Eagle Grove, IA

2022 Urban Forest Inventory Report
Iowa Department of Natural Resources

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Executive Summary

Overview

This plan was developed to assist the City of Eagle 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 27% of Eagle 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 2021, 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 1,437 trees inventoried.

- Eagle Grove's trees provide $319,594 of benefits annually, an average of $222 a tree
- There are over 49 species of trees
- The top three genera are: Maple 40%, Ash 27%, and Walnut 5%
- 56% of trees are in need of some type of management
- 77 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 77 trees needing removal, 26 trees should be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- There are a total of 381 ash trees on municipal property, including street rights of way. Either treat or plan to remove these ash trees immediately
- All trees should be examined on a routine schedule for pruning needs- one third of the city every other year
- Immediately begin identifying suitable locations for replanting new trees. Plant a diverse mix of trees that do not include: ash, cottonwood, poplar, box elder, Chinese elm, evergreen, or willow; maples and black walnut should be discouraged for the time being

Introduction

This report was developed to assist Eagle 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 Eagle 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 Eagle 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 Eagle 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 Eagle Grove's urban forestry goals.

Inventory

In 2021, 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 1,437 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. Fin

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Eagle Grove's trees reduce energy related costs by approximately $83,340 annually (Appendix A, Table 1). These savings are both in Electricity (396 MWh) and in Natural Gas (54,372Therms).

Annual Stormwater Benefits

Eagle Grove's trees intercept about 4.6 million gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $124,896 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 Eagle Grove, it is estimated that trees remove 5,191 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 $14,667 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Eagle Grove, trees sequester about 1.5 million lbs of carbon a year with an associated value of $11,624 (Appendix A, Table 5). In addition, the trees store 17.8 million lbs of carbon, with a yearly benefit of $133,742 (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. Eagle Grove receives $85,067 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, Eagle Grove's trees provide $319,594 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 1,437 trees in Eagle Grove provide approximately $222 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Eagle Grove has over 49 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	569	40%
Ash	381	27%
Walnut	78	5%
Apple (Crab)	56	4%
Hackberry	47	3%
Locust	46	3%
Linden/Basswood	45	3%
Others		<3%

Age Class

Most of Eagle Grove's trees (70%) are greater than 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. Eagle 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 Eagle Grove indicate that 93% of the trees are in good or fair health, with only 7% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 91% of Eagle Grove's trees are in good or fair health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 9% of the population. This 9% is an estimate of trees that need management follow up.

Management Needs

The following outlines the specific management needs of the street and park trees by number of trees and percent of canopy (Appendix B, Figure 3).

Crown Cleaning	352	24%
Crown Raising	292	20%
Tree Staking	14	1%
Tree Removal	77	5%
Crown Reduction	73	5%

Canopy Cover

The total canopy with both private and public trees is 10%, 259 acres. The canopy cover on city owned properties included in the Eagle Grove inventory includes approximately 46 acres (Appendix A, Figure 4). A hypothetical Canopy goal for the city would be to increase canopy by 1%, in 30 years on all lands, after accounting for losses to EAB. To achieve this goal it is estimated that 63 trees need to be planted annually on public and/or private lands.

Land Use and Location

The majority of Eagle Grove's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7).

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

Eagle Grove has 2 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. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 10 trees with these needs.

Ash trees & poor quality/health trees

After the removal of the critical concern trees, all ash trees and any trees in poor, dead, or dying health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). *City ownership of the trees recommended for removal should be verified prior to any removal*

Pruning Cycle

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

Planting

Most of the planting over the next 5 years can 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 Eagle 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 (40%) (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, and others outlined in city ordinances.

Emerald Ash Borer Information

Ash Tree Removal

Tree removal should 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 an effective short-term tool for residents to maintain their private ash trees or for communities to spread removal costs out over several years while allowing trees to continue to provide benefits. Contact a qualified locally-licensed pesticide applicator for information on ash tree treatment.

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 should be replaced. All trees should meet the restrictions in city ordinance. 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.

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.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Eagle Grove

Annual Energy Benefits of Public Trees

7/6/2022

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	113.0	8,578	15,439.2	15,130	23,709	(N/A)	26.2	28.4	63.06
Silver maple	85.7	6,504	11,265.0	11,040	17,544	(N/A)	17.9	21.1	68.26
Norway maple	57.6	4,376	8,314.9	8,149	12,524	(N/A)	15.9	15.0	54.93
Black walnut	23.3	1,766	3,248.4	3,183	4,950	(N/A)	5.4	5.9	63.46
Apple	7.3	556	1,110.5	1,088	1,644	(N/A)	3.9	2.0	29.36
Northern hackberry	18.0	1,369	2,589.5	2,538	3,907	(N/A)	3.3	4.7	83.12
Honeylocust	16.2	1,228	2,100.2	2,058	3,286	(N/A)	3.2	3.9	71.43
American basswood	11.2	850	1,630.8	1,598	2,448	(N/A)	2.8	2.9	61.20
Sugar maple	10.0	762	1,364.9	1,338	2,099	(N/A)	2.6	2.5	55.25
Northern red oak	6.6	502	896.1	878	1,380	(N/A)	2.6	1.7	37.29
Siberian elm	4.8	366	658.3	645	1,012	(N/A)	1.7	1.2	42.15
Red maple	2.3	171	293.5	288	459	(N/A)	1.7	0.6	19.13
Blue spruce	2.7	208	376.4	369	577	(N/A)	1.5	0.7	26.24
Black maple	5.3	404	728.6	714	1,118	(N/A)	1.3	1.3	58.83
American sycamore	5.9	445	808.9	793	1,238	(N/A)	1.1	1.5	77.37
Northern white cedar	1.8	139	219.8	215	354	(N/A)	1.0	0.4	25.29
Pin oak	3.3	248	439.2	430	678	(N/A)	0.7	0.8	67.80
Catalpa	4.7	354	614.5	602	956	(N/A)	0.7	1.1	95.59
Broadleaf Deciduous Small	0.1	8	17.8	17	25	(N/A)	0.6	0.0	2.79
Willow	2.1	160	306.1	300	460	(N/A)	0.5	0.6	65.67
Boxelder	1.7	128	233.1	228	356	(N/A)	0.4	0.4	59.38
Conifer Evergreen Large	1.0	79	137.8	135	214	(N/A)	0.4	0.3	35.61
Bur oak	0.7	54	101.8	100	153	(N/A)	0.3	0.2	30.69
Littleleaf linden	1.2	93	175.4	172	265	(N/A)	0.3	0.3	52.95
White ash	1.7	126	219.8	215	342	(N/A)	0.3	0.4	68.30
Eastern red cedar	0.6	42	82.2	81	123	(N/A)	0.3	0.1	24.57
Mulberry	0.5	42	88.9	87	129	(N/A)	0.3	0.2	32.17
Norway spruce	0.7	50	88.6	87	137	(N/A)	0.3	0.2	34.32
Amur maple	0.3	25	50.3	49	75	(N/A)	0.2	0.1	24.84
Dogwood	0.0	1	1.9	2	3	(N/A)	0.2	0.0	0.87
Cottonwood	1.1	84	154.2	151	235	(N/A)	0.2	0.3	78.32
Eastern white pine	0.3	24	38.8	38	62	(N/A)	0.2	0.1	20.62
Lilac	0.3	21	41.3	40	62	(N/A)	0.2	0.1	20.58
Broadleaf Deciduous Mediu	0.4	34	63.2	62	96	(N/A)	0.2	0.1	31.91
Scotch pine	0.3	25	44.3	43	69	(N/A)	0.1	0.1	34.32
Eastern hophornbeam	0.4	28	49.3	48	76	(N/A)	0.1	0.1	38.13
Spruce	0.2	14	24.1	24	38	(N/A)	0.1	0.0	18.86
Quaking aspen	0.3	25	40.7	40	65	(N/A)	0.1	0.1	32.43
Japanese maple	0.2	15	32.2	32	47	(N/A)	0.1	0.1	23.50
Eastern cottonwood	0.8	58	105.8	104	162	(N/A)	0.1	0.2	80.97
Eastern redbud	0.2	14	24.7	24	38	(N/A)	0.1	0.0	38.13
Conifer Evergreen Medium	0.1	5	10.2	10	15	(N/A)	0.1	0.0	14.80
Chinese elm	0.3	20	38.1	37	57	(N/A)	0.1	0.1	57.32
Plum	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Ohio buckeye	0.2	18	29.5	29	47	(N/A)	0.1	0.1	46.78
Tulip tree	0.4	29	53.7	53	82	(N/A)	0.1	0.1	82.02
Black spruce	0.1	5	10.2	10	15	(N/A)	0.1	0.0	14.80
Juniper	0.0	0	0.7	1	1	(N/A)	0.1	0.0	0.93
Conifer Evergreen Small	0.0	4	7.9	8	11	(N/A)	0.1	0.0	11.47
Total	396.0	30,055	54,372.1	53,285	83,340	(N/A)	100.0	100.0	58.00

