Jesup, IA:

2020 Urban Forest Management Plan

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Executive Summary

EXECUTIVE SUMMARY

Overview

This plan was developed to assist the City of Jesup 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 4% of Jesup'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 414 trees inventoried.

- Jesup's trees provide $76,804 of benefits annually, an average of $185.52 per tree
- There are over 24 species of trees
- The top three genera are: maple 29%, oak 12%, and pine 12%
- 19% of trees need some type of management
- 28 trees should be removed

Recommendations

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

- Out of the 28 trees needing removal, 12 trees are over 24 inches in diameter at 4.5 feet and must be addressed immediately. *City ownership of the trees recommended for removal should be verified prior to any removal*
- 9 of the 18 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: cottonwood, poplar, box elder, Chinese elm, evergreen, willow, or black walnut.
- Check ash trees yearly with a visual survey.
- With the current budget it will take 1 year to remove ash. No budget increase is required, however if more funding is wanted, we recommended applying for grants to plant replacement trees.

Introduction

INTRODUCTION

This plan was developed to assist Jesup 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 Jesup, 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 Jesup'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 Jesup 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 Jesup's urban forestry goals.

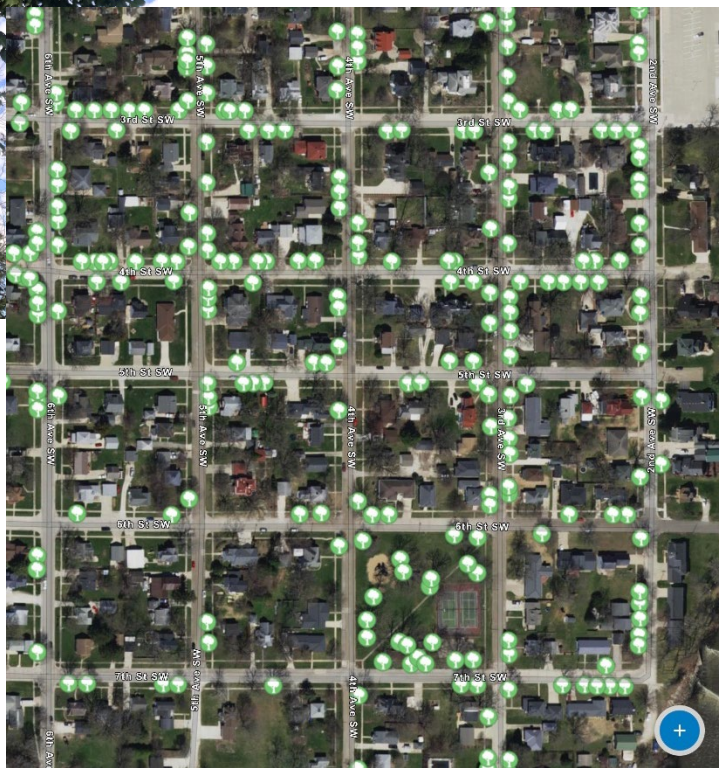
Assist Jesup with Managing its Urban Forest

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 on 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 414 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. Jesup's trees reduce energy-related costs by approximately $18,943 annually (Appendix A, Table 1). These savings are both in electricity (90.4 MWh) and in natural gas (12,326.4 Therms).

Annual Stormwater Benefits

Jesup's trees intercept about 1,078,476 gallons of rainfall or snow melt per year (Appendix A, Table 2). This interception provides $29,227 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 Jesup, it is estimated that trees remove 1,095.4 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 $2,998 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Jesup, trees sequester about 231,731 lbs of carbon per year with an associated value of $1,738 (Appendix A, Table 5). In addition, the trees store 3,492,606 lbs of carbon, with a yearly benefit of $26,195 (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. Jesup receives $22,895 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, Jesup's trees provide $76,804 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 414 trees in Jesup provide approximately $185.52 annually (Appendix A, Table 7).

ENERGY	STORMWATER	AIR QUALITY	CARBON	AESTHETICS	SUMMARY
• Reduce energy cost by **$18,943**	• Intercept **1,078,476 gallons** • Provides **$29,227** benefit	• Remove **1,095.4 lbs** of pollution • Net value of **$2,998**	• Sequester **231,731 lbs** • Value of **$1,738** • Store **3,492,606 lbs** • Value of **$26,195**	• **$22,895** in social benefits	• **$76,804** annual benefits • Each tree provides **$185.52** annually

FOREST STRUCTURE

Species Distribution

Jesup has over 24 different tree species along city streets and parks (Appendix A, Figure 1).

The distribution of trees by genera is as follows:

Maple	119	29%	Boxelder	4	<1%
Oak	49	12%	Cedar	4	<1%
Pine	49	12%	Amur maple	3	<1%
Spruce	48	11.5%	Birch	2	<1%
Walnut	42	10%	Catalpa	2	<1%
Apple	21	5%	Eastern redbud	2	<1%
Ash	18	4%	Ginkgo	2	<1%
Hackberry	10	2%	Elm	1	<1%
Locust	8	2%	Kentucky coffee	1	<1%
Basswood/Linden	8	2%	Sumac	1	<1%
Pear	6	1%	Other conifer	2	<1%
Lilac	5	1%	Other Deciduous	7	1.5%

Age Class

Most of Jesup's trees (47%) are between 12 and 24 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. Jesup's size curve is on the medium side, indicating a younger-to-middle aged 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 Jesup indicate that 72 percent of the trees are in good health, with only 4 percent of the foliage in poor health, dead, or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 61 percent of Jesup'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 6 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	47	11%
Crown Reduction	2	<1%
Tree Removal	28	6.5%
Crown Raising	9	2%
Tree Staking	21	5%

Canopy Cover

The total canopy with both private and public trees is 174.5 acres or around 15%. The canopy cover included in the Jesup inventory includes approximately 10 acres (Appendix A, Figure 4). The city's canopy goal is to increase canopy by 15 percent in 30 years. To achieve this goal it is estimated that 14 trees need to be planted annually on public and private lands.

Land Use and Location

The majority of Jesup'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	44%
Industrial/Large Commercial	0%
Park/Vacant/Other	54.5%
Small Commercial	0%
Multifamily Residential	1%

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

Jesup has 28 trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance Map (Appendix B, Figure 4). We recommend starting with the large-diameter, critical concern trees first. There are 12 trees over 24 inches in diameter at 4.5 feet that should be addressed immediately. Please refer to the Proposed Schedule and Budget 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 79 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). Of the 28 removals, 12 are ash trees. There are a total of 18 ash trees, and 9 of those have signs and symptoms that have been associated with EAB. In addition, those 9 trees 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 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 Schedule and Budget 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 Jesup.

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 (29%) (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: any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, boxelder, Chinese elm, evergreen, willow, or black walnut as outlined in section 151.02 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.02 (Appendix C).

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. All trees will meet the restrictions in city ordinance 151.02 (Appendix C). The new plantings will be a diverse mix and will not include any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, boxelder, 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 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. City Code 151.06 states “A property owner may remove a tree that is on personal property as long as the property owner does the actual work. Otherwise, the property owner must hire a licensed tree surgeon to remove the tree.”

Schedule & Budget

PROPOSED WORK SCHEDULE & BUDGET

Budget Allowance of $13,000/Year – (Based off Reported Yearly Tree Budget)

YEAR 1	Est. Cost
Remove 7 trees recommended for immediate removal	$4,900
Remove 7 ash trees	$4,900
Plant 21 trees in open locations	$3,150
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$12,950**

YEAR 2	Est. Cost
Remove 8 trees recommended for immediate removal	$5,600
Remove 5 ash trees	$3,500
Plant 12 trees in open locations	$1,800
Prune 1/3 of city owned trees	$2,070
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$12,970**

YEAR 3	Est. Cost
Remove 12 trees recommended for immediate removal	$8,400
Remove 4 ash trees	$2,800
Plant 12 trees in open locations	$1,800
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$13,000**

YEAR 4	Est. Cost
Remove 1 tree recommended for immediate removal	$700
Prune 1/3 of city owned trees	$2,070
Additional removal, planting and maintenance	$10,230
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$13,000**

YEAR 5	Est. Cost
Additional removal, planting and maintenance	$13,000
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$13,000**

YEAR 6	Est. Cost
Remove 3 ash trees	$10,930
Prune 1/3 of city owned trees	$2,070
Visual Survey of EAB Signs/Symptoms	n/a
TOTAL	**$13,000**

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 current budget would need is sufficient.*

