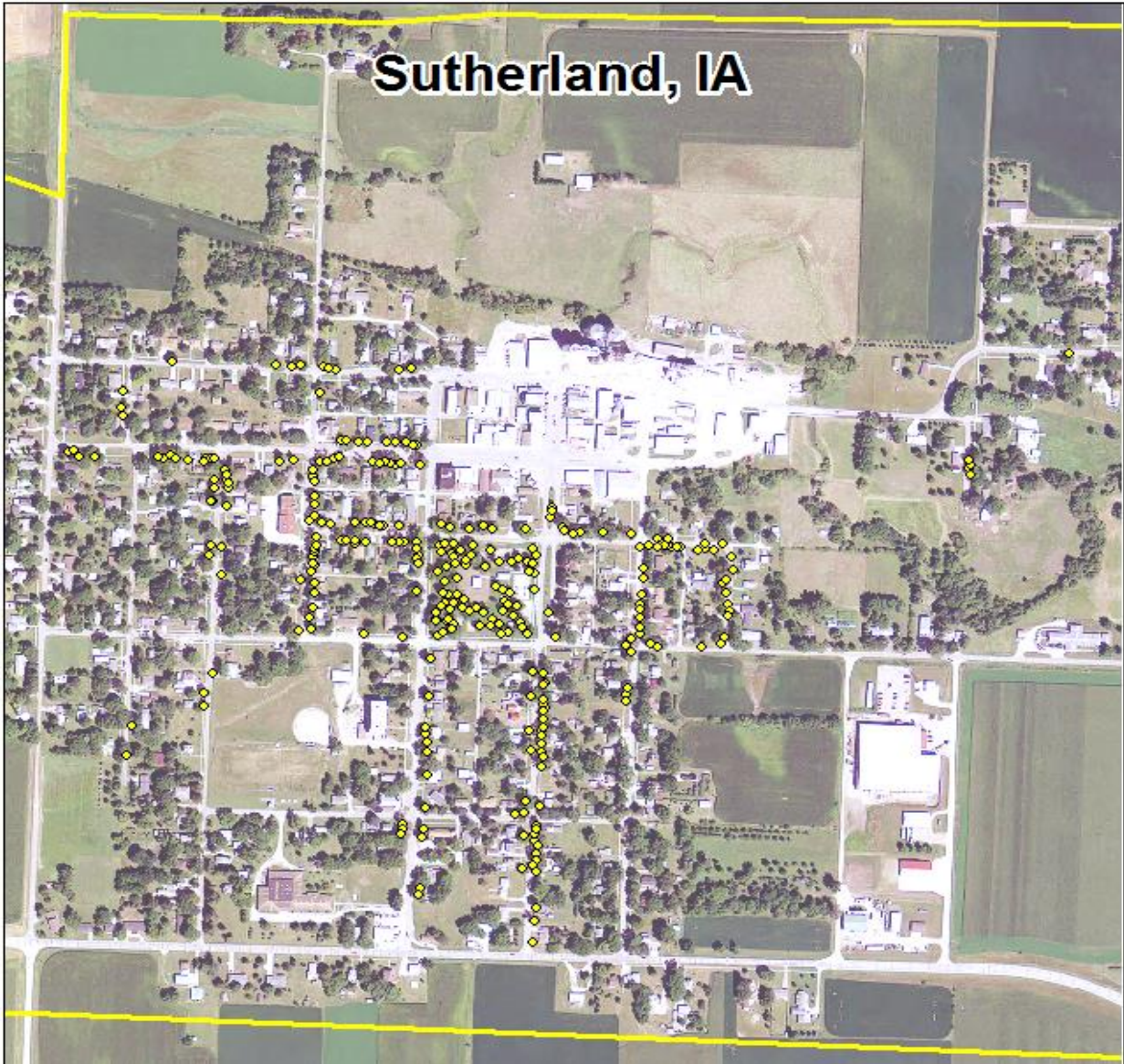


Emerald Ash Borer/Urban Plan Sutherland, IA



2015 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Sutherland with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to Sutherland, and sound management allows you to 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 50% of Sutherland'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 2014, 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 300 trees inventoried.

- Sutherland's trees provide \$54,112 of benefits annually, an average of \$180 a tree.
- There are over 30 species of trees.
- The top three genera are: Ash 50%, Maple 25%, and Spruce 5%.
- 21% of trees are in need of some type of management.
- 14 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 14 trees needing removal, 7 trees are 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*](#).
- 34 of the 150 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 fifth of the city every fifth 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 Sutherland 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 Sutherland, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

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

Inventory

In 2014, a tree inventory was conducted that included 100% of the city-owned trees along streets and in 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 300 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.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Sutherland's trees reduce energy related costs by approximately \$15,820 annually (Appendix A, Table 1). These savings are both in Electricity (73.5 MWh) and in Natural Gas (10,450.2 Therms).

Annual Stormwater Benefits

Sutherland's trees intercept about 788,051 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$21,356 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 Sutherland, it is estimated that trees remove 994 lbs. of air pollution (ozone (O₃), particulate matter less than 10 microns (PM₁₀), carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂)) per year with a net value of \$2,823 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Sutherland, trees sequester about 125,007 lbs. of carbon a year with an associated value of \$938 (Appendix A, Table 5). In addition, the trees store 2,723,680 lbs of carbon, with a yearly benefit of \$20,428 (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. Sutherland receives \$13,176 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, Sutherland's trees provide \$54,112 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 300 trees in Sutherland provide approximately \$180 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Sutherland has over 30 different tree species along city streets and parks (Appendix A, Figure 1).

The distribution of trees by genera is as follows:

Ash	150	50%
Maple	74	25%
Spruce	14	5%
Walnut	9	3%
Linden	8	<3%
Hackberry	5	<2%
Poplar	4	<1%
Pine	4	<1%
Cherry	4	<1%
Elm	3	<1%
Birch	2	<1%
Sycamore	2	<1%
Lilac	2	<1%
Other evergreens	2	<1%
Apple	2	<1%
Oak	2	<1%
Dogwood	1	<1%
Gingko	1	<1%
Locust	1	<1%
Mountain ash	1	<1%

Age Class

Most of Sutherland's trees (52%) are between 18 and 30 inches in diameter at 4.5 ft. (Appendix A, Figure 2). With regard to age/size, it is preferred that a large number of trees have smaller trunk diameters, so younger and smaller trees will replace natural mortality and to maintain canopy cover. Sutherland has 35% of its trees between 1 and 18 inches in diameter.

Sutherland's size curve is slightly above average but you do have an adequate number of trees on hand to replace those reaching maturity and dying.

Condition: Wood and Foliage, All Species

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition of 96% of your trees is in good condition with only 4% of the foliage in poor health, dead and dying (Appendix A, Figure 3). Similarly, the wood condition of 71% of your trees is in good health, 25% in fair health, and 4% in poor health, dead, or dying

(Appendix A, Figure 4). This 29% of the wood condition is an estimate of the number 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).

No work	237	79%
Staking & Train	0	0%
Crown Cleaning	49	16%
Crown Raising	0	0%
Crown Reduction	0	0%
Tree Removal	14	5%
Treat Pests	0	0%

Canopy Cover

The canopy cover of Sutherland is approximately 8 acres (Appendix B, Figure 5). According to the 2010 census, Sutherland covers 558 acre. Thus the canopy cover is about 1.4% .

Land Use and Location

The majority of Sutherland’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	78%
Park/vacant/other	22%
Industrial/Large commercial	0%
Small commercial	0%
Multifamily residential	0%

Location

Planting strip	100%
Other maintained locations	0%
Cutout (surrounded by pavement)	0%
Front yard	0%

Recommendations

Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 24 inches should be removed. Forked trees with open splits exposing interior wood 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

Sutherland has 2 'critical concern' trees that need immediate appraisal for needed maintenance or removal. These trees can be seen (Appendix B, Figure 4). Also on Figure 4, are young and mature trees needing 'immediate' work. Sutherland has 14 trees needing 'removal' regardless of the tree species. They are shown on Figure 5, Appendix B as red circles with black X's in them. The 'removal' trees are broken down this way: 1 Silver maple, 12 ashes, and 1 Black walnut. Also, shown on Figure 5, 49 trees need their crowns cleaned up. They are noted a green stars.

Poor tree species

Ash trees in poor health, dead, or dying should be assessed for required maintenance or eventual removal (Appendix B, Figure 3). With respect to the wood condition, Sutherland has 2 dead and dying ash trees, and 5 ash trees in poor condition. In addition, two ash trees have dead and dying foliage and no ash trees with poor foliage. There are a total of 150 ash trees with 34 ash trees have one or more signs or symptoms associated with EAB. [*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 the categories are defined as follows: 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.

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 Sutherland.

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 ash (25%) and maple (50%) (Appendix A, Figure 1). Ash and Maples should not be planted until their percentages are 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 your city ordinance.

