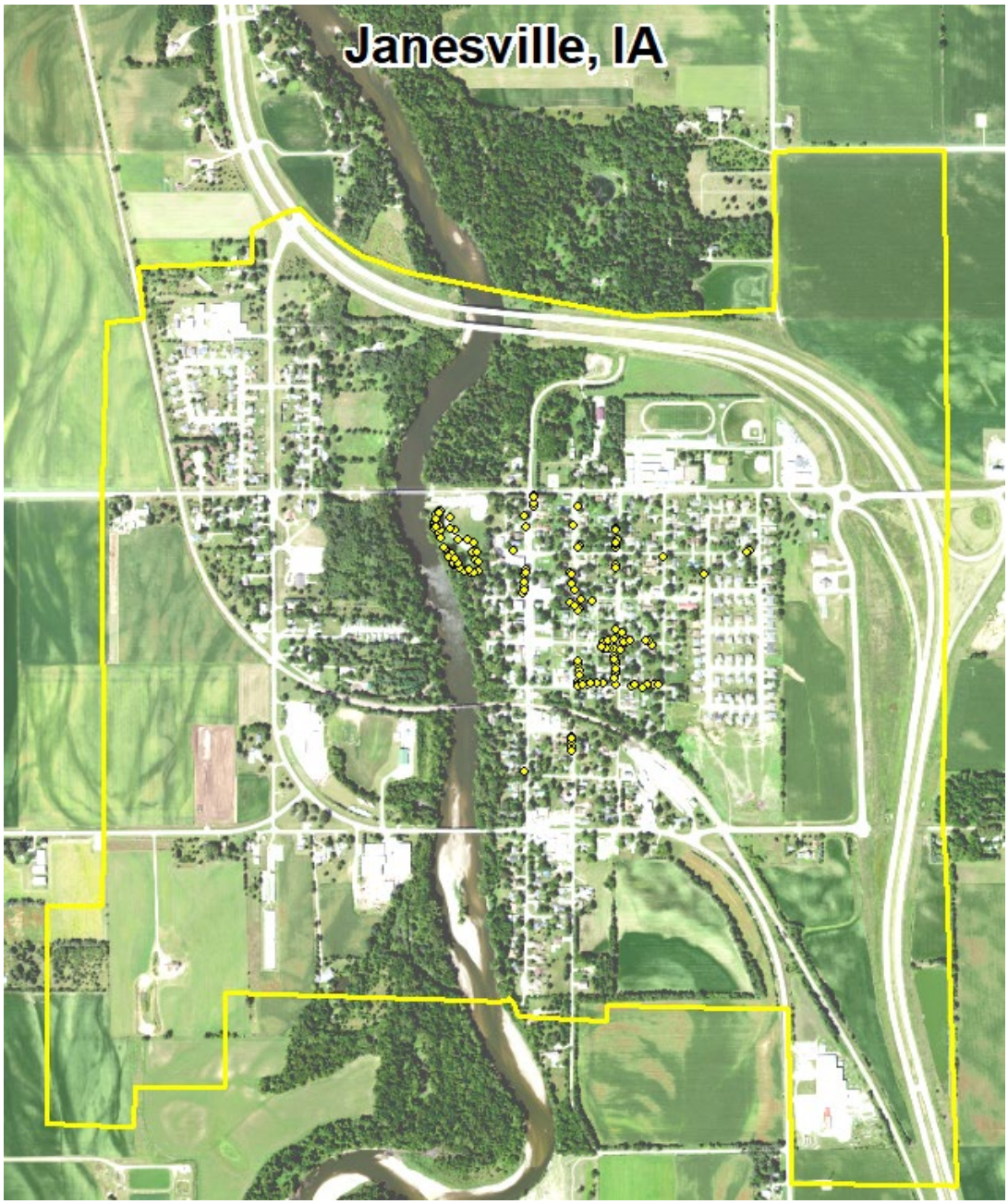
Janesville, IA



2021 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Janesville 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 13% of Janesville'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 2020, 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 142 trees inventoried.

- Janesville's trees provide $23,521 of benefits annually, an average of $167 a tree
- There are over 17 species of trees
- The top three genera are: Maple 49%, Ash 13%, and Cottonwood 6%
- 28 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 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

Introduction

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

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

Inventory

In 2020, 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 142 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. Janesville's trees reduce energy related costs by approximately $23,521 annually (Appendix A, Table 1). These savings are both in Electricity (34.3 MWh) and in Natural Gas (4,692.7 Therms).

Annual Stormwater Benefits

Janesville's trees intercept about 331,151 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $8,974 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 Janesville, it is estimated that trees remove 457 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 $1,296 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Janesville, trees sequester about 45,828 lbs of carbon a year with an associated value of $344 (Appendix A, Table 5). In addition, the trees store 1,114,380 lbs of carbon, with a yearly benefit of $8,358 (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. Janesville receives $5,315 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, Janesville's trees provide $23,521 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 142 trees in Janesville provide approximately $166 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Janesville has over 17 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	70	49%
Ash	17	13%
Cottonwood	9	6%
Northern Hackberrry	8	6%
Eastern Red Cedar	7	5%
Northern White Cedar	6	4%
Black Walnut	6	4%
Oak	4	3%
Spruce	3	2%
Honeylocust	3	2%
Chinese Elm	2	1%
Boxelder	2	1%
Mulberry	1	<1%
Siberian Elm	1	<1%
Black Cherry	1	<1%
Apple	1	<1%
American Sycamore	1	<1%

Age Class

Most of Janesville's trees (48%) 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. Janesville'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 Janesville indicate that 74% of the trees are in good health, with only 12% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 60% of Janesville'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 20% of the population.

Canopy Cover

The total canopy with both private and public trees is 3.77 acres.

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

Janesville has 28 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.

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 Janesville.

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 (45%) (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 section 151.02 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.02 (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.

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 151.02 (Appendix C). The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

Postponed Work

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

Monitoring

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

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if preventative treatments are not being used. City Code 151.06 states “If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property.”

Works Cited

Census Bureau. 2010. http://censtats.census.gov/data/IA/1601964290.pdf (April, 2013)

USDA Forest Service, et al. 2006. i-Tree Software Suite v1.0 User’s Manual. Pp. 27-40.

McPherson EG, Simpson JR, Peper PJ, Gardner SL, Vargas KE, Ho J, Maco S, Xiao Q. 2005b. City of Charleston, South Carolina, municipal forest resource analysis. Internal Tech Rep. Davis, CA: U.S. Department of Agriculture, Center for Urban Forest Research. p. 57

Nowak, DJ and JF Dwyer. 2007. Understanding the benefits and costs of urban forest ecosystems. In: Kuser, J. (ed.) Urban and Community Forestry in the Northeast. New York: Springer. Pp. 25-46.