Table 2: Annual Stormwater Benefits

Eagle Grove

Annual Stormwater Benefits of Public Trees

7/6/2022

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	1,312,375	35,565	(N/A)	26.2	28.5	94.59
Silver maple	1,217,205	32,986	(N/A)	17.9	26.4	128.35
Norway maple	530,884	14,387	(N/A)	15.9	11.5	63.10
Black walnut	262,010	7,100	(N/A)	5.4	5.7	91.03
Apple	30,948	839	(N/A)	3.9	0.7	14.98
Northern hackberry	187,299	5,076	(N/A)	3.3	4.1	108.00
Honeylocust	200,588	5,436	(N/A)	3.2	4.4	118.17
American basswood	130,862	3,546	(N/A)	2.8	2.8	88.66
Sugar maple	106,679	2,891	(N/A)	2.6	2.3	76.08
Northern red oak	60,165	1,630	(N/A)	2.6	1.3	44.07
Siberian elm	44,964	1,219	(N/A)	1.7	1.0	50.77
Red maple	14,304	388	(N/A)	1.7	0.3	16.15
Blue spruce	42,535	1,153	(N/A)	1.5	0.9	52.40
Black maple	50,683	1,374	(N/A)	1.3	1.1	72.29
American sycamore	80,544	2,183	(N/A)	1.1	1.7	136.42
Northern white cedar	26,525	719	(N/A)	1.0	0.6	51.34
Pin oak	39,481	1,070	(N/A)	0.7	0.9	106.99
Catalpa	72,389	1,962	(N/A)	0.7	1.6	196.17
Broadleaf Deciduous Small	324	9	(N/A)	0.6	0.0	0.98
Willow	22,710	615	(N/A)	0.5	0.5	87.92
Boxelder	23,862	647	(N/A)	0.4	0.5	107.78
Conifer Evergreen Large	24,357	660	(N/A)	0.4	0.5	110.01
Bur oak	6,374	173	(N/A)	0.3	0.1	34.55
Littleleaf linden	13,480	365	(N/A)	0.3	0.3	73.06
White ash	19,737	535	(N/A)	0.3	0.4	106.98
Eastern red cedar	8,173	221	(N/A)	0.3	0.2	44.30
Mulberry	2,877	78	(N/A)	0.3	0.1	19.49
Norway spruce	15,148	411	(N/A)	0.3	0.3	102.63
Amur maple	1,196	32	(N/A)	0.2	0.0	10.80
Dogwood	22	1	(N/A)	0.2	0.0	0.20
Cottonwood	14,924	404	(N/A)	0.2	0.3	134.81
Eastern white pine	3,673	100	(N/A)	0.2	0.1	33.18
Lilac	1,000	27	(N/A)	0.2	0.0	9.03
Broadleaf Deciduous Medium	2,581	70	(N/A)	0.2	0.1	23.32
Scotch pine	7,574	205	(N/A)	0.1	0.2	102.63
Eastern hophornbeam	1,333	36	(N/A)	0.1	0.0	18.06
Spruce	2,134	58	(N/A)	0.1	0.0	28.92
Quaking aspen	2,073	56	(N/A)	0.1	0.0	28.09
Japanese maple	1,181	32	(N/A)	0.1	0.0	16.01
Eastern cottonwood	11,182	303	(N/A)	0.1	0.2	151.51
Eastern redbud	667	18	(N/A)	0.1	0.0	18.06
Conifer Evergreen Medium	755	20	(N/A)	0.1	0.0	20.47
Chinese elm	2,591	70	(N/A)	0.1	0.1	70.21
Plum	7	0	(N/A)	0.1	0.0	0.20
Ohio buckeye	1,409	38	(N/A)	0.1	0.0	38.19
Tulip tree	5,491	149	(N/A)	0.1	0.1	148.79
Black spruce	755	20	(N/A)	0.1	0.0	20.47
Juniper	24	1	(N/A)	0.1	0.0	0.66
Conifer Evergreen Small	659	18	(N/A)	0.1	0.0	17.86
Citywide total	4,608,714	124,896	(N/A)	100.0	100.0	86.91

Table 3: Annual Air Quality Benefits

Eagle Grove

Annual Air Quality Benefits of Public Trees

7/6/2022

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	172.0	27.5	80.9	7.7	912	539.4	78.6	74.9	512.2	3,361	0.0	0	1,493.1	4,273 (N/A)	26.2	11.36
Silver maple	209.3	35.5	102.9	9.3	1,129	403.9	59.1	56.5	387.7	2,527	-109.6	-411	1,154.5	3,245 (N/A)	17.9	12.63
Norway maple	107.1	18.5	52.7	4.7	579	279.5	40.4	38.5	261.6	1,731	-25.2	-94	777.8	2,216 (N/A)	15.9	9.72
Black walnut	31.9	5.1	15.3	1.4	170	111.7	16.2	15.5	105.5	694	0.0	0	302.6	864 (N/A)	5.4	11.08
Apple	9.3	1.5	4.4	0.4	50	35.9	5.2	4.9	33.2	221	-0.1	0	94.8	271 (N/A)	3.9	4.84
Northern hackberry	30.7	5.3	15.4	1.4	167	87.3	12.6	12.0	81.8	541	0.0	0	246.6	708 (N/A)	3.3	15.07
Honeylocust	40.0	6.6	18.0	1.8	211	76.0	11.1	10.6	73.2	476	-32.1	-120	205.4	567 (N/A)	3.2	12.32
American basswood	18.2	3.1	8.9	0.8	98	54.4	7.9	7.5	50.8	337	-15.4	-58	136.2	377 (N/A)	2.8	9.43
Sugar maple	14.1	2.4	7.1	0.6	76	47.8	7.0	6.6	45.5	298	-11.1	-42	119.9	333 (N/A)	2.6	8.75
Northern red oak	12.3	2.1	6.0	0.5	66	31.4	4.6	4.4	29.9	196	-17.5	-66	73.8	197 (N/A)	2.6	5.32
Siberian elm	6.3	1.1	3.2	0.3	34	23.0	3.4	3.2	21.9	143	0.0	0	62.3	178 (N/A)	1.7	7.41
Red maple	2.7	0.5	1.4	0.1	15	10.6	1.6	1.5	10.2	67	-1.0	-4	27.6	78 (N/A)	1.7	3.23
Blue spruce	6.5	1.3	5.2	0.8	42	13.1	1.9	1.8	12.4	81	-16.0	-60	27.0	64 (N/A)	1.5	2.90
Black maple	13.0	2.2	6.0	0.6	69	25.4	3.7	3.5	24.1	158	-4.2	-16	74.1	211 (N/A)	1.3	11.10
American sycamore	12.4	2.0	5.6	0.6	65	28.1	4.1	3.9	26.6	175	0.0	0	83.2	240 (N/A)	1.1	15.00
Northern white cedar	3.0	0.6	2.5	0.4	20	8.4	1.2	1.2	8.3	53	-11.2	-42	14.4	31 (N/A)	1.0	2.21
Pin oak	7.3	1.3	3.7	0.3	40	15.5	2.3	2.2	14.8	97	-13.4	-50	33.9	86 (N/A)	0.7	8.62
Catalpa	14.1	2.3	6.2	0.6	74	22.0	3.2	3.1	21.1	138	0.0	0	72.7	211 (N/A)	0.7	21.14
Broadleaf Deciduous Small	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	0.38
Willow	5.0	0.9	2.4	0.2	27	10.2	1.5	1.4	9.5	63	-1.1	-4	30.0	86 (N/A)	0.5	12.28
Boxelder	3.6	0.6	1.6	0.2	19	8.1	1.2	1.1	7.6	50	-0.9	-4	22.9	65 (N/A)	0.4	10.88
Conifer Evergreen Large	3.0	0.6	2.4	0.4	19	4.9	0.7	0.7	4.7	31	-14.2	-53	3.0	-3 (N/A)	0.4	-0.57
Bur oak	0.6	0.1	0.3	0.0	3	3.4	0.5	0.5	3.2	21	0.0	0	8.6	24 (N/A)	0.3	4.89
Littleleaf linden	2.4	0.4	1.2	0.1	13	5.9	0.9	0.8	5.6	37	-1.1	-4	16.1	45 (N/A)	0.3	9.06
White ash	3.1	0.5	1.5	0.1	17	7.9	1.1	1.1	7.5	49	0.0	0	22.9	66 (N/A)	0.3	13.13
Eastern red cedar	1.7	0.3	1.4	0.2	11	2.7	0.4	0.4	2.5	17	-4.5	-17	5.1	11 (N/A)	0.3	2.19
Mulberry	1.0	0.2	0.4	0.0	5	2.7	0.4	0.4	2.5	17	0.0	0	7.6	22 (N/A)	0.3	5.45
Norway spruce	1.8	0.4	1.5	0.2	12	3.1	0.5	0.4	3.0	20	-8.5	-32	2.4	0 (N/A)	0.3	-0.06
Amur maple	0.3	0.0	0.2	0.0	2	1.6	0.2	0.2	1.5	10	0.0	0	4.1	12 (N/A)	0.2	3.88
Dogwood	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)	0.2	0.11
Cottonwood	2.1	0.3	0.9	0.1	11	5.3	0.8	0.7	5.0	33	0.0	0	15.3	44 (N/A)	0.2	14.63
Eastern white pine	0.4	0.1	0.3	0.0	3	1.5	0.2	0.2	1.4	9	-1.3	-5	2.9	7 (N/A)	0.2	2.37
Lilac	0.3	0.0	0.1	0.0	1	1.4	0.2	0.2	1.3	8	0.0	0	3.5	10 (N/A)	0.2	3.27
Broadleaf Deciduous Medium	0.3	0.1	0.2	0.0	2	2.2	0.3	0.3	2.0	13	-0.1	0	5.3	15 (N/A)	0.2	4.95
Scotch pine	0.9	0.2	0.7	0.1	6	1.6	0.2	0.2	1.5	10	-4.2	-16	1.2	0 (N/A)	0.1	-0.06
Eastern hophornbeam	0.4	0.1	0.2	0.0	2	1.7	0.3	0.2	1.7	11	0.0	0	4.6	13 (N/A)	0.1	6.56
Spruce	0.2	0.0	0.2	0.0	2	0.9	0.1	0.1	0.8	5	-0.7	-3	1.7	4 (N/A)	0.1	2.15
Quaking aspen	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
Japanese maple	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)	0.1	4.23
Eastern cottonwood	1.7	0.3	0.7	0.1	9	3.7	0.5	0.5	3.5	23	0.0	0	10.9	32 (N/A)	0.1	15.76
Eastern redbud	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
Conifer Evergreen Medium	0.1	0.0	0.1	0.0	0	0.3	0.0	0.0	0.3	2	-0.2	-1	0.6	2 (N/A)	0.1	1.53
Chinese elm	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.3	9 (N/A)	0.1	9.34
Plum	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
Ohio buckeye	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
Tulip tree	0.8	0.1	0.4	0.0	4	1.9	0.3	0.3	1.8	12	0.0	0	5.5	16 (N/A)	0.1	15.71
Black spruce	0.1	0.0	0.1	0.0	0	0.3	0.0	0.0	0.3	2	-0.2	-1	0.6	2 (N/A)	0.1	1.53
Juniper	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	0.09
Conifer Evergreen Small	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
Citywide total	741.3	124.2	362.9	34.4	3,992	1,891.3	275.3	262.4	1,794.1	11,779	-294.5	-1,104	5,191.5	14,667 (N/A)	100.0	10.21

