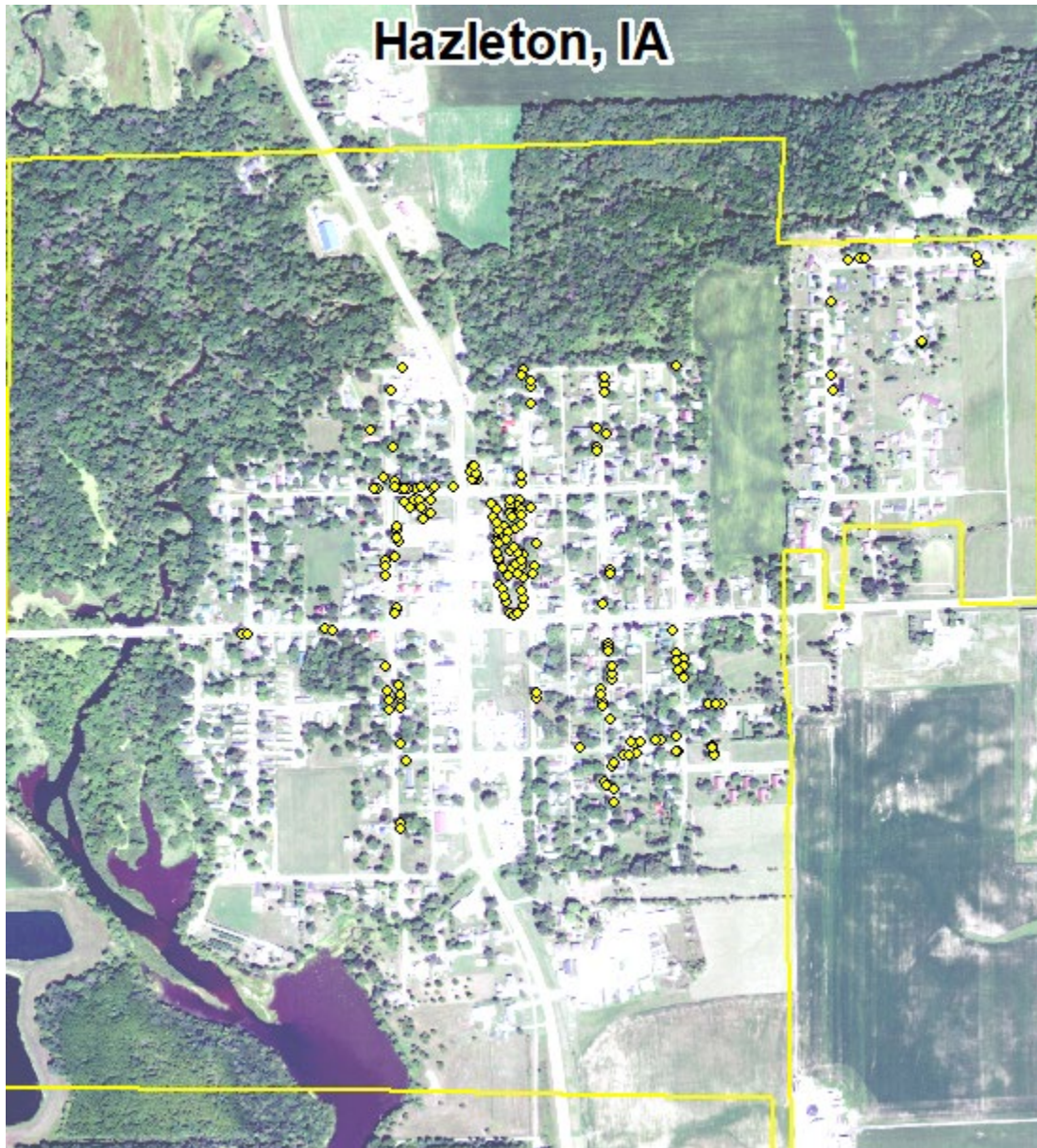


# Hazleton, IA



2023 Urban Forest Management Plan  
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## Table of Contents

Executive Summary.....	1
Overview .....	1
Inventory and Results .....	1
Recommendations .....	1
Introduction .....	2
Inventory.....	2
Inventory Results .....	2
Annual Benefits.....	3
Annual Energy Benefits.....	3
Annual Stormwater Benefits.....	3
Annual Air Quality Benefits.....	3
Annual Carbon Benefits .....	3
Annual Aesthetics Benefits .....	3
Financial Summary of all Benefits.....	3
Forest Structure .....	3
Species Distribution .....	3
Age Class .....	4
Condition: Wood and Foliage .....	4
Management Needs.....	4
Canopy Cover .....	4
Land Use and Location.....	5
Recommendations .....	5
Risk Management .....	5
Pruning Cycle.....	5
Planting .....	6
Continual Monitoring.....	6
Six Year Maintenance Plan with No Additional Funding .....	6
Budget and Emerald Ash Borer Plan.....	6
Ash Tree Removal .....	7
Treatment of Ash Trees .....	7
EAB Quarantines .....	7
Wood Disposal .....	7
Canopy Replacement .....	7
Postponed Work .....	8
Monitoring .....	8
Private Ash Trees .....	8
Works Cited.....	8
Appendix A: i-Tree Data .....	10
Table 1: Annual Energy Benefits.....	10
Table 2: Annual Stormwater Benefits.....	11
Table 3: Annual Air Quality Benefits .....	12
Table 4: Annual Carbon Stored .....	13
Table 5: Annual Carbon Sequestered .....	14
Table 6: Annual Social and Aesthetic Benefits.....	15

Table 7: Summary of Benefits in Dollars.....	16
Figure 1: Species Distribution .....	17
Figure 2: Relative Age Class .....	17
Figure 3: Foliage Condition .....	18
Figure 4: Wood Condition.....	18
Figure 5: Canopy Cover in Acres .....	18
Figure 6: Land Use of city/park trees.....	19
Figure 7: Location of city/park trees.....	19
Appendix B: ArcGIS Mapping.....	20
Figure 1: Location of Ash Trees.....	21
Figure 2: Location of EAB symptoms .....	21
Figure 3: Location of Poor Condition Trees .....	23
Figure 4: Location of Trees with Recommended Maintenance.....	23
Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal* .....	24
Appendix C: Hazleton Tree Ordinances .....	25

# Executive Summary

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## Overview

This plan was developed to assist the City of Hazleton 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 8% of Hazleton'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 2022, 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 188 trees inventoried.

- Hazleton's trees provide \$36,300 of benefits annually, an average of \$198 a tree
- There are over 31 species of trees
- The top three genera are: Maple 34%, Oak 10% and Spruce 9%
- 12% of trees are in need of some type of management
- 18 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 18 trees needing removal 14 are ash [\\*City ownership of the trees recommended for removal should be verified prior to any removal\\*](#)
- 14 of the 15 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, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With ash removal needed the next two year will need more funding than usual– Suggestion: request a budget increase and apply for grants to plant replacement trees

# Introduction

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This plan was developed to assist Hazleton 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 recovery from Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal or treatment and replacement planting. With proper planning and management of the current canopy in Hazleton, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Hazleton'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 Hazleton 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 Hazleton's urban forestry goals.

# Inventory

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In 2022, 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

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The data collected for the 188 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

## Annual Benefits

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### Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Hazleton’s trees reduce energy related costs by approximately \$8,970 annually (Appendix A, Table 1). These savings are both in Electricity (43.3MWh) and in Natural Gas (3,288 Therms).

### Annual Stormwater Benefits

Hazleton’s trees intercept about 517,287 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$14,018 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 Hazleton, it is estimated that trees remove 552.6 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 \$1,549 (Appendix A, Table 3).

### Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Hazleton, trees sequester about 113,280 lbs of carbon a year with an associated value of \$1,326 (Appendix A, Table 5). In addition, the trees store 1,808,027lbs of carbon, with a yearly benefit of \$13,560 (Appendix A, Table 4).

### 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. Hazleton receives \$10,436 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, Hazleton’s trees provide \$36,300 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 188 trees in Hazleton provide approximately \$198 annually (Appendix A, Table 7).

## Forest Structure

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### Species Distribution

Hazleton has over 31 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	63	34%
Oak	19	10%

Spruce	17	9%
Ash	15	8%
Walnut	14	7%
Hackberry	13	7%
Linden/Basswood	7	4%
Hickory	6	3%
Arborvitae	6	3%
Honey Locust	5	3%
Cedar	5	3%
Japanese Lilac	5	3%
Ginkgo	4	2%
Birch	3	2%
Pine	2	1%
Elm	2	1%
Kentucky Coffeetree	1	1%
Sycamore	1	1%

### Age Class

Largest size class of trees (27%) are between 12 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. Hazleton’s size curve is bell shaped, indicating a mid-sized 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 Hazleton indicate that 85% of the trees are in good health, with only 8% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). 43% of Hazleton’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 14% of the population. This 14% 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	5	3%
Tree Removal	18	10%

### Canopy Cover

The total canopy with both private and public trees is 41%, 204 acres. The canopy cover on city own properties included in the Hazleton inventory includes approximately 5 acres (Appendix A, Figure 4). The City’s Canopy goal is to increase canopy by 3%, in 30 years on all lands. To achieve this goal it is estimated that 37 trees need to be planted annually on public and/or private lands.

## Land Use and Location

The majority of Hazleton’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	62%
Park/vacant/other	38%

### Location

Front Yard	66%
Planting strip	34%

## Changes in Forest Structure Since plan in 2013

Over all the number of public trees has reduced over the 10 years. Species composition has change slightly with a reduction of ash and an increase in oak. Removal has stayed about the same, but pruning needs have reduced. For site type and locations, there are fewer street trees than in 2013, while park trees remain about the same.

## 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

Hazleton has 9 critical concern trees 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 4 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 13 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 18 removals, 14 are ash trees. There are a total of 15 ash trees, and 14 of those have signs and symptoms that have been associated with EAB. In addition, all 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 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 Hazleton.

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 (34%) (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, as outlined in section 150.3 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 150.3 (Appendix C).

### **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.

## **Budget and Emerald Ash Borer Plan**

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### **Six Year Maintenance Plan**

**Current Budget need estimate:** \$7,917/year, Total \$47,500 over 6 years – The first years will need to be funded at a higher than average rate to address critical concerns and the poor condition ash trees.

#### **Removal**

18 marked removals estimate: \$18,000

Additional ash tree and other issues as they arise in the next 6 years estimate: \$12,000

#### **Pruning**

5 marked trees estimate: \$2,500

Additional issues as they arise in the next 6 years estimate: \$6,000

#### **Planting and watering**

Planting ten trees per year for 60 trees total estimate: \$9,000

### **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](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. All trees will meet the restrictions in city ordinance 150.3 (Appendix C). 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 if preventative treatments are not being used. City Code 150.06 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.”

## Proposed Budget Increase

EAB could potentially kill all ash trees in Hazleton within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased in the first years to address these trees immediately. Additionally, it is recommended that Hazleton 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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# Appendix A: i-Tree Data

**Table 1: Annual Energy Benefits**

Annual Energy Benefits of Public Trees									
2/4/2023									
Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total Standard (\$)	Error	% of Total Trees	% of Total \$	Avg. \$/tree
Silver maple	12.5	947	1,635.9	1,603	2,550	(N/A)	19.7	28.4	68.92
Black walnut	3.4	256	460.0	451	707	(N/A)	7.4	7.9	50.47
Norway maple	2.9	217	380.3	373	590	(N/A)	7.4	6.6	42.12
Green ash	4.4	333	575.8	564	897	(N/A)	7.4	10.0	64.06
Bur oak	4.5	339	619.5	607	946	(N/A)	6.9	10.5	72.75
Northern hackberry	3.8	291	550.5	539	831	(N/A)	6.9	9.3	63.90
Spruce	1.1	80	123.5	121	201	(N/A)	5.3	2.2	20.13
American basswood	0.6	44	84.8	83	127	(N/A)	3.2	1.4	21.18
Northern white cedar	0.5	40	59.9	59	98	(N/A)	3.2	1.1	16.40
Catalpa	2.1	156	281.7	276	432	(N/A)	3.2	4.8	72.02
Honeylocust	1.3	101	167.7	164	266	(N/A)	2.7	3.0	53.11
Eastern red cedar	0.5	38	73.7	72	110	(N/A)	2.7	1.2	21.95
Japanese tree lilac	0.0	1	3.1	3	4	(N/A)	2.7	0.0	0.87
Blue spruce	0.4	29	56.0	55	84	(N/A)	2.7	0.9	16.74
Sugar maple	1.1	82	138.0	135	218	(N/A)	2.7	2.4	43.53
Ginkgo	0.0	1	1.6	2	2	(N/A)	2.1	0.0	0.57
Red maple	0.5	38	72.9	71	110	(N/A)	1.6	1.2	36.61
Boxelder	0.6	47	78.6	77	124	(N/A)	1.6	1.4	41.34
Paper birch	0.3	22	41.2	40	62	(N/A)	1.6	0.7	20.64
Northern red oak	0.3	20	37.6	37	57	(N/A)	1.1	0.6	28.45
Elm	0.6	47	80.7	79	126	(N/A)	1.1	1.4	63.12
Norway spruce	0.3	24	39.2	38	62	(N/A)	1.1	0.7	31.15
Swamp white oak	0.0	3	7.0	7	10	(N/A)	1.1	0.1	5.04
Pin oak	0.2	16	31.6	31	47	(N/A)	1.1	0.5	23.64
American sycamore	0.3	25	46.9	46	71	(N/A)	0.5	0.8	70.91
White ash	0.4	32	54.5	53	85	(N/A)	0.5	1.0	85.27
Red pine	0.1	10	14.6	14	24	(N/A)	0.5	0.3	24.14
Eastern white pine	0.2	14	24.6	24	38	(N/A)	0.5	0.4	38.17
Littleleaf linden	0.2	15	23.9	23	39	(N/A)	0.5	0.4	38.70
Maple	0.0	3	5.2	5	8	(N/A)	0.5	0.1	7.85
Kentucky coffeetree	0.2	18	27.0	26	44	(N/A)	0.5	0.5	44.23
<b>Total</b>	<b>43.3</b>	<b>3,288</b>	<b>5,797.6</b>	<b>5,682</b>	<b>8,970</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>47.71</b>

