Ainsworth, IA:

2020 Urban Forest Management Plan

PREPARED BY:

Andrew Larson & Morgan Langer
Iowa Department of Natural Resources

JEO CONSULTING GROUP

Table of Contents

Table of Contents

Executive Summary

EXECUTIVE SUMMARY

Overview

This plan was developed to assist the City of Ainsworth in managing its urban forest, including budgeting and future planning. Trees bring numerous benefits to a community, and sound management helps leaders take advantage of these benefits. Management is especially important now considering the serious threats posed by forest pests like 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 except mountain ash. There is a strong possibility that 9% of Ainsworth's city-owned trees will die once EAB becomes established in the community, unless local leaders begin preventative treatment. 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 2020, JEO conducted a tree inventory 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 140 trees inventoried.

- Ainsworth's trees provide $16,102 of benefits annually, an average of $134 per tree
- There are over 26 species of trees
- The top three genera are: maple 43%, oak 9%, and ash 9%
- 8% of trees need some type of management
- No trees are recommended for immediate removal

Recommendations

Below are some key recommendations, for further details see the Recommendation and Emerald Ash Borer Plan Sections:.

- 19 trees should be assessed for removal within the next year or two. *City ownership of the trees recommended for removal should be verified prior to any removal*
- 9 of the 11 ash trees should be carefully examined annually, however are not currently showing signs or symptoms that could be related to EAB.
- 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 yearly with a visual survey.
- With the current budget recommended budget, it will take 7 years to remove ash with a suggested budget of $1,200 per capita. We suggest that city officials request an annual budget of $1,700 annually and apply for grants to plant replacement trees

Introduction

INTRODUCTION

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

Trees are an important part of Ainsworth's infrastructure and one of the city's greatest assets. The benefits of trees are immense. Trees improve air quality, intercept stormwater runoff, conserve energy, lower traffic speeds, increase property values, reduce crime, improve mental health, and create a desirable place to live, to name just a few. Good urban forestry management will maintain these important benefits for the people of Ainsworth and future generations.

Urban forestry management sets goals and develops management strategies to achieve them. To develop management strategies, a comprehensive public tree inventory must be conducted. The inventory informs maintenance, removal schedules, tree planting, and budgeting. Aligning management actions with the tree inventory results will help meet Ainsworth's urban forestry goals.

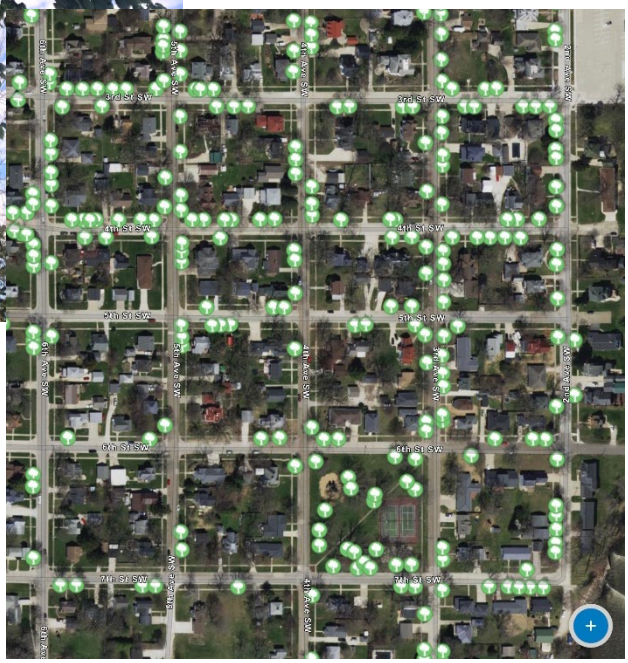
Assist Ainsworth with Managing its Urban Forest

Inform on the Benefits of a Healthy Urban Forest

Establish Preventative Treatment for Emerald Ash Borer

Develop Efficient City Tree Management Techniques

Mitigate Public Safety Issues



Inventory Results

INVENTORY

In 2020, JEO conducted a tree inventory that included 100% of the city-owned trees in both streets and parks. The team collected tree data 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 ArcGIS 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 data collectors' programming 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 feet, recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, for all ash trees, the team notes signs and symptoms associated with EAB including canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

INVENTORY RESULTS

JEO entered the data collected for the 140 city trees into the USDA Forest Service Program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. Following are results from the i-Tree STREETS analysis.

ANNUAL BENEFITS

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Ainsworth's trees reduce energy-related costs by approximately $5,641 annually (Appendix A, Table 1). These savings are both in electricity (26.9 MWh) and in natural gas (3,676.0 Therms).

Annual Stormwater Benefits

Ainsworth's trees intercept about 317,503 gallons of rainfall or snow melt per year (Appendix A, Table 2). This interception provides $8,604 in benefit 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 lessens emissions of volatile organic matter (ozone). In Ainsworth, it is estimated that trees remove 3,468 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $975 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Ainsworth, trees sequester about 59,046 lbs of carbon per year with an associated value of $443 (Appendix A, Table 5). In addition, the trees store 1,255,347 lbs of carbon, with a yearly benefit of $9,415 (Appendix A, Table 4).

Annual Aesthetics Benefits

The social benefits of trees are hard to capture. The i-Tree 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. Ainsworth receives $5,305 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, Ainsworth's trees provide $30,383 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 140 trees in Ainsworth provide approximately $151.84 annually (Appendix A, Table 7).

ENERGY	STORMWATER	AIR QUALITY	CARBON	AESTHETICS	SUMMARY
• Reduce energy cost by **$5,641**	• Intercept **317,503 gallons** • Provides **$8,604** benefit	• Remove **3,468 lbs** of pollution • Net value of **$975**	• Sequester **59,046 lbs** • Value of **$443** • Store **1,255,347 lbs** • Value of **$9,415**	• **$5,305** in social benefits	• **$30,383** annual benefits • Each tree provides **$151** annually

FOREST STRUCTURE

Species Distribution

Ainsworth has over 35 different tree species along city streets and parks (Appendix A, Figure 1).

The distribution of trees by genera is as follows:

Maple	55	39%
Oak	21	15%
Ash	11	8%
Spruce	9	6%
Walnut	7	5%
Redbud	7	5%
Cedar	6	4%
Apple (Crab)	5	4%

Elm	2	1%
Hackberry	2	1%
Birch	1	<1%
Cottonwood	1	<1%
Mulberry	1	<1%
Willow	1	<1%
Pine	1	<1%
Other Deciduous	10	7%

Age Class

Most of Ainsworth's trees (29%) are between 0 and 6 inches in diameter at 4.5 feet (Appendix A, Figure 2).

To prepare for natural mortality and to maintain canopy cover, most trees should be in the smallest size category (a downward slope), indicating youth. Ainsworth's size curve is on the smaller side, indicating a younger than average stand.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the urban forest's overall health. The foliage condition results for Ainsworth indicate that 89 percent of the trees are in good health, with only 10 percent of the foliage in poor health, dead, or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 85 percent of Ainsworth's trees are in good health for wood condition (Appendix A, Figure 4 & Appendix B, Figure 3). Three percent of the tree population's wood condition is in poor health, dead, or dying. This 15 percent 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).

Action	Number of Trees	Percentage
Crown Cleaning	37	26%
Tree Removal	19	14%
Crown Raising	16	11%
Tree Staking	14	10%
Crown Reduction	10	7%

Canopy Cover

The total canopy with both private and public trees is 51.78 acres or around 22%. The canopy cover included in the Ainsworth inventory includes approximately 3 acres (Appendix A, Figure 4). The city's canopy goal is to increase canopy by 13% in 30 years. To achieve this goal it is estimated that 3 trees need to be planted annually on public and private lands.

Land Use and Location

The majority of Ainsworth'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	Percentage
Single Family Residential	57%
Industrial/Large Commercial	36%
Park/Vacant/Other	7%
Small Commercial	0%
Multifamily Residential	0%

Recommendations

RECOMMENDATIONS

Risk Management

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

HAZARDOUS TREES

Ainsworth has no 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). Ainsworth does have 19 trees under the critical size of 24 inches that should be removed before they become a serious danger. We recommend starting with the largest diameter trees first. Please refer to the Proposed Schedule and Budget at the end of this section. After all of the removals are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 77 trees with maintenance needs.

