Lone Tree, IA

2011 Community Street & Park Tree Management Plan

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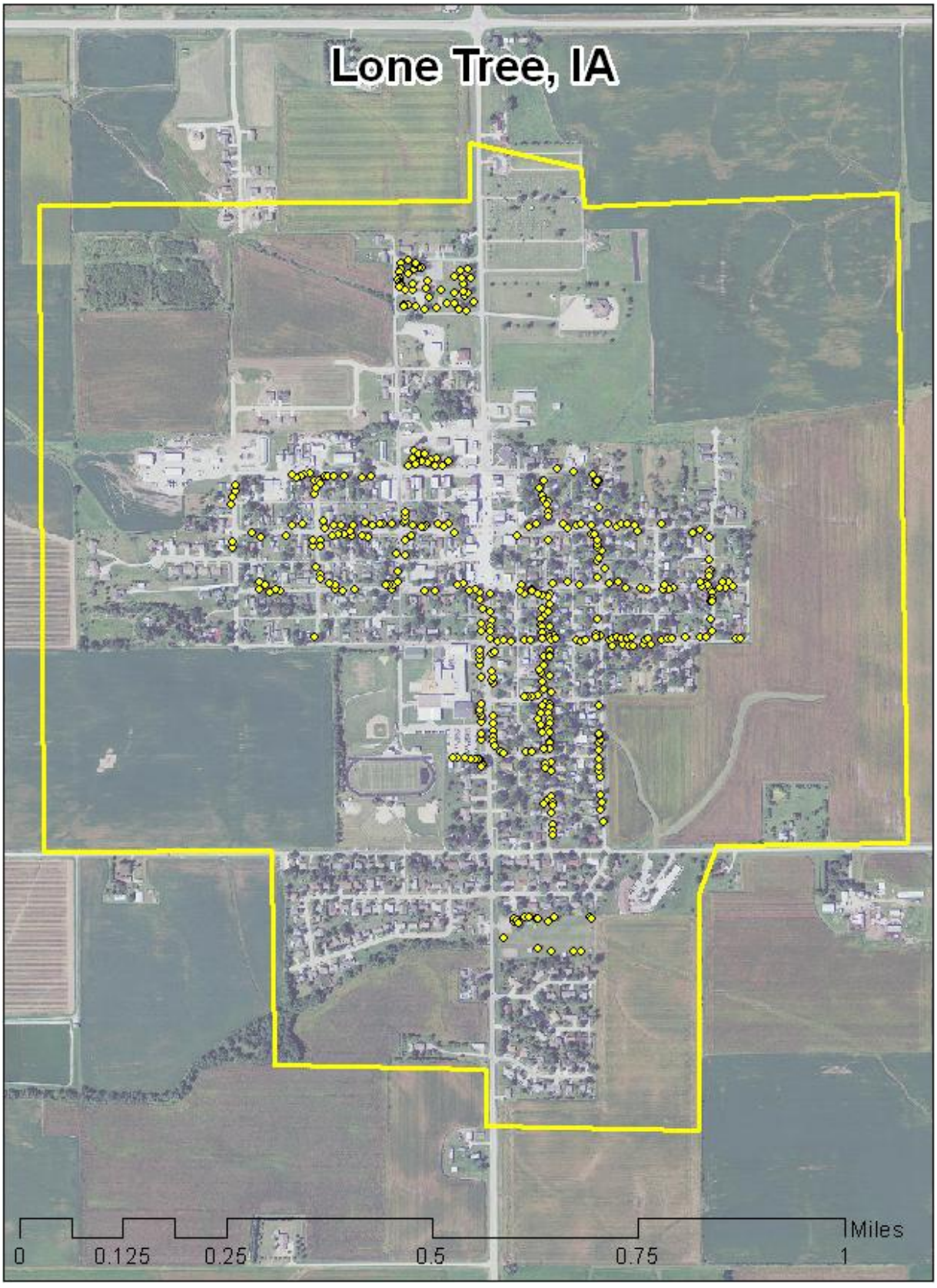
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Executive Summary

Overview

This plan was developed to assist the City of Lone Tree 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) and gypsy moth. 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). **This pest was found in northeast Iowa in the spring of 2010, but has not been found in your area yet.** There is a strong possibility that ~10 % of Lone Tree's city owned trees (ash-43) will die once EAB becomes established in the community. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues. Another concern is that 44% of Lone Tree's city owned trees are some type of (maple-186), so if any type of insect or disease starts to threaten the health of maples in the community this could have a significant impact on the community tree population. Basically, 54% (229) of Lone Tree's city owned trees are either maple or ash.

Inventory and Results

In the fall of 2010 a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees in the community. Below are some key findings of the 418 trees inventoried.

- Lone Tree's trees provide $63,560 of benefits annually, an average of $152 a tree
- There are ~41 species of trees
- The top four genus are: Maple 44%, Oak 11%, Ash 10%, & Crabapple 8%
- 57% of trees are in need of some type of management, the majority of the management is pruning such as raising above streets and sidewalks for safety or cleaning out dead material
- 23 trees are recommended for removal consideration, and 14 of these are considered critical and should be evaluated as soon as possible.
- There are 24 trees outlined in a 9/30/2010 letter to the City Clerk from the Iowa DNR District Forester that need to be inspected to see what action (s) is/are needed

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.

- There are 23 trees to be considered for removal, and only one of these is ash. *City ownership of the trees recommended for removal should always be verified prior to any removal*
- Only 6 of the 43 ash trees are in need of follow up because they are displaying signs and symptoms associated with EAB.

- Attempt to prune all park trees on a routine schedule, and when new trees are planted use good pruning techniques to develop quality trees in the first 5 to 15 years after planting. There are a significant number of park trees that have been damaged by mowing equipment, so take steps to eliminate this type of damage.
- Tree planting is no longer allowed in the public right-a-way along the community streets, so consider some new plantings in the parks. Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, boxelder, Chinese elm, willow, black walnut, or evergreen species as street trees. Evergreen species such as Norway spruce, Serbian spruce, white spruce, Eastern white pine, Eastern redcedar, concolor fir, or arborvitae can be considered for park plantings.
- Check ash trees with a visual survey yearly
- EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Lone Tree. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 43 ash in the community would be between $25,800 and $43,000.

