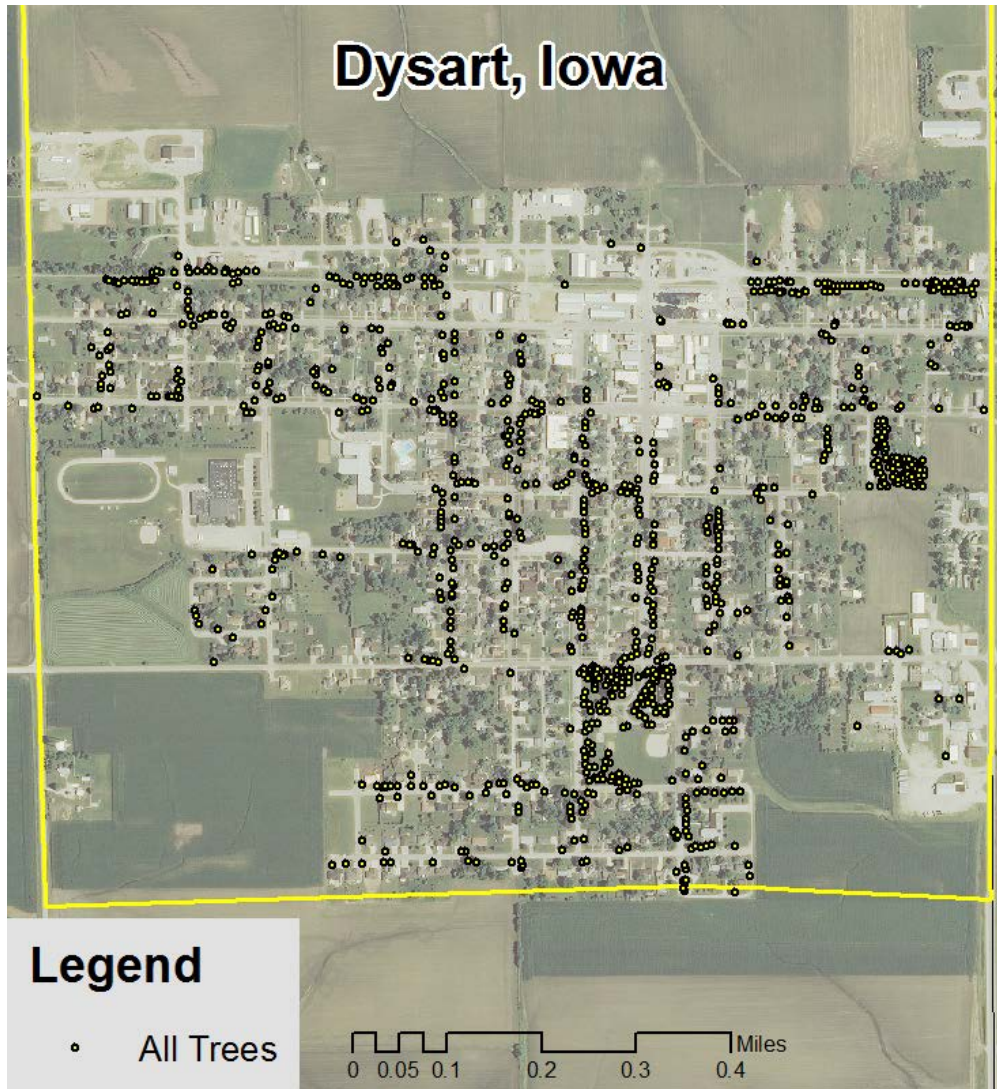


# Dysart, IA



2016 Urban Forest Management Plan  
Prepared by Matt Brewer  
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# Executive Summary

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## Overview

This plan was developed to assist the City of Dysart 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 9% of Dysart'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 2015, a tree inventory was conducted by Matt Brewer, Iowa DNR, 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 931 trees inventoried.

- Dysart's trees provide \$112,617 of benefits annually, an average of \$120 a tree
- There are over 61 species of trees
- The top three genera are: Maple 35%, Apple/Crabapple 11%, and Oak 9%
- 9% of trees are in need of some type of management
- 13 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 13 trees needing removal, 6 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\\*](#)
- 28 of the 85 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include ash and maple, and are consistent with the Official Street Tree Species list
- Check ash trees with a visual survey yearly
- Budget impacts from ash removal – Suggestion: request a budget increase to at least \$6,000-\$15,000 annually and apply for grants to plant replacement trees

## Introduction

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This plan was developed to assist Dysart 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 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 Dysart, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Dysart'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, stormwater 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 Dysart 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 Dysart's urban forestry goals.

## Inventory

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In 2015, a tree inventory was conducted by Matt Brewer, Iowa DNR, 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

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The data collected for the 931 city trees was entered into the USDA Forest Service program i-Tree Streets, part of the i-Tree suite. The following are results from the i-Tree Streets analysis.

### **Annual Benefits**

#### **Annual Energy Benefits**

Trees conserve energy by shading buildings and blocking winds. Dysart's trees reduce energy related costs by approximately \$29,604 annually (Appendix A, Table 1). These savings are both in Electricity (139.8 MWh) and in Natural Gas (19,380.2 Therms).

#### **Annual Stormwater Benefits**

Dysart's trees intercept about 1,609,820 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$43,626 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 matter (ozone). In Dysart, it is estimated that trees remove 1,753 lbs of air pollution (ozone (O<sub>3</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>)) per year with a net value of \$4,876 (Appendix A, Table 3).

#### **Annual Carbon Benefits**

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Dysart, trees sequester about 329,446 lbs of carbon a year with an associated value of \$2,471 (Appendix A, Table 4). In addition, the trees store 6,427,691 lbs of carbon, with a yearly benefit of \$48,208 (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. Dysart receives \$30,525 in annual social benefits from trees (Appendix A, Table 6).

#### **Financial Summary of all Benefits**

According to the USDA Forest Service i-Tree Streets analysis, Dysart's trees provide \$112,617 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 931 trees in Dysart provides approximately \$120 annually (Appendix A, Table 7).

## **Forest Structure**

### **Species Distribution**

Dysart has over 61 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	328	35%
Apple/Crabapple	104	11%
Oak	86	9%
Ash	85	9%
Pear	42	5%
Spruce	35	4%
Linden/Basswood	29	3%
Northern White Cedar	20	2%
Birch	17	2%
Lilac	13	1%
Elm	13	1%
Honeylocust	8	1%
Willow	7	1%
Hackberry	6	1%
Black Walnut	6	1%
Pine	6	1%
Ohio Buckeye	5	1%
Ginkgo	5	1%
Eastern Red Cedar	5	1%
Tuliptree	5	1%
Mulberry	5	1%
Aspen/Cottonwood	5	1%
Dogwood	4	<1%
Kentucky Coffeetree	4	<1%
Hickory	2	<1%
Yellowwood	2	<1%
Cherry/Plum	2	<1%
Alder	1	<1%
Eastern Redbud	1	<1%
Black Locust	1	<1%
Mountain Ash	1	<1%
Other Small Deciduous	35	4%
Other Large Evergreen	29	3%
Other Medium Deciduous	9	1%
Other Large Deciduous	3	<1%

Other Medium Evergreen	1	<1%
Other Small Evergreen	1	<1%

**Age Class**

Over half of Dysart’s trees (68%) are under 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that a large number of trees are in the smallest size categories (a downward slope) to prepare for natural mortality and to maintain canopy cover. Dysart will have an aging tree population as the other 32% matures, and should consider continuing with new plantings to develop the next generation of trees.

**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 Dysart indicate that 91% of the trees are in good health, with only 3% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Additionally, 69% of Dysart’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 8% of the population. This 8% 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	48	5%
Tree Staking	20	2%
Tree Removal	13	1%
Crown Raising	2	<1%

**Canopy Cover**

The total canopy with both private and public trees is 11% (85 acres). The canopy cover included in the Dysart inventory includes approximately 16 acres (Appendix A, Figure 4).

**Land Use and Location**

The majority of Dysart’s city and park trees are in front yards 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	60%
Park/vacant/other	34%
Small commercial	4%
Industrial/Large commercial	<1%

## Location

Front yard	60%
Planting strip	40%

## Recommendations

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### **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

Dysart has 6 critical concern trees, 4 of which need immediate removal and 2 that need immediate cleaning. 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 5 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 83 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 13 removals, 3 are ash trees. There are a total of 85 ash trees, and 28 of those have signs and symptoms that have been associated with EAB. In addition, there are 20 ash 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 at least 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 or greater number of trees helps ensure continuation of the benefits of the existing forest in Dysart.

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 10% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 5-10% of the total urban forest. Presently, the forest is heavily planted with maple (35%) (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 guidance on species to plant is contained in the Official Street Tree Species list, as outlined in section 140.03 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 140.04 (Appendix C).

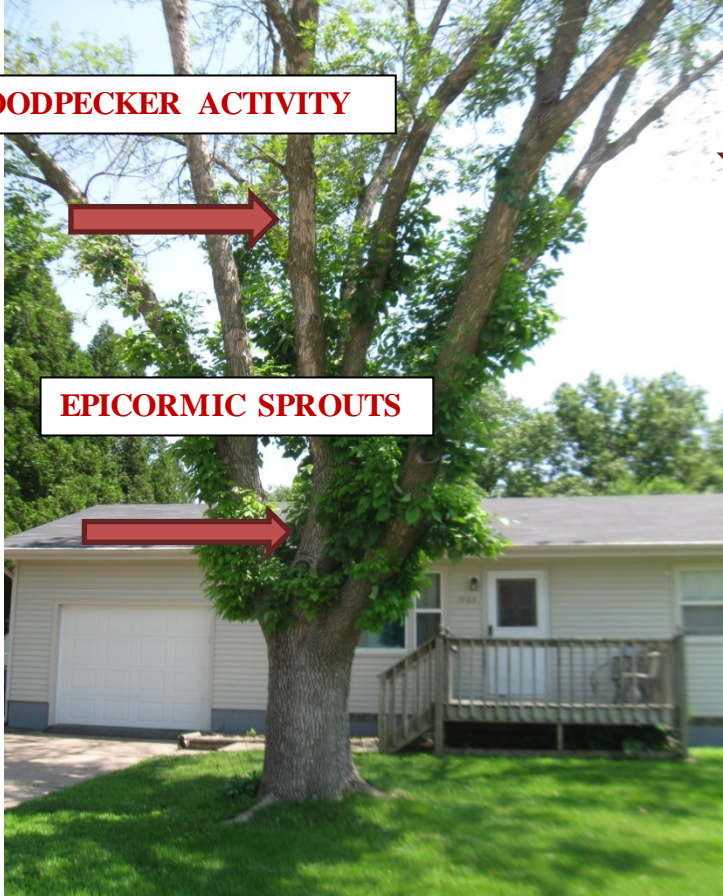
### **Continual Monitoring For EAB**

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 (See examples below). **Once EAB arrives in Dysart, it could potentially kill all ash within 4 to 10 years of its arrival.**



**EAB infested tree in Muscatine with top thinning and many new green epicormic sprouts**

**WOODPECKER ACTIVITY**



**EPICORMIC SPROUTS**

**WOODPECKER ACTIVITY**



**D-SHAPED EXIT HOLE**

**EAB infested tree in Muscatine with sprouting, wood pecker activity, and D-shaped exit holes**

# Emerald Ash Borer Plan

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## 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 an 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.

## 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? The entire state of Iowa is under quarantine, so regulated articles may not be moved into non-quarantined states. For more information, please visit <http://www.emeraldashborer.info/>.

## **Canopy Replacement**

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance 140.04 (Appendix C). The new plantings will be a diverse mix, not include ash and maple, and be consistent with the Official Street Tree Species list.

## **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 140.08 states "The City shall have the right to cause the removal of any dead or diseased tree on private property within the city, when the tree constitute a hazard to life and property, or harbor insects or disease which constitute a potential threat to other trees within the city. The board will notify in writing the property owner of the property where the tree is. Removal shall be done by the owner at the owner's expense within 20 days after the date of the notice. In the event of failure of the owner to comply with the notice, the City shall have the authority to remove the tree and assess the cost to the property owner."



