

2014 Urban Forest Management Plan

Lawler, Iowa

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Community Tree Inventory

Lawler, Iowa

Summary

This plan was developed to assist the City of Lawler with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows communities to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (does not include mountain ash). There is a strong possibility that 25.5% of Lawler's city owned trees (ash) 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.

Inventory & Results

In 2014, a tree inventory was conducted using Global Positioning System (GPS) data collectors. --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. The inventory was a complete inventory of street and park trees. Below are some key findings of the **474 trees inventoried**.

Inventory Overview

- ◆ Lawler's trees provide \$86,303 of benefits annually, an average of \$182 a tree
- ◆ There are over 34 species of trees
- ◆ The top three genus are: Maple 38%, Ash 25.5% Spruce 9.3%
- ◆ 35.86% of trees are in need of some type of management
- ◆ 19 trees are recommended for removal.

General Recommendations

The following are key recommendations from the inventory:

- ◆ Of the 19 trees needing removal, **5 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately**. Of the 19 removals, 9 are ash trees.
**City ownership of the trees recommended for removal should be verified prior to any removal*
- ◆ After the removal of the 19 critical concern trees, ash trees in poor health should be assessed for removal.
- ◆ 19 of the 121 ash trees should be re-evaluated at a later date, because they are displaying signs and symptoms associated with EAB.
- ◆ All trees should be pruned on a routine schedule - one third of the city every other year.
- ◆ Plant a diverse mix of trees that does NOT include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.
- ◆ Check ash trees with a visual survey yearly

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.

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 woodpecker damage.

Detailed Inventory Results

The data collected for the 474 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis.

Annual Benefits

1. Annual Energy Benefits: Trees conserve energy by shading buildings and blocking winds. Lawler's trees reduce energy related costs by approximately \$22,621.33 annually. These savings are both in Electricity (107.22 MWh) and in Natural Gas (14,778.6 Therms).

2. Annual Stormwater Benefits: Lawler's trees intercept about 1,315,270.87 gallons of rainfall or snowmelt a year. This interception provides \$35,643.84 of benefits to the city.

3. 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 Lawler, it is estimated that trees remove 1,346.87 lbs of air pollution (ozone (O₃), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂)) per year with a net value of \$3,740.80.

4. Annual Carbon Benefits: Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Lawler trees sequester about 394,683.98 lbs of carbon dioxide (CO₂) a year with an associated value of \$2,960.13. In addition, the trees store 4,884,039.96 lbs of carbon, with a yearly benefit of \$36,630.30.

5. 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. Lawler receives \$21,336.40 in annual social benefits from trees.

Financial Summary of all Benefits: According to the USDA Forest Service i-Tree STRATUM analysis, Lawler's trees provide **\$86,303 of benefits annually**. Benefits of individual trees vary based on size, species, health and location, but **on average each of the 474 trees in Lawler provide approximately \$182 annually**.

Table 1: Annual Benefits of Public Trees

Benefits	Per Tree	Cumulative
Energy	\$47.72	\$22,621.33
CO ₂	\$6.24	\$2,960.13
Air Quality	\$7.89	\$3,740.80
Stormwater	\$75.20	\$35,643.84
Aesthetic/Other	\$45.01	\$21,336.40
Total (\$)	\$182.07	\$86,302.51

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Forest Structure

1. Species & Genus Distribution: Lawler has over 34 different tree species along city streets and parks. The following figures and tables show the distribution of the 13 most common trees by genus and the ten most common species. 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, and it is recommended that they should not be planted until this percentage can be lowered.

Figure 1: Common Tree Genus by Percentage

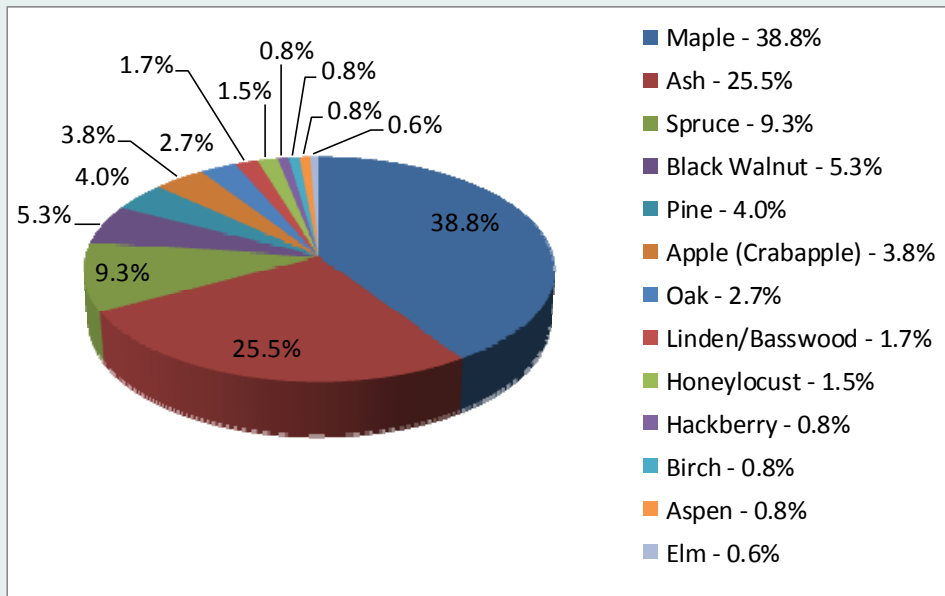
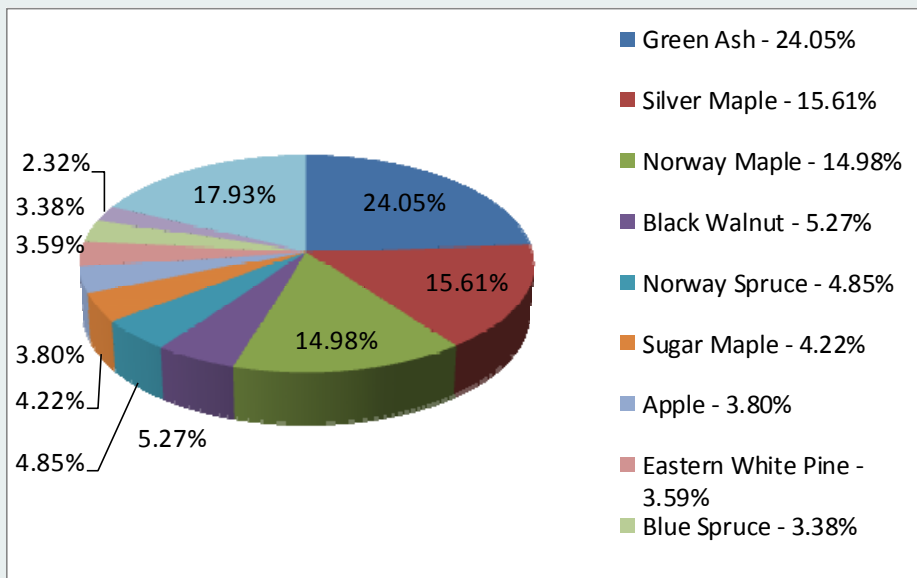


Table 2: Tree Genus

Genus	No. of Trees
Maple	184
Ash	121
Spruce	44
Black Walnut	25
Pine	19
Apple (Crab)	18
Oak	13
Linden/Basswood	8
Honeylocust	7
Hackberry	4
Birch	4
Aspen	4
Elm	3

Figure 2: Common Tree Species by Percentage



2. Age Class: Lawler has a good balance of age classes. For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Lawler's size curve is on the smaller side, indicating a younger than average stand. However, the most abundant genus, maple, is older than average.

Figure 3: Age Distribution of Top 10 Public Tree Species (by Percentage)

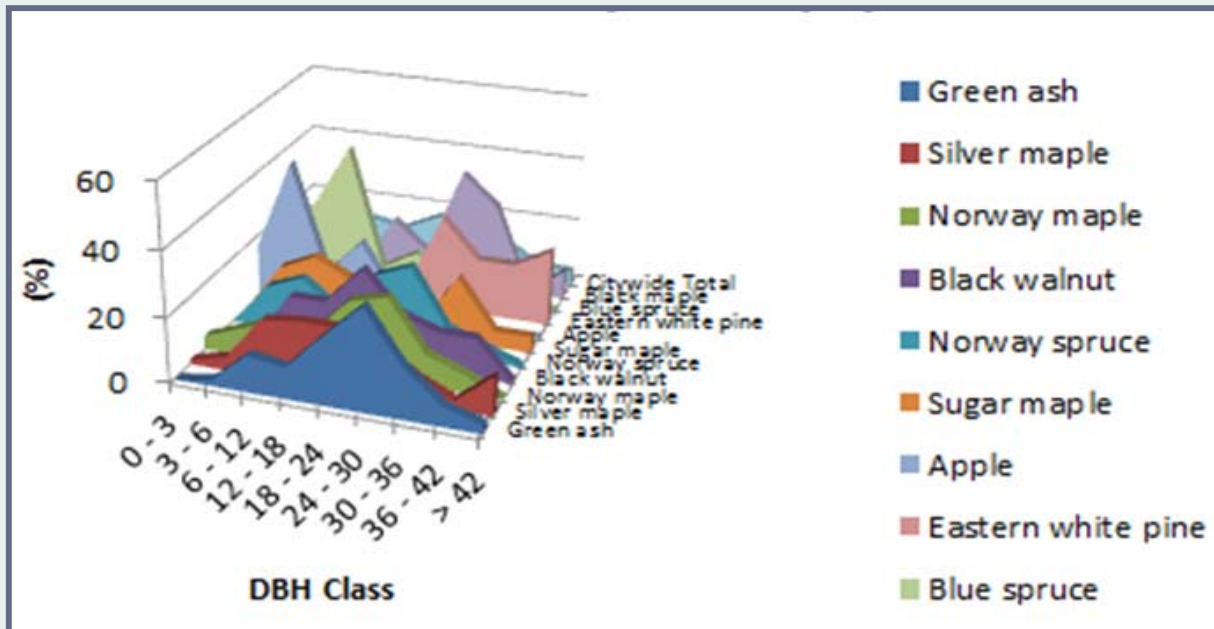


Table 3: Relative Age Distribution

Species	DBH class (in)								
	0 - 3	3 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36	36 - 42	>42
Green ash	0.00	1.75	11.40	9.65	21.05	31.58	15.79	6.14	2.63
Silver maple	1.35	4.05	17.57	18.92	18.92	16.22	8.11	2.70	12.16
Norway maple	4.23	8.45	12.68	11.27	22.54	25.35	9.86	5.63	0.00
Black walnut	0.00	0.00	16.00	16.00	28.00	16.00	12.00	12.00	0.00
Norway spruce	0.00	13.04	17.39	8.70	21.74	26.09	8.70	4.35	0.00
Sugar maple	0.00	15.00	20.00	15.00	15.00	5.00	20.00	5.00	5.00
Apple	16.67	44.44	11.11	22.22	5.56	0.00	0.00	0.00	0.00
Eastern white pine	0.00	0.00	0.00	5.88	5.88	29.41	17.65	17.65	23.53
Blue spruce	12.50	25.00	43.75	6.25	12.50	0.00	0.00	0.00	0.00
Black maple	0.00	0.00	0.00	18.18	9.09	36.36	27.27	0.00	9.09
Citywide Total	5.27	9.92	13.71	11.60	16.88	20.89	11.60	5.49	4.64

3. 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 Lawler indicate that 98.31% of the trees are in fair-good health, with only 1.68% of the foliage in poor health, dead or dying. Similarly, 88.6% of Lawler's trees are in fair-good health for wood condition. Wood condition that is in poor health, dead or dying is about 11.4% of the population. This 11.4% is an estimate of trees that need management follow up soon.