POOR TREE SPECIES

After removing the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). There are a total of 11 ash trees, and 9 of those have signs and symptoms that have been associated with EAB. *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 removes lower branches that are two inches in diameter or larger to provide clearance for pedestrians or vehicles. Crown reduction removes individual limbs from structures or utility wires. We recommend that all trees be pruned on a routine schedule every five to seven years. Please refer to the Proposed Budget and Schedule for further information.

Planting

Most of the planting over the next five years will replace the trees that are removed. We recommend planting 1.2 trees for every tree removed, since survival rates will not be 100%. 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 Ainsworth.

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 percent of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10 percent of the total urban forest. Presently, the forest is heavily planted with maple (39%) (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. While the city currently has no existing City Code about tree species planting restrictions, we encourage the city to work with the Iowa Department of Natural Resources to develop a plan moving forward."

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. We recommend 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.

EMERALD ASH BORER PLAN

Ash Tree Removal

Tree removal will be prioritized by first removing dead, dying, hazardous trees (Appendix B, Figure 4). Next will be all ash in poor condition that display EAB signs and symptoms (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 providing benefits. However, treatment is not recommended if EAB is more than 15 miles away from the community. For more information on the cost of treatment strategies visit http://extension.entm.purdue.edu/treecomputer/

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of

the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:

- emerald ash borer
- firewood of all hardwood species (for example ash, oak, maple and hickory)
- nursery stock and green lumber of ash
- any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

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

Wood Disposal

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

Canopy Replacement

As budget permits, all removed trees will be replaced. The current city ordinance does not address what species shall not be planted, however we strongly recommend ash, maple, chestnut, Callery pear, Amur maple, cottonwood, poplar, box elder, and Chinese elm be added to a "do not plant" 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 EAB signs and symptoms including 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. The City Code does not yet address the proper procedure for tree removal on private property. City Code Section 6-106 (2) addresses general removal stating, “Whenever any such growth is allowed to grow within two feet of the lot line contrary to the provisions of this section, the City Council may pass a resolution ordering the owner or occupant to remove such obstructions within three days after having been served with a copy of said resolution by the City stating that the City will do so and will charge the costs thereof to the owner or occupant as a special assessment for improvements as herein provided or shall collect the same by civil suit brought in the name of the City against the said owner or occupant.” We suggest revising tree ordinances to be specific about hazardous trees located on private property to avoid problems with private ash removal in the future.

Schedule & Budget

PROPOSED WORK SCHEDULE & BUDGET

Budget Allowance of $1,200/Year – (Based off suggested $2 per capita)

YEAR 1	Est. Cost
Remove 1 ash in poor condition	$700
Plant 3 trees in open locations	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

YEAR 2	Est. Cost
Remove 1 ash in poor condition	$700
Prune 1/4 of city owned trees	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

YEAR 3	Est. Cost
Remove 1 ash in poor condition	$700
Plant 3 trees in open locations	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

YEAR 4	Est. Cost
Remove 1 ash in poor condition	$700
Prune 1/4 of city owned trees	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

YEAR 5	Est. Cost
Remove 1 ash in poor condition	$700
Plant 3 trees in open locations	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

YEAR 6	Est. Cost
Remove 1 ash in poor condition	$700
Prune 1/4 of city owned trees	$450
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,150**

Estimated costs based on average costs of $700/tree for removal, $150/tree for planting and maintenance, and $15/tree for pruning.

***To remove all ash trees within 6 years alone, the budget would need to be $1,300 a year. If the budget were increased to $1,200 a year all ash could be removed in 7 years. These budgets do not allow for other maintenance costs (pruning, planting, etc.)*

PROPOSED WORK SCHEDULE WITH INCREASED BUDGET

Budget Allowance of $1,700/Year – (Budget Increase Suggested to Best Manage City Trees)

YEAR 1	Est. Cost
Remove 2 ash in poor condition	$1,400
Plant 2 trees in open locations	$300
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,700**

YEAR 2	Est. Cost
Remove 1 ash in poor condition	$700
Plant 2 trees in open locations	$300
Prune 1/3 of city owned trees	$600
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,600**

YEAR 3	Est. Cost
Remove 2 ash in poor condition	$1,400
Plant 2 trees in open locations	$300
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,700**

YEAR 4	Est. Cost
Remove 1 ash in poor condition	$700
Plant 2 trees in open locations	$300
Prune 1/3 of city owned trees	$600
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,600**

YEAR 5	Est. Cost
Remove 2 ash in poor condition	$1,400
Plant 2 trees in open locations	$300
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,700**

YEAR 6	Est. Cost
Remove 1 ash in poor condition	$700
Plant 2 trees in open locations	$300
Prune 1/3 of city owned trees	$600
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$1,600**

Proposed Budget Increase

EAB could potentially kill all ash trees in Ainsworth within four years of its arrival. To remove all ash trees within six years, the budget would need to be set to $1,300 a year. If the budget were set to $700 per year all ash could be removed within 13 years (roughly one removal per year). Additionally, we recommend that Ainsworth 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 considered by many communities is treating 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 removal all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at $15 per inch, about 2 trees could be treated per year (every other year treatment). Four trees would be selected for treatment, and Ainsworth would still need to find $6,300 for removal. Nine of the eleven ash in Ainsworth are in poor condition and will not benefit from treatment. This is an alternative to simply removing 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 Ainsworth. We suggest considering an increased budget to plan for this.

WORKS CITED

Census Bureau. 2010. http://censtats.census.gov/data/IA/1601964290.pdf(April, 2013)

USDA Forest Service, et al. 2006. i-Tree Software Suite v1.0 User's Manual. Pp. 27-40.

McPherson EG, Simpson JR, Peper PJ, Gardner SL, Vargas KE, Ho J, Maco S, Xiao Q. 2005b. City of Charleston, South Carolina, municipal forest resource analysis. Internal Tech Rep. Davis, CA: U.S. Department of Agriculture, Center for Urban Forest Research. p. 57

Nowak, DJ and JF Dwyer. 2007. Understanding the benefits and costs of urban forest ecosystems. In: Kuser, J. (ed.) Urban and Community Forestry in the Northeast. New York: Springer. Pp. 25-46.

Peper, Paula J; McPherson, E Gregory; Simpson, James R; Vargas, Kelaine E; Xiao, Qingfu 2009. Lower Midwest community tree guide: benefits, costs, and strategic planting. Gen. Tech. Rep. PSW-GTR-219. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. p.115

Appendices

APPENDIX A: i-TREE DATA

Annual Energy Benefits of Public Trees

1/29/2021

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Sugar maple	5.1	388	686.2	672	1,060	(N/A)	12.9	18.8	58.89
Silver maple	4.2	322	563.5	552	874	(N/A)	10.0	15.5	62.41
Green ash	2.5	186	336.3	330	516	(N/A)	6.4	9.1	57.33
Maple	0.4	30	58.3	57	87	(N/A)	6.4	1.5	9.71
Black walnut	1.5	116	206.9	203	318	(N/A)	5.0	5.6	45.49
Eastern redbud	0.1	7	16.6	16	23	(N/A)	5.0	0.4	3.34
Broadleaf Deciduous Small	0.0	2	4.4	4	6	(N/A)	5.0	0.1	0.87
White oak	2.4	180	327.8	321	502	(N/A)	5.0	8.9	71.68
Bur oak	1.8	138	241.8	237	375	(N/A)	5.0	6.6	53.50
Red maple	0.1	7	13.4	13	20	(N/A)	4.3	0.4	3.30
Apple	0.2	15	33.9	33	48	(N/A)	3.6	0.9	9.61
Black spruce	0.6	46	83.9	82	128	(N/A)	3.6	2.3	25.65
Norway maple	0.8	60	120.7	118	178	(N/A)	2.9	3.2	44.62
Eastern red cedar	0.4	29	57.3	56	85	(N/A)	2.9	1.5	21.30
Blue spruce	0.3	24	40.6	40	64	(N/A)	2.1	1.1	21.27
Northern hackberry	0.8	61	114.8	112	173	(N/A)	1.4	3.1	86.67
Swamp white oak	0.6	42	76.9	75	118	(N/A)	1.4	2.1	58.81
Black maple	0.6	43	79.8	78	121	(N/A)	1.4	2.2	60.68
White ash	0.2	14	26.7	26	40	(N/A)	1.4	0.7	20.10
Northern red oak	0.5	39	72.8	71	110	(N/A)	1.4	2.0	55.22
Broadleaf Deciduous Mediu	0.1	11	23.0	23	33	(N/A)	1.4	0.6	16.73
Siberian elm	0.9	71	120.5	118	190	(N/A)	1.4	3.4	94.77
Northern white cedar	0.0	3	7.9	8	11	(N/A)	1.4	0.2	5.61
Oak	0.0	0	0.5	0	1	(N/A)	0.7	0.0	0.66
Cottonwood	0.5	37	63.1	62	99	(N/A)	0.7	1.7	98.63
Amur maple	0.2	15	31.6	31	46	(N/A)	0.7	0.8	46.14
Pin oak	0.4	29	51.8	51	80	(N/A)	0.7	1.4	80.25
Broadleaf Deciduous Large	0.4	29	53.7	53	82	(N/A)	0.7	1.5	82.02
Spruce	0.1	10	14.6	14	24	(N/A)	0.7	0.4	24.14
Paper birch	0.4	33	59.0	58	91	(N/A)	0.7	1.6	91.02
Mulberry	0.0	0	0.6	1	1	(N/A)	0.7	0.0	0.87
Boxelder	0.2	15	23.9	23	39	(N/A)	0.7	0.7	38.63
Willow	0.0	0	0.8	1	1	(N/A)	0.7	0.0	1.10
Northern pin oak	0.3	24	47.4	46	71	(N/A)	0.7	1.3	70.84
Austrian pine	0.1	10	15.2	15	25	(N/A)	0.7	0.4	24.51
Total	26.9	2,038	3,676.0	3,603	5,641	(N/A)	100.0	100.0	40.29