## Six Year Maintenance Plan and Cost Estimates

### Year 1 (FY 2016)

Remove 4 critical concern trees that need immediate attention	\$3,600
Maintain 2 critical concern trees that need immediate attention (cleaning)	\$600
Remove 3 trees (marked for removal)	\$2,700
Plant and Maintain 9 trees in open locations (pursue grants)	\$900
Ash tree treatment (if elected), 42 trees in good condition, average 24–30” -\$15 per inch, treated every two years, see note *Or saving for future ash removal	avg. \$405/tree
Visual Survey for signs and symptoms of EAB	

### Year 2 (FY 2017)

Remove 6 trees (marked for removal)	\$5,400
Plant and Maintain 8 trees in open locations (pursue grants)	\$800
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~\$300 per tree)	
Visual Survey for signs and symptoms of EAB	

### Year 3 (FY 2018)

Remove any new critical concern trees and ash in poor health	\$900/tree
Plant and Maintain 30 trees in open locations (pursue grants)	\$3,000
Ash tree treatment (if elected) or saving for future ash removal	
Visual Survey for signs and symptoms of EAB	

### Year 4 (FY 2019)

Remove any new critical concern trees and ash in poor health	\$900/tree
Plant and Maintain 30 trees in open locations (pursue grants)	\$3,000
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~\$300 per tree)	
Visual Survey for signs and symptoms of EAB	

### Year 5 (FY 2020)

Remove any new critical concern trees and ash in poor health	\$900/tree
Plant and Maintain 30 trees in open locations (pursue grants)	\$3,000
Ash tree treatment (if elected) or saving for future ash removal	
Visual Survey for signs and symptoms of EAB	

## Year 6 (FY 2021)

Remove any new critical concern trees and ash in poor health	\$900/tree
Plant and Maintain 30 trees in open locations (pursue grants)	\$3,000
Ash tree treatment (if elected) or saving for future ash removal	
Routine trimming: Contract to trim 1/3 of the city trees (~\$300 per tree)	
Visual Survey for signs and symptoms of EAB	

\*Reduction of ash in poor health will reduce exposure to Emerald Ash Borer over time. EAB could potentially kill all ash within 4-15 years of its arrival.

\*\*Assuming a cost of \$900 per tree for removal, the budget would need to be increased to \$12,750 a year to remove all ash trees within 6 years.

\*\*\*Suggest a future (post ash removal and replacement) budget of at least \$2 per capita (population 1,379). Currently, this amount would cover about 22% of what would be needed to remove EAB infested trees over a six year period. Suggest setting aside additional funds to prepare for the expected arrival of EAB. Planting would be at least partially dependent on receiving grant funds annually.

### Proposed Budget Increase

EAB could potentially kill all ash trees in Dysart within 4-15 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to \$12,750 a year. If the budget were increased to \$5,900 a year all ash could be removed within 13 years. Additionally, it is recommended that Dysart 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.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For an example, if the average ash diameter is 20 inches and treatment costs \$15 per inch, then treating 10 trees would cost about \$3,000 (every other year treatment). This would be 10 trees selected for treatment, and Dysart would still need to find \$900 per tree for removal. Alternatively, if there are 15 treatable trees, it would cost approximately \$4,500 every two years for treatment and leave five less trees for removal (for at least two more years). These are alternatives to straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees if EAB is found in Dysart. It is suggested to consider increasing the budget to plan for this.

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# Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Annual Energy Benefits of Public Trees									
1/7/2016									
Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Apple	7.1	537	1,124.9	1,102	1,639	(N/A)	11.2	5.5	15.76
Sugar maple	29.0	2,201	3,883.8	3,806	6,007	(N/A)	10.5	20.3	61.29
Green ash	27.2	2,065	3,698.5	3,624	5,689	(N/A)	8.5	19.2	72.02
Norway maple	16.6	1,262	2,441.7	2,393	3,655	(N/A)	8.3	12.3	47.47
Maple	2.1	161	308.3	302	463	(N/A)	5.9	1.6	8.41
Red maple	4.9	370	665.7	652	1,023	(N/A)	5.5	3.5	20.06
Pear	2.0	153	334.8	328	481	(N/A)	4.5	1.6	11.45
Silver maple	13.3	1,008	1,730.8	1,696	2,704	(N/A)	4.2	9.1	69.33
Broadleaf Deciduous Small	0.4	31	71.7	70	101	(N/A)	3.8	0.3	2.89
Conifer Evergreen Large	1.8	134	242.1	237	371	(N/A)	3.1	1.3	12.78
Pin oak	8.2	623	1,064.1	1,043	1,666	(N/A)	2.7	5.6	66.65
Spruce	2.8	216	380.9	373	589	(N/A)	2.5	2.0	25.61
Northern red oak	3.1	235	436.3	428	662	(N/A)	2.5	2.2	28.80
Northern white cedar	1.0	73	137.2	134	208	(N/A)	2.1	0.7	10.38
Littleleaf linden	1.2	90	162.0	159	249	(N/A)	1.7	0.8	15.54
Oak	0.3	26	50.0	49	75	(N/A)	1.6	0.3	5.00
Swamp white oak	0.7	55	116.7	114	169	(N/A)	1.3	0.6	14.10
Blue spruce	0.6	43	76.8	75	118	(N/A)	1.2	0.4	10.75
Japanese tree lilac	0.3	22	50.3	49	71	(N/A)	1.2	0.2	6.49
American basswood	1.1	86	170.5	167	253	(N/A)	1.1	0.9	25.31
Broadleaf Deciduous Medium	0.4	28	56.7	56	83	(N/A)	1.0	0.3	9.25
Honeylocust	2.7	205	352.1	345	550	(N/A)	0.9	1.9	68.74
River birch	0.9	67	121.2	119	186	(N/A)	0.9	0.6	23.21
Elm	0.8	63	116.4	114	177	(N/A)	0.9	0.6	22.18
Willow	0.4	30	64.5	63	94	(N/A)	0.8	0.3	13.37
Paper birch	0.4	34	63.4	62	96	(N/A)	0.6	0.3	16.01
Black walnut	2.0	148	260.4	255	403	(N/A)	0.6	1.4	67.22
Bur oak	0.5	35	59.1	58	93	(N/A)	0.6	0.3	15.44
Northern hackberry	0.8	64	126.5	124	188	(N/A)	0.6	0.6	31.34
White ash	0.8	60	107.8	106	166	(N/A)	0.5	0.6	33.14
Tulip tree	0.0	1	2.3	2	3	(N/A)	0.5	0.0	0.66
Mulberry	0.4	27	54.8	54	81	(N/A)	0.5	0.3	16.16
Eastern red cedar	0.2	16	34.2	33	50	(N/A)	0.5	0.2	9.90
Eastern white pine	0.2	18	33.9	33	51	(N/A)	0.5	0.2	10.25
Ginkgo	0.1	7	14.1	14	21	(N/A)	0.5	0.1	4.19
Ohio buckeye	0.2	14	30.8	30	45	(N/A)	0.5	0.2	8.93
White oak	0.6	45	71.9	70	116	(N/A)	0.5	0.4	23.11
Siberian elm	1.0	77	130.0	127	204	(N/A)	0.5	0.7	40.81
Kentucky coffeetree	0.3	22	41.7	41	63	(N/A)	0.4	0.2	15.64
Amur maple	0.6	42	74.6	73	115	(N/A)	0.4	0.4	28.82
Quaking aspen	0.2	17	31.6	31	48	(N/A)	0.4	0.2	11.94
Dogwood	0.1	9	21.0	21	30	(N/A)	0.4	0.1	7.47
Birch	0.0	1	2.4	2	3	(N/A)	0.3	0.0	1.10
Boxelder	0.9	66	121.2	119	185	(N/A)	0.3	0.6	61.64
Basswood	0.4	30	54.6	54	83	(N/A)	0.3	0.3	27.78
Broadleaf Deciduous Large	0.0	1	1.4	1	2	(N/A)	0.3	0.0	0.66
Hickory	0.7	50	93.7	92	142	(N/A)	0.2	0.5	70.91
Lilac	0.0	2	4.4	4	6	(N/A)	0.2	0.0	3.13
Plum	0.0	1	1.2	1	2	(N/A)	0.2	0.0	0.87
Yellowwood	0.0	1	1.6	2	2	(N/A)	0.2	0.0	1.10
Conifer Evergreen Medium	0.0	2	4.9	5	7	(N/A)	0.1	0.0	6.94
Black locust	0.0	0	0.8	1	1	(N/A)	0.1	0.0	1.10
Cottonwood	0.0	0	0.5	0	1	(N/A)	0.1	0.0	0.66
Black maple	0.0	3	5.2	5	8	(N/A)	0.1	0.0	7.85
Scotch pine	0.1	11	19.7	19	30	(N/A)	0.1	0.1	30.47
Black ash	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Conifer Evergreen Small	0.0	1	2.5	2	4	(N/A)	0.1	0.0	3.62
Mountain ash	0.2	15	31.6	31	46	(N/A)	0.1	0.2	46.14
Norway spruce	0.0	0	0.7	1	1	(N/A)	0.1	0.0	0.93
Alder	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Eastern redbud	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Total	139.8	10,612	19,380.2	18,993	29,604	(N/A)	100.0	100.0	31.80

**Table 2: Annual Stormwater Benefits**

<b>Annual Stormwater Benefits of Public Trees</b>						
1/7/2016						
Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Apple	27,357	741	(N/A)	11.2	1.7	7.13
Sugar maple	384,119	10,410	(N/A)	10.5	23.9	106.22
Green ash	356,536	9,662	(N/A)	8.5	22.1	122.31
Norway maple	164,582	4,460	(N/A)	8.3	10.2	57.92
Maple	10,631	288	(N/A)	5.9	0.7	5.24
Red maple	30,366	823	(N/A)	5.5	1.9	16.14
Pear	7,066	191	(N/A)	4.5	0.4	4.56
Silver maple	211,280	5,726	(N/A)	4.2	13.1	146.81
Broadleaf Deciduous Small	1,264	34	(N/A)	3.8	0.1	0.98
Conifer Evergreen Large	34,044	923	(N/A)	3.1	2.1	31.81
Pin oak	93,194	2,526	(N/A)	2.7	5.8	101.02
Spruce	57,369	1,555	(N/A)	2.5	3.6	67.60
Northern red oak	29,808	808	(N/A)	2.5	1.9	35.12
Northern white cedar	12,138	329	(N/A)	2.1	0.8	16.45
Littleleaf linden	6,744	183	(N/A)	1.7	0.4	11.42
Oak	2,192	59	(N/A)	1.6	0.1	3.96
Swamp white oak	3,890	105	(N/A)	1.3	0.2	8.78
Blue spruce	6,591	179	(N/A)	1.2	0.4	16.24
Japanese tree lilac	963	26	(N/A)	1.2	0.1	2.37
American basswood	10,301	279	(N/A)	1.1	0.6	27.92
Broadleaf Deciduous Medium	2,878	78	(N/A)	1.0	0.2	8.67
Honeylocust	33,421	906	(N/A)	0.9	2.1	113.21
River birch	6,945	188	(N/A)	0.9	0.4	23.52
Elm	10,681	289	(N/A)	0.9	0.7	36.18
Willow	2,108	57	(N/A)	0.8	0.1	8.16
Paper birch	3,731	101	(N/A)	0.6	0.2	16.85
Black walnut	23,546	638	(N/A)	0.6	1.5	106.35
Bur oak	2,889	78	(N/A)	0.6	0.2	13.05
Northern hackberry	6,886	187	(N/A)	0.6	0.4	31.10
White ash	7,754	210	(N/A)	0.5	0.5	42.03
Tulip tree	89	2	(N/A)	0.5	0.0	0.48
Mulberry	1,272	34	(N/A)	0.5	0.1	6.89
Eastern red cedar	2,820	76	(N/A)	0.5	0.2	15.29
Eastern white pine	5,128	139	(N/A)	0.5	0.3	27.79
Ginkgo	404	11	(N/A)	0.5	0.0	2.19
Ohio buckeye	936	25	(N/A)	0.5	0.1	5.07
White oak	3,728	101	(N/A)	0.5	0.2	20.21
Siberian elm	7,330	199	(N/A)	0.5	0.5	39.73
Kentucky coffeetree	1,841	50	(N/A)	0.4	0.1	12.48
Amur maple	2,007	54	(N/A)	0.4	0.1	13.60
Quaking aspen	1,405	38	(N/A)	0.4	0.1	9.52
Dogwood	409	11	(N/A)	0.4	0.0	2.77
Birch	37	1	(N/A)	0.3	0.0	0.33
Boxelder	12,158	329	(N/A)	0.3	0.8	109.82
Basswood	5,526	150	(N/A)	0.3	0.3	49.92
Broadleaf Deciduous Large	54	1	(N/A)	0.3	0.0	0.48
Hickory	7,886	214	(N/A)	0.2	0.5	106.85
Lilac	76	2	(N/A)	0.2	0.0	1.03
Plum	15	0	(N/A)	0.2	0.0	0.20
Yellowwood	24	1	(N/A)	0.2	0.0	0.33
Conifer Evergreen Medium	256	7	(N/A)	0.1	0.0	6.95
Black locust	12	0	(N/A)	0.1	0.0	0.33
Cottonwood	18	0	(N/A)	0.1	0.0	0.48
Black maple	137	4	(N/A)	0.1	0.0	3.72
Scotch pine	2,969	80	(N/A)	0.1	0.2	80.46
Black ash	586	16	(N/A)	0.1	0.0	15.88
Conifer Evergreen Small	183	5	(N/A)	0.1	0.0	4.97
Mountain ash	1,174	32	(N/A)	0.1	0.1	31.82
Norway spruce	49	1	(N/A)	0.1	0.0	1.32
Alder	7	0	(N/A)	0.1	0.0	0.20
Eastern redbud	7	0	(N/A)	0.1	0.0	0.20
Citywide total	1,609,820	43,626	(N/A)	100.0	100.0	46.86

