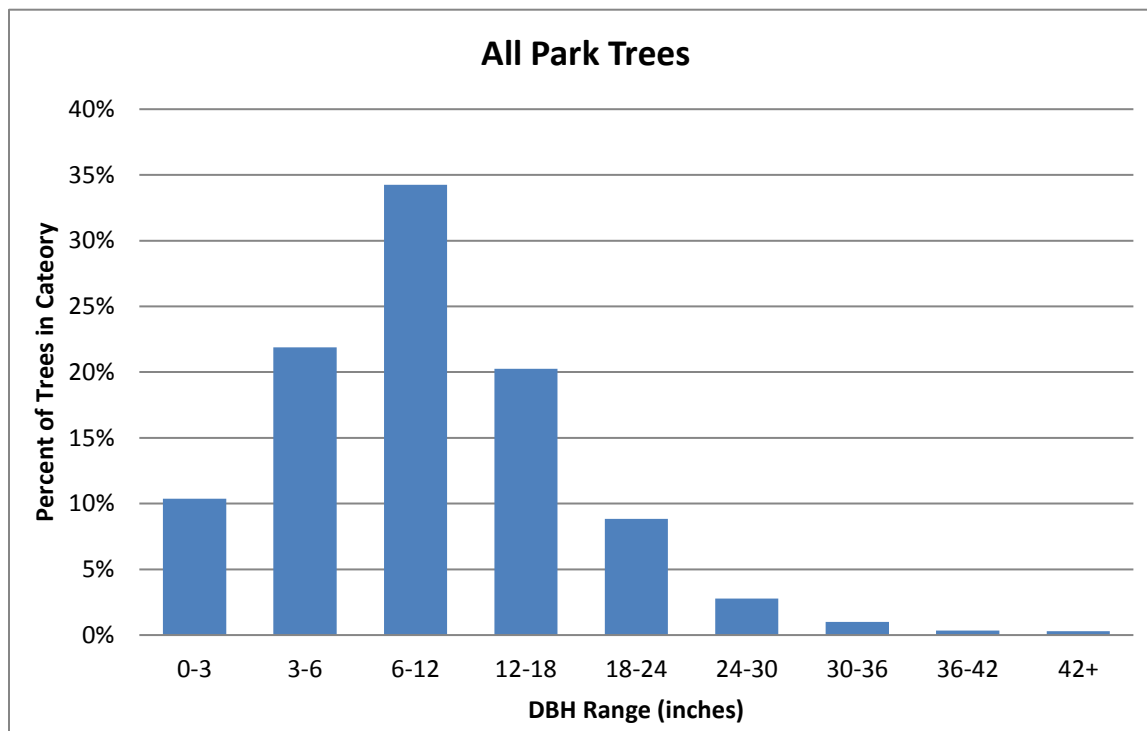
a) All Street Trees <sup>%%</sup>			b) City-owned Street Trees			c) DCR-owned Street Trees		
DBH range (inches)	Count	Percent of trees	DBH range (inches)	Count	Percent of trees	DBH range (inches)	Count	Percent of trees
0-3	551	10.4%	0-3	495	11.4%	0-3	50	5.8%
3-6	1,162	21.9%	3-6	1,011	23.4%	3-6	90	10.4%
6-12	1,818	34.2%	6-12	1,539	35.6%	6-12	238	27.5%
12-18	1,075	20.2%	12-18	818	18.9%	12-18	246	28.5%
18-24	469	8.8%	18-24	311	7.2%	18-24	158	18.3%
24-30	147	2.8%	24-30	86	2.0%	24-30	61	7.1%
30-36	53	1.0%	30-36	40	0.9%	30-36	13	1.5%
36-42	18	0.3%	36-42	12	0.3%	36-42	6	0.7%
42+	16	0.3%	42+	14	0.3%	42+	2	0.2%
<b>TOTAL</b>	<b>5,309</b>	<b>100%</b>	<b>TOTAL</b>	<b>4,326</b>	<b>100%</b>	<b>TOTAL</b>	<b>864</b>	<b>100%</b>

<sup>§§</sup>Sixty City-owned park trees, 226 DCR-owned park trees, and 4 trees not owned by the City or DCR were excluded from this analysis because they did not have a recorded DBH value.

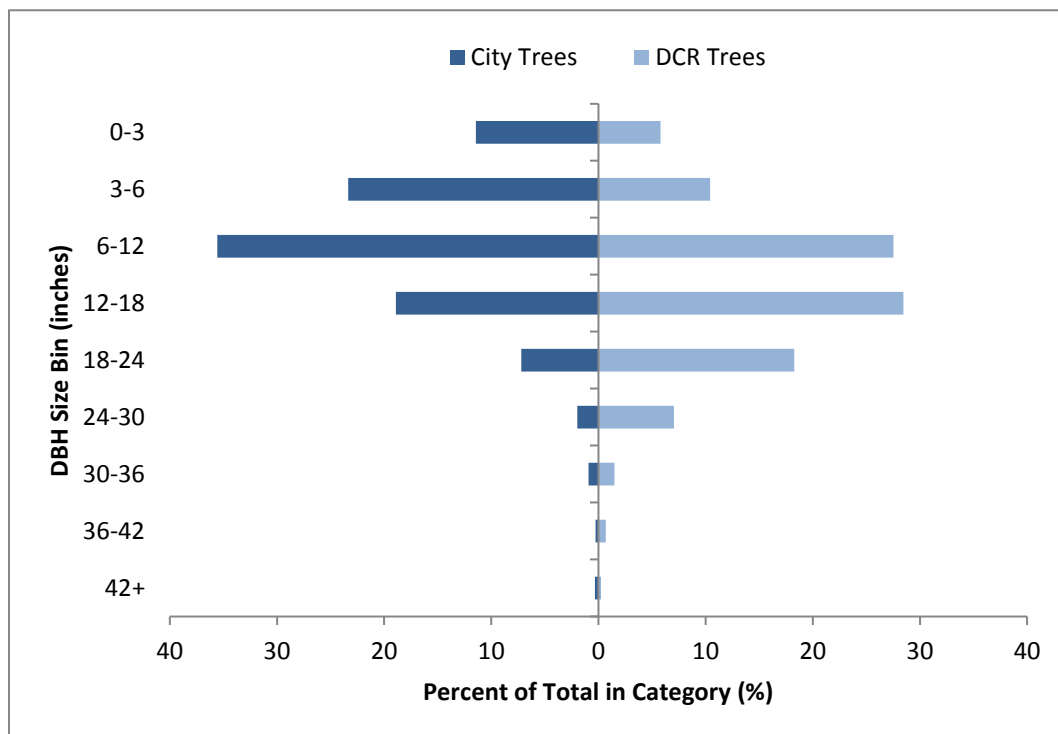
<sup>%%</sup>This category includes 4,326 City-owned park trees with a recorded DBH, 864 DCR-owned park trees with a recorded DBH, and 119 trees with a recorded DBH that are not maintained by the City or DCR.



**Figure 3. Size class distribution of all park trees in the City.**



**Figure 4. Size class distribution of City-owned and DCR-owned park trees in the City.**



## Species Composition

Among all publicly-owned trees in the city there are 140 unique tree species, and an additional 114 trees that have not been identified to species (see *Appendix A* for a complete list). Maintaining an urban forest with high species diversity is beneficial in various ways. Higher tree diversity increases the community and ecosystem benefits provided by the urban forest, such as providing greater aesthetic appeal and providing a wider range of habitats to support wildlife. Moreover, maintaining a diverse urban forest minimizes the impacts of pest outbreaks that target specific species, and also increases the urban forest's resiliency to climate change.

### IN A NUTSHELL...

- Maintaining a diverse number of species in an urban forest is important for maximizing community and ecosystem benefits. A diverse urban forest is for minimizing negative impacts of species-specific threats such as pest outbreaks, and for increasing resiliency to climate change.
- The public trees in the City are comprised of 140 unique tree species.
- The species diversity of City-owned trees is higher than DCR-owned trees.
- The diversity of park trees is higher than street trees

We present the species richness (total number of unique tree species) and species composition separately for street trees and park trees, and for City-owned trees versus DCR-owned trees.

Species richness is often correlated with number of individuals, and there are more City-owned trees than DCR-owned trees. Thus, in order to compare the species richness values between the city and DCR values, we also present *rarefied species richness*, whereby the expected species richness is modeled for equivalently sized samples in each category.

## Street Trees

Among the 12,421 City-owned street trees, there are 93 unique species and 11 trees that have not been identified to species. Among the 548 DCR-owned street trees there are 18 unique species and 4 trees that have not been identified to species. Using rarefied species richness ( $n = 544$ ), the tree diversity of City-owned trees is still higher than DCR-owned trees (City = 51 unique species, DCR = 18 unique species).

The City of Cambridge maintains a more diverse street tree population than the cities of Somerville or Brookline. The ten most commonly planted species comprise 87.3% of the street tree population in the City of Somerville<sup>8</sup>, and 82.2% of the street tree population in Brookline<sup>10</sup>, but only 67.2% of the street tree population in the City of Cambridge.

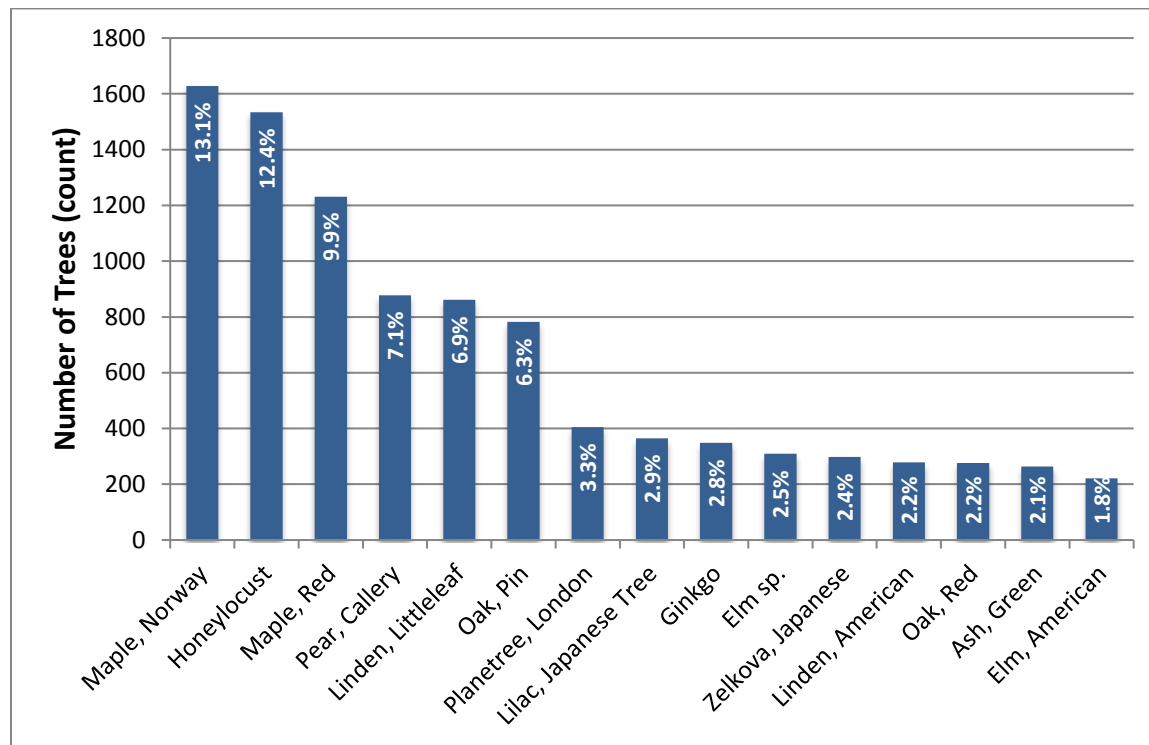
Six species make up over half of the City-owned street trees (55.7%; *Figure 5*). The most common City-owned street tree species is Norway Maple (1,628 trees, 13.1% of City trees), but

<sup>10</sup> <http://www.brooklinema.gov/579/Tree-Inventory> (Accessed May 21, 2016).

the proportion is lower than it was in 2011 (2,038 trees, 15.8% of all trees<sup>3</sup>). Norway Maple was placed on the Massachusetts Prohibited Plant List<sup>11</sup> as of 2009, and since that time no additional Norway Maples have been planted in the City. Thus, the abundance of this species is expected to continue to decline. Norway maple is also the most common species of street tree in Somerville<sup>8</sup>, Lawrence<sup>9</sup>, and Brookline<sup>10</sup>, although the percentage of Norway Maple street trees in the City of Cambridge is lower than in the other cities. The other five most abundant City-owned street tree species are Honeylocust (1,534 trees, 12.4%), Red Maple (1,231 trees, 9.9%), Callery Pear (878 trees, 7.1%), Littleleaf Linden (861 trees, 6.9%), and Pin Oak (782, 6.3%). Although no one species or cultivar of Cherry is abundant enough to be one of the 15 most abundant City-owned street tree species, in total there are 485 cherry trees (3.9%).

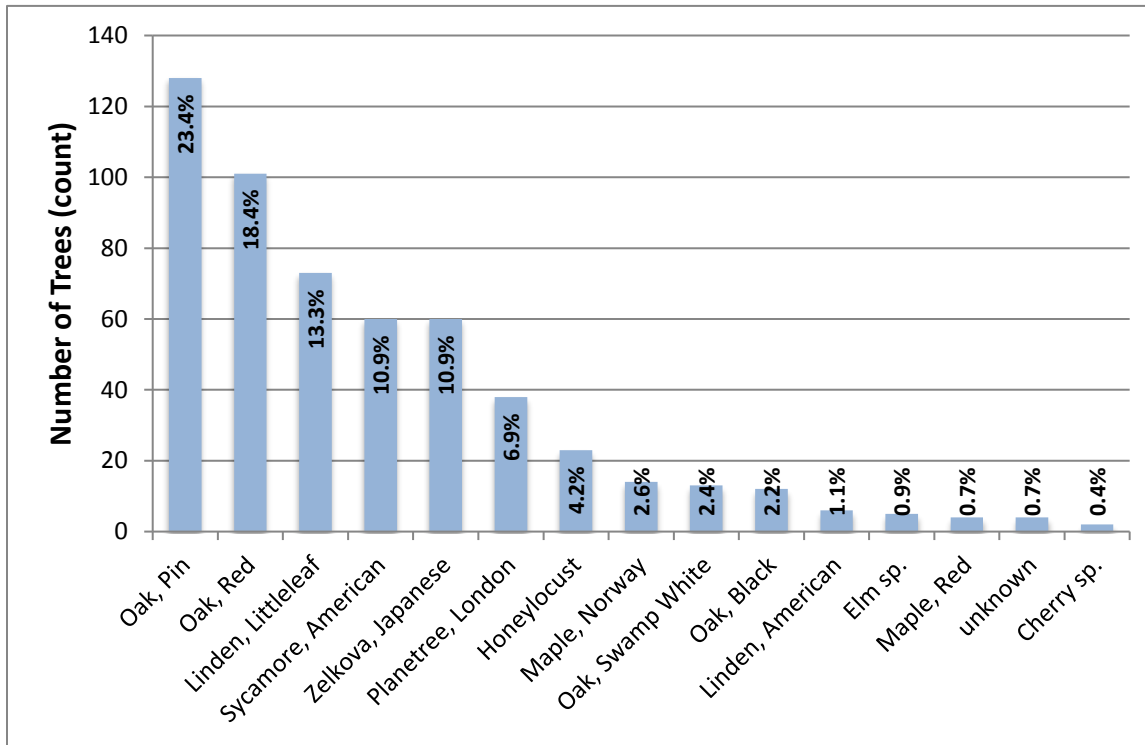
Many of the species comprising the 15 most abundant DCR-owned street trees are also among the most abundant City-owned species, although the proportions are very different (**Figure 6**). The six most common DCR tree species comprise 83.3% of all DCR-owned street trees. The most abundant DCR-owned street tree is Pin Oak (23.4%), followed by Red Oak (18.4%), Littleleaf Linden (13.3%), American Sycamore (10.9%), Japanese Zelkova (10.9%), and London Planetree (6.9%).

