**New Hampton, IA**

# Urban Forestry Management Plan

JEO CONSULTING GROUP

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# Executive Summary

# EXECUTIVE SUMMARY

## Overview

**This plan was developed to assist the City of New Hampton in managing its urban forest, including budgeting and future planning. Trees bring numerous benefits to a community, and sound management helps leaders take advantage of these benefits. Management is especially important now considering the serious threats posed by forest pests like 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 except mountain ash. There is a strong possibility that 15% of New Hampton's city-owned trees will die once EAB becomes established in the community, unless local leaders begin preventative treatment. 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 2022, JEO conducted a tree inventory 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 1,562 trees inventoried.

- New Hampton trees provide $252,803 of benefits annually, an average of $162 per tree
- There are over 42 species of trees
- The top three genera are: Maple 43%, Cedar 18%, and Ash 15%
- 19% of trees need some type of management
- 190 trees should be removed

## Recommendations

We detail our core recommendations in the Recommendations Section. In the Emerald Ash Borer Plan, we include management recommendations. Below are some key recommendations.

- Out of the 190 trees needing removal, 78 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*
- 104 of the 238 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 yearly with a visual survey.
- With the current budget it could take 24 years to remove ash. We suggest that city officials request a budget increase to $14,000 annually and apply for grants to plant replacement trees.

# Introduction

# INTRODUCTION

This plan was developed to assist New Hampton with managing, budgeting, and future planning of their urban forest. Across the state, forestry budgets continue to decrease as a higher percentage of the budgets are devoted to 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, treatment, and replacement planting. With proper planning and management of the current canopy in New Hampton, these costs can be spread out over the years and public safety issues from dead and dying ash trees can be mitigated.

Trees are an important part of New Hampton's infrastructure and one of the city's greatest assets. The benefits of trees are immense. Trees improve air quality, intercept stormwater runoff, conserve energy, lower traffic speeds, increase property values, reduce crime, improve mental health, and create a desirable place to live, to name just a few. Good urban forestry management will maintain these important benefits for the people of New Hampton and future generations.

Urban forestry management sets goals and develops management strategies to achieve them. To develop management strategies, a comprehensive public tree inventory must be conducted. The inventory informs maintenance, removal schedules, tree planting, and budgeting. Aligning management actions with the tree inventory results will help meet New Hampton's urban forestry goals.

| Assist New Hampton with Managing its Urban Forest | Inform on the Benefits of a Healthy Urban Forest | Establish Preventative Treatment for Emerald Ash Borer | Develop Efficient City Tree Management Techniques | Mitigate Public Safety Issues |

# Findings

# INVENTORY

In 2022, JEO conducted a tree inventory that included 100% of the city-owned trees on both streets and parks. The team collected tree data 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 data collectors' programming 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, for all ash trees, the team notes signs and symptoms associated with EAB including canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

# INVENTORY RESULTS

JEO entered the data collected for the 1,562 city trees into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. Following are results from the i-Tree STREETS analysis.

# ANNUAL BENEFITS

## Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. New Hampton's trees reduce energy-related costs by approximately $65,248 annually (Appendix A, Table 1). These savings are both in electricity (309.5 MWh) and in natural gas (42,608.1 Therms).

## Annual Stormwater Benefits

New Hampton's trees intercept about 3,514,575 gallons of rainfall or snow melt per year (Appendix A, Table 2). This interception provides $95,245 in benefit 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 lessens emissions of volatile organic matter (ozone). In New Hampton, it is estimated that trees remove 3,790 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 $10,475 (Appendix A, Table 3).

## Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In New Hampton, trees sequester about 717,126 lbs of carbon per year with an associated value of $8,834 (Appendix A, Table 5). In addition, the trees store 11,417,338 lbs of carbon, with a yearly benefit of $85,630 (Appendix A, Table 4).

## Annual Aesthetics Benefits

The social benefits of trees are hard to capture. The i-Tree 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. New Hampton receives $73,002 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, New Hampton's trees provide $252,803 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 1,562 trees in New Hampton provide approximately $162 annually (Appendix A, Table 7).

| ENERGY | STORMWATER | AIR QUALITY | CARBON | AESTHETICS | SUMMARY |
|---|---|---|---|---|---|
| • Reduce energy cost by **$65,248** | • Intercept 3,514,575 **gallons**<br>• Provides **$95,245** benefit | • Remove 3,790 **lbs** of pollution<br>• Net value of **$10,475** | • Sequester 717,126 **lbs**<br>• Value of **$8,834**<br>• Store 11,417,338 **lbs**<br>• Value of **$85,630** | • **$73,002** in social benefits | • **$252,803** annual benefits<br>• Each tree provides **$162** annually |

# FOREST STRUCTURE

## Species Distribution

New Hampton has over 42 different tree species along city streets and parks (Appendix A, Figure 1).

The distribution of trees by genera is as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| Maple | 668 | 43% | | Elm | 9 | 1% |
| Cedar | 275 | 18% | | Birch | 8 | <1% |
| Ash | 238 | 15% | | Walnut | 5 | <1% |
| Spruce | 120 | 8% | | Pear | 3 | <1% |
| Oak | 43 | 3% | | Hackberry | 3 | <1% |
| Apple | 42 | 3% | | Catalpa | 3 | <1% |
| Pine | 36 | 2% | | Buckeye | 2 | <1% |
| Locust | 33 | 2% | | Mulberry | 2 | <1% |
| Basswood/Linden | 30 | 2% | | Ginkgo | 1 | <1% |
| Cottonwood | 29 | 2% | | Locust | 1 | <1% |
| Boxelder | 10 | 1% | | Willow | 1 | <1% |

## Age Class

Most of New Hampton's trees (46%) are between 6 and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2).

To prepare for natural mortality and to maintain canopy cover, most trees should be in the smallest size category (a downward slope), indicating youth. New Hampton's size curve is on the smaller side, indicating a younger than average stand.

## Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the urban forest's overall health. The foliage condition results for New Hampton indicate that 86% of the trees are in good health, with 12% of the foliage in poor health, dead, or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 74% of New Hampton's trees are in good health for wood condition (Appendix A, Figure 4 & Appendix B, Figure 3). Fourteen percent of the tree population's wood

condition is in poor health, dead, or dying. This 14% 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).

| Action | Number of Trees | Percentage |
|---|---|---|
| Tree Removal | 190 | 12% |
| Crown Cleaning | 98 | 6% |
| Crown Reduction | 9 | 1% |
| Crown Raising | 6 | <1% |
| Tree Staking | 0 | 0% |

## Canopy Cover

The total canopy with both private and public trees is 242 acres or 12% cover. The canopy cover included in the New Hampton inventory includes approximately 34 acres (Appendix A, Figure 4). The city's canopy goal is to increase canopy by 5% in 30 years. To achieve this goal it is estimated that 22 trees need to be planted annually on public and private lands.

## Land Use and Location

The majority of New Hampton'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 | Percentage |
|---|---|
| Single Family Residential | 60% |
| Park/Vacant/Other | 37% |
| Industrial/Large Commercial | 2% |
| Small Commercial | <1% |
| Multifamily Residential | <1% |

# Recommendations

# RECOMMENDATIONS

## Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead, dying, or have large issues such as trunk cracks longer than 18 inches should be removed. Broken branches and branches that interfere with motorists' vision of pedestrians, vehicles, traffic signs and signals should be removed.

### HAZARDOUS TREES

New Hampton has 118 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). We recommend starting with the large-diameter, critical concern trees first. There are 35 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 303 trees with maintenance needs.

### POOR TREE SPECIES

After removing the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 190 removals, 182 are ash trees. There are a total of 238 ash trees, and 104 of those have signs and symptoms that have been associated with EAB. In addition, there are 84 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 removes lower branches that are two inches in diameter or larger to provide clearance for pedestrians or vehicles. Crown reduction removes individual limbs from structures or utility wires. We recommend 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 five years will replace the trees that are removed. We recommend planting 1.2 trees for every tree removed, since survival rates will not be 100%. 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 New Hampton.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (43%) (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: crabapple, Japanese Lilac, serviceberry, oak (red, white), hackberry, linden, elm (disease resistant), cork, London plane, ironwood hornbeam as outlined in section 66.4 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 66.4 (Appendix C).

## Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. We recommend 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

Tree removal will be prioritized by first removing dead, dying, hazardous trees (Appendix B, Figure 4). Next will be all ash in poor condition that display EAB signs and symptoms (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 an effective tool for communities to spread removal costs out over several years while allowing trees to continue providing 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 normally disposed of if your county is not part of a quarantine.

## Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance 66.4 (Appendix C). The new plantings will be a diverse mix and will not include crabapple, Japanese Lilac, serviceberry, oak (red, white), hackberry, linden, elm (disease resistant), cork, London plane, ironwood hornbeam.

## 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 EAB signs and symptoms including canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

## Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if preventative treatments are not being used. City Code 66.8 states "A property owner may remove a tree that is on personal property as long as the property owner does the actual work. Otherwise, the property owner must hire a licensed tree surgeon to remove the tree."

# Schedule & Budget
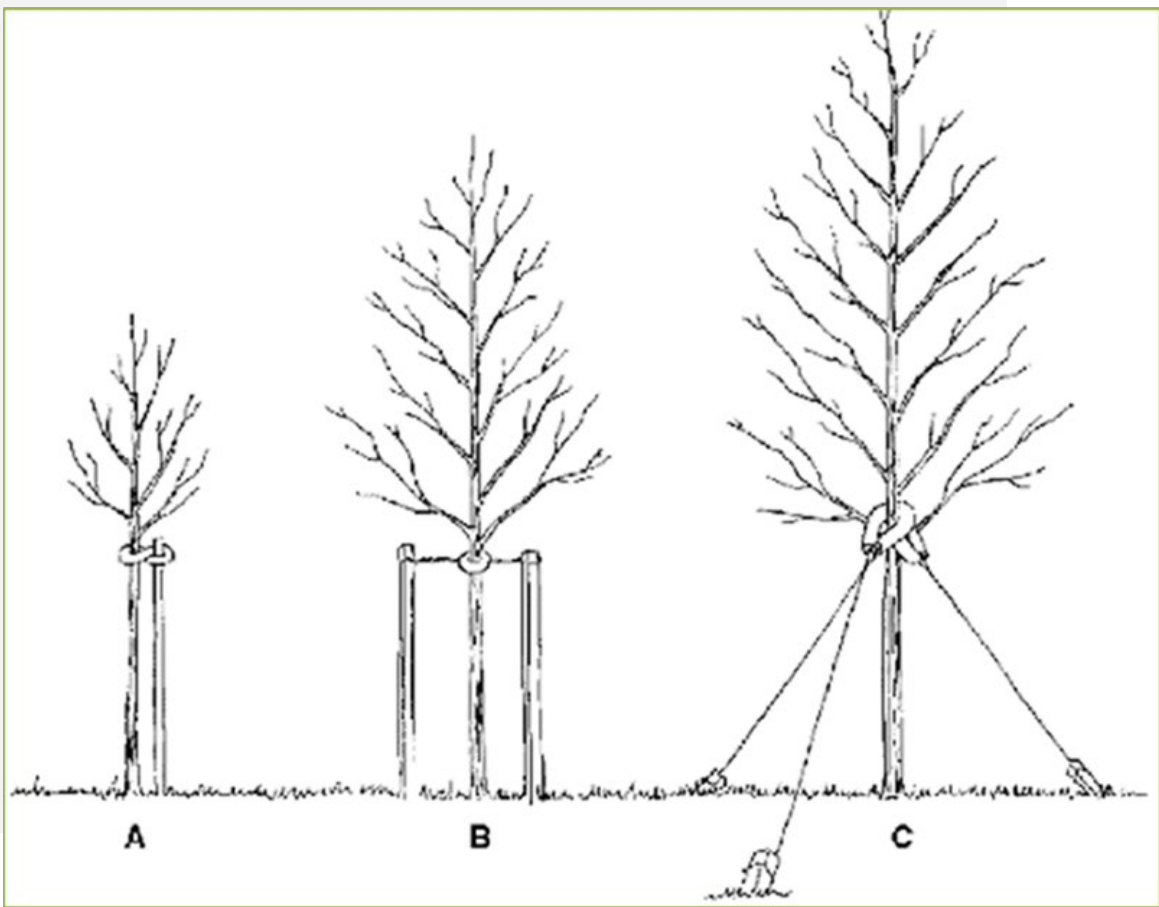
# PROPOSED WORK SCHEDULE & BUDGET

Budget Allowance of $7,000/Year – (Based off $2/Resident Estimation)

| YEAR 1 | Est. Cost |
|---|---|
| Remove 5 trees recommended for immediate removal | $3,500 |
| Remove 3 ash tree in poor condition | $2,100 |
| Plant 9 trees in open locations | $1,350 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,950** |

| YEAR 4 | Est. Cost |
|---|---|
| Remove 3 ash trees | $2,100 |
| Plant 6 trees in open locations | $900 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,905** |

| YEAR 2 | Est. Cost |
|---|---|
| Remove 3 tree recommended for immediate removal | $2,100 |
| Plant 6 trees in open locations | $900 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,905** |

| YEAR 5 | Est. Cost |
|---|---|
| Remove 8 trees recommended for removal | $5,600 |
| Plant 9 trees in open locations | $1,350 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,950** |

| YEAR 3 | Est. Cost |
|---|---|
| Remove 3 tree recommended for immediate removal | $2,100 |
| Remove 5 ash trees in poor condition | $3,500 |
| Plant 9 trees in open locations | $1,350 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,950** |

| YEAR 6 | Est. Cost |
|---|---|
| Remove 3 ash tree | $2,100 |
| Plant 6 trees in open locations | $900 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$6,905** |