Continual Monitoring

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

Emerald Ash Borer Plan

Ash Tree Removal

Appendix B, Figure 1 shows the locations of every public ash tree in Sutherland. Figure 5, shows the location of the 14 'removal' trees noted by a red circle with a black X which should be done first. Then, on Figure 4, appraise the 2 'critical concern' trees and the 12 mature trees needing some sort of 'immediate' maintenance (Appendix A, Table 9 shows the trunk diameters of the 12 trees). Next, this work is followed by appraising and dealing with trees labeled as poor, dead and dying and shown on Figure 3 of Appendix B. While city personnel are working on the earlier work, they may notice the 34 ash trees showing one or more signs and symptoms of EAB (Appendix B, Figure 2). [*City ownership of the tree recommended for removal should be verified prior to any removal*](#).

Treatment of Ash Trees

Chemical treatment can be an effective tool to spread removal costs out over several years while allowing trees to continue to provide benefits. Sutherland has the added benefit of not finding any infestations of EAB. Chemical 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 trees in 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 since Sutherland is not affected by EAB. At this time, the entire State of Iowa is under quarantine for EAB, and the moving of all types of firewood, nursery stock, and ash logs.

Canopy Replacement

As budget permits, all removed trees will be replaced. An updated, sample city tree code can be found in Appendix C covering public and private trees; past, present and future insect and disease problems, and sampling of trees for insect and disease problems. All new tree plantings should meet the restrictions of your city ordinance. The new plantings 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. 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

Budget information was not obtained at the time of the street survey. In the 1990's and again in 2011 to 2013, storms hit northwest Iowa and caused thousands of dollars of tree damage. Numerous trees have been removed as the result of these storms and normal aging with normal wood rot. The following sample budget is based on a state-wide tree removal cost of \$550 per tree. Local costs may be \$200 to \$300 more per tree as Hartley experienced.

Current Budget

FY 2016 Budget

Removal: \$2,000 (about 4 trees removed).
Planting: \$500 (plant 4 new trees).
Watering & Maintenance: \$500 for the season.

FY 2017 Budget

Removal: \$2,000
Planting: \$600
Routine trimming: \$1,700 (working on the ash needing 'immediate' work).
Watering & Maintenance: \$500

FY 2018 Budget

Removal: \$2,500
Planting: \$600
Watering & Maintenance: \$500

FY 2019 Budget

Removal: \$2,500
Planting: \$600
Routine trimming: \$1,700 to \$2,000 for the 34 ash trees with one EAB symptom).
Watering & Maintenance: \$500

FY 2020 Budget

Removal: \$3,000
Planting: \$900
Watering & Maintenance: \$900

FY 2016 Budget

Removal: \$2,000 for newly damaged trees.
Planting: \$600
Routine trimming: \$1,700 (for unexpected damage).
Watering & Maintenance: \$800

Purposed Budget Increase

EAB could potentially kill all ash trees in Sutherland within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to \$14,500 a year. If the budget were increased to \$10,000 flat a year all ash could be removed within 9 years. Additionally, it is recommended that Sutherland 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.

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, D.J. and J.F. 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

Sutherland

Annual Energy Benefits of Public Trees

1/13/2015

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Ash	40.9	3,101	6,001.3	5,881	8,982	(N/A)	50.2	56.8	59.88
Silver maple	13.4	1,016	1,783.2	1,748	2,764	(N/A)	14.7	17.5	62.81
Maple	5.1	385	695.6	682	1,067	(N/A)	8.7	6.7	41.03
Spruce	0.5	40	75.6	74	114	(N/A)	4.0	0.7	9.52
Sugar maple	2.8	210	364.9	358	567	(N/A)	3.3	3.6	56.72
Black walnut	2.0	153	275.8	270	423	(N/A)	2.7	2.7	52.86
American basswood	1.3	97	183.8	180	277	(N/A)	2.3	1.8	39.60
Northern hackberry	1.6	121	232.8	228	349	(N/A)	1.7	2.2	69.84
Amur maple	0.3	23	45.1	44	67	(N/A)	1.3	0.4	16.78
American elm	1.1	84	150.5	147	231	(N/A)	1.0	1.5	76.99
Black cherry	0.2	11	26.3	26	37	(N/A)	1.0	0.2	12.42
Black poplar	1.2	92	166.3	163	255	(N/A)	1.0	1.6	85.02
Apple	0.1	11	25.7	25	36	(N/A)	0.7	0.2	18.19
American sycamore	0.8	58	105.8	104	162	(N/A)	0.7	1.0	80.97
Birch	0.2	16	33.7	33	49	(N/A)	0.7	0.3	24.47
Eastern white pine	0.3	20	29.3	29	48	(N/A)	0.7	0.3	24.14
Red pine	0.2	14	24.1	24	38	(N/A)	0.7	0.2	18.86
Lilac	0.0	1	1.2	1	2	(N/A)	0.7	0.0	0.87
Common chokecherry	0.0	0	0.6	1	1	(N/A)	0.3	0.0	0.87
Northern red oak	0.1	7	14.2	14	21	(N/A)	0.3	0.1	21.11
Conifer Evergreen Small	0.0	1	2.5	2	4	(N/A)	0.3	0.0	3.62
Littleleaf linden	0.2	15	23.9	23	39	(N/A)	0.3	0.2	38.70
Eastern red cedar	0.0	1	2.5	2	4	(N/A)	0.3	0.0	3.62
Cottonwood	0.3	20	38.1	37	57	(N/A)	0.3	0.4	57.32
Mountain ash	0.2	14	24.7	24	38	(N/A)	0.3	0.2	38.13
Dogwood	0.1	6	12.8	13	18	(N/A)	0.3	0.1	18.19
Conifer Evergreen Medium	0.1	10	15.2	15	25	(N/A)	0.3	0.2	24.51
Ginkgo	0.0	0	0.4	0	1	(N/A)	0.3	0.0	0.57
Bur oak	0.3	25	46.9	46	71	(N/A)	0.3	0.4	70.91
Honeylocust	0.4	28	47.4	46	74	(N/A)	0.3	0.5	74.28
Total	73.5	5,579	10,450.2	10,241	15,820	(N/A)	100.0	100.0	52.91

Table 2: Annual Stormwater Benefits

Sutherland

Annual Stormwater Benefits of Public Trees

1/13/2015

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Ash	423,865	11,487	(N/A)	50.2	53.8	76.58
Silver maple	175,404	4,753	(N/A)	14.7	22.3	108.03
Maple	42,878	1,162	(N/A)	8.7	5.4	44.69
Spruce	5,861	159	(N/A)	4.0	0.7	13.24
Sugar maple	29,162	790	(N/A)	3.3	3.7	79.03
Black walnut	19,197	520	(N/A)	2.7	2.4	65.03
American basswood	12,506	339	(N/A)	2.3	1.6	48.42
Northern hackberry	15,272	414	(N/A)	1.7	1.9	82.78
Amur maple	1,068	29	(N/A)	1.3	0.1	7.24
American elm	10,110	274	(N/A)	1.0	1.3	91.32
Black cherry	536	15	(N/A)	1.0	0.1	4.85
Black poplar	18,220	494	(N/A)	1.0	2.3	164.59
Apple	529	14	(N/A)	0.7	0.1	7.17
American sycamore	11,182	303	(N/A)	0.7	1.4	151.51
Birch	1,172	32	(N/A)	0.7	0.1	15.88
Eastern white pine	3,077	83	(N/A)	0.7	0.4	41.70
Red pine	2,134	58	(N/A)	0.7	0.3	28.92
Lilac	15	0	(N/A)	0.7	0.0	0.20
Common chokecherry	7	0	(N/A)	0.3	0.0	0.20
Northern red oak	529	14	(N/A)	0.3	0.1	14.33
Conifer Evergreen Small	183	5	(N/A)	0.3	0.0	4.97
Littleleaf linden	1,260	34	(N/A)	0.3	0.2	34.14
Eastern red cedar	183	5	(N/A)	0.3	0.0	4.97
Cottonwood	2,591	70	(N/A)	0.3	0.3	70.21
Mountain ash	667	18	(N/A)	0.3	0.1	18.06
Dogwood	264	7	(N/A)	0.3	0.0	7.17
Conifer Evergreen Medium	1,544	42	(N/A)	0.3	0.2	41.85
Ginkgo	7	0	(N/A)	0.3	0.0	0.19
Bur oak	3,943	107	(N/A)	0.3	0.5	106.85
Honeylocust	4,685	127	(N/A)	0.3	0.6	126.96
Citywide total	788,051	21,356	(N/A)	100.0	100.0	71.43

