# Fairbank, IA



Legend
- All Trees
- City Boundary
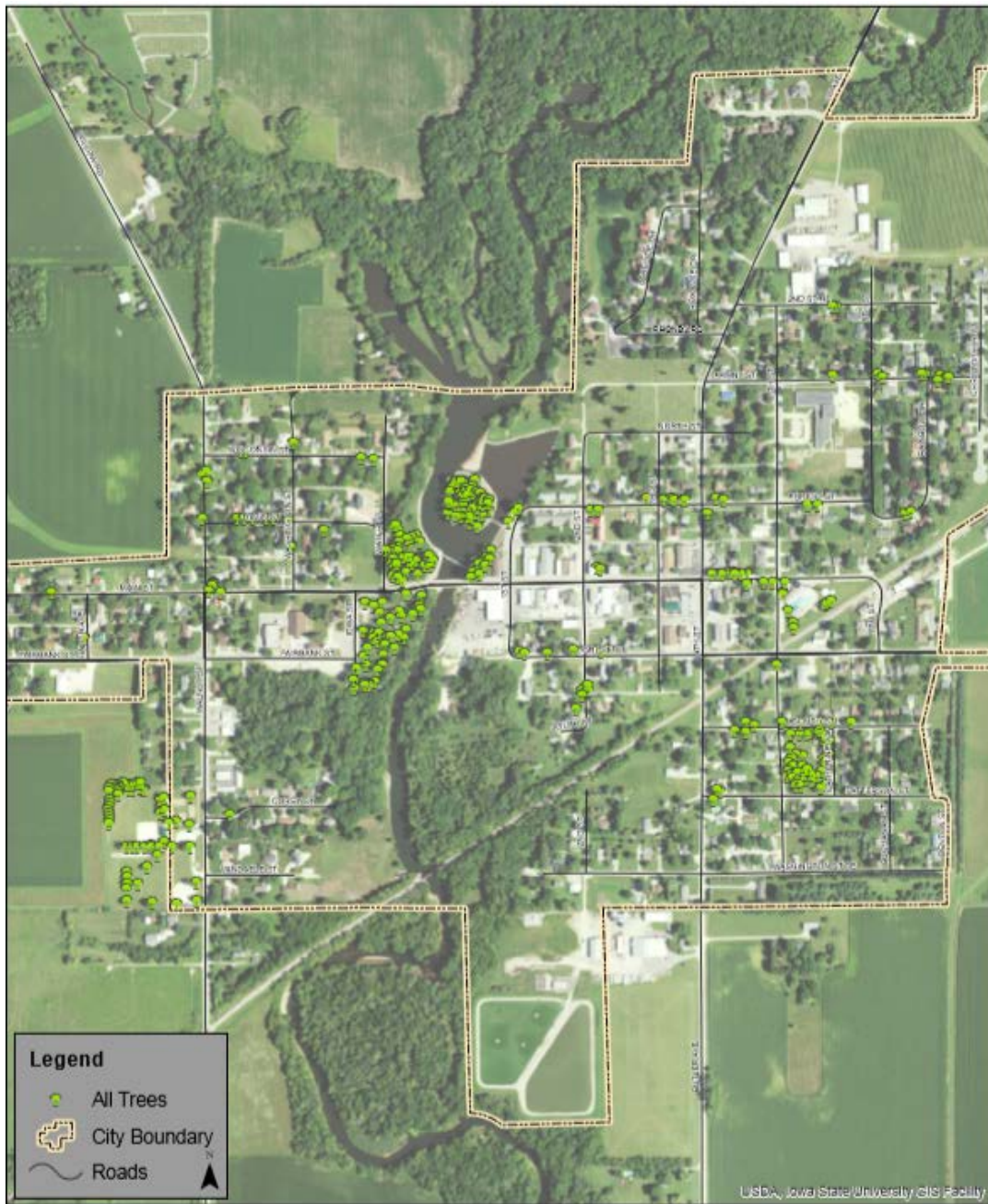- Roads

2018 Urban Forest Management Plan
Prepared by Richard Kittelson
Iowa Department of Natural Resources

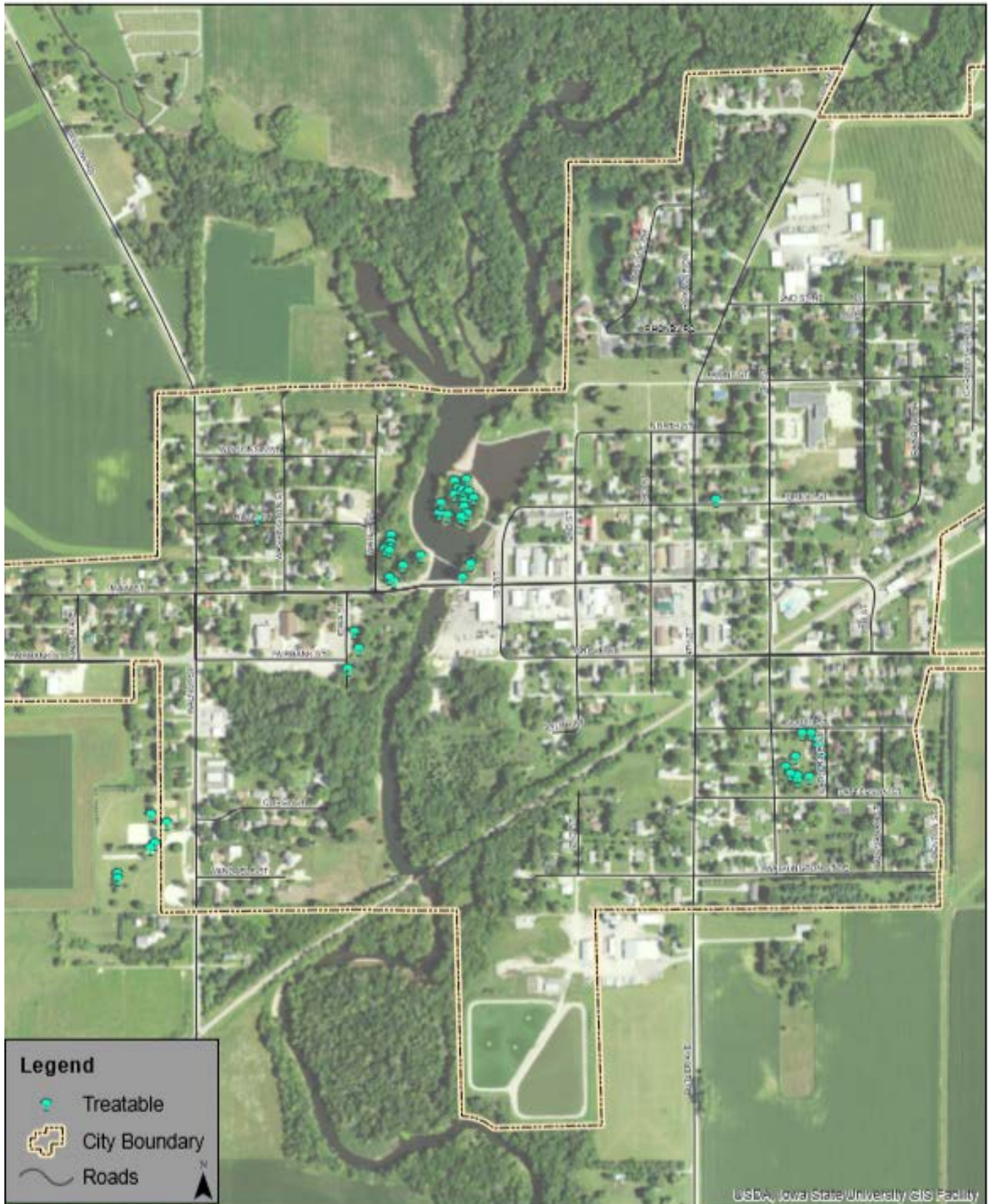# Table of Contents

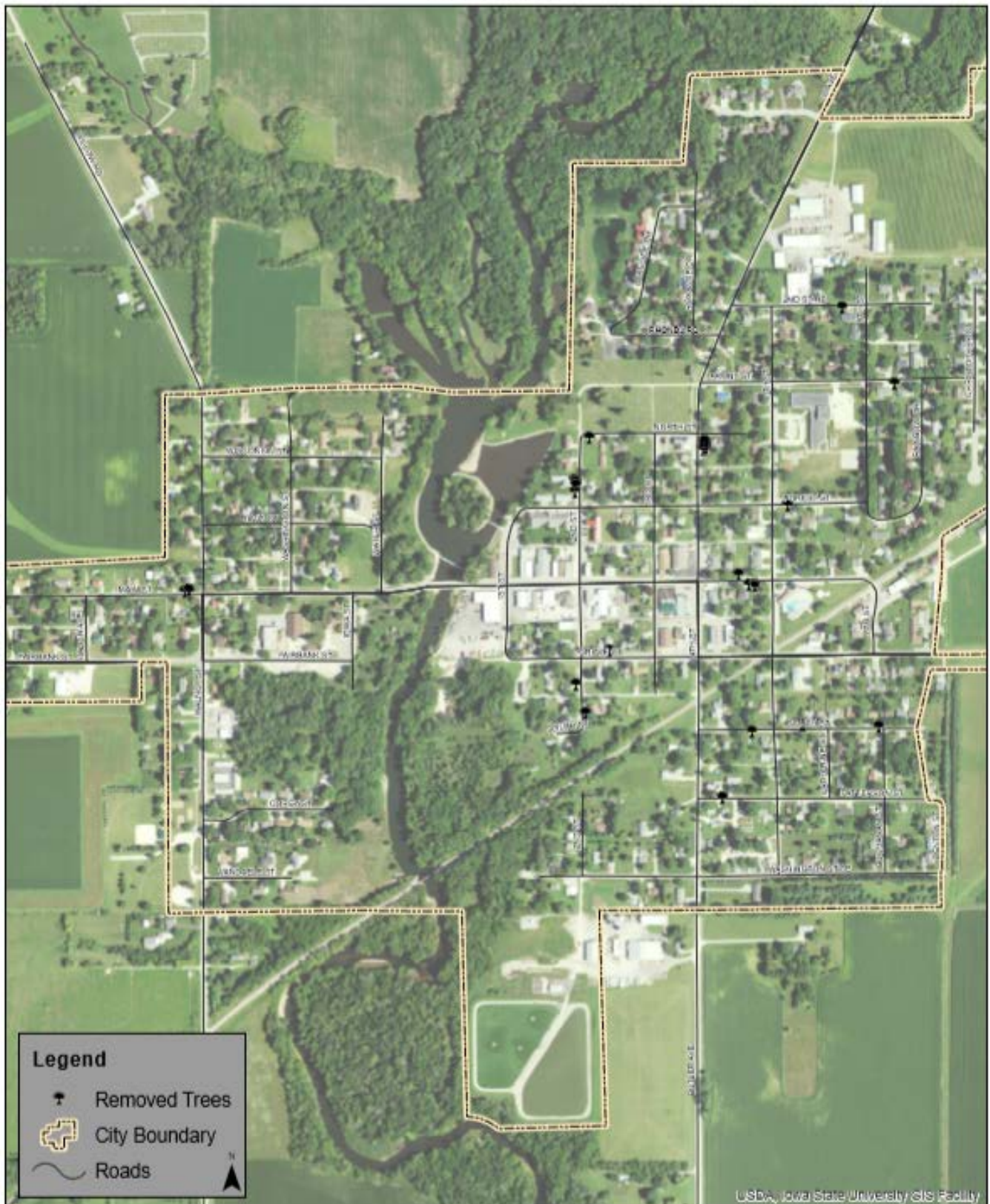Location of Treatable Ash Trees
2018 Community Tree Inventory
Fairbank, IA



**Legend**

- 🌳 Treatable
- ⬡ City Boundary
- 〰 Roads

# Executive Summary

**Overview**

This plan was developed to assist the City of Fairbank 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 36% of Fairbank'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 2018, 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 342 trees inventoried.