**Figure 5. Fifteen most abundant City-owned street trees in the City.**



<sup>11</sup> <http://www.mass.gov/eea/agencies/agr/farm-products/plants/massachusetts-prohibited-plant-list.html>.

**Figure 6. Fifteen most abundant DCR-owned street trees in the City.**



## Park Trees

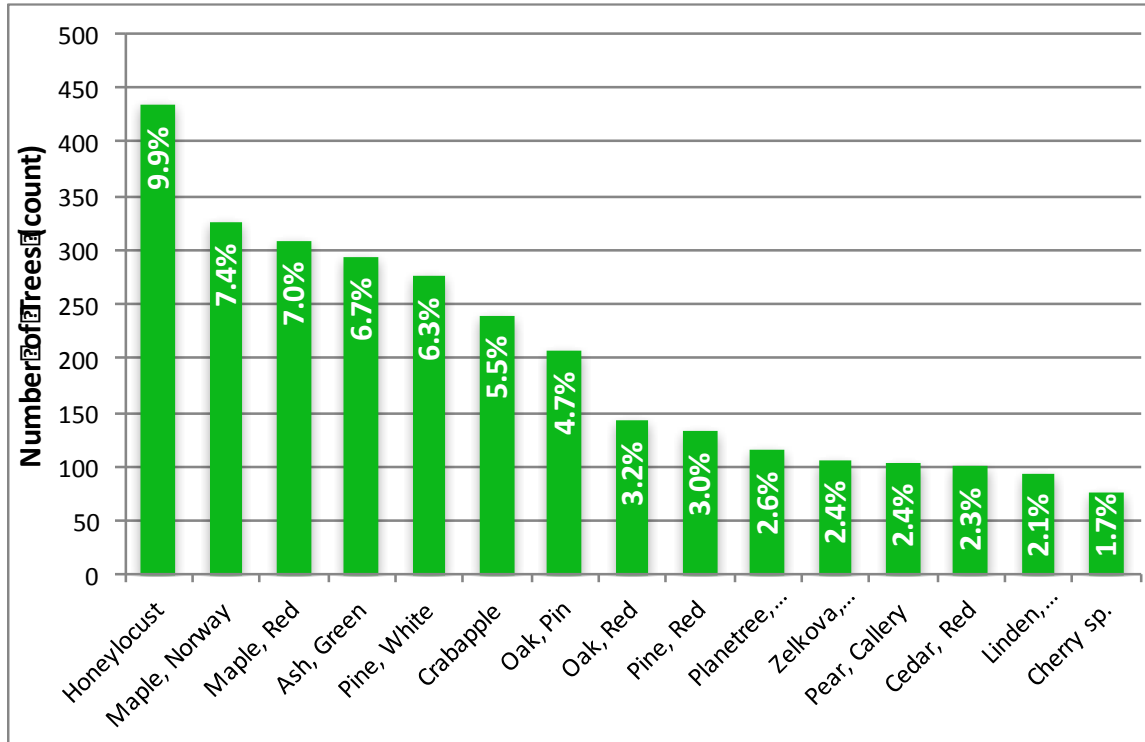
Park trees in the City are more diverse than street trees. Among the 4,386 City-owned park trees, there are 104 unique species, and 20 trees that have not been identified to species. Among the 1,130 DCR-owned park trees there are 53 unique species, and 57 trees that have not been identified to species. Using rarefied species richness ( $n = 544$ ), the tree diversity of City-owned park trees is higher than DCR-owned park trees (City = 70 unique species, DCR = 47 unique species), but the difference is not as extreme as for street trees. Rarefied species richness of DCR-owned park trees is similar to the rarefied species richness of City-owned street trees.

Seven species make up almost half of the City-owned park trees (47.5%, **Figure 7**). The most common City-owned park tree species is Honeylocust (433 trees, 9.9% of City trees), followed by Norway Maple (325 trees, 7.4%), Red Maple (308 trees, 7.0%), Green Ash (294 trees, 6.7%), White Pine (275 trees, 6.3%), Crabapple (240 trees, 5.5%), and Pin Oak (207 trees, 4.7%).

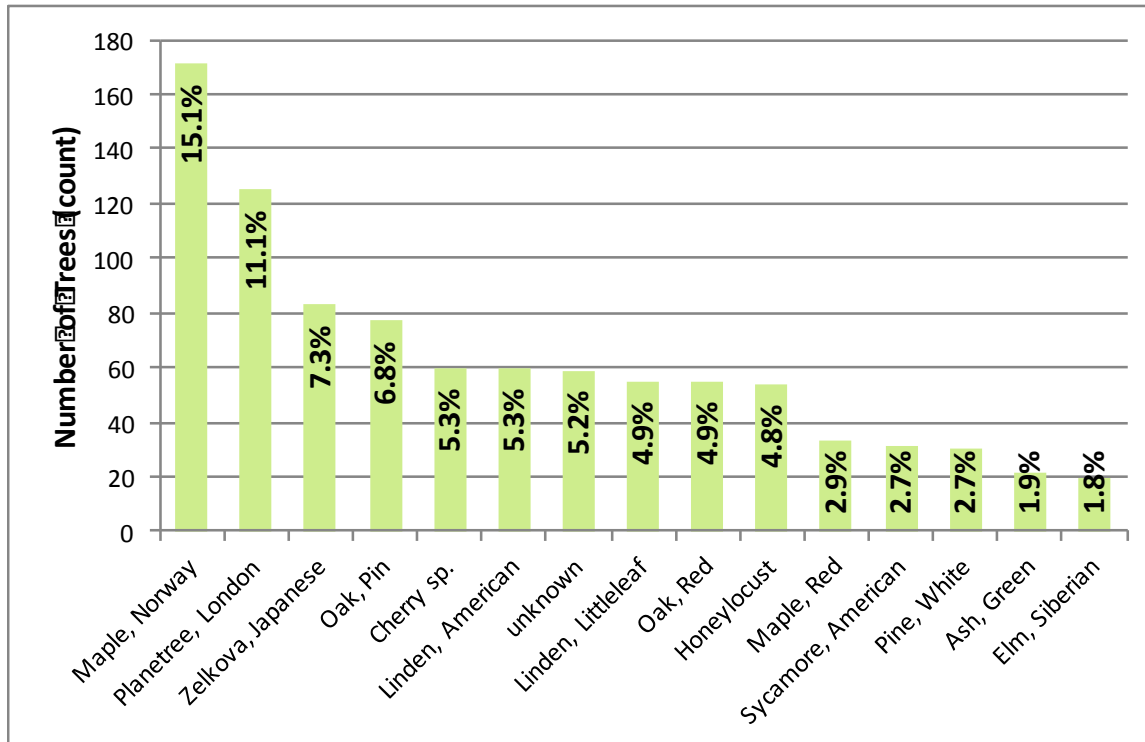
The most abundant DCR-owned park trees are Norway Maple (171 trees, 15.1%), London Planetree (125 trees, 11.1%), Japanese Zelkova (83 trees, 7.3%), and Pin Oak (77 trees, 6.8%) (**Figure 8**).



**Figure 7. Fifteen most abundant City-owned park trees in the City.**



**Figure 8. Fifteen most abundant DCR-owned park trees in the City.**



## Recent Plantings

For the past 10 years, one of the annual goals of the *Parks + Urban Forestry Division* of the City of Cambridge Department of Public Works is to plant a minimum of 300 public trees per year. In general, new trees are planted when a resident makes a request, when a new tree is needed to replace a failing tree, when there is an available empty tree well, or when a new location for a tree is identified. Based on the current tree inventory, 2,837 public trees were planted between 2008 and 2015 (*Table 5*). Note that this total does not account for trees that died after they were planted and were removed from the inventory. The majority of these trees are City-owned, but the total also includes nine private/ back of sidewalk trees, and one DCR tree. Of the 2,827 City-owned trees planted between 2008 and 2015, 2,728 are still alive, whereas 21 are standing dead, 58 are empty planting sites, and 20 are stumps.

### IN A NUTSHELL...

- Between 2008 and 2015, 2,484 street trees and 178 park trees were planted.
- Honeylocust and Red Maple are the most commonly planted species overall, but in recent years there has been a trend towards planting more Elms and Oaks.

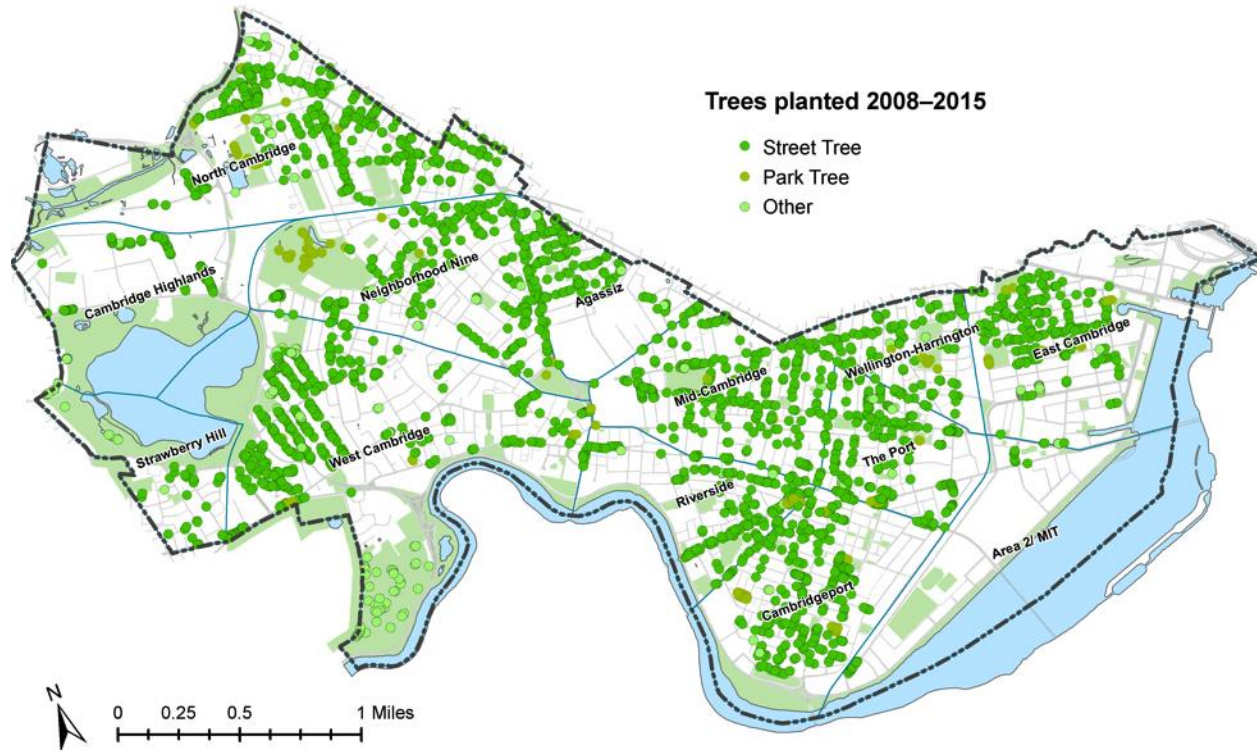
**Table 5. Trees planted in the City between 2008 and 2015.**

Note that trees that died and were replaced are not included these annual counts because they are no longer in the tree inventory.

Ownership (total count)	Site type	Year Planted								Total
		2008	2009	2010	2011	2012	2013	2014	2015	
City (2,827)	Tree (alive)	208	416	233	410	262	437	365	397	<b>2,728</b>
	Tree (dead)	2	6	2	2	5	1	3	--	<b>21</b>
	Planting Site	1	7	11	12	11	10	4	2	<b>58</b>
	Stump	2	11	1	3	1	--	2	--	<b>20</b>
DCR (1)	Tree (alive)	--	--	--	--	--	--	1	--	<b>1</b>
Not City or DCR (9)	Tree (alive)	--	2	--	--	--	1	6	--	<b>9</b>
<b>Yearly Totals</b>		<b>213</b>	<b>442</b>	<b>247</b>	<b>427</b>	<b>279</b>	<b>449</b>	<b>381</b>	<b>399</b>	<b>2,837</b>

Of all 2,837 trees planted between 2008 and 2015, 2,484 (87.6%) were planted along streets, 178 (6.3%) were planted in parks, and 175 (6.2%) trees were planted in locations other than along streets or in parks (*Map 4*). See *Appendix C* for details about the location of trees planted each year from 2008 to 2015.

**Map 4. Location of all trees planted in the City between 2008 and 2015.**



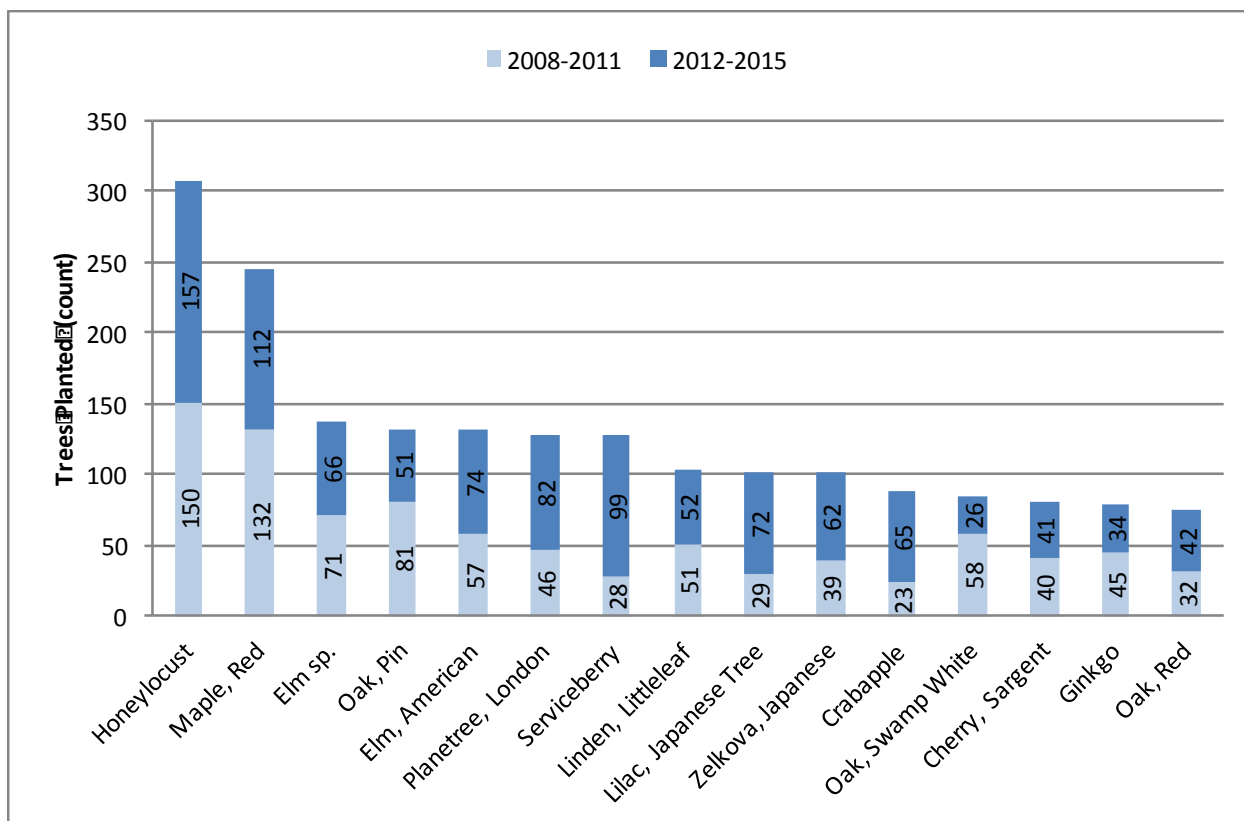
## Recent Planting Species Diversity

Of the 2,837 trees in the inventory that were planted between 2008 and 2015, the ten most commonly planted species are Honeylocust (11.1%), Red Maple (8.8%), hybrid Elms (Elm sp., 5.0%), Pin Oak (4.8%), American Elm (4.7%), London Planetree (4.6%), Serviceberry (4.6%), Littleleaf Linden (3.7%), Japanese Tree Lilac (3.7%), and Japanese Zelkova (3.7%; **Figure 9**).

