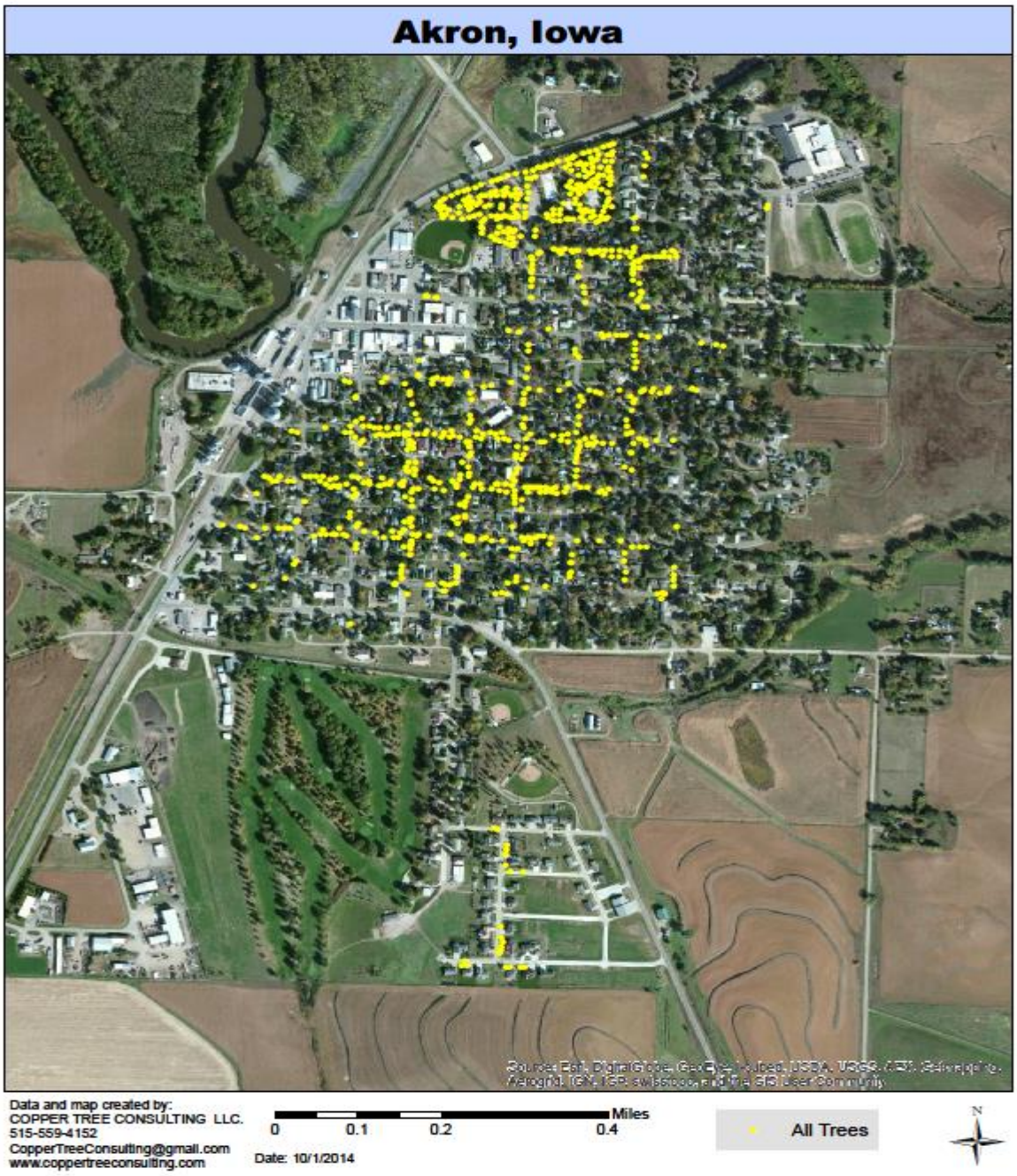

2014 Urban Forest Management Plan
Prepared by Copper Tree Consulting
In Partnership with the Iowa DNR

Table of Contents

Executive Summary

Overview

This plan was developed to assist the City of Akron with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 22.1% of Akron's city owned trees (ash) will die once EAB becomes established in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

Inventory and Results

In 2014, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 760 trees inventoried.

- Akron's trees provide $132,662.94, of benefits annually, an average of 174.56 a tree
- There are over 39 species of trees
- The top three genera are: Maple 33.55%, Ash 22.1%, and Oak 8.15%
- 84% of trees are in need of some type of management
- 34 trees are recommended for removal

Recommendations

The core recommendations are detailed in the Recommendations Section. The Emerald Ash Borer Plan includes management recommendations as well. Below are some key recommendations.

- Of the 34 trees needing removal, 11 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- 24 of the 169 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 24 years to remove ash – Suggestion: request a budget increase to $10,000 annually and apply for grants to plant replacement trees

Introduction

This plan was developed to assist Akron with the management, budgeting and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the anticipated arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal and replacement planting. With proper planning and management of the current canopy in Akron, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Akron's infrastructure and one of the greatest assets to the community. The benefits of trees are immense. Trees provide the community with improved air quality, storm water runoff interception, energy conservation, lower traffic speeds, increased property values, reduced crime, improved mental health and create a desirable place to live, to name just a few benefits. It is essential that these benefits be maintained for the people of Akron and future generations through good urban forestry management.

Good urban forestry management involves setting goals and developing management strategies to achieve these goals. An essential part of developing management strategies is a comprehensive public tree inventory. The inventory supplies information that will be used for maintenance, removal schedules, tree planting and budgeting. Basing actions on this information will help meet Akron's urban forestry goals.

Inventory

In 2014, a tree inventory was conducted that included 100% of the city owned trees on both streets and parks. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

The programming used to collect tree information on the data collectors was written to be compatible with a state-of-the-art software suite called i-Tree. i-Tree was developed by the USDA Forest Service to quantify the structure of community trees and the environmental services that trees provide. The i-Tree suite is a public domain which can be accessed for free.

To quantify the urban forest structure and benefits, specific data is collected for each tree. This data includes: location, land use, species, diameter at 4.5 ft., recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, signs and symptoms associated with EAB were noted for all ash trees. The signs and symptoms noted were canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Inventory Results

The data collected for the 760 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis. Findings

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Akron's trees reduce energy related costs by approximately $34,259 annually (Appendix A, Table 1). These savings are both in Electricity (163.5 MWh) and in Natural Gas (22,295.7 Therms).