Introduction

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

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

Inventory

In the fall of 2010, 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 of 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 418 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. Lone Tree's trees reduce energy related costs by approximately $16,597 annually (Appendix A, Table 1). These savings are both in Electricity (80 MWh) and in Natural Gas (10,738.6 Therms).

Annual Stormwater Benefits

Lone Tree's trees intercept about 815,293 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $22,096 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 Lone Tree, it is estimated that trees remove 965.6 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $2,675 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Lone Tree, trees sequester about 193,397 lbs of carbon a year with an associated value of $2,354 (Appendix A, Table 5). In addition, the trees store 2,838,876 lbs of carbon, with a yearly benefit of $21,292 (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. Lone Tree receives $19,838 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, Lone Tree's trees provide $63,560 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 418 trees in Lone Tree provide approximately $152 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Lone Tree has 41 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genus is as follows:

Maple	186	44% (Silver, Sugar, Norway, Red, and Hybrid)
Oak	48	11% (Pin, Bur, Red, white, & Swamp White)
Ash	43	10% (Green & White)
Apple (crabapple)	34	8%
Spruce	18	4% (Norway & Blue)
Honeylocust	15	4% Species 3% or less are below

Northern White Cedar (Arborvitae), Linden (American & Little Leaf)
Aspen, Hackberry
Cottonwood, Pine (White & Scotch)
Black Walnut, Eastern Redcedar
Elm, Black Cherry
Tulip Poplar, Sycamore
Plum, Pear
Willow, Hickory

Size Class

Forty percent of Lone Tree's public trees are 12 inches and under in diameter at 4.5 ft (Appendix A, Figure 2). Approximately 23.7% of the trees are between 12 and 18 inches in diameter, and 36% of the trees are 18 inches or greater.

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 Lone Tree indicate that 91% of the trees are in good health, 7% fair, and 2% are considered dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 56% of Lone Tree's trees are in good health for wood condition, 35% fair, 7% poor, and 2% considered dead and dying (Appendix A, Figure 4 & Appendix B, Figure 3).

Management Needs

- In (Appendix B, Figure 4) the specific management needs of the inventoried trees are identified. Management practices needed include crown cleaning, crown raising, crown reduction, and some potential removal. Fifty-seven percent of the inventoried trees are in need of some type of management, the majority of the management is pruning such as raising above streets and sidewalks for safety or cleaning out dead material. There are 23 trees on the map listed for possible removal that should be evaluated as soon as possible to decide if they need to be removed and when. *City ownership of the trees recommended for removal should be verified prior to any removal*

Land Use and Location

The majority of Lone Tree's city trees are along the streets of the community in single family residential neighborhoods (80%). The majority of these street trees are planted in planting strips. The majority of the remaining trees (~18%) are in the parks (Appendix A, Figure 5 & Figure 6).

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 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

Lone Tree has 23 trees that need to be considered for removal as soon as possible. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 5). There are also 24 trees outlined in a 9/30/2010 letter to the City Clerk from the Iowa DNR District Forester that need to be inspected to see what action (s) is/are needed. Below is the list of those 24 trees that need to be looked at:

- Large sugar maple just south of swing in Railroad Park with significant dead material in top.
- Large silver maple next to light pole and shelter in Railroad Park is tree of concern with trunk decay.
- Norway maple west of shelter in Railroad Park has significant trunk decay and is tree of concern.
- Sugar maple north of slide in Railroad Park has severe top dieback.
- Large hackberry near water tower in Railroad Park is mostly dead and should be removed.
- Large red oak in North Park north of shelter along road has crack between two main stems and could fail and fall toward neighbors.

- Large silver maple south of shelter in North Park with significant trunk decay is tree of concern.
- Large black cherry west of shelter in North Park with trunk decay should be evaluated.
- 105 Jayne Street dead/dying sugar maple needs to be removed.
- 105 Jayne Street very large Siberian elm needs to be inspected. This tree had the majority of the root system on the south side removed/cut when new sidewalk installed. This tree needs closer inspection.
- Across the street from 115 Jayne Street large silver maple with significant top dieback.
- 110 Jayne sugar maple with dead branches over walk.
- 216 Jayne sugar maple with severe trunk decay.
- 411 Jayne large silver maple with heavy decay in tree is tree of concern.
- 106 Jayne very large cottonwood with very large dead/decayed branch near sidewalk needs branch removed and tree needs closer inspection to see if it is safe.
- 308 Jayne Street large silver maple with some significant decay needs closer inspection.
- Just east of 405 Jayne Street large honeylocust with significant trunk decay needs to be considered for removal.
- 501 Devoe Street good size hanging branch over sidewalk in sugar maple.
- Across from 403 Center large sugar maple with hanger over sidewalk.
- 410 elm large silver maple with large dead branches over walk and street and tree is hollow and in bad shape. Portion of tree conflicting with utility wires.
- 300 Elm honeylocust with 4 inch hanging branch over sidewalk.
- 400 elm large green ash with heavy decay at base and dead stub in top. Tree of concern should be inspected.
- 516 Center sugar maple that is hollow and tree of concern.
- 309 Linn dead maple.

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, and when new trees are planted in the parks use good pruning techniques to develop quality trees in the first 5 to 15 years after planting. Please refer to the six year maintenance plan for further information.

Planting

The Lone Tree ordinance does not allow planting in the public right-a-way, so consider planting in some of the parks. If some trees are removed in the next few years consider replacing these trees at a minimum. It is recommended to plant 1 to 2 trees for every tree removed. 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.

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 15 to 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 has 44% maple and for this reason consider not planting maple on public property until this percentage becomes lower. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Species to avoid because they can be public nuisances include: cottonwood, poplar, boxelder, Chinese elm, evergreens as street trees, willow or black walnut.

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 death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage. With many new potential tree health threats on the horizon attempt to monitor the health of all city owned trees on a regular basis.

