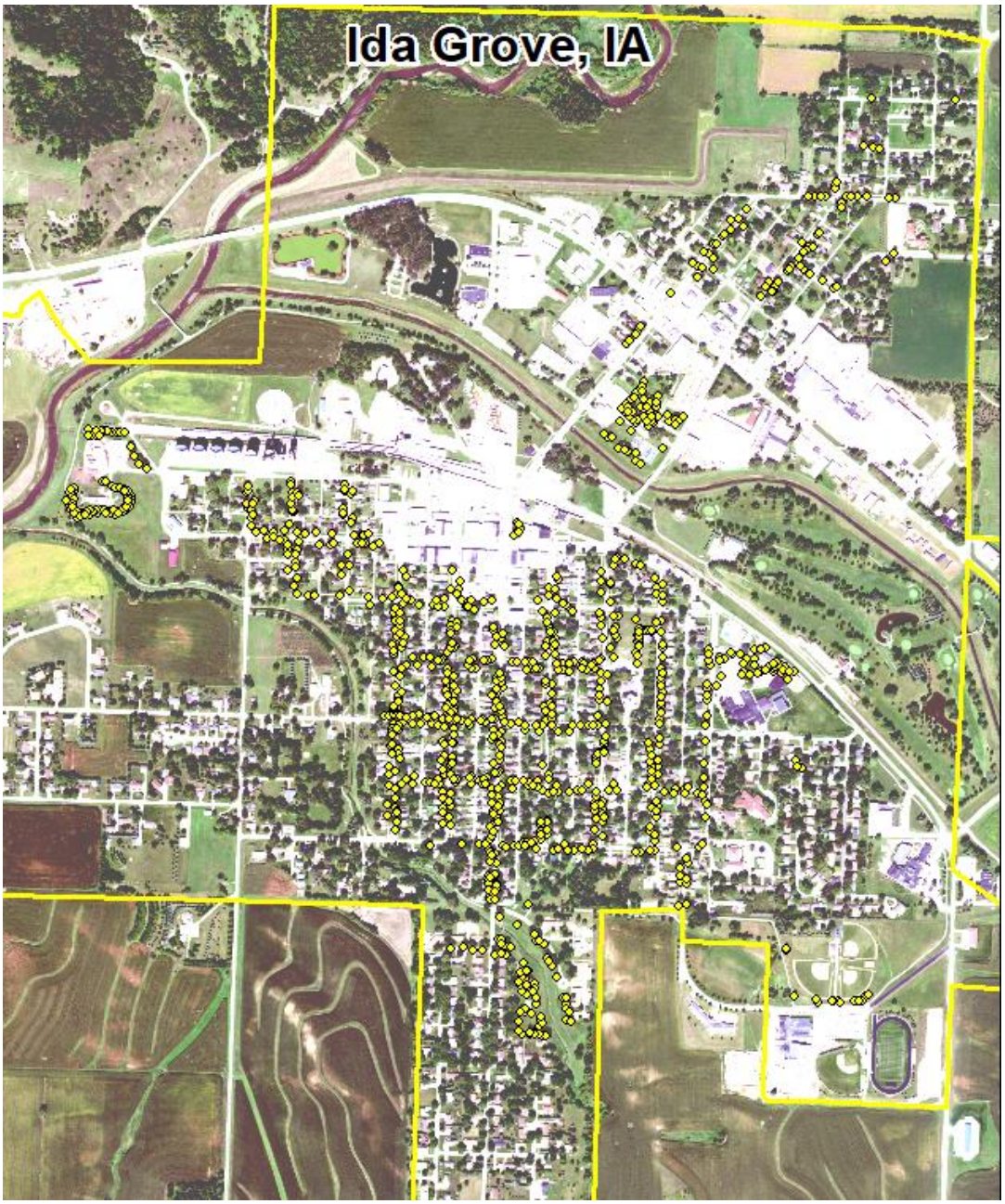
Ida Grove, IA



2023 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Ida Grove with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 20% of Ida Grove's city owned trees (ash) will die once EAB becomes established in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

Inventory and Results

In 2022, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 1017 trees inventoried.

- Ida Grove's trees provide $208,906 of benefits annually, an average of $205 a tree
- There are over 26 species of trees
- The top three genera are: Maple 32%, Ash 20%, and Spruce 20%
- 10% of trees are in need some type of management
- 12 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 41 trees needing removal, 25 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately
- 195 of the 210 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 42 years to remove ash – Suggestion: request a budget increase to $10,000 annually and apply for grants to plant replacement trees

Introduction

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

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

Inventory

In 2022, a tree inventory was conducted that included 100% of the city owned trees on both streets and parks. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

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

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

Inventory Results

The data collected for the 1017 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Ida Grove's trees reduce energy related costs by approximately $53,802 annually (Appendix A, Table 1). These savings are both in Electricity (255.6 MWh) and in Natural Gas (35,102.8 Therms).

Annual Stormwater Benefits

Ida Grove's trees intercept about 3,085,378 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $83,614 of benefits to the city.

Annual Air Quality Benefits

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic matter (ozone). In Ida Grove, it is estimated that trees remove 3,408 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 $9,625 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Ida Grove, trees sequester about 624,797 lbs of carbon a year with an associated value of $4,686 (Appendix A, Table 5). In addition, the trees store 12,865,966 lbs of carbon, with a yearly benefit of $96,495 (Appendix A, Table 4).

Annual Aesthetics Benefits

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city livability and much more. Ida Grove receives $54,448 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, Ida Grove's trees provide $208,906 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 1018 trees in Ida Grove provide approximately $205 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Ida Grove has over 26 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	331	32%
Ash	210	20%
Spruce	120	12%
Hackberry	77	7%
Oak	57	5%
Apple	45	4%
Willow	32	3%
Linden / Basswood	32	3%
Honeylocust	22	2%
Walnut	13	1%
Birch	12	1%
Chokecherry	10	1%
Plum	9	<1%
Eastern Red Cedar	7	<1%
Elm	6	<1%
Pine	4	<1%
Hickory	2	<1%
Ohio buckeye	2	<1%
Sycamore	2	<1%
Pear	1	<1%
Kentucky coffeetree	1	<1%
Lilac	1	<1%
Mulberry	1	<1%
Tulip tree	1	<1%
Broadleaf Deciduous	6	<1%
Conifer Evergreen	13	1%

Age Class

Most of Ida Grove's trees (40%) 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. Ida Grove'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 Ida Grove indicate that 79% of the trees are in good health, with only 3% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 80% of Ida Grove'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 3% of the population.

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).

Tree Removal	41	4%
Crown Cleaning	33	3%
Treat pest/disease	14	<1%
Crown Reduction	4	<1%

Canopy Cover

The total canopy with both private and public trees is 20%, 269 acres. The canopy cover on city own properties included in the Ida Grove inventory includes approximately 31 acres (Appendix A, Figure 4). The City's Canopy goal is to increase canopy by 1%, in 30 years on all lands. To achieve this goal, it is estimated that 33 trees need to be planted annually on public and/or private lands.

Land Use and Location

The majority of Ida Grove's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7). The following describes the land use and locations for the street and park trees.

Land Use	
Single family residential	77%
Park/vacant/other	22%
Industrial/Large commercial	<1%

Location	
Planting strip	100%

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

Ida Grove has 12 critical concern trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 46 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance.

Poor tree species

After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 41 removals, 37 are ash trees. There are a total of 210 ash trees, and 195 of those have signs and symptoms that have been associated with EAB. In addition, there are 24 trees that are in poor health.

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 Ida Grove.

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 (32%) (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 or Evergreen outlined in section **12.05.030** of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance **Chapter 12.05** (Appendix C).

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

Budget and Emerald Ash Borer Plan

Six Year Maintenance Plan with <u>No Additional Funding</u>
Current Budget $4,100/year, Total $24,600 over 6 years

2023	Quantity	Est. Price
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500
Visual Survey for signs and symptoms of EAB		
		$4,100
2024		
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500
Visual Survey for signs and symptoms of EAB		
		$4,100
2025		
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500
Visual Survey for signs and symptoms of EAB		
		$4,100
2026		
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500
Visual Survey for signs and symptoms of EAB		
		$4,100
2027		
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500

Visual Survey for signs and symptoms of EAB		
		$4,100
2028		
Removal (Schedule based on priority level)	4	$2,800
Planting and Replacement	8	$800
Routine trimming (1/3 of the city trees)	5	$500
Visual Survey for signs and symptoms of EAB		
		$4,100

*Reduction of ash over 6 years: Approximately 53 ash trees removed (approximately 25% of ash). It will take approximately 42 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 to 15 years of its arrival.
**To remove all ash trees within 6 years, the budget would need to be increased to $24,000 a year. If the budget were increased to $10,000 a year all ash could be removed in 15 years.

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).

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 **12.05.030** (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, Box Elder, Chinese Elm or Evergreen.

Postponed Work

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

Monitoring

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

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if preventative treatments are not being used.

