Sigourney, Iowa

2015 Urban Forest
Management plan
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In Partnership with:
the Iowa DNR

Table of Contents

Executive Summary **3**

Overview 3
Inventory and Results 3
Recommendations 3

Introduction **4**

Inventory___ **4**

Inventory_Results **4**

Annual Benefits *5*
Annual Energy Benefits 5
Annual Stormwater Benefits 5
Annual Air Quality Benefits 5
Annual Carbon Benefits 5
Annual Aesthetics Benefits 5
Financial Summary of all Benefits 5

Forest Structure *5*
Species Distribution 5
Age Class 5
Condition: Wood and Foliage 6
Management Needs 7
Canopy Cover 7
Land Use and Location 7

Recommendations **7**

Risk Management 7
Pruning Cycle 7
Planting 8
Continual Monitoring 8
Six Year Maintenance Plan 8

Emerald Ash Borer **9**

Ash Tree Removal 9
EAB Quarantines 9
Wood Disposal 10
Canopy Replacement 10
Postponed Work 10
Monitoring 10
Private Ash Trees 10

Budget_____ **11**

Works Cited **12**

Appendix B: ArcGIS Mapping ..... Error! Bookmark not defined.

Appendix C: Sigourney Tree Ordinances ..... Error! Bookmark not defined.

Executive Summary

Overview

This plan was developed to assist the City of Sigourney 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 24% of Sigourney'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 2015, 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 701 trees inventoried.

- Sigourney's trees provide $124,351.00 of benefits annually, an average of $178.41 a tree
- There are 43 species of trees
- Sigourney has 91 ash trees owned by the city
- The top three genera are: Maple 49.5%, Ash 11.9%, and Apple at 6.5%
- 1 tree is 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.

- 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 Sigourney 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 and replacement planting. With proper planning and management of the current canopy in Sigourney, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Sigourney'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, storm water 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 Sigourney 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 Sigourney's urban forestry goals.

Inventory

In 2015, 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 701 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis. Findings

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Sigourney's trees reduce energy related costs by approximately $12,457 annually (Appendix A, Table 1). These savings are both in Electricity (164.1 MWh) and in Natural Gas (27,743.1 Therms).

Annual Stormwater Benefits

Sigourney's trees intercept about 2,476,320 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $67,108.00 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 Sigourney, it is estimated that trees remove 2,667 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 $7,505 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Sigourney, trees sequester about 577,853 lbs of carbon a year with an associated value of $6,502 (Appendix A, Table 4). In addition, the trees store 10,061,520 lbs of carbon, with a yearly benefit of $1,710 (Appendix A, Table 5).

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. Sigourney receives $49,198.00 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Sigourney's trees provide $172,873.00 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 766 trees in Sigourney provide approximately $225.68 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

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

Species	# of Standard	% of
Silver maple	172 (N/A)	22.45
Green ash	72 (N/A)	9.40
Norway maple	69 (N/A)	9.01
Pin oak	48 (N/A)	6.27
Northern hackberry	41 (N/A)	5.35
Sugar maple	39 (N/A)	5.09
Apple	36 (N/A)	4.70
Red maple	35 (N/A)	4.57

Chinese elm	30 (N/A)	3.92
American basswood	20 (N/A)	2.61
Scotch pine	17 (N/A)	2.22
Birch	17 (N/A)	2.22
Honeylocust	17 (N/A)	2.22
Black walnut	16 (N/A)	2.09
Pear	16 (N/A)	2.09
Eastern white pine	14 (N/A)	1.83
White ash	12 (N/A)	1.57
Hickory	8 (N/A)	1.04
Northern red oak	7 (N/A)	0.91
Conifer Evergreen	6 (N/A)	0.78
Blue spruce	6 (N/A)	0.78
Catalpa	6 (N/A)	0.78
Littleleaf linden	5 (N/A)	0.65
Bur oak	4 (N/A)	0.52
Northern pin oak	4 (N/A)	0.52
American sycamore	4 (N/A)	0.52
Broadleaf Deciduous	4 (N/A)	0.52
Kentucky coffeetree	4 (N/A)	0.52
Siberian elm	4 (N/A)	0.52
Eastern redbud	4 (N/A)	0.52
Tulip tree	4 (N/A)	0.52
Mulberry	3 (N/A)	0.39
Eastern red cedar	3 (N/A)	0.39
Ohio buckeye	3 (N/A)	0.39
Maple	2 (N/A)	0.26
Willow	2 (N/A)	0.26
Cottonwood	2 (N/A)	0.26
Spruce	2 (N/A)	0.26
Black poplar	2 (N/A)	0.26
Conifer Evergreen	1 (N/A)	0.13
Dogwood	1 (N/A)	0.13
Common chokecherry	1 (N/A)	0.13
Black maple	1 (N/A)	0.13
Oak	1 (N/A)	0.13
Ginkgo	1 (N/A)	0.13
Citywide	766 (N/A)	100.00

Age Class

A good portion of Sigourney's trees (31.6%) 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. Sigourney's size curve is about in the middle, indicating a stand that has a fair representation of young and mature trees .

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 Sigourney indicate that over 90% of the trees are in good health. Similarly, over 90% of Sigourney'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 less than 5% of the population. This 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	754	95%
Tree Removal	12	<5%

Canopy Cover

The canopy cover included in the Sigourney inventory includes approximately 25 acres.

Land Use and Location

The majority of Sigourney'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 Dwelling	83%
Park	17%

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

Sigourney has 1 critical concern tree that needs immediate removal. This tree can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance.

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 Sigourney.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (40.6%) (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.

Six Year Maintenance Plan

Year 1

- Removal: 4 critical concern trees
- Planting and Replacement: 5 trees to be planted in open locations
- Visual Survey for signs and symptoms of EAB

Year 2

- Removal:8 ash trees with poor health
- *Or saving for ash tree treatment
- Planting and Replacement: plant 10 trees in open locations from year one removals
- Routine trimming: Contract to trim city trees
- Visual Survey for signs and symptoms of EAB

Year 3

- Removal: 12 trees - removal of any new critical concern trees and ash in poor health
- *Or saving for ash tree treatment
- Planting and Replacement: 16 trees to be planted in open locations and locations from previous removals
- Visual Survey for signs and symptoms of EAB

Year 4

- Removal: removal of any new critical concern trees and ash in poor health
- *Or saving for ash tree treatment
- Planting and Replacement: trees to be planted in open locations and locations from previous removals

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
Planting and Replacement: trees to be planted in open locations and locations from previous removals
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
Planting and Replacement: trees to be planted in open locations and locations from previous removals
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 21 ash trees removed (approximately 25% of ash). EAB could potentially kill all ash within 4 years of its arrival.
** To remove all ash trees within 6 years, the budget would need to be increased to $11,200.00 a year. If the budget were increased to $5,200.00 a year all ash could be removed in 13 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 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. 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.”

