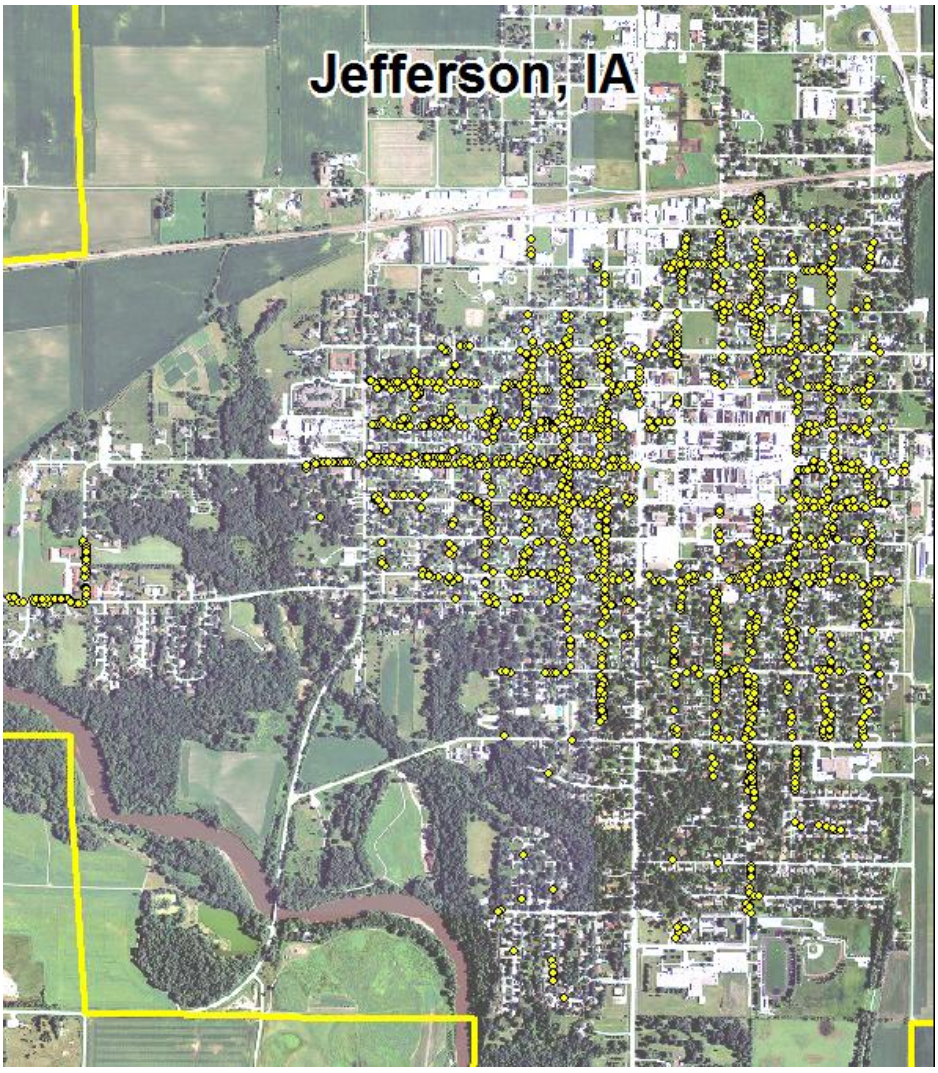
Jefferson, IA



2016 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Jefferson with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows communities to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 15% of Jefferson's city owned trees (ash) will die once EAB becomes established in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

Inventory and Results

In 2015, a tree inventory was conducted 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 1,731 trees inventoried.

- Jefferson's trees provide $232,609 of benefits annually, an average of $134 a tree
- There are over 42 species of trees
- The top three genera are: Maple 44%, Ash 15%, and Apple 9%
- 7% of trees are in need of some type of management
- 118 trees are recommended for removal

Recommendations

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

- Of the 118 trees needing removal, 28 trees are over 24 inches in diameter at 4.5 ft and should be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly

Introduction

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

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

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

Inventory

In 2015, a tree inventory was conducted that included 100% of the city owned trees on the rights of way. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

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

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

Inventory Results

The data collected for the 1731 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis. Findings

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Jefferson's trees reduce energy related costs by approximately $70,748 annually (Appendix A, Table 1). These savings are both in Electricity (335.8 MWh) and in Natural Gas (46,188.6 Therms).

Annual Stormwater Benefits

Jefferson's trees intercept about 2,754,257 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $74,640 of benefits to the city.

Annual Air Quality Benefits

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic mater (ozone). In Jefferson it is estimated that trees remove 1,956 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $5,454 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Jefferson trees sequester about 580,352 lbs of carbon a year with an associated value of $4,353 (Appendix A, Table 4). In addition, the trees store 8,198,516 lbs of carbon, with a yearly benefit of $61,481(Appendix A, Table 5).

Annual Aesthetics Benefits

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city livability and much more. Jefferson receives $70,962 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Jefferson's trees provide $232,609 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 1,731 trees in Jefferson provide approximately $134 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Jefferson has over 42 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	769	44%
Ash	253	15%
Apple	164	9%
Linden/Basswood	144	8%
Hackberry	78	5%
Honeylocust	35	2%
Broadleaf Decidous Med	35	2%
Black Walnut	33	2%
Red Oak	31	2%
Sycamore	23	1%
Elm	23	1%
Gingko	21	1%
Swamp White Oak	19	1%
Pear	16	1%
Kentucky Coffeetree	10	<1%
Bur Oak	9	<1%
Cottonwood	7	<1%
Spruce	5	<1%
Black Cherry	5	<1%
Other Misc Hardwoods	53	3%

Age Class

Most of Jefferson's trees (55%) are between 6 and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Jefferson's size curve is on the smaller side, indicating a younger than average stand.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Jefferson indicate that 99% of the trees are in good health, with only 1% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 94% of Jefferson's trees are in good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 6% of the population. This 6% is an estimate of trees that need management follow up.

Canopy Cover

The canopy cover included in the Jefferson inventory includes approximately 35 acres (Appendix A, Figure 4).

Land Use and Location

All of the trees surveyed in Jefferson were city trees located in the right of way planting strips.

Recommendations

Risk Management

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

Hazardous trees

Jefferson has 32 trees that need immediate attention. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 11 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section.

Pruning Cycle

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

Planting

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

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (44%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut, as outlined in chapter 151 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151 (Appendix C).

Continual Monitoring

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

Six Year Maintenance Plan with <u>No Additional Funding</u>

Year 1

- Removal: 10 - 12 largest immediate concern trees
- Planting and Replacement: 14 trees to be planted in open locations
- Visual Survey for signs and symptoms of EAB

Year 2

- Removal: 10 - 12 immediate concern trees
- Planting and Replacement: 14 trees in open locations from year one removals
- Routine trimming: As funding or staffing allows
- Visual Survey for signs and symptoms of EAB

Year 3

- Removal: 10 - 12 immediate concern trees - removal of any new critical concern trees and ash in poor health
- Planting and Replacement: 14 trees to be planted in open locations and locations from previous removals
- Visual Survey for signs and symptoms of EAB

Year 4

- Removal: 10 – 12 trees - removal of any new critical concern trees and ash in poor health
- Planting and Replacement: 14 trees in open locations from previous removals
- Routine trimming: As funding or staffing allows
- Visual Survey for signs and symptoms of EAB

Year 5

- Removal: 10 - 12 trees - removal of any new critical concern trees and ash in poor health
- Planting and Replacement: 14 trees to be planted in open locations and locations from previous removals
- Visual Survey for signs and symptoms of EAB

Year 6

Removal: 10 - 12 trees - removal of any new critical concern trees and ash in poor health
Planting and Replacement: 14 trees in open locations from previous removals
Routine trimming: As funding or staffing allows
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 5 ash trees removed if the current budget is only used to address trees of immediate concern. It will take approximately 30 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 years of its arrival.
** To remove all ash trees within 6 years as well as the other trees identified as immediate concern, the budget would need to be increased to $30,000 a year. If the budget were increased to $15,000 a year all ash could be removed in 12 years.