**Table 3: Annual Air Quality Benefits**

**Annual Air Quality Benefits of Public Trees**

1/7/2016

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (lb)	BVOC Emissions (\$)	Total (lb)	Total Standard (\$)	Standard Error	% of Total Trees	Avg. \$/tree
	O <sub>3</sub>	NO <sub>2</sub>	PM <sub>10</sub>	SO <sub>2</sub>		NO <sub>2</sub>	PM <sub>10</sub>	VOC	SO <sub>2</sub>								
Apple	6.8	1.1	3.4	0.3	37	35.2	5.0	4.8	32.1	216	0.0	0	88.6	252 (N/A)		11.2	2.42
Sugar maple	57.1	9.7	27.4	2.5	306	137.5	20.1	19.2	131.3	859	-44.3	-166	360.6	999 (N/A)		10.5	10.19
Green ash	51.7	8.3	23.6	2.3	272	129.7	18.9	18.0	123.3	808	0.0	0	375.8	1,080 (N/A)		8.5	13.68
Norway maple	34.6	6.0	16.9	1.5	187	81.0	11.7	11.1	75.4	501	-8.0	-30	230.2	657 (N/A)		8.3	8.54
Maple	1.3	0.2	0.8	0.1	7	10.2	1.5	1.4	9.6	63	-0.5	-2	24.5	69 (N/A)		5.9	1.25
Red maple	5.3	0.9	2.7	0.2	29	23.2	3.4	3.2	22.1	145	-2.0	-8	59.2	166 (N/A)		5.5	3.26
Pear	1.3	0.2	0.7	0.1	7	10.1	1.4	1.4	9.1	62	0.0	0	24.4	69 (N/A)		4.5	1.65
Silver maple	38.6	6.5	18.7	1.7	207	62.4	9.1	8.7	60.0	391	-19.6	-74	186.3	525 (N/A)		4.2	13.45
Broadleaf Deciduous Small	0.1	0.0	0.1	0.0	1	2.1	0.3	0.3	1.9	13	0.0	0	4.8	13 (N/A)		3.8	0.38
Conifer Evergreen Large	3.8	0.8	3.2	0.5	25	8.4	1.2	1.2	8.0	52	-16.7	-63	10.3	15 (N/A)		3.1	0.52
Pin oak	17.0	3.0	8.7	0.8	93	38.6	5.7	5.4	37.2	242	-31.5	-118	84.8	217 (N/A)		2.7	8.68
Spruce	6.8	1.3	5.5	0.8	45	13.5	2.0	1.9	12.9	84	-31.8	-119	12.9	9 (N/A)		2.5	0.41
Northern red oak	6.1	1.1	3.0	0.3	33	14.9	2.2	2.1	14.0	92	-8.8	-33	34.7	92 (N/A)		2.5	4.01
Northern white cedar	1.2	0.2	1.1	0.1	8	4.6	0.7	0.6	4.4	29	-4.3	-16	8.7	21 (N/A)		2.1	1.04
Littleleaf linden	0.7	0.1	0.4	0.0	4	5.7	0.8	0.8	5.4	35	-0.4	-2	13.5	38 (N/A)		1.7	2.36
Oak	0.1	0.0	0.1	0.0	1	1.7	0.2	0.2	1.5	10	0.0	0	3.8	11 (N/A)		1.6	0.72
Swamp white oak	0.3	0.1	0.2	0.0	2	3.6	0.5	0.5	3.3	22	-0.1	0	8.5	24 (N/A)		1.3	1.98
Blue spruce	0.7	0.1	0.7	0.1	5	2.7	0.4	0.4	2.6	17	-2.2	-8	5.4	13 (N/A)		1.2	1.22
Japanese tree lilac	0.1	0.0	0.1	0.0	1	1.5	0.2	0.2	1.3	9	0.0	0	3.4	10 (N/A)		1.2	0.88
American basswood	1.2	0.2	0.6	0.1	7	5.6	0.8	0.8	5.1	34	-1.1	-4	13.3	37 (N/A)		1.1	3.68
Broadleaf Deciduous Medium	0.5	0.1	0.3	0.0	3	1.8	0.3	0.2	1.7	11	-0.1	0	4.7	13 (N/A)		1.0	1.49
Honeylocust	6.6	1.1	3.0	0.3	35	12.7	1.9	1.8	12.2	80	-5.4	-20	34.2	94 (N/A)		0.9	11.80
River birch	1.3	0.2	0.7	0.1	7	4.2	0.6	0.6	4.0	26	-0.3	-1	11.4	32 (N/A)		0.9	4.03
Elm	1.5	0.2	0.7	0.1	8	4.0	0.6	0.6	3.8	25	0.0	0	11.3	33 (N/A)		0.9	4.07
Willow	0.2	0.0	0.1	0.0	1	2.0	0.3	0.3	1.8	12	-0.1	0	4.7	13 (N/A)		0.8	1.87
Paper birch	0.3	0.0	0.2	0.0	2	2.2	0.3	0.3	2.0	13	0.0	0	5.3	15 (N/A)		0.6	2.50
Black walnut	3.2	0.5	1.5	0.1	17	9.3	1.4	1.3	8.8	58	0.0	0	26.0	75 (N/A)		0.6	12.42
Bur oak	0.2	0.0	0.1	0.0	1	2.2	0.3	0.3	2.1	13	0.0	0	5.1	14 (N/A)		0.6	2.41
Northern hackberry	0.9	0.2	0.5	0.0	5	4.1	0.6	0.6	3.8	25	0.0	0	10.7	30 (N/A)		0.6	5.08
White ash	1.0	0.2	0.5	0.0	5	3.8	0.5	0.5	3.6	23	0.0	0	10.1	29 (N/A)		0.5	5.76
Tulip tree	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.1	0 (N/A)		0.5	0.08
Mulberry	0.3	0.0	0.2	0.0	2	1.8	0.3	0.2	1.6	11	0.0	0	4.4	12 (N/A)		0.5	2.49
Eastern red cedar	0.3	0.1	0.2	0.0	2	1.1	0.1	0.1	1.0	6	-1.5	-6	1.4	3 (N/A)		0.5	0.53
Eastern white pine	0.6	0.1	0.5	0.1	4	1.1	0.2	0.2	1.1	7	-3.0	-11	0.8	0 (N/A)		0.5	-0.07
Ginkgo	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	0.0	0	1.1	3 (N/A)		0.5	0.59
Ohio buckeye	0.1	0.0	0.1	0.0	0	1.0	0.1	0.1	0.9	6	0.0	0	2.2	6 (N/A)		0.5	1.23
White oak	0.2	0.0	0.2	0.0	1	2.8	0.4	0.4	2.7	17	0.0	0	6.7	19 (N/A)		0.5	3.76
Siberian elm	0.8	0.1	0.4	0.0	4	4.7	0.7	0.7	4.6	30	0.0	0	12.0	34 (N/A)		0.5	6.80
Kentucky coffeetree	0.1	0.0	0.1	0.0	0	1.4	0.2	0.2	1.3	9	0.0	0	3.2	9 (N/A)		0.4	2.27
Amur maple	0.6	0.1	0.3	0.0	3	2.6	0.4	0.4	2.5	16	0.0	0	7.0	20 (N/A)		0.4	4.94
Quaking aspen	0.1	0.0	0.0	0.0	0	1.1	0.2	0.1	1.0	7	0.0	0	2.5	7 (N/A)		0.4	1.73
Dogwood	0.1	0.0	0.0	0.0	0	0.6	0.1	0.1	0.6	4	0.0	0	1.4	4 (N/A)		0.4	1.02
Birch	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.1	0 (N/A)		0.3	0.14
Boxelder	1.8	0.3	0.8	0.1	10	4.2	0.6	0.6	3.9	26	-0.5	-2	11.8	34 (N/A)		0.3	11.18
Basswood	0.8	0.1	0.4	0.0	4	1.9	0.3	0.3	1.8	12	0.0	0	5.5	16 (N/A)		0.3	5.29
Broadleaf Deciduous Large	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)		0.3	0.08
Hickory	1.0	0.2	0.5	0.0	5	3.2	0.5	0.4	3.0	20	0.0	0	8.7	25 (N/A)		0.2	12.48
Lilac	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)		0.2	0.41
Plum	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)		0.2	0.11
Yellowwood	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)		0.2	0.14
Conifer Evergreen Medium	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	-0.1	0	0.3	1 (N/A)		0.1	0.75
Black locust	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
Cottonwood	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	0.08
Black 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)		0.1	1.12
Scotch pine	0.3	0.1	0.3	0.0	2	0.7	0.1	0.1	0.7	4	-1.4	-5	0.9	1 (N/A)		0.1	1.45
Black ash	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3 (N/A)		0.1	3.47
Conifer Evergreen Small	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	-0.1	0	0.1	0 (N/A)		0.1	0.20
Mountain ash	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)		0.1	8.35
Norway spruce	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	0.05
Alder	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	0.11
Eastern redbud	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	0.11
Citywide total	258.1	43.8	129.6	12.6	1,402	669.2	97.3	92.7	633.4	4,164	-184.0	-690	1,752.6	4,876 (N/A)		100.0	5.24

**Table 4: Annual Carbon Stored**

<b>Stored CO2 Benefits of Public Trees</b>						
1/7/2016						
Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Apple	114,800	861	(N/A)	11.2	1.8	8.28
Sugar maple	1,694,677	12,710	(N/A)	10.5	26.4	129.69
Green ash	1,714,455	12,858	(N/A)	8.5	26.7	162.76
Norway maple	573,761	4,303	(N/A)	8.3	8.9	55.89
Maple	19,001	143	(N/A)	5.9	0.3	2.59
Red maple	64,576	484	(N/A)	5.5	1.0	9.50
Pear	25,090	188	(N/A)	4.5	0.4	4.48
Silver maple	894,971	6,712	(N/A)	4.2	13.9	172.11
Broadleaf Deciduous	3,583	27	(N/A)	3.8	0.1	0.77
Conifer Evergreen La	40,213	302	(N/A)	3.1	0.6	10.40
Pin oak	460,044	3,450	(N/A)	2.7	7.2	138.01
Spruce	80,360	603	(N/A)	2.5	1.3	26.20
Northern red oak	132,133	991	(N/A)	2.5	2.1	43.09
Northern white cedar	8,525	64	(N/A)	2.1	0.1	3.20
Littleleaf linden	17,227	129	(N/A)	1.7	0.3	8.08
Oak	3,423	26	(N/A)	1.6	0.1	1.71
Swamp white oak	7,108	53	(N/A)	1.3	0.1	4.44
Blue spruce	3,977	30	(N/A)	1.2	0.1	2.71
Japanese tree lilac	2,924	22	(N/A)	1.2	0.0	1.99
American basswood	44,196	331	(N/A)	1.1	0.7	33.15
Broadleaf Deciduous	8,483	64	(N/A)	1.0	0.1	7.07
Honeylocust	86,622	650	(N/A)	0.9	1.3	81.21
River birch	22,016	165	(N/A)	0.9	0.3	20.64
Elm	48,985	367	(N/A)	0.9	0.8	45.92
Willow	3,773	28	(N/A)	0.8	0.1	4.04
Paper birch	10,061	75	(N/A)	0.6	0.2	12.58
Black walnut	104,091	781	(N/A)	0.6	1.6	130.11
Bur oak	5,951	45	(N/A)	0.6	0.1	7.44
Northern hackberry	12,693	95	(N/A)	0.6	0.2	15.87
White ash	19,911	149	(N/A)	0.5	0.3	29.87
Tulip tree	61	0	(N/A)	0.5	0.0	0.09
Mulberry	5,045	38	(N/A)	0.5	0.1	7.57
Eastern red cedar	1,151	9	(N/A)	0.5	0.0	1.73
Eastern white pine	7,572	57	(N/A)	0.5	0.1	11.36
Ginkgo	565	4	(N/A)	0.5	0.0	0.85
Ohio buckeye	1,571	12	(N/A)	0.5	0.0	2.36
White oak	8,576	64	(N/A)	0.5	0.1	12.86
Siberian elm	19,574	147	(N/A)	0.5	0.3	29.36
Kentucky coffeetree	3,116	23	(N/A)	0.4	0.0	5.84
Amur maple	9,125	68	(N/A)	0.4	0.1	17.11
Quaking aspen	2,267	17	(N/A)	0.4	0.0	4.25
Dogwood	1,277	10	(N/A)	0.4	0.0	2.39
Birch	51	0	(N/A)	0.3	0.0	0.13
Boxelder	70,760	531	(N/A)	0.3	1.1	176.90
Basswood	25,967	195	(N/A)	0.3	0.4	64.92
Broadleaf Deciduous	36	0	(N/A)	0.3	0.0	0.09
Hickory	31,546	237	(N/A)	0.2	0.5	118.30
Lilac	192	1	(N/A)	0.2	0.0	0.72
Plum	28	0	(N/A)	0.2	0.0	0.10
Yellowwood	34	0	(N/A)	0.2	0.0	0.13
Conifer Evergreen Mf	43	0	(N/A)	0.1	0.0	0.32
Black locust	17	0	(N/A)	0.1	0.0	0.13
Cottonwood	12	0	(N/A)	0.1	0.0	0.09
Black maple	218	2	(N/A)	0.1	0.0	1.64
Scotch pine	3,343	25	(N/A)	0.1	0.1	25.07
Black ash	1,101	8	(N/A)	0.1	0.0	8.26
Conifer Evergreen Sn	43	0	(N/A)	0.1	0.0	0.32
Mountain ash	6,743	51	(N/A)	0.1	0.1	50.57
Norway spruce	2	0	(N/A)	0.1	0.0	0.02
Alder	14	0	(N/A)	0.1	0.0	0.10
Eastern redbud	14	0	(N/A)	0.1	0.0	0.10
Citywide total	6,427,691	48,208	(N/A)	100.0	100.0	51.78