Six Year Maintenance Plan

Lone Tree does not have a specific budget for tree management activities, so the maintenance plan below provides general guidelines to consider depending on available funds.

Year 1

Removal: 5 to 10 trees (@ estimate $200 to $1,000/tree) with the highest concern that have been identified
Planting and Replacement: 10 to 15 trees (@ $50 to $150/tree) planted in open locations
Visual Survey for signs and symptoms of EAB

Year 2

Removal: 5 to 10 trees (@ estimate $200 to $1,000/tree) with the highest concern that have been identified
Visual Survey for signs and symptoms of EAB

Year 3

Removal: 5 to 10 trees (@ estimate $200 to $1,000/tree) with the highest concern that have been identified
Planting and Replacement: 10 to 15 trees (@ $50 to $150/tree) planted in open locations
Routine trimming: Prune a portion of park trees (@$20 to $200/tree)
Visual Survey for signs and symptoms of EAB

Year 4
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Visual Survey for signs and symptoms of EAB

Year 5
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Planting and Replacement: 10 to 15 trees (@ $50 to $150/tree) planted in open locations
Routine trimming: Prune a portion of park trees (@$20 to $200/tree)
Visual Survey for signs and symptoms of EAB

Year 6
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Visual Survey for signs and symptoms of EAB

EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Lone Tree. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 43 ash in the community would be between $25,800 and $43,000.

Emerald Ash Borer Plan

Ash Tree Removal

There is only one ash tree at this time that needs to be considered for removal. Any tree removal that occurs will be prioritized with hazardous, dead, and dying trees to be removed first. *City ownership of the tree recommended for removal should be verified prior to any removal*

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of over 25 million 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 ash 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 ash trees should be replaced. New plantings will be a diverse mix and will not include ash, maple at this time, cottonwood, poplar, bur oak, box elder, Chinese elm, evergreens along the streets, 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 genus other than ash will be prioritized by hazardous or emergency situations only.

Monitoring

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

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if they are infested with the pest. Current City Code **151.05 DISEASE CONTROL and 151.06 INSPECTION AND REMOVAL** allows the city to require removal of trees declared a nuisance for health reasons.

Budget

EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Lone Tree. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 43 ash in the community would be between $25,800 and $43,000.

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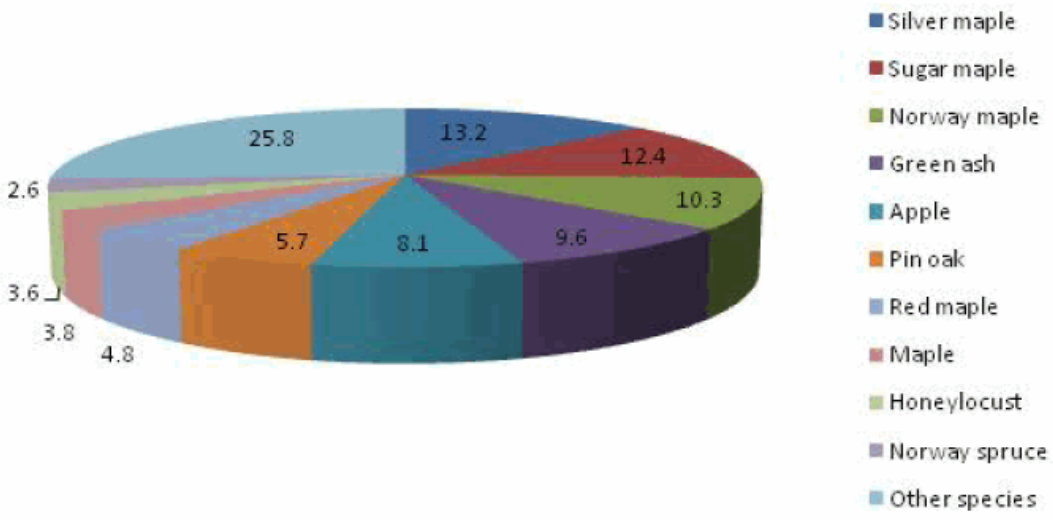
Appendix A: i-Tree Data

Species Distribution of Public Trees (%)

12/6/2010

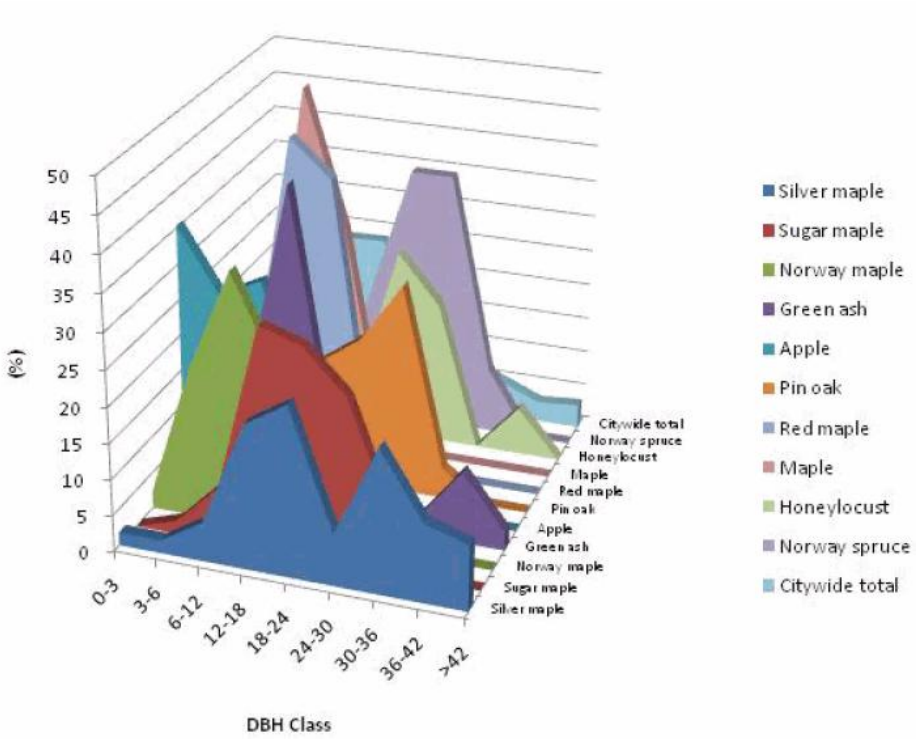


Species	Percent
Silver maple	13.2
Sugar maple	12.4
Norway maple	10.3
Green ash	9.6
Apple	8.1
Pin oak	5.7
Red maple	4.8
Maple	3.8
Honeylocust	3.6
Norway spruce	2.6
Other species	25.8
Total	100.0