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

Jesup

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
Silver maple	18.3	1,388	2,404.4	2,356	3,745	(N/A)	12.8	19.8	70.65
Black walnut	12.2	924	1,694.6	1,661	2,585	(N/A)	10.1	13.6	61.55
Norway maple	9.8	744	1,425.4	1,397	2,141	(N/A)	8.7	11.3	59.47
Red pine	2.5	193	344.1	337	531	(N/A)	6.8	2.8	18.95
Sugar maple	7.0	533	944.1	925	1,458	(N/A)	6.0	7.7	58.33
Northern red oak	0.6	49	94.5	93	142	(N/A)	6.0	0.7	5.67
Blue spruce	3.1	237	410.7	402	640	(N/A)	5.6	3.4	27.81
Apple	3.0	229	442.8	434	663	(N/A)	5.1	3.5	31.56
Eastern white pine	2.7	206	358.4	351	557	(N/A)	4.6	2.9	29.31
Pin oak	5.6	422	754.2	739	1,161	(N/A)	4.1	6.1	68.27
Green ash	3.5	264	462.6	453	717	(N/A)	3.1	3.8	55.19
Spruce	1.9	144	245.3	240	385	(N/A)	3.1	2.0	29.59
Norway spruce	1.6	120	206.5	202	323	(N/A)	2.4	1.7	32.29
Northern hackberry	2.8	211	406.3	398	609	(N/A)	2.4	3.2	60.94
Honeylocust	2.9	218	374.2	367	585	(N/A)	1.9	3.1	73.09
Littleleaf linden	1.3	99	182.3	179	277	(N/A)	1.7	1.5	39.61
Broadleaf Deciduous Mediu	1.0	77	139.0	136	214	(N/A)	1.4	1.1	35.62
Callery pear	1.0	80	149.1	146	226	(N/A)	1.4	1.2	37.61
Lilac	0.9	65	132.4	130	195	(N/A)	1.2	1.0	38.95
White ash	2.0	153	235.5	231	383	(N/A)	1.2	2.0	76.69
Boxelder	1.0	74	132.7	130	204	(N/A)	1.0	1.1	51.01
Bur oak	0.7	52	92.6	91	143	(N/A)	1.0	0.8	35.71
Red maple	0.8	63	109.9	108	170	(N/A)	0.7	0.9	56.77
Eastern red cedar	0.3	25	49.3	48	74	(N/A)	0.7	0.4	24.57
Amur maple	0.6	44	87.9	86	130	(N/A)	0.7	0.7	43.47
Maple	0.3	22	35.3	35	57	(N/A)	0.5	0.3	28.40
Conifer Evergreen Small	0.0	1	3.1	3	5	(N/A)	0.5	0.0	2.27
Northern catalpa	0.6	43	73.8	72	115	(N/A)	0.5	0.6	57.57
Eastern redbud	0.0	3	7.6	7	11	(N/A)	0.5	0.1	5.40
Swamp white oak	0.2	16	33.7	33	49	(N/A)	0.5	0.3	24.47
Black spruce	0.1	7	15.0	15	22	(N/A)	0.5	0.1	10.87
Ginkgo	0.3	20	35.0	34	54	(N/A)	0.5	0.3	26.89
River birch	0.6	42	76.9	75	118	(N/A)	0.5	0.6	58.81
Austrian pine	0.3	23	42.8	42	65	(N/A)	0.5	0.3	32.56
Broadleaf Deciduous Small	0.1	6	12.8	13	18	(N/A)	0.2	0.1	18.19
Kentucky coffeetree	0.1	7	13.7	13	21	(N/A)	0.2	0.1	20.64
American elm	0.2	19	27.5	27	46	(N/A)	0.2	0.2	45.87
Northern white cedar	0.1	10	14.6	14	24	(N/A)	0.2	0.1	24.14
American basswood	0.1	7	13.8	14	20	(N/A)	0.2	0.1	20.27
White oak	0.3	20	38.1	37	57	(N/A)	0.2	0.3	57.32
Sumac	0.0	2	3.8	4	5	(N/A)	0.2	0.0	5.40
Total	90.4	6,863	12,326.4	12,080	18,943	(N/A)	100.0	100.0	45.76

Annual Stormwater Benefits of Public Trees

1/29/2021

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	275,366	7,462	(N/A)	12.8	25.5	140.80
Black walnut	135,381	3,669	(N/A)	10.1	12.6	87.35
Norway maple	95,290	2,582	(N/A)	8.7	8.8	71.73
Red pine	42,010	1,138	(N/A)	6.8	3.9	40.66
Sugar maple	71,645	1,942	(N/A)	6.0	6.6	77.66
Northern red oak	4,179	113	(N/A)	6.0	0.4	4.53
Blue spruce	46,240	1,253	(N/A)	5.6	4.3	54.48
Apple	13,133	356	(N/A)	5.1	1.2	16.95
Eastern white pine	53,917	1,461	(N/A)	4.6	5.0	76.90
Pin oak	59,736	1,619	(N/A)	4.1	5.5	95.23
Green ash	34,775	942	(N/A)	3.1	3.2	72.49
Spruce	37,045	1,004	(N/A)	3.1	3.4	77.23
Norway spruce	33,373	904	(N/A)	2.4	3.1	90.44
Northern hackberry	26,671	723	(N/A)	2.4	2.5	72.28
Honeylocust	35,699	967	(N/A)	1.9	3.3	120.93
Littleleaf linden	11,917	323	(N/A)	1.7	1.1	46.14
Broadleaf Deciduous Medium	5,985	162	(N/A)	1.4	0.6	27.03
Callery pear	7,055	191	(N/A)	1.4	0.7	31.87
Lilac	4,453	121	(N/A)	1.2	0.4	24.14
White ash	24,390	661	(N/A)	1.2	2.3	132.19
Boxelder	10,725	291	(N/A)	1.0	1.0	72.66
Bur oak	5,272	143	(N/A)	1.0	0.5	35.72
Red maple	7,338	199	(N/A)	0.7	0.7	66.29
Eastern red cedar	4,904	133	(N/A)	0.7	0.5	44.30
Amur maple	3,015	82	(N/A)	0.7	0.3	27.23
Maple	1,741	47	(N/A)	0.5	0.2	23.59
Conifer Evergreen Small	208	6	(N/A)	0.5	0.0	2.82
Northern catalpa	5,409	147	(N/A)	0.5	0.5	73.29
Eastern redbud	137	4	(N/A)	0.5	0.0	1.86
Swamp white oak	1,172	32	(N/A)	0.5	0.1	15.88
Black spruce	1,012	27	(N/A)	0.5	0.1	13.71
Ginkgo	1,939	53	(N/A)	0.5	0.2	26.27
River birch	5,173	140	(N/A)	0.5	0.5	70.10
Austrian pine	5,237	142	(N/A)	0.5	0.5	70.96
Broadleaf Deciduous Small	264	7	(N/A)	0.2	0.0	7.17
Kentucky coffeetree	608	16	(N/A)	0.2	0.1	16.47
American elm	1,391	38	(N/A)	0.2	0.1	37.69
Northern white cedar	1,539	42	(N/A)	0.2	0.1	41.70
American basswood	474	13	(N/A)	0.2	0.0	12.83
White oak	2,591	70	(N/A)	0.2	0.2	70.21
Sumac	69	2	(N/A)	0.2	0.0	1.86
Citywide total	1,078,476	29,227	(N/A)	100.0	100.0	70.60