**Table 5: Annual Carbon Sequestered**

**Annual CO Benefits of Public Trees**

1/7/2016

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
Apple	10,762	81	-552	-108	-5	11,869	89	21,972	165 (N/A)	11.2	4.1	1.58
Sugar maple	74,908	562	-8,136	-332	-64	48,632	365	115,072	863 (N/A)	10.5	21.7	8.81
Green ash	61,993	465	-8,229	-295	-64	45,633	342	99,101	743 (N/A)	8.5	18.6	9.41
Norway maple	20,498	154	-2,759	-184	-22	27,888	209	45,444	341 (N/A)	8.3	8.6	4.43
Maple	2,906	22	-93	-29	-1	3,550	27	6,334	48 (N/A)	5.9	1.2	0.86
Red maple	8,793	66	-311	-50	-3	8,188	61	16,620	125 (N/A)	5.5	3.1	2.44
Pear	3,145	24	-121	-34	-1	3,378	25	6,368	48 (N/A)	4.5	1.2	1.14
Silver maple	61,020	458	-4,296	-154	-33	22,272	167	78,842	591 (N/A)	4.2	14.8	15.16
Broadleaf Deciduous Smal	748	6	-18	-12	0	686	5	1,404	11 (N/A)	3.8	0.3	0.30
Conifer Evergreen Large	1,892	14	-193	-36	-2	2,950	22	4,614	35 (N/A)	3.1	0.9	1.19
Pin oak	34,284	257	-2,208	-86	-17	13,777	103	45,766	343 (N/A)	2.7	8.6	13.73
Spruce	2,454	18	-386	-56	-3	4,768	36	6,781	51 (N/A)	2.5	1.3	2.21
Northern red oak	3,510	26	-634	-41	-5	5,188	39	8,023	60 (N/A)	2.5	1.5	2.62
Northern white cedar	929	7	-41	-19	0	1,618	12	2,487	19 (N/A)	2.1	0.5	0.93
Littleleaf linden	3,095	23	-87	-16	-1	1,986	15	4,978	37 (N/A)	1.7	0.9	2.33
Oak	729	5	-17	-6	0	573	4	1,279	10 (N/A)	1.6	0.2	0.64
Swamp white oak	1,557	12	-36	-9	0	1,213	9	2,725	20 (N/A)	1.3	0.5	1.70
Blue spruce	370	3	-19	-10	0	951	7	1,292	10 (N/A)	1.2	0.2	0.88
Japanese tree lilac	481	4	-14	-6	0	488	4	949	7 (N/A)	1.2	0.2	0.65
American basswood	2,937	22	-212	-15	-2	1,900	14	4,611	35 (N/A)	1.1	0.9	3.46
Broadleaf Deciduous Medi	694	5	-42	-5	0	612	5	1,258	9 (N/A)	1.0	0.2	1.05
Honeylocust	4,659	35	-416	-20	-3	4,527	34	8,749	66 (N/A)	0.9	1.6	8.20
River birch	979	7	-107	-10	-1	1,479	11	2,341	18 (N/A)	0.9	0.4	2.20
Elm	1,865	14	-235	-10	-2	1,401	11	3,020	23 (N/A)	0.9	0.6	2.83
Willow	874	7	-20	-5	0	671	5	1,520	11 (N/A)	0.8	0.3	1.63
Paper birch	1,094	8	-48	-6	0	750	6	1,790	13 (N/A)	0.6	0.3	2.24
Black walnut	4,476	34	-500	-20	-4	3,275	25	7,231	54 (N/A)	0.6	1.4	9.04
Bur oak	942	7	-29	-5	0	768	6	1,676	13 (N/A)	0.6	0.3	2.10
Northern hackberry	963	7	-61	-8	-1	1,415	11	2,309	17 (N/A)	0.6	0.4	2.89
White ash	2,044	15	-96	-8	-1	1,326	10	3,266	24 (N/A)	0.5	0.6	4.90
Tulip tree	13	0	0	-1	0	22	0	33	0 (N/A)	0.5	0.0	0.05
Mulberry	542	4	-24	-5	0	600	4	1,112	8 (N/A)	0.5	0.2	1.67
Eastern red cedar	173	1	-6	-5	0	354	3	516	4 (N/A)	0.5	0.1	0.77
Eastern white pine	43	0	-36	-6	0	399	3	400	3 (N/A)	0.5	0.1	0.60
Ginkgo	80	1	-3	-2	0	158	1	233	2 (N/A)	0.5	0.0	0.35
Ohio buckeye	426	3	-9	-3	0	319	2	734	6 (N/A)	0.5	0.1	1.10
White oak	1,176	9	-41	-6	0	998	7	2,127	16 (N/A)	0.5	0.4	3.19
Siberian elm	1,613	12	-94	-10	-1	1,694	13	3,203	24 (N/A)	0.5	0.6	4.80
Kentucky coffeetree	629	5	-15	-4	0	481	4	1,091	8 (N/A)	0.4	0.2	2.05
Amur maple	812	6	-44	-6	0	931	7	1,693	13 (N/A)	0.4	0.3	3.17
Quaking aspen	494	4	-11	-3	0	371	3	851	6 (N/A)	0.4	0.2	1.60
Dogwood	198	1	-6	-3	0	204	2	394	3 (N/A)	0.4	0.1	0.74
Birch	16	0	0	-1	0	22	0	37	0 (N/A)	0.3	0.0	0.09
Boxelder	4,365	33	-340	-13	-3	1,462	11	5,474	41 (N/A)	0.3	1.0	13.69
Basswood	965	7	-125	-5	-1	659	5	1,494	11 (N/A)	0.3	0.3	3.74
Broadleaf Deciduous Larg	8	0	0	-1	0	13	0	20	0 (N/A)	0.3	0.0	0.05
Hickory	1,714	13	-151	-7	-1	1,105	8	2,660	20 (N/A)	0.2	0.5	9.97
Lilac	47	0	-1	-1	0	43	0	88	1 (N/A)	0.2	0.0	0.33
Plum	17	0	0	0	0	11	0	28	0 (N/A)	0.2	0.0	0.10
Yellowwood	11	0	0	0	0	14	0	25	0 (N/A)	0.2	0.0	0.09
Conifer Evergreen Medium	12	0	0	-1	0	48	0	60	0 (N/A)	0.1	0.0	0.45
Black locust	5	0	0	0	0	7	0	12	0 (N/A)	0.1	0.0	0.09
Cottonwood	3	0	0	0	0	4	0	7	0 (N/A)	0.1	0.0	0.05
Black maple	39	0	-1	-1	0	60	0	97	1 (N/A)	0.1	0.0	0.73
Scotch pine	187	1	-16	-3	0	246	2	415	3 (N/A)	0.1	0.1	3.11
Black ash	224	2	-5	-1	0	176	1	393	3 (N/A)	0.1	0.1	2.95
Conifer Evergreen Small	13	0	0	-1	0	26	0	39	0 (N/A)	0.1	0.0	0.29
Mountain ash	0	0	-32	-4	0	335	3	299	2 (N/A)	0.1	0.1	2.24
Norway spruce	4	0	0	0	0	6	0	9	0 (N/A)	0.1	0.0	0.07
Alder	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Eastern redbud	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Citywide total	329,446	2,471	-30,878	-1,686	-244	234,513	1,759	531,395	3,985 (N/A)	100.0	100.0	4.28

**Table 6: Annual Social and Aesthetic Benefits**

<b>Annual Aesthetic/Other Benefits of Public Trees</b>					
1/7/2016					
Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Apple	606	(N/A)	11.2	2.0	5.83
Sugar maple	7,356	(N/A)	10.5	24.1	75.06
Green ash	4,601	(N/A)	8.5	15.1	58.24
Norway maple	1,986	(N/A)	8.3	6.5	25.79
Maple	496	(N/A)	5.9	1.6	9.02
Red maple	1,320	(N/A)	5.5	4.3	25.87
Pear	172	(N/A)	4.5	0.6	4.08
Silver maple	4,531	(N/A)	4.2	14.8	116.19
Broadleaf Deciduous Small	30	(N/A)	3.8	0.1	0.86
Conifer Evergreen Large	520	(N/A)	3.1	1.7	17.94
Pin oak	2,607	(N/A)	2.7	8.5	104.27
Spruce	460	(N/A)	2.5	1.5	19.99
Northern red oak	293	(N/A)	2.5	1.0	12.73
Northern white cedar	297	(N/A)	2.1	1.0	14.87
Littleleaf linden	398	(N/A)	1.7	1.3	24.85
Oak	158	(N/A)	1.6	0.5	10.55
Swamp white oak	194	(N/A)	1.3	0.6	16.17
Blue spruce	155	(N/A)	1.2	0.5	14.12
Japanese tree lilac	25	(N/A)	1.2	0.1	2.30
American basswood	234	(N/A)	1.1	0.8	23.44
Broadleaf Deciduous Medium	85	(N/A)	1.0	0.3	9.47
Honeylocust	1,198	(N/A)	0.9	3.9	149.77
River birch	112	(N/A)	0.9	0.4	14.04
Elm	180	(N/A)	0.9	0.6	22.55
Willow	110	(N/A)	0.8	0.4	15.70
Paper birch	136	(N/A)	0.6	0.4	22.62
Black walnut	348	(N/A)	0.6	1.1	57.97
Bur oak	128	(N/A)	0.6	0.4	21.37
Northern hackberry	158	(N/A)	0.6	0.5	26.40
White ash	260	(N/A)	0.5	0.9	52.01
Tulip tree	26	(N/A)	0.5	0.1	5.26
Mulberry	30	(N/A)	0.5	0.1	6.08
Eastern red cedar	99	(N/A)	0.5	0.3	19.75
Eastern white pine	25	(N/A)	0.5	0.1	5.04
Ginkgo	11	(N/A)	0.5	0.0	2.13
Ohio buckeye	57	(N/A)	0.5	0.2	11.49
White oak	140	(N/A)	0.5	0.5	28.05
Siberian elm	155	(N/A)	0.5	0.5	31.06
Kentucky coffeetree	91	(N/A)	0.4	0.3	22.73
Amur maple	46	(N/A)	0.4	0.2	11.62
Quaking aspen	77	(N/A)	0.4	0.3	19.28
Dogwood	11	(N/A)	0.4	0.0	2.64
Birch	8	(N/A)	0.3	0.0	2.74
Boxelder	239	(N/A)	0.3	0.8	79.76
Basswood	77	(N/A)	0.3	0.3	25.71
Broadleaf Deciduous Large	16	(N/A)	0.3	0.1	5.26
Hickory	131	(N/A)	0.2	0.4	65.59
Lilac	2	(N/A)	0.2	0.0	1.05
Plum	0	(N/A)	0.2	0.0	0.03
Yellowwood	5	(N/A)	0.2	0.0	2.74
Conifer Evergreen Medium	12	(N/A)	0.1	0.0	12.31
Black locust	3	(N/A)	0.1	0.0	2.74
Cottonwood	5	(N/A)	0.1	0.0	5.26
Black maple	7	(N/A)	0.1	0.0	7.28
Scotch pine	47	(N/A)	0.1	0.2	47.08
Black ash	26	(N/A)	0.1	0.1	26.22
Conifer Evergreen Small	13	(N/A)	0.1	0.0	13.37
Mountain ash	0	(N/A)	0.1	0.0	0.00
Norway spruce	6	(N/A)	0.1	0.0	5.76
Alder	0	(N/A)	0.1	0.0	0.03
Eastern redbud	0	(N/A)	0.1	0.0	0.03
<b>Citywide total</b>	<b>30,525</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>32.79</b>