Annual Storm water Benefits

Akron's trees intercept about 1,831,694 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $49,639 of benefits to the city.

Annual Air Quality Benefits

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic mater (ozone). In Akron it is estimated that trees remove 2,117.1 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $5,970 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Akron, trees sequester about 420,858 lbs of carbon a year with an associated value of $4,928 (Appendix A, Table 4). In addition, the trees store 7,531,596 lbs of carbon, with a yearly benefit of $56,487 (Appendix A, Table 5).

Annual Aesthetics Benefits

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city livability and much more. Akron receives $37,866 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Akron's trees provide $132,662.94 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 760 trees in Akron provide approximately $174.56 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Akron has over 39 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Species	Number of Trees	% of Total Trees
Green ash	165	21.71
Silver maple	109	14.34
Norway maple	73	9.61
American basswood	58	7.63
Sugar maple	43	5.66
Northern hackberry	38	5

Northern red oak	32	4.21
Red maple	27	3.55
Apple	25	3.29
Blue spruce	24	3.16
Littleleaf linden	22	2.89
Honeylocust	19	2.5
Swamp white oak	19	2.5
Black walnut	16	2.11
Spruce	15	1.97
Scotch pine	12	1.58
Black poplar	11	1.45
Northern pin oak	8	1.05
Chinese elm	4	0.53
Pear	4	0.53
Kentucky coffeetree	3	0.39
Cottonwood	3	0.39
Catalpa	3	0.39
American elm	3	0.39
Hickory	3	0.39
White ash	3	0.39
Eastern red cedar	3	0.39
Ponderosa pine	2	0.26
Maple	2	0.26
Bur oak	2	0.26
Broadleaf Deciduous Medi	1	0.13
Southern magnolia	1	0.13
White oak	1	0.13
Ohio buckeye	1	0.13
Sweetbay	1	0.13

Age Class

Most of Akron's trees (45%) are between 6 and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Akron's size curve is on the smaller side, indicating a younger than average stand.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Akron indicate that 84% of the trees are in good health, with only 0% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 80% of Akron's trees are in good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 2% of the population. This 2% is an estimate of trees that need management follow up.

Management Needs

The following outlines the specific management needs of the street and park trees by number of trees and percent of canopy (Appendix B, Figure 3).

Crown Cleaning	623	82%
Crown Raising	37	5%
Tree Staking	9	1%
Tree Removal	34	4%
Crown Reduction	10	1%

Canopy Cover

The total canopy with public trees is 19%, acres. The canopy cover included in the Akron inventory includes approximately 168.19 acres.

Land Use and Location

The majority of Akron's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7). The following describes the land use and locations for the street and park trees.

Land Use	
Single family residential	67%
Park/vacant/other	28%
Industrial/Large commercial	<1%
Small commercial	3%
Multifamily residential	1%

Location	
Planting strip	59%
Other maintained locations	0%
Cutout (surrounded by pavement)	< 1%
Front yard	41%

Recommendations

Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 18 inches should be removed. Broken branches and branches that interfere with motorist's vision of pedestrians, vehicles, traffic signs and signals, etc. should be removed.

Hazardous trees

Akron has 1 critical concern tree that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 11 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 42 trees with these needs.

Poor tree species

After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 34 removals, 16 are ash trees. There are a total of 168 ash trees, and 26 of those have signs and symptoms that have been associated with EAB. In addition, there are 16 trees that are in poor health. *City ownership of the trees recommended for removal should be verified prior to any removal*

Pruning Cycle

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. In the Management Needs section of the Findings there are four main maintenance issues to be addressed: routine pruning, crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising is the removal of lower branches that are 2 inches in diameter or larger in the case of providing clearance for pedestrians or vehicles. Crown reduction is removing individual limbs from structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years. Please refer to the six year maintenance plan for further information.

Planting

Most of the planting over the next 5 years will replace the trees that are removed. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Akron.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (33.5%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree decline and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Six Year Maintenance Plan

Year 1

- Removal: 7 largest critical concern trees
- Planting and Replacement: up to 30 bare root trees to be planted in open locations
- Visual Survey for signs and symptoms of EAB

Year 2

- Removal: 6 critical concern trees and 4 additional ash trees with poor health
- *Or saving for ash tree treatment
- Planting and Replacement: up to 30 bare root trees in open locations
- Routine trimming: Contract to trim 1/3 of the city trees
- Visual Survey for signs and symptoms of EAB

Year 3

- Removal: 8 trees - removal of any new critical concern trees and ash in poor health
- *Or saving for ash tree treatment
- Planting and Replacement: up to 30 bare root trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

Year 4

Removal: 5 trees - removal of any new critical concern trees and ash in poor health

*Or saving for ash tree treatment

Planting and Replacement: up to 30 bare root trees in open locations Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

Year 5

Removal: 8 trees - removal of any new critical concern trees and ash in poor health

*Or saving for ash tree treatment

Planting and Replacement: up to 30 bare root trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

Year 6

Removal: 5 trees - removal of any new critical concern trees and ash in poor health

*Or saving for ash tree treatment

Planting and Replacement: up to 30 bare root trees in open locations

Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 40 to 42 ash trees removed (approximately 25% of ash). It will take approximately 24 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 years of its arrival.

** To remove all ash trees within 6 years, the budget would need to be increased to $16,800 a year. If the budget were increased to $10,000 a year all ash could be removed in 13 years.

Emerald Ash Borer Plan

Ash Tree Removal

Tree removal will be prioritized with dead, dying, hazardous trees to be removed first (Appendix B, Figure 4). Next will be all ash in poor condition and displaying signs and symptoms of EAB (Appendix B, Figure 2 & Appendix B, Figure 3). *City ownership of the tree recommended for removal should be verified prior to any removal*

Treatment of Ash Trees

Chemical treatment can be effective tool for communities to spread removal costs out over several years while allowing trees to continue to provide benefits. However, treatment is not recommended if EAB is more than 15 miles away from the community. For more information on the cost of treatment strategies visit http://extension.entm.purdue.edu/treecomputer/

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:
• emerald ash borer
• firewood of all hardwood species (for example ash, oak, maple and hickory)
• nursery stock and green lumber of ash
• any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB once a quarantine is in effect for your county.

Wood Disposal

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the hundreds of trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml. Wood waste can be disposed of as you normally would if your county is not part of a quarantine.

Canopy Replacement

As budget permits, all removed trees will be replaced. The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

Postponed Work

While finances, staffing and equipment are focused on the management of ash, usual services may be delayed. Tree removal requests on genera other than ash will be prioritized by hazardous or emergency situations only.