Budget

Current Budget
Total $33,000 over 6 years ($5,500/year)

FY 2017 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

FY 2018 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

FY 2019 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

FY 2020 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

FY 2021 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

FY 2022 Budget
Removal: $2,300.00
Replanting and associated maintenance (trimming of existing mature trees): $2,200.00

* Reduction of ash over 6 years: Approximately 21 ash trees removed (approximately 25% of ash). EAB could potentially kill all ash within 4 years of its arrival). **It will take approximately 24 years to remove all ash with the current budget.**

Purposed Budget Increase

EAB could potentially kill all ash trees in Sigourney within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $11,200.00 a year. If the budget were increased to $5,200 a year all ash could be removed within 13 years. Additionally, it is recommended that Sigourney 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.

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Sigourney

Annual Energy Benefits of Public Trees

5/17/2016

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	58.5	4,444	8,428.4	8,260	12,704	(N/A)	33.3	36.5	54.76
Silver maple	27.6	2,091	3,613.4	3,541	5,632	(N/A)	14.2	16.2	56.89
Green ash	20.3	1,544	2,699.1	2,645	4,189	(N/A)	11.9	12.0	50.47
Apple	2.9	217	473.7	464	681	(N/A)	6.5	2.0	15.14
Bur oak	9.8	746	1,375.5	1,348	2,094	(N/A)	5.0	6.0	59.83
Pin oak	7.4	560	988.5	969	1,529	(N/A)	3.6	4.4	61.16
American sycamore	7.9	598	1,099.7	1,078	1,676	(N/A)	3.2	4.8	76.19
Red maple	1.9	145	260.5	255	400	(N/A)	2.0	1.2	28.60
Hickory	2.7	202	369.9	362	565	(N/A)	1.9	1.6	43.43
Black walnut	2.9	223	397.2	389	612	(N/A)	1.7	1.8	51.03
Northern hackberry	3.7	280	535.1	524	804	(N/A)	1.7	2.3	67.04
Honeylocust	2.8	211	371.3	364	575	(N/A)	1.4	1.7	57.51
Spruce	0.3	25	56.3	55	80	(N/A)	1.4	0.2	8.00
White ash	2.5	187	301.1	295	482	(N/A)	1.1	1.4	60.24
Eastern red cedar	0.8	63	123.0	121	183	(N/A)	1.1	0.5	22.93
Black locust	1.6	119	211.1	207	326	(N/A)	1.0	0.9	46.52
Maple	0.6	48	85.5	84	132	(N/A)	0.9	0.4	21.93
Eastern redbud	0.2	15	34.5	34	49	(N/A)	0.9	0.1	8.15
Siberian elm	1.3	102	176.1	173	274	(N/A)	0.7	0.8	54.89
Oak	1.0	74	140.5	138	212	(N/A)	0.7	0.6	42.40
Broadleaf Deciduous Mediu	1.1	80	146.0	143	223	(N/A)	0.6	0.6	55.77
Basswood	1.4	104	194.3	190	295	(N/A)	0.6	0.8	73.69
Austrian pine	0.4	33	58.0	57	90	(N/A)	0.4	0.3	29.88
Willow	0.3	21	41.2	40	61	(N/A)	0.4	0.2	20.30
Catalpa	0.8	58	105.8	104	162	(N/A)	0.3	0.5	80.97
Littleleaf linden	0.5	39	75.7	74	113	(N/A)	0.3	0.3	56.51
Mountain ash	0.0	3	7.6	7	11	(N/A)	0.3	0.0	5.40
Ohio buckeye	0.2	16	33.7	33	49	(N/A)	0.3	0.1	24.47
Mulberry	0.2	17	35.4	35	52	(N/A)	0.3	0.1	25.77
Black poplar	0.3	25	40.7	40	65	(N/A)	0.3	0.2	32.43
Amur maple	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
American basswood	0.2	18	36.4	36	54	(N/A)	0.1	0.2	53.99
Sweetgum	0.1	7	13.7	13	21	(N/A)	0.1	0.1	20.64
Ash	0.2	18	29.5	29	47	(N/A)	0.1	0.1	46.78
American elm	0.4	29	52.8	52	80	(N/A)	0.1	0.2	80.37
Japanese maple	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Black cherry	0.2	15	31.6	31	46	(N/A)	0.1	0.1	46.14
Birch	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Cottonwood	0.2	18	27.0	26	44	(N/A)	0.1	0.1	44.23
Water oak	0.4	30	53.7	53	83	(N/A)	0.1	0.2	82.54
Pear	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Plum	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Southern magnolia	0.1	6	12.7	12	19	(N/A)	0.1	0.1	18.82
Eastern white pine	0.1	11	19.7	19	30	(N/A)	0.1	0.1	30.47
Total	164.1	12,457	22,788.1	22,332	34,790	(N/A)	100.0	100.0	49.91