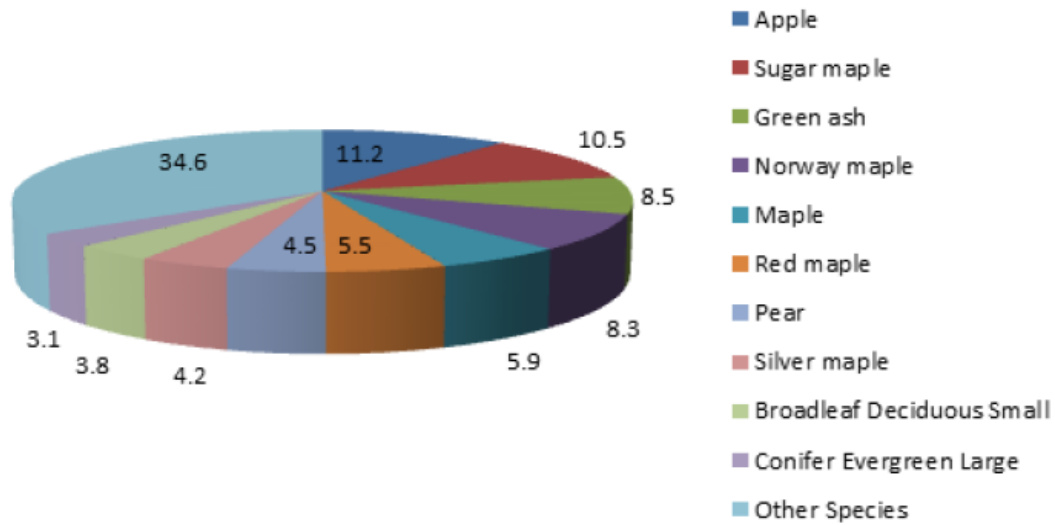


**Table 7: Summary of Benefits in Dollars**

Total Annual Benefits of Public Trees by Species (\$)								
1/7/2016								
Species	Energy	CO <sub>2</sub>	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Apple	1,639	165	252	741	606	3,404	(N/A)	3.0
Sugar maple	6,007	863	999	10,410	7,356	25,635	(N/A)	22.8
Green ash	5,689	743	1,080	9,662	4,601	21,776	(N/A)	19.3
Norway maple	3,655	341	657	4,460	1,986	11,099	(N/A)	9.9
Maple	463	48	69	288	496	1,363	(N/A)	1.2
Red maple	1,023	125	166	823	1,320	3,456	(N/A)	3.1
Pear	481	48	69	191	172	961	(N/A)	0.9
Silver maple	2,704	591	525	5,726	4,531	14,077	(N/A)	12.5
Broadleaf Deciduous Sm	101	11	13	34	30	190	(N/A)	0.2
Conifer Evergreen Large	371	35	15	923	520	1,863	(N/A)	1.7
Pin oak	1,666	343	217	2,526	2,607	7,359	(N/A)	6.5
Spruce	589	51	9	1,555	460	2,664	(N/A)	2.4
Northern red oak	662	60	92	808	293	1,916	(N/A)	1.7
Northern white cedar	208	19	21	329	297	873	(N/A)	0.8
Littleleaf linden	249	37	38	183	398	904	(N/A)	0.8
Oak	75	10	11	59	158	313	(N/A)	0.3
Swamp white oak	169	20	24	105	194	513	(N/A)	0.5
Blue spruce	118	10	13	179	155	475	(N/A)	0.4
Japanese tree lilac	71	7	10	26	25	140	(N/A)	0.1
American basswood	253	35	37	279	234	838	(N/A)	0.7
Broadleaf Deciduous Med	83	9	13	78	85	269	(N/A)	0.2
Honeylocust	550	66	94	906	1,198	2,814	(N/A)	2.5
River birch	186	18	32	188	112	536	(N/A)	0.5
Elm	177	23	33	289	180	702	(N/A)	0.6
Willow	94	11	13	57	110	285	(N/A)	0.3
Paper birch	96	13	15	101	136	361	(N/A)	0.3
Black walnut	403	54	75	638	348	1,518	(N/A)	1.3
Bur oak	93	13	14	78	128	326	(N/A)	0.3
Northern hackberry	188	17	30	187	158	581	(N/A)	0.5
White ash	166	24	29	210	260	689	(N/A)	0.6
Tulip tree	3	0	0	2	26	33	(N/A)	0.0
Mulberry	81	8	12	34	30	166	(N/A)	0.1
Eastern red cedar	50	4	3	76	99	231	(N/A)	0.2
Eastern white pine	51	3	0	139	25	218	(N/A)	0.2
Ginkgo	21	2	3	11	11	47	(N/A)	0.0
Ohio buckeye	45	6	6	25	57	139	(N/A)	0.1
White oak	116	16	19	101	140	392	(N/A)	0.3
Siberian elm	204	24	34	199	155	616	(N/A)	0.5
Kentucky coffeetree	63	8	9	50	91	221	(N/A)	0.2
Amur maple	115	13	20	54	46	249	(N/A)	0.2
Quaking aspen	48	6	7	38	77	176	(N/A)	0.2
Dogwood	30	3	4	11	11	59	(N/A)	0.1
Birch	3	0	0	1	8	13	(N/A)	0.0
Boxelder	185	41	34	329	239	828	(N/A)	0.7
Basswood	83	11	16	150	77	337	(N/A)	0.3
Broadleaf Deciduous Large	2	0	0	1	16	20	(N/A)	0.0
Hickory	142	20	25	214	131	532	(N/A)	0.5
Lilac	6	1	1	2	2	12	(N/A)	0.0
Plum	2	0	0	0	0	3	(N/A)	0.0
Yellowwood	2	0	0	1	5	9	(N/A)	0.0
Conifer Evergreen Medium	7	0	1	7	12	27	(N/A)	0.0
Black locust	1	0	0	0	3	4	(N/A)	0.0
Cottonwood	1	0	0	0	5	7	(N/A)	0.0
Black maple	8	1	1	4	7	21	(N/A)	0.0
Scotch pine	30	3	1	80	47	163	(N/A)	0.1
Black ash	24	3	3	16	26	73	(N/A)	0.1
Conifer Evergreen Small	4	0	0	5	13	22	(N/A)	0.0
Mountain ash	46	2	8	32	0	89	(N/A)	0.1
Norway spruce	1	0	0	1	6	8	(N/A)	0.0
Alder	1	0	0	0	0	1	(N/A)	0.0
Eastern redbud	1	0	0	0	0	1	(N/A)	0.0
<b>Citywide Total</b>	<b>29,604</b>	<b>3,985</b>	<b>4,876</b>	<b>43,626</b>	<b>30,525</b>	<b>112,617</b>	<b>(N/A)</b>	<b>100.0</b>

# Species Distribution of Public Trees

1/7/2016



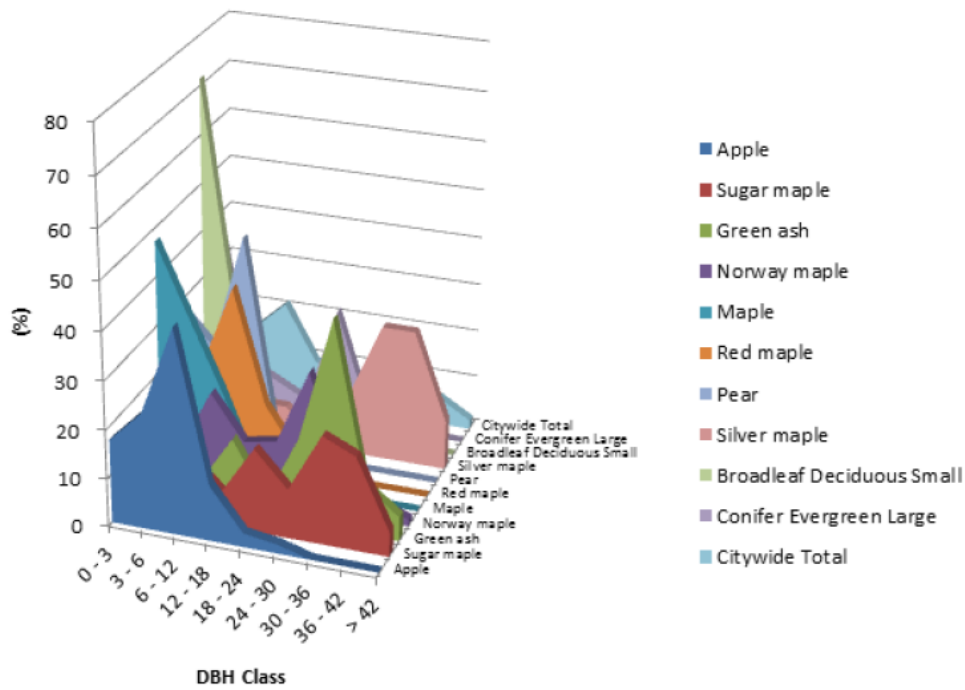
Species	Percent
Apple	11.2
Sugar maple	10.5
Green ash	8.5
Norway maple	8.3
Maple	5.9
Red maple	5.5
Pear	4.5
Silver maple	4.2
Broadleaf Deciduous Small	3.8
Conifer Evergreen Large	3.1
Other Species	34.6
Total	100.0

Figure 1: Species Distribution



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

1/7/2016



Species	DBH class (in)								
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42
Apple	17.31	24.04	42.31	11.54	2.88	1.92	0.00	0.00	0.00
Sugar maple	3.06	2.04	13.27	7.14	17.35	10.20	22.45	19.39	5.10
Green ash	0.00	0.00	5.06	15.19	3.80	17.72	43.04	10.13	5.06
Norway maple	6.49	7.79	20.78	11.69	12.99	28.57	6.49	3.90	1.30
Maple	47.27	32.73	18.18	1.82	0.00	0.00	0.00	0.00	0.00
Red maple	25.49	19.61	37.25	13.73	3.92	0.00	0.00	0.00	0.00
Pear	28.57	21.43	45.24	4.76	0.00	0.00	0.00	0.00	0.00
Silver maple	5.13	0.00	7.69	7.69	0.00	12.82	28.21	28.21	10.26
Broadleaf Deciduous Sm	71.43	22.86	5.71	0.00	0.00	0.00	0.00	0.00	0.00
Conifer Evergreen Large	48.28	10.34	6.90	3.45	24.14	3.45	3.45	0.00	0.00
Citywide Total	22.66	15.04	21.16	9.45	6.12	8.49	9.45	5.80	1.83