Some species, such as American Elm, London Planetree, Serviceberry, Japanese Tree Lilac, Japanese Zelkova, and Crabapple were planted more often in recent years (*ex.* 2012-2015, **Figure 9**). Other species, such as Red Maple, Elm sp., Pin Oak, Swamp White Oak, and Ginkgo, were planted in higher proportions between 2008 and 2011.

See **Appendix B** for a complete list of species that were planted between 2008 and 2015, and a count of how many individuals of each species were planted each year.

**Figure 9. Fifteen most commonly planted species in the City between 2008 and 2015.**





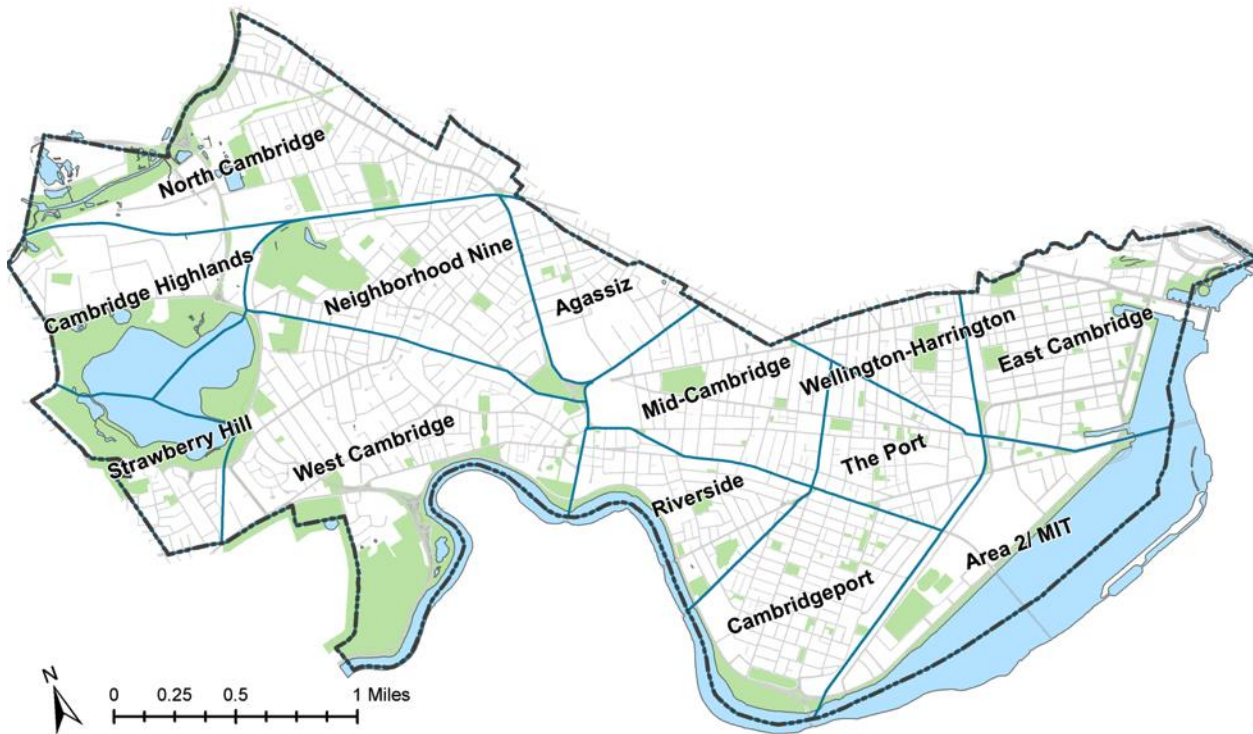
## Neighborhood Analyses

The City of Cambridge is divided into 13 neighborhoods (*Map 5*). Here we show the distribution of trees in each neighborhood, and in each neighborhood we relate the number of street trees to the total length of streets. Detailed information specific to each neighborhood can be found in *Appendix D*.

### IN A NUTSHELL...

- The 13 neighborhoods in Cambridge vary in overall size and in the length of streets they contain.
- The density of street trees in each neighborhood ranges from 29 trees per mile of street in Strawberry Hill to 100 trees per mile of street in Cambridgeport.
- The density of street trees has increased since 2011 in eight of the neighborhoods.
- Across the city there are 1,250 tree wells that do not contain a live tree. Across neighborhoods, 4% to 8% of the available tree wells are empty.

**Map 5. The neighborhoods of the City of Cambridge.**



\*Note that in the 2011 report “West Cambridge” is referred to as “Neighborhood 10”, and “The Port” is referred to as “Area Four”.

Considering all types of trees owned by the City and by DCR (including street trees, park trees, and trees that are not street or park trees), the largest neighborhood, West Cambridge, has more public trees than any other neighborhood, although Neighborhood Nine, East Cambridge, North

Cambridge, and Cambridgeport also have large number of public trees (*Table 6*). Neighborhood Nine has the most park trees, and West Cambridge has the most street trees. The neighborhoods with the fewest trees are Cambridge Highlands, Strawberry Hill, Agassiz, and Area 2/ MIT.

**Table 6. Distribution of trees across the 13 neighborhoods in the City.**

	Street Trees		Park Trees		Not Street or Park	Total
	City	DCR	City	DCR	City + DCR	
Agassiz	561	--	52	--	22	<b>635</b>
Area 2/MIT	344	36	32	396	33	<b>841</b>
Cambridge Highlands	143	93	33	3	103	<b>375</b>
Cambridgeport	1,667	69	302	6	125	<b>2,169</b>
East Cambridge	1,390	80	574	148	180	<b>2,372</b>
Mid-Cambridge	1,229	--	171	--	81	<b>1,481</b>
Neighborhood Nine	1,248	3	1,520	--	38	<b>2,809</b>
North Cambridge	1,335	61	706	79	98	<b>2,279</b>
Riverside	750	48	283	59	17	<b>1,157</b>
Strawberry Hill	223	--	72	--	177	<b>472</b>
The Port	919	--	208	--	40	<b>1,167</b>
Wellington-Harrington	784	--	160	--	85	<b>1,029</b>
West Cambridge	1,775	157	267	437	951	<b>3,587</b>
<i>Outside of Neighborhood Boundaries</i>	53	1	6	2	2	<b>64</b>
<b>Total</b>	<b>12,421</b>	<b>548</b>	<b>4,368</b>	<b>1,130</b>	<b>1,952</b>	<b>20,437</b>

However, the neighborhoods are of variable sizes, and some are more densely lined with streets than others. The number of street trees in each neighborhood is more accurately compared using a standardized metric that incorporates the total street length. The ratio of the number of street trees per mile of street is a standardized metric that can be compared not only across neighborhoods, but also across cities. *Table 7* shows the number of City-owned street trees and the total length of streets in each neighborhood. The streets are most densely lined with street trees in the Cambridgeport neighborhood, while Cambridge Highlands has the lowest density of street trees (*Table 7*). For comparison with the 2011 report<sup>3</sup>, the ratio of the percent street trees in the city to the percent street length in the city is presented for each neighborhood. Although this value cannot be readily compared with the values in other cities, the metric is useful for comparisons within the City, and the rank of values for this ratio matches the rank of values for the ratio of the number of street trees per mile. Compared to the values from the 2011 report<sup>3</sup>, the density of street trees per street length increased in most neighborhoods, although the densities in East Cambridge, North Cambridge, Agassiz, Strawberry Hill, and Area 2/MIT declined to some extent (*Table 7*).

**Table 7. Number of City-owned street trees and length of streets in each neighborhood.**

Values shown in green highlight neighborhoods for which the ratio of street trees per street length has increased since the 2011 report, and values shown in red highlight neighborhoods for which the ratio has declined since the 2011 report.

Neighborhood	City Street Trees (count)	Total Street Length (mi)	Trees per mile of street (# / mi)	Ratio: % Street Trees / % Street Length <sup>&amp;</sup>	Difference between 2016 and 2011 Ratio (%)
Cambridgeport	1667	16.60	100.4	1.36	7.06%
East Cambridge	1390	15.75	88.2	1.19	-0.45%
Wellington-Harrington	784	9.18	85.4	1.16	10.14%
The Port	919	10.95	83.9	1.14	36.88%
Mid-Cambridge	1229	14.76	83.2	1.13	12.72%
Neighborhood Nine	1248	17.29	72.2	0.98	16.37%
North Cambridge	1335	18.64	71.6	0.97	-21.16%
West Cambridge	1775	26.17	67.8	0.92	45.80%
Agassiz	561	8.31	67.5	0.91	-5.78%
Riverside	750	11.98	62.6	0.85	17.74%
Strawberry Hill	223	4.60	48.4	0.66	-15.93%
Area 2/MIT	344	9.08	37.9	0.51	-24.58%
Cambridge Highlands	143	4.86	29.4	0.40	28.46%

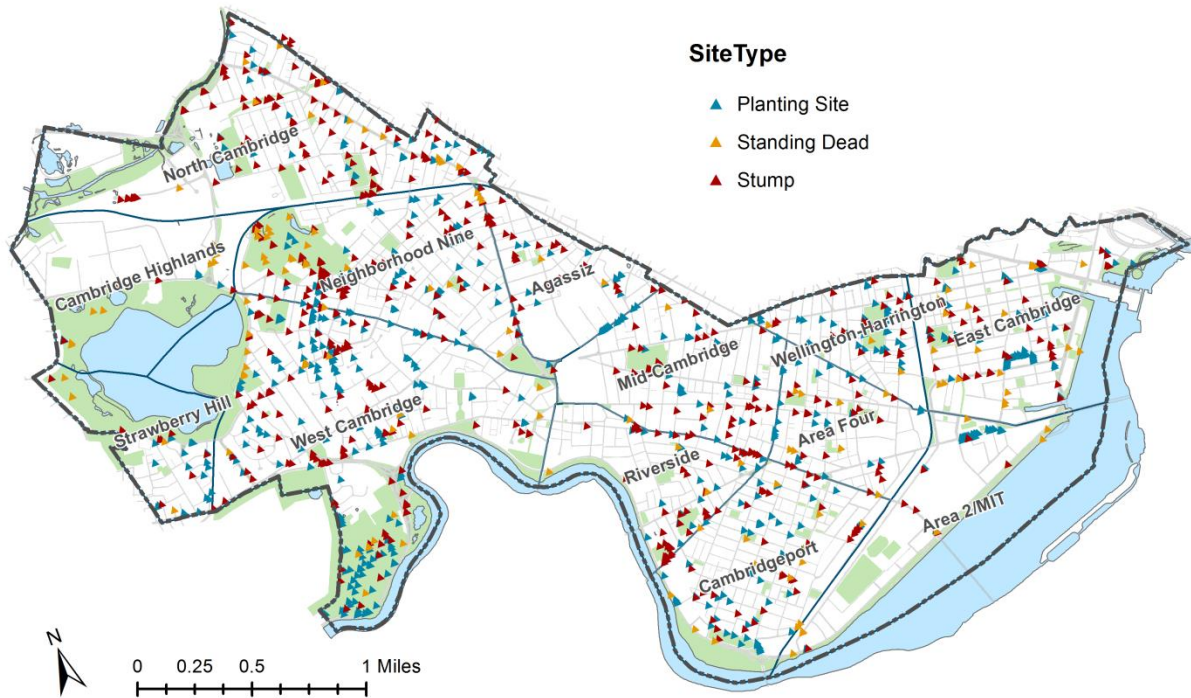
<sup>&</sup> the ratio of percent street trees the neighborhood divided by percent street length was presented in the 2011 report. The percent street trees is calculated as the number of city street trees in the neighborhood, divided by the total number of City-owned street trees in the City of Cambridge (12,421 trees). Note that the total street tree count includes 53 City-owned street trees that are outside of the boundaries of the neighborhoods (see **Table 5**). The percent street length is calculated as the sum of the length of streets in the neighborhood, divided by the total length of streets in the city (168.19 miles).

## Planting Sites, Stumps, and Standing Dead Trees

Various wells throughout the city do not contain a live tree. Some of these wells are empty planting sites (tree inventory Site Type = “*Planting Site*”), some contain a stump remaining from a previous tree in that location (tree inventory Site Type = “*Stump*”), and some trees are standing dead trees (tree inventory Site Type = “*Tree*” and Condition = “*Dead*”). A planting site is a tree well that is available for immediate planting, whereas any stumps or standing dead trees would need to be removed before a new tree could be planted in those tree wells. In addition, although stumps and standing dead trees are no longer sequestering carbon from the atmosphere, they are still storing carbon that they sequestered when they were alive. Thus, stumps and standing dead trees play a functional role in the urban ecosystem.

In total, the tree inventory contains 1,258 records of tree wells that do not contain a live tree (5.7% of all records in the tree inventory). Across the city there are 571 planting sites (2.6% of all tree inventory records), 546 stumps (2.5% of all tree inventory records), and 141 standing dead trees (0.6% of all tree inventory records). The tree wells that do contain live trees are distributed throughout the city (*Map 6*).

**Map 6. Location of tree planting locations that do not contain a live tree.**



## Planting Sites, Stumps, and Standing Dead Trees by Neighborhood

Each neighborhood contains between 389 and 3,888 tree wells. Among the tree wells in each neighborhood, 4.2–7.6% of the wells do not contain a live tree (**Table 8**). Of the total number of wells in each neighborhood, Cambridgeport has the lowest percentage of wells that do not contain a live tree (4.2%) and West Cambridge has the highest (7.6%). West Cambridge has been undergoing high levels of construction for the last few years due to the Huron B and Concord Avenue reconstructions that are part of the Alewife sewer separation project. To mitigate the impacts of this construction on the City’s public trees, an additional 200 trees will be planted in these areas within the next two years.

Looking specifically at the percentage of tree wells in each of the categories, North Cambridge has the lowest percentage of wells categorized as planting sites (1.4%), and West Cambridge has the highest (4.1%). Area 2/ MIT has the lowest percentage of tree wells categorized as stumps (0.9%), and North Cambridge has the highest. Mid-Cambridge has the lowest percentage of tree wells categorized as standing dead trees (0.2%), and Cambridge Highlands has the highest (2.1%; **Table 8**).



**Table 8. Tree wells in each neighborhood that do not contain a live tree.**

Count of tree wells in the inventory that are categorized as “Planting site”, “Stump” or “Standing Dead”. The total number of tree wells in each neighborhood is also shown, which includes tree wells with a live tree and tree wells without a live tree. Finally, the percent of tree wells in each category is shown, which is calculated as the percentage of tree wells in each category out of the total number of tree wells in the neighborhood. “n.a.” stands for “not applicable”.

