



# Pittsburgh i-Tree Ecosystem Analysis

## City of Pittsburgh, Pennsylvania

July 2015

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## Acknowledgments

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The City of Pittsburgh’s vision to promote and preserve the urban forest and improve the management of public trees was a fundamental inspiration for this project. Among the keystones of the Pittsburgh Urban Forest Master Plan is “Connect” and “Engage”, which outlines goals to improve access to tree benefits and for developing education and outreach strategies that increase awareness of the importance of Pittsburgh’s urban forest. Quantifying tree benefit results will help the city and its partners in the achievement of those goals.

The City of Pittsburgh is thankful for the funding and expertise it received from the City of Pittsburgh Shade Tree Commission, The Pennsylvania Department of Conservation and Natural Resources, Tree Pittsburgh, and the Western Pennsylvania Conservancy.



CITY OF  
**PITTSBURGH**  
“AMERICA’S MOST LIVABLE CITY”  
WILLIAM PEDUTO, MAYOR

Western Pennsylvania Conservancy



## Pittsburgh Benefits Executive Summary

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This report reflects data gathered by Davey Resource Group, a division of The Davey Tree Expert Company, throughout a complete street tree inventory during summer and fall 2014. Davey Resource Group used i-Tree Eco (UFORE) and i-Tree Streets urban forest analysis tools to analyze the data and estimate the annual monetary benefits the City of Pittsburgh receives from its street tree resource (see Appendix E for more detail on i-Tree eco and i-Tree streets analysis tools).

A Street Tree Management Plan was also produced in conjunction with the benefits analysis. These reports and the major tree planting efforts throughout the TreeVitalize Pittsburgh project have been led by Pittsburgh's urban forestry partners, including: Allegheny County Parks, City of Pittsburgh Forestry Division, the City of Pittsburgh Shade Tree Commission, Pennsylvania Department of Conservation and Natural Resources, Tree Pittsburgh, and the Western Pennsylvania Conservancy.

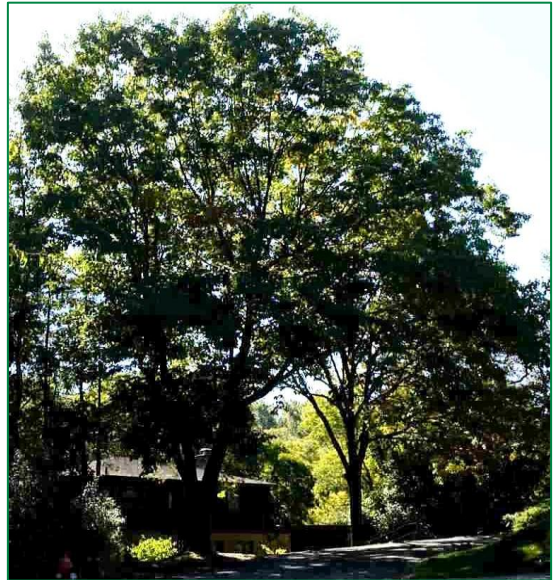
This analysis is based on benefits which have been quantified by the i-Tree Eco and Streets analysis tools. It is important to note that many of the benefits provided by the urban forest and its street tree resource are not presently accounted for by these analysis tools. Urban forests have been shown to have positive effects on crime rates, hospital recovery time, community pride and cohesion, physical health, and mental and emotional well-being. For some, these intrinsic values are just as important as the tangible monetary benefits trees provide. As the i-Tree model is developed and economic values are quantified for additional benefits, the importance of Pittsburgh's street tree resource value will continue to increase.

### Resource Structure

For the purpose of this analysis, Pittsburgh's street tree resource was divided into 90 neighborhoods, most of which are located in the eastern part of the city (see map in Appendix A). A thorough analysis of resource composition across Pittsburgh's diverse mix of neighborhoods is essential to understanding the management needs and benefits of these street trees.

Pittsburgh's street tree inventory comprises 33,498 publicly-managed street trees. Looking at species diversity, age distribution, condition, canopy coverage, and replacement value, Pittsburgh's street tree resource composition is characterized by the following findings:

- There are 189 distinct tree species along Pittsburgh's street rights-of-way. Highly abundant species such as *Acer platanoides* (Norway maple, 10.5%) and *A. rubrum* (red maple, 10.0%) currently pose a threat to the biodiversity of Pittsburgh's street tree population. Other predominant species include: *Pyrus calleryana* (Callery pear, 8.9%); *Platanus x acerifolia* (London planetree, 8.2%); and *Tilia cordata* (littleleaf linden, 6.7%). Norway maple and Callery pear are non-native invasive species, which is an additional concern.



*Photograph 1. This Quercus rubra (northern red oak) in the North Squirrel Hill neighborhood provides shade on a sunny summer day.*

- The age structure of Pittsburgh’s street trees is nearly ideal. While there are too few trees of middle diameter classes, the high volume of young trees bodes well for the future flow of benefits.
- Two of Pittsburgh’s top performing species—*Platanus x acerfolia* (London planetree) and *Quercus palustris* (pin oak)—are limited when it comes to existing young replacements. That said, some young planetrees have been planted, and a variety of white oak species have been planted to replace the pin oak. Red oak is not currently being planted due to its susceptibility to oak wilt disease and the obscure scale insect pest.
- The majority of Pittsburgh’s street trees are in Good or Fair condition (42% and 41%, respectively). Maintaining these trees is essential to maximizing their benefits and increasing their useful lifespan. Critical and Dead trees need to be removed as soon as possible.
- The estimated street tree canopy covers 1,435 acres, or 4.1% of Pittsburgh’s total land area. The area covered by street tree canopy is about 26% of the total estimated street ROW area (5,461 acres) within the city.
- Replacing Pittsburgh’s 33,498 street trees with trees of similar size, species, and condition would cost approximately \$51 million.

### Functional Benefits

Pittsburgh’s street trees provide numerous functional benefits to the community. These cumulative benefits can be valued at an annual average of approximately \$67 per tree, for a net total annual value of \$2.24 million. Trees help conserve and reduce energy use, reduce local carbon dioxide levels, improve air quality, mitigate stormwater runoff, improve aesthetics, and increase property value.

Pittsburgh’s street trees benefit the community in the following ways:

- Remove and mitigate air pollutants. The net air quality improvement provided by Pittsburgh’s street tree population is valued at approximately \$417,700 per year, for an average net benefit of \$12.48 per tree.
- Provide an annual benefit of roughly \$38,335 (\$1.14 per tree) in carbon storage and avoidance. Carbon storage amounts to a net 4.4 million pounds each year, which accounts for an estimated annual value of \$14,400. As a result of the cooling and wind break benefits trees provide, the amount of carbon released into the environment was reduced by 7.3 million pounds, valued at \$23,967.
- Reduce electricity and natural gas use in Pittsburgh for a total energy savings of roughly \$96,501, with a citywide average of \$2.88 per street tree.
- Intercept 15.2 million gallons of stormwater per year, for an average of 450 gallons per tree. The total annual value of this benefit is \$134,848, for an average value of \$4.03 per tree.
- Aesthetic and property values account for an estimated total annual benefit of \$1,556,747, for an average of \$46.47 per tree.
- Annual tree-related expenditures amount to a projected average of \$1,488,466 over the next ten years. The net annual benefit (benefits minus costs) is approximately \$755,665. The City of Pittsburgh receives roughly \$1.51 in benefits for every \$1 spent on its municipal forestry program.

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## The Street Tree Network

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Trees work together to improve ecosystem function and human health. Trees protect each other from wind, snow, and ice, but they also complement each other by growing in different types of microclimates or soil types. Trees also provide shelter and food for a variety of wildlife and help create understory microclimates required for many plants and wildflowers that are unique to the western Pennsylvania region.



*Photograph 2. These Quercus spp. (oak) provide many environmental benefits to the City of Pittsburgh. With proper maintenance, they will continue to do so for years to come.*

When trees are removed, great care is taken to ensure that the health of the urban forest is protected. Foresters make sure that young trees are planted according to the best and latest urban forestry practices, including planting a diverse species mix with proper spacing to complement the existing forest. Foresters are cognizant that the trees they plant and maintain will grow into the mature canopy of the future. The City of Pittsburgh, TreePittsburgh, and the Western Pennsylvania Conservancy are all well represented with experienced urban foresters who apply their knowledge of urban forestry best practices to new planting projects throughout the city.

Well-managed urban forests provide significant and measurable economic and aesthetic benefits. Poorly-managed street trees result in the loss of economic, environmental, and health benefits and create hazardous and costly conditions for people and property. Recovery from under-maintained urban forests can take decades.

Urban forest managers unfortunately are at a disadvantage compared to rural foresters. While the latter maintains control over all the trees within their management zone, city managers only control the portions of the urban forests on public property and within public rights-of-way (ROW). Urban foresters have a limited say in how trees on private property are managed. Trees in natural park areas can be managed much like rural forests. Trees in open-park areas which are primarily managed for aesthetic benefits generally demonstrate positive growth and are less likely to present liability issues, with exception to high traffic areas. Therefore, city forestry divisions tend to dedicate most of their resources to the management of trees in the public ROWs.

Traditionally, street trees in American cities have been managed *reactively*, meaning trees are often planted, maintained, and removed on an individual basis. However, over the past decades, research has shown that *planned management* of urban forests increases benefits, reduces liability, and greatly improves the scale efficiency of management activities. Ultimately, proactive planning leads to a successful street tree network.

### A Forest of Trees

The whole is equal to the sum of its parts. The condition of Pittsburgh's street tree resource cannot be determined without closely looking at each of the trees that comprise it. An inspection of Pittsburgh's street tree resource sheds light on its current condition and provides an outlook for the future.

### Street Tree Numbers

A complete census of street trees was conducted by Davey Resource Group in summer and fall 2014. A total of 33,498 trees within the street’s right-of-way (ROW) were inventoried. This is an increase of roughly 4,000 trees since the 2005 street tree analysis, as reported in the *2008 City of Pittsburgh Municipal Forest Resource Analysis*. In comparison to the entire land area of Pittsburgh, the street tree density in Pittsburgh is roughly 650 street trees per square mile (about 1 tree per acre of city land). When compared to the land area encompassed by the street ROW, street tree density is about 6,500 per square mile (about 10 trees per acre within the street ROW) throughout the approximately 5 square miles of Pittsburgh’s ROW. Thus, the canopy within the street ROW is about 10 times denser than that of the city in general.

Figure 1 shows which of Pittsburgh’s neighborhoods have the highest street tree populations. Many of Pittsburgh’s neighborhoods are well stocked with young trees thanks to planting campaigns like the TreeVitalize Pittsburgh program. However, neighborhoods such as Squirrel Hill North and Point Breeze have significant populations of mature, large-statured trees, which is the result of a century of excellent urban forest management. Such neighborhoods serve as an example of canopy potential in neighborhoods throughout the city.

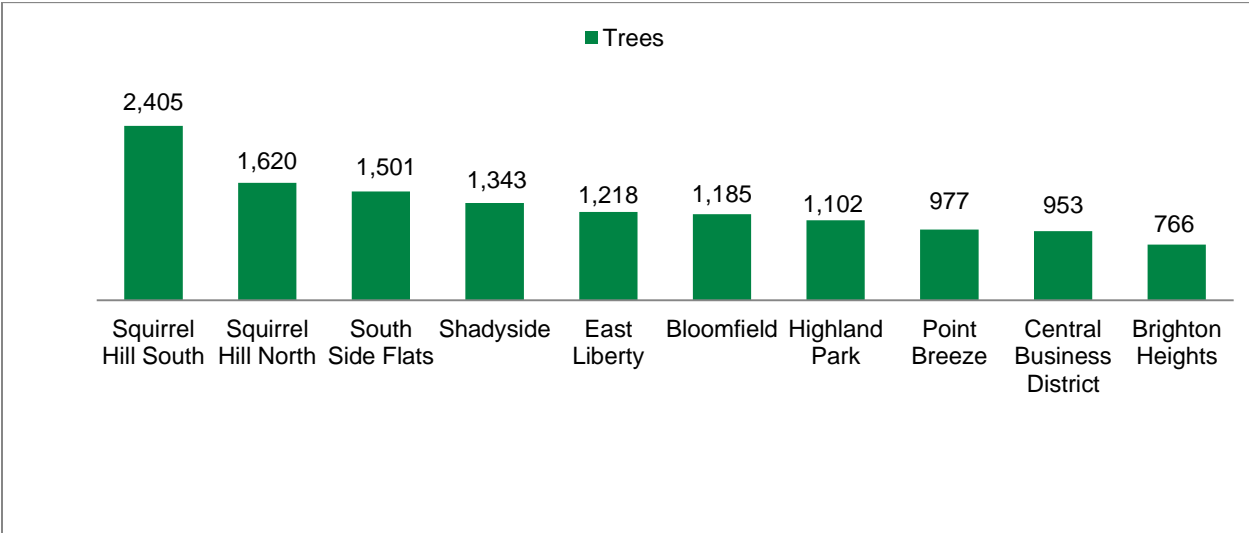
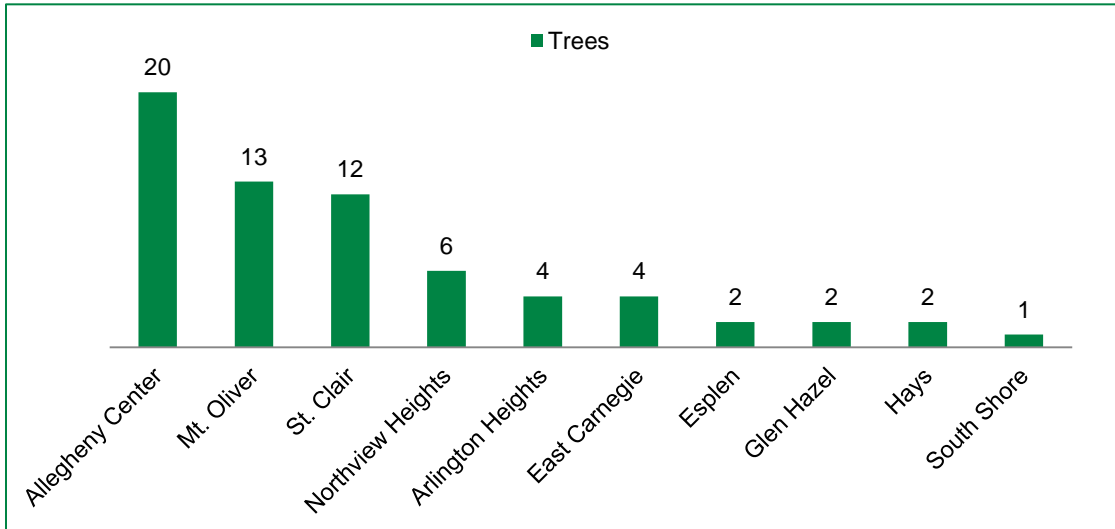


Figure 1. Number of trees in the 10 neighborhoods with the most trees.



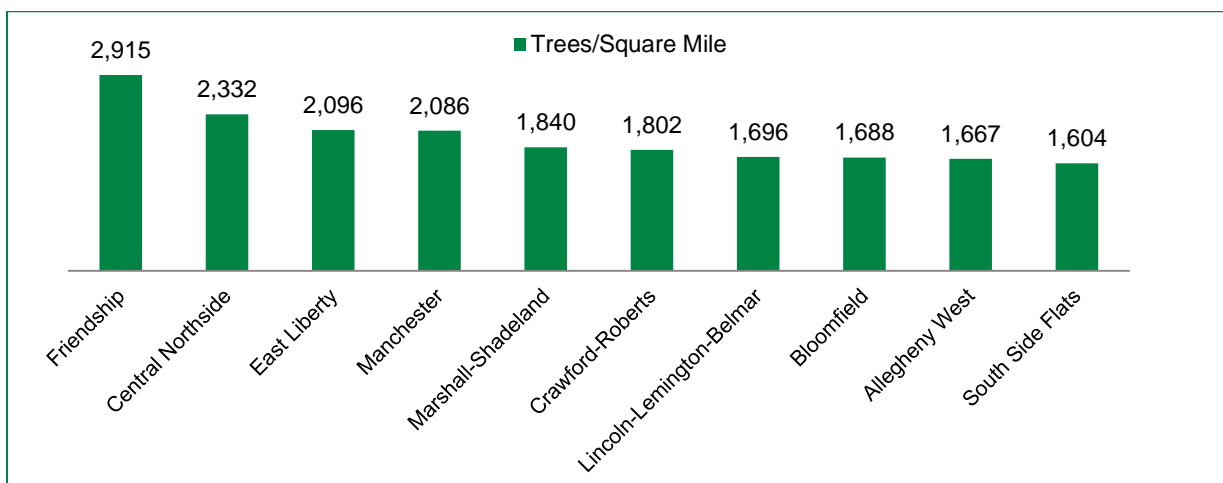
Figure 2 shows the 10 neighborhoods with the fewest number of street trees. Some of these neighborhoods, such as Allegheny Center, contain privately maintained street trees which are not part of this analysis. Others are characterized by low population densities (e.g., South Shore), locations on the far edges of town in which naturally occurring trees are not maintained by the city, small land area, or narrow ROWs which present problems for tree planting.



*Figure 2. Number of trees in the 10 neighborhoods with the fewest trees.*

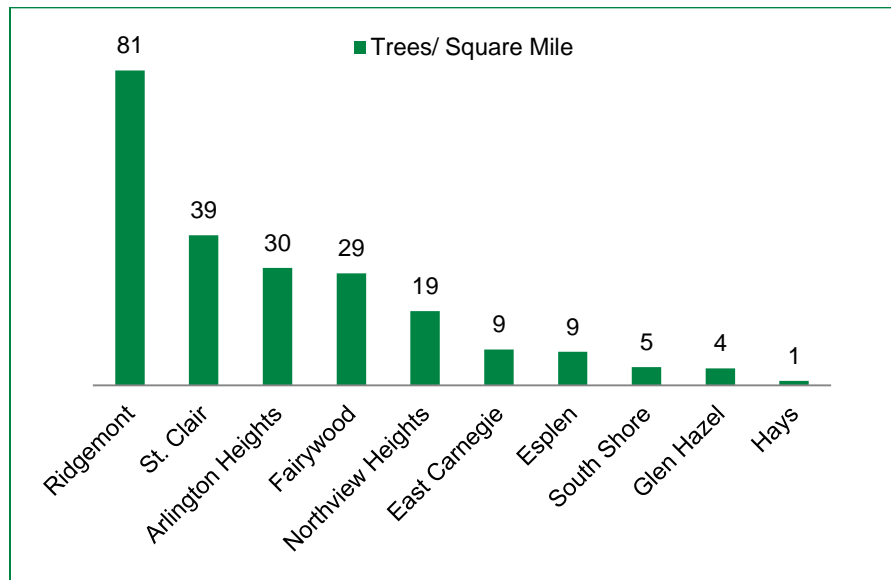
Figure 3 shows which of the 90 Pittsburgh neighborhoods have the highest density of street trees. The neighborhoods are relatively dispersed throughout the city. Many of them have benefited from recent planting efforts by the TreeVitalize Pittsburgh program and its key partners.

Many of these neighborhoods have their own business districts, which have a high quantity of small trees. Other neighborhoods contain heavily planted boulevards. The infrastructure in these high-density neighborhoods is often favorable for tree planting. Many of these neighborhoods have a large number of existing tree lawns or pits. The infrastructure often also has a wide enough ROW for new pit and tree lawn construction. Others have ROW that extends onto the privately owned side of the sidewalk and away from the street, such that trees can be planted in wide open areas.



*Figure 3. Top 10 highest street tree density neighborhoods per square mile.*

Many of the neighborhoods with low tree density (Figure 4) such as Fairywood used to be heavy industrial areas with a shrinking population and declining housing stock. Urban forest investment in these low-density areas, which have very few trees of any kind, would provide significant benefits to the city, especially by reducing stormwater runoff and increasing the aesthetic values in the neighborhood. Neighborhoods like Fairywood have little existing infrastructure for tree planting; significant tree site preparation costs will be associated with improving the state of their portion of Pittsburgh’s urban forest. Since trees in industrial or vacant areas provide many of the same environmental benefits in residential areas, the City of Pittsburgh should explore opportunities to introduce more trees into neighborhoods with significant infrastructure issues.



*Figure 4. Top 10 lowest street tree density neighborhoods per square mile.*

### *Species Richness and Diversity*

Pittsburgh’s species mix is highly rich and diverse. Its street tree population includes a mix of 189 species—almost four times more than the average tree species (52) reported by McPherson and Rowntree (1989) in their nationwide survey of street tree populations across 22 U.S. cities. This is unusual for densely urbanized cities of continental climate, which typically have a narrow selection of species. This species diversity is a direct result of choices made by the skilled urban foresters working with Pittsburgh’s TreeVitalize program and the high rate of planting this program’s funding allows.

Table 1. Top 16 Most Frequent Pittsburgh Street Tree Species by Number of Trees and Percentage of Total

Common Name	Trees	Percentage of Total
Norway maple	3,515	10.5%
red maple	3,355	10.0%
Callery pear	2,974	8.9%
London planetree	2,757	8.2%
littleleaf linden	2,254	6.7%
honeylocust	2,020	6.0%
pin oak	1,026	3.1%
apple spp.	1,017	3.0%
ginkgo	852	2.5%
sweetgum	775	2.3%
Freeman maple	750	2.2%
American elm	729	2.2%
Japanese zelkova	593	1.8%
sugar maple	579	1.7%
hedge maple	575	1.7%
northern red oak	568	1.7%
Total	24,339	72.7%

The diversity of the urban forest is hindered by an overabundance of certain species. Table 1 shows that the top 16 species comprise nearly 73% of the street tree population. This is a marked improvement over the species mix identified in the 2008 *City of Pittsburgh Municipal Forest Resource Analysis*, which indicated that the top 15 species comprised 85.7% of the street tree population. Still, efforts should be made to continue reducing this number. *Acer platanoides* (Norway maple, 10.5%) and *A. rubrum* (red maple, 10.0%) are highly prominent. These species are actually threatening the biodiversity of Pittsburgh’s street tree population. The composition of a tree population should follow the 10-20-30 Rule for species diversity: a single species should represent no more than 10% of the urban forest, a single genus no more than 20%, and a single family no more than 30%.



**Photograph 3.** This *Acer platanoides* (Norway maple) is an example of the most prominent tree species on Pittsburgh’s streets. Unfortunately, many Norway maples are in declining condition.

Table 2. Top 10 Most Frequent Pittsburgh Street Tree Genera by Number of Trees and Percentage of Total

Genus	Trees	Percentage
<i>Acer</i>	9,831	29.3%
<i>Pyrus</i>	3,037	9.1%
<i>Platanus</i>	2,899	8.7%
<i>Tilia</i>	2,389	7.1%
<i>Gleditsia</i>	2,020	6.0%
<i>Quercus</i>	1,901	5.7%
<i>Ulmus</i>	1,267	3.8%
<i>Malus</i>	1,033	3.1%
<i>Ginkgo</i>	852	2.5%
<i>Liquidambar</i>	775	2.3%
Top Ten Genera	26,004	77.6%

The richness of genera in Pittsburgh is impressive. The street tree population included 79 different genera. However, Pittsburgh is still too heavily dependent on one genus, as illustrated in Table 2. Specifically, *Acer* (maple) comprises more than 29% of the street tree population. The TreeVitalize program has taken steps to remediate this problem. The program has never planted Norway maple, and planting of other maple species are restricted to special circumstances.

Skewed populations can compromise the benefits provided by the urban forest and can be costly over time. For example, dominance of maples (29%) in the street tree population is a concern due to potentially catastrophic effects on the urban forest, including impact storms, drought, disease, and invasive pests. Historical examples of Dutch elm disease and the present threat of pests, such as emerald ash borer (*Agrilus planipennis*) and Asian longhorned beetle (*Anoplophora glabripennis*, ALB), highlight the importance of a balanced distribution of species and genera. ALB has not arrived in western Pennsylvania; the closest current outbreak is in the Cincinnati metropolitan area. The maple genus is the primary host of the ALB.

In June 2007, U.S. Department of Agriculture surveyors in Butler County confirmed the presence of emerald ash borer (EAB) in western Pennsylvania, about 20 miles from Pittsburgh. EAB is now well established in Pittsburgh proper. While ash trees are relatively rare among the street tree population (451 trees, 1.3% of all street trees), the impact of this pest poses management challenges for the city. TreeVitalize has stopped planting ash trees.

### Species Importance Value

Much like a company that benefits from having employees with various skills and capabilities, forests thrive when they are diverse. While all roles in an organization or forest are indispensable, the hardest working members often stand out from the rest. The City of Pittsburgh must find a balance in maximizing the populations of the hardest working trees without relying too heavily on any one species. Importance Value (IV) is one of the primary methods of evaluating the hardest working tree species.

Importance Value reflects the mean of three key street tree metrics:

- Percentage of total population
- Percentage of total leaf area
- Percentage of total canopy cover

Tree size is a major component of Importance Value. A tree's Importance Value (IV) can range from 0–100. An IV of 0 indicates no reliance on a particular species; an IV of 100 indicates absolute reliance. Since IV isn't measured by population numbers alone, managers can better understand the loss of benefits from a catastrophic loss of a species.

An urban forest that depends too heavily on any one hard-working species risks losing much of its productivity in a short time span. When IVs are evenly dispersed among the 10 to 15 most abundant species, the risk of significant benefit loss is mitigated.

Table 3. Top 15 Pittsburgh Street Tree Species by Importance Value (IV)

Species Name	Trees	% of Tree Population	Leaf Area (ft <sup>2</sup> )	% of Leaf Area	Importance Value
London planetree	2,757	8.2%	15,350,465	24.0%	16.1
Norway maple	3,515	10.5%	8,869,201	13.9%	12.2
littleleaf linden	2,254	6.7%	8,761,875	13.7%	10.2
red maple	3,355	10.0%	4,918,364	7.7%	8.9
Callery pear	2,974	8.9%	2,799,189	4.4%	6.6
pin oak	1,026	3.1%	3,392,649	5.3%	4.2
honeylocust	2,020	6.0%	1,163,142	1.8%	3.9
sweetgum	775	2.3%	2,206,488	3.5%	2.9
northern red oak	568	1.7%	1,965,495	3.1%	2.4
ginkgo	852	2.5%	996,704	1.6%	2.1
American elm	729	2.2%	1,202,801	1.9%	2.0
sugar maple	579	1.7%	1,173,126	1.8%	1.8
apple spp.	1,017	3.0%	333,355	0.5%	1.8
Freeman maple	750	2.2%	796,422	1.2%	1.7
silver maple	407	1.2%	1,250,654	2.0%	1.6
Remaining 174 species	9,734	29.1%	8,702,132	13.6%	21.6
Total	33,498	100%	63,882,059	100%	100%

Table 3 shows that *Platanus × acerfolia* (London planetree) is the hardest working tree species in Pittsburgh (16.1 IV), comprising only 8.2% of the population. Anyone who has seen the magnificent archways created by London planetrees throughout the city would not be surprised by these results.

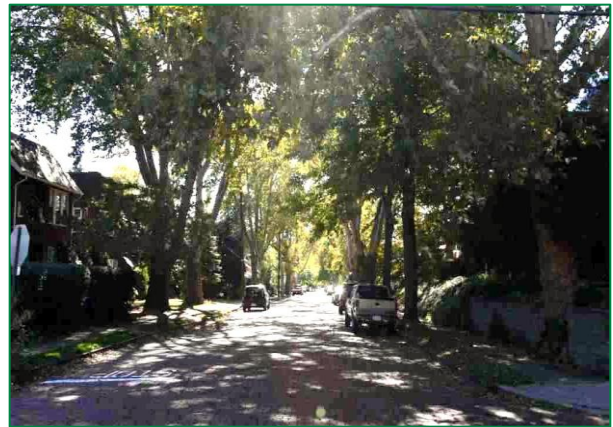
London planetrees are extremely resilient in urban settings. Their strong potential for canopy spread translates to a high flow of benefits. Regular plantings of London planetrees are advisable, especially in neighborhoods like Squirrel Hill where planetrees form cathedral-like ceilings. However, overpopulation of these trees would expose the urban forest to the possibility of extreme and sudden loss. Only a slight increase in proportion is suitable. Norway maple and Callery pear, number two and five in importance value, are both highly invasive species which have been banned from planting in the *Pittsburgh Urban Forest Master Plan*. They pose a critical threat to natural ecosystems both within Pittsburgh and the surrounding region. Although these species currently provide high levels of benefits, they should eventually be replaced by species which provide the same or higher level of benefits and which are compatible with healthy ecosystems. Neither Norway maple nor Callery pear has ever been planted as part of the TreeVitalize Pittsburgh program.



The top 5 street tree species by IV (London planetree, Norway maple, littleleaf linden, red maple, and Callery pear) have a combined IV of 54. An ideal distribution would be spread more evenly across a greater number of species.

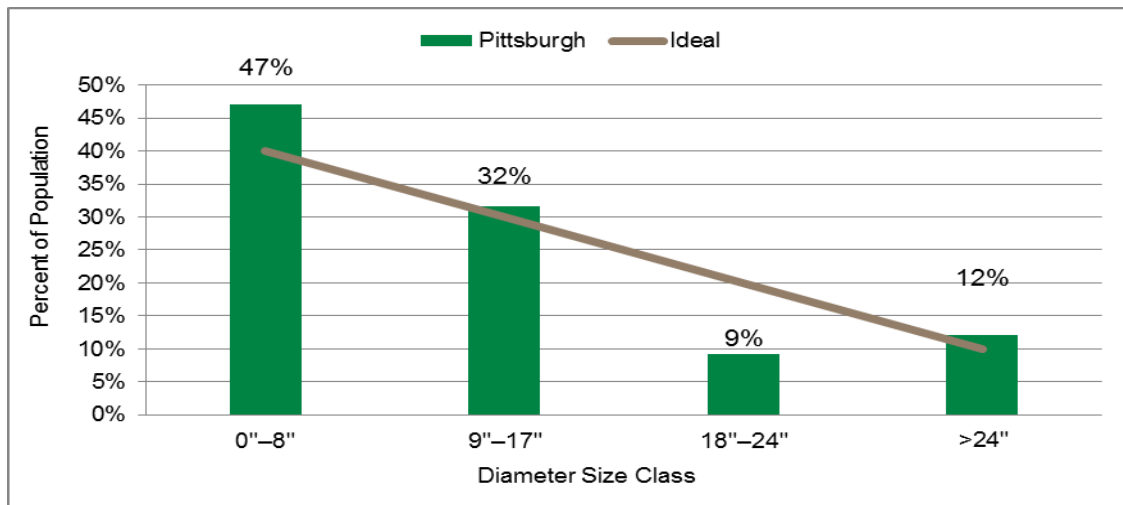
### Age Distribution

The distribution of ages within a tree population influences present and future costs, as well as the flow of benefits. An uneven-aged population allows managers to uniformly allocate annual maintenance costs over many years and assures continuity in overall tree canopy cover. A desirable distribution has a high proportion of young trees to offset young tree establishment and age-related mortality, while the percentage of older trees declines with age (Richards 1982/83). This “ideal” uneven distribution suggests that the largest fraction of trees (40% of the total) should be young with diameters less than 8 inches, while 10% should be in the large diameter classes (> 24 inches DBH).

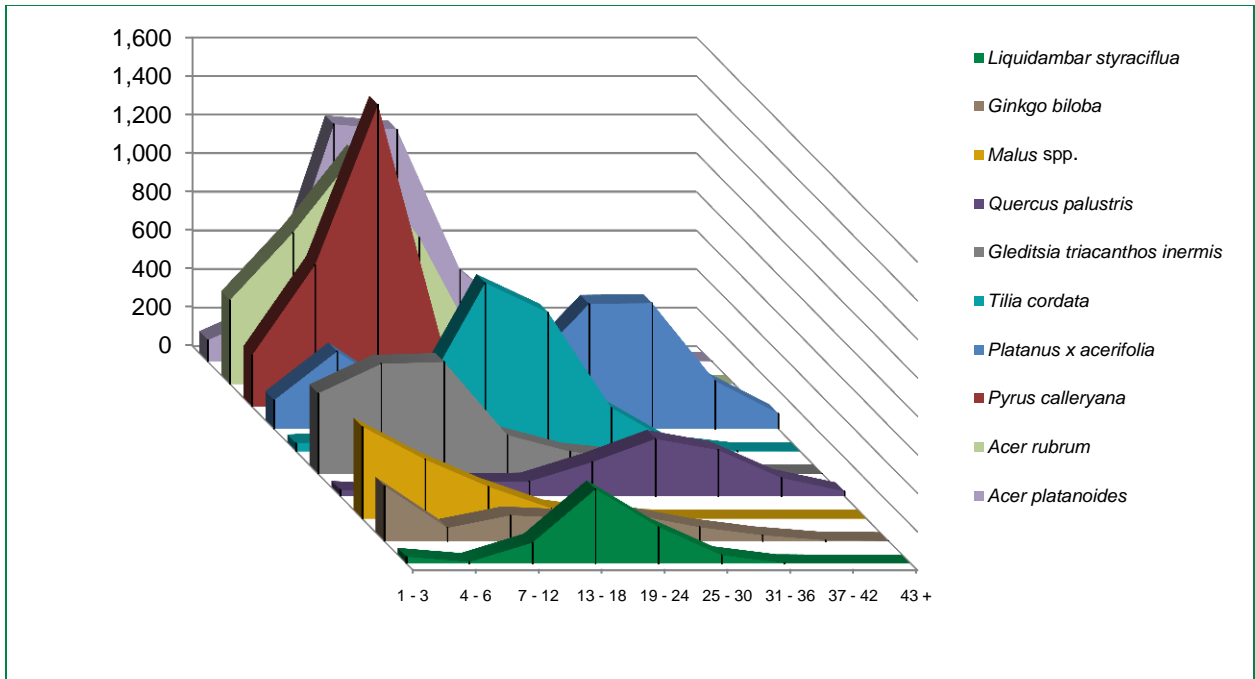


**Photograph 4.** These *Platanus × acerfolia* (London planetrees) in Swisshelm Park are in a class of their own. No other Pittsburgh street trees species works as hard shading the hot summer sun and moderating springtime flooding.

Figure 5 compares Pittsburgh’s diameter distribution to that of the ideal distribution. The city’s street tree distribution skews to the Young, with 47% Young trees (< 8 inches DBH), 32% Established trees (6 to 18 inches DBH), 9% Maturing trees (18 to 24 inches DBH), and 12% Mature trees (> 24 inches DBH). This is good news for the future of Pittsburgh’s urban forest. It shows that recent planting efforts have been successful. The deficit in trees between 18 inches and 24 inches is likely a result of an era when city priorities did not allow for significant tree planting and maintenance. Over time, many of the smaller trees will see an increase in canopy cover and move into the larger diameter classes, thereby increasing the flow of benefits and normalizing Pittsburgh’s diameter distribution toward the ideal.



**Figure 5.** Diameter distribution of street trees in Pittsburgh.

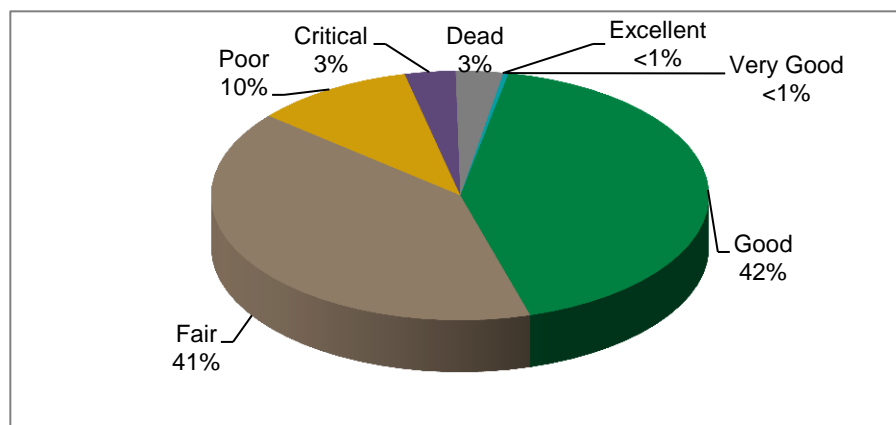


**Figure 6. Diameter distribution of the 10 most common Pittsburgh street tree species.**

The populations of *Acer rubrum* (red maple), *Gleditsia triacanthos* (honeylocust), *Malus* spp. (crabapple), and *Pyrus calleryana* (Callery pear) are significantly proportioned in smaller diameter classes. This means that their importance in terms of benefit provision will likely grow or remain stable in the next few decades. Callery pear will be allowed to expire from the population because of its ban from future plantings. The population of London planetree skews towards the larger diameter classes. There has been some replacement planting, so if all London planetrees are replaced with the same species, they will maintain their dominance of Pittsburgh's canopy. One population of concern is *Quercus palustris* (pin oak), which skews heavily towards the larger diameter classes and has few young replacements. Eventually, pin oak will comprise much less of the canopy than it currently does. Recent plantings of other types of *Quercus* (oak), along with the growing presence of other large trees, should be able to compensate for such a decline. Since there has been a recent severe outbreak of oak wilt in Pittsburgh, red oak group species are not currently being planted, as they exhibit much more vulnerability to this disease.

## Tree Condition and Relative Performance

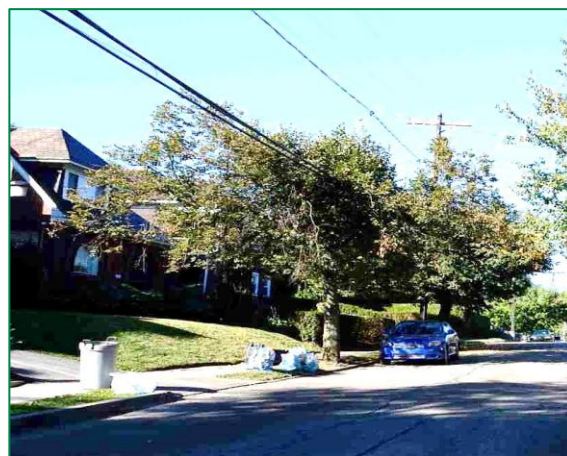
A tree's condition influences the amount of benefits it can provide over time. Figure 7 shows that Pittsburgh's trees are generally healthy. The majority of trees are in Good or Fair condition (83%). This distribution shows that the city is doing a good job of planting trees in the right places and promptly removing trees when they become unsustainable. Tree conditions are substantially improved from the results recorded during the 2005 tree inventory and reported in the 2008 *Pittsburgh Municipal Forest Resource Analysis*. In 2005, 27% of trees were in Good condition, 50% were in Fair condition, and 23% were in Poor condition or worse. Continued attention by the city and TreeVitalize partners to identifying suitable planting sites, planting a wide variety of tree species in suitable sites, and creating a proactive maintenance program will increase the proportion of trees in Good and Fair condition.



*Figure 7. Proportion of Pittsburgh street trees in different condition classes.*

Condition ratings across neighborhoods presented strong variability. Eleven neighborhoods with street tree populations greater than 100 had 90% or more of their trees rated Fair or higher. These included Upper Lawrenceville (96%), Crawford-Roberts (96%), Lower Lawrenceville (95%), Allegheny West (95%), Friendship (93%), East Allegheny (93%), New Homestead (93%), North Shore (92%), Strip District (90%), Squirrel Hill North (90%) and Mount Washington (90%). Most of these neighborhoods have benefited from recent large-scale planting programs. That so many of the young trees remain in good condition is a credit to the quality of site preparation, species selection, and young tree maintenance practices of the TreeVitalize program. Squirrel Hill North trees are an exception in that most of its trees are large and well over 50 years old. This neighborhood is an example of the quality of a well-planned and well-maintained urban forest when it meets its full potential.