*Estimated costs based on average costs of $700/tree for removal, $150/tree for planting and maintenance, and $15/tree for pruning.*

*\*\*To remove all ash trees within 6 years alone, the budget would need to be $28,000 a year. If the budget were increased to $14,000 a year all ash could be removed in 12 years.*

# PROPOSED WORK SCHEDULE WITH INCREASED BUDGET

Budget Allowance of $14,000/Year – (Budget Increase Suggested to Best Manage City Trees)

| YEAR 1 | Est. Cost |
|---|---|
| Remove 6 trees recommended for immediate removal | $4,200 |
| Remove 10 ash trees in poor condition | $7,000 |
| Plant 18 trees in open locations | $2,700 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$13,900** |

| YEAR 4 | Est. Cost |
|---|---|
| Remove 11 ash trees | $7,700 |
| Plant 14 trees in open locations | $2,100 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$13,705** |

| YEAR 2 | Est. Cost |
|---|---|
| Remove 12 ash trees in poor condition | $8,400 |
| Plant 11 trees in open locations | $1,650 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$13,955** |

| YEAR 5 | Est. Cost |
|---|---|
| Remove 14 ash trees | $9,800 |
| Plant 28 trees in open locations | $4,200 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$14,000** |

| YEAR 3 | Est. Cost |
|---|---|
| Remove 15 ash trees | $10,500 |
| Plant 22 trees in open locations | $3,300 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$13,800** |

| YEAR 6 | Est. Cost |
|---|---|
| Remove 11 trees recommended for removal | $7,700 |
| Plant 15 trees in open locations | $2,250 |
| Prune 1/6 of city owned trees | $3,905 |
| Visual Survey of EAB Signs/Symptoms | n/a |
| TOTAL | **$13,855** |

**Purposed Budget Increase**

EAB could potentially kill all ash trees in New Hampton within four years of its arrival. To remove all ash trees within six years, the budget would need to be increased to $28,000 a year. If the budget were increased to $14,000 per year all ash could be removed within 12 years. Additionally, we recommend that New Hampton 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 considered by many communities is treating 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 removal 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 $15 per inch, about 6 trees could be treated per year (every other year treatment). Twelve trees would be selected for treatment, and New Hampton would still need to find $158,200 for removal. Alternatively, if there are 16 treatable trees, it would cost approximately $2,400 a year for treatment and leave $4,600 for removal. 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 if EAB is found in New Hampton. We suggest considering an increased budget to plan for this.

## WORKS CITED

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


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


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


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


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

# Appendices

# APPENDIX A: i-TREE DATA

**Table 1: Annual Energy Benefits**

**New Hampton**

# Annual Energy Benefits of Public Trees

2/7/2023

| Species | Total Electricity (MWh) | Electricity ($) | Total Natural Gas (Therms) | Natural Gas ($) | Total ($) | Standard Error | % of Total Trees | % of Total $ | Avg. $/tree |
|---|---|---|---|---|---|---|---|---|---|
| Norway maple | 58.5 | 4,441 | 8,436.4 | 8,268 | 12,709 | (N/A) | 16.8 | 19.5 | 48.51 |
| Green ash | 61.1 | 4,637 | 8,400.0 | 8,232 | 12,869 | (N/A) | 14.7 | 19.7 | 55.95 |
| Northern white cedar | 10.5 | 800 | 1,705.9 | 1,672 | 2,472 | (N/A) | 10.8 | 3.8 | 14.63 |
| Silver maple | 55.0 | 4,172 | 7,239.2 | 7,094 | 11,266 | (N/A) | 10.6 | 17.3 | 67.87 |
| Sugar maple | 40.3 | 3,058 | 5,379.8 | 5,272 | 8,330 | (N/A) | 9.5 | 12.8 | 55.91 |
| Spruce | 14.3 | 1,084 | 1,802.4 | 1,766 | 2,850 | (N/A) | 7.6 | 4.4 | 23.95 |
| Eastern red cedar | 7.9 | 602 | 1,214.9 | 1,191 | 1,792 | (N/A) | 6.8 | 2.7 | 16.91 |
| Maple | 4.0 | 300 | 548.0 | 537 | 837 | (N/A) | 2.9 | 1.3 | 18.61 |
| Apple | 3.3 | 254 | 524.7 | 514 | 768 | (N/A) | 2.7 | 1.2 | 18.29 |
| Red maple | 2.8 | 211 | 381.7 | 374 | 585 | (N/A) | 2.4 | 0.9 | 15.39 |
| Honeylocust | 10.1 | 768 | 1,315.3 | 1,289 | 2,057 | (N/A) | 2.1 | 3.2 | 62.32 |
| Eastern white pine | 4.4 | 334 | 579.1 | 568 | 901 | (N/A) | 1.9 | 1.4 | 31.08 |
| Cottonwood | 7.6 | 578 | 1,024.8 | 1,004 | 1,582 | (N/A) | 1.9 | 2.4 | 54.55 |
| Pin oak | 4.9 | 375 | 661.6 | 648 | 1,023 | (N/A) | 1.2 | 1.6 | 56.86 |
| Littleleaf linden | 3.3 | 250 | 455.7 | 447 | 697 | (N/A) | 1.1 | 1.1 | 40.98 |
| Northern red oak | 2.3 | 172 | 304.4 | 298 | 470 | (N/A) | 0.8 | 0.7 | 36.17 |
| American basswood | 4.2 | 318 | 607.1 | 595 | 913 | (N/A) | 0.8 | 1.4 | 70.22 |
| Boxelder | 1.9 | 146 | 254.1 | 249 | 395 | (N/A) | 0.6 | 0.6 | 39.48 |
| Black maple | 0.8 | 64 | 113.5 | 111 | 175 | (N/A) | 0.5 | 0.3 | 21.93 |
| White ash | 1.5 | 115 | 173.9 | 170 | 286 | (N/A) | 0.4 | 0.4 | 47.59 |
| Oak | 1.8 | 138 | 252.5 | 247 | 385 | (N/A) | 0.4 | 0.6 | 64.20 |
| Bur oak | 0.9 | 66 | 119.1 | 117 | 183 | (N/A) | 0.3 | 0.3 | 36.61 |
| Paper birch | 0.6 | 47 | 83.0 | 81 | 129 | (N/A) | 0.3 | 0.2 | 25.73 |
| Black walnut | 1.2 | 90 | 163.8 | 161 | 250 | (N/A) | 0.3 | 0.4 | 50.08 |
| Siberian elm | 1.7 | 127 | 226.5 | 222 | 349 | (N/A) | 0.3 | 0.5 | 69.77 |
| Red pine | 0.5 | 38 | 63.4 | 62 | 100 | (N/A) | 0.3 | 0.2 | 25.01 |
| Elm | 0.7 | 52 | 99.2 | 97 | 150 | (N/A) | 0.3 | 0.2 | 37.38 |
| Pear | 0.1 | 5 | 11.4 | 11 | 16 | (N/A) | 0.2 | 0.0 | 5.40 |
| Northern hackberry | 0.2 | 13 | 26.7 | 26 | 39 | (N/A) | 0.2 | 0.1 | 12.91 |
| Catalpa | 1.3 | 96 | 171.6 | 168 | 264 | (N/A) | 0.2 | 0.4 | 88.02 |
| Scotch pine | 0.4 | 28 | 49.2 | 48 | 76 | (N/A) | 0.1 | 0.1 | 38.17 |
| Ohio buckeye | 0.2 | 16 | 33.7 | 33 | 49 | (N/A) | 0.1 | 0.1 | 24.47 |
| Birch | 0.4 | 27 | 53.6 | 53 | 80 | (N/A) | 0.1 | 0.1 | 39.91 |
| Mulberry | 0.0 | 3 | 7.6 | 7 | 11 | (N/A) | 0.1 | 0.0 | 5.40 |
| Mountain ash | 0.4 | 28 | 49.3 | 48 | 76 | (N/A) | 0.1 | 0.1 | 38.13 |
| Blue spruce | 0.1 | 11 | 19.5 | 19 | 30 | (N/A) | 0.1 | 0.0 | 29.65 |
| Conifer Evergreen Large | 0.1 | 10 | 14.6 | 14 | 24 | (N/A) | 0.1 | 0.0 | 24.14 |
| Ginkgo | 0.0 | 0 | 0.4 | 0 | 1 | (N/A) | 0.1 | 0.0 | 0.57 |
| Quaking aspen | 0.0 | 0 | 0.5 | 0 | 1 | (N/A) | 0.1 | 0.0 | 0.66 |
| Black locust | 0.0 | 3 | 6.2 | 6 | 9 | (N/A) | 0.1 | 0.0 | 8.99 |
| Willow | 0.1 | 8 | 16.9 | 17 | 24 | (N/A) | 0.1 | 0.0 | 24.47 |
| Swamp white oak | 0.1 | 8 | 16.9 | 17 | 24 | (N/A) | 0.1 | 0.0 | 24.47 |
| Total | 309.5 | 23,492 | 42,608.1 | 41,756 | 65,248 | (N/A) | 100.0 | 100.0 | 41.77 |

**Table 2: Annual Stormwater Benefits**

**New Hampton**

# Annual Stormwater Benefits of Public Trees

2/7/2023

| Species | Total rainfall interception (Gal) | Total ($) | Standard Error | % of Total Trees | % of Total $ | Avg. $/tree |
|---|---|---|---|---|---|---|
| Norway maple | 527,872 | 14,305 | (N/A) | 16.8 | 15.0 | 54.60 |
| Green ash | 643,011 | 17,426 | (N/A) | 14.7 | 18.3 | 75.76 |
| Northern white cedar | 125,760 | 3,408 | (N/A) | 10.8 | 3.6 | 20.17 |
| Silver maple | 795,400 | 21,555 | (N/A) | 10.6 | 22.6 | 129.85 |
| Sugar maple | 444,560 | 12,048 | (N/A) | 9.5 | 12.6 | 80.86 |
| Spruce | 220,704 | 5,981 | (N/A) | 7.6 | 6.3 | 50.26 |
| Eastern red cedar | 112,791 | 3,057 | (N/A) | 6.8 | 3.2 | 28.84 |
| Maple | 27,297 | 740 | (N/A) | 2.9 | 0.8 | 16.44 |
| Apple | 13,720 | 372 | (N/A) | 2.7 | 0.4 | 8.85 |
| Red maple | 15,669 | 425 | (N/A) | 2.4 | 0.4 | 11.17 |
| Honeylocust | 102,609 | 2,781 | (N/A) | 2.1 | 2.9 | 84.26 |
| Eastern white pine | 93,094 | 2,523 | (N/A) | 1.9 | 2.6 | 86.99 |
| Cottonwood | 84,722 | 2,296 | (N/A) | 1.9 | 2.4 | 79.17 |
| Pin oak | 45,457 | 1,232 | (N/A) | 1.2 | 1.3 | 68.44 |
| Littleleaf linden | 30,172 | 818 | (N/A) | 1.1 | 0.9 | 48.10 |
| Northern red oak | 20,177 | 547 | (N/A) | 0.8 | 0.6 | 42.06 |
| American basswood | 50,201 | 1,360 | (N/A) | 0.8 | 1.4 | 104.65 |
| Boxelder | 17,053 | 462 | (N/A) | 0.6 | 0.5 | 46.21 |
| Black maple | 7,396 | 200 | (N/A) | 0.5 | 0.2 | 25.05 |
| White ash | 14,097 | 382 | (N/A) | 0.4 | 0.4 | 63.67 |
| Oak | 19,828 | 537 | (N/A) | 0.4 | 0.6 | 89.56 |
| Bur oak | 10,627 | 288 | (N/A) | 0.3 | 0.3 | 57.60 |
| Paper birch | 4,854 | 132 | (N/A) | 0.3 | 0.1 | 26.31 |
| Black walnut | 11,198 | 303 | (N/A) | 0.3 | 0.3 | 60.69 |
| Siberian elm | 18,890 | 512 | (N/A) | 0.3 | 0.5 | 102.38 |
| Red pine | 8,277 | 224 | (N/A) | 0.3 | 0.2 | 56.08 |
| Elm | 7,159 | 194 | (N/A) | 0.3 | 0.2 | 48.50 |
| Pear | 206 | 6 | (N/A) | 0.2 | 0.0 | 1.86 |
| Northern hackberry | 817 | 22 | (N/A) | 0.2 | 0.0 | 7.38 |
| Catalpa | 19,968 | 541 | (N/A) | 0.2 | 0.6 | 180.38 |
| Scotch pine | 9,209 | 250 | (N/A) | 0.1 | 0.3 | 124.79 |
| Ohio buckeye | 1,172 | 32 | (N/A) | 0.1 | 0.0 | 15.88 |
| Birch | 3,927 | 106 | (N/A) | 0.1 | 0.1 | 53.21 |
| Mulberry | 137 | 4 | (N/A) | 0.1 | 0.0 | 1.86 |
| Mountain ash | 1,333 | 36 | (N/A) | 0.1 | 0.0 | 18.06 |
| Blue spruce | 2,312 | 63 | (N/A) | 0.1 | 0.1 | 62.66 |
| Conifer Evergreen Large | 1,539 | 42 | (N/A) | 0.1 | 0.0 | 41.70 |
| Ginkgo | 7 | 0 | (N/A) | 0.1 | 0.0 | 0.19 |
| Quaking aspen | 18 | 0 | (N/A) | 0.1 | 0.0 | 0.48 |
| Black locust | 163 | 4 | (N/A) | 0.1 | 0.0 | 4.41 |
| Willow | 586 | 16 | (N/A) | 0.1 | 0.0 | 15.88 |
| Swamp white oak | 586 | 16 | (N/A) | 0.1 | 0.0 | 15.88 |
| Citywide total | 3,514,575 | 95,245 | (N/A) | 100.0 | 100.0 | 60.98 |