Peper, Paula J; McPherson, E Gregory; Simpson, James R; Vargas, Kelaine E; Xiao, Qingfu 2009. Lower Midwest community tree guide: benefits, costs, and strategic planting. Gen. Tech. Rep. PSW-GTR-219. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. p.115

Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Janesville

Annual Energy Benefits of Public Trees

3/17/2021

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	16.8	1,278	2,293.0	2,247	3,525	(N/A)	49.3	48.9	50.36
Ash	4.4	335	604.4	592	927	(N/A)	12.7	12.9	51.52
Cottonwood	3.5	264	468.0	459	722	(N/A)	6.3	10.0	80.27
Northern hackberry	2.6	197	363.4	356	554	(N/A)	5.6	7.7	69.20
Eastern red cedar	0.8	59	115.1	113	172	(N/A)	4.9	2.4	24.57
Northern white cedar	0.5	37	67.3	66	103	(N/A)	4.2	1.4	17.10
Black walnut	1.5	115	201.4	197	312	(N/A)	3.5	4.3	62.46
Oak	1.0	75	134.4	132	207	(N/A)	2.8	2.9	51.67
Spruce	0.2	13	28.5	28	41	(N/A)	2.1	0.6	13.58
Honeylocust	0.6	48	87.9	86	134	(N/A)	2.1	1.9	44.72
Chinese elm	0.7	50	93.7	92	142	(N/A)	1.4	2.0	70.91
Boxelder	0.3	23	38.8	38	61	(N/A)	1.4	0.8	30.54
Mulberry	0.2	14	24.7	24	38	(N/A)	0.7	0.5	38.13
Siberian elm	0.5	38	62.2	61	98	(N/A)	0.7	1.4	98.48
Black cherry	0.2	15	31.6	31	46	(N/A)	0.7	0.6	46.14
Apple	0.2	14	24.7	24	38	(N/A)	0.7	0.5	38.13
American sycamore	0.4	29	53.7	53	82	(N/A)	0.7	1.1	82.02
Total	34.3	2,604	4,692.7	4,599	7,203	(N/A)	100.0	100.0	50.72

Table 2: Annual Stormwater Benefits

Janesville

Annual Stormwater Benefits of Public Trees

3/17/2021

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	148,892	4,035	(N/A)	49.3	45.0	57.64
Ash	34,602	938	(N/A)	12.7	10.4	52.10
Cottonwood	46,557	1,262	(N/A)	6.3	14.1	140.19
Northern hackberry	24,795	672	(N/A)	5.6	7.5	83.99
Eastern red cedar	11,442	310	(N/A)	4.9	3.5	44.30
Northern white cedar	5,459	148	(N/A)	4.2	1.6	24.66
Black walnut	16,308	442	(N/A)	3.5	4.9	88.39
Oak	9,959	270	(N/A)	2.8	3.0	67.47
Spruce	1,787	48	(N/A)	2.1	0.5	16.14
Honeylocust	5,939	161	(N/A)	2.1	1.8	53.65
Chinese elm	7,886	214	(N/A)	1.4	2.4	106.85
Boxelder	2,176	59	(N/A)	1.4	0.7	29.48
Mulberry	667	18	(N/A)	0.7	0.2	18.06
Siberian elm	7,351	199	(N/A)	0.7	2.2	199.22
Black cherry	1,174	32	(N/A)	0.7	0.4	31.82
Apple	667	18	(N/A)	0.7	0.2	18.06
American sycamore	5,491	149	(N/A)	0.7	1.7	148.79
Citywide total	331,151	8,974	(N/A)	100.0	100.0	63.20

Table 3: Annual Air Quality Benefits

Janesville

Annual Air Quality Benefits of Public Trees

3/17/2021

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2								
Maple	36.3	6.2	16.9	1.6	193	80.2	11.7	11.1	76.3	500	-12.1	-45	228.2	648	(N/A)	49.3	9.25
Ash	6.4	1.1	3.2	0.3	35	21.1	3.1	2.9	20.0	132	-1.6	-6	56.6	161	(N/A)	12.7	8.92
Cottonwood	9.0	1.4	4.0	0.4	47	16.5	2.4	2.3	15.8	103	0.0	0	51.8	150	(N/A)	6.3	16.68
Northern hackberry	3.9	0.7	2.0	0.2	21	12.5	1.8	1.7	11.8	78	0.0	0	34.6	99	(N/A)	5.6	12.37
Eastern red cedar	2.4	0.5	1.9	0.3	16	3.8	0.5	0.5	3.5	23	-6.3	-24	7.1	15	(N/A)	4.9	2.19
Northern white cedar	0.5	0.1	0.5	0.1	4	2.3	0.3	0.3	2.2	14	-1.8	-7	4.6	12	(N/A)	4.2	1.92
Black walnut	2.0	0.3	1.0	0.1	11	7.2	1.0	1.0	6.9	45	0.0	0	19.5	56	(N/A)	3.5	11.10
Oak	1.1	0.2	0.6	0.1	6	4.7	0.7	0.7	4.5	29	0.0	0	12.4	35	(N/A)	2.8	8.84
Spruce	0.2	0.0	0.2	0.0	1	0.9	0.1	0.1	0.8	5	-0.5	-2	1.7	4	(N/A)	2.1	1.48
Honeylocust	1.1	0.2	0.5	0.0	6	3.0	0.4	0.4	2.9	19	-0.8	-3	7.7	21	(N/A)	2.1	7.15
Chinese elm	1.0	0.2	0.5	0.0	5	3.2	0.5	0.4	3.0	20	0.0	0	8.7	25	(N/A)	1.4	12.48
Boxelder	0.2	0.0	0.1	0.0	1	1.4	0.2	0.2	1.4	9	-0.1	0	3.5	10	(N/A)	1.4	4.82
Mulberry	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)	0.7	6.56
Siberian elm	1.7	0.3	0.8	0.1	9	2.3	0.3	0.3	2.2	15	0.0	0	8.0	23	(N/A)	0.7	23.37
Black cherry	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	8.35
Apple	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)	0.7	6.56
American sycamore	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)	0.7	15.71
Citywide total	67.4	11.4	32.8	3.2	363	163.7	23.8	22.7	155.5	1,020	-23.2	-87	457.4	1,296	(N/A)	100.0	9.13

Table 4: Annual Carbon Stored

Janesville

Stored CO2 Benefits of Public Trees

3/17/2021

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	392,123	2,941	(N/A)	49.3	35.2	42.01
Ash	105,629	792	(N/A)	12.7	9.5	44.01
Cottonwood	313,741	2,353	(N/A)	6.3	28.2	261.45
Northern hackberry	59,596	447	(N/A)	5.6	5.3	55.87
Eastern red cedar	7,714	58	(N/A)	4.9	0.7	8.27
Northern white cedar	3,367	25	(N/A)	4.2	0.3	4.21
Black walnut	64,832	486	(N/A)	3.5	5.8	97.25
Oak	36,252	272	(N/A)	2.8	3.3	67.97
Spruce	770	6	(N/A)	2.1	0.1	1.93
Honeylocust	14,061	105	(N/A)	2.1	1.3	35.15
Chinese elm	31,546	237	(N/A)	1.4	2.8	118.30
Boxelder	4,725	35	(N/A)	1.4	0.4	17.72
Mulberry	3,037	23	(N/A)	0.7	0.3	22.78
Siberian elm	41,265	309	(N/A)	0.7	3.7	309.48
Black cherry	6,743	51	(N/A)	0.7	0.6	50.57
Apple	3,037	23	(N/A)	0.7	0.3	22.78
American sycamore	25,943	195	(N/A)	0.7	2.3	194.57
Citywide total	1,114,380	8,358	(N/A)	100.0	100.0	58.86