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								
Silver maple	49.3	8.3	24.0	2.2	265	86.2	12.6	12.0	82.7	539	-25.7	-96	251.7	708	(N/A)	12.8	13.36
Black walnut	16.4	2.6	7.9	0.7	87	58.4	8.5	8.1	55.2	363	0.0	0	157.8	451	(N/A)	10.1	10.73
Norway maple	19.8	3.4	9.7	0.9	107	47.6	6.9	6.5	44.5	295	-4.6	-17	134.7	384	(N/A)	8.7	10.68
Red pine	4.7	0.9	3.9	0.6	31	12.1	1.8	1.7	11.5	76	-17.8	-67	19.4	40	(N/A)	6.8	1.42
Sugar maple	9.0	1.5	4.6	0.4	49	33.3	4.9	4.6	31.8	208	-7.2	-27	83.0	230	(N/A)	6.0	9.21
Northern red oak	0.7	0.1	0.4	0.0	4	3.1	0.5	0.4	2.9	19	-1.0	-4	7.2	20	(N/A)	6.0	0.79
Blue spruce	7.0	1.4	5.6	0.9	46	14.7	2.2	2.1	14.1	92	-17.4	-65	30.6	73	(N/A)	5.6	3.16
Apple	4.2	0.7	2.0	0.2	22	14.7	2.1	2.0	13.7	91	0.0	0	39.5	113	(N/A)	5.1	5.38
Eastern white pine	6.3	1.3	5.1	0.8	42	12.8	1.9	1.8	12.3	80	-27.2	-102	15.0	20	(N/A)	4.6	1.03
Pin oak	10.2	1.8	5.3	0.5	56	26.4	3.9	3.7	25.2	165	-19.1	-72	57.8	149	(N/A)	4.1	8.78
Green ash	4.0	0.6	2.0	0.2	22	16.5	2.4	2.3	15.8	103	0.0	0	43.8	125	(N/A)	3.1	9.58
Spruce	4.4	0.9	3.5	0.5	29	8.9	1.3	1.3	8.6	56	-19.3	-72	10.1	12	(N/A)	3.1	0.94
Norway spruce	4.0	0.8	3.2	0.5	26	7.5	1.1	1.0	7.2	47	-18.1	-68	7.2	5	(N/A)	2.4	0.51
Northern hackberry	4.1	0.7	2.1	0.2	22	13.5	2.0	1.9	12.6	84	0.0	0	37.0	106	(N/A)	2.4	10.59
Honeylocust	7.1	1.2	3.2	0.3	38	13.5	2.0	1.9	13.0	85	-5.7	-21	36.5	101	(N/A)	1.9	12.59
Littleleaf linden	1.9	0.3	1.0	0.1	10	6.3	0.9	0.9	5.9	39	-0.9	-4	16.2	46	(N/A)	1.7	6.52
Broadleaf Deciduous Medium	0.8	0.1	0.5	0.0	5	4.9	0.7	0.7	4.6	30	-0.2	-1	12.1	34	(N/A)	1.4	5.69
Callery pear	1.1	0.2	0.6	0.0	6	5.1	0.7	0.7	4.8	31	-0.3	-1	12.9	36	(N/A)	1.4	6.07
Lilac	1.6	0.3	0.7	0.1	8	4.2	0.6	0.6	3.9	26	0.0	0	11.9	34	(N/A)	1.2	6.83
White ash	5.0	0.8	2.2	0.2	26	9.2	1.4	1.3	9.1	58	0.0	0	29.3	85	(N/A)	1.2	16.92
Boxelder	1.4	0.2	0.7	0.1	8	4.6	0.7	0.6	4.4	29	-0.6	-2	12.2	34	(N/A)	1.0	8.57
Bur oak	0.4	0.1	0.2	0.0	2	3.3	0.5	0.5	3.1	20	0.0	0	8.1	23	(N/A)	1.0	5.69
Red maple	1.8	0.3	0.8	0.1	10	3.9	0.6	0.5	3.7	24	-0.6	-2	11.2	32	(N/A)	0.7	10.61
Eastern red cedar	1.0	0.2	0.8	0.1	7	1.6	0.2	0.2	1.5	10	-2.7	-10	3.1	7	(N/A)	0.7	2.19
Amur maple	1.1	0.2	0.5	0.0	6	2.9	0.4	0.4	2.6	18	0.0	0	8.1	23	(N/A)	0.7	7.75
Maple	0.3	0.1	0.2	0.0	2	1.4	0.2	0.2	1.3	9	-0.1	0	3.5	10	(N/A)	0.5	4.94
Conifer Evergreen Small	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	-0.1	0	0.1	0	(N/A)	0.5	0.14
Northern catalpa	0.6	0.1	0.3	0.0	3	2.7	0.4	0.4	2.6	17	0.0	0	7.0	20	(N/A)	0.5	9.95
Eastern redbud	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)	0.5	0.71
Swamp white oak	0.1	0.0	0.1	0.0	1	1.0	0.1	0.1	1.0	6	0.0	0	2.5	7	(N/A)	0.5	3.47
Black spruce	0.1	0.0	0.1	0.0	1	0.5	0.1	0.1	0.4	3	-0.3	-1	0.9	2	(N/A)	0.5	1.14
Ginkgo	0.5	0.1	0.3	0.0	3	1.2	0.2	0.2	1.2	8	-0.2	-1	3.5	10	(N/A)	0.5	4.97
River birch	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)	0.5	10.75
Austrian pine	0.9	0.2	0.7	0.1	6	1.5	0.2	0.2	1.4	9	-2.0	-8	3.1	7	(N/A)	0.5	3.63
Broadleaf Deciduous Small	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3	(N/A)	0.2	2.55
Kentucky coffeetree	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)	0.2	2.99

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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								
American elm	0.1	0.0	0.1	0.0	0	1.1	0.2	0.2	1.1	7	0.0	0	2.7	8	(N/A)	0.2	7.68
Northern white cedar	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)	0.2	2.82
American basswood	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)	0.2	2.71
White oak	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.3	9	(N/A)	0.2	9.34
Sumac	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	0.71
Citywide total	171.6	29.7	93.1	9.9	957	430.9	62.8	59.9	409.6	2,686	-171.9	-645	1,095.4	2,998	(N/A)	100.0	7.24

Stored CO2 Benefits of Public Trees

1/29/2021

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	1,154,477	8,659	(N/A)	12.8	33.1	163.37
Black walnut	528,133	3,961	(N/A)	10.1	15.1	94.31
Norway maple	324,956	2,437	(N/A)	8.7	9.3	67.70
Red pine	41,126	308	(N/A)	6.8	1.2	11.02
Sugar maple	255,448	1,916	(N/A)	6.0	7.3	76.63
Northern red oak	13,114	98	(N/A)	6.0	0.4	3.93
Blue spruce	53,020	398	(N/A)	5.6	1.5	17.29
Apple	65,213	489	(N/A)	5.1	1.9	23.29
Eastern white pine	67,413	506	(N/A)	4.6	1.9	26.61
Pin oak	263,829	1,979	(N/A)	4.1	7.6	116.39
Green ash	131,344	985	(N/A)	3.1	3.8	75.78
Spruce	48,270	362	(N/A)	3.1	1.4	27.85
Norway spruce	45,673	343	(N/A)	2.4	1.3	34.25
Northern hackberry	60,004	450	(N/A)	2.4	1.7	45.00
Honeylocust	92,457	693	(N/A)	1.9	2.6	86.68
Littleleaf linden	40,914	307	(N/A)	1.7	1.2	43.84
Broadleaf Deciduous	14,174	106	(N/A)	1.4	0.4	17.72
Callery pear	18,496	139	(N/A)	1.4	0.5	23.12
Lilac	24,173	181	(N/A)	1.2	0.7	36.26
White ash	75,003	563	(N/A)	1.2	2.1	112.50
Boxelder	46,465	348	(N/A)	1.0	1.3	87.12
Bur oak	14,199	106	(N/A)	1.0	0.4	26.62
Red maple	19,515	146	(N/A)	0.7	0.6	48.79
Eastern red cedar	3,306	25	(N/A)	0.7	0.1	8.27
Amur maple	16,523	124	(N/A)	0.7	0.5	41.31
Maple	3,843	29	(N/A)	0.5	0.1	14.41
Conifer Evergreen Sm	46	0	(N/A)	0.5	0.0	0.17
Northern catalpa	19,445	146	(N/A)	0.5	0.6	72.92
Eastern redbud	356	3	(N/A)	0.5	0.0	1.33
Swamp white oak	2,201	17	(N/A)	0.5	0.1	8.26
Black spruce	327	2	(N/A)	0.5	0.0	1.23
Ginkgo	7,878	59	(N/A)	0.5	0.2	29.54
River birch	17,904	134	(N/A)	0.5	0.5	67.14
Austrian pine	7,555	57	(N/A)	0.5	0.2	28.33
Broadleaf Deciduous	908	7	(N/A)	0.2	0.0	6.81
Kentucky coffeetree	1,035	8	(N/A)	0.2	0.0	7.76
American elm	3,037	23	(N/A)	0.2	0.1	22.78
Northern white cedar	1,170	9	(N/A)	0.2	0.0	8.78
American basswood	1,025	8	(N/A)	0.2	0.0	7.68
White oak	8,458	63	(N/A)	0.2	0.2	63.43
Sumac	178	1	(N/A)	0.2	0.0	1.33
Citywide total	3,492,606	26,195	(N/A)	100.0	100.0	63.27

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.