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4. Management Needs: The following management needs for Lawler’s urban trees are outlined in Table 4. The table outlines the specific management needs of the street and park trees by number of trees and percent of the canopy.

- ◆ Crown cleaning removes dead, diseased, and damaged limbs.
- ◆ Crown raising is the removal of lower branches that are 2 inches in diameter or larger in the case of providing clearance for pedestrians or vehicles.
- ◆ Crown reduction is removing individual limbs from structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years.
- ◆ Tree staking includes staking, training, mulching, etc.

Table 4: Management Needs

Technique	No of Trees	Percentage
Crown Cleaning	129	27.2%
Crown Raising	4	0.8%
Tree Staking	2	0.4%
Tree Removal	19	4.0%
Crown Reduction	16	3.4%

Table 5: Land Use

Single Family Residential	67.7%
Park/Vacant/Other	29.5%
Industrial/Large Commercial	0%
Small Commercial	1.5%
Multifamily Residential	1.3%

Table 6: Location Type

Planting Strip	19.6%
Other Maintained Location (Park)	27.4%
Front Yard	51.9%
Cutout (Surrounded by Pavement)	1.1%

5. Canopy Cover: Lawler occupies 571 acres. The tree canopy cover of Lawler is approximately 12.37 acres, about 2.17%.

6. Land Use and Location: The majority of Lawler’s city and park trees are in planting strips in single family residential neighborhoods. Table 5 & Table 6 describe the land use and locations for the street and park trees.

Recommendations

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

2. Hazardous Trees: Lawler has 19 critical concern trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Image 4). It is recommended to start with the large diameter critical concern trees first. There are 5 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 that do not include trimming. There are a total of 14 trees with these needs.

3. Poor Tree Species: After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Image 3 & Appendix B, Image 4). Of the 19 removals, 9 are ash trees. There are a total of 121 ash trees, and 19 of those have signs and symptoms that have

been associated with EAB. In addition, there are 54 trees that are in poor health. ** City ownership of the trees recommended for removal should be verified prior to any removal.*

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

5. Planting: Most of the planting over the next 5 years will replace the trees that are removed. **It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%.** 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 Lawler.

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 (38.8%). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut. All trees planted must meet the restrictions in the city tree ordinance.

The importance of species diversity was brought to the forefront with the loss of the American elm from Dutch elm disease. When one genus (Maple) makes up a majority of the species (Norway Maple, Silver Maple, Sugar Maple) in a planting it is an unbalanced population. These unbalanced populations leave the population open to destruction from diseases and pests. Unfortunately, the lessons of the American elm are only recently being heeded. Communities typically replaced lost elms with a small but reliable selection of ash and Norway and silver maple. This left cities in the predicament they are finding themselves in now as they stand to lose a large percentage of their ash trees to the emerald ash borer.

6. Continual Monitoring: It is important to continuously check the health of all trees. Due to the imminent threat of Emerald Ash Borer to ash trees, it is recommended that 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. For a list of forest health threats, please visit the Iowa DNR's website at <http://www.iowadnr.gov/Environment/Forestry/ForestHealth>

Six Year Maintenance Plan with No Additional Funding

Year 1: Removal: 5 largest critical concern trees (includes 2 ash) or saving for ash tree treatment

Planting and Replacement: 6 trees to be planted in open locations

Visual Survey for signs and symptoms of EAB

Year 2: Removal: Remaining 7 critical concern ash trees or saving for ash tree treatment

Planting and Replacement: 0 trees in open locations from year one removals

Routine pruning: 1/3 of trees (158)

Visual Survey for signs and symptoms of EAB

Year 3: Removal: 5 ash in poor health or saving for ash tree treatment

Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

Year 4: Removal: any new critical concern trees and/or 5 ash or saving for ash tree treatment

Planting and Replacement: 0 trees in open locations from previous removals

Routine pruning: 1/3 of trees (158)

Visual Survey for signs and symptoms of EAB

Year 5: Removal: 5 trees, any critical concern trees and/or ash in poor health, or saving for ash tree treatment

Planting and Replacement: 6 trees to be planted in open locations and locations from previous removals

Visual Survey for signs and symptoms of EAB

Year 6: Removal: 5 trees, any critical concern trees and/or ash in poor health, or saving for ash tree treatment

Planting and Replacement: 0 trees in open locations from previous removals

Routine pruning: 1/3 of trees (158)

Visual Survey for signs and symptoms of EAB

Reduction of ash over 6 years: Approximately 29 ash trees removed (approximately 24% of ash). It will take approximately 24 years to remove all ash with the proposed budget. EAB could potentially kill all ash within 4 years of its arrival. **** To remove all ash trees within 6 years and do nothing else, the budget would need to be increased to \$14,000 a year.**

Emerald Ash Borer Plan

1. Ash Tree Removal

Tree removal will be prioritized with dead, dying, hazardous trees to be removed first. Next will be all ash in poor condition and displaying signs and symptoms of EAB. ***City ownership of the tree recommended for removal should be verified prior to any removal.**

2. Treatment of Ash Trees

Chemical treatment can be effective, spreading removal costs out over several years while allowing trees to continue to provide benefits. However, treatment is not recommended if EAB is more than 15 miles away from the community. For more information on the cost of treatment strategies visit <http://extension.entm.purdue.edu/treecomputer/>

3. 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.

4. 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.

5. Canopy Replacement

As budget permits, all removed ash trees will be replaced. All trees will meet the restrictions in the city ordinance. The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

6. 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.



Emerald Ash Borer Beetle next to D-shaped exit holes.

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7. Monitoring (repeated)

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 die-back, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

8. Private Ash Trees

It is strongly recommended that private property owners start removing ash trees or treating healthy trees they desire to preserve on their property upon arrival of EAB or confirmed within 15 miles. Refer to City Ordinance, Chapter 14 Trees: Section 6-14-15 DEAD OR DISEASED TREE REMOVAL ON PRIVATE PROPERTY at the end of the report.

Proposed Budget

Total \$29,360 over 6 years (\$4,900/year)

FY 2015 Budget

Removal @ \$700/tree: \$3,500 *Or saving for ash tree treatment

Planting @ \$100/tree: \$600

Watering & Maintenance @ \$50/tree: \$300

FY 2016 Budget

Removal: \$4,900 *Or saving for ash tree treatment

Planting: \$0

Watering & Maintenance: \$0

Routine Pruning @ \$9/tree: \$1,420

FY 2017 Budget

Removal: \$3,500 *Or saving for ash tree treatment

Planting: \$600

Watering & Maintenance: \$300

FY 2018 Budget

Removal: \$3,500 *Or saving for ash tree treatment

Planting: \$0

Watering & Maintenance: \$0

Routine Pruning: \$1,420

FY 2019 Budget

Removal: \$3,500 *Or saving for ash tree treatment

Planting: \$600

Watering & Maintenance: \$300

FY 2020 Budget

Removal: \$3,500 *Or saving for ash tree treatment

Planting: \$0

Watering & Maintenance: \$0

Routine Pruning: \$1,420

*Reduction of ash over 6 years: 29 ash trees removed (24% of ash). **It will take approximately 24 years to remove all ash with the current budget.**

Proposed Budget Increase

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

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Annual Energy Benefits of Public Trees by Species									
Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Stand. Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	33.53	2,544.68	4,652.70	4,559.64	7,104.32	(N/A)	24.05	31.41	62.32
Silver maple	19.79	1,501.86	2,601.77	2,549.74	4,051.60	(N/A)	15.61	17.91	54.75
Norway maple	16.58	1,258.43	2,435.26	2,386.56	3,644.98	(N/A)	14.98	16.11	51.34
Black walnut	6.95	527.53	955.05	935.95	1,463.48	(N/A)	5.27	6.47	58.54
Norway spruce	2.95	224.19	399.12	391.14	615.33	(N/A)	4.85	2.72	26.75
Sugar maple	4.67	354.09	620.66	608.24	962.33	(N/A)	4.22	4.25	48.12
Apple	1.27	96.44	188.19	184.43	280.87	(N/A)	3.80	1.24	15.60
Eastern white pine	3.06	232.00	403.28	395.22	627.22	(N/A)	3.59	2.77	36.90
Blue spruce	0.98	74.02	147.40	144.46	218.47	(N/A)	3.38	0.97	13.65
Black maple	3.07	233.23	419.20	410.82	644.05	(N/A)	2.32	2.85	58.55
Honeylocust	2.25	170.73	292.08	286.24	456.96	(N/A)	1.48	2.02	65.28
Littleleaf linden	0.26	19.82	39.40	38.61	58.43	(N/A)	1.27	0.26	9.74
Bur oak	1.65	125.26	225.87	221.35	346.61	(N/A)	1.27	1.53	57.77
Red maple	0.51	38.82	67.46	66.11	104.94	(N/A)	1.27	0.46	17.49
Northern red oak	0.19	14.08	27.40	26.86	40.94	(N/A)	1.05	0.18	8.19
Spruce	0.72	54.71	98.12	96.16	150.87	(N/A)	1.05	0.67	30.17
Paper birch	0.32	24.38	38.06	37.30	61.68	(N/A)	0.84	0.27	15.42
Northern hackberry	0.32	24.36	51.84	50.81	75.16	(N/A)	0.84	0.33	18.79
White ash	1.31	99.09	168.87	165.50	264.59	(N/A)	0.84	1.17	66.15
Quaking aspen	1.34	101.59	181.21	177.58	279.18	(N/A)	0.84	1.23	69.79
Other city Trees	5.52	418.99	765.63	750.32	1,169.31	(N/A)	7.17	5.17	29.53
Total	107.22	8,138.31	14,778.60	14,483.03	22,621.33	(N/A)	100.00	100.00	47.72

Table 2: Annual Stormwater Benefits

Annual Stormwater Benefits of Public Trees by Species						
Species	Total Rainfall Interception (Gal)	Total (\$)	Stand. Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	399,707.86	10,832.08	(N/A)	24.05	30.39	95.02
Silver maple	250,000.28	6,775.01	(N/A)	15.61	19.01	91.55
Norway maple	166,393.76	4,509.27	(N/A)	14.98	12.65	63.51
Black walnut	80,388.56	2,178.53	(N/A)	5.27	6.11	87.14
Norway spruce	62,385.41	1,690.64	(N/A)	4.85	4.74	73.51
Sugar maple	53,388.41	1,446.83	(N/A)	4.22	4.06	72.34
Apple	4,940.76	133.89	(N/A)	3.80	0.38	7.44
Eastern white pine	73,577.57	1,993.95	(N/A)	3.59	5.59	117.29
Blue spruce	12,559.19	340.35	(N/A)	3.38	0.95	21.27
Black maple	29,010.55	786.19	(N/A)	2.32	2.21	71.47
Honeylocust	28,289.39	766.64	(N/A)	1.48	2.15	109.52
Littleleaf linden	2,487.39	67.41	(N/A)	1.27	0.19	11.23
Bur oak	24,254.59	657.30	(N/A)	1.27	1.84	109.55
Red maple	2,778.22	75.29	(N/A)	1.27	0.21	12.55
Northern red oak	901.67	24.44	(N/A)	1.05	0.07	4.89
Spruce	15,743.20	426.64	(N/A)	1.05	1.20	85.33
Paper birch	1,980.44	53.67	(N/A)	0.84	0.15	13.42
Northern hackberry	1,597.76	43.30	(N/A)	0.84	0.12	10.82
White ash	13,412.30	363.47	(N/A)	0.84	1.02	90.87
Quaking aspen	16,389.55	444.16	(N/A)	0.84	1.25	111.04
Other City Trees	75,084.01	2,034.78	(N/A)	7.17	5.71	50.12
Citywide total	1,315,270.87	35,643.84	(N/A)	100.00	100.00	75.20