Table 5: Annual Carbon Sequestered

Janesville

Annual CO Benefits of Public Trees

3/17/2021

Species	Sequestered (lb)	Sequestered ($)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total Standard ($) Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	16,504	124	-1,882	-156	-15	28,246	212	42,711	320 (N/A)	49.3	43.7	4.58
Ash	7,173	54	-507	-41	-4	7,403	56	14,028	105 (N/A)	12.7	14.4	5.84
Cottonwood	5,033	38	-1,506	-40	-12	5,830	44	9,317	70 (N/A)	6.3	9.5	7.76
Northern hackberry	3,128	23	-286	-24	-2	4,364	33	7,182	54 (N/A)	5.6	7.4	6.73
Eastern red cedar	300	2	-37	-14	0	1,308	10	1,557	12 (N/A)	4.9	1.6	1.67
Northern white cedar	442	3	-16	-9	0	811	6	1,227	9 (N/A)	4.2	1.3	1.53
Black walnut	3,564	27	-311	-15	-2	2,540	19	5,778	43 (N/A)	3.5	5.9	8.67
Oak	2,368	18	-174	-10	-1	1,656	12	3,840	29 (N/A)	2.8	3.9	7.20
Spruce	158	1	-4	-4	0	283	2	434	3 (N/A)	2.1	0.4	1.08
Honeylocust	1,889	14	-67	-5	-1	1,062	8	2,877	22 (N/A)	2.1	2.9	7.19
Chinese elm	1,714	13	-151	-7	-1	1,105	8	2,660	20 (N/A)	1.4	2.7	9.97
Boxelder	599	4	-23	-3	0	509	4	1,082	8 (N/A)	1.4	1.1	4.06
Mulberry	268	2	-15	-2	0	308	2	560	4 (N/A)	0.7	0.6	4.20
Siberian elm	983	7	-198	-6	-2	829	6	1,608	12 (N/A)	0.7	1.6	12.06
Black cherry	478	4	-32	-3	0	335	3	778	6 (N/A)	0.7	0.8	5.84
Apple	268	2	-15	-2	0	308	2	560	4 (N/A)	0.7	0.6	4.20
American sycamore	960	7	-125	-4	-1	650	5	1,481	11 (N/A)	0.7	1.5	11.11
Citywide total	45,828	344	-5,349	-345	-43	57,548	432	97,681	733 (N/A)	100.0	100.0	5.16

Table 6: Annual Social and Aesthetic Benefits

Janesville

Annual Aesthetic/Other Benefits of Public Trees

3/17/2021

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Maple	2,220	(N/A)	49.3	41.8	31.72
Ash	696	(N/A)	12.7	13.1	38.67
Cottonwood	374	(N/A)	6.3	7.0	41.51
Northern hackberry	432	(N/A)	5.6	8.1	53.96
Eastern red cedar	96	(N/A)	4.9	1.8	13.68
Northern white cedar	126	(N/A)	4.2	2.4	21.05
Black walnut	289	(N/A)	3.5	5.4	57.90
Oak	206	(N/A)	2.8	3.9	51.40
Spruce	46	(N/A)	2.1	0.9	15.42
Honeylocust	452	(N/A)	2.1	8.5	150.62
Chinese elm	131	(N/A)	1.4	2.5	65.59
Boxelder	66	(N/A)	1.4	1.3	33.23
Mulberry	15	(N/A)	0.7	0.3	15.48
Siberian elm	54	(N/A)	0.7	1.0	54.03
Black cherry	29	(N/A)	0.7	0.5	28.80
Apple	15	(N/A)	0.7	0.3	15.48
American sycamore	67	(N/A)	0.7	1.3	66.60
Citywide total	5,315	(N/A)	100.0	100.0	37.43

Table 7: Summary of Benefits in Dollars

Janesville

Total Annual Benefits of Public Trees by Species ($)

3/17/2021

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Maple	3,525	320	648	4,035	2,220	10,748	(N/A)	45.7
Ash	927	105	161	938	696	2,827	(N/A)	12.0
Cottonwood	722	70	150	1,262	374	2,578	(N/A)	11.0
Northern hackberry	554	54	99	672	432	1,810	(N/A)	7.7
Eastern red cedar	172	12	15	310	96	605	(N/A)	2.6
Northern white cedar	103	9	12	148	126	398	(N/A)	1.7
Black walnut	312	43	56	442	289	1,143	(N/A)	4.9
Oak	207	29	35	270	206	746	(N/A)	3.2
Spruce	41	3	4	48	46	143	(N/A)	0.6
Honeylocust	134	22	21	161	452	790	(N/A)	3.4
Chinese elm	142	20	25	214	131	532	(N/A)	2.3
Boxelder	61	8	10	59	66	204	(N/A)	0.9
Mulberry	38	4	7	18	15	82	(N/A)	0.4
Siberian elm	98	12	23	199	54	387	(N/A)	1.6
Black cherry	46	6	8	32	29	121	(N/A)	0.5
Apple	38	4	7	18	15	82	(N/A)	0.4
American sycamore	82	11	16	149	67	324	(N/A)	1.4
Citywide Total	7,203	733	1,296	8,974	5,315	23,521	(N/A)	100.0