Figure 1: Species Distribution

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

12/6/2010



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Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
Silver maple	1.8	1.8	5.5	20.0	23.6	7.3	20.0	10.9	9.1
Sugar maple	0.0	1.9	7.7	30.8	28.8	23.1	7.7	0.0	0.0
Norway maple	2.3	20.9	34.9	23.3	18.6	0.0	0.0	0.0	0.0
Green ash	2.5	7.5	17.5	45.0	10.0	2.5	2.5	10.0	2.5
Apple	35.3	26.5	29.4	8.8	0.0	0.0	0.0	0.0	0.0
Pin oak	8.3	4.2	16.7	16.7	20.8	29.2	4.2	0.0	0.0
Red maple	0.0	10.0	45.0	40.0	0.0	5.0	0.0	0.0	0.0
Maple	6.3	12.5	50.0	31.3	0.0	0.0	0.0	0.0	0.0
Honeylocust	6.7	0.0	33.3	6.7	26.7	20.0	0.0	6.7	0.0
Norway spruce	0.0	0.0	0.0	18.2	36.4	36.4	9.1	0.0	0.0
Citywide total	6.9	10.0	23.4	23.7	15.6	8.9	5.3	2.9	3.3

Figure 2: Relative Age Class

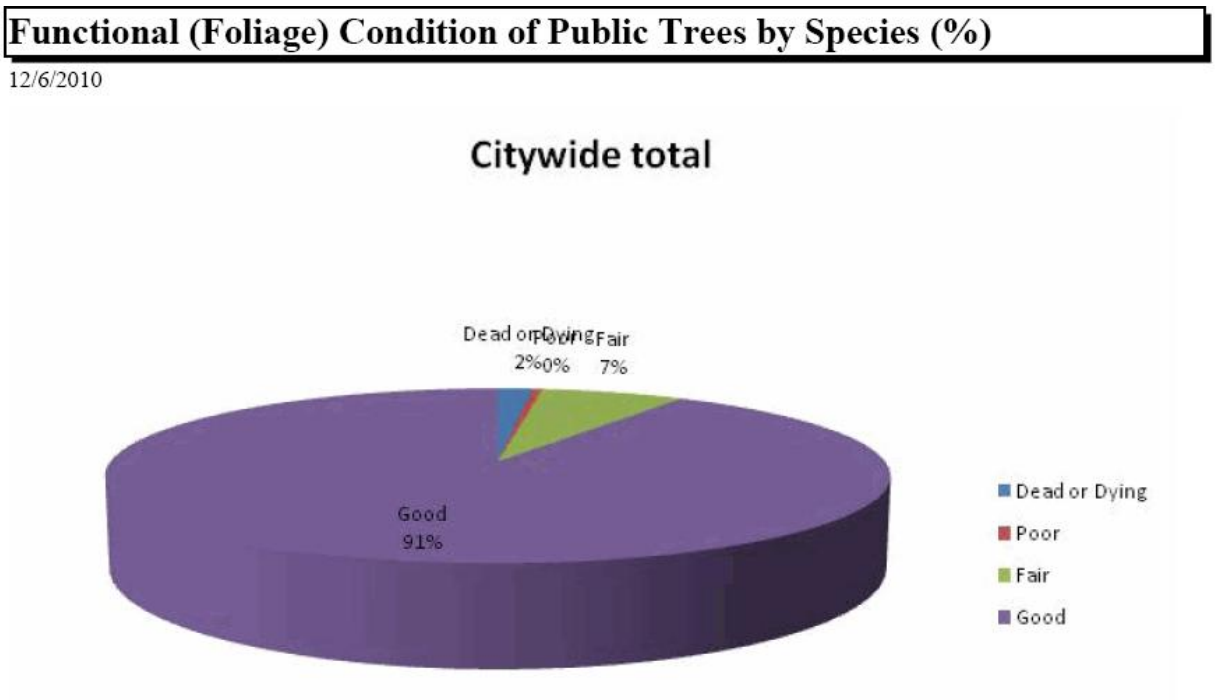


Figure 3: Foliage Condition

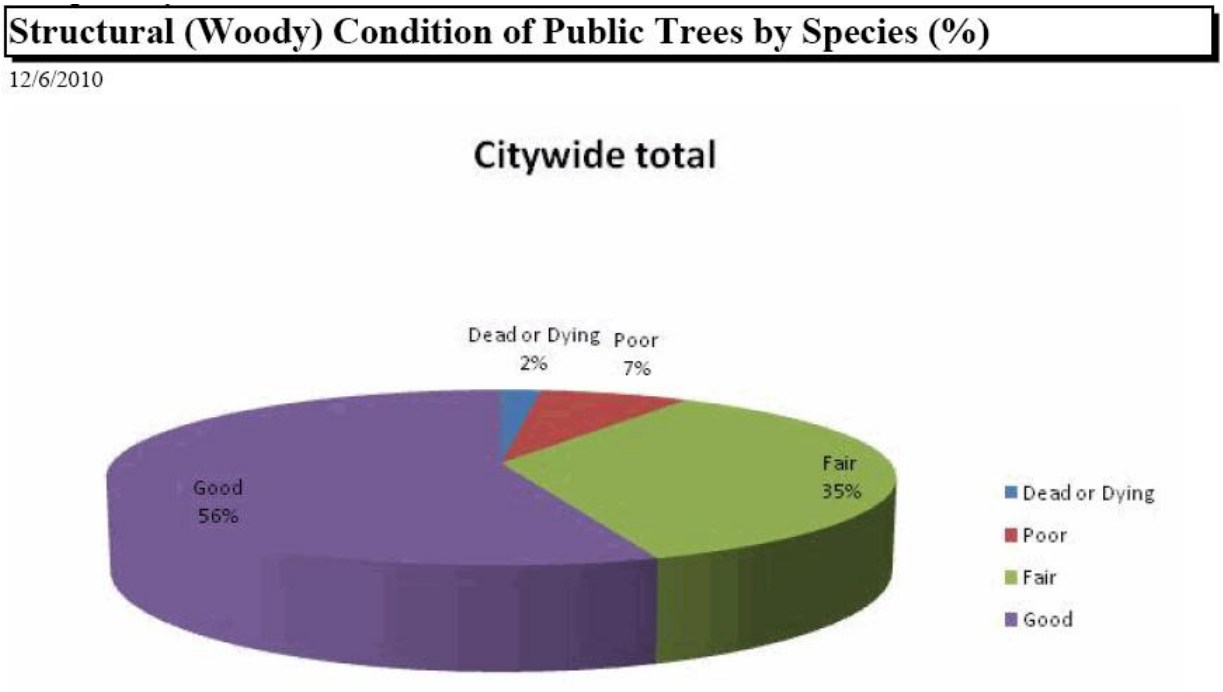
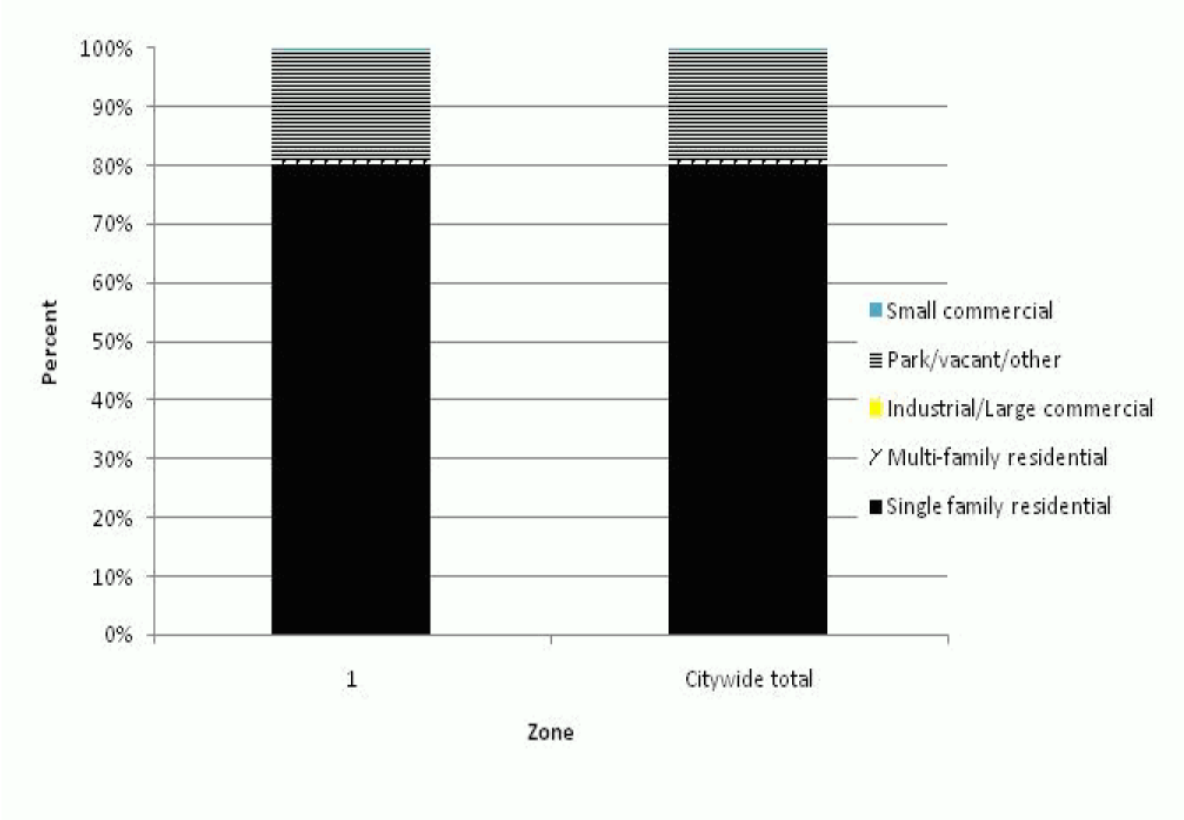


Figure 4: Wood Condition

Land Use of Public Trees by Zone (%)