- Fairbank's trees provide $63,026.33 of benefits annually, an average of $184.29 a tree
- There are over 25 species of trees
- The top three genera are: Ash 36.3%, Maple 20.8%, and Spruce 14.3%
- 57% of trees are in need of some type of management
- 81 trees (69 ash) 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 81 trees needing removal, 43 trees are over 18 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*
- 108 (epicormic sprouts) of the 124 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 31 years to remove ash – Suggestion: request a budget increase to $5,000 annually and apply for grants to plant replacement trees

# Introduction

This plan was developed to assist Fairbank with the management, budgeting and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the anticipated arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal or treatment and replacement planting. With proper planning and management of the current canopy in Fairbank, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

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

# Inventory

In 2018, 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 342 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

# Annual Benefits

**Annual Energy Benefits**
Trees conserve energy by shading buildings and blocking winds. Fairbank's trees reduce energy related costs by approximately $16,664.56 annually (Appendix A, Table 1). These savings are both in Electricity (79.88 MWh) and in Natural Gas (10,817.65 Therms).

**Annual Stormwater Benefits**
Fairbank's trees intercept about 882,928.17 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $23,927.35 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 Fairbank it is estimated that trees remove 1,027.83 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 $2,901.57 (Appendix A, Table 3).

**Annual Carbon Benefits**
Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Fairbank trees sequester about 182,879.30 lbs of carbon a year with an associated value of $1,371.59 (Appendix A, Table 5). In addition, the trees store 3,395,978.63 lbs of carbon, with a yearly benefit of $25,469.84 (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. Fairbank receives $17,285.08 in annual social benefits from trees (Appendix A, Table 6).

**Financial Summary of all Benefits**
According to the USDA Forest Service i-Tree STREETS analysis, Fairbank's trees provide $63,026.33 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 342 trees in Fairbank provide approximately $184.29 annually (Appendix A, Table 7).

# Forest Structure

**Species Distribution**

Fairbank has over 25 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

| | | |
|---|---|---|
| Ash | 124 | 36.3% |
| Maple | 71 | 20.8% |
| Spruce | 49 | 14.3% |
| Walnut | 17 | 5% |
| Oak | 17 | 5% |
| Cottonwood | 13 | 3.8% |
| Hackberry | 8 | 2.3% |
| Catalpa | 6 | 1.8% |
| Honeylocust | 4 | 1.2% |
| Birch | 4 | 1.2% |
| Ohio Buckeye | 4 | 1.2% |
| Others | 25 | 7.3% |

**Age Class**

Most of Fairbank's trees (50%) are greater than 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. Fairbank's size curve is on the larger side, indicating an older than average stand.

**Condition: Wood and Foliage**

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Fairbank indicate that 97% of the trees are in fair to good health, with only 3% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 82% of Fairbank's trees are in fair to good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 18% of the population. This 18% 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 | 58 | 17% |
| Crown Raising | 2 | .6% |

|                  |     |     |
|------------------|-----|-----|
| Tree Staking     | 0   | 0%  |
| Tree Removal     | 81  | 24% |
| Crown Reduction  | 1   | .3% |
| Treat EAB        | 52  | 15% |

**Canopy Cover**

The total canopy with both private and public trees is 24%, 110.89 acres. The canopy cover included in the Fairbank inventory includes approximately 9 acres (Appendix A, Figure 4). The City's Canopy goal is to increase canopy by %, in 30 years. To achieve this goal it is estimated that 34 trees need to be planted annually.

**Land Use and Location**

The majority of Fairbank'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.

<u>Land Use</u>

| | |
|---|---|
| Single family residential | 24.85% |
| Park/vacant/other | 74.56% |
| Industrial/Large commercial | 0% |
| Small commercial | 0.58% |
| Multifamily residential | 0% |

<u>Location</u>

| | |
|---|---|
| Planting strip | 99.4% |
| Other maintained locations | 0.0% |
| Cutout (surrounded by pavement) | .3% |
| Front yard | .3% |

# 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.

<u>Hazardous trees</u>

Fairbank has 4 critical concern trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 3 trees over 24 inches in diameter at

4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 190 trees with these needs.

<u>Poor tree species</u>
After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 81 removals, 69 are ash trees. There are a total of 124 ash trees, and 108 of those have signs and symptoms that have been associated with EAB. In addition, there are 32 trees that are in poor health. *City ownership of the trees recommended for removal should be verified prior to any removal*

**Pruning Cycle**
Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. In the Management Needs section of the Findings there are four main maintenance issues to be addressed: routine pruning, crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising is the removal of lower branches that are 2 inches in diameter or larger in the case of providing clearance for pedestrians or vehicles. Crown reduction is removing individual limbs from structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years. Please refer to the six year maintenance plan for further information.

**Planting**
Most of the planting over the next 5 years will replace the trees that are removed. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Fairbank.

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 maximally planted with maple (20.8%) (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.

**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 with <u>No Additional Funding</u>**
Year 1

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

Year 2
Removal: 2 critical concern trees and 2 additional ash trees with poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 2 trees in open locations from year one removals
Young Tree Pruning & Maintenance:
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 3
Removal: 4 trees -ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 2 trees to be planted in open locations and locations from previous
removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 4
Removal: 2 trees - ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 2 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 5
Removal: 2 trees -ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 2 trees to be planted in open locations and locations from previous
removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 6
Removal: 2 trees -ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 2 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 10 ash trees removed (approximately 1% of ash). It will take approximately 31 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 to 15 years of its arrival.

**To remove all ash trees within 6 years, the budget would need to be increased to $10,700 a year. If the budget were increased to $5,000 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. The new plantings will be a diverse mix and should not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

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

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

## Private Ash Trees
It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if preventative treatments are not being used.

# Budget

**Current Budget**
Total $7,200 over 6 years ($1,200/year)

**FY 2019 Budget**
    Removal: $1,000
    *Or saving for ash tree treatment and/or future ash removal
    Planting: $150
    Watering & Maintenance: $50

**FY 2020 Budget**
    Removal: $1,000
    *Or saving for ash tree treatment and/or future ash removal
    Planting: $00
    Routine trimming: $150
    Watering & Maintenance: $50

**FY 2021 Budget**
    Removal: $1,000
    *Or saving for ash tree treatment and/or future ash removal
    Planting: $150
    Watering & Maintenance: $50

**FY 2022 Budget**
Removal: $1,000
*Or saving for ash tree treatment and/or future ash removal
Planting: $00
Routine trimming: $150
Watering & Maintenance: $50

**FY 2023 Budget**
Removal: $1,000
*Or saving for ash tree treatment and/or future ash removal
Planting: $150
Watering & Maintenance: $50

**FY 2024 Budget**
Removal: $1,000
*Or saving for ash tree treatment and/or future ash removal
Planting: $00
Routine trimming: $150
Watering & Maintenance: $50

*Reduction of ash over 6 years: approximately 10 ash trees removed (approximately 1% of ash). **It will take approximately 31 years to remove all ash with the current budget.**

Purposed Budget Increase
EAB could potentially kill all ash trees in Fairbank within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $10,700 a year. If the budget were increased to $10,000 a year all ash could be removed within 7 years. Additionally, it is recommended that Fairbank apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at $12 per inch, about 26 trees could be treated ($6,240) per year (1/2 treatable ash every other year treatment). This would be 52 total trees selected for treatment, and Fairbank would still need to find $1,000 for removal. Alternatively, if there are 52 treated trees every other year, it would cost approximately $12,480 every 2 years for treatment and leave $0 for removal and $0 for planting. These are alternatives to straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees when EAB is found in Fairbank. It is suggested to consider increasing the budget to plan for this.

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# Appendix A: i-Tree Data

## Table 1: Annual Energy Benefits

| Annual Energy Benefits of All Trees by Species | | | 12/20/2018 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Species | Total Electricity (MWh) | Electricity ($) | Total Natural Gas (Therms) | Natural Gas ($) | Total ($) | Stand. Error | % of Total Trees | % of Total $ | Avg. $/tree |
| Green ash | 25.72 | 1,952.39 | 3,476.51 | 3,406.98 | 5,359.37 | (N/A) | 34.21 | 32.16 | 45.81 |
| Blue spruce | 2.79 | 212.11 | 400.41 | 392.41 | 604.52 | (N/A) | 10.23 | 3.63 | 17.27 |
| Silver maple | 11.14 | 845.19 | 1,479.39 | 1,449.81 | 2,294.99 | (N/A) | 10.23 | 13.77 | 65.57 |
| Norway maple | 6.97 | 529.38 | 972.63 | 953.18 | 1,482.56 | (N/A) | 7.89 | 8.90 | 54.91 |
| Black walnut | 5.48 | 415.70 | 765.50 | 750.19 | 1,165.89 | (N/A) | 4.97 | 7.00 | 68.58 |
| Norway spruce | 1.40 | 106.61 | 174.76 | 171.26 | 277.87 | (N/A) | 3.80 | 1.67 | 21.37 |
| Cottonwood | 6.00 | 455.74 | 791.75 | 775.92 | 1,231.65 | (N/A) | 3.80 | 7.39 | 94.74 |
| Northern hackberry | 2.95 | 223.62 | 425.78 | 417.27 | 640.89 | (N/A) | 2.34 | 3.85 | 80.11 |
| Northern red oak | 1.28 | 97.44 | 166.39 | 163.06 | 260.50 | (N/A) | 2.34 | 1.56 | 32.56 |
| Apple | 0.33 | 25.13 | 50.14 | 49.13 | 74.27 | (N/A) | 2.05 | 0.45 | 10.61 |
| White ash | 1.88 | 143.07 | 229.71 | 225.12 | 368.19 | (N/A) | 1.75 | 2.21 | 61.36 |
| Red maple | 0.95 | 72.01 | 122.48 | 120.03 | 192.04 | (N/A) | 1.75 | 1.15 | 32.01 |
| Catalpa | 2.23 | 169.54 | 297.15 | 291.21 | 460.74 | (N/A) | 1.75 | 2.76 | 76.79 |
| Honeylocust | 1.11 | 83.95 | 143.43 | 140.56 | 224.50 | (N/A) | 1.17 | 1.35 | 56.13 |
| Ohio buckeye | 0.86 | 65.07 | 122.67 | 120.21 | 185.29 | (N/A) | 1.17 | 1.11 | 46.32 |
| Bur oak | 1.22 | 92.75 | 167.57 | 164.22 | 256.96 | (N/A) | 1.17 | 1.54 | 64.24 |
| Elm | 0.89 | 67.76 | 120.71 | 118.29 | 186.05 | (N/A) | 0.88 | 1.12 | 62.02 |
| Pin oak | 0.94 | 71.55 | 130.46 | 127.85 | 199.40 | (N/A) | 0.88 | 1.20 | 66.47 |
| Sugar maple | 0.84 | 63.60 | 117.57 | 115.21 | 178.81 | (N/A) | 0.88 | 1.07 | 59.60 |
| Southern magnolia | 0.46 | 35.13 | 48.43 | 47.46 | 82.59 | (N/A) | 0.58 | 0.50 | 41.29 |
| Others | 4.42 | 335.53 | 614.22 | 601.94 | 937.47 | | 6.14 | 5.63 | 45.22 |
| Total | 79.88 | 6,063.26 | 10,817.65 | 10,601.30 | 16,664.56 | (N/A) | 100.00 | 100.00 | 48.73 |