Monitoring

It is recommended that ash trees be checked with a visual survey every year for tree death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB. City Code 151.06 states "If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property."

Budget

Current Budget
Total $31,000 over 6 years ($5,167/year)

FY 2015 Budget
Removal: $4,367
*Or saving for ash tree treatment
Planting: $300
Watering & Maintenance: $500

FY 2016 Budget
Removal: $3,000
*Or saving for ash tree treatment
Planting: $300
Routine trimming: $1,367
Watering & Maintenance: $500

FY 2017 Budget
Removal: $4,367
*Or saving for ash tree treatment
Planting: $300
Watering & Maintenance: $500

FY 2018 Budget
Removal: $3,000
*Or saving for ash tree treatment
Planting: $300
Routine trimming: $1,367
Watering & Maintenance: $500

FY 2019 Budget
Removal: $4,367
*Or saving for ash tree treatment
Planting: $300
Watering & Maintenance: $500

FY 2020 Budget
Removal: $3,000
*Or saving for ash tree treatment
Planting: $300
Routine trimming: $1,367
Watering & Maintenance: $500

*Reduction of ash over 6 years: approximately 40 to 42 ash trees removed (approximately 25% of ash). **It will take approximately 24 years to remove all ash with the current budget.**

Purposed Budget Increase

EAB could potentially kill all ash trees in Akron within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $16,800 a year. If the budget were increased to $10,000 a year all ash could be removed within 10 years. Additionally, it is recommended that Akron apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

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Akron

Annual Energy Benefits of Public Trees

2/28/2015

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	45.7	3,465	6,178.9	6,055	9,521	(N/A)	21.7	27.8	57.70
Silver maple	36.6	2,777	4,791.7	4,696	7,473	(N/A)	14.3	21.8	68.56
Norway maple	13.1	992	1,942.0	1,903	2,896	(N/A)	9.6	8.5	39.67
American basswood	11.9	900	1,651.0	1,618	2,518	(N/A)	7.6	7.3	43.41
Sugar maple	4.8	362	651.2	638	1,000	(N/A)	5.7	2.9	23.26
Northern hackberry	11.4	865	1,599.6	1,568	2,433	(N/A)	5.0	7.1	64.01
Northern red oak	2.8	209	365.9	359	567	(N/A)	4.2	1.7	17.73
Red maple	2.5	188	352.0	345	533	(N/A)	3.6	1.6	19.76
Apple	3.0	227	457.5	448	675	(N/A)	3.3	2.0	27.00
Blue spruce	2.1	158	297.0	291	449	(N/A)	3.2	1.3	18.71
Littleleaf linden	2.2	165	309.7	304	469	(N/A)	2.9	1.4	21.31
Honeylocust	6.1	461	792.0	776	1,237	(N/A)	2.5	3.6	65.13
Swamp white oak	1.2	93	197.5	194	287	(N/A)	2.5	0.8	15.09
Black walnut	2.9	217	372.4	365	582	(N/A)	2.1	1.7	36.36
Spruce	1.4	108	183.5	180	288	(N/A)	2.0	0.8	19.21
Scotch pine	1.5	111	190.5	187	297	(N/A)	1.6	0.9	24.78
Black poplar	5.0	383	669.4	656	1,039	(N/A)	1.4	3.0	94.48
Northern pin oak	2.1	156	309.5	303	460	(N/A)	1.1	1.3	57.45
Chinese elm	1.8	140	244.2	239	379	(N/A)	0.5	1.1	94.83
Pear	0.2	12	26.9	26	38	(N/A)	0.5	0.1	9.53
Kentucky coffeetree	1.1	86	156.1	153	239	(N/A)	0.4	0.7	79.79
Cottonwood	0.9	69	113.0	111	179	(N/A)	0.4	0.5	59.83
Catalpa	0.6	44	77.3	76	120	(N/A)	0.4	0.4	39.97
American elm	0.0	0	0.4	0	1	(N/A)	0.4	0.0	0.23
Hickory	0.2	17	31.1	31	47	(N/A)	0.4	0.1	15.70
White ash	0.8	61	85.1	83	144	(N/A)	0.4	0.4	48.12
Eastern red cedar	0.1	11	23.8	23	34	(N/A)	0.4	0.1	11.47
Ponderosa pine	0.3	20	29.3	29	48	(N/A)	0.3	0.1	24.14
Maple	0.0	3	6.0	6	9	(N/A)	0.3	0.0	4.44
Bur oak	0.5	37	67.4	66	103	(N/A)	0.3	0.3	51.33
Broadleaf Deciduous Mediu	0.0	0	0.8	1	1	(N/A)	0.1	0.0	1.10
Southern magnolia	0.2	18	24.2	24	41	(N/A)	0.1	0.1	41.29
White oak	0.0	2	3.7	4	6	(N/A)	0.1	0.0	5.82
Ohio buckeye	0.0	0	0.8	1	1	(N/A)	0.1	0.0	1.10
Sweetbay	0.0	2	4.0	4	6	(N/A)	0.1	0.0	5.61
Black maple	0.3	19	30.1	29	49	(N/A)	0.1	0.1	48.95
American sycamore	0.3	25	46.9	46	71	(N/A)	0.1	0.2	70.91
Cherry plum	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Norway spruce	0.1	4	9.5	9	14	(N/A)	0.1	0.0	13.58
Total	163.5	12,410	22,295.7	21,850	34,259	(N/A)	100.0	100.0	45.08