Table 4: Annual Carbon Stored

Eagle Grove

Stored CO2 Benefits of Public Trees

7/6/2022

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	5,644,435	42,333	(N/A)	26.2	31.7	112.59
Silver maple	4,772,494	35,794	(N/A)	17.9	26.8	139.28
Norway maple	1,758,243	13,187	(N/A)	15.9	9.9	57.84
Black walnut	1,026,122	7,696	(N/A)	5.4	5.8	98.67
Apple	146,787	1,101	(N/A)	3.9	0.8	19.66
Northern hackberry	466,877	3,502	(N/A)	3.3	2.6	74.50
Honeylocust	519,815	3,899	(N/A)	3.2	2.9	84.75
American basswood	676,122	5,071	(N/A)	2.8	3.8	126.77
Sugar maple	405,274	3,040	(N/A)	2.6	2.3	79.99
Northern red oak	258,422	1,938	(N/A)	2.6	1.4	52.38
Siberian elm	157,649	1,182	(N/A)	1.7	0.9	49.27
Red maple	31,914	239	(N/A)	1.7	0.2	9.97
Blue spruce	49,971	375	(N/A)	1.5	0.3	17.04
Black maple	137,997	1,035	(N/A)	1.3	0.8	54.47
American sycamore	417,516	3,131	(N/A)	1.1	2.3	195.71
Northern white cedar	26,135	196	(N/A)	1.0	0.1	14.00
Pin oak	194,322	1,457	(N/A)	0.7	1.1	145.74
Catalpa	492,926	3,697	(N/A)	0.7	2.8	369.69
Broadleaf Deciduous	1,018	8	(N/A)	0.6	0.0	0.85
Willow	82,970	622	(N/A)	0.5	0.5	88.90
Boxelder	147,017	1,103	(N/A)	0.4	0.8	183.77
Conifer Evergreen La	36,647	275	(N/A)	0.4	0.2	45.81
Bur oak	19,911	149	(N/A)	0.3	0.1	29.87
Littleleaf linden	50,509	379	(N/A)	0.3	0.3	75.76
White ash	56,810	426	(N/A)	0.3	0.3	85.22
Eastern red cedar	5,510	41	(N/A)	0.3	0.0	8.27
Mulberry	15,301	115	(N/A)	0.3	0.1	28.69
Norway spruce	21,666	162	(N/A)	0.3	0.1	40.62
Amur maple	4,853	36	(N/A)	0.2	0.0	12.13
Dogwood	41	0	(N/A)	0.2	0.0	0.10
Cottonwood	67,659	507	(N/A)	0.2	0.4	169.15
Eastern white pine	2,597	19	(N/A)	0.2	0.0	6.49
Lilac	4,123	31	(N/A)	0.2	0.0	10.31
Broadleaf Deciduous	5,825	44	(N/A)	0.2	0.0	14.56
Scotch pine	10,833	81	(N/A)	0.1	0.1	40.62
Eastern hophornbeam	6,074	46	(N/A)	0.1	0.0	22.78
Spruce	1,427	11	(N/A)	0.1	0.0	5.35
Quaking aspen	4,706	35	(N/A)	0.1	0.0	17.65
Japanese maple	6,756	51	(N/A)	0.1	0.0	25.34
Eastern cottonwood	55,031	413	(N/A)	0.1	0.3	206.37
Eastern redbud	3,037	23	(N/A)	0.1	0.0	22.78
Conifer Evergreen Me	284	2	(N/A)	0.1	0.0	2.13
Chinese elm	8,458	63	(N/A)	0.1	0.0	63.43
Plum	14	0	(N/A)	0.1	0.0	0.10
Ohio buckeye	3,624	27	(N/A)	0.1	0.0	27.18
Tulip tree	25,943	195	(N/A)	0.1	0.1	194.57
Black spruce	284	2	(N/A)	0.1	0.0	2.13
Juniper	3	0	(N/A)	0.1	0.0	0.02
Conifer Evergreen Sm	277	2	(N/A)	0.1	0.0	2.08
Citywide total	17,832,232	133,742	(N/A)	100.0	100.0	93.07