Annual Stormwater Benefits of Public Trees

1/29/2021

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Sugar maple	57,111	1,548	(N/A)	12.9	18.0	85.98
Silver maple	57,281	1,552	(N/A)	10.0	18.0	110.88
Green ash	26,235	711	(N/A)	6.4	8.3	79.00
Maple	1,723	47	(N/A)	6.4	0.5	5.19
Black walnut	13,312	361	(N/A)	5.0	4.2	51.54
Eastern redbud	309	8	(N/A)	5.0	0.1	1.20
Broadleaf Deciduous Small	52	1	(N/A)	5.0	0.0	0.20
White oak	34,709	941	(N/A)	5.0	10.9	134.38
Bur oak	24,060	652	(N/A)	5.0	7.6	93.15
Red maple	321	9	(N/A)	4.3	0.1	1.45
Apple	674	18	(N/A)	3.6	0.2	3.65
Black spruce	9,237	250	(N/A)	3.6	2.9	50.06
Norway maple	7,416	201	(N/A)	2.9	2.3	50.24
Eastern red cedar	5,563	151	(N/A)	2.9	1.8	37.69
Blue spruce	3,844	104	(N/A)	2.1	1.2	34.72
Northern hackberry	8,604	233	(N/A)	1.4	2.7	116.58
Swamp white oak	5,173	140	(N/A)	1.4	1.6	70.10
Black maple	5,734	155	(N/A)	1.4	1.8	77.70
White ash	1,227	33	(N/A)	1.4	0.4	16.63
Northern red oak	6,061	164	(N/A)	1.4	1.9	82.12
Broadleaf Deciduous Medium	749	20	(N/A)	1.4	0.2	10.14
Siberian elm	13,255	359	(N/A)	1.4	4.2	179.61
Northern white cedar	426	12	(N/A)	1.4	0.1	5.77
Oak	18	0	(N/A)	0.7	0.0	0.48
Cottonwood	7,239	196	(N/A)	0.7	2.3	196.17
Amur maple	1,174	32	(N/A)	0.7	0.4	31.82
Pin oak	4,943	134	(N/A)	0.7	1.6	133.95
Broadleaf Deciduous Large	5,491	149	(N/A)	0.7	1.7	148.79
Spruce	1,539	42	(N/A)	0.7	0.5	41.70
Paper birch	7,239	196	(N/A)	0.7	2.3	196.17
Mulberry	7	0	(N/A)	0.7	0.0	0.20
Boxelder	1,456	39	(N/A)	0.7	0.5	39.46
Willow	12	0	(N/A)	0.7	0.0	0.33
Northern pin oak	3,764	102	(N/A)	0.7	1.2	102.01
Austrian pine	1,544	42	(N/A)	0.7	0.5	41.85
Citywide total	317,503	8,604	(N/A)	100.0	100.0	61.46

Annual Air Quality Benefits of Public Trees

1/29/2021

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2								
Sugar maple	8.0	1.4	3.9	0.4	43	24.2	3.5	3.4	23.1	151	-6.3	-23	61.6	171	(N/A)	12.9	9.50
Silver maple	9.2	1.6	4.6	0.4	50	20.0	2.9	2.8	19.2	125	-4.8	-18	55.8	157	(N/A)	10.0	11.20
Green ash	3.1	0.5	1.5	0.1	17	11.7	1.7	1.6	11.1	73	0.0	0	31.5	90	(N/A)	6.4	9.97
Maple	0.1	0.0	0.1	0.0	1	1.9	0.3	0.3	1.8	12	-0.1	0	4.5	13	(N/A)	6.4	1.40
Black walnut	1.3	0.2	0.7	0.1	7	7.3	1.1	1.0	6.9	45	0.0	0	18.5	52	(N/A)	5.0	7.47
Eastern redbud	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)	5.0	0.46
Broadleaf Deciduous Small	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)	5.0	0.11
White oak	5.1	0.8	2.3	0.2	27	11.4	1.7	1.6	10.8	71	0.0	0	33.9	98	(N/A)	5.0	13.95
Bur oak	3.9	0.6	1.8	0.2	21	8.6	1.3	1.2	8.2	54	0.0	0	25.7	74	(N/A)	5.0	10.60
Red maple	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	0.0	0	1.0	3	(N/A)	4.3	0.46
Apple	0.1	0.0	0.1	0.0	1	1.0	0.1	0.1	0.9	6	0.0	0	2.3	7	(N/A)	3.6	1.32
Black spruce	1.3	0.3	1.1	0.2	9	2.9	0.4	0.4	2.7	18	-3.5	-13	5.8	14	(N/A)	3.6	2.74
Norway maple	1.5	0.3	0.7	0.1	8	3.9	0.6	0.5	3.6	24	-0.3	-1	10.8	31	(N/A)	2.9	7.67
Eastern red cedar	1.1	0.2	0.9	0.1	7	1.9	0.3	0.3	1.7	12	-3.1	-11	3.4	7	(N/A)	2.9	1.79
Blue spruce	0.5	0.1	0.4	0.1	3	1.5	0.2	0.2	1.4	9	-1.3	-5	3.0	7	(N/A)	2.1	2.44
Northern hackberry	1.4	0.2	0.7	0.1	8	3.9	0.6	0.5	3.6	24	0.0	0	11.0	32	(N/A)	1.4	15.88
Swamp white oak	1.1	0.2	0.5	0.0	6	2.7	0.4	0.4	2.5	17	-0.3	-1	7.5	21	(N/A)	1.4	10.75
Black maple	1.5	0.3	0.7	0.1	8	2.7	0.4	0.4	2.6	17	-0.5	-2	8.1	23	(N/A)	1.4	11.54
White ash	0.0	0.0	0.0	0.0	0	0.9	0.1	0.1	0.8	6	0.0	0	2.1	6	(N/A)	1.4	2.91
Northern red oak	1.3	0.2	0.6	0.1	7	2.5	0.4	0.3	2.3	15	-1.9	-7	5.8	15	(N/A)	1.4	7.65
Broadleaf Deciduous Medium	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.7	4	0.0	0	1.7	5	(N/A)	1.4	2.34
Siberian elm	2.9	0.5	1.3	0.1	15	4.4	0.6	0.6	4.3	28	0.0	0	14.8	43	(N/A)	1.4	21.50
Northern white cedar	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	-0.1	0	0.4	1	(N/A)	1.4	0.56
Oak	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)	0.7	0.08
Cottonwood	1.6	0.3	0.7	0.1	8	2.3	0.3	0.3	2.2	14	0.0	0	7.7	23	(N/A)	0.7	22.55
Amur maple	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)	0.7	8.35
Pin oak	0.9	0.2	0.5	0.0	5	1.8	0.3	0.3	1.8	12	-1.7	-6	4.0	10	(N/A)	0.7	10.20
Broadleaf Deciduous Large	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)	0.7	15.71
Spruce	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)	0.7	2.82
Paper birch	1.2	0.2	0.5	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.6	19	(N/A)	0.7	19.04
Mulberry	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)	0.7	0.11
Boxelder	0.1	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6	(N/A)	0.7	6.37
Willow	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)	0.7	0.14
Northern pin oak	0.9	0.1	0.4	0.0	5	1.6	0.2	0.2	1.5	10	-0.2	-1	4.7	14	(N/A)	0.7	13.58
Austrian pine	0.2	0.0	0.2	0.0	1	0.6	0.1	0.1	0.6	4	-0.6	-2	1.2	3	(N/A)	0.7	2.89