Neighborhood	Count of Tree Wells				Percent of Tree Wells in Neighborhood				
	Planting site (#)	Stump (#)	Standing dead (#)	Total wells w/o live tree (#)	Total wells in neighborhood (#)	Planting site (% of total)	Stump (% of total)	Standing dead (% of total)	Total wells w/o live tree (% of total)
Agassiz	23	25	2	50	692	3.3%	3.6%	0.3%	7.2%
Area 2 / MIT	31	8	7	46	912	3.4%	0.9%	0.8%	5.0%
Cambridge Highlands	8	4	8	20	389	2.1%	1.0%	2.1%	5.1%
Cambridgeport	51	32	13	96	2,281	2.2%	1.4%	0.6%	4.2%
East Cambridge	58	42	22	122	2,702	2.1%	1.6%	0.8%	4.5%
Mid-Cambridge	32	41	3	76	1,554	2.1%	2.6%	0.2%	4.9%
Neighborhood Nine	64	81	27	172	2,956	2.2%	2.7%	0.9%	5.8%
North Cambridge	33	98	14	145	2,413	1.4%	4.1%	0.6%	6.0%
Riverside	21	49	5	75	1,227	1.7%	4.0%	0.4%	6.1%
Strawberry Hill	20	8	5	33	500	4.0%	1.6%	1.0%	6.6%
The Port	19	23	10	52	1,210	1.6%	1.9%	0.8%	4.3%
Wellington-Harrington	45	20	3	68	1,094	4.1%	1.8%	0.3%	6.2%
West Cambridge	162	111	22	295	3,888	4.2%	2.9%	0.6%	7.6%
<i>Outside City Boundaries</i>	<i>4</i>	<i>4</i>	<i>0</i>	<i>8</i>	<i>72</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
<b>TOTAL</b>	<b>571</b>	<b>546</b>	<b>141</b>	<b>1,258</b>	<b>21,890</b>	<b>2.6%</b>	<b>0.6%</b>	<b>2.5%</b>	<b>5.7%</b>



## Tree Condition

Of the 21,890 tree and tree well records in the tree inventory, 10,424 of them have a condition rating which is a categorical description of the overall health of the trees. Trees are given one of four possible condition ratings: “Dead”, “Poor”, “Fair”, and “Good”.

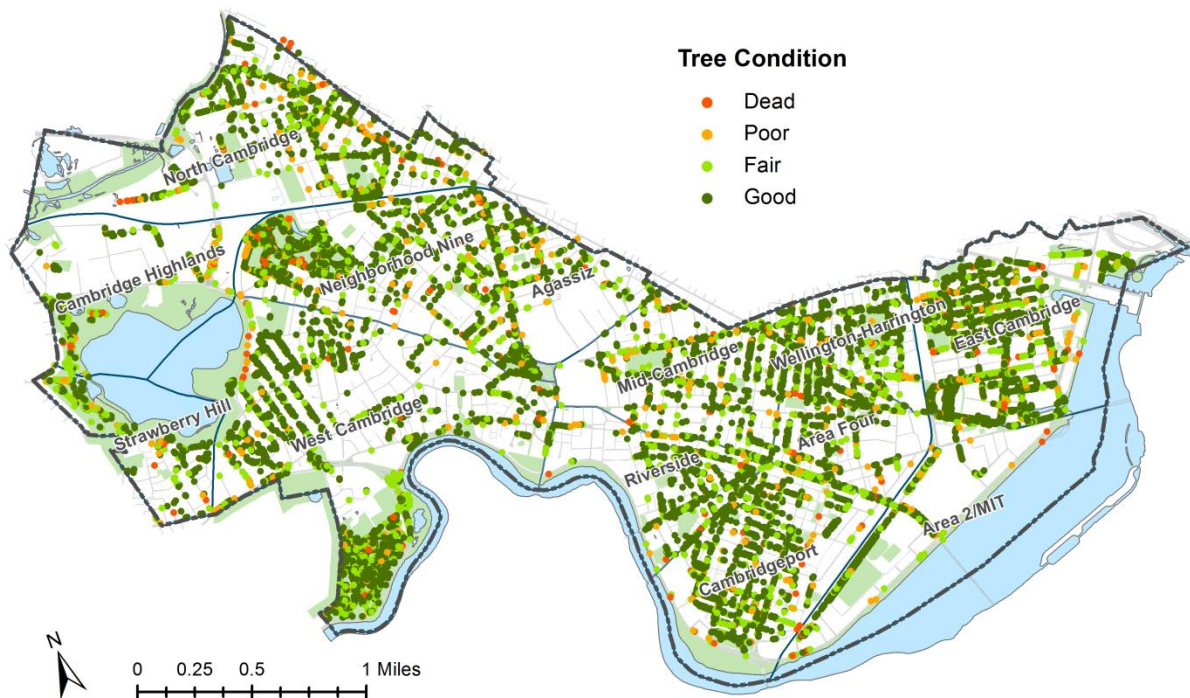
These tree condition categories are somewhat subjective, and thus the rating may vary from person to person among those who made the assessment. For a detailed description of the tree condition ratings, see the *Appendix E*.

### IN A NUTSHELL...

- 78.2% of young trees planted between 2008 and 2015 were rated as “Good”.
- 62.8% of the older trees in the inventory that have a condition rating were rated as “Good”.
- Public trees owned by the City have better condition ratings, overall, than the public trees owned by DCR.

The distribution of trees across the city with various condition ratings is shown in *Map 7*.

**Map 7. Distribution of trees in the City by condition rating.**



Condition ratings are further assessed separately for young trees, planted between 2008 and 2015, and old trees for which planting date is unknown. Note that the number of trees with the condition “Dead” is higher than the number of standing dead trees in the “Planting Sites, Stumps,”

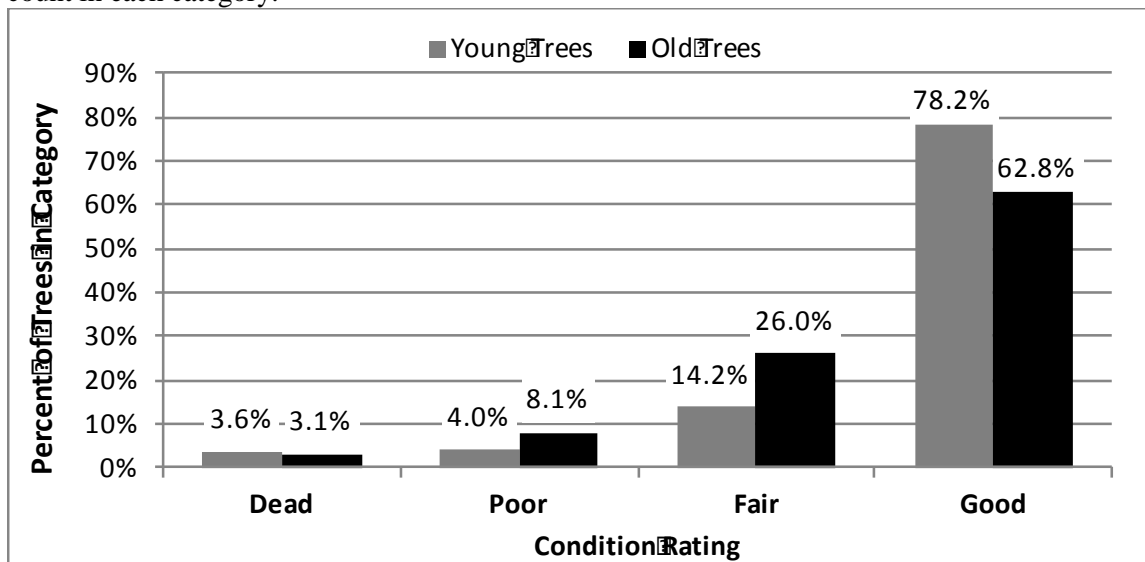
and Standing Dead Trees” section (see above) because the number of dead trees includes some of the Planting Sites and Stumps in the inventory which were known to contain a live tree at some point during the study (*i.e.*, since the tree inventory first began in 2005).

Among the 2,837 young trees planted between 2008 and 2015, 2,732 trees have a condition rating. The condition of the remaining 105 trees is unknown. Of the 2,732 young trees with a condition rating, 2,136 are rated as “Good” (78.2%), 387 are rated as “Fair” (14.2%), 110 (4.0%) are rated as “Poor”, and 99 (3.6%) are “Dead”. Note that any trees that were planted between 2008 and 2015 that are labeled as “Planting Site” or “Stump” in the tree inventory are considered “Dead”.

Among the 19,053 trees in the inventory for which planting date is unknown, 7,692 have a condition rating. Of the 7,692 old trees with a condition rating, 4,828 (62.8%) are rated as “Good”, 2,000 (26.0%) are rated as “Fair”, 623 (8.1%) are rated as “Poor”, and 241 (3.1%) are “Dead”. The proportion of old trees categorized as “Good” is lower than the proportion of young trees categorized as “Good”, and the proportion of old trees in the “Fair” and “Poor” categories is higher than the proportion of young trees in those categories (*Figure 10*).

**Figure 10. Percentage of young trees and old trees in each of the condition rating categories.**

Young trees are trees that were planted between 2008 and 2015, and which have a known date of planting. Old trees are trees with no recorded plant date. The numbers above each bar represent the tree count in each category.



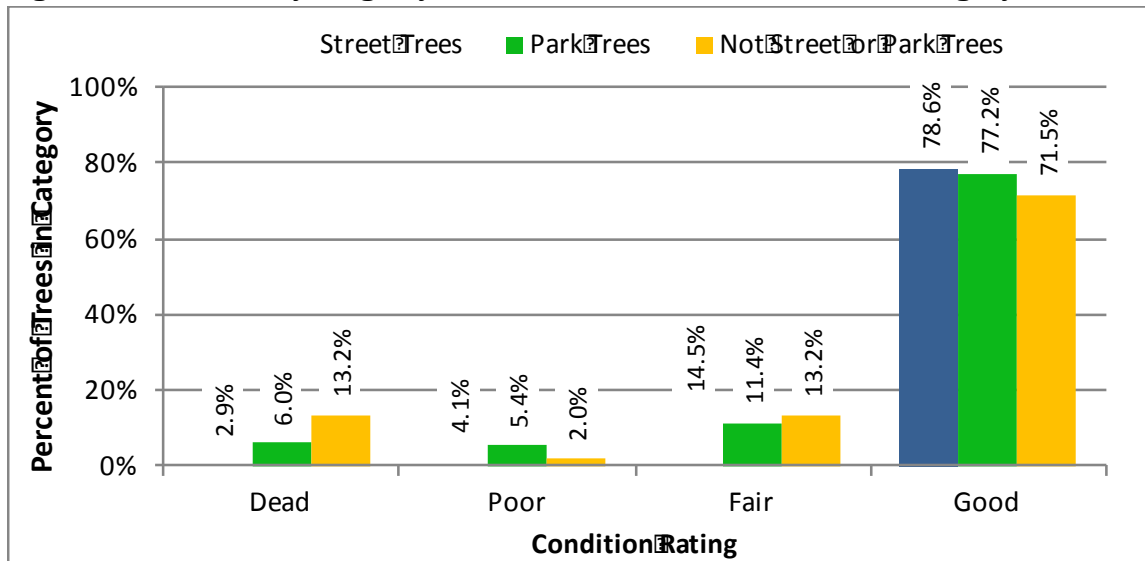
Tree condition ratings vary by location (*i.e.*, street trees, park trees, or trees not located along street or within parks), as well as by ownership (*i.e.*, City, DCR, or trees not owned by the City or DCR). Among the 2,732 young trees with a condition rating, 2,723 are owned and maintained by the City. Only one young tree is owned by DCR (and has rating of “Good”), and eight young

trees are not owned or maintained by the City or DCR (and all eight have a condition rating of “Good”). Considering only the young trees owned and maintained by the City, 2,405 are street trees, 167 are park trees, and 151 are not street or park trees (*Table 9*). The percentage of trees in each condition category varies slightly by tree location, but the majority of City-owned young trees are categorized as “Good” (*Figure 11*). The percentage of young City-owned street trees categorized as “Dead” is lower than the percentage of young City-owned park trees and trees that are not located along streets or within parks.

**Table 9. Number of young City-owned trees with each condition rating in each location.**

Condition Rating	Street Trees	Park Trees	Not Street or Park Trees
Dead	69	10	20
Poor	98	9	3
Fair	348	19	20
Good	1,890	129	108
<b>TOTAL</b>	<b>2,405</b>	<b>167</b>	<b>151</b>

**Figure 11. Percent of young City-owned trees with each condition rating, by tree location.**



Among the 7,095 older City-owned trees in the inventory with a tree condition rating and for which planting date is unknown, the majority of trees have a “Good” condition rating (60.2% of City-owned street trees, 70.3% of City-owned park trees, and 64.1% of City-owned trees that are not located along streets or within parks) (*Table 10, Figure 12*). Approximately one quarter of these City-owned older trees are rated as “Fair” (28.0% of street trees, 21.1% of park trees, and 26.6% of trees not located along streets or within parks). A low percentage of City-owned trees are “Dead” (2.9% of street trees, 2.3% of park trees, and 2.1% of trees not located along streets

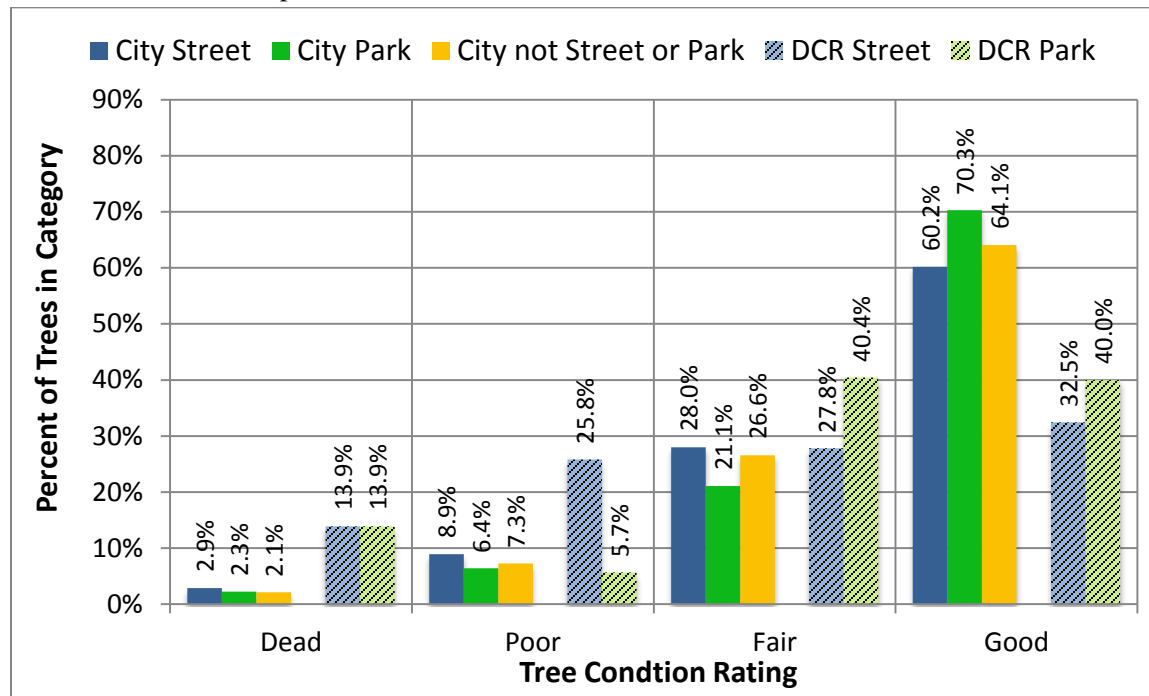
or within parks). In contrast, less than half of DCR-owned trees have a “Good” condition rating (32.5% of street trees and 40.0% of park trees; no DCR-owned trees with a condition rating occur in any other locations). Compared to City-owned trees, a higher percentage of DCR-owned park trees have a “Fair” condition rating (40.4% of park trees), but the percentage of DCR-owned street trees rated as “Fair” (27.8%) is similar to that of the City-owned street trees. Over one quarter of DCR-owned street trees are rated as “Poor” (25.8%), although only 5.7% of DCR-owned park trees are rated as “Poor”. The percentage of “Dead” DCR-owned trees is much higher than the percentage of “Dead” City-owned trees (13.9% of DCR-owned street trees and park trees).

**Table 10. Count of old trees with each condition rating, by ownership and location.**

Condition Rating	City-owned			DCR-owned			Not City or DCR			TOTAL
	Street	Park	Other	Street	Park	Other	Street	Park	Other	
Dead	118	41	25	21	32	--	4	--	--	241
Poor	366	116	86	39	13	--	3	--	--	623
Fair	1,147	383	315	42	93	--	13	7	--	2,000
Good	2,463	1,276	759	49	92	--	131	24	34	4,828
<b>TOTAL</b>	<b>4,094</b>	<b>1,816</b>	<b>1,185</b>	<b>151</b>	<b>230</b>	<b>--</b>	<b>151</b>	<b>31</b>	<b>34</b>	<b>7,692</b>

**Figure 12. Percent of old trees with each condition rating, by ownership and location.**

Includes City-owned street trees, park trees, and trees are not along streets or within parks, and DCR-owned street trees and park trees.



