Goldfield, IA

2020 Urban Forest Management Plan
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Table of Contents

Executive Summary

Overview

This plan was developed to assist the City of Goldfield 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 29% of Goldfield'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 2019, 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 689 trees inventoried.

- Goldfield's trees provide $146,661 of benefits annually, an average of $213 a tree
- There are over 40 species of trees
- The top three genera are: Maple 45%, Ash 17%, and Oak 15%
- 5% of trees are in need of some type of management
- 13 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.

- All of the 13 trees needing removal are over 24 inches in diameter at 4.5 ft and must be addressed within 2 years *City ownership of the trees recommended for removal should be verified prior to any removal*
- 60 of the 200 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 46 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 Goldfield with the management, budgeting and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the anticipated arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal or treatment and replacement planting. With proper planning and management of the current canopy in Goldfield, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

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

Inventory

In 2019, 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 689 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. Goldfield's trees reduce energy related costs by approximately $36,412 annually (Appendix A, Table 1). These savings are both in Electricity (174.6MWh) and in Natural Gas (23,630.3 Therms).

Annual Stormwater Benefits

Goldfield's trees intercept about 2,202,110 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $59,677 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 Goldfield, it is estimated that trees remove 2,310.7 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 $6,529 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Goldfield, trees sequester about 441,027 lbs of carbon a year with an associated value of $3,308 (Appendix A, Table 5). In addition, the trees store 8,593,895 lbs of carbon, with a yearly benefit of $64,454 (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. Goldfield receives $38,862 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, Goldfield's trees provide $146,661 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 689 trees in Goldfield provide approximately $213 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Goldfield has over 40 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Maple	251	36%
Ash	200	29%
Spruce	75	11%
Hackberry	45	7%
Apple (crab)	26	4%
Walnut	18	3%
Honeylocust	15	2%
Oak	15	2%
Pine	13	2%
Japanese Lilac	5	1%
Other	4	1%
Red Cedar	3	<1%
Mulberry	3	<1%
Linden	3	<1%
Redbud	2	<1%
Poplar	2	<1%
Ohio Buckeye	1	<1%
Hickory	1	<1%
Catalpa	1	<1%
Coffeetree	1	<1%
Magnolia	1	<1%
Cherry	1	<1%
Pear	1	<1%
Mountain ash	1	<1%
Elm	1	<1%

Age Class

Most of Goldfield'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. Goldfield's size curve is double peaking showing a slowing of planting 20 years ago and in the past 6 years.

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 Goldfield indicate that 92% of the trees are in good health, with only 2% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Also, 27% of Goldfield'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 12% of the population. This 12% 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	18	3%
Tree Removal	13	2%
Crown Raising	3	<1%
Crown Reduction	2	<1%

Canopy Cover

The total canopy with both private and public trees is 16%, 124 acres. The canopy cover included in the Goldfield inventory includes approximately 21 acres (Appendix A, Figure 4). The City's Canopy goal is to increase canopy by 3%, in 30 years. To achieve this goal it is estimated that 56 trees need to be planted annually on public and private lands.

Land Use and Location

The majority of Goldfield'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	57%
Park/vacant/other	43%
Industrial/Large commercial	0%
Small commercial	0%
Multifamily residential	0%

Location	
Planting strip	64%
Front yard	36%
Other maintained locations	0%
Cutout (surrounded by pavement)	0%

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

Goldfield has 3 critical concern trees, one needing 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 trees first. There are 7 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. There are a total of 15 trees with these needs.

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 13 removals, 2 are ash trees. There are a total of 200 ash trees, and 60 of those have signs and symptoms that have been associated with EAB. In addition, there are 29 trees that are in poor health. *City ownership of the trees recommended for removal should be verified prior to any removal*

Pruning Cycle

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. In the Management Needs section of the Findings there are four main maintenance issues to be addressed: routine pruning, crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising 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 Goldfield.

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 (36%) (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. All trees planted must meet the restrictions in city ordinance.

Continual Monitoring

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

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

Year 1

Removal: 1 critical concern trees and 4 immediate trees
Trimming: 2 critical concern trees
Planting and Replacement: 6 trees to be planted in open locations
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 2

Removal: 4 trees
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 5 trees in open locations from year one removals
Young Tree Pruning & Maintenance:
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 3

Removal: 4 marked removal and any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 4

Removal: 4 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 5 trees in open locations from year one removals
Young Tree Pruning & Maintenance:
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 5

Removal: 5 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 6

Removal: 4 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 5 trees in open locations from year one removals
Young Tree Pruning & Maintenance:
Routine trimming: Contract to trim 1/3 of the city trees

Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 20 ash trees removed (approximately 10% of ash). It will take approximately 46 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 $35,000 a year. If the budget were increased to $10,000 a year all ash could be removed in 12 years.

Emerald Ash Borer Plan

Ash Tree Removal

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

Treatment of Ash Trees

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

EAB Quarantines

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

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

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

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

Wood Disposal

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the hundreds of trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment

capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml. Wood waste can be disposed of as you normally would if your county is not part of a quarantine.

Canopy Replacement

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

Postponed Work

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

Monitoring

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

Private Ash Trees

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

Budget

Current Budget

Total $30,000 over 6 years ($5,000/year)

FY 2020 Budget

Removal: $4,000
*Or saving for ash tree treatment and/or future ash removal
Trimming: $400
Planting: $600

FY 2021 Budget

Removal: $3,200
*Or saving for ash tree treatment and/or future ash removal
Planting: $500
Routine trimming: $1,100
Watering & Maintenance: $200

FY 2022 Budget

Removal: $4,300
*Or saving for ash tree treatment and/or future ash removal

Planting: $500
Watering & Maintenance: $200

FY 2023 Budget
Removal: $3,200
*Or saving for ash tree treatment and/or future ash removal
Planting: $500
Routine trimming: $1,100
Watering & Maintenance: $200

FY 2024 Budget
Removal: $4,300
*Or saving for ash tree treatment and/or future ash removal
Planting: $500
Watering & Maintenance: $200

FY 2025 Budget
Removal: $3,200
*Or saving for ash tree treatment and/or future ash removal
Planting: $500
Routine trimming: $1,100
Watering & Maintenance: $200

*Reduction of ash over 6 years: approximately 20 ash trees removed (approximately 10% of ash). **It will take approximately 46 years to remove all ash with the current budget.**

Purposed Budget Increase

EAB could potentially kill all ash trees in Goldfield within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $35,000 a year. If the budget were increased to $10,000 a year all ash could be removed within 12 years. Additionally, it is recommended that Goldfield apply for grants to fund replacement trees. 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 for $1,200 (every other year treatment). This would be 8 trees selected for treatment, and Goldfield would still need to find $153,600 for removal. Alternatively, if there are 50 treatable trees, it would cost approximately $2,250 a year for treatment and leave $120,000 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 Goldfield. 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