Table 5: Annual Carbon Sequestered

Eagle Grove

Annual CO Benefits of Public Trees

7/6/2022

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	263,916	1,979	-27,093	-1,188	-212	189,579	1,422	425,214	3,189 (N/A)	26.2	27.4	8.48
Silver maple	354,114	2,656	-22,909	-940	-179	143,736	1,078	474,002	3,555 (N/A)	17.9	30.6	13.83
Norway maple	85,818	644	-8,442	-593	-68	96,697	725	173,480	1,301 (N/A)	15.9	11.2	5.71
Black walnut	57,843	434	-4,925	-243	-39	39,036	293	91,710	688 (N/A)	5.4	5.9	8.82
Apple	12,715	95	-705	-95	-6	12,290	92	24,205	182 (N/A)	3.9	1.6	3.24
Northern hackberry	24,440	183	-2,241	-174	-18	30,258	227	52,282	392 (N/A)	3.3	3.4	8.34
Honeylocust	25,032	188	-2,495	-122	-20	27,128	203	49,542	372 (N/A)	3.2	3.2	8.08
American basswood	38,696	290	-3,245	-134	-25	18,778	141	54,095	406 (N/A)	2.8	3.5	10.14
Sugar maple	21,982	165	-1,946	-108	-15	16,837	126	36,766	276 (N/A)	2.6	2.4	7.26
Northern red oak	6,880	52	-1,241	-82	-10	11,086	83	16,643	125 (N/A)	2.6	1.1	3.37
Siberian elm	8,832	66	-758	-53	-6	8,099	61	16,120	121 (N/A)	1.7	1.0	5.04
Red maple	4,255	32	-154	-22	-1	3,790	28	7,870	59 (N/A)	1.7	0.5	2.46
Blue spruce	2,272	17	-240	-52	-2	4,606	35	6,586	49 (N/A)	1.5	0.4	2.25
Black maple	5,143	39	-662	-50	-5	8,924	67	13,355	100 (N/A)	1.3	0.9	5.27
American sycamore	12,647	95	-2,004	-66	-16	9,838	74	20,416	153 (N/A)	1.1	1.3	9.57
Northern white cedar	1,583	12	-125	-30	-1	3,063	23	4,490	34 (N/A)	1.0	0.3	2.41
Pin oak	11,247	84	-933	-36	-7	5,471	41	15,750	118 (N/A)	0.7	1.0	11.81
Catalpa	6,522	49	-2,366	-55	-18	7,815	59	11,915	89 (N/A)	0.7	0.8	8.94
Broadleaf Deciduous Smal	183	1	-5	-3	0	169	1	344	3 (N/A)	0.6	0.0	0.29
Willow	856	6	-398	-26	-3	3,528	26	3,959	30 (N/A)	0.5	0.3	4.24
Boxelder	8,584	64	-706	-25	-5	2,826	21	10,679	80 (N/A)	0.4	0.7	13.35
Conifer Evergreen Large	887	7	-176	-23	-1	1,737	13	2,425	18 (N/A)	0.4	0.2	3.03
Bur oak	1,692	13	-96	-8	-1	1,187	9	2,776	21 (N/A)	0.3	0.2	4.16
Littleleaf linden	2,093	16	-242	-16	-2	2,052	15	3,887	29 (N/A)	0.3	0.3	5.83
White ash	4,973	37	-273	-14	-2	2,787	21	7,473	56 (N/A)	0.3	0.5	11.21
Eastern red cedar	214	2	-26	-10	0	934	7	1,112	8 (N/A)	0.3	0.1	1.67
Mulberry	228	2	-73	-9	-1	918	7	1,063	8 (N/A)	0.3	0.1	1.99
Norway spruce	631	5	-104	-14	-1	1,115	8	1,627	12 (N/A)	0.3	0.1	3.05
Amur maple	495	4	-23	-4	0	557	4	1,025	8 (N/A)	0.2	0.1	2.56
Dogwood	26	0	0	-1	0	17	0	42	0 (N/A)	0.2	0.0	0.10
Cottonwood	2,776	21	-325	-12	-3	1,852	14	4,292	32 (N/A)	0.2	0.3	10.73
Eastern white pine	284	2	-12	-5	0	527	4	794	6 (N/A)	0.2	0.1	1.98
Lilac	419	3	-20	-4	0	470	4	866	6 (N/A)	0.2	0.1	2.16
Broadleaf Deciduous Medi	834	6	-28	-4	0	747	6	1,548	12 (N/A)	0.2	0.1	3.87
Scotch pine	443	3	-52	-6	0	557	4	943	7 (N/A)	0.1	0.1	3.53
Eastern hophornbeam	535	4	-29	-4	0	617	5	1,119	8 (N/A)	0.1	0.1	4.20
Spruce	168	1	-7	-3	0	311	2	469	4 (N/A)	0.1	0.0	1.76
Quaking aspen	654	5	-23	-3	0	552	4	1,180	9 (N/A)	0.1	0.1	4.43
Japanese maple	487	4	-32	-3	0	340	3	792	6 (N/A)	0.1	0.1	2.97
Eastern cottonwood	1,769	13	-264	-9	-2	1,287	10	2,783	21 (N/A)	0.1	0.2	10.44
Eastern redbud	268	2	-15	-2	0	308	2	560	4 (N/A)	0.1	0.0	4.20
Conifer Evergreen Medium	39	0	-1	-1	0	106	1	142	1 (N/A)	0.1	0.0	1.07
Chinese elm	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.1	0.1	7.93
Plum	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Ohio buckeye	386	3	-17	-2	0	395	3	762	6 (N/A)	0.1	0.0	5.71
Tulip tree	960	7	-125	-4	-1	650	5	1,481	11 (N/A)	0.1	0.1	11.11
Black spruce	39	0	-1	-1	0	106	1	142	1 (N/A)	0.1	0.0	1.07
Juniper	1	0	0	0	0	6	0	6	0 (N/A)	0.1	0.0	0.05
Conifer Evergreen Small	40	0	-1	-1	0	82	1	119	1 (N/A)	0.1	0.0	0.89
Citywide total	975,567	7,317	-85,602	-4,263	-674	664,218	4,982	1,549,921	11,624 (N/A)	100.0	100.0	8.09

Table 6: Annual Social and Aesthetic Benefits

Eagle Grove

Annual Aesthetic/Other Benefits of Public Trees

7/6/2022

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	21,146	(N/A)	26.2	24.9	56.24
Silver maple	27,554	(N/A)	17.9	32.4	107.21
Norway maple	8,090	(N/A)	15.9	9.5	35.48
Black walnut	4,640	(N/A)	5.4	5.5	59.49
Apple	742	(N/A)	3.9	0.9	13.24
Northern hackberry	3,057	(N/A)	3.3	3.6	65.04
Honeylocust	6,326	(N/A)	3.2	7.4	137.52
American basswood	2,728	(N/A)	2.8	3.2	68.20
Sugar maple	2,324	(N/A)	2.6	2.7	61.16
Northern red oak	568	(N/A)	2.6	0.7	15.36
Siberian elm	768	(N/A)	1.7	0.9	32.02
Red maple	602	(N/A)	1.7	0.7	25.08
Blue spruce	400	(N/A)	1.5	0.5	18.17
Black maple	634	(N/A)	1.3	0.7	33.37
American sycamore	919	(N/A)	1.1	1.1	57.45
Northern white cedar	433	(N/A)	1.0	0.5	30.91
Pin oak	863	(N/A)	0.7	1.0	86.34
Catalpa	405	(N/A)	0.7	0.5	40.48
Broadleaf Deciduous Small	7	(N/A)	0.6	0.0	0.74
Willow	82	(N/A)	0.5	0.1	11.75
Boxelder	469	(N/A)	0.4	0.6	78.25
Conifer Evergreen Large	147	(N/A)	0.4	0.2	24.45
Bur oak	180	(N/A)	0.3	0.2	35.96
Littleleaf linden	218	(N/A)	0.3	0.3	43.61
White ash	514	(N/A)	0.3	0.6	102.77
Eastern red cedar	68	(N/A)	0.3	0.1	13.68
Mulberry	13	(N/A)	0.3	0.0	3.20
Norway spruce	120	(N/A)	0.3	0.1	30.10
Amur maple	28	(N/A)	0.2	0.0	9.43
Dogwood	0	(N/A)	0.2	0.0	0.03
Cottonwood	199	(N/A)	0.2	0.2	66.26
Eastern white pine	80	(N/A)	0.2	0.1	26.69
Lilac	24	(N/A)	0.2	0.0	7.98
Broadleaf Deciduous Medium	92	(N/A)	0.2	0.1	30.53
Scotch pine	73	(N/A)	0.1	0.1	36.67
Eastern hophornbeam	31	(N/A)	0.1	0.0	15.48
Spruce	48	(N/A)	0.1	0.1	23.87
Quaking aspen	74	(N/A)	0.1	0.1	37.21
Japanese maple	29	(N/A)	0.1	0.0	14.42
Eastern cottonwood	124	(N/A)	0.1	0.1	61.96
Eastern redbud	15	(N/A)	0.1	0.0	15.48
Conifer Evergreen Medium	21	(N/A)	0.1	0.0	21.08
Chinese elm	58	(N/A)	0.1	0.1	57.69
Plum	0	(N/A)	0.1	0.0	0.03
Ohio buckeye	39	(N/A)	0.1	0.0	39.16
Tulip tree	67	(N/A)	0.1	0.1	66.60
Black spruce	21	(N/A)	0.1	0.0	21.08
Juniper	4	(N/A)	0.1	0.0	4.27
Conifer Evergreen Small	21	(N/A)	0.1	0.0	21.34
Citywide total	85,067	(N/A)	100.0	100.0	59.20

Table 7: Summary of Benefits in Dollars

Eagle Grove

Total Annual Benefits of Public Trees by Species ($)

7/6/2022

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Green ash	23,709	3,189	4,273	35,565	21,146	87,882	(N/A)	27.5
Silver maple	17,544	3,555	3,245	32,986	27,554	84,884	(N/A)	26.6
Norway maple	12,524	1,301	2,216	14,387	8,090	38,518	(N/A)	12.1
Black walnut	4,950	688	864	7,100	4,640	18,242	(N/A)	5.7
Apple	1,644	182	271	839	742	3,677	(N/A)	1.2
Northern hackberry	3,907	392	708	5,076	3,057	13,140	(N/A)	4.1
Honeylocust	3,286	372	567	5,436	6,326	15,986	(N/A)	5.0
American basswood	2,448	406	377	3,546	2,728	9,505	(N/A)	3.0
Sugar maple	2,099	276	333	2,891	2,324	7,923	(N/A)	2.5
Northern red oak	1,380	125	197	1,630	568	3,900	(N/A)	1.2
Siberian elm	1,012	121	178	1,219	768	3,297	(N/A)	1.0
Red maple	459	59	78	388	602	1,585	(N/A)	0.5
Blue spruce	577	49	64	1,153	400	2,243	(N/A)	0.7
Black maple	1,118	100	211	1,374	634	3,436	(N/A)	1.1
American sycamore	1,238	153	240	2,183	919	4,733	(N/A)	1.5
Northern white cedar	354	34	31	719	433	1,570	(N/A)	0.5
Pin oak	678	118	86	1,070	863	2,816	(N/A)	0.9
Catalpa	956	89	211	1,962	405	3,623	(N/A)	1.1
Broadleaf Deciduous Sn	25	3	3	9	7	47	(N/A)	0.0
Willow	460	30	86	615	82	1,273	(N/A)	0.4
Boxelder	356	80	65	647	469	1,618	(N/A)	0.5
Conifer Evergreen Large	214	18	-3	660	147	1,035	(N/A)	0.3
Bur oak	153	21	24	173	180	551	(N/A)	0.2
Littleleaf linden	265	29	45	365	218	923	(N/A)	0.3
White ash	342	56	66	535	514	1,512	(N/A)	0.5
Eastern red cedar	123	8	11	221	68	432	(N/A)	0.1
Mulberry	129	8	22	78	13	249	(N/A)	0.1
Norway spruce	137	12	0	411	120	680	(N/A)	0.2
Amur maple	75	8	12	32	28	155	(N/A)	0.0
Dogwood	3	0	0	1	0	4	(N/A)	0.0
Cottonwood	235	32	44	404	199	914	(N/A)	0.3
Eastern white pine	62	6	7	100	80	255	(N/A)	0.1
Lilac	62	6	10	27	24	129	(N/A)	0.0
Broadleaf Deciduous M	96	12	15	70	92	284	(N/A)	0.1
Scotch pine	69	7	0	205	73	354	(N/A)	0.1
Eastern hophornbeam	76	8	13	36	31	165	(N/A)	0.1
Spruce	38	4	4	58	48	151	(N/A)	0.0
Quaking aspen	65	9	10	56	74	215	(N/A)	0.1
Japanese maple	47	6	8	32	29	122	(N/A)	0.0
Eastern cottonwood	162	21	32	303	124	641	(N/A)	0.2
Eastern redbud	38	4	7	18	15	82	(N/A)	0.0
Conifer Evergreen Medi	15	1	2	20	21	59	(N/A)	0.0
Chinese elm	57	8	9	70	58	202	(N/A)	0.1
Plum	1	0	0	0	0	1	(N/A)	0.0
Ohio buckeye	47	6	8	38	39	138	(N/A)	0.0
Tulip tree	82	11	16	149	67	324	(N/A)	0.1
Black spruce	15	1	2	20	21	59	(N/A)	0.0
Juniper	1	0	0	1	4	6	(N/A)	0.0
Conifer Evergreen Smal	11	1	1	18	21	52	(N/A)	0.0
Citywide Total	83,340	11,624	14,667	124,896	85,067	319,594	(N/A)	100.0