Sigourney

Annual Stormwater Benefits of Public Trees

5/17/2016

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	550,028	14,906	(N/A)	33.3	32.8	64.25
Silver maple	356,326	9,656	(N/A)	14.2	21.2	97.54
Green ash	186,592	5,057	(N/A)	11.9	11.1	60.92
Apple	10,122	274	(N/A)	6.5	0.6	6.10
Bur oak	113,569	3,078	(N/A)	5.0	6.8	87.93
Pin oak	75,651	2,050	(N/A)	3.6	4.5	82.01
American sycamore	104,957	2,844	(N/A)	3.2	6.3	129.29
Red maple	11,202	304	(N/A)	2.0	0.7	21.68
Hickory	25,176	682	(N/A)	1.9	1.5	52.48
Black walnut	25,957	703	(N/A)	1.7	1.5	58.62
Northern hackberry	33,215	900	(N/A)	1.7	2.0	75.01
Honeylocust	25,359	687	(N/A)	1.4	1.5	68.72
Spruce	3,276	89	(N/A)	1.4	0.2	8.88
White ash	25,234	684	(N/A)	1.1	1.5	85.48
Eastern red cedar	12,101	328	(N/A)	1.1	0.7	40.99
Black locust	12,043	326	(N/A)	1.0	0.7	46.62
Maple	3,629	98	(N/A)	0.9	0.2	16.39
Eastern redbud	681	18	(N/A)	0.9	0.0	3.08
Siberian elm	10,681	289	(N/A)	0.7	0.6	57.89
Oak	9,904	268	(N/A)	0.7	0.6	53.68
Broadleaf Deciduous Medium	9,062	246	(N/A)	0.6	0.5	61.39
Basswood	17,319	469	(N/A)	0.6	1.0	117.34
Austrian pine	6,781	184	(N/A)	0.4	0.4	61.26
Willow	2,504	68	(N/A)	0.4	0.1	22.62
Catalpa	11,182	303	(N/A)	0.3	0.7	151.51
Littleleaf linden	6,110	166	(N/A)	0.3	0.4	82.79
Mountain ash	137	4	(N/A)	0.3	0.0	1.86
Ohio buckeye	1,172	32	(N/A)	0.3	0.1	15.88
Mulberry	1,243	34	(N/A)	0.3	0.1	16.84
Black poplar	2,073	56	(N/A)	0.3	0.1	28.09
Amur maple	69	2	(N/A)	0.1	0.0	1.86
American basswood	2,133	58	(N/A)	0.1	0.1	57.80
Sweetgum	608	16	(N/A)	0.1	0.0	16.47
Ash	1,409	38	(N/A)	0.1	0.1	38.19
American elm	4,551	123	(N/A)	0.1	0.3	123.33
Japanese maple	69	2	(N/A)	0.1	0.0	1.86
Black cherry	1,174	32	(N/A)	0.1	0.1	31.82
Birch	586	16	(N/A)	0.1	0.0	15.88
Cottonwood	1,466	40	(N/A)	0.1	0.1	39.72
Water oak	7,920	215	(N/A)	0.1	0.5	214.64
Pear	69	2	(N/A)	0.1	0.0	1.86
Plum	69	2	(N/A)	0.1	0.0	1.86
Southern magnolia	677	18	(N/A)	0.1	0.0	18.34
Eastern white pine	2,969	80	(N/A)	0.1	0.2	80.46
Citywide total	1,677,051	45,448	(N/A)	100.0	100.0	65.21

Sigourney

Annual Air Quality Benefits of Public Trees

5/17/2016

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								
Norway maple	112.7	19.4	55.3	5.0	609	283.7	41.0	39.1	265.6	1,758	-26.4	-99	795.6	2,268	(N/A)	33.3	9.77
Silver maple	56.1	9.5	28.2	2.5	304	129.8	19.0	18.2	124.7	812	-30.3	-114	357.6	1,003	(N/A)	14.2	10.13
Green ash	20.2	3.2	10.2	0.9	109	96.4	14.1	13.4	92.2	602	0.0	0	250.6	711	(N/A)	11.9	8.57
Apple	1.9	0.3	1.1	0.1	11	14.4	2.0	1.9	13.0	88	0.0	0	34.7	98	(N/A)	6.5	2.19
Bur oak	14.1	2.3	6.7	0.6	75	47.2	6.9	6.5	44.5	293	0.0	0	128.8	368	(N/A)	5.0	10.52
Pin oak	12.7	2.2	6.6	0.6	70	35.0	5.1	4.9	33.4	219	-23.9	-90	76.6	199	(N/A)	3.6	7.95
American sycamore	15.0	2.4	6.9	0.7	79	37.8	5.5	5.2	35.7	235	0.0	0	109.2	314	(N/A)	3.2	14.28
Red maple	1.8	0.3	0.9	0.1	10	9.1	1.3	1.3	8.7	57	-0.7	-3	22.7	64	(N/A)	2.0	4.56
Hickory	2.6	0.4	1.3	0.1	14	12.8	1.9	1.8	12.1	79	0.0	0	32.9	93	(N/A)	1.9	7.19
Black walnut	2.5	0.4	1.3	0.1	14	14.0	2.0	1.9	13.3	87	0.0	0	35.7	101	(N/A)	1.7	8.43
Northern hackberry	4.8	0.8	2.5	0.2	27	17.9	2.6	2.5	16.7	111	0.0	0	48.1	137	(N/A)	1.7	11.45
Honeylocust	4.7	0.8	2.2	0.2	25	13.2	1.9	1.8	12.6	82	-3.4	-13	34.0	95	(N/A)	1.4	9.46
Spruce	0.2	0.0	0.3	0.0	2	1.7	0.2	0.2	1.5	10	-0.9	-3	3.2	8	(N/A)	1.4	0.83
White ash	3.9	0.6	1.9	0.2	21	11.4	1.7	1.6	11.1	72	0.0	0	32.5	93	(N/A)	1.1	11.60
Eastern red cedar	2.5	0.5	2.0	0.3	16	4.0	0.6	0.6	3.8	25	-6.7	-25	7.5	16	(N/A)	1.1	1.99
Black locust	2.2	0.4	1.1	0.1	12	7.5	1.1	1.0	7.1	46	-0.5	-2	20.0	57	(N/A)	1.0	8.09
Maple	0.6	0.1	0.3	0.0	3	3.0	0.4	0.4	2.8	19	-0.2	-1	7.5	21	(N/A)	0.9	3.49
Eastern redbud	0.1	0.0	0.1	0.0	1	1.0	0.1	0.1	0.9	6	0.0	0	2.4	7	(N/A)	0.9	1.12
Siberian elm	1.3	0.2	0.7	0.1	7	6.3	0.9	0.9	6.1	40	0.0	0	16.5	47	(N/A)	0.7	9.33
Oak	1.1	0.2	0.5	0.0	6	4.7	0.7	0.7	4.4	29	0.0	0	12.3	35	(N/A)	0.7	7.00
Broadleaf Deciduous Medium	1.8	0.3	0.9	0.1	10	5.1	0.7	0.7	4.8	31	-0.4	-2	13.9	40	(N/A)	0.6	9.89
Basswood	2.3	0.4	1.1	0.1	12	6.6	1.0	0.9	6.2	41	0.0	0	18.5	53	(N/A)	0.6	13.28
Austrian pine	1.1	0.2	0.9	0.1	7	2.0	0.3	0.3	2.0	13	-2.6	-10	4.3	10	(N/A)	0.4	3.38
Willow	0.5	0.1	0.2	0.0	3	1.3	0.2	0.2	1.2	8	-0.1	0	3.7	10	(N/A)	0.4	3.48
Catalpa	1.7	0.3	0.7	0.1	9	3.7	0.5	0.5	3.5	23	0.0	0	10.9	32	(N/A)	0.3	15.76
Littleleaf linden	1.1	0.2	0.5	0.0	6	2.5	0.4	0.3	2.3	15	-0.5	-2	6.9	19	(N/A)	0.3	9.72
Mountain ash	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)	0.3	0.71
Ohio buckeye	0.1	0.0	0.1	0.0	1	1.0	0.1	0.1	1.0	6	0.0	0	2.5	7	(N/A)	0.3	3.47
Mulberry	0.4	0.1	0.2	0.0	2	1.1	0.2	0.1	1.0	7	0.0	0	3.1	9	(N/A)	0.3	4.53
Black poplar	0.1	0.0	0.1	0.0	1	1.5	0.2	0.2	1.5	10	0.0	0	3.7	10	(N/A)	0.3	5.21
Amur maple	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1	(N/A)	0.1	0.71
American basswood	0.2	0.0	0.1	0.0	1	1.2	0.2	0.2	1.1	7	-0.2	-1	2.8	8	(N/A)	0.1	7.78
Sweetgum	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
Ash	0.2	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	-0.1	0	2.8	8	(N/A)	0.1	7.92
American elm	0.5	0.1	0.3	0.0	3	1.8	0.3	0.3	1.7	11	0.0	0	4.9	14	(N/A)	0.1	14.10