Proposed Budget Increase

EAB could potentially kill all ash trees in Ida Grove within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $24,000 a year. Additionally, it is recommended that Ida Grove apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at $15 per inch, about 4 trees could be treated per year (every other year treatment) would be $1,200. This would be 8 trees selected for treatment, and Ida Grove would still need to find $21,600 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately $4,450 a year for treatment and leave $19,550 for removal. These are alternatives to

straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees if EAB is found in Ida Grove. It is suggested to consider increasing the budget to plan for this.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Ida Grove

Annual Energy Benefits of Public Trees

1/27/2023

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	70.0	5,309	9,510.7	9,321	14,630	(N/A)	20.6	27.2	70.00
Silver maple	66.2	5,023	8,856.8	8,680	13,703	(N/A)	20.1	25.5	67.17
Norway maple	28.0	2,122	3,932.3	3,854	5,976	(N/A)	11.4	11.1	51.52
Blue spruce	7.5	570	1,111.6	1,089	1,659	(N/A)	9.3	3.1	17.46
Northern hackberry	28.3	2,146	3,954.9	3,876	6,022	(N/A)	7.6	11.2	78.20
Apple	4.7	356	696.1	682	1,038	(N/A)	4.4	1.9	23.07
Willow	3.5	265	551.9	541	805	(N/A)	3.1	1.5	25.17
Northern pin oak	7.7	588	1,117.7	1,095	1,683	(N/A)	2.7	3.1	62.34
Littleleaf linden	6.4	482	892.1	874	1,356	(N/A)	2.6	2.5	52.17
Northern red oak	4.9	373	683.1	669	1,042	(N/A)	2.5	1.9	41.70
Norway spruce	2.6	201	325.2	319	519	(N/A)	2.4	1.0	21.64
Honeylocust	7.6	578	998.4	978	1,557	(N/A)	2.2	2.9	70.76
Black walnut	3.7	280	489.2	479	759	(N/A)	1.3	1.4	58.41
Red maple	1.2	91	159.9	157	248	(N/A)	1.1	0.5	22.55
Common chokecherry	0.4	29	58.4	57	86	(N/A)	1.0	0.2	8.59
American basswood	2.2	168	306.9	301	469	(N/A)	0.7	0.9	66.94
Conifer Evergreen Large	1.0	77	132.3	130	207	(N/A)	0.7	0.4	29.55
Eastern red cedar	0.5	42	82.3	81	122	(N/A)	0.7	0.2	17.45
Elm	2.5	189	334.8	328	517	(N/A)	0.6	1.0	86.21
Conifer Evergreen Medium	0.2	13	29.1	29	42	(N/A)	0.6	0.1	6.94
Plum	0.0	3	6.9	7	10	(N/A)	0.6	0.0	1.62
Birch	0.5	40	75.6	74	114	(N/A)	0.5	0.2	22.74
River birch	0.5	42	71.4	70	112	(N/A)	0.4	0.2	27.88
Bur oak	0.7	50	84.8	83	133	(N/A)	0.4	0.2	33.18
Broadleaf Evergreen Large	1.0	76	113.5	111	187	(N/A)	0.4	0.3	46.87
Paper birch	1.1	81	139.9	137	218	(N/A)	0.3	0.4	72.63
Scotch pine	0.4	32	54.1	53	85	(N/A)	0.3	0.2	28.36
Cherry plum	0.1	9	20.4	20	29	(N/A)	0.3	0.1	9.67
Ohio buckeye	0.2	16	33.7	33	49	(N/A)	0.2	0.1	24.47
Hickory	0.7	50	93.7	92	142	(N/A)	0.2	0.3	70.91
American sycamore	0.3	25	47.3	46	72	(N/A)	0.2	0.1	35.78
Mulberry	0.2	15	31.6	31	46	(N/A)	0.1	0.1	46.14
White oak	0.0	2	3.7	4	6	(N/A)	0.1	0.0	5.82
Kentucky coffeetree	0.0	0	0.5	0	1	(N/A)	0.1	0.0	0.66
Tulip tree	0.0	0	0.5	0	1	(N/A)	0.1	0.0	0.66
Eastern white pine	0.2	14	24.6	24	38	(N/A)	0.1	0.1	38.17
Callery pear	0.2	18	29.5	29	47	(N/A)	0.1	0.1	46.78
White ash	0.1	7	13.3	13	20	(N/A)	0.1	0.0	20.10
Broadleaf Deciduous Mediu	0.2	18	29.5	29	47	(N/A)	0.1	0.1	46.78
Lilac	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Broadleaf Deciduous Small	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Total	255.6	19,401	35,102.8	34,401	53,802	(N/A)	100.0	100.0	52.90

Table 2: Annual Stormwater Benefits

Ida Grove

Annual Stormwater Benefits of Public Trees

1/27/2023

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	896,795	24,303	(N/A)	20.6	29.1	116.28
Silver maple	981,909	26,610	(N/A)	20.1	31.8	130.44
Norway maple	240,262	6,511	(N/A)	11.4	7.8	56.13
Blue spruce	95,773	2,595	(N/A)	9.3	3.1	27.32
Northern hackberry	300,202	8,135	(N/A)	7.6	9.7	105.66
Apple	18,201	493	(N/A)	4.4	0.6	10.96
Willow	19,574	530	(N/A)	3.1	0.6	16.58
Northern pin oak	78,510	2,128	(N/A)	2.7	2.5	78.80
Littleleaf linden	70,050	1,898	(N/A)	2.6	2.3	73.01
Northern red oak	53,207	1,442	(N/A)	2.5	1.7	57.68
Norway spruce	33,391	905	(N/A)	2.4	1.1	37.70
Honeylocust	89,260	2,419	(N/A)	2.2	2.9	109.95
Black walnut	36,954	1,001	(N/A)	1.3	1.2	77.03
Red maple	8,023	217	(N/A)	1.1	0.3	19.77
Common chokecherry	1,297	35	(N/A)	1.0	0.0	3.51
American basswood	27,918	757	(N/A)	0.7	0.9	108.08
Conifer Evergreen Large	20,456	554	(N/A)	0.7	0.7	79.19
Eastern red cedar	7,881	214	(N/A)	0.7	0.3	30.51
Elm	35,288	956	(N/A)	0.6	1.1	159.39
Conifer Evergreen Medium	1,539	42	(N/A)	0.6	0.0	6.95
Plum	106	3	(N/A)	0.6	0.0	0.48
Birch	2,906	79	(N/A)	0.5	0.1	15.75
River birch	3,144	85	(N/A)	0.4	0.1	21.30
Bur oak	7,146	194	(N/A)	0.4	0.2	48.41
Broadleaf Evergreen Large	10,109	274	(N/A)	0.4	0.3	68.49
Paper birch	15,086	409	(N/A)	0.3	0.5	136.27
Scotch pine	7,477	203	(N/A)	0.3	0.2	67.54
Cherry plum	402	11	(N/A)	0.3	0.0	3.63
Ohio buckeye	1,172	32	(N/A)	0.2	0.0	15.88
Hickory	7,886	214	(N/A)	0.2	0.3	106.85
American sycamore	3,961	107	(N/A)	0.2	0.1	53.67
Mulberry	1,174	32	(N/A)	0.1	0.0	31.82
White oak	172	5	(N/A)	0.1	0.0	4.65
Kentucky coffeetree	18	0	(N/A)	0.1	0.0	0.48
Tulip tree	18	0	(N/A)	0.1	0.0	0.48
Eastern white pine	4,605	125	(N/A)	0.1	0.1	124.79
Callery pear	1,409	38	(N/A)	0.1	0.0	38.19
White ash	614	17	(N/A)	0.1	0.0	16.63
Broadleaf Deciduous Medium	1,409	38	(N/A)	0.1	0.0	38.19
Lilac	7	0	(N/A)	0.1	0.0	0.20
Broadleaf Deciduous Small	69	2	(N/A)	0.1	0.0	1.86
Citywide total	3,085,378	83,614	(N/A)	100.0	100.0	82.22

