Eddyville, IA

2020 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Eddyville 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 2.1% of Eddyville'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 283 trees inventoried.

- Eddyville's trees provide $55,918 of benefits annually, an average of $198 a tree
- There are over 43 species of trees
- The top four genera are: Maple 38%, Elm 9.2%, Hackberry 6.7% and Oak 6.4%
- 19% of trees are in need of some type of management
- 5 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 5 trees needing removal, 1 tree is over 24 inches in diameter at 4.5 ft and must be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- 4 of the 6 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 proposed budget all ash will be removed in 6 years.

Introduction

This plan was developed to assist Eddyville 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 Eddyville, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Eddyville' 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 Eddyville 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 Eddyville'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 283 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. Eddyville's trees reduce energy related costs by approximately $13,732 annually (Appendix A, Table 1). These savings are both in Electricity (66.1 MWh) and in Natural Gas (8,894 Therms).

Annual Stormwater Benefits

Eddyville's trees intercept about 808,851 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $21,920 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 Eddyville, it is estimated that trees remove 889 lbs. of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $2,514 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Eddyville, trees sequester about 185,782 lbs. of carbon a year with an associated value of $2,099 (Appendix A, Table 5). In addition, the trees store 3,325,018 lbs. of carbon, with a yearly benefit of $24,938 (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. Eddyville receives $15,652 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, Eddyville's trees provide $55,918 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 283 trees in Eddyville provide approximately $198 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Eddyville has over 43 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Maple	108	38%
Elm	26	9.2%

Hackberry	19	6.7%
Oak	18	6.4%
Apple (Crab)	11	3.9%
Redbud	11	3.9%
Red Cedar	10	3.5%
Callery Pear	10	3.5%
Sycamore	9	3.2%
Spruce	7	2.5%

Age Class

19% of Eddyville's trees are between 1 and 6 inches in diameter at 4.5 ft. and 37% are over 24 inches in diameter. (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. Eddyville's size curve is on the larger side, indicating an older 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 Eddyville indicate that 99% of the trees are in good/fair health, with only 1% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 97% of Eddyville'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. This 3% 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	20	7%
Crown Raising	5	<2%
Tree Staking	1	<1%
Tree Removal	5	<2%
Crown Reduction	22	8%

Canopy Cover

The total canopy with both private and public trees is 31.5%, 237.9 acres. The canopy cover included in the Eddyville inventory includes approximately 8.2 acres (Appendix A, Figure 5). If the City's Canopy goal is to increase canopy by 1%, in 30 years, it is estimated that 18 trees need to be planted annually on public and private lands.

Land Use and Location

The majority of Eddyville'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	86%
Park/vacant/other	12%
Industrial/Large commercial	<1%
Small commercial	0%
Multifamily residential	1%

Location	
Planting strip	83%
Other maintained locations	0%
Cutout (surrounded by pavement)	0%
Front yard	47%

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

Eddyville has 0 critical concern trees that need immediate removal, although 3 trees were designated immediate removal (not critical). 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 is 1 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 immediate concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 54 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 5 removals, 4 are ash trees. There are a total of 6 ash trees, and 4 of those have signs and symptoms that have been associated with EAB. In addition, there are 7 other 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 Eddyville.

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 (38%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut, as outlined in the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance (Appendix C).

Continual Monitoring

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

Six Year Maintenance Plan

Year 1

- Removal: 2 largest immediate concern trees
- Planting and Replacement: 3 trees to be planted in open locations
- Young Tree Pruning & Maintenance:
- Visual Survey for signs and symptoms of EAB

Year 2

- Removal: 1 immediate concern tree
- Planting and Replacement: 2 trees in open locations from year one removals
- Young Tree Pruning & Maintenance:
- Routine trimming: Contract to trim 1/3 of the city trees needing maintenance
- Visual Survey for signs and symptoms of EAB

Year 3

Removal: 2 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: 2 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: 1 tree - 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: 2 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 5
Removal: - 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: 2 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: - 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: 2 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: all ash will be removed in 6 years

Emerald Ash Borer Plan

Ash Tree Removal

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

Treatment of Ash Trees

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

EAB Quarantines

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

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

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

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

Wood Disposal

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

Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance (Appendix C). The new plantings will be a diverse mix and should 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. City Code states "If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property."

Budget

Current Budget

Total $13,200 over 6 years ($2,200/year)

FY 2020 Budget

Removal: $1,600
*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Watering & Maintenance: $200

FY 2021 Budget

Removal: $800
*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Routine trimming of trees requiring maintenance: $1,200
Watering & Maintenance: $200

FY 2022 Budget

Removal: $1,600
*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Watering & Maintenance: $200

FY 2023 Budget

Removal: $800
*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Routine trimming: $1,200
Watering & Maintenance: $200

FY 2024 Budget

Removal: $1,600

*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Watering & Maintenance: $500

FY 2025 Budget
Removal: $800
*Or saving for ash tree treatment and/or future ash removal
Planting: $200
Routine trimming: $1,200
Watering & Maintenance: $200

*Reduction of ash over 6 years: All ash will be removed in 6 years.

Purposed Budget Increase

EAB could potentially kill all ash trees in Eddyville within 4 years of its arrival. To remove all ash trees within 6 years the proposed budget would be adequate. Additionally, it is recommended that Eddyville 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 has to be 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, the cost would be $300 every two years, or $150 per year for each tree treated. 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 Eddyville. It is suggested to consider this when planning the budget.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Eddyville