Sigourney

Annual Air Quality Benefits of Public Trees

5/17/2016

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								
Japanese maple	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1	(N/A)	0.1	0.71
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)	0.1	8.35
Birch	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
Cottonwood	0.1	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	0.0	0	2.6	7	(N/A)	0.1	7.42
Water oak	1.5	0.3	1.1	0.2	9	1.9	0.3	0.3	1.8	12	-3.7	-14	3.5	7	(N/A)	0.1	7.16
Pear	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1	(N/A)	0.1	0.71
Plum	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1	(N/A)	0.1	0.71
Southern magnolia	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	-0.2	-1	0.8	2	(N/A)	0.1	2.10
Eastern white pine	0.3	0.1	0.3	0.0	2	0.7	0.1	0.1	0.7	4	-1.4	-5	0.9	1	(N/A)	0.1	1.45
Citywide total	273.5	46.3	137.1	12.6	1,484	786.6	114.3	108.9	743.9	4,893	-102.3	-384	2,121.0	5,993	(N/A)	100.0	8.60

Sigourney

Annual CO $_2$ Benefits of Public Trees

5/17/2016

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
Norway maple	82,321	617	-8,906	-609	-5	98,208	737	171,013	1,283 (N/A)	33.3	27.9	5.53
Silver maple	102,280	767	-5,977	-292	-2	46,215	347	142,227	1,067 (N/A)	14.2	23.2	10.77
Green ash	45,569	342	-3,168	-201	-2	34,120	256	76,322	572 (N/A)	11.9	12.5	6.90
Apple	4,406	33	-175	-45	0	4,796	36	8,982	67 (N/A)	6.5	1.5	1.50
Bur oak	24,584	184	-2,180	-105	-1	16,487	124	38,787	291 (N/A)	5.0	6.3	8.31
Pin oak	31,205	234	-1,585	-76	-1	12,380	93	41,923	314 (N/A)	3.6	6.8	12.58
American sycamore	18,814	141	-2,369	-87	-1	13,224	99	29,582	222 (N/A)	3.2	4.8	10.08
Red maple	3,141	24	-106	-18	0	3,209	24	6,225	47 (N/A)	2.0	1.0	3.34
Hickory	6,397	48	-401	-28	0	4,468	34	10,437	78 (N/A)	1.9	1.7	6.02
Black walnut	6,805	51	-395	-29	0	4,931	37	11,312	85 (N/A)	1.7	1.8	7.07
Northern hackberry	4,504	34	-337	-34	0	6,190	46	10,322	77 (N/A)	1.7	1.7	6.45
Honeylocust	6,583	49	-285	-23	0	4,669	35	10,944	82 (N/A)	1.4	1.8	8.21
Spruce	284	2	-5	-8	0	548	4	819	6 (N/A)	1.4	0.1	0.61
White ash	6,591	49	-339	-20	0	4,129	31	10,360	78 (N/A)	1.1	1.7	9.71
Eastern red cedar	168	1	-38	-15	0	1,390	10	1,505	11 (N/A)	1.1	0.2	1.41
Black locust	2,479	19	-178	-15	0	2,623	20	4,910	37 (N/A)	1.0	0.8	5.26
Maple	1,021	8	-34	-6	0	1,055	8	2,035	15 (N/A)	0.9	0.3	2.54
Eastern redbud	321	2	-11	-4	0	334	3	640	5 (N/A)	0.9	0.1	0.80
Siberian elm	2,238	17	-153	-13	0	2,251	17	4,323	32 (N/A)	0.7	0.7	6.48
Oak	2,459	18	-163	-11	0	1,642	12	3,928	29 (N/A)	0.7	0.6	5.89
Broadleaf Deciduous Medi	1,612	12	-141	-10	0	1,769	13	3,229	24 (N/A)	0.6	0.5	6.05
Basswood	3,530	26	-352	-15	0	2,307	17	5,471	41 (N/A)	0.6	0.9	10.26
Austrian pine	426	3	-42	-8	0	725	5	1,102	8 (N/A)	0.4	0.2	2.75
Willow	481	4	-38	-3	0	454	3	894	7 (N/A)	0.4	0.1	2.23
Catalpa	1,769	13	-264	-9	0	1,287	10	2,783	21 (N/A)	0.3	0.5	10.44
Littleleaf linden	1,907	14	-113	-6	0	858	6	2,646	20 (N/A)	0.3	0.4	9.92
Mountain ash	76	1	-2	-1	0	74	1	147	1 (N/A)	0.3	0.0	0.55
Ohio buckeye	448	3	-11	-2	0	352	3	787	6 (N/A)	0.3	0.1	2.95
Mulberry	38	0	-33	-4	0	372	3	373	3 (N/A)	0.3	0.1	1.40
Black poplar	654	5	-23	-3	0	552	4	1,180	9 (N/A)	0.3	0.2	4.43
Amur maple	38	0	-1	-1	0	37	0	74	1 (N/A)	0.1	0.0	0.55
American basswood	597	4	-39	-3	0	405	3	960	7 (N/A)	0.1	0.2	7.20