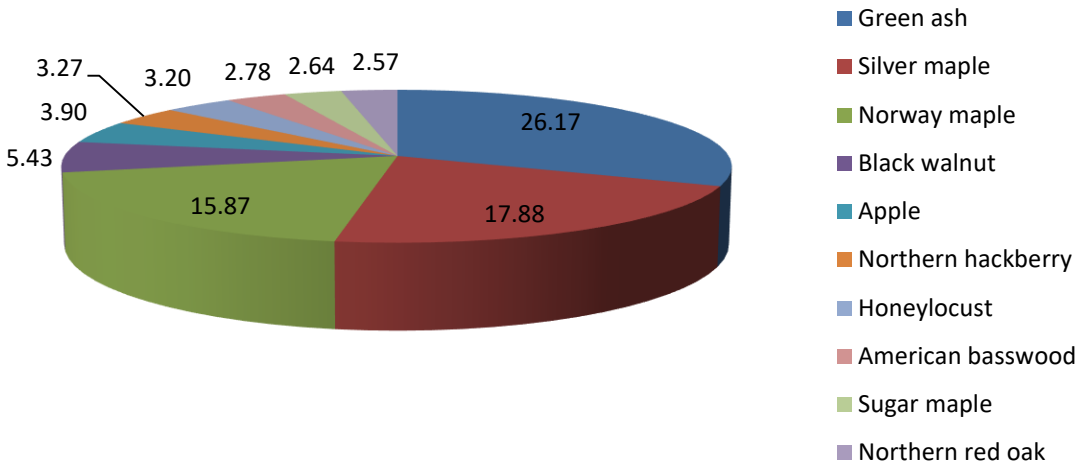

Figure 1: Species Distribution

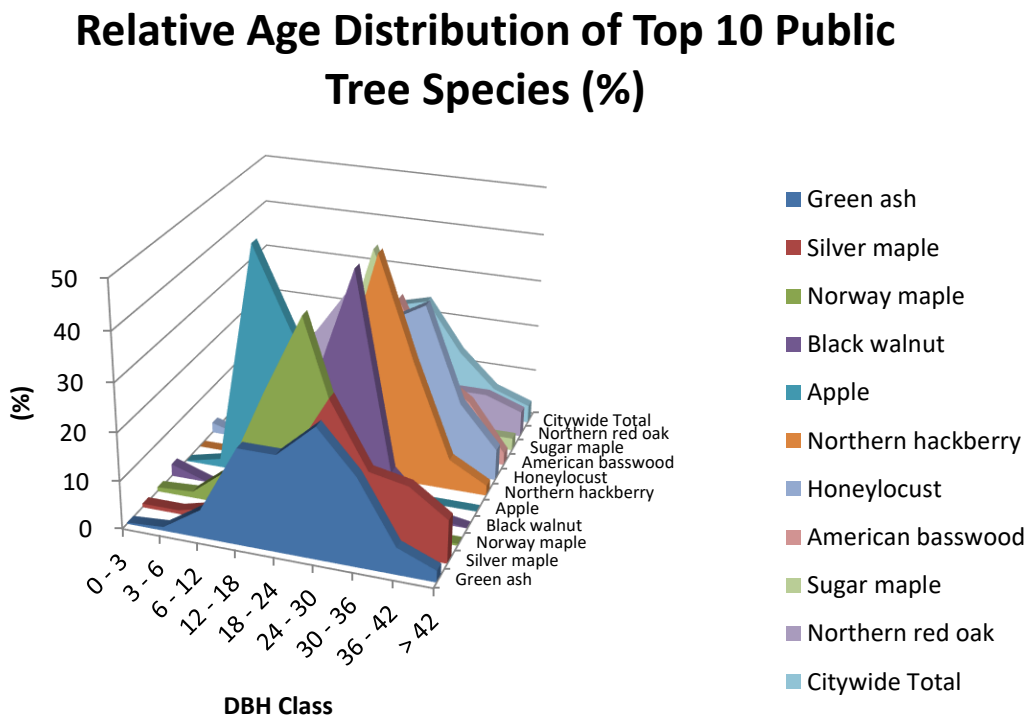

Figure 2: Relative Age Class

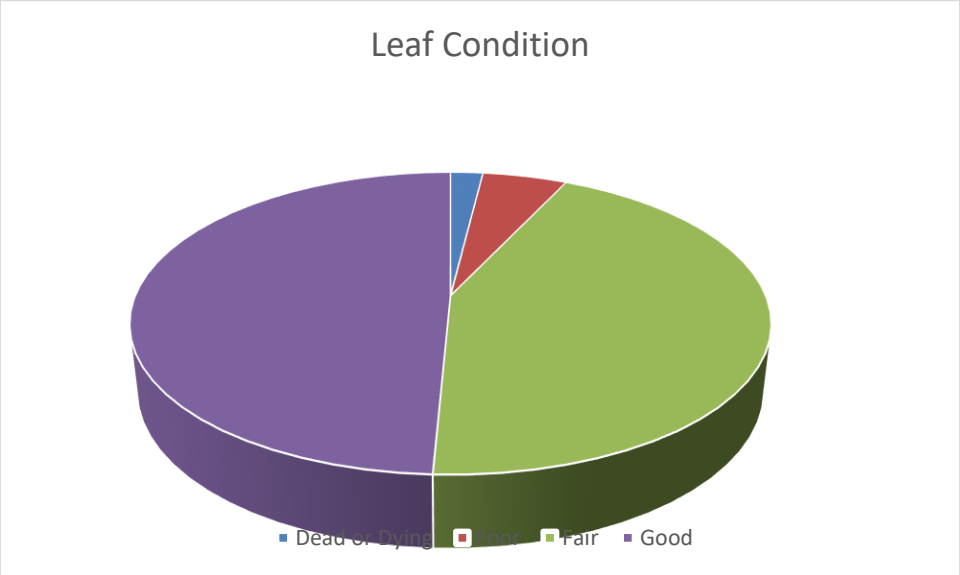

Figure 3: Foliage Condition

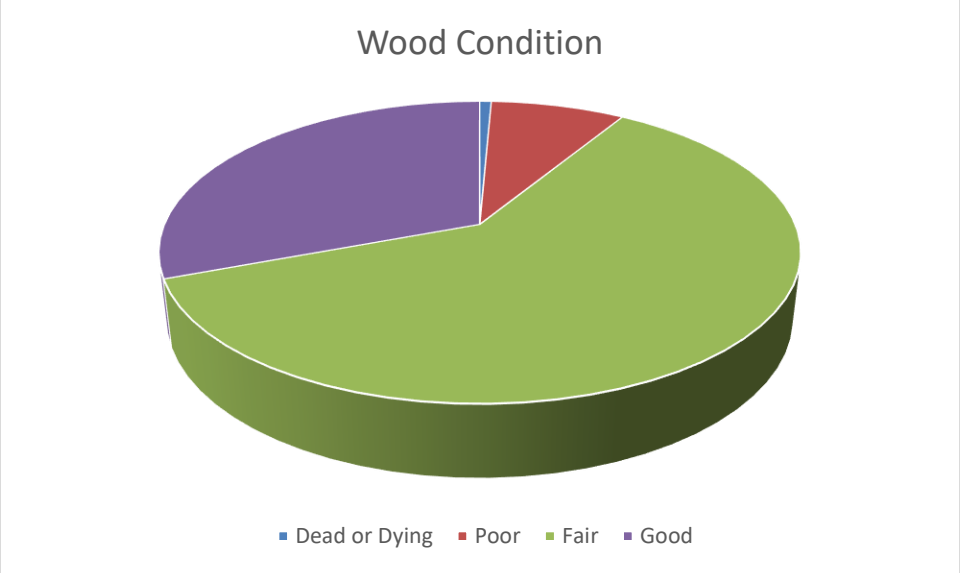