12/6/2010

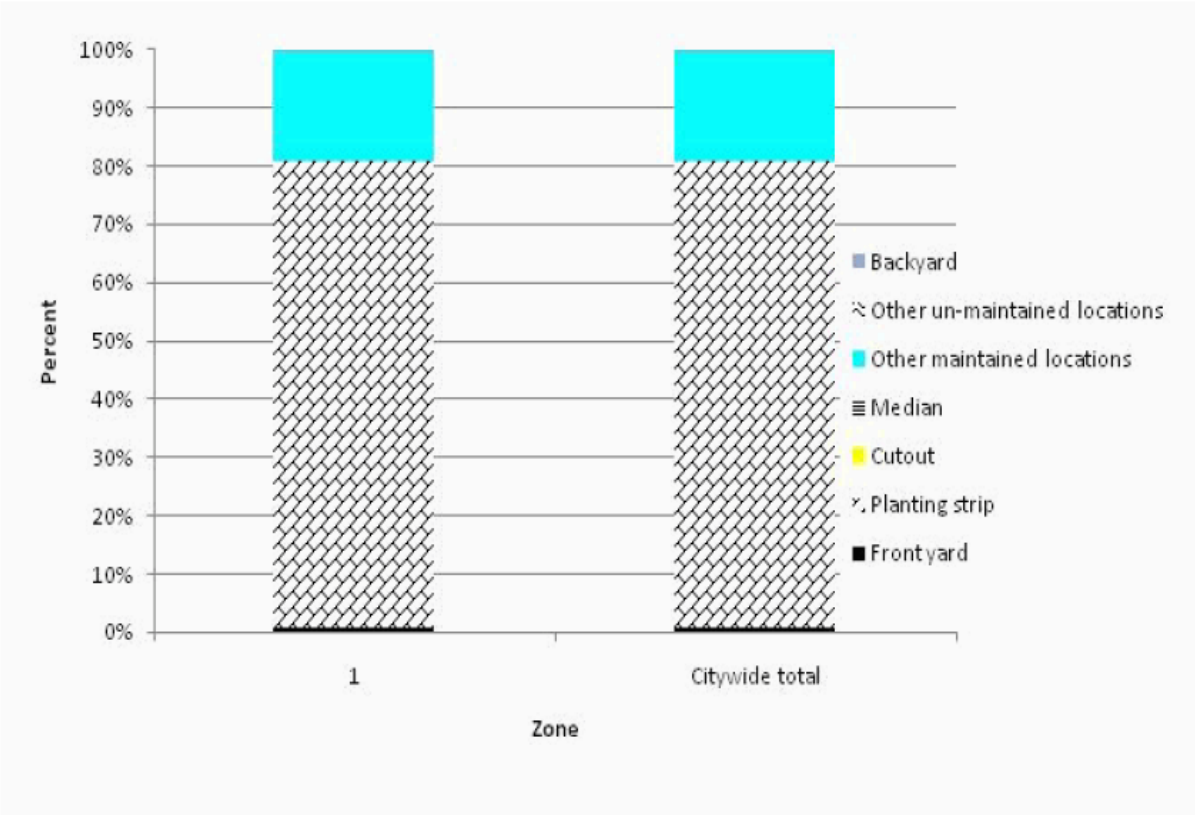


Zone	Single family residential	Multi-family residential	Industrial/ Large commercial	Park/vacant/ other	Small commercial
1	80.4	0.5	0.2	18.4	0.5
Citywide total	80.4	0.5	0.2	18.4	0.5

Figure 5: Land Use of city/park trees

Location of Public Trees by Zone (%)

12/6/2010



Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	1.0	80.1	0.0	0.0	18.4	0.0	0.5
Citywide total	1.0	80.1	0.0	0.0	18.4	0.0	0.5