**Table 2: Annual Stormwater Benefits**

<b>Annual Stormwater Benefits of Public Trees</b>						
2/4/2023						
Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Silver maple	186,857	5,064	(N/A)	19.7	36.1	136.86
Black walnut	34,819	944	(N/A)	7.4	6.7	67.40
Norway maple	18,790	509	(N/A)	7.4	3.6	36.37
Green ash	49,818	1,350	(N/A)	7.4	9.6	96.43
Bur oak	56,909	1,542	(N/A)	6.9	11.0	118.63
Northern hackberry	37,712	1,022	(N/A)	6.9	7.3	78.62
Spruce	13,837	375	(N/A)	5.3	2.7	37.50
American basswood	6,932	188	(N/A)	3.2	1.3	31.31
Northern white cedar	6,252	169	(N/A)	3.2	1.2	28.24
Catalpa	25,823	700	(N/A)	3.2	5.0	116.63
Honeylocust	9,983	271	(N/A)	2.7	1.9	54.11
Eastern red cedar	7,197	195	(N/A)	2.7	1.4	39.01
Japanese tree lilac	37	1	(N/A)	2.7	0.0	0.20
Blue spruce	4,566	124	(N/A)	2.7	0.9	24.75
Sugar maple	10,910	296	(N/A)	2.7	2.1	59.13
Ginkgo	28	1	(N/A)	2.1	0.0	0.19
Red maple	4,118	112	(N/A)	1.6	0.8	37.20
Boxelder	5,145	139	(N/A)	1.6	1.0	46.48
Paper birch	1,824	49	(N/A)	1.6	0.4	16.47
Northern red oak	3,049	83	(N/A)	1.1	0.6	41.32
Elm	6,956	189	(N/A)	1.1	1.3	94.25
Norway spruce	6,143	166	(N/A)	1.1	1.2	83.24
Swamp white oak	175	5	(N/A)	1.1	0.0	2.37
Pin oak	1,158	31	(N/A)	1.1	0.2	15.69
American sycamore	3,943	107	(N/A)	0.5	0.8	106.85
White ash	5,299	144	(N/A)	0.5	1.0	143.62
Red pine	1,539	42	(N/A)	0.5	0.3	41.70
Eastern white pine	4,605	125	(N/A)	0.5	0.9	124.79
Littleleaf linden	1,260	34	(N/A)	0.5	0.2	34.14
Maple	137	4	(N/A)	0.5	0.0	3.72
Kentucky coffeetree	1,466	40	(N/A)	0.5	0.3	39.72
<b>Citywide total</b>	<b>517,287</b>	<b>14,018</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>74.57</b>

**Table 3: Annual Air Quality Benefits**

**Annual Air Quality Benefits of Public Trees**

2/4/2023

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 <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>							
Silver maple	32.1	5.5	15.7	1.4	173	58.7	8.6	8.2	56.4	368	-16.2	-61	170.6	480 (N/A)	19.7	12.98
Black walnut	4.0	0.6	2.0	0.2	22	16.1	2.3	2.2	15.3	100	0.0	0	42.8	122 (N/A)	7.4	8.70
Norway maple	3.1	0.5	1.6	0.1	17	13.6	2.0	1.9	13.0	85	-0.8	-3	35.0	99 (N/A)	7.4	7.05
Green ash	6.5	1.0	3.0	0.3	34	20.7	3.0	2.9	19.9	130	0.0	0	57.3	164 (N/A)	7.4	11.70
Bur oak	7.7	1.2	3.5	0.3	41	21.4	3.1	3.0	20.2	133	0.0	0	60.5	174 (N/A)	6.9	13.35
Northern hackberry	5.9	1.0	3.0	0.3	32	18.6	2.7	2.6	17.4	115	0.0	0	51.4	147 (N/A)	6.9	11.33
Spruce	1.5	0.3	1.3	0.2	10	4.8	0.7	0.7	4.8	31	-5.2	-20	9.1	21 (N/A)	5.3	2.13
American basswood	1.0	0.2	0.5	0.0	5	2.8	0.4	0.4	2.6	17	-0.8	-3	7.1	20 (N/A)	3.2	3.29
Northern white cedar	0.7	0.1	0.6	0.1	5	2.4	0.4	0.3	2.4	15	-2.2	-8	4.7	11 (N/A)	3.2	1.90
Catalpa	3.5	0.6	1.6	0.2	18	9.8	1.4	1.4	9.3	61	0.0	0	27.7	80 (N/A)	3.2	13.25
Honeylocust	1.8	0.3	0.8	0.1	9	6.2	0.9	0.9	6.0	39	-1.3	-5	15.8	44 (N/A)	2.7	8.77
Eastern red cedar	1.4	0.3	1.1	0.2	9	2.4	0.3	0.3	2.2	15	-4.0	-15	4.4	9 (N/A)	2.7	1.87
Japanese tree lilac	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.2	1 (N/A)	2.7	0.11
Blue spruce	0.5	0.1	0.4	0.1	3	1.8	0.3	0.3	1.7	11	-1.5	-6	3.6	9 (N/A)	2.7	1.81
Sugar maple	1.4	0.2	0.7	0.1	8	5.1	0.7	0.7	4.9	32	-1.1	-4	12.8	35 (N/A)	2.7	7.08
Ginkgo	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)	2.1	0.07
Red maple	0.9	0.2	0.4	0.0	5	2.4	0.4	0.3	2.3	15	-0.3	-1	6.6	19 (N/A)	1.6	6.27
Boxelder	0.6	0.1	0.3	0.0	3	2.9	0.4	0.4	2.8	18	-0.3	-1	7.2	20 (N/A)	1.6	6.76
Paper birch	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)	1.6	2.99
Northern red oak	0.7	0.1	0.3	0.0	4	1.3	0.2	0.2	1.2	8	-1.0	-4	3.0	8 (N/A)	1.1	3.93
Elm	0.9	0.1	0.4	0.0	5	2.9	0.4	0.4	2.8	18	0.0	0	8.1	23 (N/A)	1.1	11.57
Norway spruce	0.7	0.1	0.6	0.1	5	1.5	0.2	0.2	1.4	9	-3.4	-13	1.5	1 (N/A)	1.1	0.62
Swamp white oak	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.5	1 (N/A)	1.1	0.67
Pin oak	0.1	0.0	0.1	0.0	0	1.0	0.2	0.1	1.0	6	-0.2	-1	2.2	6 (N/A)	1.1	3.05
American sycamore	0.5	0.1	0.2	0.0	3	1.6	0.2	0.2	1.5	10	0.0	0	4.4	12 (N/A)	0.5	12.48
White ash	0.9	0.1	0.4	0.0	5	2.0	0.3	0.3	1.9	12	0.0	0	6.0	17 (N/A)	0.5	17.19
Red pine	0.2	0.0	0.1	0.0	1	0.6	0.1	0.1	0.6	4	-0.5	-2	1.2	3 (N/A)	0.5	2.82
Eastern white pine	0.6	0.1	0.4	0.1	4	0.9	0.1	0.1	0.8	5	-2.9	-11	0.3	-2 (N/A)	0.5	-1.58
Littleleaf linden	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6 (N/A)	0.5	6.42
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)	0.5	1.12
Kentucky coffeetree	0.1	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	0.0	0	2.6	7 (N/A)	0.5	7.42
Citywide total	77.5	13.1	39.6	3.9	423	205.5	30.0	28.6	196.2	1,283	-41.8	-157	552.6	1,549 (N/A)	100.0	8.24