Goldfield

Annual Energy Benefits of Public Trees

4/13/2020

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	62.3	4,731	8,346.7	8,180	12,910	(N/A)	29.0	35.5	64.55
Silver maple	46.2	3,505	6,013.6	5,893	9,399	(N/A)	19.9	25.8	68.60
Norway maple	13.0	984	1,874.3	1,837	2,821	(N/A)	7.8	7.7	52.24
Spruce	3.4	260	490.8	481	741	(N/A)	7.0	2.0	15.44
Northern hackberry	15.9	1,210	2,245.7	2,201	3,411	(N/A)	6.5	9.4	75.80
Sugar maple	10.4	790	1,405.7	1,378	2,168	(N/A)	5.2	6.0	60.21
Apple	1.7	128	284.9	279	407	(N/A)	3.8	1.1	15.66
Black walnut	5.4	406	715.5	701	1,107	(N/A)	2.6	3.0	61.52
Honeylocust	4.3	330	569.4	558	888	(N/A)	2.2	2.4	59.20
Blue spruce	1.0	80	153.6	151	230	(N/A)	2.2	0.6	15.34
Scotch pine	1.7	133	225.8	221	354	(N/A)	1.9	1.0	27.22
Maple	0.3	26	51.5	51	77	(N/A)	1.7	0.2	6.40
Norway spruce	1.0	78	141.9	139	217	(N/A)	1.6	0.6	19.76
Swamp white oak	0.7	52	94.3	92	145	(N/A)	0.9	0.4	24.12
Black maple	1.4	108	199.5	196	303	(N/A)	0.7	0.8	60.68
Japanese tree lilac	0.2	16	37.1	36	53	(N/A)	0.7	0.1	10.52
Northern red oak	0.3	24	41.1	40	64	(N/A)	0.7	0.2	12.77
Bur oak	1.2	88	158.6	155	244	(N/A)	0.6	0.7	60.95
Red maple	0.0	3	6.7	7	10	(N/A)	0.4	0.0	3.30
Mulberry	0.3	21	45.1	44	65	(N/A)	0.4	0.2	21.73
Eastern red cedar	0.2	16	32.3	32	48	(N/A)	0.4	0.1	15.84
Boxelder	0.7	54	95.4	93	147	(N/A)	0.4	0.4	49.13
American basswood	0.8	57	108.2	106	163	(N/A)	0.3	0.4	81.70
Black poplar	0.4	27	51.8	51	78	(N/A)	0.3	0.2	38.98
Eastern redbud	0.0	2	4.4	4	6	(N/A)	0.3	0.0	3.13
Broadleaf Deciduous Small	0.1	6	13.5	13	19	(N/A)	0.3	0.1	9.53
Kentucky coffeetree	0.0	0	0.5	0	1	(N/A)	0.1	0.0	0.66
Hickory	0.3	20	38.1	37	57	(N/A)	0.1	0.2	57.32
Japanese maple	0.1	6	12.8	13	18	(N/A)	0.1	0.0	18.19
Littleleaf linden	0.2	15	23.9	23	39	(N/A)	0.1	0.1	38.70
Mountain ash	0.1	6	12.8	13	18	(N/A)	0.1	0.0	18.19
Plum	0.1	6	12.8	13	18	(N/A)	0.1	0.0	18.19
Broadleaf Deciduous Mediu	0.0	0	0.8	1	1	(N/A)	0.1	0.0	1.10
Broadleaf Evergreen Large	0.1	7	14.0	14	21	(N/A)	0.1	0.1	20.59
Black spruce	0.1	5	10.2	10	15	(N/A)	0.1	0.0	14.80
Southern magnolia	0.0	1	2.8	3	4	(N/A)	0.1	0.0	3.94
Pear	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Ohio buckeye	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Catalpa	0.1	7	13.7	13	21	(N/A)	0.1	0.1	20.64
Elm	0.5	37	63.1	62	99	(N/A)	0.1	0.3	98.63
Total	174.6	13,254	23,630.3	23,158	36,412	(N/A)	100.0	100.0	52.85

Table 2: Annual Stormwater Benefits

Goldfield

Annual Stormwater Benefits of Public Trees

4/13/2020

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	778,324	21,093	(N/A)	29.0	35.3	105.46
Silver maple	693,584	18,796	(N/A)	19.9	31.5	137.20
Norway maple	125,921	3,412	(N/A)	7.8	5.7	63.19
Spruce	40,863	1,107	(N/A)	7.0	1.9	23.07
Northern hackberry	160,437	4,348	(N/A)	6.5	7.3	96.62
Sugar maple	139,576	3,782	(N/A)	5.2	6.3	105.07
Apple	5,981	162	(N/A)	3.8	0.3	6.23
Black walnut	64,653	1,752	(N/A)	2.6	2.9	97.34
Honeylocust	50,306	1,363	(N/A)	2.2	2.3	90.89
Blue spruce	12,482	338	(N/A)	2.2	0.6	22.55
Scotch pine	30,503	827	(N/A)	1.9	1.4	63.59
Maple	1,507	41	(N/A)	1.7	0.1	3.40
Norway spruce	20,419	553	(N/A)	1.6	0.9	50.30
Swamp white oak	4,015	109	(N/A)	0.9	0.2	18.13
Black maple	14,335	388	(N/A)	0.7	0.7	77.70
Japanese tree lilac	735	20	(N/A)	0.7	0.0	3.98
Northern red oak	1,779	48	(N/A)	0.7	0.1	9.64
Bur oak	15,492	420	(N/A)	0.6	0.7	104.96
Red maple	161	4	(N/A)	0.4	0.0	1.45
Mulberry	1,446	39	(N/A)	0.4	0.1	13.06
Eastern red cedar	2,953	80	(N/A)	0.4	0.1	26.68
Boxelder	7,713	209	(N/A)	0.4	0.4	69.67
American basswood	10,705	290	(N/A)	0.3	0.5	145.06
Black poplar	3,199	87	(N/A)	0.3	0.1	43.34
Eastern redbud	76	2	(N/A)	0.3	0.0	1.03
Broadleaf Deciduous Small	272	7	(N/A)	0.3	0.0	3.68
Kentucky coffeetree	18	0	(N/A)	0.1	0.0	0.48
Hickory	2,591	70	(N/A)	0.1	0.1	70.21
Japanese maple	264	7	(N/A)	0.1	0.0	7.17
Littleleaf linden	1,260	34	(N/A)	0.1	0.1	34.14
Mountain ash	264	7	(N/A)	0.1	0.0	7.17
Plum	264	7	(N/A)	0.1	0.0	7.17
Broadleaf Deciduous Medium	12	0	(N/A)	0.1	0.0	0.33
Broadleaf Evergreen Large	750	20	(N/A)	0.1	0.0	20.32
Black spruce	755	20	(N/A)	0.1	0.0	20.47
Southern magnolia	56	2	(N/A)	0.1	0.0	1.53
Pear	7	0	(N/A)	0.1	0.0	0.20
Ohio buckeye	586	16	(N/A)	0.1	0.0	15.88
Catalpa	608	16	(N/A)	0.1	0.0	16.47
Elm	7,239	196	(N/A)	0.1	0.3	196.17
Citywide total	2,202,110	59,677	(N/A)	100.0	100.0	86.61