Annual Air Quality Benefits of Public Trees

Table 3 Continued

1/29/2021

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2								
Citywide total	49.8	8.4	25.1	2.5	271	128.1	18.7	17.8	121.7	798	-25.2	-95	346.8	975	(N/A)	100.0	6.96

Table 4: Annual Carbon Stored

Stored CO2 Benefits of Public Trees

1/29/2021

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Sugar maple	231,693	1,738	(N/A)	12.9	18.5	96.54
Silver maple	199,168	1,494	(N/A)	10.0	15.9	106.70
Green ash	101,410	761	(N/A)	6.4	8.1	84.51
Maple	2,848	21	(N/A)	6.4	0.2	2.37
Black walnut	41,187	309	(N/A)	5.0	3.3	44.13
Eastern redbud	991	7	(N/A)	5.0	0.1	1.06
Broadleaf Deciduous	96	1	(N/A)	5.0	0.0	0.10
White oak	168,986	1,267	(N/A)	5.0	13.5	181.06
Bur oak	133,338	1,000	(N/A)	5.0	10.6	142.86
Red maple	504	4	(N/A)	4.3	0.0	0.63
Apple	2,185	16	(N/A)	3.6	0.2	3.28
Black spruce	9,386	70	(N/A)	3.6	0.7	14.08
Norway maple	24,427	183	(N/A)	2.9	1.9	45.80
Eastern red cedar	3,583	27	(N/A)	2.9	0.3	6.72
Blue spruce	2,521	19	(N/A)	2.1	0.2	6.30
Northern hackberry	21,555	162	(N/A)	1.4	1.7	80.83
Swamp white oak	17,904	134	(N/A)	1.4	1.4	67.14
Black maple	15,891	119	(N/A)	1.4	1.3	59.59
White ash	2,069	16	(N/A)	1.4	0.2	7.76
Northern red oak	30,478	229	(N/A)	1.4	2.4	114.29
Broadleaf Deciduous	1,319	10	(N/A)	1.4	0.1	4.95
Siberian elm	70,618	530	(N/A)	1.4	5.6	264.82
Northern white cedar	76	1	(N/A)	1.4	0.0	0.29
Oak	12	0	(N/A)	0.7	0.0	0.09
Cottonwood	55,982	420	(N/A)	0.7	4.5	419.86
Amur maple	6,743	51	(N/A)	0.7	0.5	50.57
Pin oak	24,952	187	(N/A)	0.7	2.0	187.14
Broadleaf Deciduous	25,943	195	(N/A)	0.7	2.1	194.57
Spruce	1,170	9	(N/A)	0.7	0.1	8.78
Paper birch	39,259	294	(N/A)	0.7	3.1	294.44
Mulberry	14	0	(N/A)	0.7	0.0	0.10
Boxelder	3,624	27	(N/A)	0.7	0.3	27.18
Willow	17	0	(N/A)	0.7	0.0	0.13
Northern pin oak	14,280	107	(N/A)	0.7	1.1	107.10
Austrian pine	1,118	8	(N/A)	0.7	0.1	8.39
Citywide total	1,255,347	9,415	(N/A)	100.0	100.0	67.25

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

Ainsworth

Annual CO $_2$ Benefits of Public Trees

Table 5: Annual Carbon Sequestered

1/29/2021

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
Sugar maple	11,684	88	-1,112	-55	-9	8,565	64	19,082	143 (N/A)	12.9	19.5	7.95
Silver maple	16,193	121	-956	-45	-8	7,106	53	22,297	167 (N/A)	10.0	22.8	11.95
Green ash	5,855	44	-487	-25	-4	4,121	31	9,463	71 (N/A)	6.4	9.7	7.89
Maple	475	4	-14	-6	0	669	5	1,124	8 (N/A)	6.4	1.2	0.94
Black walnut	3,532	26	-198	-15	-2	2,556	19	5,875	44 (N/A)	5.0	6.0	6.29
Eastern redbud	166	1	-5	-2	0	158	1	316	2 (N/A)	5.0	0.3	0.34
Broadleaf Deciduous Smal	61	0	-1	-1	0	39	0	98	1 (N/A)	5.0	0.1	0.10
White oak	5,713	43	-811	-27	-6	3,989	30	8,864	66 (N/A)	5.0	9.1	9.50
Bur oak	3,461	26	-640	-20	-5	3,040	23	5,841	44 (N/A)	5.0	6.0	6.26
Red maple	89	1	-3	-2	0	148	1	232	2 (N/A)	4.3	0.2	0.29
Apple	312	2	-11	-4	0	328	2	626	5 (N/A)	3.6	0.6	0.94
Black spruce	570	4	-45	-11	0	1,017	8	1,531	11 (N/A)	3.6	1.6	2.30
Norway maple	918	7	-117	-9	-1	1,330	10	2,122	16 (N/A)	2.9	2.2	3.98
Eastern red cedar	126	1	-17	-7	0	642	5	744	6 (N/A)	2.9	0.8	1.39
Blue spruce	220	2	-12	-5	0	532	4	735	6 (N/A)	2.1	0.8	1.84
Northern hackberry	1,116	8	-103	-8	-1	1,345	10	2,350	18 (N/A)	1.4	2.4	8.81
Swamp white oak	386	3	-86	-6	-1	934	7	1,227	9 (N/A)	1.4	1.3	4.60
Black maple	0	0	-76	-5	-1	954	7	872	7 (N/A)	1.4	0.9	3.27
White ash	364	3	-10	-2	0	311	2	663	5 (N/A)	1.4	0.7	2.49
Northern red oak	0	0	-146	-7	-1	864	6	711	5 (N/A)	1.4	0.7	2.67
Broadleaf Deciduous Medi	320	2	-7	-2	0	240	2	551	4 (N/A)	1.4	0.6	2.07
Siberian elm	1,894	14	-339	-11	-3	1,579	12	3,123	23 (N/A)	1.4	3.2	11.71
Northern white cedar	36	0	0	-1	0	76	1	110	1 (N/A)	1.4	0.1	0.41
Oak	3	0	0	0	0	4	0	7	0 (N/A)	0.7	0.0	0.05
Cottonwood	479	4	-269	-6	-2	813	6	1,017	8 (N/A)	0.7	1.0	7.63
Amur maple	0	0	-32	-4	0	335	3	299	2 (N/A)	0.7	0.3	2.24
Pin oak	2,196	16	-120	-4	-1	652	5	2,723	20 (N/A)	0.7	2.8	20.43
Broadleaf Deciduous Larg	960	7	-125	-4	-1	650	5	1,481	11 (N/A)	0.7	1.5	11.11
Spruce	116	1	-6	-2	0	216	2	324	2 (N/A)	0.7	0.3	2.43
Paper birch	912	7	-188	-5	-1	734	6	1,453	11 (N/A)	0.7	1.5	10.90
Mulberry	9	0	0	0	0	6	0	14	0 (N/A)	0.7	0.0	0.10
Boxelder	418	3	-17	-2	0	336	3	735	6 (N/A)	0.7	0.8	5.51
Willow	5	0	0	0	0	7	0	12	0 (N/A)	0.7	0.0	0.09

Annual CO_2 Benefits of Public Trees

Table 5 Continued

1/29/2021

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
Northern pin oak	370	3	-69	-4	-1	539	4	837	6 (N/A)	0.7	0.9	6.27
Austrian pine	91	1	-5	-2	0	213	2	296	2 (N/A)	0.7	0.3	2.22
Citywide total	59,046	443	-6,028	-311	-48	45,049	338	97,756	733 (N/A)	100.0	100.0	5.24