Annual Energy Benefits of Public Trees

3/23/2020

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	25.2	1,910	3,301.5	3,236	5,146	(N/A)	25.4	37.5	71.47
Siberian elm	8.6	656	1,137.2	1,114	1,770	(N/A)	8.8	12.9	70.81
Northern hackberry	7.4	559	1,039.3	1,019	1,577	(N/A)	6.7	11.5	83.01
Red maple	2.7	202	330.4	324	525	(N/A)	6.0	3.8	30.91
Apple	0.8	61	131.7	129	190	(N/A)	3.9	1.4	17.27
Eastern redbud	0.8	60	122.3	120	180	(N/A)	3.9	1.3	16.34
Callery pear	0.8	64	127.8	125	190	(N/A)	3.5	1.4	18.96
Eastern red cedar	0.8	61	121.8	119	180	(N/A)	3.5	1.3	18.02
Norway maple	2.1	159	304.6	298	457	(N/A)	3.5	3.3	45.71
American sycamore	3.8	287	513.7	503	791	(N/A)	3.2	5.8	87.87
Northern pin oak	0.9	65	117.9	116	180	(N/A)	2.5	1.3	25.76
Northern red oak	0.7	55	98.1	96	151	(N/A)	2.1	1.1	25.13
Blue spruce	0.3	21	45.6	45	66	(N/A)	1.8	0.5	13.23
Honeylocust	0.8	60	103.7	102	162	(N/A)	1.8	1.2	32.39
Northern white cedar	0.1	9	19.9	19	28	(N/A)	1.8	0.2	5.61
Sugar maple	1.5	114	199.2	195	309	(N/A)	1.4	2.3	77.32
Broadleaf Deciduous Large	0.6	48	81.6	80	128	(N/A)	1.4	0.9	31.89
Cherry plum	0.0	2	5.7	6	8	(N/A)	1.4	0.1	2.00
White oak	0.3	21	39.5	39	59	(N/A)	1.4	0.4	14.82
Ginkgo	0.5	39	56.8	56	94	(N/A)	1.1	0.7	31.46
Southern magnolia	0.3	25	39.8	39	64	(N/A)	1.1	0.5	21.35
Lilac	0.0	2	5.0	5	7	(N/A)	1.1	0.1	2.38
Littleleaf linden	0.2	18	37.4	37	55	(N/A)	1.1	0.4	18.25
Kentucky coffeetree	0.9	65	107.7	106	170	(N/A)	1.1	1.2	56.82
Black walnut	1.0	72	127.5	125	197	(N/A)	1.1	1.4	65.72
Eastern white pine	0.4	31	49.0	48	79	(N/A)	1.1	0.6	26.25
Eastern cottonwood	1.0	74	126.2	124	197	(N/A)	0.7	1.4	98.63
White ash	0.5	41	56.8	56	96	(N/A)	0.7	0.7	48.12
Amur maple	0.1	11	25.7	25	36	(N/A)	0.7	0.3	18.19
Norway spruce	0.3	21	34.3	34	55	(N/A)	0.7	0.4	27.30
White mulberry	0.2	15	32.2	32	47	(N/A)	0.7	0.3	23.50
Ash	0.4	32	64.3	63	95	(N/A)	0.7	0.7	47.66
Green ash	0.2	14	27.5	27	41	(N/A)	0.7	0.3	20.64
Black maple	0.3	22	39.9	39	61	(N/A)	0.4	0.4	60.68
Maple	0.1	8	16.5	16	25	(N/A)	0.4	0.2	24.58
Black cherry	0.0	2	3.8	4	5	(N/A)	0.4	0.0	5.40
Swamp white oak	0.2	18	29.5	29	47	(N/A)	0.4	0.3	46.78
Boxelder	0.0	1	1.3	1	2	(N/A)	0.4	0.0	1.86
Cottonwood	0.3	20	38.1	37	57	(N/A)	0.4	0.4	57.32
Chinese elm	0.4	33	59.0	58	91	(N/A)	0.4	0.7	91.02
River birch	0.2	18	29.5	29	47	(N/A)	0.4	0.3	46.78
Conifer Evergreen Medium	0.0	2	4.9	5	7	(N/A)	0.4	0.1	6.94
Black locust	0.3	20	39.6	39	59	(N/A)	0.4	0.4	58.69
Total	66.1	5,016	8,893.9	8,716	13,732	(N/A)	100.0	100.0	48.52

Table 2: Annual Stormwater Benefits

Eddyville

Annual Stormwater Benefits of Public Trees

3/23/2020

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	376,751	10,210	(N/A)	25.4	46.6	141.80
Siberian elm	100,030	2,711	(N/A)	8.8	12.4	108.43
Northern hackberry	83,117	2,252	(N/A)	6.7	10.3	118.55
Red maple	16,130	437	(N/A)	6.0	2.0	25.71
Apple	2,859	77	(N/A)	3.9	0.4	7.04
Eastern redbud	2,808	76	(N/A)	3.9	0.3	6.92
Callery pear	4,566	124	(N/A)	3.5	0.6	12.38
Eastern red cedar	11,469	311	(N/A)	3.5	1.4	31.08
Norway maple	17,834	483	(N/A)	3.5	2.2	48.33
American sycamore	58,157	1,576	(N/A)	3.2	7.2	175.12
Northern pin oak	5,798	157	(N/A)	2.5	0.7	22.45
Northern red oak	6,468	175	(N/A)	2.1	0.8	29.21
Blue spruce	3,278	89	(N/A)	1.8	0.4	17.77
Honeylocust	6,784	184	(N/A)	1.8	0.8	36.77
Northern white cedar	1,064	29	(N/A)	1.8	0.1	5.77
Sugar maple	21,962	595	(N/A)	1.4	2.7	148.79
Broadleaf Deciduous Large	6,992	189	(N/A)	1.4	0.9	47.37
Cherry plum	91	2	(N/A)	1.4	0.0	0.62
White oak	2,644	72	(N/A)	1.4	0.3	17.92
Ginkgo	2,153	58	(N/A)	1.1	0.3	19.45
Southern magnolia	2,509	68	(N/A)	1.1	0.3	22.66
Lilac	84	2	(N/A)	1.1	0.0	0.75
Littleleaf linden	1,382	37	(N/A)	1.1	0.2	12.48
Kentucky coffeetree	8,422	228	(N/A)	1.1	1.0	76.08
Black walnut	10,899	295	(N/A)	1.1	1.3	98.45
Eastern white pine	6,046	164	(N/A)	1.1	0.7	54.62
Eastern cottonwood	14,478	392	(N/A)	0.7	1.8	196.17
White ash	3,325	90	(N/A)	0.7	0.4	45.05
Amur maple	529	14	(N/A)	0.7	0.1	7.17
Norway spruce	4,508	122	(N/A)	0.7	0.6	61.08
White mulberry	1,181	32	(N/A)	0.7	0.1	16.01
Ash	4,350	118	(N/A)	0.7	0.5	58.95
Green ash	1,216	33	(N/A)	0.7	0.2	16.47
Black maple	2,867	78	(N/A)	0.4	0.4	77.70
Maple	625	17	(N/A)	0.4	0.1	16.95
Black cherry	69	2	(N/A)	0.4	0.0	1.86
Swamp white oak	1,409	38	(N/A)	0.4	0.2	38.19
Boxelder	25	1	(N/A)	0.4	0.0	0.67
Cottonwood	2,591	70	(N/A)	0.4	0.3	70.21
Chinese elm	7,239	196	(N/A)	0.4	0.9	196.17
River birch	1,409	38	(N/A)	0.4	0.2	38.19
Conifer Evergreen Medium	256	7	(N/A)	0.4	0.0	6.95
Black locust	2,479	67	(N/A)	0.4	0.3	67.19
Citywide total	808,851	21,920	(N/A)	100.0	100.0	77.46