## Table 3: Annual Air Quality Benefits

# Annual Air Quality Benefits of Public Trees

2/7/2023

| Species | Deposition (lb) | | | | Total Depos. ($) | Avoided (lb) | | | | Total Avoided ($) | BVOC Emissions (lb) | BVOC Emissions ($) | Total (lb) | Total ($) Standard Error | % of Total Trees | Avg. $/tree |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $O_3$ | $NO_2$ | $PM_{10}$ | $SO_2$ | | $NO_2$ | $PM_{10}$ | VOC | $SO_2$ | | | | | | | |
| Norway maple | 105.4 | 18.2 | 52.2 | 4.7 | 571 | 283.7 | 41.0 | 39.0 | 265.5 | 1,757 | -24.9 | -94 | 784.7 | 2,234 (N/A) | 16.8 | 8.53 |
| Green ash | 75.1 | 12.0 | 36.7 | 3.4 | 402 | 292.0 | 42.5 | 40.5 | 276.9 | 1,818 | 0.0 | 0 | 779.0 | 2,220 (N/A) | 14.7 | 9.65 |
| Northern white cedar | 11.8 | 2.3 | 11.6 | 1.5 | 83 | 52.6 | 7.5 | 7.1 | 47.7 | 322 | -43.1 | -162 | 99.0 | 243 (N/A) | 10.8 | 1.44 |
| Silver maple | 137.7 | 23.3 | 67.5 | 6.1 | 742 | 259.1 | 37.9 | 36.2 | 248.6 | 1,621 | -70.9 | -266 | 745.6 | 2,097 (N/A) | 10.6 | 12.63 |
| Sugar maple | 58.7 | 10.0 | 29.3 | 2.6 | 318 | 190.9 | 27.9 | 26.6 | 182.5 | 1,193 | -46.1 | -173 | 482.5 | 1,338 (N/A) | 9.5 | 8.98 |
| Spruce | 24.8 | 4.9 | 20.9 | 3.1 | 165 | 66.6 | 9.8 | 9.4 | 64.7 | 419 | -94.2 | -353 | 110.0 | 230 (N/A) | 7.6 | 1.94 |
| Eastern red cedar | 19.0 | 3.8 | 15.5 | 2.3 | 125 | 38.9 | 5.6 | 5.3 | 35.9 | 240 | -61.4 | -230 | 64.9 | 134 (N/A) | 6.8 | 1.27 |
| Maple | 5.4 | 0.9 | 2.7 | 0.2 | 29 | 18.9 | 2.8 | 2.6 | 17.9 | 118 | -1.9 | -7 | 49.5 | 140 (N/A) | 2.9 | 3.10 |
| Apple | 3.8 | 0.6 | 1.8 | 0.2 | 20 | 16.6 | 2.4 | 2.2 | 15.2 | 102 | 0.0 | 0 | 42.7 | 122 (N/A) | 2.7 | 2.90 |
| Red maple | 2.4 | 0.4 | 1.3 | 0.1 | 13 | 13.2 | 1.9 | 1.8 | 12.6 | 82 | -1.0 | -4 | 32.8 | 92 (N/A) | 2.4 | 2.42 |
| Honeylocust | 19.7 | 3.3 | 9.1 | 0.9 | 104 | 47.6 | 7.0 | 6.7 | 45.8 | 298 | -14.9 | -56 | 125.0 | 346 (N/A) | 2.1 | 10.50 |
| Eastern white pine | 11.1 | 2.2 | 9.0 | 1.4 | 73 | 20.7 | 3.0 | 2.9 | 19.9 | 130 | -51.5 | -193 | 18.8 | 10 (N/A) | 1.9 | 0.33 |
| Cottonwood | 11.1 | 1.8 | 5.3 | 0.5 | 59 | 36.2 | 5.3 | 5.0 | 34.5 | 226 | 0.0 | 0 | 99.6 | 285 (N/A) | 1.9 | 9.82 |
| Pin oak | 7.1 | 1.2 | 3.8 | 0.3 | 39 | 23.4 | 3.4 | 3.3 | 22.4 | 146 | -13.6 | -51 | 51.3 | 135 (N/A) | 1.2 | 7.47 |
| Littleleaf linden | 4.8 | 0.8 | 2.4 | 0.2 | 26 | 15.8 | 2.3 | 2.2 | 15.0 | 98 | -2.4 | -9 | 41.1 | 116 (N/A) | 1.1 | 6.79 |
| Northern red oak | 4.1 | 0.7 | 2.0 | 0.2 | 22 | 10.7 | 1.6 | 1.5 | 10.3 | 67 | -5.8 | -22 | 25.2 | 67 (N/A) | 0.8 | 5.18 |
| American basswood | 7.1 | 1.2 | 3.4 | 0.3 | 38 | 20.3 | 2.9 | 2.8 | 19.0 | 126 | -5.9 | -22 | 51.2 | 142 (N/A) | 0.8 | 10.90 |
| Boxelder | 1.9 | 0.3 | 1.0 | 0.1 | 10 | 9.1 | 1.3 | 1.3 | 8.7 | 57 | -0.9 | -3 | 22.8 | 64 (N/A) | 0.6 | 6.40 |
| Black maple | 1.8 | 0.3 | 0.8 | 0.1 | 10 | 4.0 | 0.6 | 0.6 | 3.8 | 25 | -0.6 | -2 | 11.4 | 32 (N/A) | 0.5 | 4.06 |
| White ash | 2.3 | 0.4 | 1.1 | 0.1 | 12 | 6.9 | 1.0 | 1.0 | 6.9 | 44 | 0.0 | 0 | 19.7 | 56 (N/A) | 0.4 | 9.36 |
| Oak | 2.4 | 0.4 | 1.1 | 0.1 | 13 | 8.7 | 1.3 | 1.2 | 8.2 | 54 | 0.0 | 0 | 23.4 | 67 (N/A) | 0.4 | 11.11 |
| Bur oak | 1.9 | 0.3 | 0.9 | 0.1 | 10 | 4.2 | 0.6 | 0.6 | 4.0 | 26 | 0.0 | 0 | 12.4 | 36 (N/A) | 0.3 | 7.17 |
| Paper birch | 0.4 | 0.1 | 0.2 | 0.0 | 2 | 3.0 | 0.4 | 0.4 | 2.8 | 18 | 0.0 | 0 | 7.3 | 21 (N/A) | 0.3 | 4.14 |
| Black walnut | 1.2 | 0.2 | 0.6 | 0.1 | 6 | 5.7 | 0.8 | 0.8 | 5.4 | 35 | 0.0 | 0 | 14.6 | 42 (N/A) | 0.3 | 8.31 |
| Siberian elm | 3.3 | 0.6 | 1.6 | 0.1 | 18 | 8.0 | 1.2 | 1.1 | 7.6 | 50 | 0.0 | 0 | 23.4 | 67 (N/A) | 0.3 | 13.49 |
| Red pine | 1.0 | 0.2 | 0.8 | 0.1 | 6 | 2.3 | 0.3 | 0.3 | 2.3 | 15 | -4.1 | -15 | 3.2 | 6 (N/A) | 0.3 | 1.39 |
| Elm | 0.8 | 0.1 | 0.4 | 0.0 | 4 | 3.3 | 0.5 | 0.5 | 3.1 | 21 | 0.0 | 0 | 8.7 | 25 (N/A) | 0.3 | 6.22 |
| Pear | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.3 | 0.0 | 0.0 | 0.3 | 2 | 0.0 | 0 | 0.8 | 2 (N/A) | 0.2 | 0.71 |
| Northern hackberry | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.8 | 0.1 | 0.1 | 0.7 | 5 | 0.0 | 0 | 1.9 | 5 (N/A) | 0.2 | 1.77 |
| Catalpa | 3.1 | 0.5 | 1.4 | 0.1 | 16 | 6.0 | 0.9 | 0.8 | 5.7 | 38 | 0.0 | 0 | 18.6 | 54 (N/A) | 0.2 | 17.93 |
| Scotch pine | 1.1 | 0.2 | 0.9 | 0.1 | 7 | 1.8 | 0.3 | 0.2 | 1.7 | 11 | -5.7 | -21 | 0.6 | -3 (N/A) | 0.1 | -1.58 |
| Ohio buckeye | 0.1 | 0.0 | 0.1 | 0.0 | 1 | 1.0 | 0.1 | 0.1 | 1.0 | 6 | 0.0 | 0 | 2.5 | 7 (N/A) | 0.1 | 3.47 |
| Birch | 0.9 | 0.2 | 0.4 | 0.0 | 5 | 1.8 | 0.3 | 0.2 | 1.6 | 11 | -0.2 | -1 | 5.2 | 15 (N/A) | 0.1 | 7.40 |
| Mulberry | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.2 | 0.0 | 0.0 | 0.2 | 1 | 0.0 | 0 | 0.5 | 1 (N/A) | 0.1 | 0.71 |

**New Hampton**

# Annual Air Quality Benefits of Public Trees

2/7/2023

| Species | Deposition (lb) | | | | Total Depos. ($) | Avoided (lb) | | | | Total Avoided ($) | BVOC Emissions (lb) | BVOC Emissions ($) | Total (lb) | Total Standard ($) Error | % of Total Trees | Avg. $/tree |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $O_3$ | $NO_2$ | $PM_{10}$ | $SO_2$ | | $NO_2$ | $PM_{10}$ | VOC | $SO_2$ | | | | | | | |
| Mountain ash | 0.4 | 0.1 | 0.2 | 0.0 | 2 | 1.7 | 0.3 | 0.2 | 1.7 | 11 | 0.0 | 0 | 4.6 | 13 (N/A) | 0.1 | 6.56 |
| Blue spruce | 0.4 | 0.1 | 0.3 | 0.0 | 2 | 0.7 | 0.1 | 0.1 | 0.6 | 4 | -0.9 | -3 | 1.3 | 3 (N/A) | 0.1 | 3.10 |
| Conifer Evergreen Large | 0.2 | 0.0 | 0.1 | 0.0 | 1 | 0.6 | 0.1 | 0.1 | 0.6 | 4 | -0.5 | -2 | 1.2 | 3 (N/A) | 0.1 | 2.82 |
| 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) | 0.1 | 0.07 |
| Quaking aspen | 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) | 0.1 | 0.08 |
| Black locust | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.2 | 0.0 | 0.0 | 0.2 | 1 | 0.0 | 0 | 0.4 | 1 (N/A) | 0.1 | 1.21 |
| Willow | 0.1 | 0.0 | 0.0 | 0.0 | 0 | 0.5 | 0.1 | 0.1 | 0.5 | 3 | 0.0 | 0 | 1.2 | 3 (N/A) | 0.1 | 3.47 |
| Swamp white oak | 0.1 | 0.0 | 0.0 | 0.0 | 0 | 0.5 | 0.1 | 0.1 | 0.5 | 3 | 0.0 | 0 | 1.2 | 3 (N/A) | 0.1 | 3.47 |
| Citywide total | 532.3 | 91.6 | 286.4 | 29.1 | 2,957 | 1,478.8 | 215.2 | 205.1 | 1,402.3 | 9,208 | -450.8 | -1,691 | 3,790.0 | 10,475 (N/A) | 100.0 | 6.71 |