Table 3: Annual Air Quality Benefits

Goldfield

Annual Air Quality Benefits of Public Trees

4/13/2020

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	108.7	17.4	50.1	4.9	573	296.0	43.2	41.2	282.5	1,848	0.0	0	843.9	2,421 (N/A)	29.0	12.11
Silver maple	120.1	20.4	58.7	5.3	647	217.1	31.8	30.4	208.9	1,360	-60.9	-229	631.7	1,778 (N/A)	19.9	12.98
Norway maple	26.3	4.5	12.8	1.2	142	62.9	9.1	8.7	58.8	390	-6.1	-23	178.3	509 (N/A)	7.8	9.42
Spruce	4.0	0.8	3.8	0.5	28	16.5	2.4	2.3	15.5	103	-13.8	-52	32.0	79 (N/A)	7.0	1.64
Northern hackberry	26.3	4.5	13.2	1.2	143	76.8	11.1	10.6	72.3	477	0.0	0	216.1	620 (N/A)	6.5	13.78
Sugar maple	20.4	3.5	9.8	0.9	110	49.5	7.2	6.9	47.1	309	-15.8	-59	129.5	359 (N/A)	5.2	9.97
Apple	1.1	0.2	0.6	0.0	6	8.5	1.2	1.1	7.6	52	0.0	0	20.4	58 (N/A)	3.8	2.23
Black walnut	8.7	1.4	4.0	0.4	46	25.4	3.7	3.5	24.3	159	0.0	0	71.4	204 (N/A)	2.6	11.36
Honeylocust	9.9	1.6	4.5	0.4	52	20.5	3.0	2.9	19.7	128	-7.9	-30	54.6	151 (N/A)	2.2	10.05
Blue spruce	1.3	0.3	1.2	0.2	9	5.1	0.7	0.7	4.7	31	-4.1	-15	10.1	25 (N/A)	2.2	1.66
Scotch pine	3.5	0.7	2.9	0.4	23	8.2	1.2	1.2	7.9	51	-13.4	-50	12.6	24 (N/A)	1.9	1.87
Maple	0.1	0.0	0.1	0.0	1	1.7	0.2	0.2	1.6	10	-0.1	0	3.9	11 (N/A)	1.7	0.92
Norway spruce	2.4	0.5	1.9	0.3	16	4.9	0.7	0.7	4.7	31	-11.1	-42	5.0	5 (N/A)	1.6	0.42
Swamp white oak	0.5	0.1	0.3	0.0	3	3.3	0.5	0.5	3.1	21	-0.2	-1	8.2	23 (N/A)	0.9	3.84
Black maple	3.7	0.6	1.7	0.2	20	6.8	1.0	0.9	6.4	42	-1.2	-5	20.2	58 (N/A)	0.7	11.54
Japanese tree lilac	0.1	0.0	0.1	0.0	1	1.1	0.2	0.1	1.0	7	0.0	0	2.6	7 (N/A)	0.7	1.44
Northern red oak	0.3	0.0	0.2	0.0	2	1.5	0.2	0.2	1.4	9	-0.4	-1	3.4	9 (N/A)	0.7	1.86
Bur oak	2.6	0.4	1.2	0.1	14	5.6	0.8	0.8	5.3	35	0.0	0	16.8	48 (N/A)	0.6	12.12
Red maple	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.5	1 (N/A)	0.4	0.46
Mulberry	0.5	0.1	0.2	0.0	3	1.4	0.2	0.2	1.3	8	0.0	0	3.8	11 (N/A)	0.4	3.67
Eastern red cedar	0.5	0.1	0.4	0.1	3	1.0	0.1	0.1	0.9	6	-1.6	-6	1.7	3 (N/A)	0.4	1.14
Boxelder	1.0	0.2	0.5	0.0	5	3.4	0.5	0.5	3.2	21	-0.4	-1	8.9	25 (N/A)	0.4	8.37
American basswood	1.7	0.3	0.8	0.1	9	3.7	0.5	0.5	3.4	23	-1.3	-5	9.6	26 (N/A)	0.3	13.23
Black poplar	0.3	0.0	0.2	0.0	2	1.7	0.3	0.2	1.6	11	0.0	0	4.4	12 (N/A)	0.3	6.17
Eastern redbud	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)	0.3	0.41
Broadleaf Deciduous Small	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	2	0.0	0	0.9	3 (N/A)	0.3	1.33
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
Hickory	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
Japanese maple	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.1	2.55
Littleleaf linden	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6 (N/A)	0.1	6.42
Mountain ash	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.1	2.55
Plum	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.1	2.55
Broadleaf Deciduous Medium	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	0.14
Broadleaf Evergreen Large	0.0	0.0	0.1	0.0	0	0.4	0.1	0.1	0.4	3	-0.2	-1	0.8	2 (N/A)	0.1	2.16
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
Southern magnolia	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.2	0 (N/A)	0.1	0.47
Pear	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	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3 (N/A)	0.1	3.47
Catalpa	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	0.0	0	1.1	3 (N/A)	0.1	2.99
Elm	1.6	0.3	0.7	0.1	8	2.3	0.3	0.3	2.2	14	0.0	0	7.7	23 (N/A)	0.1	22.55
Citywide total	346.4	58.0	170.3	16.4	1,868	830.7	121.1	115.5	791.0	5,181	-138.8	-520	2,310.7	6,529 (N/A)	100.0	9.48

Table 4: Annual Carbon Stored

Goldfield

Stored CO2 Benefits of Public Trees

4/13/2020

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	3,611,546	27,087	(N/A)	29.0	42.0	135.43
Silver maple	2,672,322	20,042	(N/A)	19.9	31.1	146.30
Norway maple	433,292	3,250	(N/A)	7.8	5.0	60.18
Spruce	26,977	202	(N/A)	7.0	0.3	4.22
Northern hackberry	405,923	3,044	(N/A)	6.5	4.7	67.65
Sugar maple	601,775	4,513	(N/A)	5.2	7.0	125.37
Apple	21,026	158	(N/A)	3.8	0.2	6.07
Black walnut	286,443	2,148	(N/A)	2.6	3.3	119.35
Honeylocust	128,223	962	(N/A)	2.2	1.5	64.11
Blue spruce	6,242	47	(N/A)	2.2	0.1	3.12
Scotch pine	31,680	238	(N/A)	1.9	0.4	18.28
Maple	2,496	19	(N/A)	1.7	0.0	1.56
Norway spruce	27,797	208	(N/A)	1.6	0.3	18.95
Swamp white oak	9,483	71	(N/A)	0.9	0.1	11.85
Black maple	39,726	298	(N/A)	0.7	0.5	59.59
Japanese tree lilac	2,349	18	(N/A)	0.7	0.0	3.52
Northern red oak	4,657	35	(N/A)	0.7	0.1	6.99
Bur oak	90,568	679	(N/A)	0.6	1.1	169.82
Red maple	252	2	(N/A)	0.4	0.0	0.63
Mulberry	7,664	57	(N/A)	0.4	0.1	19.16
Eastern red cedar	1,656	12	(N/A)	0.4	0.0	4.14
Boxelder	34,375	258	(N/A)	0.4	0.4	85.94
American basswood	62,568	469	(N/A)	0.3	0.7	234.63
Black poplar	9,492	71	(N/A)	0.3	0.1	35.60
Eastern redbud	192	1	(N/A)	0.3	0.0	0.72
Broadleaf Deciduous	922	7	(N/A)	0.3	0.0	3.46
Kentucky coffeetree	12	0	(N/A)	0.1	0.0	0.09
Hickory	8,458	63	(N/A)	0.1	0.1	63.43
Japanese maple	908	7	(N/A)	0.1	0.0	6.81
Littleleaf linden	3,595	27	(N/A)	0.1	0.0	26.96
Mountain ash	908	7	(N/A)	0.1	0.0	6.81
Plum	908	7	(N/A)	0.1	0.0	6.81
Broadleaf Deciduous	17	0	(N/A)	0.1	0.0	0.13
Broadleaf Evergreen I	1,025	8	(N/A)	0.1	0.0	7.68
Black spruce	284	2	(N/A)	0.1	0.0	2.13
Southern magnolia	3	0	(N/A)	0.1	0.0	0.02
Pear	14	0	(N/A)	0.1	0.0	0.10
Ohio buckeye	1,101	8	(N/A)	0.1	0.0	8.26
Catalpa	1,035	8	(N/A)	0.1	0.0	7.76
Elm	55,982	420	(N/A)	0.1	0.7	419.86
Citywide total	8,593,895	64,454	(N/A)	100.0	100.0	93.55