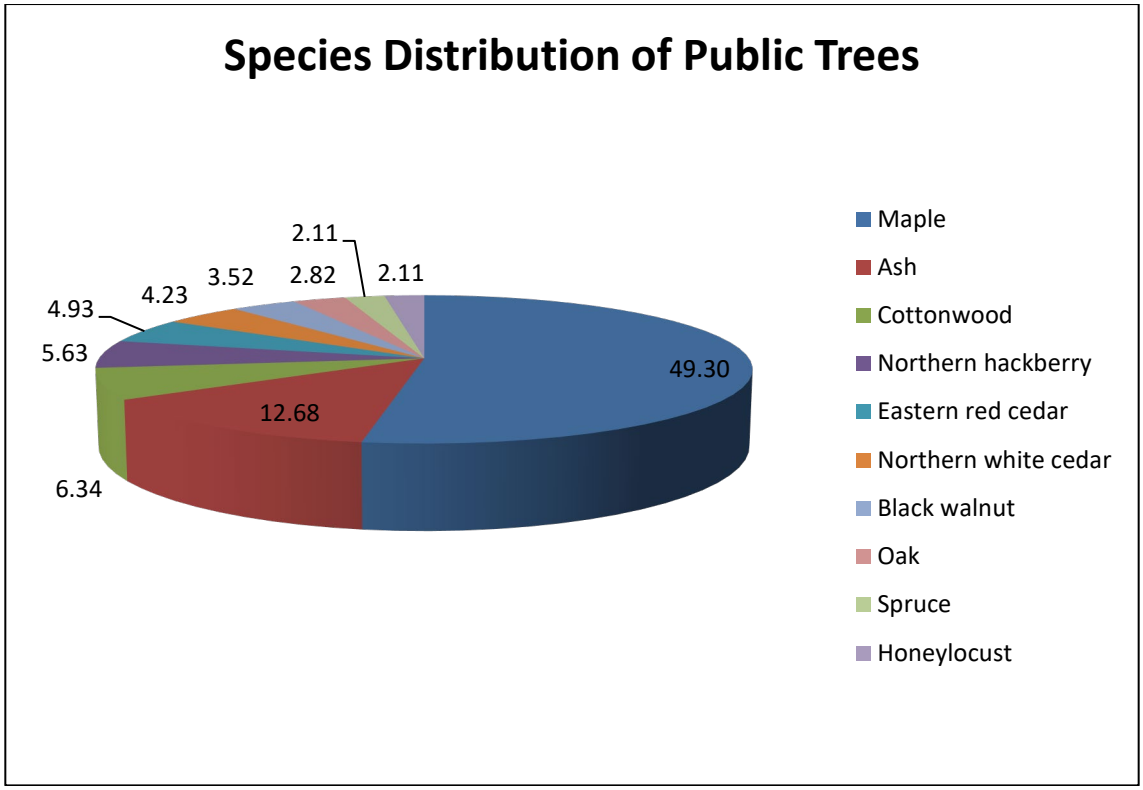

Figure 1: Species Distribution

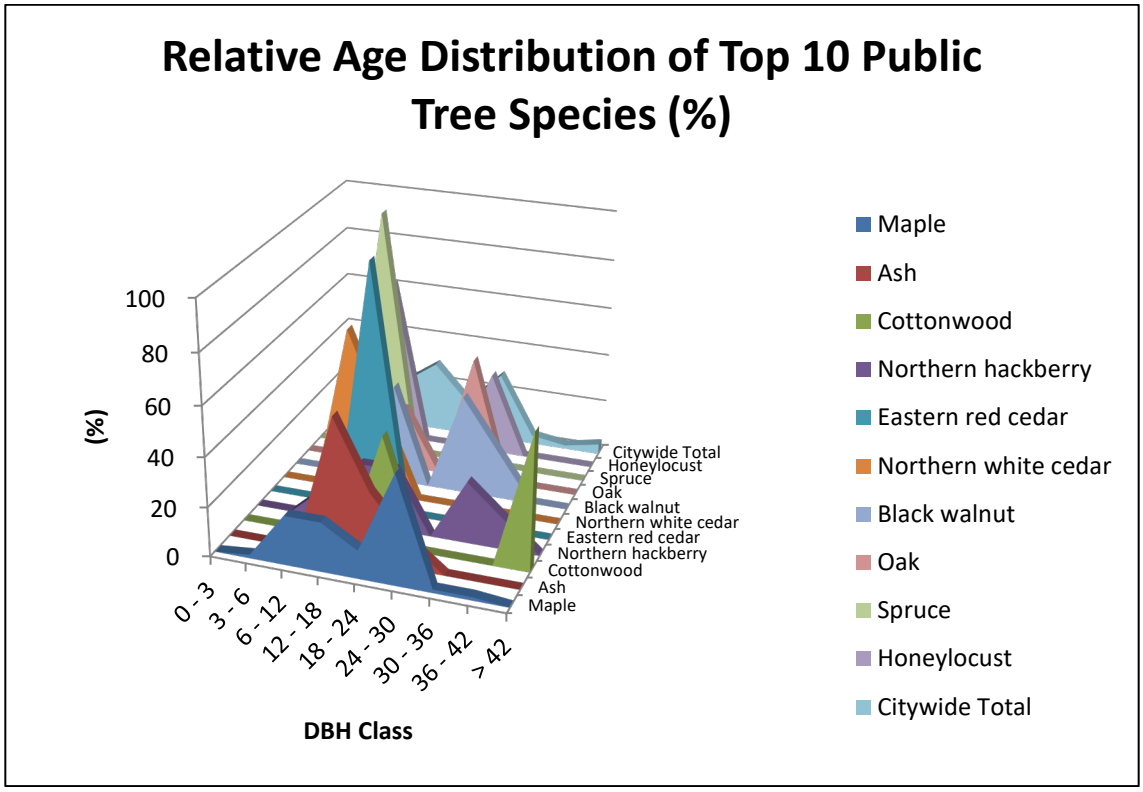

Figure 2: Relative Age Class

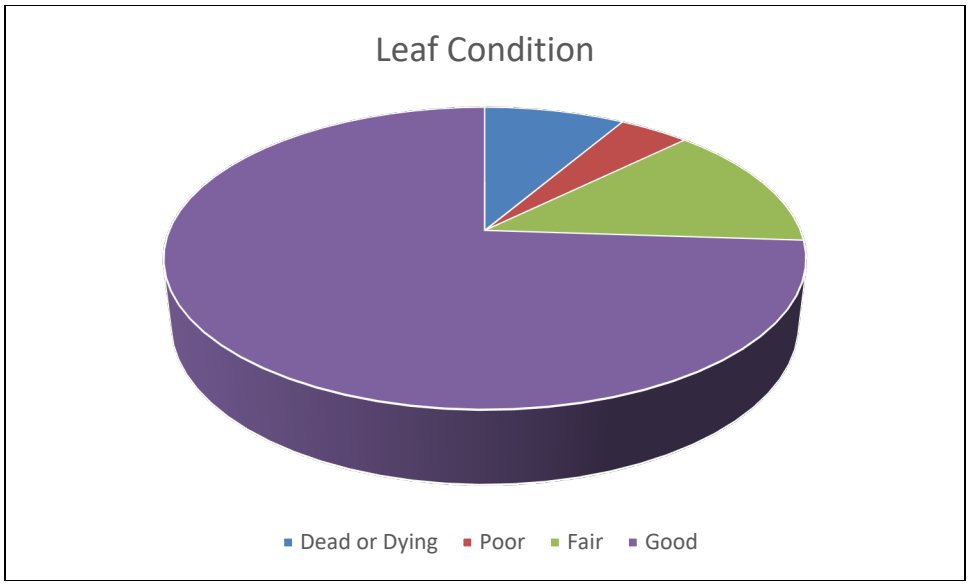

Figure 3: Foliage Condition