Akron

Annual Stormwater Benefits of Public Trees

2/28/2015

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	504,610	13,675	(N/A)	21.7	27.5	82.88
Silver maple	560,879	15,200	(N/A)	14.3	30.6	139.45
Norway maple	105,915	2,870	(N/A)	9.6	5.8	39.32
American basswood	109,118	2,957	(N/A)	7.6	6.0	50.98
Sugar maple	36,785	997	(N/A)	5.7	2.0	23.18
Northern hackberry	101,059	2,739	(N/A)	5.0	5.5	72.07
Northern red oak	17,105	464	(N/A)	4.2	0.9	14.49
Red maple	15,322	415	(N/A)	3.6	0.8	15.38
Apple	14,344	389	(N/A)	3.3	0.8	15.55
Blue spruce	26,590	721	(N/A)	3.2	1.5	30.02
Littleleaf linden	17,688	479	(N/A)	2.9	1.0	21.79
Honeylocust	63,544	1,722	(N/A)	2.5	3.5	90.63
Swamp white oak	6,327	171	(N/A)	2.5	0.3	9.02
Black walnut	20,820	564	(N/A)	2.1	1.1	35.26
Spruce	16,478	447	(N/A)	2.0	0.9	29.77
Scotch pine	24,422	662	(N/A)	1.6	1.3	55.15
Black poplar	79,628	2,158	(N/A)	1.4	4.3	196.17
Northern pin oak	20,511	556	(N/A)	1.1	1.1	69.48
Chinese elm	28,956	785	(N/A)	0.5	1.6	196.17
Pear	544	15	(N/A)	0.5	0.0	3.68
Kentucky coffeetree	17,069	463	(N/A)	0.4	0.9	154.19
Cottonwood	10,170	276	(N/A)	0.4	0.6	91.87
Catalpa	7,865	213	(N/A)	0.4	0.4	71.04
American elm	10	0	(N/A)	0.4	0.0	0.09
Hickory	1,387	38	(N/A)	0.4	0.1	12.53
White ash	4,988	135	(N/A)	0.4	0.3	45.05
Eastern red cedar	1,978	54	(N/A)	0.4	0.1	17.86
Ponderosa pine	3,077	83	(N/A)	0.3	0.2	41.70
Maple	149	4	(N/A)	0.3	0.0	2.02
Bur oak	6,098	165	(N/A)	0.3	0.3	82.63
Broadleaf Deciduous Medium	12	0	(N/A)	0.1	0.0	0.33
Southern magnolia	1,775	48	(N/A)	0.1	0.1	48.11
White oak	172	5	(N/A)	0.1	0.0	4.65
Ohio buckeye	12	0	(N/A)	0.1	0.0	0.33
Sweetbay	78	2	(N/A)	0.1	0.0	2.10
Black maple	1,604	43	(N/A)	0.1	0.1	43.46
American sycamore	3,943	107	(N/A)	0.1	0.2	106.85
Cherry plum	69	2	(N/A)	0.1	0.0	1.86
Norway spruce	596	16	(N/A)	0.1	0.0	16.14
Citywide total	1,831,694	49,639	(N/A)	100.0	100.0	65.31

1

Akron

Annual Air Quality Benefits of Public Trees

2/28/2015

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($) Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2							
Green ash	64.5	10.3	30.8	2.9	343	217.4	31.7	30.2	206.9	1,356	0.0	0	594.7	1,699 (N/A)	21.7	10.30
Silver maple	106.3	18.0	51.4	4.7	571	172.3	25.2	24.1	165.5	1,079	-57.3	-215	510.2	1,434 (N/A)	14.3	13.16
Norway maple	19.1	3.3	9.8	0.8	104	63.9	9.2	8.7	59.3	395	-4.7	-18	169.4	481 (N/A)	9.6	6.59
American basswood	13.5	2.3	7.0	0.6	74	57.0	8.3	7.9	53.8	354	-12.0	-45	138.3	383 (N/A)	7.6	6.60
Sugar maple	3.8	0.7	2.2	0.2	22	22.7	3.3	3.2	21.6	142	-3.3	-12	54.4	151 (N/A)	5.7	3.51
Northern hackberry	15.9	2.8	8.2	0.7	87	54.8	8.0	7.6	51.7	341	0.0	0	149.6	428 (N/A)	5.0	11.26
Northern red oak	2.8	0.5	1.5	0.1	15	13.0	1.9	1.8	12.5	81	-3.9	-15	30.2	82 (N/A)	4.2	2.57
Red maple	2.5	0.4	1.3	0.1	14	11.9	1.7	1.6	11.2	74	-1.0	-4	30.0	84 (N/A)	3.6	3.12
Apple	4.8	0.8	2.2	0.2	25	14.7	2.1	2.0	13.5	90	0.0	0	40.2	115 (N/A)	3.3	4.62
Blue spruce	3.1	0.6	2.8	0.4	21	10.0	1.5	1.4	9.4	62	-9.1	-34	20.1	49 (N/A)	3.2	2.05
Littleleaf linden	2.6	0.4	1.3	0.1	14	10.5	1.5	1.5	9.9	65	-1.3	-5	26.5	74 (N/A)	2.9	3.38
Honeylocust	12.3	2.0	5.6	0.6	65	28.6	4.2	4.0	27.5	179	-9.4	-35	75.4	209 (N/A)	2.5	10.99
Swamp white oak	0.5	0.1	0.4	0.0	3	6.1	0.9	0.8	5.6	38	-0.2	-1	14.2	40 (N/A)	2.5	2.10
Black walnut	1.6	0.3	1.0	0.1	9	13.5	2.0	1.9	13.0	84	0.0	0	33.2	94 (N/A)	2.1	5.84
Spruce	1.7	0.3	1.5	0.2	12	6.7	1.0	0.9	6.5	42	-5.5	-21	13.3	33 (N/A)	2.0	2.19
Scotch pine	2.8	0.6	2.3	0.3	18	6.9	1.0	1.0	6.6	43	-11.1	-41	10.4	20 (N/A)	1.6	1.66
Black poplar	14.9	2.4	6.5	0.7	77	23.9	3.5	3.3	22.9	149	0.0	0	78.1	227 (N/A)	1.4	20.63
Northern pin oak	4.2	0.7	2.1	0.2	23	10.1	1.5	1.4	9.3	62	-1.0	-4	28.5	81 (N/A)	1.1	10.18
Chinese elm	5.5	0.9	2.4	0.2	29	8.7	1.3	1.2	8.4	55	0.0	0	28.6	83 (N/A)	0.5	20.79
Pear	0.1	0.0	0.1	0.0	1	0.8	0.1	0.1	0.7	5	0.0	0	1.9	5 (N/A)	0.5	1.33
Kentucky coffeetree	2.6	0.4	1.2	0.1	14	5.4	0.8	0.8	5.2	34	0.0	0	16.4	47 (N/A)	0.4	15.80
Cottonwood	1.4	0.2	0.6	0.1	7	4.2	0.6	0.6	4.1	27	0.0	0	11.9	34 (N/A)	0.4	11.29
Catalpa	1.6	0.3	0.7	0.1	8	2.8	0.4	0.4	2.6	17	0.0	0	8.8	26 (N/A)	0.4	8.54
American elm	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.4	0.03
Hickory	0.1	0.0	0.0	0.0	0	1.1	0.2	0.1	1.0	7	0.0	0	2.4	7 (N/A)	0.4	2.29
White ash	0.3	0.1	0.2	0.0	2	3.6	0.5	0.5	3.6	23	0.0	0	8.9	25 (N/A)	0.4	8.32
Eastern red cedar	0.2	0.0	0.2	0.0	1	0.7	0.1	0.1	0.7	4	-1.0	-4	1.0	2 (N/A)	0.4	0.62
Ponderosa pine	0.3	0.1	0.3	0.0	2	1.2	0.2	0.2	1.2	7	-1.1	-4	2.3	6 (N/A)	0.3	2.82
Maple	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.4	1 (N/A)	0.3	0.62
Bur oak	0.8	0.1	0.4	0.0	4	2.3	0.3	0.3	2.2	14	0.0	0	6.5	19 (N/A)	0.3	9.35
Broadleaf Deciduous Medium	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.1	0.14
Southern magnolia	0.1	0.0	0.1	0.0	1	1.0	0.2	0.1	1.0	7	-0.5	-2	2.1	5 (N/A)	0.1	5.49
White oak	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)	0.1	0.87
Ohio buckeye	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.1	0.14
Sweetbay	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)	0.1	0.75
Black maple	0.3	0.1	0.2	0.0	2	1.2	0.2	0.2	1.2	7	-0.1	0	3.1	9 (N/A)	0.1	8.75