Table 5: Annual Carbon Sequestered

Goldfield

Annual CO Benefits of Public Trees

4/13/2020

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	139,730	1,048	-17,335	-664	-135	104,543	784	226,274	1,697 (N/A)	29.0	32.8	8.49
Silver maple	194,518	1,459	-12,829	-512	-100	77,469	581	258,646	1,940 (N/A)	19.9	37.4	14.16
Norway maple	15,011	113	-2,082	-143	-17	21,753	163	34,539	259 (N/A)	7.8	5.0	4.80
Spruce	3,231	24	-129	-63	-1	5,751	43	8,788	66 (N/A)	7.0	1.3	1.37
Northern hackberry	20,330	152	-1,948	-152	-16	26,749	201	44,979	337 (N/A)	6.5	6.5	7.50
Sugar maple	27,006	203	-2,889	-120	-23	17,460	131	41,457	311 (N/A)	5.2	6.0	8.64
Apple	2,600	20	-101	-27	-1	2,827	21	5,300	40 (N/A)	3.8	0.8	1.53
Black walnut	12,268	92	-1,375	-56	-11	8,976	67	19,812	149 (N/A)	2.6	2.9	8.25
Honeylocust	7,032	53	-616	-33	-5	7,294	55	13,678	103 (N/A)	2.2	2.0	6.84
Blue spruce	672	5	-30	-18	0	1,759	13	2,383	18 (N/A)	2.2	0.3	1.19
Scotch pine	2,014	15	-152	-31	-1	2,931	22	4,762	36 (N/A)	1.9	0.7	2.75
Maple	412	3	-12	-6	0	582	4	976	7 (N/A)	1.7	0.1	0.61
Norway spruce	1,254	9	-133	-20	-1	1,729	13	2,830	21 (N/A)	1.6	0.4	1.93
Swamp white oak	1,231	9	-46	-7	0	1,156	9	2,334	18 (N/A)	0.9	0.3	2.92
Black maple	923	7	-191	-14	-2	2,385	18	3,104	23 (N/A)	0.7	0.4	4.66
Japanese tree lilac	342	3	-11	-4	0	360	3	686	5 (N/A)	0.7	0.1	1.03
Northern red oak	443	3	-22	-4	0	521	4	938	7 (N/A)	0.7	0.1	1.41
Bur oak	2,172	16	-435	-13	-3	1,953	15	3,677	28 (N/A)	0.6	0.5	6.89
Red maple	44	0	-1	-1	0	74	1	116	1 (N/A)	0.4	0.0	0.29
Mulberry	123	1	-37	-5	0	465	3	545	4 (N/A)	0.4	0.1	1.36
Eastern red cedar	80	1	-8	-4	0	351	3	418	3 (N/A)	0.4	0.1	1.05
Boxelder	2,567	19	-165	-9	-1	1,192	9	3,585	27 (N/A)	0.4	0.5	8.96
American basswood	3,305	25	-300	-9	-2	1,268	10	4,263	32 (N/A)	0.3	0.6	15.99
Black poplar	868	7	-46	-4	0	600	5	1,419	11 (N/A)	0.3	0.2	5.32
Eastern redbud	47	0	-1	-1	0	43	0	88	1 (N/A)	0.3	0.0	0.33
Broadleaf Deciduous Smal	123	1	-4	-1	0	130	1	246	2 (N/A)	0.3	0.0	0.92
Kentucky coffeetree	3	0	0	0	0	4	0	7	0 (N/A)	0.1	0.0	0.05
Hickory	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.1	0.2	7.93
Japanese maple	114	1	-4	-1	0	124	1	232	2 (N/A)	0.1	0.0	1.74
Littleleaf linden	514	4	-17	-2	0	337	3	832	6 (N/A)	0.1	0.1	6.24
Mountain ash	114	1	-4	-1	0	124	1	232	2 (N/A)	0.1	0.0	1.74
Plum	114	1	-4	-1	0	124	1	232	2 (N/A)	0.1	0.0	1.74
Broadleaf Deciduous Medi	5	0	0	0	0	7	0	12	0 (N/A)	0.1	0.0	0.09
Broadleaf Evergreen Large	197	1	-5	-1	0	152	1	343	3 (N/A)	0.1	0.0	2.57
Black spruce	39	0	-1	-1	0	106	1	142	1 (N/A)	0.1	0.0	1.07
Southern magnolia	1	0	0	0	0	26	0	27	0 (N/A)	0.1	0.0	0.20
Pear	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Ohio buckeye	224	2	-5	-1	0	176	1	393	3 (N/A)	0.1	0.1	2.95
Catalpa	209	2	-5	-1	0	159	1	361	3 (N/A)	0.1	0.1	2.71
Elm	479	4	-269	-6	-2	813	6	1,017	8 (N/A)	0.1	0.1	7.63
Citywide total	441,027	3,308	-41,256	-1,939	-324	292,919	2,197	690,750	5,181 (N/A)	100.0	100.0	7.52

Table 6: Annual Social and Aesthetic Benefits

Goldfield

Annual Aesthetic/Other Benefits of Public Trees

4/13/2020

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Green ash	10,849	(N/A)	29.0	27.9	54.25
Silver maple	15,041	(N/A)	19.9	38.7	109.79
Norway maple	1,430	(N/A)	7.8	3.7	26.49
Spruce	928	(N/A)	7.0	2.4	19.34
Northern hackberry	2,660	(N/A)	6.5	6.8	59.12
Sugar maple	2,649	(N/A)	5.2	6.8	73.58
Apple	145	(N/A)	3.8	0.4	5.59
Black walnut	970	(N/A)	2.6	2.5	53.88
Honeylocust	1,753	(N/A)	2.2	4.5	116.88
Blue spruce	304	(N/A)	2.2	0.8	20.26
Scotch pine	521	(N/A)	1.9	1.3	40.10
Maple	74	(N/A)	1.7	0.2	6.14
Norway spruce	223	(N/A)	1.6	0.6	20.25
Swamp white oak	136	(N/A)	0.9	0.4	22.71
Black maple	109	(N/A)	0.7	0.3	21.82
Japanese tree lilac	19	(N/A)	0.7	0.0	3.80
Northern red oak	45	(N/A)	0.7	0.1	8.99
Bur oak	168	(N/A)	0.6	0.4	41.90
Red maple	7	(N/A)	0.4	0.0	2.45
Mulberry	6	(N/A)	0.4	0.0	2.15
Eastern red cedar	43	(N/A)	0.4	0.1	14.23
Boxelder	170	(N/A)	0.4	0.4	56.50
American basswood	214	(N/A)	0.3	0.5	106.78
Black poplar	86	(N/A)	0.3	0.2	43.12
Eastern redbud	2	(N/A)	0.3	0.0	1.05
Broadleaf Deciduous Small	6	(N/A)	0.3	0.0	3.22
Kentucky coffeetree	5	(N/A)	0.1	0.0	5.26
Hickory	58	(N/A)	0.1	0.1	57.69
Japanese maple	6	(N/A)	0.1	0.0	6.40
Littleleaf linden	55	(N/A)	0.1	0.1	55.09
Mountain ash	6	(N/A)	0.1	0.0	6.40
Plum	6	(N/A)	0.1	0.0	6.40
Broadleaf Deciduous Medium	3	(N/A)	0.1	0.0	2.74
Broadleaf Evergreen Large	58	(N/A)	0.1	0.1	58.26
Black spruce	21	(N/A)	0.1	0.1	21.08
Southern magnolia	0	(N/A)	0.1	0.0	0.01
Pear	0	(N/A)	0.1	0.0	0.03
Ohio buckeye	26	(N/A)	0.1	0.1	26.22
Catalpa	29	(N/A)	0.1	0.1	28.56
Elm	29	(N/A)	0.1	0.1	28.57
Citywide total	38,862	(N/A)	100.0	100.0	56.40