Table 3: Annual Air Quality Benefits & Table 4: Annual Carbon Sequestered

Annual Air Quality Benefits of Public Trees by Species																		
Species	Deposition O3 (lb)		Deposition NO2 (lb)		Deposition PM10 (lb)		Deposition SO2 (lb)		Total Deposition (\$)		Avoided (lb)		Total Avoided (\$)					
	O3 (lb)	NO2 (lb)	PM10 (lb)	SO2 (lb)	PM10 (lb)	NO2 (lb)	SO2 (lb)	VOC (lb)	PM10 (lb)	NO2 (lb)	SO2 (lb)	PM10 (lb)	NO2 (lb)	SO2 (lb)				
Green ash	52.85	8.45	24.78	2.37	280.03	160.64	23.35	22.25	151.94	999.28	0.00	0.00	446.64	1,279.31	(N/A)	24.05	11.22	
Silver maple	40.71	6.90	20.43	1.80	220.73	93.31	13.66	13.04	89.55	583.82	- 22.97	- 86.13	256.43	718.42	(N/A)	15.61	9.71	
Norway maple	35.21	6.07	17.15	1.56	189.80	80.77	11.65	11.08	75.22	499.38	- 8.15	- 30.56	230.57	658.61	(N/A)	14.98	9.28	
Black walnut	10.23	1.64	4.85	0.46	54.35	33.22	4.83	4.61	31.50	206.84	0.00	0.00	91.33	261.19	(N/A)	5.27	10.45	
Norway spruce	7.40	1.47	5.97	0.91	48.46	14.02	2.05	1.95	13.38	87.53	- 34.59	- 129.72	12.56	6.27	(N/A)	4.85	0.27	
Sugar maple	7.62	1.30	3.75	0.34	41.16	22.08	3.23	3.08	21.13	138.01	- 0.98	- 22.43	56.56	156.74	(N/A)	4.22	7.84	
Apple	1.39	0.23	9.03	1.79	58.71	14.42	2.11	2.02	13.85	90.26	- 44.89	- 168.34	6.58	- 19.36	(N/A)	3.59	- 1.14	
Eastern white pine	1.43	0.28	1.29	0.18	9.76	4.77	0.69	0.65	4.41	29.40	- 4.26	- 15.97	9.44	23.20	(N/A)	3.38	1.45	
Blue spruce	7.39	1.26	3.40	0.33	39.19	14.64	2.13	2.03	13.92	91.25	- 2.42	- 9.08	42.67	121.37	(N/A)	2.32	11.03	
Black maple	5.64	0.93	2.54	0.26	29.72	10.57	1.55	1.48	10.18	66.22	- 4.57	- 17.13	28.59	78.81	(N/A)	1.48	11.26	
Honeylocust	0.39	0.07	0.20	0.02	2.13	1.28	0.18	0.18	1.19	7.90	- 0.19	- 0.72	3.31	9.31	(N/A)	1.27	1.55	
Littleleaf linden	3.61	0.58	1.62	0.16	18.92	7.88	1.15	1.09	7.48	49.08	0.00	0.00	23.57	68.00	(N/A)	1.27	11.33	
Bur oak	0.43	0.07	0.23	0.02	2.40	2.41	0.35	0.34	2.32	15.10	- 0.17	- 0.62	6.01	16.87	(N/A)	1.27	2.81	
Red maple	0.09	0.02	0.06	0.00	0.54	0.90	0.13	0.12	0.84	5.57	- 0.14	- 0.51	2.03	5.60	(N/A)	1.05	1.12	
Northern red oak	1.88	0.37	1.51	0.23	12.27	3.43	0.50	0.48	3.27	21.38	- 8.65	- 32.44	3.01	1.22	(N/A)	1.05	0.24	
Spruce	0.12	0.02	0.08	0.01	0.69	1.48	0.22	0.21	1.46	9.35	0.00	0.00	3.58	10.03	(N/A)	0.84	2.51	
Paper birch	0.07	0.01	0.07	0.00	0.49	1.60	0.23	0.22	1.46	9.82	0.00	0.00	3.67	10.31	(N/A)	0.84	2.58	
Northern hackberry	1.76	0.28	0.86	0.08	9.42	6.14	0.90	0.86	5.91	38.46	0.00	0.00	16.79	47.88	(N/A)	0.84	11.97	
White ash	2.19	0.35	1.02	0.10	11.57	6.37	0.93	0.89	6.07	39.75	0.00	0.00	17.91	51.32	(N/A)	0.84	12.83	
Quaking aspen	13.73	2.34	7.06	0.80	75.37	26.43	3.84	3.66	25.01	164.44	- 13.28	- 49.78	69.60	190.03	(N/A)	7.17	4.47	
Other City Trees	203.18	34.43	104.69	10.79	1,113.17	512.56	74.57	71.09	485.82	3,191.09	- 150.26	- 563.46	1,346.87	3,740.80	(N/A)	100.00	7.89	
Citywide Total																		

Annual CO2 Benefits of Public Trees by Species																			
Species	Sequestered (lb) (\$)		Decomposition Release (lb)		Maint. Release (lb) (\$)		Total Release (lb) (\$)		Avoided (\$)		Net Total (lb)		Stand. Error		% of Total		Avg. \$/tree		
	Sequestered (lb)	Sequestered (\$)	Release (lb)	Release (\$)	Release (lb)	Release (\$)	Release (lb)	Release (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)	Total (\$)
Green ash	79,535.50	596.52	- 8,326.78	- 359.97	- 359.97	- 18.14	- 2.70	56,236.76	421.78	127,085.50	953.14	(N/A)	24.05	32.20	8.36				
Silver maple	76,553.76	574.15	- 4,685.41	- 213.33	- 213.33	- 18.14	- 1.60	33,190.70	248.93	104,845.71	786.34	(N/A)	15.61	26.56	10.63				
Norway maple	19,872.50	149.04	- 2,795.60	- 184.28	- 184.28	- 18.14	- 1.38	27,810.88	208.58	44,703.51	335.28	(N/A)	14.98	11.33	4.72				
Black walnut	16,276.99	122.08	- 1,616.28	- 73.71	- 73.71	- 18.14	- 0.55	11,658.27	87.44	26,245.27	196.84	(N/A)	5.27	6.65	7.87				
Norway spruce	2,968.76	22.27	- 420.52	- 58.70	- 58.70	- 18.14	- 0.44	4,954.56	37.16	7,444.11	55.83	(N/A)	4.85	1.89	2.43				
Sugar maple	10,877.95	81.58	- 1,086.73	- 52.07	- 52.07	- 18.14	- 0.39	7,825.22	58.69	17,564.38	131.73	(N/A)	4.22	4.45	6.59				
Apple	2,106.32	15.80	- 106.55	- 18.14	- 18.14	- 18.14	- 0.14	2,131.40	15.99	4,113.04	30.85	(N/A)	3.80	1.04	1.71				
Eastern white pine	1,583.17	11.87	- 560.96	- 70.59	- 70.59	- 18.14	- 0.53	5,127.21	38.45	6,078.83	45.59	(N/A)	3.59	1.54	2.68				
Blue spruce	706.76	5.30	- 41.32	- 18.33	- 18.33	- 18.14	- 0.14	1,635.71	12.27	2,282.82	17.12	(N/A)	3.38	0.58	1.07				
Black maple	1,889.75	14.17	- 378.03	- 28.47	- 28.47	- 18.14	- 0.21	5,154.36	38.66	6,637.61	49.78	(N/A)	2.32	1.68	4.53				
Honeylocust	3,016.36	22.62	- 354.07	- 16.97	- 16.97	- 18.14	- 0.13	3,772.99	28.30	6,418.31	48.14	(N/A)	1.48	1.63	6.88				
Littleleaf linden	921.42	6.91	- 41.34	- 4.10	- 4.10	- 18.14	- 0.03	438.09	3.29	1,314.07	9.86	(N/A)	1.27	0.33	1.64				
Bur oak	3,789.06	28.42	- 578.90	- 19.11	- 19.11	- 18.14	- 0.14	2,768.23	20.76	5,959.28	44.69	(N/A)	1.27	1.51	7.45				
Red maple	803.40	6.03	- 26.87	- 5.46	- 5.46	- 18.14	- 0.04	857.93	6.43	1,629.00	12.22	(N/A)	1.27	0.41	2.04				
Northern red oak	267.43	2.01	- 6.91	- 2.73	- 2.73	- 18.14	- 0.02	311.27	2.33	569.06	4.27	(N/A)	1.05	0.14	0.85				
Spruce	939.48	7.05	- 105.23	- 13.65	- 13.65	- 18.14	- 0.10	1,209.09	9.07	2,029.69	15.22	(N/A)	1.05	0.51	3.04				
Paper birch	667.88	5.01	- 20.30	- 3.71	- 3.71	- 18.14	- 0.03	538.79	4.04	1,182.67	8.87	(N/A)	0.84	0.30	2.22				
Northern hackberry	206.38	1.55	- 5.19	- 3.51	- 3.51	- 18.14	- 0.03	538.28	4.04	735.96	5.52	(N/A)	0.84	0.19	1.38				
White ash	3,498.72	26.24	- 174.53	- 10.92	- 10.92	- 18.14	- 0.08	2,189.91	16.42	5,503.18	41.27	(N/A)	0.84	1.39	10.32				
Quaking aspen	3,221.39	24.16	- 342.39	- 14.04	- 14.04	- 18.14	- 0.11	2,245.18	16.84	5,110.14	38.33	(N/A)	0.84	1.29	9.58				
Other City Trees	9,832.49	73.74	- 1,780.44	- 79.76	- 79.76	- 18.14	- 0.60	9,259.54	69.45	17,231.83	129.24	(N/A)	7.17	4.37	3.41				
Citywide Total	239,535.46	1,796.52	- 23,454.35	- 1,251.52	- 1,251.52	- 18.14	- 9.39	179,854.39	1,348.91	394,683.98	2,960.13	(N/A)	100.00	100.00	6.24				