Annual CO $_2$ Benefits of Public Trees

5/17/2016

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
Sweetgum	209	2	-5	-1	0	159	1	361	3	(N/A)	0.1	0.1	2.71
Ash	386	3	-17	-2	0	395	3	762	6	(N/A)	0.1	0.1	5.71
American elm	454	3	-59	-4	0	632	5	1,023	8	(N/A)	0.1	0.2	7.68
Japanese maple	38	0	-1	-1	0	37	0	74	1	(N/A)	0.1	0.0	0.55
Black cherry	478	4	-32	-3	0	335	3	778	6	(N/A)	0.1	0.1	5.84
Birch	224	2	-5	-1	0	176	1	393	3	(N/A)	0.1	0.1	2.95
Cottonwood	445	3	-18	-2	0	393	3	819	6	(N/A)	0.1	0.1	6.14
Water oak	914	7	-73	-4	0	661	5	1,498	11	(N/A)	0.1	0.2	11.23
Pear	38	0	-1	-1	0	37	0	74	1	(N/A)	0.1	0.0	0.55
Plum	38	0	-1	-1	0	37	0	74	1	(N/A)	0.1	0.0	0.55
Southern magnolia	56	0	-2	-1	0	141	1	194	1	(N/A)	0.1	0.0	1.45
Eastern white pine	187	1	-16	-3	0	246	2	415	3	(N/A)	0.1	0.1	3.11
Citywide total	367,214	2,754	-28,093	-1,724	-13	275,307	2,065	612,704	4,595	(N/A)	100.0	100.0	6.59

Sigourney

Annual Aesthetic/Other Benefits of Public Trees

5/17/2016

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	7,758	(N/A)	33.3	23.1	33.44
Silver maple	8,568	(N/A)	14.2	25.6	86.54
Green ash	4,142	(N/A)	11.9	12.4	49.90
Apple	246	(N/A)	6.5	0.7	5.48
Bur oak	1,973	(N/A)	5.0	5.9	56.37
Pin oak	2,488	(N/A)	3.6	7.4	99.52
American sycamore	1,376	(N/A)	3.2	4.1	62.54
Red maple	503	(N/A)	2.0	1.5	35.95
Hickory	588	(N/A)	1.9	1.8	45.26
Black walnut	624	(N/A)	1.7	1.9	51.97
Northern hackberry	633	(N/A)	1.7	1.9	52.76
Honeylocust	1,436	(N/A)	1.4	4.3	143.57
Spruce	94	(N/A)	1.4	0.3	9.41
White ash	738	(N/A)	1.1	2.2	92.29
Eastern red cedar	62	(N/A)	1.1	0.2	7.80
Black locust	244	(N/A)	1.0	0.7	34.86
Maple	163	(N/A)	0.9	0.5	27.12
Eastern redbud	17	(N/A)	0.9	0.1	2.83
Siberian elm	190	(N/A)	0.7	0.6	37.98
Oak	224	(N/A)	0.7	0.7	44.85
Broadleaf Deciduous Medium	153	(N/A)	0.6	0.5	38.21
Basswood	263	(N/A)	0.6	0.8	65.84
Austrian pine	58	(N/A)	0.4	0.2	19.34
Willow	49	(N/A)	0.4	0.1	16.17
Catalpa	124	(N/A)	0.3	0.4	61.96
Littleleaf linden	188	(N/A)	0.3	0.6	93.75
Mountain ash	4	(N/A)	0.3	0.0	2.06
Ohio buckeye	52	(N/A)	0.3	0.2	26.22
Mulberry	2	(N/A)	0.3	0.0	1.03
Black poplar	74	(N/A)	0.3	0.2	37.21
Amur maple	2	(N/A)	0.1	0.0	2.06
American basswood	48	(N/A)	0.1	0.1	47.53
Sweetgum	29	(N/A)	0.1	0.1	28.56
Ash	39	(N/A)	0.1	0.1	39.16
American elm	64	(N/A)	0.1	0.2	64.36
Japanese maple	2	(N/A)	0.1	0.0	2.06
Black cherry	29	(N/A)	0.1	0.1	28.80
Birch	26	(N/A)	0.1	0.1	26.22
Cottonwood	46	(N/A)	0.1	0.1	45.86
Water oak	132	(N/A)	0.1	0.4	131.54
Pear	2	(N/A)	0.1	0.0	2.06
Plum	2	(N/A)	0.1	0.0	2.06
Southern magnolia	22	(N/A)	0.1	0.1	21.93
Eastern white pine	47	(N/A)	0.1	0.1	47.08
Citywide total	33,525	(N/A)	100.0	100.0	48.10

Sigourney

Annual Benefits of Public Trees by Species ($/tree)