Table 7: Summary of Benefits in Dollars

Goldfield

Total Annual Benefits of Public Trees by Species ($)

4/13/2020

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Green ash	12,910	1,697	2,421	21,093	10,849	48,970	(N/A)	33.4
Silver maple	9,399	1,940	1,778	18,796	15,041	46,953	(N/A)	32.0
Norway maple	2,821	259	509	3,412	1,430	8,431	(N/A)	5.7
Spruce	741	66	79	1,107	928	2,921	(N/A)	2.0
Northern hackberry	3,411	337	620	4,348	2,660	11,377	(N/A)	7.8
Sugar maple	2,168	311	359	3,782	2,649	9,269	(N/A)	6.3
Apple	407	40	58	162	145	812	(N/A)	0.6
Black walnut	1,107	149	204	1,752	970	4,182	(N/A)	2.9
Honeylocust	888	103	151	1,363	1,753	4,258	(N/A)	2.9
Blue spruce	230	18	25	338	304	915	(N/A)	0.6
Scotch pine	354	36	24	827	521	1,762	(N/A)	1.2
Maple	77	7	11	41	74	210	(N/A)	0.1
Norway spruce	217	21	5	553	223	1,019	(N/A)	0.7
Swamp white oak	145	18	23	109	136	430	(N/A)	0.3
Black maple	303	23	58	388	109	882	(N/A)	0.6
Japanese tree lilac	53	5	7	20	19	104	(N/A)	0.1
Northern red oak	64	7	9	48	45	173	(N/A)	0.1
Bur oak	244	28	48	420	168	907	(N/A)	0.6
Red maple	10	1	1	4	7	24	(N/A)	0.0
Mulberry	65	4	11	39	6	126	(N/A)	0.1
Eastern red cedar	48	3	3	80	43	177	(N/A)	0.1
Boxelder	147	27	25	209	170	578	(N/A)	0.4
American basswood	163	32	26	290	214	725	(N/A)	0.5
Black poplar	78	11	12	87	86	274	(N/A)	0.2
Eastern redbud	6	1	1	2	2	12	(N/A)	0.0
Broadleaf Deciduous Sn	19	2	3	7	6	37	(N/A)	0.0
Kentucky coffeetree	1	0	0	0	5	7	(N/A)	0.0
Hickory	57	8	9	70	58	202	(N/A)	0.1
Japanese maple	18	2	3	7	6	36	(N/A)	0.0
Littleleaf linden	39	6	6	34	55	141	(N/A)	0.1
Mountain ash	18	2	3	7	6	36	(N/A)	0.0
Plum	18	2	3	7	6	36	(N/A)	0.0
Broadleaf Deciduous M	1	0	0	0	3	4	(N/A)	0.0
Broadleaf Evergreen La	21	3	2	20	58	104	(N/A)	0.1
Black spruce	15	1	2	20	21	59	(N/A)	0.0
Southern magnolia	4	0	0	2	0	6	(N/A)	0.0
Pear	1	0	0	0	0	1	(N/A)	0.0
Ohio buckeye	24	3	3	16	26	73	(N/A)	0.0
Catalpa	21	3	3	16	29	71	(N/A)	0.0
Elm	99	8	23	196	29	354	(N/A)	0.2
Citywide Total	36,412	5,181	6,529	59,677	38,862	146,661	(N/A)	100.0