Seven neighborhoods with street tree populations greater than 100 had 30% of their trees rated Poor or worse.



*Photograph 5. This *Tilia cordata* (littleleaf linden) in Point Breeze is an example of a tree in Fair condition. While it does provide benefits, the tree is currently in decline due to the stress of repeated utility pruning.*

These included Lincoln-Lemington-Belmar (42%), Upper Hill (42%), Crafton Heights (33%), Perry South (32%), Overbrook (32%), Manchester (31%), and Hazelwood (29%). Most of these neighborhoods have poor infrastructure and declining populations. However, as long as these neighborhoods do contain high populations of residents, efforts should be made to increase planting and maintenance in these areas to reduce the current discrepancies.

The Relative Performance Index (RPI) is an excellent tool for urban forest managers to analyze the conditions of urban tree species in greater detail. RPI offers valuable insight into how one species' performance compares to that of other species. This index compares the condition rating assigned to each tree and relates that condition to the inventoried tree population as a whole.

RPI is calculated by dividing the percentage of each species in Good condition by the percentage of the total population in Good condition. A value of 1.0 or better indicates that the species is performing well compared to other species. A value of 1.0 means the species is performing equally to the entire population. RPI values below 1.0 indicate that the species is not performing well compared to the rest of the population. When a species adapts poorly to local conditions, planting location should be evaluated.

Table 4. Condition Ratings and Relative Performance Index (RPI) of the 25 Most Common Pittsburgh Street Tree Species

Species	Very Good	Good	Fair	Poor	Critical	Dead	RPI	Trees
downy serviceberry	0.0%	78.8%	14.4%	3.6%	1.4%	1.8%	1.22	214
Japanese tree lilac	0.0%	68.6%	25.9%	2.8%	0.6%	2.2%	1.18	505
northern white cedar	1.7%	63.3%	30.0%	1.7%	1.7%	1.7%	1.17	233
eastern redbud	0.5%	64.9%	26.4%	2.9%	1.9%	3.4%	1.15	208
hedge maple	0.2%	61.7%	27.8%	5.9%	3.0%	1.4%	1.13	575
honeylocust	0.0%	54.7%	38.0%	5.1%	1.5%	0.8%	1.12	2,020
Norway spruce	4.1%	50.5%	36.4%	5.5%	0.9%	2.7%	1.11	220
Callery pear	0.2%	51.9%	38.5%	5.7%	2.0%	1.7%	1.1	2,974
Colorado spruce	1.4%	53.4%	33.4%	8.2%	1.9%	1.7%	1.1	416
Japanese zelkova	0.2%	58.8%	28.1%	2.7%	1.9%	8.4%	1.09	593
London planetree	0.7%	43.4%	47.5%	6.9%	1.2%	0.4%	1.08	2,757
ginkgo	0.9%	49.0%	39.1%	5.6%	2.9%	2.5%	1.08	852
Freeman maple	0.1%	51.9%	33.9%	8.8%	3.3%	2.0%	1.08	750
sweetgum	0.3%	39.4%	52.6%	6.8%	0.4%	0.5%	1.07	775
apple	0.0%	48.0%	38.0%	9.9%	2.5%	1.7%	1.06	1,017
American elm	0.0%	53.7%	29.3%	8.2%	3.6%	5.2%	1.06	729
northern red oak	1.2%	37.7%	51.2%	8.6%	0.7%	0.5%	1.05	568
red maple	0.2%	43.4%	39.9%	10.9%	3.4%	2.2%	1.03	3,355
plum	0.0%	47.1%	35.2%	9.1%	3.7%	4.9%	1.03	429
hawthorn	0.0%	41.6%	39.6%	11.2%	3.2%	4.4%	1.01	250
littleleaf linden	0.9%	32.0%	51.2%	12.3%	2.7%	1.0%	1	2,254
elm hybrid	0.0%	50.4%	28.0%	4.6%	7.7%	9.4%	1	292
pin oak	0.4%	27.2%	53.3%	17.1%	1.6%	0.4%	0.97	1,026
silver maple	0.0%	28.6%	49.6%	16.9%	4.2%	0.7%	0.96	407
Siberian elm	0.0%	14.1%	70.4%	11.6%	2.0%	2.0%	0.92	199
Norway maple	0.1%	24.2%	46.1%	20.7%	6.7%	2.4%	0.9	3,515
sugar maple	0.5%	26.0%	41.7%	21.9%	7.2%	2.8%	0.89	579
white mulberry	0.0%	8.0%	67.2%	21.3%	2.4%	1.2%	0.87	338
black locust	0.4%	12.2%	42.2%	26.7%	7.5%	11.1%	0.75	469
green ash	0.0%	1.9%	20.8%	25.9%	31.5%	19.9%	0.49	214

Based on the ratings and RPIs in Table 4, additional well-performing species should be considered for increased planting, especially the ones that comprise much less than 10% of the street tree population. Strong performances by honeylocust, Japanese zelkova, London planetree, ginkgo, American elm, and northern red oak are especially impressive since their populations include many old trees. Continued planting of most of these species is recommended, although white oak group trees should be planted instead of northern red oak, since the latter is extremely vulnerable to oak wilt.

Table 5. Relative Performance Index (RPI) of 14 Well-Performing Pittsburgh Street Tree Species with Low Representation of Pittsburgh Streets.

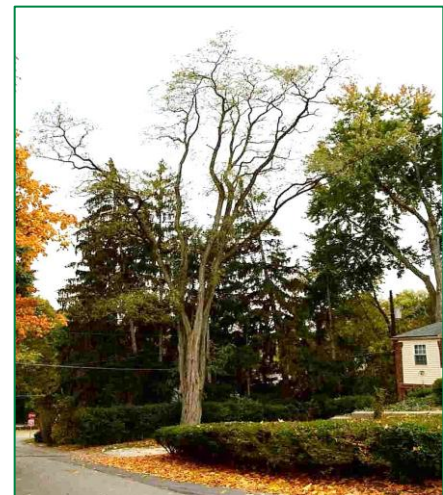
Species	RPI	Existing Trees
Kentucky coffeetree	1.32	48
maackia, Amur	1.26	12
bur oak	1.22	17
Persian parrotia	1.21	18
saucer magnolia	1.2	55
dawn redwood	1.2	30
common smoketree	1.19	11
sawtooth oak	1.19	52
European beech	1.18	11
black tupelo	1.16	27
English oak	1.14	20
hardy rubber tree	1.11	20
white oak	1.09	26
scarlet oak	1.07	16

Table 5 indicates that many well-performing species currently have low representation on the streets of Pittsburgh. Most of these trees are very young. If these species continue their strong performance over time, heavier planting of these trees in appropriate sites will continue to improve the biological diversity of Pittsburgh’s urban forest. Other new tree species should also be planted on a trial basis to increase tree diversity and to find additional strong performing species which can provide a high level of benefits moving forward.

### The Green Umbrella

Canopy cover, one of the most common attributes of assessing and comparing urban forests, is the area of land surface that is covered by individual tree crowns. Individual tree crowns are composed of leaves, which seem like a small part of the tree as a whole. Why, then, is the size of this “Green Umbrella” such a popular yardstick for measuring a city’s street tree resource?

For one, leaves are one of nature’s hardest working creations. As a tree’s solar panel, leaves use the sun to create sugars as an energy source. Leaves also create most of the proteins that sustain a tree. They are the tree’s ventilation system, as they absorb necessary carbon dioxide and expel oxygen waste. Leaves are the tree’s pump, as they are responsible for drawing water and nutrients from the soil, up through the tree, and back into the atmosphere.



**Photograph 6. This Robinia pseudoacacia (black locust) continues to provide canopy cover, but the amount of shade it provides diminishes every year.**



Thus, the amount and distribution of leaf surface area is the driving force behind the urban forest's ability to produce quantifiable benefits for the community (Clark 1997). Leaves are almost as good for city dwellers as they are for trees. Leaves are a safeguard against intense summer heat; they lower cooling costs and serve as a ventilation system by filtering harmful pollutants from the air we breathe. Leaves capture rainfall, which reduces peak rain runoff, wastewater treatment needs, soil erosion, and flooding.

### Street Tree Contribution to Pittsburgh's Canopy

A bird's-eye-view of the urban forest doesn't fully account for the human activity that affects the overall canopy. This is why surveying on the ground is necessary to determine the amount of canopy associated with any sub-population of the urban forest (e.g., street trees).

The summer and fall 2014 inventory of Pittsburgh's street trees was conducted on the ground by Davey Resource Group's trained, professional staff. The crown width, breadth, depth, and density of each tree were assessed in the study area. Using these data, the leaf area of each tree's crown was calculated.

According to a 2011 urban tree canopy analysis conducted by the United States Forest Service, the City of Pittsburgh has 14,883 acres of tree canopy, amounting to 42% of all land area (35,500 acres or about 55 square miles). The 2014 street tree inventory estimates that roughly 1,450 acres (2.2 square miles) of canopy are comprised of street trees. Street trees contribute canopy to 4.2% of Pittsburgh's land area and make up 10% of the total canopy. The street ROW is estimated at about 5,500 acres (8.5 square miles). This means that street trees contribute canopy equivalent to about 27% of the street ROW area.

Table 6. Pittsburgh Neighborhoods with More than 10% Canopy Cover Contributed by Street Trees

Neighborhood	Neighborhood Area (acres)	Leaf Area (acres)	Percentage of Canopy
Squirrel Hill North	782.1	161.7	20.7%
Knoxville	193.3	29.1	15.0%
Lincoln-Lemington-Belmar	179.2	26.2	14.6%
Regent Square	122.9	17.9	14.6%
Friendship	67.8	9.7	14.2%
Point Breeze North	183.0	25.9	14.1%
Marshall-Shadeland	147.8	17.9	12.1%
Point Breeze	642.6	76.9	12.0%
East Liberty	371.8	41.6	11.2%
Shadyside	589.4	64.7	11.0%
Central Northside	16.0	165.8	9.7%

Table 6 shows that 11 neighborhoods have 10% or more of their land area covered by the foliage of street trees. Most of these neighborhoods, such as Squirrel Hill North (20.7%), are dominated by London planetrees and pin oak. Plantings from the first half of the twentieth century have become vaulted ceilings. If high rates of planting continue and maintenance needs are addressed, many other neighborhoods will eventually contain street trees that contribute similarly large canopy cover.

Table 7. Pittsburgh Neighborhoods with Less than 1% Canopy Cover Contributed by Street Trees

Neighborhood	Neighborhood Area (acres)	Leaf Area (acres)	Percentage Canopy
Mt. Oliver	0.6	65.9	0.9%
Arlington	2.7	300.8	0.9%
West Oakland	1.1	137.6	0.8%
Spring Hill-City View	2.8	403.2	0.7%
Duquesne Heights	2.6	398.7	0.7%
Allegheny Center	0.8	134.4	0.6%
St. Clair	0.9	198.4	0.4%
Spring Garden	0.6	176.0	0.3%
Troy Hill	0.7	245.8	0.3%
Ridgemont	0.6	236.2	0.3%
Fairywood	1.5	620.2	0.2%
Arlington Heights	0.2	84.5	0.2%
Northview Heights	0.3	200.3	0.2%
East Carnegie	0.1	276.5	0.0%
Esplen	0.0	147.2	0.0%
South Shore	0.0	135.7	0.0%
Glen Hazel	0.0	291.8	0.0%
Hays	0.0	1,120.0	0.0%

Table 7 shows that 18 neighborhoods have less than 1% of their land area covered by the canopy of street trees. Of these 18 neighborhoods, 5 are completely devoid of canopy cover contributed by street trees. Most of these neighborhoods are industrial areas or have a high proportion of natural vegetation. Many also have narrow ROWs, which makes it difficult or impossible to plant large shade trees.



**Photograph 7. Even small trees like *Acer campestre* (hedge maple) and *Pyrus calleryana* (Callery pear) contribute to the canopy.**

## Street Tree Benefits

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The i-Tree Eco and i-Tree Streets applications were used to assess the trees inventoried—these management and analysis tools use tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits provided by trees, including energy conservation, air quality improvement, CO<sub>2</sub> reduction, stormwater control, and increases in property value. They estimate the costs and benefits of a street tree population and create annual benefit results that demonstrate the value street trees provide to a community.

The Pittsburgh street tree population has recorded an annual value of \$2.24 million in ecosystem services and economic benefits.

## Air Quality Impacts

Over the past four decades, Pittsburgh's air quality has improved as heavy industry has dissipated. However, the western Pennsylvania region and the industrial Midwest continue to rely on coal-fired power plants for energy production.

Vehicular traffic continues to be a primary source of air pollution as well. Prevailing winds ensure that much of the small particulate matter expelled by industry, utilities, vehicles, homes, and businesses is trapped by the region's hills.

As a result, The American Lung Association's *State of the Air 2014* report ranks the levels of small particulate matter in the Pittsburgh region as the sixth highest in the country. This has negative consequences for the health and quality of life of people in the region. It also leads to higher medical costs in the area.

While efforts are being made to reduce the nation's dependence on coal for energy, it is unclear when, and to what extent, these changes will reduce the amount of pollution emitted. Even if the City of Pittsburgh can reduce the amount of pollution it emits, it cannot control emissions from its industrial neighbors to the west. However, Pittsburgh *can* control its ability to reduce the effects of air pollutants by increasing the size and health of the urban forest. Trees can improve air quality by reducing emissions and eradicating toxic byproducts.

Trees improve the quality of air we breathe in several ways:

1. Trees intercept particulate matter (PM<sub>10</sub>) such as dust, ash, dirt, pollen, and smoke on the leaves, branches, and trunks of trees. These elements are later washed off and absorb into the soil or flow to wastewater treatment facilities. Once removed from the air, most particulate pollutants are much less dangerous or completely innocuous.
2. Trees absorb gaseous pollutants (such as ozone and nitrogen dioxide) through leaf surfaces and incorporate them into the tree.
3. Trees reduce low altitude air temperatures, which reduces the production of ozone. This is done primarily by shading heat-absorbing roadways, especially asphalt. Trees also cool themselves and their surroundings through the process of transpiration, by which water from the roots is evaporated through leaves.
4. Trees reduce surface temperatures, which reduces the need for air-conditioning. This means power plants don't have to work as hard, and the amount of pollutants emitted is less than there would be in the absence of trees.

- Trees are net releasers of oxygen, which is necessary for all animal life on the planet. Growing evidence suggests that as global carbon dioxide levels rise, global oxygen levels are falling even faster.

### Findings

Table 8 indicates that on annual basis, Pittsburgh’s urban forest removes 342 pounds of carbon monoxide, 12,599 pounds of ozone, 3,209 pounds of nitrogen dioxide, 6,738 pounds of small particulate matter (PM<sub>10</sub>), 3,972 pounds of sulfur dioxide, and 1,076 pounds of fine particulate matter (PM<sub>2.5</sub>). The total value of this pollution abatement is about \$417,700, or \$12.47 per tree.

Table 8. Pollutants Removed by Pittsburgh’s Street Trees by Weight (lbs.) and Value (\$)

Pollutant	CO	O <sub>3</sub>	NO <sub>2</sub>	PM <sub>10</sub>	SO <sub>2</sub>	PM <sub>2.5</sub>	Total
Pounds Removed Per Year	342	12,599	3,209	6,738	3,972	1,076	27,936
Value	\$194	\$52,169	\$1,583	\$176,458	\$666	\$186,630	\$417,700

Table 9 shows the 15 species that contribute the highest value in pollution removal. Determining the amount of pollutants absorbed involves leaf structure area and total number of trees, much like the aforementioned process of assessing a tree’s Importance Value. Once again, London planetree proves to be the hardest working tree due to the area of canopy it provides.

Table 9. Top 15 Street Tree Species by Value of Pollutants Removed

Tree Species	Value of Pollution Removed	Percentage of Value
London planetree	\$88,833	21.3%
littleleaf linden	\$53,450	12.8%
Norway maple	\$52,251	12.5%
red maple	\$31,032	7.4%
pin oak	\$26,395	6.3%
Callery pear	\$18,768	4.5%
sweetgum	\$13,831	3.3%
northern red oak	\$13,658	3.3%
honeylocust	\$12,248	2.9%
blue spruce	\$10,684	2.6%
silver maple	\$7,948	1.9%
American elm	\$7,550	1.8%
Norway spruce	\$7,492	1.8%
sugar maple	\$7,368	1.8%
black locust	\$6,151	1.5%

## Climate Impacts

Scientific evidence indicates that a rise in atmospheric carbon dioxide is leading to an increase in average global temperatures and widespread climate change. Scientists have devoted a great deal of attention to fossil fuels and the extent to which fossil fuels are causing these changes. Deforestation has also been a major factor in the rise in atmospheric carbon dioxide levels. Pittsburgh has an opportunity to reduce its contribution to global climate change by expanding its street tree population and through proper disposal of removed trees.

Carbon comprises roughly half the weight of the wood of most trees (Lamlom and Savidge 2003). When wood is burned, most of this carbon is combined with oxygen to form carbon dioxide. The same is true for decaying wood that goes through various chemical processes within fungi, bacteria, or soil that combines its carbon with oxygen to form carbon dioxide. In general, only living trees and building materials made of wood keep carbon out of the environment. Utilizing the wood of removed urban trees to make hardwood flooring, furniture, or other durable wood products can prolong the global benefit of carbon storage for centuries.

Well-managed urban forests with large trees can also reduce the burning of fossil fuels by reducing heating and cooling needs. Our planet reaps the benefits of well-managed urban forests in the form of reduced global warming rates. There is already a voluntary market for “carbon offsets,” by which individuals or organizations pay other individuals or organizations to sequester, or store, carbon in forms such as forests. If carbon taxes or a permanent “carbon cap and trade” system are established in the future, cities with strong urban forestry programs stand to benefit financially, as they are paid for the carbon stored in their trees.

The use of wood salvaged from removed trees is another innovative way cities are maximizing the global climate benefits their urban forests provide, while also reducing operating costs and providing a new revenue stream. Milwaukee, Wisconsin is among the national leaders in this arena. Since the region surrounding Pittsburgh has a longstanding timber industry, the use of urban wood may be a viable option (Capell 2014).

## Findings

Approximately 4.4 million pounds of carbon are stored in Pittsburgh’s street trees each year, for an estimated value of roughly \$14,375. About 7.3 million pounds less carbon were released into the atmosphere as a result of cooling and wind break effects in trees. This accounted for a value of \$23,985 in deferred emissions, with a total carbon benefit value of \$38,335 annually. Pittsburgh’s street trees currently store approximately 120 million pounds of carbon, valued at about \$395,846.



*Photograph 8. Large trees, such as these ginkgo planted in a boulevard, sequester carbon and help slow the effects of global climate change.*



## Energy Savings

Historically, air flow and shade were the primary ways homes were cooled on hot summer days. Many nineteenth century American cities and towns had active shade tree organizations to build what we would today call “green infrastructure” by planting trees to beautify neighborhoods and moderate the weather extremes that come with urbanization. As electric-powered fan and air conditioned climate control technology advanced, the demand for shade declined. Some people felt that the risk of tree damage and the time spent cleaning leaves and fruit outweighed the energy benefits trees provide.

While there may be limits to both energy supply and resilience to environmental changes, many people are again relying on tree shade to reduce the financial and environmental costs of cooling and heating.

Trees modify climate and conserve energy in three principal ways:

- Shading reduces the amount of radiant energy absorbed and stored by buildings and asphalt surfaces.
- Transpiration converts moisture to water vapor, which cools the air by using solar energy that would otherwise result in heating the air.
- Wind-speed reduction reduces the movement of outside air into interior spaces and conductive heat loss where thermal conductivity is relatively high, such as with glass windows (Simpson 1998).

Trees and other vegetation within the urban environment may lower air temperatures 5°F compared to outside the green space (Chandler 1965). At the larger scale of citywide climate, temperature differences of more than 9°F have been observed between city centers and more vegetated suburban areas (Akbari et al. 1992).

The relative importance of these effects depends on the size and configuration of trees and other landscape elements (McPherson 1993). Tree spacing, crown spread, and vertical distribution of leaf area influence the transport of warm air and pollutants along streets and out of urban canyons. Trees reduce air movement into buildings and conductive heat loss from buildings. Trees can reduce wind speed and resulting air infiltration by up to 50%, translating to potential annual heating savings of 25% (Heisler 1986).



*Photograph 9. London planetrees in the Point Breeze neighborhood provide high levels of canopy coverage, which offers shelter from late summer sunshine. These tall, wide-crowned trees provide much greater annual energy savings (\$5.63/tree) than the citywide average (\$2.88/tree).*

## Findings

Street trees provide Pittsburgh an annual energy savings of roughly \$96,501. This is about \$2.8 per acre and \$2.88 per tree.

Table 10. Pittsburgh Neighborhoods with the 15 Highest Per-Acre Energy Savings

Neighborhood	Energy Benefits	Benefits/Acre	Trees	Benefits per Tree
Squirrel Hill North	\$9,126	\$11.67	1,620	\$5.63
Marshall-Shadeland	\$1,495	\$10.11	425	\$3.52
Central Northside	\$1,568	\$9.46	604	\$2.60
Lincoln-Lemington-Belmar	\$1,648	\$9.20	475	\$3.47
Regent Square	\$899	\$7.32	230	\$3.91
Knoxville	\$1,351	\$6.99	415	\$3.26
Stanton Heights	\$3,257	\$6.92	622	\$5.24
Point Breeze North	\$1,223	\$6.68	423	\$2.89
Shadyside	\$3,918	\$6.65	1,343	\$2.92
North Oakland	\$1,923	\$6.02	575	\$3.34
Bloomfield	\$2,690	\$5.99	1,185	\$2.27
Friendship	\$376	\$5.55	309	\$1.22
Manchester	\$980	\$5.49	582	\$1.68
Allegheny West	\$489	\$5.42	235	\$2.08
Point Breeze	\$3,428	\$5.34	977	\$3.51

Table 11. Pittsburgh Street Tree Species with the 15 Highest Per-Tree Energy Savings

Species	Energy Benefits	Trees	Energy Benefits per Tree
London planetree	\$16,658	2,757	\$6.04
Norway maple	\$10,233	3,515	\$2.91
littleleaf linden	\$8,831	2,254	\$3.92
pin oak	\$7,857	1,026	\$7.66
red maple	\$6,389	3,355	\$1.90
Callery pear	\$5,128	2,974	\$1.72
blue spruce	\$4,336	416	\$10.42
honeylocust	\$3,735	2,020	\$1.89
northern red oak	\$3,312	568	\$5.83
sweetgum	\$3,278	775	\$4.23
ginkgo	\$2,993	852	\$3.51
black locust	\$2,590	469	\$5.52
silver maple	\$2,168	407	\$5.33
Norway spruce	\$2,147	220	\$9.76
sugar maple	\$1,717	579	\$2.97

The neighborhood with the highest per-acre and per tree energy savings is Squirrel Hill North (\$11.67 per acre; \$5.63 per tree). Marshall-Shadeland (\$10.11 per acre; \$3.52 per tree), Central Northside (\$9.46 per acre; \$2.60 per tree), and Lincoln-Lemington-Belmar (\$9.20 per acre; \$3.47 per tree) were the three other neighborhoods with per acre energy benefits higher than \$9. These neighborhoods were blessed with large numbers of healthy, tall, wide-crowned trees growing in close proximity to buildings. Many neighborhoods have the potential to reach these high levels given proper site preparation, species selection, and maintenance. London planetree provided the greatest energy benefits due to their wide crowns, tall stature, and large population. On a per tree basis, *Picea pungens* (blue spruce) provided the most energy benefits due to its generally tall stature and the windbreak capacity of its year-round foliage. Spruce and other evergreen conifer species are poor selections for narrow tree pits or tree lawns but can be wise selections in open planting sites and are especially good for moderating the brutality of winter winds.

## *Stormwater Reduction*

Most of the older big cities in America have combined sewer systems. Runoff from rainstorms and snowmelt ultimately ends up in the same system as wastewater from kitchens, bathrooms, and laundry rooms. Once stormwater enters the combined sewer system, it must be treated before it can be introduced into our waterways. Wastewater treatment costs are directly related to the amount of flow entering treatment facilities. One of the most tangible monetary benefits provided by the urban forest is its ability to reduce the amount of water that infiltrates into sewer systems.

Furthermore, during heavy rainstorms, many urban sewer systems are so overwhelmed by peak flows that large amounts of untreated water are discharged into local waterways. This leads to significant increases in pollution levels from raw sewage and non-point source pollution carried by runoff. Many cities have constructed tunnels deep in underlying bedrock to store stormwater overflow. These deep tunnels are very expensive and dangerous to construct. Alternatively, a healthy, widespread, and dense urban forest helps to greatly reduce peak stormwater flow, which in turn reduces pollution, the need for expensive infrastructure improvements, and the likelihood (and degree) of flooding in low-lying neighborhoods.

Healthy urban trees can reduce the amount of runoff and pollutant loading in receiving waters in the following ways:

1. Leaves and branch surfaces intercept and store rainfall, thereby reducing runoff volumes and delaying the onset of peak flows.
2. Root growth and decomposition increase the capacity and rate of soil infiltration by rainfall, and reduce overland flow.
3. Tree canopies reduce soil erosion and surface transport by diminishing the impact of rain drops on barren surfaces. The roots also secure soil, which would otherwise flow into the sewer system and waterways of Pittsburgh.
4. The expanded tree lawns and tree pits necessary for healthy street trees also decrease the proportion of impervious cement and concrete surfaces in the city, which encourages more rainwater infiltration, reducing treatment costs and downstream pollution.

## *Findings*

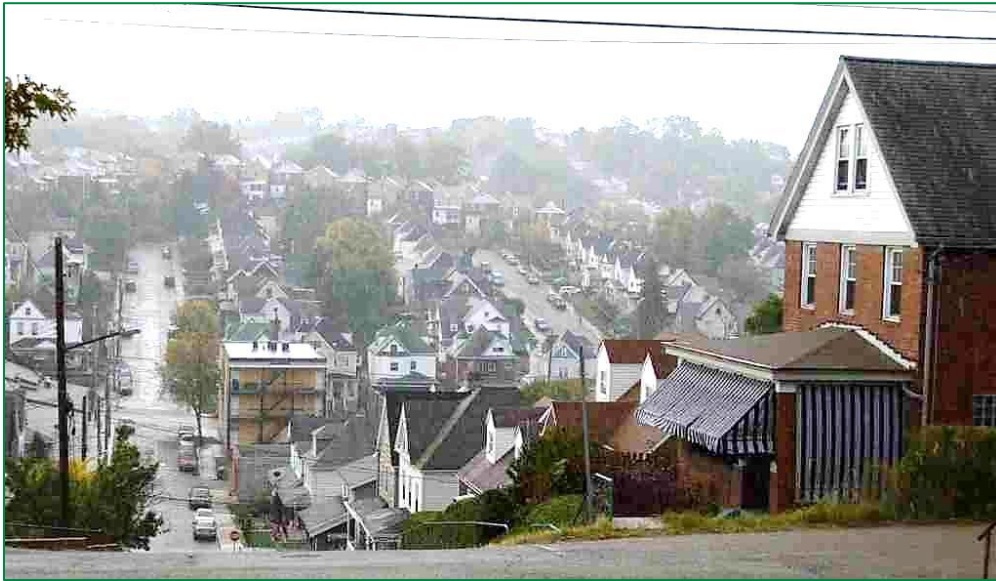
Every year, Pittsburgh's street trees prevent approximately 15 million gallons of stormwater from infiltrating into the wastewater treatment system. This values out at \$134,848 per year in foregone sewage treatment costs. This is an average savings of about \$4.03 per acre and per tree. Once again, London planetree is the hardest-working tree species in Pittsburgh in regards to remediating peak stormwater flows. It tops both as a species overall and on a per tree basis.

Table 12. Pittsburgh Neighborhoods with the 15 Highest Levels of Savings from Stormwater Reduction.

Neighborhood	Benefits	Acres	Benefits per Acre	Trees	Benefits per Tree	Runoff Avoided (gal.)
Squirrel Hill North	\$14,395	782.1	\$18.41	1,620	\$8.89	1,617,431
Squirrel Hill South	\$11,201	1,709.4	\$6.55	2,405	\$4.66	1,258,578
Point Breeze	\$7,021	642.6	\$10.93	977	\$7.19	788,928
Highland Park	\$5,802	744.3	\$7.79	1,102	\$5.26	651,897
Shadyside	\$5,757	589.4	\$9.77	1,343	\$4.29	646,899
Stanton Heights	\$4,271	470.4	\$9.08	622	\$6.87	479,897
Brighton Heights	\$3,931	714.9	\$5.50	766	\$5.13	441,661
East Liberty	\$3,695	371.8	\$9.94	1,218	\$3.03	415,131
Brookline	\$3,476	1,332.5	\$2.61	752	\$4.62	390,561
Bloomfield	\$3,327	449.3	\$7.41	1,185	\$2.81	373,867
Knoxville	\$2,993	193.3	\$15.49	415	\$7.21	336,280
Carrick	\$2,937	1,070.7	\$2.74	656	\$4.48	329,941
Greenfield	\$2,737	494.7	\$5.53	599	\$4.57	307,549
South Side Flats	\$2,555	599.0	\$4.27	1,501	\$1.70	287,065
Lincoln-Lemington-Belmar	\$2,426	179.2	\$13.54	475	\$5.11	272,586

Table 13. Pittsburgh Tree Species Providing the 15 Highest Levels of Savings from Stormwater Reduction.

Species	Benefits	Trees	Benefits per Tree
London planetree	\$31,246	2,757	\$11.33
Norway maple	\$18,053	3,515	\$5.14
littleleaf linden	\$17,835	2,254	\$7.91
red maple	\$10,011	3,355	\$2.98
pin oak	\$6,905	1,026	\$6.73
Callery pear	\$5,697	2,974	\$1.92
sweetgum	\$4,491	775	\$5.80
northern red oak	\$4,001	568	\$7.04
blue spruce	\$3,349	416	\$8.05
silver maple	\$2,546	407	\$6.25
American elm	\$2,448	729	\$3.36
sugar maple	\$2,388	579	\$4.12
Norway spruce	\$2,324	220	\$10.56
honeylocust	\$2,368	2,020	\$1.17
ginkgo	\$2,029	852	\$2.38



***Photograph 10. The Hazelwood neighborhood has high amounts of overland flow during heavy rainstorms. Additional tree planting can reduce wastewater treatment costs in the City of Pittsburgh.***

## ***The Gold in Pittsburgh's Green***

Trees provide an extraordinary amount of savings. Trees conserve energy, reduce air pollution, and cut wastewater costs. But how can we quantify the value of the urban forest to the community?

Estimating the monetary value of a rural forest starts with assessing the amount of timber on a given area of land, researching per log prices for the timber, and calculating costs associated with harvest. When the timber is ultimately sold to a logging company, the net monetary benefits become quantifiable.

The most straightforward way to establish a monetary value for a forest is by establishing a structural value. Generally, this value represents the amount it would cost to replace all of the trees in the urban forest; although in assessing Pittsburgh's street tree resource, structural value provides an approximation of the investment in planning, resources, and time that have gone into the establishment and maintenance of the urban forest.

A more nuanced approach at determining the value of trees looks at their effect on city property values. People tend to pay more for homes located near well-groomed trees. This trend is especially observable as the value of homes increases. Groups like the *Council of Tree and Landscape Appraisers* (CTLA 1992) have extensively researched the relationship between aesthetic value and real estate price. A home's aesthetic value is characterized by the accrued value of trees in proximity to the property. Aesthetic value measures the degree to which trees increase resale value. A property with high aesthetic value enhances the quality of life and well-being of its residents.

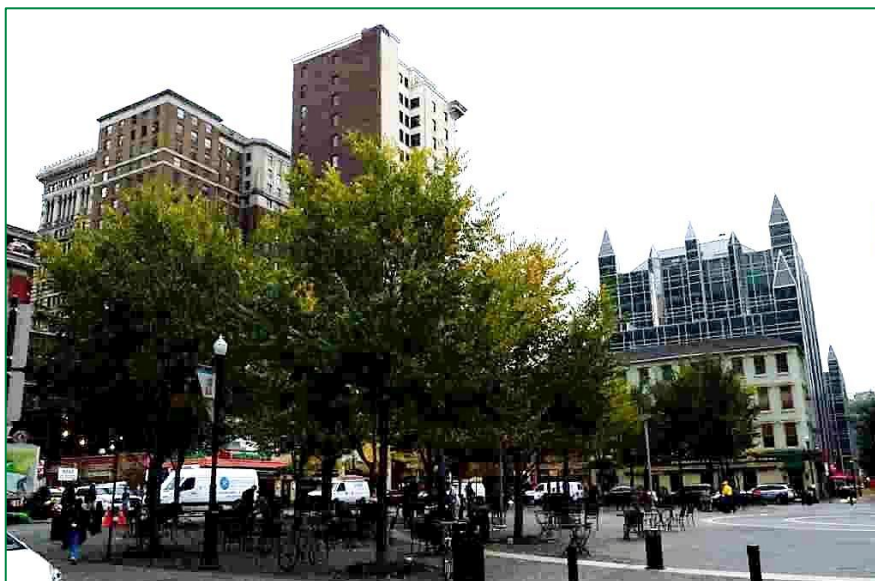
Functional value is calculated by combining the annual monetary values of environmental benefits and aesthetic benefits provided by the urban forest. This value is useful in estimating cost-benefit ratios, which help establish budgets that provide taxpayers the most bang for their buck.



### Findings – Aesthetic Value

The annual aesthetic value of Pittsburgh’s urban forest is estimated at approximately \$1,556,747, with an average of \$46.47 per tree.

Street trees in Squirrel Hill North (\$116,000 per year), Squirrel Hill South (\$101,000 per year), and Shadyside (\$63,000 per year) provided the highest aesthetic values.



*Photograph 11. These Ulmus ssp. (hybrid elms) add aesthetic value to this commercial gathering space in downtown Pittsburgh.*

### Findings – Structural Value

The structural value of all Pittsburgh street trees is over \$51,000,000.

Table 14 shows that Squirrel Hill North (\$5,550,261), Squirrel Hill South (\$4,547,219), and Point Breeze (\$2,760,630) have the highest street tree structural values. Table 15 shows that London planetree has the most structural value on the streets of Pittsburgh, with an approximate total of \$12,250,000 (\$4,450 per tree). Pin oak holds the most structural value per tree at about \$4,900.

Table 14. Top 15 Street Tree Structural Values Among Pittsburgh Neighborhoods

Neighborhood	Structural Value	Neighborhood Acres	Value/Acre	Trees	Value/ Tree
Squirrel Hill North	\$5,550,261	782.08	\$7,097	1,620	\$3,426
Squirrel Hill South	\$4,547,219	1,709.44	\$2,660	2,405	\$1,891
Point Breeze	\$2,760,630	642.56	\$4,296	977	\$2,826
Shadyside	\$2,475,339	589.44	\$4,199	1,343	\$1,843
Highland Park	\$2,357,901	744.32	\$3,168	1,102	\$2,140
Stanton Heights	\$1,632,902	470.4	\$3,471	622	\$2,625
Brookline	\$1,563,593	1,332.48	\$1,173	752	\$2,079
Bloomfield	\$1,340,759	449.28	\$2,984	1,185	\$1,131
Brighton Heights	\$1,210,939	714.88	\$1,694	766	\$1,581
East Liberty	\$1,157,770	371.84	\$3,114	1,218	\$951
Carrick	\$1,105,254	1,070.72	\$1,032	656	\$1,685
North Oakland	\$1,102,393	319.36	\$3,452	575	\$1,917
Greenfield	\$1,058,752	494.72	\$2,140	599	\$1,768
Banksville	\$1,056,183	620.16	\$1,703	432	\$2,445
Mount Washington	\$988,077	728.96	\$1,355	689	\$1,434

Table 15. Top 15 Street Tree Structural Values Among Tree Species

Species	Structural Value	Trees	Structural Value Per Tree
London planetree	\$12,251,054	2,757	\$4,444
littleleaf linden	\$5,893,962	2,254	\$2,615
pin oak	\$5,025,733	1,026	\$4,898
Norway maple	\$4,527,071	3,515	\$1,288
red maple	\$3,288,064	3,355	\$980
northern red oak	\$2,512,715	568	\$4,424
Callery pear	\$2,419,055	2,974	\$813
honeylocust	\$1,858,342	2,020	\$920
sweetgum	\$1,730,633	775	\$2,233
ginkgo	\$1,717,172	852	\$2,015
silver maple	\$990,062	407	\$2,433
sugar maple	\$929,154	579	\$1,605
black locust	\$782,923	469	\$1,669
American elm	\$568,071	729	\$779
blue spruce	\$548,290	416	\$1,318

### Findings – Functional Value

The functional value of all the environmental services and aesthetic improvements, as shown in Table 16, is \$2,244,131 per year. This equates to about \$67 per tree per year. At the moment, the greatest monetary benefit of Pittsburgh trees comes from its increasing aesthetic values throughout the city. The greatest environmental monetary benefit is improved air quality.



*Photograph 12. Lined with large pin oak, ginkgo, and London planetree, this Squirrel Hill street is a major contributor to Pittsburgh's overall street tree structural value.*

Table 16. Annual Functional Value of Pittsburgh's Street Trees

Functional Benefit	Yearly Benefit
Pollution Effects	\$417,700
Carbon Storage and Avoidance	\$38,335
Energy Savings	\$96,501
Captured Stormwater	\$134,848
Aesthetic and Other Benefits	\$1,556,747
Total Street Tree Benefits	\$2,244,131

## Findings – Benefit-Cost Ratio (BCR)

Pittsburgh receives substantial benefits from its street trees. Applying a benefit-cost ratio (BCR) is a useful way to evaluate the public investment in the street tree population. A BCR is an indicator used to summarize the overall value compared to the costs of a given project. In this analysis, BCR accounts for the cumulative monetary benefits provided by Pittsburgh’s street trees compared to the costs associated with their management.

The annual functional benefits provided by Pittsburgh’s street trees are \$2,244,131. According to the 2015 *Pittsburgh Street Tree Management Plan*, the annual costs of the forestry program are expected to average \$1,488,466 over the next ten years (Davey Resource Group 2015). The BCR thus values out at 1.51, meaning that for every dollar required for maintenance, there is \$1.51 worth of annual benefits derived from street trees.

Street tree benefits are sure to grow for two reasons:

- Annual costs include planting new trees, which will provide expanding benefits moving forward.
- Many of Pittsburgh’s trees are young and will continue to provide expanding benefits for decades to come.

Furthermore, if energy and wastewater treatment costs increase in the future, the monetary benefits provided by trees will also increase. If a carbon trading system is ever created in the United States, the monetary benefits associated with carbon sequestration will also likely increase.

Barring any immediate issues with Pittsburgh’s urban forest, costs shouldn’t increase much after the completion of the current ten-year budget. The BCR of Pittsburgh’s street trees is sure to grow over the decades if the city and its many non-profit partners continue committing resources for wise management.