Figure 4: Wood Condition

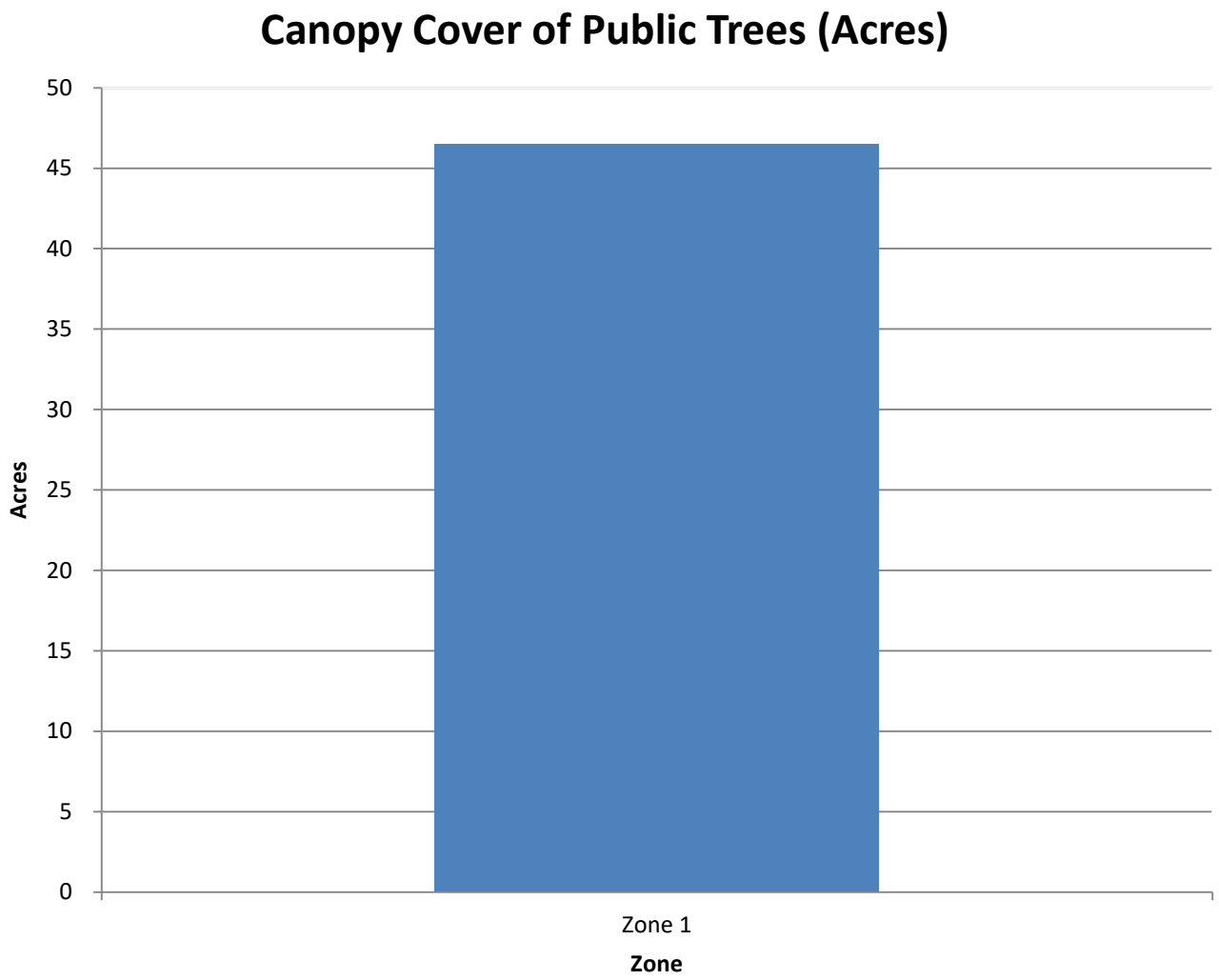

Figure 5: Canopy Cover in Acres

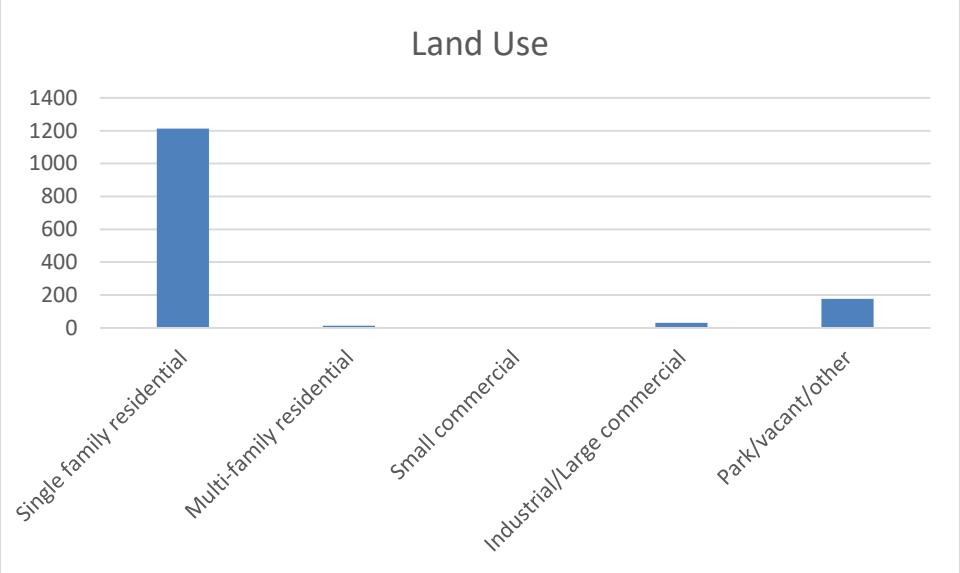

Figure 6: Land Use of city/park trees

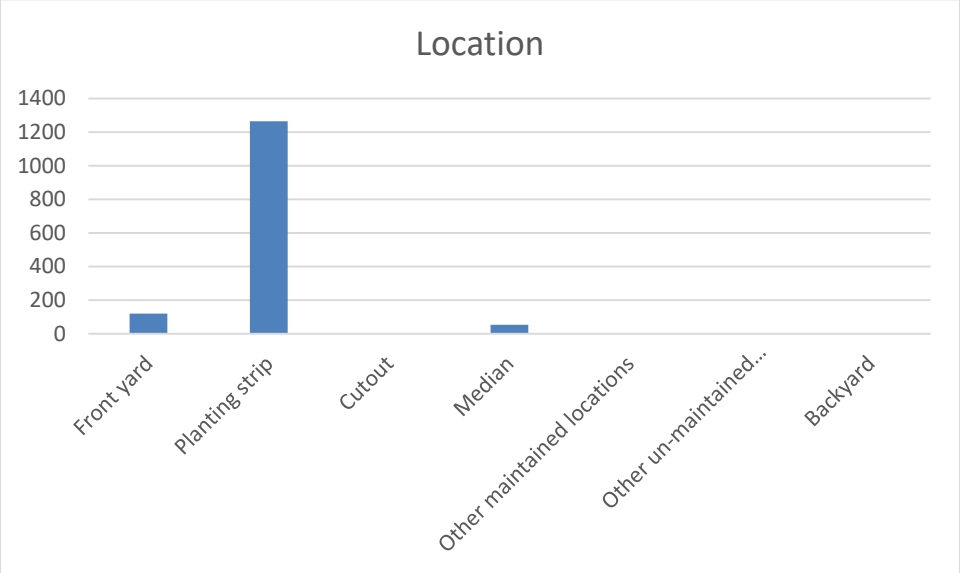

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