**Table 4: Annual Carbon Stored**

**Stored CO2 Benefits of Public Trees**

2/4/2023

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Silver maple	701,828	5,264	(N/A)	19.7	38.8	142.26
Black walnut	131,274	985	(N/A)	7.4	7.3	70.33
Norway maple	51,300	385	(N/A)	7.4	2.8	27.48
Green ash	212,091	1,591	(N/A)	7.4	11.7	113.62
Bur oak	249,508	1,871	(N/A)	6.9	13.8	143.95
Northern hackberry	89,179	669	(N/A)	6.9	4.9	51.45
Spruce	11,539	87	(N/A)	5.3	0.6	8.65
American basswood	39,213	294	(N/A)	3.2	2.2	49.02
Northern white cedar	4,686	35	(N/A)	3.2	0.3	5.86
Catalpa	113,047	848	(N/A)	3.2	6.3	141.31
Honeylocust	22,264	167	(N/A)	2.7	1.2	33.40
Eastern red cedar	4,685	35	(N/A)	2.7	0.3	7.03
Japanese tree lilac	69	1	(N/A)	2.7	0.0	0.10
Blue spruce	2,255	17	(N/A)	2.7	0.1	3.38
Sugar maple	43,124	323	(N/A)	2.7	2.4	64.69
Ginkgo	18	0	(N/A)	2.1	0.0	0.03
Red maple	10,147	76	(N/A)	1.6	0.6	25.37
Boxelder	15,194	114	(N/A)	1.6	0.8	37.98
Paper birch	3,104	23	(N/A)	1.6	0.2	7.76
Northern red oak	15,251	114	(N/A)	1.1	0.8	57.19
Elm	29,615	222	(N/A)	1.1	1.6	111.06
Norway spruce	8,661	65	(N/A)	1.1	0.5	32.48
Swamp white oak	235	2	(N/A)	1.1	0.0	0.88
Pin oak	2,049	15	(N/A)	1.1	0.1	7.68
American sycamore	15,773	118	(N/A)	0.5	0.9	118.30
White ash	15,773	118	(N/A)	0.5	0.9	118.30
Red pine	1,170	9	(N/A)	0.5	0.1	8.78
Eastern white pine	7,490	56	(N/A)	0.5	0.4	56.18
Littleleaf linden	3,595	27	(N/A)	0.5	0.2	26.96
Maple	218	2	(N/A)	0.5	0.0	1.64
Kentucky coffeetree	3,672	28	(N/A)	0.5	0.2	27.54
<b>Citywide total</b>	<b>1,808,027</b>	<b>13,560</b>	<b>(N/A)</b>	<b>100.0</b>	<b>100.0</b>	<b>72.13</b>



**Table 5: Annual Carbon Sequestered**

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

2/4/2023

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Silver maple	52,317	392	-3,369	-138	-26	20,928	157	69,738	523 (N/A)		19.7	39.4	14.14
Black walnut	7,980	60	-630	-35	-5	5,653	42	12,968	97 (N/A)		7.4	7.3	6.95
Norway maple	4,739	36	-246	-26	-2	4,797	36	9,264	69 (N/A)		7.4	5.2	4.96
Green ash	10,049	75	-1,018	-44	-8	7,349	55	16,335	123 (N/A)		7.4	9.2	8.75
Bur oak	11,052	83	-1,198	-48	-9	7,483	56	17,289	130 (N/A)		6.9	9.8	9.97
Northern hackberry	4,901	37	-428	-37	-3	6,437	48	10,873	82 (N/A)		6.9	6.1	6.27
Spruce	1,003	8	-55	-17	-1	1,774	13	2,705	20 (N/A)		5.3	1.5	2.03
American basswood	2,165	16	-188	-8	-1	972	7	2,941	22 (N/A)		3.2	1.7	3.68
Northern white cedar	469	4	-23	-8	0	878	7	1,317	10 (N/A)		3.2	0.7	1.65
Catalpa	5,038	38	-543	-22	-4	3,447	26	7,921	59 (N/A)		3.2	4.5	9.90
Honeylocust	3,110	23	-107	-10	-1	2,236	17	5,229	39 (N/A)		2.7	3.0	7.84
Eastern red cedar	211	2	-22	-9	0	829	6	1,009	8 (N/A)		2.7	0.6	1.51
Japanese tree lilac	43	0	-1	-1	0	28	0	70	1 (N/A)		2.7	0.0	0.10
Blue spruce	245	2	-11	-7	0	638	5	865	6 (N/A)		2.7	0.5	1.30
Sugar maple	2,220	17	-207	-11	-2	1,821	14	3,823	29 (N/A)		2.7	2.2	5.73
Ginkgo	9	0	0	-1	0	15	0	23	0 (N/A)		2.1	0.0	0.04
Red maple	331	2	-49	-5	0	848	6	1,125	8 (N/A)		1.6	0.6	2.81
Boxelder	1,531	11	-73	-7	-1	1,039	8	2,490	19 (N/A)		1.6	1.4	6.23
Paper birch	626	5	-15	-4	0	476	4	1,084	8 (N/A)		1.6	0.6	2.71
Northern red oak	5	0	-73	-4	-1	443	3	371	3 (N/A)		1.1	0.2	1.39
Elm	1,405	11	-142	-6	-1	1,043	8	2,299	17 (N/A)		1.1	1.3	8.62
Norway spruce	116	1	-42	-6	0	527	4	595	4 (N/A)		1.1	0.3	2.23
Swamp white oak	101	1	-2	-1	0	72	1	170	1 (N/A)		1.1	0.1	0.64
Pin oak	327	2	-10	-2	0	360	3	675	5 (N/A)		1.1	0.4	2.53
American sycamore	857	6	-76	-4	-1	552	4	1,330	10 (N/A)		0.5	0.8	9.97
White ash	1,315	10	-76	-4	-1	704	5	1,940	15 (N/A)		0.5	1.1	14.55
Red pine	116	1	-6	-2	0	216	2	324	2 (N/A)		0.5	0.2	2.43
Eastern white pine	0	0	-36	-4	0	311	2	271	2 (N/A)		0.5	0.2	2.03
Littleleaf linden	514	4	-17	-2	0	337	3	832	6 (N/A)		0.5	0.5	6.24
Maple	39	0	-1	-1	0	60	0	97	1 (N/A)		0.5	0.1	0.73
Kentucky coffeetree	445	3	-18	-2	0	393	3	819	6 (N/A)		0.5	0.5	6.14
Citywide total	113,280	850	-8,680	-474	-69	72,667	545	176,793	1,326 (N/A)		100.0	100.0	7.05

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

<b>Annual Aesthetic/Other Benefits of Public Trees</b>					
2/4/2023					
Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Silver maple	4,046	(N/A)	19.7	38.8	109.36
Black walnut	697	(N/A)	7.4	6.7	49.80
Norway maple	489	(N/A)	7.4	4.7	34.91
Green ash	799	(N/A)	7.4	7.7	57.07
Bur oak	824	(N/A)	6.9	7.9	63.40
Northern hackberry	661	(N/A)	6.9	6.3	50.84
Spruce	285	(N/A)	5.3	2.7	28.48
American basswood	147	(N/A)	3.2	1.4	24.54
Northern white cedar	141	(N/A)	3.2	1.3	23.46
Catalpa	377	(N/A)	3.2	3.6	62.81
Honeylocust	729	(N/A)	2.7	7.0	145.70
Eastern red cedar	76	(N/A)	2.7	0.7	15.21
Japanese tree lilac	0	(N/A)	2.7	0.0	0.03
Blue spruce	110	(N/A)	2.7	1.0	21.91
Sugar maple	238	(N/A)	2.7	2.3	47.60
Ginkgo	1	(N/A)	2.1	0.0	0.37
Red maple	60	(N/A)	1.6	0.6	19.89
Boxelder	130	(N/A)	1.6	1.2	43.45
Paper birch	86	(N/A)	1.6	0.8	28.56
Northern red oak	2	(N/A)	1.1	0.0	0.77
Elm	112	(N/A)	1.1	1.1	56.23
Norway spruce	32	(N/A)	1.1	0.3	16.16
Swamp white oak	16	(N/A)	1.1	0.1	7.81
Pin oak	46	(N/A)	1.1	0.4	23.14
American sycamore	66	(N/A)	0.5	0.6	65.59
White ash	126	(N/A)	0.5	1.2	126.36
Red pine	32	(N/A)	0.5	0.3	32.32
Eastern white pine	0	(N/A)	0.5	0.0	0.00
Littleleaf linden	55	(N/A)	0.5	0.5	55.09
Maple	7	(N/A)	0.5	0.1	7.28
Kentucky coffeetree	46	(N/A)	0.5	0.4	45.86
Citywide total	10,436	(N/A)	100.0	100.0	55.51