1

Akron

Annual CO Benefits of Public Trees

2/28/2015

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 $
Green ash	103,066	773	-10,248	-475	-4	76,579	574	168,923	1,267 (N/A)	21.7	25.7
Silver maple	175,577	1,317	-12,903	-430	-3	61,373	460	223,616	1,677 (N/A)	14.3	34.0
Norway maple	22,203	167	-1,529	-137	-1	21,932	164	42,469	319 (N/A)	9.6	6.5
American basswood	31,551	237	-2,430	-134	-1	19,881	149	48,869	367 (N/A)	7.6	7.4
Sugar maple	8,582	64	-562	-54	0	7,998	60	15,965	120 (N/A)	5.7	2.4
Northern hackberry	13,156	99	-1,168	-105	-1	19,114	143	30,997	232 (N/A)	5.0	4.7
Northern red oak	3,628	27	-241	-33	0	4,616	35	7,970	60 (N/A)	4.2	1.2
Red maple	4,339	33	-151	-26	0	4,165	31	8,328	62 (N/A)	3.6	1.3
Apple	3,521	26	-357	-44	0	5,007	38	8,126	61 (N/A)	3.3	1.2
Blue spruce	1,498	11	-90	-37	0	3,489	26	4,859	36 (N/A)	3.2	0.7
Littleleaf linden	6,658	50	-280	-28	0	3,651	27	10,001	75 (N/A)	2.9	1.5
Honeylocust	11,238	84	-753	-47	0	10,196	76	20,633	155 (N/A)	2.5	3.1
Swamp white oak	2,753	21	-60	-15	0	2,059	15	4,737	36 (N/A)	2.5	0.7
Black walnut	6,113	46	-262	-28	0	4,793	36	10,615	80 (N/A)	2.1	1.6
Spruce	1,293	10	-54	-24	0	2,393	18	3,608	27 (N/A)	2.0	0.5
Scotch pine	1,626	12	-126	-26	0	2,446	18	3,919	29 (N/A)	1.6	0.6
Black poplar	7,867	59	-2,474	-60	0	8,471	64	13,804	104 (N/A)	1.4	2.1
Northern pin oak	2,944	22	-333	-23	0	3,453	26	6,041	45 (N/A)	1.1	0.9
Chinese elm	2,782	21	-914	-22	0	3,095	23	4,940	37 (N/A)	0.5	0.8
Pear	245	2	-9	-3	0	260	2	493	4 (N/A)	0.5	0.1
Kentucky coffeetree	2,484	19	-417	-13	0	1,910	14	3,964	30 (N/A)	0.4	0.6
Cottonwood	1,803	14	-224	-9	0	1,520	11	3,090	23 (N/A)	0.4	0.5
Catalpa	690	5	-274	-7	0	976	7	1,385	10 (N/A)	0.4	0.2
American elm	22	0	0	-1	0	6	0	27	0 (N/A)	0.4	0.0
Hickory	492	4	-11	-3	0	366	3	844	6 (N/A)	0.4	0.1
White ash	1,481	11	-53	-6	0	1,346	10	2,769	21 (N/A)	0.4	0.4
Eastern red cedar	120	1	-4	-4	0	246	2	358	3 (N/A)	0.4	0.1
Ponderosa pine	231	2	-11	-4	0	433	3	649	5 (N/A)	0.3	0.1
Maple	42	0	-1	-1	0	67	1	107	1 (N/A)	0.3	0.0
Bur oak	1,168	9	-129	-5	0	809	6	1,842	14 (N/A)	0.3	0.3
Broadleaf Deciduous Medi	5	0	0	0	0	7	0	12	0 (N/A)	0.1	0.0
Southern magnolia	143	1	-9	-2	0	388	3	520	4 (N/A)	0.1	0.1
White oak	74	1	-1	-1	0	49	0	121	1 (N/A)	0.1	0.0