## Table 2: Annual Stormwater Benefits

| Annual Stormwater Benefits of All Trees by Species | | | 12/20/2018 | | | |
|---|---|---|---|---|---|---|
| Species | Total Rainfall Interception (Gal) | Total ($) | Stand. Error | % of Total Trees | % of Total $ | Avg. $/tree |
| Green ash | 235,980.31 | 6,395.07 | (N/A) | 34.21 | 26.73 | 54.66 |
| Blue spruce | 34,099.04 | 924.08 | (N/A) | 10.23 | 3.86 | 26.40 |
| Silver maple | 162,048.34 | 4,391.51 | (N/A) | 10.23 | 18.35 | 125.47 |
| Norway maple | 61,877.28 | 1,676.87 | (N/A) | 7.89 | 7.01 | 62.11 |
| Black walnut | 67,999.43 | 1,842.78 | (N/A) | 4.97 | 7.70 | 108.40 |
| Norway spruce | 17,660.22 | 478.59 | (N/A) | 3.80 | 2.00 | 36.81 |
| Cottonwood | 90,810.00 | 2,460.95 | (N/A) | 3.80 | 10.29 | 189.30 |
| Northern hackberry | 29,453.68 | 798.19 | (N/A) | 2.34 | 3.34 | 99.77 |
| Northern red oak | 8,398.06 | 227.59 | (N/A) | 2.34 | 0.95 | 28.45 |
| Apple | 1,151.90 | 31.22 | (N/A) | 2.05 | 0.13 | 4.46 |
| White ash | 20,345.87 | 551.37 | (N/A) | 1.75 | 2.30 | 91.90 |
| Red maple | 6,848.95 | 185.61 | (N/A) | 1.75 | 0.78 | 30.93 |
| Catalpa | 29,715.94 | 805.30 | (N/A) | 1.75 | 3.37 | 134.22 |
| Honeylocust | 14,073.77 | 381.40 | (N/A) | 1.17 | 1.59 | 95.35 |
| Ohio buckeye | 7,815.42 | 211.80 | (N/A) | 1.17 | 0.89 | 52.95 |
| Bur oak | 13,294.41 | 360.28 | (N/A) | 1.17 | 1.51 | 90.07 |
| Elm | 9,351.45 | 253.42 | (N/A) | 0.88 | 1.06 | 84.47 |
| Pin oak | 9,577.80 | 259.56 | (N/A) | 0.88 | 1.08 | 86.52 |
| Sugar maple | 8,728.43 | 236.54 | (N/A) | 0.88 | 0.99 | 78.85 |
| Southern magnolia | 3,550.90 | 96.23 | (N/A) | 0.58 | 0.40 | 48.11 |
| Others | 50,146.99 | 1,358.98 | | 6.14 | 5.68 | 65.10 |
| Citywide total | 882,928.17 | 23,927.35 | (N/A) | 100.00 | 100.00 | 69.96 |

## Table 3: Annual Air Quality Benefits

| Annual Air Quality Benefits of All Trees by Species | | | | | 12/20/2018 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Species | Deposition O3 (lb) | Deposition NO2 (lb) | Deposition PM10 (lb) | Deposition SO2 (lb) | Total Deposition ($) | Avoided NO2 (lb) | Avoided PM10 (lb) | Avoided VOC (lb) | Avoided SO2 (lb) | Total Avoided ($) | BVOC Emissions (lb) | BVOC Emissions ($) | Total (lb) | Total ($) | Stand. Error | % of Total Trees | Avg. $/tree |
| Green ash | 24.36 | 3.89 | 12.55 | 1.09 | 132.25 | 122.40 | 17.85 | 17.03 | 116.59 | 763.55 | 0.00 | 0.00 | 315.77 | 895.80 | (N/A) | 34.21 | 7.66 |
| Blue spruce | 3.69 | 0.73 | 3.35 | 0.45 | 25.24 | 13.46 | 1.95 | 1.86 | 12.65 | 83.52 | - 11.43 | - 42.85 | 26.73 | 65.91 | (N/A) | 10.23 | 1.88 |
| Silver maple | 28.30 | 4.80 | 13.86 | 1.25 | 152.50 | 52.62 | 7.69 | 7.34 | 50.37 | 328.92 | - 14.90 | - 55.89 | 151.35 | 425.54 | (N/A) | 10.23 | 12.16 |
| Norway maple | 12.48 | 2.15 | 6.15 | 0.55 | 67.47 | 33.52 | 4.87 | 4.64 | 31.65 | 208.37 | - 2.94 | - 11.03 | 93.07 | 264.82 | (N/A) | 7.89 | 9.81 |
| Black walnut | 8.95 | 1.43 | 4.17 | 0.40 | 47.36 | 26.29 | 3.82 | 3.64 | 24.82 | 163.43 | 0.00 | 0.00 | 73.53 | 210.79 | (N/A) | 4.97 | 12.40 |
| Norway spruce | 1.90 | 0.38 | 1.67 | 0.23 | 12.82 | 6.53 | 0.96 | 0.92 | 6.36 | 41.12 | - 6.41 | - 24.03 | 12.55 | 29.91 | (N/A) | 3.80 | 2.30 |
| Cottonwood | 18.24 | 2.92 | 7.96 | 0.82 | 94.94 | 28.41 | 4.15 | 3.97 | 27.20 | 177.59 | 0.00 | 0.00 | 93.66 | 272.53 | (N/A) | 3.80 | 20.96 |
| Northern hackberry | 4.63 | 0.80 | 2.34 | 0.21 | 25.21 | 14.29 | 2.07 | 1.97 | 13.36 | 88.49 | 0.00 | 0.00 | 39.66 | 113.71 | (N/A) | 2.34 | 14.21 |
| Northern red oak | 1.47 | 0.25 | 0.77 | 0.07 | 8.05 | 6.04 | 0.89 | 0.85 | 5.82 | 37.84 | - 2.02 | - 7.57 | 14.12 | 38.32 | (N/A) | 2.34 | 4.79 |
| Apple | 0.27 | 0.04 | 0.14 | 0.01 | 1.45 | 1.62 | 0.23 | 0.22 | 1.50 | 10.01 | 0.00 | - 0.01 | 4.03 | 11.45 | (N/A) | 2.05 | 1.64 |
| White ash | 3.46 | 0.55 | 1.60 | 0.15 | 18.25 | 8.74 | 1.29 | 1.23 | 8.54 | 55.05 | 0.00 | 0.00 | 25.56 | 73.30 | (N/A) | 1.75 | 12.22 |
| Red maple | 1.48 | 0.25 | 0.71 | 0.07 | 7.93 | 4.46 | 0.65 | 0.62 | 4.30 | 27.95 | - 0.52 | - 1.94 | 12.02 | 33.94 | (N/A) | 1.75 | 5.66 |
| Catalpa | 5.20 | 0.83 | 2.32 | 0.23 | 27.22 | 10.59 | 1.55 | 1.48 | 10.12 | 66.15 | 0.00 | 0.00 | 32.32 | 93.37 | (N/A) | 1.75 | 15.56 |
| Honeylocust | 2.82 | 0.46 | 1.27 | 0.13 | 14.83 | 5.20 | 0.76 | 0.73 | 5.00 | 32.55 | - 2.28 | - 8.56 | 14.09 | 38.83 | (N/A) | 1.17 | 9.71 |
| Ohio buckeye | 1.58 | 0.27 | 0.78 | 0.07 | 8.54 | 4.15 | 0.60 | 0.57 | 3.89 | 25.72 | - 0.37 | - 1.39 | 11.54 | 32.87 | (N/A) | 1.17 | 8.22 |
| Bur oak | 1.59 | 0.25 | 0.76 | 0.07 | 8.49 | 5.84 | 0.85 | 0.81 | 5.54 | 36.36 | 0.00 | 0.00 | 15.72 | 44.85 | (N/A) | 1.17 | 11.21 |
| Elm | 1.10 | 0.18 | 0.53 | 0.05 | 5.87 | 4.25 | 0.62 | 0.59 | 4.05 | 26.50 | 0.00 | 0.00 | 11.36 | 32.37 | (N/A) | 0.88 | 10.79 |
| Pin oak | 1.55 | 0.27 | 0.81 | 0.07 | 8.54 | 4.51 | 0.66 | 0.62 | 4.27 | 28.06 | - 2.93 | - 10.98 | 9.84 | 25.62 | (N/A) | 0.88 | 8.54 |
| Sugar maple | 1.08 | 0.18 | 0.55 | 0.05 | 5.89 | 4.02 | 0.58 | 0.56 | 3.80 | 24.99 | - 0.86 | - 3.21 | 9.96 | 27.67 | (N/A) | 0.88 | 9.22 |
| Southern magnolia | 0.20 | 0.04 | 0.26 | 0.02 | 1.60 | 2.07 | 0.31 | 0.30 | 2.08 | 13.20 | - 1.02 | - 3.81 | 4.27 | 10.99 | (N/A) | 0.58 | 5.49 |
| Others | 7.92 | 1.34 | 4.07 | 0.43 | 43.34 | 21.19 | 3.08 | 2.93 | 20.04 | 131.79 | - 4.30 | - 16.14 | 56.68 | 158.99 | | 6.14 | 7.62 |
| Citywide Total | 132.26 | 22.04 | 66.62 | 6.43 | 717.80 | 380.19 | 55.44 | 52.87 | 361.95 | 2,371.17 | - 49.97 | - 187.40 | 1,027.83 | 2,901.57 | (N/A) | 100.00 | 8.48 |

## Table 4: Annual Carbon Stored

| Stored CO2 Benefits of All Trees by Species | | | 12/20/2018 | | | |
|---|---|---|---|---|---|---|
| Species | Total stored CO2 (lbs) | Total ($) | Stand. | % of Total Trees | % of Total $ | Avg. $/tree |
| Green ash | 796,489.57 | 5,973.67 | (N/A) | 34.21 | 23.45 | 51.06 |
| Blue spruce | 19,347.19 | 145.10 | (N/A) | 10.23 | 0.57 | 4.15 |
| Silver maple | 658,500.24 | 4,938.75 | (N/A) | 10.23 | 19.39 | 141.11 |
| Norway maple | 205,993.73 | 1,544.95 | (N/A) | 7.89 | 6.07 | 57.22 |
| Black walnut | 290,834.96 | 2,181.26 | (N/A) | 4.97 | 8.56 | 128.31 |
| Norway spruce | 13,731.37 | 102.99 | (N/A) | 3.80 | 0.40 | 7.92 |
| Cottonwood | 637,386.18 | 4,780.40 | (N/A) | 3.80 | 18.77 | 367.72 |
| Northern hackberry | 69,033.22 | 517.75 | (N/A) | 2.34 | 2.03 | 64.72 |
| Northern red oak | 25,671.92 | 192.54 | (N/A) | 2.34 | 0.76 | 24.07 |
| Apple | 4,506.01 | 33.80 | (N/A) | 2.05 | 0.13 | 4.83 |
| White ash | 58,551.79 | 439.14 | (N/A) | 1.75 | 1.72 | 73.19 |
| Red maple | 16,529.58 | 123.97 | (N/A) | 1.75 | 0.49 | 20.66 |
| Catalpa | 179,124.77 | 1,343.44 | (N/A) | 1.75 | 5.27 | 223.91 |
| Honeylocust | 36,748.31 | 275.61 | (N/A) | 1.17 | 1.08 | 68.90 |
| Ohio buckeye | 26,068.06 | 195.51 | (N/A) | 1.17 | 0.77 | 48.88 |
| Bur oak | 50,990.12 | 382.43 | (N/A) | 1.17 | 1.50 | 95.61 |
| Elm | 35,217.36 | 264.13 | (N/A) | 0.88 | 1.04 | 88.04 |
| Pin oak | 38,695.87 | 290.22 | (N/A) | 0.88 | 1.14 | 96.74 |
| Sugar maple | 30,170.72 | 226.28 | (N/A) | 0.88 | 0.89 | 75.43 |
| Southern magnolia | 3,701.05 | 27.76 | (N/A) | 0.58 | 0.11 | 13.88 |
| Others | 198,686.60 | 1,490.15 | | 6.14 | 5.85 | 70.94 |
| Citywide total | 3,395,978.63 | 25,469.84 | (N/A) | 100.00 | 100.00 | 74.47 |