Table 3: Annual Air Quality Benefits

Ida Grove

Annual Air Quality Benefits of Public Trees

1/27/2023

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($) Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2							
Green ash	134.2	21.5	61.3	6.0	707	333.4	48.6	46.3	317.0	2,078	0.0	0	968.4	2,785 (N/A)	20.6	13.33
Silver maple	182.9	31.0	88.9	8.1	984	313.4	45.8	43.7	299.4	1,957	-99.2	-372	913.9	2,569 (N/A)	20.1	12.59
Norway maple	47.0	8.1	23.3	2.1	255	134.7	19.5	18.6	126.9	837	-11.2	-42	369.0	1,049 (N/A)	11.4	9.04
Blue spruce	10.8	2.1	9.7	1.3	74	36.5	5.3	5.0	34.0	226	-32.3	-121	72.4	178 (N/A)	9.3	1.87
Northern hackberry	56.2	9.7	27.7	2.5	304	136.0	19.7	18.8	128.2	845	0.0	0	398.8	1,149 (N/A)	7.6	14.92
Apple	5.2	0.9	2.5	0.2	28	22.9	3.3	3.1	21.3	141	0.0	0	59.3	169 (N/A)	4.4	3.75
Willow	2.0	0.3	1.3	0.1	12	17.3	2.5	2.3	15.8	106	-0.7	-2	41.0	115 (N/A)	3.1	3.61
Northern pin oak	16.8	2.9	8.2	0.7	91	37.6	5.4	5.2	35.1	233	-3.9	-15	108.1	309 (N/A)	2.7	11.44
Littleleaf linden	12.6	2.2	6.1	0.6	68	30.6	4.4	4.2	28.8	190	-6.0	-22	83.6	236 (N/A)	2.6	9.06
Northern red oak	11.6	2.0	5.6	0.5	62	23.5	3.4	3.3	22.3	146	-16.6	-62	55.5	146 (N/A)	2.5	5.84
Norway spruce	3.6	0.7	3.2	0.4	24	12.3	1.8	1.7	12.0	77	-12.8	-48	23.0	54 (N/A)	2.4	2.24
Honeylocust	17.6	2.9	8.0	0.8	93	35.9	5.3	5.0	34.5	225	-13.8	-52	96.1	266 (N/A)	2.2	12.08
Black walnut	4.7	0.8	2.3	0.2	25	17.5	2.6	2.4	16.7	109	0.0	0	47.2	135 (N/A)	1.3	10.35
Red maple	1.6	0.3	0.8	0.1	9	5.7	0.8	0.8	5.5	36	-0.6	-2	14.9	42 (N/A)	1.1	3.82
Common chokecherry	0.3	0.0	0.1	0.0	2	1.9	0.3	0.3	1.7	11	0.0	0	4.6	13 (N/A)	1.0	1.30
American basswood	4.2	0.7	2.0	0.2	22	10.6	1.5	1.5	10.0	66	-3.5	-13	27.3	75 (N/A)	0.7	10.78
Conifer Evergreen Large	2.4	0.5	2.0	0.3	16	4.8	0.7	0.7	4.6	30	-11.2	-42	4.7	4 (N/A)	0.7	0.55
Eastern red cedar	1.5	0.3	1.2	0.2	10	2.7	0.4	0.4	2.5	16	-4.3	-16	4.8	10 (N/A)	0.7	1.44
Elm	6.6	1.1	2.9	0.3	34	11.8	1.7	1.6	11.3	74	0.0	0	37.4	108 (N/A)	0.6	18.07
Conifer Evergreen Medium	0.1	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	-0.4	-1	1.7	5 (N/A)	0.6	0.75
Plum	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)	0.6	0.21
Birch	0.3	0.1	0.2	0.0	2	2.5	0.4	0.3	2.4	16	-0.1	0	6.1	17 (N/A)	0.5	3.46
River birch	0.5	0.1	0.2	0.0	3	2.6	0.4	0.4	2.5	16	-0.1	0	6.5	18 (N/A)	0.4	4.56
Bur oak	0.9	0.1	0.4	0.0	5	3.1	0.5	0.4	3.0	19	0.0	0	8.4	24 (N/A)	0.4	6.02
Broadleaf Evergreen Large	0.8	0.2	0.8	0.1	6	4.6	0.7	0.7	4.5	29	-4.2	-16	8.2	19 (N/A)	0.4	4.77
Paper birch	3.2	0.5	1.4	0.1	17	5.0	0.7	0.7	4.8	31	0.0	0	16.5	48 (N/A)	0.3	16.03
Scotch pine	0.9	0.2	0.7	0.1	6	2.0	0.3	0.3	1.9	12	-3.3	-12	3.0	6 (N/A)	0.3	1.90
Cherry plum	0.1	0.0	0.0	0.0	0	0.6	0.1	0.1	0.5	4	0.0	0	1.4	4 (N/A)	0.3	1.32
Ohio buckeye	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)	0.2	3.47
Hickory	1.0	0.2	0.5	0.0	5	3.2	0.5	0.4	3.0	20	0.0	0	8.7	25 (N/A)	0.2	12.48
American sycamore	0.5	0.1	0.2	0.0	3	1.6	0.2	0.2	1.5	10	0.0	0	4.4	13 (N/A)	0.2	6.28
Mulberry	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)	0.1	8.35
White oak	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)	0.1	0.87
Kentucky coffeetree	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.1	0.08
Tulip tree	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.1	0.08
Eastern white pine	0.6	0.1	0.4	0.1	4	0.9	0.1	0.1	0.8	5	-2.9	-11	0.3	-2 (N/A)	0.1	-1.58
Callery pear	0.2	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	-0.1	0	2.8	8 (N/A)	0.1	7.92
White ash	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)	0.1	2.91
Broadleaf Deciduous Medium	0.2	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	-0.1	0	2.8	8 (N/A)	0.1	7.92
Lilac	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.1	0.11
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)	0.1	0.71
Citywide total	531.7	89.6	262.8	25.3	2,873	1,221.1	177.7	169.4	1,158.1	7,604	-227.3	-852	3,408.4	9,625 (N/A)	100.0	9.46

Table 4: Annual Carbon Stored

Ida Grove

Stored CO2 Benefits of Public Trees

1/27/2023

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	4,516,610	33,875	(N/A)	20.6	35.1	162.08
Silver maple	4,573,124	34,298	(N/A)	20.1	35.5	168.13
Norway maple	771,596	5,787	(N/A)	11.4	6.0	49.89
Blue spruce	61,873	464	(N/A)	9.3	0.5	4.88
Northern hackberry	908,324	6,812	(N/A)	7.6	7.1	88.47
Apple	81,448	611	(N/A)	4.4	0.6	13.57
Willow	37,745	283	(N/A)	3.1	0.3	8.85
Northern pin oak	277,284	2,080	(N/A)	2.7	2.2	77.02
Littleleaf linden	267,784	2,008	(N/A)	2.6	2.1	77.25
Northern red oak	255,868	1,919	(N/A)	2.5	2.0	76.76
Norway spruce	28,011	210	(N/A)	2.4	0.2	8.75
Honeylocust	227,166	1,704	(N/A)	2.2	1.8	77.44
Black walnut	158,345	1,188	(N/A)	1.3	1.2	91.35
Red maple	18,504	139	(N/A)	1.1	0.1	12.62
Common chokecherry	4,875	37	(N/A)	1.0	0.0	3.66
American basswood	162,532	1,219	(N/A)	0.7	1.3	174.14
Conifer Evergreen La	28,411	213	(N/A)	0.7	0.2	30.44
Eastern red cedar	4,965	37	(N/A)	0.7	0.0	5.32
Elm	228,290	1,712	(N/A)	0.6	1.8	285.36
Conifer Evergreen Me	257	2	(N/A)	0.6	0.0	0.32
Plum	247	2	(N/A)	0.6	0.0	0.31
Birch	6,262	47	(N/A)	0.5	0.0	9.39
River birch	7,685	58	(N/A)	0.4	0.1	14.41
Bur oak	29,813	224	(N/A)	0.4	0.2	55.90
Broadleaf Evergreen I	14,380	108	(N/A)	0.4	0.1	26.96
Paper birch	112,998	847	(N/A)	0.3	0.9	282.50
Scotch pine	7,856	59	(N/A)	0.3	0.1	19.64
Cherry plum	1,263	9	(N/A)	0.3	0.0	3.16
Ohio buckeye	2,201	17	(N/A)	0.2	0.0	8.26
Hickory	31,546	237	(N/A)	0.2	0.2	118.30
American sycamore	15,785	118	(N/A)	0.2	0.1	59.19
Mulberry	6,743	51	(N/A)	0.1	0.1	50.57
White oak	185	1	(N/A)	0.1	0.0	1.39
Kentucky coffeetree	12	0	(N/A)	0.1	0.0	0.09
Tulip tree	12	0	(N/A)	0.1	0.0	0.09
Eastern white pine	7,490	56	(N/A)	0.1	0.1	56.18
Callery pear	3,624	27	(N/A)	0.1	0.0	27.18
White ash	1,035	8	(N/A)	0.1	0.0	7.76
Broadleaf Deciduous	3,624	27	(N/A)	0.1	0.0	27.18
Lilac	14	0	(N/A)	0.1	0.0	0.10
Broadleaf Deciduous	178	1	(N/A)	0.1	0.0	1.33
Citywide total	12,865,966	96,495	(N/A)	100.0	100.0	94.88

Table 5: Annual Carbon Sequestered

Ida Grove

Annual CO Benefits of Public Trees

1/27/2023

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
Green ash	147,854	1,109	-21,680	-762	-168	117,333	880	242,745	1,821 (N/A)	20.6	24.5	8.71
Silver maple	309,591	2,322	-21,953	-771	-170	111,007	833	397,875	2,984 (N/A)	20.1	40.2	14.63
Norway maple	38,081	286	-3,704	-287	-30	46,905	352	80,995	607 (N/A)	11.4	8.2	5.24
Blue spruce	5,311	40	-297	-135	-3	12,592	94	17,471	131 (N/A)	9.3	1.8	1.38
Northern hackberry	36,959	277	-4,360	-281	-35	47,424	356	79,742	598 (N/A)	7.6	8.1	7.77
Apple	7,543	57	-391	-61	-3	7,869	59	14,961	112 (N/A)	4.4	1.5	2.49
Willow	7,328	55	-181	-38	-2	5,847	44	12,956	97 (N/A)	3.1	1.3	3.04
Northern pin oak	7,455	56	-1,331	-87	-11	12,990	97	19,028	143 (N/A)	2.7	1.9	5.29
Littleleaf linden	14,533	109	-1,285	-80	-10	10,657	80	23,824	179 (N/A)	2.6	2.4	6.87
Northern red oak	2,002	15	-1,228	-65	-10	8,242	62	8,951	67 (N/A)	2.5	0.9	2.69
Norway spruce	2,473	19	-134	-43	-1	4,436	33	6,732	50 (N/A)	2.4	0.7	2.10
Honeylocust	9,064	68	-1,090	-59	-9	12,779	96	20,693	155 (N/A)	2.2	2.1	7.05
Black walnut	7,820	59	-760	-37	-6	6,186	46	13,210	99 (N/A)	1.3	1.3	7.62
Red maple	2,417	18	-89	-12	-1	2,018	15	4,334	33 (N/A)	1.1	0.4	2.96
Common chokecherry	597	4	-24	-7	0	635	5	1,203	9 (N/A)	1.0	0.1	0.90
American basswood	8,666	65	-780	-26	-6	3,708	28	11,568	87 (N/A)	0.7	1.2	12.39
Conifer Evergreen Large	1,239	9	-136	-18	-1	1,707	13	2,791	21 (N/A)	0.7	0.3	2.99
Eastern red cedar	123	1	-24	-10	0	917	7	1,006	8 (N/A)	0.7	0.1	1.08
Elm	4,015	30	-1,096	-29	-8	4,180	31	7,071	53 (N/A)	0.6	0.7	8.84
Conifer Evergreen Mediun	72	1	-1	-4	0	290	2	358	3 (N/A)	0.6	0.0	0.45
Plum	81	1	-1	-2	0	65	0	144	1 (N/A)	0.6	0.0	0.18
Birch	1,025	8	-31	-5	0	876	7	1,864	14 (N/A)	0.5	0.2	2.80
River birch	963	7	-38	-5	0	919	7	1,839	14 (N/A)	0.4	0.2	3.45
Bur oak	1,482	11	-143	-7	-1	1,096	8	2,427	18 (N/A)	0.4	0.2	4.55
Broadleaf Evergreen Large	1,674	13	-69	-8	-1	1,685	13	3,282	25 (N/A)	0.4	0.3	6.15
Paper birch	1,167	9	-542	-13	-4	1,785	13	2,396	18 (N/A)	0.3	0.2	5.99
Scotch pine	490	4	-38	-7	0	709	5	1,154	9 (N/A)	0.3	0.1	2.89
Cherry plum	190	1	-6	-2	0	199	1	380	3 (N/A)	0.3	0.0	0.95
Ohio buckeye	448	3	-11	-2	0	352	3	787	6 (N/A)	0.2	0.1	2.95
Hickory	1,714	13	-151	-7	-1	1,105	8	2,660	20 (N/A)	0.2	0.3	9.97
American sycamore	859	6	-76	-4	-1	557	4	1,337	10 (N/A)	0.2	0.1	5.01
Mulberry	478	4	-32	-3	0	335	3	778	6 (N/A)	0.1	0.1	5.84
White oak	74	1	-1	-1	0	49	0	121	1 (N/A)	0.1	0.0	0.91
Kentucky coffeetree	3	0	0	0	0	4	0	7	0 (N/A)	0.1	0.0	0.05
Tulip tree	3	0	0	0	0	4	0	7	0 (N/A)	0.1	0.0	0.05
Eastern white pine	0	0	-36	-5	0	311	2	270	2 (N/A)	0.1	0.0	2.02
Callery pear	386	3	-17	-2	0	395	3	762	6 (N/A)	0.1	0.1	5.71
White ash	182	1	-5	-1	0	156	1	331	2 (N/A)	0.1	0.0	2.49
Broadleaf Deciduous Medi	386	3	-17	-2	0	395	3	762	6 (N/A)	0.1	0.1	5.71
Lilac	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Broadleaf Deciduous Smal	38	0	-1	-1	0	37	0	74	1 (N/A)	0.1	0.0	0.55
Citywide total	624,797	4,686	-61,762	-2,889	-485	428,761	3,216	988,906	7,417 (N/A)	100.0	100.0	7.29