Table 3: Annual Air Quality Benefits

Sutherland

Annual Air Quality Benefits of Public Trees

1/13/2015

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (m ³)	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							
Ash	91.3	15.8	44.3	4.0	492	199.0	28.7	27.3	185.3	1,230	-21.0	-79	574.7	1,643 (N/A)	50.2	10.96
Silver maple	27.6	4.7	13.9	1.2	150	63.3	9.3	8.8	60.6	396	-14.5	-55	174.8	491 (N/A)	14.7	11.15
Maple	10.1	1.7	4.7	0.4	54	24.2	3.5	3.4	23.0	151	-3.4	-13	67.7	192 (N/A)	8.7	7.38
Spruce	0.5	0.1	0.5	0.1	4	2.5	0.4	0.4	2.4	16	-1.9	-7	5.0	12 (N/A)	4.0	1.04
Sugar maple	3.8	0.6	1.9	0.2	21	13.1	1.9	1.8	12.5	82	-3.0	-11	32.8	91 (N/A)	3.3	9.10
Black walnut	2.0	0.3	1.0	0.1	11	9.6	1.4	1.3	9.1	60	0.0	0	24.9	71 (N/A)	2.7	8.85
American basswood	1.6	0.3	0.8	0.1	9	6.2	0.9	0.9	5.8	38	-1.4	-5	15.1	42 (N/A)	2.3	5.97
Northern hackberry	2.3	0.4	1.2	0.1	13	7.8	1.1	1.1	7.2	48	0.0	0	21.2	61 (N/A)	1.7	12.13
Amur maple	0.3	0.0	0.1	0.0	1	1.5	0.2	0.2	1.4	9	0.0	0	3.7	11 (N/A)	1.3	2.63
American elm	2.0	0.3	1.0	0.1	11	5.3	0.8	0.7	5.0	33	0.0	0	15.1	43 (N/A)	1.0	14.48
Black cherry	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)	1.0	1.73
Black poplar	2.7	0.4	1.2	0.1	14	5.8	0.8	0.8	5.5	36	0.0	0	17.5	50 (N/A)	1.0	16.82
Apple	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
American sycamore	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)	0.7	15.76
Birch	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)	0.7	3.47
Eastern white pine	0.3	0.1	0.3	0.0	2	1.2	0.2	0.2	1.2	7	-1.1	-4	2.3	6 (N/A)	0.7	2.82
Red pine	0.2	0.0	0.2	0.0	2	0.9	0.1	0.1	0.8	5	-0.7	-3	1.7	4 (N/A)	0.7	2.15
Lilac	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)	0.7	0.11
Common chokecherry	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.3	0.11
Northern red oak	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	-0.1	0	1.1	3 (N/A)	0.3	2.89
Conifer Evergreen Small	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	-0.1	0	0.1	0 (N/A)	0.3	0.20
Littleleaf linden	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6 (N/A)	0.3	6.42
Eastern red cedar	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	-0.1	0	0.1	0 (N/A)	0.3	0.20
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)	0.3	9.34
Mountain ash	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)	0.3	6.56
Dogwood	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.3	2.55
Conifer Evergreen Medium	0.2	0.0	0.2	0.0	1	0.6	0.1	0.1	0.6	4	-0.6	-2	1.2	3 (N/A)	0.3	2.89
Ginkgo	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.3	0.07
Bur oak	0.5	0.1	0.2	0.0	3	1.6	0.2	0.2	1.5	10	0.0	0	4.4	12 (N/A)	0.3	12.48
Honeylocust	0.9	0.2	0.4	0.0	5	1.7	0.3	0.2	1.7	11	-0.8	-3	4.7	13 (N/A)	0.3	12.87
Citywide total	149.2	25.5	73.3	6.7	805	354.5	51.4	48.9	333.2	2,200	-48.7	-183	994.0	2,823 (N/A)	100.0	9.44

Table 4: Annual Carbon Stored

Sutherland

Stored CO2 Benefits of Public Trees

1/13/2015

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Ash	1,505,496	11,291	(N/A)	50.2	55.3	75.27
Silver maple	587,675	4,408	(N/A)	14.7	21.6	100.17
Maple	110,473	829	(N/A)	8.7	4.1	31.87
Spruce	3,271	25	(N/A)	4.0	0.1	2.04
Sugar maple	108,370	813	(N/A)	3.3	4.0	81.28
Black walnut	65,297	490	(N/A)	2.7	2.4	61.22
American basswood	59,709	448	(N/A)	2.3	2.2	63.97
Northern hackberry	34,170	256	(N/A)	1.7	1.3	51.25
Amur maple	4,301	32	(N/A)	1.3	0.2	8.06
American elm	42,839	321	(N/A)	1.0	1.6	107.10
Black cherry	1,830	14	(N/A)	1.0	0.1	4.57
Black poplar	91,145	684	(N/A)	1.0	3.3	227.86
Apple	1,816	14	(N/A)	0.7	0.1	6.81
American sycamore	55,031	413	(N/A)	0.7	2.0	206.37
Birch	2,201	17	(N/A)	0.7	0.1	8.26
Eastern white pine	2,340	18	(N/A)	0.7	0.1	8.78
Red pine	1,427	11	(N/A)	0.7	0.1	5.35
Lilac	28	0	(N/A)	0.7	0.0	0.10
Common chokecherry	14	0	(N/A)	0.3	0.0	0.10
Northern red oak	1,025	8	(N/A)	0.3	0.0	7.68
Conifer Evergreen Sn	43	0	(N/A)	0.3	0.0	0.32
Littleleaf linden	3,595	27	(N/A)	0.3	0.1	26.96
Eastern red cedar	43	0	(N/A)	0.3	0.0	0.32
Cottonwood	8,458	63	(N/A)	0.3	0.3	63.43
Mountain ash	3,037	23	(N/A)	0.3	0.1	22.78
Dogwood	908	7	(N/A)	0.3	0.0	6.81
Conifer Evergreen M	1,118	8	(N/A)	0.3	0.0	8.39
Ginkgo	5	0	(N/A)	0.3	0.0	0.03
Bur oak	15,773	118	(N/A)	0.3	0.6	118.30
Honeylocust	12,245	92	(N/A)	0.3	0.4	91.84
Citywide total	2,723,680	20,428	(N/A)	100.0	100.0	68.32

Table 5: Annual Carbon Sequestered

Sutherland

Annual CO₂ Benefits of Public Trees

1/13/2015

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
Ash	49,761	373	-7,228	-447	-3	0	0	42,086	316 (N/A)	50.2	33.7	2.10
Silver maple	49,693	373	-2,821	-141	-1	0	0	46,731	350 (N/A)	14.7	37.4	7.97
Maple	10,631	80	-530	-48	0	0	0	10,053	75 (N/A)	8.7	8.0	2.90
Spruce	472	4	-16	-10	0	0	0	446	3 (N/A)	4.0	0.4	0.28
Sugar maple	5,889	44	-520	-29	0	0	0	5,340	40 (N/A)	3.3	4.3	4.00
Black walnut	4,792	36	-313	-20	0	0	0	4,459	33 (N/A)	2.7	3.6	4.18
American basswood	3,694	28	-287	-15	0	0	0	3,393	25 (N/A)	2.3	2.7	3.63
Northern hackberry	2,047	15	-164	-15	0	0	0	1,868	14 (N/A)	1.7	1.5	2.80
Amur maple	457	3	-21	-4	0	0	0	432	3 (N/A)	1.3	0.3	0.81
American elm	1,339	10	-206	-11	0	0	0	1,123	8 (N/A)	1.0	0.9	2.81
Black cherry	236	2	-9	-3	0	0	0	225	2 (N/A)	1.0	0.2	0.56
Black poplar	2,831	21	-437	-14	0	0	0	2,380	18 (N/A)	1.0	1.9	5.95
Apple	228	2	-9	-2	0	0	0	217	2 (N/A)	0.7	0.2	0.81
American sycamore	1,769	13	-264	-9	0	0	0	1,496	11 (N/A)	0.7	1.2	5.61
Birch	448	3	-11	-2	0	0	0	435	3 (N/A)	0.7	0.3	1.63
Eastern white pine	231	2	-11	-4	0	0	0	216	2 (N/A)	0.7	0.2	0.81
Red pine	168	1	-7	-3	0	0	0	158	1 (N/A)	0.7	0.1	0.59
Lilac	17	0	0	0	0	0	0	17	0 (N/A)	0.7	0.0	0.06
Common chokecherry	9	0	0	0	0	0	0	8	0 (N/A)	0.3	0.0	0.06
Northern red oak	147	1	-5	-1	0	0	0	141	1 (N/A)	0.3	0.1	1.06
Conifer Evergreen Small	13	0	0	-1	0	0	0	13	0 (N/A)	0.3	0.0	0.09
Littleleaf linden	514	4	-17	-2	0	0	0	495	4 (N/A)	0.3	0.4	3.71
Eastern red cedar	13	0	0	-1	0	0	0	13	0 (N/A)	0.3	0.0	0.09
Cottonwood	660	5	-41	-3	0	0	0	616	5 (N/A)	0.3	0.5	4.62
Mountain ash	268	2	-15	-2	0	0	0	251	2 (N/A)	0.3	0.2	1.88
Dogwood	114	1	-4	-1	0	0	0	108	1 (N/A)	0.3	0.1	0.81
Conifer Evergreen Medium	91	1	-5	-2	0	0	0	83	1 (N/A)	0.3	0.1	0.63
Ginkgo	2	0	0	0	0	0	0	2	0 (N/A)	0.3	0.0	0.01
Bur oak	857	6	-76	-4	0	0	0	778	6 (N/A)	0.3	0.6	5.83
Honeylocust	1,486	11	-59	-3	0	0	0	1,424	11 (N/A)	0.3	1.1	10.68
Citywide total	138,879	1,042	-13,075	-797	-6	0	0	125,007	938 (N/A)	100.0	100.0	3.14