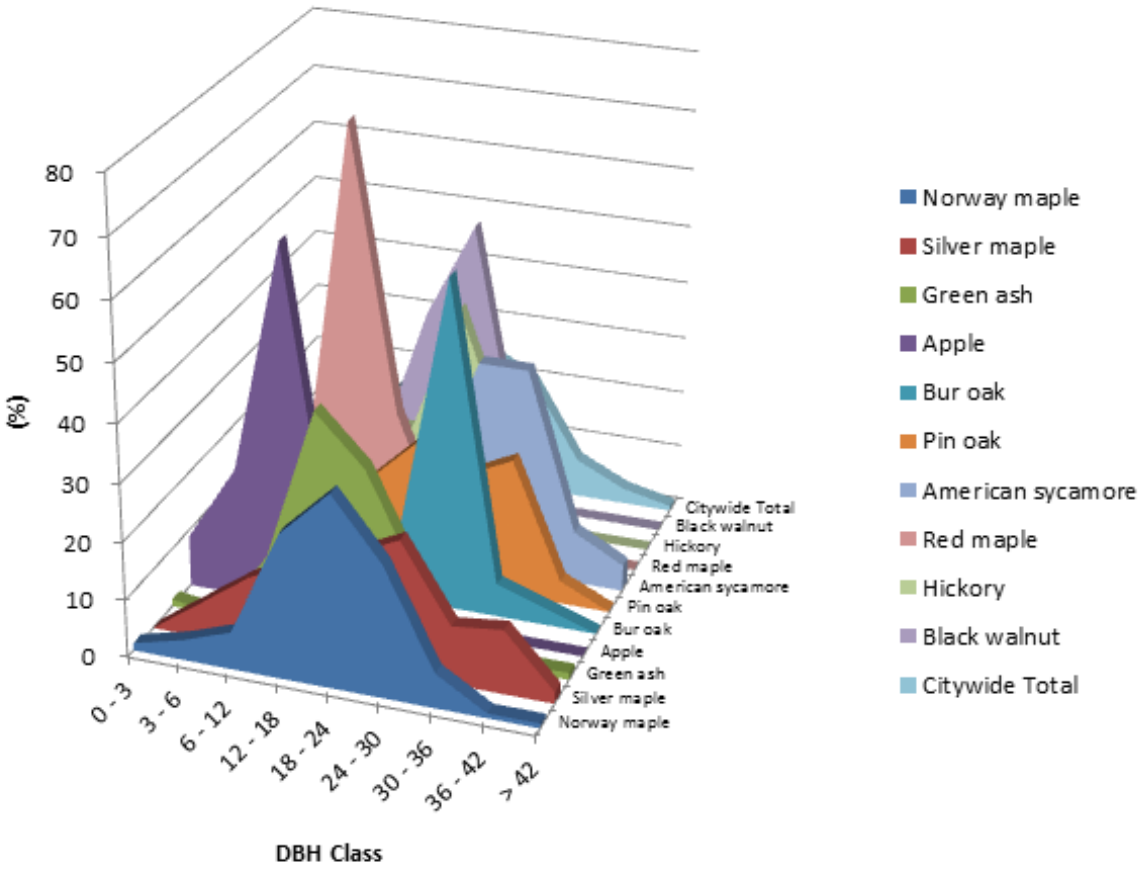
5/17/2016

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error
Norway maple	54.76	5.53	9.77	64.25	33.44	167.75	(N/A)
Silver maple	56.89	10.77	10.13	97.54	86.54	261.88	(N/A)
Green ash	50.47	6.90	8.57	60.92	49.90	176.76	(N/A)
Apple	15.14	1.50	2.19	6.10	5.48	30.40	(N/A)
Bur oak	59.83	8.31	10.52	87.93	56.37	222.97	(N/A)
Pin oak	61.16	12.58	7.95	82.01	99.52	263.21	(N/A)
American sycamore	76.19	10.08	14.28	129.29	62.54	292.38	(N/A)
Red maple	28.60	3.34	4.56	21.68	35.95	94.13	(N/A)
Hickory	43.43	6.02	7.19	52.48	45.26	154.39	(N/A)
Black walnut	51.03	7.07	8.43	58.62	51.97	177.13	(N/A)
Northern hackberry	67.04	6.45	11.45	75.01	52.76	212.71	(N/A)
Honeylocust	57.51	8.21	9.46	68.72	143.57	287.47	(N/A)
Spruce	8.00	0.61	0.83	8.88	9.41	27.73	(N/A)
White ash	60.24	9.71	11.60	85.48	92.29	259.32	(N/A)
Eastern red cedar	22.93	1.41	1.99	40.99	7.80	75.13	(N/A)
Black locust	46.52	5.26	8.09	46.62	34.86	141.35	(N/A)
Maple	21.93	2.54	3.49	16.39	27.12	71.47	(N/A)
Eastern redbud	8.15	0.80	1.12	3.08	2.83	15.98	(N/A)
Siberian elm	54.89	6.48	9.33	57.89	37.98	166.57	(N/A)
Oak	42.40	5.89	7.00	53.68	44.85	153.83	(N/A)
Broadleaf Deciduous M	55.77	6.05	9.89	61.39	38.21	171.32	(N/A)
Basswood	73.69	10.26	13.28	117.34	65.84	280.41	(N/A)
Austrian pine	29.88	2.75	3.38	61.26	19.34	116.61	(N/A)
Willow	20.30	2.23	3.48	22.62	16.17	64.80	(N/A)
Catalpa	80.97	10.44	15.76	151.51	61.96	320.64	(N/A)
Littleleaf linden	56.51	9.92	9.72	82.79	93.75	252.70	(N/A)
Mountain ash	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Ohio buckeye	24.47	2.95	3.47	15.88	26.22	72.99	(N/A)
Mulberry	25.77	1.40	4.53	16.84	1.03	49.57	(N/A)
Black poplar	32.43	4.43	5.21	28.09	37.21	107.37	(N/A)
Amur maple	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
American basswood	53.99	7.20	7.78	57.80	47.53	174.30	(N/A)
Sweetgum	20.64	2.71	2.99	16.47	28.56	71.37	(N/A)
Ash	46.78	5.71	7.92	38.19	39.16	137.75	(N/A)
American elm	80.37	7.68	14.10	123.33	64.36	289.84	(N/A)
Japanese maple	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Black cherry	46.14	5.84	8.35	31.82	28.80	120.94	(N/A)
Birch	24.47	2.95	3.47	15.88	26.22	72.99	(N/A)
Cottonwood	44.23	6.14	7.42	39.72	45.86	143.36	(N/A)
Water oak	82.54	11.23	7.16	214.64	131.54	447.11	(N/A)
Pear	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Plum	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Southern magnolia	18.82	1.45	2.10	18.34	21.93	62.64	(N/A)
Eastern white pine	30.47	3.11	1.45	80.46	47.08	162.58	(N/A)
Citywide Total	49.91	6.59	8.60	65.21	48.10	178.41	(N/A)

Sigourney

Relative Age Distribution of Top 10 Public Tree Species for All Zones (%)