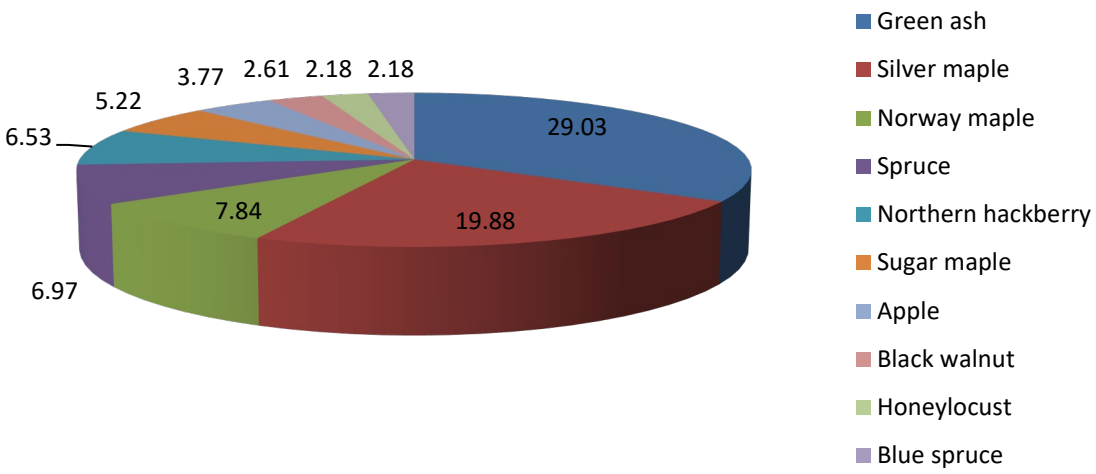

Figure 1: Species Distribution

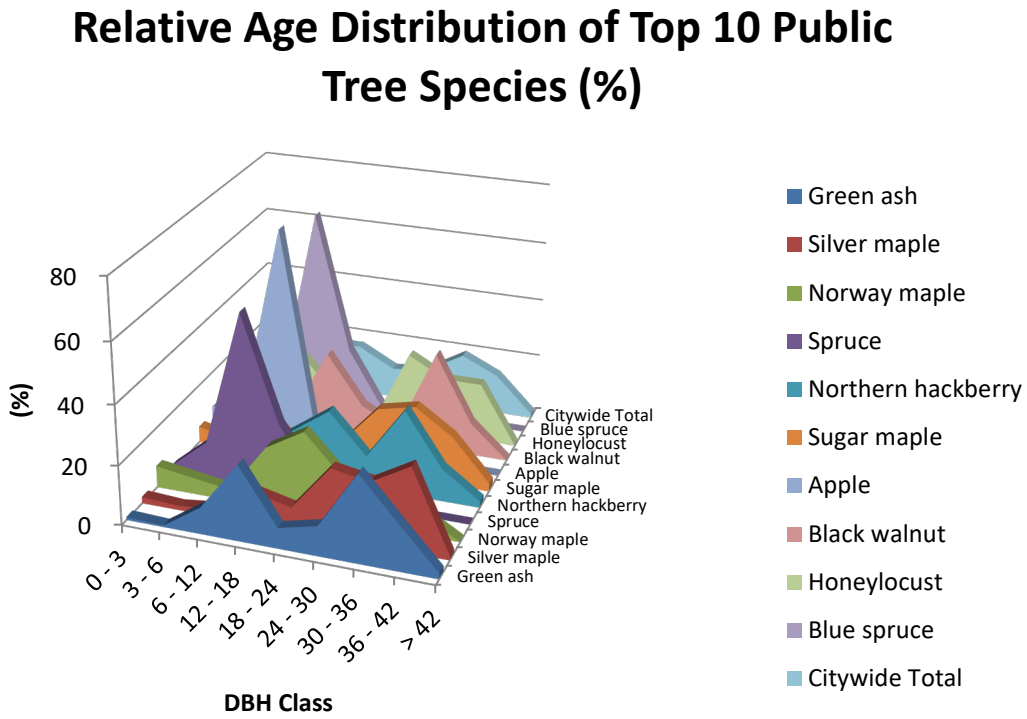

Figure 2: Relative Age Class

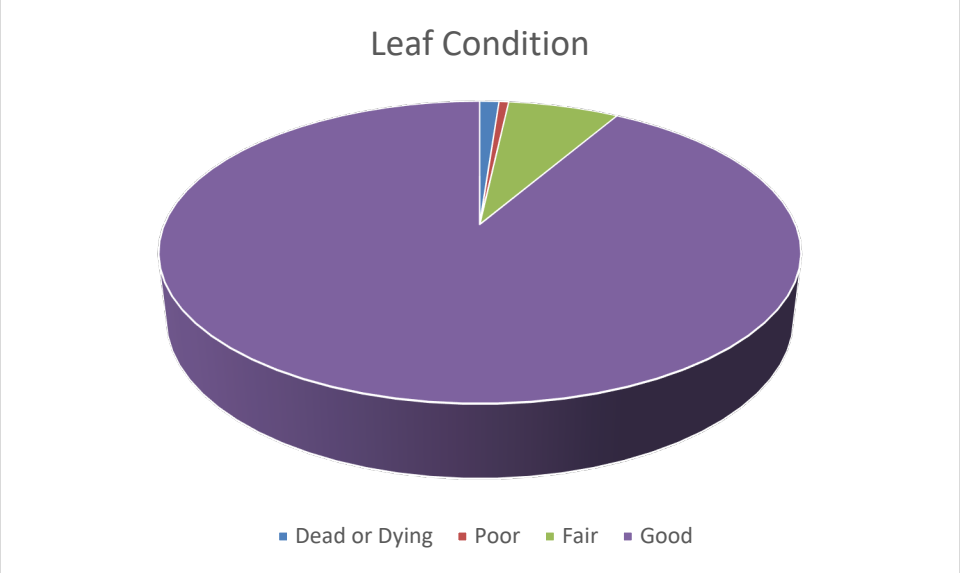

Figure 3: Foliage Condition

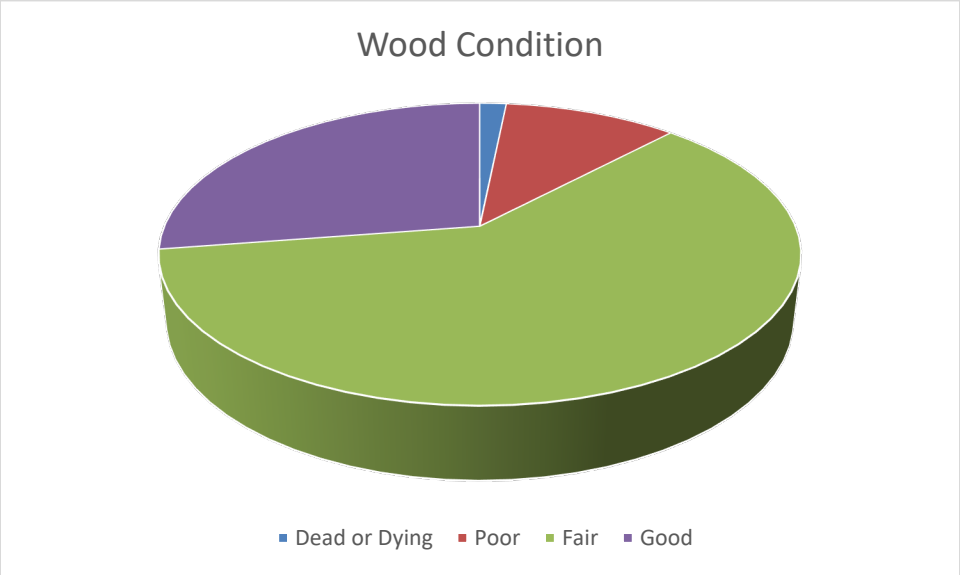

Figure 4: Wood Condition

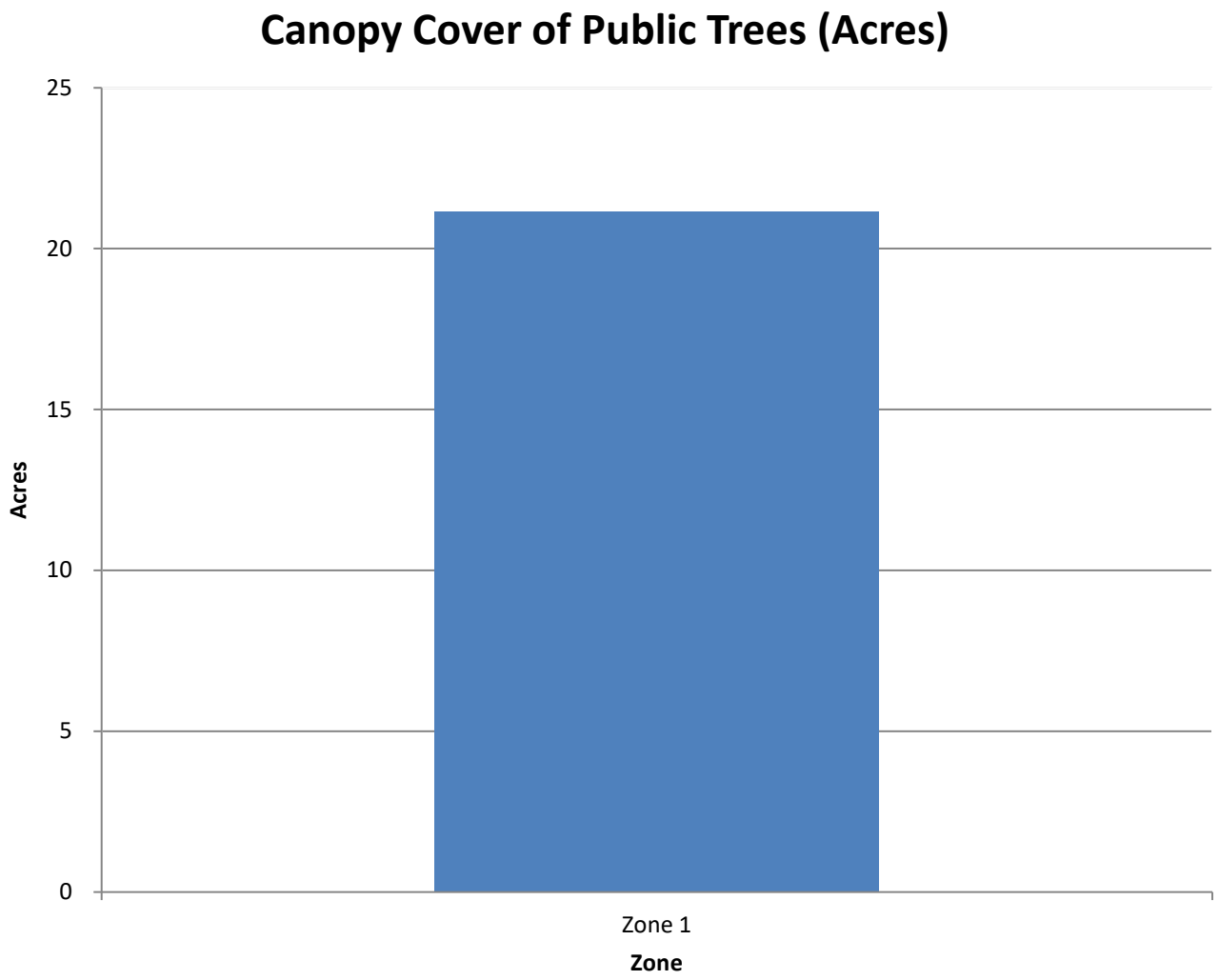