**Table 4: Annual Carbon Stored**

**New Hampton**

# Stored CO2 Benefits of Public Trees

2/7/2023

| Species | Total Stored CO2 (lbs) | Total ($) | Standard Error | % of Total Trees | % of Total $ | Avg. $/tree |
|---|---|---|---|---|---|---|
| Norway maple | 1,743,482 | 13,076 | (N/A) | 16.8 | 15.3 | 49.91 |
| Green ash | 2,434,731 | 18,260 | (N/A) | 14.7 | 21.3 | 79.39 |
| Northern white cedar | 82,837 | 621 | (N/A) | 10.8 | 0.7 | 3.68 |
| Silver maple | 3,083,200 | 23,124 | (N/A) | 10.6 | 27.0 | 139.30 |
| Sugar maple | 1,681,796 | 12,613 | (N/A) | 9.5 | 14.7 | 84.65 |
| Spruce | 219,315 | 1,645 | (N/A) | 7.6 | 1.9 | 13.82 |
| Eastern red cedar | 65,672 | 493 | (N/A) | 6.8 | 0.6 | 4.65 |
| Maple | 62,604 | 470 | (N/A) | 2.9 | 0.5 | 10.43 |
| Apple | 61,745 | 463 | (N/A) | 2.7 | 0.5 | 11.03 |
| Red maple | 30,570 | 229 | (N/A) | 2.4 | 0.3 | 6.03 |
| Honeylocust | 251,099 | 1,883 | (N/A) | 2.1 | 2.2 | 57.07 |
| Eastern white pine | 130,737 | 981 | (N/A) | 1.9 | 1.1 | 33.81 |
| Cottonwood | 370,542 | 2,779 | (N/A) | 1.9 | 3.2 | 95.83 |
| Pin oak | 179,288 | 1,345 | (N/A) | 1.2 | 1.6 | 74.70 |
| Littleleaf linden | 103,418 | 776 | (N/A) | 1.1 | 0.9 | 45.63 |
| Northern red oak | 85,802 | 644 | (N/A) | 0.8 | 0.8 | 49.50 |
| American basswood | 260,355 | 1,953 | (N/A) | 0.8 | 2.3 | 150.20 |
| Boxelder | 54,814 | 411 | (N/A) | 0.6 | 0.5 | 41.11 |
| Black maple | 19,599 | 147 | (N/A) | 0.5 | 0.2 | 18.37 |
| White ash | 39,028 | 293 | (N/A) | 0.4 | 0.3 | 48.78 |
| Oak | 75,221 | 564 | (N/A) | 0.4 | 0.7 | 94.03 |
| Bur oak | 65,672 | 493 | (N/A) | 0.3 | 0.6 | 98.51 |
| Paper birch | 13,362 | 100 | (N/A) | 0.3 | 0.1 | 20.04 |
| Black walnut | 37,394 | 280 | (N/A) | 0.3 | 0.3 | 56.09 |
| Siberian elm | 79,820 | 599 | (N/A) | 0.3 | 0.7 | 119.73 |
| Red pine | 10,087 | 76 | (N/A) | 0.3 | 0.1 | 18.91 |
| Elm | 25,277 | 190 | (N/A) | 0.3 | 0.2 | 47.39 |
| Pear | 533 | 4 | (N/A) | 0.2 | 0.0 | 1.33 |
| Northern hackberry | 499 | 4 | (N/A) | 0.2 | 0.0 | 1.25 |
| Catalpa | 104,460 | 783 | (N/A) | 0.2 | 0.9 | 261.15 |
| Scotch pine | 14,981 | 112 | (N/A) | 0.1 | 0.1 | 56.18 |
| Ohio buckeye | 2,201 | 17 | (N/A) | 0.1 | 0.0 | 8.26 |
| Birch | 14,499 | 109 | (N/A) | 0.1 | 0.1 | 54.37 |
| Mulberry | 356 | 3 | (N/A) | 0.1 | 0.0 | 1.33 |
| Mountain ash | 6,074 | 46 | (N/A) | 0.1 | 0.1 | 22.78 |
| Blue spruce | 2,661 | 20 | (N/A) | 0.1 | 0.0 | 19.96 |
| Conifer Evergreen La | 1,170 | 9 | (N/A) | 0.1 | 0.0 | 8.78 |
| Ginkgo | 5 | 0 | (N/A) | 0.1 | 0.0 | 0.03 |
| Quaking aspen | 12 | 0 | (N/A) | 0.1 | 0.0 | 0.09 |
| Black locust | 218 | 2 | (N/A) | 0.1 | 0.0 | 1.64 |
| Willow | 1,101 | 8 | (N/A) | 0.1 | 0.0 | 8.26 |
| Swamp white oak | 1,101 | 8 | (N/A) | 0.1 | 0.0 | 8.26 |
| Citywide total | 11,417,338 | 85,630 | (N/A) | 100.0 | 100.0 | 54.82 |

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

**Table 5: Annual Carbon Sequestered**

# Annual CO ₂ Benefits of Public Trees

2/7/2023

| Species | Sequestered (lb) | Sequestered ($) | Decomposition Release (lb) | Maintenance Release (lb) | Total Released ($) | Avoided (lb) | Avoided ($) | Net Total (lb) | Total Standard ($) Error | % of Total Trees | % of Total $ | Avg. $/tree |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway maple | 84,331 | 632 | -8,377 | -610 | -67 | 98,147 | 736 | 173,491 | 1,301 (N/A) | 16.8 | 14.7 | 4.97 |
| Green ash | 146,285 | 1,097 | -11,687 | -631 | -92 | 102,472 | 769 | 236,438 | 1,773 (N/A) | 14.7 | 20.1 | 7.71 |
| Northern white cedar | 10,001 | 75 | -398 | -214 | -5 | 17,679 | 133 | 27,068 | 203 (N/A) | 10.8 | 2.3 | 1.20 |
| Silver maple | 229,462 | 1,721 | -14,803 | -608 | -116 | 92,199 | 691 | 306,250 | 2,297 (N/A) | 10.6 | 26.0 | 13.84 |
| Sugar maple | 89,114 | 668 | -8,078 | -431 | -64 | 67,579 | 507 | 148,184 | 1,111 (N/A) | 9.5 | 12.6 | 7.46 |
| Spruce | 14,593 | 109 | -1,053 | -245 | -10 | 23,952 | 180 | 37,247 | 279 (N/A) | 7.6 | 3.2 | 2.35 |
| Eastern red cedar | 4,357 | 33 | -315 | -158 | -4 | 13,302 | 100 | 17,185 | 129 (N/A) | 6.8 | 1.5 | 1.22 |
| Maple | 6,283 | 47 | -301 | -42 | -3 | 6,635 | 50 | 12,575 | 94 (N/A) | 2.9 | 1.1 | 2.10 |
| Apple | 4,367 | 33 | -297 | -51 | -3 | 5,614 | 42 | 9,633 | 72 (N/A) | 2.7 | 0.8 | 1.72 |
| Red maple | 4,392 | 33 | -147 | -30 | -1 | 4,654 | 35 | 8,868 | 67 (N/A) | 2.4 | 0.8 | 1.75 |
| Honeylocust | 25,100 | 188 | -1,206 | -79 | -10 | 16,966 | 127 | 40,781 | 306 (N/A) | 2.1 | 3.5 | 9.27 |
| Eastern white pine | 5,563 | 42 | -628 | -81 | -5 | 7,379 | 55 | 12,234 | 92 (N/A) | 1.9 | 1.0 | 3.16 |
| Cottonwood | 16,756 | 126 | -1,779 | -80 | -14 | 12,766 | 96 | 27,663 | 207 (N/A) | 1.9 | 2.3 | 7.15 |
| Pin oak | 17,950 | 135 | -861 | -49 | -7 | 8,289 | 62 | 25,329 | 190 (N/A) | 1.2 | 2.2 | 10.55 |
| Littleleaf linden | 9,404 | 71 | -496 | -38 | -4 | 5,527 | 41 | 14,396 | 108 (N/A) | 1.1 | 1.2 | 6.35 |
| Northern red oak | 3,341 | 25 | -412 | -28 | -3 | 3,798 | 28 | 6,700 | 50 (N/A) | 0.8 | 0.6 | 3.87 |
| American basswood | 14,763 | 111 | -1,250 | -50 | -10 | 7,028 | 53 | 20,491 | 154 (N/A) | 0.8 | 1.7 | 11.82 |
| Boxelder | 5,156 | 39 | -263 | -22 | -2 | 3,222 | 24 | 8,094 | 61 (N/A) | 0.6 | 0.7 | 6.07 |
| Black maple | 497 | 4 | -94 | -8 | -1 | 1,419 | 11 | 1,813 | 14 (N/A) | 0.5 | 0.2 | 1.70 |
| White ash | 3,768 | 28 | -187 | -12 | -1 | 2,543 | 19 | 6,111 | 46 (N/A) | 0.4 | 0.5 | 7.64 |
| Oak | 4,533 | 34 | -361 | -19 | -3 | 3,043 | 23 | 7,196 | 54 (N/A) | 0.4 | 0.6 | 9.00 |
| Bur oak | 1,424 | 11 | -315 | -11 | -2 | 1,466 | 11 | 2,564 | 19 (N/A) | 0.3 | 0.2 | 3.85 |
| Paper birch | 1,391 | 10 | -64 | -7 | -1 | 1,046 | 8 | 2,366 | 18 (N/A) | 0.3 | 0.2 | 3.55 |
| Black walnut | 2,830 | 21 | -179 | -12 | -1 | 1,987 | 15 | 4,625 | 35 (N/A) | 0.3 | 0.4 | 6.94 |
| Siberian elm | 3,347 | 25 | -383 | -18 | -3 | 2,805 | 21 | 5,751 | 43 (N/A) | 0.3 | 0.5 | 8.63 |
| Red pine | 540 | 4 | -48 | -9 | 0 | 838 | 6 | 1,321 | 10 (N/A) | 0.3 | 0.1 | 2.48 |
| Elm | 1,728 | 13 | -121 | -8 | -1 | 1,157 | 9 | 2,756 | 21 (N/A) | 0.3 | 0.2 | 5.17 |
| Pear | 114 | 1 | -3 | -2 | 0 | 112 | 1 | 221 | 2 (N/A) | 0.2 | 0.0 | 0.55 |
| Northern hackberry | 107 | 1 | -3 | -2 | 0 | 277 | 2 | 379 | 3 (N/A) | 0.2 | 0.0 | 0.95 |
| Catalpa | 2,784 | 21 | -501 | -14 | -4 | 2,119 | 16 | 4,387 | 33 (N/A) | 0.2 | 0.4 | 10.97 |
| Scotch pine | 512 | 4 | -72 | -7 | -1 | 622 | 5 | 1,055 | 8 (N/A) | 0.1 | 0.1 | 3.96 |

# Annual CO Benefits of Public Trees

2/7/2023

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ohio buckeye | 448 | 3 | -11 | -2 | 0 | 352 | 3 | 787 | 6 (N/A) | 0.1 | 0.1 | 2.95 |
| Birch | 466 | 3 | -70 | -4 | -1 | 603 | 5 | 994 | 7 (N/A) | 0.1 | 0.1 | 3.73 |
| Mulberry | 76 | 1 | -2 | -1 | 0 | 74 | 1 | 147 | 1 (N/A) | 0.1 | 0.0 | 0.55 |
| Mountain ash | 535 | 4 | -29 | -4 | 0 | 617 | 5 | 1,119 | 8 (N/A) | 0.1 | 0.1 | 4.20 |
| Blue spruce | 147 | 1 | -13 | -3 | 0 | 233 | 2 | 364 | 3 (N/A) | 0.1 | 0.0 | 2.73 |
| Conifer Evergreen Large | 116 | 1 | -6 | -2 | 0 | 216 | 2 | 324 | 2 (N/A) | 0.1 | 0.0 | 2.43 |
| Ginkgo | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 6 | 0 (N/A) | 0.1 | 0.0 | 0.04 |
| Quaking aspen | 3 | 0 | 0 | 0 | 0 | 4 | 0 | 7 | 0 (N/A) | 0.1 | 0.0 | 0.05 |
| Black locust | 96 | 1 | -2 | -1 | 0 | 65 | 0 | 158 | 1 (N/A) | 0.1 | 0.0 | 1.18 |
| Willow | 224 | 2 | -5 | -1 | 0 | 176 | 1 | 393 | 3 (N/A) | 0.1 | 0.0 | 2.95 |
| Swamp white oak | 224 | 2 | -5 | -1 | 0 | 176 | 1 | 393 | 3 (N/A) | 0.1 | 0.0 | 2.95 |
| Citywide total | 717,126 | 5,378 | -54,826 | -3,594 | -438 | 519,160 | 3,894 | 1,177,866 | 8,834 (N/A) | 100.0 | 100.0 | 5.66 |