Figure 6: Location of city/park trees

Appendix B: ArcGIS Mapping

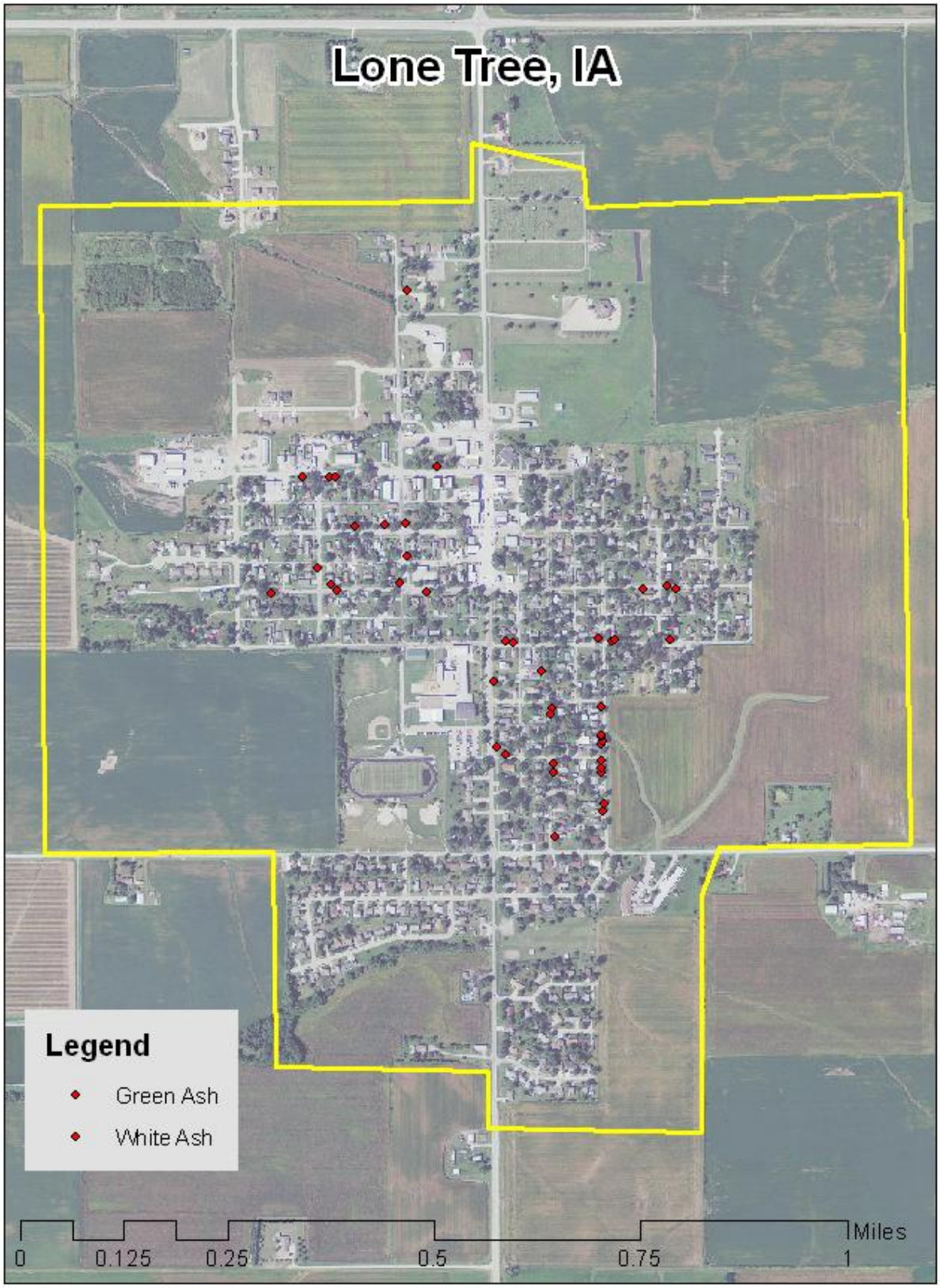


Figure 1: Location of Ash Trees

Figure 2: Location of EAB symptoms

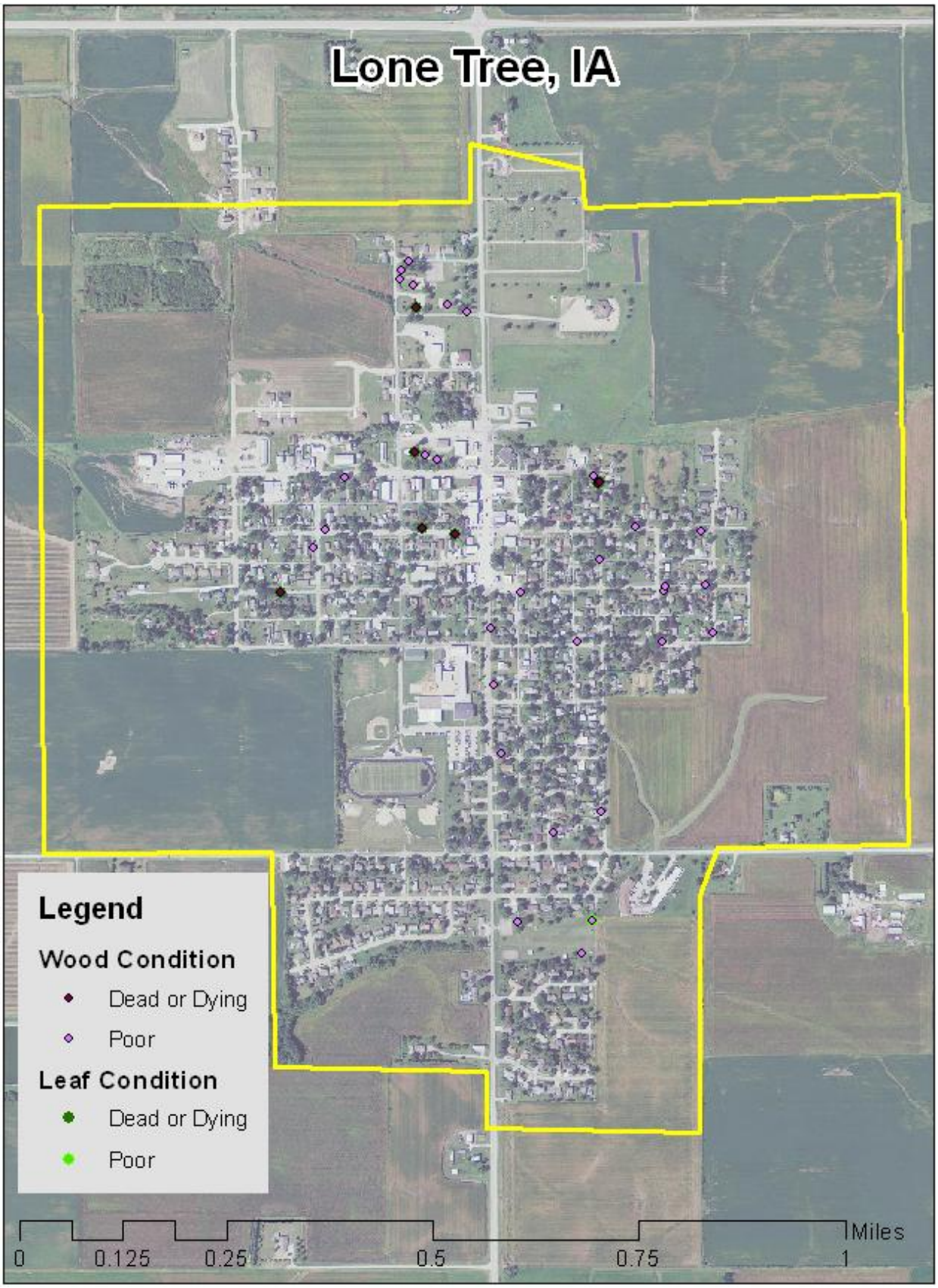


Figure 3: Location of Poor Condition Trees

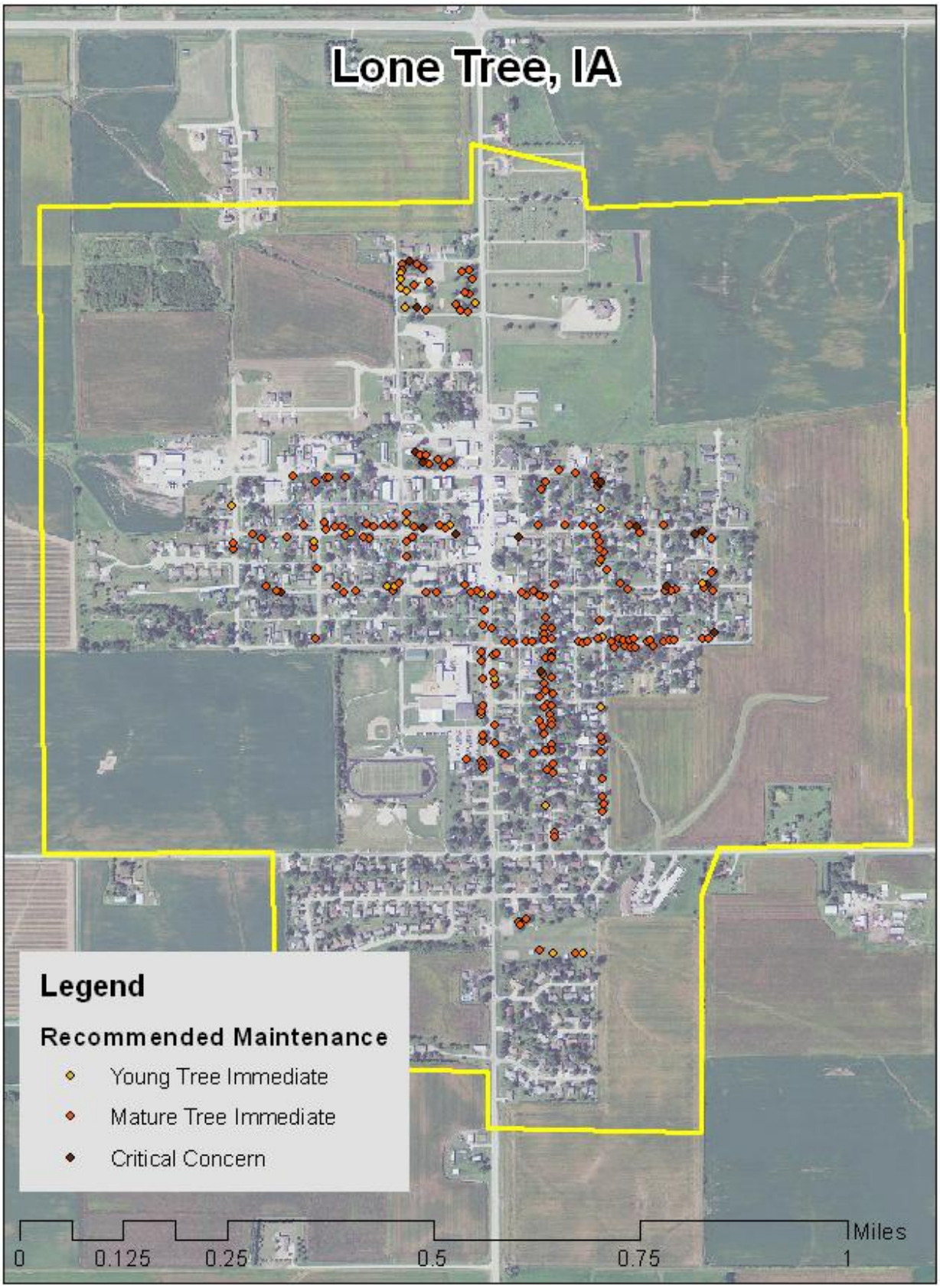