Annual Aesthetic/Other Benefits of Public Trees

1/29/2021

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Sugar maple	1,205	(N/A)	12.9	22.7	66.95
Silver maple	1,317	(N/A)	10.0	24.8	94.10
Green ash	492	(N/A)	6.4	9.3	54.68
Maple	88	(N/A)	6.4	1.7	9.79
Black walnut	328	(N/A)	5.0	6.2	46.82
Eastern redbud	7	(N/A)	5.0	0.1	0.94
Broadleaf Deciduous Small	0	(N/A)	5.0	0.0	0.03
White oak	397	(N/A)	5.0	7.5	56.66
Bur oak	268	(N/A)	5.0	5.0	38.23
Red maple	15	(N/A)	4.3	0.3	2.45
Apple	17	(N/A)	3.6	0.3	3.39
Black spruce	106	(N/A)	3.6	2.0	21.24
Norway maple	95	(N/A)	2.9	1.8	23.87
Eastern red cedar	49	(N/A)	2.9	0.9	12.18
Blue spruce	72	(N/A)	2.1	1.3	23.85
Northern hackberry	136	(N/A)	1.4	2.6	68.11
Swamp white oak	39	(N/A)	1.4	0.7	19.58
Black maple	0	(N/A)	1.4	0.0	0.00
White ash	67	(N/A)	1.4	1.3	33.42
Northern red oak	0	(N/A)	1.4	0.0	0.00
Broadleaf Deciduous Medium	39	(N/A)	1.4	0.7	19.55
Siberian elm	108	(N/A)	1.4	2.0	53.77
Northern white cedar	14	(N/A)	1.4	0.3	6.83
Oak	5	(N/A)	0.7	0.1	5.26
Cottonwood	29	(N/A)	0.7	0.5	28.57
Amur maple	0	(N/A)	0.7	0.0	0.00
Pin oak	157	(N/A)	0.7	3.0	157.02
Broadleaf Deciduous Large	67	(N/A)	0.7	1.3	66.60
Spruce	32	(N/A)	0.7	0.6	32.32
Paper birch	58	(N/A)	0.7	1.1	58.34
Mulberry	0	(N/A)	0.7	0.0	0.03
Boxelder	39	(N/A)	0.7	0.7	39.36
Willow	3	(N/A)	0.7	0.1	2.74
Northern pin oak	31	(N/A)	0.7	0.6	31.46
Austrian pine	25	(N/A)	0.7	0.5	25.23
Citywide total	5,305	(N/A)	100.0	100.0	37.89

Table 7: Summary of Benefits in Dollars

Total Annual Benefits, Net Benefits, and Costs for Public Trees

1/29/2021

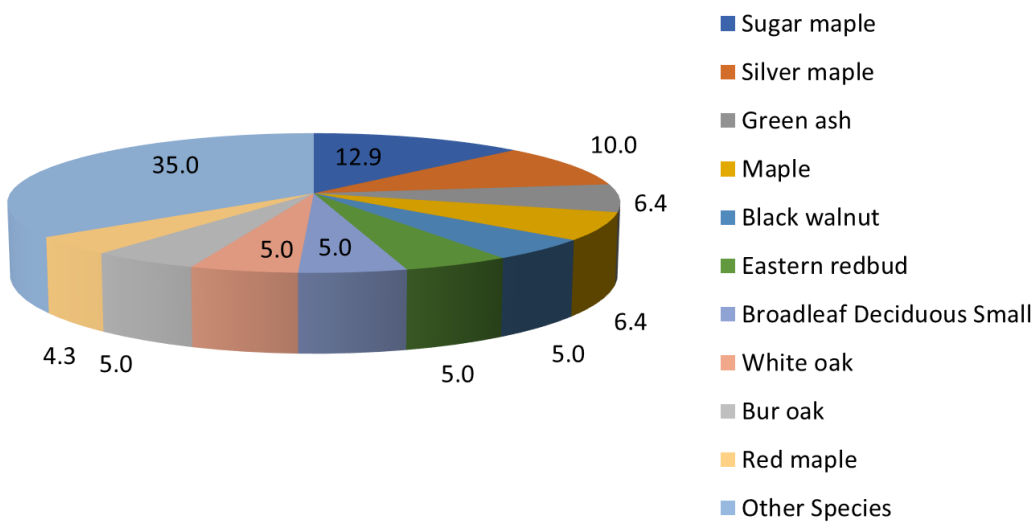
Benefits	Total ($)	Standard Error	$/tree	Standard Error	$/capita	Standard Error
Energy	5,641	(N/A)	40.29	(N/A)	0.00	(N/A)
CO2	733	(N/A)	5.24	(N/A)	0.00	(N/A)
Air Quality	975	(N/A)	6.96	(N/A)	0.00	(N/A)
Stormwater	8,604	(N/A)	61.46	(N/A)	0.00	(N/A)
Aesthetic/Other	5,305	(N/A)	37.89	(N/A)	0.00	(N/A)
Total Benefits	21,258	(N/A)	151.84	(N/A)	0.00	(N/A)
Costs						
Planting	0		0.00		0.00	
Contract Pruning	0		0.00		0.00	
Pest Management	0		0.00		0.00	
Irrigation	0		0.00		0.00	
Removal	0		0.00		0.00	
Administration	0		0.00		0.00	
Inspection/Service	0		0.00		0.00	
Infrastructure Repairs	0		0.00		0.00	
Litter Clean-up	0		0.00		0.00	
Liability/Claims	0		0.00		0.00	
Other Costs	0		0.00		0.00	
Total Costs	0		0.00		0.00	
Net Benefits	21,258	(N/A)	151.84	(N/A)	0.00	(N/A)
Benefit-cost ratio	0.00	(N/A)				

Ainsworth

Species Distribution of Public Trees

1/29/2021

Figure 1: Species Distribution

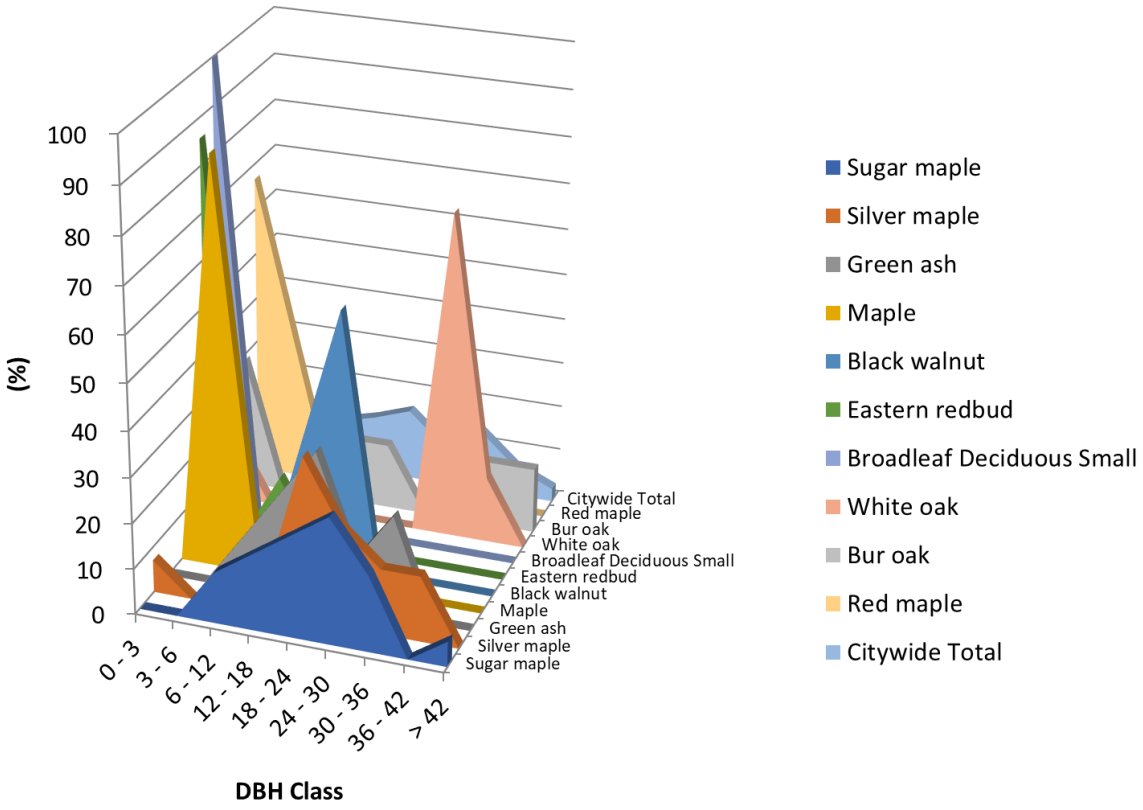


Species	Percent
Sugar maple	12.9
Silver maple	10.0
Green ash	6.4
Maple	6.4
Black walnut	5.0
Eastern redbud	5.0
Broadleaf Deciduous Small	5.0
White oak	5.0
Bur oak	5.0
Red maple	4.3
Other Species	35.0
Total	100.0