**Table 6: Annual Social and Aesthetic Benefits**

**New Hampton**

# Annual Aesthetic/Other Benefits of Public Trees

2/7/2023

| Species | Total ($) | Standard Error | % of Total Trees | % of Total $ | Avg. $/tree |
|---|---|---|---|---|---|
| Norway maple | 8,204 | (N/A) | 16.8 | 11.2 | 31.31 |
| Green ash | 12,423 | (N/A) | 14.7 | 17.0 | 54.01 |
| Northern white cedar | 2,763 | (N/A) | 10.8 | 3.8 | 16.35 |
| Silver maple | 17,803 | (N/A) | 10.6 | 24.4 | 107.25 |
| Sugar maple | 9,292 | (N/A) | 9.5 | 12.7 | 62.37 |
| Spruce | 3,793 | (N/A) | 7.6 | 5.2 | 31.87 |
| Eastern red cedar | 1,925 | (N/A) | 6.8 | 2.6 | 18.16 |
| Maple | 928 | (N/A) | 2.9 | 1.3 | 20.63 |
| Apple | 247 | (N/A) | 2.7 | 0.3 | 5.88 |
| Red maple | 703 | (N/A) | 2.4 | 1.0 | 18.50 |
| Honeylocust | 5,887 | (N/A) | 2.1 | 8.1 | 178.39 |
| Eastern white pine | 926 | (N/A) | 1.9 | 1.3 | 31.92 |
| Cottonwood | 1,424 | (N/A) | 1.9 | 2.0 | 49.10 |
| Pin oak | 1,522 | (N/A) | 1.2 | 2.1 | 84.56 |
| Littleleaf linden | 991 | (N/A) | 1.1 | 1.4 | 58.27 |
| Northern red oak | 260 | (N/A) | 0.8 | 0.4 | 20.03 |
| American basswood | 1,038 | (N/A) | 0.8 | 1.4 | 79.85 |
| Boxelder | 432 | (N/A) | 0.6 | 0.6 | 43.20 |
| Black maple | 66 | (N/A) | 0.5 | 0.1 | 8.26 |
| White ash | 443 | (N/A) | 0.4 | 0.6 | 73.78 |
| Oak | 366 | (N/A) | 0.4 | 0.5 | 60.98 |
| Bur oak | 135 | (N/A) | 0.3 | 0.2 | 26.96 |
| Paper birch | 152 | (N/A) | 0.3 | 0.2 | 30.42 |
| Black walnut | 255 | (N/A) | 0.3 | 0.3 | 51.08 |
| Siberian elm | 225 | (N/A) | 0.3 | 0.3 | 44.95 |
| Red pine | 106 | (N/A) | 0.3 | 0.1 | 26.58 |
| Elm | 157 | (N/A) | 0.3 | 0.2 | 39.27 |
| Pear | 6 | (N/A) | 0.2 | 0.0 | 2.06 |
| Northern hackberry | 39 | (N/A) | 0.2 | 0.1 | 12.96 |
| Catalpa | 183 | (N/A) | 0.2 | 0.3 | 61.09 |
| Scotch pine | 53 | (N/A) | 0.1 | 0.1 | 26.25 |
| Ohio buckeye | 52 | (N/A) | 0.1 | 0.1 | 26.22 |
| Birch | 44 | (N/A) | 0.1 | 0.1 | 22.17 |
| Mulberry | 4 | (N/A) | 0.1 | 0.0 | 2.06 |
| Mountain ash | 31 | (N/A) | 0.1 | 0.0 | 15.48 |
| Blue spruce | 20 | (N/A) | 0.1 | 0.0 | 19.97 |
| Conifer Evergreen Large | 32 | (N/A) | 0.1 | 0.0 | 32.32 |
| Ginkgo | 0 | (N/A) | 0.1 | 0.0 | 0.37 |
| Quaking aspen | 5 | (N/A) | 0.1 | 0.0 | 5.26 |
| Black locust | 13 | (N/A) | 0.1 | 0.0 | 12.89 |
| Willow | 26 | (N/A) | 0.1 | 0.0 | 26.22 |
| Swamp white oak | 26 | (N/A) | 0.1 | 0.0 | 26.22 |
| Citywide total | 73,002 | (N/A) | 100.0 | 100.0 | 46.74 |

## Table 7: Summary of Benefits in Dollars

**New Hampton**

# Total Annual Benefits, Net Benefits, and Costs for Public Trees

2/7/2023

| Benefits | Total ($) | Standard Error | $/tree | Standard Error | $/capita | Standard Error |
|---|---|---|---|---|---|---|
| Energy | 65,248 | (N/A) | 41.77 | (N/A) | 18.67 | (N/A) |
| CO2 | 8,834 | (N/A) | 5.66 | (N/A) | 2.53 | (N/A) |
| Air Quality | 10,475 | (N/A) | 6.71 | (N/A) | 3.00 | (N/A) |
| Stormwater | 95,245 | (N/A) | 60.98 | (N/A) | 27.26 | (N/A) |
| Aesthetic/Other | 73,002 | (N/A) | 46.74 | (N/A) | 20.89 | (N/A) |
| **Total Benefits** | 252,803 | (N/A) | 161.85 | (N/A) | 72.35 | (N/A) |
| Costs | | | | | | |
| Planting | 0 | | 0.00 | | 0.00 | |
| Contract Pruning | 0 | | 0.00 | | 0.00 | |
| Pest Management | 0 | | 0.00 | | 0.00 | |
| Irrigation | 0 | | 0.00 | | 0.00 | |
| Removal | 0 | | 0.00 | | 0.00 | |
| Administration | 0 | | 0.00 | | 0.00 | |
| Inspection/Service | 0 | | 0.00 | | 0.00 | |
| Infrastructure Repairs | 0 | | 0.00 | | 0.00 | |
| Litter Clean-up | 0 | | 0.00 | | 0.00 | |
| Liability/Claims | 0 | | 0.00 | | 0.00 | |
| Other Costs | 0 | | 0.00 | | 0.00 | |
| **Total Costs** | 0 | | 0.00 | | 0.00 | |
| Net Benefits | 252,803 | (N/A) | 161.85 | (N/A) | 72.35 | (N/A) |
| Benefit-cost ratio | 0.00 | (N/A) | | | | |

**Figure 1: Species Distribution**

# Species Distribution of Public Trees

2/7/2023
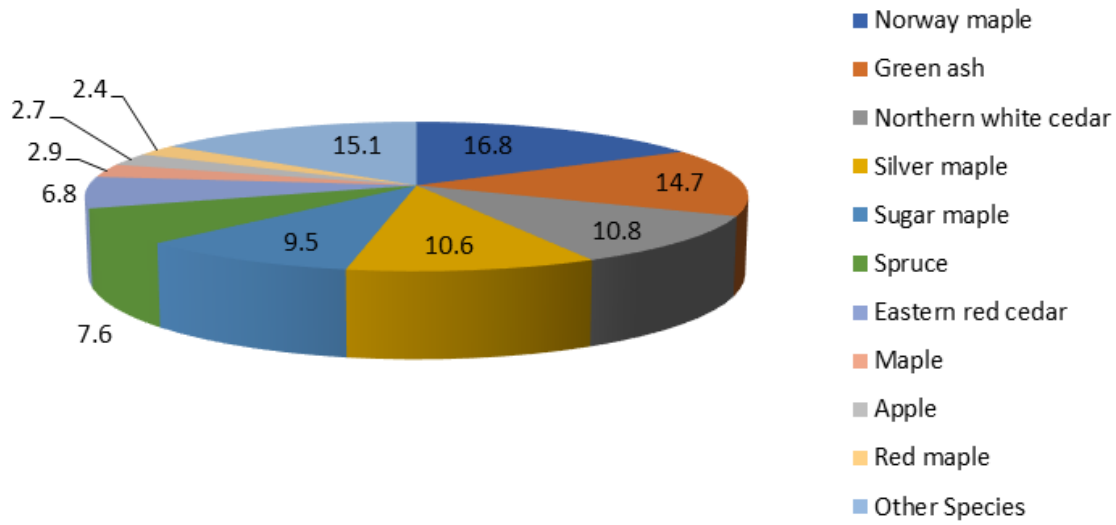


| Species | Percent |
|---|---|
| Norway maple | 16.8 |
| Green ash | 14.7 |
| Northern white cedar | 10.8 |
| Silver maple | 10.6 |
| Sugar maple | 9.5 |
| Spruce | 7.6 |
| Eastern red cedar | 6.8 |
| Maple | 2.9 |
| Apple | 2.7 |
| Red maple | 2.4 |
| Other Species | 15.1 |
| Total | 100.0 |

## Figure 2: Relative Age Class

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

2/7/2023
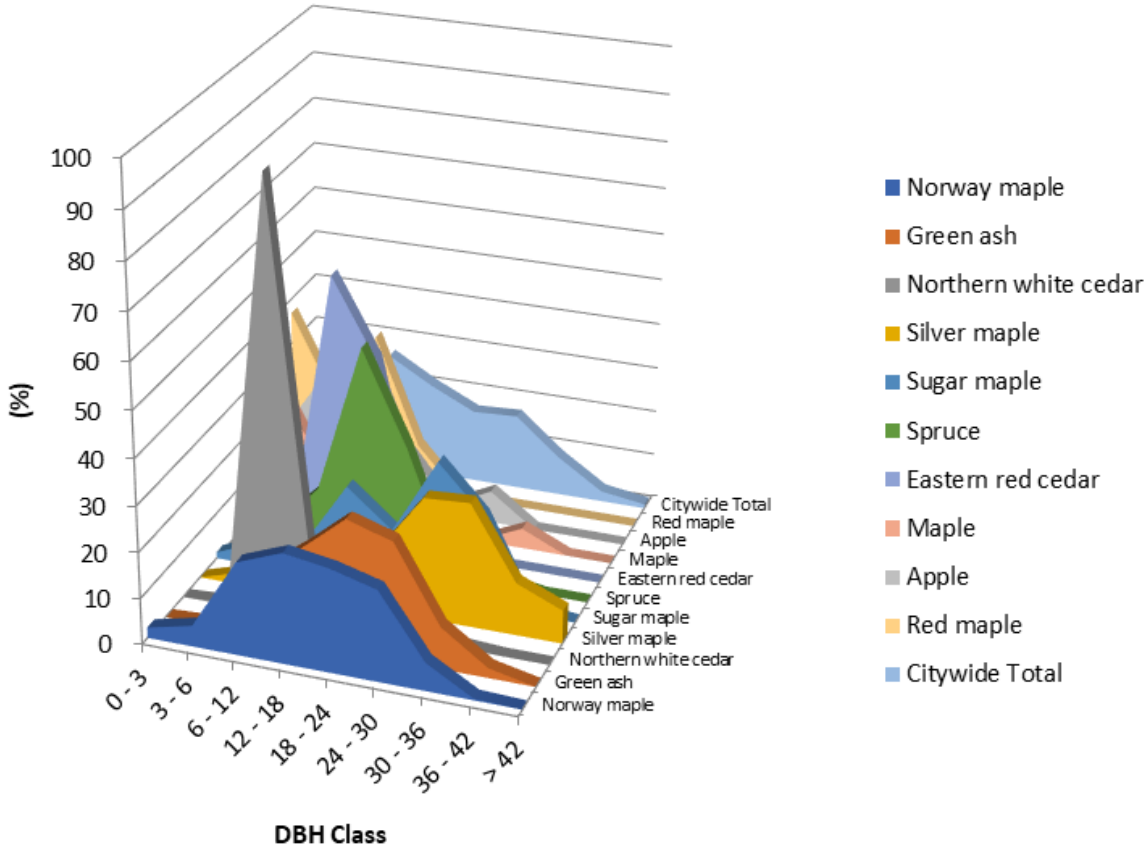


**DBH Class**

| Species | DBH class (in) | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | 0-3 | 3-6 | 6-12 | 12-18 | 18-24 | 24-30 | 30-36 | 36-42 | > 42 |
| Norway maple | 2.29 | 4.58 | 20.23 | 24.05 | 22.52 | 19.85 | 6.11 | 0.38 | 0.00 |
| Green ash | 0.00 | 0.43 | 13.48 | 20.43 | 28.70 | 25.65 | 9.13 | 2.17 | 0.00 |
| Northern white cedar | 0.00 | 0.59 | 92.90 | 2.96 | 1.18 | 1.78 | 0.59 | 0.00 | 0.00 |
| Silver maple | 0.00 | 3.01 | 4.82 | 6.63 | 13.25 | 26.51 | 27.11 | 11.45 | 7.23 |
| Sugar maple | 1.34 | 5.37 | 6.71 | 21.48 | 13.42 | 30.20 | 20.13 | 1.34 | 0.00 |
| Spruce | 0.00 | 5.04 | 15.13 | 47.90 | 27.73 | 2.52 | 1.68 | 0.00 | 0.00 |
| Eastern red cedar | 0.00 | 0.00 | 58.49 | 41.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Maple | 35.56 | 17.78 | 28.89 | 8.89 | 4.44 | 0.00 | 4.44 | 0.00 | 0.00 |
| Apple | 11.90 | 26.19 | 38.10 | 14.29 | 2.38 | 7.14 | 0.00 | 0.00 | 0.00 |
| Red maple | 36.84 | 18.42 | 34.21 | 10.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Citywide Total | 3.65 | 4.61 | 26.25 | 20.74 | 16.20 | 16.71 | 8.64 | 2.30 | 0.90 |