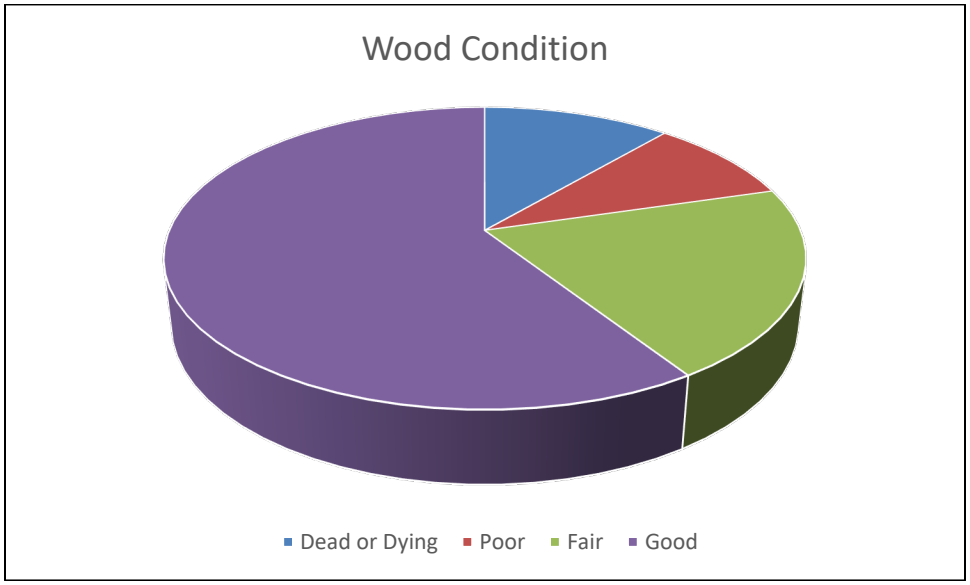

Figure 4: Wood Condition

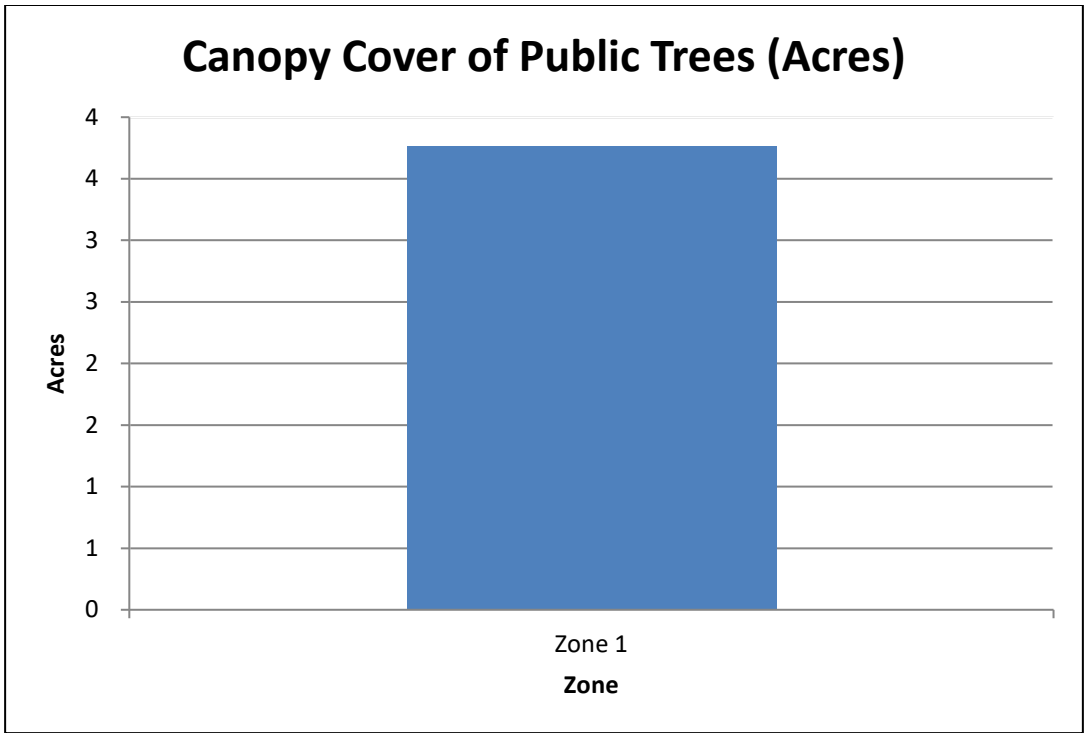

Figure 5: Canopy Cover in Acres

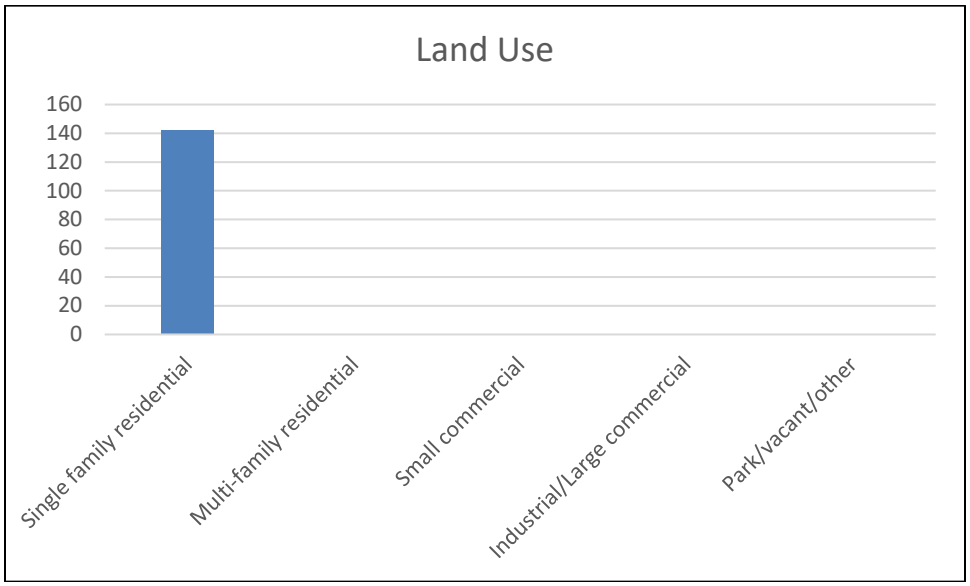