Figure 2: Relative Age Class

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

1/29/2021



	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42
Sugar maple	0.00	0.00	11.11	16.67	22.22	27.78	16.67	0.00	5.56
Silver maple	7.14	0.00	0.00	7.14	35.71	21.43	14.29	14.29	0.00
Green ash	0.00	0.00	11.11	22.22	33.33	11.11	22.22	0.00	0.00
Maple	0.00	88.89	11.11	0.00	0.00	0.00	0.00	0.00	0.00
Black walnut	14.29	0.00	0.00	28.57	57.14	0.00	0.00	0.00	0.00
Eastern redbud	85.71	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00
Broadleaf Deciduous Sm	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
White oak	14.29	0.00	0.00	0.00	0.00	0.00	71.43	14.29	0.00
Bur oak	28.57	0.00	0.00	14.29	14.29	0.00	14.29	14.29	14.29
Red maple	66.67	33.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Citywide Total	18.57	10.71	10.71	12.86	15.71	8.57	13.57	6.43	2.86

Figure 3: Foliage Condition

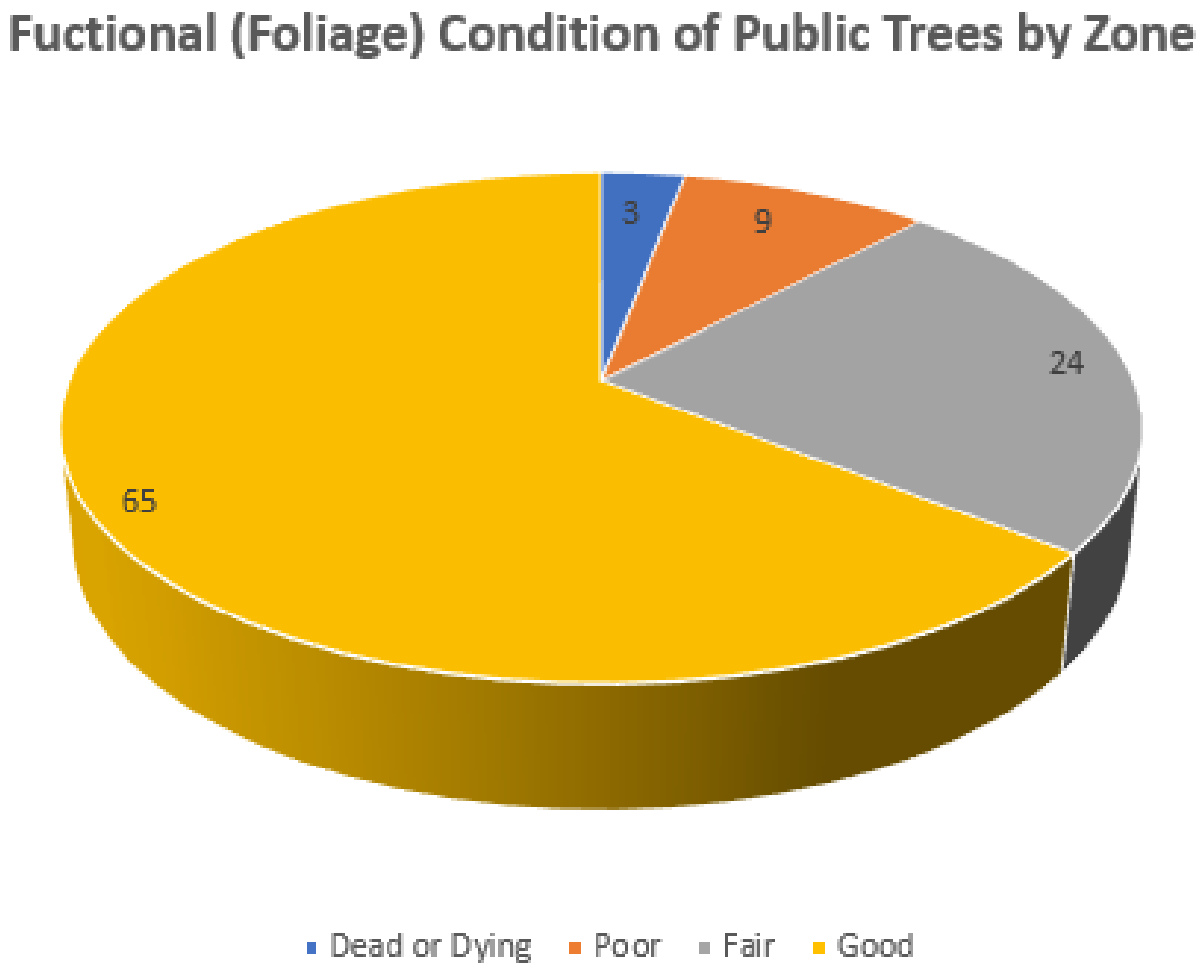
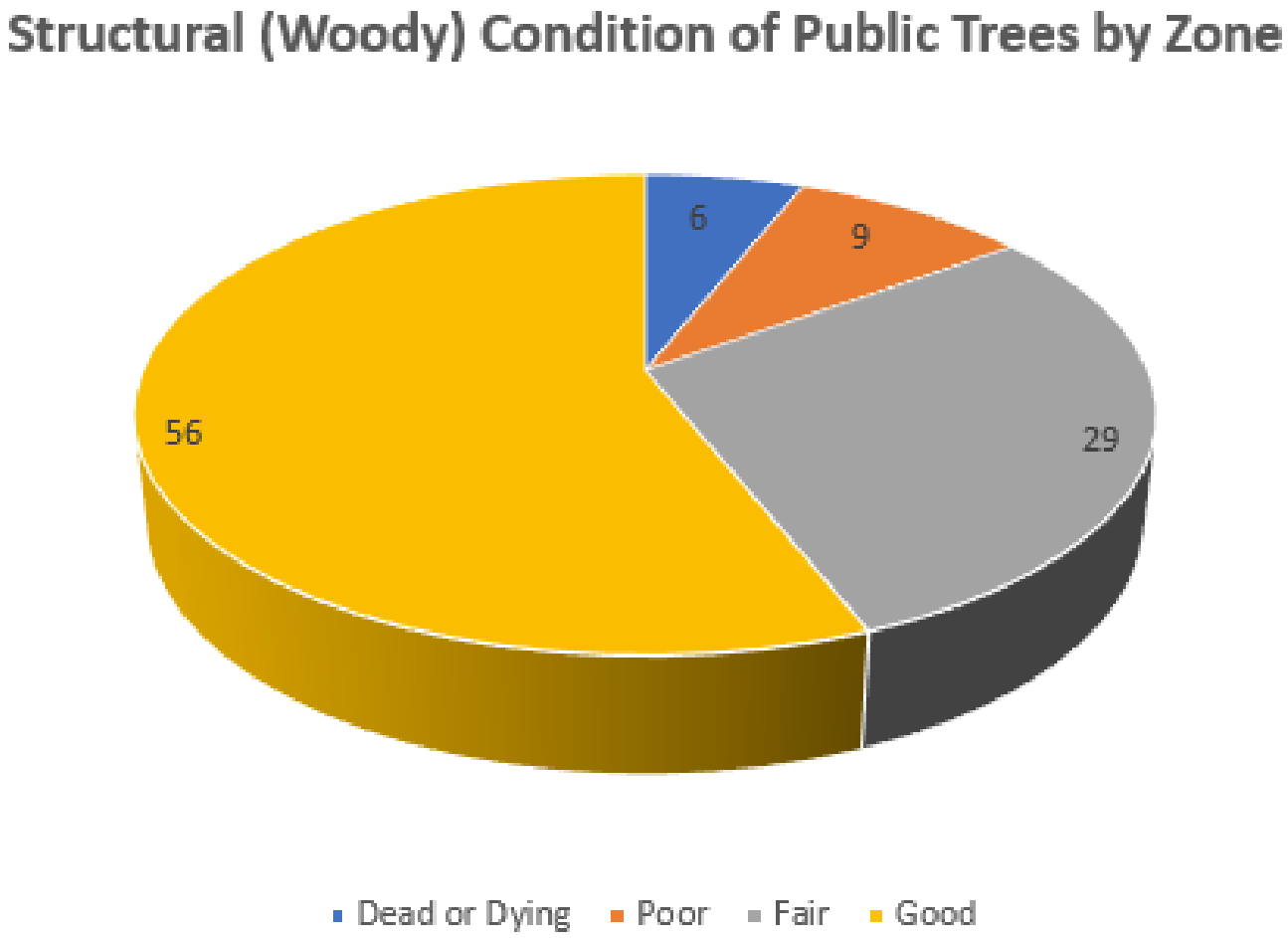