## Table 5: Annual Carbon Sequestered

| Stored CO2 Benefits of All Trees by Species | | | 12/20/2018 | | |
| --- | --- | --- | --- | --- | --- |
| Species | Total stored CO2 (lbs) | Total ($) | Stand. | % of Total Trees | % of Total $ | Avg. $/tree |
| Green ash | 796,489.57 | 5,973.67 | (N/A) | 34.21 | 23.45 | 51.06 |
| Blue spruce | 19,347.19 | 145.10 | (N/A) | 10.23 | 0.57 | 4.15 |
| Silver maple | 658,500.24 | 4,938.75 | (N/A) | 10.23 | 19.39 | 141.11 |
| Norway maple | 205,993.73 | 1,544.95 | (N/A) | 7.89 | 6.07 | 57.22 |
| Black walnut | 290,834.96 | 2,181.26 | (N/A) | 4.97 | 8.56 | 128.31 |
| Norway spruce | 13,731.37 | 102.99 | (N/A) | 3.80 | 0.40 | 7.92 |
| Cottonwood | 637,386.18 | 4,780.40 | (N/A) | 3.80 | 18.77 | 367.72 |
| Northern hackberry | 69,033.22 | 517.75 | (N/A) | 2.34 | 2.03 | 64.72 |
| Northern red oak | 25,671.92 | 192.54 | (N/A) | 2.34 | 0.76 | 24.07 |
| Apple | 4,506.01 | 33.80 | (N/A) | 2.05 | 0.13 | 4.83 |
| White ash | 58,551.79 | 439.14 | (N/A) | 1.75 | 1.72 | 73.19 |
| Red maple | 16,529.58 | 123.97 | (N/A) | 1.75 | 0.49 | 20.66 |
| Catalpa | 179,124.77 | 1,343.44 | (N/A) | 1.75 | 5.27 | 223.91 |
| Honeylocust | 36,748.31 | 275.61 | (N/A) | 1.17 | 1.08 | 68.90 |
| Ohio buckeye | 26,068.06 | 195.51 | (N/A) | 1.17 | 0.77 | 48.88 |
| Bur oak | 50,990.12 | 382.43 | (N/A) | 1.17 | 1.50 | 95.61 |
| Elm | 35,217.36 | 264.13 | (N/A) | 0.88 | 1.04 | 88.04 |
| Pin oak | 38,695.87 | 290.22 | (N/A) | 0.88 | 1.14 | 96.74 |
| Sugar maple | 30,170.72 | 226.28 | (N/A) | 0.88 | 0.89 | 75.43 |
| Southern magnolia | 3,701.05 | 27.76 | (N/A) | 0.58 | 0.11 | 13.88 |
| Others | 198,686.60 | 1,490.15 | | 6.14 | 5.85 | 70.94 |
| Citywide total | 3,395,978.63 | 25,469.84 | (N/A) | 100.00 | 100.00 | 74.47 |

## Table 6: Annual Social and Aesthetic Benefits

| Annual Aesthetic/Other Benefit of All Trees by Species | | 12/20/2018 | | |
| --- | --- | --- | --- | --- |
| Species | Total ($) | Stand. Error | % of Total Trees | % of Total $ | Avg. $/tree |
| Green ash | 5,514.50 | (N/A) | 34.21 | 31.90 | 47.13 |
| Blue spruce | 756.58 | (N/A) | 10.23 | 4.38 | 21.62 |
| Silver maple | 3,679.14 | (N/A) | 10.23 | 21.29 | 105.12 |
| Norway maple | 914.78 | (N/A) | 7.89 | 5.29 | 33.88 |
| Black walnut | 1,039.25 | (N/A) | 4.97 | 6.01 | 61.13 |
| Norway spruce | 367.30 | (N/A) | 3.80 | 2.12 | 28.25 |
| Cottonwood | 497.74 | (N/A) | 3.80 | 2.88 | 38.29 |
| Northern hackberry | 500.72 | (N/A) | 2.34 | 2.90 | 62.59 |
| Northern red oak | 172.53 | (N/A) | 2.34 | 1.00 | 21.57 |
| Apple | 28.13 | (N/A) | 2.05 | 0.16 | 4.02 |
| White ash | 573.21 | (N/A) | 1.75 | 3.32 | 95.53 |
| Red maple | 278.01 | (N/A) | 1.75 | 1.61 | 46.33 |
| Catalpa | 284.61 | (N/A) | 1.75 | 1.65 | 47.44 |
| Honeylocust | 778.18 | (N/A) | 1.17 | 4.50 | 194.55 |
| Ohio buckeye | 126.56 | (N/A) | 1.17 | 0.73 | 31.64 |
| Bur oak | 242.63 | (N/A) | 1.17 | 1.40 | 60.66 |
| Elm | 177.04 | (N/A) | 0.88 | 1.02 | 59.01 |
| Pin oak | 315.86 | (N/A) | 0.88 | 1.83 | 105.29 |
| Sugar maple | 193.59 | (N/A) | 0.88 | 1.12 | 64.53 |
| Southern magnolia | 69.96 | (N/A) | 0.58 | 0.40 | 34.98 |
| Others | 774.75 | | 6.14 | 4.48 | 37.39 |
| Citywide Total | 17,285.08 | (N/A) | 100.00 | 100.00 | 50.54 |

**Table 7: Summary of Benefits in Dollars**

| Average Annual Benefits of All Tree by Species ($/tree) | | | | | 12/20/2018 | | |
|---|---|---|---|---|---|---|---|
| Species | Energy | CO2 | Air Quality | Stormwater | Aesthetic/Other | Total | Stand. |
| Green ash | 45.81 | 6.30 | 7.66 | 54.66 | 47.13 | 161.55 | (N/A) |
| Blue spruce | 17.27 | 1.38 | 1.88 | 26.40 | 21.62 | 68.55 | (N/A) |
| Silver maple | 65.57 | 13.49 | 12.16 | 125.47 | 105.12 | 321.81 | (N/A) |
| Norway maple | 54.91 | 5.61 | 9.81 | 62.11 | 33.88 | 166.31 | (N/A) |
| Black walnut | 68.58 | 9.40 | 12.40 | 108.40 | 61.13 | 259.91 | (N/A) |
| Norway spruce | 21.37 | 2.07 | 2.30 | 36.81 | 28.25 | 90.82 | (N/A) |
| Cottonwood | 94.74 | 8.56 | 20.96 | 189.30 | 38.29 | 351.86 | (N/A) |
| Northern hackberry | 80.11 | 7.97 | 14.21 | 99.77 | 62.59 | 264.65 | (N/A) |
| Northern red oak | 32.56 | 3.72 | 4.79 | 28.45 | 21.57 | 91.08 | (N/A) |
| Apple | 10.61 | 1.12 | 1.64 | 4.46 | 4.02 | 21.84 | (N/A) |
| White ash | 61.36 | 10.15 | 12.22 | 91.90 | 95.53 | 271.16 | (N/A) |
| Red maple | 32.01 | 4.50 | 5.66 | 30.93 | 46.33 | 119.43 | (N/A) |
| Catalpa | 76.79 | 8.37 | 15.56 | 134.22 | 47.44 | 282.37 | (N/A) |
| Honeylocust | 56.13 | 8.72 | 9.71 | 95.35 | 194.55 | 364.45 | (N/A) |
| Ohio buckeye | 46.32 | 4.92 | 8.22 | 52.95 | 31.64 | 144.05 | (N/A) |
| Bur oak | 64.24 | 9.02 | 11.21 | 90.07 | 60.66 | 235.20 | (N/A) |
| Elm | 62.02 | 8.70 | 10.79 | 84.47 | 59.01 | 224.99 | (N/A) |
| Pin oak | 66.47 | 13.12 | 8.54 | 86.52 | 105.29 | 279.94 | (N/A) |
| Sugar maple | 59.60 | 7.64 | 9.22 | 78.85 | 64.53 | 219.84 | (N/A) |
| Southern magnolia | 41.29 | 3.90 | 5.49 | 48.11 | 34.98 | 133.78 | (N/A) |
| Others | 45.22 | 5.55 | 7.62 | 65.10 | 37.39 | 160.89 | |
| Citywide Total | 48.73 | 6.57 | 8.48 | 69.96 | 50.54 | 184.29 | (N/A) |

Legend:
- Green ash
- Blue spruce
- Silver maple
- Norway maple
- Black walnut
- Norway spruce
- Cottonwood
- Northern hackberry
- Northern red oak
- Apple
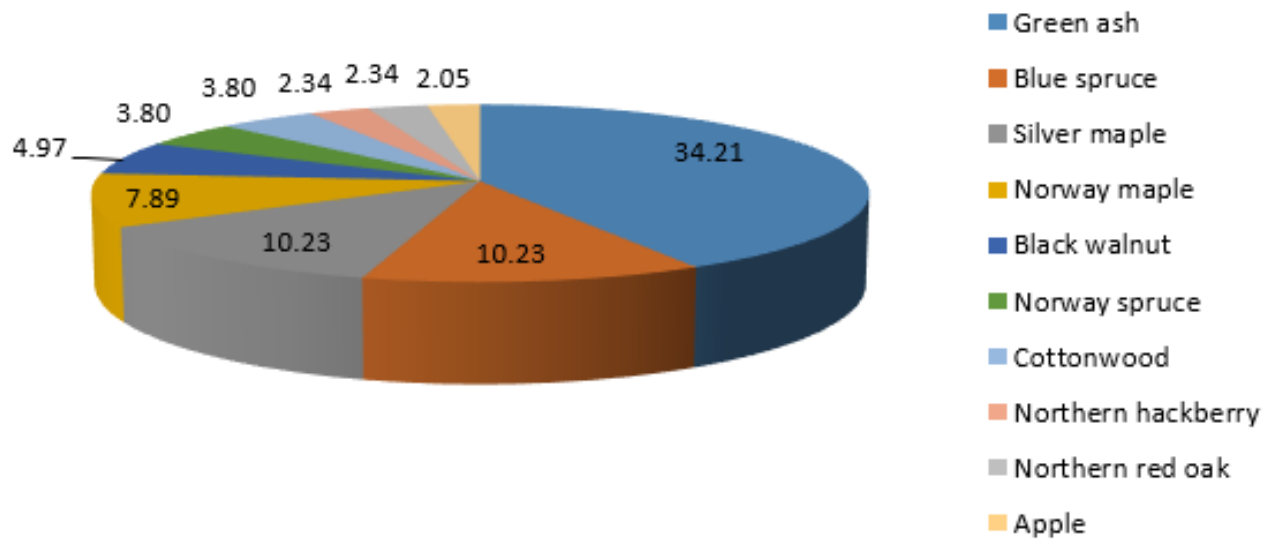
| 12/20/2018 | |
|---|---|
| Species | Percent |
| Green ash | 34.21 |
| Blue spruce | 10.23 |
| Silver maple | 10.23 |
| Norway maple | 7.89 |
| Black walnut | 4.97 |
| Norway spruce | 3.80 |
| Cottonwood | 3.80 |
| Northern hackberry | 2.34 |
| Northern red oak | 2.34 |
| Apple | 2.05 |
| Other Species | 18.13 |

