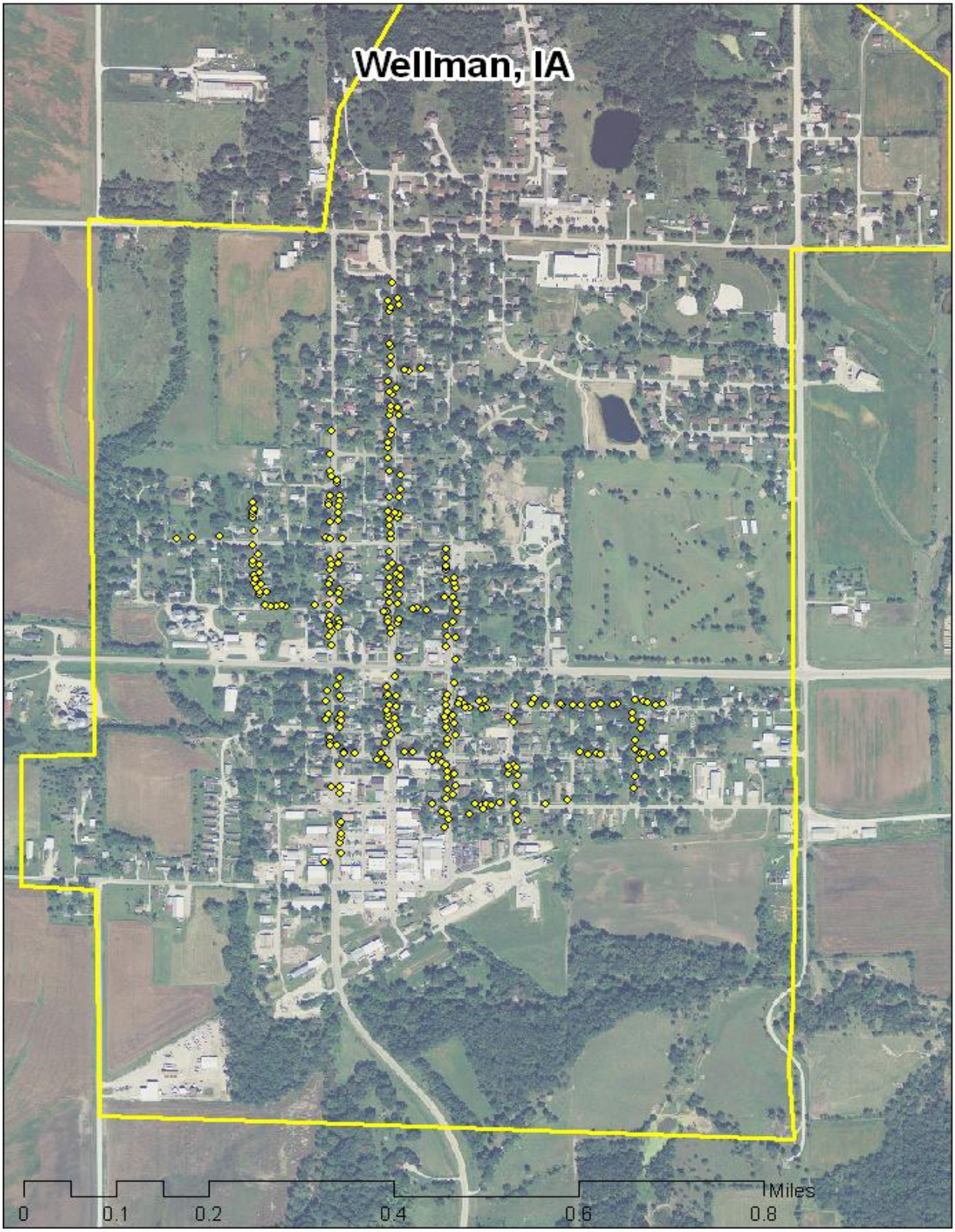
Wellman, IA

2011 Community Street Tree Management Plan

Prepared by Mark A. Vitosh
Bureau of Forestry, Iowa DNR



Trees inventoried in fall 2011

Table of Contents

Executive Summary

Overview

This plan was developed to assist Wellman with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB) and gypsy moth. EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). **This pest was found in Iowa in the spring of 2010 in northeast Iowa, but has not been found in this area at this point in time.** There is a strong possibility that ~32 % of Wellman's city owned street trees (ash-97) will die once EAB becomes established in the community. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues. Another concern is that 44% of Wellman's city owned street trees are some type of (maple-134), so if any type of insect or disease starts to threaten the health of maples in the community this could have a significant impact on the community tree population. There is a pest called Asian Long-Horned beetle that has recently been found in Ohio that does attack a number of different maple species. Basically, 76% (231) of Wellman's city owned street trees are either maple or ash.

Inventory and Results

In the fall of 2011 a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street trees in the community. Below are some key findings of the 303 street trees inventoried.

- Wellman's street trees provide $62,721 of benefits annually, an average of $207 a tree
- There are ~28 species of trees along the streets
- The top three genus are: Maple 44%, Ash 32%, and Sycamore 6%
- 22% of street trees are in need of some type of management, the majority of the management is pruning such as raising above streets and sidewalks for safety or cleaning out dead material
- 3 street trees are recommended for removal consideration
- There are 33 trees outlined in a 9/16/2011 letter to the City Clerk from the Iowa DNR District Forester that need to be inspected to see what action (s) is/are needed

Recommendations

The core recommendations are detailed in the Recommendations Section. The Emerald Ash Borer Plan includes management recommendations as well. Below are some key recommendations.

- 8 of the 97 ash street trees are in need of follow up because they are displaying signs and symptoms associated with EAB.
- Attempt to prune all park trees and street trees on a routine schedule, and any new trees planted should have good developmental pruning in the first 5 to 15 years to develop quality trees.

- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, boxelder, Chinese elm, willow, black walnut, or evergreen species as street trees. Evergreen species such as Norway spruce, Serbian spruce, white spruce, Eastern white pine, Eastern redcedar, concolor fir, or arborvitae can be considered for park plantings.
- Check ash trees with a visual survey yearly
- EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Wellman. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 97 ash street trees in the community would be between $58,200 and $97,000. These estimates do not include any ash trees that might be in the parks.

Introduction

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

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

Inventory

In the fall of 2011, a tree inventory was conducted that included 100% of the city owned street trees. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

The programming used to collect tree information on the data collectors was written to be compatible with a state-of-the-art software suite called I-Tree. I-Tree was developed by the USDA Forest Service to quantify the structure of community trees and the environmental services that trees provide. The I-Tree suite is a public domain which can be accessed for free.