Figure 5: Canopy Cover in Acres

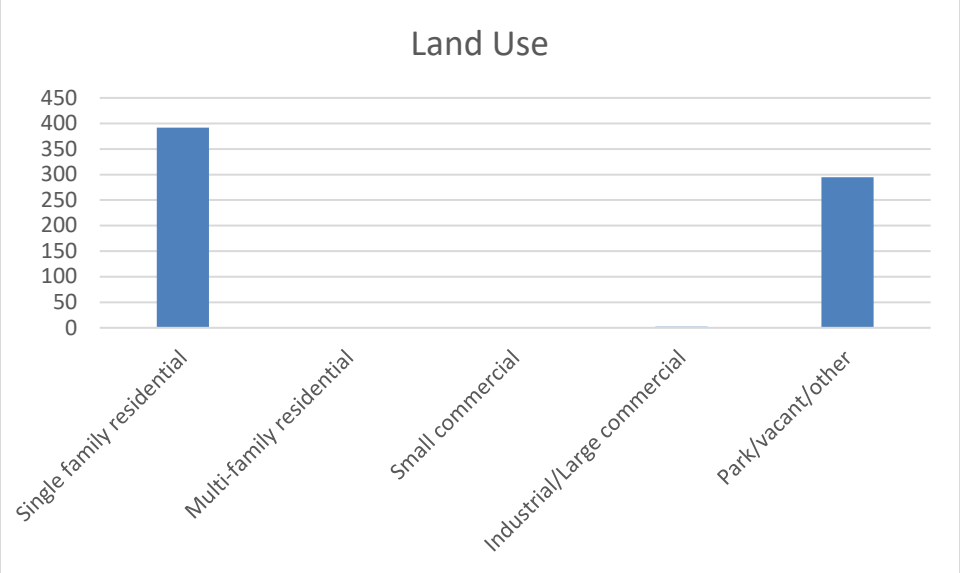

Figure 6: Land Use of city/park trees

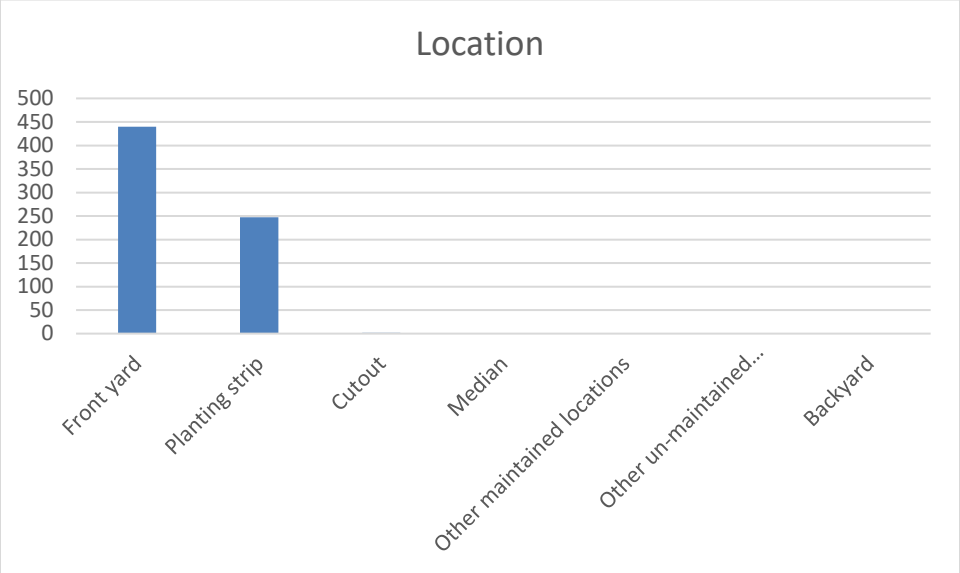

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

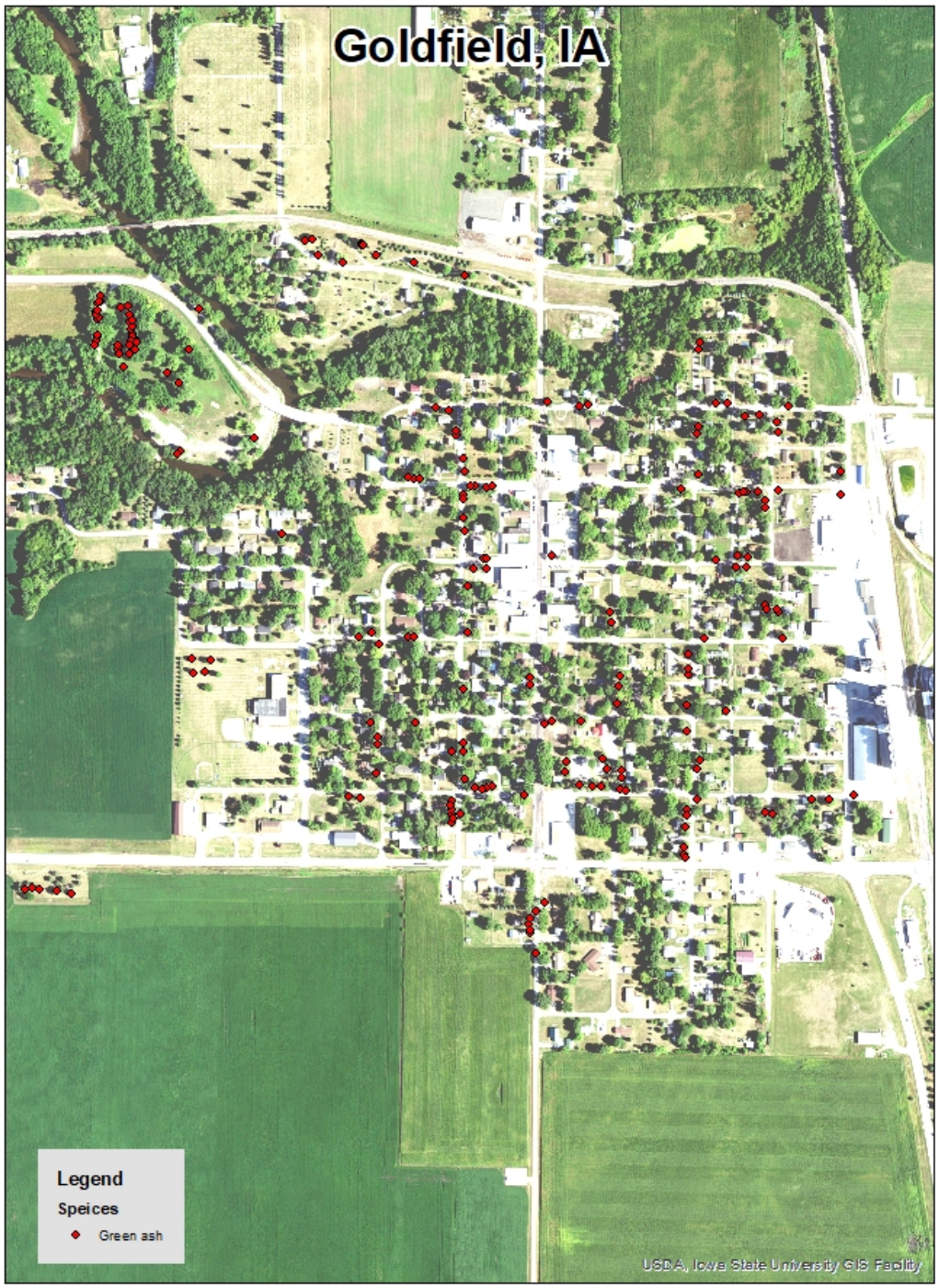

Figure 1: Location of Ash Trees