Figure 2: Relative Age Class

### Leaf Condition

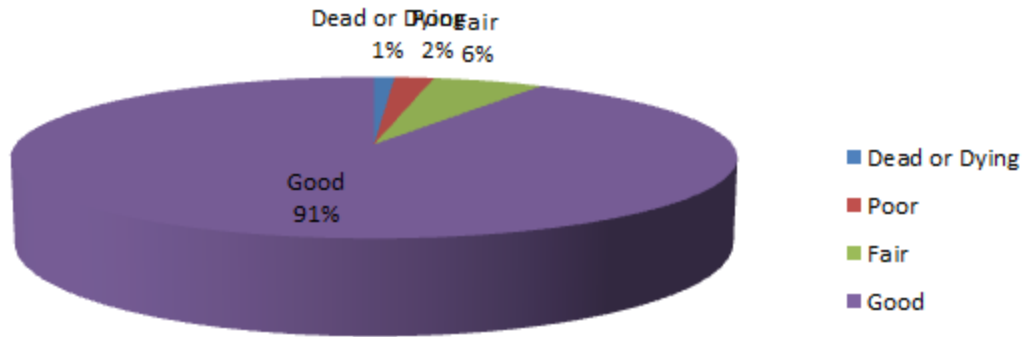


Figure 3: Foliage Condition

### Wood Condition

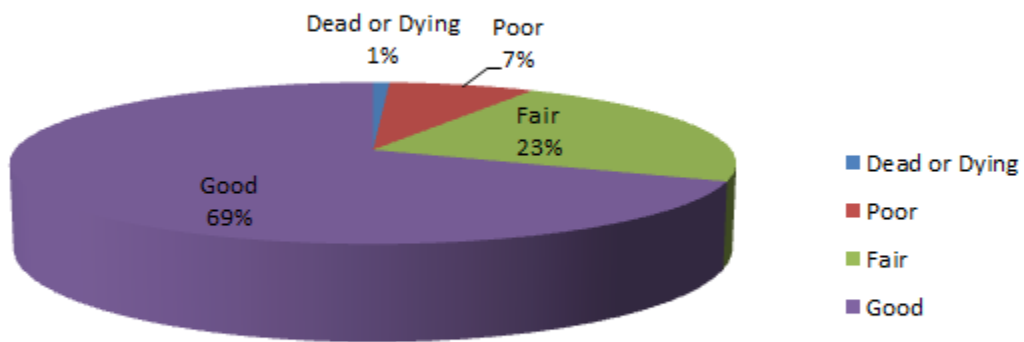
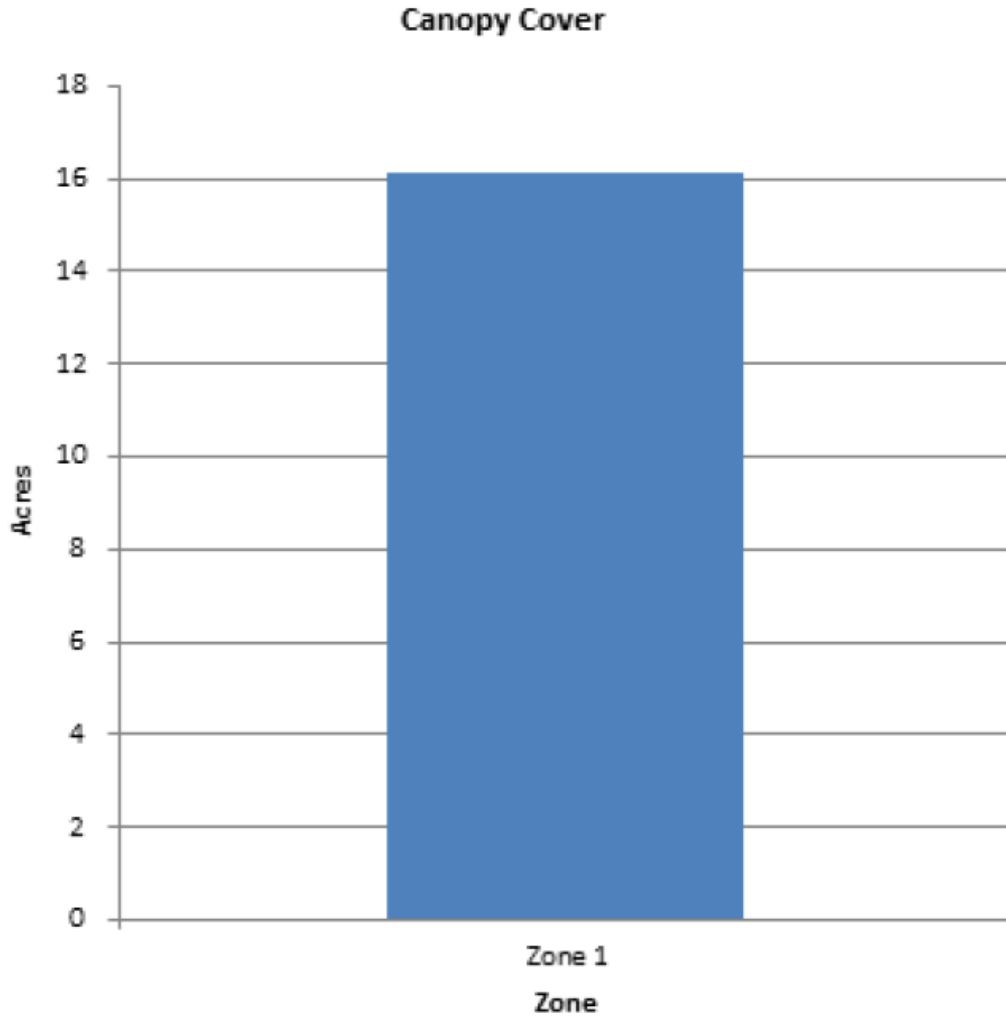


Figure 4: Wood Condition

# Canopy Cover of Public Trees (Acres)

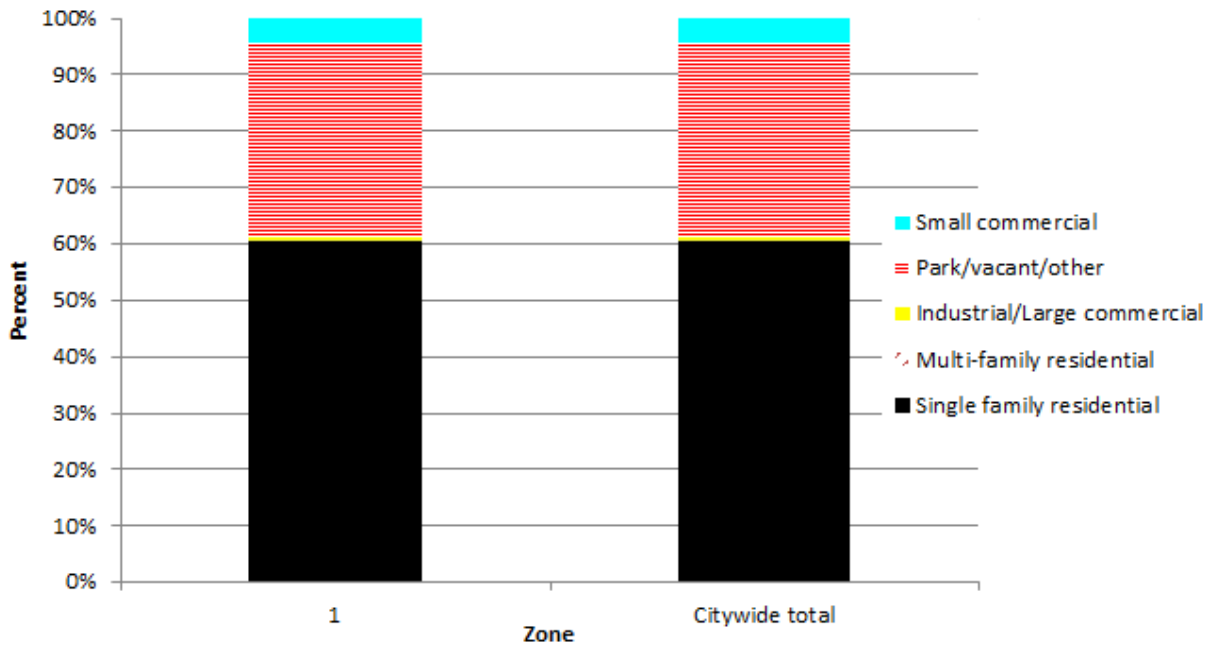
1/7/2016



Zone	Acres	% of Total Canopy Cover
Zone 1	16	100.0
Citywide total	16	100.0

Figure 5: Canopy Cover in Acres

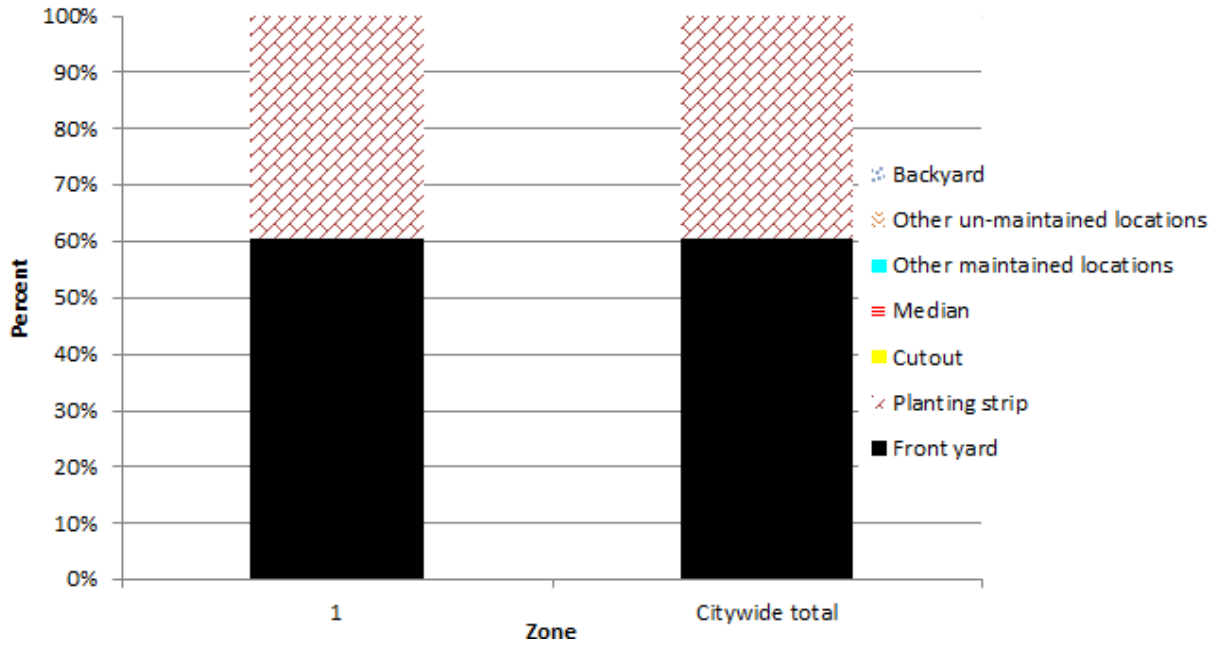
## Land use Public Trees by Zone (%)



Zone	Single family residential	Multi-family residential	Industrial/Large commercial	Park/vacant /other	Small commercial
1	60.47	0.00	0.75	34.48	4.30
Citywide total	60.47	0.00	0.75	34.48	4.30

Figure 6: Land Use of city/park trees

## Location Public Trees by Zone (%)



Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	60.37	39.63	0.00	0.00	0.00	0.00	0.00
Citywide total	60.37	39.63	0.00	0.00	0.00	0.00	0.00