6/30/2016

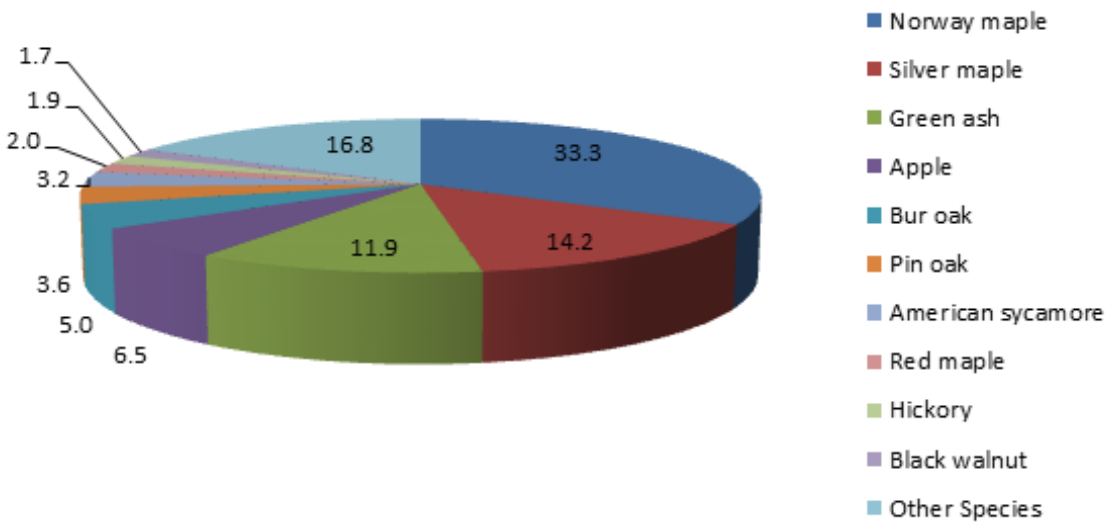


	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42
Norway maple	1.29	3.45	6.47	25.00	33.19	22.84	6.03	0.86	0.86
Silver maple	0.00	6.06	12.12	16.16	19.19	23.23	10.10	11.11	2.02
Green ash	1.20	0.00	12.05	38.55	30.12	13.25	2.41	1.20	1.20
Apple	8.89	22.22	62.22	6.67	0.00	0.00	0.00	0.00	0.00
Bur oak	0.00	8.57	5.71	8.57	11.43	57.14	5.71	2.86	0.00
Pin oak	0.00	0.00	12.00	16.00	24.00	20.00	24.00	4.00	0.00
American sycamore	0.00	0.00	0.00	0.00	13.64	36.36	36.36	9.09	4.55
Red maple	0.00	7.14	71.43	21.43	0.00	0.00	0.00	0.00	0.00
Hickory	7.69	7.69	15.38	15.38	38.46	15.38	0.00	0.00	0.00
Black walnut	0.00	0.00	8.33	33.33	50.00	8.33	0.00	0.00	0.00
Citywide Total	2.01	6.89	14.92	21.09	24.53	20.23	6.74	2.73	0.86

Sigourney

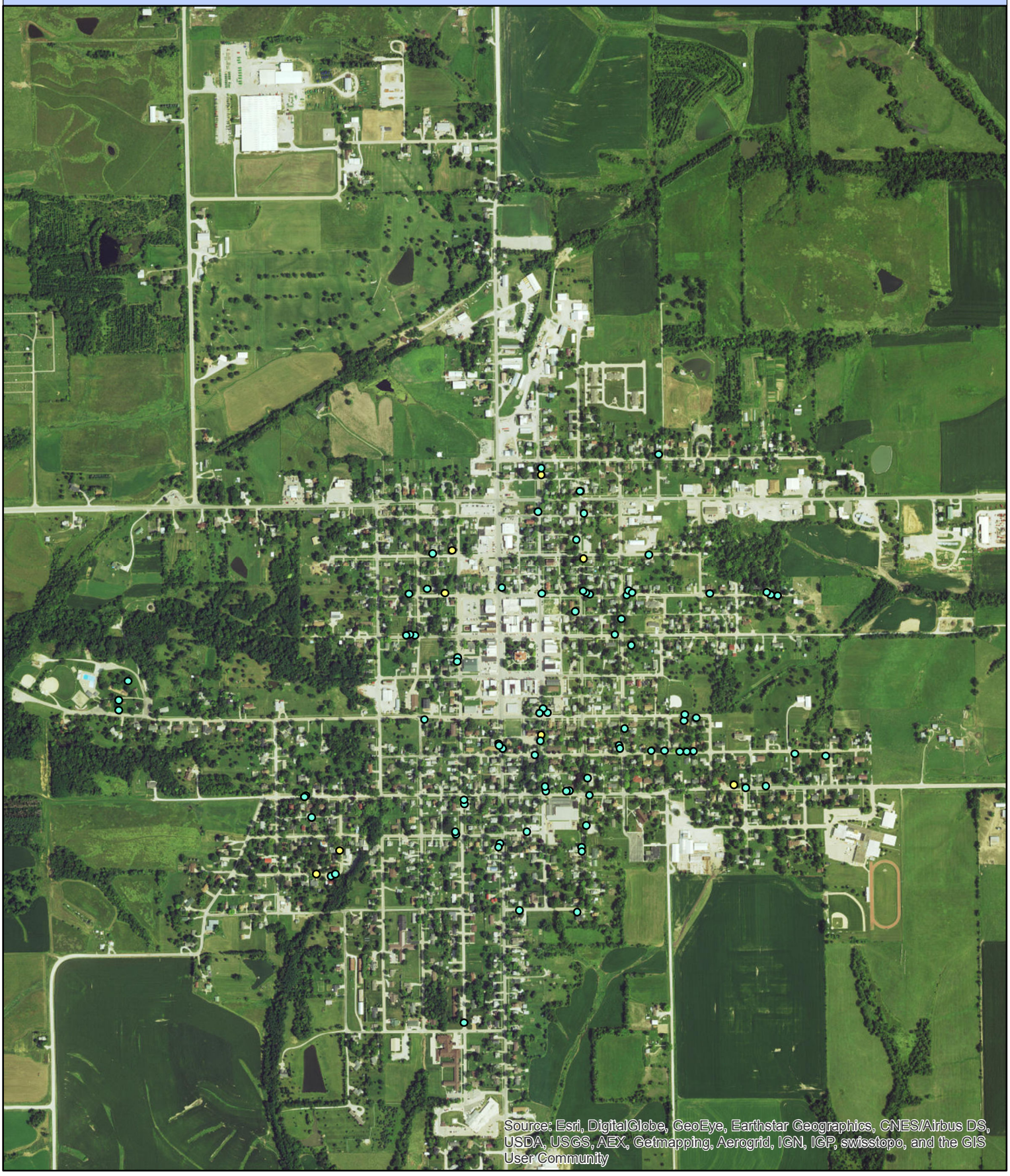
Species Distribution of Public Trees

5/17/2016



Species	Percent
Norway maple	33.3
Silver maple	14.2
Green ash	11.9
Apple	6.5
Bur oak	5.0
Pin oak	3.6
American sycamore	3.2
Red maple	2.0
Hickory	1.9
Black walnut	1.7
Other Species	16.8
Total	100.0

Sigourney, Iowa



Data and map created by:
COPPER TREE CONSULTING LLC.
515-559-4152
CopperTreeConsulting@gmail.com
www.coppertreeconsulting.com