Table 6: Annual Social and Aesthetic Benefits

Sutherland

Annual Aesthetic/Other Benefits of Public Trees

1/13/2015

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Ash	4,566	(N/A)	50.2	34.7	30.44
Silver maple	4,112	(N/A)	14.7	31.2	93.45
Maple	1,374	(N/A)	8.7	10.4	52.85
Spruce	156	(N/A)	4.0	1.2	12.96
Sugar maple	622	(N/A)	3.3	4.7	62.19
Black walnut	425	(N/A)	2.7	3.2	53.06
American basswood	271	(N/A)	2.3	2.1	38.73
Northern hackberry	276	(N/A)	1.7	2.1	55.26
Amur maple	26	(N/A)	1.3	0.2	6.50
American elm	184	(N/A)	1.0	1.4	61.44
Black cherry	13	(N/A)	1.0	0.1	4.28
Black poplar	192	(N/A)	1.0	1.5	63.85
Apple	13	(N/A)	0.7	0.1	6.40
American sycamore	124	(N/A)	0.7	0.9	61.96
Birch	52	(N/A)	0.7	0.4	26.22
Eastern white pine	65	(N/A)	0.7	0.5	32.32
Red pine	48	(N/A)	0.7	0.4	23.87
Lilac	0	(N/A)	0.7	0.0	0.03
Common chokecherry	0	(N/A)	0.3	0.0	0.03
Northern red oak	16	(N/A)	0.3	0.1	16.24
Conifer Evergreen Small	13	(N/A)	0.3	0.1	13.37
Littleleaf linden	55	(N/A)	0.3	0.4	55.09
Eastern red cedar	13	(N/A)	0.3	0.1	13.37
Cottonwood	58	(N/A)	0.3	0.4	57.69
Mountain ash	15	(N/A)	0.3	0.1	15.48
Dogwood	6	(N/A)	0.3	0.0	6.40
Conifer Evergreen Medium	25	(N/A)	0.3	0.2	25.23
Ginkgo	0	(N/A)	0.3	0.0	0.37
Bur oak	66	(N/A)	0.3	0.5	65.59
Honeylocust	389	(N/A)	0.3	3.0	388.90
Citywide total	13,176	(N/A)	100.0	100.0	44.07

Table 7: Summary of Benefits in Dollars

Sutherland

Total Annual Benefits of Public Trees by Species (\$)

1/13/2015

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Ash	8,982	316	1,643	11,487	4,566	26,994	(N/A)	49.9
Silver maple	2,764	350	491	4,753	4,112	12,470	(N/A)	23.0
Maple	1,067	75	192	1,162	1,374	3,870	(N/A)	7.2
Spruce	114	3	12	159	156	444	(N/A)	0.8
Sugar maple	567	40	91	790	622	2,110	(N/A)	3.9
Black walnut	423	33	71	520	425	1,472	(N/A)	2.7
American basswood	277	25	42	339	271	954	(N/A)	1.8
Northern hackberry	349	14	61	414	276	1,114	(N/A)	2.1
Amur maple	67	3	11	29	26	136	(N/A)	0.3
American elm	231	8	43	274	184	741	(N/A)	1.4
Black cherry	37	2	5	15	13	72	(N/A)	0.1
Black poplar	255	18	50	494	192	1,009	(N/A)	1.9
Apple	36	2	5	14	13	70	(N/A)	0.1
American sycamore	162	11	32	303	124	632	(N/A)	1.2
Birch	49	3	7	32	52	143	(N/A)	0.3
Eastern white pine	48	2	6	83	65	204	(N/A)	0.4
Red pine	38	1	4	58	48	149	(N/A)	0.3
Lilac	2	0	0	0	0	3	(N/A)	0.0
Common chokecherry	1	0	0	0	0	1	(N/A)	0.0
Northern red oak	21	1	3	14	16	56	(N/A)	0.1
Conifer Evergreen Small	4	0	0	5	13	22	(N/A)	0.0
Littleleaf linden	39	4	6	34	55	138	(N/A)	0.3
Eastern red cedar	4	0	0	5	13	22	(N/A)	0.0
Cottonwood	57	5	9	70	58	199	(N/A)	0.4
Mountain ash	38	2	7	18	15	80	(N/A)	0.1
Dogwood	18	1	3	7	6	35	(N/A)	0.1
Conifer Evergreen Medi	25	1	3	42	25	95	(N/A)	0.2
Ginkgo	1	0	0	0	0	1	(N/A)	0.0
Bur oak	71	6	12	107	66	262	(N/A)	0.5
Honeylocust	74	11	13	127	389	614	(N/A)	1.1
Citywide Total	15,820	938	2,823	21,356	13,176	54,112	(N/A)	100.0

Table 8: Priority Task Summary for Public Trees

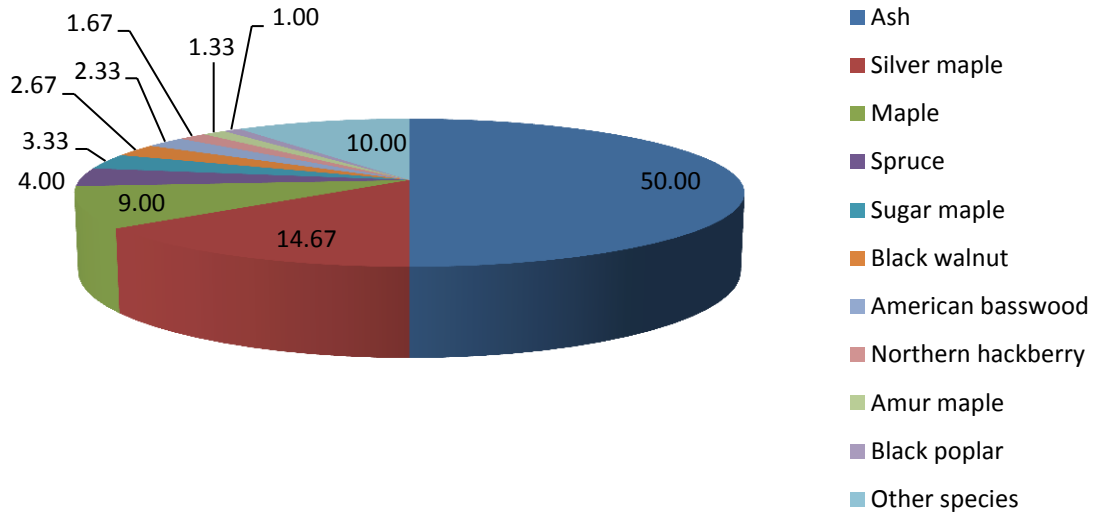
Sutherland											
Priority Task Summary for Public Trees											
DBH Class (DBH means trunk diameter at chest/breast height)											
Maintenance Type	0 to 3 inches	3 to 6 inches	6 to 12 inches	12 to 18 inches	18 to 24 inches	24 to 30 inches	30 to 36 inches	36 to 42 inches	<42 inches	ToTal number	% of Total Population
No work	9	14	39	32	56	57	22	8	0	237	79
Stake & Train	0	0	0	0	0	0	0	0	0	0	0
Clean Crown	0	0	5	6	8	20	9	1	0	49	16.33
Raise Crown	0	0	0	0	0	0	0	0	0	0	0
Reduce Crown	0	0	0	0	0	0	0	0	0	0	0
Remove Tree	0	0	0	0	7	6	1	0	0	14	4.67
Treat Pests	0	0	0	0	0	0	0	0	0	0	0
City wide Total	9	14	44	38	71	83	32	9	0	300	100

Table 9: Recommended Maintenance for Public Trees

Sutherland											
Recommended Maintenance for Public Trees											
DBH Class (DBH means trunk diameter at chest/breast height)											
Maintenance Type	0 to 3 inches	3 to 6 inches	6 to 12 inches	12 to 18 inches	18 to 24 inches	24 to 30 inches	30 to 36 inches	36 to 42 inches	<42 inches	Total number	% of Total Population
No work	2	0	0	0	0	0	0	0	0	2	0.67
Young Tree (routine)	5	2	0	0	0	0	0	0	0	7	2.33
Young Tree (immediate)	0	0	0	0	0	0	0	0	0	0	0
Mature Tree (routine)	2	12	43	38	67	78	29	8	0	277	92.33
Mature Tree (immediate)	0	0	1	0	3	4	3	1	0	12	4
Critical Concern (Public Safety)	0	0	0	0	1	1	0	0	0	2	0.67
City wide Total	9	14	44	38	71	83	32	9	0	300	100