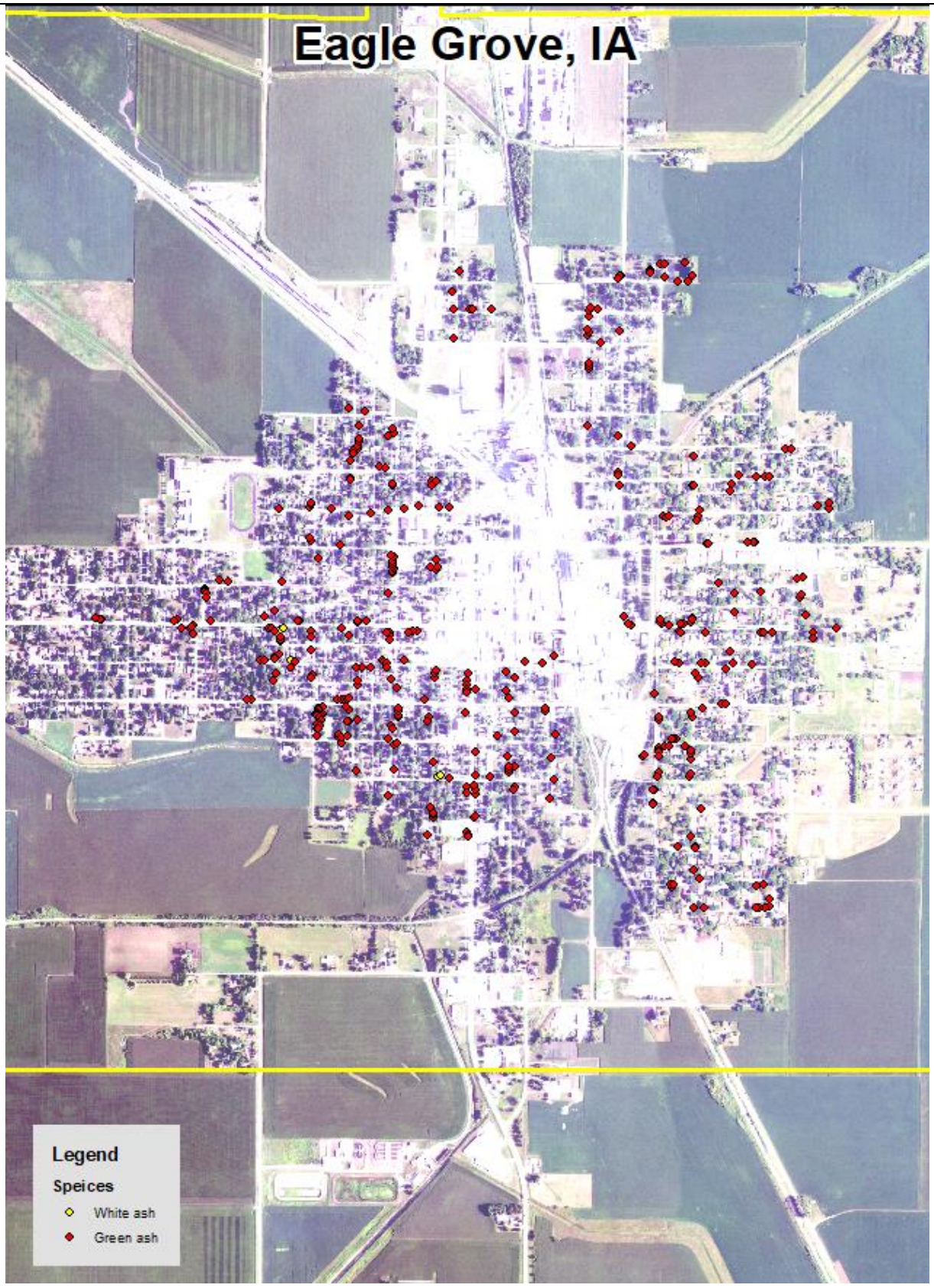

Figure 1: Location of Ash Trees

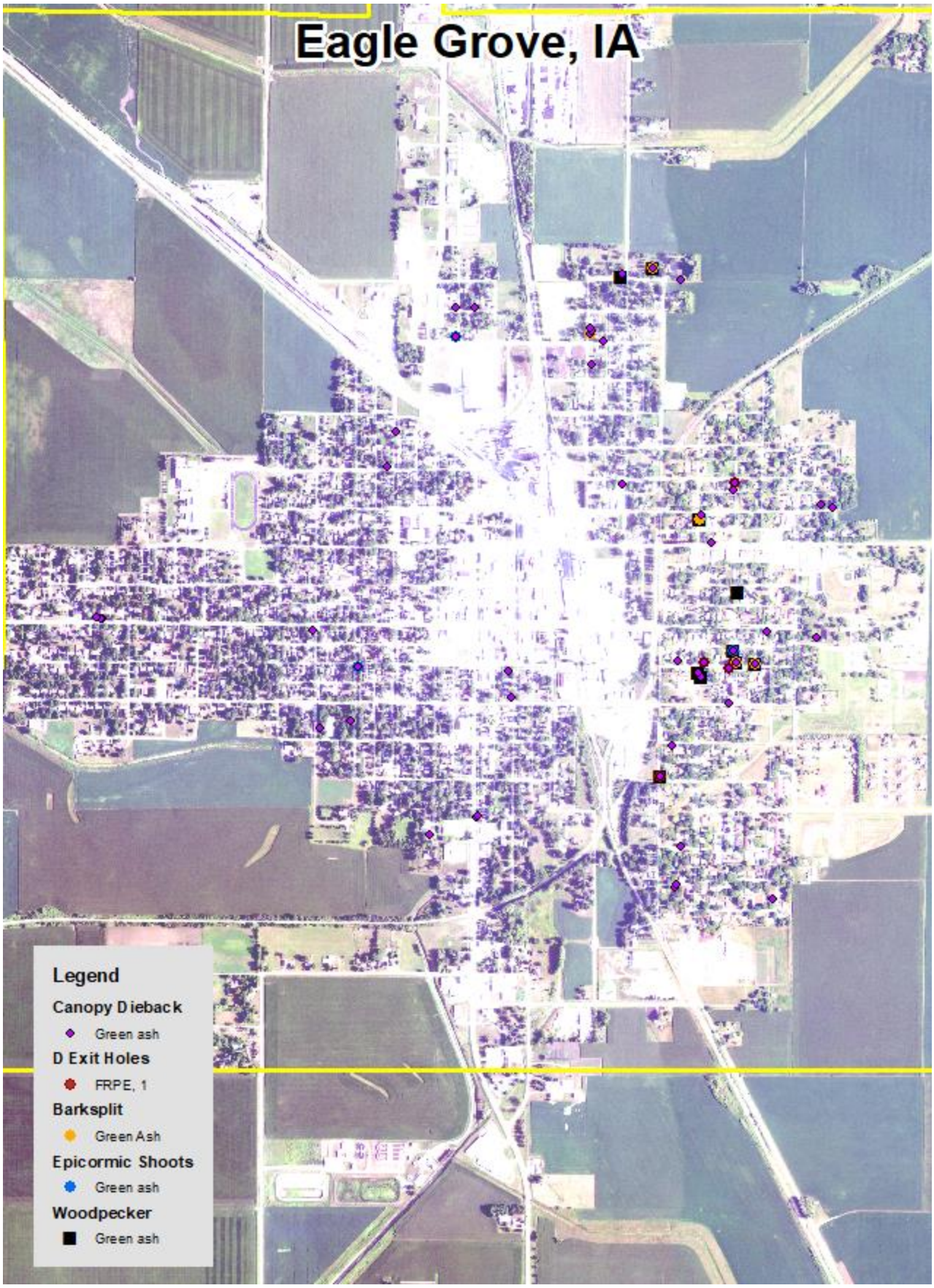

Figure 2: Location of EAB symptoms

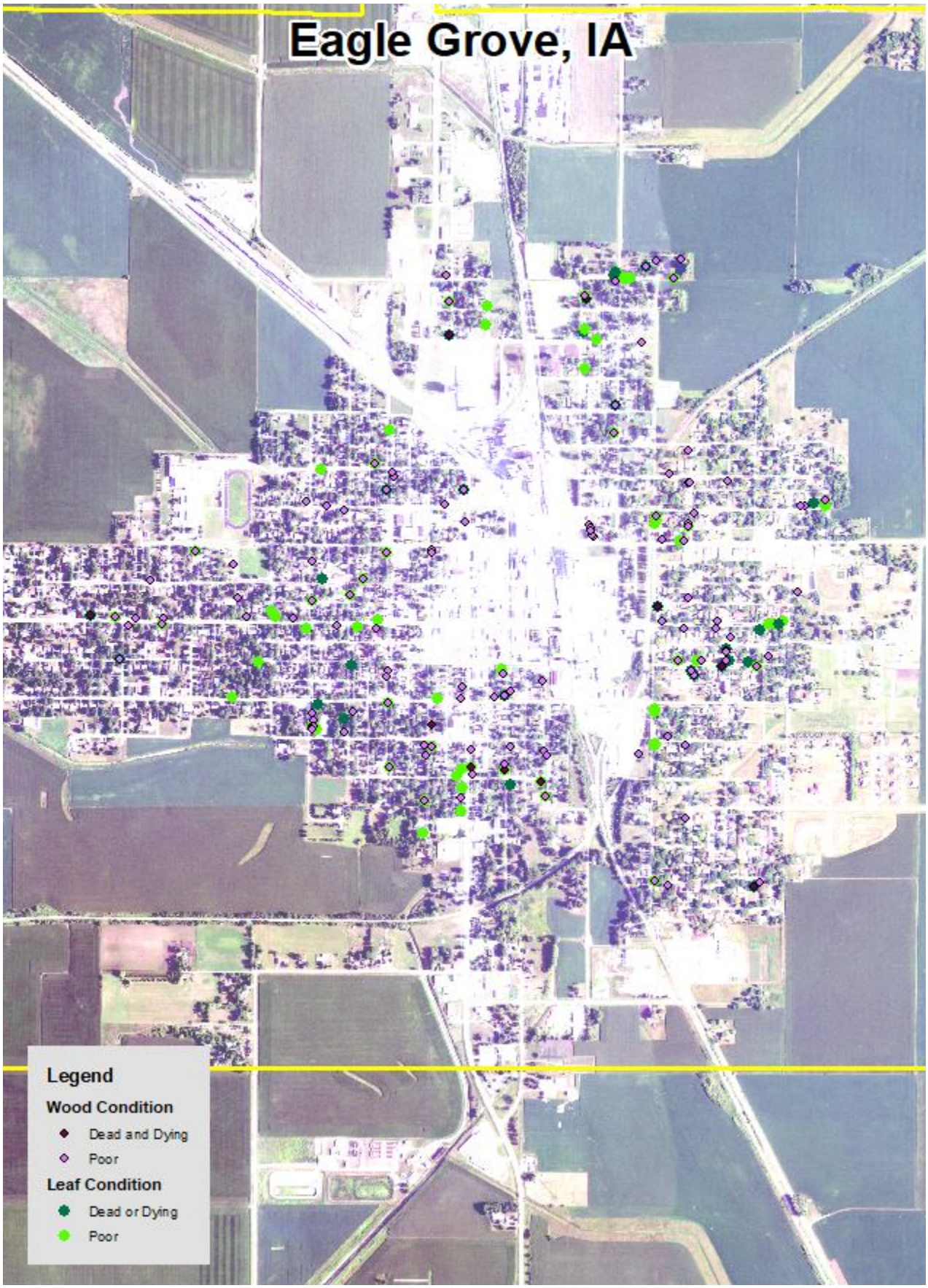

Figure 3: Location of Poor Condition Trees