## Tree Condition Ratings by Neighborhood

Condition ratings for young and old City-owned street trees showed some variation by neighborhood (*Tables 11 and 12*).

Cambridge Highlands had the lowest percentage of “Dead” City-owned street trees (0.0% young and old trees), and the highest percentage of trees rated “Fair” (29.4% of young trees, and 47.1% of old trees). Cambridge Highlands also had the highest percentage of old trees rated as “Poor” (29.4%), and the lowest percentage of old trees rated as “Good” (23.5%).

Area 2 / MIT had the highest percentage of young trees rated “Dead” (18.8%), and the lowest percentage of young trees rated “Good” (56.3%), but it also had the highest percentage of old trees rated “Good” (72.4%) and the lowest percentage of old trees rated “Fair” (19.9%), apart from the old trees in the inventory that are located outside of the City boundary.

East Cambridge had the highest percentage of young trees classified as “Good” (87.6%), and the lowest percentage of young trees categorized as “Fair” (8.6%), apart from the percentage of young trees in the inventory that are outside of the City boundary.

Mid-Cambridge had the highest percentage of young trees in the “Poor” category (6.5%), while Strawberry Hill has the lowest (0.0%).

North Cambridge had the highest percentage of old trees categorized as “Dead” (6.4%), apart from the percentage of old trees in the inventory located outside of the City boundary (17.6%).

West Cambridge had the lowest percentage of old trees in the “Poor” category (6.2%).



**Table 11. Neighborhood specific counts of young City-owned street trees with condition ratings, and the percentage of trees in each category.**

Young trees are those that were planted between 2008 and 2015. Note that total values may vary slightly from 100% due to rounding.

Neighborhood	Young City-owned Street Trees (count)	Dead	Poor	Fair	Good	TOTAL
Agassiz	144	2.1%	5.6%	18.8%	73.6%	100%
Area 2/ MIT	16	18.8%	6.3%	18.8%	56.3%	100%
Cambridge Highlands	68	0.0%	1.5%	29.4%	69.1%	100%
Cambridgeport	267	3.4%	4.9%	18.4%	73.4%	100%
East Cambridge	185	2.2%	1.6%	8.6%	87.6%	100%
Mid-Cambridge	248	3.2%	6.5%	14.1%	76.2%	100%
Neighborhood Nine	240	3.3%	3.8%	13.8%	79.2%	100%
North Cambridge	379	2.6%	2.9%	17.2%	77.3%	100%
Riverside	161	4.3%	4.3%	13.7%	77.6%	100%
Strawberry Hill	27	11.1%	0.0%	11.1%	77.8%	100%
The Port	178	3.4%	5.6%	13.5%	77.5%	100%
Wellington-Harrington	105	1.9%	4.8%	12.4%	81.0%	100%
West Cambridge	380	1.3%	3.7%	10.0%	85.0%	100%
<i>Outside City Boundaries</i>	7	14.3%	0.0%	0.0%	85.7%	100%
<b>TOTAL</b>	<b>2,405</b>					

**Table 12. Neighborhood specific counts of old City-owned street trees with condition ratings, and the percentage of trees in each category.**

Old trees are those that were planted before 2008, and for which planting date is unknown. Note that total values may vary slightly from 100% due to rounding.

Neighborhood	Old City-owned Street Trees (count)	Dead	Poor	Fair	Good	TOTAL
Agassiz	115	3.5%	13.9%	41.7%	40.9%	100%
Area 2/ MIT	286	1.0%	6.6%	19.9%	72.4%	100%
Cambridge Highlands	17	0.0%	29.4%	47.1%	23.5%	100%
Cambridgeport	566	3.0%	6.7%	24.7%	65.5%	100%
East Cambridge	851	3.5%	7.1%	24.4%	65.0%	100%
Mid-Cambridge	251	1.2%	13.1%	36.7%	49.0%	100%
Neighborhood Nine	320	2.2%	14.4%	31.6%	51.9%	100%
North Cambridge	313	6.4%	16.0%	29.4%	48.2%	100%
Riverside	268	1.5%	7.1%	34.7%	56.7%	100%
Strawberry Hill	50	4.0%	8.0%	18.0%	70.0%	100%
The Port	385	3.6%	7.3%	30.1%	59.0%	100%
Wellington-Harrington	298	1.0%	7.7%	25.5%	65.8%	100%
West Cambridge	357	2.2%	6.2%	29.4%	62.2%	100%
<i>Outside City Boundaries</i>	17	17.6%	17.6%	11.8%	52.9%	100%
<b>TOTAL</b>	<b>4,094</b>					



## Acknowledgements

We are grateful to Owen O’Riordian and John Nardone for providing insight and feedback on earlier versions of this document. We appreciate the hard work of all of the Earthwatch citizen scientist volunteers, and the support we received from the staff at Earthwatch Institute. Earthwatch data collection was supported by the Borun Family Foundation, the Goldring Family Foundation and Ernst and Young, LLC.

# Appendices

## Appendix A. List of the tree species in the City of Cambridge, and counts by ownership and location.

Table only includes trees that are maintained by the City of DCR and does not include information about the other public trees in the (*i.e.*, Ownership listed as “Other” or ‘Private or back of sidewalk’).

Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
1	Apple	<i>Malus sp</i>	Malsp			5		9	14
2	Apricot	<i>Prunus sp</i>	Prusp					6	6
3	Arborvitae	<i>Thuja occidentalis</i>	Thuocc	3		70	1	71	145
4	Ash sp.	<i>Fraxinus sp</i>	Frasp	13		32		17	62
5	Ash, Black	<i>Fraxinus nigra</i>	Franig	2		3			5
6	Ash, Green	<i>Fraxinus pennsylvanica</i>	Frapen	264		294	21	32	611
7	Ash, Korean Mountain	<i>Sorbus alnifolia</i>	Soraln	1				1	2
8	Ash, White	<i>Fraxinus americana</i>	Fraame	122		62	7	7	198
9	Aspen, Bigtooth	<i>Populus grandidentata</i>	Popgra					1	1
10	Aspen, Quaking	<i>Populus tremuloides</i>	Poptre	1		1			2
11	Beech, American	<i>Fagus grandifolia</i>	Faggra	5		13	9	4	31
12	Beech, European	<i>Fagus sylvatica</i>	Fagsyl			37	2	7	46
13	Birch sp.	<i>Betula sp</i>	Betsp				7		7
14	Birch, European White	<i>Betula pendula</i>	Betpen	1			1	4	6
15	Birch, Gray	<i>Betula populifolia</i>	Betpop			15		16	31
16	Birch, Paper	<i>Betula papyrifera</i>	Betpap	8					8
17	Birch, River	<i>Betula nigra</i>	Betnig	15		34	1	21	71
18	Buckthorn	<i>Rhamnus sp</i>	Rhasp			2			2
19	Catalpa	<i>Catalpa sp</i>	Catsp	4		5		3	12
20	Cedar, Red	<i>Juniperus virginiana</i>	Junvir			100		10	110
21	Cherry sp.	<i>Prunus sp</i>	Prusp	131	2	75	60	85	353
22	Cherry, Autumnalis	<i>Prunus x subhirtella</i>	Pruxsub	5				2	7

*Appendix A cont.*

Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
23	Cherry, Black	<i>Prunus serotina</i>	Pruser2	1		9	1	49	<b>60</b>
24	Cherry, Choke	<i>Prunus virginiana</i>	Pruvir			1		4	<b>5</b>
25	Cherry, Kwanzan	<i>Prunus serrulata</i>	Pruser	73		4	7	5	<b>89</b>
26	Cherry, Okame	<i>Prunus x incam</i>	Pruxinc	41		1			<b>42</b>
27	Cherry, Pin	<i>Prunus pensylvanica</i>	Prupen	1				2	<b>3</b>
28	Cherry, Sargent	<i>Prunus sargentii</i>	Prusar	203		22	3	8	<b>236</b>
29	Cherry, Snowgoose	<i>Prunus serrulata</i>	Pruser	27					<b>27</b>
30	Cherry, Yoshino	<i>Prunus x yedoensis</i>	Pruxyed	3		3		9	<b>15</b>
31	Chestnut, American	<i>Castanea dentata</i>	Casden	3		1			<b>4</b>
32	Coffeetree, Kentucky	<i>Gymnocladus dioicis</i>	Gymdio	41		5		12	<b>58</b>
33	Corktree, Amur	<i>Phellodendron amurense</i>	Pheamu	37		8	3	2	<b>50</b>
34	Cottonwood, Eastern	<i>Populus deltoides</i>	Popdel			36		1	<b>37</b>
35	Crabapple	<i>Malus sp</i>	Malsp	103	1	240	16	81	<b>441</b>
36	Dogwood sp.	<i>Cornus sp</i>	Corsp	1				3	<b>4</b>
37	Dogwood, Alternate-leaved	<i>Cornus alternifolia</i>	Cornalt					2	<b>2</b>
38	Dogwood, Flowering	<i>Cornus florida</i>	Corflo	1		24	7	17	<b>49</b>
39	Dogwood, Kousa	<i>Cornus kousa</i>	Corkou	1		28	13	20	<b>62</b>
40	Elm sp.	<i>Ulmus sp</i>	Ulmsp	309	5	14		24	<b>352</b>
41	Elm, American	<i>Ulmus americana</i>	Ulmame	221		26	5	12	<b>264</b>
42	Elm, Lacebark	<i>Ulmus parvifolia</i>	Ulmpar	76		27	3	2	<b>108</b>
43	Elm, Siberian	<i>Ulmus pumila</i>	Ulmpum	27		10	20	2	<b>59</b>
44	Fir, Douglas	<i>Pseudotsuga menziesii</i>	Psemen			4		3	<b>7</b>
45	Fir, White	<i>Abies concolor</i>	Abicon			4		6	<b>10</b>
46	Ginkgo	<i>Ginkgo biloba</i>	Ginbil	348		14		24	<b>386</b>
47	Hackberry	<i>Celtis sp</i>	Celsp	61		17		1	<b>79</b>

*Appendix A cont.*

Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
48	Hawthorn sp.	<i>Crataegus sp</i>	Crasp	14		32	1	27	<b>74</b>
49	Hemlock, Carolina	<i>Tsuga caroliniana</i>	Tsucar			3			<b>3</b>
50	Hemlock, Eastern	<i>Tsuga canadensis</i>	Tsucan			39		24	<b>63</b>
51	Hickory sp.	<i>Carya sp</i>	Carsp	6					<b>6</b>
52	Holly, American	<i>Ilex opaca</i>	Ileopa					2	<b>2</b>
53	Holly, English	<i>Ilex aquifolium</i>	Ileaqu					1	<b>1</b>
54	Honeylocust	<i>Gleditsia triacanthos</i>	Gletri	1,534	23	433	54	144	<b>2,188</b>
55	Hophornbeam	<i>Ostrya sp</i>	Ostsp					11	<b>11</b>
56	Hoptree	<i>Ptelea sp</i>	Ptesp			1			<b>1</b>
57	Hornbeam, American	<i>Carpinus caroliniana</i>	Carcar	40		28	1	3	<b>72</b>
58	Horsechestnut, European	<i>Aesculus hippocastanum</i>	Aeship	19		15	11	5	<b>50</b>
59	Ironwood, Persian	<i>Parrotia persica</i>	Parper	8					<b>8</b>
60	Katsuratree	<i>Cercidiphyllum japonicum</i>	Cerjap	24		22		6	<b>52</b>
61	Larch, American	<i>Larix laricina</i>	Larlar	1		5		2	<b>8</b>
62	Larch sp.	<i>Larix sp</i>	Larsp					2	<b>2</b>
63	Lilac, Japanese Tree	<i>Syringa reticulata</i>	Syrret	365		32	7	11	<b>415</b>
64	Linden, American	<i>Tilia americana</i>	Tilame	278	6	34	60	17	<b>395</b>
65	Linden, Littleleaf	<i>Tilia cordata</i>	Tilcor	861	73	94	55	36	<b>1,119</b>
66	Linden, Silver	<i>Tilia tomentosa</i>	Tiltom	75		4		8	<b>87</b>
67	Linden sp.	<i>Tilia sp</i>	Tilsp	2					<b>2</b>
68	Locust, Black	<i>Robinia pseudoacacia</i>	Robpse	6		43	2	6	<b>57</b>
69	Maackia	<i>Maackia amurensis</i>	Maaamu	17					<b>17</b>
70	Magnolia sp.	<i>Magnolia sp</i>	Magsp	13		44		17	<b>74</b>
71	Maple sp.	<i>Acer sp</i>	Acesp	9		2	2	3	<b>16</b>
72	Maple, Amur	<i>Acer ginnala</i>	Acegin	18					<b>18</b>

*Appendix A cont.*

Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
73	Maple, Black	<i>Acer nigrum</i>	Acenig					5	5
74	Maple, Boxelder	<i>Acer negundo</i>	Aceneg			8		2	10
75	Maple, Hedge	<i>Acer campestre</i>	Acecam	182			6	1	189
76	Maple, Japanese	<i>Acer palmatum</i>	Acepal	1				2	3
77	Maple, Miyabei	<i>Acer miyabei</i>	Acemiy	3					3
78	Maple, Norway	<i>Acer platanoides</i>	Acepla	1,628	14	325	171	195	2,333
79	Maple, Paperbark	<i>Acer griseum</i>	Acegri	10		1		1	12
80	Maple, Red	<i>Acer rubrum</i>	Acerub	1,231	4	308	33	76	1,652
81	Maple, Silver	<i>Acer saccharinum</i>	Acesac2	116		23	3	21	163
82	Maple, Sugar	<i>Acer saccharum</i>	Acesac	159	2	74	6	98	339
83	Maple, Sycamore	<i>Acer pseudoplatanus</i>	Acepse	11		5		14	30
84	Maple, Tatarian	<i>Acer tataricum</i>	Acetat	1		7			8
85	Maple, Trident	<i>Acer buergerianum</i>	Acebue	5				2	7
86	Mulberry sp.	<i>Morus sp</i>	Morsp	2		7		6	15
87	Mulberry, Red	<i>Morus rubra</i>	Morrub	1		5	1	1	8
88	Mulberry, White	<i>Morus alba</i>	Moralb			4		1	5
89	Oak sp.	<i>Quercus sp</i>	Quesp	30	1	3	6		40
90	Oak, Black	<i>Quercus velutina</i>	Quevel	10	12	26		6	54
91	Oak, English	<i>Quercus robur</i>	Querob	1				5	6
92	Oak, Heritage	<i>Quercus macrocarpa x robur</i>	Quemac	4					4
93	Oak, Overcup	<i>Quercus lyrata</i>	Quelyr					2	2
94	Oak, Pin	<i>Quercus palustris</i>	Quepal	782	128	207	77	94	1,288
95	Oak, Post	<i>Quercus stellata</i>	Queste					3	3
96	Oak, Red	<i>Quercus rubra</i>	Querub	276	101	142	55	49	623
97	Oak, Swamp White	<i>Quercus bicolor</i>	Quebic	97	13	20	4	26	160