Table 5: Annual Carbon Stored

Stored CO2 Benefits of Public Trees by Species						
Species	Total stored CO2 (lbs)	Total (\$)	Stand. Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	1,734,746.11	13,010.60	(N/A)	24.05	35.52	114.13
Silver maple	975,679.35	7,317.60	(N/A)	15.61	19.98	98.89
Norway maple	581,509.45	4,361.32	(N/A)	14.98	11.91	61.43
Black walnut	336,725.28	2,525.44	(N/A)	5.27	6.89	101.02
Norway spruce	87,608.16	657.06	(N/A)	4.85	1.79	28.57
Sugar maple	225,964.18	1,694.73	(N/A)	4.22	4.63	84.74
Apple	22,170.84	166.28	(N/A)	3.80	0.45	9.24
Eastern white pine	116,867.43	876.51	(N/A)	3.59	2.39	51.56
Blue spruce	8,605.97	64.54	(N/A)	3.38	0.18	4.03
Black maple	78,755.90	590.67	(N/A)	2.32	1.61	53.70
Honeylocust	73,646.84	552.35	(N/A)	1.48	1.51	78.91
Littleleaf linden	8,454.75	63.41	(N/A)	1.27	0.17	10.57
Bur oak	120,603.87	904.53	(N/A)	1.27	2.47	150.75
Red maple	5,598.69	41.99	(N/A)	1.27	0.11	7.00
Northern red oak	1,422.91	10.67	(N/A)	1.05	0.03	2.13
Spruce	21,922.78	164.42	(N/A)	1.05	0.45	32.88
Paper birch	4,228.21	31.71	(N/A)	0.84	0.09	7.93
Northern hackberry	989.42	7.42	(N/A)	0.84	0.02	1.86
White ash	36,359.96	272.70	(N/A)	0.84	0.74	68.17
Quaking aspen	71,330.90	534.98	(N/A)	0.84	1.46	133.75
Other City Trees	370,848.96	2,781.37	(N/A)	7.17	7.59	63.61
Citywide total	4,884,039.96	36,630.30	(N/A)	100.00	100.00	77.28

Table 6: Annual Social and Aesthetic Benefits

Annual Aesthetic/Other Benefit of Public Trees by Species					
Species	Total (\$)	Stand. Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	6,343.77	(N/A)	24.05	29.73	55.65
Silver maple	6,280.81	(N/A)	15.61	29.44	84.88
Norway maple	1,889.93	(N/A)	14.98	8.86	26.62
Black walnut	1,338.64	(N/A)	5.27	6.27	53.55
Norway spruce	539.76	(N/A)	4.85	2.53	23.47
Sugar maple	1,118.71	(N/A)	4.22	5.24	55.94
Apple	120.10	(N/A)	3.80	0.56	6.67
Eastern white pine	210.69	(N/A)	3.59	0.99	12.39
Blue spruce	272.07	(N/A)	3.38	1.28	17.00
Black maple	240.87	(N/A)	2.32	1.13	21.90
Honeylocust	785.43	(N/A)	1.48	3.68	112.20
Littleleaf linden	102.95	(N/A)	1.27	0.48	17.16
Bur oak	278.33	(N/A)	1.27	1.30	46.39
Red maple	124.85	(N/A)	1.27	0.59	20.81
Northern red oak	33.73	(N/A)	1.05	0.16	6.75
Spruce	162.09	(N/A)	1.05	0.76	32.42
Paper birch	90.06	(N/A)	0.84	0.42	22.51
Northern hackberry	70.40	(N/A)	0.84	0.33	17.60
White ash	392.81	(N/A)	0.84	1.84	98.20
Quaking aspen	244.65	(N/A)	0.84	1.15	61.16
Other City Trees	695.74	(N/A)	7.17	3.26	19.50
Citywide Total	21,336.40	(N/A)	100.00	100.00	45.01

Table 7: Summary of Benefits in Dollars

Average Annual Benefits of Public Trees by Species (\$/tree)						
Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/Other	Total
Green ash	62.32	8.36	11.22	95.02	55.65	232.57
Silver maple	54.75	10.63	9.71	91.55	84.88	251.52
Norway maple	51.34	4.72	9.28	63.51	26.62	155.47
Black walnut	58.54	7.87	10.45	87.14	53.55	217.55
Norway spruce	26.75	2.43	0.27	73.51	23.47	126.43
Sugar maple	48.12	6.59	7.84	72.34	55.94	190.82
Apple	15.60	1.71	2.54	7.44	6.67	33.97
Eastern white pine	36.90	2.68	- 1.14	117.29	12.39	168.12
Blue spruce	13.65	1.07	1.45	21.27	17.00	54.45
Black maple	58.55	4.53	11.03	71.47	21.90	167.48
Honeylocust	65.28	6.88	11.26	109.52	112.20	305.14
Littleleaf linden	9.74	1.64	1.55	11.23	17.16	41.33
Bur oak	57.77	7.45	11.33	109.55	46.39	232.49
Red maple	17.49	2.04	2.81	12.55	20.81	55.70
Northern red oak	8.19	0.85	1.12	4.89	6.75	21.80
Spruce	30.17	3.04	0.24	85.33	32.42	151.21
Paper birch	15.42	2.22	2.51	13.42	22.51	56.08
Northern hackberry	18.79	1.38	2.58	10.82	17.60	51.17
White ash	66.15	10.32	11.97	90.87	98.20	277.51
Quaking aspen	69.79	9.58	12.83	111.04	61.16	264.41
Other City Trees	502.01	58.02	75.93	852.10	331.46	1,819.51
Citywide Total	47.72	6.24	7.89	75.20	45.01	182.07

Figure 1: Species Distribution

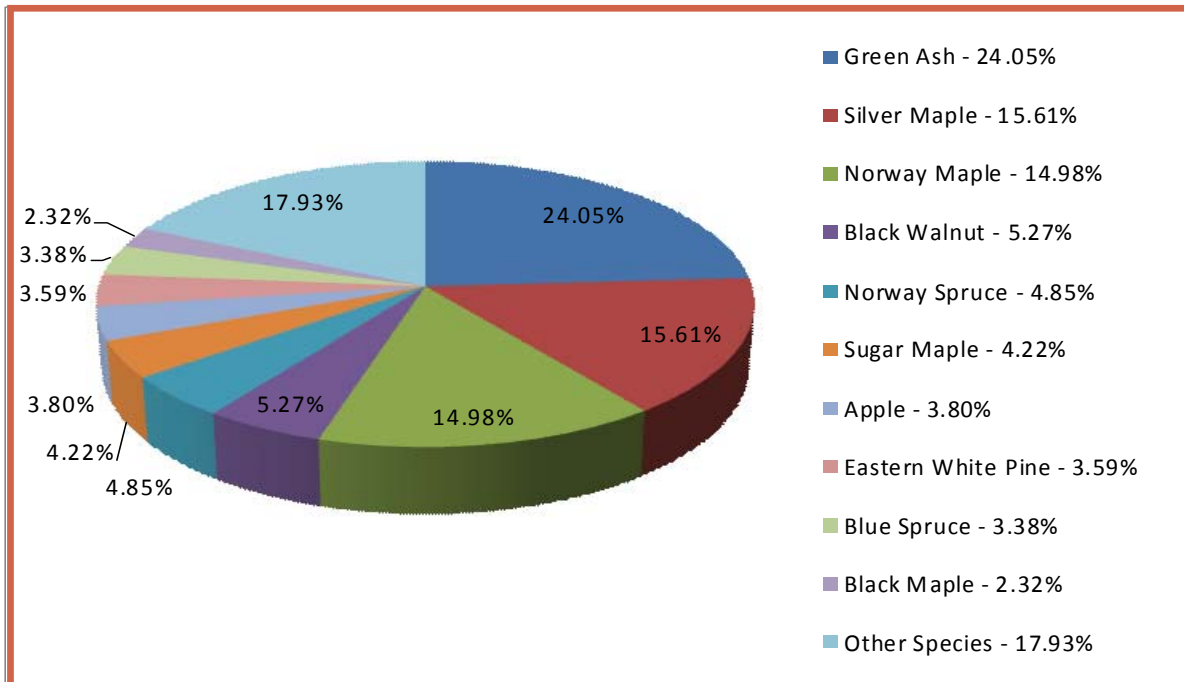


Figure 2: Relative Age Class

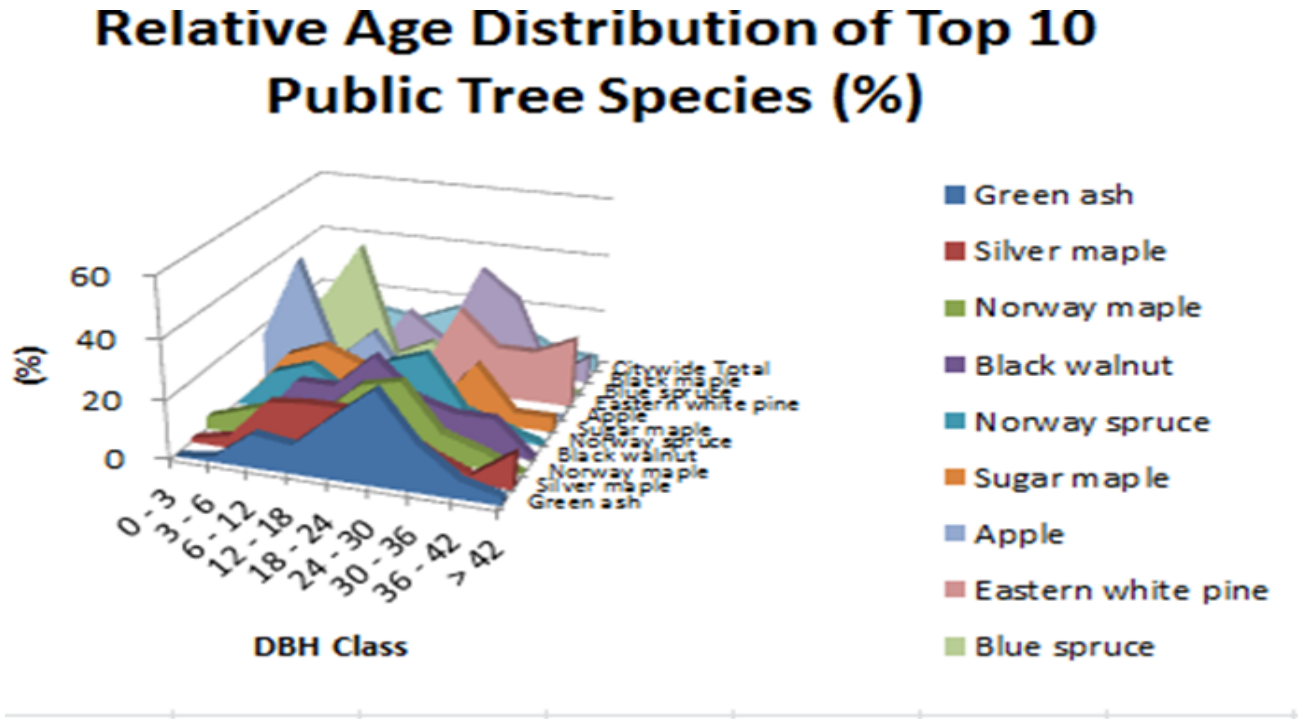


Table 8: Relative Age Class

Species	DBH class (in)								
	0 - 3	3 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36	36 - 42	> 42
Green ash	0.00	1.75	11.40	9.65	21.05	31.58	15.79	6.14	2.63
Silver maple	1.35	4.05	17.57	18.92	18.92	16.22	8.11	2.70	12.16
Norway maple	4.23	8.45	12.68	11.27	22.54	25.35	9.86	5.63	0.00
Black walnut	0.00	0.00	16.00	16.00	28.00	16.00	12.00	12.00	0.00
Norway spruce	0.00	13.04	17.39	8.70	21.74	26.09	8.70	4.35	0.00
Sugar maple	0.00	15.00	20.00	15.00	15.00	5.00	20.00	5.00	5.00
Apple	16.67	44.44	11.11	22.22	5.56	0.00	0.00	0.00	0.00
Eastern white pine	0.00	0.00	0.00	5.88	5.88	29.41	17.65	17.65	23.53
Blue spruce	12.50	25.00	43.75	6.25	12.50	0.00	0.00	0.00	0.00
Black maple	0.00	0.00	0.00	18.18	9.09	36.36	27.27	0.00	9.09
Citywide Total	5.27	9.92	13.71	11.60	16.88	20.89	11.60	5.49	4.64