Figure 7: Location of city/park trees

## Appendix B: ArcGIS Mapping

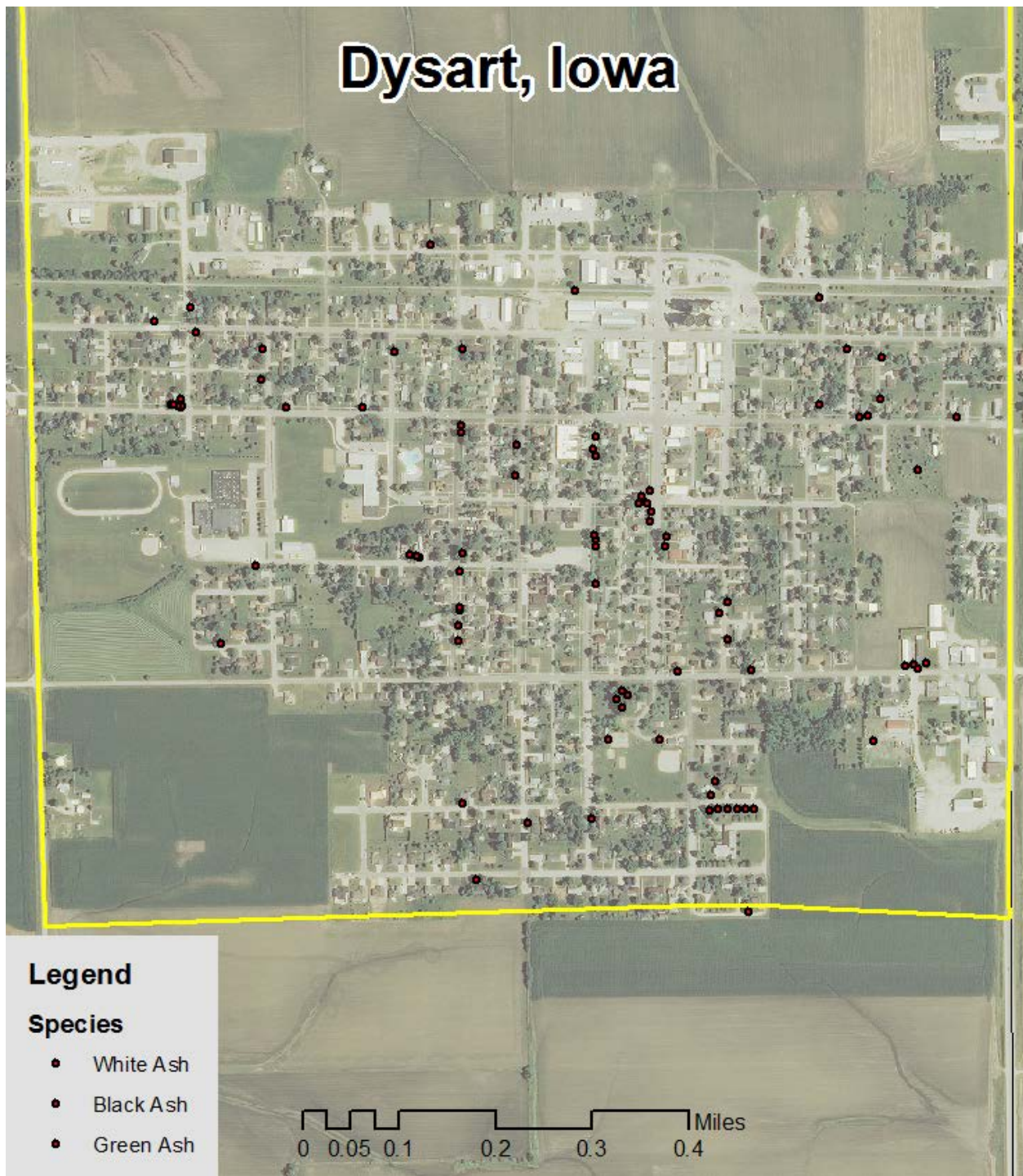


Figure 1: Location of Ash Trees



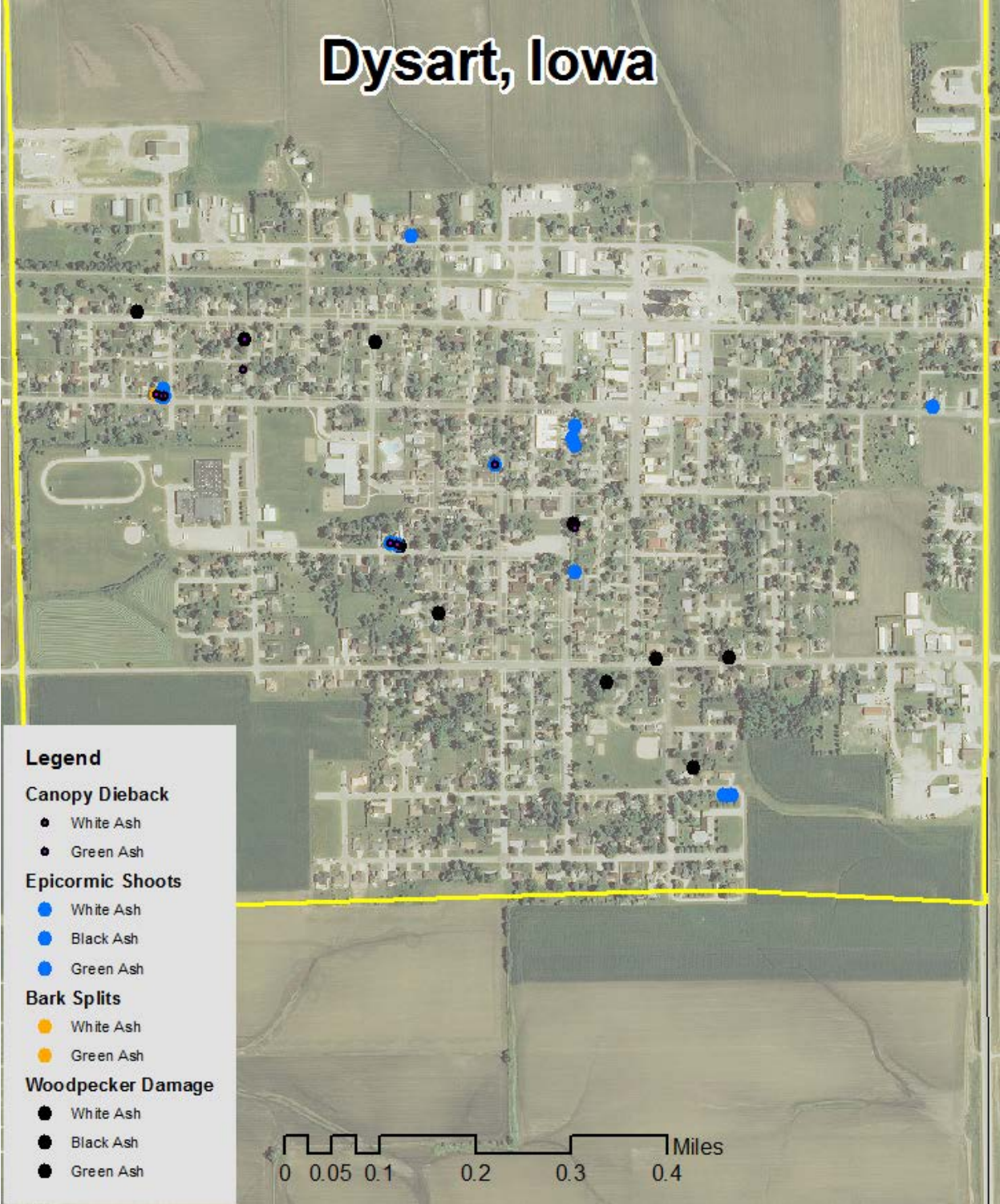


Figure 2: Location of EAB symptoms



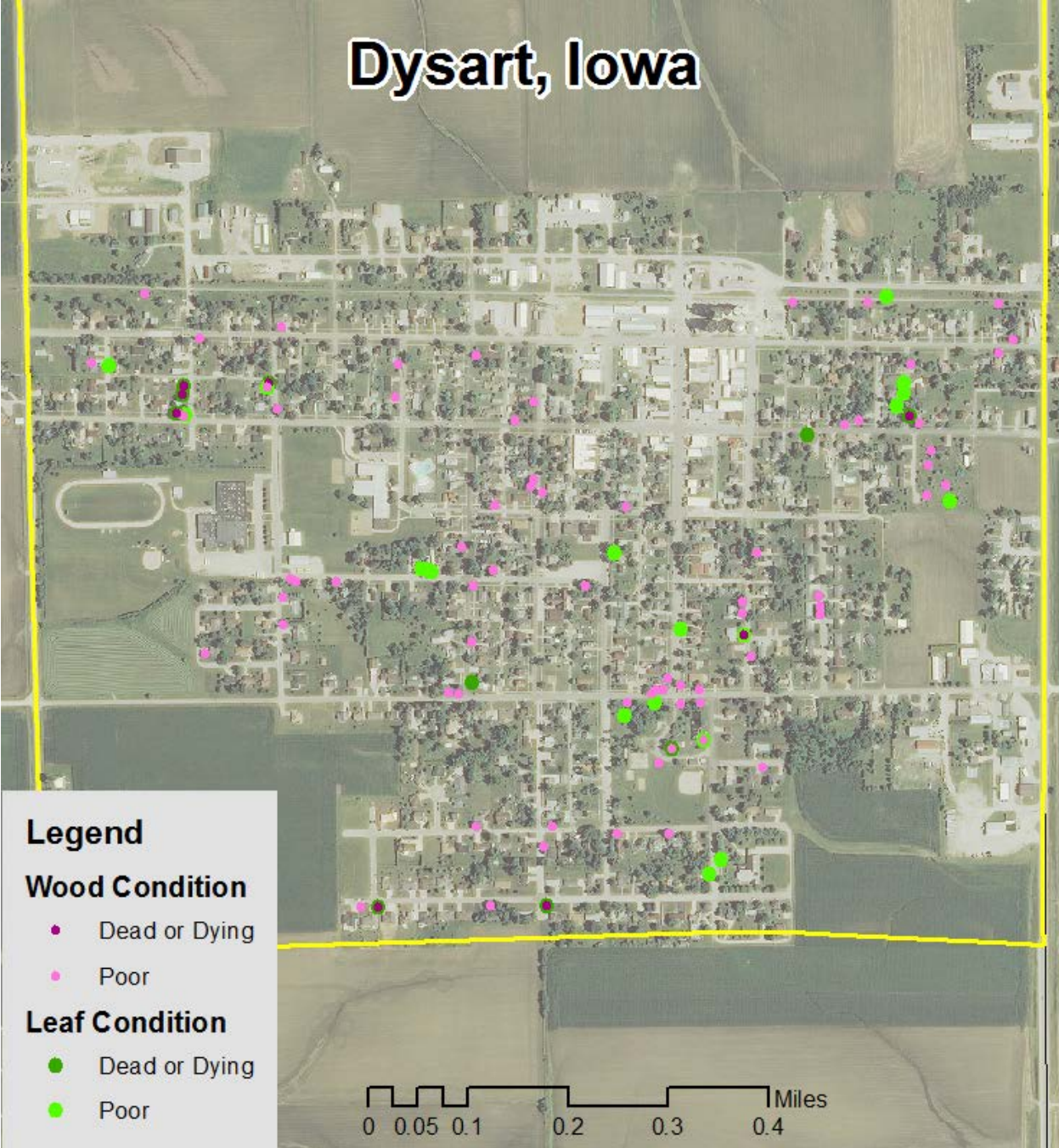


Figure 3: Location of Poor Condition Trees



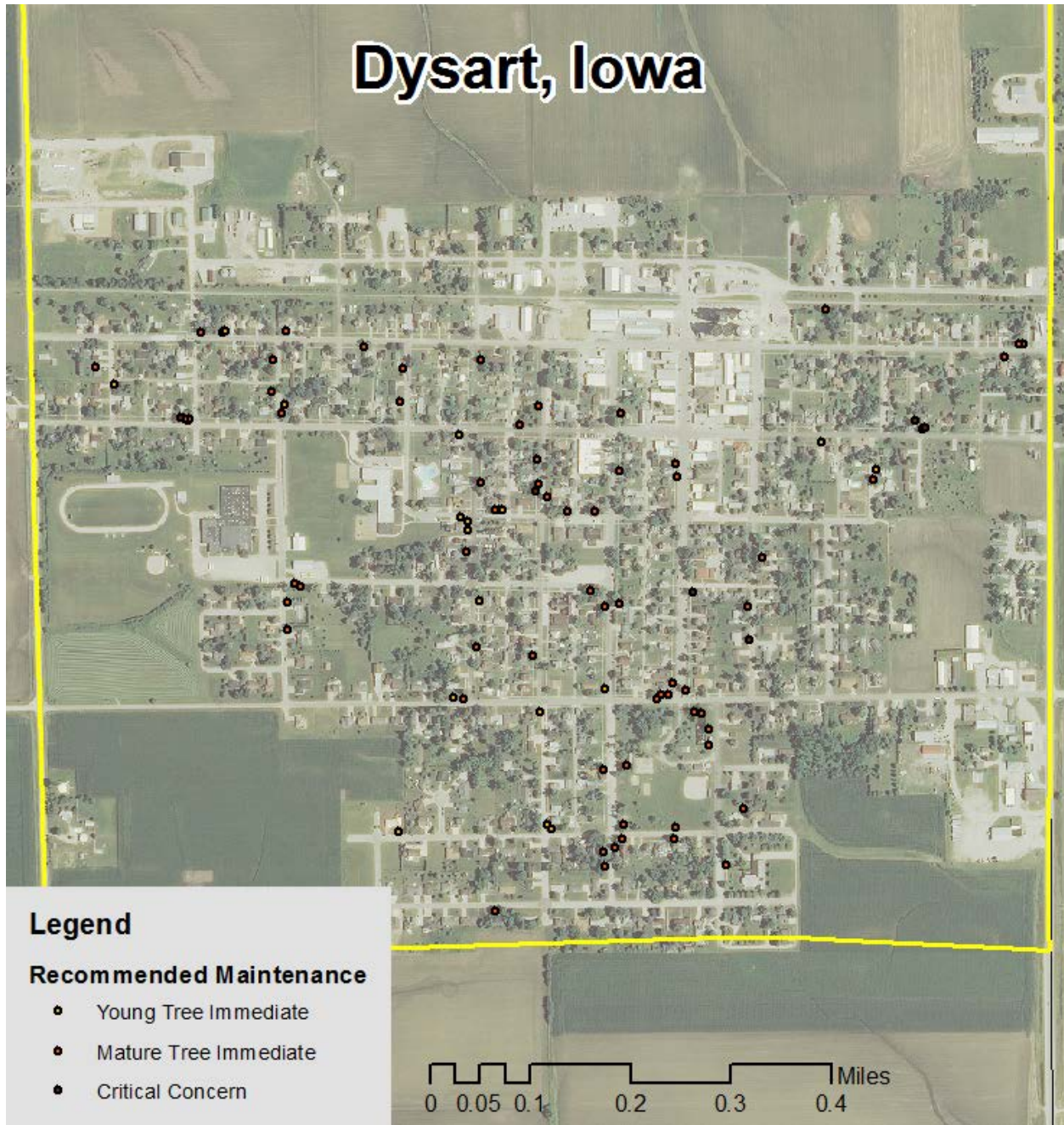


Figure 4: Location of Trees with Recommended Maintenance



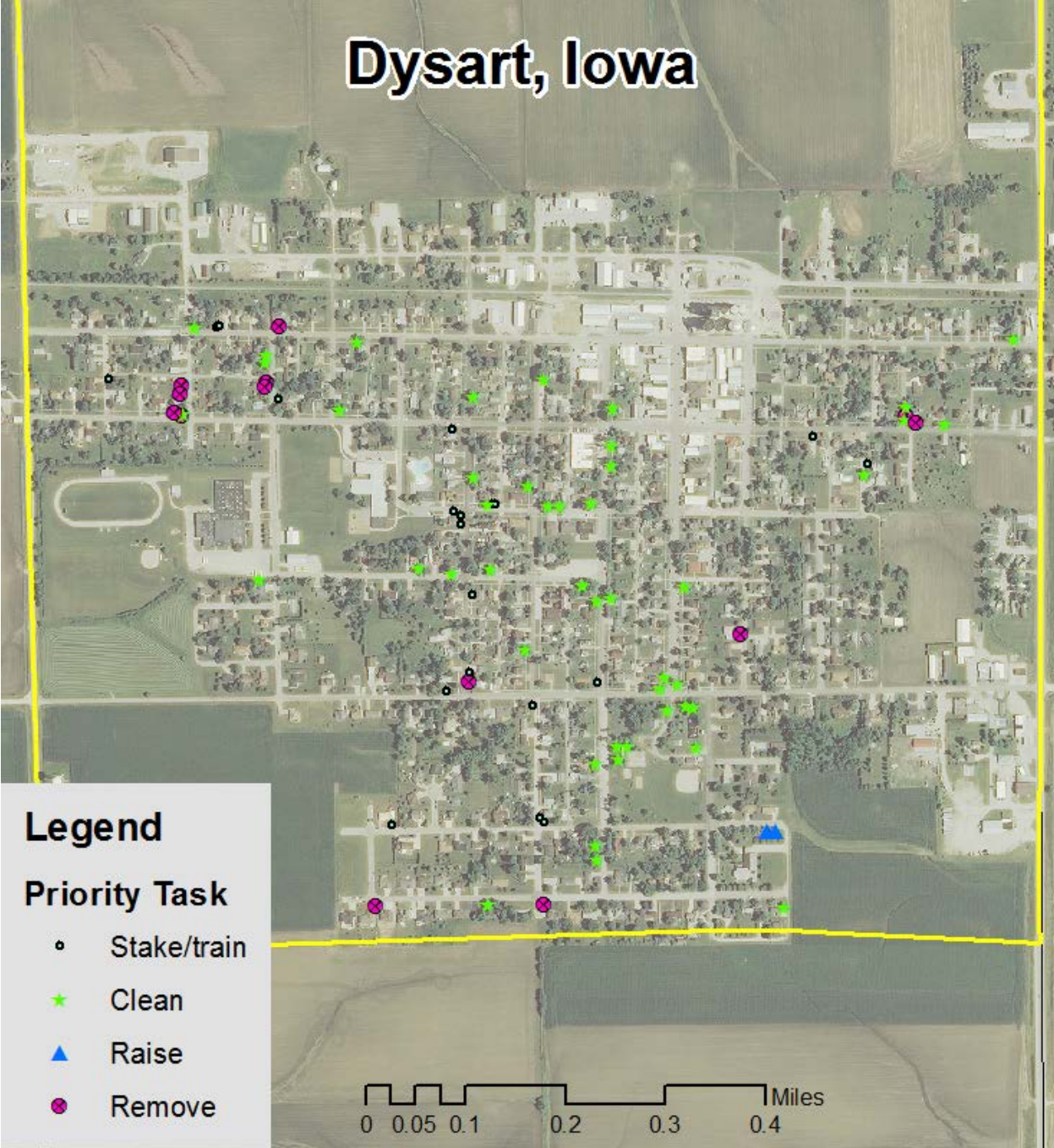


Figure 5: Maintenance Tasks \*City ownership of the trees recommended for removal should be verified prior to any removal\*

# Appendix C: Dysart Tree Ordinances

CODE OF ORDINANCES, DYSART, IOWA

## CHAPTER 140

### TREES

<b>140.01 Purpose</b>	<b>140.07 Tree Topping</b>
<b>140.02 Definitions</b>	<b>140.08 Dead or Diseased Tree Removal</b>
<b>140.03 City Tree Board</b>	<b>140.09 Removal of Stumps</b>
<b>140.04 Planting Restrictions</b>	<b>140.10 Interference with Tree Board</b>
<b>140.05 Trimming Restrictions</b>	<b>140.11 Tree Trimmers</b>
<b>140.06 Public Tree Care</b>	

140.01 PURPOSE. The purpose of this chapter is to beautify and preserve the appearance of the City by requiring street trees to be uniformly located and maintained and by licensing and regulating tree trimmers and tree surgeons.

140.02 DEFINITIONS.

1. "Board" means the City tree board
2. "Park Trees" means those trees, shrubs, bushes and all other woody vegetation located in public parks and other public places.
3. "Parking" means that part of the street not covered by sidewalk and lying between the lot line and curb line, or on unpaved streets, that part of the street lying between the lot line and that portion of the street usually traveled by vehicular traffic.
4. "Street Trees" means those trees, shrubs, bushes and all other woody vegetation located on the parking.
5. "Tree Trimmer" or "Tree Surgeon" means any person, firm or corporation, who solicits or performs the work of felling trees, or who cuts or trims any tree or limbs or branches of any tree, or who offers services in the diagnosis and treatment of diseases of any tree, all for a valuable consideration.

140.03 CITY TREE BOARD. The City tree board shall consist of 9 persons who shall be appointed by the mayor, subject to the approval of the council. The term of members of the board shall be for three years. In the event a vacancy shall occur, any replacement appointed to the board shall be for the unexpired portion of the term. Members of the board shall serve without compensation. The duties and responsibilities of the board shall be as follows:

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1. To prepare a written plan for the care, preservation, pruning, planting, replanting, removal or disposition of trees and shrubs in parks, along streets and in other public areas and to update the plan on an annual basis.
2. To present the updated plan to the council on an annual basis for the council's consideration and upon the council's approval the plan shall constitute the official "Comprehensive Tree Plan" for the City.
3. To administer the "Comprehensive Tree Plan."
4. Upon request by the mayor or council, to consider, investigate, and report and make a recommendation as to any matter falling within the board's duties and responsibilities.
5. to establish 3 classes of trees: small trees, medium trees, large trees and designate at least 6 species of tree within each category. This list shall be known as the "Official Street Tree Species" for the City and shall be subject to approval by the council.

**140.04 PLANTING RESTRICTIONS.**

1. The spacing of street trees will be in accordance with the 3 species size classes established by the board and trees shall not be planted closer together than the following: small trees, 30 feet; medium trees, 40 feet; and large trees, 50 feet; except in special plantings designed by a landscape architect and approved in writing by the board.
2. The distance trees may be planted from curbs or curblines and sidewalks will be in accordance with the 3 species size classes, and no trees may be planted closer to any curb or sidewalk than the following: small trees, 2 feet; medium trees, 3 feet; and large trees, 4 feet.
3. No trees shall be planted in the area adjacent to a street corner formed by the intersecting curblines and a line connecting the intersecting curblines at a straight point 35 feet distant along each curbline.
4. No street tree shall be planted closer than 10 feet to any fire hydrant.
5. No street trees, other than those species designated as small trees, may be planted under or within 10 lateral feet of any overhead utility wire or over or within 5 lateral feet of any underground water line, sewer line, transmission line or other utility line.
6. All street trees shall be of sufficient size to warrant satisfactory results and withstand the abuse to which street trees may be subject.



7. All street trees shall have comparatively straight trunks, well-developed leaders and top and root characteristics of the species or variety showing evidence of proper nursery pruning. All trees must be free of insect, disease, mechanical injuries and other objectionable features at the time of planting. To compensate for any serious loss of roots, the top of the tree should be reduced by thinning or cutting back as determined by the growth characteristics of the tree species. The leader shall not be cut off in such trimming.
8. New trees shall be at least one and one-quarter inch (1 1/4") in caliper and at least four feet (4') in height.
9. No conifers shall be planted in the parking along any street.

140.05 TRIMMING RESTRICTIONS.

1. All dead and diseased wood shall be removed.
2. All limbs one inch in diameter or more must be pre-cut to prevent splitting. All limbs or branches that might injure the tree or adjacent property, streets or sidewalks shall be lowered by ropes.
3. A crossed or rubbing branch shall be removed where practicable, but removal shall not leave large holes in the general outline of the tree. Crossed or rubbing branches may be cabled apart.
4. The use of tree dressing is not recommended as it interferes with the natural healing process.
5. Where there is a danger of transmitting disease by tools, the tools shall be disinfected with alcohol before use on another tree.
6. The owner of the abutting property shall be responsible for trimming of street trees on the adjacent parking and shall keep the street trees trimmed so that all branches will be at least 15 feet above the surface of the street and 8 feet above the sidewalks.
7. The owner of the abutting property shall, upon 20 days notice in writing, remove all dead, diseased, or dangerous trees, or broken or decayed limbs which constitute a danger to the public safety or property or otherwise constitute a nuisance.