*Appendix A cont.*

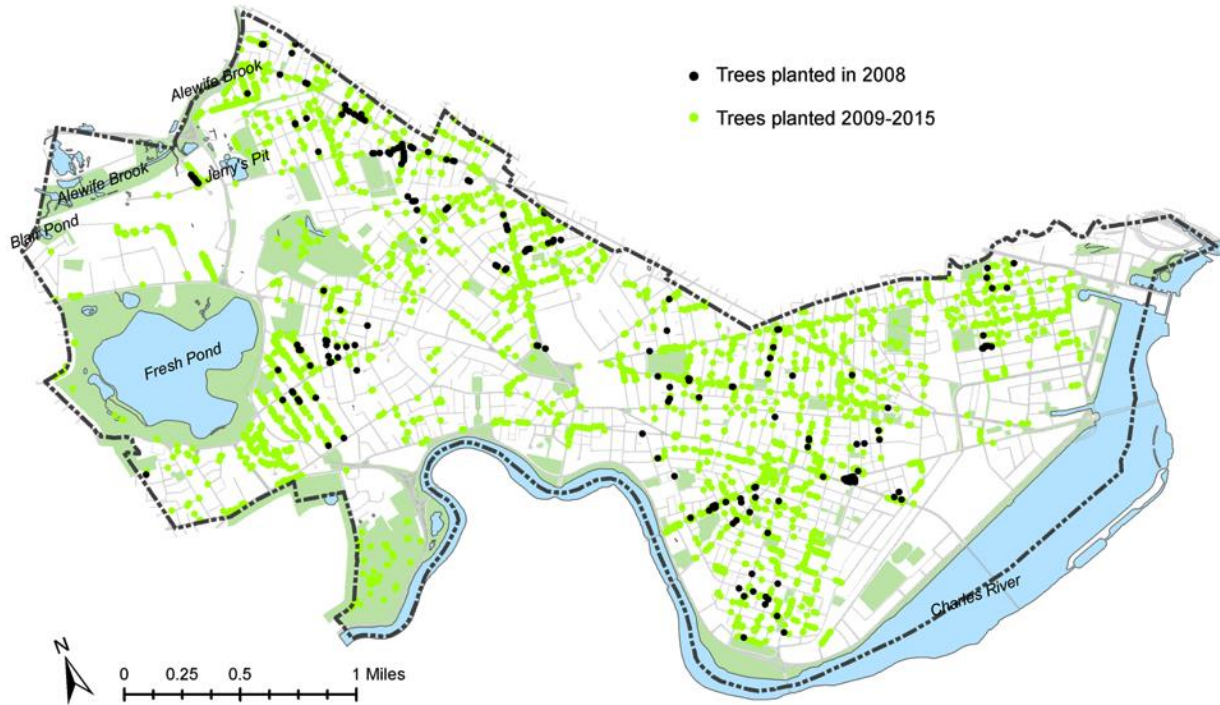
Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
98	Oak, White	<i>Quercus alba</i>	Quealb			3	10		<b>13</b>
99	Pagoda Tree, Japanese	<i>Styphnolobium japonicum</i>	Styjap	215		41	3	33	<b>292</b>
100	Peach	<i>Prunus persica</i>	Pruper			1		3	<b>4</b>
101	Pear, Callery	<i>Pyrus calleryana</i>	Pyrca	878		104	2	25	<b>1,009</b>
102	Pine sp.	<i>Pinus sp</i>	Pinsp					1	<b>1</b>
103	Pine, Austrian	<i>Pinus nigra</i>	Pinnig	4		75		74	<b>153</b>
104	Pine, Japanese White	<i>Pinus parviflora</i>	Pinpar					1	<b>1</b>
105	Pine, Red	<i>Pinus resinosa</i>	Pinres	8		132	14	2	<b>156</b>
106	Pine, Scotch	<i>Pinus sylvestris</i>	Pinsyl			1		2	<b>3</b>
107	Pine, White	<i>Pinus strobus</i>	Pinstr	1		275	30	56	<b>362</b>
108	Planetree, London	<i>Platanus x acerifolia</i>	Plaxace	405	38	115	125	22	<b>705</b>
109	Plum	<i>Prunus sp</i>	Prusp	13		2		8	<b>23</b>
110	Poplar, Lombardy	<i>Populus nigra</i>	Popnig			1			<b>1</b>
111	Raintree, Golden	<i>Koelreuteria paniculata</i>	Koepan	68		17	3	10	<b>98</b>
112	Redbud	<i>Cercis canadensis</i>	Cercan	44	1	12	1	7	<b>65</b>
113	Redwood, Dawn	<i>Metasequoia glyptostroboides</i>	Metgly	6		12			<b>18</b>
114	Rubber Tree, Chinese	<i>Eucommia ulmoides</i>	Euculm			3			<b>3</b>
115	Sassafras	<i>Sassafras albidum</i>	Sasalb					1	<b>1</b>
116	Serviceberry	<i>Amelanchier arborea</i>	Amearb	136		39	14	37	<b>226</b>
117	Silverbell, Carolina	<i>Halesia tetraptera</i>	Haltet			2			<b>2</b>
118	Smoketree	<i>Cotinus coggygria</i>	Cotcog			2		8	<b>10</b>
119	Snowbell, Japanese	<i>Styrax japonicus</i>	Styrjap			1			<b>1</b>
120	Sourwood	<i>Oxydendrum arboreum</i>	Oxyarb	1				1	<b>2</b>
121	Spruce sp.	<i>Picea sp</i>	Picsp			4			<b>4</b>
122	Spruce, Black	<i>Picea mariana</i>	Picmar			1		1	<b>2</b>

*Appendix A cont.*

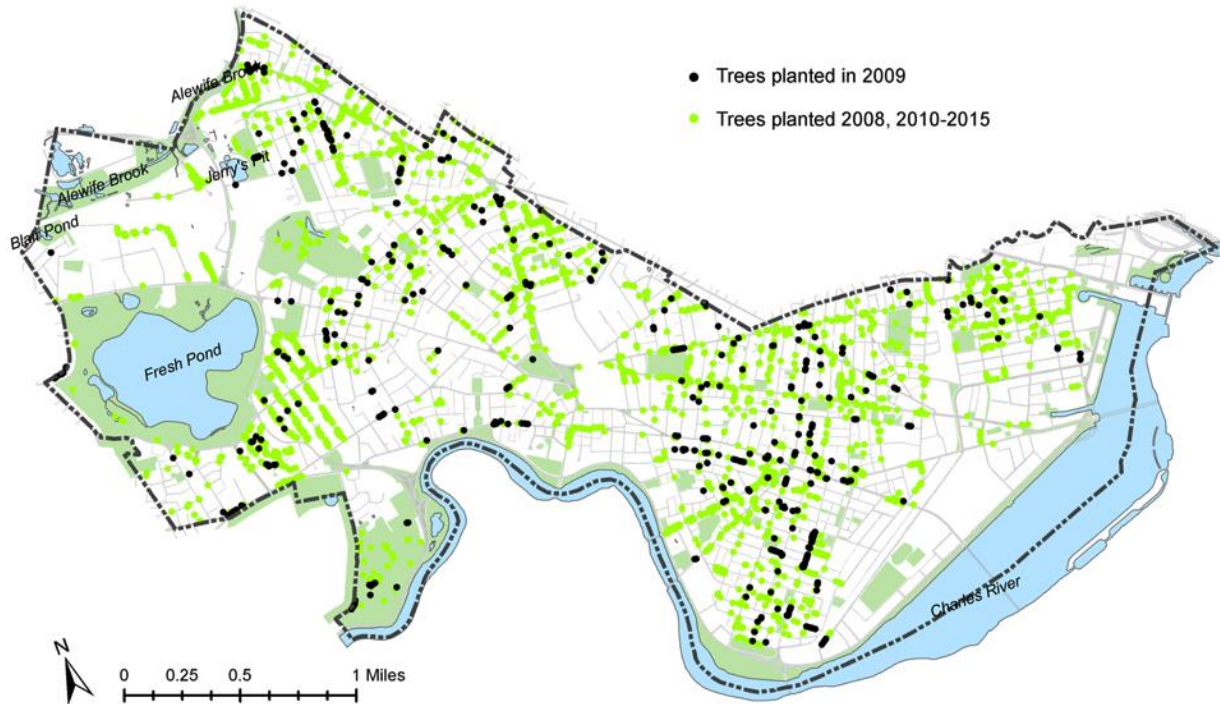
Species count	Common Name	Scientific Name	Species Code	Street Trees		Park Trees		Not Street or Park	Total
				City	DCR	City	DCR		
123	Spruce, Blue	<i>Picea pungens</i>	Picpun	2		15		15	<b>32</b>
124	Spruce, Norway	<i>Picea abies</i>	Picabi			10		20	<b>30</b>
125	Spruce, White	<i>Picea glauca</i>	Picgla			8		8	<b>16</b>
126	Sweetgum, American	<i>Liquidambar styraciflua</i>	Liqsty	153		60	3	17	<b>233</b>
127	Sycamore, American	<i>Platanus occidentalis</i>	Plaocc	99	60	4	31	2	<b>196</b>
128	Tree of Heaven	<i>Ailanthus altissima</i>	Ailalt	6		24	6	21	<b>57</b>
129	Tuliptree	<i>Liriodendron tulipifera</i>	Lirtul	60		16	3	6	<b>85</b>
130	Tupelo	<i>Nyssa sp</i>	Nyssp	3		2			<b>5</b>
131	Tupelo, Black	<i>Nyssa sylvatica</i>	Nyssyl	3					<b>3</b>
	unknown			11	4	20	59	20	<b>114</b>
132	Viburnum sp.	<i>Viburnum sp</i>	Vibsp					2	<b>2</b>
133	Walnut, Black	<i>Juglans nigra</i>	Jugnig			1		1	<b>2</b>
134	Willow sp.	<i>Salix sp</i>	Salsp			3		1	<b>4</b>
135	Willow, Black	<i>Salix nigra</i>	Salnig			1			<b>1</b>
136	Willow, Weeping	<i>Salix × sepulcralis</i>	Sal×sep			17		13	<b>30</b>
137	Witchhazel sp.	<i>Hamamelis sp</i>	Hamsp			2			<b>2</b>
138	Yellowwood	<i>Cladrastis kentukea</i>	Claken	14		12	1	1	<b>28</b>
139	Yew	<i>Taxus sp</i>	Taxsp					11	<b>11</b>
140	Zelkova, Japanese	<i>Zelkova serrata</i>	Zelser	298	60	106	83	2	<b>549</b>
<b>Total Count</b>				<b>12,421</b>	<b>548</b>	<b>4,386</b>	<b>1,130</b>	<b>1,952</b>	<b>20,437</b>