**Figure 3: Foliage Condition**



Foliage Condition

11%

2%

1%

86%

■ Good  ■ Fair  ■ Poor  ■ Dead or Dying

**Figure 4: Wood Condition**



Wood Condition

6%
8%
12%
74%

■ Good  ■ Fair  ■ Poor  ■ Dead or Dying
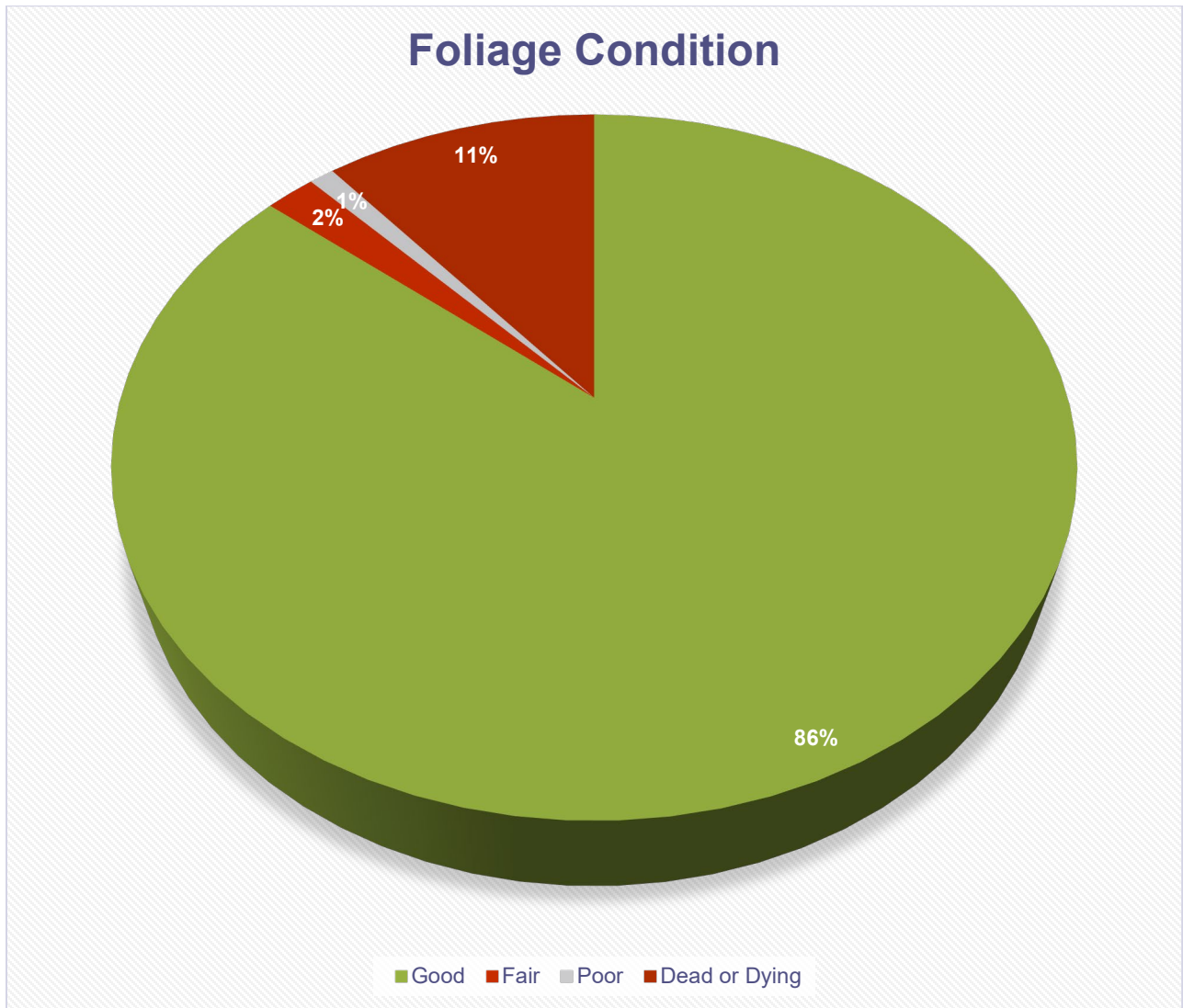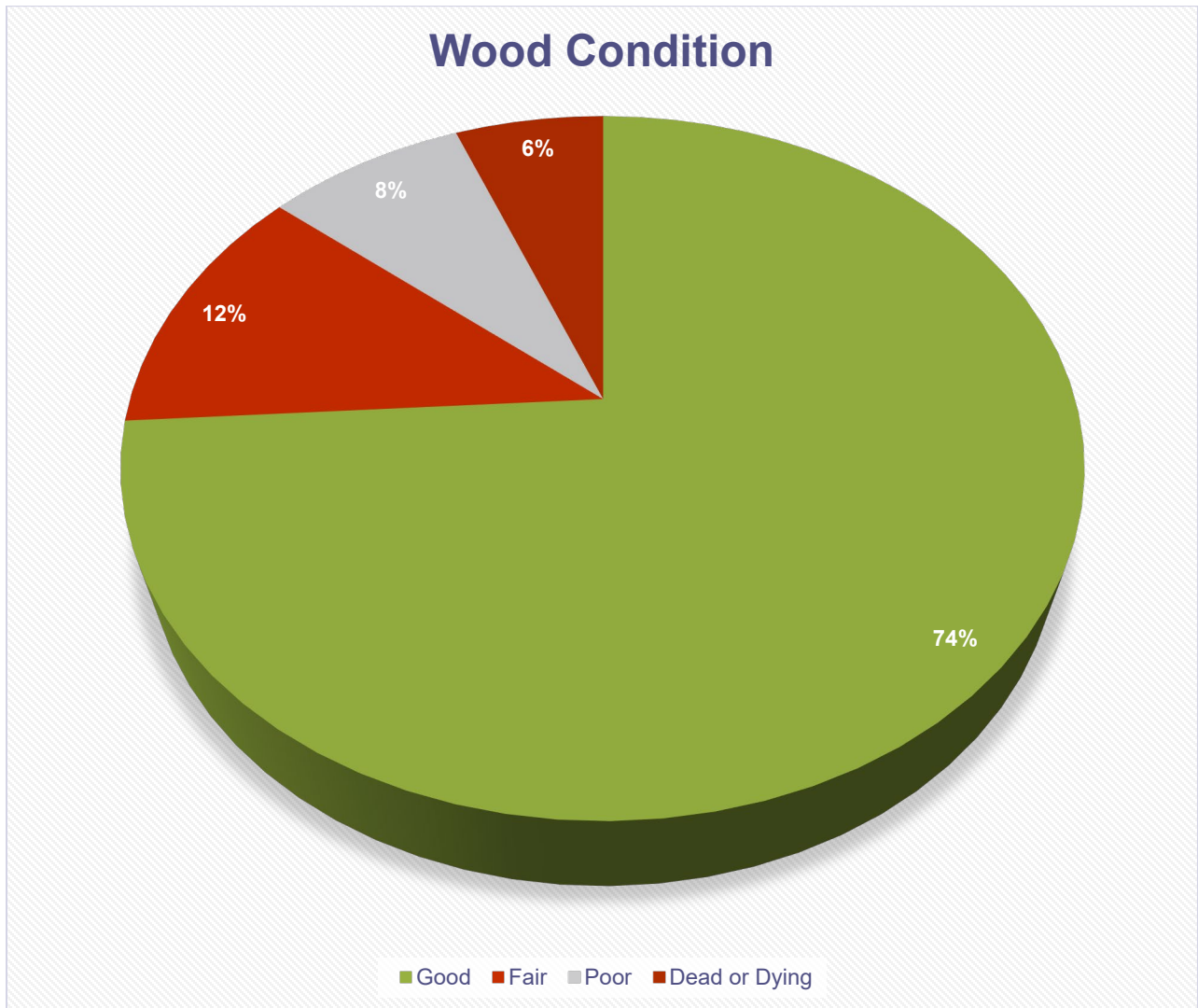
**Figure 5: Canopy Cover in Acres**

# Canopy Cover of Public Trees (Acres)

2/7/2023
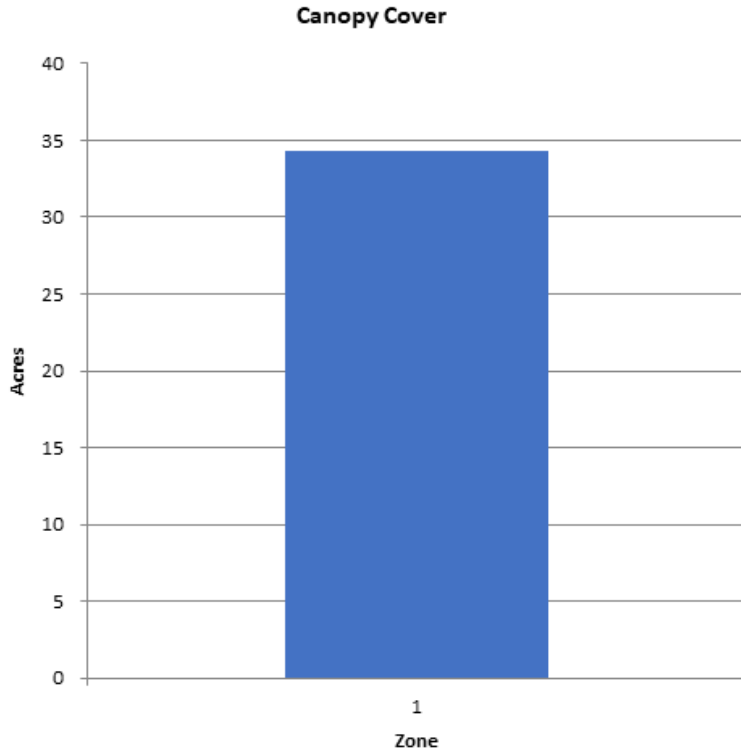
**Canopy Cover**



| Zone | Acres | % of Total Canopy Cover |
|------|-------|-------------------------|
| 1 | 34 | 100.0 |
| Citywide total | 34 | 100.0 |

| | Total Land Area | Total Street and Sidewalk Area | Total Canopy Cover | Canopy Cover as % of Total Land Area | Canopy Cover as % of Total Streets and Sidewalks |
|---|---|---|---|---|---|
| Citywide Total | 0 | 0 | 34 | 0.00 | 0.00 |