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Annual CO ₂ Benefits of Public Trees

1/29/2021

Table 5: Annual Carbon Sequestered

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
Silver maple	80,843	606	-5,542	-207	-43	30,681	230	105,776	793 (N/A)	12.8	28.9	14.97
Black walnut	29,976	225	-2,535	-127	-20	20,429	153	47,743	358 (N/A)	10.1	13.1	8.53
Norway maple	13,035	98	-1,560	-105	-12	16,444	123	27,815	209 (N/A)	8.7	7.6	5.79
Red pine	2,856	21	-197	-47	-2	4,275	32	6,887	52 (N/A)	6.8	1.9	1.84
Sugar maple	14,717	110	-1,226	-73	-10	11,778	88	25,196	189 (N/A)	6.0	6.9	7.56
Northern red oak	918	7	-64	-10	-1	1,088	8	1,932	14 (N/A)	6.0	0.5	0.58
Blue spruce	2,673	20	-254	-57	-2	5,242	39	7,604	57 (N/A)	5.6	2.1	2.48
Apple	4,413	33	-313	-39	-3	5,058	38	9,120	68 (N/A)	5.1	2.5	3.26
Eastern white pine	3,350	25	-324	-50	-3	4,546	34	7,523	56 (N/A)	4.6	2.1	2.97
Pin oak	24,812	186	-1,266	-58	-10	9,316	70	32,803	246 (N/A)	4.1	9.0	14.47
Green ash	7,897	59	-630	-35	-5	5,838	44	13,070	98 (N/A)	3.1	3.6	7.54
Spruce	2,032	15	-232	-35	-2	3,190	24	4,956	37 (N/A)	3.1	1.4	2.86
Norway spruce	1,749	13	-219	-30	-2	2,662	20	4,161	31 (N/A)	2.4	1.1	3.12
Northern hackberry	3,567	27	-288	-27	-2	4,667	35	7,918	59 (N/A)	2.4	2.2	5.94
Honeylocust	9,851	74	-444	-22	-3	4,819	36	14,204	107 (N/A)	1.9	3.9	13.32
Littleleaf linden	4,172	31	-196	-15	-2	2,179	16	6,139	46 (N/A)	1.7	1.7	6.58
Broadleaf Deciduous Medi	1,830	14	-68	-9	-1	1,713	13	3,465	26 (N/A)	1.4	0.9	4.33
Callery pear	1,914	14	-89	-10	-1	1,758	13	3,572	27 (N/A)	1.4	1.0	4.47
Lilac	1,338	10	-116	-12	-1	1,437	11	2,647	20 (N/A)	1.2	0.7	3.97
White ash	6,147	46	-360	-16	-3	3,374	25	9,145	69 (N/A)	1.2	2.5	13.72
Boxelder	3,533	26	-223	-12	-2	1,635	12	4,933	37 (N/A)	1.0	1.3	9.25
Bur oak	1,523	11	-68	-7	-1	1,152	9	2,599	19 (N/A)	1.0	0.7	4.87
Red maple	2,330	17	-94	-7	-1	1,385	10	3,614	27 (N/A)	0.7	1.0	9.03
Eastern red cedar	86	1	-16	-6	0	561	4	625	5 (N/A)	0.7	0.2	1.56
Amur maple	1,225	9	-79	-7	-1	978	7	2,116	16 (N/A)	0.7	0.6	5.29
Maple	522	4	-18	-3	0	491	4	992	7 (N/A)	0.5	0.3	3.72
Conifer Evergreen Small	14	0	0	-1	0	32	0	45	0 (N/A)	0.5	0.0	0.17
Northern catalpa	1,302	10	-93	-5	-1	945	7	2,149	16 (N/A)	0.5	0.6	8.06
Eastern redbud	76	1	-2	-1	0	74	1	147	1 (N/A)	0.5	0.0	0.55
Swamp white oak	448	3	-11	-2	0	352	3	787	6 (N/A)	0.5	0.2	2.95
Black spruce	51	0	-2	-2	0	155	1	202	2 (N/A)	0.5	0.1	0.76
Ginkgo	335	3	-38	-4	0	431	3	725	5 (N/A)	0.5	0.2	2.72
River birch	386	3	-86	-6	-1	934	7	1,227	9 (N/A)	0.5	0.3	4.60

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
Austrian pine	336	3	-36	-6	0	512	4	806	6 (N/A)	0.5	0.2	3.02
Broadleaf Deciduous Smal	114	1	-4	-1	0	124	1	232	2 (N/A)	0.2	0.1	1.74
Kentucky coffeetree	209	2	-5	-1	0	159	1	361	3 (N/A)	0.2	0.1	2.71
American elm	222	2	-15	-2	0	418	3	623	5 (N/A)	0.2	0.2	4.67
Northern white cedar	116	1	-6	-2	0	216	2	324	2 (N/A)	0.2	0.1	2.43
American basswood	120	1	-5	-1	0	148	1	262	2 (N/A)	0.2	0.1	1.96
White oak	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.2	0.3	7.93
Sumac	38	0	-1	-1	0	37	0	74	1 (N/A)	0.2	0.0	0.55
Citywide total	231,731	1,738	-16,766	-1,064	-134	151,675	1,138	365,576	2,742 (N/A)	100.0	100.0	6.62

Annual Aesthetic/Other Benefits of Public Trees

1/29/2021

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	6,086	(N/A)	12.8	26.6	114.83
Black walnut	2,435	(N/A)	10.1	10.6	57.99
Norway maple	1,209	(N/A)	8.7	5.3	33.59
Red pine	776	(N/A)	6.8	3.4	27.71
Sugar maple	1,569	(N/A)	6.0	6.9	62.75
Northern red oak	102	(N/A)	6.0	0.4	4.06
Blue spruce	470	(N/A)	5.6	2.1	20.42
Apple	258	(N/A)	5.1	1.1	12.26
Eastern white pine	704	(N/A)	4.6	3.1	37.03
Pin oak	1,955	(N/A)	4.1	8.5	114.97
Green ash	686	(N/A)	3.1	3.0	52.77
Spruce	412	(N/A)	3.1	1.8	31.68
Norway spruce	332	(N/A)	2.4	1.4	33.17
Northern hackberry	487	(N/A)	2.4	2.1	48.67
Honeylocust	2,528	(N/A)	1.9	11.0	316.00
Littleleaf linden	442	(N/A)	1.7	1.9	63.08
Broadleaf Deciduous Medium	196	(N/A)	1.4	0.9	32.69
Callery pear	200	(N/A)	1.4	0.9	33.34
Lilac	79	(N/A)	1.2	0.3	15.90
White ash	623	(N/A)	1.2	2.7	124.61
Boxelder	236	(N/A)	1.0	1.0	58.91
Bur oak	161	(N/A)	1.0	0.7	40.16
Red maple	284	(N/A)	0.7	1.2	94.68
Eastern red cedar	27	(N/A)	0.7	0.1	9.12
Amur maple	73	(N/A)	0.7	0.3	24.36
Maple	73	(N/A)	0.5	0.3	36.59
Conifer Evergreen Small	18	(N/A)	0.5	0.1	8.82
Northern catalpa	111	(N/A)	0.5	0.5	55.72
Eastern redbud	4	(N/A)	0.5	0.0	2.06
Swamp white oak	52	(N/A)	0.5	0.2	26.22
Black spruce	33	(N/A)	0.5	0.1	16.70
Ginkgo	26	(N/A)	0.5	0.1	12.85
River birch	39	(N/A)	0.5	0.2	19.58
Austrian pine	33	(N/A)	0.5	0.1	16.39
Broadleaf Deciduous Small	6	(N/A)	0.2	0.0	6.40
Kentucky coffeetree	29	(N/A)	0.2	0.1	28.56
American elm	37	(N/A)	0.2	0.2	36.79
Northern white cedar	32	(N/A)	0.2	0.1	32.32
American basswood	13	(N/A)	0.2	0.1	13.08
White oak	58	(N/A)	0.2	0.3	57.69
Sumac	2	(N/A)	0.2	0.0	2.06
Citywide total	22,895	(N/A)	100.0	100.0	55.30

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

1/29/2021

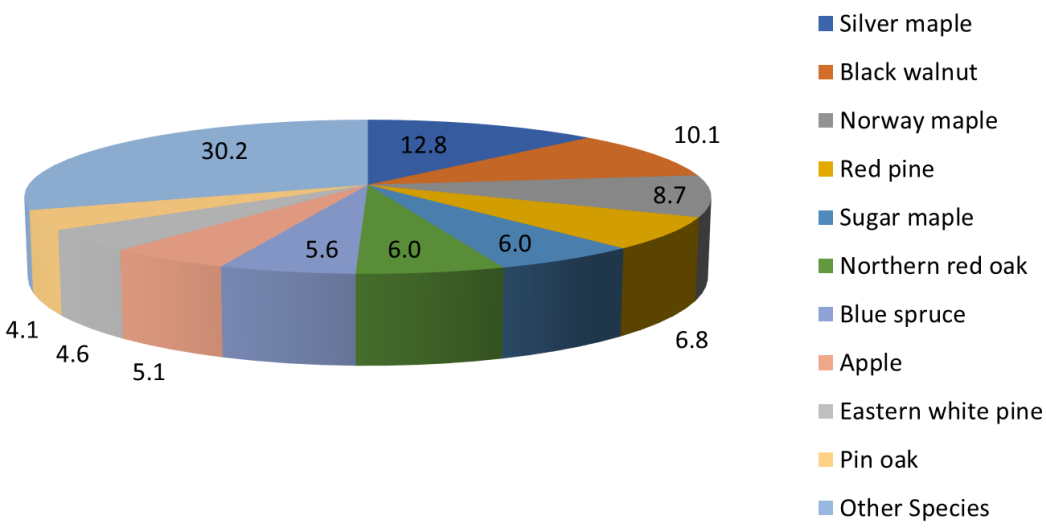
Benefits	Total ($)	Standard Error	$/tree	Standard Error	$/capita	Standard Error
Energy	18,943	(N/A)	45.76	(N/A)	0.00	(N/A)
CO2	2,742	(N/A)	6.62	(N/A)	0.00	(N/A)
Air Quality	2,998	(N/A)	7.24	(N/A)	0.00	(N/A)
Stormwater	29,227	(N/A)	70.60	(N/A)	0.00	(N/A)
Aesthetic/Other	22,895	(N/A)	55.30	(N/A)	0.00	(N/A)
Total Benefits	76,804	(N/A)	185.52	(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	76,804	(N/A)	185.52	(N/A)	0.00	(N/A)
Benefit-cost ratio	0.00	(N/A)				