Appendix A, Figures

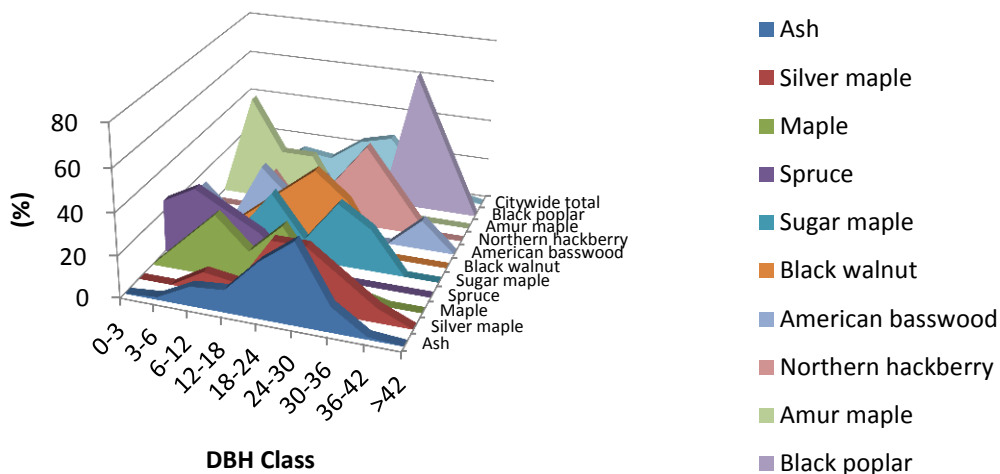
Figure 1: Species Distribution



Sutherland	
Species Distribution of Public Trees (%)	
1/13/2015	
Species	Percent
Ash	50.00
Silver maple	14.67
Maple	9.00
Spruce	4.00
Sugar maple	3.33
Black walnut	2.67
American basswood	2.33
Northern hackberry	1.67
Amur maple	1.33
Black poplar	1.00
Other species	10.00
Total	100.00

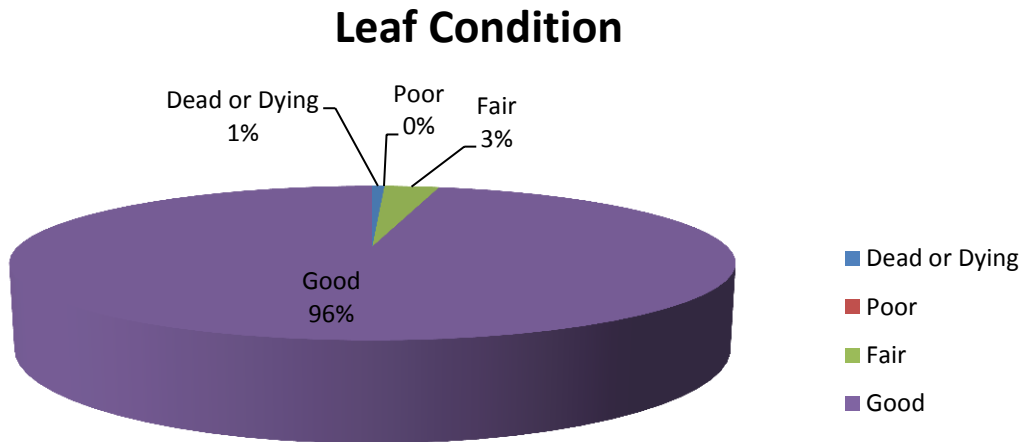
Figure 2: Relative Age Class

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



Sutherland									
Relative Age Distribution of Top 10 Public Tree Species (%)									
1/13/2015									
	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
Ash	0.00	1.33	9.33	10.67	26.67	38.67	12.00	1.33	0.00
Silver maple	0.00	0.00	9.09	6.82	29.55	29.55	18.18	6.82	0.00
Maple	0.00	14.81	29.63	14.81	29.63	7.41	3.70	0.00	0.00
Spruce	25.00	33.33	25.00	16.67	0.00	0.00	0.00	0.00	0.00
Sugar maple	0.00	0.00	10.00	30.00	10.00	30.00	20.00	0.00	0.00
Black walnut	0.00	0.00	12.50	25.00	37.50	25.00	0.00	0.00	0.00
American basswood	14.29	0.00	28.57	14.29	28.57	0.00	0.00	14.29	0.00
Northern hackberry	0.00	0.00	20.00	0.00	20.00	40.00	20.00	0.00	0.00
Amur maple	0.00	50.00	25.00	25.00	0.00	0.00	0.00	0.00	0.00
Black poplar	0.00	0.00	0.00	0.00	0.00	0.00	66.67	33.33	0.00
Citywide total	3.00	4.67	14.67	12.67	23.67	27.67	10.67	3.00	0.00

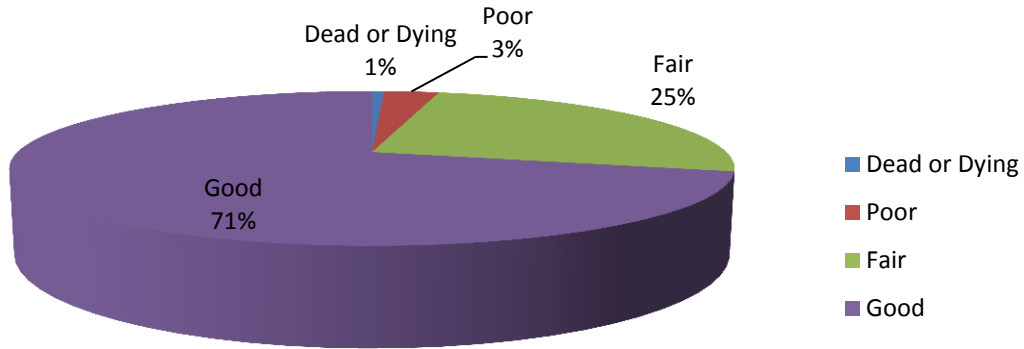
Figure 3: Foliage Condition



Sutherland				
Condition (Foliage) of Public Trees by Species (%)				
1/13/2015				
Species Name	Dead or Dying	Poor	Fair	Good
Ash	1.33	0.00	4.00	94.67
Silver maple	0.00	0.00	0.00	100.00
Maple	0.00	0.00	3.70	96.30
Spruce	0.00	0.00	0.00	100.00
Sugar maple	0.00	0.00	0.00	100.00
Black walnut	0.00	0.00	0.00	100.00
American basswood	0.00	0.00	0.00	100.00
Northern hackberry	0.00	0.00	0.00	100.00
Amur maple	0.00	0.00	0.00	100.00
Black poplar	0.00	0.00	0.00	100.00
Black cherry	0.00	0.00	0.00	100.00
American elm	0.00	0.00	66.67	33.33
Citywide total	0.67	0.00	3.00	96.33

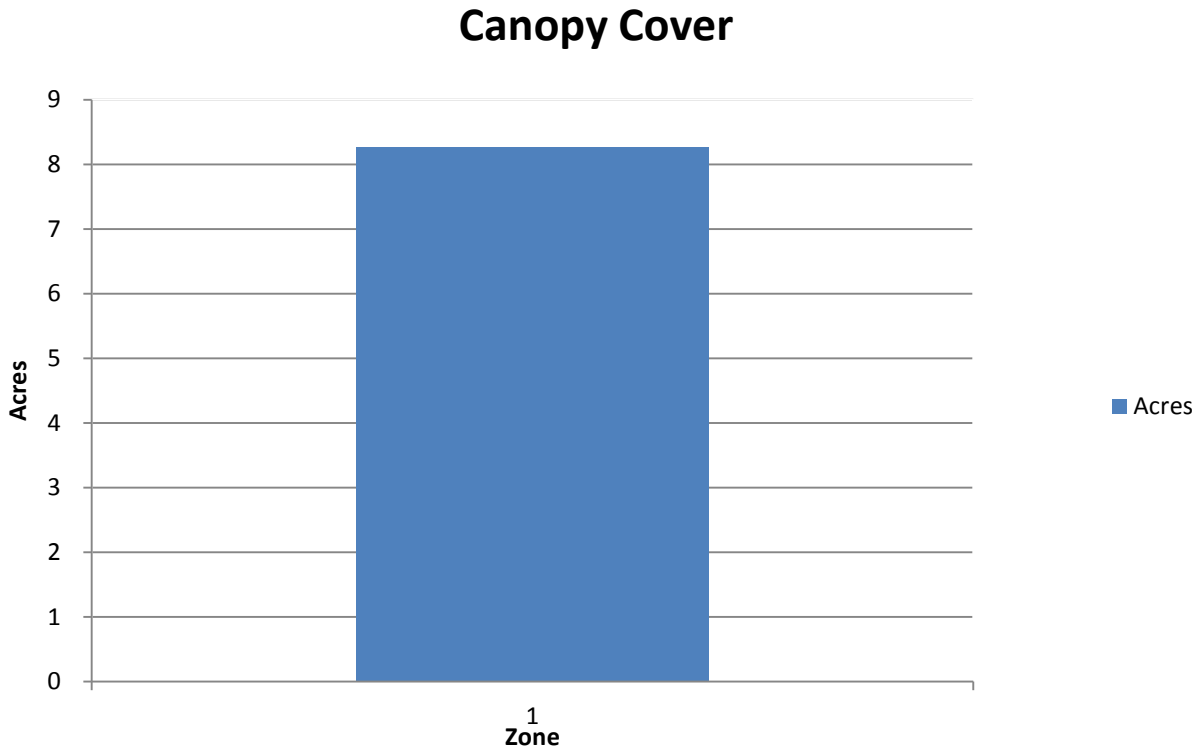
Figure 4: Wood Condition

Wood Condition



Sutherland				
Condition (Woody) of Public Trees by Species (%)				
1/13/2015				
Species Name	Dead or Dying	Poor	Fair	Good
Ash	1.33	3.33	29.33	66.00
Silver maple	0.00	2.27	13.64	84.09
Maple	0.00	3.70	29.63	66.67
Spruce	0.00	0.00	0.00	100.00
Sugar maple	0.00	0.00	60.00	40.00
Black walnut	0.00	12.50	12.50	75.00
American basswood	0.00	14.29	0.00	85.71
Northern hackberry	0.00	0.00	80.00	20.00
Amur maple	0.00	0.00	50.00	50.00
Black poplar	0.00	0.00	100.00	0.00
Black cherry	0.00	0.00	0.00	100.00
American elm	0.00	0.00	33.33	66.67
Citywide total	0.67	3.00	25.33	71.00