Akron

Stored CO2 Benefits of Public Trees

2/28/2015

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	2,134,974	16,012	(N/A)	21.7	28.3	97.04
Silver maple	2,687,601	20,157	(N/A)	14.3	35.7	184.93
Norway maple	318,195	2,386	(N/A)	9.6	4.2	32.69
American basswood	506,197	3,796	(N/A)	7.6	6.7	65.46
Sugar maple	115,602	867	(N/A)	5.7	1.5	20.16
Northern hackberry	243,257	1,824	(N/A)	5.0	3.2	48.01
Northern red oak	50,194	376	(N/A)	4.2	0.7	11.76
Red maple	31,376	235	(N/A)	3.6	0.4	8.72
Apple	74,420	558	(N/A)	3.3	1.0	22.33
Blue spruce	18,811	141	(N/A)	3.2	0.2	5.88
Littleleaf linden	57,319	430	(N/A)	2.9	0.8	19.54
Honeylocust	156,974	1,177	(N/A)	2.5	2.1	61.96
Swamp white oak	11,007	83	(N/A)	2.5	0.1	4.34
Black walnut	54,646	410	(N/A)	2.1	0.7	25.62
Spruce	11,159	84	(N/A)	2.0	0.1	5.58
Scotch pine	26,312	197	(N/A)	1.6	0.3	16.45
Black poplar	515,461	3,866	(N/A)	1.4	6.8	351.45
Northern pin oak	69,387	520	(N/A)	1.1	0.9	65.05
Chinese elm	190,481	1,429	(N/A)	0.5	2.5	357.15
Pear	1,843	14	(N/A)	0.5	0.0	3.46
Kentucky coffeetree	86,975	652	(N/A)	0.4	1.2	217.44
Cottonwood	46,602	350	(N/A)	0.4	0.6	116.51
Catalpa	57,029	428	(N/A)	0.4	0.8	142.57
American elm	41	0	(N/A)	0.4	0.0	0.10
Hickory	2,255	17	(N/A)	0.4	0.0	5.64
White ash	11,016	83	(N/A)	0.4	0.1	27.54
Eastern red cedar	831	6	(N/A)	0.4	0.0	2.08
Ponderosa pine	2,340	18	(N/A)	0.3	0.0	8.78
Maple	235	2	(N/A)	0.3	0.0	0.88
Bur oak	26,978	202	(N/A)	0.3	0.4	101.17
Broadleaf Deciduous	17	0	(N/A)	0.1	0.0	0.13
Southern magnolia	1,851	14	(N/A)	0.1	0.0	13.88
White oak	185	1	(N/A)	0.1	0.0	1.39
Ohio buckeye	17	0	(N/A)	0.1	0.0	0.13
Sweetbay	178	1	(N/A)	0.1	0.0	1.33
Black maple	3,624	27	(N/A)	0.1	0.0	27.18
American sycamore	15,773	118	(N/A)	0.1	0.2	118.30
Cherry plum	178	1	(N/A)	0.1	0.0	1.33
Norway spruce	257	2	(N/A)	0.1	0.0	1.93
Citywide total	7,531,596	56,487	(N/A)	100.0	100.0	74.32

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.

1

Akron

Annual Aesthetic/Other Benefits of Public Trees

2/28/2015

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	8,626	(N/A)	21.7	22.8	52.28
Silver maple	12,764	(N/A)	14.3	33.7	117.10
Norway maple	2,270	(N/A)	9.6	6.0	31.10
American basswood	2,382	(N/A)	7.6	6.3	41.06
Sugar maple	1,018	(N/A)	5.7	2.7	23.68
Northern hackberry	1,898	(N/A)	5.0	5.0	49.95
Northern red oak	368	(N/A)	4.2	1.0	11.52
Red maple	681	(N/A)	3.6	1.8	25.21
Apple	204	(N/A)	3.3	0.5	8.17
Blue spruce	521	(N/A)	3.2	1.4	21.73
Littleleaf linden	761	(N/A)	2.9	2.0	34.61
Honeylocust	2,582	(N/A)	2.5	6.8	135.90
Swamp white oak	341	(N/A)	2.5	0.9	17.97
Black walnut	648	(N/A)	2.1	1.7	40.51
Spruce	366	(N/A)	2.0	1.0	24.43
Scotch pine	390	(N/A)	1.6	1.0	32.51
Black poplar	493	(N/A)	1.4	1.3	44.81
Northern pin oak	273	(N/A)	1.1	0.7	34.12
Chinese elm	174	(N/A)	0.5	0.5	43.45
Pear	13	(N/A)	0.5	0.0	3.22
Kentucky coffeetree	174	(N/A)	0.4	0.5	58.12
Cottonwood	150	(N/A)	0.4	0.4	50.02
Catalpa	62	(N/A)	0.4	0.2	20.80
American elm	6	(N/A)	0.4	0.0	1.91
Hickory	72	(N/A)	0.4	0.2	23.95
White ash	191	(N/A)	0.4	0.5	63.74
Eastern red cedar	64	(N/A)	0.4	0.2	21.34
Ponderosa pine	65	(N/A)	0.3	0.2	32.32
Maple	7	(N/A)	0.3	0.0	3.66
Bur oak	95	(N/A)	0.3	0.3	47.58
Broadleaf Deciduous Medium	3	(N/A)	0.1	0.0	2.74
Southern magnolia	35	(N/A)	0.1	0.1	34.98
White oak	15	(N/A)	0.1	0.0	14.73
Ohio buckeye	3	(N/A)	0.1	0.0	2.74
Sweetbay	1	(N/A)	0.1	0.0	0.99
Black maple	66	(N/A)	0.1	0.2	65.89
American sycamore	66	(N/A)	0.1	0.2	65.59
Cherry plum	2	(N/A)	0.1	0.0	2.06
Norway spruce	15	(N/A)	0.1	0.0	15.42
Citywide total	37,866	(N/A)	100.0	100.0	49.82

1

Akron

Annual Benefits of Public Trees by Species ($/tree)