Jesup

Species Distribution of Public Trees

1/29/2021

Figure 1: Species Distribution



Species	Percent
Silver maple	12.8
Black walnut	10.1
Norway maple	8.7
Red pine	6.8
Sugar maple	6.0
Northern red oak	6.0
Blue spruce	5.6
Apple	5.1
Eastern white pine	4.6
Pin oak	4.1
Other Species	30.2
Total	100.0

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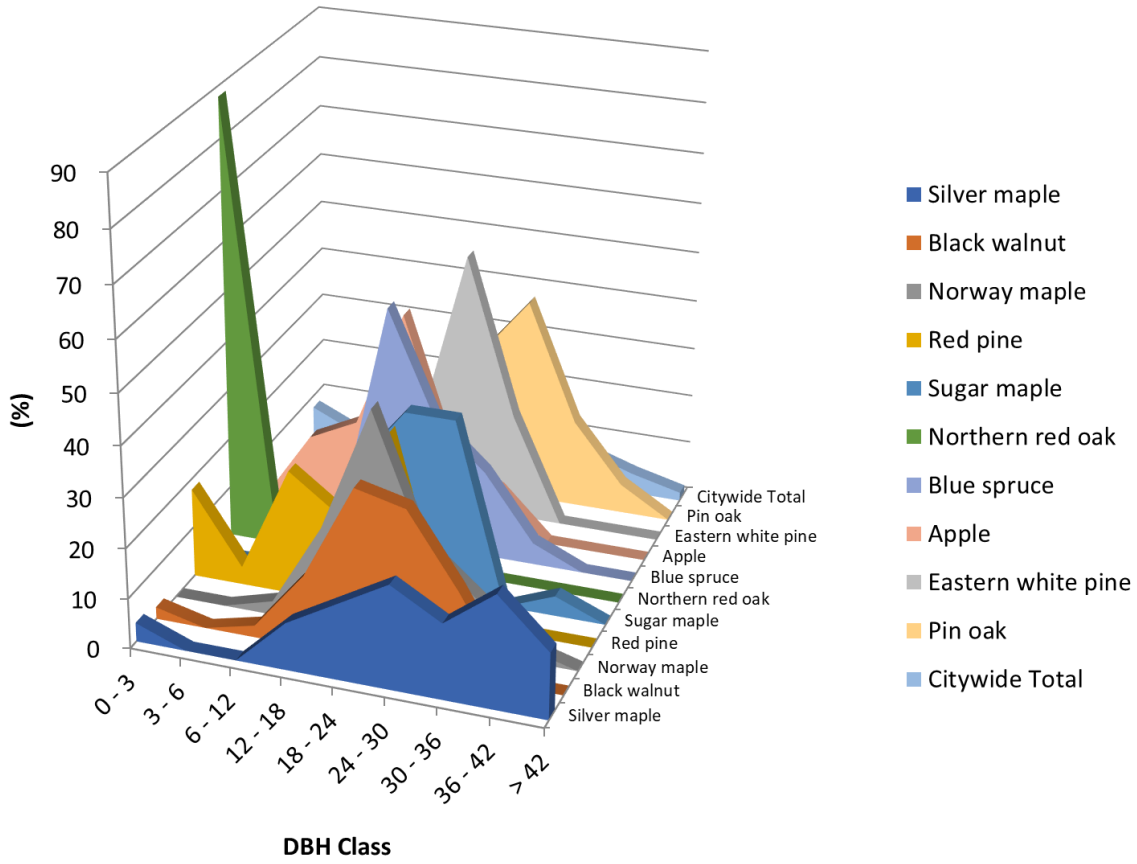
Figure 2: Relative Age Class

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
Silver maple	3.77	0.00	0.00	9.43	15.09	20.75	15.09	22.64	13.21
Black walnut	2.38	0.00	2.38	14.29	33.33	30.95	16.67	0.00	0.00
Norway maple	0.00	0.00	2.78	19.44	44.44	19.44	11.11	2.78	0.00
Red pine	17.86	3.57	25.00	17.86	35.71	0.00	0.00	0.00	0.00
Sugar maple	0.00	0.00	0.00	24.00	36.00	36.00	0.00	4.00	0.00
Northern red oak	88.00	0.00	4.00	4.00	4.00	0.00	0.00	0.00	0.00
Blue spruce	0.00	0.00	4.35	47.83	26.09	17.39	4.35	0.00	0.00
Apple	0.00	14.29	19.05	42.86	14.29	9.52	0.00	0.00	0.00
Eastern white pine	0.00	0.00	10.53	15.79	52.63	21.05	0.00	0.00	0.00
Pin oak	0.00	0.00	0.00	5.88	29.41	41.18	17.65	5.88	0.00
Citywide Total	7.49	3.14	8.94	20.77	26.33	20.29	7.25	4.11	1.69