Emerald Ash Borer Plan

Ash Tree Removal

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

Treatment of Ash Trees

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

EAB Quarantines

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

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

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

Wood Disposal

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

Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance (Appendix C). The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

Postponed Work

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

Monitoring

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

Private Ash Trees

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

Budget

Current Budget
$6,000 annually for removals
$2,000 annually for planting

Purposed Budget Increase

EAB could potentially kill all ash trees in Jefferson within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $30,000 a year. If the budget were increased to $15,000 a year all ash could be removed within 12 years. Additionally, it is recommended that Jefferson apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Jefferson

Annual Energy Benefits of Public Trees

1/15/2016

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	163.3	12,392	21,886.2	21,448	33,840	(N/A)	44.4	47.8	44.06
Ash	53.4	4,057	7,588.3	7,437	11,493	(N/A)	14.6	16.2	45.61
Apple	11.6	883	1,868.8	1,831	2,714	(N/A)	9.5	3.8	16.55
American basswood	22.6	1,715	3,099.5	3,038	4,753	(N/A)	8.3	6.7	33.24
Northern hackberry	21.8	1,657	3,107.1	3,045	4,702	(N/A)	4.5	6.6	60.28
Honeylocust	10.5	796	1,384.7	1,357	2,153	(N/A)	2.0	3.0	61.50
Broadleaf Deciduous Mediu	4.6	348	649.5	637	985	(N/A)	2.0	1.4	28.14
Black walnut	8.7	662	1,172.6	1,149	1,811	(N/A)	1.9	2.6	54.87
Northern red oak	4.6	348	636.8	624	972	(N/A)	1.8	1.4	31.37
American sycamore	6.9	527	968.5	949	1,476	(N/A)	1.3	2.1	67.09
American elm	6.4	483	838.9	822	1,305	(N/A)	1.3	1.8	59.34
Ginkgo	2.6	197	347.8	341	538	(N/A)	1.2	0.8	26.91
Swamp white oak	1.7	131	277.4	272	403	(N/A)	1.1	0.6	21.20
Pear	0.9	69	156.3	153	222	(N/A)	0.9	0.3	14.78
Kentucky coffeetree	0.1	8	14.8	15	23	(N/A)	0.6	0.0	2.06
Bur oak	2.4	182	336.0	329	512	(N/A)	0.5	0.7	56.84
Cottonwood	2.8	212	375.5	368	580	(N/A)	0.4	0.8	82.87
Spruce	0.8	59	87.8	86	145	(N/A)	0.3	0.2	24.14
Black cherry	1.0	75	136.2	133	209	(N/A)	0.3	0.3	34.81
Ohio buckeye	1.0	77	139.0	136	214	(N/A)	0.3	0.3	35.62
Black locust	0.5	40	84.3	83	122	(N/A)	0.3	0.2	24.47
Mulberry	0.6	48	87.5	86	133	(N/A)	0.3	0.2	26.69
Norway maple	0.9	66	125.5	123	189	(N/A)	0.2	0.3	47.16
Sugar maple	0.5	41	71.4	70	111	(N/A)	0.2	0.2	27.70
Japanese tree lilac	0.2	19	42.3	41	60	(N/A)	0.2	0.1	15.00
Catalpa	1.4	107	185.2	181	288	(N/A)	0.2	0.4	96.09
Conifer Evergreen Large	0.2	13	28.5	28	41	(N/A)	0.2	0.1	13.58
Blue spruce	0.3	19	35.6	35	54	(N/A)	0.2	0.1	18.04
Silver maple	1.1	85	150.0	147	232	(N/A)	0.2	0.3	77.28
Paper birch	0.3	25	40.7	40	65	(N/A)	0.1	0.1	32.43
Basswood	0.5	40	76.2	75	115	(N/A)	0.1	0.2	57.32
Amur maple	0.2	14	24.7	24	38	(N/A)	0.1	0.1	38.13
Northern pin oak	0.0	3	6.2	6	9	(N/A)	0.1	0.0	8.99
Eastern red cedar	0.0	4	7.9	8	11	(N/A)	0.1	0.0	11.47
Conifer Evergreen Medium	0.0	0	1.2	1	2	(N/A)	0.1	0.0	1.65
River birch	0.1	8	16.9	17	24	(N/A)	0.1	0.0	24.47
Broadleaf Deciduous Large	0.2	18	27.0	26	44	(N/A)	0.1	0.1	44.23
Quaking aspen	0.5	37	63.1	62	99	(N/A)	0.1	0.1	98.63
Tulip tree	0.1	7	13.7	13	21	(N/A)	0.1	0.0	20.64
Broadleaf Evergreen Mediu	0.0	1	2.8	3	4	(N/A)	0.1	0.0	3.94
Willow	0.1	8	16.9	17	24	(N/A)	0.1	0.0	24.47
Scotch pine	0.1	4	9.5	9	14	(N/A)	0.1	0.0	13.58
Total	335.8	25,484	46,188.6	45,265	70,748	(N/A)	100.0	100.0	40.87

Table 2: Annual Stormwater Benefits

Jefferson

Annual Stormwater Benefits of Public Trees

1/15/2016

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	1,322,901	35,851	(N/A)	44.4	48.0	46.68
Ash	431,935	11,705	(N/A)	14.6	15.7	46.45
Apple	43,423	1,177	(N/A)	9.5	1.6	7.18
American basswood	156,952	4,253	(N/A)	8.3	5.7	29.74
Northern hackberry	185,147	5,017	(N/A)	4.5	6.7	64.33
Honeylocust	108,018	2,927	(N/A)	2.0	3.9	83.64
Broadleaf Deciduous Medium	28,266	766	(N/A)	2.0	1.0	21.89
Black walnut	90,430	2,451	(N/A)	1.9	3.3	74.26
Northern red oak	44,313	1,201	(N/A)	1.8	1.6	38.74
American sycamore	90,788	2,460	(N/A)	1.3	3.3	111.83
American elm	59,901	1,623	(N/A)	1.3	2.2	73.79
Ginkgo	16,274	441	(N/A)	1.2	0.6	22.05
Swamp white oak	9,562	259	(N/A)	1.1	0.3	13.64
Pear	3,184	86	(N/A)	0.9	0.1	5.75
Kentucky coffeetree	658	18	(N/A)	0.6	0.0	1.62
Bur oak	26,575	720	(N/A)	0.5	1.0	80.02
Cottonwood	38,080	1,032	(N/A)	0.4	1.4	147.42
Spruce	9,232	250	(N/A)	0.3	0.3	41.70
Black cherry	3,597	97	(N/A)	0.3	0.1	16.25
Ohio buckeye	5,985	162	(N/A)	0.3	0.2	27.03
Black locust	2,930	79	(N/A)	0.3	0.1	15.88
Mulberry	2,272	62	(N/A)	0.3	0.1	12.31
Norway maple	6,954	188	(N/A)	0.2	0.3	47.11
Sugar maple	3,006	81	(N/A)	0.2	0.1	20.37
Japanese tree lilac	862	23	(N/A)	0.2	0.0	5.84
Catalpa	21,717	589	(N/A)	0.2	0.8	196.17
Conifer Evergreen Large	1,787	48	(N/A)	0.2	0.1	16.14
Blue spruce	3,055	83	(N/A)	0.2	0.1	27.60
Silver maple	16,535	448	(N/A)	0.2	0.6	149.37
Paper birch	2,073	56	(N/A)	0.1	0.1	28.09
Basswood	5,181	140	(N/A)	0.1	0.2	70.21
Amur maple	667	18	(N/A)	0.1	0.0	18.06
Northern pin oak	163	4	(N/A)	0.1	0.0	4.41
Eastern red cedar	659	18	(N/A)	0.1	0.0	17.86
Conifer Evergreen Medium	38	1	(N/A)	0.1	0.0	1.03
River birch	586	16	(N/A)	0.1	0.0	15.88
Broadleaf Deciduous Large	1,466	40	(N/A)	0.1	0.1	39.72
Quaking aspen	7,239	196	(N/A)	0.1	0.3	196.17
Tulip tree	608	16	(N/A)	0.1	0.0	16.47
Broadleaf Evergreen Medium	56	2	(N/A)	0.1	0.0	1.53
Willow	586	16	(N/A)	0.1	0.0	15.88
Scotch pine	596	16	(N/A)	0.1	0.0	16.14
Citywide total	2,754,257	74,640	(N/A)	100.0	100.0	43.12