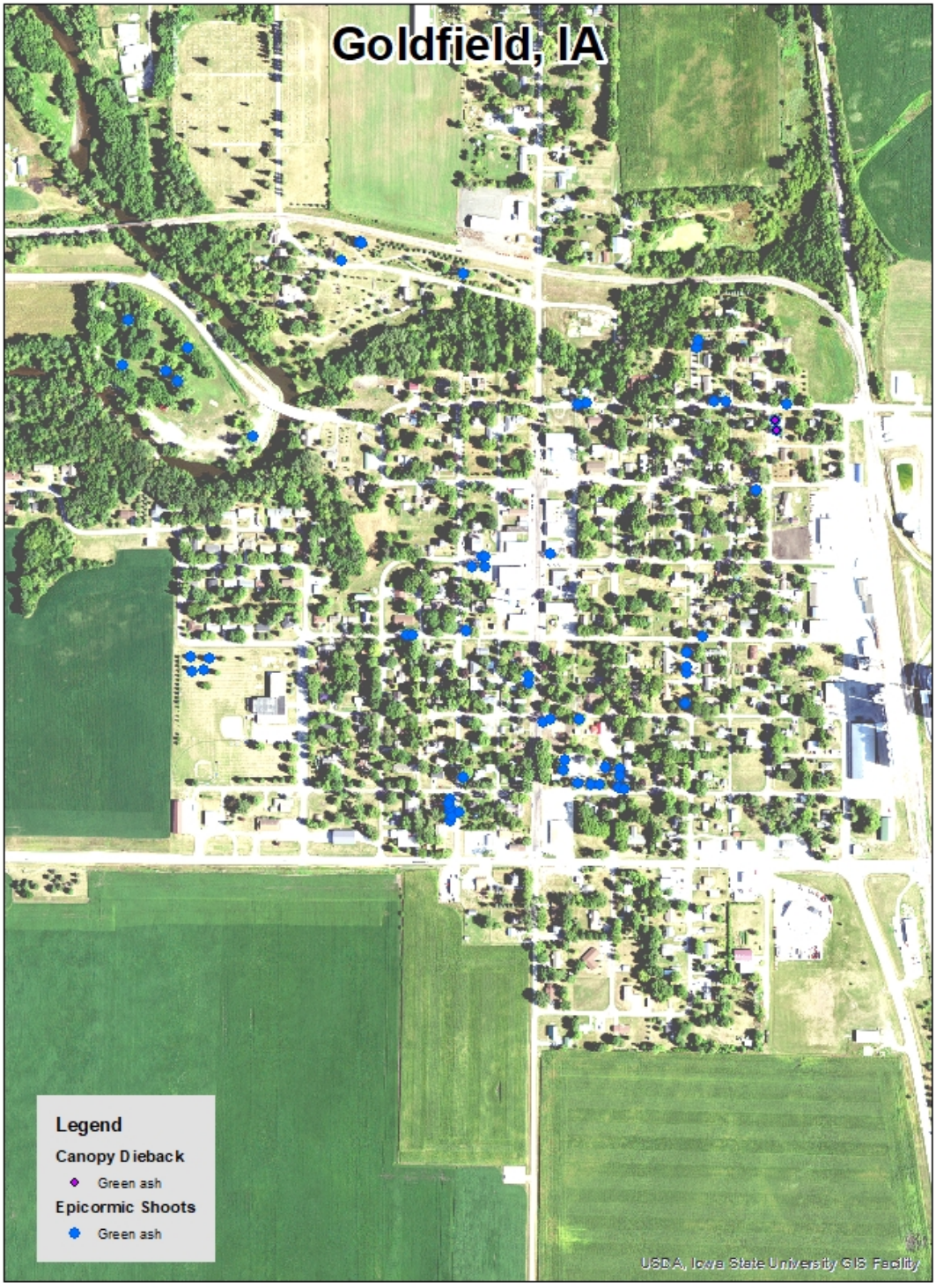

Figure 2: Location of EAB symptoms

Figure 3: Location of Poor Condition Trees

Figure 4: Location of Trees with Recommended Maintenance

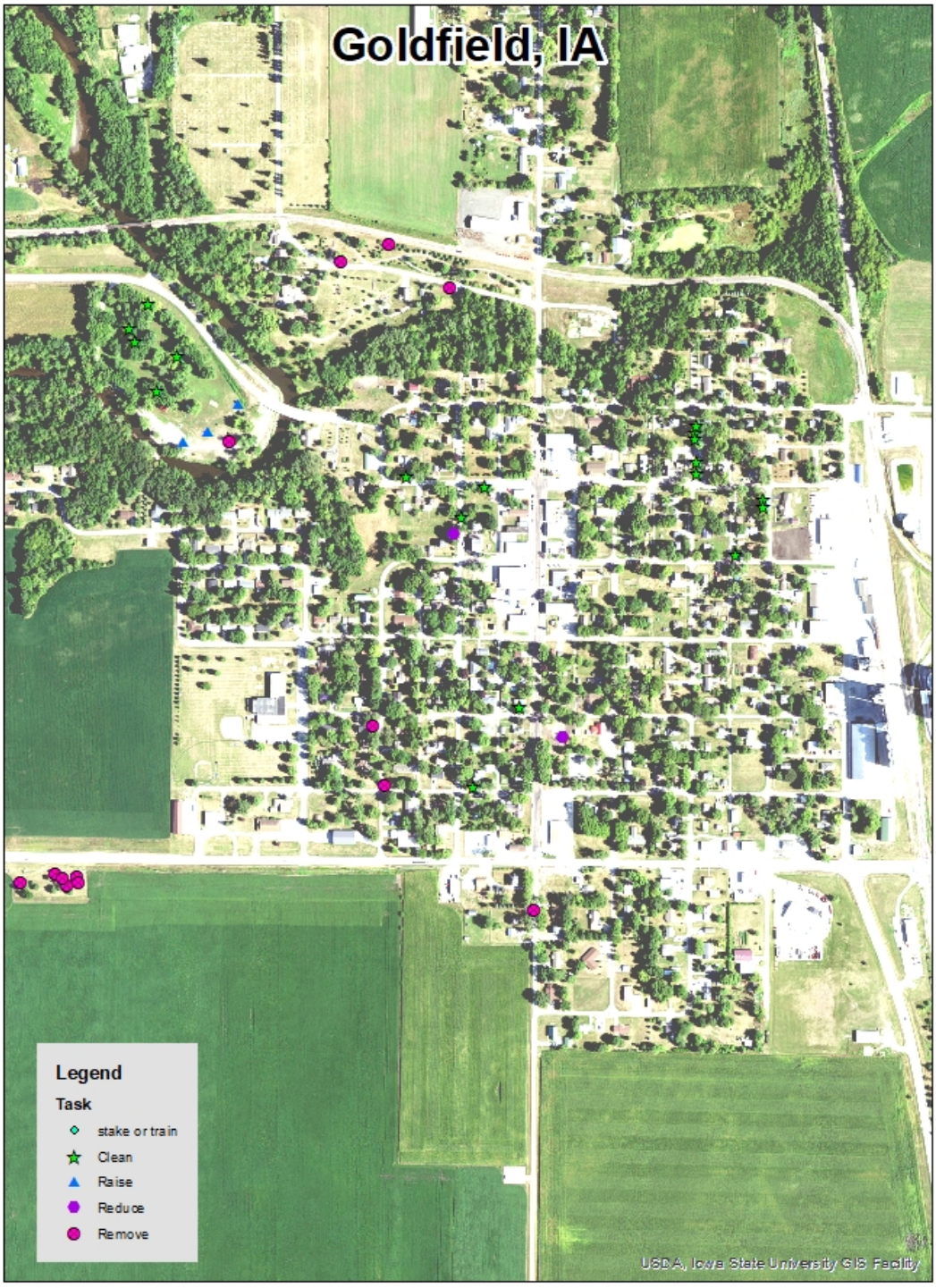

Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

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