Figure 3: Foliage Condition

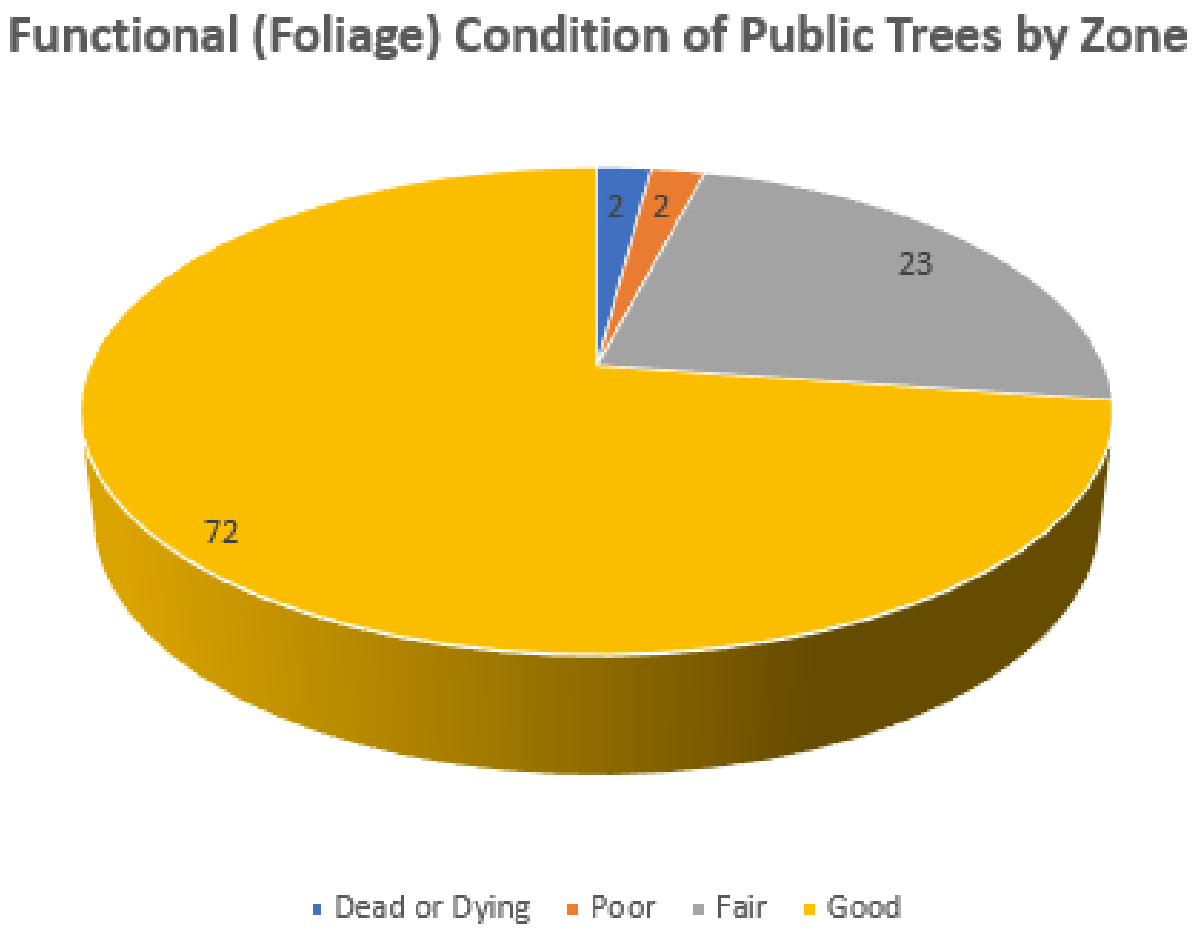


Figure 4: Wood Condition

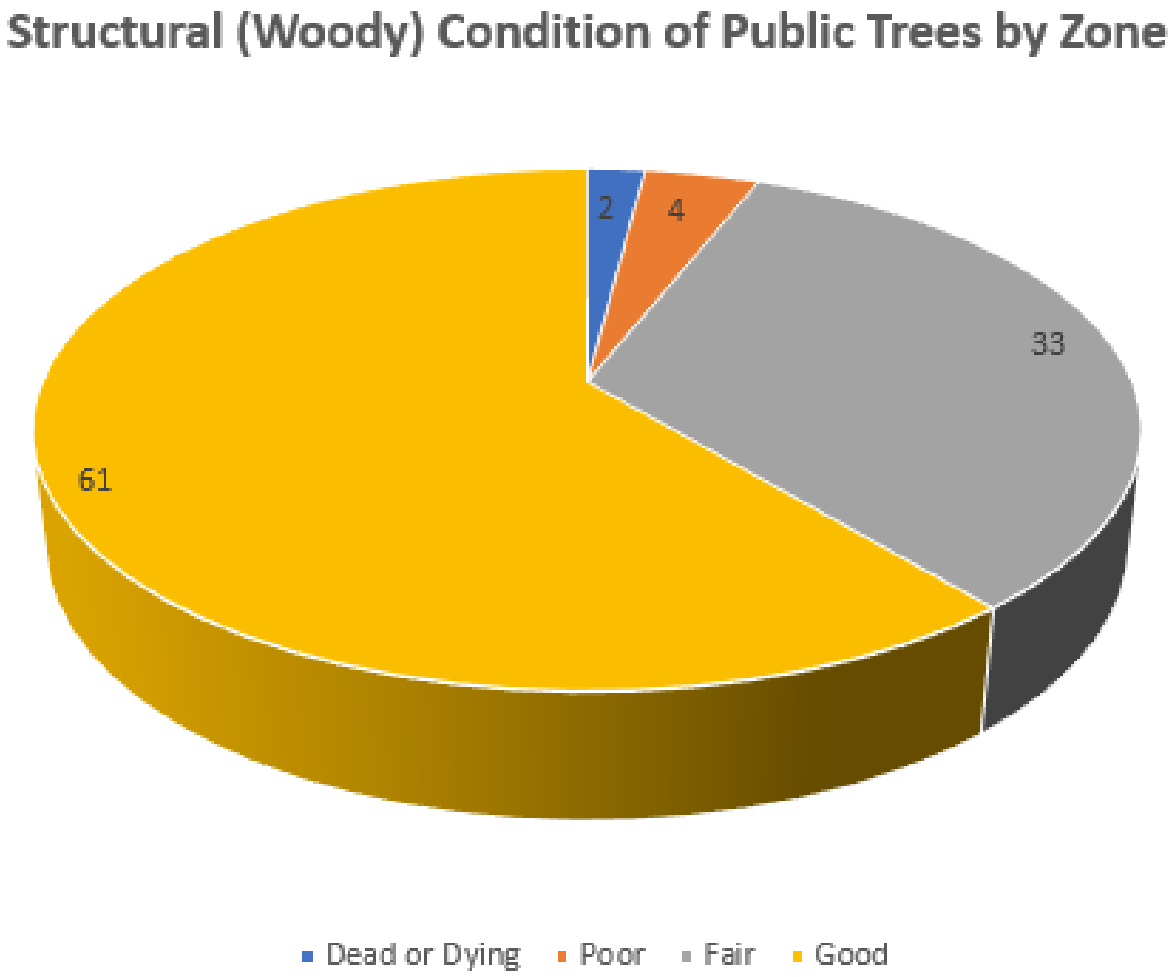


Figure 5: Canopy Cover in Acres

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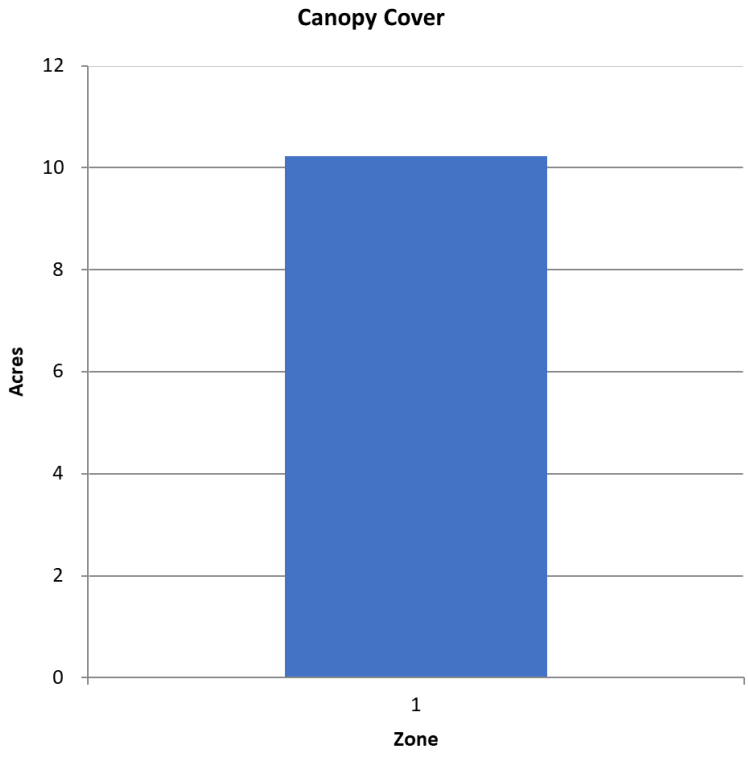
Canopy Cover of Public Trees (Acres)