**Figure 1: Species Distribution**

## Relative Age Distribution of Top 10 All Tree Species (%)
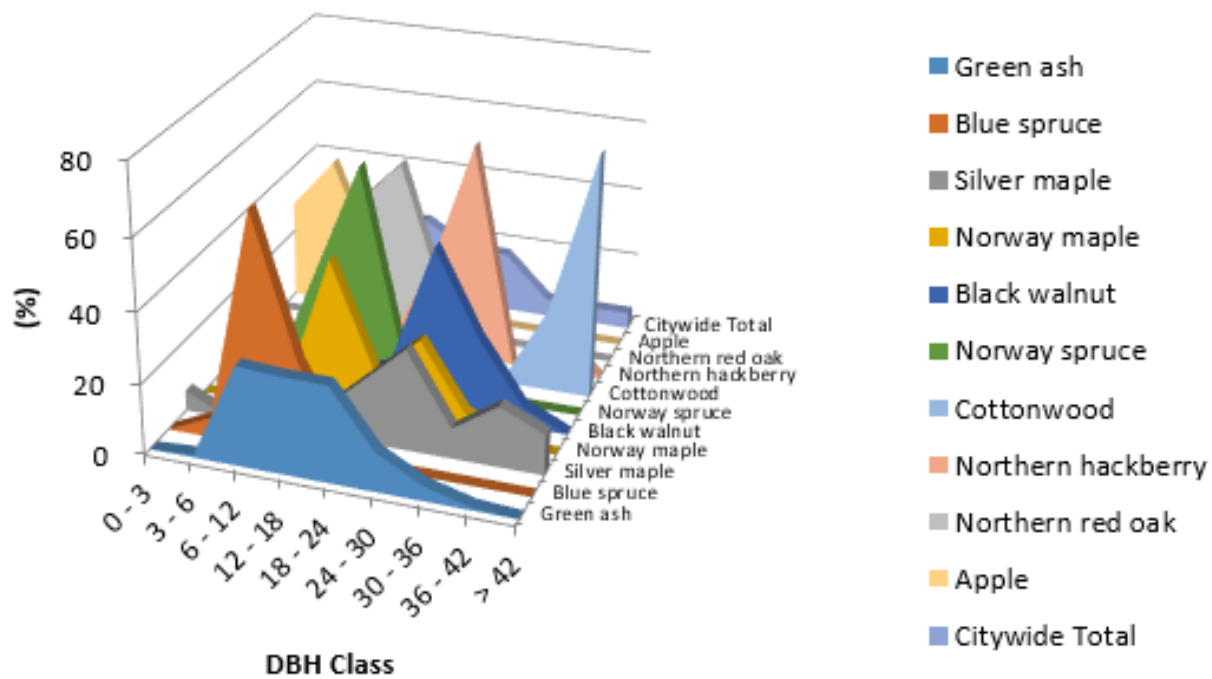
| Relative Age Distribution of Top 10 All Tree Species (%) | | | | 12/20/2018 | | DBH class (in) | | |
|---|---|---|---|---|---|---|---|---|
| Species | 0 - 3 | 3 - 6 | 6 - 12 | 12 - 18 | 18 - 24 | 24 - 30 | 30 - 36 | 36 - 42 | > 42 |
| Green ash | 0.00 | 0.85 | 28.21 | 27.35 | 27.35 | 11.11 | 4.27 | 0.85 | 0.00 |
| Blue spruce | 0.00 | 5.71 | 65.71 | 25.71 | 2.86 | 0.00 | 0.00 | 0.00 | 0.00 |
| Silver maple | 5.71 | 0.00 | 5.71 | 5.71 | 17.14 | 28.57 | 8.57 | 17.14 | 11.43 |
| Norway maple | 0.00 | 0.00 | 7.41 | 44.44 | 14.81 | 25.93 | 7.41 | 0.00 | 0.00 |
| Black walnut | 0.00 | 0.00 | 5.88 | 5.88 | 11.76 | 47.06 | 23.53 | 5.88 | 0.00 |
| Norway spruce | 0.00 | 0.00 | 30.77 | 61.54 | 7.69 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cottonwood | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.69 | 0.00 | 23.08 | 69.23 |
| Northern hackberry | 0.00 | 0.00 | 0.00 | 0.00 | 25.00 | 62.50 | 0.00 | 12.50 | 0.00 |
| Northern red oak | 0.00 | 0.00 | 37.50 | 50.00 | 12.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| Apple | 28.57 | 42.86 | 14.29 | 14.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Citywide Total | 1.75 | 2.92 | 21.93 | 24.27 | 17.25 | 17.25 | 5.26 | 4.68 | 4.68 |

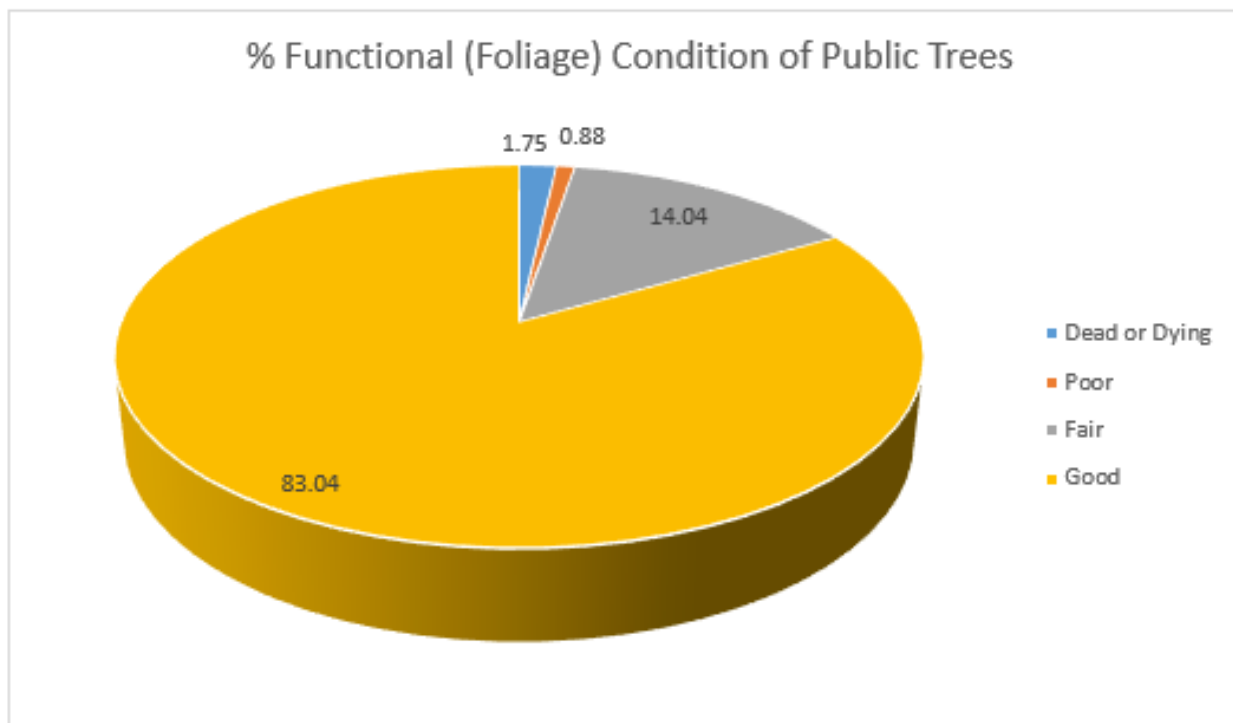**Figure 2: Relative Age Class**

**Figure 3: Foliage Condition**
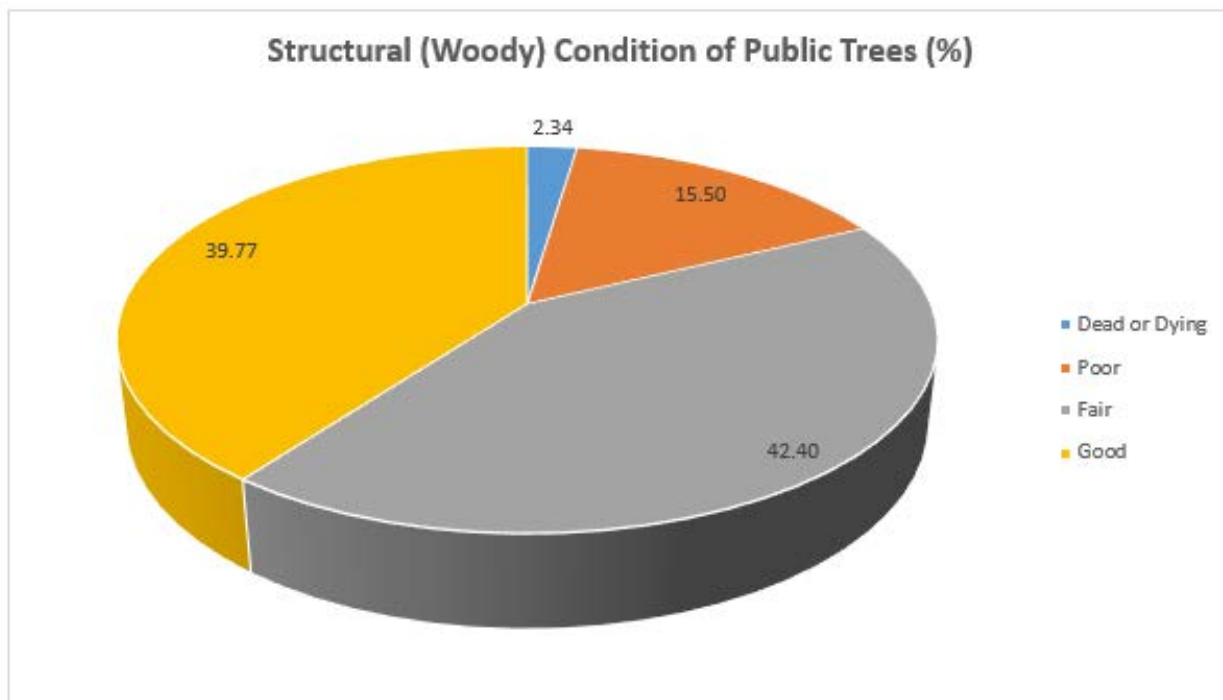


**Figure 4: Wood Condition**

## Canopy Cover of All Trees (Acres)
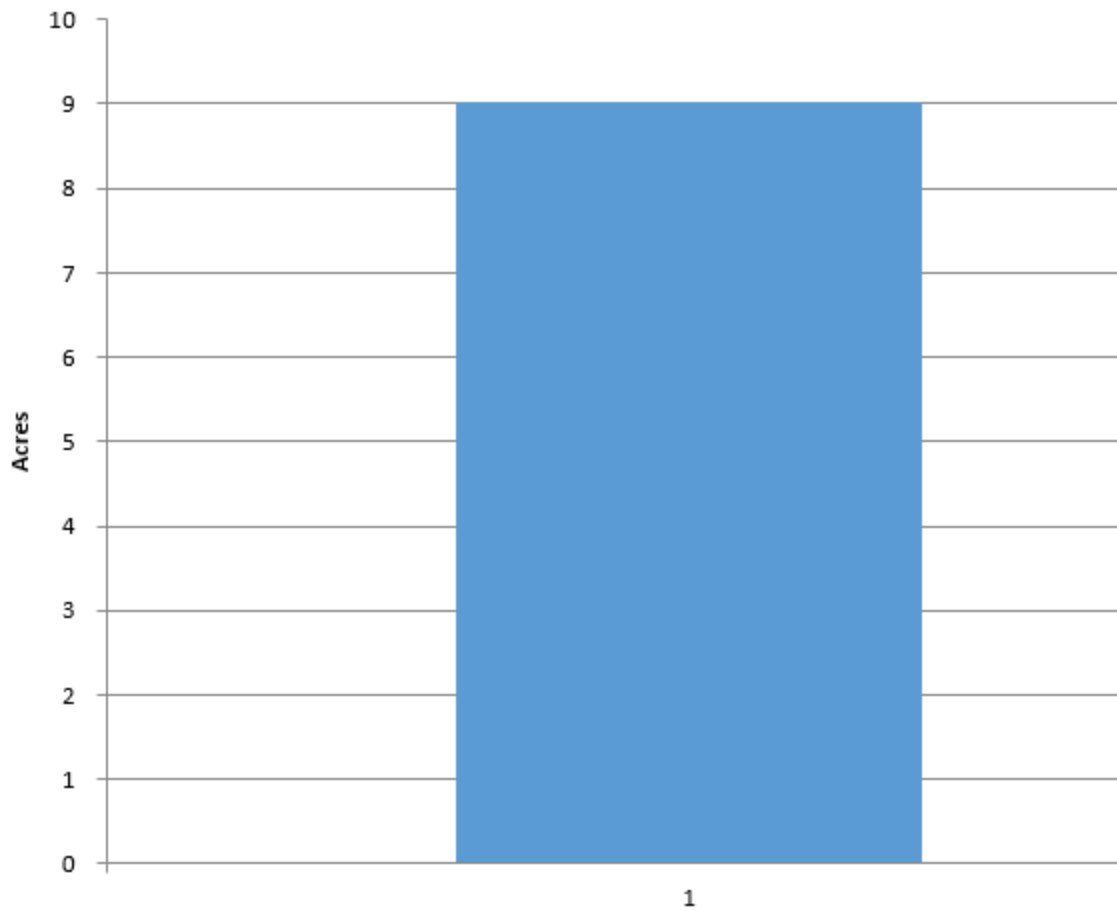


| Canopy Cover of All Trees (Acres) | | 12/20/2018 |
|---|---|---|
| Zone | Acres | % of Total Canopy |
| 1 | 9.02 | 8.10 |
| Citywide Total | 110.89 | 100.00 |