Table 6: Annual Social and Aesthetic Benefits

Ida Grove

Annual Aesthetic/Other Benefits of Public Trees

1/27/2023

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	11,344	(N/A)	20.6	20.8	54.28
Silver maple	22,782	(N/A)	20.1	41.8	111.68
Norway maple	3,698	(N/A)	11.4	6.8	31.88
Blue spruce	2,022	(N/A)	9.3	3.7	21.28
Northern hackberry	4,676	(N/A)	7.6	8.6	60.73
Apple	434	(N/A)	4.4	0.8	9.64
Willow	852	(N/A)	3.1	1.6	26.63
Northern pin oak	694	(N/A)	2.7	1.3	25.69
Littleleaf linden	1,459	(N/A)	2.6	2.7	56.10
Northern red oak	159	(N/A)	2.5	0.3	6.35
Norway spruce	651	(N/A)	2.4	1.2	27.14
Honeylocust	2,048	(N/A)	2.2	3.8	93.10
Black walnut	678	(N/A)	1.3	1.2	52.19
Red maple	337	(N/A)	1.1	0.6	30.63
Common chokecherry	32	(N/A)	1.0	0.1	3.23
American basswood	575	(N/A)	0.7	1.1	82.18
Conifer Evergreen Large	206	(N/A)	0.7	0.4	29.41
Eastern red cedar	61	(N/A)	0.7	0.1	8.66
Elm	277	(N/A)	0.6	0.5	46.10
Conifer Evergreen Medium	74	(N/A)	0.6	0.1	12.31
Plum	2	(N/A)	0.6	0.0	0.37
Birch	117	(N/A)	0.5	0.2	23.47
River birch	104	(N/A)	0.4	0.2	26.02
Bur oak	132	(N/A)	0.4	0.2	33.11
Broadleaf Evergreen Large	389	(N/A)	0.4	0.7	97.24
Paper birch	86	(N/A)	0.3	0.2	28.57
Scotch pine	126	(N/A)	0.3	0.2	42.16
Cherry plum	11	(N/A)	0.3	0.0	3.51
Ohio buckeye	52	(N/A)	0.2	0.1	26.22
Hickory	131	(N/A)	0.2	0.2	65.59
American sycamore	71	(N/A)	0.2	0.1	35.43
Mulberry	29	(N/A)	0.1	0.1	28.80
White oak	15	(N/A)	0.1	0.0	14.73
Kentucky coffeetree	5	(N/A)	0.1	0.0	5.26
Tulip tree	5	(N/A)	0.1	0.0	5.26
Eastern white pine	0	(N/A)	0.1	0.0	0.00
Callery pear	39	(N/A)	0.1	0.1	39.16
White ash	33	(N/A)	0.1	0.1	33.42
Broadleaf Deciduous Medium	39	(N/A)	0.1	0.1	39.16
Lilac	0	(N/A)	0.1	0.0	0.03
Broadleaf Deciduous Small	2	(N/A)	0.1	0.0	2.06
Citywide total	54,448	(N/A)	100.0	100.0	53.54

Table 7: Summary of Benefits in Dollars

Ida Grove

Total Annual Benefits of Public Trees by Species ($)

1/27/2023

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Green ash	14,630	1,821	2,785	24,303	11,344	54,882	(N/A)	26.3
Silver maple	13,703	2,984	2,569	26,610	22,782	68,647	(N/A)	32.9
Norway maple	5,976	607	1,049	6,511	3,698	17,842	(N/A)	8.5
Blue spruce	1,659	131	178	2,595	2,022	6,585	(N/A)	3.2
Northern hackberry	6,022	598	1,149	8,135	4,676	20,580	(N/A)	9.9
Apple	1,038	112	169	493	434	2,246	(N/A)	1.1
Willow	805	97	115	530	852	2,400	(N/A)	1.1
Northern pin oak	1,683	143	309	2,128	694	4,956	(N/A)	2.4
Littleleaf linden	1,356	179	236	1,898	1,459	5,128	(N/A)	2.5
Northern red oak	1,042	67	146	1,442	159	2,856	(N/A)	1.4
Norway spruce	519	50	54	905	651	2,180	(N/A)	1.0
Honeylocust	1,557	155	266	2,419	2,048	6,445	(N/A)	3.1
Black walnut	759	99	135	1,001	678	2,673	(N/A)	1.3
Red maple	248	33	42	217	337	877	(N/A)	0.4
Common chokecherry	86	9	13	35	32	175	(N/A)	0.1
American basswood	469	87	75	757	575	1,963	(N/A)	0.9
Conifer Evergreen Large	207	21	4	554	206	992	(N/A)	0.5
Eastern red cedar	122	8	10	214	61	414	(N/A)	0.2
Elm	517	53	108	956	277	1,912	(N/A)	0.9
Conifer Evergreen Medi	42	3	5	42	74	164	(N/A)	0.1
Plum	10	1	1	3	2	17	(N/A)	0.0
Birch	114	14	17	79	117	341	(N/A)	0.2
River birch	112	14	18	85	104	333	(N/A)	0.2
Bur oak	133	18	24	194	132	501	(N/A)	0.2
Broadleaf Evergreen La	187	25	19	274	389	894	(N/A)	0.4
Paper birch	218	18	48	409	86	778	(N/A)	0.4
Scotch pine	85	9	6	203	126	429	(N/A)	0.2
Cherry plum	29	3	4	11	11	57	(N/A)	0.0
Ohio buckeye	49	6	7	32	52	146	(N/A)	0.1
Hickory	142	20	25	214	131	532	(N/A)	0.3
American sycamore	72	10	13	107	71	272	(N/A)	0.1
Mulberry	46	6	8	32	29	121	(N/A)	0.1
White oak	6	1	1	5	15	27	(N/A)	0.0
Kentucky coffeetree	1	0	0	0	5	7	(N/A)	0.0
Tulip tree	1	0	0	0	5	7	(N/A)	0.0
Eastern white pine	38	2	-2	125	0	163	(N/A)	0.1
Callery pear	47	6	8	38	39	138	(N/A)	0.1
White ash	20	2	3	17	33	76	(N/A)	0.0
Broadleaf Deciduous M	47	6	8	38	39	138	(N/A)	0.1
Lilac	1	0	0	0	0	1	(N/A)	0.0
Broadleaf Deciduous Sn	5	1	1	2	2	11	(N/A)	0.0
Citywide Total	53,802	7,417	9,625	83,614	54,448	208,906	(N/A)	100.0