To quantify the urban forest structure and benefits, specific data is collected for each tree. This data includes: location, land use, species, diameter at 4.5 ft, recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, signs and symptoms of EAB were noted for all ash trees. The signs and symptoms noted were canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Inventory Results

The data collected for the 303 city street trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the I-Tree suite. The following are results from the I-Tree STRATUM analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Wellman's street trees reduce energy related costs by approximately $16,750 annually (Appendix A, Table 1 attached to document). These savings are both in Electricity (79.2 MWh) and in Natural Gas (10,954.8 Therms).

Annual Stormwater Benefits

Wellman's street trees intercept about 808,534 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $23,864 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 Wellman, it is estimated that street trees remove 1,019.5 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 $2,885 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Wellman, street trees sequester about 191,064 lbs of carbon a year with an associated value of $2,309 (Appendix A, Table 5). In addition, the street trees store 3,335,723 lbs of carbon, with a yearly benefit of $25,018 (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. Wellman receives $16,913 in annual social benefits from street trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Wellman's trees provide $62,721 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 303 street trees in Wellman provide approximately $207 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Wellman has 28 different tree species along city streets (Appendix A, Figure 1).
The distribution of trees by genus is as follows:

Maple	134	44% (Sugar,Norway, Silver,Red,Amur, Black, Boxelder)
Ash	97	32% (Green & White)
Sycamore	18	6%
Hackberry	11	4% Species 3% or less are below

Apple (Crabapple)
Oak (Pin, Red, & Swamp White)
Linden (Little Leaf Linden & American)
Black Walnut
Plum
Elm (Siberian Elm & Elm species)
Honeylocust
Redbud
Hickory
Buckeye
Blue Spruce
White Pine
Scotch Pine

Size Class

In Wellman (17.5%) of the street trees are 12 inches or less in diameter at 4.5 ft, (14.5%) are between 12 and 18 inches, and (68%) are 18 inches and greater. A significant number of trees along the streets are larger indicating that many of these trees could start to reach maturity in the next 10 to 20 years.

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 Wellman indicate that 97% of the street trees are in good health along with 2% fair and 1% poor (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 59% of Wellman's trees are in good health for wood condition along with 34% fair, 6% poor, and 1% dead or dying (Appendix A, Figure 4 & Appendix B, Figure 3).

Management Needs

- In (Appendix B, Figure 4 & 5) the specific management needs of the inventoried trees are identified. Management practices needed include crown cleaning, crown raising, crown reduction, and some potential removal. Twenty-two percent of the inventoried street trees are in need of some type of management, the majority of the management is pruning such as raising above streets and sidewalks for safety or cleaning out dead material. There are 3 street trees on the map listed for possible removal that should be evaluated as soon as possible to decide if they need to be removed and when. *City ownership of the trees recommended for removal should be verified prior to any removal*

Land Use and Location

The majority of Wellman's street trees are in areas of single-family residential homes (97.4 %), and are planted within planting strips (99 %) (Appendix A, Figure 5 & Figure 6).

Recommendations

Risk Management

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

Hazardous trees

Wellman has 3 street trees that need to be considered for removal as soon as possible. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 5). There are 33 trees outlined in a 9/16/2011 letter to the City Clerk from the Iowa DNR District Forester that need to be inspected to see what action (s) is/are needed. Below is the list of those 33 trees that need to be looked at:

Trees Needing Evaluation

- 317 8th Avenue trees are actually on 4th street. 2 hackberry trees with trunk problems that both need closer evaluation.
- 401 8th Avenue large sycamore with 5 inch dead branch over the sidewalk.
- 417 8th Avenue large sycamore with 4 inch hanging branch over the street.

- 707 8th Avenue Norway maple with hollow trunk needs closer evaluation.
- 807 8th avenue large green ash with 6 to 7 inch dead branch near walk.
- 900 8th Avenue large hackberry with severe stem decay in different locations needs closer evaluation.
- 911 8th Avenue large honeylocust with 5 to 6 inch dead limb near the road.
- 1015 8th Avenue large hackberry with 4 inch branch over the street.
- 1017 8th Avenue tree with 3 to 5 inch dead branches over the walk.
- 1204 8th Avenue large green ash with 8 inch dead top over the street
- 612 3rd Street is on 7th Avenue side. Large ash with dead 7 inch branch over sidewalk.
- 701 3rd Street Amur maple in very poor condition and dead branch over mailbox needs to be evaluated for removal.
- 308 4th Street large green ash with trunk decay needs closer inspection.
- 412 5th Street large green ash has crack where branch meets the trunk needs closer inspection.
- 408 6th Street large sugar maple with a number of dead 4 to 6 inch dead branches over walk.
- 314 7th Avenue large green ash with significant stem decay needs closer inspection.
- 405 7th Avenue large sugar maple with dead/broken branches over street, plus trees overall condition needs closer inspection.
- 608 7th Avenue large silver maple with 6 inch dead branch over the street.
- 613 7th Avenue large Norway maple with significant trunk decay that needs closer inspection.
- 709 7th Avenue Norway maple with hollow trunk needs closer inspection.
- 108 7th Street, just east of this address large green ash with 8 inch broken branch over street and stem decay in trunk also needs closer inspection.
- 701 7th Street on 8th Avenue side large Norway maple with 4 to 7 inch dead branches over street.
- 409 9th Avenue across the street from address large green ash with 3 to 4 inch dead branches over sidewalk.
- 415 9th Avenue large sugar maple with significant decay in trunk that needs closer inspection.
- 416 9th Avenue large sugar maple with couple dead 4 to 6 inch branches over sidewalk.
- 500 9th Avenue large green ash with 7 inch dead branch over sidewalk.
- 501 9th Avenue Siberian elm with 3 to 5 inch dead branches over the street and sidewalk.
- 515 9th Avenue (2) large silver maples with a couple dead 4 to 6 inch branches over the sidewalk and street.
- 700 9th Avenue large sugar maple with 4 inch hanging branch over the sidewalk.
- 819 9th Avenue 14 inch sugar maple with significant dead in the tree that needs to be considered for removal.
- 913 9th Avenue large silver maple with significant dead branches in the top.

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 along the streets and in the park (s) be pruned on a routine schedule every five to seven years, and any new trees planted should have good developmental pruning in the first 5 to 15 years to develop quality trees. Please refer to the six year maintenance plan for further information.

Planting

If some trees are removed in the next few years consider replacing these trees at a minimum. It is recommended to plant 1 to 2 trees for every tree removed. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. There are a number of trees along the streets that are in conflict with overhead wires, so I would recommend not re-planting in these specific locations when trees get removed.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 15 to 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the street tree population has 44% maple and for this reason consider not planting maple on public property until this percentage becomes lower. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Species to avoid because they can be public nuisances include: cottonwood, poplar, boxelder, Chinese elm, evergreens as street trees, willow or black walnut.