**Figure 6: Land Use of City/Park Trees**



Land Use of Public Trees #
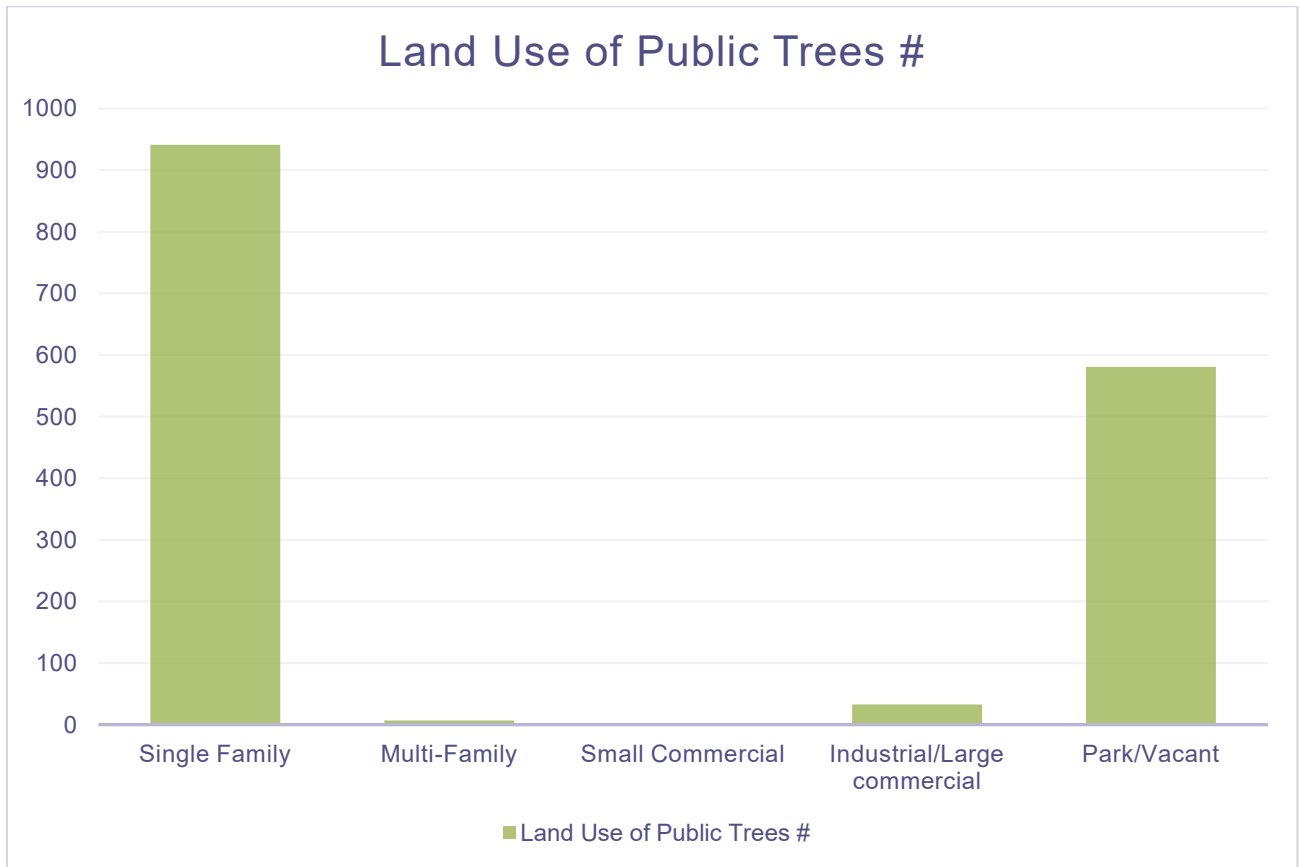
# APPENDIX B: ArcGIS MAPPING

**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*

## Legend
### Ash Trees
- ● Trees (236)

0   0.2   0.4
Miles

N
W    E
S
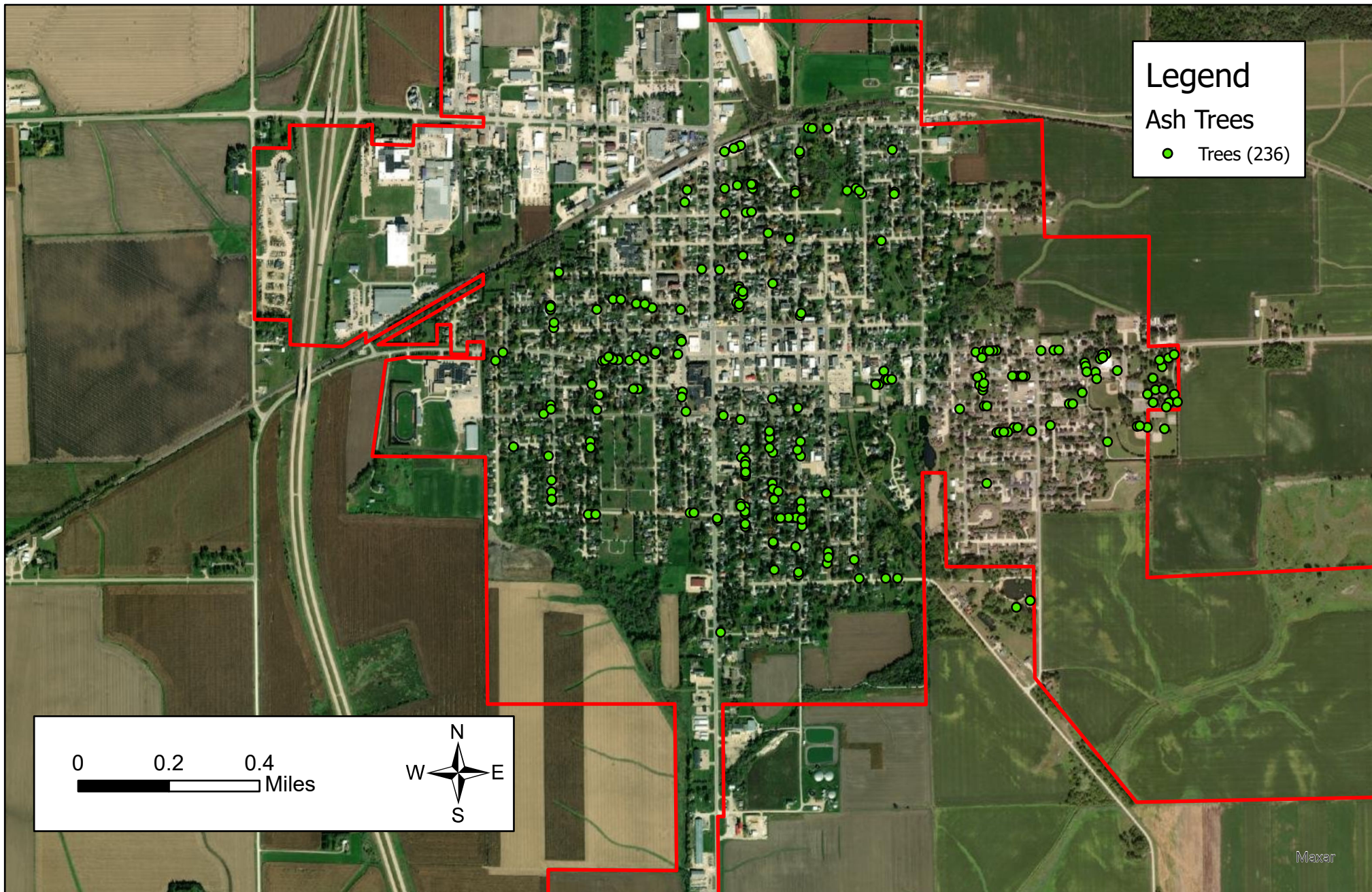
# 2022 IDNR Tree Inventory

## Figure 1 - Ash Tree Location
## New Hampton, Iowa

**jeo**
JEO CONSULTING GROUP INC

Maxar

## Legend

### Ash Trees

- ● Both (1)
- ● Epicormic Shoots (91)
- ● D Shaped Exit Holes (1)

0   0.2   0.4 Miles

N
W   E
S
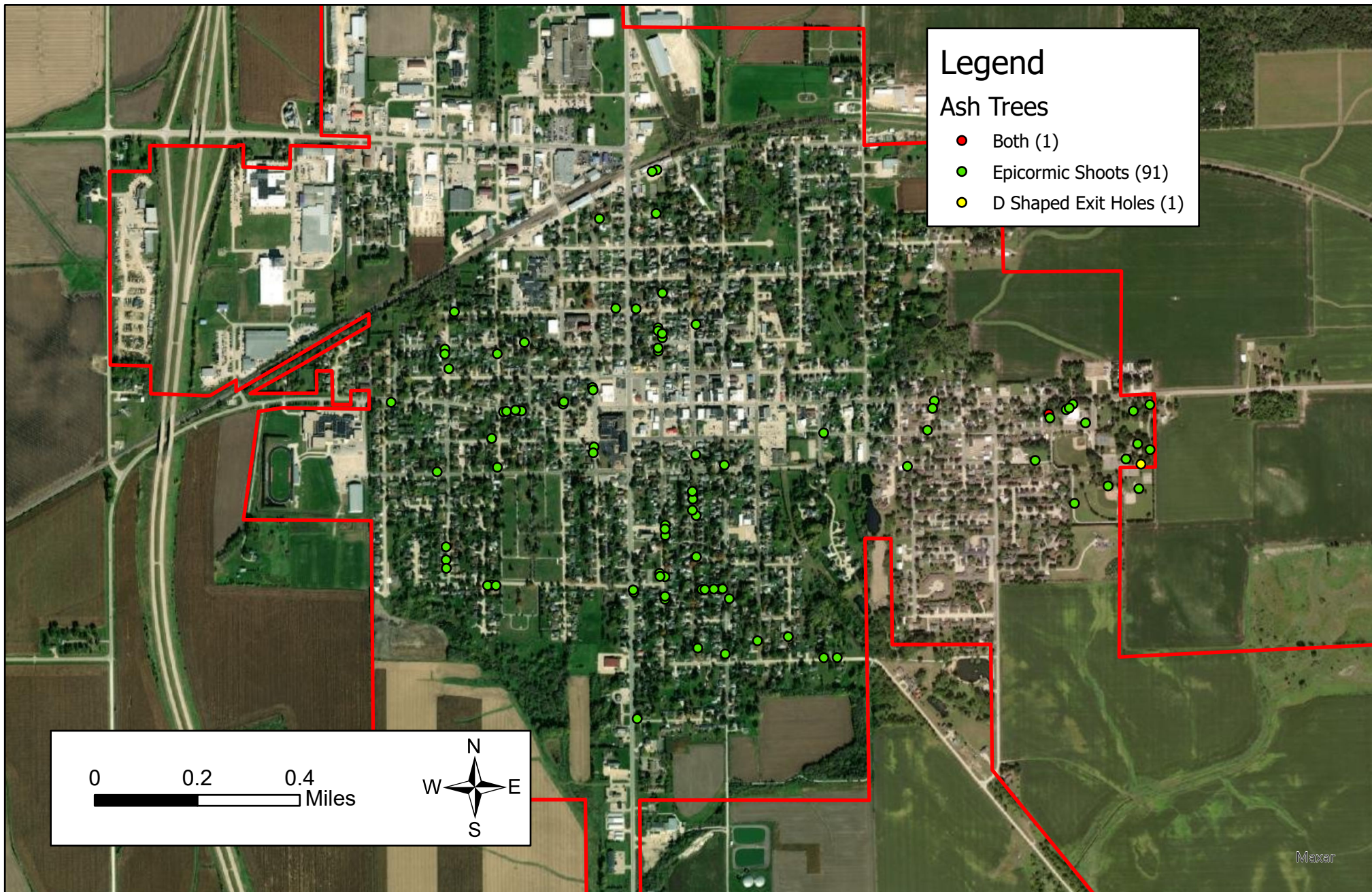
## 2022 IDNR Tree Inventory

Figure 2 - EAB Symptoms
New Hampton, Iowa

JEO CONSULTING GROUP INC

## Legend

### Tree Condition

- Poor Condition (228)
- Good Condition (1334)