It is important to keep in mind that the BCR, while significantly positive, only describes the benefits which are quantifiable through i-Tree Eco and i-Tree Streets analysis tools. Urban forests have been shown to have positive effects on crime rates, hospital recovery times, community pride and cohesion, general health, and mental well-being. The benefits of the Pittsburgh urban forest extend well beyond a simple monetary benefit-to-cost analysis. A well-maintained and thriving street tree population will play an essential role in expanding the intangible benefits Pittsburgh’s urban forest provides. Furthermore, as the i-Tree model is continually developed and economic values are quantified for additional benefits, the quantifiable value will continue to increase.



*Photograph 13. This west Oakland northern red oak provides an accent to this view of the Cathedral of Learning. The tree also benefits people who walk on this street every day.*



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***Appendix A***  
***Neighborhood Map***

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# Pittsburgh, Pennsylvania Neighborhoods



(Homa, 2012-2014)

***Appendix B***  
***Data by Tree Species***

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# Pollution Effects in PittsburghPA by Species

Series: Inventory2014, Time Period: 2014

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	PM10	SO2	PM2.5	CO	O3	NO2	PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Alsaka cedar	4 0.01%	0.3 0.01%	12.2 0.01%	3.1 0.01%	1.5 0.00%	3.8 0.01%	0.2 0.00%	0.01 0.01%	3.15 0.01%	0.10 0.01%	2.49 0.00%	0.04 0.01%	2.63 0.00%	0.02 0.00%	0.20 0.00%	0.23 0.00%
American basswood	62 0.19%	7.1 0.13%	260.1 0.13%	66.2 0.13%	299.4 0.28%	82.0 0.13%	47.8 0.28%	0.25 0.13%	67.30 0.13%	2.04 0.13%	490.02 0.28%	0.86 0.13%	518.26 0.28%	0.00 0.00%	0.00 0.00%	0.00 0.00%
American beech	5 0.01%	0.1 0.00%	4.0 0.00%	1.0 0.00%	3.0 0.00%	1.3 0.00%	0.5 0.00%	0.00 0.00%	1.03 0.00%	0.03 0.00%	4.96 0.00%	0.01 0.00%	5.25 0.00%	0.02 0.00%	0.39 0.00%	0.41 0.00%
American elm	729 2.18%	106.5 1.95%	3,922.8 1.95%	999.1 1.95%	1,926.4 1.79%	1,236.8 1.95%	307.5 1.79%	3.78 1.95%	1,015.23 1.95%	30.80 1.95%	3,153.16 1.79%	12.95 1.95%	3,334.92 1.79%	14.99 0.01%	64.22 0.27%	79.21 0.05%
American hazlenut	1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.01 0.00%	0.00 0.00%	0.05 0.00%	0.00 0.00%	0.05 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
American holly	22 0.07%	0.8 0.01%	29.5 0.01%	7.5 0.01%	8.0 0.01%	9.3 0.01%	1.3 0.01%	0.03 0.01%	7.63 0.01%	0.23 0.01%	13.02 0.01%	0.10 0.01%	13.77 0.01%	0.06 0.00%	0.50 0.00%	0.55 0.00%
American hornbeam	123 0.37%	1.9 0.04%	71.3 0.04%	18.2 0.04%	43.3 0.04%	22.5 0.04%	6.9 0.04%	0.07 0.04%	18.46 0.04%	0.56 0.04%	70.85 0.04%	0.24 0.04%	74.94 0.04%	0.27 0.00%	18.68 0.08%	18.96 0.01%
American mountain ash	2 0.01%	0.0 0.00%	1.7 0.00%	0.4 0.00%	1.0 0.00%	0.5 0.00%	0.2 0.00%	0.00 0.00%	0.45 0.00%	0.01 0.00%	1.64 0.00%	0.01 0.00%	1.73 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
American plum	1 0.00%	0.1 0.00%	4.3 0.00%	1.1 0.00%	2.3 0.00%	1.4 0.00%	0.4 0.00%	0.00 0.00%	1.12 0.00%	0.03 0.00%	3.77 0.00%	0.01 0.00%	3.99 0.00%	0.02 0.00%	0.07 0.00%	0.09 0.00%
American smoketree	3 0.01%	0.0 0.00%	0.8 0.00%	0.2 0.00%	0.4 0.00%	0.2 0.00%	0.1 0.00%	0.00 0.00%	0.20 0.00%	0.01 0.00%	0.69 0.00%	0.00 0.00%	0.73 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
American snowbell	1 0.00%	0.0 0.00%	0.4 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.10 0.00%	0.00 0.00%	0.36 0.00%	0.00 0.00%	0.38 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
American sycamore	142 0.42%	44.9 0.82%	1,654.5 0.82%	421.4 0.82%	1,184.6 1.10%	521.6 0.82%	189.1 1.10%	1.60 0.82%	428.19 0.82%	12.99 0.82%	1,938.91 1.10%	5.46 0.82%	2,050.68 1.10%	2,212.20 1.81%	27.09 0.11%	2,239.29 1.54%
Amur corktree	19 0.06%	2.8 0.05%	102.7 0.05%	26.2 0.05%	51.5 0.05%	32.4 0.05%	8.2 0.05%	0.10 0.05%	26.59 0.05%	0.81 0.05%	84.37 0.05%	0.34 0.05%	89.24 0.05%	0.39 0.00%	26.91 0.11%	27.30 0.02%
Amur maackia	12 0.04%	0.2 0.00%	8.3 0.00%	2.1 0.00%	4.5 0.00%	2.6 0.00%	0.7 0.00%	0.01 0.00%	2.14 0.00%	0.06 0.00%	7.33 0.00%	0.03 0.00%	7.75 0.00%	2.94 0.00%	0.44 0.00%	3.38 0.00%
Amur maple	119 0.36%	4.6 0.08%	168.1 0.08%	42.8 0.08%	102.2 0.09%	53.0 0.08%	16.3 0.09%	0.16 0.08%	43.50 0.08%	1.32 0.08%	167.32 0.09%	0.55 0.08%	176.96 0.09%	0.64 0.00%	44.03 0.19%	44.67 0.03%
apple spp	1,017 3.04%	35.0 0.64%	1,288.7 0.64%	328.2 0.64%	588.5 0.55%	406.3 0.64%	94.0 0.55%	1.24 0.64%	333.52 0.64%	10.12 0.64%	963.32 0.55%	4.25 0.64%	1,018.85 0.55%	0.00 0.00%	0.00 0.00%	0.00 0.00%
ash spp	110 0.33%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Atlantic white cedar	3 0.01%	0.4 0.01%	13.6 0.01%	3.5 0.01%	2.1 0.00%	4.3 0.01%	0.3 0.00%	0.01 0.01%	3.53 0.01%	0.11 0.01%	3.51 0.00%	0.05 0.01%	3.71 0.00%	0.03 0.00%	0.23 0.00%	0.26 0.00%
Atlas cedar	3 0.01%	1.1 0.02%	40.1 0.02%	10.2 0.02%	7.2 0.01%	12.6 0.02%	1.1 0.01%	0.04 0.02%	10.38 0.02%	0.32 0.02%	11.73 0.01%	0.13 0.02%	12.40 0.01%	0.08 0.00%	5.40 0.02%	5.48 0.00%
Austrian pine	46 0.14%	13.0 0.24%	480.4 0.24%	122.3 0.24%	169.9 0.16%	151.4 0.24%	27.1 0.16%	0.46 0.24%	124.32 0.24%	3.77 0.24%	278.03 0.16%	1.59 0.24%	294.06 0.16%	0.91 0.00%	121.22 0.51%	122.13 0.08%
Baldcypress	106 0.32%	9.9 0.18%	363.2 0.18%	92.5 0.18%	75.2 0.07%	114.5 0.18%	12.0 0.07%	0.35 0.18%	93.99 0.18%	2.85 0.18%	123.13 0.07%	1.20 0.18%	130.23 0.07%	1.39 0.00%	178.37 0.75%	179.75 0.12%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Balsam fir	2 0.01%	2.2 0.04%	81.7 0.04%	20.8 0.04%	24.0 0.02%	25.8 0.04%	3.8 0.02%	0.08 0.04%	21.14 0.04%	0.64 0.04%	39.23 0.02%	0.27 0.04%	41.49 0.02%	0.16 0.00%	20.61 0.09%	20.77 0.01%
Beaked hazlenut	1 0.00%	0.0 0.00%	0.4 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.34 0.00%	0.00 0.00%	0.36 0.00%	0.00 0.00%	0.05 0.00%	0.05 0.00%
Bitternut hickory	6 0.02%	1.4 0.03%	51.2 0.03%	13.1 0.03%	32.5 0.03%	16.2 0.03%	5.2 0.03%	0.05 0.03%	13.26 0.03%	0.40 0.03%	53.25 0.03%	0.17 0.03%	56.32 0.03%	0.20 0.00%	13.42 0.06%	13.62 0.01%
Black cherry	110 0.33%	17.8 0.33%	656.1 0.33%	167.1 0.33%	320.8 0.30%	206.9 0.33%	51.2 0.30%	0.63 0.33%	169.81 0.33%	5.15 0.33%	525.13 0.30%	2.17 0.33%	555.40 0.30%	2.51 0.00%	10.74 0.05%	13.25 0.01%
Black haw	6 0.02%	0.1 0.00%	2.1 0.00%	0.5 0.00%	1.2 0.00%	0.7 0.00%	0.2 0.00%	0.00 0.00%	0.54 0.00%	0.02 0.00%	1.97 0.00%	0.01 0.00%	2.09 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Black locust	469 1.40%	63.3 1.16%	2,332.9 1.16%	594.2 1.16%	1,638.8 1.52%	735.5 1.16%	261.6 1.52%	2.25 1.16%	603.77 1.16%	18.32 1.16%	2,682.27 1.52%	7.70 1.16%	2,836.89 1.52%	1,247.73 1.02%	76.39 0.32%	1,324.12 0.91%
Black maple	11 0.03%	1.7 0.03%	62.7 0.03%	16.0 0.03%	39.4 0.04%	19.8 0.03%	6.3 0.04%	0.06 0.03%	16.24 0.03%	0.49 0.03%	64.50 0.04%	0.21 0.03%	68.21 0.04%	0.24 0.00%	16.43 0.07%	16.67 0.01%
Black oak	10 0.03%	1.6 0.03%	59.2 0.03%	15.1 0.03%	33.5 0.03%	18.7 0.03%	5.4 0.03%	0.06 0.03%	15.33 0.03%	0.47 0.03%	54.90 0.03%	0.20 0.03%	58.07 0.03%	158.42 0.13%	1.94 0.01%	160.36 0.11%
Black poplar	6 0.02%	0.1 0.00%	3.7 0.00%	0.9 0.00%	1.7 0.00%	1.2 0.00%	0.3 0.00%	0.00 0.00%	0.95 0.00%	0.03 0.00%	2.80 0.00%	0.01 0.00%	2.96 0.00%	9.86 0.01%	0.06 0.00%	9.92 0.01%
Black tupelo	27 0.08%	0.3 0.01%	10.1 0.01%	2.6 0.01%	10.7 0.01%	3.2 0.01%	1.7 0.01%	0.01 0.01%	2.61 0.01%	0.08 0.01%	17.55 0.01%	0.03 0.01%	18.56 0.01%	5.39 0.00%	0.99 0.00%	6.38 0.00%
Black walnut	29 0.09%	6.8 0.12%	251.1 0.12%	63.9 0.12%	99.0 0.09%	79.2 0.12%	15.8 0.09%	0.24 0.12%	64.98 0.12%	1.97 0.12%	162.09 0.09%	0.83 0.12%	171.44 0.09%	0.96 0.00%	123.31 0.52%	124.27 0.09%
Black willow	5 0.01%	1.0 0.02%	36.0 0.02%	9.2 0.02%	20.1 0.02%	11.4 0.02%	3.2 0.02%	0.03 0.02%	9.33 0.02%	0.28 0.02%	32.82 0.02%	0.12 0.02%	34.71 0.02%	75.32 0.06%	4.72 0.02%	80.04 0.05%
Blue spruce	416 1.24%	339.8 6.21%	12,516.9 6.21%	3,187.9 6.21%	2,165.5 2.01%	3,946.3 6.21%	345.7 2.01%	12.07 6.21%	3,239.41 6.21%	98.28 6.21%	3,544.47 2.01%	41.33 6.21%	3,748.78 2.01%	3,331.81 2.73%	3,158.69 13.35%	6,490.50 4.46%
Boxelder	44 0.13%	4.1 0.08%	152.2 0.08%	38.8 0.08%	63.2 0.06%	48.0 0.08%	10.1 0.06%	0.15 0.08%	39.38 0.08%	1.19 0.08%	103.38 0.06%	0.50 0.08%	109.34 0.06%	0.58 0.00%	39.86 0.17%	40.44 0.03%
boxwood spp	1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.03 0.00%	0.00 0.00%	0.11 0.00%	0.00 0.00%	0.12 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Bur oak	17 0.05%	1.8 0.03%	64.6 0.03%	16.4 0.03%	26.8 0.02%	20.4 0.03%	4.3 0.02%	0.06 0.03%	16.71 0.03%	0.51 0.03%	43.89 0.02%	0.21 0.03%	46.42 0.02%	172.70 0.14%	2.11 0.01%	174.82 0.12%
Butternut	6 0.02%	1.6 0.03%	57.2 0.03%	14.6 0.03%	33.5 0.03%	18.0 0.03%	5.4 0.03%	0.06 0.03%	14.81 0.03%	0.45 0.03%	54.87 0.03%	0.19 0.03%	58.03 0.03%	0.22 0.00%	28.11 0.12%	28.33 0.02%
Callery pear	2,974 8.88%	255.2 4.66%	9,399.0 4.66%	2,393.8 4.66%	4,817.9 4.47%	2,963.3 4.66%	769.1 4.47%	9.06 4.66%	2,432.48 4.66%	73.80 4.66%	7,885.89 4.47%	31.03 4.66%	8,340.46 4.47%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Canada plum	2 0.01%	0.0 0.00%	1.3 0.00%	0.3 0.00%	0.6 0.00%	0.4 0.00%	0.1 0.00%	0.00 0.00%	0.34 0.00%	0.01 0.00%	0.99 0.00%	0.00 0.00%	1.05 0.00%	0.01 0.00%	0.02 0.00%	0.03 0.00%
Cherry plum	31 0.09%	1.0 0.02%	36.5 0.02%	9.3 0.02%	23.6 0.02%	11.5 0.02%	3.8 0.02%	0.04 0.02%	9.46 0.02%	0.29 0.02%	38.68 0.02%	0.12 0.02%	40.91 0.02%	0.14 0.00%	0.60 0.00%	0.74 0.00%
Chinese chestnut	2 0.01%	0.4 0.01%	13.9 0.01%	3.5 0.01%	6.9 0.01%	4.4 0.01%	1.1 0.01%	0.01 0.01%	3.60 0.01%	0.11 0.01%	11.36 0.01%	0.05 0.01%	12.01 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Chinese elm	35 0.10%	3.4 0.06%	124.3 0.06%	31.7 0.06%	37.0 0.03%	39.2 0.06%	5.9 0.03%	0.12 0.06%	32.17 0.06%	0.98 0.06%	60.56 0.03%	0.41 0.06%	64.05 0.03%	0.47 0.00%	2.03 0.01%	2.51 0.00%



Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Chinese fringe tree	1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.04 0.00%	0.00 0.00%	0.10 0.00%	0.00 0.00%	0.10 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Chinkapin oak	14 0.04%	0.6 0.01%	21.5 0.01%	5.5 0.01%	8.2 0.01%	6.8 0.01%	1.3 0.01%	0.02 0.01%	5.56 0.01%	0.17 0.01%	13.45 0.01%	0.07 0.01%	14.23 0.01%	57.41 0.05%	0.70 0.00%	58.12 0.04%
Common chokecherry	28 0.08%	0.3 0.00%	9.7 0.00%	2.5 0.00%	5.4 0.01%	3.1 0.00%	0.9 0.01%	0.01 0.00%	2.52 0.00%	0.08 0.00%	8.86 0.01%	0.03 0.00%	9.37 0.01%	0.04 0.00%	0.16 0.00%	0.20 0.00%
Common elderberry	1 0.00%	0.0 0.00%	0.4 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.30 0.00%	0.00 0.00%	0.31 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Common lilac	1 0.00%	0.0 0.00%	0.3 0.00%	0.1 0.00%	0.1 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.08 0.00%	0.00 0.00%	0.19 0.00%	0.00 0.00%	0.20 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
Common pear	15 0.04%	1.2 0.02%	45.8 0.02%	11.7 0.02%	24.0 0.02%	14.4 0.02%	3.8 0.02%	0.04 0.02%	11.86 0.02%	0.36 0.02%	39.33 0.02%	0.15 0.02%	41.60 0.02%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Corkscrew willow	7 0.02%	1.5 0.03%	53.6 0.03%	13.6 0.03%	29.0 0.03%	16.9 0.03%	4.6 0.03%	0.05 0.03%	13.87 0.03%	0.42 0.03%	47.53 0.03%	0.18 0.03%	50.27 0.03%	111.97 0.09%	7.02 0.03%	118.99 0.08%
Cornelian cherry	115 0.34%	0.7 0.01%	27.0 0.01%	6.9 0.01%	14.9 0.01%	8.5 0.01%	2.4 0.01%	0.03 0.01%	7.00 0.01%	0.21 0.01%	24.41 0.01%	0.09 0.01%	25.81 0.01%	0.10 0.00%	7.08 0.03%	7.19 0.00%
Cucumber tree	4 0.01%	0.2 0.00%	5.6 0.00%	1.4 0.00%	5.6 0.01%	1.8 0.00%	0.9 0.01%	0.01 0.00%	1.45 0.00%	0.04 0.00%	9.21 0.01%	0.02 0.00%	9.75 0.01%	0.02 0.00%	2.73 0.01%	2.75 0.00%
Dawn redwood	30 0.09%	3.6 0.07%	133.3 0.07%	34.0 0.07%	77.7 0.07%	42.0 0.07%	12.4 0.07%	0.13 0.07%	34.51 0.07%	1.05 0.07%	127.21 0.07%	0.44 0.07%	134.54 0.07%	5.09 0.00%	65.48 0.28%	70.57 0.05%
Douglas fir	8 0.02%	9.1 0.17%	336.7 0.17%	85.7 0.17%	62.3 0.06%	106.1 0.17%	9.9 0.06%	0.32 0.17%	87.13 0.17%	2.64 0.17%	101.98 0.06%	1.11 0.17%	107.86 0.06%	0.64 0.00%	45.31 0.19%	45.95 0.03%
Downy serviceberry	214 0.64%	2.0 0.04%	75.2 0.04%	19.2 0.04%	53.5 0.05%	23.7 0.04%	8.5 0.05%	0.07 0.04%	19.47 0.04%	0.59 0.04%	87.56 0.05%	0.25 0.04%	92.61 0.05%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Eastern cottonwood	10 0.03%	2.4 0.04%	90.1 0.04%	23.0 0.04%	44.9 0.04%	28.4 0.04%	7.2 0.04%	0.09 0.04%	23.33 0.04%	0.71 0.04%	73.46 0.04%	0.30 0.04%	77.70 0.04%	241.03 0.20%	1.48 0.01%	242.50 0.17%
Eastern hemlock	84 0.25%	22.1 0.40%	814.0 0.40%	207.3 0.40%	302.4 0.28%	256.6 0.40%	48.3 0.28%	0.78 0.40%	210.65 0.40%	6.39 0.40%	495.02 0.28%	2.69 0.40%	523.56 0.28%	1.55 0.00%	13.69 0.06%	15.24 0.01%
Eastern hophornbeam	36 0.11%	0.2 0.00%	8.6 0.00%	2.2 0.00%	5.0 0.00%	2.7 0.00%	0.8 0.00%	0.01 0.00%	2.22 0.00%	0.07 0.00%	8.11 0.00%	0.03 0.00%	8.58 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Eastern red cedar	85 0.25%	40.1 0.73%	1,477.4 0.73%	376.3 0.73%	159.1 0.15%	465.8 0.73%	25.4 0.15%	1.42 0.73%	382.35 0.73%	11.60 0.73%	260.34 0.15%	4.88 0.73%	275.34 0.15%	2.81 0.00%	74.57 0.32%	77.37 0.05%
Eastern redbud	208 0.62%	3.6 0.07%	132.1 0.07%	33.6 0.07%	85.0 0.08%	41.6 0.07%	13.6 0.08%	0.13 0.07%	34.19 0.07%	1.04 0.07%	139.19 0.08%	0.44 0.07%	147.21 0.08%	0.50 0.00%	2.16 0.01%	2.67 0.00%
Eastern service berry	29 0.09%	0.5 0.01%	16.7 0.01%	4.2 0.01%	10.2 0.01%	5.3 0.01%	1.6 0.01%	0.02 0.01%	4.31 0.01%	0.13 0.01%	16.68 0.01%	0.05 0.01%	17.64 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Eastern white pine	116 0.35%	27.3 0.50%	1,007.1 0.50%	256.5 0.50%	536.3 0.50%	317.5 0.50%	85.6 0.50%	0.97 0.50%	260.64 0.50%	7.91 0.50%	877.81 0.50%	3.33 0.50%	928.41 0.50%	1.91 0.00%	254.14 1.07%	256.05 0.18%
elm spp	292 0.87%	11.8 0.22%	434.9 0.22%	110.8 0.22%	237.9 0.22%	137.1 0.22%	38.0 0.22%	0.42 0.22%	112.57 0.22%	3.42 0.22%	389.34 0.22%	1.44 0.22%	411.78 0.22%	1.66 0.00%	7.12 0.03%	8.78 0.01%
Engelmann spruce	1 0.00%	0.2 0.00%	7.4 0.00%	1.9 0.00%	1.1 0.00%	2.3 0.00%	0.2 0.00%	0.01 0.00%	1.91 0.00%	0.06 0.00%	1.88 0.00%	0.02 0.00%	1.99 0.00%	1.96 0.00%	1.86 0.01%	3.82 0.00%
English oak	20 0.06%	1.0 0.02%	35.8 0.02%	9.1 0.02%	19.4 0.02%	11.3 0.02%	3.1 0.02%	0.03 0.02%	9.26 0.02%	0.28 0.02%	31.75 0.02%	0.12 0.02%	33.58 0.02%	95.72 0.08%	1.17 0.00%	96.89 0.07%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
English walnut	4 0.01%	0.3 0.01%	11.9 0.01%	3.0 0.01%	9.1 0.01%	3.8 0.01%	1.5 0.01%	0.01 0.01%	3.09 0.01%	0.09 0.01%	14.94 0.01%	0.04 0.01%	15.80 0.01%	0.05 0.00%	5.87 0.02%	5.91 0.00%
European beech	11 0.03%	0.6 0.01%	23.6 0.01%	6.0 0.01%	15.7 0.01%	7.4 0.01%	2.5 0.01%	0.02 0.01%	6.10 0.01%	0.19 0.01%	25.67 0.01%	0.08 0.01%	27.15 0.01%	0.09 0.00%	2.32 0.01%	2.41 0.00%
European buckthorn	3 0.01%	0.0 0.00%	0.3 0.00%	0.1 0.00%	0.3 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.50 0.00%	0.00 0.00%	0.53 0.00%	0.26 0.00%	0.00 0.00%	0.26 0.00%
European hornbeam	188 0.56%	2.2 0.04%	81.1 0.04%	20.6 0.04%	46.7 0.04%	25.6 0.04%	7.5 0.04%	0.08 0.04%	20.98 0.04%	0.64 0.04%	76.39 0.04%	0.27 0.04%	80.79 0.04%	0.31 0.00%	21.24 0.09%	21.55 0.01%
European mountain ash	2 0.01%	0.0 0.00%	1.5 0.00%	0.4 0.00%	0.8 0.00%	0.5 0.00%	0.1 0.00%	0.00 0.00%	0.39 0.00%	0.01 0.00%	1.30 0.00%	0.00 0.00%	1.37 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
European white birch	2 0.01%	0.3 0.01%	11.5 0.01%	2.9 0.01%	7.2 0.01%	3.6 0.01%	1.2 0.01%	0.01 0.01%	2.98 0.01%	0.09 0.01%	11.86 0.01%	0.04 0.01%	12.55 0.01%	0.04 0.00%	0.38 0.00%	0.42 0.00%
Flowering dogwood	94 0.28%	1.8 0.03%	65.0 0.03%	16.6 0.03%	45.0 0.04%	20.5 0.03%	7.2 0.04%	0.06 0.03%	16.82 0.03%	0.51 0.03%	73.69 0.04%	0.21 0.03%	77.93 0.04%	0.25 0.00%	17.03 0.07%	17.28 0.01%
Fraser fir	1 0.00%	0.2 0.00%	8.6 0.00%	2.2 0.00%	1.8 0.00%	2.7 0.00%	0.3 0.00%	0.01 0.00%	2.22 0.00%	0.07 0.00%	2.94 0.00%	0.03 0.00%	3.10 0.00%	0.02 0.00%	2.16 0.01%	2.18 0.00%
Freeman maple	750 2.24%	54.6 1.00%	2,010.1 1.00%	511.9 1.00%	1,209.7 1.12%	633.7 1.00%	193.1 1.12%	1.94 1.00%	520.22 1.00%	15.78 1.00%	1,980.04 1.12%	6.64 1.00%	2,094.18 1.12%	7.68 0.01%	526.51 2.22%	534.19 0.37%
Fringe tree	1 0.00%	0.0 0.00%	0.5 0.00%	0.1 0.00%	0.4 0.00%	0.2 0.00%	0.1 0.00%	0.00 0.00%	0.14 0.00%	0.00 0.00%	0.61 0.00%	0.00 0.00%	0.64 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
Ginkgo	852 2.54%	53.5 0.98%	1,970.7 0.98%	501.9 0.98%	1,571.2 1.46%	621.3 0.98%	250.8 1.46%	1.90 0.98%	510.01 0.98%	15.47 0.98%	2,571.62 1.46%	6.51 0.98%	2,719.86 1.46%	0.00 0.00%	967.87 4.09%	967.87 0.66%
Golden-chain tree	2 0.01%	0.0 0.00%	0.3 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.08 0.00%	0.00 0.00%	0.26 0.00%	0.00 0.00%	0.27 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
Goldenrain tree	57 0.17%	3.0 0.06%	111.9 0.06%	28.5 0.06%	58.5 0.05%	35.3 0.06%	9.3 0.05%	0.11 0.06%	28.97 0.06%	0.88 0.06%	95.67 0.05%	0.37 0.06%	101.19 0.05%	191.99 0.16%	0.00 0.00%	191.99 0.13%
Gray birch	11 0.03%	1.0 0.02%	35.7 0.02%	9.1 0.02%	20.1 0.02%	11.2 0.02%	3.2 0.02%	0.03 0.02%	9.23 0.02%	0.28 0.02%	32.97 0.02%	0.12 0.02%	34.87 0.02%	0.14 0.00%	1.17 0.00%	1.30 0.00%
Green ash	214 0.64%	15.7 0.29%	576.7 0.29%	146.9 0.29%	375.7 0.35%	181.8 0.29%	60.0 0.35%	0.56 0.29%	149.25 0.29%	4.53 0.29%	614.97 0.35%	1.90 0.29%	650.42 0.35%	2.20 0.00%	9.44 0.04%	11.64 0.01%
Green hawthorn	3 0.01%	0.1 0.00%	2.3 0.00%	0.6 0.00%	1.2 0.00%	0.7 0.00%	0.2 0.00%	0.00 0.00%	0.60 0.00%	0.02 0.00%	1.98 0.00%	0.01 0.00%	2.09 0.00%	0.09 0.00%	0.08 0.00%	0.17 0.00%
Hardy rubber tree	20 0.06%	0.3 0.01%	10.2 0.01%	2.6 0.01%	4.9 0.00%	3.2 0.01%	0.8 0.00%	0.01 0.01%	2.65 0.01%	0.08 0.01%	8.07 0.00%	0.03 0.01%	8.53 0.00%	7.70 0.01%	1.34 0.01%	9.05 0.01%
hawthorn spp	250 0.75%	3.9 0.07%	143.5 0.07%	36.5 0.07%	157.3 0.15%	45.2 0.07%	25.1 0.15%	0.14 0.07%	37.14 0.07%	1.13 0.07%	257.52 0.15%	0.47 0.07%	272.36 0.15%	5.48 0.00%	4.70 0.02%	10.18 0.01%
Hedge maple	575 1.72%	16.7 0.31%	616.6 0.31%	157.0 0.31%	391.9 0.36%	194.4 0.31%	62.6 0.36%	0.59 0.31%	159.57 0.31%	4.84 0.31%	641.49 0.36%	2.04 0.31%	678.47 0.36%	2.36 0.00%	161.50 0.68%	163.85 0.11%
Higan cherry	10 0.03%	0.1 0.00%	3.4 0.00%	0.9 0.00%	2.0 0.00%	1.1 0.00%	0.3 0.00%	0.00 0.00%	0.88 0.00%	0.03 0.00%	3.24 0.00%	0.01 0.00%	3.42 0.00%	0.01 0.00%	0.06 0.00%	0.07 0.00%
Honeylocust	40 0.12%	4.5 0.08%	165.1 0.08%	42.0 0.08%	83.1 0.08%	52.1 0.08%	13.3 0.08%	0.16 0.08%	42.73 0.08%	1.30 0.08%	136.06 0.08%	0.55 0.08%	143.90 0.08%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Horsechestnut	129 0.39%	30.3 0.55%	1,115.0 0.55%	284.0 0.55%	577.4 0.54%	351.5 0.55%	92.2 0.54%	1.08 0.55%	288.57 0.55%	8.75 0.55%	945.06 0.54%	3.68 0.55%	999.53 0.54%	0.00 0.00%	0.00 0.00%	0.00 0.00%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Japanese barberry	1 0.00%	0.0 0.00%	0.2 0.00%	0.0 0.00%	0.1 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.05 0.00%	0.00 0.00%	0.14 0.00%	0.00 0.00%	0.15 0.00%	0.16 0.00%	0.00 0.00%	0.16 0.00%
Japanese maple	153 0.46%	4.5 0.08%	167.5 0.08%	42.7 0.08%	109.1 0.10%	52.8 0.08%	17.4 0.10%	0.16 0.08%	43.35 0.08%	1.32 0.08%	178.52 0.10%	0.55 0.08%	188.81 0.10%	0.64 0.00%	43.88 0.19%	44.52 0.03%
Japanese pagoda tree	21 0.06%	7.9 0.14%	289.2 0.14%	73.7 0.14%	120.2 0.11%	91.2 0.14%	19.2 0.11%	0.28 0.14%	74.84 0.14%	2.27 0.14%	196.67 0.11%	0.95 0.14%	208.01 0.11%	1.10 0.00%	9.47 0.04%	10.57 0.01%
Japanese snowbell	2 0.01%	0.0 0.00%	0.2 0.00%	0.1 0.00%	0.1 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.06 0.00%	0.00 0.00%	0.18 0.00%	0.00 0.00%	0.19 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Japanese tree lilac	505 1.51%	6.7 0.12%	248.5 0.12%	63.3 0.12%	97.0 0.09%	78.3 0.12%	15.5 0.09%	0.24 0.12%	64.31 0.12%	1.95 0.12%	158.85 0.09%	0.82 0.12%	168.00 0.09%	0.00 0.00%	4.07 0.02%	4.07 0.00%
Japanese white pine	1 0.00%	0.0 0.00%	1.6 0.00%	0.4 0.00%	0.6 0.00%	0.5 0.00%	0.1 0.00%	0.00 0.00%	0.41 0.00%	0.01 0.00%	0.96 0.00%	0.01 0.00%	1.02 0.00%	0.00 0.00%	0.40 0.00%	0.41 0.00%
Japanese zelkova	593 1.77%	31.3 0.57%	1,153.0 0.57%	293.7 0.57%	617.4 0.57%	363.5 0.57%	98.6 0.57%	1.11 0.57%	298.41 0.57%	9.05 0.57%	1,010.60 0.57%	3.81 0.57%	1,068.86 0.57%	4.40 0.00%	37.75 0.16%	42.16 0.03%
Katsura tree	26 0.08%	0.5 0.01%	18.2 0.01%	4.6 0.01%	8.6 0.01%	5.7 0.01%	1.4 0.01%	0.02 0.01%	4.70 0.01%	0.14 0.01%	14.00 0.01%	0.06 0.01%	14.81 0.01%	39.49 0.03%	4.76 0.02%	44.24 0.03%
Kentucky coffeetree	48 0.14%	1.7 0.03%	62.3 0.03%	15.9 0.03%	33.1 0.03%	19.6 0.03%	5.3 0.03%	0.06 0.03%	16.13 0.03%	0.49 0.03%	54.23 0.03%	0.21 0.03%	57.36 0.03%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Kousa dogwood	72 0.22%	0.6 0.01%	21.5 0.01%	5.5 0.01%	14.2 0.01%	6.8 0.01%	2.3 0.01%	0.02 0.01%	5.56 0.01%	0.17 0.01%	23.19 0.01%	0.07 0.01%	24.53 0.01%	0.08 0.00%	5.63 0.02%	5.71 0.00%
Kwanzan cherry	105 0.31%	3.0 0.06%	112.0 0.06%	28.5 0.06%	55.5 0.05%	35.3 0.06%	8.9 0.05%	0.11 0.06%	28.98 0.06%	0.88 0.06%	90.78 0.05%	0.37 0.06%	96.01 0.05%	0.43 0.00%	1.83 0.01%	2.26 0.00%
Lacebark pine	1 0.00%	0.0 0.00%	0.7 0.00%	0.2 0.00%	0.3 0.00%	0.2 0.00%	0.0 0.00%	0.00 0.00%	0.18 0.00%	0.01 0.00%	0.50 0.00%	0.00 0.00%	0.53 0.00%	0.00 0.00%	0.17 0.00%	0.17 0.00%
Littleleaf linden	2,254 6.73%	799.0 14.60%	29,431.4 14.60%	7,495.7 14.60%	13,503.1 12.53%	9,279.1 14.60%	2,155.6 12.53%	28.37 14.60%	7,616.89 14.60%	231.08 14.60%	22,101.55 12.53%	97.17 14.60%	23,375.57 12.53%	0.00 0.00%	0.00 0.00%	0.00 0.00%
locust spp	1,980 5.91%	143.8 2.63%	5,296.6 2.63%	1,348.9 2.63%	3,114.2 2.89%	1,669.9 2.63%	497.1 2.89%	5.11 2.63%	1,370.76 2.63%	41.59 2.63%	5,097.21 2.89%	17.49 2.63%	5,391.03 2.89%	0.00 0.00%	0.00 0.00%	0.00 0.00%
London plane	2,757 8.23%	858.4 15.69%	31,618.3 15.69%	8,052.7 15.69%	23,833.0 22.11%	9,968.6 15.69%	3,804.5 22.11%	30.48 15.69%	8,182.88 15.69%	248.26 15.69%	39,009.26 22.11%	104.39 15.69%	41,257.90 22.11%	42,276.37 34.68%	517.62 2.19%	42,793.99 29.39%
maple spp	20 0.06%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Mimosa	10 0.03%	0.4 0.01%	14.1 0.01%	3.6 0.01%	14.2 0.01%	4.4 0.01%	2.3 0.01%	0.01 0.01%	3.64 0.01%	0.11 0.01%	23.22 0.01%	0.05 0.01%	24.56 0.01%	0.05 0.00%	0.46 0.00%	0.51 0.00%
Miyabe's Maple	138 0.41%	2.6 0.05%	94.2 0.05%	24.0 0.05%	63.8 0.06%	29.7 0.05%	10.2 0.06%	0.09 0.05%	24.38 0.05%	0.74 0.05%	104.41 0.06%	0.31 0.05%	110.42 0.06%	0.36 0.00%	24.67 0.10%	25.03 0.02%
Mountain silverbell	1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.1 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.03 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.10 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Northern catalpa	61 0.18%	4.9 0.09%	181.8 0.09%	46.3 0.09%	115.3 0.11%	57.3 0.09%	18.4 0.11%	0.18 0.09%	47.04 0.09%	1.43 0.09%	188.75 0.11%	0.60 0.09%	199.63 0.11%	6.94 0.01%	5.95 0.03%	12.89 0.01%
Northern hackberry	125 0.37%	4.2 0.08%	154.1 0.08%	39.3 0.08%	101.7 0.09%	48.6 0.08%	16.2 0.09%	0.15 0.08%	39.89 0.08%	1.21 0.08%	166.40 0.09%	0.51 0.08%	176.00 0.09%	0.59 0.00%	5.05 0.02%	5.64 0.00%
Northern red oak	568 1.70%	190.7 3.48%	7,023.0 3.48%	1,788.6 3.48%	3,490.4 3.24%	2,214.2 3.48%	557.2 3.24%	6.77 3.48%	1,817.57 3.48%	55.14 3.48%	5,713.03 3.24%	23.19 3.48%	6,042.35 3.24%	18,780.53 15.40%	229.95 0.97%	19,010.47 13.06%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	PM10	SO2	PM2.5	CO	O3	NO2	PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Northern white cedar	233 0.70%	47.7 0.87%	1,756.3 0.87%	447.3 0.87%	283.7 0.26%	553.7 0.87%	45.3 0.26%	1.69 0.87%	454.54 0.87%	13.79 0.87%	464.37 0.26%	5.80 0.87%	491.14 0.26%	3.34 0.00%	88.64 0.37%	91.98 0.06%
Norway maple	3,515 10.50%	582.8 10.65%	21,466.2 10.65%	5,467.1 10.65%	13,788.4 12.79%	6,767.9 10.65%	2,201.1 12.79%	20.70 10.65%	5,555.49 10.65%	168.54 10.65%	22,568.53 12.79%	70.87 10.65%	23,869.47 12.79%	82.01 0.07%	5,622.73 23.76%	5,704.74 3.92%
Norway spruce	220 0.66%	231.7 4.23%	8,533.1 4.23%	2,173.2 4.23%	1,538.1 1.43%	2,690.3 4.23%	245.5 1.43%	8.23 4.23%	2,208.37 4.23%	67.00 4.23%	2,517.61 1.43%	28.17 4.23%	2,662.73 1.43%	2,271.37 1.86%	2,153.35 9.10%	4,424.72 3.04%
oak spp	3 0.01%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.01 0.00%	0.00 0.00%	0.06 0.00%	0.00 0.00%	0.06 0.00%	0.10 0.00%	0.00 0.00%	0.10 0.00%
Ohio buckeye	37 0.11%	1.2 0.02%	44.3 0.02%	11.3 0.02%	22.0 0.02%	14.0 0.02%	3.5 0.02%	0.04 0.02%	11.46 0.02%	0.35 0.02%	35.96 0.02%	0.15 0.02%	38.04 0.02%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Osage orange	22 0.07%	4.0 0.07%	147.4 0.07%	37.5 0.07%	53.9 0.05%	46.5 0.07%	8.6 0.05%	0.14 0.07%	38.16 0.07%	1.16 0.07%	88.28 0.05%	0.49 0.07%	93.37 0.05%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Paper birch	26 0.08%	1.8 0.03%	67.4 0.03%	17.2 0.03%	36.0 0.03%	21.3 0.03%	5.7 0.03%	0.07 0.03%	17.45 0.03%	0.53 0.03%	58.84 0.03%	0.22 0.03%	62.23 0.03%	0.26 0.00%	2.21 0.01%	2.46 0.00%
Paperbark maple	44 0.13%	0.4 0.01%	13.1 0.01%	3.3 0.01%	9.4 0.01%	4.1 0.01%	1.5 0.01%	0.01 0.01%	3.39 0.01%	0.10 0.01%	15.45 0.01%	0.04 0.01%	16.34 0.01%	0.05 0.00%	3.43 0.01%	3.48 0.00%
Paradise apple	16 0.05%	0.7 0.01%	26.3 0.01%	6.7 0.01%	10.2 0.01%	8.3 0.01%	1.6 0.01%	0.03 0.01%	6.81 0.01%	0.21 0.01%	16.77 0.01%	0.09 0.01%	17.74 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Pawpaw	3 0.01%	0.1 0.00%	3.9 0.00%	1.0 0.00%	0.9 0.00%	1.2 0.00%	0.1 0.00%	0.00 0.00%	1.02 0.00%	0.03 0.00%	1.43 0.00%	0.01 0.00%	1.51 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Peach	7 0.02%	0.2 0.00%	6.0 0.00%	1.5 0.00%	3.7 0.00%	1.9 0.00%	0.6 0.00%	0.01 0.00%	1.56 0.00%	0.05 0.00%	6.08 0.00%	0.02 0.00%	6.44 0.00%	0.02 0.00%	0.10 0.00%	0.12 0.00%
pear spp	48 0.14%	3.2 0.06%	116.8 0.06%	29.8 0.06%	63.5 0.06%	36.8 0.06%	10.1 0.06%	0.11 0.06%	30.23 0.06%	0.92 0.06%	103.98 0.06%	0.39 0.06%	109.97 0.06%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Pecan	1 0.00%	0.2 0.00%	6.8 0.00%	1.7 0.00%	3.3 0.00%	2.1 0.00%	0.5 0.00%	0.01 0.00%	1.75 0.00%	0.05 0.00%	5.45 0.00%	0.02 0.00%	5.77 0.00%	0.03 0.00%	1.78 0.01%	1.80 0.00%
Persian ironwood	18 0.05%	0.2 0.00%	7.6 0.00%	1.9 0.00%	3.7 0.00%	2.4 0.00%	0.6 0.00%	0.01 0.00%	1.98 0.00%	0.06 0.00%	6.07 0.00%	0.03 0.00%	6.43 0.00%	12.96 0.01%	3.76 0.02%	16.72 0.01%
Pignut hickory	1 0.00%	0.0 0.00%	1.8 0.00%	0.4 0.00%	3.2 0.00%	0.6 0.00%	0.5 0.00%	0.00 0.00%	0.45 0.00%	0.01 0.00%	5.23 0.00%	0.01 0.00%	5.53 0.00%	0.01 0.00%	0.46 0.00%	0.47 0.00%
Pin cherry	10 0.03%	0.4 0.01%	13.4 0.01%	3.4 0.01%	10.6 0.01%	4.2 0.01%	1.7 0.01%	0.01 0.01%	3.48 0.01%	0.11 0.01%	17.27 0.01%	0.04 0.01%	18.27 0.01%	0.05 0.00%	0.22 0.00%	0.27 0.00%
Pin oak	1,026 3.06%	373.8 6.83%	13,768.1 6.83%	3,506.5 6.83%	6,729.6 6.24%	4,340.8 6.83%	1,074.3 6.24%	13.27 6.83%	3,563.22 6.83%	108.10 6.83%	11,014.93 6.24%	45.46 6.83%	11,649.87 6.24%	36,817.91 30.20%	450.79 1.90%	37,268.70 25.60%
plum spp	429 1.28%	12.9 0.24%	474.6 0.24%	120.9 0.24%	243.6 0.23%	149.6 0.24%	38.9 0.23%	0.46 0.24%	122.83 0.24%	3.73 0.24%	398.71 0.23%	1.57 0.24%	421.70 0.23%	1.81 0.00%	7.77 0.03%	9.58 0.01%
Pussy willow	4 0.01%	0.0 0.00%	1.7 0.00%	0.4 0.00%	1.6 0.00%	0.5 0.00%	0.3 0.00%	0.00 0.00%	0.44 0.00%	0.01 0.00%	2.64 0.00%	0.01 0.00%	2.79 0.00%	3.55 0.00%	0.22 0.00%	3.77 0.00%
Red buckeye	14 0.04%	0.3 0.00%	9.2 0.00%	2.4 0.00%	5.1 0.00%	2.9 0.00%	0.8 0.00%	0.01 0.00%	2.39 0.00%	0.07 0.00%	8.31 0.00%	0.03 0.00%	8.79 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Red maple	3,355 10.02%	403.2 7.37%	14,853.1 7.37%	3,782.8 7.37%	8,020.9 7.44%	4,682.9 7.37%	1,280.4 7.44%	14.32 7.37%	3,844.01 7.37%	116.62 7.37%	13,128.46 7.44%	49.04 7.37%	13,885.24 7.44%	56.74 0.05%	3,890.54 16.44%	3,947.29 2.71%
Red mulberry	12 0.04%	3.2 0.06%	118.9 0.06%	30.3 0.06%	43.6 0.04%	37.5 0.06%	7.0 0.04%	0.11 0.06%	30.77 0.06%	0.93 0.06%	71.29 0.04%	0.39 0.06%	75.40 0.04%	0.45 0.00%	3.89 0.02%	4.35 0.00%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Red pine	1 0.00%	0.1 0.00%	4.2 0.00%	1.1 0.00%	1.2 0.00%	1.3 0.00%	0.2 0.00%	0.00 0.00%	1.08 0.00%	0.03 0.00%	1.92 0.00%	0.01 0.00%	2.03 0.00%	0.01 0.00%	1.05 0.00%	1.06 0.00%
River birch	56 0.17%	5.1 0.09%	187.5 0.09%	47.8 0.09%	90.9 0.08%	59.1 0.09%	14.5 0.08%	0.18 0.09%	48.54 0.09%	1.47 0.09%	148.76 0.08%	0.62 0.09%	157.33 0.08%	0.72 0.00%	6.14 0.03%	6.86 0.00%
Rose-of-sharon	14 0.04%	0.0 0.00%	1.8 0.00%	0.5 0.00%	1.5 0.00%	0.6 0.00%	0.2 0.00%	0.00 0.00%	0.47 0.00%	0.01 0.00%	2.39 0.00%	0.01 0.00%	2.53 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Roughleaf dogwood	4 0.01%	0.0 0.00%	0.9 0.00%	0.2 0.00%	0.7 0.00%	0.3 0.00%	0.1 0.00%	0.00 0.00%	0.24 0.00%	0.01 0.00%	1.15 0.00%	0.00 0.00%	1.22 0.00%	0.00 0.00%	0.25 0.00%	0.25 0.00%
Russian olive	3 0.01%	0.0 0.00%	1.4 0.00%	0.4 0.00%	1.0 0.00%	0.5 0.00%	0.2 0.00%	0.00 0.00%	0.37 0.00%	0.01 0.00%	1.70 0.00%	0.00 0.00%	1.80 0.00%	0.01 0.00%	0.05 0.00%	0.05 0.00%
Sargent cherry	1 0.00%	0.0 0.00%	1.6 0.00%	0.4 0.00%	0.8 0.00%	0.5 0.00%	0.1 0.00%	0.00 0.00%	0.42 0.00%	0.01 0.00%	1.38 0.00%	0.01 0.00%	1.46 0.00%	0.01 0.00%	0.03 0.00%	0.03 0.00%
Sassafras	2 0.01%	0.2 0.00%	8.4 0.00%	2.1 0.00%	6.3 0.01%	2.7 0.00%	1.0 0.01%	0.01 0.00%	2.18 0.00%	0.07 0.00%	10.26 0.01%	0.03 0.00%	10.85 0.01%	0.03 0.00%	0.14 0.00%	0.17 0.00%
Saucer magnolia	55 0.16%	4.3 0.08%	157.2 0.08%	40.0 0.08%	85.8 0.08%	49.6 0.08%	13.7 0.08%	0.15 0.08%	40.68 0.08%	1.23 0.08%	140.44 0.08%	0.52 0.08%	148.54 0.08%	0.59 0.00%	76.44 0.32%	77.04 0.05%
Sawara false cypress	7 0.02%	0.9 0.02%	34.4 0.02%	8.8 0.02%	4.7 0.00%	10.9 0.02%	0.7 0.00%	0.03 0.02%	8.92 0.02%	0.27 0.02%	7.66 0.00%	0.11 0.02%	8.10 0.00%	0.07 0.00%	0.58 0.00%	0.65 0.00%
Sawtooth oak	52 0.16%	1.0 0.02%	38.5 0.02%	9.8 0.02%	15.7 0.01%	12.1 0.02%	2.5 0.01%	0.04 0.02%	9.96 0.02%	0.30 0.02%	25.74 0.01%	0.13 0.02%	27.23 0.01%	102.90 0.08%	1.26 0.01%	104.16 0.07%
Scarlet oak	16 0.05%	2.1 0.04%	76.0 0.04%	19.4 0.04%	41.9 0.04%	24.0 0.04%	6.7 0.04%	0.07 0.04%	19.66 0.04%	0.60 0.04%	68.56 0.04%	0.25 0.04%	72.52 0.04%	203.19 0.17%	2.49 0.01%	205.68 0.14%
Scotch pine	13 0.04%	4.1 0.07%	150.5 0.07%	38.3 0.07%	56.9 0.05%	47.4 0.07%	9.1 0.05%	0.15 0.07%	38.94 0.07%	1.18 0.07%	93.15 0.05%	0.50 0.07%	98.52 0.05%	0.29 0.00%	37.97 0.16%	38.26 0.03%
Siberian elm	199 0.59%	46.2 0.84%	1,701.6 0.84%	433.4 0.84%	918.3 0.85%	536.5 0.84%	146.6 0.85%	1.64 0.84%	440.37 0.84%	13.36 0.84%	1,503.08 0.85%	5.62 0.84%	1,589.73 0.85%	6.50 0.01%	27.86 0.12%	34.36 0.02%
Silver linden	73 0.22%	0.9 0.02%	32.1 0.02%	8.2 0.02%	23.3 0.02%	10.1 0.02%	3.7 0.02%	0.03 0.02%	8.32 0.02%	0.25 0.02%	38.14 0.02%	0.11 0.02%	40.33 0.02%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Silver maple	407 1.22%	80.1 1.46%	2,951.8 1.46%	751.8 1.46%	2,122.5 1.97%	930.6 1.46%	338.8 1.97%	2.85 1.46%	763.92 1.46%	23.18 1.46%	3,474.08 1.97%	9.75 1.46%	3,674.34 1.97%	11.28 0.01%	773.17 3.27%	784.44 0.54%
Slippery elm	12 0.04%	1.0 0.02%	38.4 0.02%	9.8 0.02%	34.3 0.03%	12.1 0.02%	5.5 0.03%	0.04 0.02%	9.93 0.02%	0.30 0.02%	56.13 0.03%	0.13 0.02%	59.36 0.03%	0.15 0.00%	0.63 0.00%	0.77 0.00%
Smoke tree	11 0.03%	0.4 0.01%	13.0 0.01%	3.3 0.01%	7.0 0.01%	4.1 0.01%	1.1 0.01%	0.01 0.01%	3.37 0.01%	0.10 0.01%	11.43 0.01%	0.04 0.01%	12.08 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Smooth service berry	85 0.25%	0.6 0.01%	22.9 0.01%	5.8 0.01%	15.4 0.01%	7.2 0.01%	2.5 0.01%	0.02 0.01%	5.92 0.01%	0.18 0.01%	25.18 0.01%	0.08 0.01%	26.63 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Smooth sumac	2 0.01%	0.0 0.00%	0.8 0.00%	0.2 0.00%	0.5 0.00%	0.2 0.00%	0.1 0.00%	0.00 0.00%	0.20 0.00%	0.01 0.00%	0.89 0.00%	0.00 0.00%	0.94 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Southern magnolia	3 0.01%	0.1 0.00%	4.1 0.00%	1.0 0.00%	1.1 0.00%	1.3 0.00%	0.2 0.00%	0.00 0.00%	1.07 0.00%	0.03 0.00%	1.87 0.00%	0.01 0.00%	1.98 0.00%	0.02 0.00%	2.00 0.01%	2.02 0.00%
Southwestern redbud	7 0.02%	0.0 0.00%	0.8 0.00%	0.2 0.00%	0.5 0.00%	0.3 0.00%	0.1 0.00%	0.00 0.00%	0.21 0.00%	0.01 0.00%	0.86 0.00%	0.00 0.00%	0.91 0.00%	0.00 0.00%	0.01 0.00%	0.02 0.00%
Staghorn sumac	1 0.00%	0.3 0.01%	10.2 0.01%	2.6 0.01%	3.7 0.00%	3.2 0.01%	0.6 0.00%	0.01 0.01%	2.63 0.01%	0.08 0.01%	6.13 0.00%	0.03 0.01%	6.48 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%



Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
Star magnolia	4 0.01%	0.0 0.00%	0.5 0.00%	0.1 0.00%	0.3 0.00%	0.2 0.00%	0.0 0.00%	0.00 0.00%	0.14 0.00%	0.00 0.00%	0.49 0.00%	0.00 0.00%	0.52 0.00%	0.00 0.00%	0.26 0.00%	0.26 0.00%
Striped maple	1 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.0 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Sugar maple	579 1.73%	86.0 1.57%	3,169.1 1.57%	807.1 1.57%	1,932.8 1.79%	999.1 1.57%	308.5 1.79%	3.06 1.57%	820.16 1.57%	24.88 1.57%	3,163.60 1.79%	10.46 1.57%	3,345.97 1.79%	12.11 0.01%	830.09 3.51%	842.19 0.58%
Swamp white oak	145 0.43%	3.0 0.05%	109.5 0.05%	27.9 0.05%	43.6 0.04%	34.5 0.05%	7.0 0.04%	0.11 0.05%	28.33 0.05%	0.86 0.05%	71.34 0.04%	0.36 0.05%	75.45 0.04%	292.73 0.24%	3.58 0.02%	296.32 0.20%
Sweet cherry	12 0.04%	1.4 0.03%	50.7 0.03%	12.9 0.03%	24.9 0.02%	16.0 0.03%	4.0 0.02%	0.05 0.03%	13.12 0.03%	0.40 0.03%	40.69 0.02%	0.17 0.03%	43.04 0.02%	0.19 0.00%	0.83 0.00%	1.02 0.00%
Sweet mountain pine	3 0.01%	0.1 0.00%	3.6 0.00%	0.9 0.00%	1.4 0.00%	1.1 0.00%	0.2 0.00%	0.00 0.00%	0.94 0.00%	0.03 0.00%	2.29 0.00%	0.01 0.00%	2.42 0.00%	0.01 0.00%	0.92 0.00%	0.93 0.00%
Sweetbay	38 0.11%	0.6 0.01%	22.9 0.01%	5.8 0.01%	6.2 0.01%	7.2 0.01%	1.0 0.01%	0.02 0.01%	5.93 0.01%	0.18 0.01%	10.07 0.01%	0.08 0.01%	10.65 0.01%	0.09 0.00%	11.14 0.05%	11.23 0.01%
Sweetgum	775 2.31%	123.3 2.25%	4,542.4 2.25%	1,156.9 2.25%	3,741.3 3.47%	1,432.1 2.25%	597.2 3.47%	4.38 2.25%	1,175.58 2.25%	35.67 2.25%	6,123.67 3.47%	15.00 2.25%	6,476.67 3.47%	12,320.70 10.11%	2,230.92 9.43%	14,551.62 10.00%
Sycamore maple	23 0.07%	3.7 0.07%	137.9 0.07%	35.1 0.07%	65.4 0.06%	43.5 0.07%	10.4 0.06%	0.13 0.07%	35.69 0.07%	1.08 0.07%	107.11 0.06%	0.46 0.07%	113.29 0.06%	0.53 0.00%	36.12 0.15%	36.65 0.03%
Tamarack	2 0.01%	0.0 0.00%	0.5 0.00%	0.1 0.00%	0.3 0.00%	0.2 0.00%	0.1 0.00%	0.00 0.00%	0.13 0.00%	0.00 0.00%	0.56 0.00%	0.00 0.00%	0.60 0.00%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Tatar maple	89 0.27%	2.3 0.04%	86.2 0.04%	22.0 0.04%	57.6 0.05%	27.2 0.04%	9.2 0.05%	0.08 0.04%	22.31 0.04%	0.68 0.04%	94.22 0.05%	0.28 0.04%	99.66 0.05%	0.33 0.00%	22.58 0.10%	22.91 0.02%
Tree Hardwood	103 0.31%	0.0 0.00%	0.3 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.26 0.00%	0.00 0.00%	0.27 0.00%	0.05 0.00%	0.09 0.00%	0.13 0.00%
Tree of heaven	193 0.58%	30.1 0.55%	1,108.8 0.55%	282.4 0.55%	570.5 0.53%	349.6 0.55%	91.1 0.53%	1.07 0.55%	286.95 0.55%	8.71 0.55%	933.80 0.53%	3.66 0.55%	987.63 0.53%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Trident maple	8 0.02%	0.8 0.01%	28.1 0.01%	7.2 0.01%	7.3 0.01%	8.9 0.01%	1.2 0.01%	0.03 0.01%	7.28 0.01%	0.22 0.01%	11.90 0.01%	0.09 0.01%	12.59 0.01%	0.11 0.00%	7.36 0.03%	7.47 0.01%
Tulip tree	62 0.19%	9.0 0.16%	332.5 0.16%	84.7 0.16%	183.3 0.17%	104.8 0.16%	29.3 0.17%	0.32 0.16%	86.05 0.16%	2.61 0.16%	300.08 0.17%	1.10 0.16%	317.38 0.17%	1.27 0.00%	10.89 0.05%	12.16 0.01%
Turkish hazelnut	54 0.16%	0.4 0.01%	15.4 0.01%	3.9 0.01%	8.0 0.01%	4.8 0.01%	1.3 0.01%	0.01 0.01%	3.97 0.01%	0.12 0.01%	13.08 0.01%	0.05 0.01%	13.84 0.01%	0.06 0.00%	2.26 0.01%	2.32 0.00%
Umbrella magnolia	3 0.01%	0.3 0.01%	12.7 0.01%	3.2 0.01%	6.6 0.01%	4.0 0.01%	1.1 0.01%	0.01 0.01%	3.30 0.01%	0.10 0.01%	10.85 0.01%	0.04 0.01%	11.48 0.01%	0.05 0.00%	6.19 0.03%	6.24 0.00%
Virginia pine	1 0.00%	0.1 0.00%	5.3 0.00%	1.3 0.00%	2.0 0.00%	1.7 0.00%	0.3 0.00%	0.01 0.00%	1.36 0.00%	0.04 0.00%	3.28 0.00%	0.02 0.00%	3.47 0.00%	0.01 0.00%	1.32 0.01%	1.33 0.00%
Water oak	3 0.01%	0.9 0.02%	32.0 0.02%	8.1 0.02%	12.9 0.01%	10.1 0.02%	2.1 0.01%	0.03 0.02%	8.27 0.02%	0.25 0.02%	21.10 0.01%	0.11 0.02%	22.32 0.01%	85.50 0.07%	1.05 0.00%	86.55 0.06%
Weeping willow	3 0.01%	0.4 0.01%	16.1 0.01%	4.1 0.01%	10.1 0.01%	5.1 0.01%	1.6 0.01%	0.02 0.01%	4.16 0.01%	0.13 0.01%	16.56 0.01%	0.05 0.01%	17.51 0.01%	33.62 0.03%	2.11 0.01%	35.73 0.02%
White ash	124 0.37%	6.0 0.11%	222.8 0.11%	56.7 0.11%	172.5 0.16%	70.2 0.11%	27.5 0.16%	0.21 0.11%	57.65 0.11%	1.75 0.11%	282.29 0.16%	0.74 0.11%	298.57 0.16%	0.85 0.00%	3.65 0.02%	4.50 0.00%
White fir	2 0.01%	0.6 0.01%	20.3 0.01%	5.2 0.01%	4.4 0.00%	6.4 0.01%	0.7 0.00%	0.02 0.01%	5.26 0.01%	0.16 0.01%	7.26 0.00%	0.07 0.01%	7.68 0.00%	0.04 0.00%	5.12 0.02%	5.16 0.00%

Species Name	Trees	Pollution Removed (ounce/yr)						Removal Value (\$/yr) <sup>1</sup>						VOC Emission (ounce/yr)		
	Count	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	CO	O3	NO2	<sup>2</sup> PM10	SO2	PM2.5	Isoprene	Mono-terpene	VOCs
White mulberry	338 1.01%	48.4 0.88%	1,783.9 0.88%	454.3 0.88%	940.4 0.87%	562.4 0.88%	150.1 0.87%	1.72 0.88%	461.68 0.88%	14.01 0.88%	1,539.24 0.87%	5.89 0.88%	1,627.97 0.87%	6.81 0.01%	58.41 0.25%	65.22 0.04%
White oak	26 0.08%	3.3 0.06%	123.1 0.06%	31.3 0.06%	75.3 0.07%	38.8 0.06%	12.0 0.07%	0.12 0.06%	31.85 0.06%	0.97 0.06%	123.31 0.07%	0.41 0.06%	130.42 0.07%	329.08 0.27%	4.03 0.02%	333.11 0.23%
White poplar	1 0.00%	0.1 0.00%	4.2 0.00%	1.1 0.00%	3.0 0.00%	1.3 0.00%	0.5 0.00%	0.00 0.00%	1.08 0.00%	0.03 0.00%	4.91 0.00%	0.01 0.00%	5.19 0.00%	11.18 0.01%	0.07 0.00%	11.25 0.01%
White spruce	43 0.13%	14.9 0.27%	549.7 0.27%	140.0 0.27%	105.1 0.10%	173.3 0.27%	16.8 0.10%	0.53 0.27%	142.26 0.27%	4.32 0.27%	172.00 0.10%	1.81 0.27%	181.92 0.10%	146.32 0.12%	138.71 0.59%	285.03 0.20%
Willow oak	1 0.00%	0.0 0.00%	0.9 0.00%	0.2 0.00%	0.5 0.00%	0.3 0.00%	0.1 0.00%	0.00 0.00%	0.23 0.00%	0.01 0.00%	0.75 0.00%	0.00 0.00%	0.79 0.00%	2.34 0.00%	0.03 0.00%	2.36 0.00%
wisteria spp	2 0.01%	0.0 0.00%	0.4 0.00%	0.1 0.00%	0.2 0.00%	0.1 0.00%	0.0 0.00%	0.00 0.00%	0.09 0.00%	0.00 0.00%	0.28 0.00%	0.00 0.00%	0.29 0.00%	0.00 0.00%	0.01 0.00%	0.01 0.00%
Witch hazel	4 0.01%	0.0 0.00%	1.0 0.00%	0.3 0.00%	0.7 0.00%	0.3 0.00%	0.1 0.00%	0.00 0.00%	0.26 0.00%	0.01 0.00%	1.10 0.00%	0.00 0.00%	1.17 0.00%	0.68 0.00%	0.49 0.00%	1.17 0.00%
Yellow birch	1 0.00%	0.1 0.00%	3.0 0.00%	0.8 0.00%	2.7 0.00%	0.9 0.00%	0.4 0.00%	0.00 0.00%	0.77 0.00%	0.02 0.00%	4.40 0.00%	0.01 0.00%	4.65 0.00%	0.01 0.00%	0.10 0.00%	0.11 0.00%
Yellow buckeye	9 0.03%	0.4 0.01%	12.9 0.01%	3.3 0.01%	6.9 0.01%	4.1 0.01%	1.1 0.01%	0.01 0.01%	3.34 0.01%	0.10 0.01%	11.27 0.01%	0.04 0.01%	11.92 0.01%	0.00 0.00%	0.00 0.00%	0.00 0.00%
Yellowwood	14 0.04%	0.5 0.01%	18.4 0.01%	4.7 0.01%	9.7 0.01%	5.8 0.01%	1.6 0.01%	0.02 0.01%	4.77 0.01%	0.14 0.01%	15.90 0.01%	0.06 0.01%	16.81 0.01%	0.07 0.00%	0.60 0.00%	0.67 0.00%
yew spp	24 0.07%	9.4 0.17%	347.0 0.17%	88.4 0.17%	73.3 0.07%	109.4 0.17%	11.7 0.07%	0.33 0.17%	89.80 0.17%	2.72 0.17%	119.91 0.07%	1.15 0.17%	126.82 0.07%	0.66 0.00%	43.78 0.18%	44.44 0.03%
Yoshino flowering cherry	9 0.03%	0.4 0.01%	14.0 0.01%	3.6 0.01%	6.8 0.01%	4.4 0.01%	1.1 0.01%	0.01 0.01%	3.62 0.01%	0.11 0.01%	11.14 0.01%	0.05 0.01%	11.78 0.01%	0.05 0.00%	0.23 0.00%	0.28 0.00%
<b>TOTAL</b>	<b>33,487</b> <b>100.00%</b>	<b>5472.5</b> <b>100.00%</b>	<b>201577.5</b> <b>100.00%</b>	<b>51,338.4</b> <b>100.00%</b>	<b>107,808.3</b> <b>100.00%</b>	<b>63,553.4</b> <b>100.00%</b>	<b>17,209.9</b> <b>100.00%</b>	<b>194.34</b> <b>100.00%</b>	<b>52168.62</b> <b>100.00%</b>	<b>1,582.71</b> <b>100.00%</b>	<b>176,458.1</b> <b>4</b> <b>100.00%</b>	<b>665.55</b> <b>100.00%</b>	<b>186,629.9</b> <b>100.00%</b>	<b>121,914.7</b> <b>7</b> <b>100.00%</b>	<b>23,668.77</b> <b>100.00%</b>	<b>145,583.5</b> <b>4</b> <b>100.00%</b>

<sup>1</sup>Pollution Removal value is calculated based on the prices of \$1136 per ton (CO), \$8282 per ton (O3), \$987 per ton (NO2), \$335 per ton (SO2), \$52377 per ton (PM10), \$347020 per ton (PM2.5)

<sup>2</sup>PM10 consists of particulate matter less than 10 microns and greater than 2.5 microns. As PM2.5 is also estimated, the sum of PM10 and PM2.5 provides the total pollution removal and value for particulate matter less than 10 microns.

# Pittsburgh

## Annual CO<sub>2</sub> Benefits of Public Trees

7/22/2015

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	1,062,437	3,506	-182,164	-39,422	-731	887,315	2,928	1,728,167	5,703(N/A)		10.5	14.9	1.62
maple, red	316,352	1,044	-98,545	-26,142	-411	569,163	1,878	760,829	2,511(N/A)		10.0	6.5	0.75
pear, callery	518,906	1,712	-17,399	-3,401	-69	463,291	1,529	961,398	3,173(N/A)		8.9	8.3	1.07
planetree, London	918,565	3,031	-135,884	-51,387	-618	1,292,939	4,267	2,024,232	6,680(N/A)		8.2	17.4	2.42
linden, littleleaf	296,971	980	-170,485	-31,151	-665	638,914	2,108	734,249	2,423(N/A)		6.7	6.3	1.07
honeylocust	218,315	720	-49,729	-14,356	-211	199,592	659	353,822	1,168(N/A)		5.9	3.0	0.59
oak, pin	759,921	2,508	-119,695	-21,139	-465	561,167	1,852	1,180,254	3,895(N/A)		3.1	10.2	3.76
apple	37,796	125	-7,793	-4,465	-40	60,674	200	86,212	284(N/A)		3.0	0.7	0.28
ginkgo	100,243	331	-15,939	-8,217	-80	156,310	516	232,397	767(N/A)		2.5	2.0	0.90
sweetgum	79,349	262	-19,084	-9,870	-96	254,820	841	305,215	1,007(N/A)		2.3	2.6	1.30
maple, freeman	75,295	248	-19,593	-4,829	-81	114,033	376	164,906	544(N/A)		2.2	1.4	0.73
elm, american	128,379	424	-26,528	-5,643	-106	140,956	465	237,164	783(N/A)		2.2	2.0	1.07
zelkova, Japanese	39,624	131	-5,993	-2,994	-30	104,935	346	135,572	447(N/A)		1.8	1.2	0.75
maple, sugar	99,987	330	-27,916	-5,921	-112	129,296	427	195,447	645(N/A)		1.7	1.7	1.11
maple, hedge	31,877	105	-5,587	-2,281	-26	33,720	111	57,729	191(N/A)		1.7	0.5	0.33
oak, northern red	228,646	755	-39,703	-9,407	-162	270,966	894	450,502	1,487(N/A)		1.7	3.9	2.62
Japanese tree lilac	13,580	45	-1,471	-1,374	-9	17,634	58	28,368	94(N/A)		1.5	0.2	0.19
locust, black	104,831	346	-40,405	-6,780	-156	198,713	656	256,359	846(N/A)		1.4	2.2	1.80
plum	29,926	99	-6,675	-2,040	-29	27,111	89	48,322	159(N/A)		1.3	0.4	0.37
spruce, Colorado	21,785	72	-6,939	-3,847	-36	72,907	241	83,906	277(N/A)		1.2	0.7	0.67
maple, silver	102,128	337	-26,219	-6,338	-107	149,692	494	219,263	724(N/A)		1.2	1.9	1.77
mulberry, white	34,984	115	-12,166	-3,057	-50	67,717	223	87,479	289(N/A)		1.0	0.8	0.85
elm	11,316	37	-1,551	-1,122	-9	10,423	34	19,065	63(N/A)		0.9	0.2	0.22
hawthorn	14,519	48	-3,322	-1,036	-14	13,798	46	23,958	79(N/A)		0.7	0.2	0.32
cedar, northern white	10,897	36	-1,627	-974	-9	10,480	35	18,775	62(N/A)		0.7	0.2	0.26
serviceberry, downy	5,745	19	-764	-561	-4	7,021	23	11,441	38(N/A)		0.7	0.1	0.17
spruce, Norway	10,884	36	-3,581	-1,982	-18	37,886	125	43,208	143(N/A)		0.7	0.4	0.65
ash, green	28,786	95	-5,981	-2,257	-27	62,071	205	82,619	273(N/A)		0.6	0.7	1.26
redbud, eastern	7,736	26	-1,248	-672	-6	8,762	29	14,578	48(N/A)		0.6	0.1	0.23
elm, Siberian	61,168	202	-16,972	-2,408	-64	67,887	224	109,675	362(N/A)		0.6	0.9	1.82
tree-of-heaven	28,099	93	-8,919	-1,799	-35	56,675	187	74,055	244(N/A)		0.6	0.6	1.27
hornbeam, European	6,165	20	-704	-537	-4	6,853	23	11,777	39(N/A)		0.6	0.1	0.21

# Annual CO<sub>2</sub> Benefits of Public Trees

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Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Japanese	10,716	35	-2,245	-682	-10	11,349	37	19,137	63(N/A)		0.5	0.2	0.41
oak, swamp white	6,415	21	-640	-404	-3	7,127	24	12,497	41(N/A)		0.4	0.1	0.28
sycamore, American	41,635	137	-5,848	-2,468	-27	62,984	208	96,303	318(N/A)		0.4	0.8	2.24
maple, miyabei	4,561	15	-469	-493	-3	4,126	14	7,725	25(N/A)		0.4	0.1	0.18
horsechestnut	48,770	161	0	-1,975	-7	31,103	103	77,898	257(N/A)		0.4	0.7	1.99
cherry, cornelian	2,259	7	-247	-252	-2	3,019	10	4,779	16(N/A)		0.4	0.0	0.13
ash, white	20,916	69	-3,571	-1,487	-17	40,628	134	56,485	186(N/A)		0.4	0.5	1.49
hackberry, northern	5,704	19	-962	-458	-5	15,914	53	20,199	67(N/A)		0.4	0.2	0.53
hornbeam, American	5,012	17	-627	-425	-3	5,930	20	9,890	33(N/A)		0.4	0.1	0.26
maple, amur	7,003	23	-1,240	-504	-6	7,509	25	12,769	42(N/A)		0.4	0.1	0.35
pine, eastern white	5,227	17	-1,237	-973	-7	16,701	55	19,717	65(N/A)		0.3	0.2	0.56
ash	16,036	53	-3,105	-1,225	-14	33,691	111	45,398	150(N/A)		0.3	0.4	1.36
cherry, black	21,344	70	-6,024	-1,179	-24	15,644	52	29,785	98(N/A)		0.3	0.3	0.89
cherry, kwanzan	8,762	29	-2,040	-556	-9	7,454	25	13,620	45(N/A)		0.3	0.1	0.43
Unknown	11,096	37	-3,767	-934	-16	20,896	69	27,292	90(N/A)		0.3	0.2	0.87
baldcypress	3,334	11	-300	-351	-2	12,335	41	15,018	50(N/A)		0.3	0.1	0.51
serviceberry, Allegheny	1,339	4	-150	-183	-1	1,873	6	2,879	10(N/A)		0.3	0.0	0.10
dogwood, flowering	4,690	15	-960	-353	-4	4,596	15	7,973	26(N/A)		0.3	0.1	0.28
maple, tatarian	4,625	15	-830	-367	-4	4,903	16	8,331	27(N/A)		0.3	0.1	0.31
cedar, eastern red	4,265	14	-642	-375	-3	4,110	14	7,359	24(N/A)		0.3	0.1	0.29
hemlock, eastern	4,451	15	-711	-387	-4	3,883	13	7,236	24(N/A)		0.3	0.1	0.28
linden, silver	3,334	11	-298	-247	-2	2,900	10	5,690	19(N/A)		0.2	0.0	0.26
dogwood, kousa	2,191	7	-290	-207	-2	2,653	9	4,347	14(N/A)		0.2	0.0	0.20
basswood, American	10,239	34	-3,304	-728	-13	15,362	51	21,570	71(N/A)		0.2	0.2	1.15
tulip tree	6,161	20	-2,126	-447	-8	13,669	45	17,258	57(N/A)		0.2	0.1	0.92
catalpa, northern	7,229	24	-2,503	-648	-10	14,345	47	18,422	61(N/A)		0.2	0.2	1.00
goldenrain tree	3,580	12	-744	-274	-3	3,572	12	6,134	20(N/A)		0.2	0.1	0.36
birch, river	3,081	10	-406	-243	-2	8,572	28	11,003	36(N/A)		0.2	0.1	0.65
magnolia, spp	5,114	17	-958	-344	-4	4,885	16	8,696	29(N/A)		0.2	0.1	0.55
oak, sawtooth	2,411	8	-196	-168	-1	2,706	9	4,753	16(N/A)		0.2	0.0	0.30
hazelnut, Turkish	1,215	4	-68	-130	-1	4,704	16	5,721	19(N/A)		0.2	0.0	0.37
pear	4,758	16	-1,312	-302	-5	4,080	13	7,224	24(N/A)		0.1	0.1	0.50
coffeetree, Kentucky	1,647	5	-248	-142	-1	4,994	16	6,251	21(N/A)		0.1	0.1	0.43
pine, Austrian	2,293	8	-654	-410	-4	7,836	26	9,065	30(N/A)		0.1	0.1	0.65
maple, paperbark	1,291	4	-130	-114	-1	1,349	4	2,396	8(N/A)		0.1	0.0	0.18

# Annual CO<sub>2</sub> Benefits of Public Trees

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boxelder	10,230	34	-1,910	-402	-8	8,777	29	16,694	55(N/A)		0.1	0.1	1.25
honeylocust	4,595	15	-2,059	-424	-8	12,968	43	15,080	50(N/A)		0.1	0.1	1.24
spruce, white	1,428	5	-331	-244	-2	3,707	12	4,560	15(N/A)		0.1	0.0	0.38
redwood, dawn	2,037	7	-374	-159	-2	5,435	18	6,939	23(N/A)		0.1	0.1	0.60
magnolia, sweetbay	662	2	-134	-66	-1	759	3	1,220	4(N/A)		0.1	0.0	0.11
buckeye, Ohio	936	3	0	-121	0	1,529	5	2,345	8(N/A)		0.1	0.0	0.21
hophornbeam, eastern	502	2	-40	-54	0	396	1	805	3(N/A)		0.1	0.0	0.07
elm, Chinese	2,831	9	-459	-170	-2	3,375	11	5,576	18(N/A)		0.1	0.0	0.53
plum, cherry	2,116	7	-477	-145	-2	1,913	6	3,407	11(N/A)		0.1	0.0	0.36
walnut, black	3,359	11	-1,080	-239	-4	7,657	25	9,697	32(N/A)		0.1	0.1	1.10
serviceberry, eastern	973	3	-128	-90	-1	1,174	4	1,929	6(N/A)		0.1	0.0	0.22
chokecherry, common	919	3	-104	-71	-1	845	3	1,589	5(N/A)		0.1	0.0	0.19
tupelo, black	712	2	-108	-65	-1	855	3	1,394	5(N/A)		0.1	0.0	0.17
oak, white	10,073	33	-1,720	-306	-7	7,871	26	15,918	53(N/A)		0.1	0.1	2.02
birch, paper	1,868	6	-251	-136	-1	4,827	16	6,308	21(N/A)		0.1	0.1	0.80
katsura tree	745	2	-121	-67	-1	938	3	1,495	5(N/A)		0.1	0.0	0.19
yew	572	2	-38	-27	0	1,390	5	1,897	6(N/A)		0.1	0.0	0.26
maple, sycamore	6,505	21	-983	-235	-4	5,002	17	10,290	34(N/A)		0.1	0.1	1.48
hardy rubber tree	684	2	-50	-66	0	2,383	8	2,951	10(N/A)		0.1	0.0	0.44
holly, American	335	1	-10	-25	0	379	1	678	2(N/A)		0.1	0.0	0.10
osage-orange	2,613	9	-941	-217	-4	4,846	16	6,301	21(N/A)		0.1	0.1	0.95
Japanese pagoda tree	3,513	12	-1,447	-345	-6	8,158	27	9,880	33(N/A)		0.1	0.1	1.55
oak, English	1,496	5	-291	-88	-1	2,027	7	3,144	10(N/A)		0.1	0.0	0.52
maple	4,691	15	-919	-172	-4	3,616	12	7,216	24(N/A)		0.1	0.1	1.19
corktree, amur	2,796	9	-1,283	-230	-5	5,667	19	6,950	23(N/A)		0.1	0.1	1.21
oak, bur	2,265	7	-246	-89	-1	1,957	6	3,887	13(N/A)		0.1	0.0	0.75
oak, scarlet	4,138	14	-733	-152	-3	3,417	11	6,671	22(N/A)		0.0	0.1	1.38
parrotia, persian	425	1	-44	-43	0	558	2	895	3(N/A)		0.0	0.0	0.18
pear, common	3,075	10	-107	-17	0	2,970	10	5,921	20(N/A)		0.0	0.1	1.30
Paradise apple	523	2	-113	-59	-1	797	3	1,148	4(N/A)		0.0	0.0	0.25
rose-of-sharon	413	1	-44	-41	0	536	2	863	3(N/A)		0.0	0.0	0.20
red buckeye	217	1	-12	-32	0	225	1	399	1(N/A)		0.0	0.0	0.09
yellowwood	566	2	-71	-48	0	669	2	1,116	4(N/A)		0.0	0.0	0.26
oak, chinkapin	1,008	3	-92	-47	0	997	3	1,867	6(N/A)		0.0	0.0	0.44
pine, scotch	643	2	-190	-126	-1	2,226	7	2,553	8(N/A)		0.0	0.0	0.65