## Appendix B: Location of all trees planted from 2008 to 2015, by year.

### a) 2008

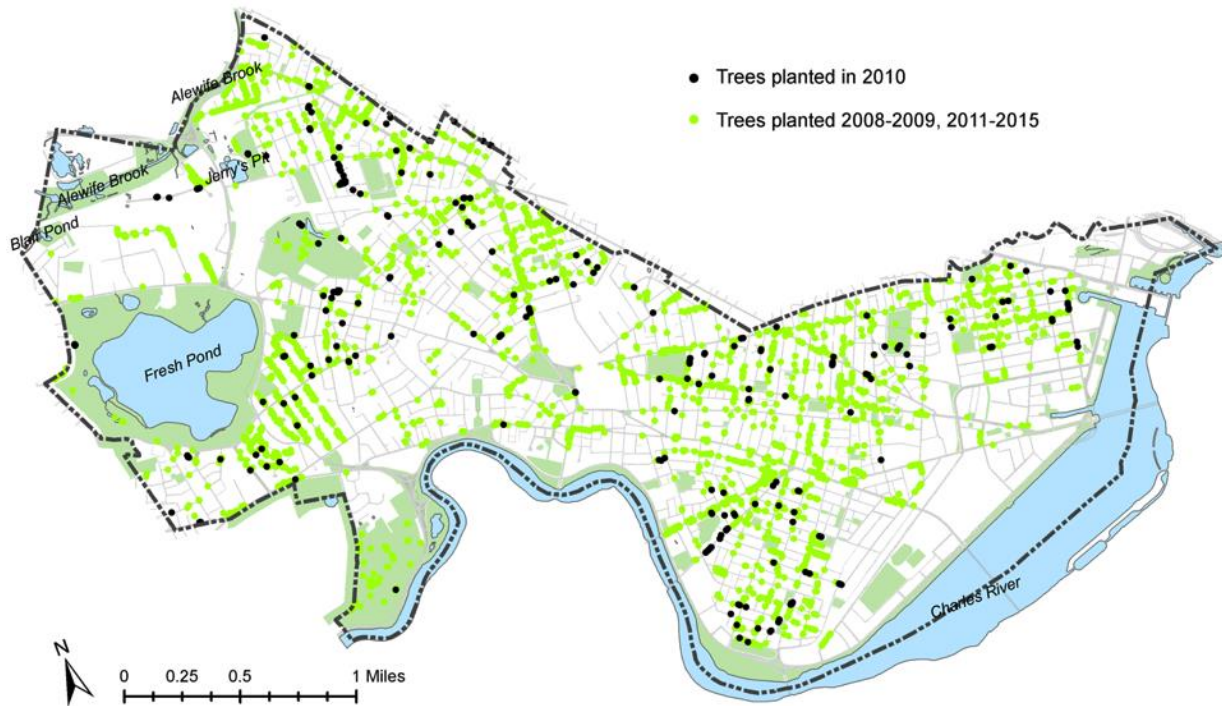


### b) 2009

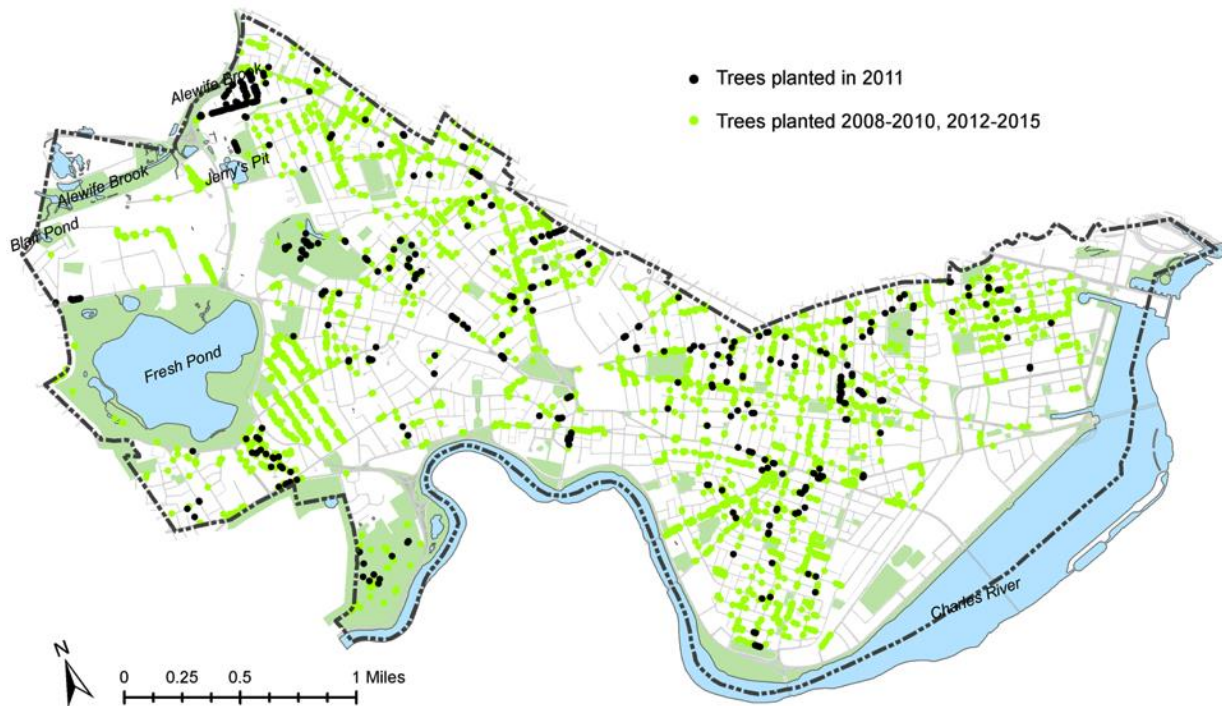




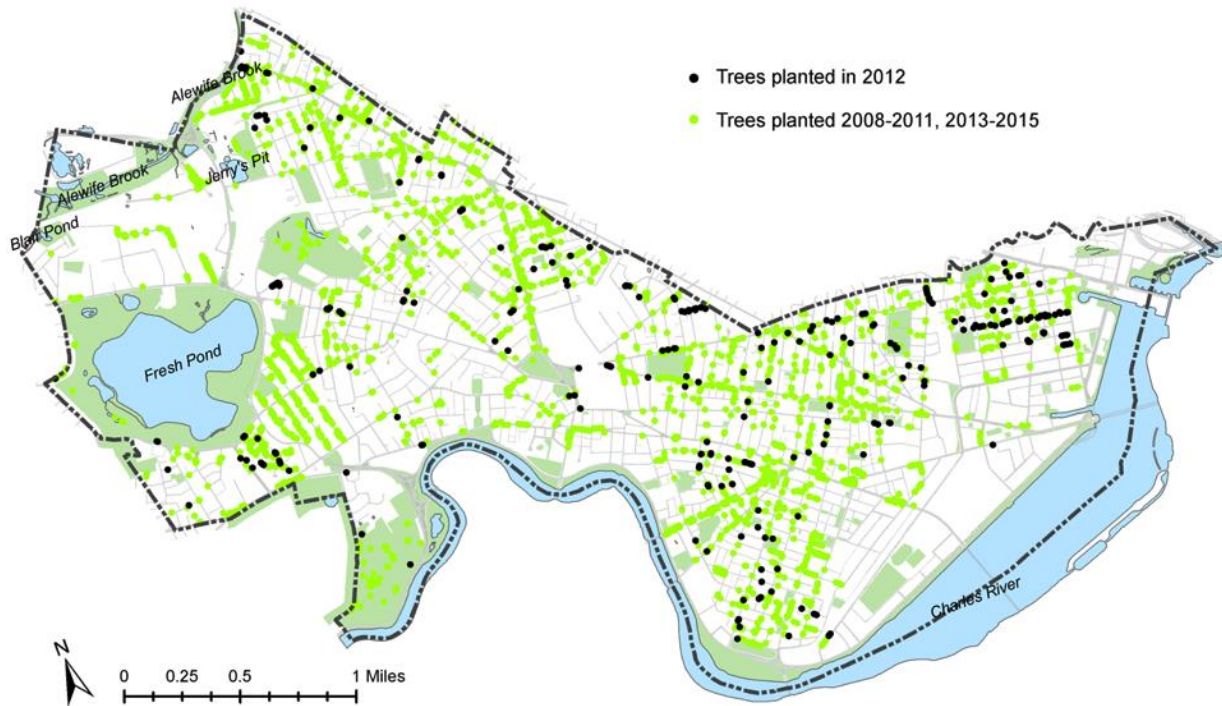
c) 2010



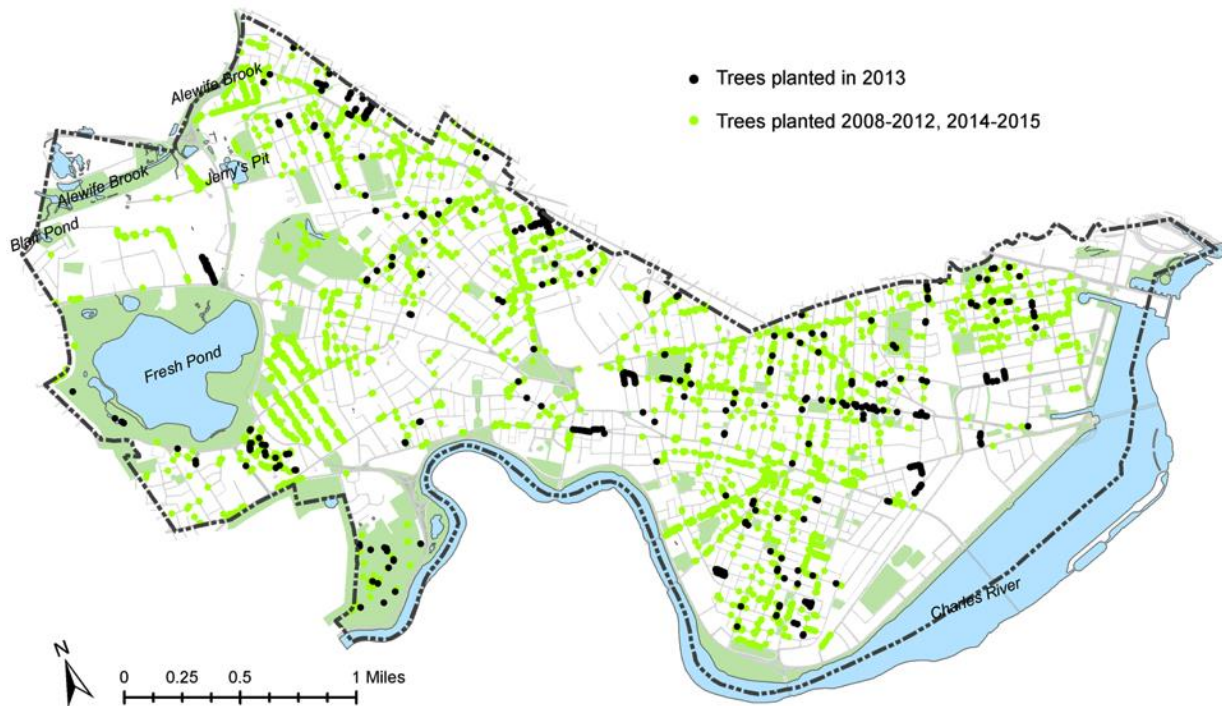
d) 2011



e) 2012

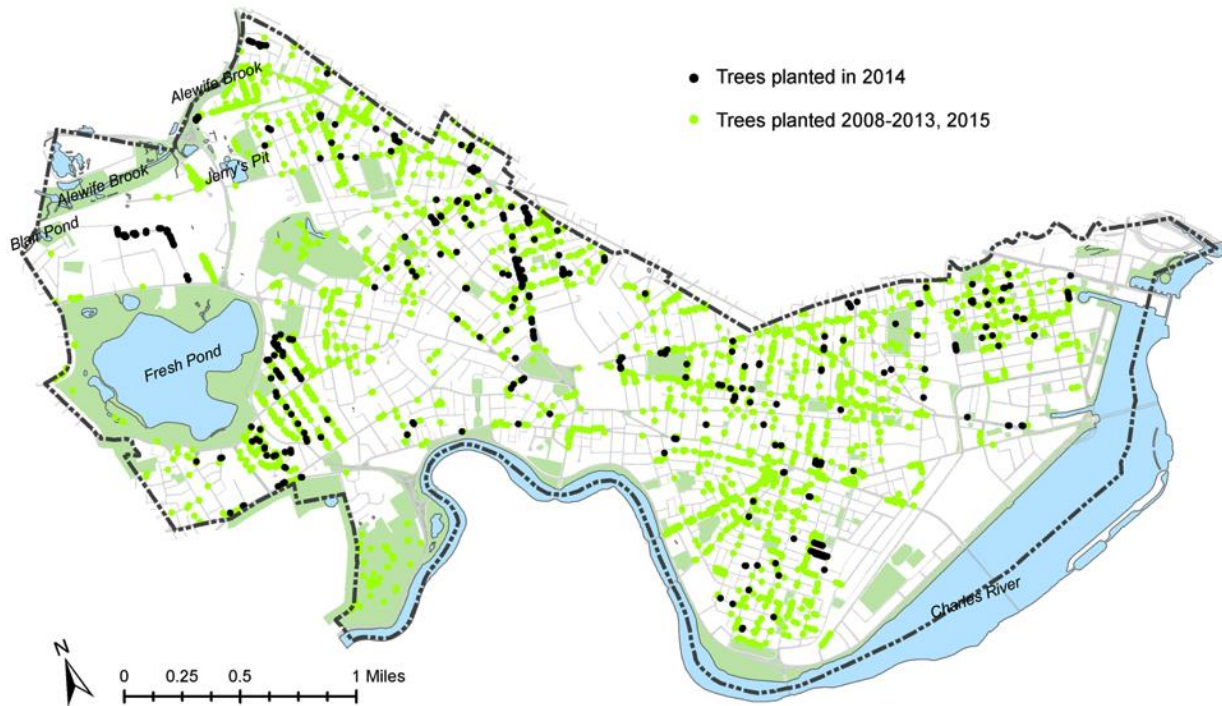


f) 2013

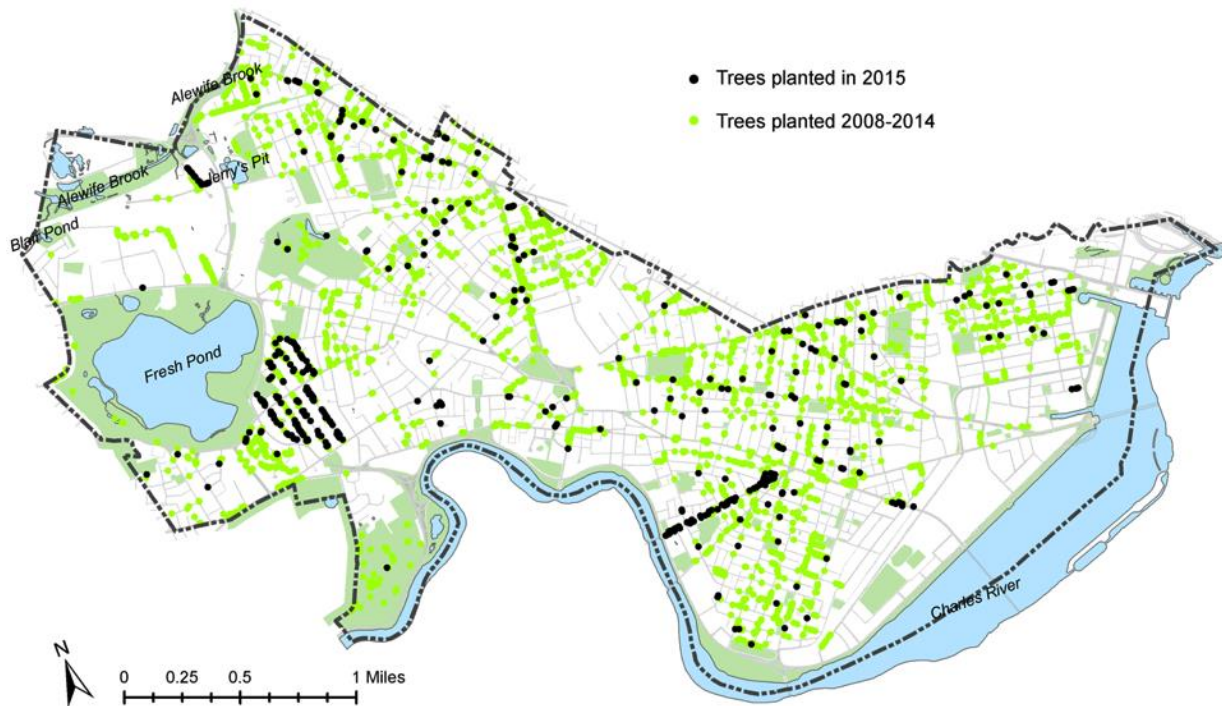




**g) 2014**



**h) 2015**





## Appendix C. Count of trees planted between 2008 and 2015 by species and planting year.

Species (Common Name)	Total	Count by Planting Year							
		2008	2009	2010	2011	2012	2013	2014	2015
Ash sp.	1	1	0	0	0	0	0	0	0
Ash, Green	8	4	0	2	1	1	0	0	0
Ash, White	9	0	8	0	0	0	1	0	0
Birch, Gray	1	0	0	0	1	0	0	0	0
Birch, River	30	0	2	3	4	0	5	9	7
Cherry sp.	60	11	10	1	3	5	9	16	5
Cherry, Autumnalis	7	0	0	3	2	0	0	1	1
Cherry, Kwanzan	62	1	14	7	7	12	6	4	11
Cherry, Okame	40	0	7	9	9	2	0	3	10
Cherry, Sargent	81	16	6	4	14	5	18	13	5
Cherry, Snowgoose	27	2	7	1	10	1	0	1	5
Cherry, Yoshino	13	0	4	4	0	1	0	1	3
Coffeetree, Kentucky	3	0	0	0	0	0	0	3	0
Crabapple	88	0	1	5	17	25	21	16	3
Dogwood sp.	4	0	0	0	0	0	0	4	0
Dogwood, Flowering	1	0	0	0	0	0	0	0	1
Dogwood, Kousa	1	0	1	0	0	0	0	0	0
Elm sp.	137	6	16	21	28	25	17	11	13
Elm, American	131	10	20	4	23	11	12	18	33
Elm, Lacebark	12	5	4	0	1	0	2	0	0
Ginkgo	79	15	7	7	16	4	14	8	8
Hackberry	42	1	0	6	11	5	1	18	0
Hawthorn sp.	1	0	0	0	0	1	0	0	0
Honeylocust	307	11	57	40	42	21	57	47	32
Hornbeam, American	16	1	4	0	0	0	0	6	5
Horsechestnut, European	3	0	0	0	0	0	3	0	0
Ironwood, Persian	8	0	0	0	0	0	0	8	0
Katsuratree	11	0	0	1	3	0	7	0	0
Lilac, Japanese Tree	101	2	10	5	12	15	24	20	13
Linden, American	7	2	0	0	0	3	1	0	1
Linden, Littleleaf	103	12	21	6	12	7	25	11	9
Linden, Silver	35	8	0	0	13	7	2	0	5
Maackia	16	0	1	0	10	5	0	0	0
Magnolia sp.	1	1	0	0	0	0	0	0	0
Maple sp.	5	0	0	0	0	0	0	0	5
Maple, Amur	15	0	0	0	0	6	0	0	9

*Appendix C cont.*

Species (Common Name)	Total	Count by Planting Year							
		2008	2009	2010	2011	2012	2013	2014	2015
Maple, Hedge	65	0	15	17	19	3	7	4	0
Maple, Miyabei	3	0	0	0	1	2	0	0	0
Maple, Norway	1	0	0	0	0	0	1	0	0
Maple, Paperbark	3	0	0	0	0	0	0	1	2
Maple, Red	244	38	36	18	40	18	53	9	32
Maple, Silver	5	1	3	0	1	0	0	0	0
Maple, Sugar	11	0	3	3	1	2	1	1	0
Maple, Trident	1	0	0	1	0	0	0	0	0
Oak sp.	28	0	0	0	0	0	1	1	26
Oak, Black	6	0	0	1	0	3	2	0	0
Oak, English	1	0	0	0	0	0	1	0	0
Oak, Heritage	4	0	0	0	0	1	0	0	3
Oak, Pin	132	11	44	14	12	11	8	10	22
Oak, Red	74	4	12	5	11	0	23	12	7
Oak, Swamp White	84	5	23	11	19	1	9	15	1
Pagoda Tree, Japanese	36	0	5	1	3	6	15	4	2
Peach	1	0	0	0	0	0	1	0	0
Pear, Callery	55	2	34	3	3	5	7	0	1
Planetree, London	128	7	24	3	12	5	25	20	32
Raintree, Golden	44	12	12	4	4	0	9	3	0
Redbud	42	3	1	3	0	6	1	6	22
Redwood, Dawn	1	0	0	0	0	1	0	0	0
Serviceberry	127	0	3	5	20	18	24	27	30
Spruce, Norway	1	0	0	0	0	0	0	1	0
Sweetgum, American	52	8	3	1	9	7	14	9	1
Sycamore, American	2	0	0	0	0	0	2	0	0
Tuliptree	30	1	2	0	1	4	4	6	12
Tupelo	2	0	0	0	0	0	0	0	2
Tupelo, Black	3	0	0	3	0	0	0	0	0
Willow, Weeping	1	0	0	0	0	0	0	0	1
Yellowwood	5	1	2	1	0	0	0	1	0
Zelkova, Japanese	101	8	2	12	17	12	6	27	17
Unknown ( <i>species not listed</i> )	78	3	18	12	15	12	10	6	2
<b>TOTAL</b>	<b>2,837</b>	<b>213</b>	<b>442</b>	<b>247</b>	<b>427</b>	<b>279</b>	<b>449</b>	<b>381</b>	<b>399</b>