Table 3: Annual Air Quality Benefits

Eddyville

Annual Air Quality Benefits of Public Trees

3/23/2020

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								
Silver maple	69.4	11.8	33.7	3.1	375	118.6	17.4	16.6	113.9	742	-36.5	-137	347.8	978	(N/A)	25.4	13.59
Siberian elm	18.6	3.2	8.9	0.8	100	40.8	6.0	5.7	39.1	255	0.0	0	123.1	355	(N/A)	8.8	14.20
Northern hackberry	14.7	2.6	7.3	0.7	80	35.5	5.1	4.9	33.4	220	0.0	0	104.1	300	(N/A)	6.7	15.79
Red maple	3.0	0.5	1.5	0.1	16	12.4	1.8	1.7	12.0	78	-1.1	-4	31.9	90	(N/A)	6.0	5.28
Apple	0.6	0.1	0.3	0.0	3	4.0	0.6	0.5	3.6	25	0.0	0	9.8	28	(N/A)	3.9	2.52
Eastern redbud	0.7	0.1	0.3	0.0	4	3.9	0.6	0.5	3.6	24	0.0	0	9.7	27	(N/A)	3.9	2.50
Callery pear	0.5	0.1	0.3	0.0	3	4.2	0.6	0.6	3.8	26	-0.2	-1	9.9	28	(N/A)	3.5	2.78
Eastern red cedar	2.0	0.4	1.6	0.2	13	3.9	0.6	0.5	3.6	24	-6.3	-23	6.7	14	(N/A)	3.5	1.40
Norway maple	3.4	0.6	1.7	0.2	18	10.2	1.5	1.4	9.5	63	-0.8	-3	27.5	78	(N/A)	3.5	7.82
American sycamore	9.4	1.5	4.2	0.4	49	18.0	2.6	2.5	17.2	112	0.0	0	55.8	162	(N/A)	3.2	17.95
Northern pin oak	0.9	0.2	0.5	0.0	5	4.1	0.6	0.6	3.9	25	-0.2	-1	10.5	30	(N/A)	2.5	4.25
Northern red oak	1.3	0.2	0.6	0.1	7	3.4	0.5	0.5	3.3	21	-1.9	-7	8.0	21	(N/A)	2.1	3.58
Blue spruce	0.3	0.1	0.3	0.0	2	1.4	0.2	0.2	1.3	9	-1.0	-4	2.7	7	(N/A)	1.8	1.38
Honeylocust	1.2	0.2	0.6	0.1	6	3.7	0.5	0.5	3.6	23	-0.9	-3	9.5	26	(N/A)	1.8	5.29
Northern white cedar	0.0	0.0	0.1	0.0	0	0.6	0.1	0.1	0.5	3	-0.3	-1	1.1	3	(N/A)	1.8	0.56
Sugar maple	3.7	0.6	1.7	0.2	20	7.1	1.0	1.0	6.8	44	-2.8	-11	19.3	53	(N/A)	1.4	13.36
Broadleaf Deciduous Large	0.9	0.1	0.4	0.0	5	3.0	0.4	0.4	2.8	19	0.0	0	8.2	23	(N/A)	1.4	5.82
Cherry plum	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.1	1	0.0	0	0.4	1	(N/A)	1.4	0.26
White oak	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.4	10	(N/A)	1.4	2.40
Ginkgo	0.4	0.1	0.2	0.0	2	2.3	0.3	0.3	2.3	15	-0.1	-1	5.8	16	(N/A)	1.1	5.44
Southern magnolia	0.1	0.0	0.2	0.0	1	1.5	0.2	0.2	1.5	10	-0.7	-3	3.1	8	(N/A)	1.1	2.69
Lilac	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)	1.1	0.31
Littleleaf linden	0.1	0.0	0.1	0.0	1	1.2	0.2	0.2	1.1	7	-0.1	0	2.7	8	(N/A)	1.1	2.55
Kentucky coffeetree	1.0	0.2	0.5	0.0	5	4.0	0.6	0.6	3.9	25	0.0	0	10.7	31	(N/A)	1.1	10.18
Black walnut	1.4	0.2	0.7	0.1	7	4.5	0.7	0.6	4.3	28	0.0	0	12.5	36	(N/A)	1.1	11.87
Eastern white pine	0.7	0.1	0.6	0.1	5	1.9	0.3	0.3	1.8	12	-2.5	-9	3.3	7	(N/A)	1.1	2.36
Eastern cottonwood	3.2	0.5	1.4	0.1	16	4.6	0.7	0.6	4.4	29	0.0	0	15.5	45	(N/A)	0.7	22.55
White ash	0.2	0.0	0.1	0.0	1	2.4	0.4	0.3	2.4	15	0.0	0	5.9	17	(N/A)	0.7	8.32
Amur maple	0.1	0.0	0.1	0.0	1	0.8	0.1	0.1	0.7	5	0.0	0	1.8	5	(N/A)	0.7	2.55
Norway spruce	0.5	0.1	0.4	0.1	3	1.3	0.2	0.2	1.2	8	-1.9	-7	2.1	4	(N/A)	0.7	2.13
White 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)	0.7	4.23
Ash	0.9	0.2	0.5	0.0	5	2.1	0.3	0.3	1.9	13	-0.2	-1	6.0	17	(N/A)	0.7	8.52
Green ash	0.0	0.0	0.0	0.0	0	0.9	0.1	0.1	0.9	6	0.0	0	2.1	6	(N/A)	0.7	2.99
Black maple	0.7	0.1	0.3	0.0	4	1.4	0.2	0.2	1.3	8	-0.2	-1	4.0	12	(N/A)	0.4	11.54
Maple	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.3	4	(N/A)	0.4	3.64
Black cherry	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)	0.4	0.71
Swamp white oak	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)	0.4	7.92
Boxelder	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0	(N/A)	0.4	0.25
Cottonwood	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)	0.4	9.34
Chinese elm	1.2	0.2	0.5	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.6	19	(N/A)	0.4	19.04
River birch	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)	0.4	7.92
Conifer Evergreen Medium	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	-0.1	0	0.3	1	(N/A)	0.4	0.75
Black locust	0.5	0.1	0.2	0.0	3	1.3	0.2	0.2	1.2	8	-0.1	0	3.6	10	(N/A)	0.4	10.16
Citywide total	143.2	24.3	70.6	6.7	773	313.9	45.8	43.7	299.3	1,959	-58.1	-218	889.3	2,514	(N/A)	100.0	8.88