Figure 3: Foliage Condition

Functional (Foliage) Condition of Public Trees

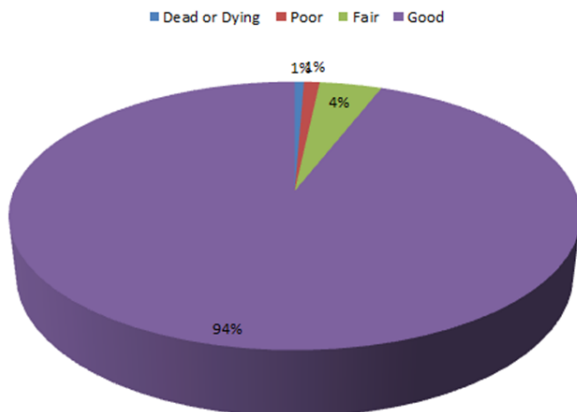


Figure 4: Wood Condition
Structural (Woody) Condition of Public Trees

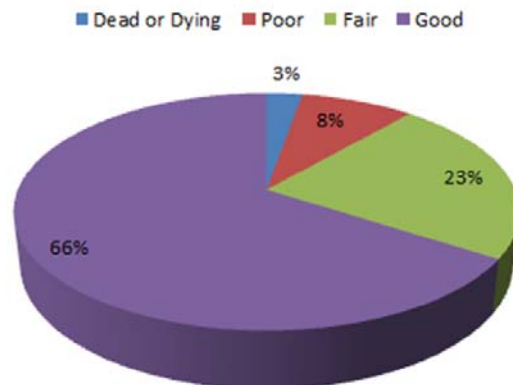


Figure 5: Land Use of City/Park Trees

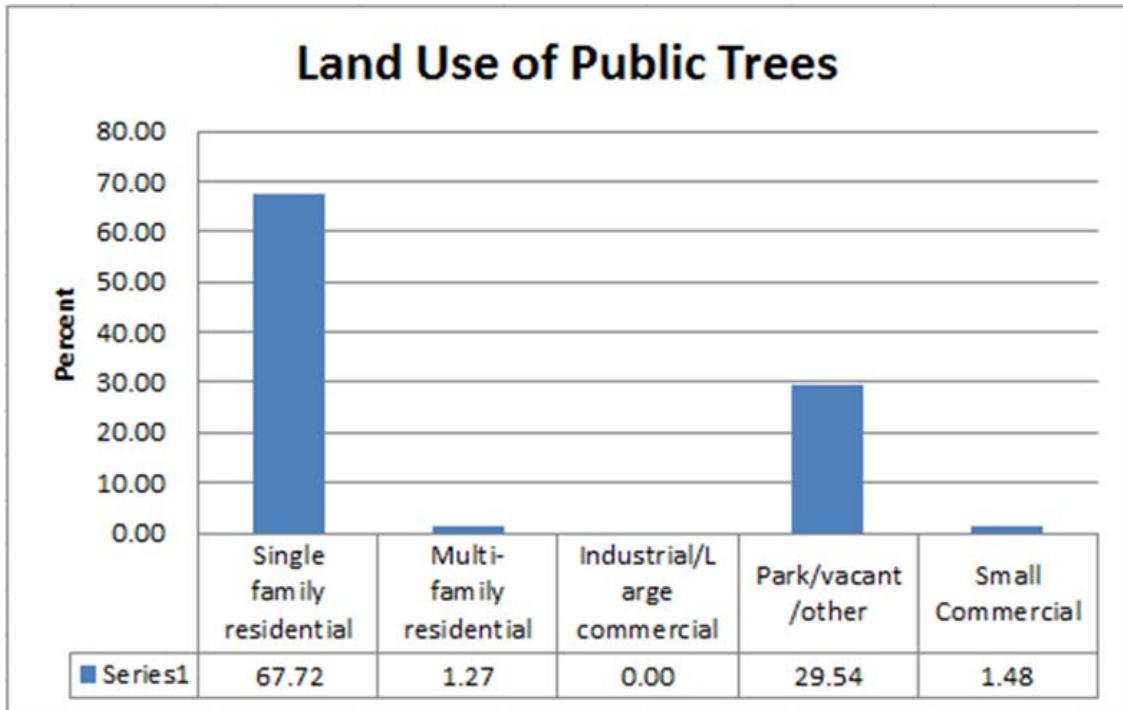
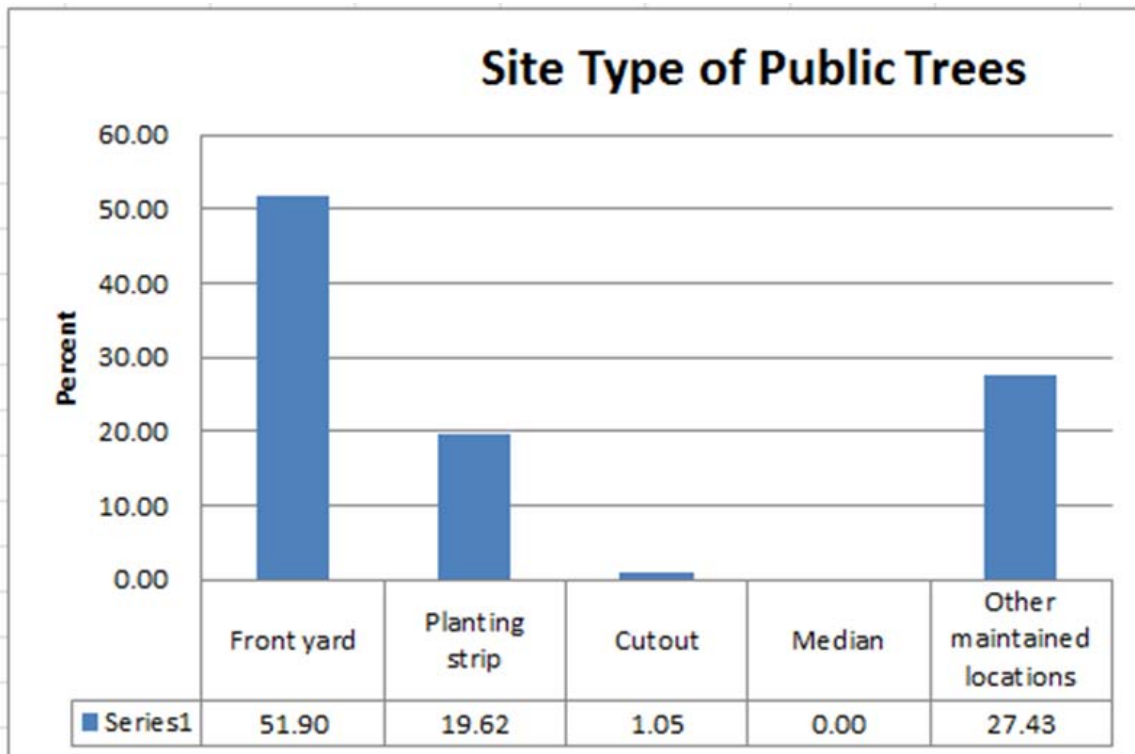


Figure 6: Location of City/Park Trees



Appendix B: ArcGIS Mapping

Image 1: Location of Ash Trees

Image 2: Location of EAB symptoms

Image 3: Location of Poor Condition Ash Trees

Image 4: Location of Trees with Recommended Maintenance

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



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, and Northeast Iowa RC&D

Image 1. Location of Ash Trees

Legend

-  Green ash
-  Ash
-  White ash
-  Black ash

Lawler, Iowa




Map created by Northeast Iowa RC&D
11/13/2014



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, and Northeast Iowa RC&D

Image 2. Location of Trees with One or More Symptoms of EAB
 (Canopy Dieback, Epicormic Shoots, Woodpecker Damage, Bark Splitting, or D-Shaped Exit Holes)

Legend

 EAB Symptoms

 City Limits

Lawler, Iowa



Map created by Northeast Iowa RC&D
 11/13/2014

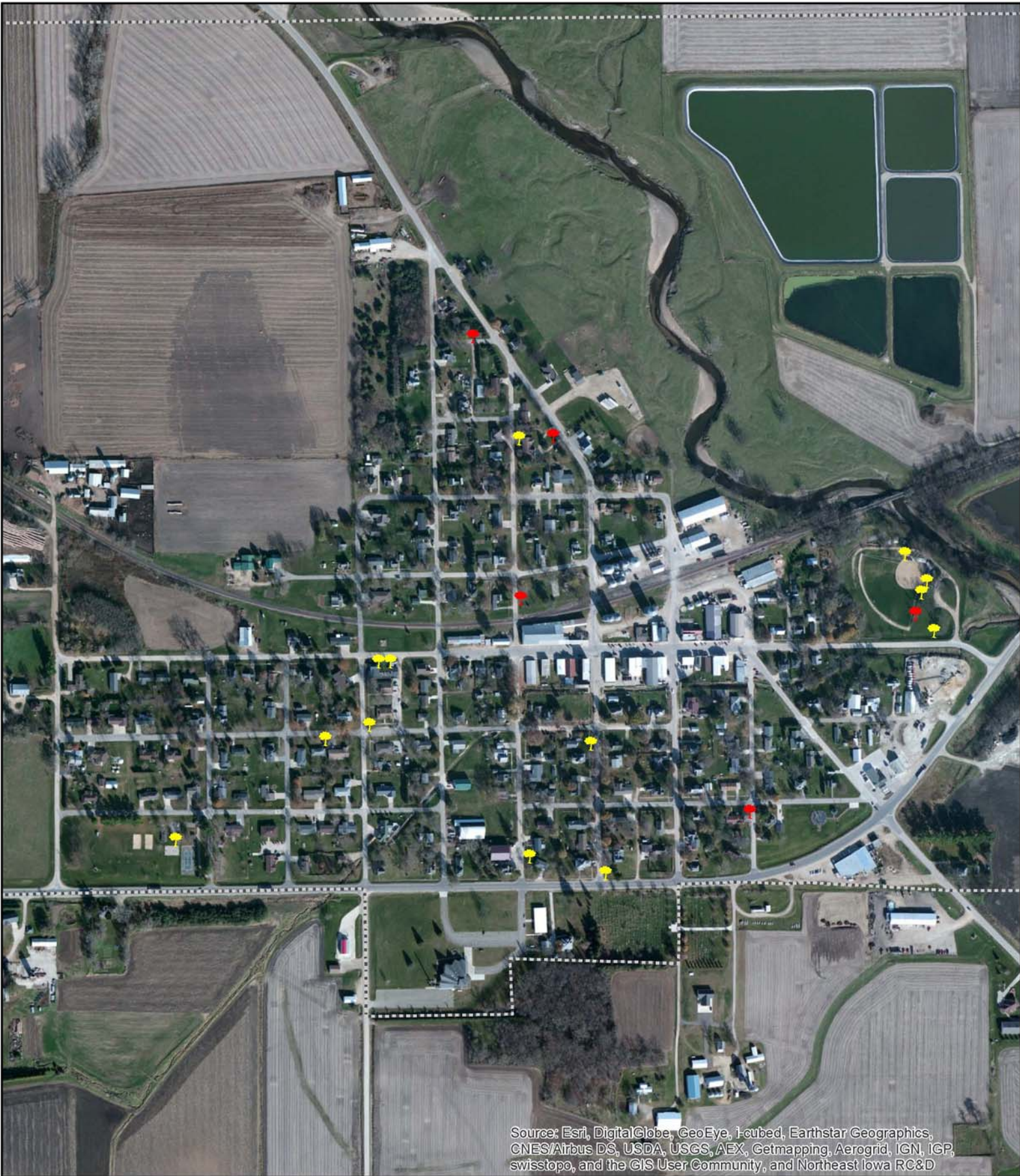


Image 3. Location of Poor Condition Ash Trees
(Wood and/or Leaves are Dead/Dying or in Poor Condition)