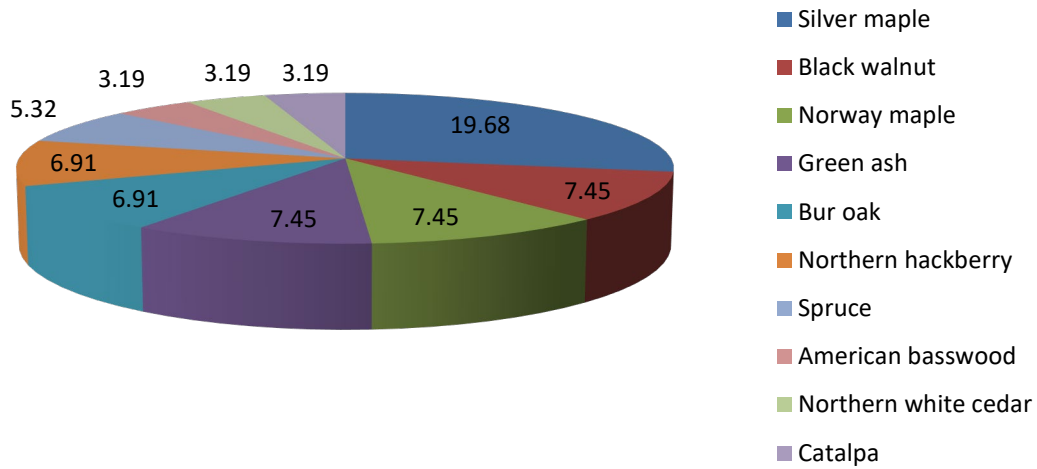
**Table 7: Summary of Benefits in Dollars**

**Total Annual Benefits of Public Trees by Species (\$)**

2/4/2023

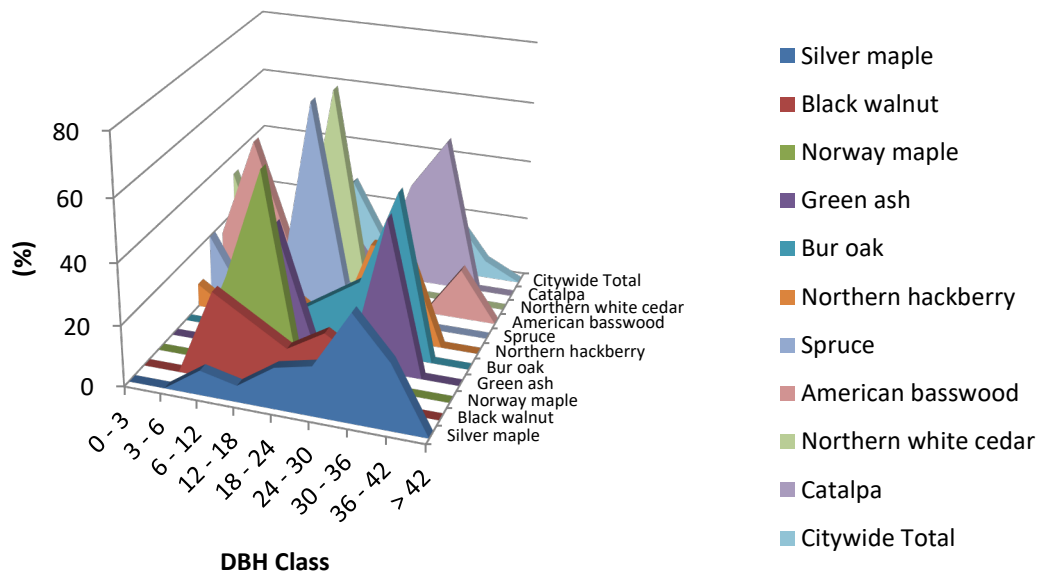
Species	Energy	CO <sub>2</sub>	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Silver maple	2,550	523	480	5,064	4,046	12,663	(N/A)	34.9
Black walnut	707	97	122	944	697	2,566	(N/A)	7.1
Norway maple	590	69	99	509	489	1,756	(N/A)	4.8
Green ash	897	123	164	1,350	799	3,332	(N/A)	9.2
Bur oak	946	130	174	1,542	824	3,615	(N/A)	10.0
Northern hackberry	831	82	147	1,022	661	2,743	(N/A)	7.6
Spruce	201	20	21	375	285	903	(N/A)	2.5
American basswood	127	22	20	188	147	504	(N/A)	1.4
Northern white cedar	98	10	11	169	141	430	(N/A)	1.2
Catalpa	432	59	80	700	377	1,648	(N/A)	4.5
Honeylocust	266	39	44	271	729	1,348	(N/A)	3.7
Eastern red cedar	110	8	9	195	76	398	(N/A)	1.1
Japanese tree lilac	4	1	1	1	0	7	(N/A)	0.0
Blue spruce	84	6	9	124	110	333	(N/A)	0.9
Sugar maple	218	29	35	296	238	815	(N/A)	2.2
Ginkgo	2	0	0	1	1	5	(N/A)	0.0
Red maple	110	8	19	112	60	308	(N/A)	0.8
Boxelder	124	19	20	139	130	433	(N/A)	1.2
Paper birch	62	8	9	49	86	214	(N/A)	0.6
Northern red oak	57	3	8	83	2	152	(N/A)	0.4
Elm	126	17	23	189	112	468	(N/A)	1.3
Norway spruce	62	4	1	166	32	267	(N/A)	0.7
Swamp white oak	10	1	1	5	16	33	(N/A)	0.1
Pin oak	47	5	6	31	46	136	(N/A)	0.4
American sycamore	71	10	12	107	66	266	(N/A)	0.7
White ash	85	15	17	144	126	387	(N/A)	1.1
Red pine	24	2	3	42	32	103	(N/A)	0.3
Eastern white pine	38	2	-2	125	0	163	(N/A)	0.5
Littleleaf linden	39	6	6	34	55	141	(N/A)	0.4
Maple	8	1	1	4	7	21	(N/A)	0.1
Kentucky coffeetree	44	6	7	40	46	143	(N/A)	0.4
<b>Citywide Total</b>	<b>8,970</b>	<b>1,326</b>	<b>1,549</b>	<b>14,018</b>	<b>10,436</b>	<b>36,300</b>	<b>(N/A)</b>	<b>100.0</b>