Figure 4: Wood Condition

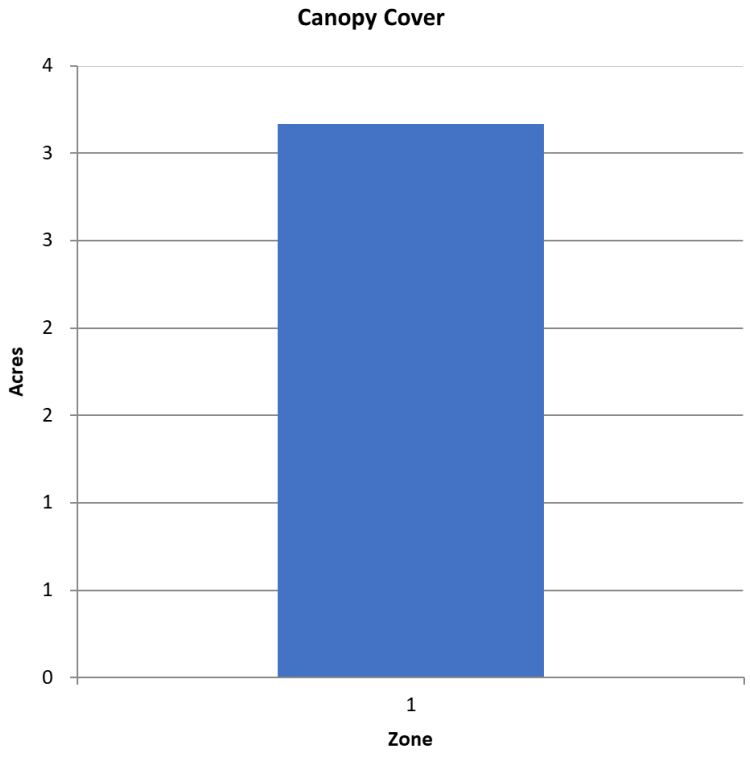


Ainsworth

Figure 5: Canopy Cover in Acres

Canopy Cover of Public Trees (Acres)