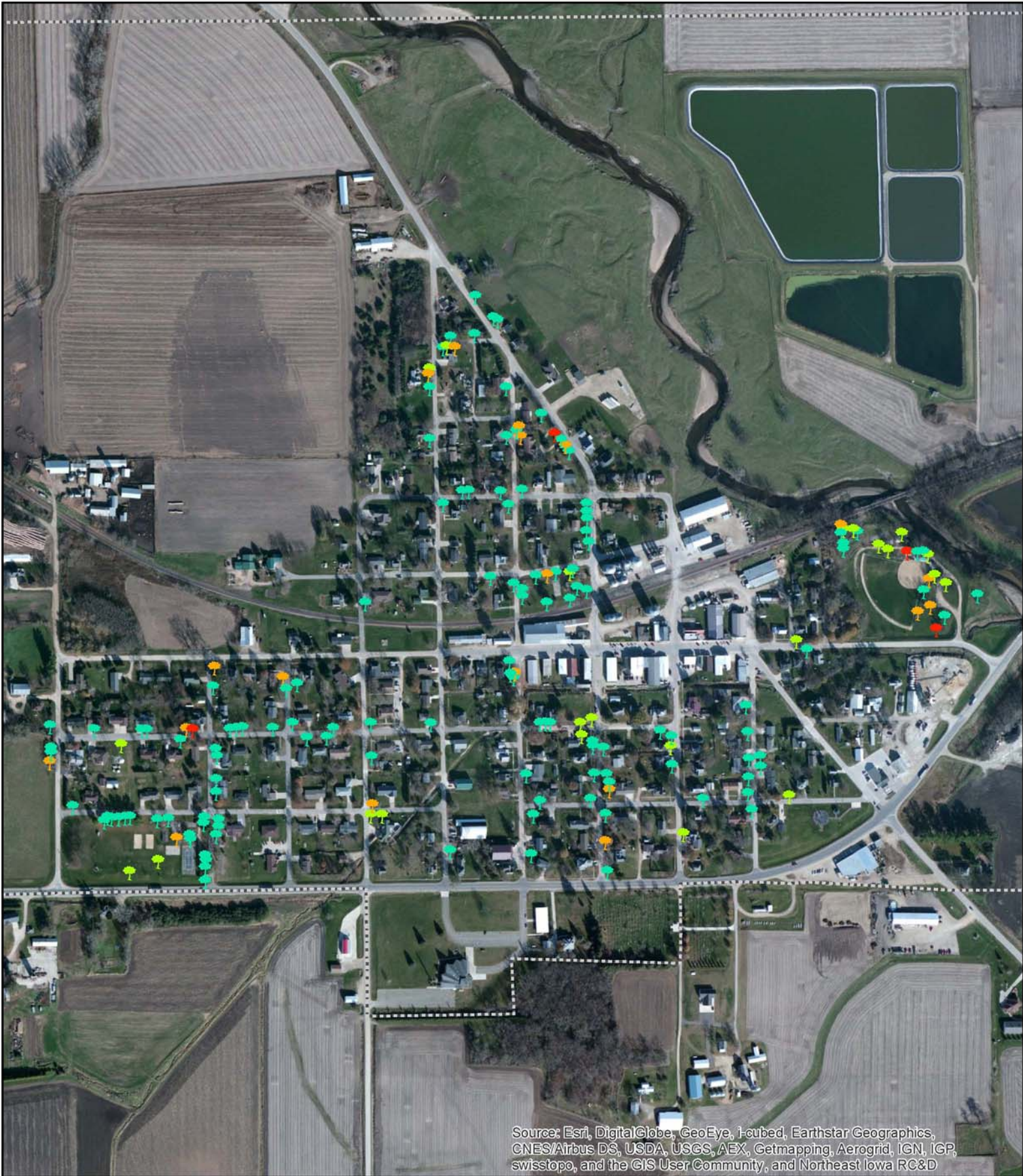
Legend

- Dead or Dying
- Poor

Lawler, Iowa



Map created by Northeast Iowa RC&D
11/13/2014



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, and Northeast Iowa RC&D

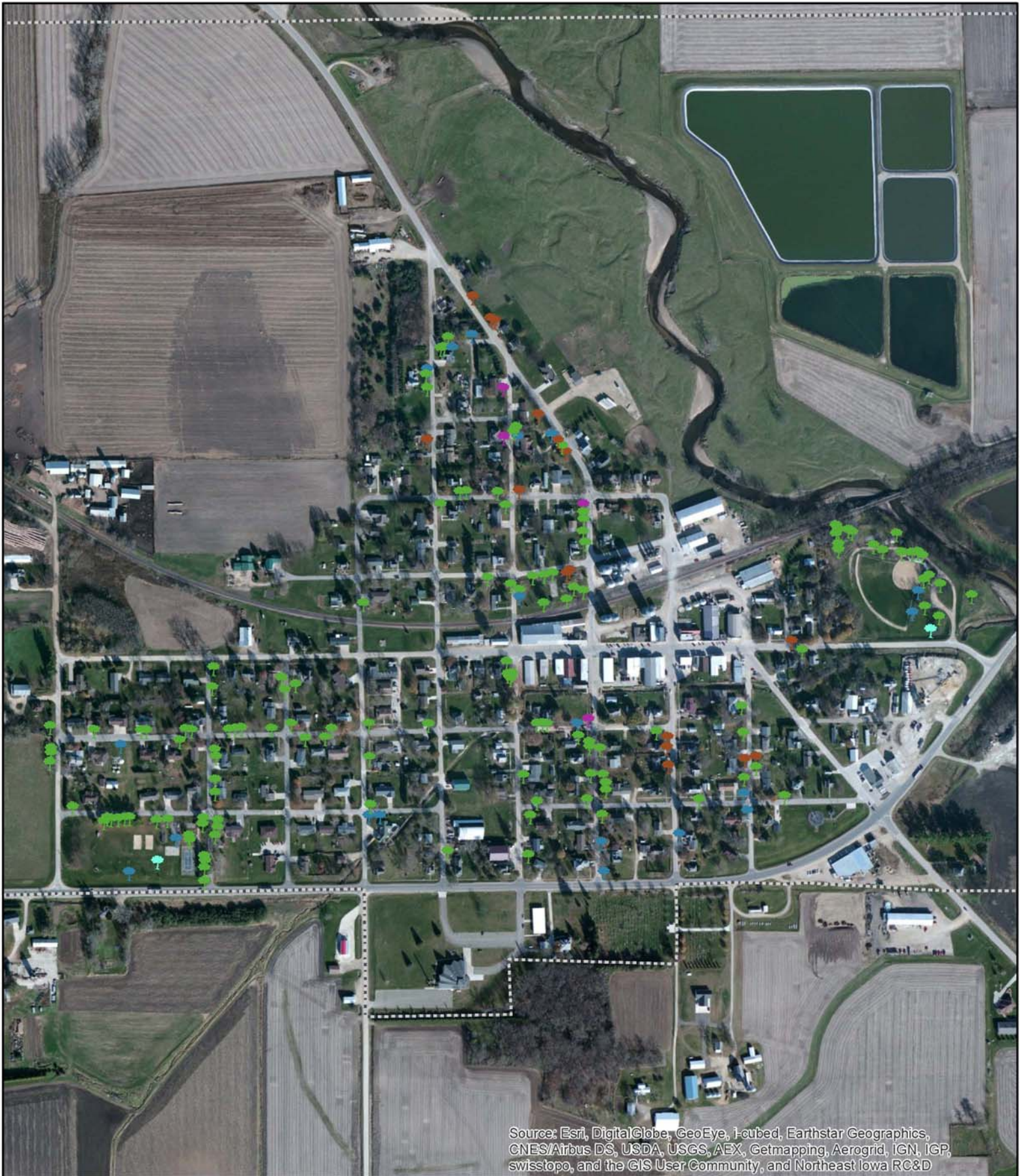
Image 4. Location of Trees with Recommended Maintenance

Lawler, Iowa

Legend									
	Critical Concern		Mature Tree Immediate		Mature Tree Routine		Young Tree Immediate		Young Tree Routine



Map created by Northeast Iowa RC&D
11/13/2014



Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, and Northeast Iowa RC&D

Image 5. Location of Maintenance Tasks

Lawler, Iowa

Legend

- Clean
- Raise
- Reduce
- Remove*
- Stake/Train
- Treat pest/disease

*City owned trees recommended for removal should be verified prior to any removal



Map created by Northeast Iowa RC&D
11/20/2014

Appendix C: Lawler Tree Ordinances

TITLE VI PHYSICAL ENVIRONMENT

CHAPTER 6 TREES AND WEEDS

6-6-1	Purpose	6-6-13	Inspection and Removal
6-6-2	Definitions	6-6-14	Appeals
6-6-3	Tree Board	6-6-15	Interference
6-6-4	Authority	6-6-16	Weed Official Appointed
6-6-5	Permits	6-6-17	Duty to Cut Noxious Weeds
6-6-6	Removal	6-6-18	Developed and undeveloped lots; Weeds Removal; Grass Cutting
6-6-7	Species and Varieties	6-6-19	Obstruction Public Ways
6-6-8	Obstruction	6-6-20	Interference with Weed Official
6-6-9	Nuisance and Condemnation	6-6-21	Watercourses
6-6-10	Protection of Trees	6-6-22	Fire Hazards
6-6-11	Tree Trimming by Contractors		
6-6-12	Disease Control		

6-6-1 PURPOSE. It is the purpose of this chapter to promote and protect the public health, safety and general welfare by providing for the regulation of the planting, maintenance and removal of trees, shrubs and other plants within the City.

6-6-2 DEFINITIONS. For use in this chapter, the following terms are defined:

1. "Park" means all public parks.
2. "Parking" means that part of the street, avenue or highway in the City not covered by sidewalk and lying between the lot line and the curb line; or, on unpaved streets, that, part of the street, avenue or highway lying between the lot line and that portion of the street usually traveled by vehicular traffic.
3. "Superintendent" means the Superintendent of Streets or such other person as may be designated by the Council.