Figure 6: Land Use of city/park trees

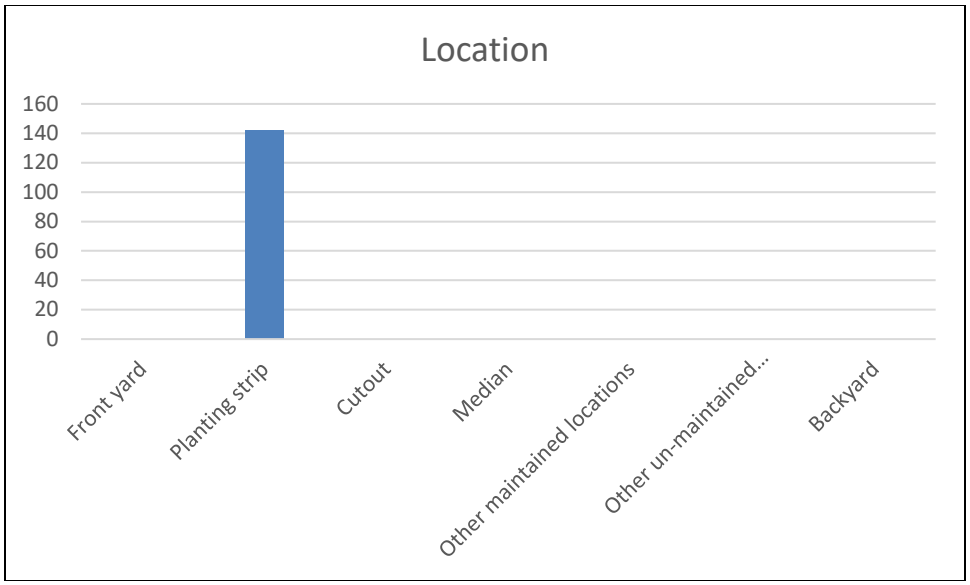

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

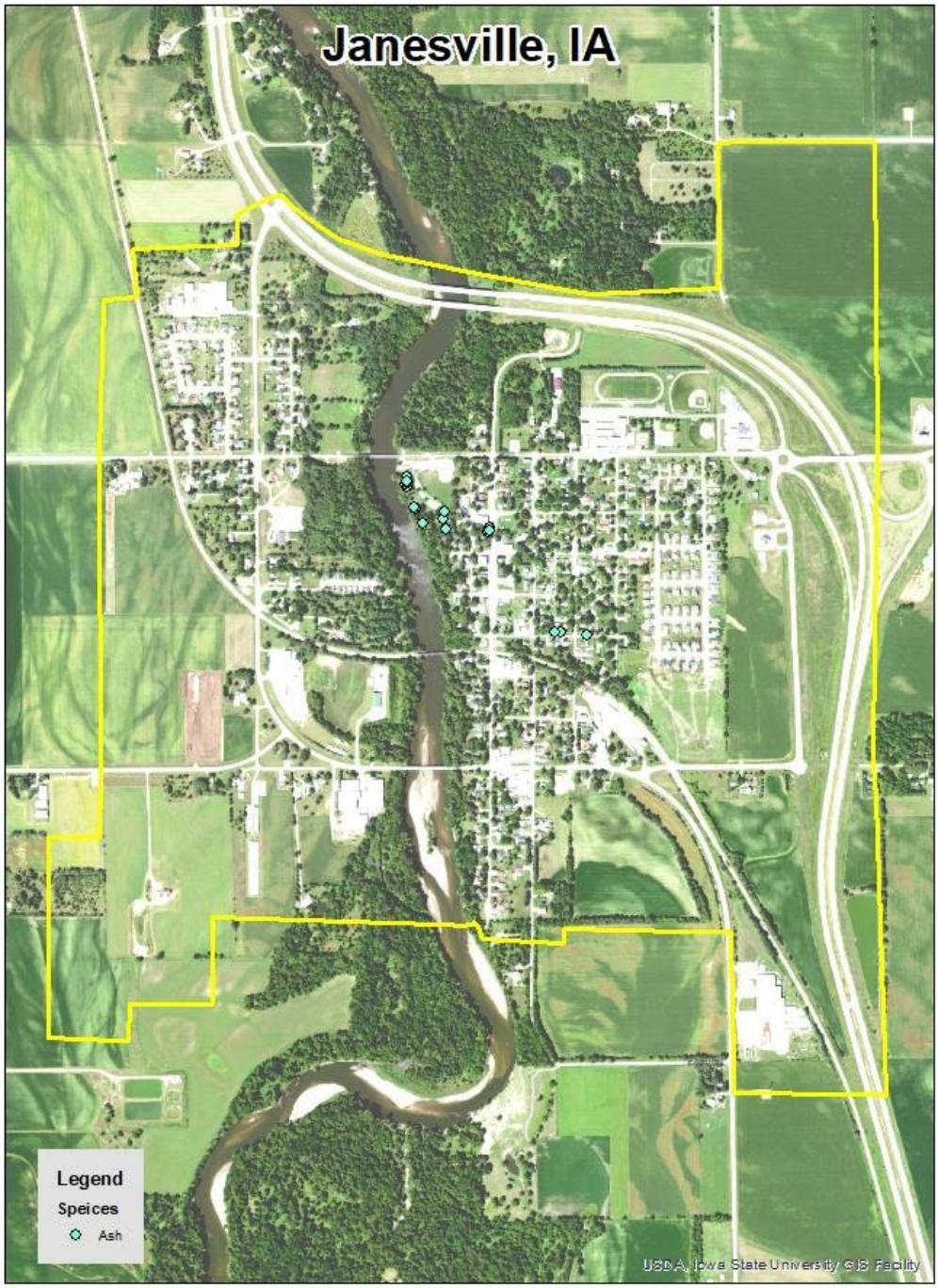

Figure 1: Location of Ash Trees