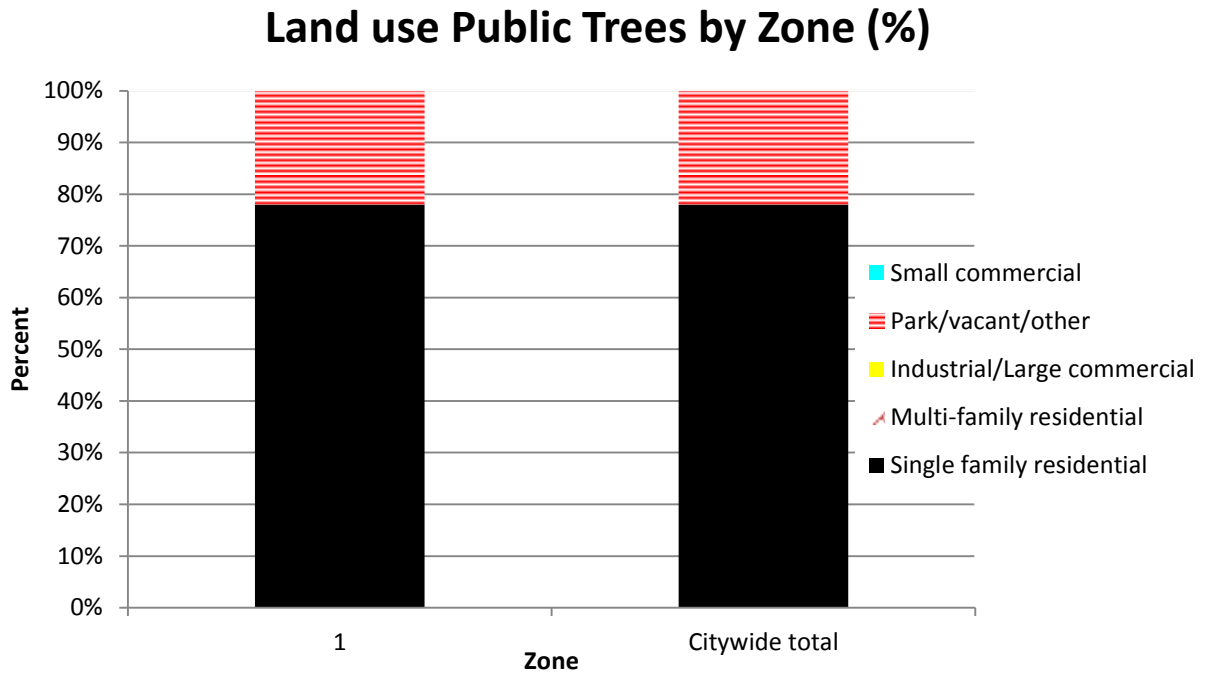
Figure 5: Canopy Cover in Acres



Sutherland
Canopy Cover of Public Trees (Acres)
1/13/2015

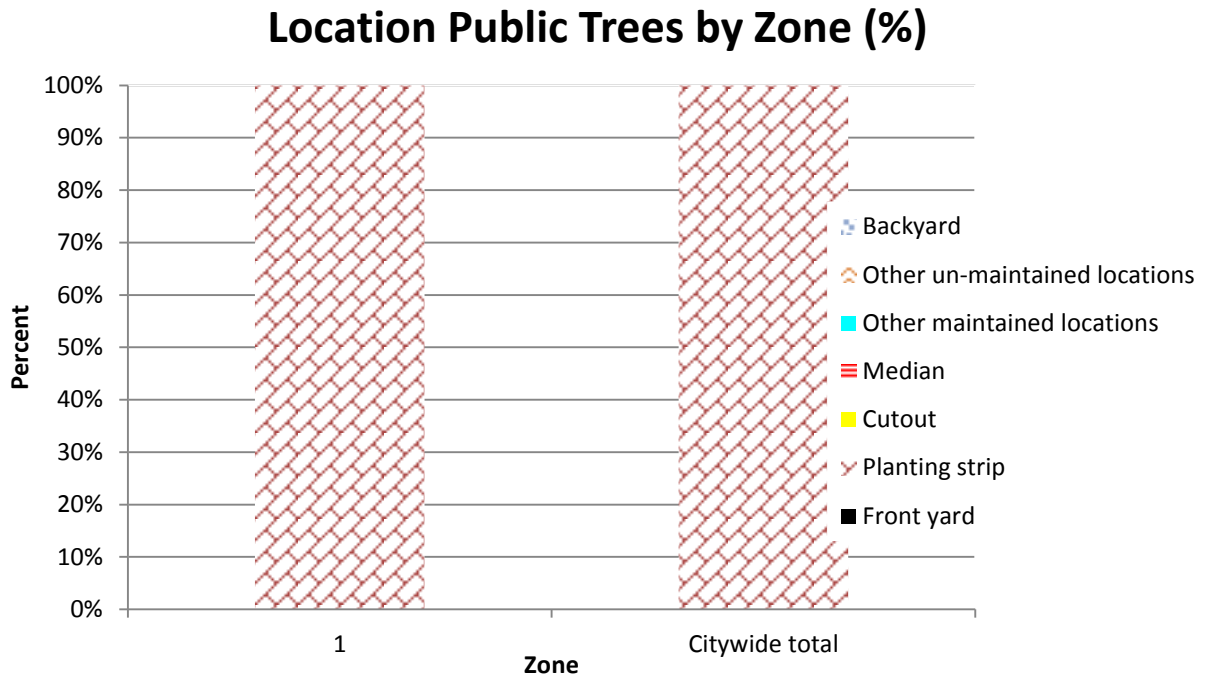
	Total Land Area	Total Canopy Cover	Canopy Cover as % of Total Land Area
Citywide total	557.71	8.27	1.40

Figure 6: Land Use of city/park trees



Sutherland					
Land use Public Trees by Zone (%)					
1/13/2015					
Zone	Single family residential	Multi-family residential	Industrial/Large commercial	Park/vacant /other	Small commercial
1	78.00	0.00	0.00	22.00	0.00
Citywide total	78.00	0.00	0.00	22.00	0.00

Figure 7: Location of city/park trees



Sutherland							
Location Public Trees by Zone (%)							
1/13/2015							
Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	0.00	100.00	0.00	0.00	0.00	0.00	0.00
Citywide total	0.00	100.00	0.00	0.00	0.00	0.00	0.00