**Figure 5: Canopy Cover in Acres**

## % Land Use of Public Trees

Legend:
- Small Commercial
- Park/vacant/other
- Industrial Large Commercial
- Multi Family Residential
- Single Family Residential
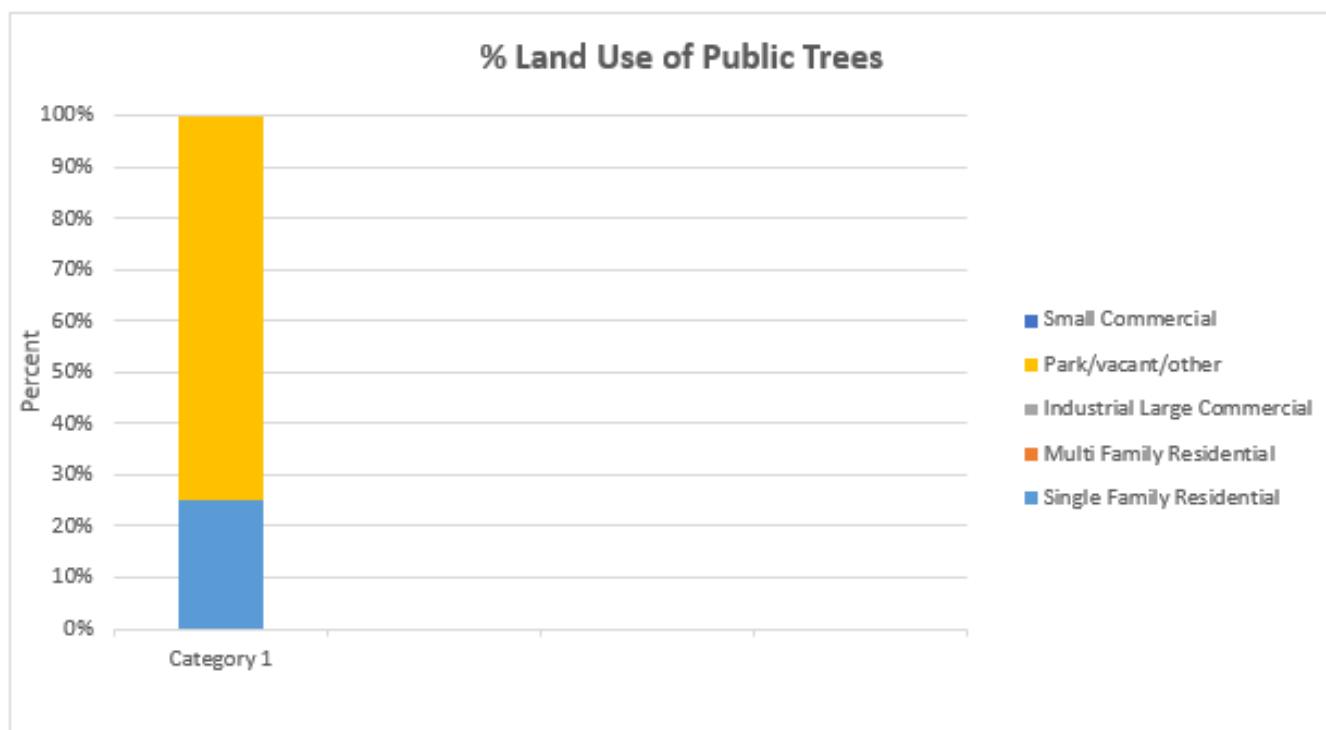
| Citywide | Single family residential | 85 | (N/A) | 24.85 |
|---|---|---|---|---|
| 12/20/2018 | Multi-family residential | 0 | (N/A) | 0.00 |
| | Industrial/Large commercial | 0 | (N/A) | 0.00 |
| | Park/vacant/other | 255 | (N/A) | 74.56 |
| | Small commercial | 2 | (N/A) | 0.58 |
| | Total | 342 | (N/A) | 100.00 |

**Figure 6: Land Use of city/park trees**

## % Location of Public Trees



| Citywide | Front yard | 1 | (N/A) | 0.29 |
|---|---|---|---|---|
| **12/20/2018** | Planting strip | 340 | (N/A) | 99.42 |
| | Cutout | 1 | (N/A) | 0.29 |
| | Median | 0 | (N/A) | 0.00 |
| | Other maintained locations | 0 | (N/A) | 0.00 |
| | Other un-maintained locations | 0 | (N/A) | 0.00 |
| | Backyard | 0 | (N/A) | 0.00 |
| | Total | 342 | (N/A) | 100.00 |
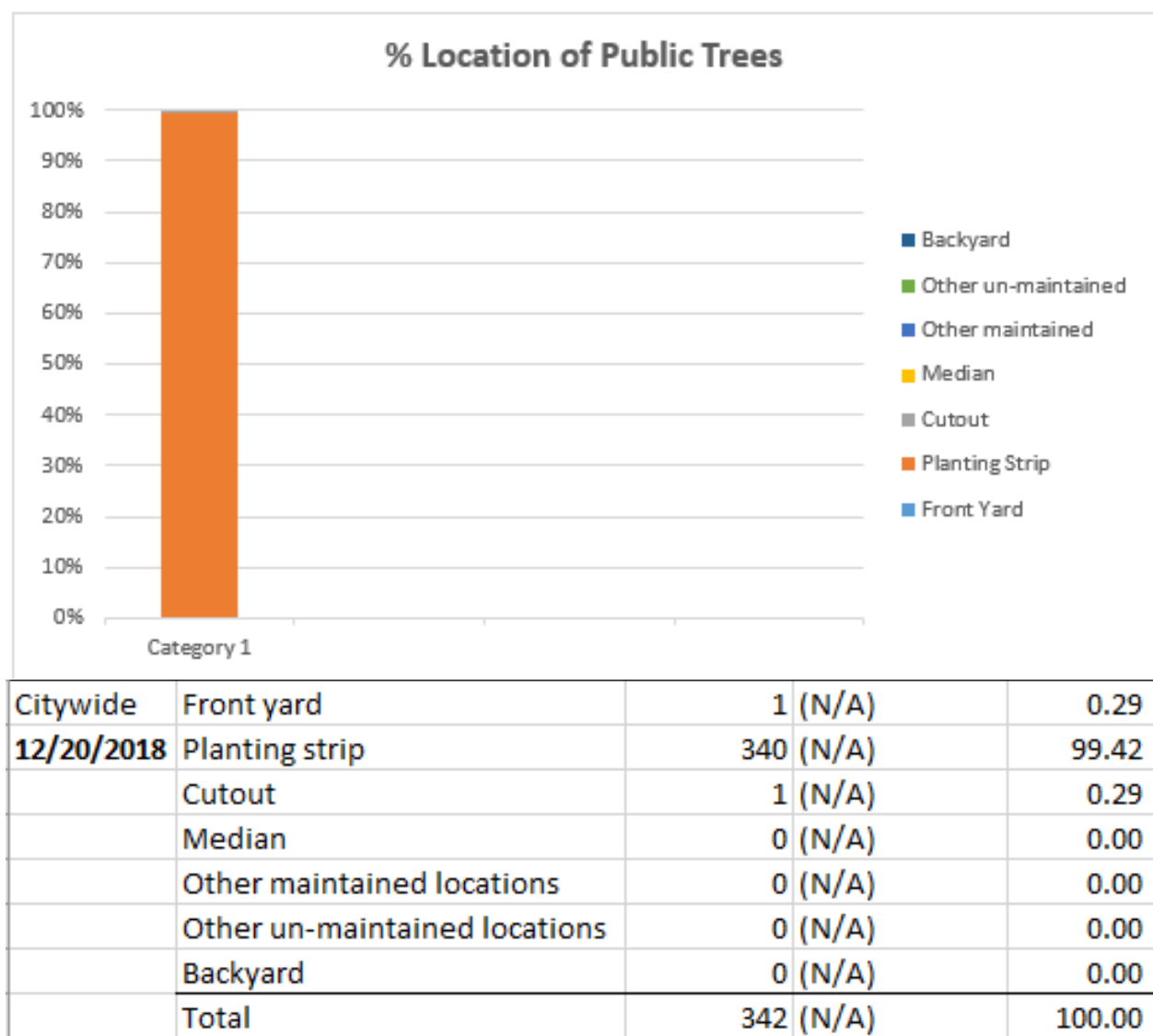
**Figure 7: Location of city/park trees**

# Appendix B: ArcGIS Mapping

**Figure 1:**



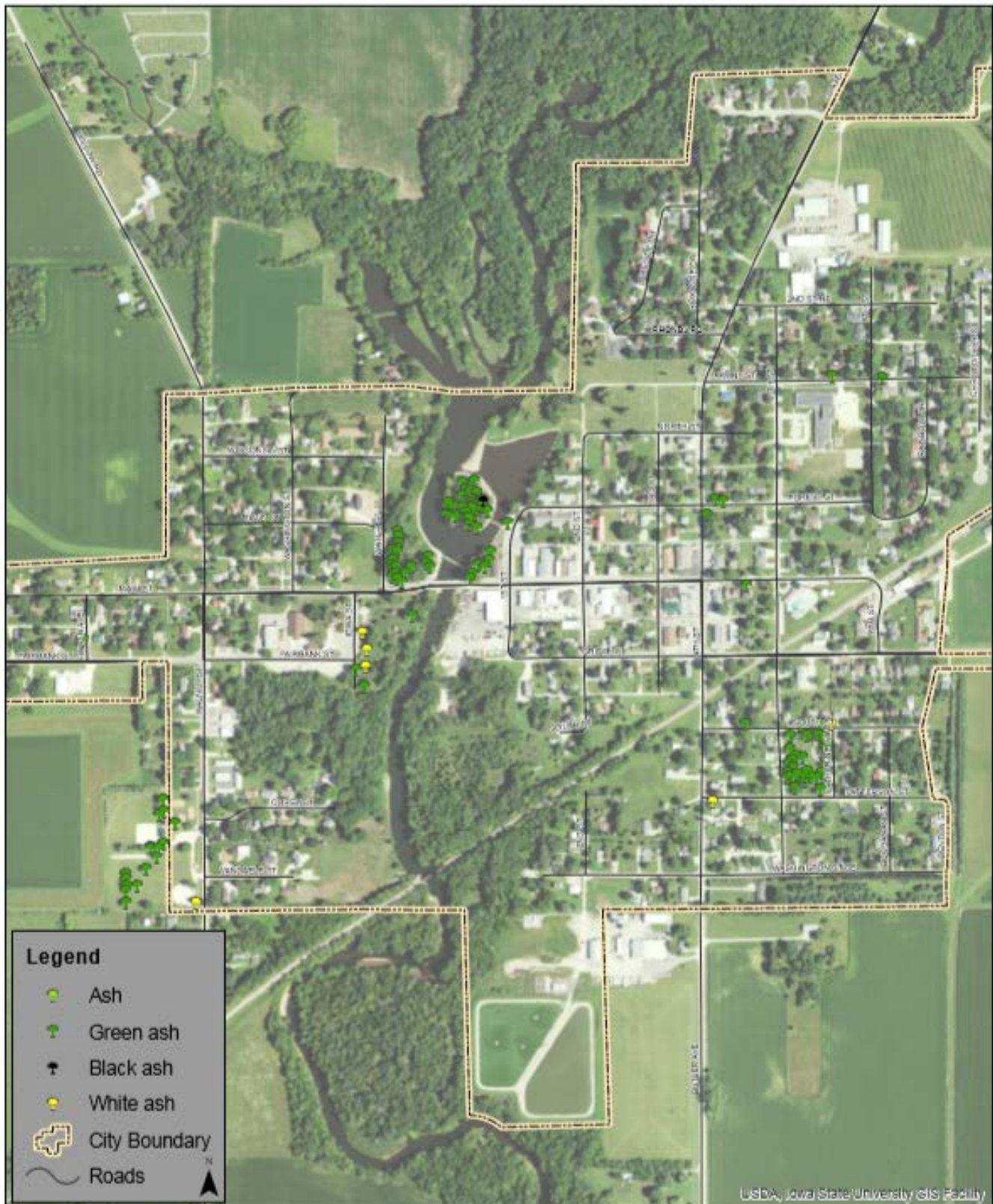Location of Ash Trees
2018 Community Tree Inventory
Fairbank, IA

Legend
- Ash
- Green ash
- Black ash
- White ash
- City Boundary
- Roads

USDA, Iowa State University GIS Facility

Location of EAB Symptoms
2018 Community Tree Inventory
Fairbank, IA



Legend
- Canopy Dieback
- Epicormic Shoots
- Woodpecker Damage
- City Boundary
- Roads