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage. With many new potential tree health threats on the horizon attempt to monitor the health of all city owned trees on a regular basis.

Six Year Maintenance Plan

At the time of writing this plan I had not received the budget information questionnaire I left with the community in the fall, so the following are general guidelines that will be influenced by the available budget and community goals.

Year 1
Removal: 3 trees (@ estimate $600 to $1,000/tree) with the highest concern that have been identified
Planting and Replacement: 10 trees (@ $50 to $150/tree) planted in open locations within the public parking areas or parks
Visual Survey for signs and symptoms of EAB
Routine trimming: Prune a portion of park (s) trees (@$20 to $200/tree) and street trees

Year 2
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Planting and Replacement: 10 trees (@ $50 to $150/tree) planted in open locations within the public parking areas or parks
Visual Survey for signs and symptoms of EAB

Year 3
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Routine trimming: Prune a portion of park (s) trees (@$20 to $200/tree) and street trees
Visual Survey for signs and symptoms of EAB

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

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

Year 6
Removal: Removal of any new critical concern trees and ash in poor health as budget permits
Planting and Replacement: 10 trees (@ $50 to $150/tree) planted in open locations within the public parking areas or parks
Visual Survey for signs and symptoms of EAB

EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Wellman. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 97 ash street trees in the community would be between $58,200 and $97,000. These estimates do not include any ash trees that might be in the parks.

Emerald Ash Borer Plan

Ash Tree Removal

8 of the 97 ash street trees are in need of follow up because they are displaying signs and symptoms associated with EAB. Any tree removal that occurs will be prioritized with hazardous, dead, and dying trees to be removed first. *City ownership of the tree recommended for removal should be verified prior to any removal*

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of over 25 million ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:
- emerald ash borer
- firewood of all hardwood species (for example ash, oak, maple and hickory)
- nursery stock and green lumber of ash

- any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included) In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB once a quarantine is in effect for your county.

Wood Disposal

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the ash trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml. Wood waste can be disposed of as you normally would if your county is not part of a quarantine.

Canopy Replacement

As budget permits, all removed ash trees should be replaced. New plantings will be a diverse mix and will not include ash, maple at this time, cottonwood, poplar, bur oak, box elder, Chinese elm, evergreens along the streets, willow or black walnut.

Postponed Work

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

Monitoring

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

Private Ash Trees

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

Budget

EAB could potentially kill all ash trees within 4 to 10 years of its arrival to Wellman. If removal costs range from $600 to $1,000 per tree, total estimated costs to remove all 97 ash street trees in the community would be between $58,200 and $97,000. These estimates do not include any ash trees that might be in the parks.

Works Cited

Census Bureau. 2000. http://censtats.census.gov/data/IA/1601964290.pdf (April, 2010)

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

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

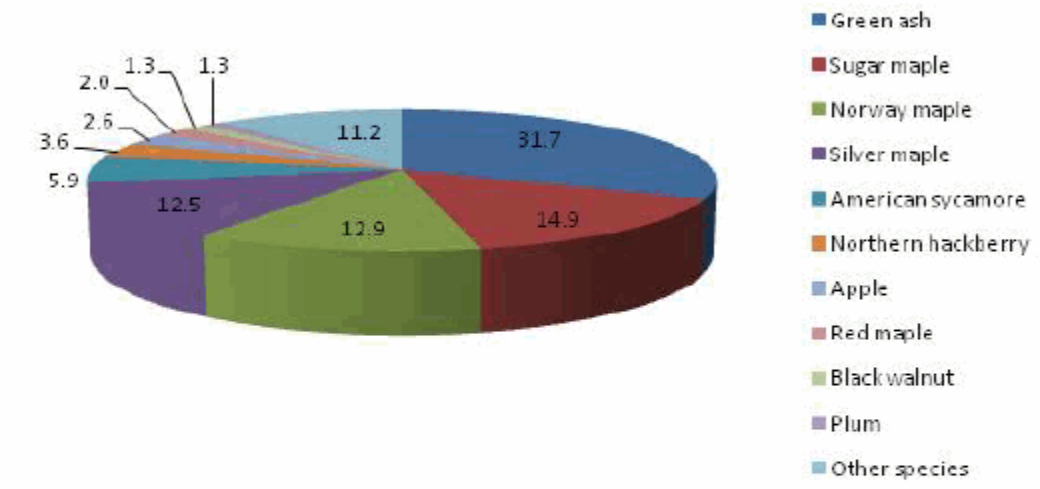
Nowak, D.J. and J.F. Dwyer. 2007. Understanding the benefits and costs of urban forest ecosystems. In: Kuser, J. (ed.) Urban and Community Forestry in the Northeast. New York: Springer. Pp. 25-46.

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

Appendix A: i-Tree Data

Species Distribution of Public Trees (%)

10/25/2011

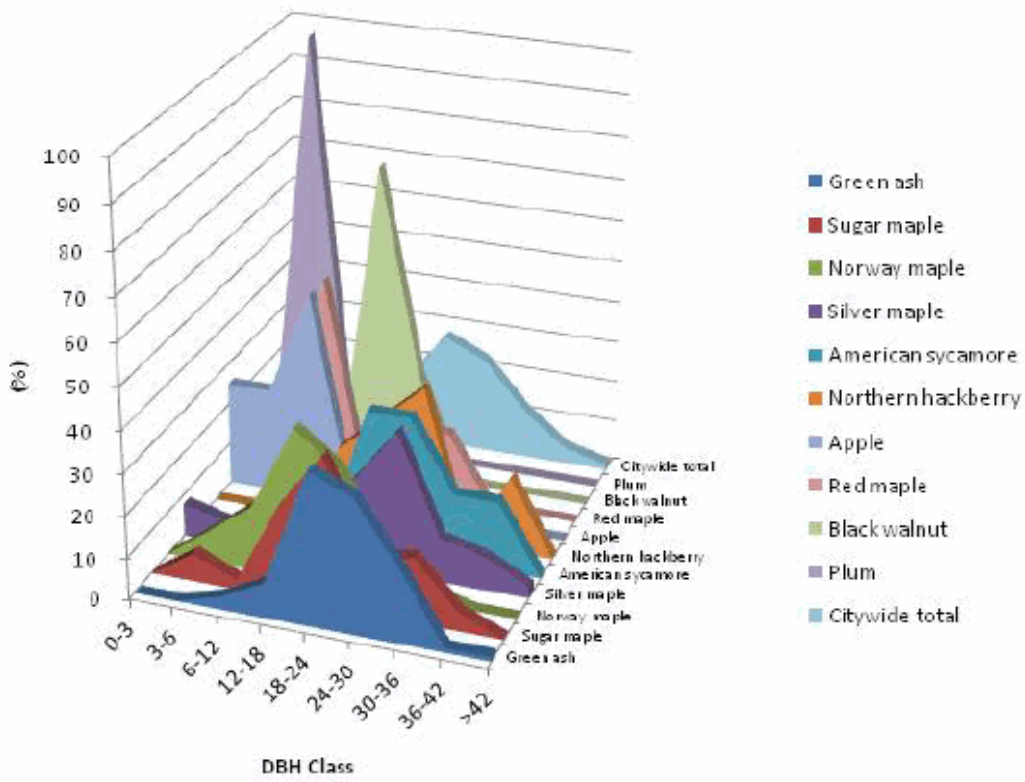


Species	Percent
Green ash	31.7
Sugar maple	14.9
Norway maple	12.9
Silver maple	12.5
American sycamore	5.9
Northern hackberry	3.6
Apple	2.6
Red maple	2.0
Black walnut	1.3
Plum	1.3
Other species	11.2
Total	100.0