## Appendix D: Analyses by Neighborhood.

### Agassiz

Area = 0.29 square miles (4.1% of city area)  
 635 city owned trees (57 species)  
 8.31 miles of road  
 67.5 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	0	151	24.3%
3-6	4	114	19.0%
6-12	29	115	23.2%
12-18	12	75	14.0%
18-24	7	63	11.3%
24-30	2	27	4.7%
30-36	2	16	2.9%
36-42	2	1	0.5%
42+	1	0	0.2%

#### Sixteen most common City-owned species

Species	Count	Percent
Maple, Norway	112	17.6%
Honeylocust	92	14.5%
Oak, Pin	53	8.3%
Maple, Red	42	6.6%
Lilac, Japanese Tree	27	4.3%
Pear, Callery	26	4.1%
Linden, Littleleaf	23	3.6%
Oak, Red	16	2.5%
Pagoda Tree, Japanese	13	2.0%
Linden, American	12	1.9%
Maple, Hedge	12	1.9%
Sycamore, American	12	1.9%
Zelkova, Japanese	11	1.7%
Ash, Green	10	1.6%

**Area 2/ MIT**

Area = 0.64 square miles (8.9% of city area)

407 city owned trees (22 species)

9.08 miles of road

37.9 city street trees per mile of road

**Size class distribution of park and street trees**

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	14	199	25.4%
3-6	72	91	19.5%
6-12	143	65	24.9%
12-18	134	26	19.1%
18-24	67	1	8.1%
24-30	19	0	2.3%
30-36	6	0	0.7%
36-42	0	0	0.0%
42+	0	0	0.0%

**Sixteen most common City-owned species**

Species	Count	Percent
Elm sp.	107	26.3%
Ginkgo	59	14.5%
Linden, Littleleaf	45	11.1%
Honeylocust	44	10.8%
Linden, American	41	10.1%
Pear, Callery	23	5.7%
Oak, Pin	22	5.4%
Cherry, Kwanzan	11	2.7%
Lilac, Japanese Tree	11	2.7%
Maple, Norway	10	2.5%
Sweetgum, American	6	1.5%
Maple, Red	5	1.2%
Hawthorn sp.	4	1.0%
Yellowwood	4	1.0%
Maple sp.	3	0.7%
Planetree, London	3	0.7%
Serviceberry	3	0.7%

### Cambridge Highlands

Area = 0.53 square miles (7.4% of city area)

279 city owned trees (36 species)

4.86 miles of road

29.4 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	8	91	36.4%
3-6	3	62	23.9%
6-12	9	34	15.8%
12-18	9	19	10.3%
18-24	0	4	1.5%
24-30	4	11	5.5%
30-36	0	10	3.7%
36-42	0	4	1.5%
42+	3	1	1.5%

#### Sixteen most common City-owned species

Species	Count	Percent
Oak, Red	39	14.0%
Oak, Pin	38	13.6%
Maple, Norway	24	8.6%
Honeylocust	19	6.8%
Maple, Red	19	6.8%
Cherry sp.	13	4.7%
Linden, Littleleaf	12	4.3%
Crabapple	11	3.9%
Oak, Swamp White	11	3.9%
Zelkova, Japanese	11	3.9%
Pine, White	9	3.2%
Sweetgum, American	8	2.9%
Sycamore, American	8	2.9%
Lilac, Japanese Tree	7	2.5%
Maple, Hedge	5	1.8%
unknown	5	1.8%

### Cambridgeport

Area = 0.57 square miles (8.0% of city area)

2094 city owned trees (68 species)

16.60 miles of road

100.4 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	35	386	20.3%
3-6	79	485	27.3%
6-12	93	498	28.6%
12-18	82	213	14.3%
18-24	23	88	5.4%
24-30	15	46	2.9%
30-36	8	15	1.1%
36-42	0	3	0.1%
42+	0	0	0.0%

#### Sixteen most common City-owned species

Species	Count	Percent
Maple, Red	260	12.4%
Honeylocust	228	10.9%
Maple, Norway	218	10.4%
Pear, Callery	199	9.5%
Linden, Littleleaf	197	9.4%
Oak, Pin	120	5.7%
Zelkova, Japanese	73	3.5%
Lilac, Japanese Tree	49	2.3%
Cherry sp.	43	2.1%
Crabapple	41	2.0%
Elm sp.	40	1.9%
Planetree, London	38	1.8%
Maple, Hedge	36	1.7%
Pagoda Tree, Japanese	35	1.7%
Maple, Sugar	34	1.6%



### East Cambridge

Area = 0.71 square miles (10.0% of city area)

2138 city owned trees (70 species)

15.75 miles of road

88.2 city street trees per mile of road

### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	43	319	15.4%
3-6	164	385	23.3%
6-12	279	448	30.9%
12-18	176	293	19.9%
18-24	76	108	7.8%
24-30	12	29	1.7%
30-36	5	10	0.6%
36-42	0	4	0.2%
42+	2	0	0.1%

### Sixteen most common City-owned species

Species	Count	Percent
Maple, Red	201	9.4%
Pear, Callery	200	9.4%
Maple, Norway	189	8.8%
Planetree, London	166	7.8%
Honeylocust	159	7.4%
Crabapple	118	5.5%
Oak, Pin	117	5.5%
Zelkova, Japanese	100	4.7%
Linden, American	91	4.3%
Oak, Red	87	4.1%
Linden, Littleleaf	76	3.6%
Pine, Red	55	2.6%
Pagoda Tree, Japanese	49	2.3%
Ginkgo	44	2.1%
Maple, Sugar	42	2.0%

### Mid-Cambridge

Area = 0.47 square miles (6.5% of city area)

1481 city owned trees (79 species)

14.76 miles of road

83.2 city street trees per mile of road

### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	16	279	21.2%
3-6	57	286	24.6%
6-12	47	302	25.1%
12-18	36	185	15.9%
18-24	8	111	8.5%
24-30	5	33	2.7%
30-36	0	19	1.4%
36-42	0	6	0.4%
42+	2	0	0.1%

### Sixteen most common City-owned species

Species	Count	Percent
Maple, Norway	209	14.1%
Honeylocust	200	13.5%
Maple, Red	130	8.8%
Linden, Littleleaf	76	5.1%
Pear, Callery	72	4.9%
Oak, Pin	67	4.5%
Pagoda Tree, Japanese	47	3.2%
Lilac, Japanese Tree	42	2.8%
Planetree, London	41	2.8%
Zelkova, Japanese	41	2.8%
Elm, American	34	2.3%
Ash, Green	28	1.9%
Sweetgum, American	27	1.8%
Ginkgo	25	1.7%
Elm sp.	22	1.5%
Linden, American	22	1.5%
Linden, Silver	22	1.5%
Serviceberry	22	1.5%

### Neighborhood Nine

Area = 0.64 square miles (8.9% of city area)

2806 city owned trees (85 species)

17.29 miles of road

72.2 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	178	274	16.5%
3-6	398	295	25.3%
6-12	590	297	32.4%
12-18	203	173	13.7%
18-24	84	112	7.2%
24-30	25	55	2.9%
30-36	15	27	1.5%
36-42	4	3	0.3%
42+	3	1	0.1%

#### Sixteen most common City-owned species

Species	Count	Percent
Honeylocust	341	12.2%
Maple, Norway	303	10.8%
Ash, Green	247	8.8%
Maple, Red	241	8.6%
Pine, White	212	7.6%
Oak, Pin	193	6.9%
Pear, Callery	88	3.1%
Sweetgum, American	62	2.2%
Linden, Littleleaf	59	2.1%
Lilac, Japanese Tree	54	1.9%
Oak, Red	52	1.9%
Pine, Austrian	51	1.8%
Planetree, London	49	1.7%
Maple, Silver	46	1.6%
Maple, Sugar	45	1.6%

### North Cambridge

Area = 0.88 square miles (12.4% of city area)

2139 city owned trees (82 species)

18.64 miles of road

71.6 city street trees per mile of road

### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	110	382	22.6%
3-6	145	307	20.8%
6-12	263	338	27.6%
12-18	155	202	16.4%
18-24	76	94	7.8%
24-30	21	49	3.2%
30-36	8	19	1.2%
36-42	1	2	0.1%
42+	1	2	0.1%

### Sixteen most common City-owned species

Species	Count	Percent
Maple, Norway	341	15.9%
Maple, Red	205	9.6%
Honeylocust	180	8.4%
Oak, Pin	121	5.7%
Arborvitae	88	4.1%
Linden, Littleleaf	79	3.7%
Cherry sp.	68	3.2%
Cherry, Sargent	63	2.9%
Ash, Green	61	2.9%
Lilac, Japanese Tree	59	2.8%
Pear, Callery	57	2.7%
Ash, White	50	2.3%
Elm, American	50	2.3%
Pine, Red	50	2.3%
Maple, Hedge	46	2.2%

### Riverside

Area = 0.34 square miles (4.8% of city area)

1050 city owned trees (62 species)

11.98 miles of road

62.6 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	11	148	14.1%
3-6	26	151	15.6%
6-12	152	241	34.7%
12-18	85	165	22.1%
18-24	44	51	8.4%
24-30	14	15	2.6%
30-36	4	11	1.3%
36-42	2	8	0.9%
42+	0	3	0.3%

#### Sixteen most common City-owned species

Species	Count	Percent
Honeylocust	148	14.1%
Pear, Callery	105	10.0%
Linden, Littleleaf	83	7.9%
Ash, Green	63	6.0%
Maple, Norway	59	5.6%
Maple, Red	54	5.1%
Zelkova, Japanese	53	5.0%
Planetree, London	47	4.5%
Crabapple	45	4.3%
Oak, Pin	37	3.5%
Pine, White	35	3.3%
Elm, American	22	2.1%
Ginkgo	21	2.0%
Hawthorn sp.	18	1.7%
Linden, American	16	1.5%
Oak, Red	16	1.5%



### Strawberry Hill

Area = 0.29 square miles (4.1% of city area)

472 city owned trees (50 species)

4.60 miles of road

48.4 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	9	43	17.6%
3-6	8	37	15.3%
6-12	23	59	27.8%
12-18	23	35	19.7%
18-24	1	23	8.1%
24-30	6	13	6.4%
30-36	1	11	4.1%
36-42	1	2	1.0%
42+	0	0	0.0%

#### Sixteen most common City-owned species

Species	Count	Percent
Maple, Norway	60	12.7%
Honeylocust	50	10.6%
Oak, Pin	33	7.0%
Maple, Red	30	6.4%
Linden, Littleleaf	26	5.5%
Pine, White	24	5.1%
Pear, Callery	22	4.7%
Ash, Green	20	4.2%
Lilac, Japanese Tree	19	4.0%
Ginkgo	15	3.2%
Maple, Sugar	12	2.5%
Cherry, Sargent	11	2.3%
Cherry sp.	10	2.1%
Birch, River	9	1.9%
Willow, Weeping	9	1.9%

**The Port (previously known as Area Four)**

Area = 0.30 square miles (4.2% of city area)

1167 city owned trees (59 species)

10.95 miles of road

83.9 city street trees per mile of road

**Size class distribution of park and street trees**

<b>DBH range (inches)</b>	<b>Park Trees</b>	<b>Street Trees</b>	<b>% Trees in Neighborhood</b>
0-3	29	200	20.4%
3-6	87	228	28.1%
6-12	47	258	27.2%
12-18	30	148	15.9%
18-24	10	65	6.7%
24-30	2	7	0.8%
30-36	0	3	0.3%
36-42	1	4	0.4%
42+	1	0	0.1%

**Sixteen most common City-owned species**

<b>Species</b>	<b>Count</b>	<b>Percent</b>
Honeylocust	208	17.8%
Maple, Red	137	11.7%
Linden, Littleleaf	85	7.3%
Maple, Norway	83	7.1%
Pear, Callery	73	6.3%
Oak, Pin	66	5.7%
Planetree, London	52	4.5%
Lilac, Japanese Tree	38	3.3%
Hornbeam, American	34	2.9%
Pagoda Tree, Japanese	32	2.7%
Ash, White	25	2.1%
Zelkova, Japanese	24	2.1%
Elm sp.	22	1.9%
Ash, Green	21	1.8%
Sweetgum, American	21	1.8%

### Wellington-Harrington

Area = 0.24 square miles (3.3% of city area)

1029 city owned trees (69 species)

9.18 miles of road

85.4 city street trees per mile of road

#### Size class distribution of park and street trees

DBH range (inches)	Park Trees	Street Trees	% Trees in Neighborhood
0-3	27	139	17.6%
3-6	55	134	20.1%
6-12	37	243	29.8%
12-18	28	176	21.7%
18-24	10	62	7.7%
24-30	1	14	1.6%
30-36	0	12	1.3%
36-42	0	0	0.0%
42+	1	2	0.3%

#### Sixteen most common City-owned species

Species	Count	Percent
Honeylocust	158	15.4%
Maple, Norway	115	11.2%
Linden, Littleleaf	110	10.7%
Maple, Red	83	8.1%
Ginkgo	60	5.8%
Oak, Pin	54	5.2%
Pear, Callery	49	4.8%
Planetree, London	36	3.5%
Ash, Green	26	2.5%
Oak, Red	26	2.5%
Beech, European	24	2.3%
Lilac, Japanese Tree	20	1.9%
Crabapple	19	1.8%
Pagoda Tree, Japanese	17	1.7%
Maple, Sugar	15	1.5%

**West Cambridge (previously known as Neighborhood 10)**

Area = 1.23 square miles (17.3% of city area)

2993 city owned trees (108 species)

26.17 miles of road

67.8 city street trees per mile of road

**Size class distribution of park and street trees**

<b>DBH range (inches)</b>	<b>Park Trees</b>	<b>Street Trees</b>	<b>% Trees in Neighborhood</b>
0-3	71	450	21.9%
3-6	60	313	15.7%
6-12	104	404	21.4%
12-18	100	315	17.5%
18-24	63	221	12.0%
24-30	21	114	5.7%
30-36	4	59	2.7%
36-42	7	29	1.5%
42+	2	37	1.6%

**Sixteen most common City-owned species**

<b>Species</b>	<b>Count</b>	<b>Percent</b>
Maple, Norway	419	14.0%
Honeylocust	254	8.5%
Maple, Red	201	6.7%
Oak, Pin	162	5.4%
Oak, Red	133	4.4%
Linden, Littleleaf	115	3.8%
Maple, Sugar	111	3.7%
Pear, Callery	93	3.1%
Crabapple	73	2.4%
Cherry sp.	69	2.3%
Planetree, London	58	1.9%
Serviceberry	57	1.9%
Ginkgo	56	1.9%
Lilac, Japanese Tree	56	1.9%
Pine, Austrian	55	1.8%

## Appendix E: Tree Condition Rating Definitions.

The following photos and guidelines were provided to Earthwatch citizen-scientists in order to determine the condition rating for each tree.

### Dead



Tree condition is “Dead” if the tree has no leaves. If you scratch the bark, it will be dry and brown (live trees will have a moist, healthy, green color).

### Poor



Tree condition is “Poor” if the tree appears unhealthy and may have structural defects such as co-dominant stems, severe damaged bark, or severe trunk and/or limb decay. A tree in this category may also have severe mechanical damage, crown dieback, or poor vigor threatening its ability to thrive.



### Fair



Tree condition is “Fair” if the tree has minor structural problems and/or mechanical damage, significant damage from non-fatal or disfiguring diseases, minor crown imbalance or thin crown, or stunted growth compared to adjacent trees or shrubs. This condition can also include trees that have been topped, but show reasonable vitality and show no obvious signs of decay.

### Good



Tree condition is “Good” if the tree has no major structural problems, no significant mechanical damage, may have only minor aesthetic insect, disease, or structure problems, yet is in good health. Many of the trees in Cambridge fall into this category.