Table 4: Annual Carbon Stored

Eddyville

Stored CO2 Benefits of Public Trees

3/23/2020

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	1,663,446	12,476	(N/A)	25.4	50.0	173.28
Siberian elm	455,013	3,413	(N/A)	8.8	13.7	136.50
Northern hackberry	234,287	1,757	(N/A)	6.7	7.0	92.48
Red maple	34,766	261	(N/A)	6.0	1.0	15.34
Apple	10,492	79	(N/A)	3.9	0.3	7.15
Eastern redbud	10,997	82	(N/A)	3.9	0.3	7.50
Callery pear	9,119	68	(N/A)	3.5	0.3	6.84
Eastern red cedar	6,896	52	(N/A)	3.5	0.2	5.17
Norway maple	55,729	418	(N/A)	3.5	1.7	41.80
American sycamore	316,789	2,376	(N/A)	3.2	9.5	263.99
Northern pin oak	15,866	119	(N/A)	2.5	0.5	17.00
Northern red oak	27,264	204	(N/A)	2.1	0.8	34.08
Blue spruce	1,180	9	(N/A)	1.8	0.0	1.77
Honeylocust	15,815	119	(N/A)	1.8	0.5	23.72
Northern white cedar	191	1	(N/A)	1.8	0.0	0.29
Sugar maple	111,446	836	(N/A)	1.4	3.4	208.96
Broadleaf Deciduous	29,639	222	(N/A)	1.4	0.9	55.57
Cherry plum	219	2	(N/A)	1.4	0.0	0.41
White oak	8,494	64	(N/A)	1.4	0.3	15.93
Ginkgo	5,360	40	(N/A)	1.1	0.2	13.40
Southern magnolia	2,337	18	(N/A)	1.1	0.1	5.84
Lilac	205	2	(N/A)	1.1	0.0	0.51
Littleleaf linden	3,074	23	(N/A)	1.1	0.1	7.68
Kentucky coffeetree	33,287	250	(N/A)	1.1	1.0	83.22
Black walnut	45,388	340	(N/A)	1.1	1.4	113.47
Eastern white pine	5,683	43	(N/A)	1.1	0.2	14.21
Eastern cottonwood	111,964	840	(N/A)	0.7	3.4	419.86
White ash	7,344	55	(N/A)	0.7	0.2	27.54
Amur maple	1,816	14	(N/A)	0.7	0.1	6.81
Norway spruce	4,513	34	(N/A)	0.7	0.1	16.92
White mulberry	6,756	51	(N/A)	0.7	0.2	25.34
Ash	15,381	115	(N/A)	0.7	0.5	57.68
Green ash	2,069	16	(N/A)	0.7	0.1	7.76
Black maple	7,945	60	(N/A)	0.4	0.2	59.59
Maple	1,101	8	(N/A)	0.4	0.0	8.26
Black cherry	178	1	(N/A)	0.4	0.0	1.33
Swamp white oak	3,624	27	(N/A)	0.4	0.1	27.18
Boxelder	17	0	(N/A)	0.4	0.0	0.13
Cottonwood	8,458	63	(N/A)	0.4	0.3	63.43
Chinese elm	39,259	294	(N/A)	0.4	1.2	294.44
River birch	3,624	27	(N/A)	0.4	0.1	27.18
Conifer Evergreen M	43	0	(N/A)	0.4	0.0	0.32
Black locust	7,945	60	(N/A)	0.4	0.2	59.59
Citywide total	3,325,018	24,938	(N/A)	100.0	100.0	88.12

Table 5: Annual Carbon Sequestered

Eddyville

Annual CO Benefits of Public Trees

3/23/2020

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 $
Silver maple	114,574	859	-7,985	-287	-62	42,219	317	148,521	1,114 (N/A)	25.4	53.1
Siberian elm	16,578	124	-2,185	-94	-17	14,493	109	28,792	216 (N/A)	8.8	10.3
Northern hackberry	10,175	76	-1,125	-74	-9	12,346	93	21,323	160 (N/A)	6.7	7.6
Red maple	4,739	36	-167	-23	-1	4,455	33	9,005	68 (N/A)	6.0	3.2
Apple	1,225	9	-50	-12	0	1,345	10	2,507	19 (N/A)	3.9	0.9
Eastern redbud	1,198	9	-53	-11	0	1,323	10	2,457	18 (N/A)	3.9	0.9
Callery pear	1,760	13	-47	-10	0	1,421	11	3,124	23 (N/A)	3.5	1.1
Eastern red cedar	371	3	-33	-16	0	1,344	10	1,666	12 (N/A)	3.5	0.6
Norway maple	3,565	27	-268	-21	-2	3,505	26	6,781	51 (N/A)	3.5	2.4
American sycamore	7,966	60	-1,521	-43	-12	6,350	48	12,752	96 (N/A)	3.2	4.6
Northern pin oak	1,534	12	-78	-9	-1	1,431	11	2,878	22 (N/A)	2.5	1.0
Northern red oak	728	5	-131	-9	-1	1,207	9	1,795	13 (N/A)	2.1	0.6
Blue spruce	167	1	-6	-5	0	473	4	629	5 (N/A)	1.8	0.2
Honeylocust	2,094	16	-78	-6	-1	1,334	10	3,344	25 (N/A)	1.8	1.2
Northern white cedar	90	1	-1	-3	0	189	1	275	2 (N/A)	1.8	0.1
Sugar maple	4,369	33	-535	-18	-4	2,521	19	6,337	48 (N/A)	1.4	2.3
Broadleaf Deciduous Large	1,410	11	-142	-7	-1	1,052	8	2,313	17 (N/A)	1.4	0.8
Cherry plum	64	0	-1	-1	0	54	0	116	1 (N/A)	1.4	0.0
White oak	667	5	-41	-3	0	455	3	1,078	8 (N/A)	1.4	0.4
Ginkgo	403	3	-26	-6	0	856	6	1,227	9 (N/A)	1.1	0.4
Southern magnolia	201	2	-11	-3	0	554	4	740	6 (N/A)	1.1	0.3
Lilac	55	0	-1	-1	0	48	0	102	1 (N/A)	1.1	0.0
Littleleaf linden	670	5	-15	-4	0	401	3	1,052	8 (N/A)	1.1	0.4
Kentucky coffeetree	1,850	14	-160	-8	-1	1,436	11	3,118	23 (N/A)	1.1	1.1
Black walnut	2,262	17	-218	-10	-2	1,595	12	3,629	27 (N/A)	1.1	1.3
Eastern white pine	418	3	-27	-7	0	679	5	1,064	8 (N/A)	1.1	0.4
Eastern cottonwood	958	7	-537	-12	-4	1,626	12	2,034	15 (N/A)	0.7	0.7
White ash	987	7	-35	-4	0	898	7	1,846	14 (N/A)	0.7	0.7
Amur maple	228	2	-9	-2	0	248	2	465	3 (N/A)	0.7	0.2
Norway spruce	303	2	-22	-5	0	463	3	739	6 (N/A)	0.7	0.3
White mulberry	487	4	-32	-3	0	340	3	792	6 (N/A)	0.7	0.3
Ash	224	2	-74	-5	-1	714	5	859	6 (N/A)	0.7	0.3
Green ash	418	3	-10	-2	0	318	2	723	5 (N/A)	0.7	0.3
Black maple	0	0	-38	-3	0	477	4	436	3 (N/A)	0.4	0.2
Maple	165	1	-5	-1	0	186	1	344	3 (N/A)	0.4	0.1
Black cherry	38	0	-1	-1	0	37	0	74	1 (N/A)	0.4	0.0
Swamp white oak	386	3	-17	-2	0	395	3	762	6 (N/A)	0.4	0.3
Boxelder	16	0	0	0	0	13	0	28	0 (N/A)	0.4	0.0
Cottonwood	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.4	0.4
Chinese elm	912	7	-188	-5	-1	734	6	1,453	11 (N/A)	0.4	0.5
River birch	386	3	-17	-2	0	395	3	762	6 (N/A)	0.4	0.3
Conifer Evergreen Medium	12	0	0	-1	0	48	0	60	0 (N/A)	0.4	0.0
Black locust	470	4	-38	-3	0	440	3	869	7 (N/A)	0.4	0.3
Citywide total	185,782	1,393	-15,970	-744	-125	110,861	831	279,930	2,099 (N/A)	100.0	100.0