# Annual CO<sub>2</sub> Benefits of Public Trees

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cherry, sweet	2,322	8	-734	-128	-3	1,741	6	3,200	11(N/A)	0.0	0.0	0.88	
elm, slippery	2,820	9	-734	-115	-3	3,117	10	5,088	17(N/A)	0.0	0.0	1.40	
mulberry, red	2,174	7	-487	-204	-2	4,679	15	6,162	20(N/A)	0.0	0.1	1.69	
smoketree, common	448	1	-116	-58	-1	778	3	1,052	3(N/A)	0.0	0.0	0.32	
beech, European	1,545	5	-392	-75	-2	1,817	6	2,894	10(N/A)	0.0	0.0	0.87	
birch, gray	685	2	-131	-57	-1	1,013	3	1,510	5(N/A)	0.0	0.0	0.45	
Amur maaackia	202	1	-11	-27	0	199	1	362	1(N/A)	0.0	0.0	0.12	
oak, black	2,530	8	-417	-123	-2	3,626	12	5,615	19(N/A)	0.0	0.0	1.85	
cherry, higan	854	3	-180	-58	-1	778	3	1,394	5(N/A)	0.0	0.0	0.46	
maple, black	2,561	8	-439	-138	-2	2,896	10	4,879	16(N/A)	0.0	0.0	1.61	
cottonwood, eastern	2,474	8	-1,118	-148	-4	4,114	14	5,322	18(N/A)	0.0	0.0	1.76	
mimosa	921	3	-254	-57	-1	789	3	1,399	5(N/A)	0.0	0.0	0.46	
cherry, pin	800	3	-149	-43	-1	547	2	1,155	4(N/A)	0.0	0.0	0.38	
buckeye, yellow	518	2	0	-37	0	498	2	979	3(N/A)	0.0	0.0	0.36	
cherry, yoshino flowerir	1,206	4	-284	-62	-1	818	3	1,678	6(N/A)	0.0	0.0	0.62	
fir, douglas	445	1	-119	-73	-1	1,343	4	1,595	5(N/A)	0.0	0.0	0.66	
maple, trident	510	2	-94	-35	0	545	2	926	3(N/A)	0.0	0.0	0.38	
falsecypress, Japanese	93	0	-12	-21	0	199	1	259	1(N/A)	0.0	0.0	0.12	
willow, corkscrew	974	3	-421	-80	-2	1,904	6	2,377	8(N/A)	0.0	0.0	1.12	
peach	392	1	-68	-31	0	412	1	706	2(N/A)	0.0	0.0	0.33	
redbud, southwestern	97	0	-5	-15	0	103	0	180	1(N/A)	0.0	0.0	0.08	
butternut	1,114	4	-285	-64	-1	2,117	7	2,882	10(N/A)	0.0	0.0	1.59	
hickory, bitternut	1,239	4	-615	-71	-2	2,024	7	2,578	9(N/A)	0.0	0.0	1.42	
blackhaw	96	0	-9	-11	0	136	0	211	1(N/A)	0.0	0.0	0.12	
poplar, black	469	2	-53	-34	0	1,223	4	1,605	5(N/A)	0.0	0.0	0.88	
beech, American	248	1	-27	-19	0	699	2	901	3(N/A)	0.0	0.0	0.59	
willow, black	763	3	-340	-70	-1	1,606	5	1,959	6(N/A)	0.0	0.0	1.29	
willow, pussy	320	1	-117	-37	-1	464	2	630	2(N/A)	0.0	0.0	0.52	
witchhazel	54	0	-5	-7	0	79	0	121	0(N/A)	0.0	0.0	0.10	
magnolia, star	54	0	-5	-7	0	79	0	121	0(N/A)	0.0	0.0	0.10	
magnolia, cucumbertree	219	1	-25	-21	0	186	1	359	1(N/A)	0.0	0.0	0.30	
walnut, English	402	1	-49	-27	0	979	3	1,304	4(N/A)	0.0	0.0	1.08	
dogwood, roughleaf	62	0	-3	-9	0	64	0	114	0(N/A)	0.0	0.0	0.09	
oak	106	0	-8	-8	0	132	0	222	1(N/A)	0.0	0.0	0.24	
smoketree, American	78	0	-8	-8	0	102	0	164	1(N/A)	0.0	0.0	0.18	



# Annual CO<sub>2</sub> Benefits of Public Trees

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pine, mugo	36	0	0	-3	0	47	0	79	0 (N/A)	0.0	0.0	0.09	
oak, water	1,057	3	-343	-39	-1	1,009	3	1,684	6 (N/A)	0.0	0.0	1.85	
spruce, white	35	0	-2	-6	0	39	0	66	0 (N/A)	0.0	0.0	0.07	
magnolia, southern	89	0	-11	-9	0	132	0	201	1 (N/A)	0.0	0.0	0.22	
pawpaw	108	0	-12	-10	0	137	0	223	1 (N/A)	0.0	0.0	0.24	
cedar, atlas	90	0	-11	-9	0	80	0	150	0 (N/A)	0.0	0.0	0.17	
willow, weeping	406	1	-97	-35	0	815	3	1,088	4 (N/A)	0.0	0.0	1.20	
olive, Russian	460	2	-139	-25	-1	349	1	644	2 (N/A)	0.0	0.0	0.71	
hawthorn, green	108	0	-12	-10	0	137	0	223	1 (N/A)	0.0	0.0	0.24	
magnolia, Chinese ; mag	178	1	-32	-14	0	183	1	316	1 (N/A)	0.0	0.0	0.35	
magnolia, umbrella	382	1	-130	-25	-1	546	2	773	3 (N/A)	0.0	0.0	0.85	
buckthorn, common	48	0	-4	-6	0	68	0	106	0 (N/A)	0.0	0.0	0.12	
cedar, atlantic white	35	0	-2	-6	0	39	0	66	0 (N/A)	0.0	0.0	0.07	
snowbell, Japanese	18	0	-1	-2	0	8	0	24	0 (N/A)	0.0	0.0	0.04	
sumac, smooth	12	0	0	-2	0	22	0	32	0 (N/A)	0.0	0.0	0.05	
fir, white	43	0	-8	-8	0	102	0	129	0 (N/A)	0.0	0.0	0.21	
apricot, mammee	54	0	-3	-7	0	51	0	96	0 (N/A)	0.0	0.0	0.16	
ash, American mountain	385	1	-83	-23	0	433	1	712	2 (N/A)	0.0	0.0	1.17	
plum, black	31	0	-2	-5	0	32	0	57	0 (N/A)	0.0	0.0	0.09	
fir, balsam	130	0	-24	-23	0	423	1	506	2 (N/A)	0.0	0.0	0.84	
sassafras	225	1	-71	-18	0	434	1	569	2 (N/A)	0.0	0.0	0.94	
chestnut, Chinese	167	1	-35	-14	0	262	1	380	1 (N/A)	0.0	0.0	0.63	
birch, European white	225	1	-71	-18	0	434	1	569	2 (N/A)	0.0	0.0	0.94	
ash, European mountain	142	0	-28	-10	0	137	0	242	1 (N/A)	0.0	0.0	0.40	
goldenchain tree	42	0	-4	-5	0	57	0	90	0 (N/A)	0.0	0.0	0.15	
wisteria, American	109	0	-12	-10	0	93	0	180	1 (N/A)	0.0	0.0	0.30	
larch, American	30	0	-2	-7	0	61	0	82	0 (N/A)	0.0	0.0	0.13	
spruce, Engelmann	27	0	-2	-3	0	26	0	48	0 (N/A)	0.0	0.0	0.16	
filbert, American	6	0	0	-1	0	11	0	16	0 (N/A)	0.0	0.0	0.05	
hickory, pignut	303	1	-117	-16	0	453	1	624	2 (N/A)	0.0	0.0	2.06	
maple, striped	7	0	0	-1	0	4	0	9	0 (N/A)	0.0	0.0	0.03	
plum, American	36	0	-4	-3	0	46	0	74	0 (N/A)	0.0	0.0	0.24	
birch, yellow	204	1	-48	-11	0	392	1	536	2 (N/A)	0.0	0.0	1.77	
pine, Japanese white	15	0	-1	-3	0	31	0	41	0 (N/A)	0.0	0.0	0.13	
snowbell, American	27	0	-2	-3	0	26	0	48	0 (N/A)	0.0	0.0	0.16	

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lilac, common	6	0	0	-1	0	11	0	16	0 (N/A)		0.0	0.0	0.05
pine, red	41	0	-8	-7	0	99	0	125	0 (N/A)		0.0	0.0	0.41
pine, lacebark	27	0	-2	-3	0	26	0	48	0 (N/A)		0.0	0.0	0.16
pecan	192	1	-42	-11	0	217	1	356	1 (N/A)		0.0	0.0	1.17
pine, Virginia	192	1	-42	-11	0	217	1	356	1 (N/A)		0.0	0.0	1.17
filbert, Turkish	27	0	-2	-3	0	26	0	48	0 (N/A)		0.0	0.0	0.16
serviceberry, dwarf	4	0	0	-1	0	7	0	9	0 (N/A)		0.0	0.0	0.03
boxwood	4	0	0	-1	0	7	0	9	0 (N/A)		0.0	0.0	0.03
fringetree, white	6	0	0	-1	0	7	0	12	0 (N/A)		0.0	0.0	0.04
fir, fraser	82	0	-11	-7	0	67	0	132	0 (N/A)		0.0	0.0	0.43
barberry, Japanese	4	0	0	-1	0	7	0	9	0 (N/A)		0.0	0.0	0.03
apple, common	82	0	-11	-7	0	67	0	132	0 (N/A)		0.0	0.0	0.43
poplar, white	360	1	-225	-21	-1	546	2	660	2 (N/A)		0.0	0.0	2.18
elderberry, American	4	0	0	-1	0	7	0	9	0 (N/A)		0.0	0.0	0.03
silverbell, Carolina	36	0	-4	-3	0	46	0	74	0 (N/A)		0.0	0.0	0.24
fringetree, Chinese	4	0	0	-1	0	7	0	9	0 (N/A)		0.0	0.0	0.03
cherry, sargent	107	0	-24	-7	0	92	0	167	1 (N/A)		0.0	0.0	0.55
oak, willow	141	0	-23	-7	0	141	0	252	1 (N/A)		0.0	0.0	0.83
sumac, staghorn	192	1	-42	-11	0	217	1	356	1 (N/A)		0.0	0.0	1.17
Citywide total	5,814,956	19,189	-1,155,807	-305,143	-4,821	7,262,706	23,967	11,616,712	38,335 (N/A)		100.0	100.0	1.14

# Pittsburgh

## Stored CO2 Benefits of Public Trees

7/23/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	16,016,380	52,854	(N/A)	10.5	13.4	14.97
maple, red	4,732,671	15,618	(N/A)	10.0	3.9	4.64
pear, callery	3,815,474	12,591	(N/A)	8.9	3.2	4.23
planetree, London	28,524,134	94,130	(N/A)	8.2	23.8	34.09
linden, littleleaf	9,334,158	30,803	(N/A)	6.7	7.8	13.63
honeylocust	2,404,764	7,936	(N/A)	5.9	2.0	4.01
oak, pin	19,655,285	64,862	(N/A)	3.1	16.4	62.55
apple	617,143	2,037	(N/A)	3.0	0.5	2.00
ginkgo	2,250,602	7,427	(N/A)	2.5	1.9	8.70
sweetgum	1,923,783	6,348	(N/A)	2.3	1.6	8.17
maple, freeman	1,083,628	3,576	(N/A)	2.2	0.9	4.77
elm, american	2,161,569	7,133	(N/A)	2.2	1.8	9.77
zelkova, Japanese	281,047	927	(N/A)	1.8	0.2	1.56
maple, sugar	2,252,542	7,433	(N/A)	1.7	1.9	12.79
maple, hedge	262,080	865	(N/A)	1.7	0.2	1.50
oak, northern red	6,868,748	22,667	(N/A)	1.7	5.7	39.98
Japanese tree lilac	65,672	217	(N/A)	1.5	0.1	0.43
locust, black	2,667,273	8,802	(N/A)	1.4	2.2	18.77
plum	360,727	1,190	(N/A)	1.3	0.3	2.77
spruce, Colorado	448,422	1,480	(N/A)	1.2	0.4	3.56
maple, silver	4,422,456	14,594	(N/A)	1.2	3.7	35.68
mulberry, white	761,698	2,514	(N/A)	1.0	0.6	7.44
elm	69,253	229	(N/A)	0.9	0.1	0.80
hawthorn	148,306	489	(N/A)	0.7	0.1	1.96
cedar, northern whi	72,641	240	(N/A)	0.7	0.1	1.01
serviceberry, downy	34,103	113	(N/A)	0.7	0.0	0.51
spruce, Norway	238,720	788	(N/A)	0.7	0.2	3.58
ash, green	513,796	1,696	(N/A)	0.6	0.4	7.85
redbud, eastern	55,702	184	(N/A)	0.6	0.0	0.88
elm, Siberian	1,087,644	3,589	(N/A)	0.6	0.9	18.04
tree-of-heaven	506,108	1,670	(N/A)	0.6	0.4	8.65
hornbeam, Europea	31,428	104	(N/A)	0.6	0.0	0.55
maple, Japanese	100,243	331	(N/A)	0.5	0.1	2.16
oak, swamp white	73,222	242	(N/A)	0.4	0.1	1.67
sycamore, America	1,180,257	3,895	(N/A)	0.4	1.0	27.43
maple, miyabei	20,925	69	(N/A)	0.4	0.0	0.50
horsechestnut	0	0	(N/A)	0.4	0.0	0.00
cherry, cornelian	11,020	36	(N/A)	0.4	0.0	0.29
ash, white	404,779	1,336	(N/A)	0.4	0.3	10.69
hackberry, northern	42,937	142	(N/A)	0.4	0.0	1.13
hornbeam, America	28,004	92	(N/A)	0.4	0.0	0.75
maple, amur	55,336	183	(N/A)	0.4	0.0	1.53
pine, eastern white	115,047	380	(N/A)	0.3	0.1	3.24
ash	289,213	954	(N/A)	0.3	0.2	8.68
cherry, black	488,489	1,612	(N/A)	0.3	0.4	14.65
cherry, kwanzan	106,739	352	(N/A)	0.3	0.1	3.35
Unknown	217,428	718	(N/A)	0.3	0.2	6.90
baldcypress	26,900	89	(N/A)	0.3	0.0	0.91
serviceberry, Alleg	6,708	22	(N/A)	0.3	0.0	0.24
dogwood, flowering	42,851	141	(N/A)	0.3	0.0	1.50
maple, tatarian	37,054	122	(N/A)	0.3	0.0	1.37
cedar, eastern red	28,654	95	(N/A)	0.3	0.0	1.11
hemlock, eastern	31,754	105	(N/A)	0.3	0.0	1.25
linden, silver	13,303	44	(N/A)	0.2	0.0	0.60
dogwood, kousa	12,941	43	(N/A)	0.2	0.0	0.59

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# Stored CO2 Benefits of Public Trees

7/23/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
basswood, America	317,522	1,048	(N/A)	0.2	0.3	16.90
tulip tree	148,874	491	(N/A)	0.2	0.1	7.92
catalpa, northern	181,807	600	(N/A)	0.2	0.2	9.84
goldenrain tree	64,591	213	(N/A)	0.2	0.1	3.74
birch, river	18,142	60	(N/A)	0.2	0.0	1.07
magnolia, spp	54,327	179	(N/A)	0.2	0.0	3.45
oak, sawtooth	8,765	29	(N/A)	0.2	0.0	0.56
hazelnut, Turkish	3,058	10	(N/A)	0.2	0.0	0.20
pear	58,578	193	(N/A)	0.1	0.0	4.03
coffeetree, Kentuck	11,065	37	(N/A)	0.1	0.0	0.76
pine, Austrian	56,382	186	(N/A)	0.1	0.0	4.04
maple, paperbark	5,790	19	(N/A)	0.1	0.0	0.43
boxelder	150,223	496	(N/A)	0.1	0.1	11.27
honeylocust	150,431	496	(N/A)	0.1	0.1	12.41
spruce, white	14,755	49	(N/A)	0.1	0.0	1.22
redwood, dawn	16,706	55	(N/A)	0.1	0.0	1.45
magnolia, sweetbay	6,002	20	(N/A)	0.1	0.0	0.52
buckeye, Ohio	0	0	(N/A)	0.1	0.0	0.00
hophornbeam, easte	1,787	6	(N/A)	0.1	0.0	0.16
elm, Chinese	20,505	68	(N/A)	0.1	0.0	1.93
plum, cherry	21,295	70	(N/A)	0.1	0.0	2.27
walnut, black	61,721	204	(N/A)	0.1	0.1	7.02
serviceberry, easter	5,706	19	(N/A)	0.1	0.0	0.65
chokecherry, comm	12,493	41	(N/A)	0.1	0.0	1.47
tupelo, black	4,810	16	(N/A)	0.1	0.0	0.59
oak, white	231,148	763	(N/A)	0.1	0.2	29.34
birch, paper	11,186	37	(N/A)	0.1	0.0	1.42
katsura tree	5,405	18	(N/A)	0.1	0.0	0.69
yew	8,272	27	(N/A)	0.1	0.0	1.14
maple, sycamore	102,491	338	(N/A)	0.1	0.1	14.71
hardy rubber tree	2,215	7	(N/A)	0.1	0.0	0.33
holly, American	2,181	7	(N/A)	0.1	0.0	0.33
osage-orange	48,924	161	(N/A)	0.1	0.0	7.34
Japanese pagoda tre	125,357	414	(N/A)	0.1	0.1	19.70
oak, English	32,853	108	(N/A)	0.1	0.0	5.42
maple	78,460	259	(N/A)	0.1	0.1	12.95
corktree, amur	57,274	189	(N/A)	0.1	0.0	9.95
oak, bur	43,802	145	(N/A)	0.1	0.0	8.50
oak, scarlet	69,798	230	(N/A)	0.0	0.1	14.40
parrotia, persian	1,971	7	(N/A)	0.0	0.0	0.41
pear, common	23,474	77	(N/A)	0.0	0.0	5.16
Paradise apple	7,463	25	(N/A)	0.0	0.0	1.64
rose-of-sharon	1,951	6	(N/A)	0.0	0.0	0.46
red buckeye	523	2	(N/A)	0.0	0.0	0.12
yellowwood	3,150	10	(N/A)	0.0	0.0	0.74
oak, chinkapin	16,464	54	(N/A)	0.0	0.0	3.88
pine, scotch	13,930	46	(N/A)	0.0	0.0	3.54
cherry, sweet	48,467	160	(N/A)	0.0	0.0	13.33
elm, slippery	47,996	158	(N/A)	0.0	0.0	13.20
mulberry, red	84,859	280	(N/A)	0.0	0.1	23.34
smoketree, commor	10,547	35	(N/A)	0.0	0.0	3.16
beech, European	17,512	58	(N/A)	0.0	0.0	5.25
birch, gray	5,848	19	(N/A)	0.0	0.0	1.75
Amur maackia	511	2	(N/A)	0.0	0.0	0.17
oak, black	51,353	169	(N/A)	0.0	0.0	16.95
cherry, higan	8,027	26	(N/A)	0.0	0.0	2.65
maple, black	72,719	240	(N/A)	0.0	0.1	24.00
cottonwood, easterr	63,399	209	(N/A)	0.0	0.1	20.92

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# Stored CO2 Benefits of Public Trees

7/23/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
mimosa	11,354	37	(N/A)	0.0	0.0	3.75
cherry, pin	14,501	48	(N/A)	0.0	0.0	4.79
buckeye, yellow	0	0	(N/A)	0.0	0.0	0.00
cherry, yoshino flov	20,521	68	(N/A)	0.0	0.0	7.52
fir, douglas	8,029	26	(N/A)	0.0	0.0	3.31
maple, trident	4,193	14	(N/A)	0.0	0.0	1.73
falsecypress, Japan	527	2	(N/A)	0.0	0.0	0.25
willow, corkscrew	18,791	62	(N/A)	0.0	0.0	8.86
peach	3,017	10	(N/A)	0.0	0.0	1.42
redbud, southweste	227	1	(N/A)	0.0	0.0	0.11
butternut	12,736	42	(N/A)	0.0	0.0	7.00
hickory, bitternut	27,443	91	(N/A)	0.0	0.0	15.09
blackhaw	389	1	(N/A)	0.0	0.0	0.21
poplar, black	2,367	8	(N/A)	0.0	0.0	1.30
beech, American	1,191	4	(N/A)	0.0	0.0	0.79
willow, black	25,964	86	(N/A)	0.0	0.0	17.14
willow, pussy	13,062	43	(N/A)	0.0	0.0	10.78
witchhazel	204	1	(N/A)	0.0	0.0	0.17
magnolia, star	204	1	(N/A)	0.0	0.0	0.17
magnolia, cucumbe	1,099	4	(N/A)	0.0	0.0	0.91
walnut, English	2,200	7	(N/A)	0.0	0.0	1.81
dogwood, roughleaf	149	0	(N/A)	0.0	0.0	0.12
oak	354	1	(N/A)	0.0	0.0	0.39
smoketree, America	359	1	(N/A)	0.0	0.0	0.40
pine, mugo	89	0	(N/A)	0.0	0.0	0.10
oak, water	15,331	51	(N/A)	0.0	0.0	16.86
spruce, white	78	0	(N/A)	0.0	0.0	0.09
magnolia, southern	490	2	(N/A)	0.0	0.0	0.54
pawpaw	524	2	(N/A)	0.0	0.0	0.58
cedar, atlas	484	2	(N/A)	0.0	0.0	0.53
willow, weeping	11,274	37	(N/A)	0.0	0.0	12.40
olive, Russian	6,225	21	(N/A)	0.0	0.0	6.85
hawthorn, green	524	2	(N/A)	0.0	0.0	0.58
magnolia, Chinese ;	1,421	5	(N/A)	0.0	0.0	1.56
magnolia, umbrella	5,825	19	(N/A)	0.0	0.0	6.41
buckthorn, commor	194	1	(N/A)	0.0	0.0	0.21
cedar, atlantic white	78	0	(N/A)	0.0	0.0	0.09
snowbell, Japanese	31	0	(N/A)	0.0	0.0	0.05
sumac, smooth	20	0	(N/A)	0.0	0.0	0.03
fir, white	362	1	(N/A)	0.0	0.0	0.60
apricot, mammee	143	0	(N/A)	0.0	0.0	0.24
ash, American mou	3,725	12	(N/A)	0.0	0.0	6.15
plum, black	75	0	(N/A)	0.0	0.0	0.12
fir, balsam	3,773	12	(N/A)	0.0	0.0	6.23
sassafras	3,180	10	(N/A)	0.0	0.0	5.25
chestnut, Chinese	1,564	5	(N/A)	0.0	0.0	2.58
birch, European wh	3,180	10	(N/A)	0.0	0.0	5.25
ash, European mou	1,246	4	(N/A)	0.0	0.0	2.06
goldenchain tree	185	1	(N/A)	0.0	0.0	0.30
wisteria, American	549	2	(N/A)	0.0	0.0	0.91
larch, American	107	0	(N/A)	0.0	0.0	0.18
spruce, Engelmann	72	0	(N/A)	0.0	0.0	0.24
filbert, American	10	0	(N/A)	0.0	0.0	0.03
hickory, pignut	5,203	17	(N/A)	0.0	0.0	17.17
maple, striped	17	0	(N/A)	0.0	0.0	0.06
plum, American	175	1	(N/A)	0.0	0.0	0.58
birch, yellow	2,144	7	(N/A)	0.0	0.0	7.08
pine, Japanese whit	53	0	(N/A)	0.0	0.0	0.18

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# Stored CO2 Benefits of Public Trees

7/23/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
snowbell, American	72	0	(N/A)	0.0	0.0	0.24
lilac, common	10	0	(N/A)	0.0	0.0	0.03
pine, red	360	1	(N/A)	0.0	0.0	1.19
pine, lacebark	72	0	(N/A)	0.0	0.0	0.24
pecan	1,862	6	(N/A)	0.0	0.0	6.15
pine, Virginia	1,862	6	(N/A)	0.0	0.0	6.15
filbert, Turkish	72	0	(N/A)	0.0	0.0	0.24
serviceberry, dwarf	3	0	(N/A)	0.0	0.0	0.01
boxwood	3	0	(N/A)	0.0	0.0	0.01
fringetree, white	14	0	(N/A)	0.0	0.0	0.05
fir, fraser	478	2	(N/A)	0.0	0.0	1.58
barberry, Japanese	3	0	(N/A)	0.0	0.0	0.01
apple, common	478	2	(N/A)	0.0	0.0	1.58
poplar, white	10,044	33	(N/A)	0.0	0.0	33.14
elderberry, American	3	0	(N/A)	0.0	0.0	0.01
silverbell, Carolina	175	1	(N/A)	0.0	0.0	0.58
fringetree, Chinese	3	0	(N/A)	0.0	0.0	0.01
cherry, sargent	1,072	4	(N/A)	0.0	0.0	3.54
oak, willow	1,025	3	(N/A)	0.0	0.0	3.38
sumac, staghorn	1,862	6	(N/A)	0.0	0.0	6.15
Citywide total	119,953,329	395,846	(N/A)	100.0	100.0	11.79

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## *Value of Energy Benefits by Species*

Species	Benefits	Trees	Benefits Per Tree
Alaska cedar	\$0	4	\$0.00
American basswood	\$309	62	\$4.99
American beech	\$0	5	\$0.00
American elm	\$1,569	729	\$2.15
American hazelnut	\$0	1	\$0.00
American holly	\$0	22	\$0.00
American hornbeam	\$38	123	\$0.31
American mountain ash	\$0	2	\$0.00
American plum	\$0	1	\$0.00
American smoketree	\$0	3	\$0.00
American snowbell	\$0	1	\$0.00
American sycamore	\$911	142	\$6.42
Amur corktree	\$30	19	\$1.58
Amur maackia	-\$5	12	-\$0.45
Amur maple	\$69	119	\$0.58
apple spp (Genus)	\$180	1,017	\$0.18
ash spp (Genus)	\$583	110	\$5.30
Atlantic white cedar	\$0	3	\$0.00
Atlas cedar	\$0	3	\$0.00
Austrian pine	\$209	46	\$4.55
bald cypress	\$15	106	\$0.15
balsam fir	\$16	2	\$8.23
beaked hazelnut	\$0	1	\$0.01
bitternut hickory	\$28	6	\$4.61
black cherry	\$451	110	\$4.10
black haw	\$0	6	\$0.00
black locust	\$2,590	469	\$5.52
black maple	-\$1	11	-\$0.10
black oak	\$82	10	\$8.19
black poplar	\$8	6	\$1.32
black tupelo	\$0	27	\$0.00
black walnut	\$16	29	\$0.54
black willow	\$6	5	\$1.15
blue spruce	\$4,336	416	\$10.42
boxelder	\$54	44	\$1.22
boxwood spp (Genus)	\$0	1	\$0.00
bur oak	\$43	17	\$2.52
butternut	-\$3	6	-\$0.46
Callery pear	\$5,128	2,974	\$1.72
Canada plum	\$0	2	\$0.00

Species	Benefits	Trees	Benefits Per Tree
cherry plum	\$7	31	\$0.23
Chinese chestnut	\$0	2	\$0.00
Chinese elm	\$45	35	\$1.30
Chinese fringe tree	\$0	1	\$0.00
chinkapin oak	-\$2	14	-\$0.17
common chokecherry	\$3	28	\$0.10
common elderberry	\$0	1	\$0.00
common lilac	\$0	1	\$0.00
common pear	\$32	15	\$2.14
corkscrew willow	\$17	7	\$2.37
Cornelian cherry	-\$3	115	-\$0.02
cucumber tree	\$4	4	\$0.94
dawn redwood	\$60	30	\$2.01
Douglas fir	\$141	8	\$17.61
downy serviceberry	\$66	214	\$0.31
eastern cottonwood	\$102	10	\$10.20
eastern hemlock	\$169	84	\$2.01
eastern hophornbeam	-\$5	36	-\$0.14
eastern red cedar	\$310	85	\$3.64
eastern redbud	-\$8	208	-\$0.04
eastern service berry	\$1	29	\$0.02
eastern white pine	\$711	116	\$6.13
elm spp (Genus)	\$260	292	\$0.89
Engelmann spruce	\$0	1	\$0.00
English oak	\$5	20	\$0.27
English walnut	\$0	4	\$0.00
European beech	\$1	11	\$0.11
European buckthorn	\$0	3	\$0.00
European hornbeam	\$16	188	\$0.08
European mountain ash	\$0	2	\$0.00
European white birch	\$0	2	\$0.00
flowering dogwood	-\$3	94	-\$0.03
Fraser fir	\$0	1	\$0.00
Freeman maple	\$1,218	750	\$1.62
fringe tree	\$0	1	\$0.00
ginkgo	\$2,993	852	\$3.51
golden-chain tree	\$0	2	\$0.00
goldenrain tree	\$79	57	\$1.38
gray birch	\$16	11	\$1.46
green ash	\$671	214	\$3.14
green hawthorn	-\$2	3	-\$0.66
hardy rubber tree	\$10	20	\$0.49

Species	Benefits	Trees	Benefits Per Tree
hawthorn spp (Genus)	\$138	250	\$0.55
hedge maple	\$113	575	\$0.20
Higan cherry	\$0	10	\$0.00
honeylocust	\$3,861	2020	\$5.05
horsechestnut	\$443	129	\$3.44
Japanese barberry	\$0	1	\$0.00
Japanese maple	\$93	153	\$0.61
Japanese pagoda tree	\$55	21	\$2.61
Japanese snowbell	\$0	2	\$0.00
Japanese tree lilac	\$18	505	\$0.04
Japanese white pine	\$0	1	\$0.00
Japanese zelkova	\$385	593	\$0.65
Katsura tree	-\$3	26	-\$0.10
Kentucky coffeetree	\$16	48	\$0.33
Kousa dogwood	-\$6	72	-\$0.09
Kwanzan cherry	\$44	105	\$0.41
lacebark pine	\$0	1	\$0.00
littleleaf linden	\$8,831	2254	\$3.92
London planetree	\$16,658	2757	\$6.04
maple spp (Genus)	\$16	20	\$0.79
mimosa	\$0	10	\$0.04
Miyabe's maple	-\$9	138	-\$0.06
mountain silverbell	\$0	1	\$0.00
northern catalpa	\$189	61	\$3.10
northern hackberry	\$40	125	\$0.32
northern red oak	\$3,312	568	\$5.83
northern white cedar	\$661	233	\$2.84
Norway maple	\$10,233	3515	\$2.91
Norway spruce	\$2,147	220	\$9.76
oak spp (Genus)	\$0	3	\$0.00
Ohio buckeye	-\$2	37	-\$0.05
osage orange	\$75	22	\$3.41
paper birch	\$8	26	\$0.31
paperbark maple	-\$2	44	-\$0.04
paradise apple	-\$1	16	-\$0.03
pawpaw	\$0	3	\$0.00
peach	\$0	7	\$0.00
pear spp (Genus)	\$73	48	\$1.53
pecan	\$0	1	\$0.00
Persian ironwood	\$4	18	\$0.25
pignut hickory	\$25	1	\$24.83
pin cherry	\$0	10	-\$0.02

Species	Benefits	Trees	Benefits Per Tree
pin oak	\$7,857	1,026	\$7.66
plum spp (Genus)	\$100	429	\$0.23
pussy willow	\$0	4	\$0.00
red buckeye	\$0	14	\$0.00
red maple	\$6,389	3,355	\$1.90
red mulberry	\$89	12	\$7.38
red pine	\$0	1	\$0.00
river birch	\$82	56	\$1.46
rose of Sharon	\$0	14	\$0.00
roughleaf dogwood	\$0	4	\$0.00
Russian olive	\$0	3	\$0.00
Sargent cherry	\$0	1	\$0.00
sassafras	\$0	2	\$0.00
saucer magnolia	\$43	55	\$0.79
Sawara false cypress	\$0	7	\$0.00
sawtooth oak	\$54	52	\$1.04
scarlet oak	\$65	16	\$4.07
Scotch pine	\$137	13	\$10.57
Siberian elm	\$893	199	\$4.49
silver linden	-\$8	73	-\$0.11
silver maple	\$2,168	407	\$5.33
slippery elm	\$38	12	\$3.19
smoke tree	\$3	11	\$0.23
smooth service berry	-\$8	85	-\$0.09
smooth sumac	\$0	2	\$0.00
Southern magnolia	\$2	3	\$0.57
Southwestern redbud	\$0	7	\$0.00
Staghorn sumac	\$0	1	\$0.00
star magnolia	\$0	4	\$0.00
striped maple	\$0	1	\$0.00
sugar maple	\$1,717	579	\$2.97
swamp white oak	\$51	145	\$0.35
sweet cherry	\$35	12	\$2.93
sweet mountain pine	\$3	3	\$1.16
sweetbay	\$0	38	\$0.00
sweetgum	\$3,278	775	\$4.23
sycamore maple	\$64	23	\$2.80
Tamarack	\$0	2	\$0.00
Tatar maple	-\$9	89	-\$0.10
Tree Hardwood	\$220	103	\$2.13
tree of heaven	\$668	193	\$3.46
Trident maple	\$10	8	\$1.23

Species	Benefits	Trees	Benefits Per Tree
tulip tree	\$135	62	\$2.18
Turkish hazelnut	\$6	54	\$0.12
umbrella magnolia	\$0	3	\$0.00
Virginia pine	\$37	1	\$37.11
water oak	\$0	3	\$0.00
weeping willow	\$0	3	\$0.00
white ash	\$432	124	\$3.48
white fir	\$0	2	\$0.00
white mulberry	\$715	338	\$2.12
white oak	\$64	26	\$2.47
white poplar	\$13	1	\$12.92
white spruce	\$159	43	\$3.71
willow oak	\$0	1	\$0.00
wisteria spp (Genus)	\$0	2	\$0.00
witch hazel	-\$1	4	-\$0.24
yellow birch	\$0	1	\$0.00
yellow buckeye	-\$1	9	-\$0.07
yellowwood	\$7	14	\$0.47
yew spp (Genus)	\$13	24	\$0.52
Yoshino flowering cherry	-\$10	9	-\$1.09

## *Value of Stormwater Benefits by Species*

<b>Species</b>	<b>Benefits</b>	<b>Trees</b>	<b>Benefits per Tree</b>
Alaska cedar	\$2	4	\$0.55
American basswood	\$404	62	\$6.52
American beech	\$4	5	\$0.85
American elm	\$2,448	729	\$3.36
American hazelnut	\$0	1	\$0.04
American holly	\$10	22	\$0.46
American hornbeam	\$54	123	\$0.44
American mountain ash	\$1	2	\$0.49
American plum	\$3	1	\$2.54
American smoketree	\$0	3	\$0.16
American snowbell	\$0	1	\$0.23
American sycamore	\$1,550	142	\$10.92
Amur corktree	\$62	19	\$3.28
Amur maackia	\$5	12	\$0.42
Amur maple	\$136	119	\$1.14
apple spp	\$679	1017	\$0.67
ash spp	\$0	110	\$0.00
Atlantic white cedar	\$2	3	\$0.82
Atlas cedar	\$12	3	\$3.88
Austrian pine	\$226	46	\$4.92
Baldcypress	\$105	106	\$0.99
Balsam fir	\$36	2	\$17.80
Beaked hazelnut	\$0	1	\$0.23
Bitternut hickory	\$37	6	\$6.17
Black cherry	\$384	110	\$3.49
Black haw	\$1	6	\$0.21
Black locust	\$1,967	469	\$4.19
Black maple	\$51	11	\$4.60
Black oak	\$38	10	\$3.81
Black poplar	\$2	6	\$0.39
Black tupelo	\$13	27	\$0.49
Black walnut	\$142	29	\$4.90
Black willow	\$26	5	\$5.16
Blue spruce	\$3,349	416	\$8.05
Boxelder	\$76	44	\$1.72
boxwood spp	\$0	1	\$0.08
Bur oak	\$30	17	\$1.75
Butternut	\$47	6	\$7.84
Callery pear	\$5,697	2974	\$1.92



<b>Species</b>	<b>Benefits</b>	<b>Trees</b>	<b>Benefits per Tree</b>
Canada plum	\$1	2	\$0.39
Cherry plum	\$27	31	\$0.88
Chinese chestnut	\$9	2	\$4.51
Chinese elm	\$50	35	\$1.42
Chinese fringe tree	\$0	1	\$0.09
Chinkapin oak	\$10	14	\$0.71
Common chokecherry	\$6	28	\$0.20
Common elderberry	\$0	1	\$0.22
Common lilac	\$0	1	\$0.15
Common pear	\$28	15	\$1.85
Corkscrew willow	\$38	7	\$5.49
Cornelian cherry	\$19	115	\$0.16
Cucumber tree	\$8	4	\$1.95
Dawn redwood	\$107	30	\$3.57
Douglas fir	\$98	8	\$12.20
Downy serviceberry	\$56	214	\$0.26
Eastern cottonwood	\$57	10	\$5.67
Eastern hemlock	\$398	84	\$4.74
Eastern hophornbeam	\$6	36	\$0.17
Eastern red cedar	\$241	85	\$2.84
Eastern redbud	\$94	208	\$0.45
Eastern service berry	\$10	29	\$0.34
Eastern white pine	\$711	116	\$6.13
elm spp	\$290	292	\$0.99
Engelmann spruce	\$2	1	\$1.57
English oak	\$24	20	\$1.22
English walnut	\$13	4	\$3.22
European beech	\$21	11	\$1.94
European buckthorn	\$0	3	\$0.12
European hornbeam	\$61	188	\$0.33
European mountain ash	\$1	2	\$0.43
European white birch	\$9	2	\$4.41
Flowering dogwood	\$51	94	\$0.54
Fraser fir	\$3	1	\$2.76
Freeman maple	\$1,621	750	\$2.16
Fringe tree	\$0	1	\$0.32
Ginkgo	\$2,029	852	\$2.38
Golden-chain tree	\$0	2	\$0.09
Goldenrain tree	\$63	57	\$1.10
Gray birch	\$27	11	\$2.48
Green ash	\$401	214	\$1.88

<b>Species</b>	<b>Benefits</b>	<b>Trees</b>	<b>Benefits per Tree</b>
Green hawthorn	\$1	3	\$0.47
Hardy rubber tree	\$6	20	\$0.31
hawthorn spp	\$181	250	\$0.72
Hedge maple	\$497	575	\$0.86
Higan cherry	\$2	10	\$0.20
honeylocust	\$2,368	2020	\$1.17
Horsechestnut	\$724	129	\$5.61
Japanese barberry	\$0	1	\$0.11
Japanese maple	\$135	153	\$0.88
Japanese pagoda tree	\$115	21	\$5.50
Japanese snowbell	\$0	2	\$0.08
Japanese tree lilac	\$117	505	\$0.23
Japanese white pine	\$1	1	\$0.75
Japanese zelkova	\$699	593	\$1.18
Katsura tree	\$11	26	\$0.42
Kentucky coffeetree	\$38	48	\$0.79
Kousa dogwood	\$17	72	\$0.23
Kwanzan cherry	\$66	105	\$0.63
Lacebark pine	\$0	1	\$0.32
Littleleaf linden	\$17,835	2254	\$7.91
London plane	\$31,246	2757	\$11.33
maple spp	\$0	20	\$0.00
Mimosa	\$15	10	\$1.47
Miyabe's Maple	\$76	138	\$0.55
Mountain silverbell	\$0	1	\$0.07
Northern catalpa	\$136	61	\$2.22
Northern hackberry	\$135	125	\$1.08
Northern red oak	\$4,001	568	\$7.04
Northern white cedar	\$415	233	\$1.78
Norway maple	\$18,053	3515	\$5.14
Norway spruce	\$2,324	220	\$10.56
oak spp	\$0	3	\$0.01
Ohio buckeye	\$27	37	\$0.74
Osage orange	\$67	22	\$3.03
Paper birch	\$44	26	\$1.68
Paperbark maple	\$11	44	\$0.24
Paradise apple	\$14	16	\$0.87
Pawpaw	\$1	3	\$0.36
Peach	\$4	7	\$0.50
pear spp	\$71	48	\$1.48
Pecan	\$4	1	\$4.42