Table 3: Annual Air Quality Benefits

Jefferson

Annual Air Quality Benefits of Public Trees

1/15/2016

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								
Maple	305.4	52.0	143.8	13.5	1,630	774.4	113.1	107.9	739.6	4,836	-104.2	-391	2,145.5	6,075	(N/A)	44.4	7.91
Ash	80.2	13.8	40.6	3.6	437	258.1	37.4	35.6	242.5	1,601	-19.5	-73	692.3	1,965	(N/A)	14.6	7.80
Apple	9.9	1.6	5.1	0.5	54	58.0	8.3	7.8	52.7	355	-0.1	0	143.7	409	(N/A)	9.5	2.49
American basswood	15.0	2.5	8.7	0.7	85	108.2	15.7	15.0	102.6	674	-14.9	-56	253.5	702	(N/A)	8.3	4.91
Northern hackberry	26.5	4.6	14.0	1.2	146	105.5	15.3	14.5	99.0	654	0.0	0	280.5	800	(N/A)	4.5	10.26
Honeylocust	20.7	3.4	9.5	0.9	110	49.5	7.2	6.9	47.4	310	-15.8	-59	130.0	360	(N/A)	2.0	10.29
Broadleaf Deciduous Medium	4.0	0.7	2.2	0.2	22	22.2	3.2	3.1	20.8	138	-1.1	-4	55.3	156	(N/A)	2.0	4.45
Black walnut	10.7	1.7	5.2	0.5	57	41.4	6.0	5.8	39.5	259	0.0	0	110.8	316	(N/A)	1.9	9.56
Northern red oak	9.2	1.6	4.5	0.4	50	22.0	3.2	3.0	20.8	137	-13.1	-49	51.6	137	(N/A)	1.8	4.42
American sycamore	12.9	2.1	5.9	0.6	68	33.3	4.8	4.6	31.4	207	0.0	0	95.6	275	(N/A)	1.3	12.49
American elm	12.7	2.2	6.2	0.6	69	30.1	4.4	4.2	28.9	188	0.0	0	89.2	257	(N/A)	1.3	11.67
Ginkgo	3.9	0.7	1.9	0.2	21	12.3	1.8	1.7	11.8	77	-1.3	-5	33.1	93	(N/A)	1.2	4.67
Swamp white oak	0.9	0.2	0.6	0.0	5	8.6	1.2	1.2	7.8	53	-0.3	-1	20.2	57	(N/A)	1.1	3.00
Pear	0.5	0.1	0.3	0.0	3	4.6	0.6	0.6	4.1	28	0.0	0	10.9	31	(N/A)	0.9	2.06
Kentucky coffeetree	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3	(N/A)	0.6	0.30
Bur oak	3.2	0.5	1.5	0.1	17	11.5	1.7	1.6	10.9	72	0.0	0	31.1	89	(N/A)	0.5	9.85
Cottonwood	7.4	1.2	3.3	0.3	38	13.3	1.9	1.8	12.7	83	0.0	0	41.9	121	(N/A)	0.4	17.34
Spruce	1.0	0.2	0.9	0.1	7	3.5	0.5	0.5	3.5	22	-3.3	-12	7.0	17	(N/A)	0.3	2.82
Black cherry	1.1	0.2	0.5	0.0	6	4.7	0.7	0.7	4.5	30	0.0	0	12.4	35	(N/A)	0.3	5.89
Ohio buckeye	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)	0.3	5.69
Black locust	0.3	0.0	0.2	0.0	2	2.6	0.4	0.4	2.4	16	-0.1	0	6.2	17	(N/A)	0.3	3.47
Mulberry	0.7	0.1	0.3	0.0	4	3.0	0.4	0.4	2.9	19	0.0	0	7.8	22	(N/A)	0.3	4.46
Norway maple	1.3	0.2	0.6	0.1	7	4.2	0.6	0.6	3.9	26	-0.3	-1	11.2	32	(N/A)	0.2	7.93
Sugar maple	0.2	0.0	0.2	0.0	1	2.5	0.4	0.4	2.4	16	-0.2	-1	5.9	16	(N/A)	0.2	4.11
Japanese tree lilac	0.1	0.0	0.1	0.0	1	1.2	0.2	0.2	1.1	8	0.0	0	2.9	8	(N/A)	0.2	2.09
Catalpa	4.3	0.7	1.9	0.2	23	6.7	1.0	0.9	6.4	42	0.0	0	22.0	64	(N/A)	0.2	21.38
Conifer Evergreen Large	0.2	0.0	0.2	0.0	1	0.9	0.1	0.1	0.8	5	-0.5	-2	1.7	4	(N/A)	0.2	1.48
Blue spruce	0.3	0.1	0.3	0.0	2	1.2	0.2	0.2	1.1	8	-1.0	-4	2.4	6	(N/A)	0.2	1.99
Silver maple	3.1	0.5	1.5	0.1	17	5.3	0.8	0.7	5.1	33	-1.7	-6	15.5	44	(N/A)	0.2	14.51
Paper birch	0.1	0.0	0.1	0.0	1	1.5	0.2	0.2	1.5	10	0.0	0	3.7	10	(N/A)	0.1	5.21
Basswood	0.5	0.1	0.3	0.0	3	2.5	0.4	0.4	2.4	16	0.0	0	6.6	19	(N/A)	0.1	9.34
Amur maple	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	0.0	0	2.3	7	(N/A)	0.1	6.56
Northern pin oak	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.4	1	(N/A)	0.1	1.21
Eastern red cedar	0.1	0.0	0.1	0.0	0	0.2	0.0	0.0	0.2	1	-0.3	-1	0.3	1	(N/A)	0.1	0.62
Conifer Evergreen Medium	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0	(N/A)	0.1	0.18
River birch	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3	(N/A)	0.1	3.47
Broadleaf Deciduous Large	0.1	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	0.0	0	2.6	7	(N/A)	0.1	7.42
Quaking aspen	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)	0.1	22.55
Tulip tree	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)	0.1	2.99
Broadleaf Evergreen Medium	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.2	0	(N/A)	0.1	0.47
Willow	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3	(N/A)	0.1	3.47
Scotch pine	0.1	0.0	0.1	0.0	0	0.3	0.0	0.0	0.3	2	-0.2	-1	0.6	1	(N/A)	0.1	1.48
Citywide total	539.3	91.6	262.0	24.1	2,901	1,604.9	233.5	222.6	1,521.8	9,993	-178.2	-668	4,321.6	12,226	(N/A)	100.0	7.06

Table 4: Annual Carbon Stored

Jefferson

Stored CO2 Benefits of Public Trees

1/15/2016

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	3,347,535	25,107	(N/A)	44.4	40.8	32.69
Ash	1,330,270	9,977	(N/A)	14.6	16.2	39.59
Apple	172,828	1,296	(N/A)	9.5	2.1	7.90
American basswood	550,964	4,132	(N/A)	8.3	6.7	28.90
Northern hackberry	381,401	2,861	(N/A)	4.5	4.7	36.67
Honeylocust	264,593	1,984	(N/A)	2.0	3.2	56.70
Broadleaf Deciduous	68,903	517	(N/A)	2.0	0.8	14.76
Black walnut	348,192	2,611	(N/A)	1.9	4.2	79.13
Northern red oak	196,168	1,471	(N/A)	1.8	2.4	47.46
American sycamore	424,490	3,184	(N/A)	1.3	5.2	144.71
American elm	266,869	2,002	(N/A)	1.3	3.3	90.98
Ginkgo	56,319	422	(N/A)	1.2	0.7	21.12
Swamp white oak	17,863	134	(N/A)	1.1	0.2	7.05
Pear	10,698	80	(N/A)	0.9	0.1	5.35
Kentucky coffeetree	654	5	(N/A)	0.6	0.0	0.45
Bur oak	102,318	767	(N/A)	0.5	1.2	85.27
Cottonwood	256,616	1,925	(N/A)	0.4	3.1	274.95
Spruce	7,021	53	(N/A)	0.3	0.1	8.78
Black cherry	16,094	121	(N/A)	0.3	0.2	20.12
Ohio buckeye	14,174	106	(N/A)	0.3	0.2	17.72
Black locust	5,503	41	(N/A)	0.3	0.1	8.26
Mulberry	10,033	75	(N/A)	0.3	0.1	15.05
Norway maple	20,615	155	(N/A)	0.2	0.3	38.65
Sugar maple	6,926	52	(N/A)	0.2	0.1	12.99
Japanese tree lilac	2,902	22	(N/A)	0.2	0.0	5.44
Catalpa	151,222	1,134	(N/A)	0.2	1.8	378.06
Conifer Evergreen La	770	6	(N/A)	0.2	0.0	1.93
Blue spruce	1,687	13	(N/A)	0.2	0.0	4.22
Silver maple	75,580	567	(N/A)	0.2	0.9	188.95
Paper birch	4,706	35	(N/A)	0.1	0.1	17.65
Basswood	16,915	127	(N/A)	0.1	0.2	63.43
Amur maple	3,037	23	(N/A)	0.1	0.0	22.78
Northern pin oak	218	2	(N/A)	0.1	0.0	1.64
Eastern red cedar	277	2	(N/A)	0.1	0.0	2.08
Conifer Evergreen Ma	2	0	(N/A)	0.1	0.0	0.02
River birch	1,101	8	(N/A)	0.1	0.0	8.26
Broadleaf Deciduous	3,672	28	(N/A)	0.1	0.0	27.54
Quaking aspen	55,982	420	(N/A)	0.1	0.7	419.86
Tulip tree	1,035	8	(N/A)	0.1	0.0	7.76
Broadleaf Evergreen I	3	0	(N/A)	0.1	0.0	0.02
Willow	1,101	8	(N/A)	0.1	0.0	8.26
Scotch pine	257	2	(N/A)	0.1	0.0	1.93
Citywide total	8,197,516	61,481	(N/A)	100.0	100.0	35.52