Table 6: Annual Social and Aesthetic Benefits

Eddyville

Annual Aesthetic/Other Benefits of Public Trees

3/23/2020

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	8,442	(N/A)	25.4	53.9	117.25
Siberian elm	1,114	(N/A)	8.8	7.1	44.54
Northern hackberry	1,231	(N/A)	6.7	7.9	64.78
Red maple	684	(N/A)	6.0	4.4	40.22
Apple	69	(N/A)	3.9	0.4	6.25
Eastern redbud	67	(N/A)	3.9	0.4	6.11
Callery pear	208	(N/A)	3.5	1.3	20.85
Eastern red cedar	161	(N/A)	3.5	1.0	16.14
Norway maple	347	(N/A)	3.5	2.2	34.73
American sycamore	528	(N/A)	3.2	3.4	58.70
Northern pin oak	163	(N/A)	2.5	1.0	23.25
Northern red oak	62	(N/A)	2.1	0.4	10.31
Blue spruce	97	(N/A)	1.8	0.6	19.33
Honeylocust	514	(N/A)	1.8	3.3	102.89
Northern white cedar	34	(N/A)	1.8	0.2	6.83
Sugar maple	408	(N/A)	1.4	2.6	102.05
Broadleaf Deciduous Large	123	(N/A)	1.4	0.8	30.74
Cherry plum	2	(N/A)	1.4	0.0	0.54
White oak	73	(N/A)	1.4	0.5	18.37
Ginkgo	36	(N/A)	1.1	0.2	12.07
Southern magnolia	57	(N/A)	1.1	0.4	18.97
Lilac	2	(N/A)	1.1	0.0	0.71
Littleleaf linden	94	(N/A)	1.1	0.6	31.20
Kentucky coffeetree	158	(N/A)	1.1	1.0	52.77
Black walnut	178	(N/A)	1.1	1.1	59.35
Eastern white pine	112	(N/A)	1.1	0.7	37.24
Eastern cottonwood	57	(N/A)	0.7	0.4	28.57
White ash	127	(N/A)	0.7	0.8	63.74
Amur maple	13	(N/A)	0.7	0.1	6.40
Norway spruce	79	(N/A)	0.7	0.5	39.70
White mulberry	29	(N/A)	0.7	0.2	14.42
Ash	26	(N/A)	0.7	0.2	13.11
Green ash	57	(N/A)	0.7	0.4	28.56
Black maple	0	(N/A)	0.4	0.0	0.00
Maple	30	(N/A)	0.4	0.2	29.84
Black cherry	2	(N/A)	0.4	0.0	2.06
Swamp white oak	39	(N/A)	0.4	0.3	39.16
Boxelder	15	(N/A)	0.4	0.1	15.44
Cottonwood	58	(N/A)	0.4	0.4	57.69
Chinese elm	58	(N/A)	0.4	0.4	58.34
River birch	39	(N/A)	0.4	0.3	39.16
Conifer Evergreen Medium	12	(N/A)	0.4	0.1	12.31
Black locust	43	(N/A)	0.4	0.3	43.05
Citywide total	15,652	(N/A)	100.0	100.0	55.31

Table 7: Summary of Benefits in Dollars

Eddyville

Total Annual Benefits of Public Trees by Species ($)

3/23/2020

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Silver maple	5,146	1,114	978	10,210	8,442	25,890	(N/A)	46.3
Siberian elm	1,770	216	355	2,711	1,114	6,166	(N/A)	11.0
Northern hackberry	1,577	160	300	2,252	1,231	5,520	(N/A)	9.9
Red maple	525	68	90	437	684	1,803	(N/A)	3.2
Apple	190	19	28	77	69	383	(N/A)	0.7
Eastern redbud	180	18	27	76	67	369	(N/A)	0.7
Callery pear	190	23	28	124	208	573	(N/A)	1.0
Eastern red cedar	180	12	14	311	161	679	(N/A)	1.2
Norway maple	457	51	78	483	347	1,417	(N/A)	2.5
American sycamore	791	96	162	1,576	528	3,152	(N/A)	5.6
Northern pin oak	180	22	30	157	163	552	(N/A)	1.0
Northern red oak	151	13	21	175	62	423	(N/A)	0.8
Blue spruce	66	5	7	89	97	263	(N/A)	0.5
Honeylocust	162	25	26	184	514	912	(N/A)	1.6
Northern white cedar	28	2	3	29	34	96	(N/A)	0.2
Sugar maple	309	48	53	595	408	1,414	(N/A)	2.5
Broadleaf Deciduous La	128	17	23	189	123	481	(N/A)	0.9
Cherry plum	8	1	1	2	2	15	(N/A)	0.0
White oak	59	8	10	72	73	222	(N/A)	0.4
Ginkgo	94	9	16	58	36	214	(N/A)	0.4
Southern magnolia	64	6	8	68	57	203	(N/A)	0.4
Lilac	7	1	1	2	2	13	(N/A)	0.0
Littleleaf linden	55	8	8	37	94	201	(N/A)	0.4
Kentucky coffeetree	170	23	31	228	158	611	(N/A)	1.1
Black walnut	197	27	36	295	178	733	(N/A)	1.3
Eastern white pine	79	8	7	164	112	369	(N/A)	0.7
Eastern cottonwood	197	15	45	392	57	707	(N/A)	1.3
White ash	96	14	17	90	127	344	(N/A)	0.6
Amur maple	36	3	5	14	13	72	(N/A)	0.1
Norway spruce	55	6	4	122	79	266	(N/A)	0.5
White mulberry	47	6	8	32	29	122	(N/A)	0.2
Ash	95	6	17	118	26	263	(N/A)	0.5
Green ash	41	5	6	33	57	143	(N/A)	0.3
Black maple	61	3	12	78	0	153	(N/A)	0.3
Maple	25	3	4	17	30	78	(N/A)	0.1
Black cherry	5	1	1	2	2	11	(N/A)	0.0
Swamp white oak	47	6	8	38	39	138	(N/A)	0.2
Boxelder	2	0	0	1	15	18	(N/A)	0.0
Cottonwood	57	8	9	70	58	202	(N/A)	0.4
Chinese elm	91	11	19	196	58	375	(N/A)	0.7
River birch	47	6	8	38	39	138	(N/A)	0.2
Conifer Evergreen Medi	7	0	1	7	12	27	(N/A)	0.0
Black locust	59	7	10	67	43	186	(N/A)	0.3
Citywide Total	13,732	2,099	2,514	21,920	15,652	55,918	(N/A)	100.0