<b>Species</b>	<b>Benefits</b>	<b>Trees</b>	<b>Benefits per Tree</b>
Persian ironwood	\$5	18	\$0.26
Pignut hickory	\$4	1	\$4.17
Pin cherry	\$13	10	\$1.26
Pin oak	\$6,905	1026	\$6.73
plum spp	\$278	429	\$0.65
Pussy willow	\$1	4	\$0.31
Red buckeye	\$6	14	\$0.41
Red maple	\$10,011	3355	\$2.98
Red mulberry	\$54	12	\$4.53
Red pine	\$1	1	\$1.28
River birch	\$110	56	\$1.96
Rose-of-Sharon	\$2	14	\$0.12
Roughleaf dogwood	\$1	4	\$0.19
Russian olive	\$1	3	\$0.29
Sargent cherry	\$1	1	\$0.94
Sassafras	\$8	2	\$3.89
Saucer magnolia	\$107	55	\$1.94
Sawara false cypress	\$6	7	\$0.90
Sawtooth oak	\$18	52	\$0.34
Scarlet oak	\$47	16	\$2.96
Scotch pine	\$71	13	\$5.45
Siberian elm	\$1,134	199	\$5.70
Silver linden	\$31	73	\$0.43
Silver maple	\$2,546	407	\$6.25
Slippery elm	\$39	12	\$3.24
Smoke tree	\$8	11	\$0.72
Smooth service berry	\$14	85	\$0.16
Smooth sumac	\$1	2	\$0.32
Southern magnolia	\$1	3	\$0.46
Southwestern redbud	\$1	7	\$0.08
Staghorn sumac	\$5	1	\$4.83
Star magnolia	\$0	4	\$0.09
Striped maple	\$0	1	\$0.00
Sugar maple	\$2,388	579	\$4.12
Swamp white oak	\$50	145	\$0.35
Sweet cherry	\$30	12	\$2.48
Sweet mountain pine	\$2	3	\$0.57
Sweetbay	\$7	38	\$0.19
Sweetgum	\$4,491	775	\$5.80
Sycamore maple	\$90	23	\$3.89
Tamarack	\$1	2	\$0.25

<b>Species</b>	<b>Benefits</b>	<b>Trees</b>	<b>Benefits per Tree</b>
Tatar maple	\$70	89	\$0.78
Tree Hardwood	\$0	103	\$0.00
Tree of heaven	\$672	193	\$3.48
Trident maple	\$10	8	\$1.29
Tulip tree	\$256	62	\$4.13
Turkish hazelnut	\$10	54	\$0.19
Umbrella magnolia	\$9	3	\$2.89
Virginia pine	\$2	1	\$2.48
Water oak	\$15	3	\$5.12
Weeping willow	\$12	3	\$3.84
White ash	\$178	124	\$1.44
White fir	\$7	2	\$3.28
White mulberry	\$1,107	338	\$3.28
White oak	\$77	26	\$2.95
White poplar	\$2	1	\$2.18
White spruce	\$155	43	\$3.61
Willow oak	\$0	1	\$0.45
wisteria spp	\$0	2	\$0.11
Witch hazel	\$1	4	\$0.19
Yellow birch	\$3	1	\$3.24
Yellow buckeye	\$9	9	\$1.00
Yellowwood	\$11	14	\$0.80
yew spp	\$101	24	\$4.19
Yoshino flowering cherry	\$8	9	\$0.91

# Pittsburgh

## Annual Aesthetic/Other Benefits of Public Trees

7/22/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
maple, Norway	181,925	(N/A)	10.5	11.7	51.52
maple, red	154,731	(N/A)	10.0	9.9	46.01
pear, callery	249,993	(N/A)	8.9	16.1	83.97
planetree, London	189,497	(N/A)	8.2	12.2	68.63
linden, littleleaf	57,943	(N/A)	6.7	3.7	25.64
honeylocust	36,236	(N/A)	5.9	2.3	18.32
oak, pin	94,659	(N/A)	3.1	6.1	91.28
apple	13,010	(N/A)	3.0	0.8	12.79
ginkgo	30,568	(N/A)	2.5	2.0	35.79
sweetgum	41,327	(N/A)	2.3	2.7	53.19
maple, freeman	30,176	(N/A)	2.2	1.9	40.23
elm, american	53,192	(N/A)	2.2	3.4	72.87
zelkova, Japanese	39,412	(N/A)	1.8	2.5	66.35
maple, sugar	26,824	(N/A)	1.7	1.7	46.17
maple, hedge	9,472	(N/A)	1.7	0.6	16.47
oak, northern red	32,582	(N/A)	1.7	2.1	57.46
Japanese tree lilac	4,642	(N/A)	1.5	0.3	9.17
locust, black	41,919	(N/A)	1.4	2.7	89.38
plum	4,595	(N/A)	1.3	0.3	10.71
spruce, Colorado	9,582	(N/A)	1.2	0.6	23.03
maple, silver	18,285	(N/A)	1.2	1.2	44.71
mulberry, white	15,174	(N/A)	1.0	1.0	44.89
elm	3,713	(N/A)	0.9	0.2	12.98
hawthorn	2,579	(N/A)	0.7	0.2	10.31
cedar, northern white	3,063	(N/A)	0.7	0.2	12.92
serviceberry, downy	2,001	(N/A)	0.7	0.1	9.01
spruce, Norway	4,973	(N/A)	0.7	0.3	22.61
ash, green	10,520	(N/A)	0.6	0.7	48.70
redbud, eastern	1,994	(N/A)	0.6	0.1	9.58
elm, Siberian	17,546	(N/A)	0.6	1.1	88.17
tree-of-heaven	15,201	(N/A)	0.6	1.0	78.76
hornbeam, European	8,870	(N/A)	0.6	0.6	47.18
maple, Japanese	2,860	(N/A)	0.5	0.2	18.70
oak, swamp white	5,386	(N/A)	0.4	0.3	37.14
sycamore, American	9,299	(N/A)	0.4	0.6	65.49
maple, miyabei	1,690	(N/A)	0.4	0.1	12.24
horsechestnut	7,563	(N/A)	0.4	0.5	58.63
cherry, cornelian	1,082	(N/A)	0.4	0.1	8.59
ash, white	6,420	(N/A)	0.4	0.4	51.36
hackberry, northern	7,293	(N/A)	0.4	0.5	58.34
hornbeam, American	5,844	(N/A)	0.4	0.4	47.13
maple, amur	2,064	(N/A)	0.4	0.1	17.35
pine, eastern white	2,668	(N/A)	0.3	0.2	22.80
ash	5,494	(N/A)	0.3	0.4	49.95
cherry, black	1,496	(N/A)	0.3	0.1	13.60
cherry, kwanzan	1,180	(N/A)	0.3	0.1	11.24
Unknown	4,718	(N/A)	0.3	0.3	45.36
baldecypress	5,599	(N/A)	0.3	0.4	57.14

# Annual Aesthetic/Other Benefits of Public Trees

7/22/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
serviceberry, Allegheny	859	(N/A)	0.3	0.1	9.14
dogwood, flowering	939	(N/A)	0.3	0.1	9.99
maple, tatarian	917	(N/A)	0.3	0.1	10.30
cedar, eastern red	1,174	(N/A)	0.3	0.1	13.82
hemlock, eastern	1,199	(N/A)	0.3	0.1	14.28
linden, silver	2,772	(N/A)	0.2	0.2	37.98
dogwood, kousa	669	(N/A)	0.2	0.0	9.30
basswood, American	3,454	(N/A)	0.2	0.2	55.71
tulip tree	4,102	(N/A)	0.2	0.3	66.16
catalpa, northern	2,679	(N/A)	0.2	0.2	43.92
goldenrain tree	579	(N/A)	0.2	0.0	10.16
birch, river	3,525	(N/A)	0.2	0.2	62.94
magnolia, spp	893	(N/A)	0.2	0.1	17.17
oak, sawtooth	2,015	(N/A)	0.2	0.1	38.76
hazelnut, Turkish	2,694	(N/A)	0.2	0.2	52.83
pear	721	(N/A)	0.1	0.0	15.02
coffeetree, Kentucky	2,614	(N/A)	0.1	0.2	54.45
pine, Austrian	1,031	(N/A)	0.1	0.1	22.41
maple, paperbark	2,077	(N/A)	0.1	0.1	47.22
boxelder	1,835	(N/A)	0.1	0.1	41.70
honeylocust	2,133	(N/A)	0.1	0.1	53.32
spruce, white	972	(N/A)	0.1	0.1	24.29
redwood, dawn	2,320	(N/A)	0.1	0.1	61.06
magnolia, sweetbay	318	(N/A)	0.1	0.0	8.37
buckeye, Ohio	469	(N/A)	0.1	0.0	12.68
hophornbeam, eastern	1,703	(N/A)	0.1	0.1	47.30
elm, Chinese	2,201	(N/A)	0.1	0.1	62.88
plum, cherry	333	(N/A)	0.1	0.0	10.73
walnut, black	2,137	(N/A)	0.1	0.1	73.67
serviceberry, eastern	275	(N/A)	0.1	0.0	9.49
chokecherry, common	252	(N/A)	0.1	0.0	9.01
tupelo, black	1,274	(N/A)	0.1	0.1	47.18
oak, white	1,682	(N/A)	0.1	0.1	64.70
birch, paper	1,772	(N/A)	0.1	0.1	68.14
katsura tree	1,226	(N/A)	0.1	0.1	47.15
yew	803	(N/A)	0.1	0.1	33.44
maple, sycamore	1,102	(N/A)	0.1	0.1	47.93
hardy rubber tree	1,223	(N/A)	0.1	0.1	55.58
holly, American	42	(N/A)	0.1	0.0	1.91
osage-orange	996	(N/A)	0.1	0.1	45.26
Japanese pagoda tree	836	(N/A)	0.1	0.1	39.81
oak, English	687	(N/A)	0.1	0.0	34.37
maple	807	(N/A)	0.1	0.1	40.35
corktree, amur	847	(N/A)	0.1	0.1	44.56
oak, bur	760	(N/A)	0.1	0.0	44.70
oak, scarlet	928	(N/A)	0.0	0.1	57.98
parrotia, persian	147	(N/A)	0.0	0.0	9.17
pear, common	1,373	(N/A)	0.0	0.1	91.53
Paradise apple	186	(N/A)	0.0	0.0	12.40



# Annual Aesthetic/Other Benefits of Public Trees

7/22/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
rose-of-sharon	131	(N/A)	0.0	0.0	9.36
red buckeye	117	(N/A)	0.0	0.0	8.39
yellowwood	660	(N/A)	0.0	0.0	47.13
oak, chinkapin	541	(N/A)	0.0	0.0	38.67
pine, scotch	289	(N/A)	0.0	0.0	22.26
cherry, sweet	167	(N/A)	0.0	0.0	13.90
elm, slippery	953	(N/A)	0.0	0.1	79.41
mulberry, red	483	(N/A)	0.0	0.0	40.25
smoketree, common	146	(N/A)	0.0	0.0	13.24
beech, European	769	(N/A)	0.0	0.0	69.89
birch, gray	515	(N/A)	0.0	0.0	46.86
Amur maackia	100	(N/A)	0.0	0.0	10.02
oak, black	494	(N/A)	0.0	0.0	49.41
cherry, higan	116	(N/A)	0.0	0.0	11.65
maple, black	581	(N/A)	0.0	0.0	58.11
cottonwood, eastern	918	(N/A)	0.0	0.1	91.77
mimosa	116	(N/A)	0.0	0.0	11.59
cherry, pin	105	(N/A)	0.0	0.0	10.46
buckeye, yellow	148	(N/A)	0.0	0.0	16.48
cherry, yoshino flowering	112	(N/A)	0.0	0.0	12.48
fir, douglas	191	(N/A)	0.0	0.0	23.87
maple, trident	145	(N/A)	0.0	0.0	18.16
falsecypress, Japanese	163	(N/A)	0.0	0.0	23.32
willow, corkscrew	314	(N/A)	0.0	0.0	44.86
peach	74	(N/A)	0.0	0.0	10.53
redbud, southwestern	55	(N/A)	0.0	0.0	7.80
butternut	558	(N/A)	0.0	0.0	93.06
hickory, bittersweet	506	(N/A)	0.0	0.0	84.35
blackhaw	51	(N/A)	0.0	0.0	8.51
poplar, black	430	(N/A)	0.0	0.0	71.61
beech, American	303	(N/A)	0.0	0.0	60.63
willow, black	211	(N/A)	0.0	0.0	42.17
willow, pussy	37	(N/A)	0.0	0.0	9.34
witchhazel	33	(N/A)	0.0	0.0	8.35
magnolia, star	33	(N/A)	0.0	0.0	8.35
magnolia, cucumbertree	67	(N/A)	0.0	0.0	16.80
walnut, English	313	(N/A)	0.0	0.0	78.30
dogwood, roughleaf	34	(N/A)	0.0	0.0	8.39
oak	110	(N/A)	0.0	0.0	36.82
smoketree, American	27	(N/A)	0.0	0.0	9.13
pine, mugo	84	(N/A)	0.0	0.0	28.07
oak, water	205	(N/A)	0.0	0.0	68.32
spruce, white	21	(N/A)	0.0	0.0	7.02
magnolia, southern	85	(N/A)	0.0	0.0	28.20
pawpaw	29	(N/A)	0.0	0.0	9.76
cedar, atlas	30	(N/A)	0.0	0.0	9.90
willow, weeping	131	(N/A)	0.0	0.0	43.70
olive, Russian	41	(N/A)	0.0	0.0	13.70
hawthorn, green	29	(N/A)	0.0	0.0	9.76

# Annual Aesthetic/Other Benefits of Public Trees

7/22/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
magnolia, Chinese ; magno	32	(N/A)	0.0	0.0	10.66
magnolia, umbrella	120	(N/A)	0.0	0.0	40.11
buckthorn, common	26	(N/A)	0.0	0.0	8.51
cedar, atlantic white	21	(N/A)	0.0	0.0	7.02
snowbell, Japanese	95	(N/A)	0.0	0.0	47.34
sumac, smooth	16	(N/A)	0.0	0.0	7.89
fir, white	47	(N/A)	0.0	0.0	23.59
apricot, mammee	25	(N/A)	0.0	0.0	12.48
ash, American mountain	56	(N/A)	0.0	0.0	27.78
plum, black	17	(N/A)	0.0	0.0	8.39
fir, balsam	44	(N/A)	0.0	0.0	21.92
sassafras	92	(N/A)	0.0	0.0	45.90
chestnut, Chinese	93	(N/A)	0.0	0.0	46.64
birch, European white	92	(N/A)	0.0	0.0	45.90
ash, European mountain	22	(N/A)	0.0	0.0	11.11
goldenchain tree	18	(N/A)	0.0	0.0	8.82
wisteria, American	34	(N/A)	0.0	0.0	16.80
larch, American	48	(N/A)	0.0	0.0	23.75
spruce, Engelmann	12	(N/A)	0.0	0.0	12.48
filbert, American	8	(N/A)	0.0	0.0	7.89
hickory, pignut	108	(N/A)	0.0	0.0	108.40
maple, striped	6	(N/A)	0.0	0.0	6.20
plum, American	10	(N/A)	0.0	0.0	9.76
birch, yellow	98	(N/A)	0.0	0.0	97.78
pine, Japanese white	24	(N/A)	0.0	0.0	23.75
snowbell, American	12	(N/A)	0.0	0.0	12.48
lilac, common	8	(N/A)	0.0	0.0	7.89
pine, red	25	(N/A)	0.0	0.0	24.77
pine, lacebark	12	(N/A)	0.0	0.0	12.48
pecan	28	(N/A)	0.0	0.0	27.78
pine, Virginia	28	(N/A)	0.0	0.0	27.78
filbert, Turkish	12	(N/A)	0.0	0.0	12.48
serviceberry, dwarf	4	(N/A)	0.0	0.0	4.29
boxwood	4	(N/A)	0.0	0.0	4.29
fringetree, white	8	(N/A)	0.0	0.0	7.50
fir, fraser	21	(N/A)	0.0	0.0	21.12
barberry, Japanese	4	(N/A)	0.0	0.0	4.29
apple, common	21	(N/A)	0.0	0.0	21.12
poplar, white	106	(N/A)	0.0	0.0	105.80
elderberry, American	4	(N/A)	0.0	0.0	4.29
silverbell, Carolina	10	(N/A)	0.0	0.0	9.76
fringetree, Chinese	4	(N/A)	0.0	0.0	4.29
cherry, sargent	12	(N/A)	0.0	0.0	12.46
oak, willow	47	(N/A)	0.0	0.0	47.07
sumac, staghorn	28	(N/A)	0.0	0.0	27.78
Citywide total	1,556,747	(N/A)	100.0	100.0	46.38

# Tree Characteristics in PittsburghPA by Species

Series: Inventory2014, Time Period: 2014

Species Name	Tree Count		Canopy Cover (ft2)		Leaf Area (ft2)		Leaf Biomass (lb)		Carbon Storage (lb)		Gross Carbon Seq (lb/year)		Structural Tree Value (\$)	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Alsaka cedar	4	0.01	70.0	0.00	445.9	0.00	22.8	0.00	27.4	0.00	4.4	0.00	359.0	0.00
American basswood	62	0.19	42,216.1	0.23	198,634.1	0.31	1,187.8	0.14	55,401.7	0.19	1,525.0	0.16	138,788.0	0.27
American beech	5	0.01	384.3	0.00	2,085.1	0.00	18.2	0.00	535.0	0.00	63.7	0.01	2,208.0	0.00
American elm	729	2.18	315,989.7	1.76	1,202,801.0	1.88	17,917.1	2.12	432,761.5	1.48	12,619.3	1.35	568,071.0	1.11
American hazlenut	1	0.00	5.4	0.00	19.3	0.00	0.3	0.00	1.1	0.00	1.0	0.00	51.0	0.00
American holly	22	0.07	547.9	0.00	2,020.6	0.00	55.3	0.01	316.6	0.00	76.3	0.01	2,798.0	0.01
American hornbeam	123	0.37	7,469.1	0.04	26,401.8	0.04	325.8	0.04	4,038.5	0.01	648.0	0.07	26,361.0	0.05
American mountain ash	2	0.01	245.4	0.00	485.5	0.00	7.9	0.00	829.1	0.00	26.2	0.00	937.0	0.00
American plum	1	0.00	490.8	0.00	1,247.4	0.00	19.8	0.00	73.1	0.00	5.5	0.00	144.0	0.00
American smoketree	3	0.01	86.1	0.00	232.0	0.00	3.5	0.00	47.2	0.00	13.2	0.00	482.0	0.00
American snowbell	1	0.00	50.6	0.00	113.8	0.00	1.7	0.00	48.2	0.00	9.6	0.00	428.0	0.00
American sycamore	142	0.42	181,382.7	1.01	761,582.9	1.19	7,556.8	0.89	379,280.5	1.30	9,347.8	1.00	500,381.0	0.98
Amur corktree	19	0.06	9,388.3	0.05	30,598.1	0.05	469.2	0.06	16,489.0	0.06	631.6	0.07	30,631.0	0.06
Amur maackia	12	0.04	931.1	0.01	2,462.8	0.00	37.7	0.00	247.8	0.00	61.1	0.01	2,846.0	0.01
Amur maple	119	0.36	15,139.4	0.08	66,593.2	0.10	767.8	0.09	7,082.1	0.02	1,097.7	0.12	41,670.0	0.08
apple spp	1,017	3.04	116,602.2	0.65	333,354.9	0.52	5,886.0	0.70	114,866.9	0.39	8,872.5	0.95	396,907.0	0.78
ash spp	110	0.33	0.0	0.00	0.0	0.00	0.0	0.00	78,047.9	0.27	0.0	0.00	0.0	0.00
Atlantic white cedar	3	0.01	174.4	0.00	499.8	0.00	25.6	0.00	25.6	0.00	4.8	0.00	272.0	0.00
Atlas cedar	3	0.01	183.0	0.00	2,347.9	0.00	75.3	0.01	151.0	0.00	11.2	0.00	1,030.0	0.00
Austrian pine	46	0.14	10,220.3	0.06	45,675.7	0.07	901.6	0.11	10,491.0	0.04	357.8	0.04	32,122.0	0.06
Baldcypress	106	0.32	9,546.5	0.05	51,715.3	0.08	1,658.7	0.20	8,277.2	0.03	336.3	0.04	45,112.0	0.09
Balsam fir	2	0.01	1,006.4	0.01	7,185.9	0.01	153.3	0.02	852.0	0.00	33.8	0.00	2,426.0	0.00
Beaked hazlenut	1	0.00	44.1	0.00	113.8	0.00	1.6	0.00	14.4	0.00	3.9	0.00	149.0	0.00
Bitternut hickory	6	0.02	6,591.8	0.04	18,177.0	0.03	234.0	0.03	8,692.1	0.03	301.9	0.03	14,272.0	0.03
Black cherry	110	0.33	59,478.1	0.33	188,662.9	0.30	2,996.8	0.35	129,259.8	0.44	4,570.7	0.49	125,127.0	0.25
Black haw	6	0.02	275.6	0.00	621.1	0.00	9.5	0.00	45.4	0.00	15.6	0.00	510.0	0.00
Black locust	469	1.40	302,219.4	1.68	966,363.3	1.51	10,655.5	1.26	880,800.8	3.01	20,223.4	2.16	782,923.0	1.53
Black maple	11	0.03	6,313.0	0.04	24,857.7	0.04	286.5	0.03	11,618.4	0.04	391.0	0.04	28,241.0	0.06
Black oak	10	0.03	6,826.5	0.04	18,690.9	0.03	270.6	0.03	14,156.7	0.05	557.4	0.06	22,523.0	0.04
Black poplar	6	0.02	236.8	0.00	1,143.0	0.00	16.8	0.00	833.6	0.00	77.1	0.01	3,121.0	0.01
Black tupelo	27	0.08	1,876.1	0.01	6,495.4	0.01	46.1	0.01	1,026.8	0.00	112.9	0.01	6,068.0	0.01
Black walnut	29	0.09	11,519.5	0.06	69,864.1	0.11	1,146.7	0.14	20,128.5	0.07	734.6	0.08	31,014.0	0.06
Black willow	5	0.01	3,189.3	0.02	12,688.5	0.02	164.6	0.02	10,668.0	0.04	193.7	0.02	5,455.0	0.01
Blue spruce	416	1.24	75,099.8	0.42	676,130.6	1.06	23,494.5	2.78	185,861.2	0.63	7,680.5	0.82	548,290.0	1.07
Boxelder	44	0.13	11,737.0	0.07	37,095.1	0.06	695.0	0.08	30,405.2	0.10	617.1	0.07	13,416.0	0.03
boxwood spp	1	0.00	5.4	0.00	16.1	0.00	0.2	0.00	1.1	0.00	0.9	0.00	51.0	0.00
Bur oak	17	0.05	5,662.9	0.03	14,594.8	0.02	295.0	0.03	8,415.4	0.03	311.2	0.03	18,555.0	0.04
Butternut	6	0.02	4,221.6	0.02	23,101.5	0.04	261.4	0.03	4,560.6	0.02	120.9	0.01	3,630.0	0.01
Callery pear	2,974	8.88	913,185.4	5.08	2,799,189.1	4.38	42,929.1	5.08	764,436.5	2.61	52,318.1	5.58	2,419,055.0	4.74
Canada plum	2	0.01	99.0	0.00	378.6	0.00	6.0	0.00	64.8	0.00	14.5	0.00	447.0	0.00
Cherry plum	31	0.09	4,664.0	0.03	13,413.6	0.02	166.9	0.02	3,691.9	0.01	348.2	0.04	9,860.0	0.02
Chinese chestnut	2	0.01	1,085.0	0.01	4,422.9	0.01	63.5	0.01	430.5	0.00	39.3	0.00	977.0	0.00

Species Name	Tree Count		Canopy Cover (ft2)		Leaf Area (ft2)		Leaf Biomass (lb)		Carbon Storage (lb)		Gross Carbon Seq (lb/year)		Structural Tree Value (\$)	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Chinese elm	35	0.10	5,309.8	0.03	24,393.2	0.04	567.8	0.07	3,319.3	0.01	255.5	0.03	16,002.0	0.03
Chinese fringe tree	1	0.00	7.5	0.00	41.9	0.00	0.6	0.00	1.0	0.00	1.0	0.00	51.0	0.00
Chinkapin oak	14	0.04	1,511.3	0.01	4,853.4	0.01	98.1	0.01	4,014.6	0.01	143.7	0.02	7,829.0	0.02
Common chokecherry	28	0.08	1,229.2	0.01	2,798.9	0.00	44.4	0.01	2,188.5	0.01	119.7	0.01	3,147.0	0.01
Common elderberry	1	0.00	33.4	0.00	106.1	0.00	1.6	0.00	5.7	0.00	2.4	0.00	66.0	0.00
Common lilac	1	0.00	19.4	0.00	71.3	0.00	1.4	0.00	1.0	0.00	0.9	0.00	51.0	0.00
Common pear	15	0.04	4,738.3	0.03	13,648.1	0.02	209.3	0.02	4,825.7	0.02	223.5	0.02	9,493.0	0.02
Corkscrew willow	7	0.02	4,333.6	0.02	18,863.4	0.03	244.7	0.03	4,907.3	0.02	230.4	0.02	8,615.0	0.02
Cornelian cherry	115	0.34	2,562.9	0.01	9,111.1	0.01	123.5	0.01	1,532.5	0.01	390.9	0.04	14,960.0	0.03
Cucumber tree	4	0.01	740.6	0.00	3,825.5	0.01	25.7	0.00	371.8	0.00	37.9	0.00	1,727.0	0.00
Dawn redwood	30	0.09	10,335.5	0.06	52,624.5	0.08	609.0	0.07	2,680.7	0.01	159.6	0.02	19,755.0	0.04
Douglas fir	8	0.02	2,015.0	0.01	19,701.3	0.03	631.9	0.07	1,100.1	0.00	45.3	0.00	8,454.0	0.02
Downy serviceberry	214	0.64	12,246.1	0.07	27,500.0	0.04	343.5	0.04	4,386.5	0.01	887.2	0.09	38,194.0	0.07
Eastern cottonwood	10	0.03	7,461.5	0.04	27,854.2	0.04	411.6	0.05	17,028.9	0.06	369.1	0.04	15,019.0	0.03
Eastern hemlock	84	0.25	18,791.6	0.10	80,313.4	0.13	1,527.8	0.18	7,329.1	0.03	542.2	0.06	33,116.0	0.06
Eastern hophornbeam	36	0.11	907.4	0.01	2,932.1	0.00	39.1	0.00	405.2	0.00	74.5	0.01	2,859.0	0.01
Eastern red cedar	85	0.25	6,056.9	0.03	48,741.6	0.08	2,773.1	0.33	6,607.8	0.02	392.5	0.04	32,702.0	0.06
Eastern redbud	208	0.62	18,122.1	0.10	45,998.8	0.07	603.3	0.07	7,122.9	0.02	1,007.0	0.11	47,056.0	0.09
Eastern service berry	29	0.09	2,533.8	0.01	4,896.4	0.01	76.1	0.01	726.9	0.00	153.6	0.02	6,634.0	0.01
Eastern white pine	116	0.35	32,679.2	0.18	143,511.8	0.22	1,890.4	0.22	28,550.8	0.10	1,249.1	0.13	118,751.0	0.23
elm spp	292	0.87	42,608.9	0.24	142,408.9	0.22	1,986.6	0.24	20,382.5	0.07	1,466.9	0.16	67,776.0	0.13
Engelmann spruce	1	0.00	63.5	0.00	318.0	0.00	13.8	0.00	20.0	0.00	3.7	0.00	160.0	0.00
English oak	20	0.06	3,255.0	0.02	11,985.2	0.02	163.5	0.02	6,713.7	0.02	249.8	0.03	11,947.0	0.02
English walnut	4	0.01	1,135.6	0.01	6,315.3	0.01	54.5	0.01	459.4	0.00	51.7	0.01	2,071.0	0.00
European beech	11	0.03	2,154.9	0.01	10,503.7	0.02	107.7	0.01	5,657.9	0.02	227.0	0.02	10,235.0	0.02
European buckthorn	3	0.01	63.5	0.00	168.3	0.00	1.5	0.00	16.5	0.00	5.9	0.00	253.0	0.00
European hornbeam	188	0.56	7,138.6	0.04	30,018.4	0.05	370.3	0.04	4,645.9	0.02	867.6	0.09	40,347.0	0.08
European mountain ash	2	0.01	173.3	0.00	421.4	0.00	6.9	0.00	89.3	0.00	14.0	0.00	556.0	0.00
European white birch	2	0.01	1,304.6	0.01	4,327.6	0.01	52.6	0.01	800.2	0.00	38.8	0.00	929.0	0.00
Flowering dogwood	94	0.28	9,243.0	0.05	24,948.7	0.04	296.9	0.04	5,766.1	0.02	750.2	0.08	28,472.0	0.06
Fraser fir	1	0.00	63.5	0.00	557.7	0.00	16.1	0.00	122.4	0.00	10.3	0.00	628.0	0.00
Freeman maple	750	2.24	174,240.8	0.97	796,422.3	1.25	9,180.9	1.09	181,482.5	0.62	11,473.0	1.22	488,851.0	0.96
Fringe tree	1	0.00	103.3	0.00	159.1	0.00	2.4	0.00	1.0	0.00	1.0	0.00	44.0	0.00
Ginkgo	852	2.54	248,455.8	1.38	996,703.6	1.56	9,000.8	1.07	788,922.8	2.69	27,240.1	2.90	1,717,172.0	3.37
Golden-chain tree	2	0.01	31.2	0.00	88.7	0.00	1.4	0.00	15.0	0.00	4.8	0.00	200.0	0.00
Goldenrain tree	57	0.17	12,884.4	0.07	30,889.9	0.05	511.3	0.06	11,800.5	0.04	614.1	0.07	29,028.0	0.06
Gray birch	11	0.03	2,829.8	0.02	13,384.6	0.02	162.8	0.02	1,037.6	0.00	135.2	0.01	4,494.0	0.01
Green ash	214	0.64	83,628.0	0.47	197,188.3	0.31	2,634.0	0.31	72,031.3	0.25	1,373.3	0.15	167,107.0	0.33
Green hawthorn	3	0.01	235.7	0.00	690.2	0.00	10.7	0.00	44.1	0.00	8.9	0.00	461.0	0.00
Hardy rubber tree	20	0.06	825.6	0.00	3,048.9	0.00	46.8	0.01	529.5	0.00	114.9	0.01	4,647.0	0.01
hawthorn spp	250	0.75	31,278.8	0.17	88,930.8	0.14	655.5	0.08	23,048.3	0.08	1,858.2	0.20	77,368.0	0.15
Hedge maple	575	1.72	64,539.3	0.36	244,270.7	0.38	2,816.1	0.33	36,988.3	0.13	4,577.7	0.49	171,864.0	0.34
Higan cherry	10	0.03	472.5	0.00	983.4	0.00	15.6	0.00	1,093.0	0.00	142.8	0.02	4,514.0	0.01
Honeylocust	40	0.12	23,481.5	0.13	35,162.0	0.06	754.1	0.09	43,826.2	0.15	1,240.3	0.13	56,122.0	0.11
Horsechestnut	129	0.39	97,605.0	0.54	355,574.6	0.56	5,092.8	0.60	244,919.6	0.84	6,414.7	0.68	262,219.0	0.51

Species Name	Tree Count		Canopy Cover (ft2)		Leaf Area (ft2)		Leaf Biomass (lb)		Carbon Storage (lb)		Gross Carbon Seq (lb/year)		Structural Tree Value (\$)	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
Japanese barberry	1	0.00	12.9	0.00	55.5	0.00	0.9	0.00	1.0	0.00	0.9	0.00	51.0	0.00
Japanese maple	153	0.46	18,912.2	0.11	66,358.5	0.10	765.1	0.09	15,960.0	0.05	1,555.6	0.17	61,819.0	0.12
Japanese pagoda tree	21	0.06	30,457.6	0.17	56,749.7	0.09	1,320.9	0.16	42,170.6	0.14	1,246.6	0.13	63,291.0	0.12
Japanese snowbell	2	0.01	15.1	0.00	71.4	0.00	1.1	0.00	2.0	0.00	1.9	0.00	95.0	0.00
Japanese tree lilac	505	1.51	17,791.7	0.10	57,408.7	0.09	1,134.9	0.13	8,426.9	0.03	2,055.0	0.22	81,417.0	0.16
Japanese white pine	1	0.00	38.8	0.00	152.4	0.00	3.0	0.00	21.6	0.00	3.7	0.00	422.0	0.00
Japanese zelkova	593	1.77	126,045.4	0.70	343,395.3	0.54	5,266.4	0.62	84,359.0	0.29	6,074.5	0.65	340,287.0	0.67
Katsura tree	26	0.08	1,362.7	0.01	5,409.8	0.01	83.0	0.01	1,040.0	0.00	107.3	0.01	4,507.0	0.01
Kentucky coffeetree	48	0.14	6,682.2	0.04	18,565.2	0.03	284.7	0.03	2,927.1	0.01	272.9	0.03	13,424.0	0.03
Kousa dogwood	72	0.22	2,695.3	0.01	8,214.8	0.01	98.1	0.01	1,711.4	0.01	300.7	0.03	11,597.0	0.02
Kwanzan cherry	105	0.31	10,479.7	0.06	32,276.8	0.05	511.5	0.06	18,701.6	0.06	1,542.8	0.16	43,762.0	0.09
Lacebark pine	1	0.00	28.0	0.00	65.0	0.00	1.3	0.00	18.8	0.00	3.5	0.00	444.0	0.00
Littleleaf linden	2,254	6.73	2,020,141.6	11.24	8,761,874.7	13.72	134,425.1	15.91	1,882,664.3	6.43	62,977.6	6.72	5,893,962.0	11.55
locust spp	1,980	5.91	991,044.0	5.51	1,127,979.9	1.77	24,191.6	2.86	791,962.4	2.71	38,168.0	4.07	1,802,220.0	3.53
London plane	2,757	8.23	3,632,759.5	20.21	15,350,464.9	24.03	144,413.7	17.10	8,943,099.0	30.55	217,590.1	23.20	12,251,054.0	24.01
maple spp	20	0.06	0.0	0.00	0.0	0.00	0.0	0.00	17,849.1	0.06	13.8	0.00	0.0	0.00
Mimosa	10	0.03	3,289.5	0.02	7,219.7	0.01	64.3	0.01	1,538.5	0.01	123.2	0.01	4,774.0	0.01
Miyabe's Maple	138	0.41	11,935.0	0.07	37,324.3	0.06	430.3	0.05	6,728.5	0.02	902.3	0.10	34,135.0	0.07
Mountain silverbell	1	0.00	9.7	0.00	34.8	0.00	0.5	0.00	13.9	0.00	3.8	0.00	195.0	0.00
Northern catalpa	61	0.18	22,108.0	0.12	66,572.5	0.10	830.1	0.10	61,057.6	0.21	1,958.1	0.21	78,468.0	0.15
Northern hackberry	125	0.37	15,151.3	0.08	66,068.0	0.10	704.0	0.08	13,134.8	0.04	810.3	0.09	36,037.0	0.07
Northern red oak	568	1.70	698,280.7	3.88	1,965,494.9	3.08	32,077.0	3.80	1,441,578.3	4.92	40,588.4	4.33	2,512,715.0	4.93
Northern white cedar	233	0.70	12,713.3	0.07	83,696.1	0.13	3,296.6	0.39	10,644.3	0.04	722.1	0.08	85,742.0	0.17
Norway maple	3,515	10.50	2,108,593.0	11.73	8,869,200.9	13.88	98,044.8	11.61	2,861,378.2	9.77	103,909.3	11.08	4,527,071.0	8.87
Norway spruce	220	0.66	59,845.2	0.33	469,195.9	0.73	16,016.7	1.90	95,990.8	0.33	3,928.9	0.42	282,017.0	0.55
oak spp	3	0.01	12.9	0.00	9.3	0.00	0.2	0.00	33.7	0.00	0.9	0.00	32.0	0.00
Ohio buckeye	37	0.11	3,736.2	0.02	13,493.3	0.02	202.2	0.02	982.4	0.00	170.1	0.02	8,368.0	0.02
Osage orange	22	0.07	9,416.3	0.05	32,706.6	0.05	673.4	0.08	14,055.5	0.05	554.7	0.06	24,371.0	0.05
Paper birch	26	0.08	6,453.0	0.04	21,500.6	0.03	307.9	0.04	3,776.5	0.01	401.9	0.04	12,032.0	0.02
Paperbark maple	44	0.13	1,966.6	0.01	5,182.0	0.01	59.7	0.01	900.3	0.00	152.1	0.02	4,910.0	0.01
Paradise apple	16	0.05	1,439.1	0.01	6,808.9	0.01	120.2	0.01	2,481.5	0.01	146.1	0.02	5,459.0	0.01
Pawpaw	3	0.01	157.2	0.00	521.8	0.00	17.9	0.00	57.1	0.00	15.0	0.00	590.0	0.00
Peach	7	0.02	955.8	0.01	1,732.9	0.00	27.4	0.00	533.3	0.00	73.0	0.01	1,954.0	0.00
pear spp	48	0.14	13,284.8	0.07	34,792.7	0.05	533.6	0.06	21,240.2	0.07	719.7	0.08	31,694.0	0.06
Pecan	1	0.00	490.8	0.00	2,173.6	0.00	31.0	0.00	714.8	0.00	21.1	0.00	471.0	0.00
Persian ironwood	18	0.05	631.8	0.00	2,278.2	0.00	34.9	0.00	372.1	0.00	87.7	0.01	3,401.0	0.01
Pignut hickory	1	0.00	490.8	0.00	2,049.9	0.00	8.0	0.00	1,924.0	0.01	70.3	0.01	3,148.0	0.01
Pin cherry	10	0.03	1,954.7	0.01	6,206.8	0.01	61.4	0.01	2,699.1	0.01	140.3	0.01	4,381.0	0.01
Pin oak	1,026	3.06	1,579,781.5	8.79	3,392,648.6	5.31	62,884.7	7.44	4,217,764.6	14.41	105,032.1	11.20	5,025,733.0	9.85
plum spp	429	1.28	48,958.6	0.27	136,788.1	0.21	2,167.7	0.26	70,121.2	0.24	4,988.2	0.53	139,477.0	0.27
Pussy willow	4	0.01	503.8	0.00	598.4	0.00	7.8	0.00	4,653.0	0.02	73.6	0.01	2,548.0	0.00
Red buckeye	14	0.04	1,045.2	0.01	2,811.1	0.00	42.2	0.00	135.7	0.00	43.1	0.00	1,308.0	0.00
Red maple	3,355	10.02	1,368,356.7	7.61	4,918,363.6	7.70	67,840.2	8.03	1,356,855.3	4.63	72,560.9	7.74	3,288,064.0	6.44
Red mulberry	12	0.04	7,438.9	0.04	26,695.6	0.04	543.1	0.06	27,502.3	0.09	809.2	0.09	44,420.0	0.09
Red pine	1	0.00	103.3	0.00	259.3	0.00	7.8	0.00	68.7	0.00	10.1	0.00	492.0	0.00