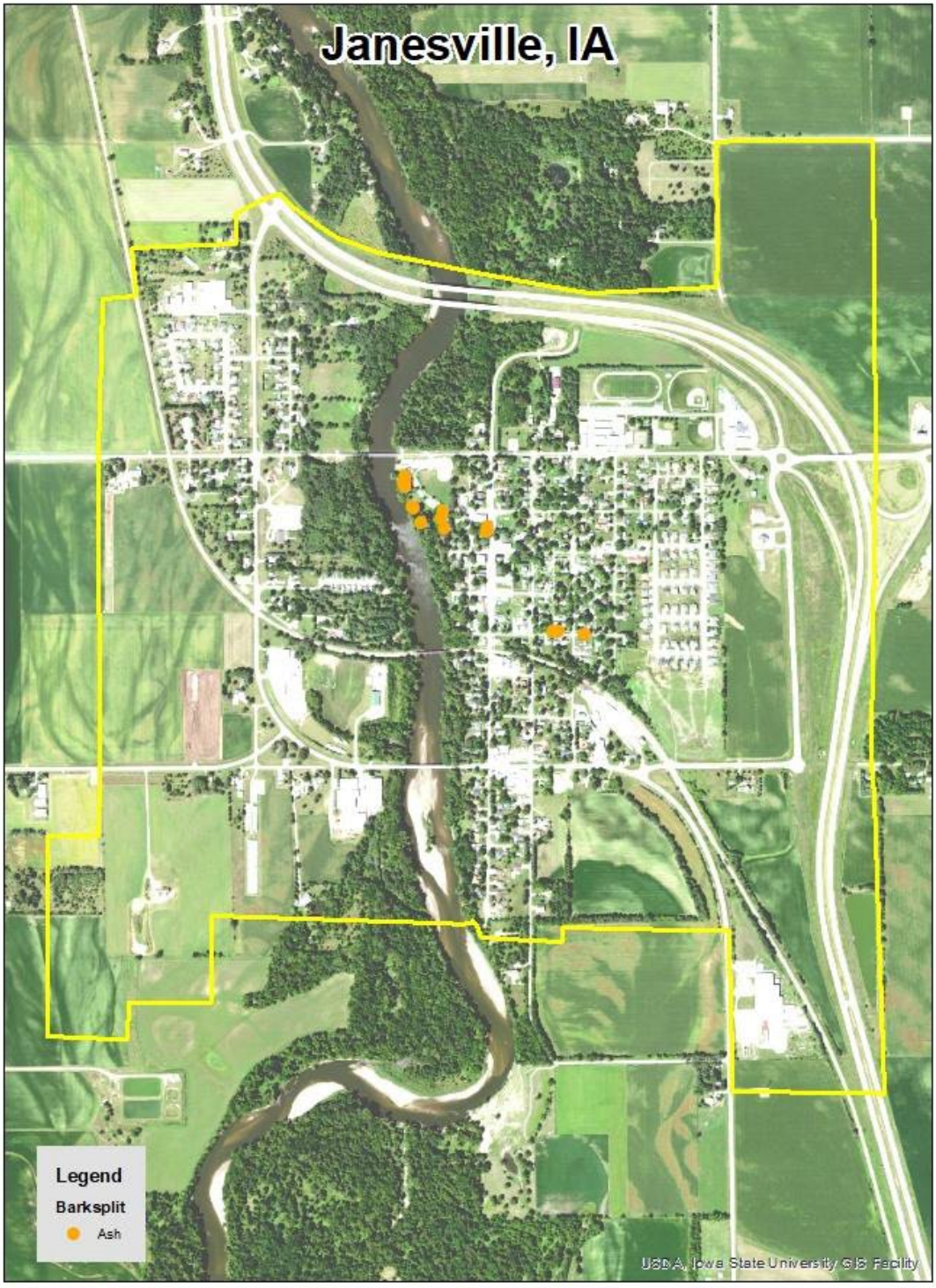

Figure 2: Location of EAB symptoms

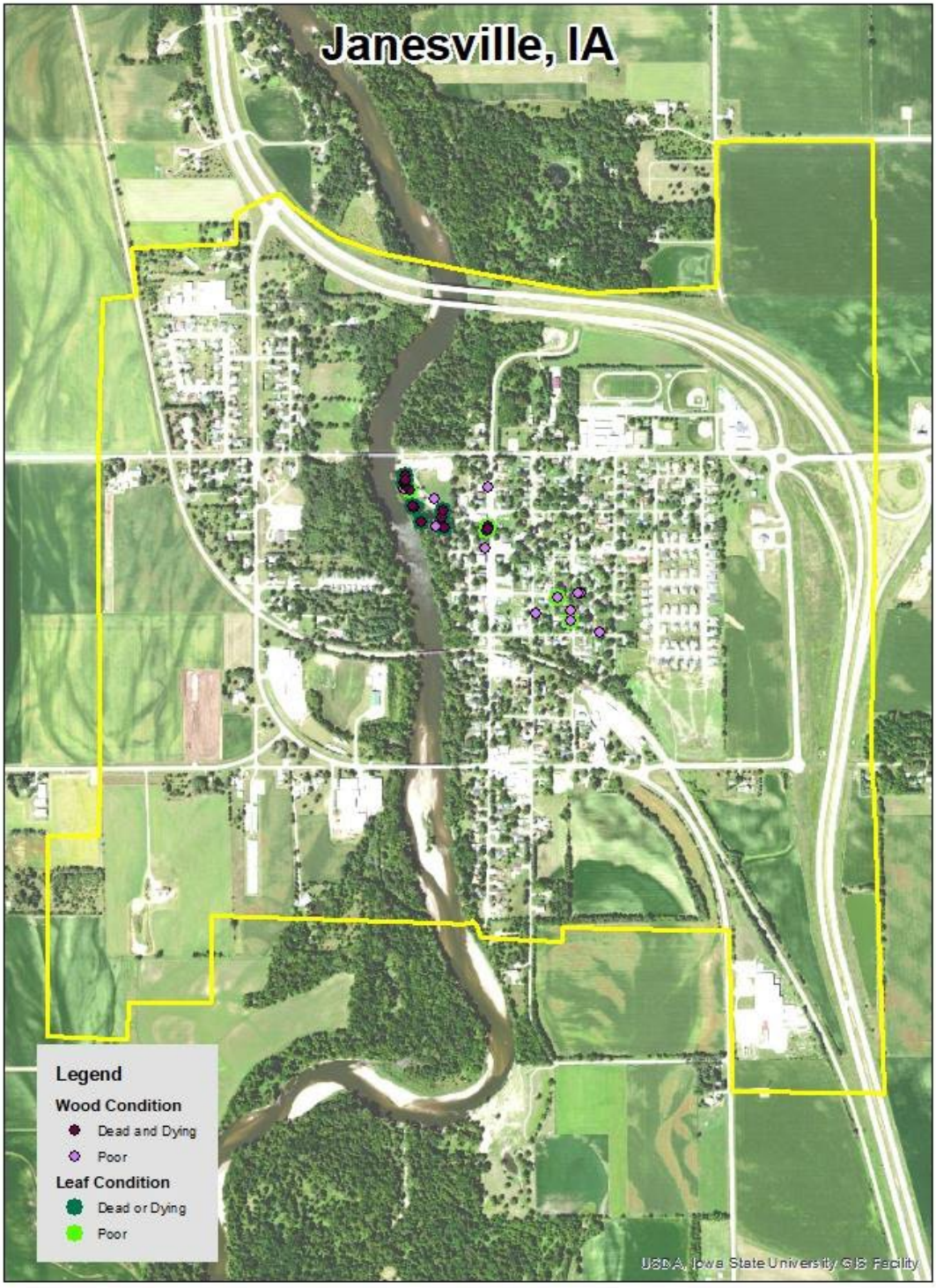

Figure 3: Location of Poor Condition Trees

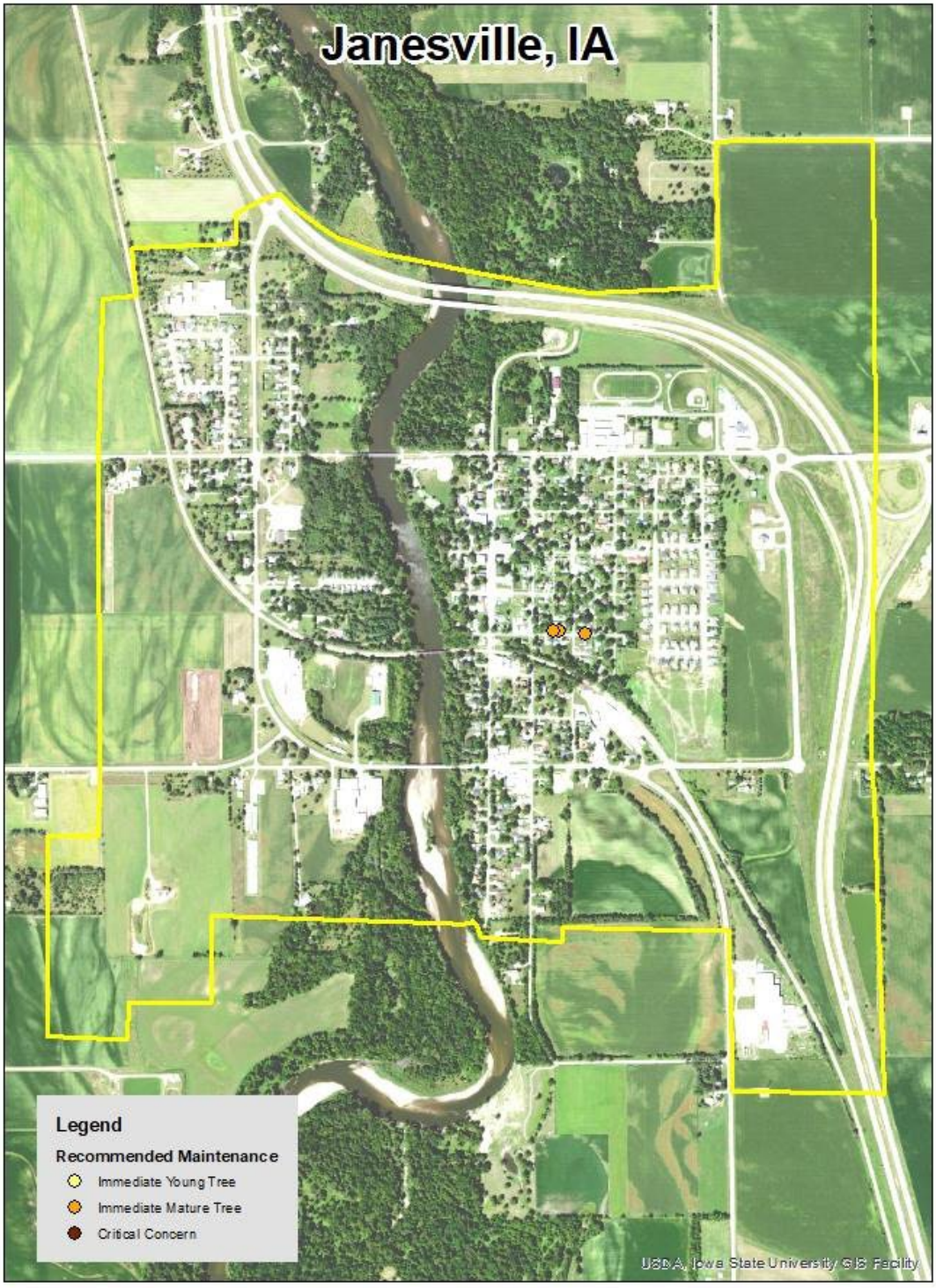