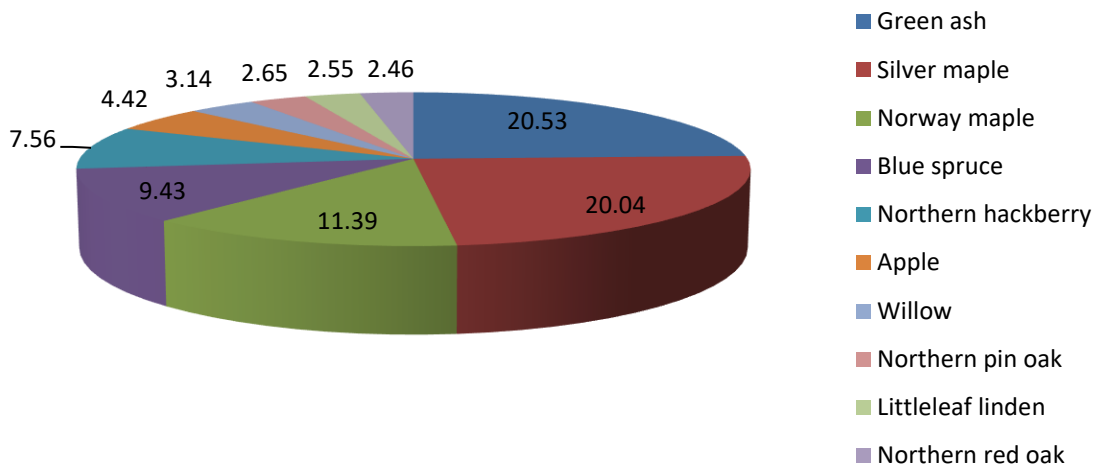

Figure 1: Species Distribution

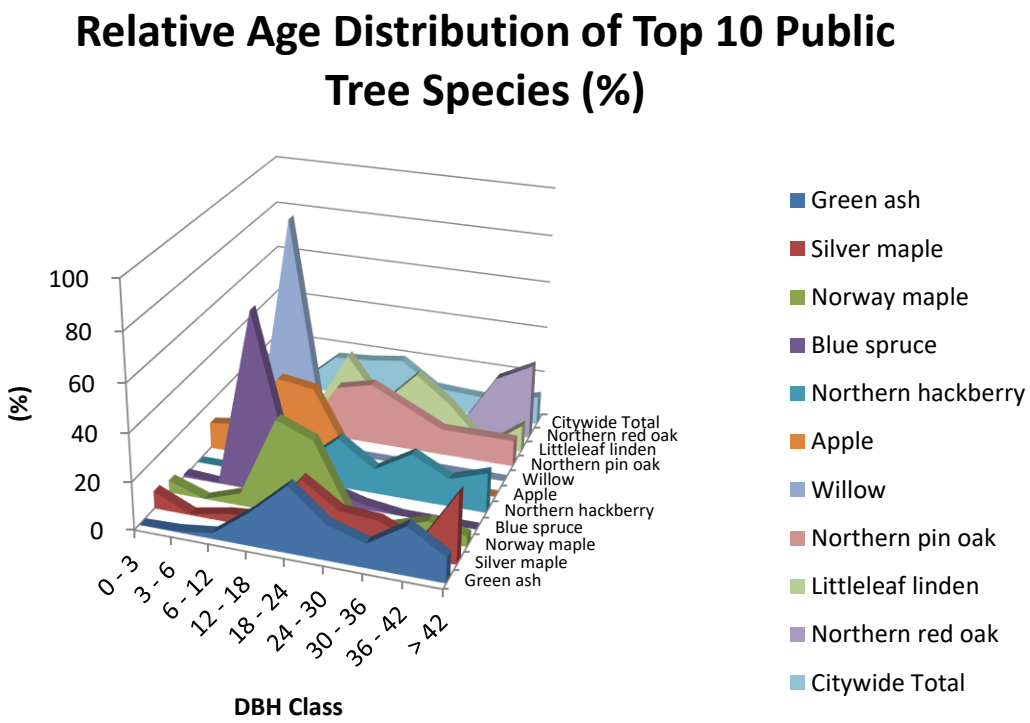

Figure 2: Relative Age Class

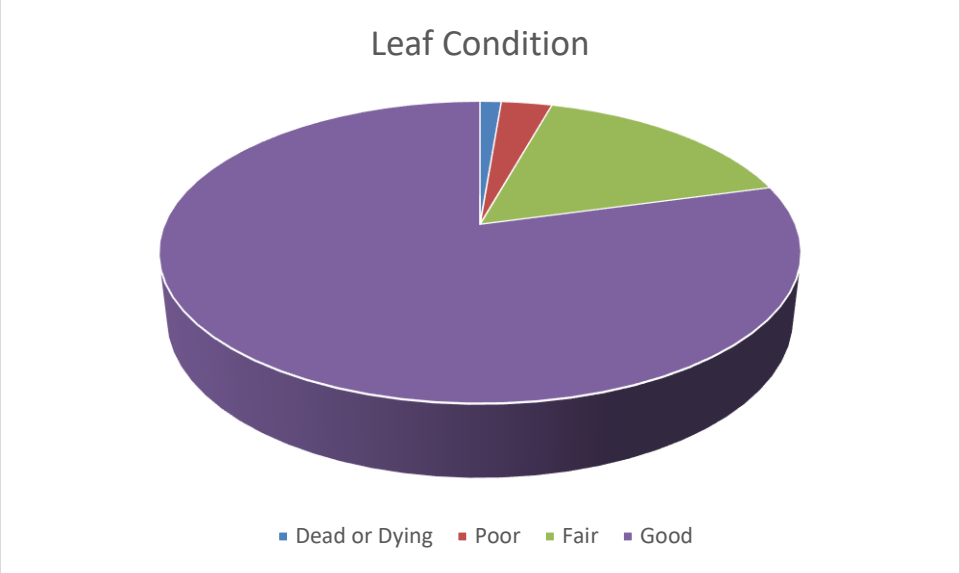

Figure 3: Foliage Condition

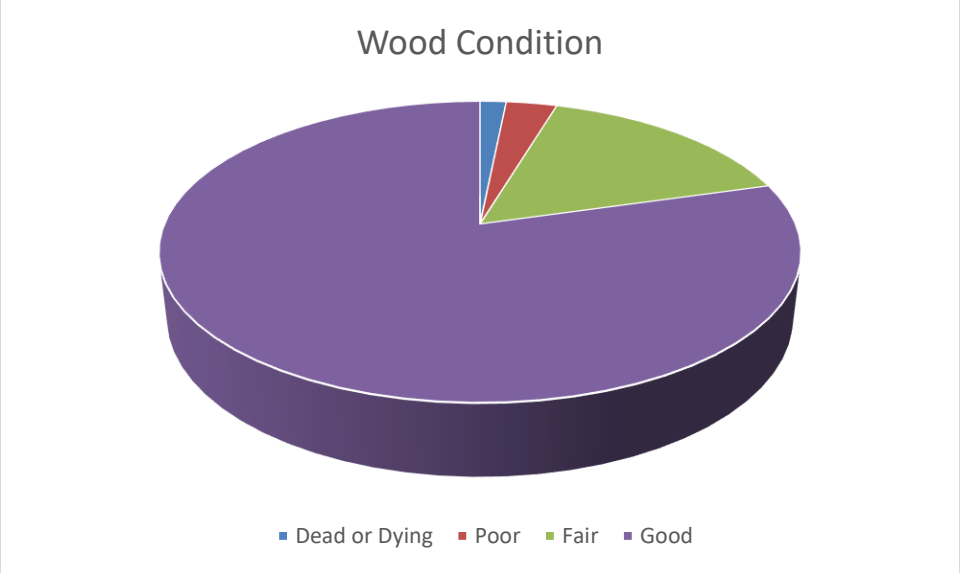

Figure 4: Wood Condition

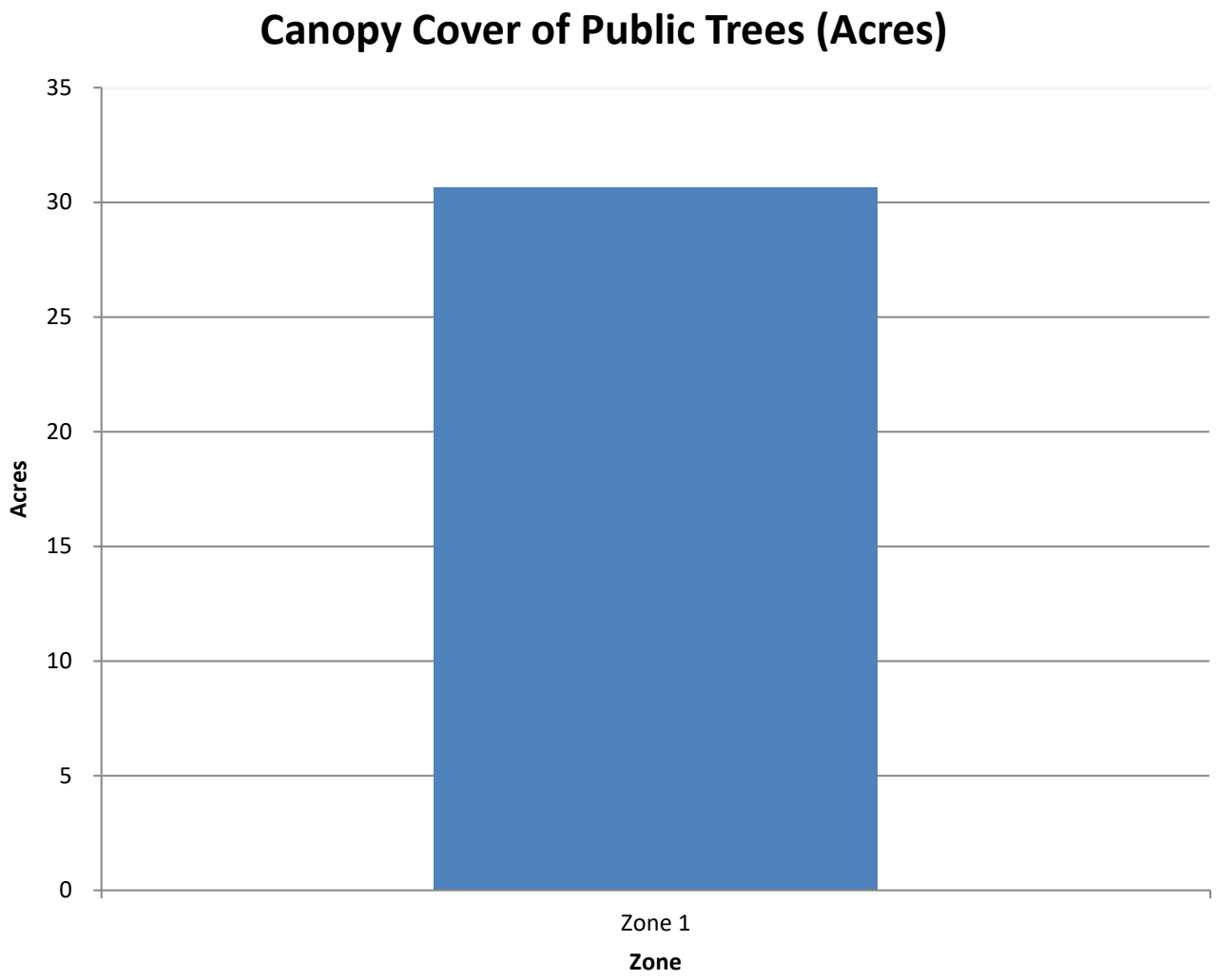

Figure 5: Canopy Cover in Acres

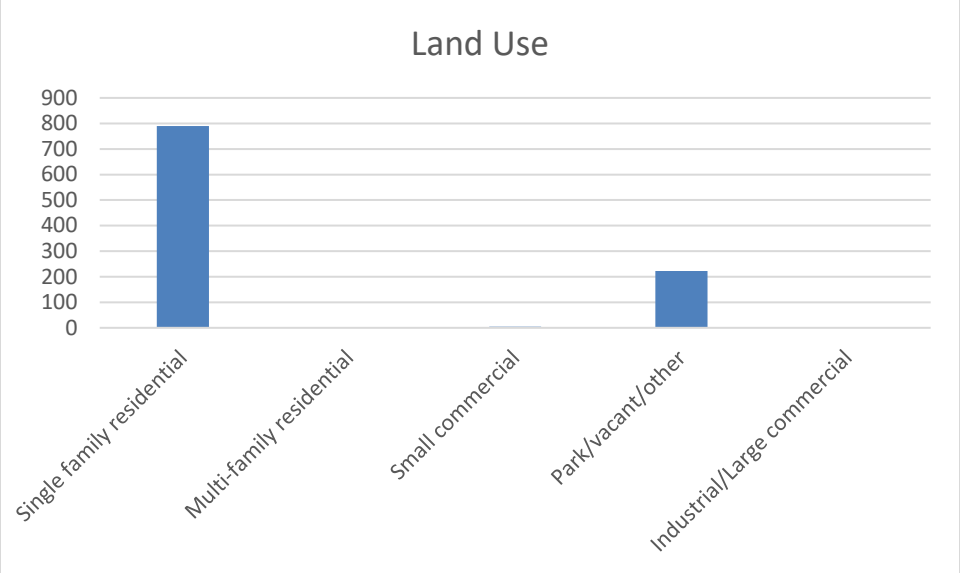

Figure 6: Land Use of city/park trees

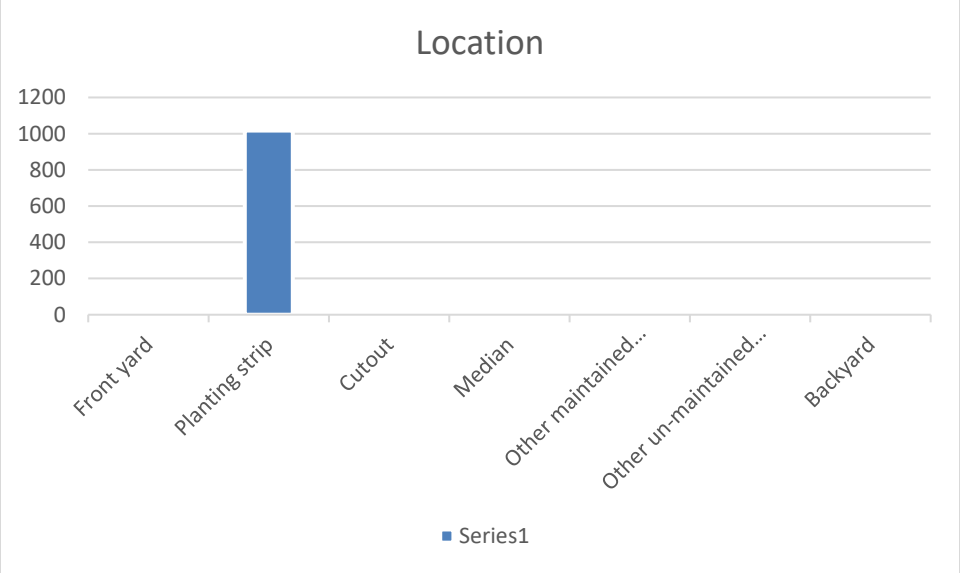

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

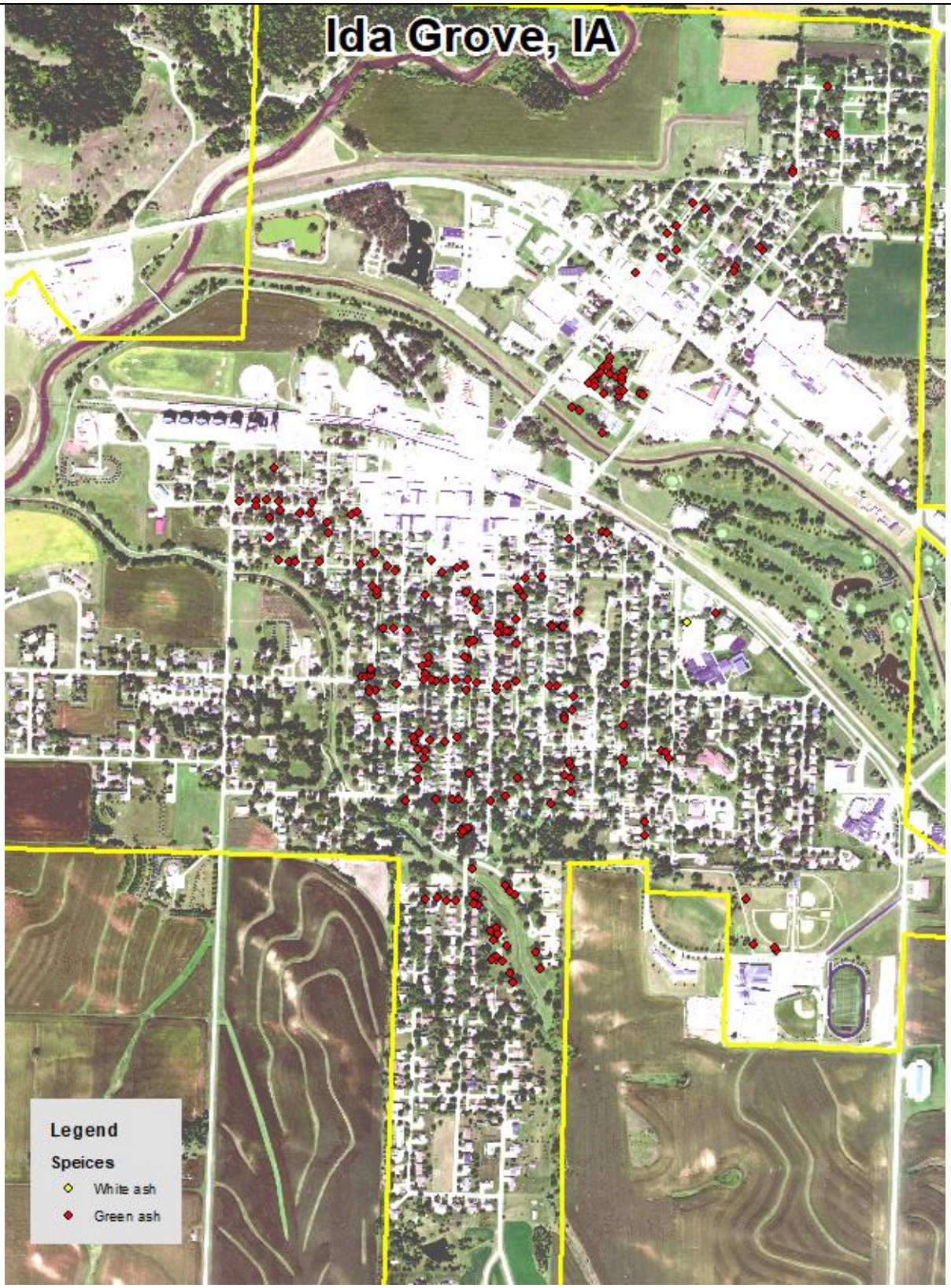

Figure 1: Location of Ash Trees

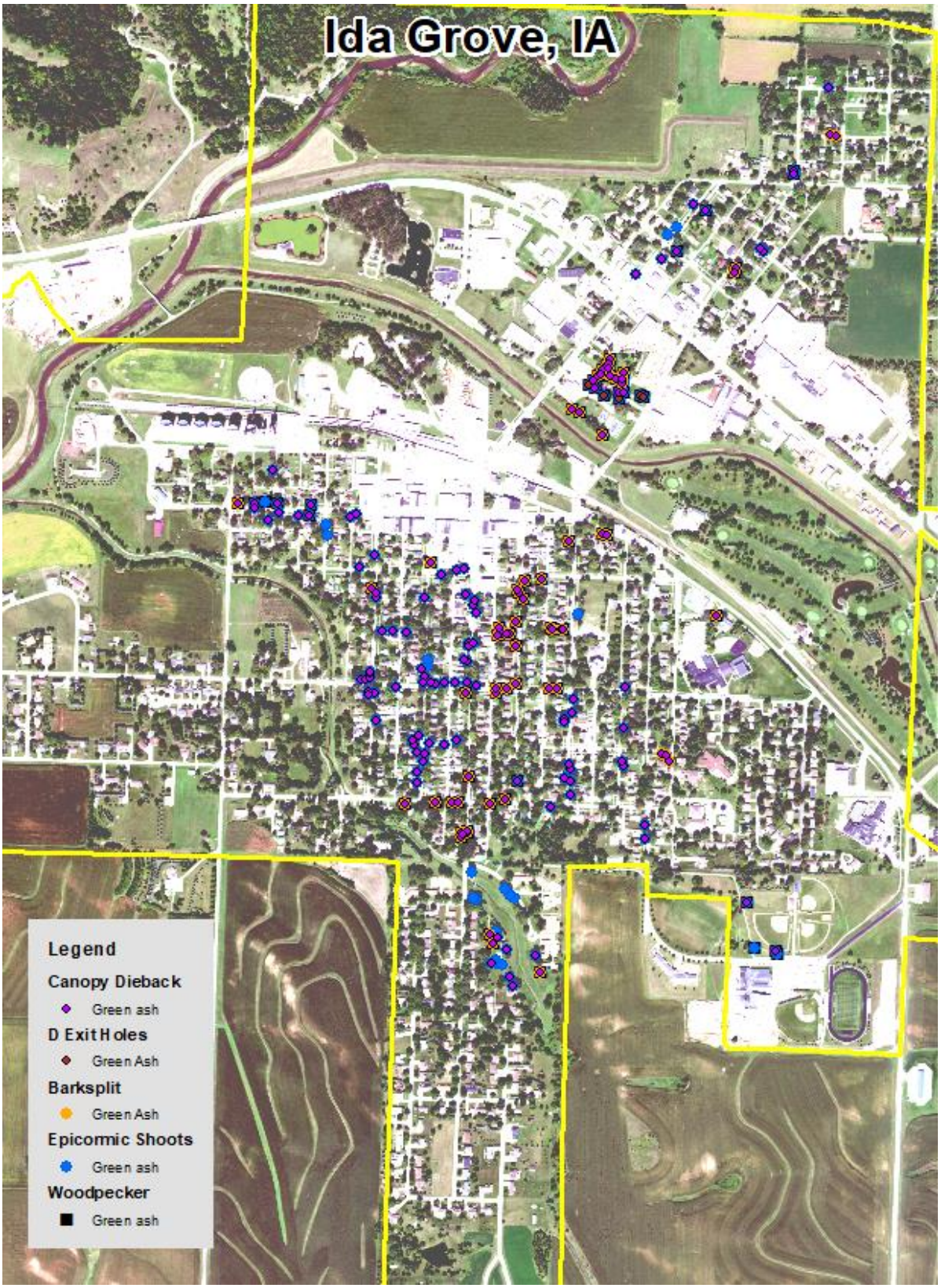

Figure 2: Location of EAB symptoms

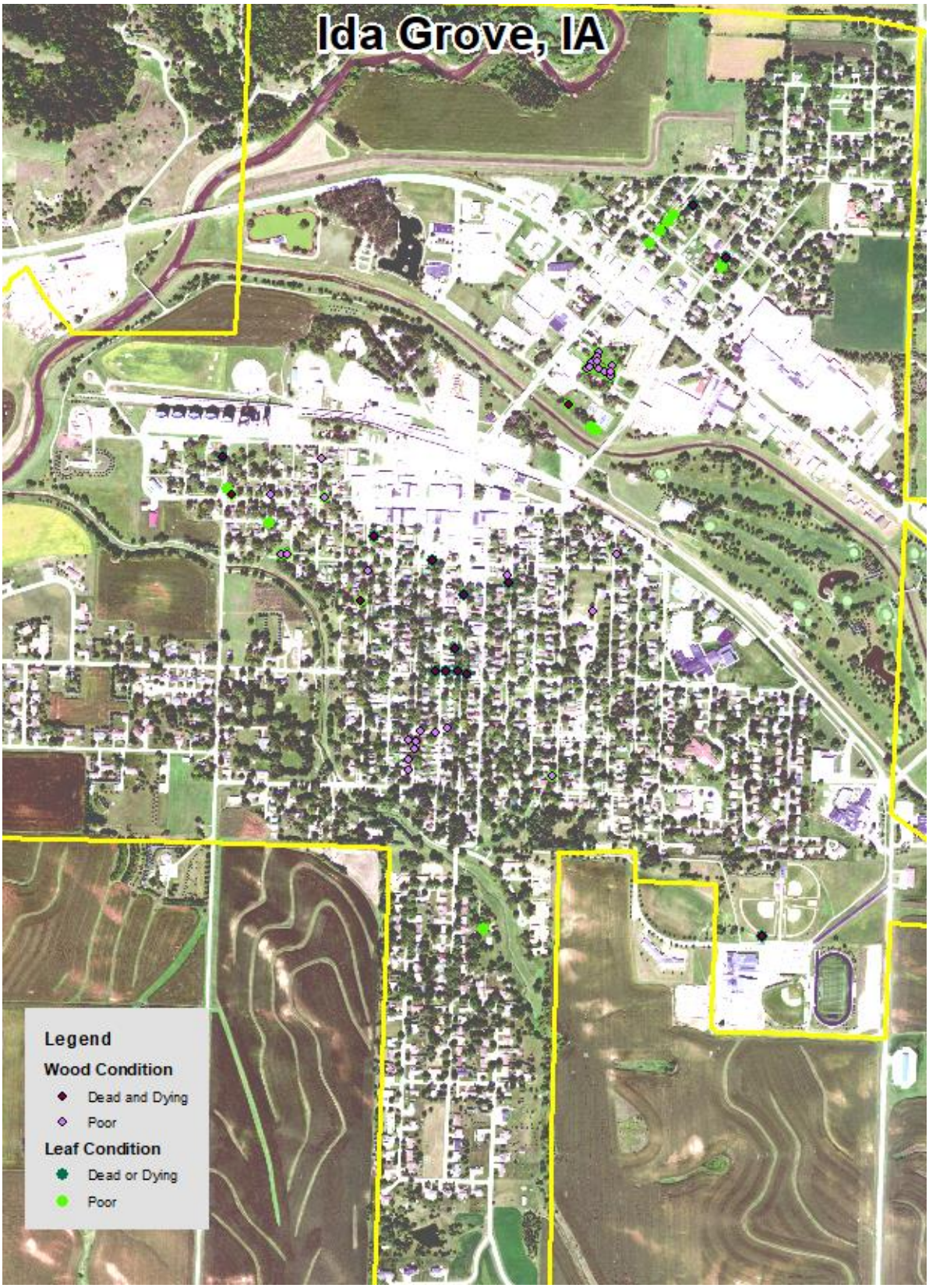

Figure 3: Location of Poor Condition Trees

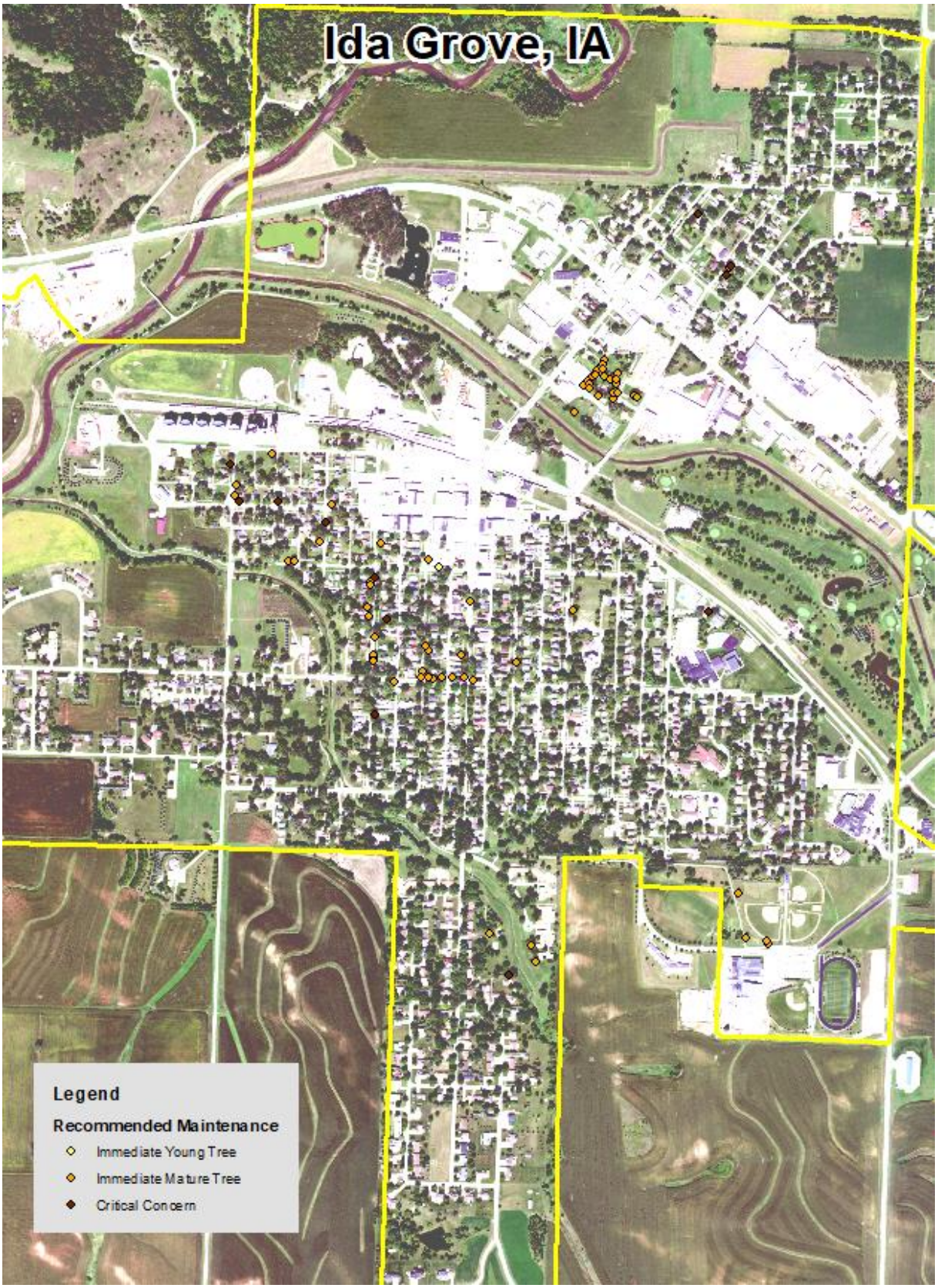

Figure 4: Location of Trees with Recommended Maintenance

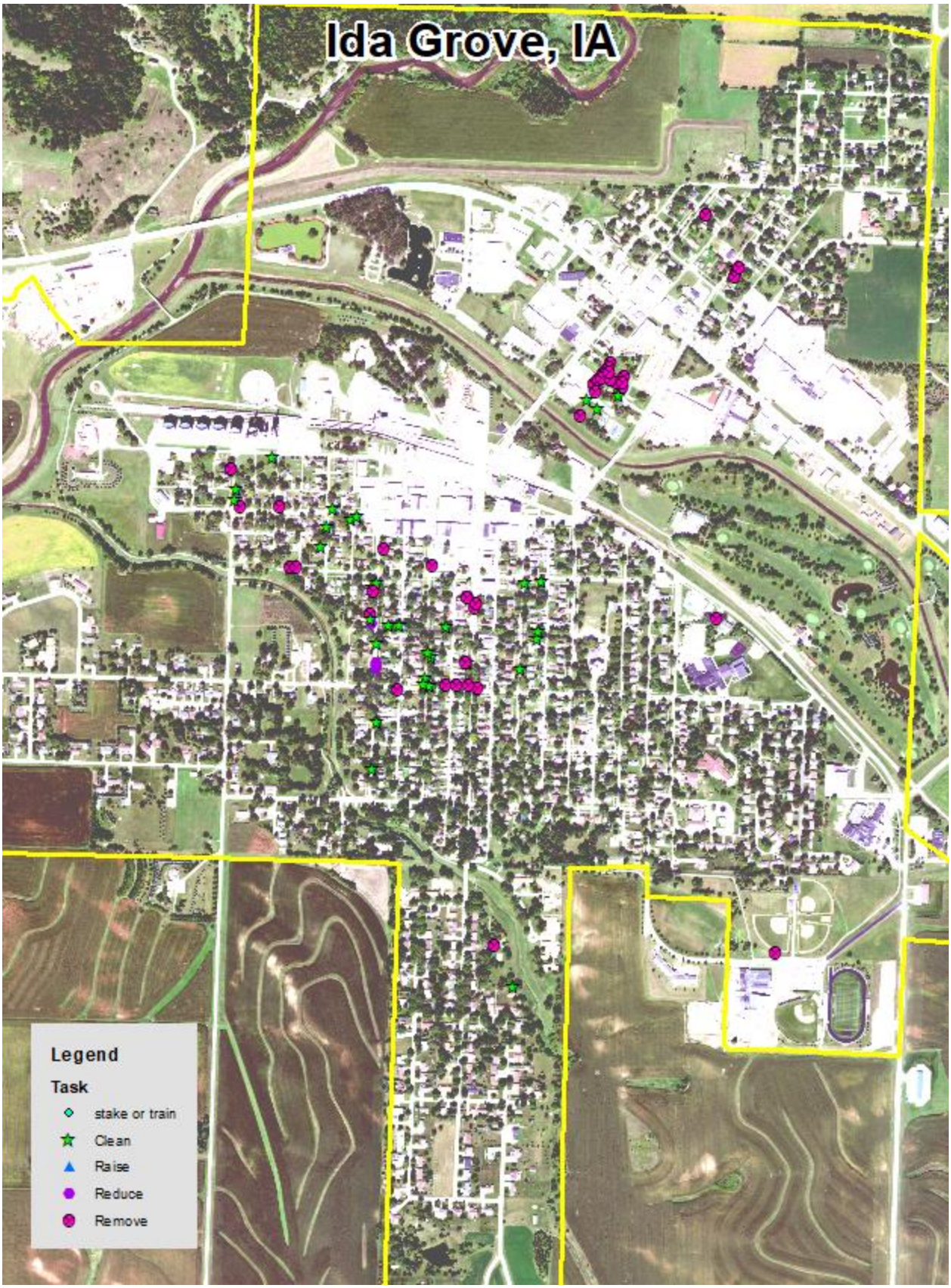

Figure 5: Maintenance Tasks

Appendix C: Ida Grove Tree Ordinances

12.05.010 Purpose.

The purpose of this chapter is to protect the public health, safety and general welfare by providing for the regulation of the planting, maintenance and removal of trees, shrubs and other plants within the city of Ida Grove, Iowa. [Ord. 435, 1993; Code 1975 § 6-2.0101.]

12.05.020 Definitions.

For use in this chapter, the following terms are defined:

"Large trees" means those trees attaining or expected to attain a height of 30 feet or more at maturity.

"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 curbline; 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.

"Street" means the entire width between property lines of streets, avenues, alleys or highways.

"Superintendent" means the superintendent of streets. No tree shall be planted in any street or

parking except in accordance with the following:

(1) *Alignment.* All trees hereafter 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 curbline or a sidewalk is not established, trees shall be planted on a line 10 feet from the property line.