Species Name	Tree Count		Canopy Cover (ft2)		Leaf Area (ft2)		Leaf Biomass (lb)		Carbon Storage (lb)		Gross Carbon Seq (lb/year)		Structural Tree Value (\$)	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
River birch	56	0.17	16,548.4	0.09	53,954.0	0.08	856.6	0.10	5,216.2	0.02	565.7	0.06	22,877.0	0.04
Rose-of-sharon	14	0.04	282.0	0.00	840.9	0.00	8.3	0.00	352.2	0.00	82.1	0.01	3,342.0	0.01
Roughleaf dogwood	4	0.01	161.5	0.00	362.6	0.00	4.3	0.00	58.6	0.00	12.3	0.00	422.0	0.00
Russian olive	3	0.01	299.2	0.00	431.2	0.00	6.6	0.00	783.3	0.00	55.7	0.01	2,188.0	0.00
Sargent cherry	1	0.00	176.5	0.00	463.8	0.00	7.3	0.00	91.2	0.00	15.1	0.00	456.0	0.00
Sassafras	2	0.01	1,083.9	0.01	3,819.5	0.01	38.5	0.00	909.6	0.00	54.0	0.01	2,256.0	0.00
Saucer magnolia	55	0.16	14,725.0	0.08	52,467.6	0.08	718.0	0.08	16,242.0	0.06	925.5	0.10	51,678.0	0.10
Sawara false cypress	7	0.02	278.8	0.00	1,263.5	0.00	64.7	0.01	114.4	0.00	17.6	0.00	1,386.0	0.00
Sawtooth oak	52	0.16	3,241.0	0.02	8,695.8	0.01	175.8	0.02	1,277.5	0.00	282.7	0.03	14,505.0	0.03
Scarlet oak	16	0.05	8,577.8	0.05	23,253.2	0.04	347.1	0.04	15,423.8	0.05	580.1	0.06	32,422.0	0.06
Scotch pine	13	0.04	4,009.6	0.02	14,307.2	0.02	282.4	0.03	3,185.5	0.01	126.7	0.01	11,613.0	0.02
Siberian elm	199	0.59	160,185.3	0.89	557,118.2	0.87	7,771.8	0.92	229,491.0	0.78	5,983.7	0.64	181,554.0	0.36
Silver linden	73	0.22	3,321.7	0.02	15,396.9	0.02	146.8	0.02	2,116.7	0.01	299.9	0.03	19,250.0	0.04
Silver maple	407	1.22	392,011.9	2.18	1,250,653.5	1.96	13,481.8	1.60	572,413.5	1.96	13,959.5	1.49	990,062.0	1.94
Slippery elm	12	0.04	6,976.1	0.04	19,113.7	0.03	175.3	0.02	10,125.4	0.03	163.6	0.02	5,387.0	0.01
Smoke tree	11	0.03	1,431.6	0.01	3,871.6	0.01	59.4	0.01	2,122.0	0.01	143.3	0.02	6,800.0	0.01
Smooth service berry	85	0.25	4,214.1	0.02	6,730.0	0.01	104.4	0.01	727.5	0.00	217.4	0.02	8,600.0	0.02
Smooth sumac	2	0.01	102.3	0.00	316.7	0.00	3.6	0.00	6.7	0.00	3.3	0.00	119.0	0.00
Southern magnolia	3	0.01	85.0	0.00	279.6	0.00	7.7	0.00	155.3	0.00	17.9	0.00	920.0	0.00
Southwestern redbud	7	0.02	114.1	0.00	280.9	0.00	3.7	0.00	62.5	0.00	9.2	0.00	212.0	0.00
Staghorn sumac	1	0.00	594.2	0.00	2,372.3	0.00	46.4	0.01	410.2	0.00	28.7	0.00	1,187.0	0.00
Star magnolia	4	0.01	53.8	0.00	181.3	0.00	2.5	0.00	21.4	0.00	8.0	0.00	394.0	0.00
Striped maple	1	0.00	0.0	0.00	0.0	0.00	0.0	0.00	7.0	0.00	0.0	0.00	0.0	0.00
Sugar maple	579	1.73	336,835.0	1.87	1,173,125.9	1.84	14,474.4	1.71	507,909.9	1.74	20,008.5	2.13	929,154.0	1.82
Swamp white oak	145	0.43	8,600.4	0.05	24,746.8	0.04	500.0	0.06	13,247.0	0.05	769.2	0.08	44,129.0	0.09
Sweet cherry	12	0.04	4,612.3	0.03	14,612.7	0.02	231.6	0.03	11,571.4	0.04	461.9	0.05	12,311.0	0.02
Sweet mountain pine	3	0.01	101.2	0.00	346.4	0.00	6.8	0.00	19.4	0.00	4.5	0.00	331.0	0.00
Sweetbay	38	0.11	1,166.8	0.01	3,573.5	0.01	104.7	0.01	666.9	0.00	102.6	0.01	5,422.0	0.01
Sweetgum	775	2.31	689,817.0	3.84	2,206,487.5	3.45	20,747.0	2.46	354,533.0	1.21	12,126.4	1.29	1,730,633.0	3.39
Sycamore maple	23	0.07	8,899.6	0.05	43,977.9	0.07	629.9	0.07	19,268.8	0.07	639.4	0.07	28,921.0	0.06
Tamarack	2	0.01	38.8	0.00	244.8	0.00	2.3	0.00	50.3	0.00	9.2	0.00	885.0	0.00
Tatar maple	89	0.27	10,493.7	0.06	34,155.5	0.05	393.7	0.05	5,563.7	0.02	736.6	0.08	26,037.0	0.05
Tree Hardwood	103	0.31	23.7	0.00	102.6	0.00	1.6	0.00	66,610.9	0.23	2.3	0.00	66.0	0.00
Tree of heaven	193	0.58	108,866.2	0.61	330,221.3	0.52	5,064.2	0.60	177,109.3	0.61	4,373.4	0.47	97,925.0	0.19
Trident maple	8	0.02	877.3	0.00	5,078.1	0.01	128.4	0.02	834.6	0.00	88.9	0.01	3,270.0	0.01
Tulip tree	62	0.19	23,413.7	0.13	125,786.5	0.20	1,518.6	0.18	38,163.4	0.13	1,245.0	0.13	83,913.0	0.16
Turkish hazelnut	54	0.16	1,346.6	0.01	4,931.2	0.01	70.1	0.01	890.1	0.00	217.6	0.02	8,759.0	0.02
Umbrella magnolia	3	0.01	1,020.4	0.01	4,252.7	0.01	58.2	0.01	968.7	0.00	69.8	0.01	3,491.0	0.01
Virginia pine	1	0.00	143.2	0.00	499.8	0.00	9.9	0.00	185.0	0.00	11.7	0.00	943.0	0.00
Water oak	3	0.01	2,415.4	0.01	7,539.6	0.01	146.0	0.02	2,863.5	0.01	136.2	0.01	7,261.0	0.01
Weeping willow	3	0.01	2,043.0	0.01	5,665.0	0.01	73.5	0.01	3,956.7	0.01	132.6	0.01	4,778.0	0.01
White ash	124	0.37	40,204.3	0.22	87,428.8	0.14	1,017.4	0.12	139,951.0	0.48	2,211.3	0.24	96,606.0	0.19
White fir	2	0.01	191.6	0.00	1,321.1	0.00	38.1	0.00	86.5	0.00	10.6	0.00	574.0	0.00
White mulberry	338	1.01	179,735.8	1.00	543,834.2	0.85	8,147.9	0.96	241,582.5	0.83	8,147.1	0.87	356,374.0	0.70
White oak	26	0.08	17,834.7	0.10	37,725.7	0.06	562.1	0.07	46,390.1	0.16	1,277.3	0.14	70,989.0	0.14

Species Name	Tree Count		Canopy Cover (ft2)		Leaf Area (ft2)		Leaf Biomass (lb)		Carbon Storage (lb)		Gross Carbon Seq (lb/year)		Structural Tree Value (\$)	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
White poplar	1	0.00	962.3	0.01	1,072.4	0.00	19.1	0.00	1,861.6	0.01	24.3	0.00	1,062.0	0.00
White spruce	43	0.13	4,498.2	0.03	31,358.8	0.05	1,031.8	0.12	5,841.5	0.02	417.9	0.04	22,450.0	0.04
Willow oak	1	0.00	113.0	0.00	219.7	0.00	4.0	0.00	35.5	0.00	5.3	0.00	523.0	0.00
wisteria spp	2	0.01	26.9	0.00	106.3	0.00	1.6	0.00	102.0	0.00	19.3	0.00	762.0	0.00
Witch hazel	4	0.01	135.6	0.00	378.6	0.00	4.6	0.00	30.9	0.00	10.9	0.00	347.0	0.00
Yellow birch	1	0.00	490.8	0.00	1,592.7	0.00	13.5	0.00	623.1	0.00	31.2	0.00	1,544.0	0.00
Yellow buckeye	9	0.03	1,058.1	0.01	4,423.0	0.01	59.0	0.01	1,276.4	0.00	77.8	0.01	3,741.0	0.01
Yellowwood	14	0.04	1,930.0	0.01	5,490.9	0.01	84.2	0.01	318.3	0.00	69.6	0.01	2,860.0	0.01
yew spp	24	0.07	4,051.5	0.02	20,304.1	0.03	651.3	0.08	3,762.4	0.01	169.4	0.02	16,875.0	0.03
Yoshino flowering cherry	9	0.03	1,244.3	0.01	4,029.5	0.01	63.9	0.01	4,181.6	0.01	208.1	0.02	5,922.0	0.01
<b>TOTAL</b>	<b>33,487</b>	<b>100</b>	<b>17,975,147</b>	<b>100</b>	<b>63,882,058</b>	<b>100</b>	<b>844,720</b>	<b>100</b>	<b>29,274,143</b>	<b>100</b>	<b>937,850</b>	<b>100</b>	<b>51,018,501</b>	<b>100</b>



# Species Importance in PittsburghPA

Series: Inventory2014, Time Period: 2014

Species Name	Tree Count		Leaf Area (ft2)		Importance
	Value	%	Value	%	
London plane	2,757	8.23	15,350,464.9	24.03	16.13
Norway maple	3,515	10.50	8,869,200.9	13.88	12.19
Littleleaf linden	2,254	6.73	8,761,874.7	13.72	10.22
Red maple	3,355	10.02	4,918,363.6	7.70	8.86
Callery pear	2,974	8.88	2,799,189.1	4.38	6.63
Pin oak	1,026	3.06	3,392,648.6	5.31	4.19
locust spp	1,980	5.91	1,127,979.9	1.77	3.84
Sweetgum	775	2.31	2,206,487.5	3.45	2.88
Northern red oak	568	1.70	1,965,494.9	3.08	2.39
Ginkgo	852	2.54	996,703.6	1.56	2.05
American elm	729	2.18	1,202,801.0	1.88	2.03
Sugar maple	579	1.73	1,173,125.9	1.84	1.78
apple spp	1,017	3.04	333,354.9	0.52	1.78
Freeman maple	750	2.24	796,422.3	1.25	1.74
Silver maple	407	1.22	1,250,653.5	1.96	1.59
Black locust	469	1.40	966,363.3	1.51	1.46
Japanese zelkova	593	1.77	343,395.3	0.54	1.15
Blue spruce	416	1.24	676,130.6	1.06	1.15
Hedge maple	575	1.72	244,270.7	0.38	1.05
White mulberry	338	1.01	543,834.2	0.85	0.93
American sycamore	142	0.42	761,582.9	1.19	0.81
Japanese tree lilac	505	1.51	57,408.7	0.09	0.80
plum spp	429	1.28	136,788.1	0.21	0.75
Siberian elm	199	0.59	557,118.2	0.87	0.73
Norway spruce	220	0.66	469,195.9	0.73	0.70
elm spp	292	0.87	142,408.9	0.22	0.55
Tree of heaven	193	0.58	330,221.3	0.52	0.55
Green ash	214	0.64	197,188.3	0.31	0.47
Horsechestnut	129	0.39	355,574.6	0.56	0.47
hawthorn spp	250	0.75	88,930.8	0.14	0.44
Northern white cedar	233	0.70	83,696.1	0.13	0.41
Eastern redbud	208	0.62	45,998.8	0.07	0.35
Downy serviceberry	214	0.64	27,500.0	0.04	0.34
Black cherry	110	0.33	188,662.9	0.30	0.31
European hornbeam	188	0.56	30,018.4	0.05	0.30
Eastern white pine	116	0.35	143,511.8	0.22	0.29
Japanese maple	153	0.46	66,358.5	0.10	0.28
White ash	124	0.37	87,428.8	0.14	0.25
American basswood	62	0.19	198,634.1	0.31	0.25
Northern hackberry	125	0.37	66,068.0	0.10	0.24
Swamp white oak	145	0.43	24,746.8	0.04	0.24
Miyabe's Maple	138	0.41	37,324.3	0.06	0.24
Amur maple	119	0.36	66,593.2	0.10	0.23
American hornbeam	123	0.37	26,401.8	0.04	0.20
Baldcypress	106	0.32	51,715.3	0.08	0.20
Tulip tree	62	0.19	125,786.5	0.20	0.19
Eastern hemlock	84	0.25	80,313.4	0.13	0.19
Kwanzan cherry	105	0.31	32,276.8	0.05	0.18
Cornelian cherry	115	0.34	9,111.1	0.01	0.18
Eastern red cedar	85	0.25	48,741.6	0.08	0.17
ash spp	110	0.33	0.0	0.00	0.16
Flowering dogwood	94	0.28	24,948.7	0.04	0.16
Tatar maple	89	0.27	34,155.5	0.05	0.16
Tree Hardwood	103	0.31	102.6	0.00	0.15
Northern catalpa	61	0.18	66,572.5	0.10	0.14
Smooth service berry	85	0.25	6,730.0	0.01	0.13
River birch	56	0.17	53,954.0	0.08	0.13
Saucer magnolia	55	0.16	52,467.6	0.08	0.12
Silver linden	73	0.22	15,396.9	0.02	0.12

Species Name	Tree Count		Leaf Area (ft2)		Importance
	Value	%	Value	%	
Kousa dogwood	72	0.22	8,214.8	0.01	0.11
Goldenrain tree	57	0.17	30,889.9	0.05	0.11
Austrian pine	46	0.14	45,675.7	0.07	0.10
pear spp	48	0.14	34,792.7	0.05	0.10
Black walnut	29	0.09	69,864.1	0.11	0.10
Boxelder	44	0.13	37,095.1	0.06	0.09
White spruce	43	0.13	31,358.8	0.05	0.09
Honeylocust	40	0.12	35,162.0	0.06	0.09
Kentucky coffeetree	48	0.14	18,565.2	0.03	0.09
Dawn redwood	30	0.09	52,624.5	0.08	0.09
Turkish hazelnut	54	0.16	4,931.2	0.01	0.08
Sawtooth oak	52	0.16	8,695.8	0.01	0.08
Japanese pagoda tree	21	0.06	56,749.7	0.09	0.08
Chinese elm	35	0.10	24,393.2	0.04	0.07
Paperbark maple	44	0.13	5,182.0	0.01	0.07
Sycamore maple	23	0.07	43,977.9	0.07	0.07
White oak	26	0.08	37,725.7	0.06	0.07
Ohio buckeye	37	0.11	13,493.3	0.02	0.07
Sweetbay	38	0.11	3,573.5	0.01	0.06
Osage orange	22	0.07	32,706.6	0.05	0.06
Cherry plum	31	0.09	13,413.6	0.02	0.06
Eastern hophornbeam	36	0.11	2,932.1	0.00	0.06
Paper birch	26	0.08	21,500.6	0.03	0.06
Amur corktree	19	0.06	30,598.1	0.05	0.05
yew spp	24	0.07	20,304.1	0.03	0.05
Eastern service berry	29	0.09	4,896.4	0.01	0.05
Black tupelo	27	0.08	6,495.4	0.01	0.05
Common chokecherry	28	0.08	2,798.9	0.00	0.04
Katsura tree	26	0.08	5,409.8	0.01	0.04
Scarlet oak	16	0.05	23,253.2	0.04	0.04
English oak	20	0.06	11,985.2	0.02	0.04
Red mulberry	12	0.04	26,695.6	0.04	0.04
Bur oak	17	0.05	14,594.8	0.02	0.04
Eastern cottonwood	10	0.03	27,854.2	0.04	0.04
Black maple	11	0.03	24,857.7	0.04	0.04
American holly	22	0.07	2,020.6	0.00	0.03
Common pear	15	0.04	13,648.1	0.02	0.03
Slippery elm	12	0.04	19,113.7	0.03	0.03
Hardy rubber tree	20	0.06	3,048.9	0.00	0.03
Scotch pine	13	0.04	14,307.2	0.02	0.03
maple spp	20	0.06	0.0	0.00	0.03
Black oak	10	0.03	18,690.9	0.03	0.03
Sweet cherry	12	0.04	14,612.7	0.02	0.03
Paradise apple	16	0.05	6,808.9	0.01	0.03
Persian ironwood	18	0.05	2,278.2	0.00	0.03
Douglas fir	8	0.02	19,701.3	0.03	0.03
Butternut	6	0.02	23,101.5	0.04	0.03
Gray birch	11	0.03	13,384.6	0.02	0.03
Corkscrew willow	7	0.02	18,863.4	0.03	0.03
Yellowwood	14	0.04	5,490.9	0.01	0.03
Chinkapin oak	14	0.04	4,853.4	0.01	0.02
European beech	11	0.03	10,503.7	0.02	0.02
Bitternut hickory	6	0.02	18,177.0	0.03	0.02
Red buckeye	14	0.04	2,811.1	0.00	0.02
Rose-of-sharon	14	0.04	840.9	0.00	0.02
Mimosa	10	0.03	7,219.7	0.01	0.02
Amur maackia	12	0.04	2,462.8	0.00	0.02
Pin cherry	10	0.03	6,206.8	0.01	0.02
Smoke tree	11	0.03	3,871.6	0.01	0.02
Black willow	5	0.01	12,688.5	0.02	0.02
Yellow buckeye	9	0.03	4,423.0	0.01	0.02
Yoshino flowering cherry	9	0.03	4,029.5	0.01	0.02

Species Name	Tree Count		Leaf Area (ft2)		Importance
	Value	%	Value	%	
Trident maple	8	0.02	5,078.1	0.01	0.02
Higan cherry	10	0.03	983.4	0.00	0.02
Peach	7	0.02	1,732.9	0.00	0.01
Sawara false cypress	7	0.02	1,263.5	0.00	0.01
English walnut	4	0.01	6,315.3	0.01	0.01
Southwestern redbud	7	0.02	280.9	0.00	0.01
Water oak	3	0.01	7,539.6	0.01	0.01
Black poplar	6	0.02	1,143.0	0.00	0.01
Black haw	6	0.02	621.1	0.00	0.01
American beech	5	0.01	2,085.1	0.00	0.01
Cucumber tree	4	0.01	3,825.5	0.01	0.01
Weeping willow	3	0.01	5,665.0	0.01	0.01
Balsam fir	2	0.01	7,185.9	0.01	0.01
Umbrella magnolia	3	0.01	4,252.7	0.01	0.01
Chinese chestnut	2	0.01	4,422.9	0.01	0.01
Pussy willow	4	0.01	598.4	0.00	0.01
European white birch	2	0.01	4,327.6	0.01	0.01
Alsaka cedar	4	0.01	445.9	0.00	0.01
Atlas cedar	3	0.01	2,347.9	0.00	0.01
Witch hazel	4	0.01	378.6	0.00	0.01
Roughleaf dogwood	4	0.01	362.6	0.00	0.01
Star magnolia	4	0.01	181.3	0.00	0.01
Sassafras	2	0.01	3,819.5	0.01	0.01
Green hawthorn	3	0.01	690.2	0.00	0.01
Pawpaw	3	0.01	521.8	0.00	0.00
Atlantic white cedar	3	0.01	499.8	0.00	0.00
Russian olive	3	0.01	431.2	0.00	0.00
Sweet mountain pine	3	0.01	346.4	0.00	0.00
Southern magnolia	3	0.01	279.6	0.00	0.00
American smoketree	3	0.01	232.0	0.00	0.00
European buckthorn	3	0.01	168.3	0.00	0.00
oak spp	3	0.01	9.3	0.00	0.00
White fir	2	0.01	1,321.1	0.00	0.00
American mountain ash	2	0.01	485.5	0.00	0.00
Staghorn sumac	1	0.00	2,372.3	0.00	0.00
European mountain ash	2	0.01	421.4	0.00	0.00
Canada plum	2	0.01	378.6	0.00	0.00
Smooth sumac	2	0.01	316.7	0.00	0.00
Pecan	1	0.00	2,173.6	0.00	0.00
Tamarack	2	0.01	244.8	0.00	0.00
Pignut hickory	1	0.00	2,049.9	0.00	0.00
wisteria spp	2	0.01	106.3	0.00	0.00
Golden-chain tree	2	0.01	88.7	0.00	0.00
Japanese snowbell	2	0.01	71.4	0.00	0.00
Yellow birch	1	0.00	1,592.7	0.00	0.00
American plum	1	0.00	1,247.4	0.00	0.00
White poplar	1	0.00	1,072.4	0.00	0.00
Fraser fir	1	0.00	557.7	0.00	0.00
Virginia pine	1	0.00	499.8	0.00	0.00
Sargent cherry	1	0.00	463.8	0.00	0.00
Engelmann spruce	1	0.00	318.0	0.00	0.00
Red pine	1	0.00	259.3	0.00	0.00
Willow oak	1	0.00	219.7	0.00	0.00
Fringe tree	1	0.00	159.1	0.00	0.00
Japanese white pine	1	0.00	152.4	0.00	0.00
Beaked hazlenut	1	0.00	113.8	0.00	0.00
American snowbell	1	0.00	113.8	0.00	0.00
Common elderberry	1	0.00	106.1	0.00	0.00
Common lilac	1	0.00	71.3	0.00	0.00
Lacebark pine	1	0.00	65.0	0.00	0.00
Japanese barberry	1	0.00	55.5	0.00	0.00
Chinese fringe tree	1	0.00	41.9	0.00	0.00

Species Name	Tree Count		Leaf Area (ft2)		Importance
	Value	%	Value	%	
Mountain silverbell	1	0.00	34.8	0.00	0.00
American hazlenut	1	0.00	19.3	0.00	0.00
boxwood spp	1	0.00	16.1	0.00	0.00
Striped maple	1	0.00	0.0	0.00	0.00

***Appendix C***  
***Data by Neighborhood***

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# Pittsburgh

## Annual CO<sub>2</sub> Benefits of Public Trees by Zone

7/23/2015

Zone	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard Error (\$)	% of Total Trees	% of Total \$	Avg. \$/tree
East Liberty	124,558	411	-27,998	-7,604	-117	174,387	575	263,343	869(N/A)	3.6	2.3	0.71
Shadyside	278,757	920	-53,598	-13,663	-222	327,962	1,082	539,458	1,780(N/A)	4.0	4.6	1.32
Central Lawrenceville	117,514	388	-23,585	-6,462	-99	147,148	486	234,616	774(N/A)	3.7	2.0	0.63
Stanton Heights	207,992	686	-44,761	-9,280	-178	208,994	690	362,946	1,198(N/A)	1.9	3.1	1.91
Morningside	56,048	185	-11,609	-3,210	-49	73,929	244	115,158	380(N/A)	1.1	1.0	1.04
Upper Lawrenceville	44,054	145	-6,647	-1,965	-28	53,438	176	88,881	293(N/A)	0.9	0.8	0.94
Garfield	77,752	257	-14,453	-3,844	-60	88,304	291	147,759	488(N/A)	1.5	1.3	0.99
Highland Park	230,175	760	-47,491	-12,509	-198	299,225	987	469,399	1,549(N/A)	3.3	4.0	1.40
Larimer	42,137	139	-9,353	-2,174	-38	57,467	190	88,077	291(N/A)	0.8	0.8	1.02
Point Breeze North	110,495	365	-16,575	-5,259	-72	120,140	396	208,801	689(N/A)	1.3	1.8	1.63
Homewood South	44,133	146	-10,367	-2,795	-43	68,670	227	99,641	329(N/A)	0.9	0.9	1.09
Homewood North	48,641	161	-13,365	-3,008	-54	70,007	231	102,275	338(N/A)	0.9	0.9	1.16
Homewood West	12,497	41	-2,067	-545	-9	13,777	45	23,661	78(N/A)	0.2	0.2	1.13
Lincoln-Lemington-Be	114,427	378	-28,265	-6,256	-114	159,274	526	239,180	789(N/A)	1.4	2.1	1.66
East Hills	87,326	288	-23,329	-5,120	-94	127,032	419	185,909	613(N/A)	1.2	1.6	1.48
Greenfield	112,268	370	-27,590	-6,304	-112	145,963	482	224,337	740(N/A)	1.8	1.9	1.24
Hazelwood	92,008	304	-20,649	-4,585	-83	115,083	380	181,857	600(N/A)	1.5	1.6	1.22
Squirrel Hill South	434,950	1,435	-87,713	-24,671	-371	571,975	1,888	894,541	2,952(N/A)	7.2	7.7	1.22
Marshall-Shadeland	96,815	319	-17,181	-4,041	-70	99,678	329	175,271	578(N/A)	1.3	1.5	1.36
Brighton Heights	149,663	494	-31,410	-8,107	-130	198,615	655	308,761	1,019(N/A)	2.3	2.7	1.32
Perry North	61,433	203	-11,566	-2,946	-48	74,893	247	121,814	402(N/A)	0.9	1.0	1.28
Overbrook	47,439	157	-11,815	-2,871	-48	64,695	213	97,449	322(N/A)	0.7	0.8	1.30
Carrick	113,762	375	-22,957	-6,425	-97	146,284	483	230,664	761(N/A)	2.0	2.0	1.16
Brookline	164,357	542	-32,731	-8,593	-136	196,030	647	319,063	1,053(N/A)	2.2	2.7	1.39
Knoxville	84,345	278	-15,020	-4,496	-64	103,241	341	168,071	555(N/A)	1.2	1.4	1.34
South Side Slopes	19,818	65	-4,286	-1,286	-18	28,340	94	42,586	141(N/A)	0.5	0.4	0.79
Arlington Heights	1,249	4	-233	-78	-1	2,051	7	2,990	10(N/A)	0.0	0.0	2.47
South Side Flats	135,959	449	-21,311	-7,213	-94	171,888	567	279,322	922(N/A)	4.5	2.4	0.61
Arlington	10,661	35	-2,393	-611	-10	12,150	40	19,807	65(N/A)	0.2	0.2	0.80
Mt. Oliver	1,334	4	-407	-103	-2	2,184	7	3,008	10(N/A)	0.0	0.0	0.76
St. Clair	2,918	10	-858	-144	-3	3,944	13	5,860	19(N/A)	0.0	0.1	1.61
Bedford Dwellings	14,228	47	-2,093	-1,011	-10	22,456	74	33,580	111(N/A)	0.5	0.3	0.66

# Annual CO<sub>2</sub> Benefits of Public Trees by Zone

7/23/2015

Zone	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$)	% of Total Trees	% of Total \$	Avg. \$/tree
Middle Hill	25,584	84	-4,926	-1,542	-21	32,208	106	51,323	169(N/A)	0.7	0.4	0.68
Central Business Dis	69,283	229	-8,180	-4,309	-41	90,290	298	147,084	485(N/A)	2.8	1.3	0.51
Bluff	15,666	52	-2,830	-970	-13	18,900	62	30,767	102(N/A)	0.6	0.3	0.51
West Oakland	4,677	15	-1,143	-292	-5	6,409	21	9,650	32(N/A)	0.2	0.1	0.45
Terrace Village	17,536	58	-2,307	-1,349	-12	29,036	96	42,916	142(N/A)	0.8	0.4	0.56
South Oakland	21,532	71	-4,565	-1,069	-19	27,073	89	42,972	142(N/A)	0.6	0.4	0.74
Central Oakland	31,245	103	-7,299	-1,700	-30	41,786	138	64,033	211(N/A)	0.7	0.6	0.89
North Oakland	92,400	305	-15,511	-4,891	-67	121,381	401	193,379	638(N/A)	1.7	1.7	1.11
Point Breeze	277,229	915	-50,933	-13,274	-212	329,283	1,087	542,305	1,790(N/A)	2.9	4.7	1.82
Squirrel Hill North	536,708	1,771	-94,843	-25,254	-396	620,604	2,048	1,037,215	3,423(N/A)	4.9	8.9	2.10
Crafton Heights	73,601	243	-16,637	-3,595	-67	86,314	285	139,684	461(N/A)	0.9	1.2	1.54
Allentown	10,928	36	-2,380	-527	-10	14,389	47	22,410	74(N/A)	0.2	0.2	1.21
Beltzhoover	22,320	74	-5,772	-1,220	-23	29,483	97	44,811	148(N/A)	0.4	0.4	1.20
Bon Air	18,410	61	-3,719	-883	-15	19,017	63	32,825	108(N/A)	0.2	0.3	1.32
Mount Washington	111,229	367	-22,403	-6,029	-94	146,384	483	229,181	756(N/A)	2.1	2.0	1.10
Hays	276	1	-59	-18	0	348	1	546	2(N/A)	0.0	0.0	0.90
New Homestead	45,057	149	-9,673	-2,299	-40	56,723	187	89,808	296(N/A)	0.5	0.8	1.65
North Shore	29,677	98	-4,213	-2,210	-21	33,584	111	56,837	188(N/A)	1.3	0.5	0.43
Chateau	25,585	84	-2,713	-1,061	-12	27,378	90	49,188	162(N/A)	0.7	0.4	0.70
Allegheny West	30,549	101	-6,945	-1,529	-28	37,272	123	59,346	196(N/A)	0.7	0.5	0.83
California-Kirkbride	13,114	43	-3,583	-801	-14	19,011	63	27,741	92(N/A)	0.3	0.2	1.09
Allegheny Center	3,614	12	-844	-220	-4	4,588	15	7,137	24(N/A)	0.1	0.1	1.18
East Allegheny	45,506	150	-8,168	-1,962	-33	50,739	167	86,114	284(N/A)	1.0	0.7	0.82
Troy Hill	7,182	24	-1,300	-615	-6	9,921	33	15,189	50(N/A)	0.5	0.1	0.29
Duquesne Heights	9,784	32	-2,383	-537	-10	13,001	43	19,866	66(N/A)	0.2	0.2	0.95
Beechview	87,609	289	-21,704	-5,275	-89	115,378	381	176,008	581(N/A)	1.6	1.5	1.05
South Shore	59	0	-11	-7	0	103	0	144	0(N/A)	0.0	0.0	0.48
Manchester	75,821	250	-17,337	-3,900	-70	106,530	352	161,114	532(N/A)	1.7	1.4	0.91
Perry South	78,387	259	-13,930	-3,364	-57	85,992	284	147,085	485(N/A)	0.9	1.3	1.63
Fineview	14,728	49	-3,721	-800	-15	21,151	70	31,357	103(N/A)	0.2	0.3	1.26
Upper Hill	26,590	88	-5,345	-1,466	-22	36,479	120	56,258	186(N/A)	0.4	0.5	1.41
Windgap	184,906	610	-32,983	-9,457	-140	227,006	749	369,472	1,219(N/A)	3.9	3.2	0.94
Friendship	35,801	118	-6,383	-2,071	-28	45,981	152	73,329	242(N/A)	0.9	0.6	0.78
Regent Square	58,293	192	-12,381	-3,069	-51	74,258	245	117,100	386(N/A)	0.7	1.0	1.67
Swisshelm Park	67,793	224	-11,695	-2,976	-48	72,692	240	125,814	415(N/A)	0.7	1.1	1.78



# Annual CO<sub>2</sub> Benefits of Public Trees by Zone

7/23/2015

Zone	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$ Error)	% of Total Trees	% of Total \$	Avg. \$/tree
Spring Hill-City Vie	12,329	41	-3,090	-787	-13	18,249	60	26,702	88(N/A)	0.3	0.2	0.95
Spring Garden	5,152	17	-817	-324	-4	6,480	21	10,491	35(N/A)	0.1	0.1	0.71
Esplen	225	1	-71	-18	0	434	1	569	2(N/A)	0.0	0.0	0.94
Westwood	40,524	134	-11,345	-3,009	-47	69,474	229	95,644	316(N/A)	0.7	0.8	1.26
Ridgemont	4,958	16	-1,319	-319	-5	7,538	25	10,859	36(N/A)	0.1	0.1	1.19
Oakwood	18,068	60	-5,431	-1,161	-22	25,543	84	37,019	122(N/A)	0.3	0.3	1.37
East Carnegie	637	2	-213	-42	-1	1,192	4	1,573	5(N/A)	0.0	0.0	1.30
Sheraden	51,487	170	-15,990	-3,298	-64	78,304	258	110,504	365(N/A)	0.9	1.0	1.27
Fairywood	13,368	44	-2,455	-512	-10	13,052	43	23,454	77(N/A)	0.1	0.2	2.76
Elliott	29,060	96	-6,765	-1,624	-28	39,859	132	60,530	200(N/A)	0.4	0.5	1.44
Banksville	100,357	331	-19,790	-5,000	-82	119,209	393	194,777	643(N/A)	1.3	1.7	1.49
Lincoln Place	47,628	157	-10,563	-2,884	-44	67,232	222	101,412	335(N/A)	0.7	0.9	1.38
Glen Hazel	244	1	-67	-18	0	445	1	604	2(N/A)	0.0	0.0	1.00
Summer Hill	19,076	63	-3,110	-773	-13	18,528	61	33,722	111(N/A)	0.2	0.3	1.52
Northview Heights	1,417	5	-248	-70	-1	1,877	6	2,976	10(N/A)	0.0	0.0	1.64
Crawford-Roberts	51,065	169	-6,034	-1,743	-26	57,421	189	100,708	332(N/A)	1.4	0.9	0.71
Strip District	24,362	80	-2,763	-1,710	-15	31,818	105	51,707	171(N/A)	1.3	0.4	0.39
Polish Hill	19,418	64	-3,328	-1,236	-15	24,188	80	39,042	129(N/A)	0.7	0.3	0.55
Lower Lawrenceville	47,450	157	-5,909	-1,893	-26	57,025	188	96,674	319(N/A)	1.4	0.8	0.70
Chartiers City	7,160	24	-2,368	-517	-10	11,334	37	15,609	52(N/A)	0.1	0.1	1.43
West End	12,579	42	-1,632	-490	-7	13,585	45	24,041	79(N/A)	0.3	0.2	0.71
Citywide total	5,814,956	19,189	-1,155,807	-305,143	-4,821	7,262,706	23,967	11,616,712	38,335(N/A)	100.0	100.0	1.14

# Pittsburgh

## Stored CO2 Benefits of Public Trees by Zone

7/23/2015

Zone	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
East Liberty	2,248,152	7,419	(N/A)	3.6	1.9	6.09
Shadyside	6,021,984	19,873	(N/A)	4.0	5.0	14.75
Central Lawrencevi	1,297,048	4,280	(N/A)	3.7	1.1	3.48
Stanton Heights	4,371,437	14,426	(N/A)	1.9	3.6	23.01
Morningside	1,073,234	3,542	(N/A)	1.1	0.9	9.65
Upper Lawrencevil	550,147	1,815	(N/A)	0.9	0.5	5.84
Garfield	1,699,454	5,608	(N/A)	1.5	1.4	11.35
Highland Park	5,260,688	17,360	(N/A)	3.3	4.4	15.68
Larimer	839,553	2,771	(N/A)	0.8	0.7	9.76
Point Breeze North	2,342,990	7,732	(N/A)	1.3	2.0	18.28
Homewood South	940,802	3,105	(N/A)	0.9	0.8	10.25
Homewood North	912,477	3,011	(N/A)	0.9	0.8	10.35
Homewood West	233,254	770	(N/A)	0.2	0.2	11.16
Lincoln-Lemington	2,726,567	8,998	(N/A)	1.4	2.3	18.94
East Hills	1,980,219	6,535	(N/A)	1.2	1.7	15.75
Greenfield	2,541,744	8,388	(N/A)	1.8	2.1	14.00
Hazelwood	1,702,954	5,620	(N/A)	1.5	1.4	11.47
Squirrel Hill South	9,840,169	32,473	(N/A)	7.2	8.2	13.47
Marshall-Shadelanc	2,068,850	6,827	(N/A)	1.3	1.7	16.03
Brighton Heights	3,130,379	10,330	(N/A)	2.3	2.6	13.38
Perry North	1,097,233	3,621	(N/A)	0.9	0.9	11.53
Overbrook	1,094,558	3,612	(N/A)	0.7	0.9	14.56
Carrick	2,628,492	8,674	(N/A)	2.0	2.2	13.20
Brookline	3,474,124	11,465	(N/A)	2.2	2.9	15.18
Knoxville	1,877,904	6,197	(N/A)	1.2	1.6	14.93
South Side Slopes	317,361	1,047	(N/A)	0.5	0.3	5.88
Arlington Heights	42,629	141	(N/A)	0.0	0.0	35.17
South Side Flats	1,284,144	4,238	(N/A)	4.5	1.1	2.82
Arlington	189,699	626	(N/A)	0.2	0.2	7.63
Mt. Oliver	20,903	69	(N/A)	0.0	0.0	5.31
St. Clair	52,554	173	(N/A)	0.0	0.0	14.45
Bedford Dwellings	245,979	812	(N/A)	0.5	0.2	4.86
Middle Hill	331,518	1,094	(N/A)	0.7	0.3	4.38
Central Business Di	560,827	1,851	(N/A)	2.8	0.5	1.94
Bluff	170,652	563	(N/A)	0.6	0.1	2.82
West Oakland	55,624	184	(N/A)	0.2	0.0	2.59
Terrace Village	218,439	721	(N/A)	0.8	0.2	2.84
South Oakland	352,931	1,165	(N/A)	0.6	0.3	6.07
Central Oakland	520,370	1,717	(N/A)	0.7	0.4	7.22
North Oakland	2,074,583	6,846	(N/A)	1.7	1.7	11.91
Point Breeze	7,115,905	23,482	(N/A)	2.9	5.9	23.82
Squirrel Hill North	14,713,198	48,554	(N/A)	4.9	12.3	29.75
Crafton Heights	1,535,186	5,066	(N/A)	0.9	1.3	16.89
Allentown	183,484	605	(N/A)	0.2	0.2	9.93
Beltzhoover	368,821	1,217	(N/A)	0.4	0.3	9.90
Bon Air	365,435	1,206	(N/A)	0.2	0.3	14.71
Mount Washington	2,066,456	6,819	(N/A)	2.1	1.7	9.90
Hays	2,645	9	(N/A)	0.0	0.0	4.36
New Homestead	1,186,077	3,914	(N/A)	0.5	1.0	21.74
North Shore	204,882	676	(N/A)	1.3	0.2	1.55
Chateau	271,109	895	(N/A)	0.7	0.2	3.86
Allegheny West	486,430	1,605	(N/A)	0.7	0.4	6.83
California-Kirkbrid	196,229	648	(N/A)	0.3	0.2	7.71
Allegheny Center	49,698	164	(N/A)	0.1	0.0	8.20
East Allegheny	496,740	1,639	(N/A)	1.0	0.4	4.72