Figure 4: Location of Trees with Recommended Maintenance

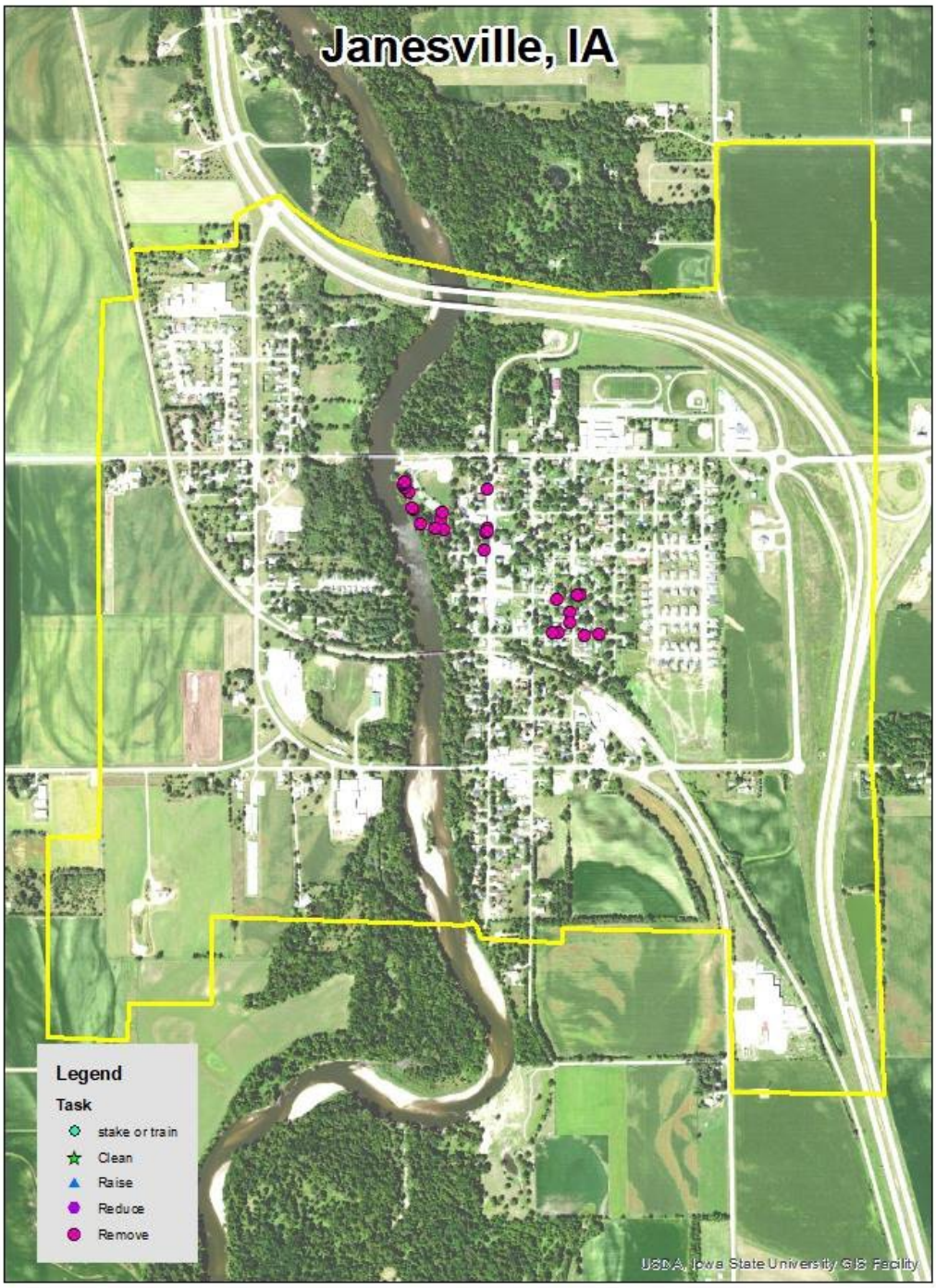

Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

Appendix C: Janesville 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.