(2) *Spacing.* Trees shall not be planted on the parking if it is less than nine feet in width; or contains less than 81 square feet of exposed soil surface per tree. Trees shall not be planted closer than 20 feet to street intersections (property lines extended), 10 feet to driveways and 20 feet to fireplugs. If it is at all possible, trees should be planted inside the property lines and not between the sidewalks and the curb.

(3) *Prohibited Trees.* No person shall hereinafter plant in any street any fruit bearing tree or any tree of the kinds commonly known as Cottonwood, Poplar, Box Elder, Chinese Elm or Evergreen.

(4) *Planting Under Utility Wires.* Only the following trees may be planted in any street under or within 10 lateral feet of any overhead utility wire:

(a) Acer ginnala – Amur Maple;

(b) Acer tataricum – Tatarian Maple;

(c) Acer truncatum – Shantung Maple (Purpleblow Maple);

(d) Amelanchier spp. – Serviceberry or Juneberry;

(e) Carpinus caroliniana – American Hornbeam;

(f) Cornus alternifolia – Pagoda Dogwood;

(g) Crataegus crus-galli var. inermis – Thornless Cockspur;

(h) Crataegus phaenopyrum – Washington Hawthorn;

(i) Crataegus viridis "Winter King" – Winter King

Hawthorn;

(j) Maackia amurensis – Amur Maackia;

(k) Malus spp. – Flowering Crabapple;

(l) Syringa pekinensis – Pekin Lilac;

(m) Syringa reticulata – Japanese Tree Lilac;

(n) Viburnum prunifolium – Blackhaw Viburnum;

(o) Cercis canadensis – Eastern Redbud;

(p) Cornus mas – Corneliancherry Dogwood;

(q) Cornus racemosa – Gray Dogwood;

(r) Hamamelis vernalis – Vernal Witchhazel;

(s) Hamamelis virginiana – Common Witchhazel;

(t) Magnolia X loebneri – Loebner Magnolia;

(u) Magnolia stellata – Star Magnolia;

(v) Ptelea trifoliate – Hoptree;

(w) Any other tree, except a large tree, may be planted if the property owner receives the prior written permission of the superintendent.

(5) Trees planted in streets prior to December 20, 1993, shall be permitted to remain as planted, if allowed by the ordinances and laws existing at the time of planting, but may not be replaced. [Ord. 435, 1993; Code 1975 § 6-2.0103.]