Table 5: Annual Carbon Sequestered

Jefferson

Annual CO Benefits of Public Trees

1/15/2016

Species	Sequestered (lb)	Sequestered ($)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total Standard ($) Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	280,600	2,104	-16,069	-1,493	-11	0	0	263,038	1,973 (N/A)	44.4	48.9	2.57
Ash	83,384	625	-6,390	-536	-4	0	0	76,457	573 (N/A)	14.6	14.2	2.28
Apple	18,698	140	-830	-178	-1	0	0	17,690	133 (N/A)	9.5	3.3	0.81
American basswood	42,849	321	-2,645	-243	-2	0	0	39,961	300 (N/A)	8.3	7.4	2.10
Northern hackberry	25,482	191	-1,831	-198	-1	0	0	23,453	176 (N/A)	4.5	4.4	2.26
Honeylocust	32,837	246	-1,271	-83	-1	0	0	31,483	236 (N/A)	2.0	5.9	6.75
Broadleaf Deciduous Medi	8,525	64	-335	-45	0	0	0	8,144	61 (N/A)	2.0	1.5	1.75
Black walnut	20,229	152	-1,671	-89	-1	0	0	18,469	139 (N/A)	1.9	3.4	4.20
Northern red oak	5,846	44	-942	-59	0	0	0	4,844	36 (N/A)	1.8	0.9	1.17
American sycamore	16,489	124	-2,038	-77	-1	0	0	14,375	108 (N/A)	1.3	2.7	4.90
American elm	7,706	58	-1,282	-62	0	0	0	6,362	48 (N/A)	1.3	1.2	2.17
Ginkgo	2,262	17	-270	-39	0	0	0	1,953	15 (N/A)	1.2	0.4	0.73
Swamp white oak	3,690	28	-87	-20	0	0	0	3,583	27 (N/A)	1.1	0.7	1.41
Pear	1,404	11	-51	-15	0	0	0	1,338	10 (N/A)	0.9	0.2	0.67
Kentucky coffeetree	243	2	-3	-3	0	0	0	237	2 (N/A)	0.6	0.0	0.16
Bur oak	5,957	45	-491	-25	0	0	0	5,441	41 (N/A)	0.5	1.0	4.53
Cottonwood	4,092	31	-1,232	-32	0	0	0	2,828	21 (N/A)	0.4	0.5	3.03
Spruce	693	5	-34	-12	0	0	0	648	5 (N/A)	0.3	0.1	0.81
Black cherry	1,452	11	-77	-11	0	0	0	1,364	10 (N/A)	0.3	0.3	1.70
Ohio buckeye	1,830	14	-68	-9	0	0	0	1,752	13 (N/A)	0.3	0.3	2.19
Black locust	1,120	8	-26	-6	0	0	0	1,087	8 (N/A)	0.3	0.2	1.63
Mulberry	925	7	-48	-7	0	0	0	870	7 (N/A)	0.3	0.2	1.31
Norway maple	1,550	12	-99	-9	0	0	0	1,442	11 (N/A)	0.2	0.3	2.70
Sugar maple	767	6	-33	-5	0	0	0	729	5 (N/A)	0.2	0.1	1.37
Japanese tree lilac	380	3	-14	-4	0	0	0	362	3 (N/A)	0.2	0.1	0.68
Catalpa	1,870	14	-726	-17	0	0	0	1,127	8 (N/A)	0.2	0.2	2.82
Conifer Evergreen Large	158	1	-4	-4	0	0	0	151	1 (N/A)	0.2	0.0	0.38
Blue spruce	168	1	-8	-4	0	0	0	156	1 (N/A)	0.2	0.0	0.39
Silver maple	5,133	38	-363	-13	0	0	0	4,757	36 (N/A)	0.2	0.9	11.89
Paper birch	654	5	-23	-3	0	0	0	628	5 (N/A)	0.1	0.1	2.36
Basswood	1,319	10	-81	-5	0	0	0	1,233	9 (N/A)	0.1	0.2	4.62
Amur maple	268	2	-15	-2	0	0	0	251	2 (N/A)	0.1	0.0	1.88
Northern pin oak	96	1	-2	-1	0	0	0	93	1 (N/A)	0.1	0.0	0.70
Eastern red cedar	40	0	-1	-1	0	0	0	37	0 (N/A)	0.1	0.0	0.28
Conifer Evergreen Mediun	2	0	0	0	0	0	0	2	0 (N/A)	0.1	0.0	0.01
River birch	224	2	-5	-1	0	0	0	217	2 (N/A)	0.1	0.0	1.63
Broadleaf Deciduous Larg	445	3	-18	-2	0	0	0	426	3 (N/A)	0.1	0.1	3.19
Quaking aspen	479	4	-269	-6	0	0	0	204	2 (N/A)	0.1	0.0	1.53
Tulip tree	209	2	-5	-1	0	0	0	203	2 (N/A)	0.1	0.0	1.52
Broadleaf Evergreen Medi	1	0	0	0	0	0	0	1	0 (N/A)	0.1	0.0	0.01
Willow	224	2	-5	-1	0	0	0	217	2 (N/A)	0.1	0.0	1.63
Scotch pine	53	0	-1	-1	0	0	0	50	0 (N/A)	0.1	0.0	0.38
Citywide total	580,352	4,353	-39,363	-3,324	-25	0	0	537,665	4,032 (N/A)	100.0	100.0	2.33

Table 6: Annual Social and Aesthetic Benefits

Jefferson

Annual Aesthetic/Other Benefits of Public Trees

1/15/2016

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	37,384	(N/A)	44.4	52.7	48.68
Ash	8,331	(N/A)	14.6	11.7	33.06
Apple	1,063	(N/A)	9.5	1.5	6.48
American basswood	3,709	(N/A)	8.3	5.2	25.94
Northern hackberry	3,679	(N/A)	4.5	5.2	47.17
Honeylocust	7,843	(N/A)	2.0	11.1	224.10
Broadleaf Deciduous Medium	930	(N/A)	2.0	1.3	26.58
Black walnut	1,732	(N/A)	1.9	2.4	52.48
Northern red oak	452	(N/A)	1.8	0.6	14.59
American sycamore	1,242	(N/A)	1.3	1.8	56.45
American elm	1,055	(N/A)	1.3	1.5	47.96
Ginkgo	196	(N/A)	1.2	0.3	9.78
Swamp white oak	438	(N/A)	1.1	0.6	23.05
Pear	79	(N/A)	0.9	0.1	5.24
Kentucky coffeetree	86	(N/A)	0.6	0.1	7.85
Bur oak	488	(N/A)	0.5	0.7	54.17
Cottonwood	295	(N/A)	0.4	0.4	42.18
Spruce	194	(N/A)	0.3	0.3	32.32
Black cherry	84	(N/A)	0.3	0.1	13.97
Ohio buckeye	196	(N/A)	0.3	0.3	32.69
Black locust	131	(N/A)	0.3	0.2	26.22
Mulberry	53	(N/A)	0.3	0.1	10.58
Norway maple	151	(N/A)	0.2	0.2	37.87
Sugar maple	103	(N/A)	0.2	0.1	25.87
Japanese tree lilac	21	(N/A)	0.2	0.0	5.32
Catalpa	115	(N/A)	0.2	0.2	38.49
Conifer Evergreen Large	46	(N/A)	0.2	0.1	15.42
Blue spruce	67	(N/A)	0.2	0.1	22.47
Silver maple	380	(N/A)	0.2	0.5	126.68
Paper birch	74	(N/A)	0.1	0.1	37.21
Basswood	115	(N/A)	0.1	0.2	57.69
Amur maple	15	(N/A)	0.1	0.0	15.48
Northern pin oak	13	(N/A)	0.1	0.0	12.89
Eastern red cedar	21	(N/A)	0.1	0.0	21.34
Conifer Evergreen Medium	5	(N/A)	0.1	0.0	5.03
River birch	26	(N/A)	0.1	0.0	26.22
Broadleaf Deciduous Large	46	(N/A)	0.1	0.1	45.86
Quaking aspen	29	(N/A)	0.1	0.0	28.57
Tulip tree	29	(N/A)	0.1	0.0	28.56
Broadleaf Evergreen Medium	0	(N/A)	0.1	0.0	0.01
Willow	26	(N/A)	0.1	0.0	26.22
Scotch pine	15	(N/A)	0.1	0.0	15.42
Citywide total	70,962	(N/A)	100.0	100.0	40.99

Table 7: Summary of Benefits in Dollars

Jefferson

Total Annual Benefits of Public Trees by Species ($)

1/15/2016

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Maple	33,840	1,973	6,075	35,851	37,384	115,123	(N/A)	49.5
Ash	11,493	573	1,965	11,705	8,331	34,068	(N/A)	14.6
Apple	2,714	133	409	1,177	1,063	5,495	(N/A)	2.4
American basswood	4,753	300	702	4,253	3,709	13,717	(N/A)	5.9
Northern hackberry	4,702	176	800	5,017	3,679	14,375	(N/A)	6.2
Honeylocust	2,153	236	360	2,927	7,843	13,519	(N/A)	5.8
Broadleaf Deciduous M	985	61	156	766	930	2,898	(N/A)	1.2
Black walnut	1,811	139	316	2,451	1,732	6,447	(N/A)	2.8
Northern red oak	972	36	137	1,201	452	2,799	(N/A)	1.2
American sycamore	1,476	108	275	2,460	1,242	5,561	(N/A)	2.4
American elm	1,305	48	257	1,623	1,055	4,288	(N/A)	1.8
Ginkgo	538	15	93	441	196	1,283	(N/A)	0.6
Swamp white oak	403	27	57	259	438	1,184	(N/A)	0.5
Pear	222	10	31	86	79	428	(N/A)	0.2
Kentucky coffeetree	23	2	3	18	86	132	(N/A)	0.1
Bur oak	512	41	89	720	488	1,849	(N/A)	0.8
Cottonwood	580	21	121	1,032	295	2,050	(N/A)	0.9
Spruce	145	5	17	250	194	611	(N/A)	0.3
Black cherry	209	10	35	97	84	436	(N/A)	0.2
Ohio buckeye	214	13	34	162	196	619	(N/A)	0.3
Black locust	122	8	17	79	131	358	(N/A)	0.2
Mulberry	133	7	22	62	53	277	(N/A)	0.1
Norway maple	189	11	32	188	151	571	(N/A)	0.2
Sugar maple	111	5	16	81	103	318	(N/A)	0.1
Japanese tree lilac	60	3	8	23	21	116	(N/A)	0.0
Catalpa	288	8	64	589	115	1,065	(N/A)	0.5
Conifer Evergreen Large	41	1	4	48	46	141	(N/A)	0.1
Blue spruce	54	1	6	83	67	211	(N/A)	0.1
Silver maple	232	36	44	448	380	1,139	(N/A)	0.5
Paper birch	65	5	10	56	74	211	(N/A)	0.1
Basswood	115	9	19	140	115	398	(N/A)	0.2
Amur maple	38	2	7	18	15	80	(N/A)	0.0
Northern pin oak	9	1	1	4	13	28	(N/A)	0.0
Eastern red cedar	11	0	1	18	21	52	(N/A)	0.0
Conifer Evergreen Medi	2	0	0	1	5	8	(N/A)	0.0
River birch	24	2	3	16	26	72	(N/A)	0.0
Broadleaf Deciduous La	44	3	7	40	46	140	(N/A)	0.1
Quaking aspen	99	2	23	196	29	347	(N/A)	0.1
Tulip tree	21	2	3	16	29	70	(N/A)	0.0
Broadleaf Evergreen Me	4	0	0	2	0	6	(N/A)	0.0
Willow	24	2	3	16	26	72	(N/A)	0.0
Scotch pine	14	0	1	16	15	47	(N/A)	0.0
Citywide Total	70,748	4,032	12,226	74,640	70,962	232,609	(N/A)	100.0