**Figure 1: Species Distribution**

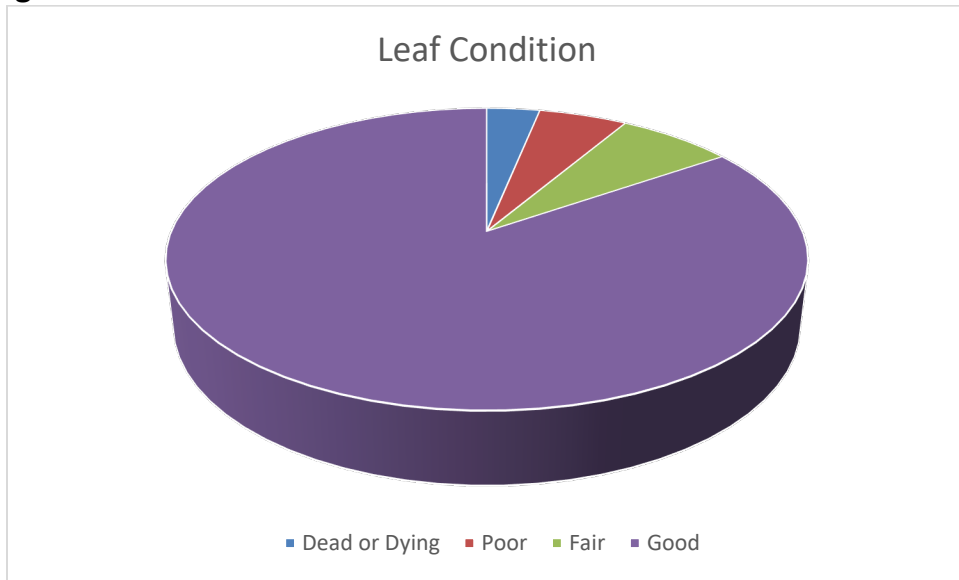


**Figure 2: Relative Age Class**

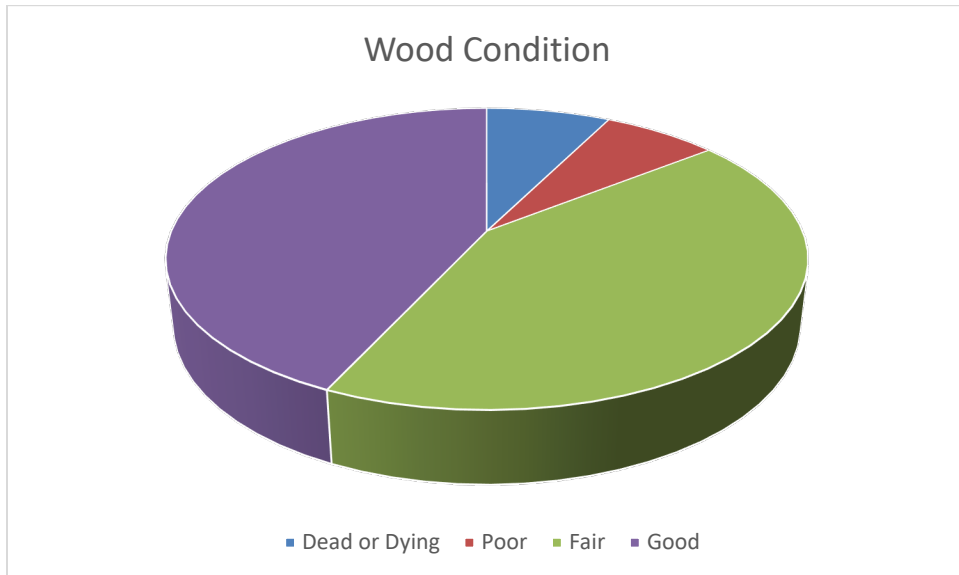
### Relative Age Distribution of Top 10 Public Tree Species (%)