Figure 1: Species Distribution

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

10/25/2011



	DBH class (in)								
Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
Green ash	0.0	0.0	3.1	8.3	36.5	32.3	17.7	1.0	1.0
Sugar maple	0.0	6.7	2.2	22.2	35.6	13.3	15.6	4.4	0.0
Norway maple	0.0	7.7	15.4	35.9	28.2	10.3	2.6	0.0	0.0
Silver maple	7.9	5.3	2.6	7.9	21.1	34.2	10.5	7.9	2.6
American sycamore	0.0	0.0	0.0	0.0	33.3	33.3	16.7	16.7	0.0
Northern hackberry	0.0	0.0	0.0	18.2	27.3	36.4	0.0	18.2	0.0
Apple	25.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
Red maple	0.0	16.7	50.0	0.0	16.7	16.7	0.0	0.0	0.0
Black walnut	0.0	0.0	0.0	75.0	25.0	0.0	0.0	0.0	0.0
Plum	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Citywide total	2.6	6.6	8.3	14.5	27.7	23.1	11.9	4.0	1.3

Figure 2: Relative Age Class

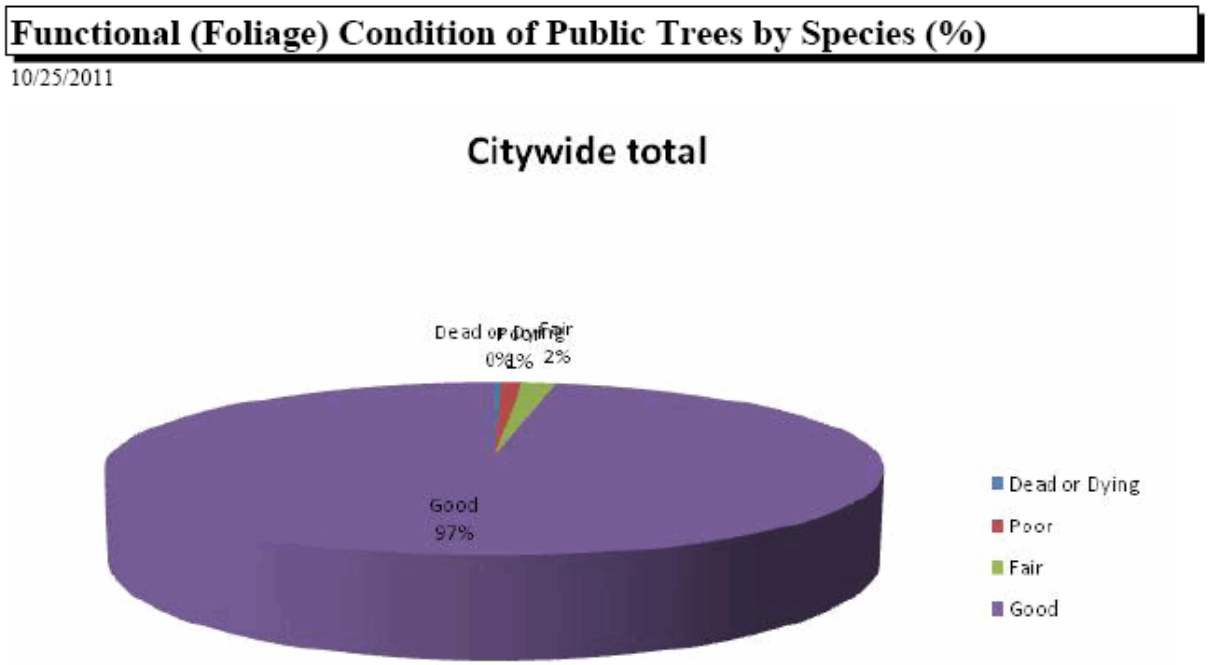


Figure 3: Foliage Condition

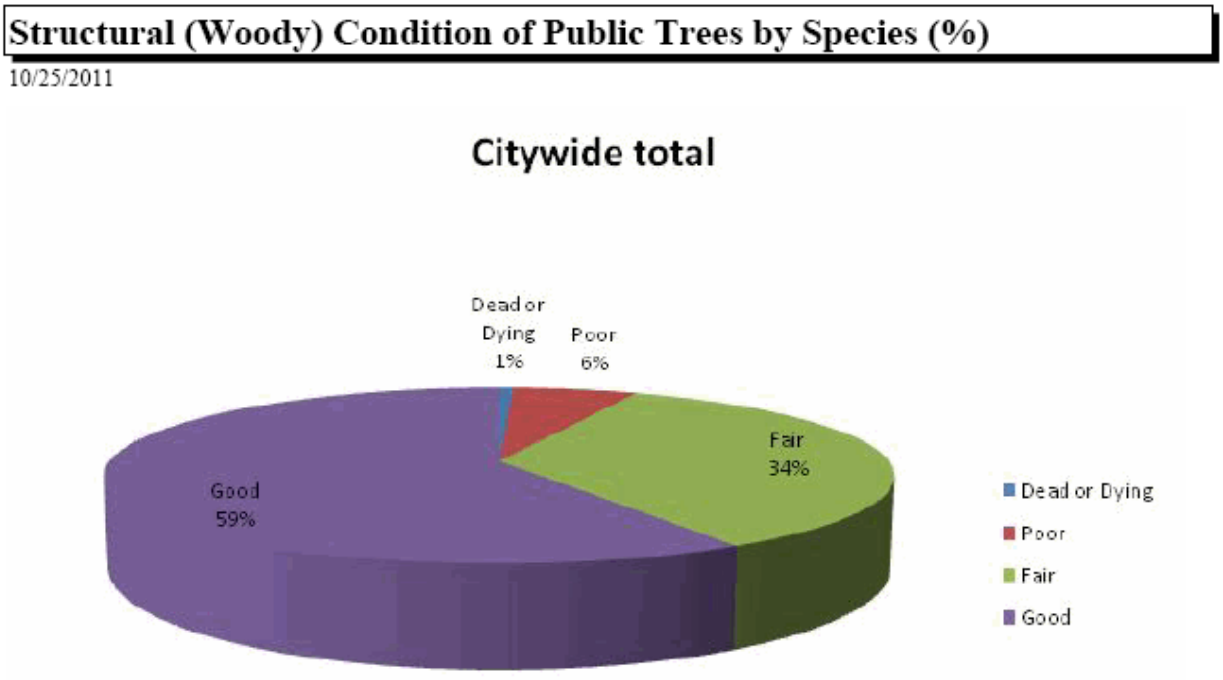
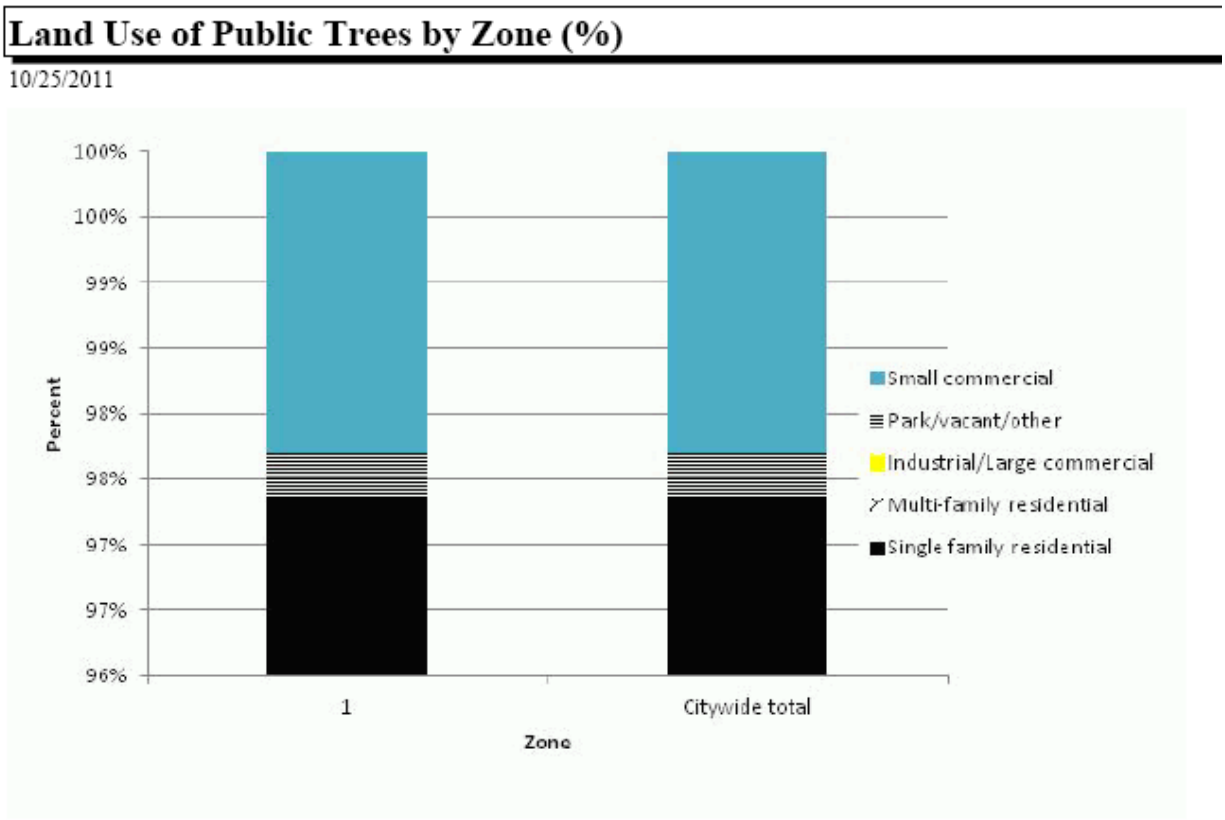


Figure 4: Wood Condition

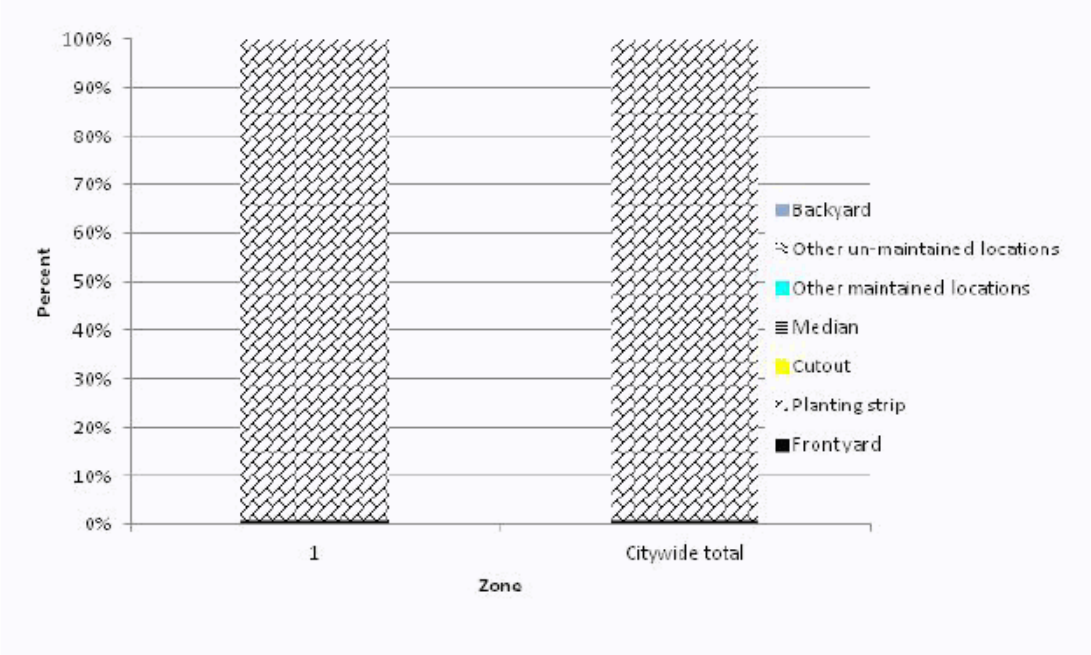


Zone	Single family residential	Multi-family residential	Industrial/ Large commercial	Park/vacant/ other	Small commercial
1	97.4	0.0	0.0	0.3	2.3
Citywide total	97.4	0.0	0.0	0.3	2.3

Figure 5: Land Use of city/park trees

Location of Public Trees by Zone (%)