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

# Stored CO2 Benefits of Public Trees by Zone

7/23/2015

Zone	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Troy Hill	58,184	192	(N/A)	0.5	0.0	1.12
Duquesne Heights	142,888	472	(N/A)	0.2	0.1	6.83
Beechview	1,819,393	6,004	(N/A)	1.6	1.5	10.90
South Shore	493	2	(N/A)	0.0	0.0	1.63
Manchester	1,014,357	3,347	(N/A)	1.7	0.8	5.75
Perry South	1,705,993	5,630	(N/A)	0.9	1.4	18.96
Fineview	282,586	933	(N/A)	0.2	0.2	11.37
Upper Hill	536,055	1,769	(N/A)	0.4	0.4	13.40
Windgap	3,094,679	10,212	(N/A)	3.9	2.6	7.89
Friendship	546,374	1,803	(N/A)	0.9	0.5	5.84
Regent Square	1,469,812	4,850	(N/A)	0.7	1.2	21.00
Swisshelm Park	1,904,482	6,285	(N/A)	0.7	1.6	26.97
Spring Hill-City Vi	178,395	589	(N/A)	0.3	0.1	6.33
Spring Garden	54,064	178	(N/A)	0.1	0.0	3.64
Esplen	3,180	10	(N/A)	0.0	0.0	5.25
Westwood	1,109,125	3,660	(N/A)	0.7	0.9	14.64
Ridgemont	113,648	375	(N/A)	0.1	0.1	12.50
Oakwood	448,235	1,479	(N/A)	0.3	0.4	16.62
East Carnegie	9,523	31	(N/A)	0.0	0.0	7.86
Sheraden	1,050,780	3,468	(N/A)	0.9	0.9	12.08
Fairywood	329,162	1,086	(N/A)	0.1	0.3	38.79
Elliott	658,155	2,172	(N/A)	0.4	0.5	15.63
Banksville	2,581,442	8,519	(N/A)	1.3	2.2	19.72
Lincoln Place	1,172,551	3,869	(N/A)	0.7	1.0	15.99
Glen Hazel	2,970	10	(N/A)	0.0	0.0	4.90
Summer Hill	358,551	1,183	(N/A)	0.2	0.3	16.21
Northview Heights	23,727	78	(N/A)	0.0	0.0	13.05
Crawford-Roberts	431,041	1,422	(N/A)	1.4	0.4	3.06
Strip District	155,942	515	(N/A)	1.3	0.1	1.17
Polish Hill	235,640	778	(N/A)	0.7	0.2	3.29
Lower Lawrencevil	467,346	1,542	(N/A)	1.4	0.4	3.40
Chartiers City	215,164	710	(N/A)	0.1	0.2	19.72
West End	144,476	477	(N/A)	0.3	0.1	4.30
Citywide total	119,953,329	395,846	(N/A)	100.0	100.0	11.79

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

## *Energy Benefits By Neighborhood*

Neighborhood	Energy Benefits	Square Miles	Acres	Benefits Per Acre	Trees	Benefits Per Tree
Allegheny Center	\$25.58	0.21	134.4	\$0.19	20	\$1.28
Allegheny West	\$488.73	0.141	90.24	\$5.42	235	\$2.08
Allentown	\$72.13	0.295	188.8	\$0.38	61	\$1.18
Arlington	\$207.89	0.47	300.8	\$0.69	82	\$2.54
Arlington Heights	\$13.72	0.132	84.48	\$0.16	4	\$3.43
Banksville	\$1,754.96	0.969	620.16	\$2.83	432	\$4.06
Bedford Dwellings	\$143.20	0.179	114.56	\$1.25	167	\$0.86
Beechview	\$2,217.81	1.46	934.4	\$2.37	551	\$4.03
Beltzhoover	\$240.49	0.421	269.44	\$0.89	123	\$1.96
Bloomfield	\$2,690.40	0.702	449.28	\$5.99	1185	\$2.27
Bluff	\$164.09	0.327	209.28	\$0.78	200	\$0.82
Bon Air	\$411.41	0.313	200.32	\$2.05	82	\$5.02
Brighton Heights	\$3,302.09	1.117	714.88	\$4.62	766	\$4.31
Brookline	\$3,678.93	2.082	1332.48	\$2.76	752	\$4.89
California-Kirkbride	\$285.77	0.217	138.88	\$2.06	84	\$3.40
Carrick	\$2,473.12	1.673	1070.72	\$2.31	656	\$3.77
Central Business District	\$906.95	0.64	409.6	\$2.21	953	\$0.95
Central Lawrenceville	\$723.35	0.963	616.32	\$1.17	610	\$1.19
Central Northside	\$1,567.87	0.259	165.76	\$9.46	604	\$2.60
Central Oakland	\$537.38	0.281	179.84	\$2.99	238	\$2.26
Chartiers City	\$295.06	0.132	84.48	\$3.49	36	\$8.20
Chateau	\$376.25	0.383	245.12	\$1.53	232	\$1.62
Crafton Heights	\$990.37	0.754	482.56	\$2.05	299	\$3.31
Crawford-Roberts	\$490.33	0.258	165.12	\$2.97	465	\$1.05
Duquesne Heights	\$188.05	0.623	398.72	\$0.47	73	\$2.58
East Allegheny	\$793.03	0.236	151.04	\$5.25	346	\$2.29
East Carnegie	\$17.73	0.432	276.48	\$0.06	4	\$4.43
East Hills	\$1,336.07	0.541	346.24	\$3.86	415	\$3.22
East Liberty	\$1,740.87	0.581	371.84	\$4.68	1218	\$1.43
Elliott	\$254.36	0.606	387.84	\$0.66	138	\$1.84
Esplen	\$0.00	0.23	147.2	\$0.00	2	\$0.00
Fairywood	\$133.35	0.969	620.16	\$0.22	28	\$4.76
Fineview	\$294.76	0.25	160	\$1.84	82	\$3.59
Friendship	\$376.32	0.106	67.84	\$5.55	309	\$1.22
Garfield	\$1,208.47	0.457	292.48	\$4.13	492	\$2.46
Glen Hazel	\$0.00	0.456	291.84	\$0.00	2	\$0.00
Greenfield	\$1,792.25	0.773	494.72	\$3.62	599	\$2.99

Neighborhood	Energy Benefits	Square Miles	Acres	Benefits Per Acre	Trees	Benefits Per Tree
Hays	\$0.00	1.75	1120	\$0.00	2	\$0.00
Hazelwood	\$1,569.39	1.583	1013.12	\$1.55	490	\$3.20
Highland Park	\$3,531.79	1.163	744.32	\$4.74	1102	\$3.20
Homewood North	\$996.89	0.434	277.76	\$3.59	290	\$3.44
Homewood South	\$934.26	0.398	254.72	\$3.67	301	\$3.10
Homewood West	\$511.55	0.199	127.36	\$4.02	69	\$7.41
Knoxville	\$1,350.98	0.302	193.28	\$6.99	415	\$3.26
Larimer	\$520.59	0.445	284.8	\$1.83	284	\$1.83
Lincoln Place	\$1,096.54	0.984	629.76	\$1.74	242	\$4.53
Lincoln-Lemington-Belmar	\$1,648.17	0.28	179.2	\$9.20	475	\$3.47
Lower Lawrenceville	\$634.29	0.43	275.2	\$2.30	454	\$1.40
Manchester	\$980.27	0.279	178.5	\$5.49	582	\$1.68
Marshall-Shadeland	\$1,495.29	0.231	147.84	\$10.11	425	\$3.52
Middle Hill	\$450.87	0.305	195.2	\$2.31	250	\$1.80
Morningside	\$1,154.52	0.382	244.48	\$4.72	364	\$3.17
Mount Washington	\$1,797.92	1.139	728.96	\$2.47	689	\$2.61
Mt. Oliver	\$8.99	0.103	65.92	\$0.14	13	\$0.69
New Homestead	\$776.11	0.794	508.16	\$1.53	180	\$4.31
North Oakland	\$1,922.95	0.499	319.36	\$6.02	575	\$3.34
North Shore	\$693.61	0.303	193.92	\$3.58	435	\$1.59
Northview Heights	-\$0.60	0.313	200.32	\$0.00	6	-\$0.10
Oakwood	\$206.57	0.252	161.28	\$1.28	89	\$2.32
Overbrook	\$1,130.10	0.839	536.96	\$2.10	248	\$4.56
Perry North	\$741.09	1.212	775.68	\$0.96	311	\$2.38
Perry South	\$1,151.90	0.905	579.2	\$1.99	297	\$3.88
Point Breeze	\$3,428.25	1.004	642.56	\$5.34	977	\$3.51
Point Breeze North	\$1,223.11	0.286	183.04	\$6.68	423	\$2.89
Polish Hill	\$326.82	0.255	163.2	\$2.00	236	\$1.38
Regent Square	\$899.03	0.192	122.88	\$7.32	230	\$3.91
Ridgemont	\$120.87	0.369	236.16	\$0.51	30	\$4.03
Shadyside	\$3,918.24	0.921	589.44	\$6.65	1343	\$2.92
Sheraden	\$1,164.35	0.89	569.6	\$2.04	287	\$4.06
South Oakland	\$241.66	0.508	325.12	\$0.74	192	\$1.26
South Shore	\$4.57	0.212	135.68	\$0.03	1	\$4.57
South Side Flats	\$1,957.56	0.936	599.04	\$3.27	1501	\$1.30
South Side Slopes	\$287.94	0.716	458.24	\$0.63	178	\$1.62
Spring Garden	\$41.05	0.275	176	\$0.23	49	\$0.84
Spring Hill-City View	\$328.37	0.63	403.2	\$0.81	93	\$3.53
Squirrel Hill North	\$9,125.88	1.222	782.08	\$11.67	1620	\$5.63
Squirrel Hill South	\$8,019.15	2.671	1709.44	\$4.69	2405	\$3.33

Neighborhood	Energy Benefits	Square Miles	Acres	Benefits Per Acre	Trees	Benefits Per Tree
St. Clair	\$19.86	0.31	198.4	\$0.10	12	\$1.66
Stanton Heights	\$3,257.00	0.735	470.4	\$6.92	622	\$5.24
Strip District	\$347.39	0.608	389.12	\$0.89	438	\$0.79
Summer Hill	\$329.42	0.439	280.96	\$1.17	73	\$4.51
Swisshelm Park	\$1,100.65	0.48	307.2	\$3.58	233	\$4.72
Terrace Village	\$257.31	0.342	218.88	\$1.18	254	\$1.01
Troy Hill	\$59.74	0.384	245.76	\$0.24	178	\$0.34
Upper Hill	\$203.37	0.313	200.32	\$1.02	131	\$1.55
Upper Lawrenceville	\$653.70	0.405	259.2	\$2.52	311	\$2.10
West End	\$243.11	0.2	128	\$1.90	111	\$2.19
West Oakland	\$14.15	0.215	137.6	\$0.10	71	\$0.20
Westwood	\$1,042.68	0.692	442.88	\$2.35	250	\$4.17
Windgap	\$392.29	0.415	265.6	\$1.48	105	\$3.74

## *Stormwater Benefits By Neighborhood*

<b>Neighborhood</b>	<b>Benefits</b>	<b>acres</b>	<b>Benefits per Acres</b>	<b>Trees</b>	<b>Benefits per tree</b>	<b>Runoff avoided (ft3)</b>	<b>Runoff avoided (gal.)</b>
Allegheny Center	\$74	134.4	\$0.55	20	\$3.72	1118.06	8363.64
Allegheny West	\$717	90.2	\$7.95	235	\$3.05	10776.24	80611.61
Allentown	\$196	188.8	\$1.04	61	\$3.22	2945.49	22033.72
Arlington	\$261	300.8	\$0.87	82	\$3.18	3915.49	29289.80
Arlington Heights	\$17	84.5	\$0.21	4	\$4.34	260.46	1948.37
Banksville	\$1,678	620.2	\$2.71	432	\$3.88	25196.94	188485.57
Bedford Dwellings	\$306	114.6	\$2.67	167	\$1.83	4596.61	34384.92
Beechview	\$2,088	934.4	\$2.23	551	\$3.79	31364.02	234618.38
Beltzhoover	\$448	269.4	\$1.66	123	\$3.64	6732.12	50359.59
Bloomfield	\$3,327	449.3	\$7.41	1185	\$2.81	49978.91	373866.97
Bluff	\$350	209.3	\$1.67	200	\$1.75	5256.11	39318.30
Bon Air	\$461	200.3	\$2.30	82	\$5.62	6919.08	51758.14
Brighton Heights	\$3,931	714.9	\$5.50	766	\$5.13	59041.64	441660.67
Brookline	\$3,476	1332.5	\$2.61	752	\$4.62	52210.63	390561.34
California-Kirkbride	\$276	138.9	\$1.99	84	\$3.28	4142.49	30987.87
Carrick	\$2,937	1070.7	\$2.74	656	\$4.48	44106.87	329941.20
Central Business District	\$1,346	409.6	\$3.29	953	\$1.41	20219.59	151252.53
Central Lawrenceville	\$903	616.3	\$1.47	610	\$1.48	13563.56	101462.14
Central Northside	\$1,427	165.8	\$8.61	604	\$2.36	21425.12	160270.49
Central Oakland	\$759	179.8	\$4.22	238	\$3.19	11401.18	85286.47
Chartiers City	\$341	84.5	\$4.04	36	\$9.47	5122.36	38317.79
Chateau	\$266	245.1	\$1.09	232	\$1.15	4001.75	29935.07
Crafton Heights	\$1,552	482.6	\$3.22	299	\$5.19	23305.54	174336.97
Crawford-Roberts	\$874	165.1	\$5.29	465	\$1.88	13132.56	98238.04
Duquesne Heights	\$234	398.7	\$0.59	73	\$3.21	3518.99	26323.79
East Allegheny	\$808	151.0	\$5.35	346	\$2.33	12133.2	90762.34
East Carnegie	\$10	276.5	\$0.04	4	\$2.54	152.6	1141.52
East Hills	\$2,194	346.2	\$6.34	415	\$5.29	32959.01	246549.70
East Liberty	\$3,695	371.8	\$9.94	1218	\$3.03	55495.07	415130.57
Elliott	\$818	387.8	\$2.11	138	\$5.92	12279.33	91855.46
Esplen	\$3	147.2	\$0.02	2	\$1.73	51.98	388.84
Fairywood	\$136	620.2	\$0.22	28	\$4.84	2037.64	15242.56
Fineview	\$293	160.0	\$1.83	82	\$3.57	4395.39	32879.69
Friendship	\$856	67.8	\$12.62	309	\$2.77	12857.26	96178.66
Garfield	\$1,342	292.5	\$4.59	492	\$2.73	20162.41	150824.80
Glen Hazel	\$1	291.8	\$0.00	2	\$0.26	7.78	58.20
Greenfield	\$2,737	494.7	\$5.53	599	\$4.57	41113.47	307549.09
Hays	\$0	1120.0	\$0.00	2	\$0.00	0	0.00

<b>Neighborhood</b>	<b>Benefits</b>	<b>acres</b>	<b>Benefits per Acres</b>	<b>Trees</b>	<b>Benefits per tree</b>	<b>Runoff avoided (ft3)</b>	<b>Runoff avoided (gal.)</b>
Hazelwood	\$1,568	1013.1	\$1.55	490	\$3.20	23557.24	176219.81
Highland Park	\$5,802	744.3	\$7.79	1102	\$5.26	87146.21	651896.75
Homewood North	\$1,599	277.8	\$5.76	290	\$5.51	24022.98	179703.77
Homewood South	\$1,449	254.7	\$5.69	301	\$4.81	21759.26	162770.03
Homewood West	\$246	127.4	\$1.93	69	\$3.56	3693.35	27628.08
Knoxville	\$2,993	193.3	\$15.49	415	\$7.21	44954.19	336279.58
Larimer	\$976	284.8	\$3.43	284	\$3.44	14652.9	109610.94
Lincoln Place	\$1,084	629.8	\$1.72	242	\$4.48	16287.07	121835.34
Lincoln-Lemington-Belmar	\$2,426	179.2	\$13.54	475	\$5.11	36439.51	272585.56
Lower Lawrenceville	\$689	275.2	\$2.51	454	\$1.52	10358.14	77484.01
Manchester	\$1,417	178.6	\$7.94	582	\$2.44	21288.66	159249.71
Marshall-Shadeland	\$1,597	147.8	\$10.80	425	\$3.76	23991.7	179469.78
Middle Hill	\$450	195.2	\$2.30	250	\$1.80	6752.68	50513.39
Morningside	\$1,781	244.5	\$7.28	364	\$4.89	26743.48	200054.46
Mount Washington	\$2,400	729.0	\$3.29	689	\$3.48	36048.73	269662.33
Mt. Oliver	\$57	65.9	\$0.86	13	\$4.39	856.64	6408.09
New Homestead	\$1,096	508.2	\$2.16	180	\$6.09	16460.2	123130.44
North Oakland	\$2,245	319.4	\$7.03	575	\$3.91	33725.07	252280.20
North Shore	\$406	193.9	\$2.09	435	\$0.93	6096.84	45607.38
Northview Heights	\$29	200.3	\$0.14	6	\$4.79	431.67	3229.11
Oakwood	\$509	161.3	\$3.16	89	\$5.72	7649.02	57218.45
Overbrook	\$1,599	537.0	\$2.98	248	\$6.45	24014.58	179640.94
Perry North	\$1,361	775.7	\$1.75	311	\$4.38	20438.65	152891.21
Perry South	\$1,109	579.2	\$1.91	297	\$3.73	16653.16	124573.87
Point Breeze	\$7,021	642.6	\$10.93	977	\$7.19	105464.75	788928.49
Point Breeze North	\$2,314	183.0	\$12.64	423	\$5.47	34755.92	259991.47
Polish Hill	\$356	163.2	\$2.18	236	\$1.51	5352.9	40042.34
Regent Square	\$1,608	122.9	\$13.08	230	\$6.99	24146.13	180625.00
Ridgemont	\$72	236.2	\$0.31	30	\$2.41	1084.94	8115.89
Shadyside	\$5,757	589.4	\$9.77	1343	\$4.29	86478.08	646898.81
Sheraden	\$1,604	569.6	\$2.82	287	\$5.59	24095.54	180246.56
South Oakland	\$543	325.1	\$1.67	192	\$2.83	8156.47	61014.43
South Shore	\$1	135.7	\$0.01	1	\$0.86	12.95	96.87
South Side Flats	\$2,555	599.0	\$4.27	1501	\$1.70	38375.13	287064.95
South Side Slopes	\$626	458.2	\$1.37	178	\$3.52	9402.72	70337.00
Spring Garden	\$53	176.0	\$0.30	49	\$1.08	793.82	5938.17
Spring Hill-City View	\$257	403.2	\$0.64	93	\$2.77	3864.98	28911.96
Squirrel Hill North	\$14,395	782.1	\$18.41	1620	\$8.89	216219.78	1617430.90
Squirrel Hill South	\$11,201	1709.4	\$6.55	2405	\$4.66	168248.03	1258578.48
St. Clair	\$78	198.4	\$0.39	12	\$6.49	1170.02	8752.33



<b>Neighborhood</b>	<b>Benefits</b>	<b>acres</b>	<b>Benefits per Acres</b>	<b>Trees</b>	<b>Benefits per tree</b>	<b>Runoff avoided (ft3)</b>	<b>Runoff avoided (gal.)</b>
Stanton Heights	\$4,271	470.4	\$9.08	622	\$6.87	64153.06	479896.62
Strip District	\$382	389.1	\$0.98	438	\$0.87	5743.99	42967.89
Summer Hill	\$380	281.0	\$1.35	73	\$5.21	5714.56	42747.74
Swisshelm Park	\$1,420	307.2	\$4.62	233	\$6.10	21333.25	159583.26
Terrace Village	\$385	218.9	\$1.76	254	\$1.52	5784.14	43268.23
Troy Hill	\$67	245.8	\$0.27	178	\$0.37	998.71	7470.84
Upper Hill	\$450	200.3	\$2.24	131	\$3.43	6752.63	50513.01
Upper Lawrenceville	\$852	259.2	\$3.29	311	\$2.74	12803.19	95774.19
West End	\$270	128.0	\$2.11	111	\$2.43	4053.31	30320.76
West Oakland	\$101	137.6	\$0.73	71	\$1.42	1511.36	11305.72
Westwood	\$1,243	442.9	\$2.81	250	\$4.97	18666.02	139631.06
Windgap	\$559	265.6	\$2.11	105	\$5.33	8402.49	62854.78

# Pittsburgh

## Annual Aesthetic/Other Benefits of Public Trees by Zone

7/23/2015

Zone	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
East Liberty	46,970	(N/A)	3.6	3.0	38.53
Shadyside	67,523	(N/A)	4.0	4.3	50.13
Central Lawrencevill	43,117	(N/A)	3.7	2.8	35.03
Stanton Heights	31,970	(N/A)	1.9	2.1	50.99
Morningside	14,947	(N/A)	1.1	1.0	40.73
Upper Lawrenceville	16,262	(N/A)	0.9	1.0	52.29
Garfield	24,436	(N/A)	1.5	1.6	49.47
Highland Park	53,753	(N/A)	3.3	3.5	48.56
Larimer	12,475	(N/A)	0.8	0.8	43.92
Point Breeze North	21,319	(N/A)	1.3	1.4	50.40
Homewood South	14,117	(N/A)	0.9	0.9	46.59
Homewood North	13,279	(N/A)	0.9	0.9	45.63
Homewood West	3,639	(N/A)	0.2	0.2	52.73
Lincoln-Lemington-Be	28,267	(N/A)	1.4	1.8	59.51
East Hills	23,124	(N/A)	1.2	1.5	55.72
Greenfield	26,181	(N/A)	1.8	1.7	43.71
Hazelwood	25,350	(N/A)	1.5	1.6	51.73
Squirrel Hill South	115,558	(N/A)	7.2	7.4	47.93
Marshall-Shadeland	21,256	(N/A)	1.3	1.4	49.90
Brighton Heights	38,069	(N/A)	2.3	2.4	49.31
Perry North	16,896	(N/A)	0.9	1.1	53.81
Overbrook	11,089	(N/A)	0.7	0.7	44.71
Carrick	26,655	(N/A)	2.0	1.7	40.57
Brookline	37,746	(N/A)	2.2	2.4	49.99
Knoxville	19,866	(N/A)	1.2	1.3	47.87
South Side Slopes	6,382	(N/A)	0.5	0.4	35.86
Arlington Heights	294	(N/A)	0.0	0.0	73.57
South Side Flats	63,257	(N/A)	4.5	4.1	42.14
Arlington	2,572	(N/A)	0.2	0.2	31.36
Mt. Oliver	551	(N/A)	0.0	0.0	42.37
St. Clair	955	(N/A)	0.0	0.1	79.58
Bedford Dwellings	6,368	(N/A)	0.5	0.4	38.13
Middle Hill	9,755	(N/A)	0.7	0.6	39.02
Central Business Dis	35,923	(N/A)	2.8	2.3	37.69
Bluff	6,995	(N/A)	0.6	0.4	34.98
West Oakland	2,272	(N/A)	0.2	0.1	32.00
Terrace Village	11,372	(N/A)	0.8	0.7	44.77
South Oakland	7,333	(N/A)	0.6	0.5	38.20
Central Oakland	9,562	(N/A)	0.7	0.6	40.18
North Oakland	26,353	(N/A)	1.7	1.7	45.83
Point Breeze	55,915	(N/A)	2.9	3.6	56.71
Squirrel Hill North	101,024	(N/A)	4.9	6.5	61.90
Crafton Heights	16,398	(N/A)	0.9	1.1	54.66
Allentown	3,319	(N/A)	0.2	0.2	54.41
Beltzhoover	5,546	(N/A)	0.4	0.4	45.09
Bon Air	3,481	(N/A)	0.2	0.2	42.46
Mount Washington	31,798	(N/A)	2.1	2.0	46.15
Hays	74	(N/A)	0.0	0.0	37.21

# Annual Aesthetic/Other Benefits of Public Trees by Zone

7/23/2015

Zone	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
New Homestead	8,672	(N/A)	0.5	0.6	48.18
North Shore	13,941	(N/A)	1.3	0.9	32.05
Chateau	10,450	(N/A)	0.7	0.7	45.04
Allegheny West	9,425	(N/A)	0.7	0.6	40.11
California-Kirkbride	3,868	(N/A)	0.3	0.2	46.04
Allegheny Center	653	(N/A)	0.1	0.0	32.66
East Allegheny	15,944	(N/A)	1.0	1.0	45.95
Troy Hill	4,333	(N/A)	0.5	0.3	25.19
Duquesne Heights	3,048	(N/A)	0.2	0.2	44.18
Beechview	21,163	(N/A)	1.6	1.4	38.41
South Shore	26	(N/A)	0.0	0.0	26.48
Manchester	28,019	(N/A)	1.7	1.8	48.14
Perry South	17,353	(N/A)	0.9	1.1	58.43
Fineview	4,618	(N/A)	0.2	0.3	56.31
Upper Hill	6,560	(N/A)	0.4	0.4	49.70
Windgap	55,395	(N/A)	3.9	3.6	42.78
Friendship	11,850	(N/A)	0.9	0.8	38.35
Regent Square	12,597	(N/A)	0.7	0.8	54.53
Swisshelm Park	11,493	(N/A)	0.7	0.7	49.33
Spring Hill-City Vie	4,117	(N/A)	0.3	0.3	44.26
Spring Garden	1,941	(N/A)	0.1	0.1	39.60
Esplen	92	(N/A)	0.0	0.0	45.90
Westwood	11,056	(N/A)	0.7	0.7	44.22
Ridgemont	1,417	(N/A)	0.1	0.1	47.25
Oakwood	3,819	(N/A)	0.3	0.2	42.92
East Carnegie	252	(N/A)	0.0	0.0	63.04
Sheraden	12,934	(N/A)	0.9	0.8	45.07
Fairywood	2,134	(N/A)	0.1	0.1	76.20
Elliott	6,622	(N/A)	0.4	0.4	47.64
Banksville	20,427	(N/A)	1.3	1.3	47.28
Lincoln Place	11,054	(N/A)	0.7	0.7	45.68
Glen Hazel	63	(N/A)	0.0	0.0	31.47
Summer Hill	4,218	(N/A)	0.2	0.3	57.78
Northview Heights	399	(N/A)	0.0	0.0	66.49
Crawford-Roberts	25,580	(N/A)	1.4	1.6	55.01
Strip District	14,542	(N/A)	1.3	0.9	33.20
Polish Hill	7,564	(N/A)	0.7	0.5	32.05
Lower Lawrenceville	21,054	(N/A)	1.4	1.4	46.37
Chartiers City	1,354	(N/A)	0.1	0.1	37.61
West End	5,339	(N/A)	0.3	0.3	48.09
Citywide total	1,556,747	(N/A)	100.0	100.0	46.38

## *Structural Value Benefits By Neighborhood*

<b>Neighborhood</b>	<b>Structural value</b>	<b>Neighborhood acres</b>	<b>Value/Acre</b>	<b>Trees</b>	<b>Value/ Tree</b>
Allegheny Center	\$39,827	134.4	\$296.33	20	\$1,991
Allegheny West	\$262,896	90.24	\$2,913.30	235	\$1,119
Allentown	\$80,852	188.8	\$428.24	61	\$1,325
Arlington	\$52,694	300.8	\$175.18	82	\$643
Arlington Heights	\$5,442	84.48	\$64.42	4	\$1,361
Banksville	\$1,056,183	620.16	\$1,703.08	432	\$2,445
Bedford Dwellings	\$140,731	114.56	\$1,228.45	167	\$843
Beechview	\$809,762	934.4	\$866.61	551	\$1,470
Beltzhoover	\$131,511	269.44	\$488.09	123	\$1,069
Bloomfield	\$1,340,759	449.28	\$2,984.24	1185	\$1,131
Bluff	\$113,564	209.28	\$542.64	200	\$568
Bon Air	\$129,020	200.32	\$644.07	82	\$1,573
Brighton Heights	\$1,210,939	714.88	\$1,693.91	766	\$1,581
Brookline	\$1,563,593	1332.48	\$1,173.45	752	\$2,079
California-Kirkbride	\$53,911	138.88	\$388.18	84	\$642
Carrick	\$1,105,254	1070.72	\$1,032.25	656	\$1,685
Central Business District	\$576,636	409.6	\$1,407.80	953	\$605
Central Lawrenceville	\$307,154	616.32	\$498.37	610	\$504
Central Northside	\$437,081	165.76	\$2,636.83	604	\$724
Central Oakland	\$237,164	179.84	\$1,318.75	238	\$996
Chartiers City	\$109,938	84.48	\$1,301.35	36	\$3,054
Chateau	\$176,296	245.12	\$719.22	232	\$760
Crafton Heights	\$570,339	482.56	\$1,181.90	299	\$1,907
Crawford-Roberts	\$296,523	165.12	\$1,795.80	465	\$638
Duquesne Heights	\$109,702	398.72	\$275.14	73	\$1,503
East Allegheny	\$285,616	151.04	\$1,891.00	346	\$825
East Carnegie	\$5,567	276.48	\$20.14	4	\$1,392
East Hills	\$628,089	346.24	\$1,814.03	415	\$1,513
East Liberty	\$1,157,770	371.84	\$3,113.62	1218	\$951
Elliott	\$278,203	387.84	\$717.31	138	\$2,016
Esplen	\$2,942	147.2	\$19.99	2	\$1,471
Fairywood	\$91,618	620.16	\$147.73	28	\$3,272
Fineview	\$95,518	160	\$596.99	82	\$1,165
Friendship	\$318,780	67.84	\$4,699.00	309	\$1,032
Garfield	\$568,611	292.48	\$1,944.10	492	\$1,156
Glen Hazel	\$187	291.84	\$0.64	2	\$94
Greenfield	\$1,058,752	494.72	\$2,140.10	599	\$1,768
Hays	\$0	1120	\$0.00	2	\$0

<b>Neighborhood</b>	<b>Structural value</b>	<b>Neighborhood acres</b>	<b>Value/Acre</b>	<b>Trees</b>	<b>Value/ Tree</b>
Hazelwood	\$595,245	1013.12	\$587.54	490	\$1,215
Highland Park	\$2,357,901	744.32	\$3,167.86	1102	\$2,140
Homewood North	\$316,307	277.76	\$1,138.78	290	\$1,091
Homewood South	\$354,949	254.72	\$1,393.49	301	\$1,179
Homewood West	\$72,126	127.36	\$566.32	69	\$1,045
Knoxville	\$751,782	193.28	\$3,889.60	415	\$1,812
Larimer	\$348,799	284.8	\$1,224.72	284	\$1,228
Lincoln Place	\$531,534	629.76	\$844.03	242	\$2,196
Lincoln-Lemington-Belmar	\$587,661	179.2	\$3,279.36	475	\$1,237
Lower Lawrenceville	\$331,856	275.2	\$1,205.87	454	\$731
Manchester	\$503,680	178.56	\$2,820.79	582	\$865
Marshall-Shadeland	\$648,324	147.84	\$4,385.31	425	\$1,525
Middle Hill	\$149,050	195.2	\$763.58	250	\$596
Morningside	\$490,298	244.48	\$2,005.47	364	\$1,347
Mount Washington	\$988,077	728.96	\$1,355.46	689	\$1,434
Mt. Oliver	\$14,504	65.92	\$220.02	13	\$1,116
New Homestead	\$492,229	508.16	\$968.65	180	\$2,735
North Oakland	\$1,102,393	319.36	\$3,451.88	575	\$1,917
North Shore	\$256,218	193.92	\$1,321.26	435	\$589
Northview Heights	\$8,948	200.32	\$44.67	6	\$1,491
Oakwood	\$186,980	161.28	\$1,159.35	89	\$2,101
Overbrook	\$389,463	536.96	\$725.31	248	\$1,570
Perry North	\$480,636	775.68	\$619.63	311	\$1,545
Perry South	\$485,176	579.2	\$837.67	297	\$1,634
Point Breeze	\$2,760,630	642.56	\$4,296.30	977	\$2,826
Point Breeze North	\$906,381	183.04	\$4,951.82	423	\$2,143
Polish Hill	\$136,148	163.2	\$834.24	236	\$577
Regent Square	\$598,270	122.88	\$4,868.73	230	\$2,601
Ridgemont	\$34,033	236.16	\$144.11	30	\$1,134
Shadyside	\$2,475,339	589.44	\$4,199.48	1343	\$1,843
Sheraden	\$550,518	569.6	\$966.50	287	\$1,918
South Oakland	\$171,415	325.12	\$527.24	192	\$893
South Shore	\$788	135.68	\$5.81	1	\$788
South Side Flats	\$897,629	599.04	\$1,498.45	1501	\$598
South Side Slopes	\$164,238	458.24	\$358.41	178	\$923
Spring Garden	\$38,494	176	\$218.72	49	\$786
Spring Hill-City View	\$97,139	403.2	\$240.92	93	\$1,045
Squirrel Hill North	\$5,550,261	782.08	\$7,096.79	1620	\$3,426
Squirrel Hill South	\$4,547,219	1709.44	\$2,660.06	2405	\$1,891

<b>Neighborhood</b>	<b>Structural value</b>	<b>Neighborhood acres</b>	<b>Value/Acre</b>	<b>Trees</b>	<b>Value/ Tree</b>
St. Clair	\$5,180	198.4	\$26.11	12	\$432
Stanton Heights	\$1,632,902	470.4	\$3,471.31	622	\$2,625
Strip District	\$173,410	389.12	\$445.65	438	\$396
Summer Hill	\$125,533	280.96	\$446.80	73	\$1,720
Swisshelm Park	\$650,360	307.2	\$2,117.06	233	\$2,791
Terrace Village	\$147,313	218.88	\$673.03	254	\$580
Troy Hill	\$45,173	245.76	\$183.81	178	\$254
Upper Hill	\$227,375	200.32	\$1,135.06	131	\$1,736
Upper Lawrenceville	\$314,853	259.2	\$1,214.71	311	\$1,012
West End	\$93,519	128	\$730.62	111	\$843
West Oakland	\$31,236	137.6	\$227.01	71	\$440
Westwood	\$567,312	442.88	\$1,280.96	250	\$2,269
Windgap	\$222,273	265.6	\$836.87	105	\$2,117

***Appendix D***  
***BenMAP Air Quality Health Impacts***

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# BenMAP<sup>1</sup> Air Quality Health Impacts and Values in PittsburghPA

Series: Inventory2014, Time Period: 2014

Pollutants Factors		NO2		O3		PM2.5		SO2	
		Incidence Reduction/yr	Value(\$/yr)	Incidence Reduction/yr	Value(\$/yr)	Incidence Reduction/yr	Value(\$/yr)	Incidence Reduction/yr	Value(\$/yr)
Tree	Acute Bronchitis					0.007	1		
	Acute Myocardial Infarction					0.012	1,060		
	Acute Respiratory Symptoms	0.469	15	9.588	820	6.068	595	0.170	5
	Asthma Exacerbation	7.354	618			3.083	251	1.577	124
	Chronic Bronchitis					0.005	1,273		
	Emergency Room Visits	0.009	4	0.004	2	0.005	2	0.010	4
	Hospital Admissions	0.032	947	0.010	315			0.017	532
	Hospital Admissions (Cardiovascular)					0.003	117		
	Hospital Admissions (Respiratory)					0.002	63		
	Lower Respiratory Symptoms					0.079	4		
	Mortality			0.007	50,800	0.024	183,090		
	School Loss Days			2.369	233				
	Upper Respiratory Symptoms					0.066	3		
	Work Loss Days					1.021	171		
<b>Tree Benefits Total</b>			<b>1,583</b>		<b>52,169</b>		<b>186,630</b>		<b>666</b>

<sup>1</sup>EPA Environmental Benefits Mapping and Analysis Program <http://www.epa.gov/airquality/benmap/index.html>

Incidence: the total number of adverse health effects avoided in a year due to a change in pollution concentration

Value: the economic value that is associated with the incidence of adverse health effects



***Appendix E***  
***Tree Benefit Analysis***

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# Tree Benefit Analysis Methodology

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## *I-Tree Eco and i-Tree Streets*

In order to identify the dollar value provided and returned to the community, the city's street tree inventory data were formatted for use in the i-Tree Streets and i-Tree Eco benefit-cost assessment tools. These tools analyze an inventoried tree population's structure to estimate the costs and benefits of that tree population. They create annual benefit reports that demonstrate the value that street trees provide for a community:

Per the i-Tree model, certain species were unable to be translated from collection to analysis due to coding deficiencies with generalized genus-level assignments. Less than 0.2% of the total number of inventoried trees was not included in the i-Tree analysis.

These quantified benefits and the reports generated are described below.

- **Air Quality:** Quantifies the air pollutants (ozone [O<sub>3</sub>], nitrogen dioxide [NO<sub>2</sub>], sulfur dioxide [SO<sub>2</sub>], particulate matter less than 10 micrometers in diameter [PM<sub>10</sub>]) deposited on tree surfaces, and reduced emissions from power plants (NO<sub>2</sub>, PM<sub>10</sub>, volatile organic compounds [VOCs], SO<sub>2</sub>) due to reduced electricity use in pounds. Also reported are the potential negative effects of trees on air quality due to biogenic volatile organic compounds (BVOC) emissions. Data derived from i-Tree Eco.
- **Carbon Stored:** Tallies all of the carbon dioxide (CO<sub>2</sub>) stored in the urban forest over the life of its trees as a result of sequestration. Carbon stored is measured in pounds. Data derived from i-Tree Streets.
- **Carbon Sequestered & Avoided:** Presents annual reductions in atmospheric CO<sub>2</sub> due to sequestration by trees and reduced emissions from power plants due to reductions in energy use measured in pounds. The model accounts for CO<sub>2</sub> released as trees die and decompose and CO<sub>2</sub> released during the care and maintenance of trees. Data derived from i-Tree Streets.
- **Energy:** Presents the contribution of the urban forest toward conserving energy in terms of reduced natural gas use in the winter in therms (thm) and reduced electricity use for air conditioning in the summer measured in Megawatt-hours (MWh). Data derived from i-Tree Eco.
- **Stormwater:** Presents reductions in annual stormwater runoff due to rainfall interception by trees measured in gallons (gal.). Data derived from i-Tree Eco.
- **Aesthetic/Other Benefits:** Shows the tangible and intangible benefits of trees reflected in increases in property values described in dollars. Data derived from i-Tree Streets.
- **Importance Value (IV):** IVs are calculated for species that make up more than 1% of the population. The Streets IV is the mean of three relative values (percentage of total trees, percentage of total leaf area, and percentage of canopy cover) and can range from 0 to 100 with an IV of 100 suggesting total reliance on one species. IVs offer valuable information about a community's reliance on certain species to provide functional benefits. For example, a species might represent 10% of a population, but have an IV of 25% because of its substantial benefits, indicating that the loss of those trees would be more significant than just their population percentage would suggest. Data derived from i-Tree Eco.

## *i-Tree Model Inputs*

In addition to tree inventory data, i-Tree Streets and i-Tree Eco models require information specific to the community which is being analyzed. Regional data, including energy prices, property values, and stormwater costs, are needed inputs to generate the environmental and economic benefits trees provide. If community program costs or local economic data are not available, i-Tree Streets uses default economic inputs from a reference city selected by the US Department of Agriculture, Forest Service (USDA FS) for the climate zone in which your community is located. Any default value can be adjusted for local conditions. For this project default values were used.

i-Tree Tools software was developed by the USDA FS with the help of several industry partners, including The Davey Tree Expert Company. Learn more at [www.itreetools.org](http://www.itreetools.org).