12.05.040 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 15 feet above the surface of the street traveled by vehicular traffic and eight feet above the sidewalks. Any person or persons owning or occupying real property bordering on any street upon which property there are trees shall prune such trees in a manner that they will not obstruct or shade the street lights, obstruct the passage of pedestrians on sidewalks, obstruct vision of traffic signs or obstruct the view of any street or alley intersection. [Ord. 435, 1993; Code 1975 § 6-2.0104.]

12.05.050 Assessment.

If the abutting property owner fails to trim trees, shrubbery, bushes or other vegetation, as required in this chapter, fails to remove any tree when so ordered by the superintendent or the superintendent's designee, or plants any tree, shrubbery, bushes or other vegetation, in violation of this chapter, the city may serve notice on the abutting property owner requiring the property owner to do so within five days. If the property owner fails to take the required action 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. [Ord. 435, 1993; Code 1975 § 6-2.0105.]

12.05.060 Removal of trees.

The superintendent shall remove, on the order of the council, any tree on the streets of the city which interferes with the making of improvements or with travel thereon. The superintendent shall additionally remove any trees on the street, not on private property, which have become diseased, or which constitute a danger to the public, or which may otherwise be declared a nuisance. [Ord. 435, 1993; Code 1975 § 6-2.0106.]

12.05.070 Topping prohibited.

The removal or stripping of all or substantially all branches and vegetation from the trunk of a tree or one or more main branches of a tree is prohibited. [Ord. 435, 1993; Code 1975 § 6-2.0107.]

12.05.080 Duty to abate dangerous trees.

(1) If there is a danger that all or a substantial portion of any tree or trees located on private property might fall on any public alley, street or any other public property, this would be sufficient evidence that such tree or trees constitute a nuisance.