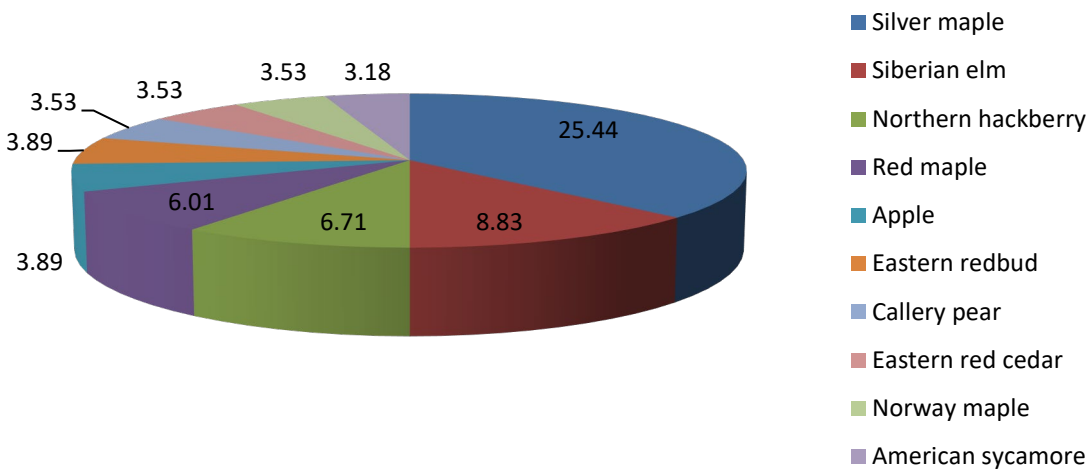

Figure 1: Species Distribution

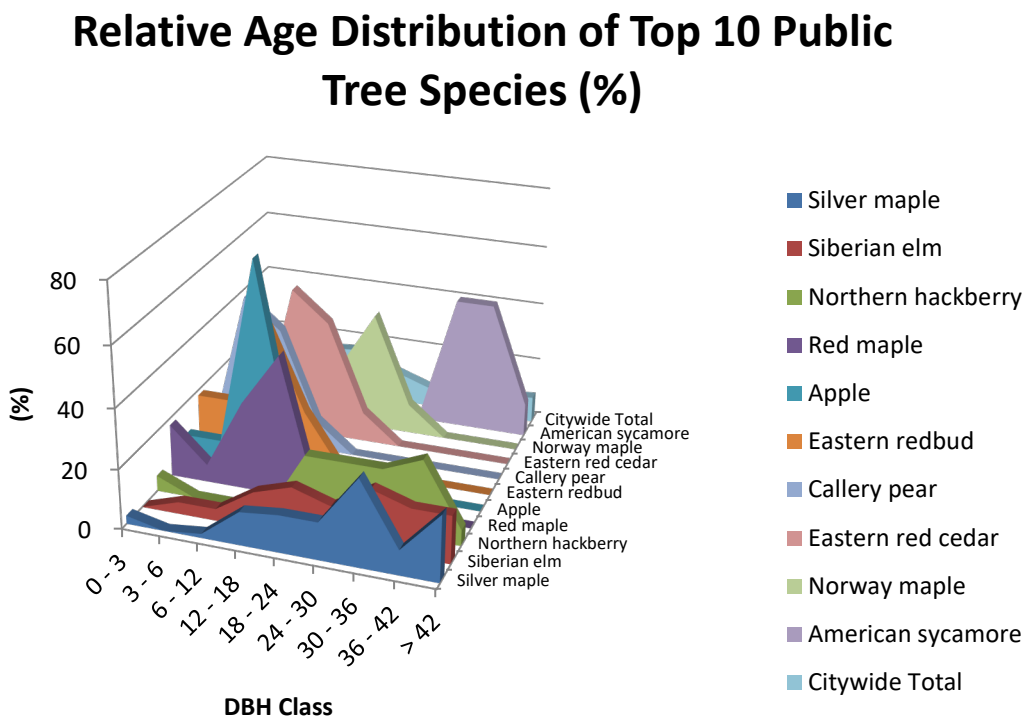

Figure 2: Relative Age Class

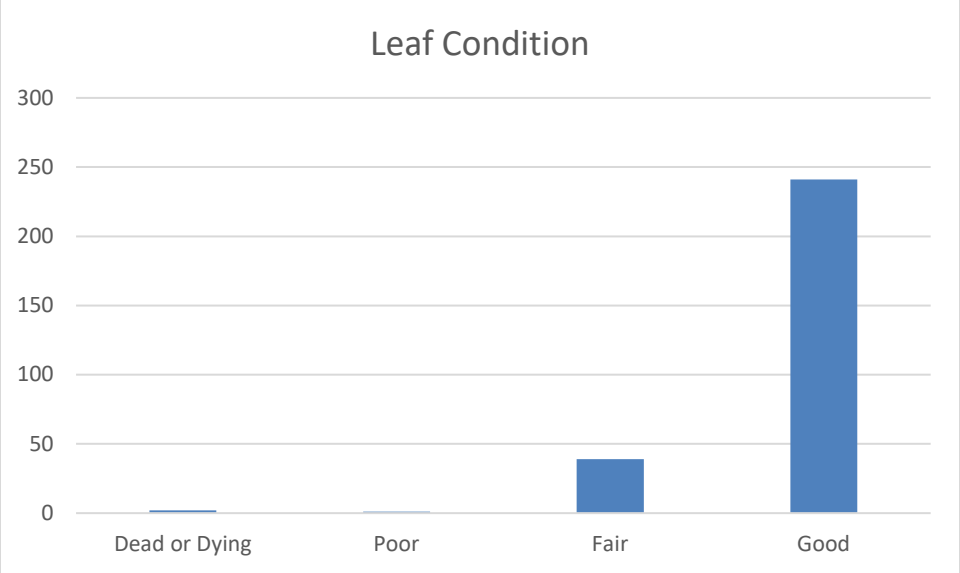

Figure 3: Foliage Condition

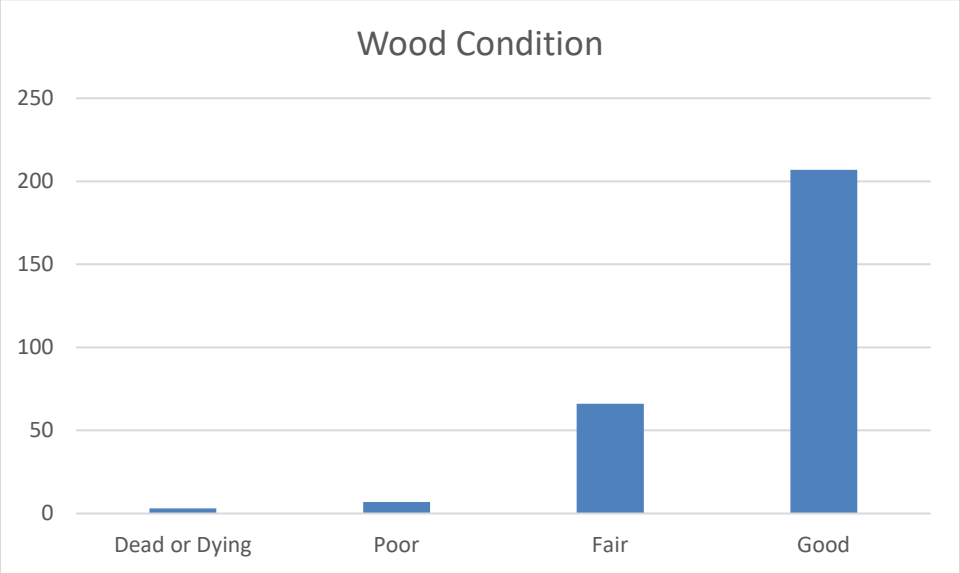

Figure 4: Wood Condition

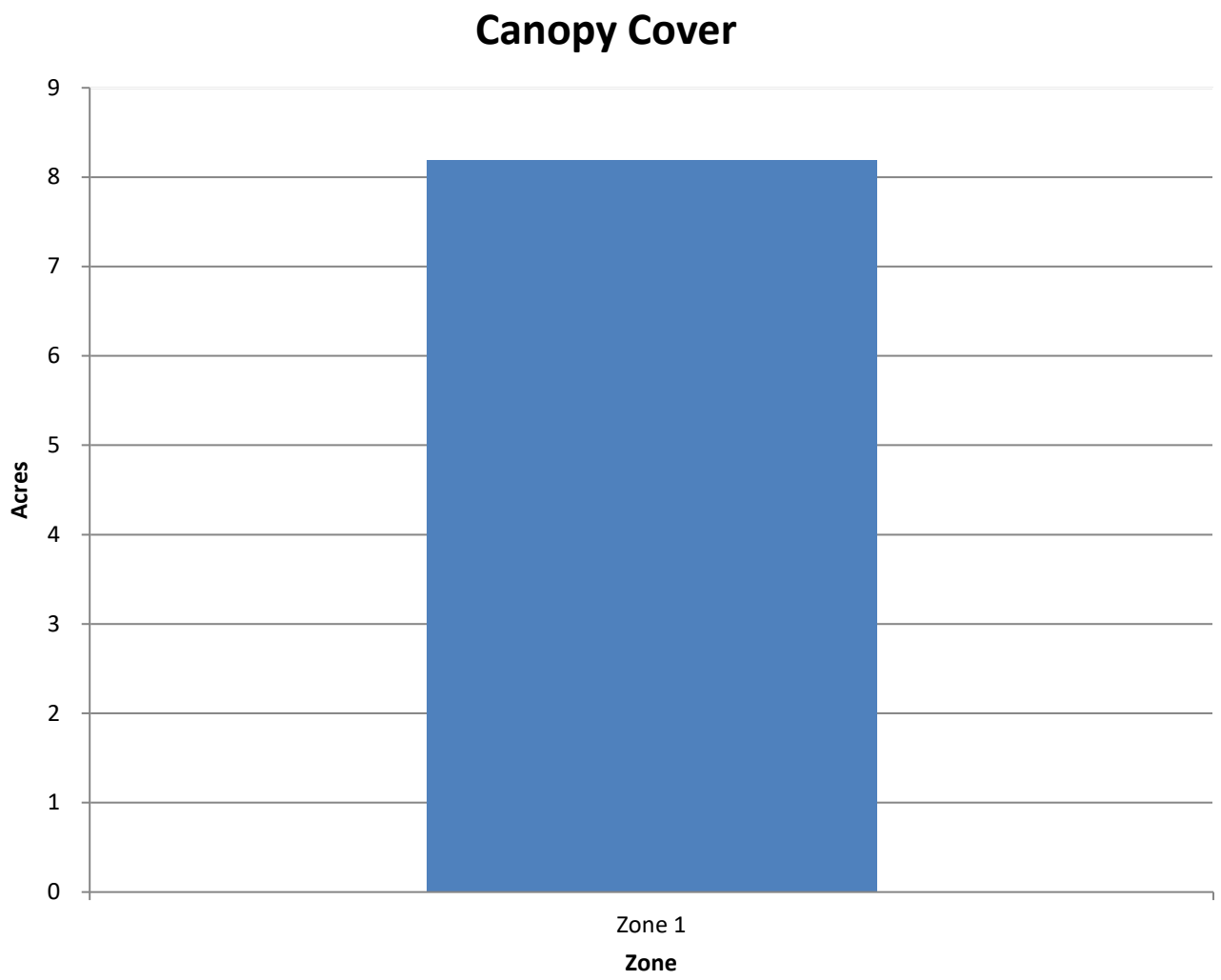

Figure 5: Canopy Cover in Acres

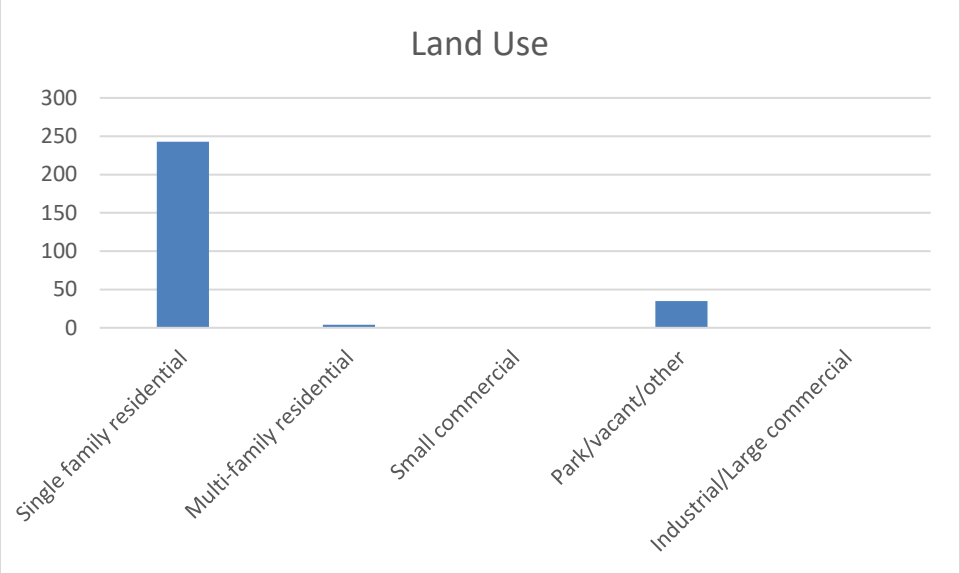

Figure 6: Land Use of city/park trees

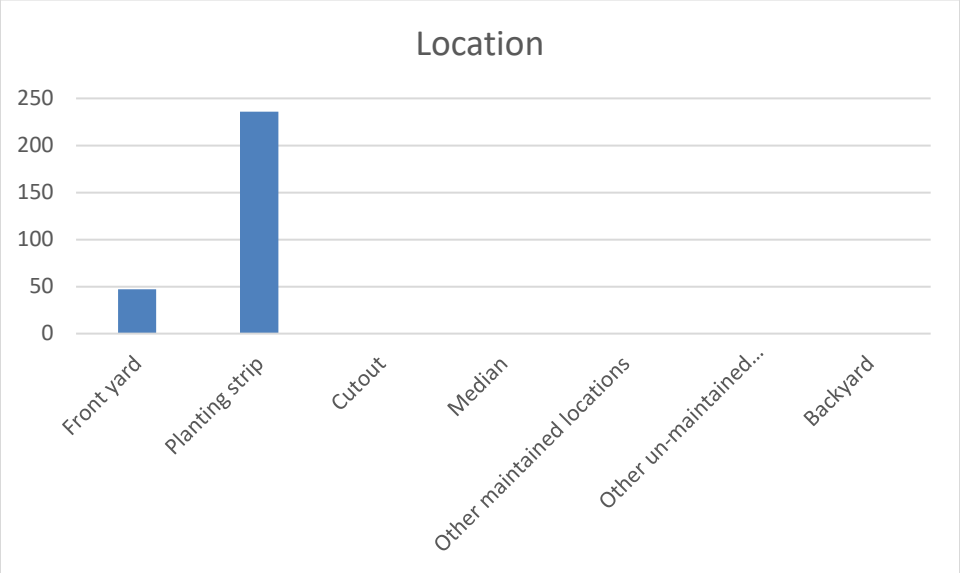

Figure 7: Location of city/park trees

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

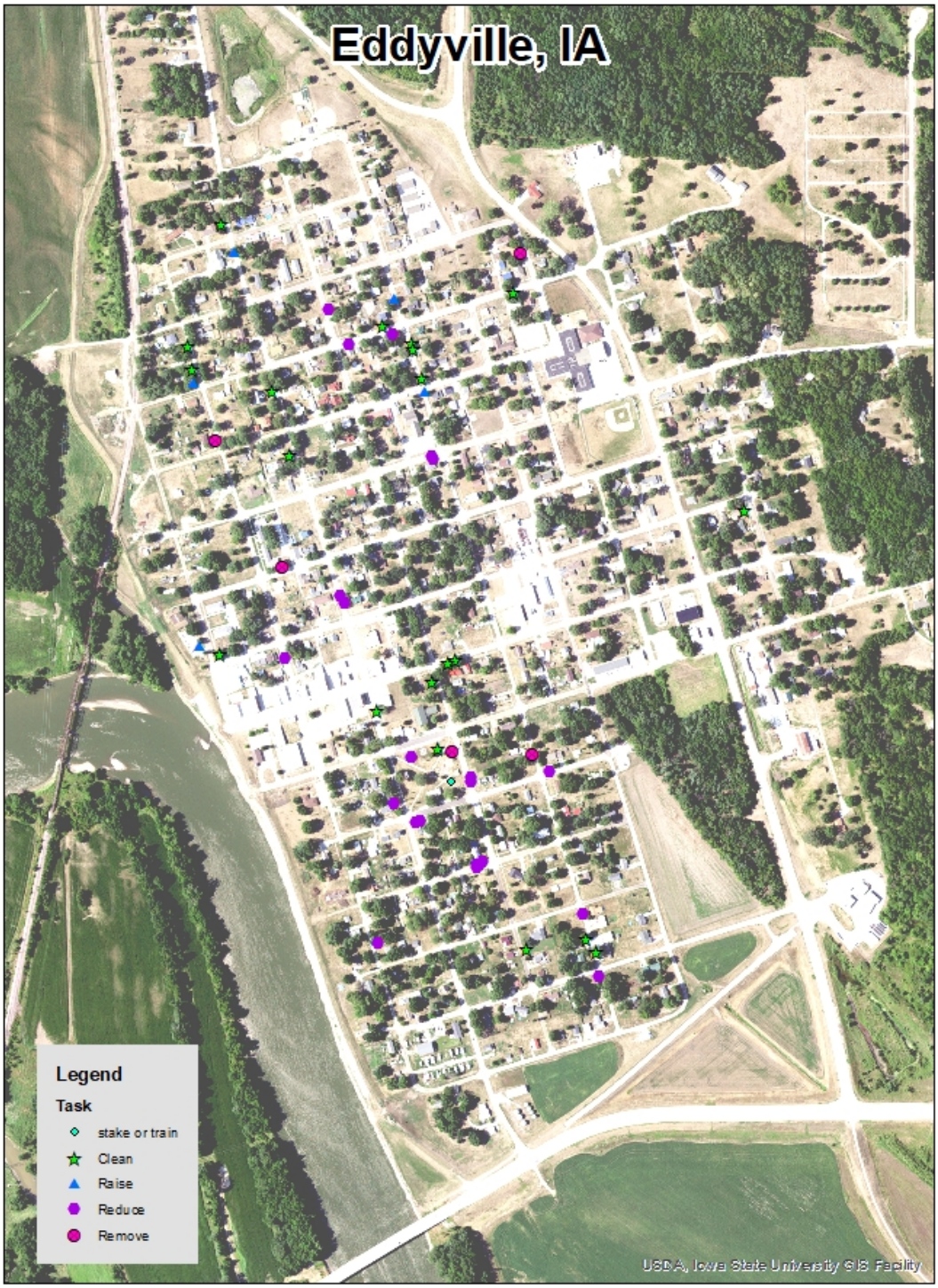

Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal****

Appendix C: Eddyville Tree Ordinances

TREES 77

BUILDINGS AND PROPERTY REGULATIONS

CHAPTER 77 TREES

77.1 DEFINITIONS

For use in this chapter, "parking" means that part of the street, avenue or highway in the City not covered by sidewalk and lying between the lot line and