6-6-3 TREE BOARD. There is hereby created and established a Tree Board for the City, which shall consist of three (3) members, who shall be appointed by the Mayor with the approval of the Council, for overlapping three-year terms. Members of the Board shall serve without compensation. The Superintendent shall serve as ex-officio member of the Tree Board. In the event of a Board vacancy, the Mayor, with the approval of the Council, shall appoint a new member to the Board.

6-6-4 AUTHORITY. The Tree Board shall have the authority of regulating the planting, maintenance and removal of trees on the parking and in parks to ensure safety or preserve or enhance the aesthetics of such public sites. The Tree Board shall have the authority to

supervise or inspect all work done in accordance with terms of this chapter. The Tree Board shall have the authority to formulate and publish a master tree plan with advice, hearing and approval of the Council.

- 6-6-5 PERMITS.** No citizen shall plant, preserve, remove, cut or otherwise disturb any tree on any parking or park without first filing an application and procuring a permit from the Clerk. A written permit will be issued at no cost. The person receiving the permit shall abide by the standards of practice adopted by the Tree Board. Contractors hired by the City to perform tree work are not required to have a permit but must have sufficient liability insurance before performing tree service. within the community. City employees are not required to have a permit, but must work directly under the Superintendent.
- 6-6-6 REMOVAL.** All public trees designated for removal shall be completely removed from the growing site and disposed of in an authorized manner. All costs incurred will be paid by the City.
- 6-6-7 SPECIES AND VARIETIES.** The Tree Board will develop and maintain a list of desirable trees for planting along streets in three sizes: small, medium and large. No person shall plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, or evergreens.
- 6-6-8 OBSTRUCTION.** It is the duty of any person owning or occupying real property bordering on any street upon which property there may be trees to prune such trees in a manner that they will not obstruct or shade the street lights, obstruct the passage of pedestrians on sidewalks, obstruct vision of traffic signs, or obstruct view of any street or alley intersection. The minimum clearance of any overhanging portion thereof shall be eight (8) feet over sidewalks and fourteen (14) feet over all streets.
- 6-6-9 NUISANCE AND CONDEMNATION.** All street trees planted in violation of, or not maintained in strict compliance with the provisions of this chapter are declared to I constitute a public nuisance. The Superintendent shall cause written notice to be served on the property owner requiring such nuisances to be corrected within thirty (30) days or the cost of correction will be assessed against the property owner.
- 6-6-10 PROTECTION OF TREES.** During development, redevelopment, razing, or renovation, no more than fifty percent (50%) of the trees shall be cut, damaged, or removed 'except by specific permit. If more than fifty percent (50%) are removed a , minimum of twenty-five percent (25%) of the trees removed must be replaced with trees on the approved tree list. Any ditches, tunnels, trenches to be excavated or any drive to be laid within a radius of ten (10) feet from any tree must have prior approval of the Tree Board. No person shall intentionally damage, cut, carve, attach any rope, wire, nails, advertising posters, or other contrivance to any tree; allow any gaseous, liquid, chemical or solid substance that is harmful to such trees to come in contact with them; or set fire or permit fire to bum when such fire or the heat will injure any portion of any tree. Tree topping is not allowed on any public-owned tree.

- 6-6-11 TREE TRIMMING BY CONTRACTORS.** Any person who shall trim, cut, remove, or otherwise disturb any tree for hire shall be responsible for the disposal of all wood, branches, brush and bark and the cleanup of the same.
- 6-6-12 DISEASE CONTROL.** Any dead, diseased or damaged tree or shrub which may harbor serious insect or disease pests or disease injurious to other trees is hereby declared to be a nuisance.
- 6-6-13 INSPECTION AND REMOVAL.** The Tree Board shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be dead, diseased or damaged, and such trees and shrubs shall be subject to the following:
1. City Property. If it is determined that any such condition exists on any public property, including the strip between the curb and the lot line of private property, the Tree Board may cause such condition to be corrected by treatment or removal. The Council may order the removal of any trees on the streets of the City which interfere with the making of improvements or with travel thereon.
 2. Private Property. If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Tree Board shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within fourteen (14) days of receipt of notice, the Tree Board may cause the condition to be corrected and the cost assessed against the property. (Code of Iowa, Sec. 364.12[3b & h])
- 6-6-14 APPEALS.** Any person who receives an order from the Tree Board or Superintendent and objects to all or a part thereof, may, within eight (8) days of receipt thereof, notify the Council, in writing, of the nature of the objection.
- 6-6-15 INTERFERENCE.** No person shall prevent or interfere with the Tree Board or Superintendent in the execution or enforcement of this chapter. (Ordinance 210)
- 6-6-16 WEED OFFICIAL APPOINTED.** The City Council shall be appoint the weed official for the City of Lawler, Iowa.
- 6-6-17 DUTY TO CUT NOXIOUS WEEDS.** Each owner and each person in the possession or control of any land shall cut or otherwise destroy, in whatever manner prescribed by the weed official, all noxious weeds thereon and shall keep said lands free of such growth.
- 6-6-18 DEVELOPED AND UNDEVELOPED LOTS WEEDS REMOVAL GRASS CUTTING.** Each Owner and each person in possession or control of any developed or undeveloped lot or land area shall be responsible to keep said lot or land area, along with

the parking adjacent thereto, alleys, public ways or land areas up to the centerline of said ways free of any weeds and to keep grasses on said land mowed so that said grass is less than six inches (6") in height.

- 6-6-19 OBSTRUCTING PUBLIC WAYS.** Each owner and each person in the possession or control of any lands shall not allow any plant growth of any sort to remain in such a manner so as to render the streets, alleys or public ways adjoining said land unsafe for public travel or in any manner so as to impede pedestrians or vehicular traffic upon any public place or way.
- 6-6-20 INTERFERENCE WITH WEED OFFICIAL.** No persons shall interfere with the weed official or any appointed assistant while engaged in the enforcement of this chapter.
- 6-6-21 WATERCOURSES.**
1. Where waterways or watercourses are found upon any developed or undeveloped lot or land areas. The owner or person in possession or control of the land shall keep the flat or level part of the bank of said waterway free of any weeds or grasses more than six inches (6") in height.
 2. Should such waterways or watercourses be found within the right of way of a street or alley, the owner or person in possession or control of the adjacent land shall be responsible to keep the flat or accessible portion of the creek bank free of any weeds and grasses more than six inches (6") in height.
- 6-6-22 FIRE HAZARDS.** No owner or persons in possession or control of any developed or undeveloped lots or land areas shall allow plant growth or accumulation of plant materials so as to constitute a fire hazard as determined by the fire marshal. The failure of a person owning, controlling or in possession of property to observe any of these requirements shall be subject to the penalties provided in Title I, Chapter 3, of the City of Lawler code.

Appendix D: Suitable Shade Tree Lists

Shade Trees for Iowa

This document lists several shade tree selections suitable for the Iowa landscape. Nursery and landscape professionals have eliminated green, white, black, pumpkin, and blue ash from their inventories and designs since they are susceptible to the emerald ash borer, which kills ash trees. This destructive pest has been found in several states in the upper Midwest.

While not all-inclusive, this list does describe many useful species, many which are also pest-resistant. Not all trees appearing on this list will “work” in every landscape situation. Great care must be taken to carefully match trees to sites (including above- and below-ground spatial and environmental constraints) and to complement species existing nearby so that a diverse tree canopy will be maintained. *A healthy and diverse tree population is the best defense against current and future tree pests.*

<u>Deciduous Shade Trees</u>	<u>Height/Width</u>	<u>Growth Habit</u>
Alder		
<u>Manchurian alder</u> – <i>Alnus hirsuta</i> 'Harbin' (Prairie Horizon [®])	40'/30'	Upright
Amur maackia – <i>Maackia amurensis</i>	25'/25'	Upright-spreading
Baldcypresses		
<u>Baldcypress</u> – <i>Taxodium distichum</i> 'Mickelson' (Shawnee Brave [®]) 'JFS-SGPN' (Green Whisper [™])	55'/20' 55'/30'	Narrow-pyramid Pyramidal
Birches		
<u>Asian white birch</u> – <i>Betula platyphylla</i> 'VerDale' (Prairie Vision [®])	35'/30'	Upright-oval
<u>Gray birch</u> – <i>Betula populifolia</i> 'Whitespire Sr.'	40'/25'	Pyramidal-oval
<u>Hybrid birch</u> – <i>Betula</i> × 'Penci-2' (Royal Frost [®])	40'/25'	Pyramidal
<u>River birch</u> – <i>Betula nigra</i> 'Cully' (Heritage [®])	45'/30'	Oval
<u>Whitebarked Himalayan birch</u> – <i>Betula utilis</i> 'Madison' (White Satin [™])	35'/20'	Broadly-pyramidal

	<u>Height/Width</u>	<u>Growth Habit</u>
Coffeetree		
<u>Kentucky coffeetree</u> – <i>Gymnocladus dioica</i>		
'Espresso'	50'/35'	Oval
Cork trees		
<u>Cork tree</u> – <i>Phellodendron</i> species		
'Longenecker' (Eye Stopper™)	40'/35'	Rounded
'His Majesty'	40'/35'	Vase-shaped
Elms		
<u>American elm</u> – <i>Ulmus americana</i>		
'Jefferson'	70'/50'	Vase-shaped
'Princeton'	60'/40'	Vase-shaped
'Lewis & Clark' (Prairie Expedition™)	60'/50'	Umbrella-shaped
'New Harmony'	70'/70'	Vase-shaped
'Valley Forge'	70'/70'	Vase-shaped
<u>Asian Elm Cultivars and Hybrids</u>		
'Morton' (Accolade™)	70'/60'	Vase-shaped
'Morton Glossy' (Triumph™)	55'/45'	Vase-shaped
'New Horizon'	55'/40'	Upright-oval
'Prospector'	40'/30'	Vase-shaped
'Discovery'	50'/40'	Vase-shaped
<u>European and Eurasian Hybrid Elm Cultivars</u>		
'Patriot'	50'/40'	Stiff vase-shaped
Filbert		
Turkish filbert – <i>Corylus colurna</i>	40'/30'	Pyramidal
Gingkoes		
<u>Ginkgo</u> – <i>Ginkgo biloba</i>		
'Autumn Gold'	45'/35'	Broadly-pyramidal
'Halka'	45'/40'	Oval
'Magyar'	60'/40'	Upright-oval
'PNI 2720' (Princeton Sentry®)	40'/15'	Narrow-pyramidal
'JFS-UGA2' (Golden Colonnade®)	45'/25'	Narrow-oval
'The President' (Presidential Gold®)	50'/40'	Broadly-pyramidal