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

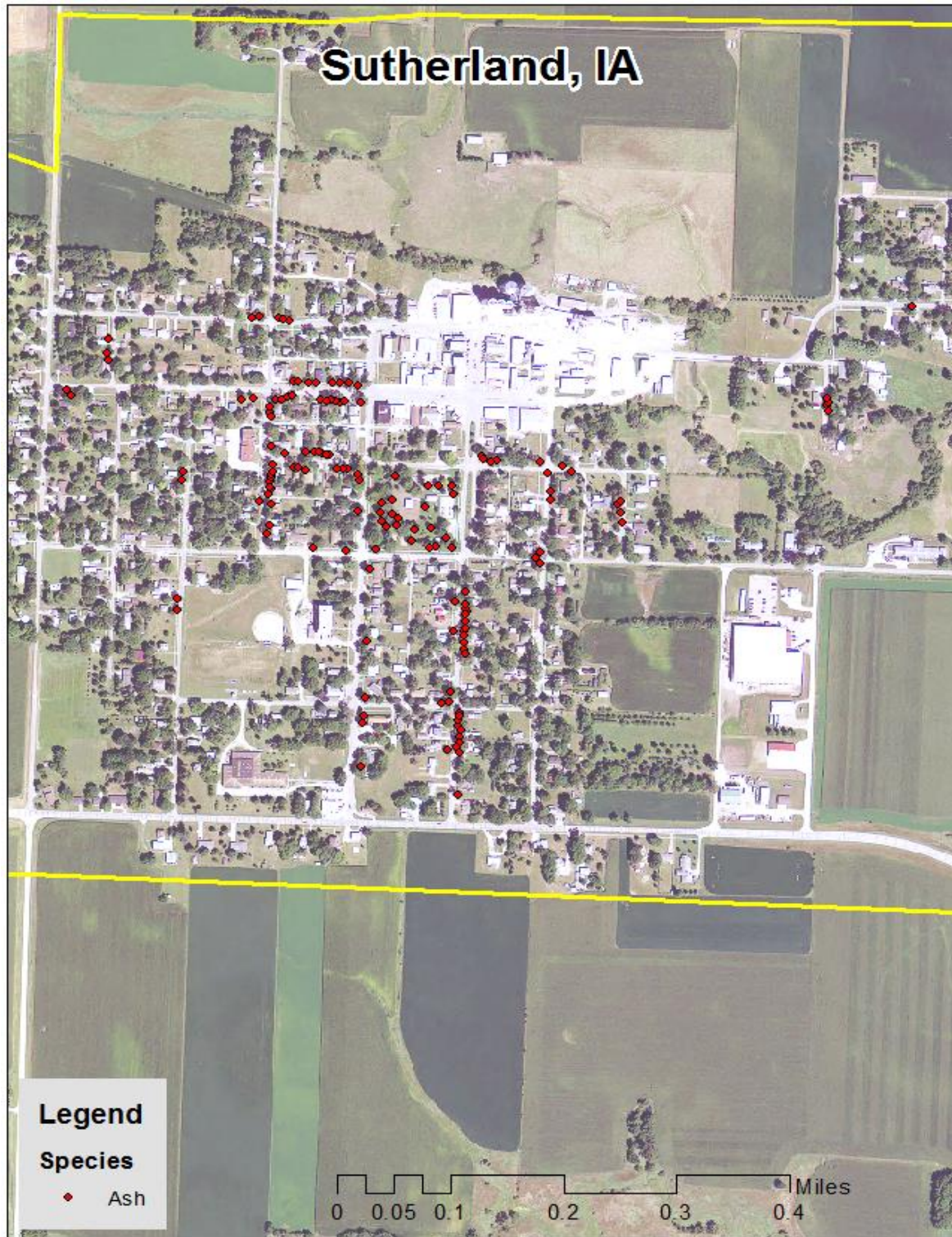


Figure 2: Location of EAB symptoms

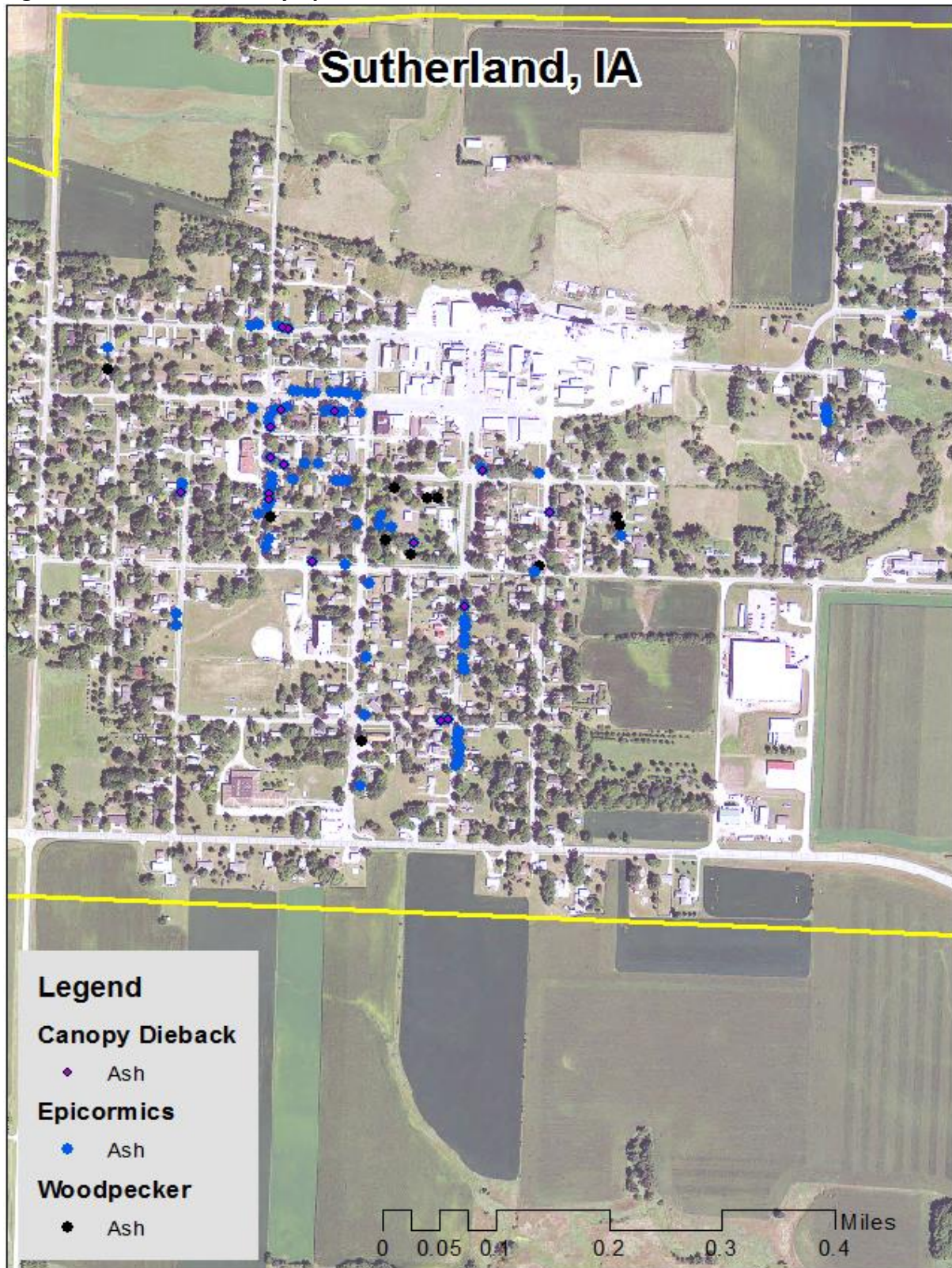


Figure 3: Location of Poor Condition Trees

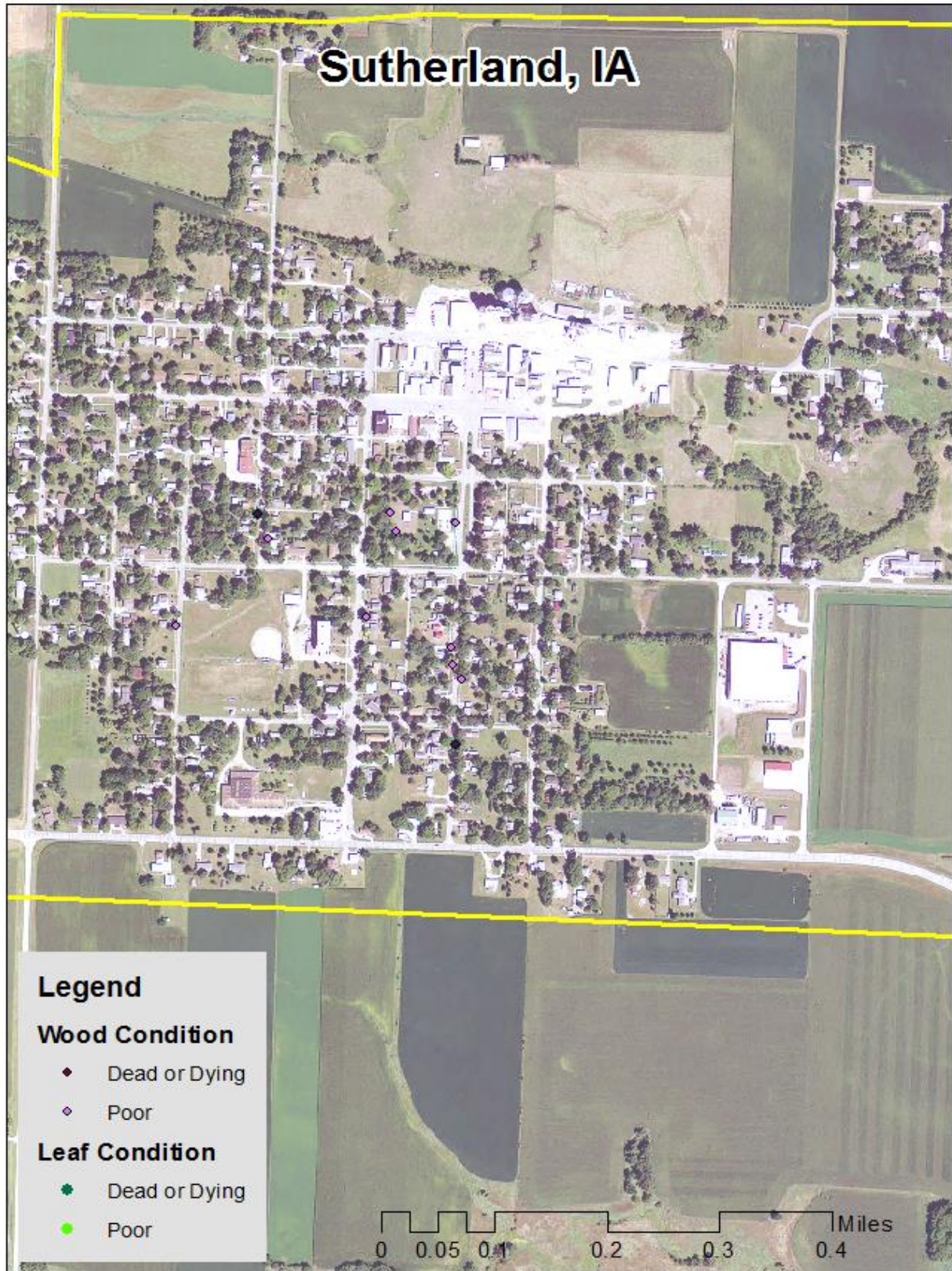


Figure 4: Location of Trees with Recommended Maintenance

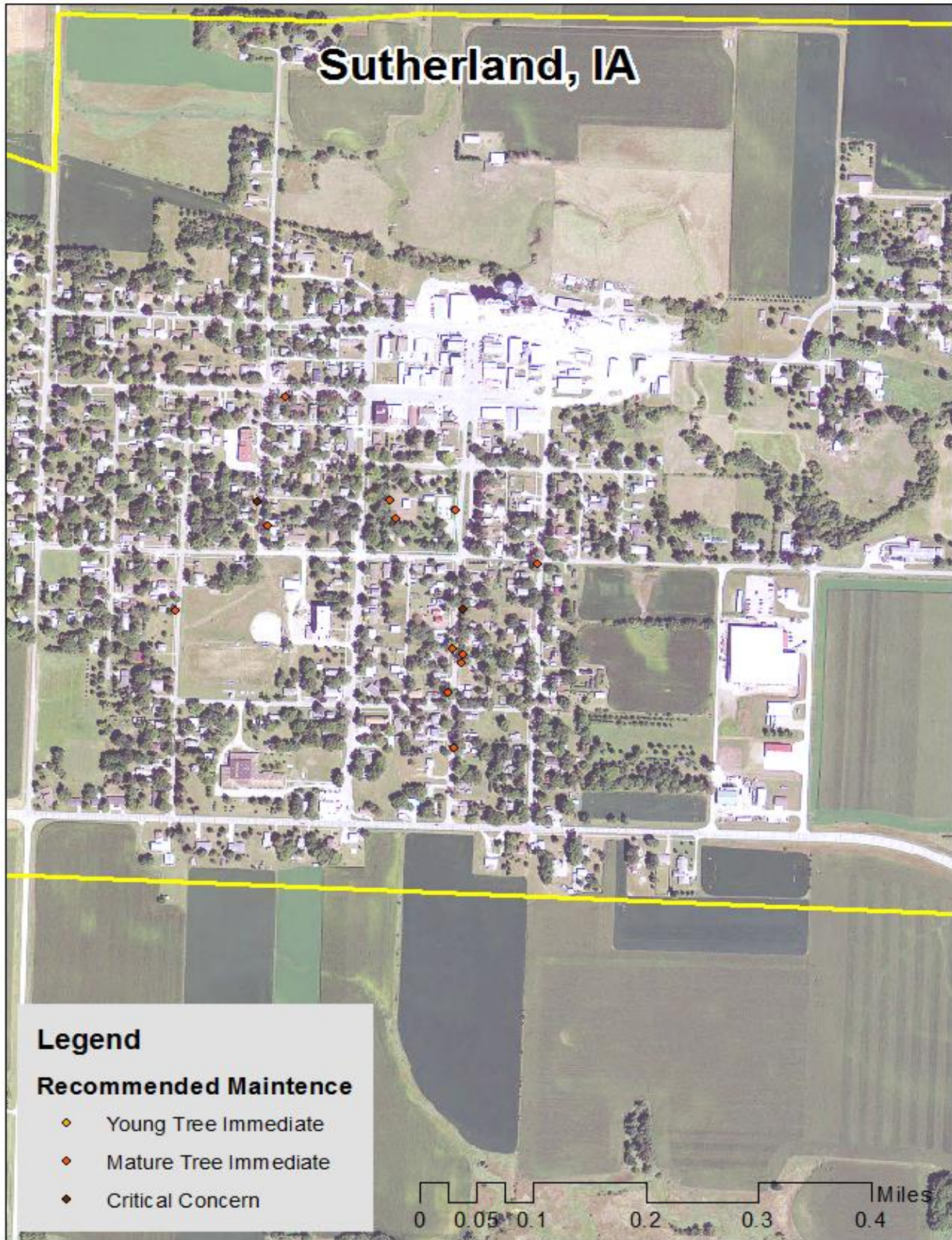
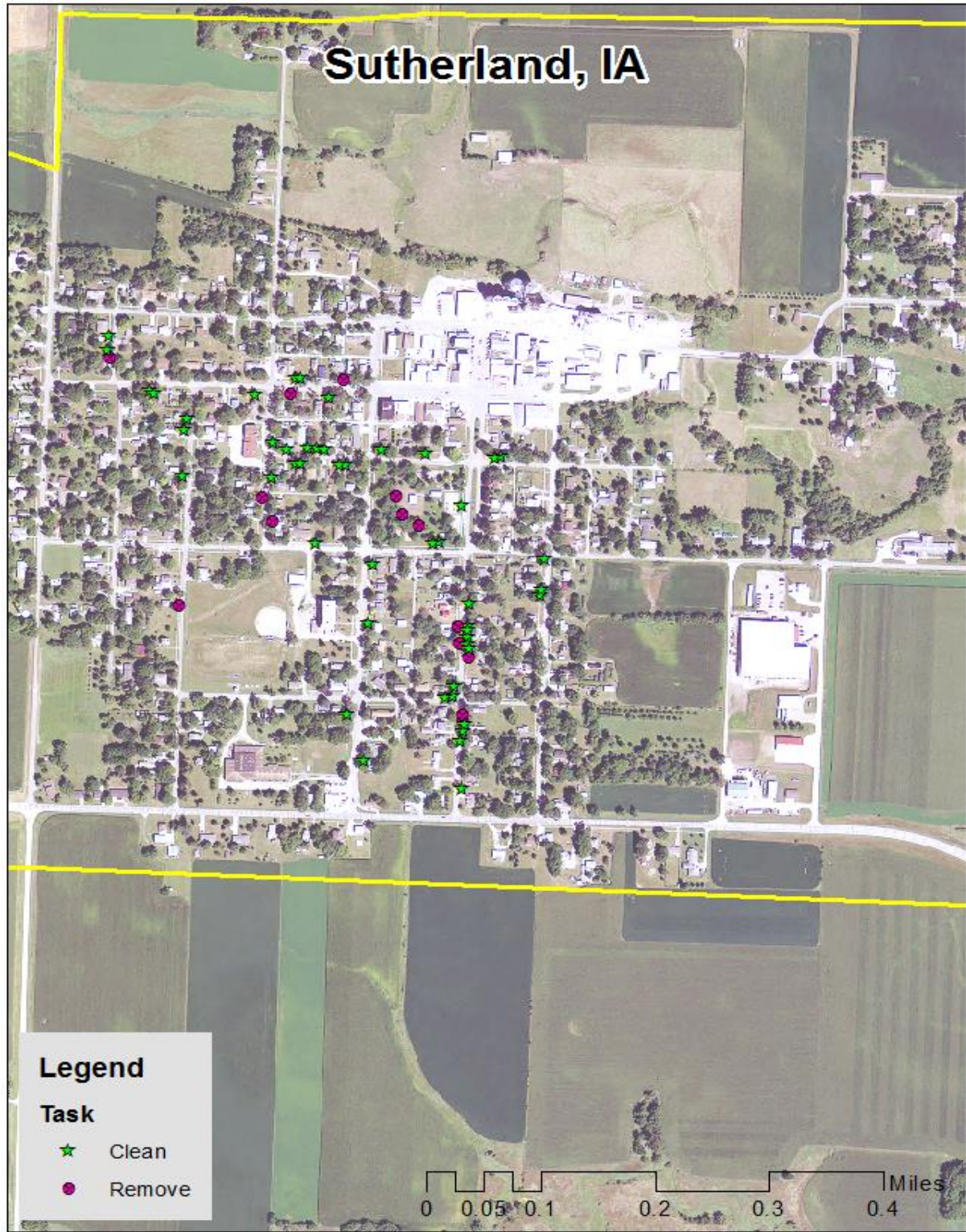


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*



Appendix C: Sutherland Tree Ordinances

CHAPTER 151 TREES AND GRASS

151.01 Definition

151.02 Planting Restrictions

151.03 Duty to Trim Trees

151.04 Trimming Trees to be Supervised

151.05 Disease Control

151.06 Inspection and Removal

151.07 Cutting or Mowing of Grass

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 trees 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.

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 515-725-8282.