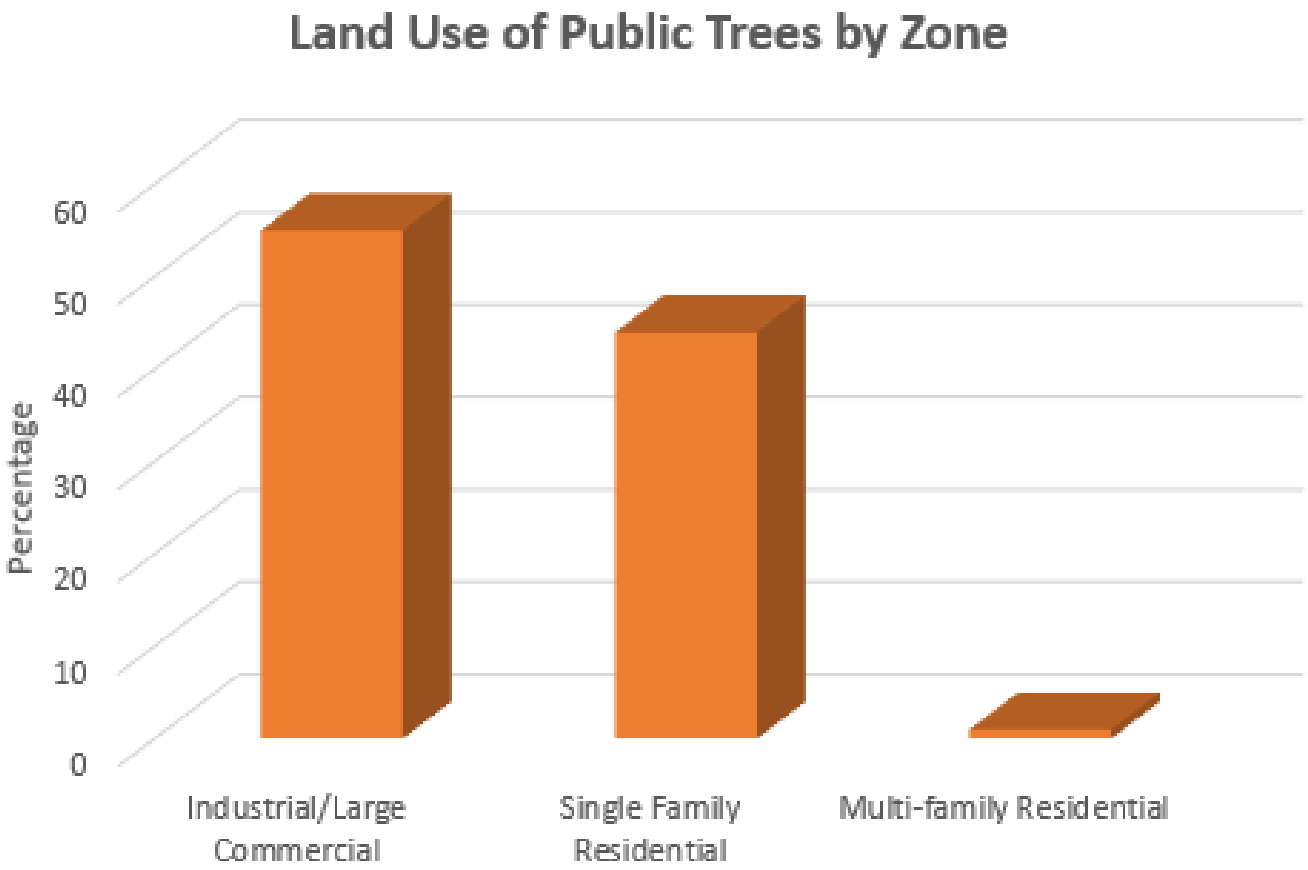
1/29/2021



Zone	Acres	% of Total Canopy Cover
1	10	100.0
Citywide total	10	100.0

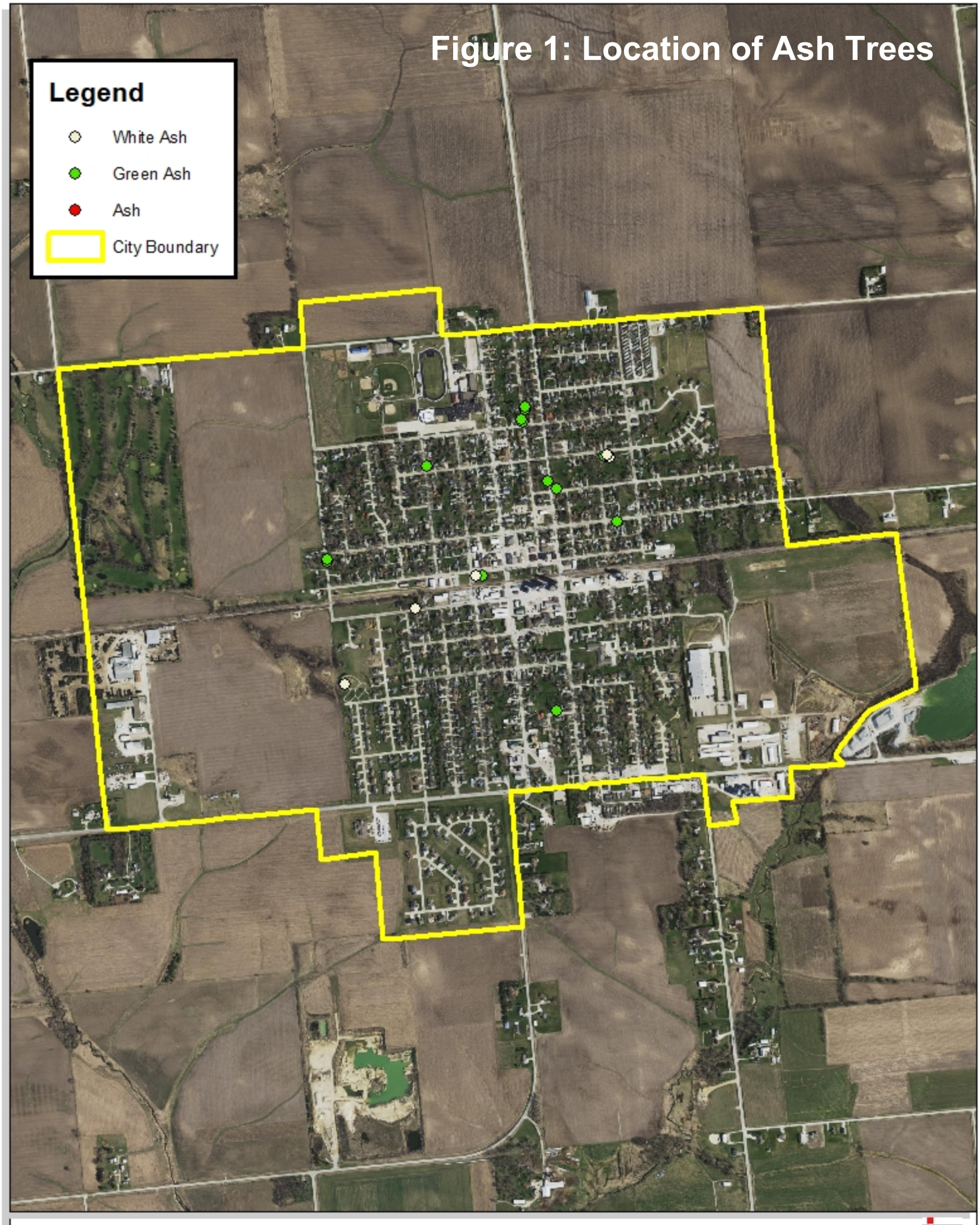
	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide Total	0	0	10	0.00	0.00