N
W E
S

0    0.2    0.4 Miles

Maxar
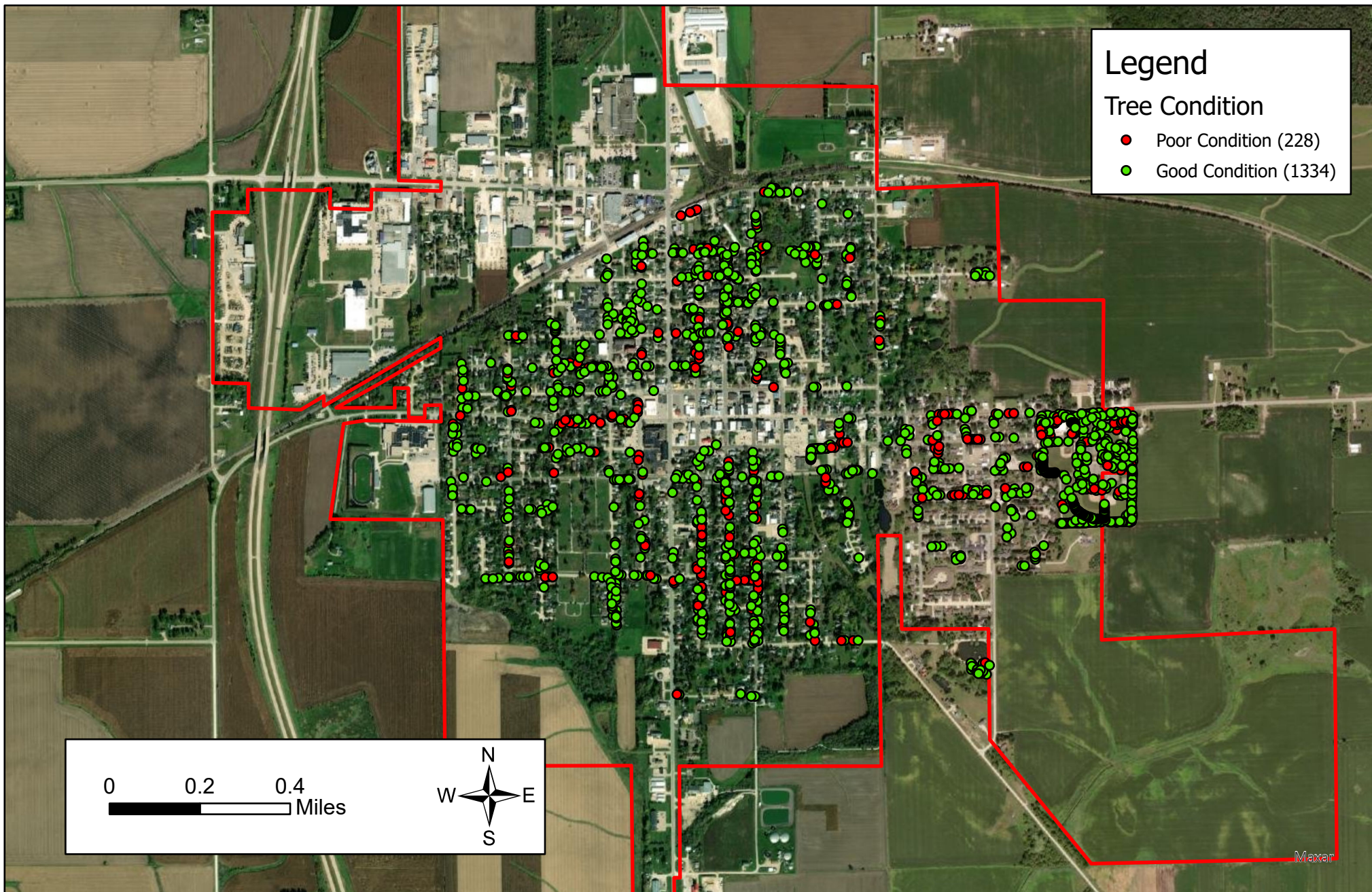
## 2022 IDNR Tree Inventory

Figure 3 - Poor Condition Trees
New Hampton, Iowa

JEO CONSULTING GROUP INC

## Legend

### Recommended Maintenance

- 🟢 None (1)
- 🟡 Routine (73)
- 🔴 Immediate (1488)

N
W E
S

0   0.2   0.4   Miles

Maxar

# 2022 IDNR Tree Inventory

## Figure 4 - Recommended Maintenance
## New Hampton, Iowa

jeo
JEO CONSULTING GROUP INC
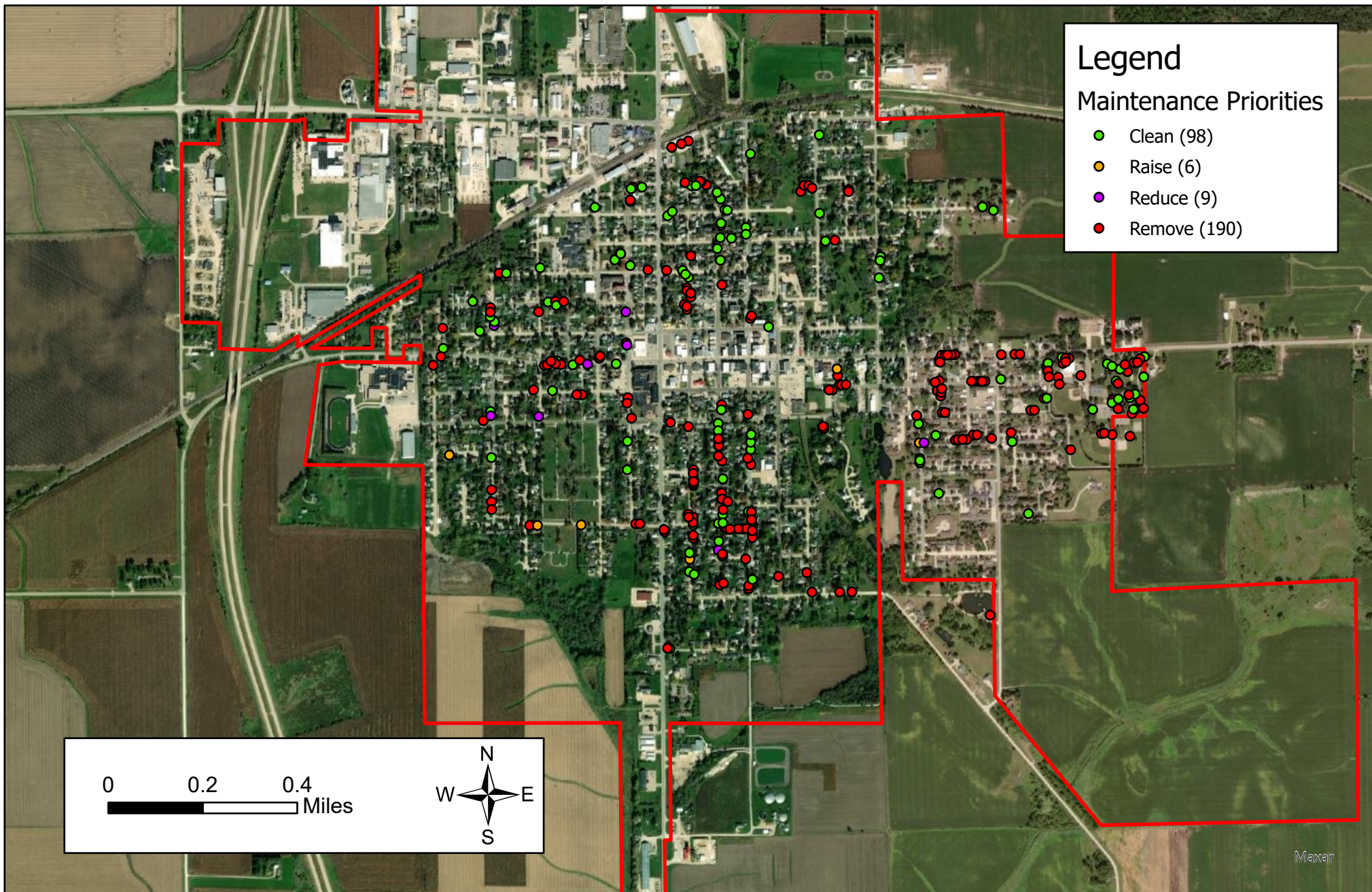
**Legend**

Maintenance Priorities

- 🟢 Clean (98)
- 🟠 Raise (6)
- 🟣 Reduce (9)
- 🔴 Remove (190)

0    0.2    0.4 Miles

N
W — E
S

**2022 IDNR Tree Inventory**

Figure 5 - Maintenance Priorities
New Hampton, Iowa

JEO CONSULTING GROUP INC

Maxar

# APPENDIX C: NEW HAMPTON TREE ORDINANCES

**ARTICLE 6**

**TREES**

**66.1 PURPOSE.** The purpose of this chapter is to beautify and preserve the appearance of

the city by regulating and providing for the planting, care and removal of trees.

**66.2 DEFINITIONS.** For use in this chapter, the following terms are defined:

1. **"Parking":** shall mean 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.

2. **"Superintendent":** shall mean the director of public works, City Tree Board, or such

other person as may be designated by the council.

**66.3 TREES IN PARKING.** The owners of all lots or parcels of land are hereby granted

the right and privilege of planting and maintaining trees, on the parking in front of and

beside their property, except as hereinafter provided, and upon the express condition that

the right is reserved to the city at any time to use the same for street or sidewalk purposes

and to remove all trees therefrom, or other things growing thereon; and providing further

that all trees, shall be planted and maintained in accordance with the requirements of this

chapter.

**66.4 PLANTING RESTRICTIONS.** No tree shall be planted in any street or parking

except in accordance with the following:

1. **Alignment.** All trees hereafter planted in any street shall be planted in the parking

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. Except as hereafter set forth, trees shall not be planted on the parking if it 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-five (25) feet to street intersections (property lines extended) and ten (10) feet to driveways. Trees shall

be planted not less than thirty (30) feet apart. If it is at all possible trees should be planted

inside the property lines and not between the sidewalk and the curb or within the City right-of-way.

3. Prohibited Trees. No person shall hereafter plant in any parking, any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, boxelder, evergreens, soft maple or willow.

4. Linn Avenue and Milwaukee Street. From the date of enactment of this ordinance, no trees shall be planted in the parking on Linn Avenue and on West Milwaukee Street from Linn Avenue west to the corporate limits.

204

**66.5 VISION.** No tree shall be maintained upon the parking in such a manner as to interfere with the clear vision of drivers of vehicles, nor within twenty-five (25) feet of any intersection, and any trees existing contrary to the provisions hereof, may be removed by the superintendent without compensation to the abutting property owners.

**66.6 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 fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks, and do not interfere with or obscure utility wires or street lights. [Code of Iowa, 2017 §364.12(2c)]

**66.7 MAINTENANCE.** It shall be the duty of the owner and occupant of the abutting or adjacent property to remove all dead, damaged and broken limbs and all limbs which are

or may become dangerous to travel upon the public street.

**66.8 ASSESSMENT.** If the abutting property owner fails to trim or maintain the trees as required in this chapter, the City shall serve notice on the abutting property owner requiring them to do so within thirty (30) days. If the owner fails to trim or maintain the trees within that time, the City of its agent shall 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, 2017, §364.12 (2d & e)]

**66.9 REMOVAL OF TREES.** The superintendent shall remove, on the order of the council, any tree on the streets of the city which interferes with the making of improvements or with travel thereon. The superintendent shall additionally remove any trees on the street, not on private property, which have become diseased, or which constitute a danger to the public, or which may otherwise be declared a nuisance. [Code of Iowa, 1999, §364.12 (2c) & 372.13(4)]

**66.10 TREES SUBJECT TO REMOVAL.** The council having determined that the health of the trees within the city is threatened by fatal epidemic diseases and hereby declares the following shall be removed: [Code of Iowa, 1999, §364.12(3b)]
1. Living or Standing Trees. Any living or standing tree or part thereof infected with the fatal epidemic disease.
2. Dead Trees. Any dead tree or part thereof including logs, branches, stumps, firewood or other material from which the bark has not been removed and burned or sprayed with an effective insecticide.

**66.11 DUTY TO REMOVE.** No person, firm or corporation shall permit any tree or material as defined in this article to remain on the premises owned, controlled or occupied by him within the city. [Code of Iowa, 1999, §364.12 (3b)]

**66.12 INSPECTION.** The City Tree Board shall inspect or cause to be inspected all premises and places within the city to determine whether any condition as defined in this 205 article exists thereon, and shall also inspect or cause to be inspected any trees reported or suspected to be infected.

**66.13 REMOVAL FROM CITY PROPERTY.** If the City Tree Board upon inspection or examination, in person or by some qualified person acting for the Board, determines that a tree in or upon any public street, alley, park or any public place, including the public right-of-way, within the City is so diseased, damaged, or deteriorated so that there is an imminent threat of harm to other trees or property, the Board shall immediately cause said tree to be removed or otherwise correct the same in such manner as to prevent as fully as possible the spread of disease or the threat of harm or damages to the residents of the City or their property.

**66.14 REMOVAL FROM PRIVATE PROPERTY.** If the City Tree Board upon inspection or examination, in person or by some qualified person acting for the Board, shall determine with reasonable certainty that disease, damage, or deterioration exists in a tree on private property and that the condition creates an imminent threat of harm or damage to other trees, neighboring property, or to the public at large, the Board shall immediately notify by certified mail the owner, occupant, or person in charge of said property to remedy and correct such situation within thirty (30) days of said notification. If such owner, occupant, or person in charge of said property fails to do so within thirty (30) days of receipt thereof, the Board or its agent may cause the threat to be remedied, including by removal of the tree and the costs thereof shall be assessed against the property as provided for in Article 5 of Title VI of the City Code. [Code of Iowa, 2017, §364.12 (3b & h)]

**If the City Tree Board is unable to determine with reasonable certainty whether or not a tree in or upon private premises is infected with disease, the Board is authorized to remove or cut specimens from said tree, and obtain a diagnosis of such specimens. If the City Tree Board is unable to determine with reasonable certainty whether or not a tree in or upon private premises is infected with disease, it is authorized to remove or cut specimens from said tree, and obtain a diagnosis of such specimens.**