2/28/2015

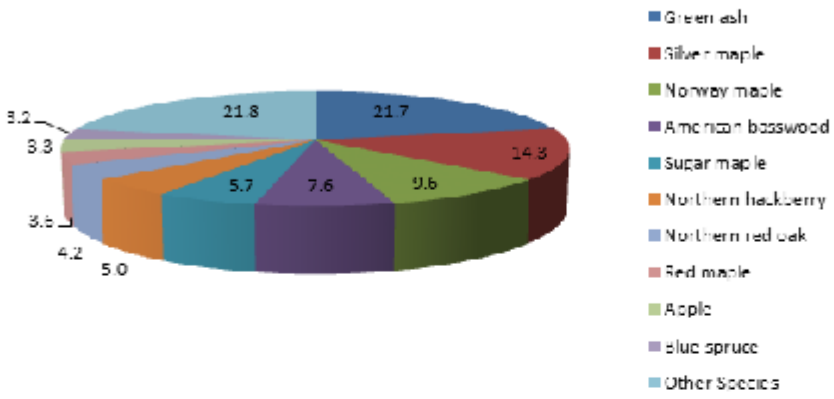
Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error
Green ash	57.70	7.68	10.30	82.88	52.28	210.83	(N/A)
Silver maple	68.56	15.39	13.16	139.45	117.10	353.65	(N/A)
Norway maple	39.67	4.36	6.59	39.32	31.10	121.03	(N/A)
American basswood	43.41	6.32	6.60	50.98	41.06	148.38	(N/A)
Sugar maple	23.26	2.78	3.51	23.18	23.68	76.41	(N/A)
Northern hackberry	64.01	6.12	11.26	72.07	49.95	203.41	(N/A)
Northern red oak	17.73	1.87	2.57	14.49	11.52	48.17	(N/A)
Red maple	19.76	2.31	3.12	15.38	25.21	65.78	(N/A)
Apple	27.00	2.44	4.62	15.55	8.17	57.77	(N/A)
Blue spruce	18.71	1.52	2.05	30.02	21.73	74.03	(N/A)
Littleleaf linden	21.31	3.41	3.38	21.79	34.61	84.50	(N/A)
Honeylocust	65.13	8.14	10.99	90.63	135.90	310.79	(N/A)
Swamp white oak	15.09	1.87	2.10	9.02	17.97	46.06	(N/A)
Black walnut	36.36	4.98	5.84	35.26	40.51	122.95	(N/A)
Spruce	19.21	1.80	2.19	29.77	24.43	77.41	(N/A)
Scotch pine	24.78	2.45	1.66	55.15	32.51	116.55	(N/A)
Black poplar	94.48	9.41	20.63	196.17	44.81	365.51	(N/A)
Northern pin oak	57.45	5.66	10.18	69.48	34.12	176.89	(N/A)
Chinese elm	94.83	9.26	20.79	196.17	43.45	364.51	(N/A)
Pear	9.53	0.92	1.33	3.68	3.22	18.68	(N/A)
Kentucky coffeetree	79.79	9.91	15.80	154.19	58.12	317.81	(N/A)
Cottonwood	59.83	7.73	11.29	91.87	50.02	220.73	(N/A)
Catalpa	39.97	3.46	8.54	71.04	20.80	143.82	(N/A)
American elm	0.23	0.07	0.03	0.09	1.91	2.33	(N/A)
Hickory	15.70	2.11	2.29	12.53	23.95	56.57	(N/A)
White ash	48.12	6.92	8.32	45.05	63.74	172.15	(N/A)
Eastern red cedar	11.47	0.89	0.62	17.86	21.34	52.19	(N/A)
Ponderosa pine	24.14	2.43	2.82	41.70	32.32	103.40	(N/A)
Maple	4.44	0.40	0.62	2.02	3.66	11.14	(N/A)
Bur oak	51.33	6.91	9.35	82.63	47.58	197.80	(N/A)
Broadleaf Deciduous T	1.10	0.09	0.14	0.33	2.74	4.40	(N/A)
Southern magnolia	41.29	3.90	5.49	48.11	34.98	133.78	(N/A)
White oak	5.82	0.91	0.87	4.65	14.73	26.98	(N/A)
Ohio buckeye	1.10	0.09	0.14	0.33	2.74	4.40	(N/A)
Sweetbay	5.61	0.48	0.75	2.10	0.99	9.94	(N/A)
Black maple	48.95	6.71	8.75	43.46	65.89	173.77	(N/A)
American sycamore	70.91	9.97	12.48	106.85	65.59	265.81	(N/A)
Cherry plum	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Norway spruce	13.58	1.08	1.48	16.14	15.42	47.70	(N/A)
Citywide Total	45.08	6.48	7.86	65.31	49.82	174.56	(N/A)

1

Akron

Species Distribution of Public Trees

2/28/2015



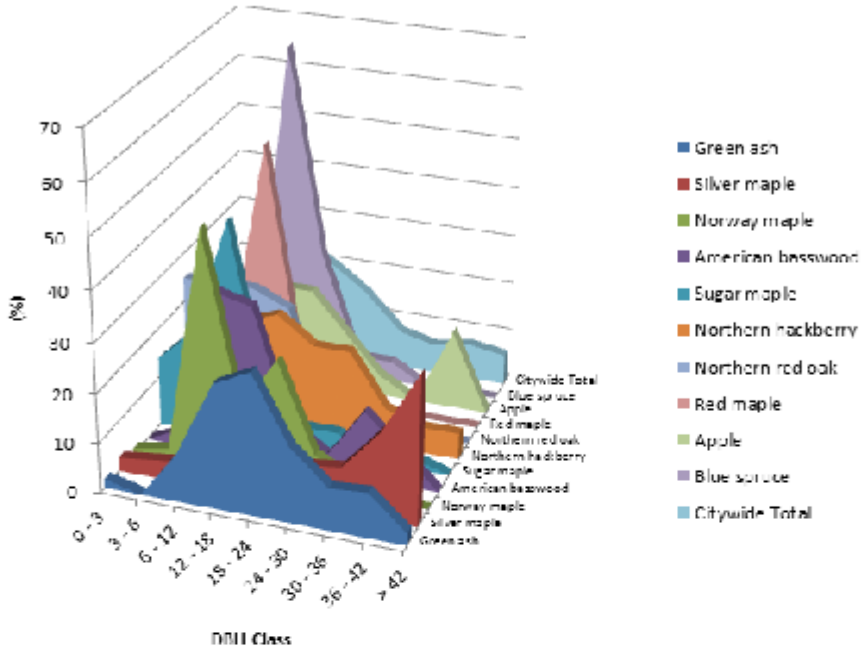
Species	Percent
Green ash	21.7
Silver maple	14.3
Norway maple	9.6
American basswood	7.6
Sugar maple	5.7
Northern hackberry	5.0
Northern red oak	4.2
Red maple	3.6
Apple	3.3
Blue spruce	3.2
Other Species	21.8
Total	100.0

1

Akron

Relative Age Distribution of Top 10 Public Tree Species for All Zones (%)

2/28/2015



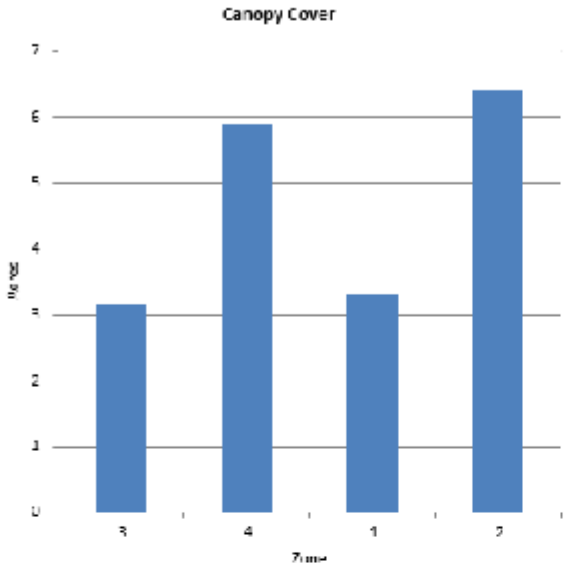
Species	DBH class (in) 0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42
Green ash	1.82	0.00	9.70	24.85	28.48	15.15	8.48	9.09	2.42
Silver maple	2.75	3.67	4.59	15.60	8.26	8.26	9.17	17.43	30.28
Norway maple	1.37	2.74	47.95	13.70	24.66	6.85	2.74	0.00	0.00
American basswood	0.00	3.45	32.76	31.03	8.62	3.45	13.79	6.90	0.00
Sugar maple	13.95	20.93	44.19	9.30	4.65	4.65	0.00	2.33	0.00
Northern hackberry	0.00	0.00	21.05	23.68	18.42	18.42	7.89	5.26	5.26
Northern red oak	25.00	25.00	25.00	21.88	0.00	0.00	3.13	0.00	0.00
Red maple	25.93	11.11	51.85	7.41	3.70	0.00	0.00	0.00	0.00
Apple	12.00	16.00	20.00	20.00	12.00	4.00	0.00	16.00	0.00
Blue spruce	0.00	0.00	66.67	25.00	4.17	4.17	0.00	0.00	0.00
Citywide Total	5.66	7.24	24.61	20.13	15.00	7.76	6.05	7.37	6.18