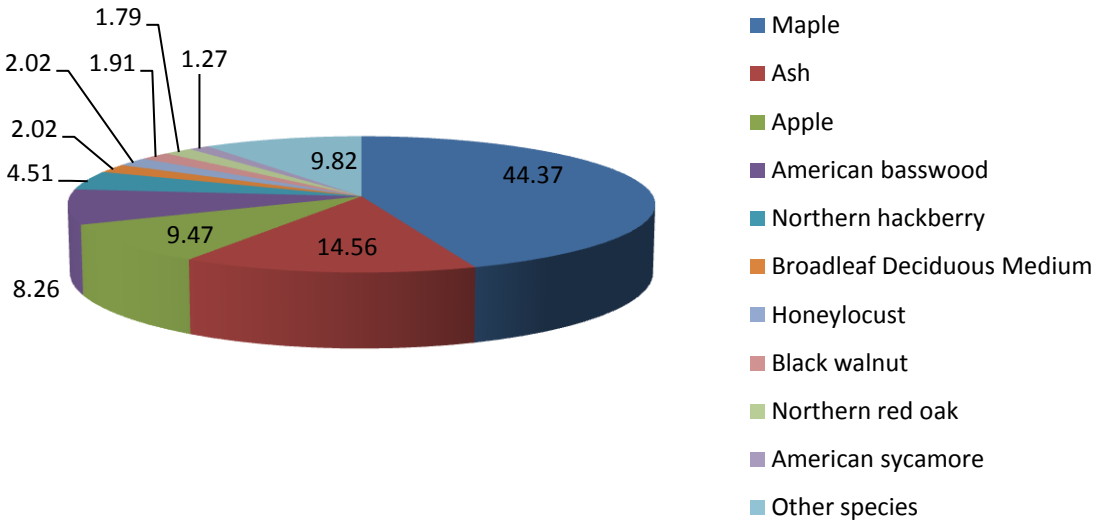

Figure 1: Species Distribution

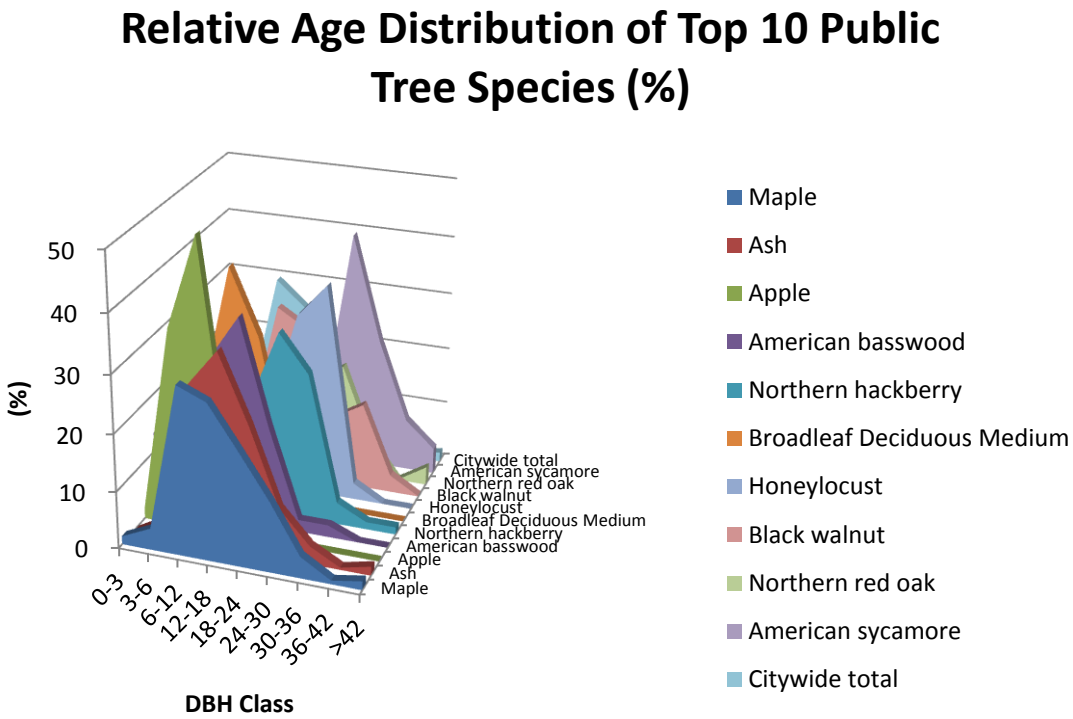

Figure 2: Relative Age Class

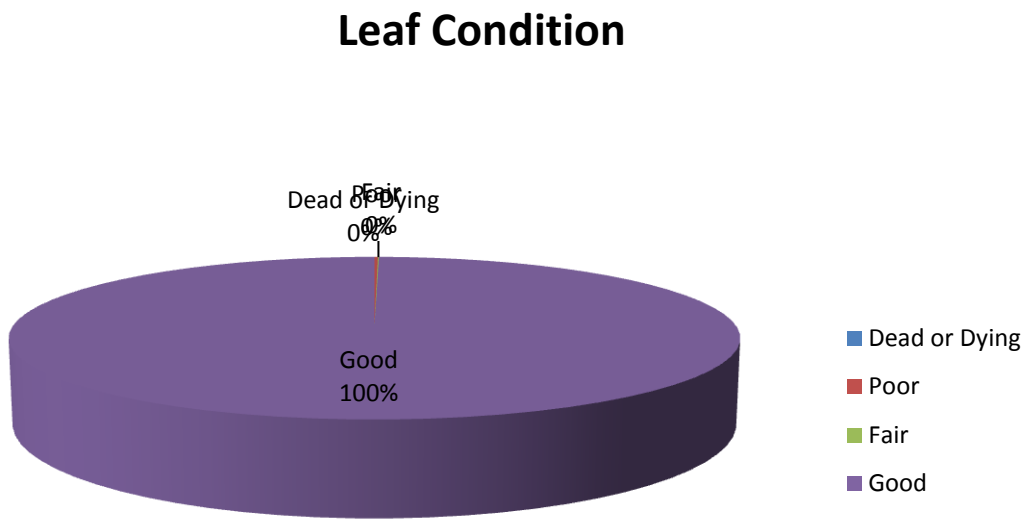

Figure 3: Foliage Condition

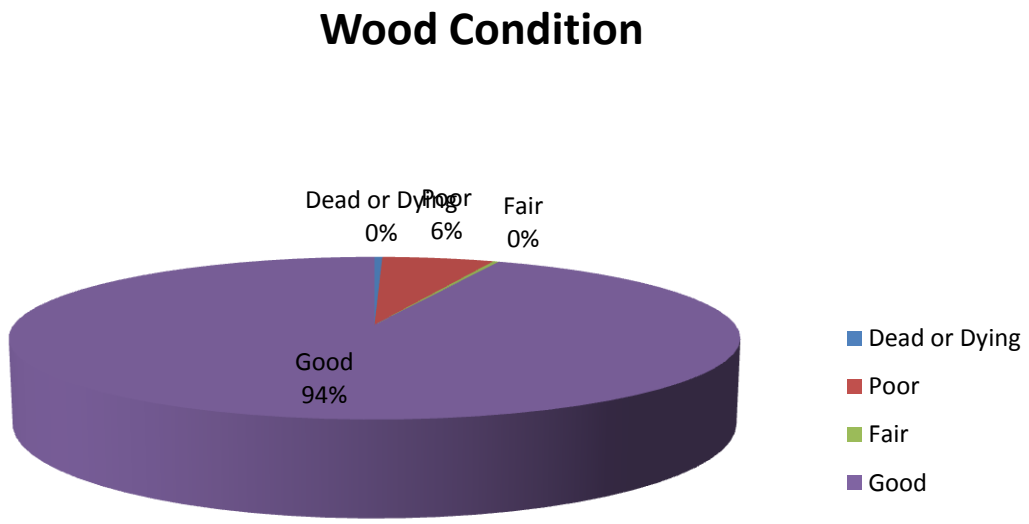

Figure 4: Wood Condition