(2) When a tree exists that would constitute a nuisance, except that the tree is located on public property, the superintendent shall abate such nuisance.

(3) If a tree that constitutes a nuisance exists upon private property, the property owner shall abate such nuisance.

(4) If such a tree exists partially on public property and partially on private property, or on two or more private property lots, the owners of the property shall be jointly responsible for abatement of such nuisance. [Ord. 435, 1993; Code 1975 § 6-2.0108.]

12.05.090 Contractor requirements.

Any person, firm, corporation or contractor hired by the city to trim or remove trees must be bonded or insured for workman's compensation and be bonded or insured for liability and personal injury to both public employees and private persons in an amount of at least $100,000.00 per person and be bonded or insured for liability and damage to public and private property in an amount of at least $100,000.00 per event. Any contractor hired by the city must demonstrate proof of such insurance before being allowed to begin any work on city or private property. [Ord. 435, 1993; Code 1975 § 6-2.0109.]

12.05.100 Intersections.

At or near intersections, all trees, shrubbery, bushes and other vegetation shall be so trimmed and pruned as to give clear vision to all vehicular traffic approaching from any direction. [Ord. 435, 1993

12.05.110 Shrubbery

All shrubbery, bushes and other vegetation in the street shall be trimmed and pruned by the owner of the premises abutting the street so as not to impede or interfere with traffic or travel on the streets or sidewalks. [Ord. 435, 1993; Code 1975 § 6-2.0111.]

12.05.120 Penalty for violation.

Any person, firm or corporation who violates the provisions of this chapter or who hinders, obstructs or otherwise interferes with the agents or employees of the city while such agents or employees are carrying out the provisions of this chapter, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in a sum not to exceed $100.00. [Ord. 435, 1993; Code 1975 § 6-2.0112.]

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.