the curb line; or, on unpaved streets, that part of the street, avenue or highway lying between the lot line and that portion of the street usually traveled by vehicular traffic.

77.2 PLANTING RESTRICTIONS

No tree shall be planted in any designated parking unless it is of the ornamental variety which does not grow over twenty (20) feet.

77.3 DUTY TO TRIM TREES

The owner or agent of the abutting property shall keep the trees on, or overhanging the street, trimmed so that all branches will be at least fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks. If the abutting property owner requiring that such action be taken within five (5) days. If such action is not taken within that time, the City may perform the required action and assess the costs against the abutting property for collection in the same manner as a property tax.

(Code of Iowa, Sec. 364.12[2c, d, & e))

77.4 TRIMMING TREES TO BE SUPERVISED

Except as allowed in Section 77.3, it is unlawful for any person to trim or cut any tree in a street or public place unless the work is done under the supervision of the City.

77.5 DISEASE CONTROL

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

77.6 INSPECTION AND REMOVAL

The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be dead, diseased or damaged, and such trees and shrubs shall be subject to the following:

1. City Property. If it is determined that any such condition exists on any public property, including the strip between the curb and the lot line of private property, the Council may cause such condition to be corrected by treatment or removal. The Council may also order the removal of any trees on the streets of the City which interfere with the making of improvements or with travel thereon.

2. Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property.

(Code of Iowa, Sec. 364.1213b & h])

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.