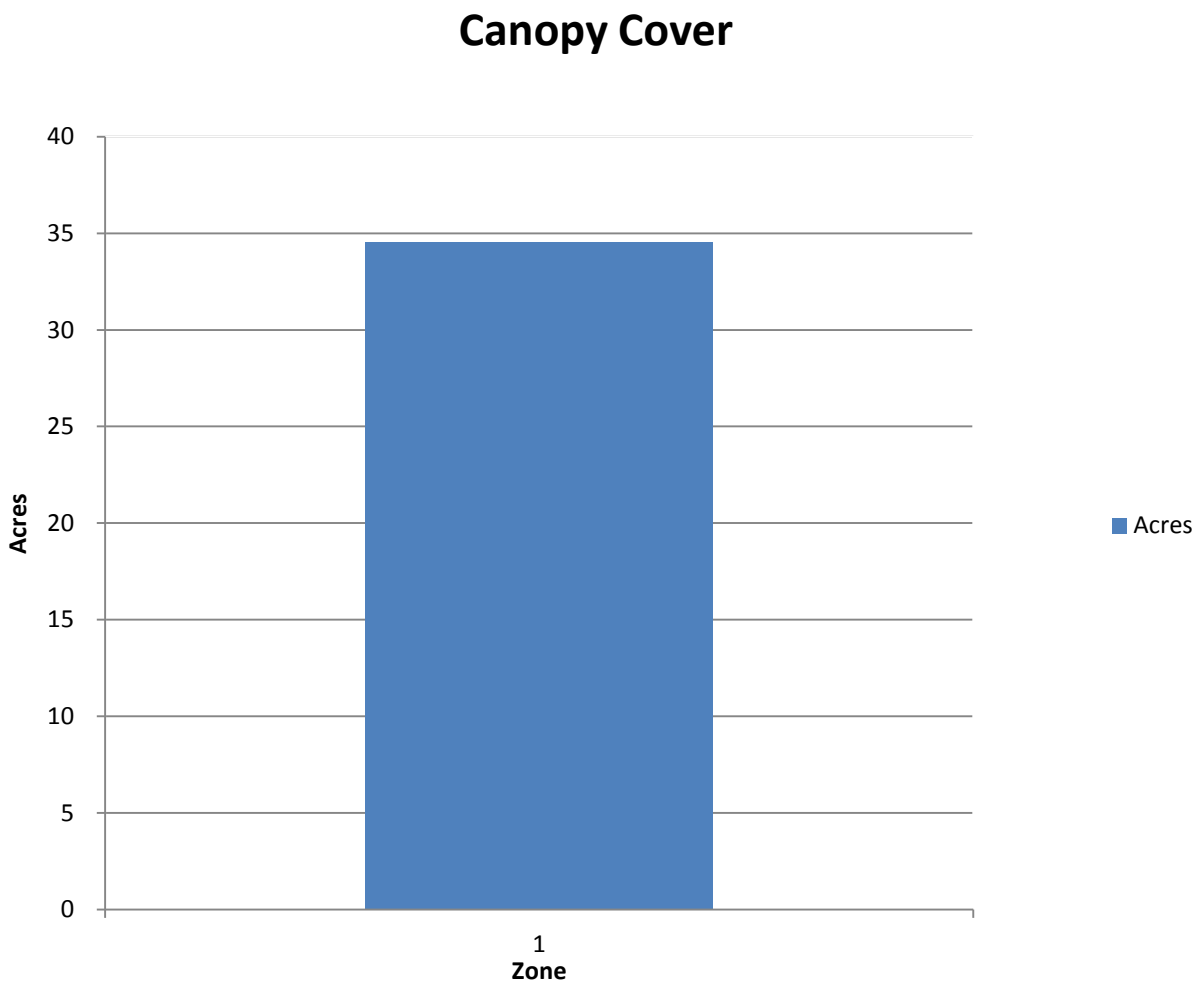

Figure 5: Canopy Cover in Acres

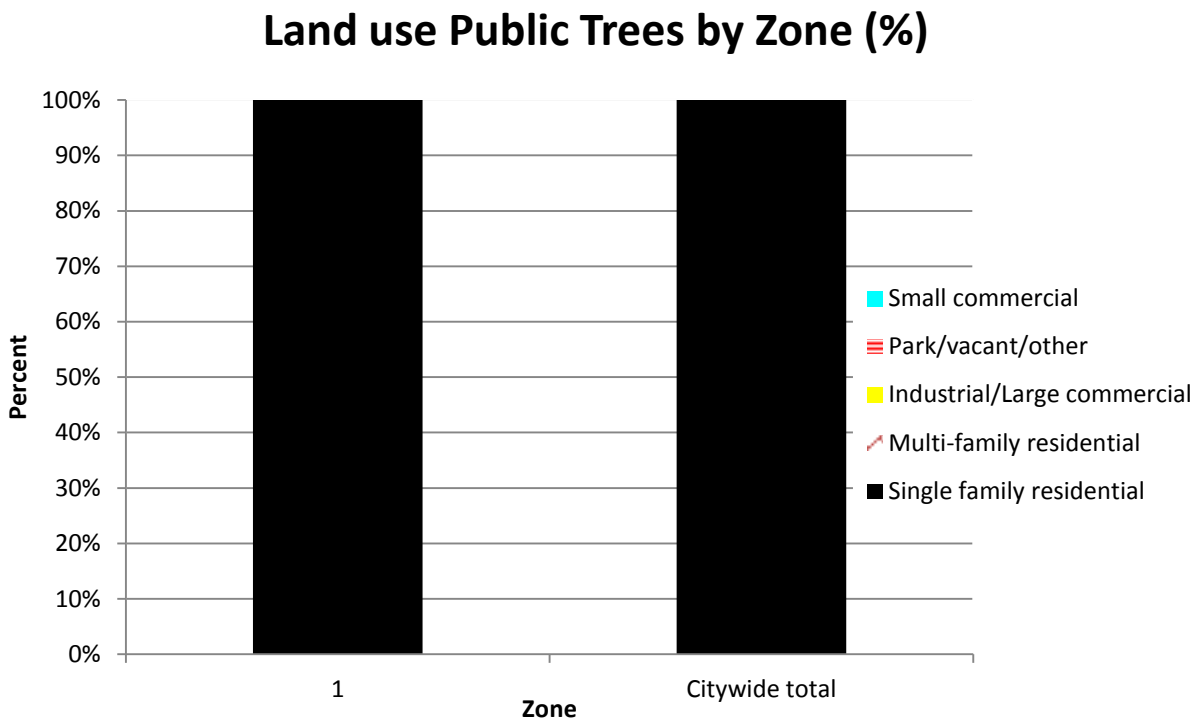

Figure 6: Land Use of city/park trees

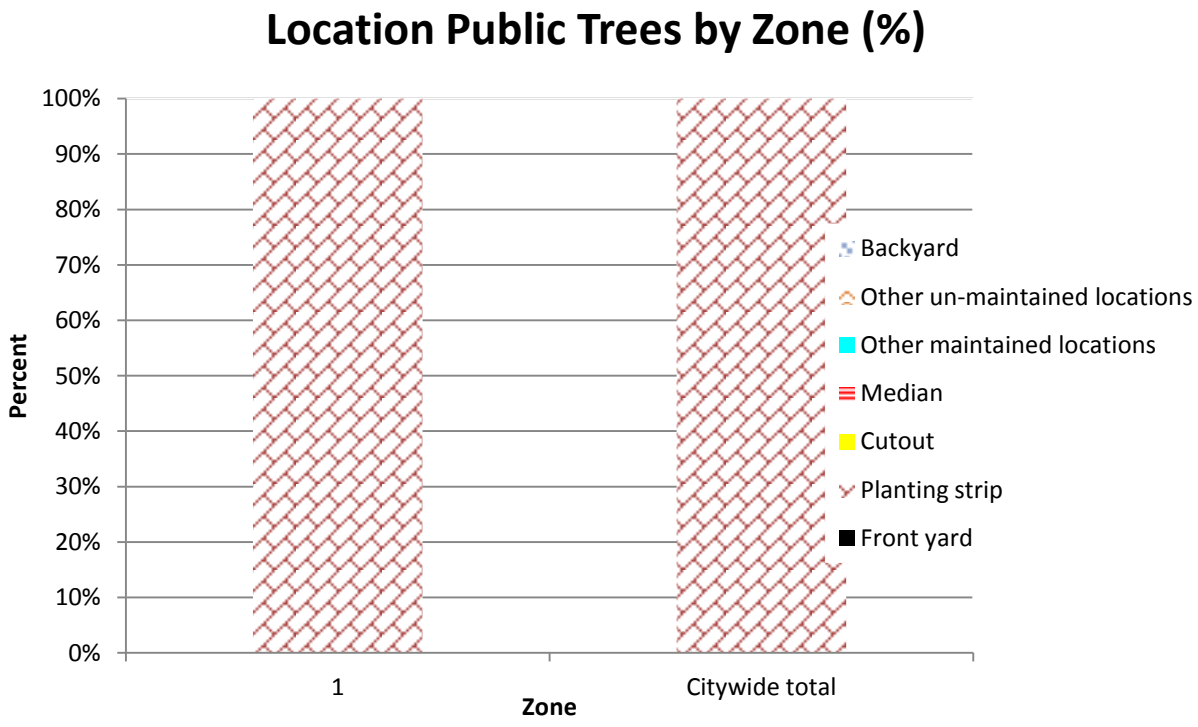

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

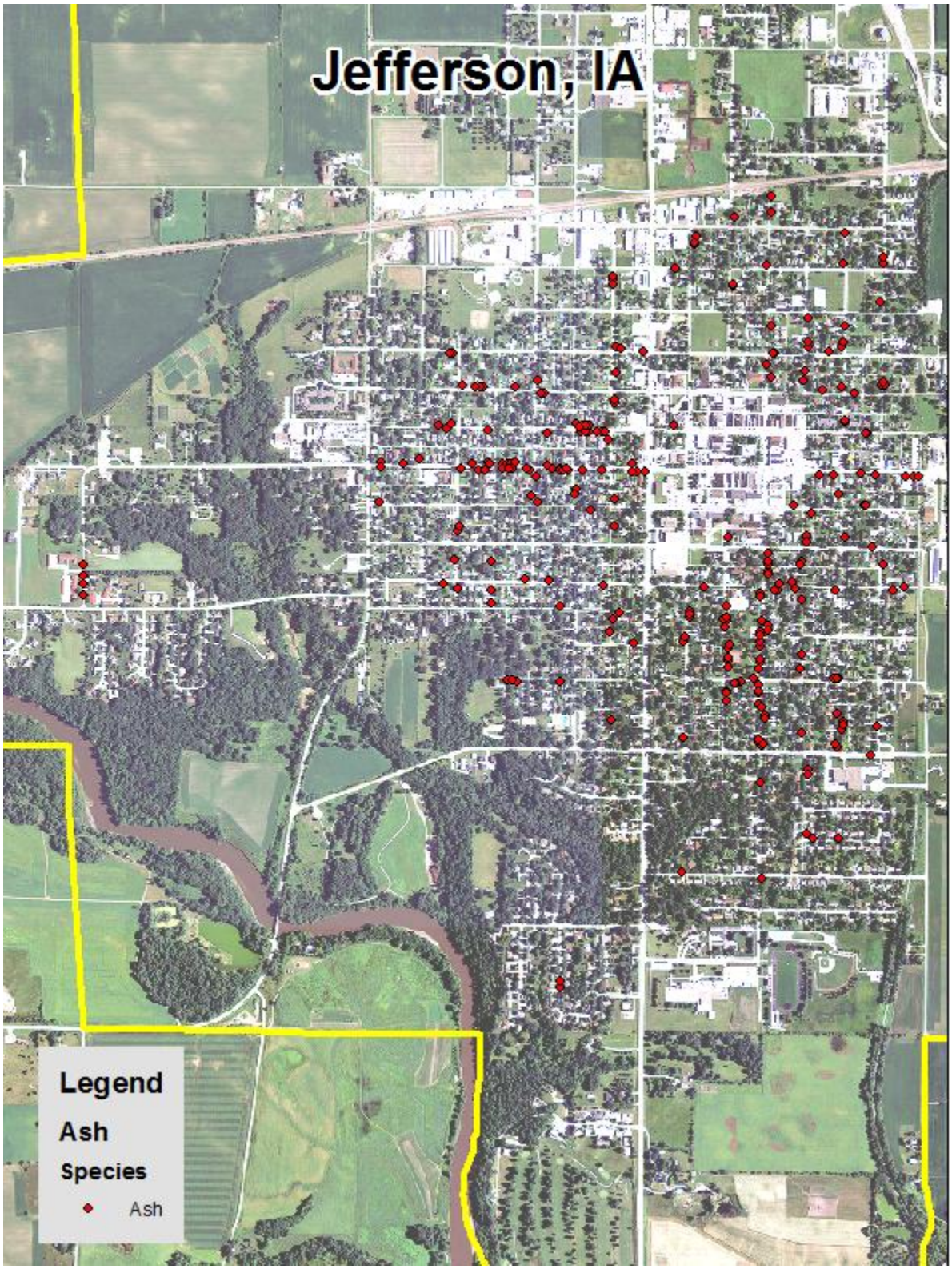