Figure 6: Land Use of City/Park Trees



APPENDIX B: ArcGIS MAPPING

Figure 1: Location of Ash Trees



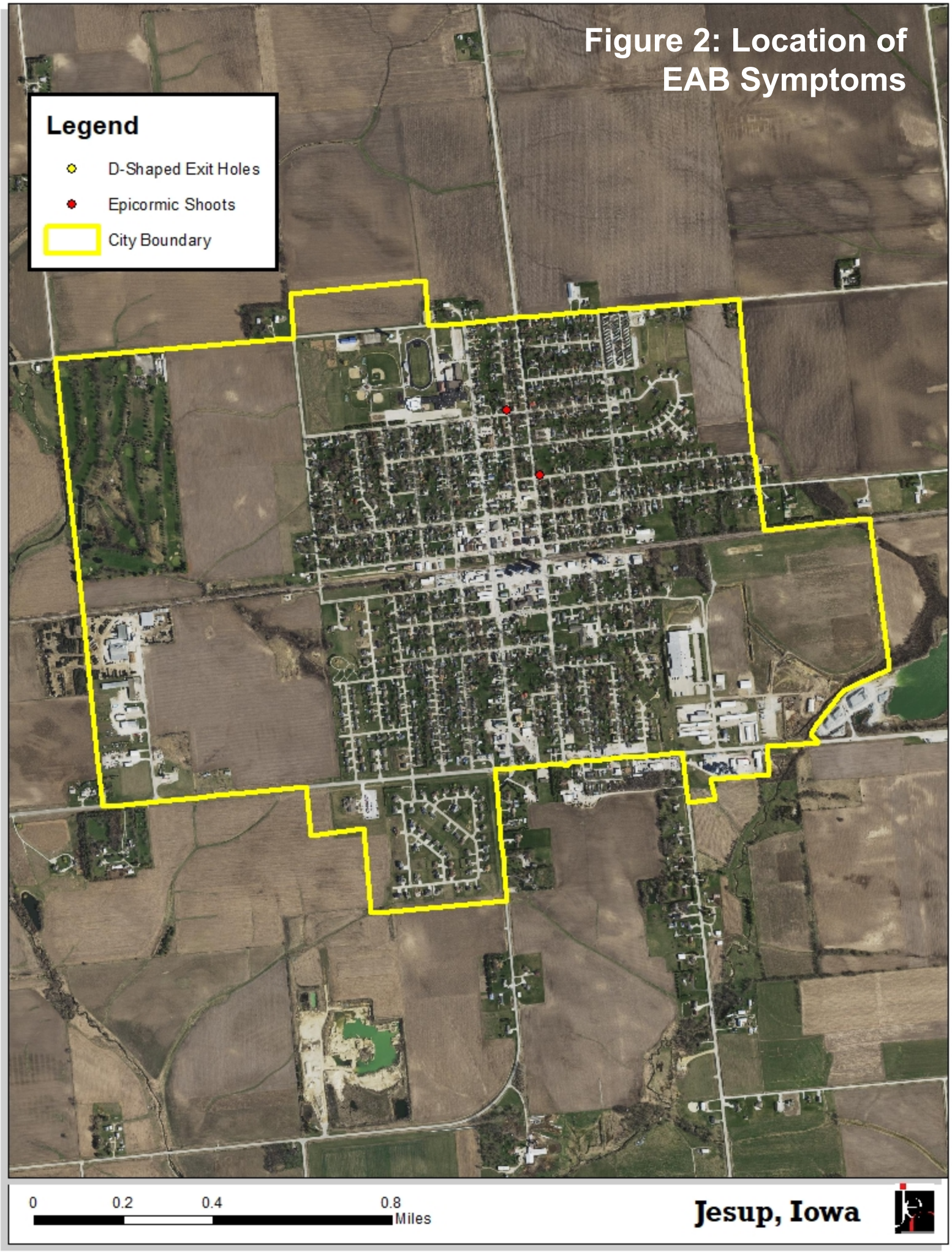
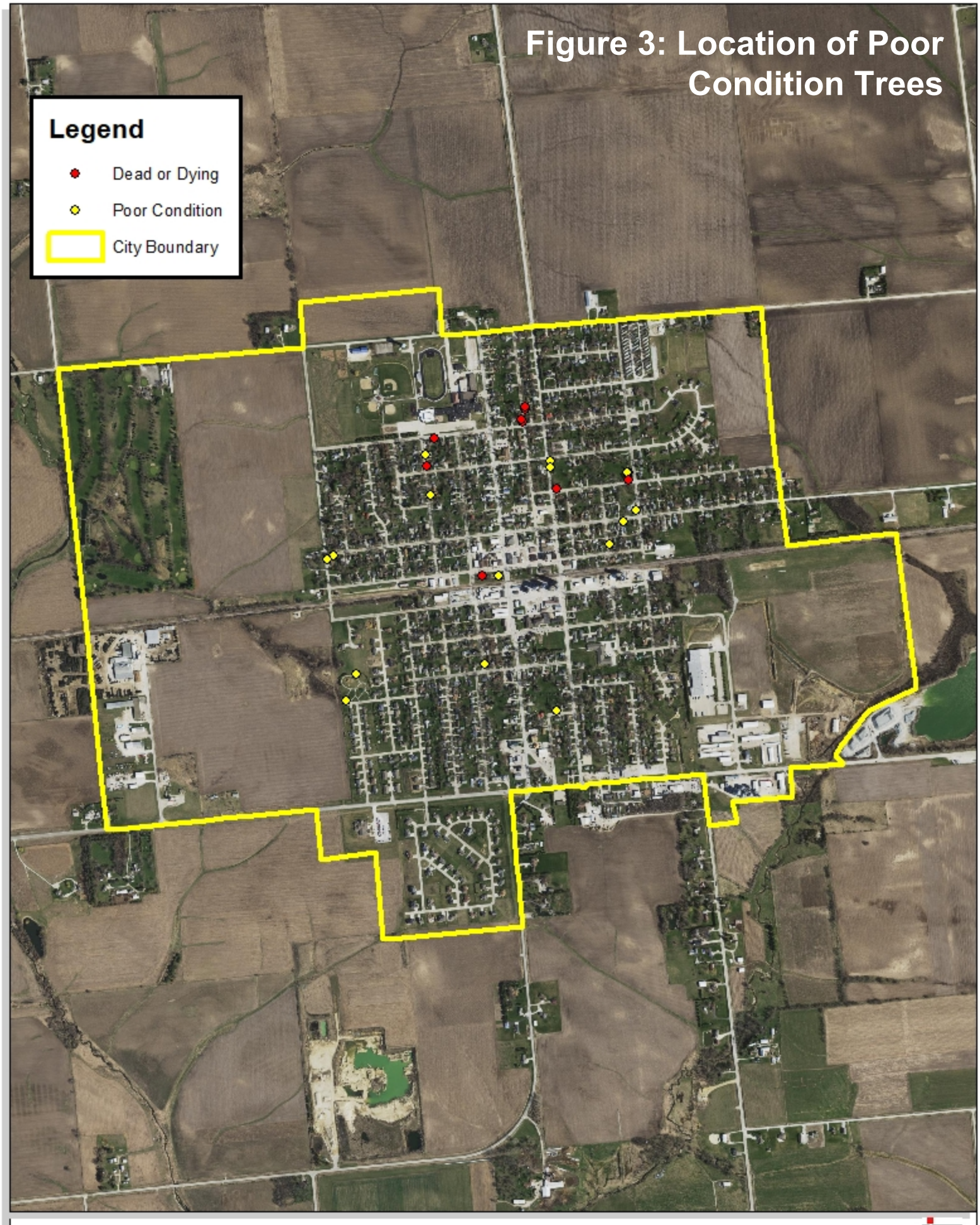
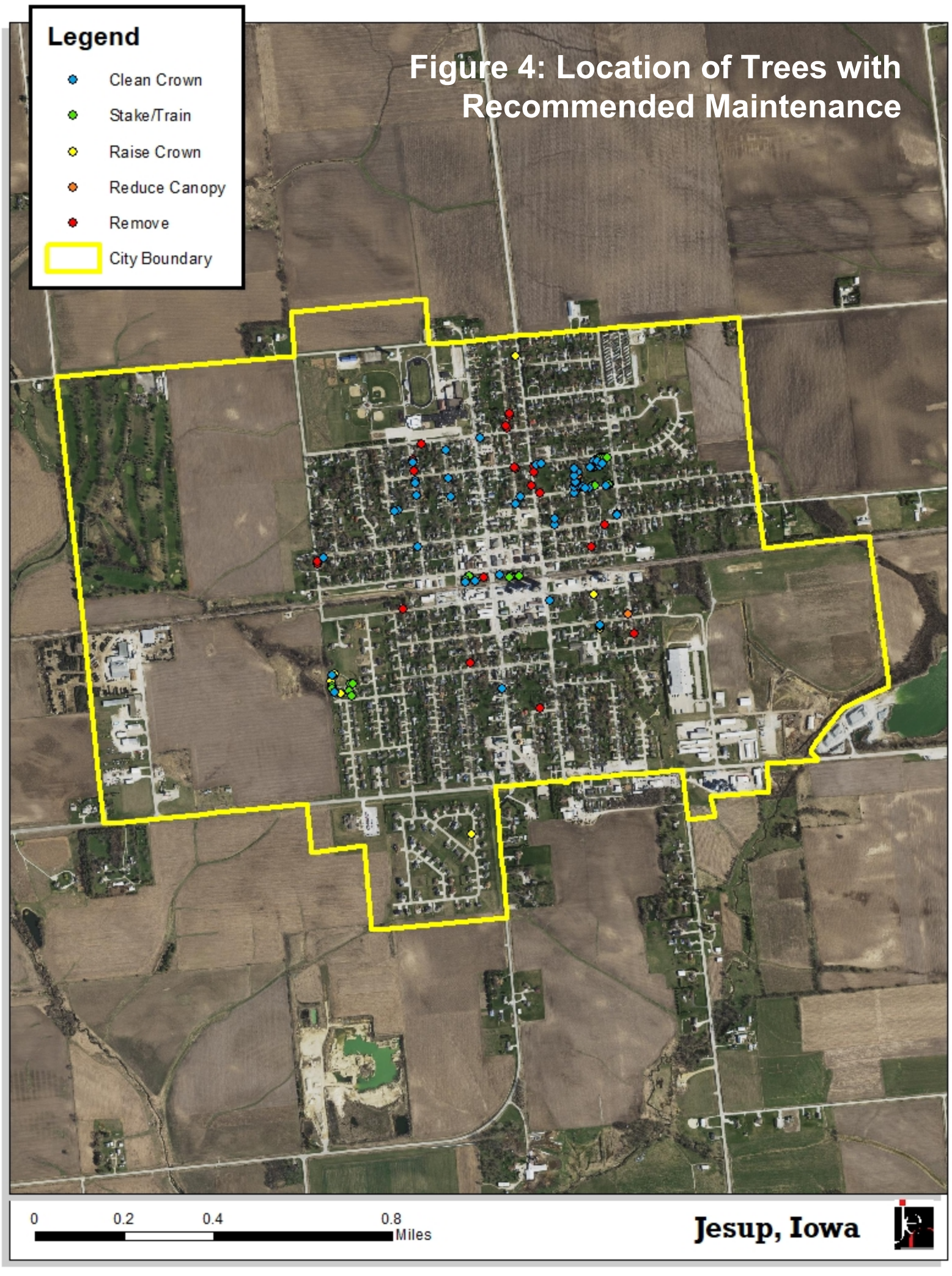


Figure 2: Location of EAB Symptoms
Legend
D-Shaped Exit Holes
Epicormic Shoots
City Boundary
0
0.2
0.4
0.8
Miles
Jesup, Iowa

Figure 3: Location of Poor Condition Trees




Legend
Clean Crown
Stake/Train
Raise Crown
Reduce Canopy
Remove
City Boundary
Figure 4: Location of Trees with Recommended Maintenance
0
0.2
0.4
0.8
Miles
Jesup, Iowa

APPENDIX C: JESUP TREE ORDINANCES

151.01 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.

151.02 PLANTING RESTRICTIONS.

No tree shall be planted in any parking or street except in accordance with the following:

1. Council Approval. Prior approval of the Council is required prior to planting a tree in any parking.
2. 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.
3. Spacing. Trees shall not be planted on any parking that 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.
4. Prohibited Trees. No person shall plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, boxelder, Chinese elm, evergreen, willow, or black walnut.

151.03 DUTY TO TRIM TREES.

The owner or agent of the abutting property shall keep the trees on, or overhanging the street, trimmed so that all branches will be at least 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, 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. 3641.2\[2c,d &e \])*

151.04 TRIMMING TREES TO BE SUPERVISED.

Except as allowed in Section 151.03, it is unlawful for any person to trim or cut any tree in as tree for public place unless the work is done under the supervision of the City.

151.05 DISEASE CONTROL.

Any dead, diseased, or damaged tree or shrub that may harbor serious insect or disease pests or disease injurious to other trees is here by declared to be a nuisance.

151.06 INSPECTION AND REMOVAL.

The Council shall inspector 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 there on.
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 within14 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\[3b & h\])*