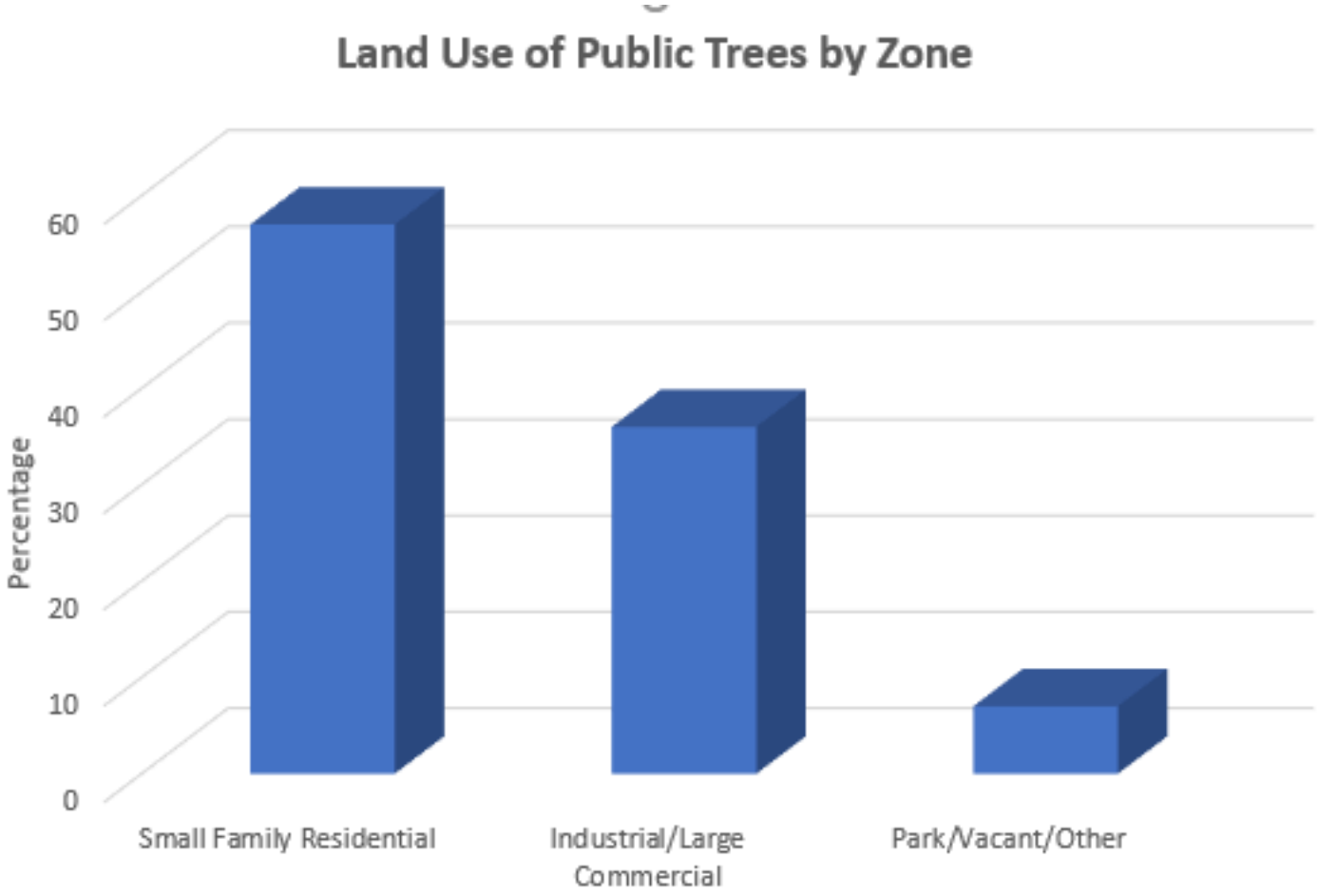
1/29/2021



Zone	Acres	% of Total Canopy Cover
1	3	100.0
Citywide total	3	100.0

	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide Total	0	0	3	0.00	0.00

Figure 6: Land Use of City/Park Trees



APPENDIX B: ArcGIS MAPPING

Figure 1: Location of Ash Trees

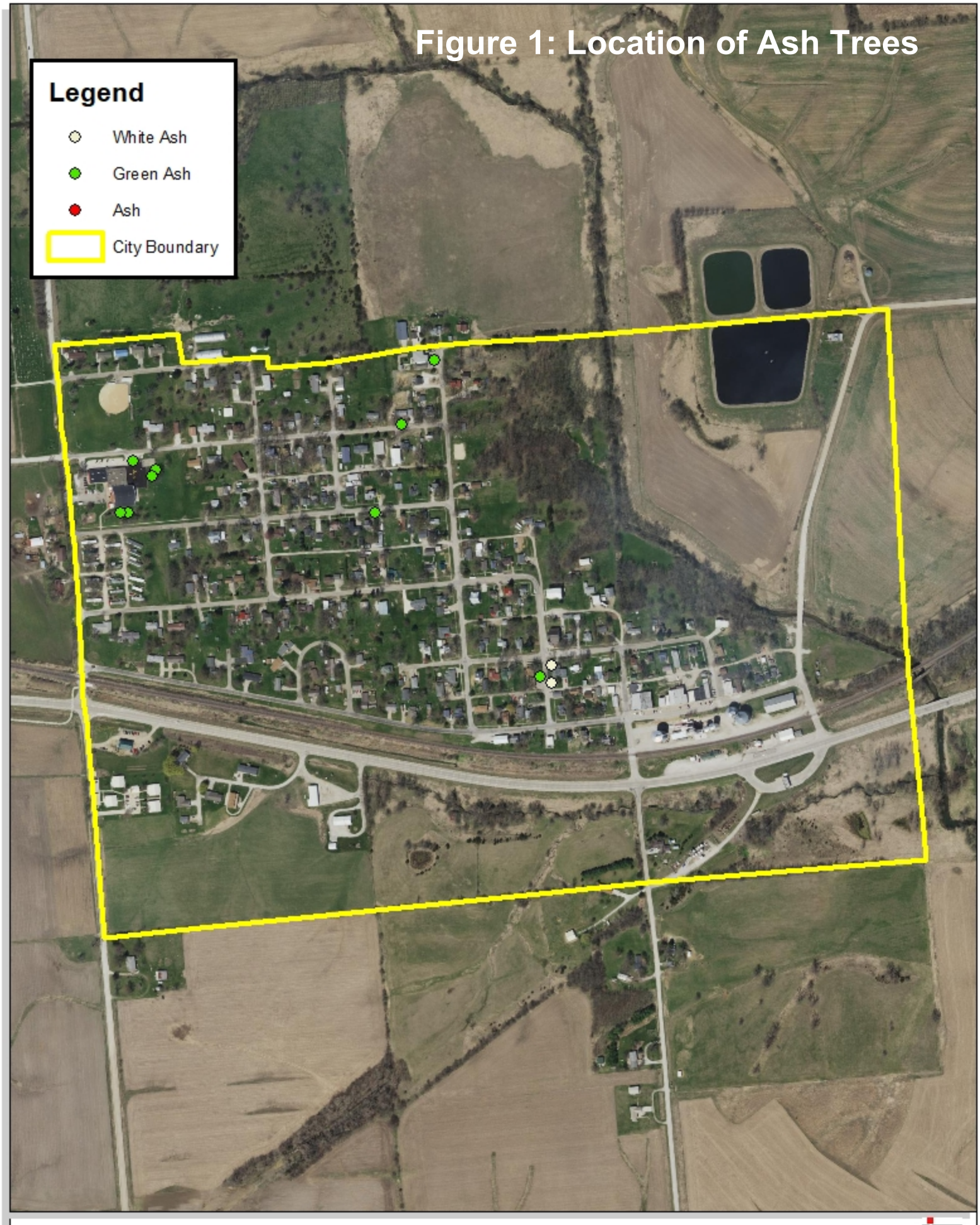
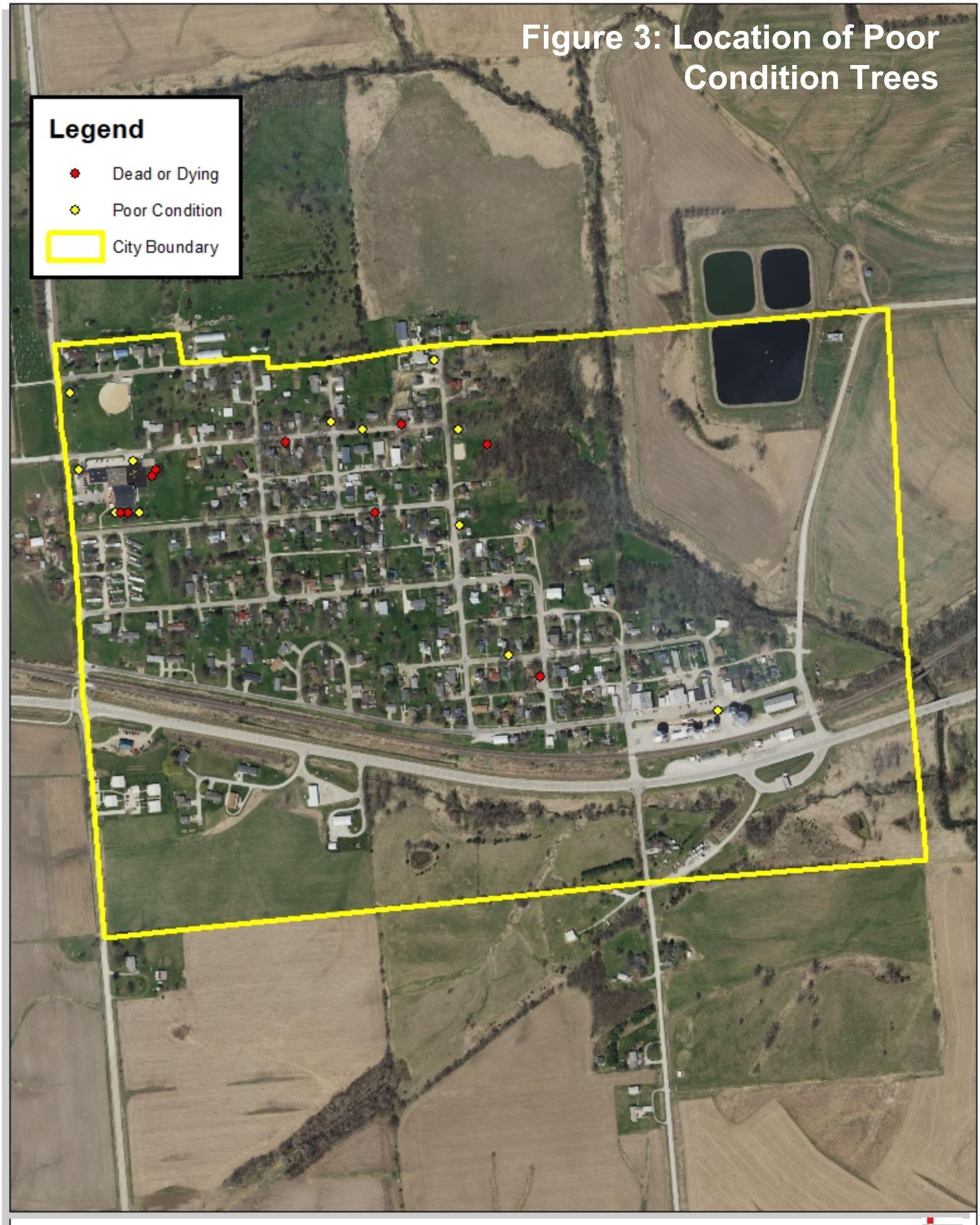


Figure 2: Location of EAB Symptoms

Figure 3: Location of Poor Condition Trees




Legend
Stake/Train
Clean Crown
Raise Crown
Reduce Canopy
Remove
City Boundary
Figure 4: Location of Trees with Recommended Maintenance
0
0.1
0.2
0.4
Miles
Ainsworth, Iowa

APPENDIX C: AINSWORTH TREE ORDINANCES

SECTION 6-106: OBSTRUCTIONS; TREES AND SHRUBS

A. Trees and shrubs growing upon or near the lot line or upon public ground and interfering with the use or construction of any public improvements shall be deemed an obstruction. Said roots maybe removed by the City at the expense of the owner of the property upon which the tree is located should the owner fail or neglect to do so after notice. It shall be unlawful for any person, persons, firm, or corporation to obstruct or encumber by fences, gates, buildings, structures, or otherwise any of the streets, alleys, or sidewalks. The public ways and property shall be considered to be obstructed when the owner or occupant of the adjacent property shall permit or suffer to remain on any premises owned or controlled by him/her any hedge, shrubbery, bush, or similar growth within two feet adjacent to the lot line whether or not there is a sidewalk abutting or adjoining such premises. It shall be the duty of owners and occupants to keep all such similar growth trimmed and pruned at all times.

B. Whenever any such growth is allowed to grow within two feet of the lot line contrary to the provisions of this section, the City Council may pass a resolution ordering the owner or occupant to remove such obstructions within three days after having been served with a copy of said resolution by the City stating that the City will do so and will charge the costs thereof to the owner or occupant as a special assessment for improvements as herein provided or shall collect the same by civil suit brought in the name of the City against the said owner or occupant.

C. Trees and shrubs growing upon the lot line partially on public ground and partially upon the abutting property or wholly upon the abutting property but so close to the lot line as to interfere with the making of any public improvement or so that the roots thereof interfere with any utility wires or pipe shall be deemed an obstruction. Such trees, shrubs, and roots may be removed by the City pursuant to the procedure prescribed above. In the event the property owner is a nonresident of the county in which the property lies, the City shall, before levying any special assessment against that property, send a copy of any notice required by law to be published by means of certified mail, return receipt requested, to the last known address of the nonresident property owner. The last known address shall be that address listed on the current tax rolls at the time such required notice was first published.