Figure 4: Location of Trees with Recommended Maintenance

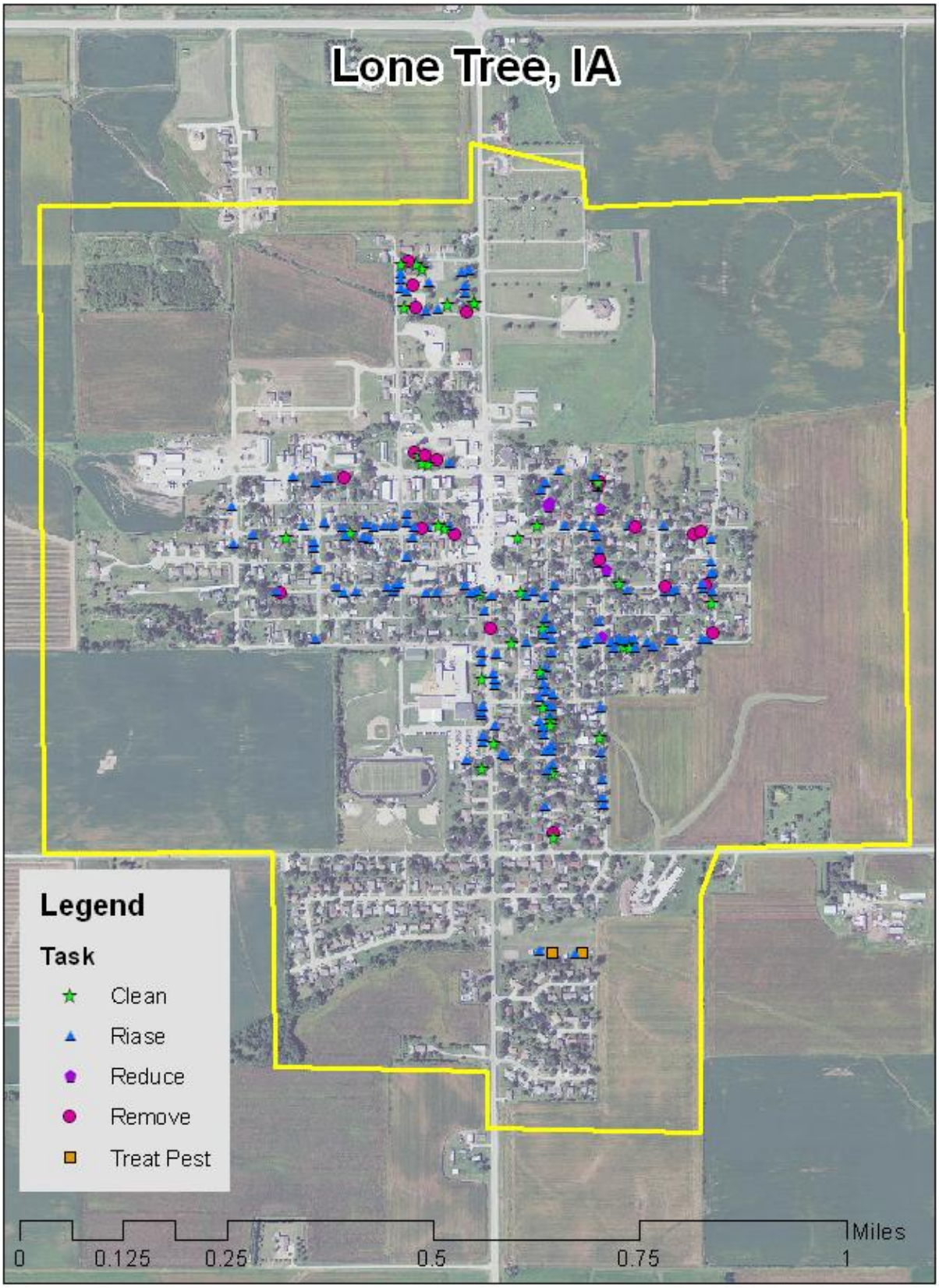


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal

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If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-281-5918.