	<u>Height/Width</u>	<u>Growth Habit</u>
Hackberries		
<u>Hackberry</u> – <i>Celtis occidentalis</i>		
'JFS-KSU1' (Prairie Sentinel [™])	45'/12'	Columnar
'Chicagoland'	50'/40'	Broadly-pyramidal
'Prairie Pride'	50'/40'	Oval
Honeylocusts		
<u>Honeylocust</u> – <i>Gleditsia triacanthos</i> var. <i>inermis</i>		
'Draves' (Street Keeper [™])	45'/20'	Narrow-upright
'Harve' (Northern Acclaim [™])	45'/35'	Upright-spreading
'Skycole' (Skyline [®])	50'/35'	Pyramidal
Hornbeams		
<u>European hornbeam</u> – <i>Carpinus betulus</i>		
'JFS-KW1CB' (Emerald Avenue [®])	40'/30'	Broadly-pyramidal
'Windy City'	45'/40'	Upright-spreading
Hophornbeam		
American hophornbeam – <i>Ostrya virginiana</i>		
	40'/25'	Upright-oval
Horsechestnuts		
<u>Common horsechestnut</u> – <i>Aesculus hippocastanum</i>		
'Baumannii'	50'/40'	Broadly-oval
<u>Red horsechestnut</u> – <i>Aesculus</i> × <i>carnea</i>		
'Briotii'	30'/35'	Round
'Fort McNair'	30'/30'	Round
Lindens		
<u>American linden</u> – <i>Tilia americana</i>		
'Boulevard'	60'/30'	Pyramidal
'Continental Appeal'	50'/30'	Narrow-oval
'Wandell' (Legend [®])	40'/30'	Broad-pyramidal
'McKSentry' (American Sentry [®])	45'/30'	Pyramidal
'Lincoln'	35'/25'	Pyramidal
'Redmond'	50'/35'	Pyramidal
<u>Hybrid Linden</u> – <i>Tilia</i> × <i>flavescens</i> (<i>americana</i> × <i>cordata</i>)		
'Glenleven'	50'/30'	Pyramidal

	<u>Height/Width</u>	<u>Growth Habit</u>
<u>Littleleaf linden</u> – <i>Tilia cordata</i>		
'Baileyi' (Shamrock [®])	40'/30'	Pyramidal
'Corzam' (Corinthian [®])	45'/15'	Narrow-pyramid
'Ronald' (Norlin [™])	40'/30'	Pyramidal
<u>Mongolian linden</u> – <i>Tilia mongolica</i>		
'Harvest Gold'	30-40'/25-30'	Upright-oval
<u>Silver linden</u> – <i>Tilia tomentosa</i>		
'PNI 6051' (Green Mountain [®])	45'/35'	Broad-pyramidal
'Sterling'	45'/35'	Broad-pyramidal
Magnolias		
Cucumbertree – <i>Magnolia acuminata</i>	50-80'/40-60'	Upright-oval
Maples		
<u>Black maple</u> – <i>Acer nigrum</i>		
	60'/60'	Round-spreading
<u>Freeman maple</u> – <i>Acer × freemanii</i>		
'Jeffersred' (Autumn Blaze [®])	50'/45'	Broadly-oval
'DTR 102' (Autumn Fantasy [®])	40'/30'	Broadly-oval
'Marmo'	50'/30'	Upright-oval
'Bailston' (Matador [™])	40'/30'	Upright-oval
'Morgan' ('Indian Summer')	45'/40'	Rounded
'Sienna' (Sienna Glen [®])	45'/35'	Pyramidal
'UMNAF#1' (Firefall [™])	50'/30'	Upright-oval
<u>Hybrid maple</u> – <i>Acer truncatum</i> × <i>platanoides</i>		
'Warrenred' (Pacific Sunset [®])	30'/25'	Upright-spreading
'JFS-KW202' (Crimson Sunset [™])	35'/25'	Upright-oval
<u>Miyabe maple</u> – <i>Acer miyabei</i>		
'Morton' (State Street [™])	45'/30'	Upright-oval
'JFS-KW3AMI' (Rugged Ridge [™])	55'/40'	Upright-oval
<u>Norway maple</u> – <i>Acer platanoides</i>		
'Columnarbrood' (Parkway [®])	40'/25'	Oval
'Deborah'	45'/40'	Rounded
'Emerald Queen'	50'/40'	Oval-upright
'Ezestre' (Easy Street [™])	40'/20'	Narrow-pyramidal
'Fairview'	45'/35'	Upright-oval

	<u>Height/Width</u>	<u>Growth Habit</u>
'Pond' (Emerald Lustre [™])	45'/40'	Rounded
'Princeton Gold'	35'/30'	Oval
<u>Red maple – <i>Acer rubrum</i></u>		
'Bailcraig' (Scarlet Jewell [™])	50'/30'	Upright
'Franksred' (Red Sunset [®])	45'/35'	Upright-oval
'Magnificent Magenta' (Burgundy Belle [®])	50'/40'	Oval
'Frank Jr.' (Redpointe [™])	45'/30'	Pyramidal
'New World'	40'/20'	Narrow-oval
'Polara' (Rubyfrost [™])	45'/40'	Broadly-oval
'Somerset'	45'/35'	Broadly-oval
<u>Sugar maple – <i>Acer saccharum</i></u>		
'Autumn Splendor'	45'/40'	Broadly-oval
'JFS-KW8' (Autumn Fest [™])	50'/35'	Upright-oval
'JFS-Caddo2' (Flashfire [™])	45'/40'	Broadly-oval
'Bailsta' (Fall Fiesta [™])	50'/50'	Upright-rounded
'Commemoration'	50'/35'	Oval-rounded
'Endowment'	50'/20'	Columnar
'Legacy'	50'/35'	Oval
'Morton' (Crescendo [™])	40'/30'	Broadly-oval
'Green Mountain'	45'/35'	Broadly-oval
Planetrees		
<u>London planetree – <i>Platanus × acerifolia</i></u>		
'Bloodgood'	50'/40'	Broadly-pyramidal
'Morton Circle' (Exclamation [™])	55'/35'	Upright-pyramidal
Oaks		
<u>Bur oak – <i>Quercus macrocarpa</i></u>		
'JFS-KW3' (Urban Pinnacle [™])	50-80'/40-80'	Spreading
	55'/25'	Narrow-pyramidal
<u>Chinkapin oak – <i>Quercus muehlenbergii</i></u>		
	45'/45'	Round
<u>English/white oak – <i>Quercus bimundorum</i></u>		
'Crimschmidt' (Crimson Spire [™])	45'/15'	Columnar
'Midwest' (Prairie Stature [™])	50'/40'	Broadly-pyramidal
<u>Hybrid oak – <i>Quercus</i> ×</u>		
'Clemons' (Heritage [®])	40-50'/40-50'	Broadly-pyramidal
'Long' (Regal Prince [®])	45'/18'	Narrow-oval

	<u>Height/Width</u>	<u>Growth Habit</u>
Red oak – <i>Quercus rubra</i>	60-75'/60'	Spreading
Shingle oak – <i>Quercus imbricaria</i>	50'/40'	Broadly-oval
Swamp white oak – <i>Quercus bicolor</i>	60'/60'	Round
White oak – <i>Quercus alba</i>	50-70'/40-80'	Spreading
Sweetgums		
<u>Sweetgum – <i>Liquidambar styraciflua</i></u>		
'Clydesform' (Emerald Sentinel®)	30'/12'	Narrow-pyramid
'Moraine'	40'/25'	Pyramidal

Compiled by Jeff Iles, Department of Horticulture, Iowa State University
10-January-2013

Small-stature Trees for Iowa

This document lists several small-stature tree selections suitable for the Iowa landscape. Nursery and landscape professionals have eliminated green, white, black, pumpkin, and blue ash from their inventories and designs since they are susceptible to the emerald ash borer, which kills ash trees. This destructive pest has been found in several states in the upper Midwest.

While not all-inclusive, this list does describe many useful species, many which are also pest-resistant. Not all trees appearing on this list will “work” in every landscape situation. Great care must be taken to carefully match trees to sites (including above- and below-ground spatial and environmental constraints) and to complement species existing nearby so that a diverse tree canopy will be maintained. *A healthy and diverse tree population is the best defense against current and future tree pests.*

<u>Deciduous Small-stature Trees</u>	<u>Height/Width</u>	<u>Growth Habit</u>
Amur maackia – <i>Maackia amurensis</i>	20'/20'	Upright-spreading
Cherries		
<u>Sargent cherry</u> – <i>Prunus sargentii</i>		
'JFS-KW58' (Pink Flair [®])	25'/15'	Upright
'Hokkaido Normandale' (Spring Wonder [™])	25'/20'	Upright-spreading
Crabapples – <i>Malus</i> species		
'Adirondack'	18'/12'	Vase-shaped
'Beeson' (May's Delight [®])	8'/8'	Upright-spreading
'Hub Tures' (Spring Sensation [™])	10'/12'	Wide-spreading
'JFS-KW5' (Royal Raindrops [®])	20'/15'	Upright-spreading
'Malusquest' (Pink Sparkles [®])	15'/12'	Upright
'Orange Crush'	15'/15'	Round-spreading
Dogwoods		
Corneliancherry dogwood – <i>Cornus mas</i>	20'/20'	Round-spreading
<u>Gray dogwood</u> – <i>Cornus racemosa</i>		
'Jade' (Snow Mantle [™])	15'/8'	Upright-spreading
Pagoda dogwood – <i>Cornus alternifolia</i>	20'/20'	Spreading

	<u>Height/Width</u>	<u>Growth Habit</u>
Hophornbeams		
American hophornbeam – <i>Ostrya virginiana</i>	25'/20'	Upright-spreading
Hornbeams		
<u>American hornbeam</u> – <i>Carpinus caroliniana</i>		
'J.N. Strain'	25'/25'	Spreading
'J.N. Upright' (Firespire™)	20'/10'	Upright
Lilacs		
<u>Japanese tree lilac</u> – <i>Syringa reticulata</i>		
'Bailnce' (Snowdance™)	18'/20'	Round-spreading
'Ivory Silk'	25'/15'	Upright
<u>Pekin lilac</u> – <i>Syringa reticulata</i> subsp. <i>pekinensis</i>		
'Morton' (China Snow®)	20'/20'	Upright-spreading
'SunDak' (Copper Curls®)	20'/15'	Upright-spreading
Magnolias		
<u>Loebner magnolia</u> – <i>Magnolia × loebneri</i>		
'Merrill'	25'/25'	Upright-spreading
'Ruth' (Spring Welcome®)	20'/20'	Round-spreading
Maples		
<u>Tatarian maple</u> – <i>Acer tataricum</i>		
'GarAnn' (Hot Wings®)	20'/25'	Round-spreading
Three-flower maple – <i>Acer triflorum</i>	25'/25'	Upright-spreading
Pears		
<u>Callery pear</u> – <i>Pyrus calleryana</i>		
'Glen's Form' (Chanticleer®)	40'/15'	Narrow-pyramid
<u>Ussurian pear</u> – <i>Pyrus ussuriensis</i>		
'MorDak' (Prairie Gem®)	25'/20'	Oval
'Bailfrost' (Mountain Frost®)	20'/15'	Upright-oval
Redbud		
<u>American redbud</u> – <i>Cercis canadensis</i>		
'Pink Trim' (Northern Herald™)	25'/25'	Spreading

Serviceberries

Allegheny serviceberry – *Amelanchier laevis*

'Cumulus'

20'/15'

Upright-spreading

'JFS-Arb' (**Spring Flurry**[®])

28'/20'

Upright-oval

Apple serviceberry – *Amelanchier* × *grandiflora*

'Autumn Brilliance'

20'/15'

Upright-spreading

'Strata'

20'/20'

Horizontal

Compiled by Jeff Iles, Department of Horticulture, Iowa State University
10-January-2013

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.