Figure 1: Location of Ash Trees

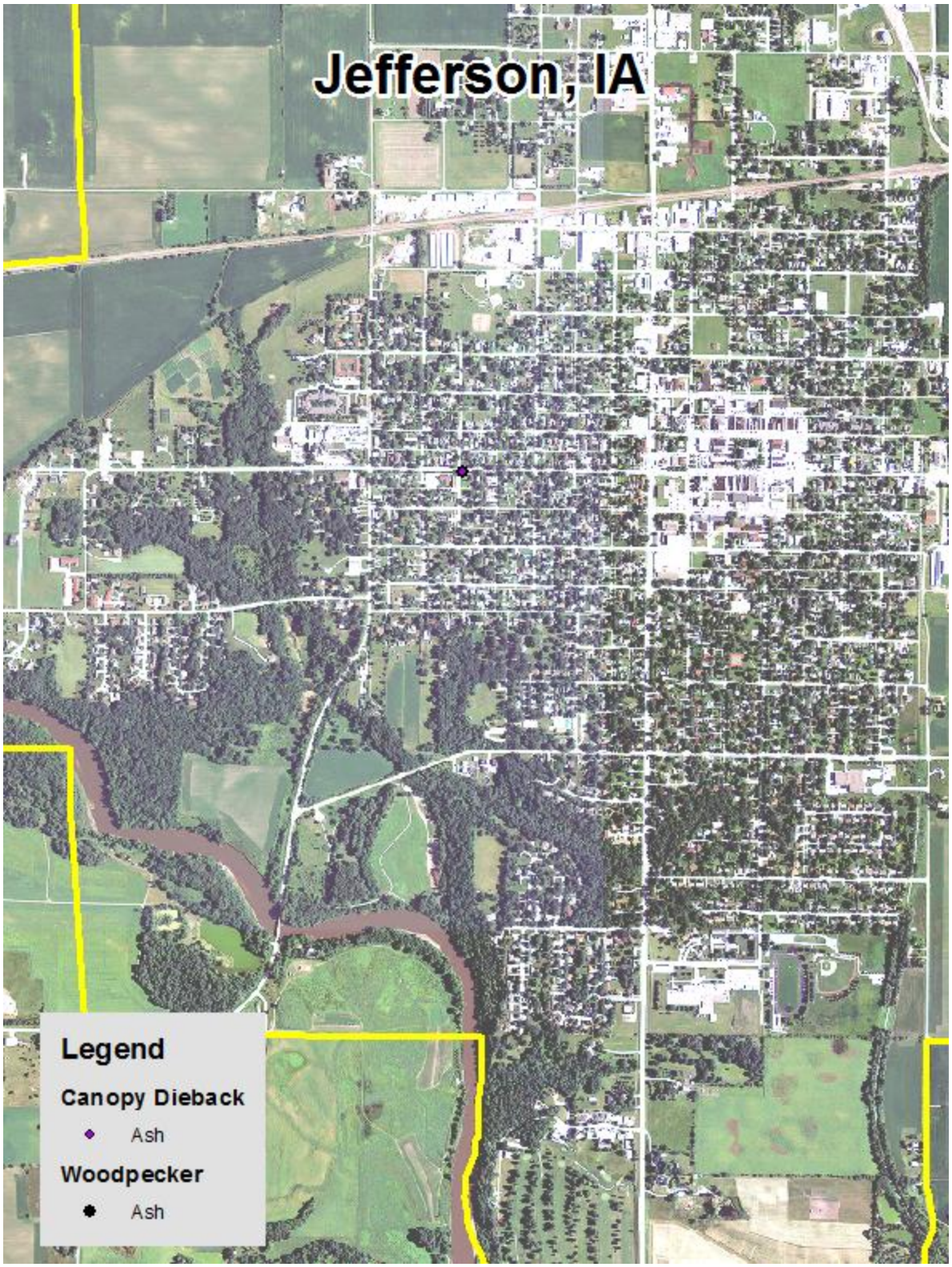

Figure 2: Location of EAB symptoms

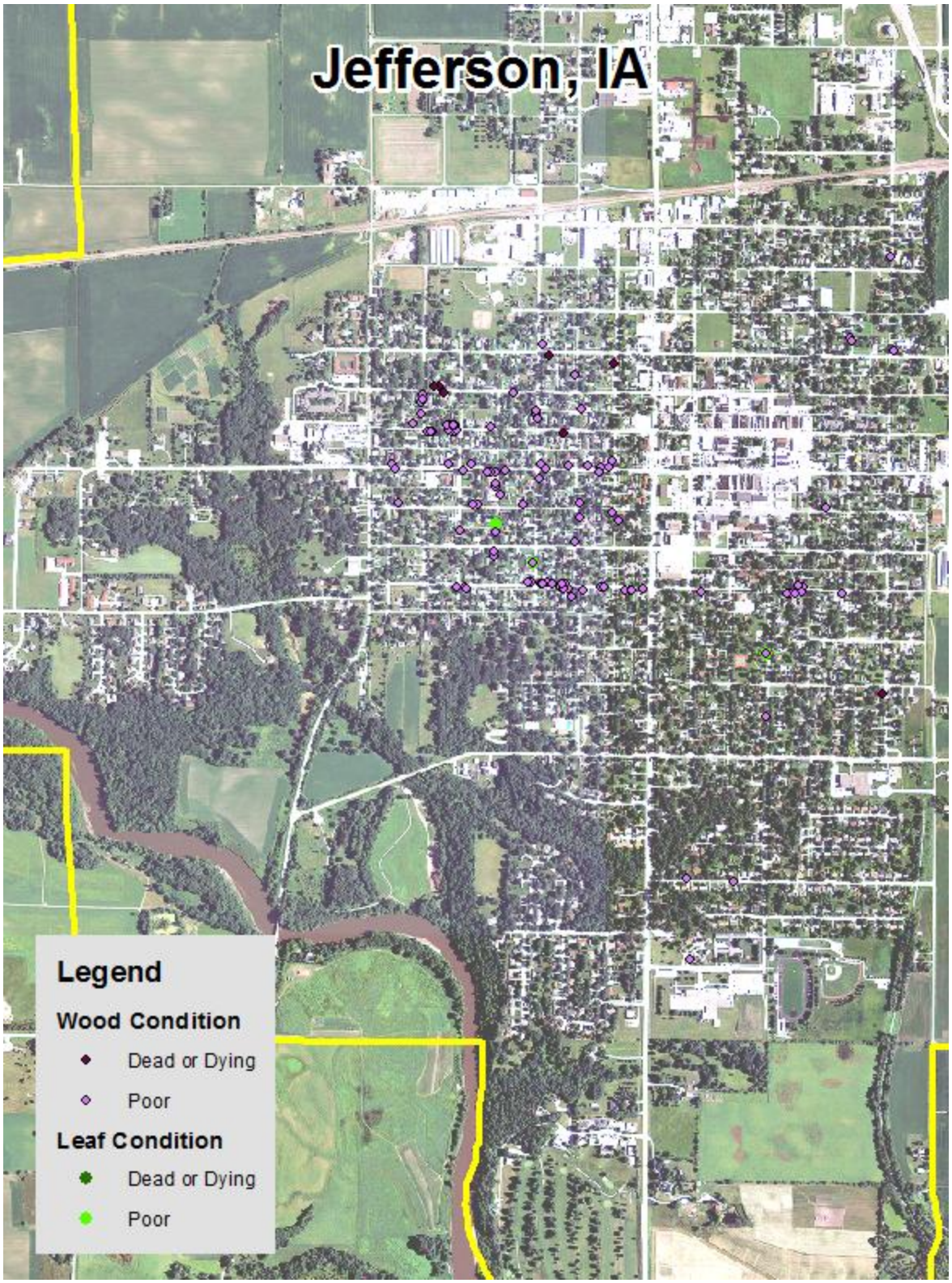

Figure 3: Location of Poor Condition Trees

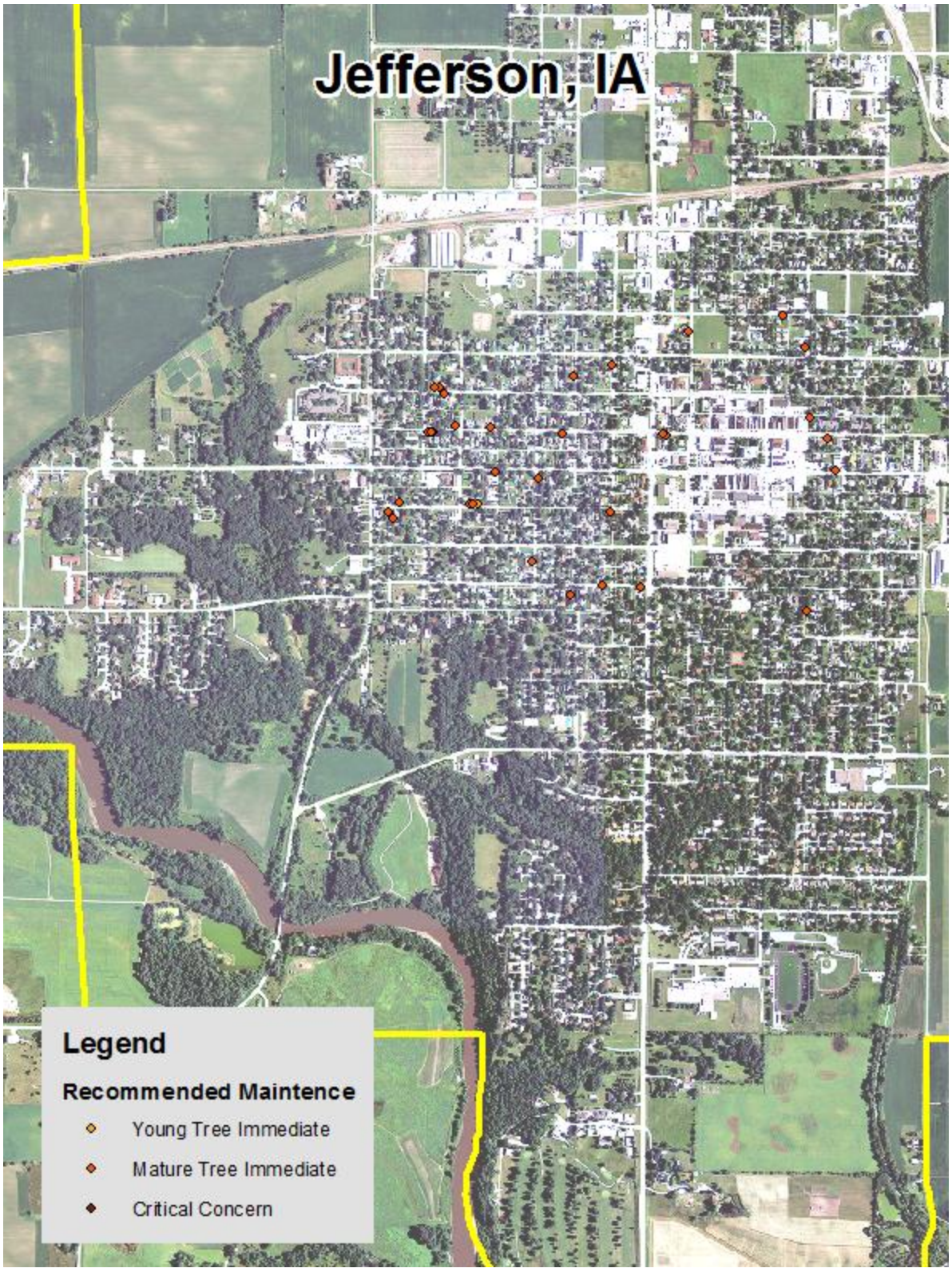

Figure 4: Location of Trees with Recommended Maintenance