10/25/2011



Zone	Front yard	Planting strip	Cutout	Median	Other maintained locations	Other un-maintained locations	Backyard
1	1.0	99.0	0.0	0.0	0.0	0.0	0.0
Citywide total	1.0	99.0	0.0	0.0	0.0	0.0	0.0

Figure 6: Location of city/park trees

Appendix B: ArcGIS Mapping

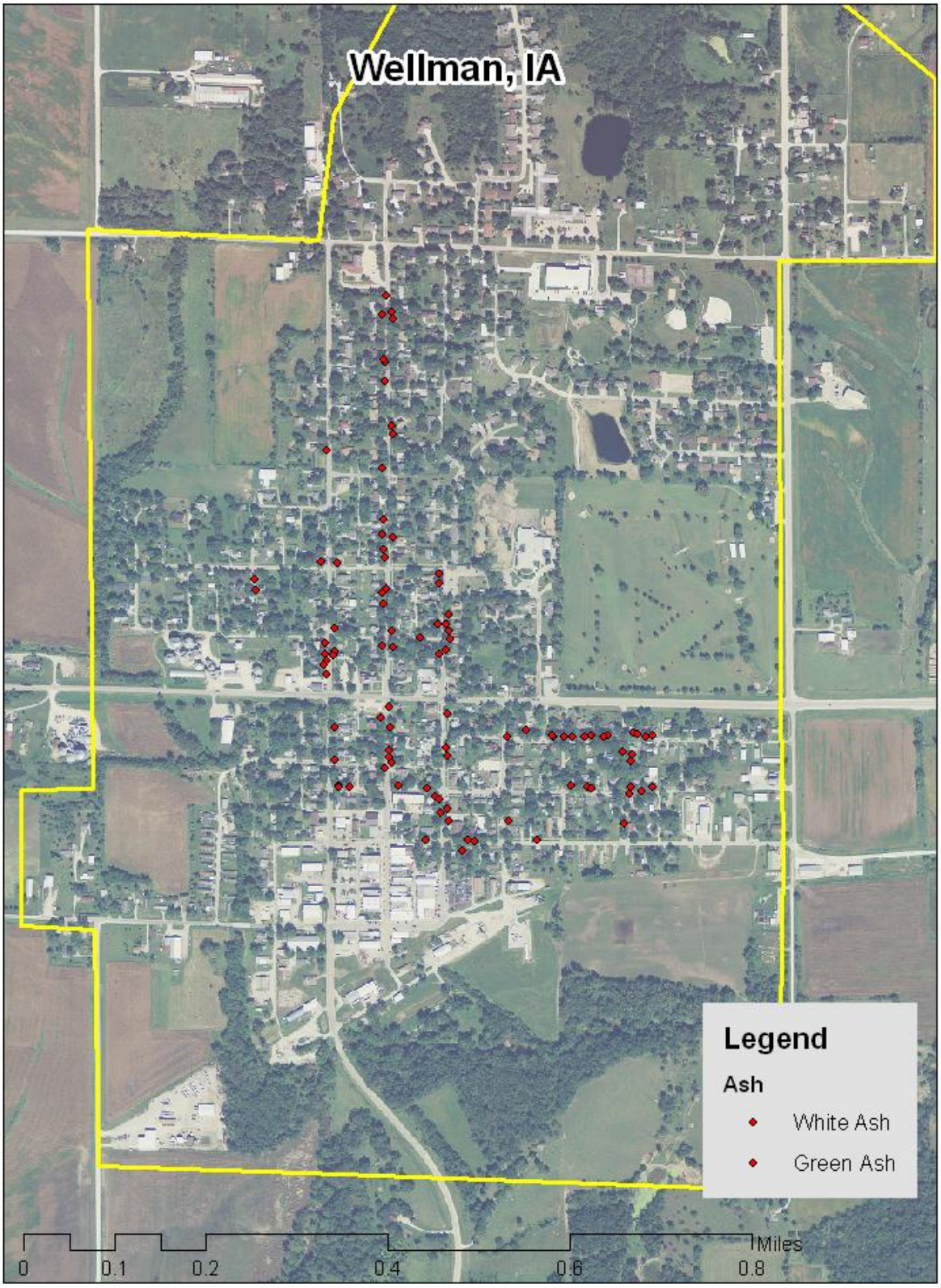