Miles
0 0.15 0.3 0.6

Date: 1/25/2016

WhiteAsh
Green Ash

N

Sigourney, Iowa

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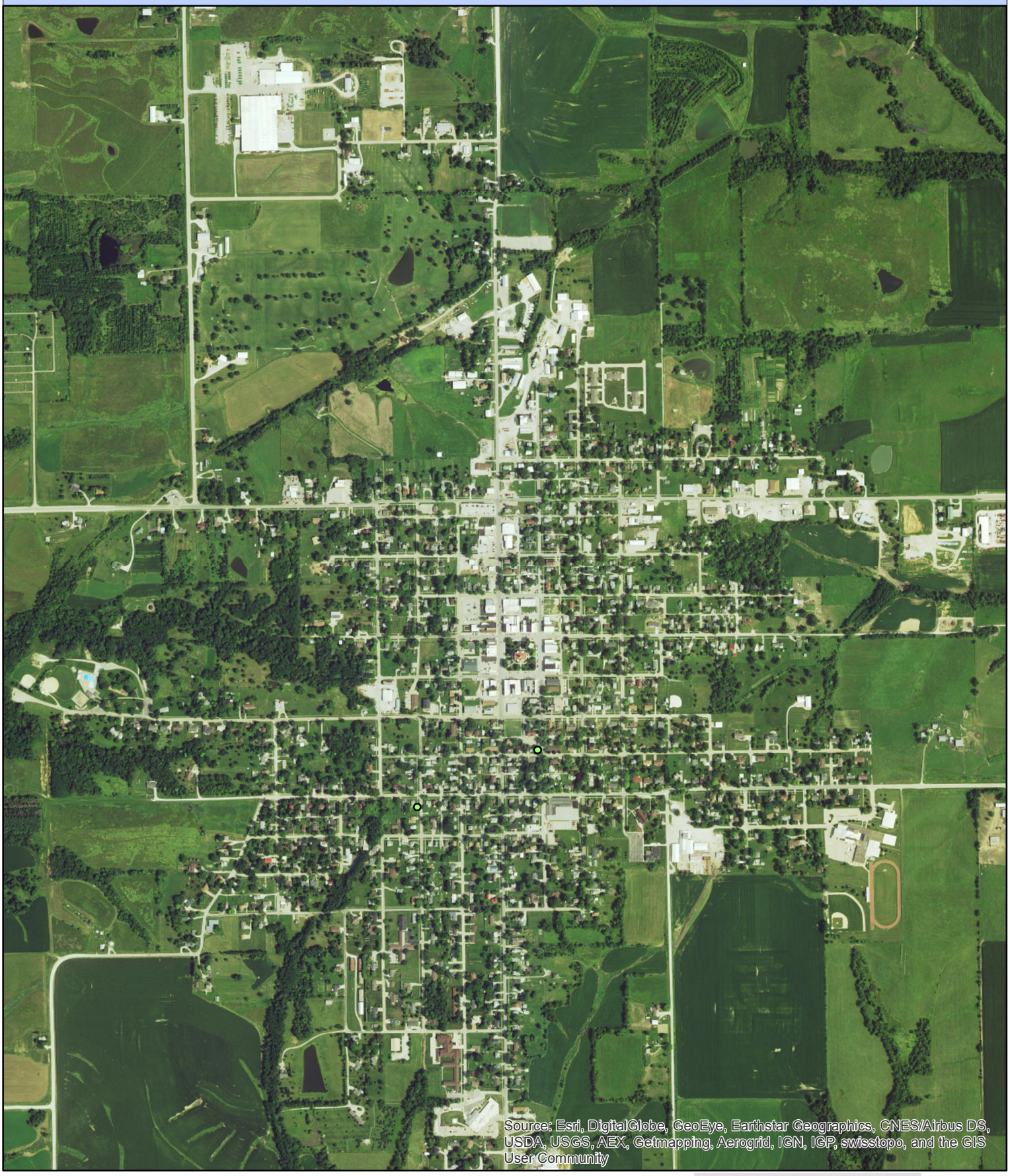
Date: 1/25/2016

- Bark Split (0)
- Epicormics (0)
- Canopy Dieback (1)
- Woodpecker Damage (0)
- D Exit Holes (0)

N

Sigourney, Iowa



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0 0.15 0.3 0.6 Miles

Date: 1/26/2016

Wood Condition		Leaf Condition	
	Dead (0)		Dead (0)
	Poor (2)		Poor (0)

N

Sigourney, Iowa

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www.coppertreeconsulting.com

Date: 1/26/2016

PRIORITY

- Stake/Train (0)
- Crown Cleaning (0)
- Crown Raising (1)
- Crown Reduction (0)
- Remove (5)
- Treat Pests/Disease (0)

N

Appendix C: Sigourney Tree Ordinances

CHAPTER 151
TREES AND GRASS

151.01 Definition 151.05 Disease Control
151.02 Planting Restrictions 151.06 Inspection and Removal
151.03 Duty to Trim Trees 151.07 Cutting or Mowing of Grass
151.04 Trimming Trees to be Supervised

151.01 DEFINITION. For use in this chapter, "boulevard" 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.

151.02 PLANTING RESTRICTIONS. No tree shall be planted in any boulevard or street except in accordance with the following:
1. Alignment. All tress planted in any street shall be planted in the boulevard midway between the outer line of the sidewalk and the curb. In the event a curb line is not established, trees shall be planted on a line ten (10) feet from the property line.
2. Spacing. Trees shall not be planted on any boulevard which is less than nine (9) feet in width, or contains less than eighty-one (81) square feet of exposed soil surface per tree. Trees shall not be planted closer than twenty (20) feet from street intersections (property lines extended) and ten (10) feet from driveways. If it is at all possible trees should be planted inside the property lines and not between the sidewalk and the curb.
3. Prohibited Trees. No person shall plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

151.03 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 eighteen (18) feet above the surface of a street, twenty (20) feet above the surface of a primary highway, and eight (8) feet above the sidewalks. If the abutting property owner fails to trim the trees, the City may serve notice on 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])

151.04 TRIMMING TREES TO BE SUPERVISED. Except as allowed in Section 151.03, 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.

151.05 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.

151.06 INSPECTION AND REMOVAL. The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests, and such trees and shrubs shall be subject to removal as follows:

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 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.
(Code of Iowa, Sec. 364.12[3b & h])

151.07 CUTTING OR MOWING OF GRASS.
1. Duty to Cut and Mow Lawns and Lots. The owner of any property shall cut and mow all lawns and lots so that such growth shall be less than four (4) inches at all times.
2. Cutting and Mowing by City. If a property owner refuses or fails to cut and mow lawns and lots within forty-eight (48) hours after being delivered a notice from the City to perform such action, the Council may require said work to be done and the cost and expenses thereof shall be assessed to the property owner after due notice is given. The amount of such assessment shall be certified to the County Auditor as provided by law and the same shall be collected with and in the same manner as general property taxes.