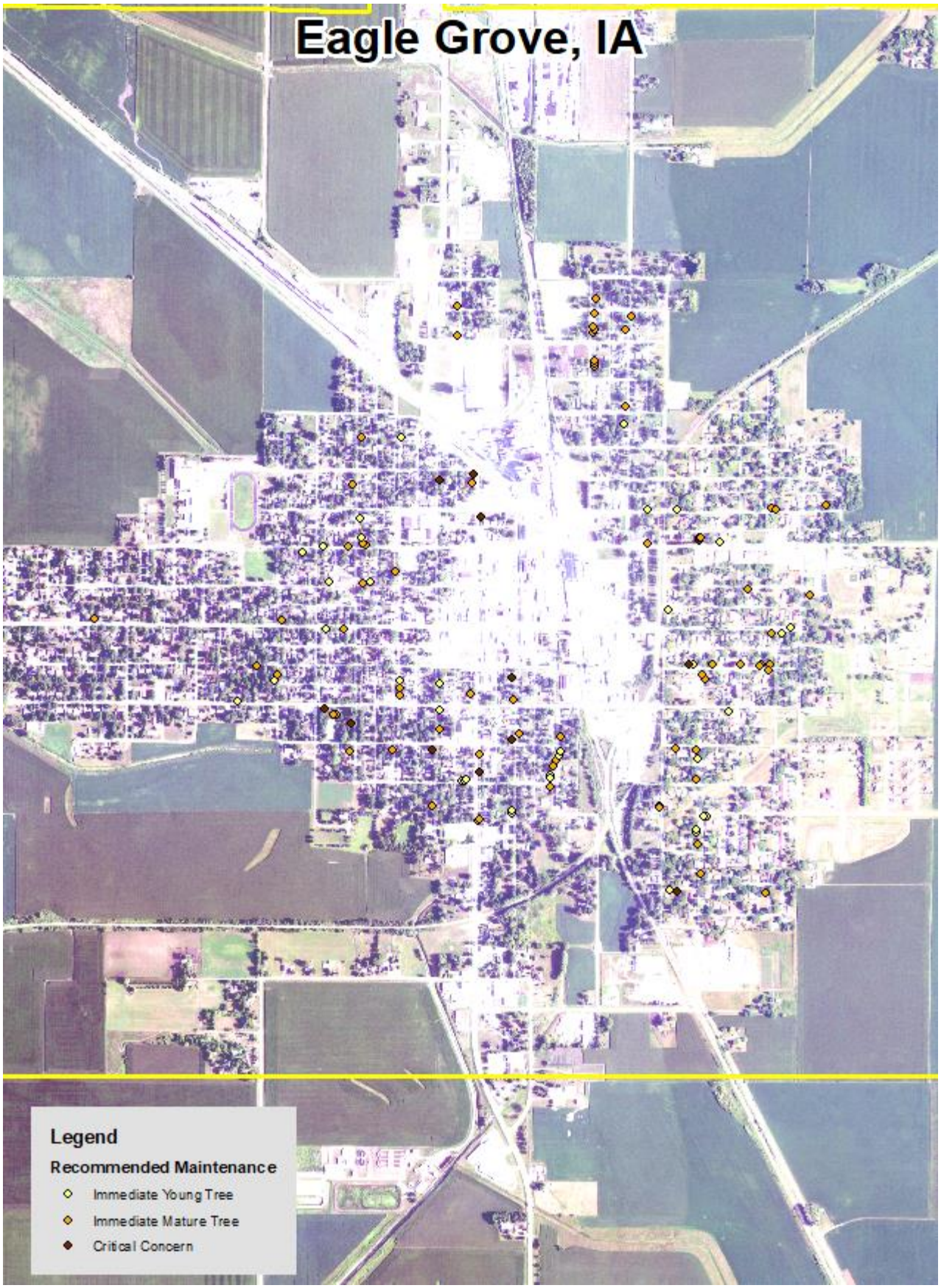

Figure 4: Location of Trees with Recommended Maintenance

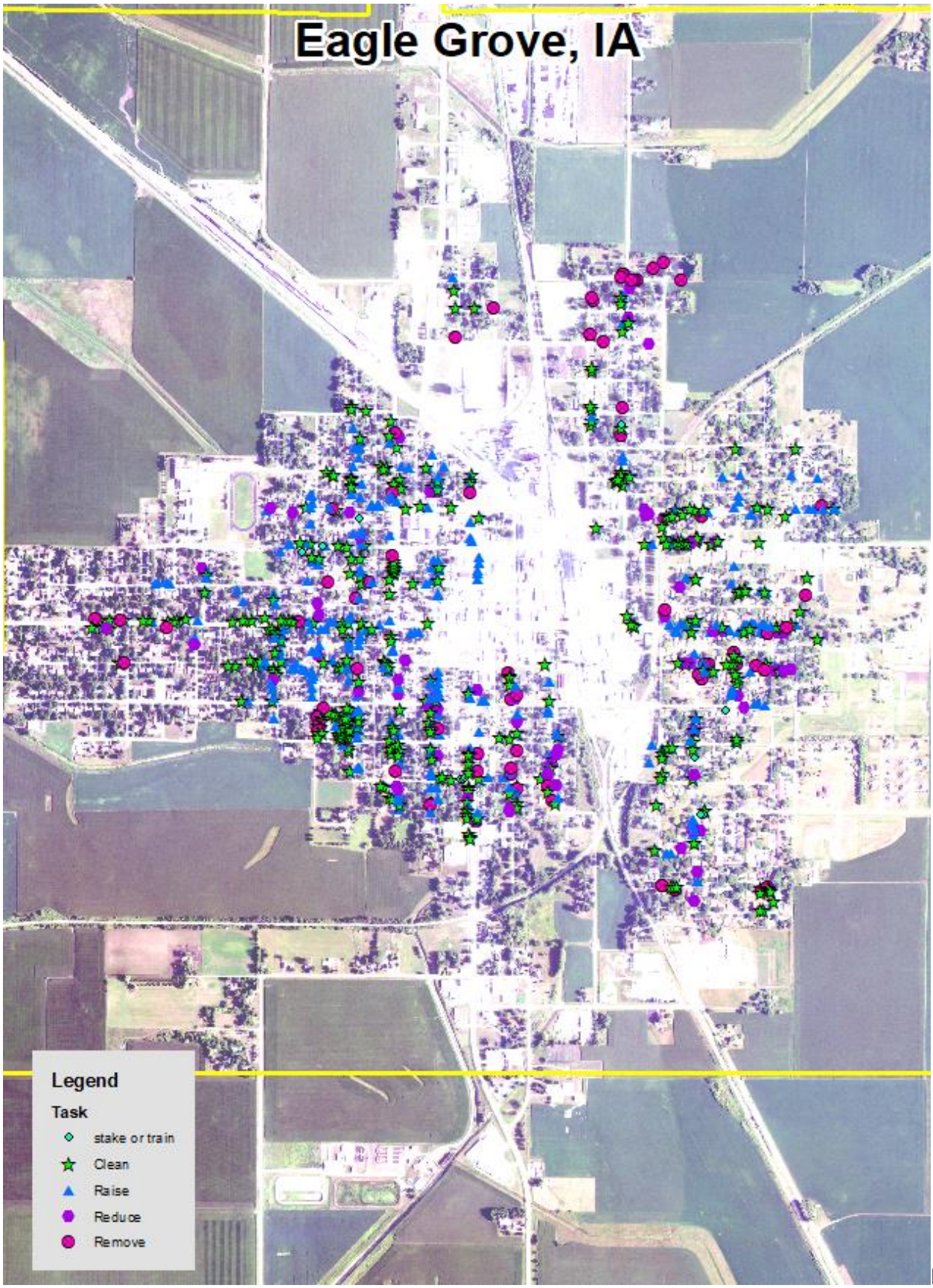

Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: Eagle Grove 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.