140.06 PUBLIC TREE CARE. The City shall have the right to plant, prune, maintain and remove trees, plants and shrubs within the lines of all streets, alleys, avenues, lanes, public ways, squares and public grounds, as may be necessary to insure public safety or

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to preserve or enhance the symmetry and beauty of such public grounds. The City may remove or cause or order to be removed, any tree or part thereof which is in an unsafe condition or which by reason of its nature is injurious to sewers, electric power lines, gas lines, water lines, or other public improvements, or is affected with any injurious fungus, insect or other pest, in the same manner as provided in section 140.08.

**140.07 TREE TOPPING.** It shall be unlawful as a normal practice for any person, firm, or city department to top any street tree, park tree, or other tree on public property. Topping is defined as the severe cutting back of limbs to stubs larger than three inches in diameter within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where other pruning practices are impractical may be exempted from this section at the determination of the board. No topping shall occur without the prior consent of the board.

**140.08 DEAD OR DISEASED TREE REMOVAL.** The City shall have the right to cause the removal of any dead or diseased tree on private property within the city, when the tree constitute a hazard to life and property, or harbor insects or disease which constitute a potential threat to other trees within the city. The board will notify in writing the property owner of the property where the tree is. Removal shall be done by the owner at the owner's expense within 20 days after the date of the notice. In the event of failure of the owner to comply with the notice, the City shall have the authority to remove the tree and assess the cost to the property owner.

**140.09 REMOVAL OF STUMPS.** All stumps of street and park trees shall be removed below the surface of the ground so that the top of the stump shall not project above the surface of the ground.

**140.10 INTERFERENCE WITH CITY TREE BOARD.** No person shall prevent, delay or interfere with the board, or any of its agents, while engaging in and about the planting, cultivating, mulching, pruning, spraying, or removing of any street trees, park trees, or trees on private grounds as authorized in this chapter

**14011 TREE TRIMMERS.**

1. License Required. No person shall engage in any activity as a tree trimmer or tree surgeon without a valid license from the city.
2. Application. Application for a license shall be made in writing to the clerk on forms furnished by the clerk. The application shall include:
  - A. Name and Address. The applicant's full name and address and if a corporation the name and address of it's principal office and registered agent.

- B. Equipment. A listing of the type and number of pieces of vehicles and power and safety equipment which is available or will be used within the city.
  - C. Qualifications. A statement of the training, experience and other qualifications pertaining to the type of work to be done within the city.
  - D. Bond Required. The applicant shall post with the clerk a bond in the sum of five thousand (5,000) dollars issued by a surety company authorized to issue bonds in the state of Iowa. The bond shall guarantee the applicant's payment for any damage done to the city or to public property, and payment of all costs incurred by the city in the course of the activities of the applicant.
  - E. Insurance and Indemnity Required.
    - 1) Each applicant shall file a certificate of insurance indicating that the applicant is carrying public liability insurance in the effect for the duration of the period the applicant will be working in the City covering the applicant and all agents and employees of the applicant for the following amounts: Personal Injury - \$100,000 per person. Property Damage - \$ 50,000.
    - 2) Each applicant shall execute and deliver, in a form approved by the City, an agreement to indemnify and hold harmless the City from the liability arising from services rendered by the applicant as a tree trimmer or tree surgeon.
1. License Issued. Upon completion of the application, a determination that the applicant can comply with the standards of this chapter, the filing of bond and insurance certificate, and the payment of the required fee as set by resolution of the council, the clerk shall issue a license.
  2. Public Safety. At all times when working in the City, the licensee shall maintain adequate warning signs and by the use of barricades or otherwise shall take reasonable precautions to insure that no injury is done to persons or property.
  3. Time Limit. No tree trimmer shall permit or allow any tree limbs, branches, clippings or other debris to remain upon any street or other public way for a period of more than four (4) hours without having first secured the written approval of the city.
  4. Removal by City. In the event any tree trimmer is found to be in violation of subsection 140.11(7), the city is authorized to remove such material and assess the costs thereof against the license holder and the surety on the bond.
  5. The provisions of this chapter requiring a bond and insurance shall not apply in the following cases:

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- A. Where the tree trimmer or tree surgeon does not cut or trim any tree within the City in excess of 20 feet in height.
- B. Where the tree trimmer or tree surgeon does not cut or trim any branch in excess of 6 inches in diameter or any part of which is more than 20 feet above the surface of the ground.
- C. Where the tree to be cut or trimmed has been felled and is lying upon the surface of the ground.

(Ordinance No. 173, Adopted 6/8/88)



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Federal law prohibits employment discrimination on the basis of race, color, age, religion, national origin, sex or disability. State law prohibits employment discrimination on the basis of race, color, creed, age, sex, sexual orientation, gender identity, national origin, religion, pregnancy, or disability. State law also prohibits public accommodation (such as access to services or physical facilities) discrimination on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, religion, national origin, or disability. If you believe you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please contact the Iowa Civil Rights Commission, 1-800-457-4416, or write to the Iowa Department of Natural Resources, Wallace State Office Bldg., 502 E. 9<sup>th</sup> St., Des Moines, IA 50319.

If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-725-8200.