Figure 1: Location of Ash Trees

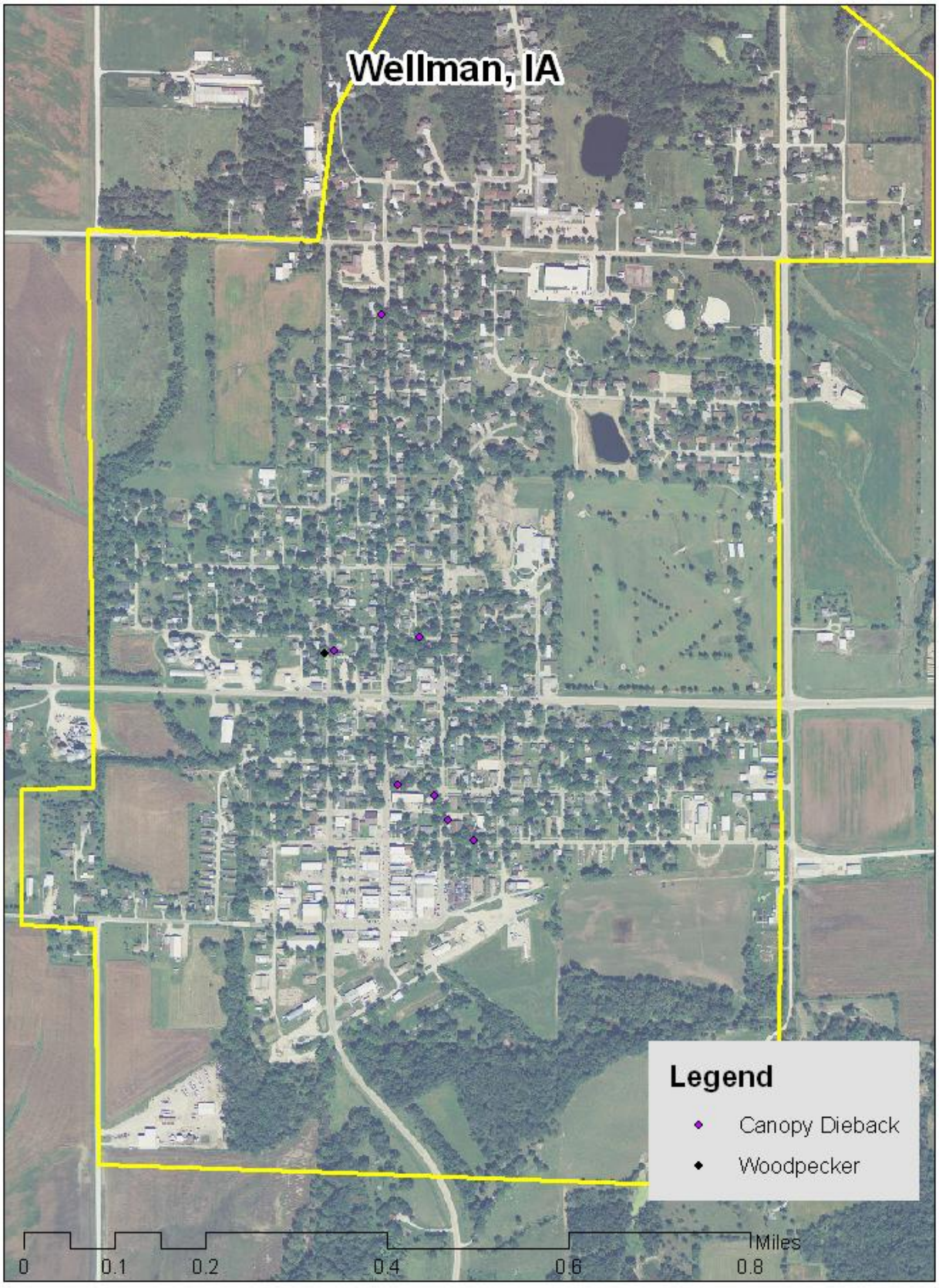


Figure 2: Location of EAB symptoms

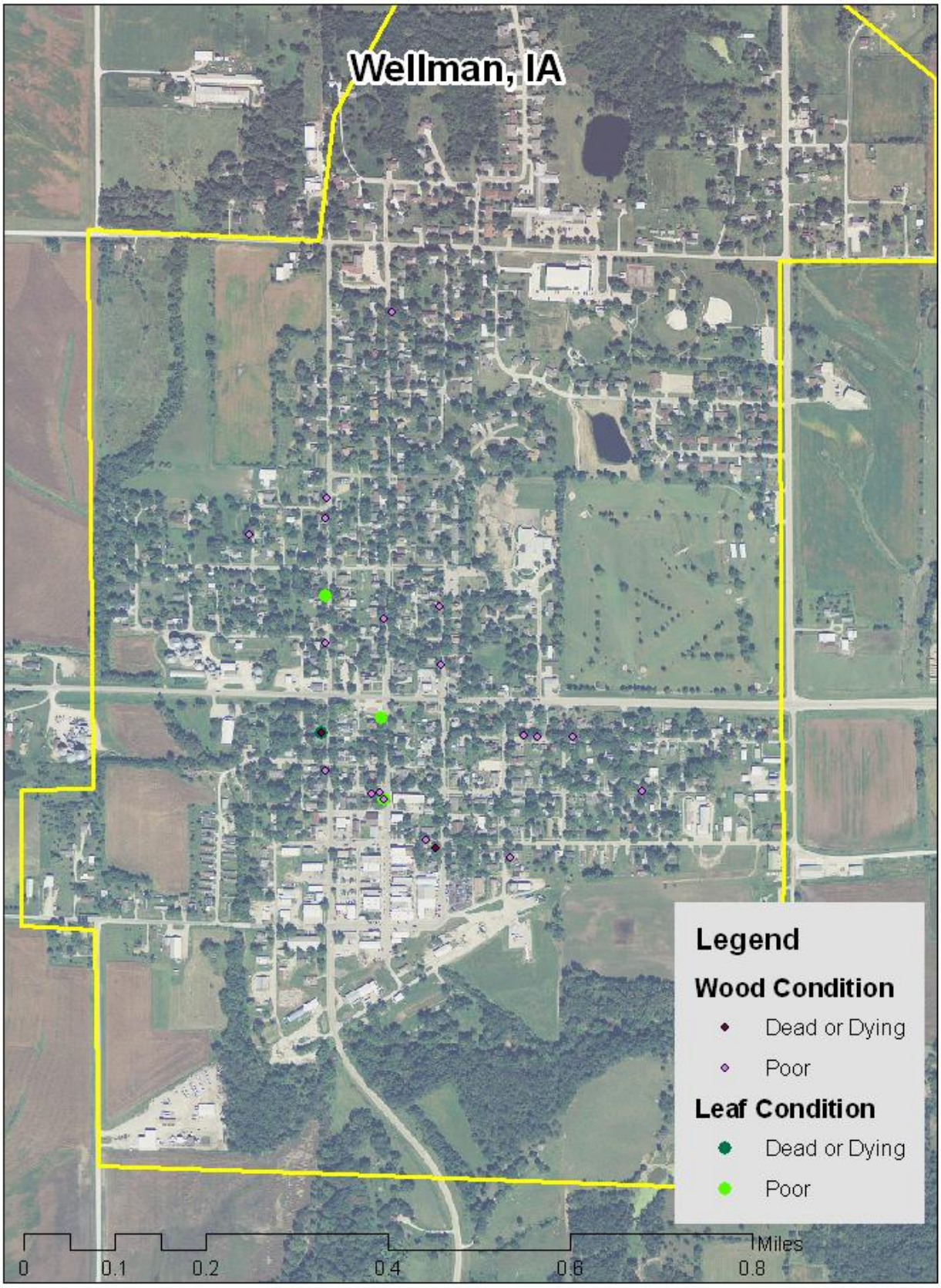


Figure 3: Location of Poor Condition Trees

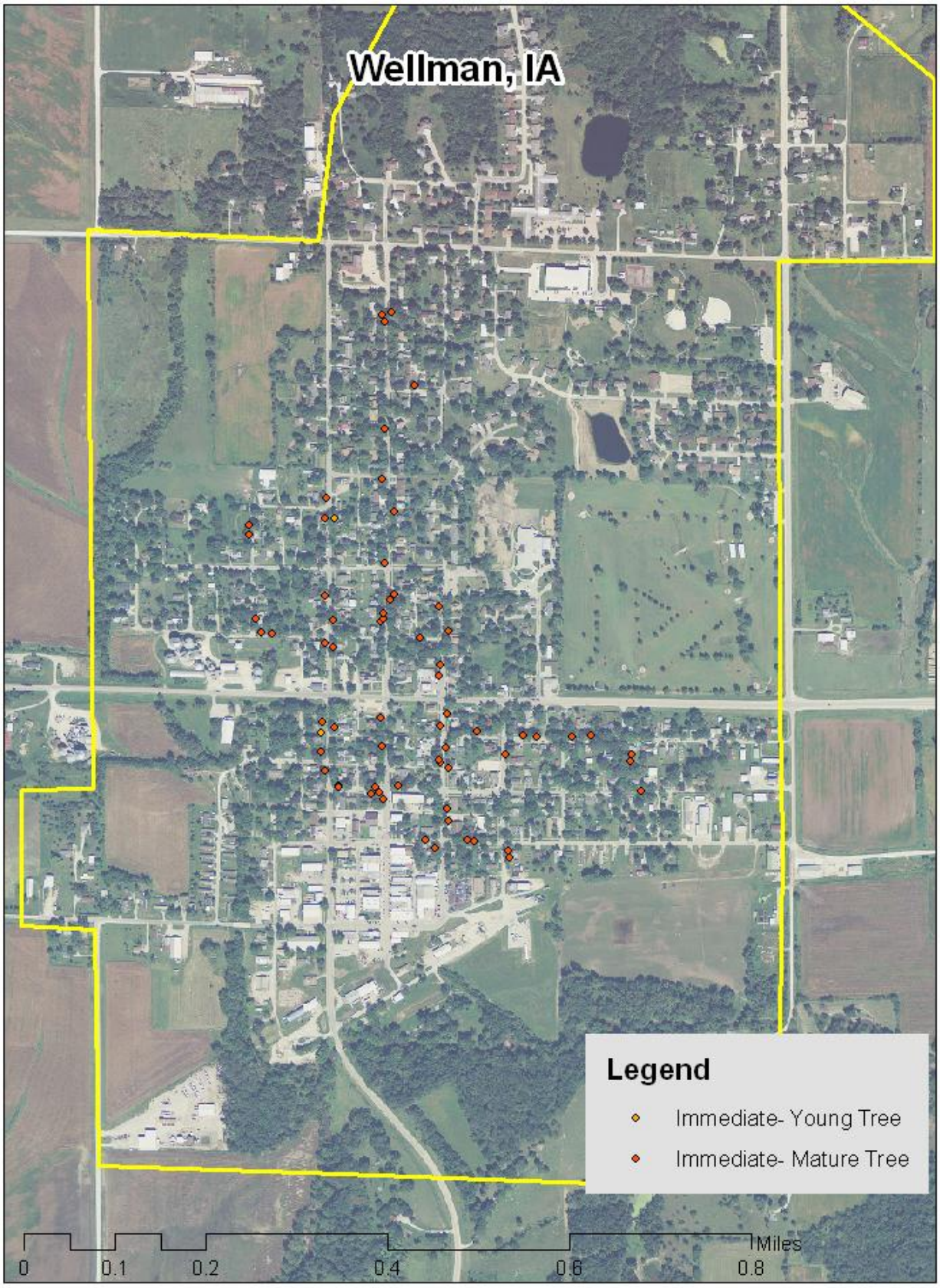


Figure 4: Location of Trees with Recommended Maintenance