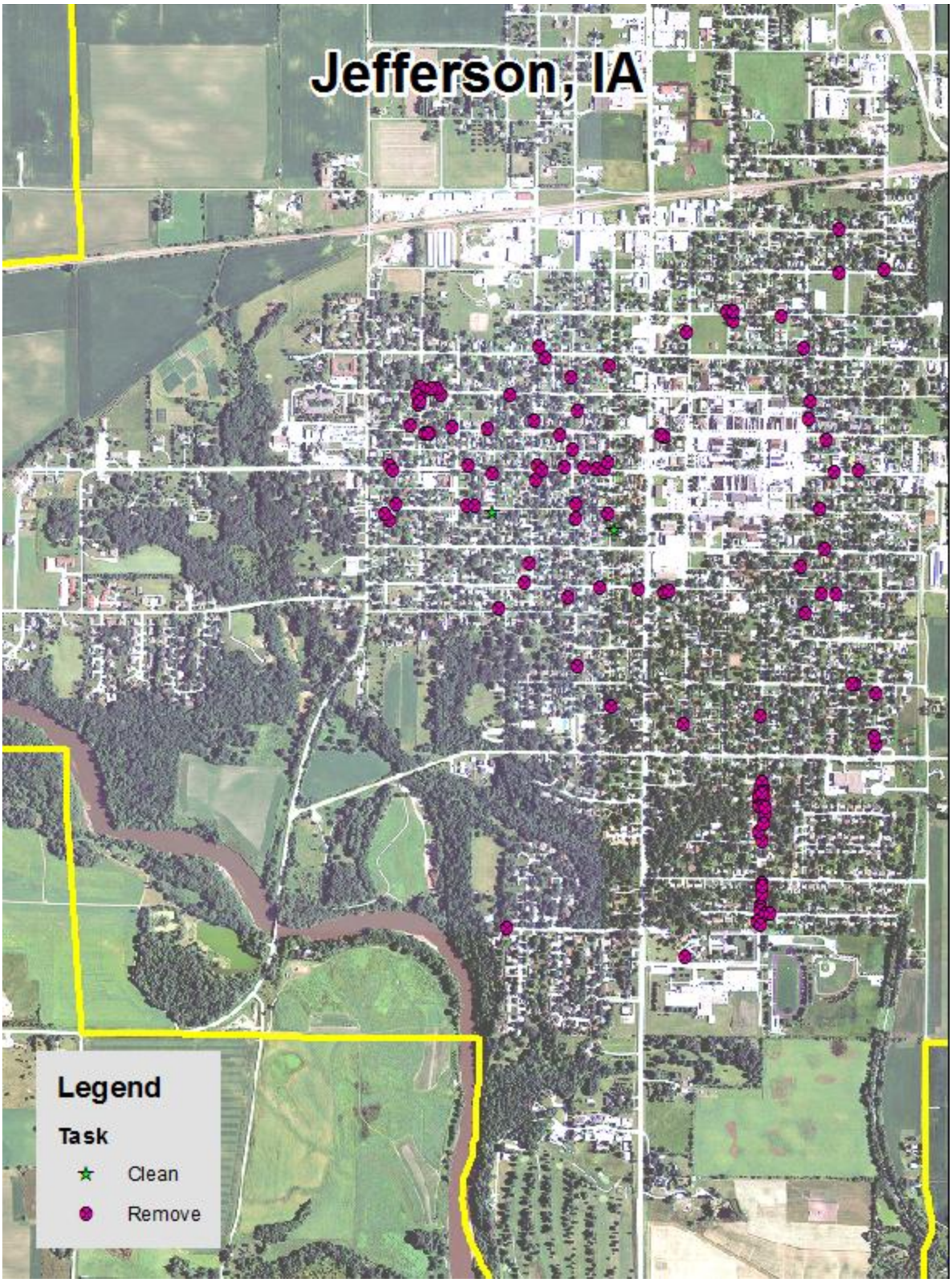

Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: Jefferson Tree Ordinances

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

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

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