USDA, Iowa State University GIS Facility
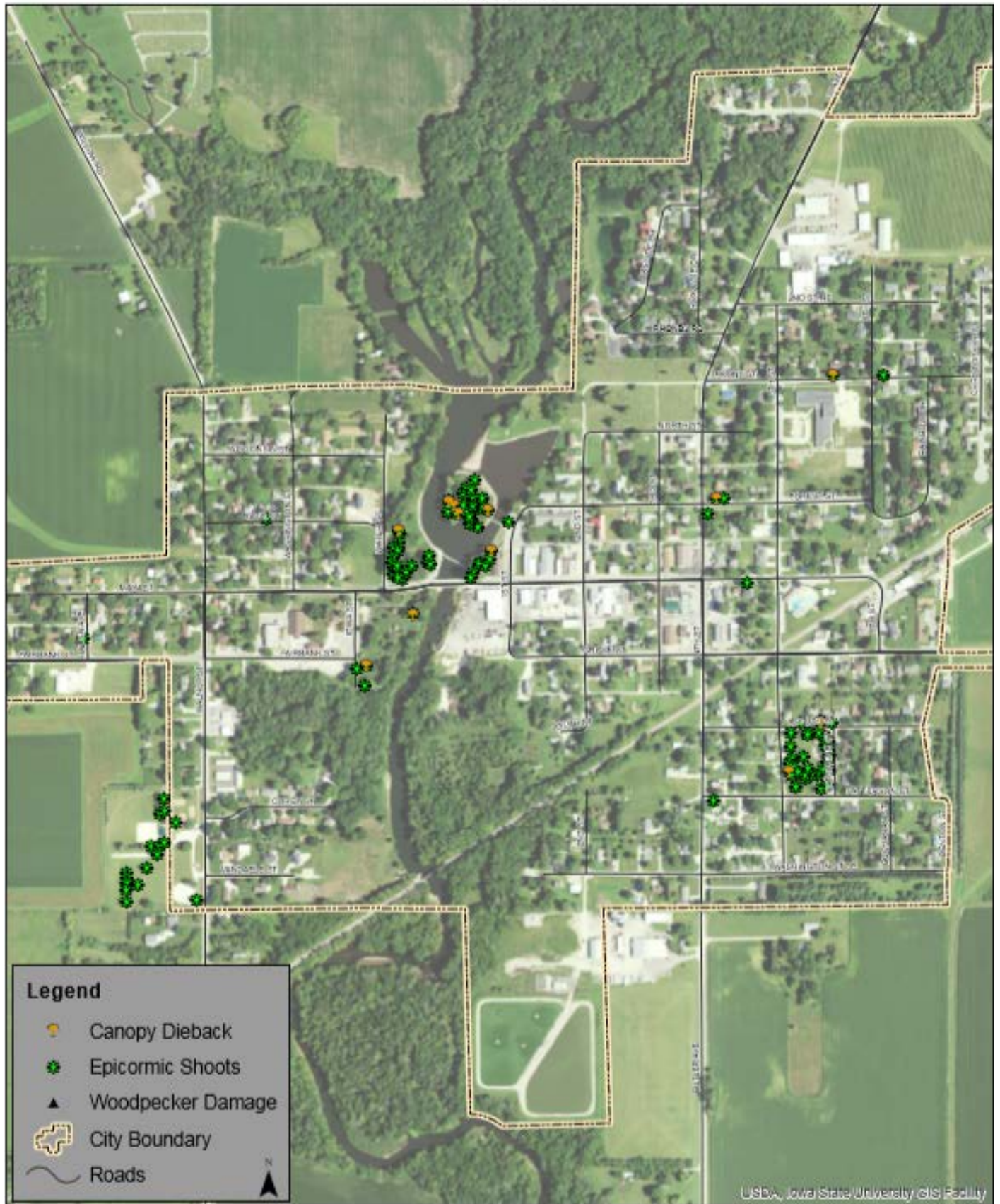
Location of Poor Condition Trees
2018 Community Tree Inventory
Fairbank, IA



Legend

**Leaf Condition**
- Dead or Dying
- Fair
- Poor

**Wood Condition**
- Dead or Dying
- Poor
- Fair
- City Boundary
- Roads
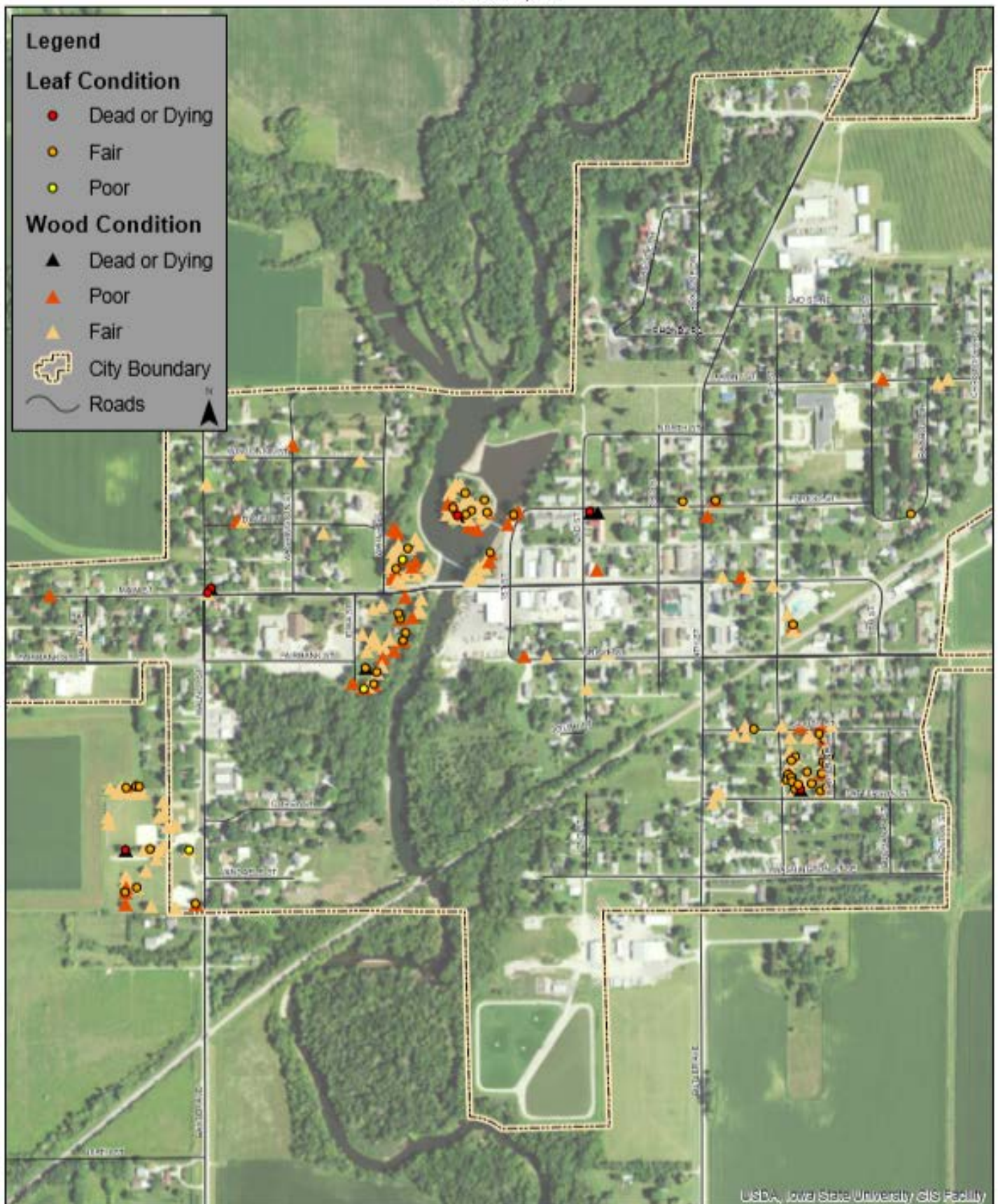
**Figure 4:**

Location of Trees with Recommended Maintenance
2018 Community Tree Inventory
Fairbank, IA

**Legend**
- ● Critical Concern
- ● Mature Tree Immediate
- ● Mature Tree Routine
- ○ Young Tree Immediate
- ○ Young Tree Routine
- ⬡ City Boundary
- ∿ Roads
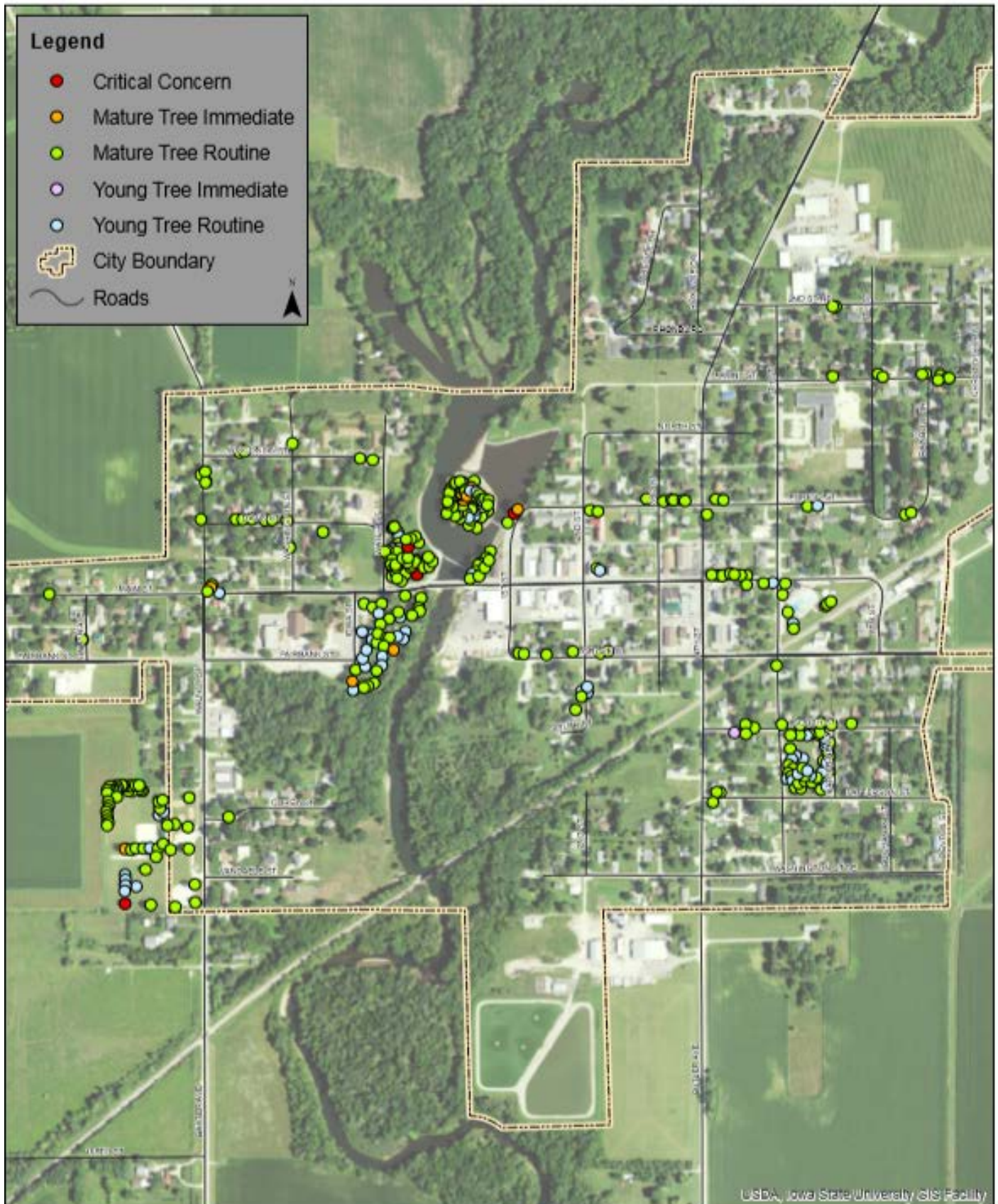
**Figure 5:**