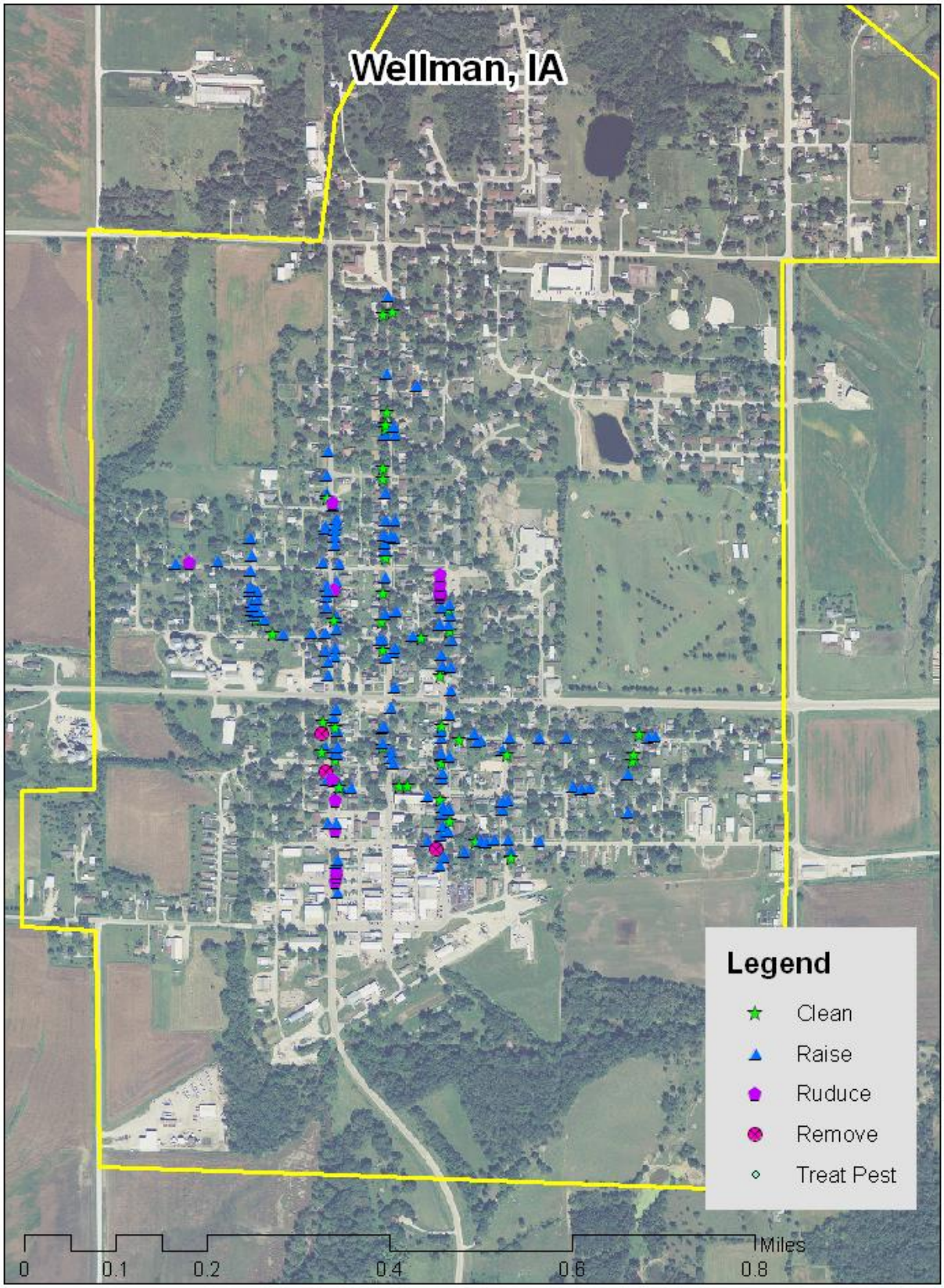


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

The State of Iowa is an Equal Opportunity Employer and provider of ADA services.

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

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