1

Akron

Canopy Cover of Public Trees (Acres)

2/28/2015



Zone	Acres	% of Total Canopy Cover
3	3	16.8
4	6	31.5
1	3	17.6
2	6	34.2
Citywide total	19	100.0

	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide Total	0	0	19	0.00	0.00

1

Akron

Land Use of Public Trees by Zone

2/28/2015

Zone	Land Use	Tree Count	Standard Error	% of Zone	% of Public Trees
1	Single family residential	106	(N/A)	99.07	13.95
	Multi-family residential	0	(N/A)	0.00	0.00
	Small commercial	0	(N/A)	0.00	0.00
	Industrial/Large commercial	0	(N/A)	0.00	0.00
	Park/vacant/other	1	(N/A)	0.93	0.13
	Total	107	(N/A)	100.00	14.08
3	Single family residential	134	(N/A)	97.81	17.63
	Multi-family residential	0	(N/A)	0.00	0.00
	Small commercial	0	(N/A)	0.00	0.00
	Industrial/Large commercial	3	(N/A)	2.19	0.39
	Park/vacant/other	0	(N/A)	0.00	0.00
	Total	137	(N/A)	100.00	18.03
4	Single family residential	194	(N/A)	91.08	25.53
	Multi-family residential	1	(N/A)	0.47	0.13
	Small commercial	0	(N/A)	0.00	0.00
	Industrial/Large commercial	4	(N/A)	1.88	0.53
	Park/vacant/other	14	(N/A)	6.57	1.84
	Total	213	(N/A)	100.00	28.03
2	Single family residential	77	(N/A)	25.41	10.13
	Multi-family residential	12	(N/A)	3.96	1.58
	Small commercial	0	(N/A)	0.00	0.00
	Industrial/Large commercial	204	(N/A)	67.33	26.84
	Park/vacant/other	10	(N/A)	3.30	1.32
	Total	303	(N/A)	100.00	39.87
Citywide	Single family residential	511	(N/A)	67.24	67.24
	Multi-family residential	13	(N/A)	1.71	1.71
	Small commercial	0	(N/A)	0.00	0.00
	Industrial/Large commercial	211	(N/A)	27.76	27.76
	Park/vacant/other	25	(N/A)	3.29	3.29
	Total	760	(N/A)	100.00	100.00

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

Figure 2: Location of EAB symptoms

Figure 3: Location of Poor Condition Trees with Recommended Maintenance

Figure 4:

Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

Appendix C: Akron Tree Ordinances

CHAPTER 151
TREES AND GRASS

151.01 DEFINITION. For use in this chapter, "boulevard" means that part of the street, avenue or highway in the City not covered by sidewalk and lying between the lot line and the curb line; or, on unpaved streets, that part of the street, avenue or highway lying between the lot line and that portion of the street usually traveled by vehicular traffic.

151.02 PLANTING RESTRICTIONS. No tree shall be planted in any boulevard or street except in accordance with the following:
1. Alignment. All tress planted in any street shall be planted in the boulevard midway between the outer line of the sidewalk and the curb. In the event a curb line is not established, trees shall be planted on a line ten (10) feet from the property line.
2. Spacing. Trees shall not be planted on any boulevard which is less than nine (9) feet in width, or contains less than eighty-one (81) square feet of exposed soil surface per tree. Trees shall not be planted closer than twenty (20) feet from street intersections (property lines extended) and ten (10) feet from driveways. If it is at all possible trees should be planted inside the property lines and not between the sidewalk and the curb.
3. Prohibited Trees. No person shall plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

151.03 DUTY TO TRIM TREES. The owner or agent of the abutting property shall keep the trees on, or overhanging the street, trimmed so that all branches will be at least eighteen (18) feet above the surface of a street, twenty (20) feet above the surface of a primary highway, and eight (8) feet above the sidewalks. If the abutting property owner fails to trim the trees, the City may serve notice on the abutting property owner requiring that such action be taken within five (5) days. If such action is not taken within that time, the City may perform the required action and assess the costs against the abutting property for collection in the same manner as a property tax.
(Code of Iowa, Sec. 364.12[2c, d, & e])

151.04 TRIMMING TREES TO BE SUPERVISED. Except as allowed in Section 151.03, it is unlawful for any person to trim or cut any tree in a street or public place unless the work is done under the supervision of the City.

151.05 DISEASE CONTROL. Any dead, diseased or damaged tree or shrub which may harbor serious insect or disease pests or disease injurious to other trees is hereby declared to be a nuisance.

151.06 INSPECTION AND REMOVAL. The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests, and such trees and shrubs shall be subject to removal as follows:

1. City Property. If it is determined that any such condition exists on any public property, including the strip between the curb and the lot line of private property, the Council may cause such condition to be corrected by treatment or removal. The Council may also order the removal of any trees on the streets of the City which interfere with the making of improvements or with travel thereon.
2. Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that the danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property.
(Code of Iowa, Sec. 364.12[3b & h])

151.07 CUTTING OR MOWING OF GRASS.
1. Duty to Cut and Mow Lawns and Lots. The owner of any property shall cut and mow all lawns and lots so that such growth shall be less than four (4) inches at all times.
2. Cutting and Mowing by City. If a property owner refuses or fails to cut and mow lawns and lots within forty-eight (48) hours after being delivered a notice from the City to perform such action, the Council may require said work to be done and the cost and expenses thereof shall be assessed to the property owner after due notice is given. The amount of such assessment shall be certified to the County Auditor as provided by law and the same shall be collected with and in the same manner as general property taxes.