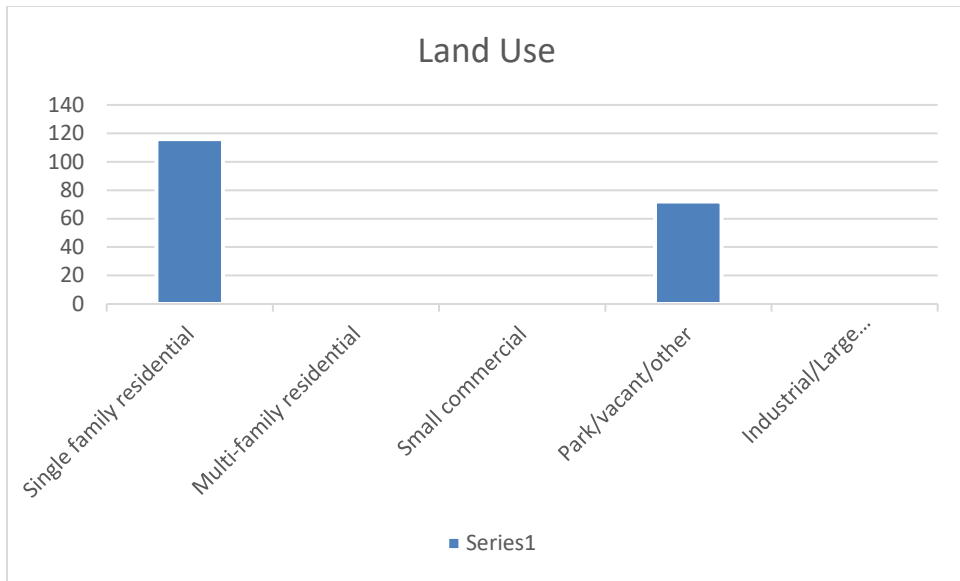
**Figure 3: Foliage Condition**



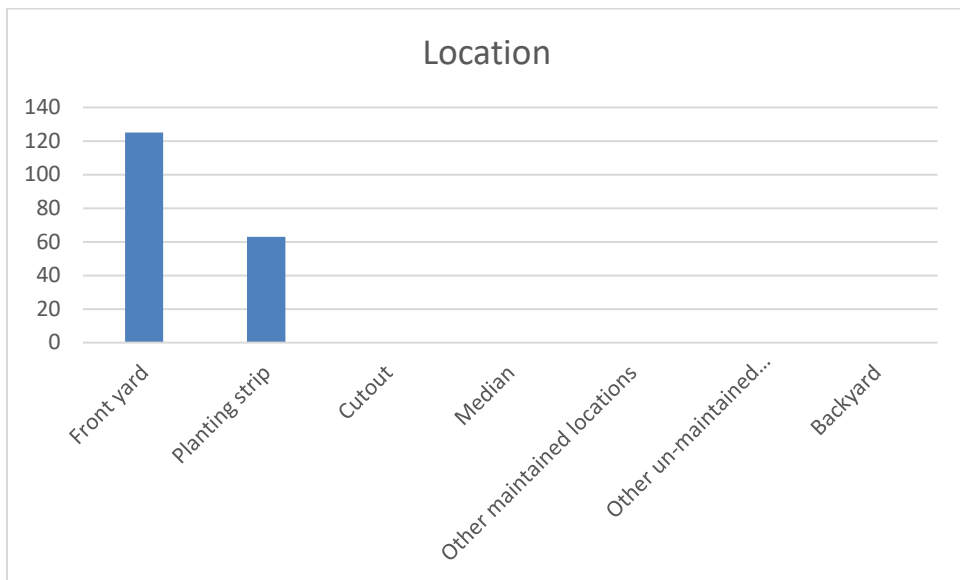
**Figure 4: Wood Condition**



**Figure 5: Canopy Cover in Acres**



**Figure 6: Land Use of city/park trees**



**Figure 7: Location of city/park trees**

## Appendix B: ArcGIS Mapping

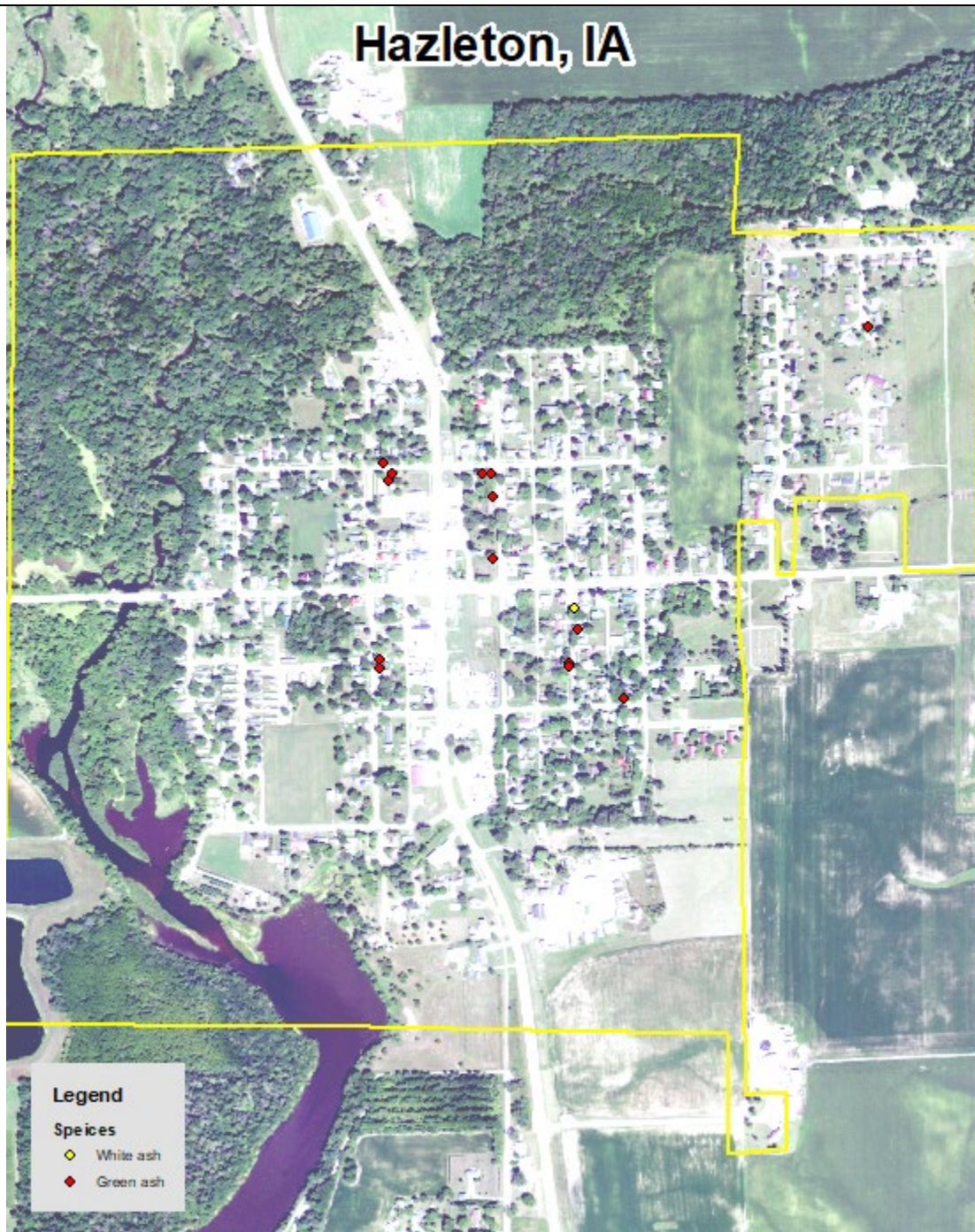


Figure 1: Location of Ash Trees

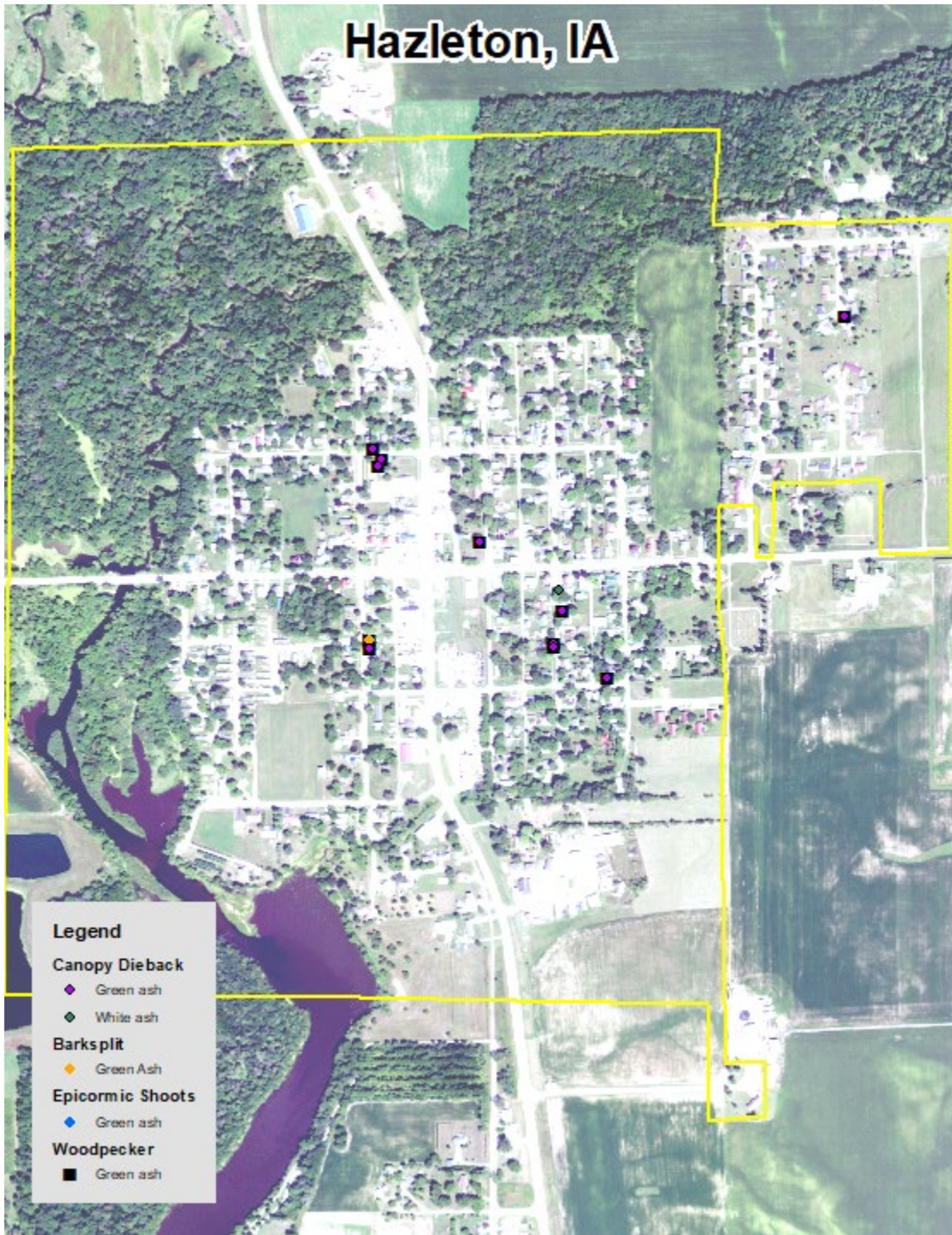


Figure 2: Location of EAB symptoms





Figure 3: Location of Poor Condition Trees

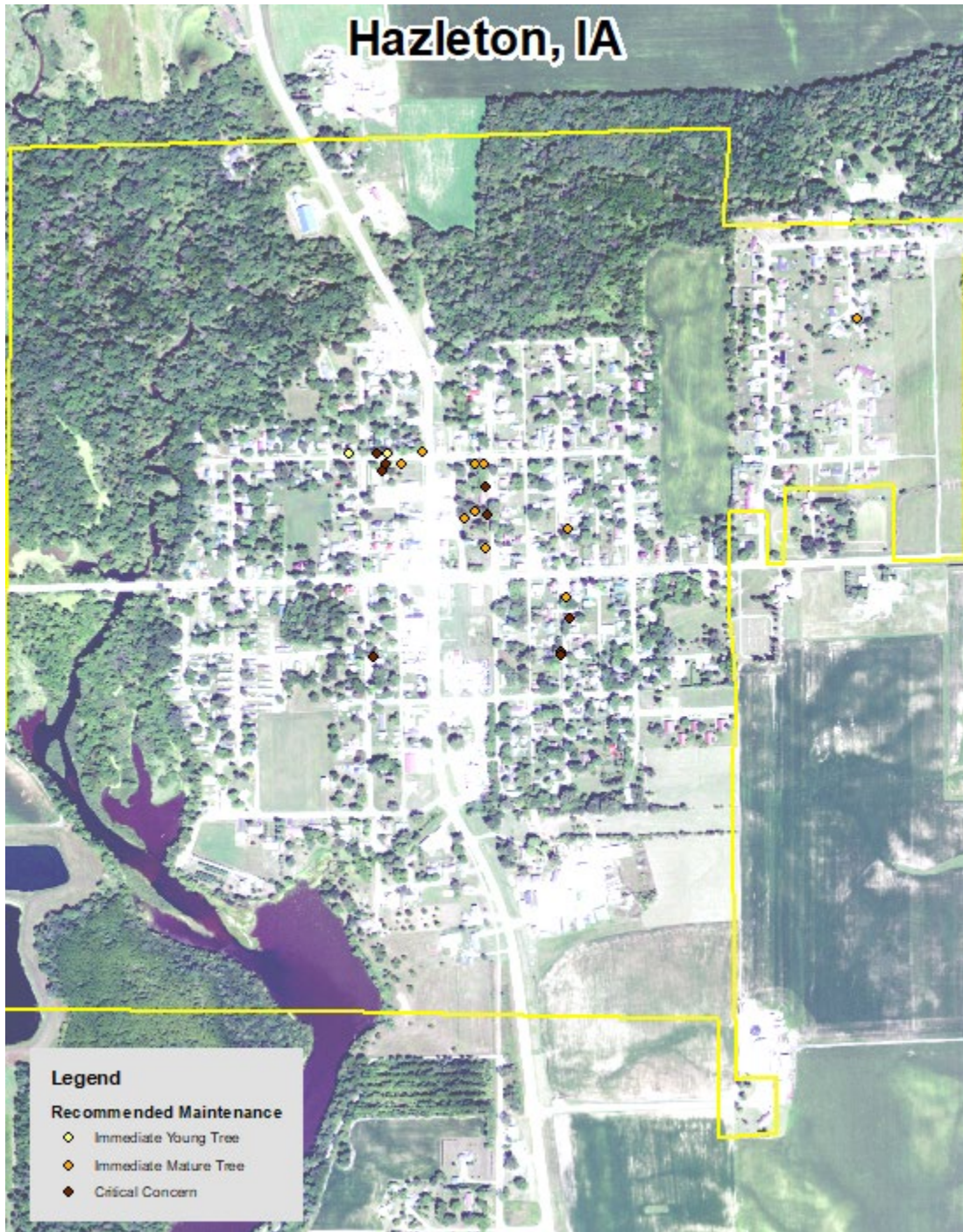
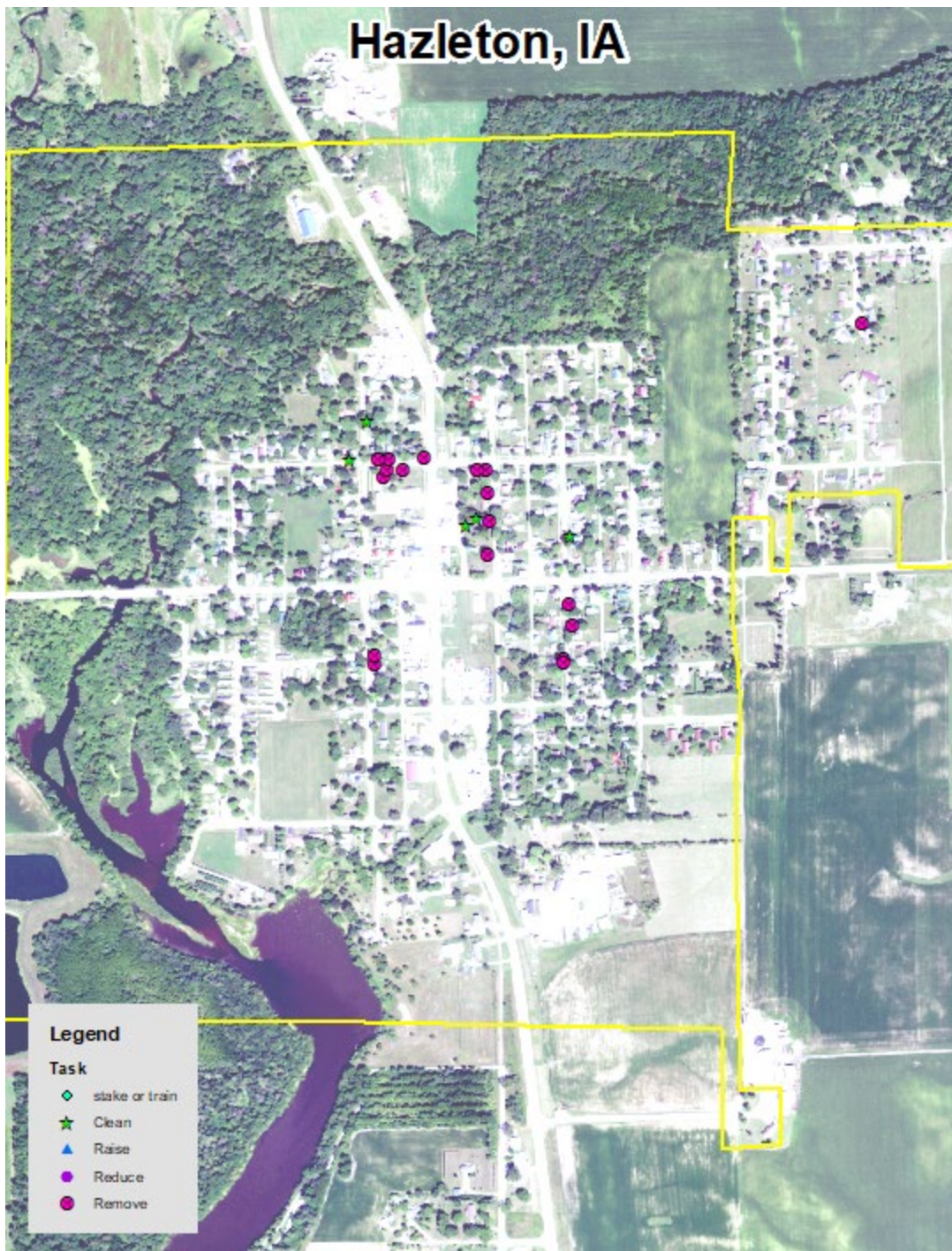


Figure 4: Location of Trees with Recommended Maintenance



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

# Appendix C: Hazleton Tree Ordinances

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## CHAPTER 150

### TREES

150.01 Definition

150.02 Planting Restrictions

150.03 Duty to Trim Trees

150.04 Trimming Trees to be Supervised

150.05 Disease Control

150.06 Inspection and Removal

**150.01 DEFINITION.** For use in this chapter, “parking” 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.

**150.02 PLANTING RESTRICTIONS.** No tree shall be planted in any parking or street except in accordance with the following:

1. Alignment. All trees planted in any street shall be planted in the parking 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 parking 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.

**150.03 DUTY TO TRIM TREES.** The owner or agent of the abutting property shall keep the trees, shrubs or other vegetation on, or overhanging the street, trimmed so that all branches will be at least fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks. If the abutting property owner fails to trim the trees, shrubs or other vegetation, 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])*

**150.04 TRIMMING TREES TO BE SUPERVISED.** Except as allowed in Section 150.03, 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.

**150.05 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.

**150.06 INSPECTION AND REMOVAL.** The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be dead, diseased or damaged, and such trees and shrubs shall be subject to the following:

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 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])*

[The next page is 731]

The State of Iowa is an Equal Opportunity Employer and provider of ADA services.

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.