Maintenance Tasks
2018 Community Tree Inventory
Fairbank, IA

**Legend**
- ○ Clean
- ○ Stake/Train
- ○ Raise
- ○ Reduce
- ○ Remove
- ○ Treat pest/disease
- City Boundary
- Roads
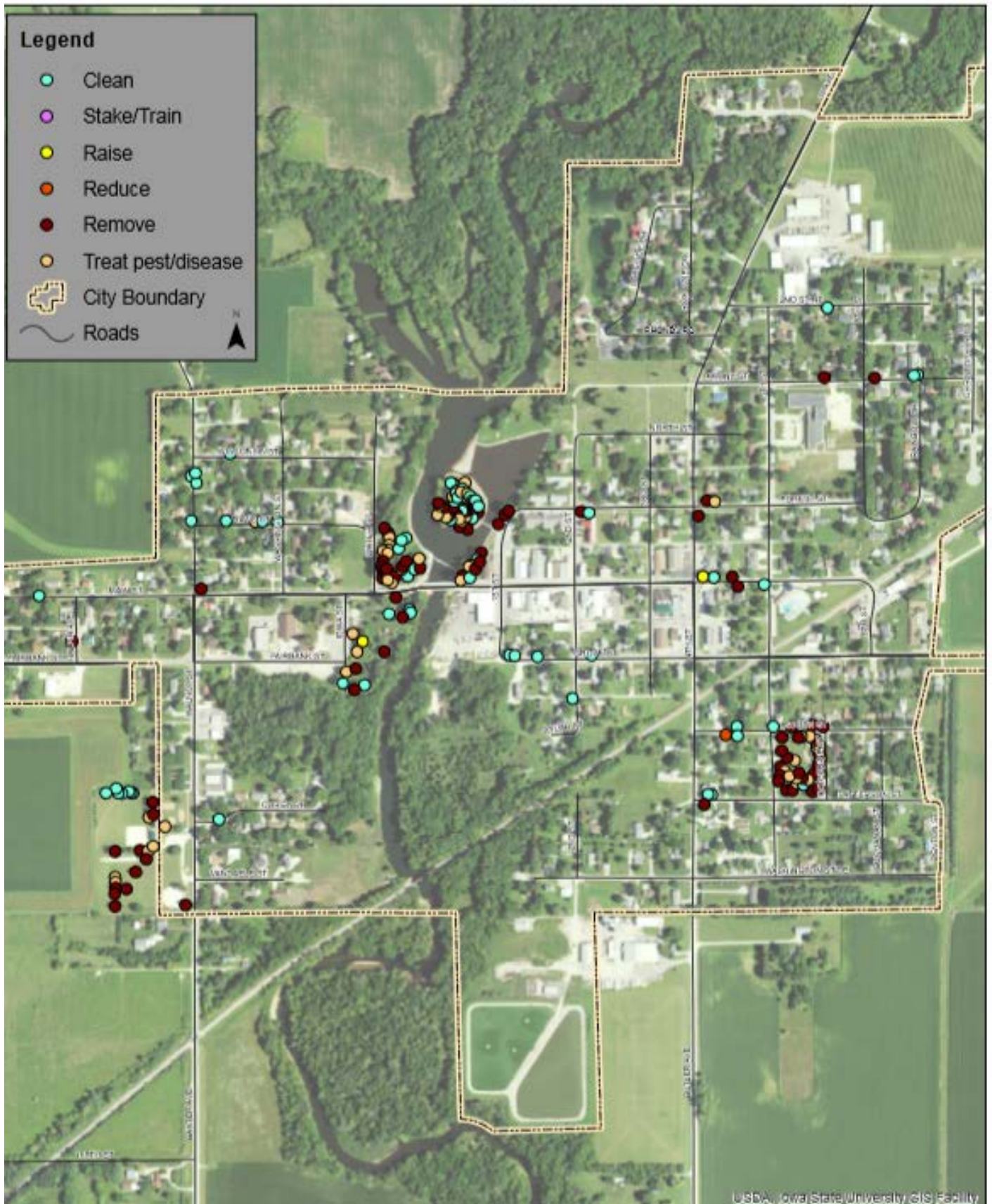
Figure 6:

Location of Treatable Ash Trees
2018 Community Tree Inventory
Fairbank, IA

**Legend**

- Treatable
- City Boundary
- Roads
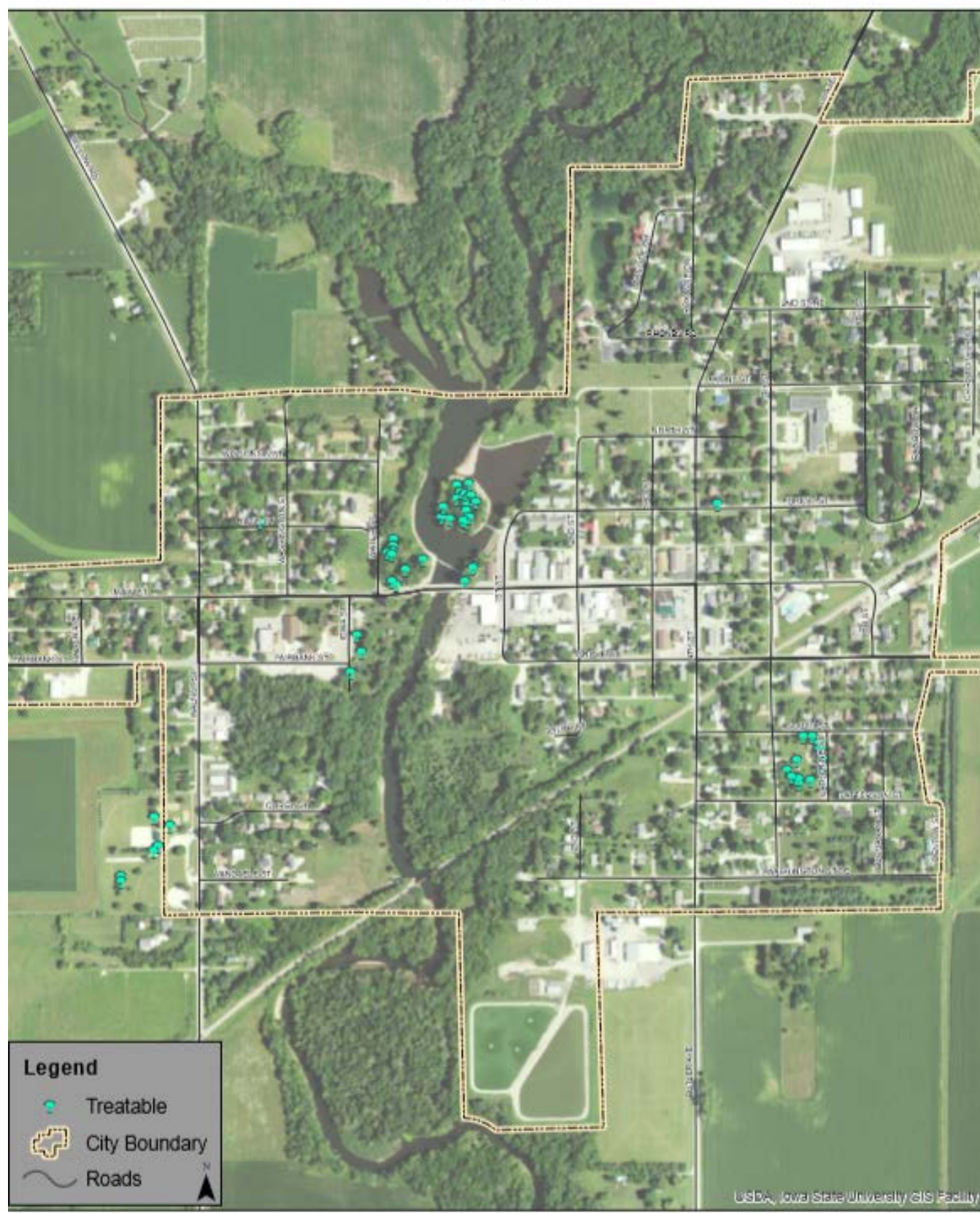
Removed Trees
2018 Community Tree Inventory
Fairbank, IA

**Figure 7:**

Legend
- Removed Trees
- City Boundary
- Roads
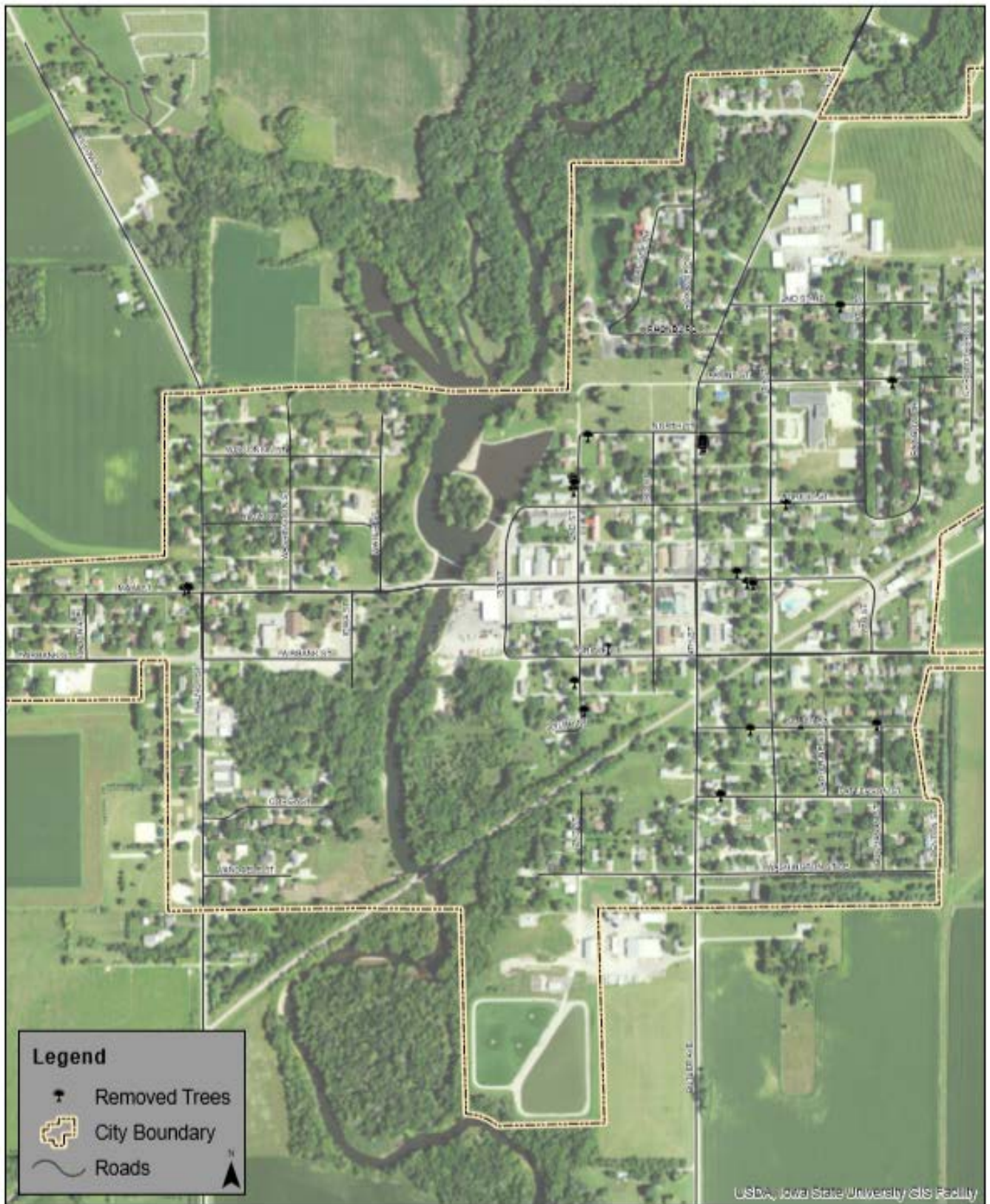
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Federal law prohibits employment discrimination on the basis of race, color, age, religion, national origin, sex or disability. State law prohibits employment discrimination on the basis of race, color, creed, age, sex, sexual orientation, gender identity, national origin, religion, pregnancy, or disability. State law also prohibits public accommodation (such as access to services or physical facilities) discrimination on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, religion, national origin, or disability. If you believe you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please contact the Iowa Civil Rights Commission, 1-800-457-4416, or write to the Iowa Department of Natural Resources, Wallace State Office Bldg., 502 E 9th St, Des Moines IA 50319.

If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-725-8200.